Action Request System™ Administrator's Guide for Windows

SunSoft Part No: 875-1776-10
Revision A, December 1995

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Printed in the U.S.A.

Cover design by Carlick Advertising.

Part Number: AGW-200-001

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Preface

Audience

This guide is written for administrators who are responsible for setting up and maintaining the Action Request System (AR System). The administrator is the architect of the support request and problem resolution process.

As an administrator, you will also need to be familiar with the AR System User Tool and Notification Tool. This manual assumes that you understand the information contained in the *Action Request System User's Guide*.

This manual describes the operations that are performed regularly by those using the Administrator Tool and assumes familiarity with MS-DOS and Microsoft Windows.

Overview of this Document

Chapter 1, "Installing the Windows Administrator and Import Tools," provides instructions for installing the Administrator and Import Tools on a personal computer (PC) running Windows.

Chapter 2, "Getting Started with the Administrator Tool," describes how to start, stop, and use the Administrator Tool.

Chapter 3, "Using the Administrator Tool," provides an introduction to the Administrator Tool window and menus. It also describes how to obtain information about the AR System UNIX and Windows NT servers and licenses and how to build and use change history for AR System structures.

Chapter 4, “Setting Up the AR System,”gives an overview of concepts an AR administrator will need to understand in order to design and build an efficient application of the AR System.

Chapter 5, “Setting Up Groups and Users,” describes how to set up client users and establish client environments on users’ machines. This chapter includes a discussion of access control.

Chapter 6, “Defining Schemas,” describes how to create and maintain the schemas that define the information fields in your database.

Chapter 7, “Defining Fields,” describes how to create and maintain the information fields in your schemas.

Chapter 8, “Defining Schema Views,” describes how to create and modify different schema views.

Chapter 9, “Defining Menus,” describes how to create and maintain pull-right character menus and how to attach the menus you create to any character field on any schema.

Chapter 10, “Defining Filters,” describes how to create and maintain the filters that define your workflow process and other conditional processing.

Chapter 11, “Defining Escalations,” describes how to create and maintain the escalations that control the timing aspects of your workflow process and other conditional processing.

Chapter 12, “Defining Active Links,” describes how to create and maintain the active links that take specific actions on the client machine when a user performs a particular task or operation.

Chapter 13, “Importing and Exporting Definitions,” describes how to transfer schema, filter, active link, escalation, and menu definitions.

Chapter 14, “Using the Import Tool,” describes how to start and use the AR System Import Tool.

Chapter 15, “Electronic Mail Support,” describes how to configure the mail handler so that ARs can be submitted using email (in addition to the User Tool), and explains the conventions used for mail templates.

Chapter 16, “The Multi-Process Server Option,” describes how to use and administer the optional multi-process server feature of the AR System.

Chapter 17, “Full Text Search,” describes how to use and administer the optional full text search (FTS) feature of the AR System.

Chapter 18, “AR System Server Utilities,” describes how to use the arcache and arreload utilities with the Windows NT server.

Appendix A, “Networking Notes,” tells you about the supported network stacks and requirements for their use.

Appendix B, “AR System File Locations,” describes the various files needed by and created by the AR System.

Appendix C, “Core and Reserved Schema Fields,” describes the fields all schemas must contain as well as the fields that are reserved for special uses.

Appendix D, “Operators, Wildcards, and Keywords,” lists the operators, keywords, and wildcards that you use to build qualifications in filters, escalations, and active links.

Appendix E, “Design Worksheets,” provides worksheets that you can reproduce for designing your workflow, schemas, active links, filters, and escalations.

Appendix F, “Procedures,”provides a list of procedures and their locations.

The “Glossary” lists and describes terms that you will need to be familiar with as you use the AR System.

AR System Documents

The ***Action Request System Installation Guide*** is a guide to installing and licensing the AR System software for all Windows and Windows NT environments.

The ***Action Request System Getting Started Guide and Sample Schemas*** provides an online demonstration showing the use of the AR System in a sample help desk environment and describes how you can use the sample schemas provided with the AR System.

The ***Action Request System User’s Guide*** is a how-to description of the operations performed by all users of the AR System. There are separate *User’s Guides* for environments supporting the Motif, Macintosh, and Windows graphical user interfaces (GUIs) and for ASCII terminals.

The ***Action Request System Administrator's Guide*** (this manual) describes how the AR System Administrator can use the Administrator Tool to set up the AR System and define its local operations. This manual is also a reference of advanced AR System concepts. There are separate *Administrator's Guides* for the Motif and Windows environments.

The ***Action Request System Programmer's Guide*** is a reference guide for programming with the application programming interfaces (APIs) that come with the AR System.

The ***Action Request System Troubleshooting and Error Messages Guide*** provides information to help you identify and solve problems with the AR System.

The ***Action Request System Distributed Server Option Administrator's Guide*** provides information about operating the AR System in a distributed, multi-server environment.

The ***ARWeb Administrator's Guide*** provides details about installing, using, and customizing the ARWeb application, so that you can provide access to your company's AR System applications through the World-Wide Web.

The ***Action Request System Help Desk Template Guide*** describes the Help Desk application that runs in conjunction with the AR System to help you manage your internal help desk organization.

Conventions Used in this Manual

bold font

Indicates that a word is a new or important term.

Example: **filters**.

Initial Caps

Button and menu names and items have the first letter capitalized.

Example: File.

`computer font`

Indicates computer output, including UNIX prompts, an explicit directory, or a file name.

Example: `prompt%.`

Indicates data to be entered by the user.

Example: `aruser &.`

<small italic fon in angle bracketst>

Indicates a variable directory, file name, or string that you replace with an appropriate directory, file name, or string.

Example: *<ar_config_dir>*.

italics

Indicates a reference to another manual or to a different section within the current manual.

Example: see *AR System Documents.*

Italic type is also used for emphasis.

Example: *All* users will be affected.

Installing the Windows Administrator and Import Tools 1

This chapter explains how to extract the AR System Windows Administrator and Import Tools from the distribution media and install it on a PC-compatible client computer running Windows.

This chapter covers the following topics:

- Hardware, operating system (OS), and network dependencies.
- Installing the software on PC client machines.

The AR System Windows Administrator Tool and Import Tool software is distributed on 3.5" disks. These media are used to install the Windows Administrator and Import Tool software and modify Windows-related system files.

1

Hardware, OS, and Network Dependencies

Table 1-1 summarizes the minimum configuration requirements for PC client machines:

Table 1-1 System Requirements for a PC Running Windows

Platform/Hardware	**OS**	**Network Stacks**
IBM PC (and compatibles) 386 or higher. * Monitor with a minimum screen resolution of 640 x 480 (VGA) that supports 16 colors. * 4MB of hard disk space available (minimum) for the AR System software. * 4MB RAM minimum, 8 MB RAM recommended. * Mouse. * Any of the network adapter cards needed by the networking software.	MS-DOS 3.3 (or later). *and* Microsoft Windows 3.1 running in enhanced mode. 1ci Microsoft Windows for Workgroups 3.11 running in enhanced mode.	* Chameleon NFS 4.0 (with patch 4) or later by NetManage. * LAN Workplace 4.12 or later by Novell. * Pathway 3.2 or later by Wollongong. * PC-NFS 5.1 or later by SunSelect. * PC/TCP 3.0 (VxD) or later by FTP. * Reflection Network Series 4.0 or later by Walker Richer & Quinn. * Super TCP/NFS 4.0 (with patch) or later by Frontier. * TCP/IP-32 version 3.11a or later by Microsoft.
	Microsoft Windows 95 16MB RAM minimum required.	Default TCP/IP network stack for Windows 95.
	Microsoft Windows NT 3.5 (or later) 16MB RAM minimum required.	TCP/IP-32 version 3.11a or later by Microsoft.
	IBM OS/2 Warp 16 MB RAM minimum required.	TCP/IP Version 2.0 for OS/2: Base Kit TCP/IP Version 2.0 for OS/2: DOS/Windows Access Kit

See either the Release Notes that came with this product or Appendix A, for specific information about network stacks.

Installing the Software on a Windows Client

Before you install the Windows Administrator and Import Tools, make sure you have all of the following information:

- The host names of the AR System servers.
- The directory in which Windows is installed.
- The network stack you are using.

Note – Before installing, it is a good idea to make backup copies of your AR System Administrator Tool for Windows disks. From the Disk menu in the Windows File Manager, use Copy Disk. (Refer to the Copy Disk command in your Microsoft Windows User's Guide for instructions.)

To install the Windows Administrator and Import Tool software:

Note – When you install the tools, make sure your old `ar.ini` file is copied into `ar.ini` in the `\home\backup` directory.

1. **Ensure that the network stack is properly installed. (For information on which network stacks are supported, see the previous section, "Hardware, OS, and Network Dependencies.)**
2. **Use the ping utility provided by the network stack to ping each server that will be managed with the Windows Administrator Tool and Import Tool software.**
3. **Scan the Release Notes for any installation information you need to know before installing the tools.**
4. **Start Windows, if it is not already running.**
5. **Exit any AR System client tools that are running. You cannot install the Administrator or Import Tools if any of these are running.**
6. **Insert the media into the drive.**
7. **In the Program Manager, choose Run from the File menu. The Run dialog box appears as shown in Figure 1-1.**

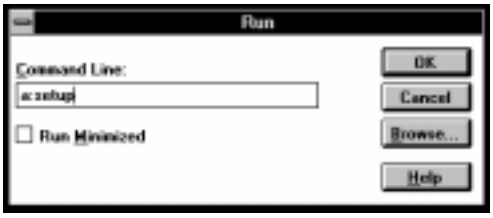

Figure 1-1 Run Dialog Box

8. **In the Command Line field, type A:SETUP (or B:SETUP) and click the OK button.**
   The installation program starts and a window appears indicating that the Setup program is initializing. The Setup program searches your local drives for a previous Windows Administrator Tool installation.

   The Welcome dialog box appears as shown in Figure 1-2.

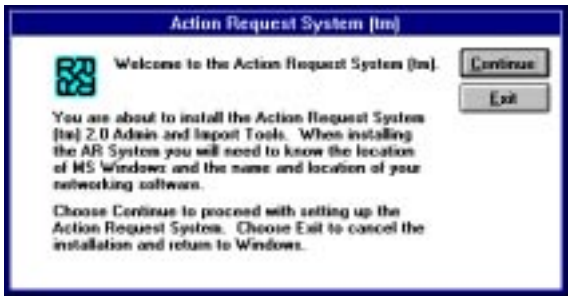

Figure 1-2 Welcome Dialog Box

9. **After reading the greeting, do one of the following:**
   - Click the Continue button to proceed with the installation.
   - Click the Exit button if you want to stop the installation procedure.

   If you clicked the Continue button, the Installation Options dialog box appears displaying your current installation directories and disk space information, as shown in Figure 1-3.

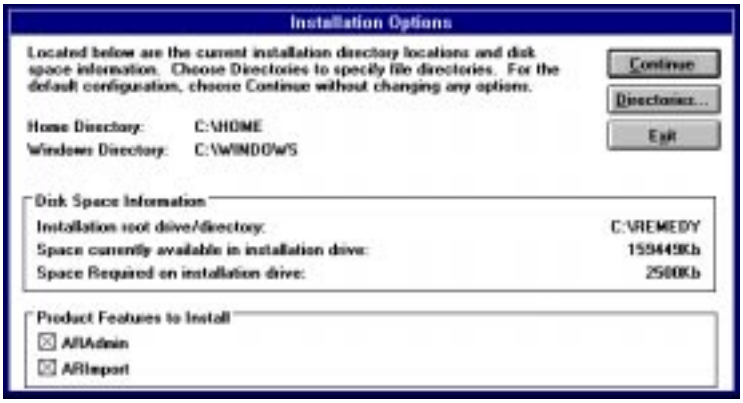

Figure 1-3 Installation Options Dialog Box

10. In the Installation Options dialog box, do one of the following:

Table 1-2 Installation Options

If you want to...	Click the...
Continue with the installation procedure and install both the Administrator and Import Tools.	Continue button.
Install only the Administrator Tool.	Clear the `ARImport` box, then click the Continue button.
Install only the Import Tool.	Clear the `ARAdmin` box, then click the Continue button.
Stop the installation procedure.	Exit button (F3 key).
Display the Directories dialog box to change the default directories for the tools installation, configuration files, or your Windows files.	Directories button.

11. If you clicked the Directories button, the Directories dialog box appears, as shown in Figure 1-4.

Figure 1-4 Directories Dialog Box

- To find out how much space is available on one of your drives, choose the drive from the Drive drop-down list. The Disk Space Information box reflects the available space on the disk.
- To change the directories in the Install Directory, Home Directory and Windows Directory fields, either type directly in the fields or click the Browse button next to the Install Directory and Home Directory fields to display the Browse Directories dialog box. The Browse Directories dialog box allows you to browse through and select from all available directories on the different drives on your system.

Click the OK button to apply your changes and return to the Installation Options dialog box.

Note – If you specify a Windows directory that does not already contain the `win.ini` file, the value in the Windows Directory field returns to the default directory.

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12. **If you clicked the Continue button, the Time Zone dialog box appears, as shown in Figure 1-5.**

Figure 1-5 Time Zone Dialog Box

In the Time Zone field, choose the appropriate time zone for your region from the drop-down list:

* PST8, Pacific Standard Time
* MST7, Mountain Standard Time
* CST6, Central Standard Time
* EST5, Eastern Standard Time
* AST4, Atlantic Standard Time
* GMT, Greenwich Mean Time
* WET, Western European Standard Time
* CET-1, Central European Standard Time
* EET-2, Eastern European Standard Time
* ST-3, Israeli Standard Time
* KST-9, Korean Standard Time
* JST-9, Japanese Standard Time
* WST-8, Australian / West Standard Time
* EST-10, Australian / Tasmania Standard Time
* NZT-12, New Zealand Standard Time
* HST10, Hawaiian Standard Time
* YST9, Yukon Standard Time

If you are in a region in which daylight savings time is observed, select the Daylight Savings Time check box.

Click on the Continue button to continue with the installation, or click on the Exit button if you want to stop the installation procedure.

13. **If you click the Continue button, the Server Locations dialog box appears as shown in Figure 1-6, allowing you to view the location of current servers, or add/delete servers. The Server List in the lower portion of the dialog box is a list of AR System servers to which your tools can connect.**

Figure 1-6 Server Locations Dialog Box

Note – Do not be confused with the abbreviation “NT” that appears in the Server List. Here NT specifically refers to the Notification Tool, not to the AR System Windows NT 2.1 servers running in the Windows NT operating system.

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14. **In the Server Locations dialog box (Figure 1-6), do one of the following:**
    - To add a server, enter a server name in the Server Name field, select the AR System Server or Notification Server check boxes, then click the Add button.
    - To delete a server from the Server List, select the server from the Server List, and then click the Delete button.
    - To disable access to a server, select a server, then enter a pound sign (#) before its name in the Server Name field.

15. **Once your server list is correct, click on the Continue button to continue with the installation procedure. (Or, if you want to stop the installation procedure, click on the Exit button.)**
    A status bar appears displaying the progress of loading the tool files, as shown in Figure 1-7. (To stop the installation procedure, click on the Exit icon in the lower right corner of the screen, or press the F3 key.)

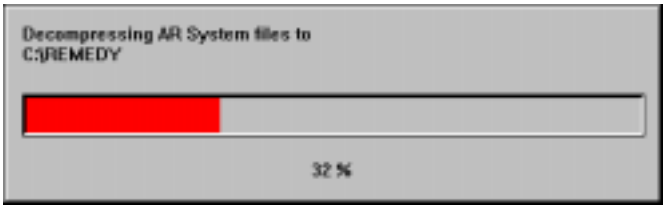


Figure 1-7 Status Bar

16. **Remove the first disk and insert the second disk when the installation program asks you to do so.**
    After the tool files have been installed, the Configuration Files dialog box (Figure 1-8) appears allowing you to modify your `win.ini` and any existing tool files either now or after the installation is completed.

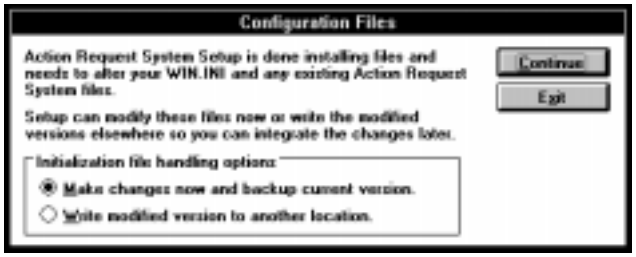


Figure 1-8 Configuration Files Dialog Box

17. **In the Configuration Files dialog box (Figure 1-8), do one of the following:**
    - Keep the default choice (`Make Changes now and backup current version`) in the `Initialization file handling options` group box and click the Continue button to back up the current version of your `win.ini` and tool files and to make the changes to the original files when the software is installed.
    - Select the `Write modified version to another location` radio button, then press the Continue button to have the installation process save your modifications in another location, allowing you to update your `win.ini` and tool files at a later time.

- Click the Exit button if you want to stop the installation procedure at this point.

If you selected the default choice in the Configuration Files dialog box (`Make Changes now and backup current version`), the Modified Files dialog box appears as shown in Figure 1-9, which provides the location of the backup files.

Figure 1-9 Modified Files Dialog Box (First File-Handling Option)

If you specified the `Write modified version to another location` radio button, then the Modified Files dialog box appears as shown in Figure 1-10, which provides the location of the files modified during the installation and further instructions.

Figure 1-10 Modified Files Dialog Box (Second File-Handling Option)

18. **Click the OK button to acknowledge the file locations and dismiss the dialog box.**
    The Setup Complete dialog box appears (shown in Figure 1-11) indicating that you have successfully installed the Windows Administrator and Import Tools.

Figure 1-11 Setup Complete Dialog Box

19. **Click the OK button to complete the installation process.**

20. **Eject the media and store it in a safe place.**
    You now can start the Administrator and Import Tools.

    - To start the Administrator Tool, see “Starting the Administrator Tool” on page 13.
    - To start the Import Tool, see “Import Tool Functions” on page 319.

1

Getting Started with the Administrator Tool 2

This chapter explains how to start and stop the AR System Windows Administrator Tool. It also explains basic information about using the Administrator Tool.

This chapter covers the following topics:

- Starting the Administrator Tool.
- Logging into the Administrator Tool.
- Exiting the Administrator Tool.
- Displaying help and version information.
- Working in the Administrator Tool main window (includes information on making menu selections and using the toolbar).

Starting the Administrator Tool

Once the AR System is installed, your desktop automatically displays the “Remedy AR System” group window containing the Administrator Tool icon. To start the tool, simply double-click the Administrator Tool icon.

Note – In Windows 3.1, you can run only one instance each of the AR System clients at any one time on a given machine. However, in Windows NT, you can run multiple instances of the clients in separate memory spaces. For further information, refer to the *Microsoft Windows NT System Guide*.

User Name and Password

Only users registered as AR administrators or subadministrators will be able to use the Administrator Tool. See Chapter 5, for information on how to add users and groups to the AR System.

Note – To operate the Administrator Tool in a production environment, you must have a fixed write license and administrator or subadministrator privileges.

To start the Administrator Tool:

1. **From the Remedy AR System program group, double-click the AR Administrator Tool icon. The Login dialog box appears as shown in Figure 2-1.**

Figure 2-1 Login Dialog Box

2. **Log in as Demo.**

Note – Demo is installed without a password during the initial installation. The AR System is case sensitive. This means you must use `Demo`, not `demo` or `DEMO`.
Do not let the Demo user become a security hole in the AR System. Add a password for this user as soon as possible. See Chapter 5, for information on adding a password.

Note – The user `Demo` may not be present on existing servers.

If the name and password you entered are valid, the Login dialog box closes. You are in the AR System Administrator Tool Main window and ready to begin working.

If this is the first time you are logging into the Administrator Tool, your login information consists of the default configuration directory and server list on your PC. If you have already created alternate logins for the User Tool, these names appear as options from the User Name menu. For information on modifying login names, configuration directories, and server lists in the User Tool, see the following section, “Login Information”.

If you enter a valid user name but an invalid password, you receive an error message and are not logged in.

The Administrator Tool Main window and Server window are displayed, as shown in Figure 2-5 on page 25. After starting the Administrator Tool, refer to the appropriate chapter for information about specific tasks.

Note – Security Alert: For security reasons, the Windows Administrator Tool does not automatically save your name and password, so the Login dialog box will always appear. If security is not an issue for you, you can add the following to the [`Admin`] section of your `ar.ini` file:

```
[Admin]
User=<your_name>
Password=<your_password>
```

The Windows Administrator Tool will then read the login information from the file and the Login dialog box will display your name and password.

Login Information

Your login information consists of a login name, configuration directory (AR Home Directory), and a server list. The configuration directory is a directory that the AR System uses to hold your personalized configuration information for the client tools. If you do not specify alternate configuration directories and more than one person logs into your client tools, your customizations (preferences) may be overwritten and notifications stored in the notification log may be both yours and theirs. If more than one person will be using the tools

on your PC, you may want to specify an alternate configuration directory for each user. This allows users to have their own customizations (preferences, customized defaults, and customized views) and notification log.

We provide default login information for any user who logs into the Administrator Tool and who does not specify any alternate login information. When first installing the AR System, the default login's configuration directory is named `Home`. Throughout this manual, we refer to your configuration directory as either <*ar_config_dir*> or `\Home`.

Note – If you change your configuration directory for the Administrator Tool, you are also changing it for the other client tools.

The server list is the list of servers that you can connect to with your client tools. The server name must be a name that is known on the network. You supply the default server list when first installing the Action Request System.

Note – Any user of the Administrator Tool can change any other user's login information.

Specifying Alternate Login Information

You can specify alternate login information for any user name from within the Administrator Tool. When you do this, you add the user name to the User Name drop down list box on the Login dialog boxes for the client tools. This makes it easier to log into the tools.

Use the following instructions to specify alternate login information after logging into the Administrator Tool.

To specify alternate login information:

1. **Choose Login from the File menu.**
   The Login dialog box (shown in Figure 2-1 on page 14) appears.
2. **Click the Login Information button.**
   The Login Information dialog box appears, as shown in Figure 2-2.

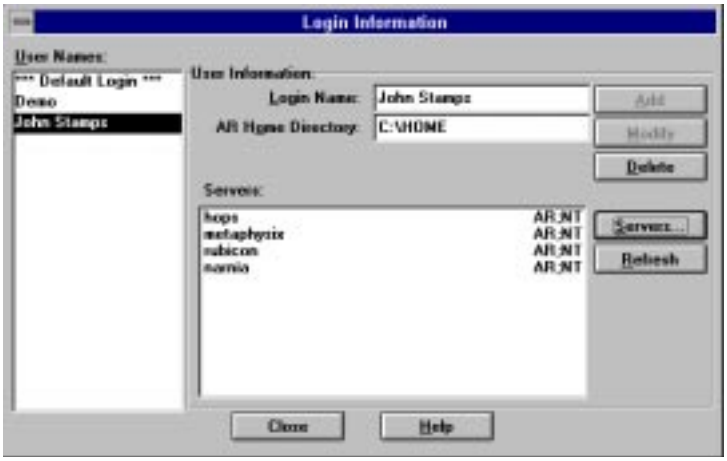


Figure 2-2 Login Information Dialog Box

3. **To use the default configuration directory and server list, select `***Default Login***` in the User Names list.**
   `*** Default Login ***` appears in the Login Name field. The default configuration directory and server list appear in the AR Home Directory and Servers fields.

4. **To copy someone else's configuration directory and server list, select that person's user name in the User Names list. For more information, see "Copying Login Information" on page 20.**
   That user's login name, configuration directory, and server list appear in the Login Name, AR Home Directory, and Servers fields.

5. **To change the configuration directory, in the AR Home Directory field enter a new directory path.**

6. **To make changes in the server list, select the Servers button.**
   The Servers dialog box appears, as shown in Figure 2-3.

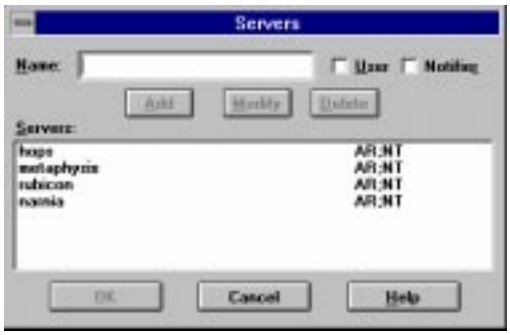


Figure 2-3 Servers Dialog Box

7. **To add a server to the server list, enter a server name in the Name field, select the User or Notifier check boxes as appropriate, and then select the Add button.**
8. **To modify a server in the server list, select the server name in the Servers list, make any changes in the Name field or in the User and Notifier check boxes, and then select the Modify button.**
9. **To delete a server from the server list, select the server name in the Server list and select the Delete button.**
10. **To comment out a server from the server list without deleting it, select a server from the Servers list and place a pound sign (#) in front of the server name, then click the Modify button.**
11. **Click the OK button to save server information and close the Servers dialog box and return to the Login Information dialog box. Click the Cancel button to cancel any changes.**
12. **To go back to the last saved server list for the given AR Home directory, click the Refresh button.**
    All changes that you have made to the server list are lost.
13. **Edit the Login Name field, as appropriate.**
14. **To add this login information, click the Add button.**
15. **For each additional user, repeat from Step 3.**
16. **To remove the Login Information dialog box, click the Close button.**

Note – After specifying alternate login information, the changes go into effect the next time this user name logs into the Administrator, User, Import, or Notification Tools.

Modifying Login Information

You can modify any user's login information (including the default login information) from within the Administrator Tool. Use the following instructions to modify any user's configuration directory or server list.

Use the following instructions to modify login information at any time after you have successfully logged into the Administrator Tool.

To modify login information:

1. **Choose Login from the File menu.**
   The Login dialog box (shown in Figure 2-1 on page 14) appears.
2. **Click the Login Information button.**
   The Login Information dialog box appears, as shown in Figure 2-2 on page 17.
3. **Select the user name from the User Names list.**
   The AR Home Directory field and Servers list contain your configuration directory and server list.
4. **To change the configuration directory, in the AR Home Directory field, enter a new directory path.**
5. **To make changes in the server list, click the Servers button.**
   The Servers dialog box appears, as shown in Figure 2-3 on page 18.
6. **To add a server to the server list, enter a server name in the Name field, select the User or Notifier check boxes as needed, and then click the Add button.**
7. **To modify a server in the server list, select the server name in the Servers list, make any changes in the Name field or in the User and Notifier check boxes, and then click the Modify button.**
8. **To delete a server from the server list, select the server name in the Server list and click the Delete button.**

9. **To comment out a server from the server list without deleting it, place a pound sign (#) in front of the server name and click the Modify button.**
10. **Click the OK button to save server information and close the Servers dialog box and return to the Login Information dialog box.**
11. **To go back to the last saved server list for the given AR Home directory, click the Refresh button.**
    All changes that you have made to the server list are lost.
12. **To save the modified login information, click the Modify button.**

Note – After modifying login information, the changes go into effect the next time this user name logs into the client tools.

Copying Login Information

You can copy either the default login information or an existing user's login information to another user.

Note – You cannot enter a name in the Login Name field that already exists in the User Names list. If you want to copy existing login information to a name already in the User Names list, you must first delete the user name from the User Names list.

Use the following instructions to copy login information at any time after you have successfully logged into the Administrator Tool.

To copy login information:

1. **Choose Login from the File menu.**
   The Login dialog box (shown in Figure 2-1 on page 14) appears.
2. **Click the Login Information button.**
   The Login Information dialog box appears, as shown in Figure 2-2 on page 17.

3. **To copy the default configuration directory and server list, select `***Default Login***` in the User Names list.**
   `*** Default Login ***` appears in the Login Name field. The default configuration directory and server list appear in the AR Home Directory and Servers fields.

4. **To copy someone else's configuration directory and server list, select that person's user name in the User Names list.**
   That user's login name, configuration directory, and server list appear in the Login Name, AR Home Directory, and Servers fields.

5. **Edit the Login Name field as appropriate.**

6. **Rename the AR Home Directory as appropriate.**

7. **To add this new user's login information, click the Add or Modify button.**

Note – After modifying login information, the changes go into effect the next time this user name logs into the client tools.

Deleting Login Information

You can delete login information from within the Administrator Tool. If you do this, the user name no longer appears in the User Name drop down list box on the Login dialog boxes for the client tools and that user name will use the default configuration directory and server list when they log in.

Use the following instructions to delete login information at any time after you have successfully logged into the Administrator Tool.

To delete login information:

1. **Choose Login from the File menu.**
   The Login dialog box (shown in Figure 2-1) appears.

2. **Click the Login Information button.**
   The Login Information dialog box appears, as shown in Figure 2-2 on page 17.

3. **Select the user name from the User Names list.**

4. **Click the Delete button.**

Note – When you delete a user name from the User Names list, all directories and files associated with this user name remain on your system.

5. **To dismiss the Login Information dialog box, click the Close button.**

Logging In as a Different User

If the Administrator Tool was previously started by another user, you can change the login information and log in as yourself. You can log in at any machine on the network that has access to the AR System server.

Note – Preference and other settings are saved in each user's configuration directory on each PC and are therefore specific to the PC on which they were set. This means that if you log onto a machine other than the one you normally use, and the directory containing your login information is not mounted as a network drive, or your login information has not been added to this Administrator Tool, the preference settings and customized default settings (login information) may be different from those you normally see.

To change the current login:

1. **Choose Login from the File menu.**
   The Login dialog box (shown in Figure 2-1 on page 14) appears.
2. **Type your user name in the User Name field or click on the drop down list box symbol and select your user name from the drop down list box.**
3. **Type your password in the Password field.**
4. **Click the OK button to complete the login.**

Exiting the Administrator Tool

To exit the Administrator Tool:

You can exit the Administrator Tool by any one of the following ways:

- Choose Exit from the File menu (see Figure 3-1 on page 35).
- Type `Alt+F, then X`.

- Type `Alt+F4`.
- Choose Close from the Control menu box in the upper left hand corner of the Main window.
- Double-click the Control menu box.

If you have selected the Confirm to Exit AR System confirm preference, a dialog box appears asking you if you really want to exit the AR System. Click the OK button to exit the Administrator Tool. Click the Cancel button to cancel the exit operation.

Note – If your Administrator Tool is in the middle of a transaction with the server, you will not be able to exit the Administrator Tool until the transaction is completed.

Displaying Help

Application help information is available on all Administrator Tool windows and commands. Help is also available on many of the procedures that you most commonly perform.

To display Administrator Tool help:

- From the Help menu, choose Contents to see an index of available help topics.
- Pressing the `F1` key or clicking the Help button when any Administrator Tool window or dialog box is open causes the help for that window to appear.

Displaying Version and Environment Information

To display version and environment information about the Administrator Tool:

- From the Help menu, choose About Admin Tool to display information about the product, as shown in Figure 2-4 on page 24. You should be prepared to provide this information whenever you call Customer Support.

Figure 2-4 Administrator Tool Version Information

Using the Main Window

The Administrator Tool Main and Server windows are the basic windows of the AR System Windows Administrator Tool, as shown in Figure 2-5 on page 25.

- You use the menus and options available from the Main window to select and control the operations you need to perform.
- You use the Server window to administer all the schemas, active links, filters, escalations, and menus that reside on a particular server. (To use the Server window, see “Selecting a Server to Administer” on page 39.)

Figure 2-5 Administrator Tool Main and Server Windows

The Main window includes a title bar, a menu bar, a toolbar, and a status bar. The menu bar provides access to the Administrator Tool menus that allow you to select the operations you want to perform. The toolbar provides shortcuts to some of the most common Administrator Tool operations. The status bars displays messages that let you know the status of the operation in progress.

You can determine whether or not to display the toolbar and the system status bar by setting your desktop preferences. See “Defining Preferences” on page 61 for information.

Windows User Conventions in the AR System

Remember the rules that follow as you work with the AR System Windows Administrator Tool:

- Within the Administrator Tool, the window (or dialog box) that is active (selected) is the one whose title bar is highlighted.

- In a dialog box with selection buttons, pressing the Return/Enter key performs the default action. The default action is the action performed by the button that has a heavy black border (the focus rectangle) around it.
- In a dialog box, pressing escape (`Esc`) closes the dialog box. (Pressing `Esc` is the same as choosing Close from the File menu when a window is active, and `Esc` is the same as clicking the Cancel button when a dialog box is active. Pressing `Esc` also removes a menu.)
- In selection lists, pressing the `Shift` key lets you select consecutive items. Pressing the `Control` key lets you select nonconsecutive items.
- In dialog boxes, clicking the OK button saves the changes and closes the dialog box. Clicking the Apply button saves the changes but leaves the dialog box open.

Using the Mouse with the AR System

Mouse operations in the AR System tools are much like those in other Windows applications. The following terminology is used in this manual to describe the operations you perform using the mouse.

Double-click means to click the left mouse button twice in quick succession.

Drag means while pointing on an object, hold down the left mouse button and move the mouse.

Press means hold down the left mouse button without moving the mouse.

Pull-right means to click and hold the left mouse button on the character menu symbol (to the right of a field) to display the items. Continue to hold the mouse button as you move the pointer over the menu items. (An arrow to the right of a selection means that there are cascading menu items for that selection. To display and select the items from a cascading menu, move the mouse to the right with that choice highlighted.) When your choice is highlighted, release the mouse button and your selection is made. (If you release the mouse button with the cursor on the character menu symbol and the menu is small, the menu remains displayed until either you select an item or select outside of the menu. If you release the button outside of the menu, the menu closes and nothing is selected.)

Select or **choose** means to click once on an item with the left mouse button.

Controlling Window Size and Position

You can manipulate windows in the AR System in the same way that you can for most Windows applications. For more information, see your Microsoft Windows User's Guide.

You can also set options that save the size of the Administrator Tool window when closed or exited by setting preferences. See "Defining Preferences" on page 61 for more information.

Making Menu Selections

You can choose options from the menu bar on the Main window in any of three ways:

- Use the mouse to display the menu and select the desired item.
- Hold down the `Alt` key as you press the key that corresponds to the letter that is underlined in the menu, then press the key that corresponds to the letter that is underlined in the menu item. For example, to choose Save Schema from the File menu, type `Alt+F`, then `S`.
- Type the shortcut key sequences that are shown beside many of the items in the menu. These key sequences are also called accelerator keys. For example, to choose Save Schema from the File menu, type `Ctrl+S`.

Note – The Cut, Copy, Paste, and Delete accelerator keys work in any text entry field, including those in the Login dialog box and the query bar.

Using the Toolbar

For many of the most commonly performed menu items, a corresponding button is available from the toolbar located below the menu bar on the Main window. To select a function from the toolbar, simply click the mouse on the button for that function. To see a Windows Tooltip description of the toolbar buttons, simply point to any toolbar button (see Figure 2-5 on page 25).

Table 2-1 shows the toolbar buttons and their functions.

Table 2-1 Toolbar Functions

Button	Function
	New Server Window. New Server window appears, which allows you to open additional Server windows for administering multiple servers and their objects.
	New Object. New Object dialog box appears, which allows you create a new schema, active link, filter, escalation, or menu.
	**Save.** Writes all changes made to the object to the database.
	**Align Left.** When modifying schemas, align fields and buttons on the left edge of the field, including the field label. Button is active only when multiple objects are selected.
	**Align Right.** When modifying schemas, align fields and buttons on the right edge of the field, including any associated field menus. Button is active only when multiple objects are selected.
	**Align Value Left.** When modifying schemas, align fields and buttons on the left edge of the data entry portion of the field. Button is active only when multiple objects are selected.
	**Align Value Right.** When modifying schemas, align fields and buttons on the right edge of the data entry portion of the field. Button is active only when multiple objects are selected.
	Align Top. When modifying schemas, aligns the top edges of objects, allowing you to place fields and buttons side by side. Button is active only when multiple objects are selected.
	Align Bottom. When modifying schemas, aligns the bottom edges of objects, allowing you to place fields and buttons side by side. Button is active only when multiple objects are selected.
	Show Grid. Toggle button to make the grid lines visible or invisible in the Create / Modify Schema window.

Where to Go from Here

At this point, you have successfully installed the Windows Administrator Tool. You can now select a server to administer, as described in “Selecting a Server to Administer” on page 39.

2

Using the Administrator Tool 3

The Action Request (AR) System Administrator Tool is the tool you, as the AR System administrator, will use to set up the AR System for use by support staff and end-users. You will use the tool to create and modify servers, schemas, menus, filters, escalations, and active links.

This chapter describes the basic operations of the Administrator Tool. It includes instructions for running the tool and provides a brief introduction to the tool's basic menus. It also describes how to display information about the AR System servers and licenses and how to build and use change history information for the objects (or structures) you create and modify using the Administrator Tool.

Before attempting to use the Administrator Tool, you must have a general familiarity with the Action Request System's features and functions. If you are not yet familiar with the AR System, review the *Action Request System User's Guide* before continuing with this guide.

The following topics are covered in this chapter:

- Overview of Administrator Tool functions.
- Using menus in the Main window.
- Selecting a server to administer.
- Defining server and license information.
- Defining default permissions for schemas, active links, and fields.
- Defining preferences.

- Building and using a history of changes made to schemas, menus, filters, escalations, and active links.
- Defining help for end-users and administrators.

Administrator Tool Functions

You use the Administrator Tool primarily to create and maintain the AR System schemas, menus, filters, escalations, and active links (known as objects or structures). You also use the tool to import and export definitions and electronic mail (email) templates and to view and manage information about the server. You can use the Windows Administrator Tool to administer all UNIX and Windows NT server processes running in the AR System.

The functions of the AR System Administrator Tool are described below.

Creating and Modifying Schemas

The information fields in your AR System databases are described in **schemas**. Each schema represents a table in a database on the AR server. The AR System comes with several sample schemas and you can build as many additional schemas as you need.

When you define a schema, you set up the fields on the schema and determine what kind of information users will enter in each field. You may also create field fill-in aids (menus) and help text.

All schemas have a set of **core fields** (discussed in *Appendix C*) and as many additional fields as needed. For information on designing schemas, see Chapter 4. For details on creating and modifying schemas and defining schema fields, see Chapter 6 and Chapter 7.

Creating and Modifying Menus

You can define **menus** that you can then attach to any character field on any schema. You can create menus that are simple lists of items, menus that are stored files on both the server and client machine, or menus that are built dynamically based on queries of AR System schemas. For details on creating menus and using them on a schema, see Chapter 9.

Creating and Modifying Filters

Filters define the workflow process and other conditional processing steps for your application of the AR System. Filters test for specified conditions on each server transaction and, if the conditions are met, they take one or more actions. These conditions and actions are called **filter conditions** and **filter actions**. For example, you might define a filter so that when an AR changes state (filter condition) the AR System notifies a specific end user (filter action).

Keep in mind when creating a filter for any purpose that filters execute on the AR System *server.*

For information on designing filters, see Chapter 4. For details on creating and modifying filters, see Chapter 10.

Creating and Modifying Escalations

Escalations test for entries matching specified conditions on a defined interval. If the conditions are met, one or more actions are taken. These conditions and actions are called **escalation conditions** and **escalation actions**. For example, you might create an escalation that executes when a ticket more than eight hours old has not yet been closed by support personnel.

Keep in mind when creating an escalation for any purpose that escalations execute on the AR System *server.*

For information on designing escalations, see Chapter 4. For details on creating and modifying escalations, see Chapter 11.

Creating and Modifying Active Links

Active links define operations that are executed on the client machine when the user performs a specific action. These conditions and actions are called **active link conditions** and **active link actions**. For example, you might create an active link that searches the database for information about the customer when the user presses Return in the Customer Name field.

Keep in mind when creating an active link that active links execute on the client system when triggered.

For information on designing active links, see Chapter 4. For details on creating and modifying active links, see Chapter 12.

Importing and Exporting Definitions

A **definition** is the structure in which the data in the AR System is organized and manipulated (for example, for fields or active links). You can use the Administrator Tool to **export** definitions on an AR server. The definitions are exported to files. The tool also supports the **import** of definitions into the AR server from files exported from AR servers. In this way, it is possible to share definitions among organizations and to migrate an AR System setup to a new server. For a full discussion of importing and exporting definitions, see Chapter 13.

Creating Export Mail Templates

You can use electronic mail to submit action requests or to notify users. As the administrator, you are responsible for generating a template for users to fill in and use to submit their ARs. For details on generating mail templates using the export operation, see Chapter 13. For information on setting up and using the electronic mail handler, see Chapter 15.

Using Menus in the Server Window

The Administrator Tool Server window is the window from which you access the main utility menus within the tool. This section provides a short description of the File, Edit, Tools, Window, and Help menus.

Note – Additional menu items appear when you select a Server Window. For information on these menu items, see “Using the Schemas Window” on page 118.

The File Menu

The File menu is shown in Figure 3-1 on page 35.

Figure 3-1 Administrator Tool — File Menu

The File menu provides the following options:

Login		Allows you to log in to the AR System. You must (1) belong to the Administrator or Subadministrator group and (2) have a fixed license.
New Object		Opens the New Object dialog box, which you use to create a new active link, escalation, filter, menu, or schema. You can also use a corresponding toolbar button to create new objects.
Close		Quits the currently active window.
Server Information		Displays information about the currently selected server. If you are an administrator, it also allows you to set server options. See “Setting Server Information and Option Settings” on page 41.
License Information		Displays information about licenses that are available or in use on the currently selected server. If you are an administrator, it also allows you to release a floating license, if necessary. See “Displaying License Information” on page 53.
Default Permissions		Allows you to define default permissions on the server for active links, schemas, and fields. See “Setting Default Permissions” on page 56.
Preferences		Allows you to set options that control the behavior of the Administrator Tool for your user login. Preference categories are: Desktop, Confirmations, Schema Fonts, and Display Menu Method. See “Defining Preferences” on page 61.
Exit		Quits the Administrator Tool.

The Edit Menu

The Edit menu, shown in Figure 3-2, lets you delete a selected item (you can delete only one item at a time).

Figure 3-2 Administrator Tool — Edit Menu

The Edit menu provides the following choice:

Delete <*object*> Deletes the selected object from the server.

Note – This is a permanent action and *cannot be undone*.

The Tools Menu

The Tools menu, shown in Figure 3-3 on page 37, lets you import and export object definitions.

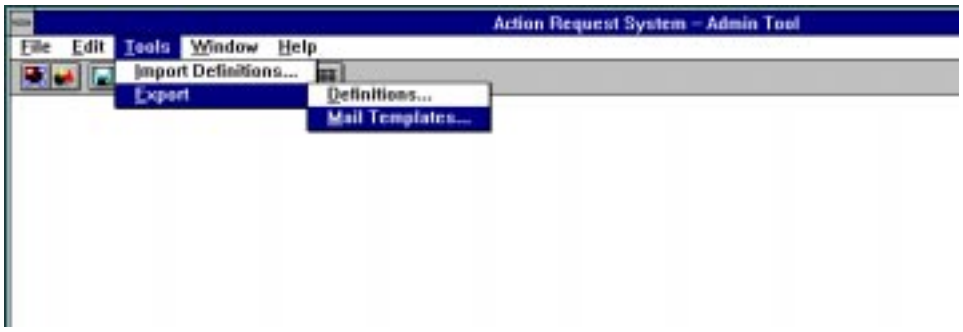


Figure 3-3 Administrator Tool — Tools Menu

The Tools menu provides the following choices:

Import	Allows you to import definitions that have been exported from the AR System.
Export	* **Definitions** — Exports definitions from the selected server. * **Mail Templates** — Generates mail templates.

For more information, see Chapter 13.

The Window Menu

The Window menu, shown in Figure 3-4, provides a choice of actions you can perform on open windows in the Administrator Tool.

Figure 3-4 Administrator Tool — Window Menu

The Window menu provides the following choices:

New Server Window 	Allows you to open additional Server windows for administering multiple servers and their objects. You can also use a corresponding toolbar button to open a new Server window.
Cascade	Arranges open windows so that they overlap with the title bar of each window visible.
Tile	Arranges all open windows so that each is visible.
Arrange Icons	Arranges any window icons at the bottom of the main window.
Close All Windows	Closes all open windows, including windows that are iconified.
Save Window Position / Size	Remembers the size and position of each type of window. The size and position are used the next time you open a window of this type.
'Open Windows List'	Lists all open windows. A check mark next to the menu selection means this window is the active window.

The Help Menu

The Help menu, shown in Figure 3-5, displays help options available in the Administrator Tool.

Figure 3-5 Administrator Tool — Help Menu

The Help menu provides the following choices:

Contents	Opens a window that contains a list of help topics for selection. Each help topic may have one or more levels of subtopics available.

Procedures	Displays help on the most commonly performed Administrator Tool procedures. A list of available procedures appears so that you can select the procedure in which you are interested.
Toolbar	Displays a summary of the operations performed when you select each of the toolbar icons.
Menu Items	Displays a list of options available for each of the menus in the Main window menu bar.
Search for Help On	Display Search dialog box to search for available Administrator Tool help topics.
How to Use Help	Displays help on using the help system.
About Admin Tool	Displays information about the AR System Windows Administrator Tool, including the version number of the AR System software and available resources.

Selecting a Server to Administer

You can use the Windows Administrator Tool to administer the servers listed in your `<ar_config_dir>\ar` file.

To select a server:

1. **Open a server window (if one is not already open) by clicking the New Server Window button on the toolbar. The servers available to you as an Administrator or Subadministrator appear in the Servers list, as shown in Figure 3-6 on page 40.**

   - An “available” server is any server you have permission to administer.
   - An “unavailable” server is any server that is not currently running or that is in your `<ar_config_dir>\ar` file but you do not have permission to administer.

   You can have multiple server windows open at the same time.

Figure 3-6 Administrator Tool — Server Window

2. **Select a server to administer by double-clicking on it.**
   Depending on your level of permissions, the Administrator Tool then displays categories of objects from the server that you chose (Figure 3-7 on page 41). For example, if you selected the server `metaphysix`, you now can administer its schemas, active links, filters, escalations, and menus.

   For each server, you can open multiple windows for creating or modifying the objects in each server that you have permission to administer.

Note – The only limit to how many windows you can have open at one time is the amount of resource memory available on your PC.

3. **From the Servers list, click the category to administer it. For example, in Figure 3-7 on page 41, double-clicking the Schemas category displays all available schemas on the server.**

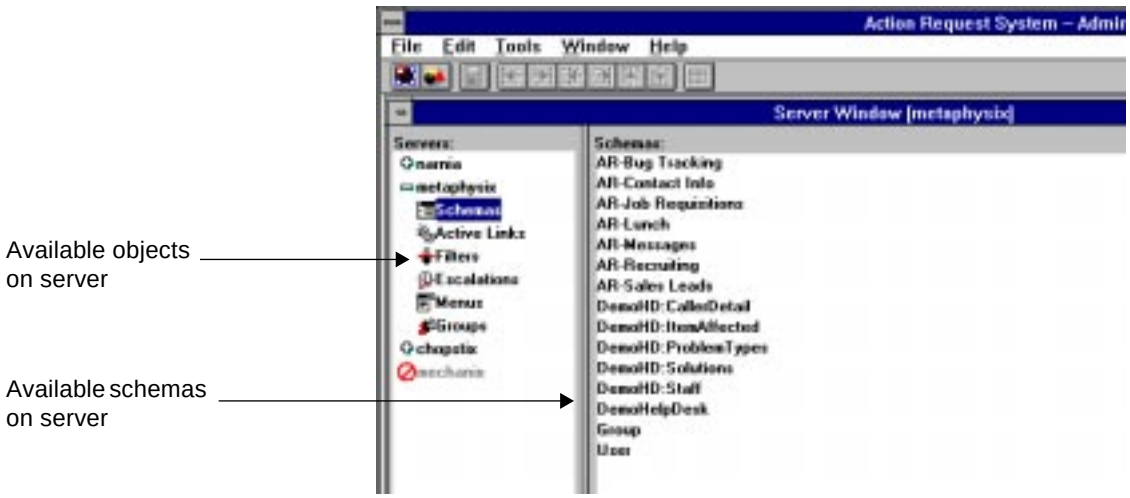


Figure 3-7 Administrator Tool — Available Objects On Server

Setting Server Information and Option Settings

To display information about the currently selected server or to set server options, select Server Information from the File menu of the Administrator Tool Main window. The Server Information dialog box appears, as shown in Figure 3-8 on page 42.

Note – The Server Information window will not display either the tabs or the information for administering the full text search and multi-process server options if the server is not licensed for these options.
These options are not available with the current release of the Windows NT server.

A number of the fields on the Server Information dialog box contain display-only information that cannot be modified. Other fields in the dialog box allow you to set options that control how the server will act. If you do not set an option for a field, the default value is in effect. You must be an Administrator to make changes in this dialog box.

Note – You may be asked to provide information from the Server Information dialog box when you place a call to Customer Support.

Platform Information

When the Server Information dialog box (Figure 3-8) first appears, it displays information about the platform on which the selected server is running.

To display platform information about the currently selected server:

1. **Select a server to administer by double-clicking on it.**
2. **Choose Server Information from the File menu. The Server Information dialog box appears, displaying the platform information.**

Figure 3-8 Server Information — Platform

The following display-only fields are available:

Server Version	Information field displaying the version number of the AR System software on the server.
Server Directory	Information field displaying the directory where the AR server files reside on the server system.

Hardware	Information field displaying the hardware platform on which the server is running.
Operating System	Information field displaying the operating system software version running on the server system.

3. **Click the OK button to close the window.**

Timeouts Information

Click the Timeouts tab (Figure 3-9) to specify timeouts for the currently selected server.

To set timeouts:

1. **Select a server to administer by double-clicking on it.**
2. **Choose Server Information from the File menu. The Server Information dialog box appears.**
3. **In the Server Information window, click the Timeouts tab.**

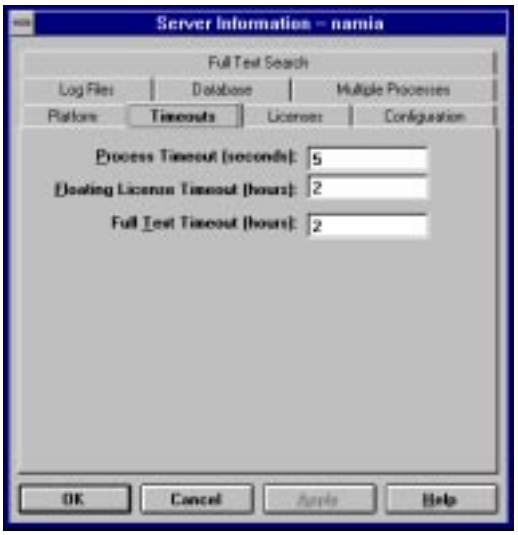


Figure 3-9 Server Information — Timeouts

4. Enter values for the following timeout settings as required:

Process Timeout (seconds)	A filter or escalation can perform a Set Fields action that runs a process and waits for a return. To prevent blocking the server if a process does not return, the server waits a specified interval and then returns even if the process has not completed. Enter a value from 1 to 20 to set a timeout in seconds. The timeout defaults to 5 seconds. (Specifying long intervals can cause an increase in response time for users.)
Floating License Timeout (hours)	This field allows you to set a time limit on how long a floating write license reserved for a user will remain reserved if the user is not accessing the AR System. When using floating write licenses, a user will reserve a token while connected to the server. If the user does not perform any AR System operation for this period of time, the license is automatically freed. You specify the number of hours of inactivity before automatic release of the license. Enter a value in hours to set a time limit. The timeout defaults to two (2) hours (a two-hour limit avoids undesired timeouts over lunch). The minimum value you can set is one (1) hour. The maximum is 99 hours.
Full Text Timeout (hours)	This option allows you to set a time limit on how long a floating full text search license reserved for a user will remain reserved if the user is not accessing the AR System. When using full text search licenses, a user will reserve a token while connected to the server. If the user does not perform any AR System operation for this period of time, the license is automatically freed. You specify the number of hours of inactivity before automatic release of the license. Enter a value in hours to set a time limit. The timeout defaults to two (2) hours (a two-hour limit avoids undesired timeouts over lunch). The minimum value you can set is one (1) hour. The maximum is 99 hours.

5. Click the OK or Apply button to save the option settings.

License Information

Click the Licenses tab (Figure 3-10 on page 45) to display information about the type and number of AR System licenses available on their server. You also set the Submitter Mode in this window.

To display license information and set the Submitter Mode:

1. **Select a server to administer by double-clicking on it.**
2. **Choose Server Information from the File menu. The Server Information dialog box appears.**
3. **In the Server Information window, click the Licenses tab.**

Figure 3-10 Server Information — Licenses

4. **The following fields and options appear. Enter values as required:**

Server License Type	Information field displaying the server's license type.
Fixed Write Licenses	Information field displaying the total number of fixed write licenses that exist on the server.
Floating Write Licenses	Information field displaying the total number of floating write licenses that exist on the server.
Fixed Full Text Licenses	Information field displaying the total number of fixed full text search licenses that exist on the server.
Floating Full Text Licenses	Information field displaying the total number of floating full text search licenses that exist on the server.
Max Schemas Allowed On Server	Information field displaying the number of schemas your license allows you to create on the server. If the field reads `Unlimited`, you can create all the schemas you want.

Remedy Server ID	Information field displaying the unique Remedy identifier code attached to the machine licensed to run the AR System.
Submitter Mode	These radio buttons let you specify whether or not anyone can change the name in the Submitter field of an AR ticket. Submitter mode determines if a submitter must have a license to write to a ticket. * If you select **Changeable** (the default setting), modifications to ARs is restricted to users with write licenses. Licensing is strictly enforced so that all users (even submitters) require a write license to make any updates. * If you select **Locked**, the submitter field is "locked" at submit time. Its value cannot be changed by any user. Licensing is relaxed so that submitters do not need a write license to update fields that they have change access to. This allows users to update information on ARs that have their names in the Submitter field without requiring a write license. **Note:** Changes to the Submitter Mode settings do not take effect until *after* the server is stopped and restarted. For more information on the role of submitters, licenses, and access control, see "Understanding Access Control" on page 99 and especially "Special Submitter Access" on page 101.

5. **Click the OK or Apply button to save the option settings.**

To display information about the use of these licenses, see "Displaying License Information" on page 53.

Configuration Information

Click the Configuration tab (Figure 3-11 on page 47) to set various administrative options.

To set the configuration:

1. **Select a server to administer by double-clicking on it.**
2. **Choose Server Information from the File menu. The Server Information dialog box appears.**
3. **In the Server Information window, click the Configuration tab.**

Figure 3-11 Server Information — Configuration

4. Select from the following options or enter settings as required:

Allow Guest Users

This option lets you specify whether or not the AR System will allow access by users who are not registered users of the system. If allowed, guest users have the following capabilities in the AR System:

* View any structures that are visible to the Public group.
* Submit new entries, if open submissions are allowed.
* View fields on schemas where fields allow Public view capability.
* View fields on schemas where they are the Submitter or Assignee, if the Submitter or Assignee have View permission.

Guest users will not have permissions to update existing ARs, unless the Submitter mode is set to Locked. Then, if guest users submit an AR and the Submitter or Public group has change permissions, they can modify fields in the ARs they submit.

Selecting the Allow Guest Users option (the default) allows guest users on this server.

Allow Unqualified Queries	This option lets you specify whether or not the server will accept unqualified queries. Unqualified queries are requests for the system to return entries with no qualifications set on the data; *all* database entries are returned by an unqualified query. The main reason to consider restricting the use of unqualified queries is to prevent the performance penalty of retrieving and returning large blocks of data due to accidental, unqualified queries to the database. Selecting the Allow Unqualified Queries option (the default) allows a query with no qualifications on the data.
Use Password File (UNIX servers only)	You can set this option to use the `/etc/passwd` file for user validation. When a user logs on with this option set, the AR System first attempts to validate the user against users registered with the AR System. If a match is found, that user definition and permissions specified in the matching User record are used. If no match is found, the AR System checks the `/etc/passwd` file or NIS password map for a match. If a match is found, the user is considered a valid user (not a guest) of the system. The UNIX group specification from the file is retrieved and the user is considered to be a member of the AR System group whose Group ID matches the UNIX group. **Note:** The `/etc/passwd` file used is the file on the machine running the AR System server. Selecting the Use Password File option (the default) causes the server to reference the `/etc/passwd` file if the user is not registered with the AR System. This setting is not displayed for Windows NT servers.
Cross Ref Blank Password (UNIX servers only)	You can set this option to tie the password for a user to the password for the UNIX user of the same name. When a user logs on with this option set, the AR System checks the AR System database for the user specified. If a password is found for the user, that password is used. If the password is blank, the AR System validates the password against the password in the `/etc/passwd` file. **Note:** The `/etc/passwd` file used is the file on the machine running the AR System server. The default setting (Cross Ref Blank Password option is *not* selected) specifies that all passwords for the AR System are stored within the AR System; a blank password means that the user has no password. This setting is not displayed for Windows NT servers.

Max Entries Returned By GetList	This field lets you limit how many database entries are returned after a query. For example, setting the maximum entries to 50 would return a maximum of 50 entries, even if there were more entries that satisfied the qualification. The AR System warns users that the query matched more entries than the administrator allows to be retrieved. The default setting is not limited.
User Email Notifies From (UNIX servers only)	This field lets you specify the From user for email notifications. By default, when the AR System sends email notifications they are delivered from the user `ARSystem`. You can specify an alternate user for the source of these notifications. If the UNIX user running the `arserverd` process is not a trusted email user, the source of the email messages will be the UNIX users themselves. The mail system will only allow trusted users to change the source of the email message. See your UNIX System documentation for more information on email and trusted users if you have questions. Enter a name to set the From address of email notifications. The default is `ARSystem`. This setting is not displayed for Windows NT servers.

5. Click the OK or Apply button to save the option settings.

Log Files Information

Click the Log Files tab (see Figure 3-12 on page 50) to set one or more of the debugging modes for the system. In debug trace mode, the AR System creates log files containing information about system activity.

You can activate logging at any time; logging will start immediately. Each log file is flushed and restarted when you restart the AR server process or when you reactivate logging after it has been deactivated. When this occurs, the previous log file is written to <*logname*>`.bak`.

You should be aware that log files consume increasing amounts of disk space as messages accumulate. You may want to monitor your disk resources carefully while logging is active.

You can enter a location and name other than the default location and name for each of the log files created in debug mode. You can specify the same files for multiple type of logging to have data from multiple logs entered in a single file.

Note – If you are running a multi-process server, each server writes to its own log file. These log files also include the RPC number of the server, as in the following: `arsql.log.390620`.

See the *Action Request System Troubleshooting and Error Messages Guide* for more information on the debug modes.

To set log files:

1. **Select a server to administer by double-clicking on it.**
2. **Choose Server Information from the File menu. The Server Information dialog box appears.**
3. **In the Server Information window, click the Log Files tab.**

Figure 3-12 Server Information — Log Files

4. **Select from the following options to enable the desired debug modes (you can select all log files, some log files, or no log files). Note that the file name field is disabled until you select the related logging check box. After you select a logging mode, you can specify a different file name, if you desire, or leave the field unchanged to accept the default file name.**

SQL Logging	Logs SQL commands sent to the database. Information is logged for each SQL command issued, including a timestamp and the user name of the user performing the operation. By default, the log file is called `arsql.log`.
Filter Logging	Logs information about filter activity for each operation. Information includes the filters that executed and whether or not filter execution was successful. By default, the log file is called `arfilter.log`.
User Logging	Logs information about connection activity for each user. Information includes the time that each user logs on, whether or not they are able to obtain a license, and when each floating license is released. This allows you to keep an audit trail of user activity to help you determine if you need more floating licenses. By default, the log file is called `aruser.log`.
Escalation Logging	Logs information about escalation activity. Information includes that escalations were checked and whether or not the escalation qualification found any matches and escalation actions were taken. By default, the log file is called `arescl.log`.
API Logging	Logs information about all API calls made by all clients. Information is logged on entering and exit of ever API call. By default, the log file is called `arapi.log`.

5. **Click the OK or Apply button to save the option settings.**

Database Information

Click the Database tab (Figure 3-13 on page 52) to display information about the database you are using. You can also use the Database tab to define the database password.

To display and update information about the database:

1. **Select a server to administer by double-clicking on it.**

2. **Choose Server Information from the File menu. The Server Information dialog box appears.**

3. **In the Server Information window, click the Database tab.**

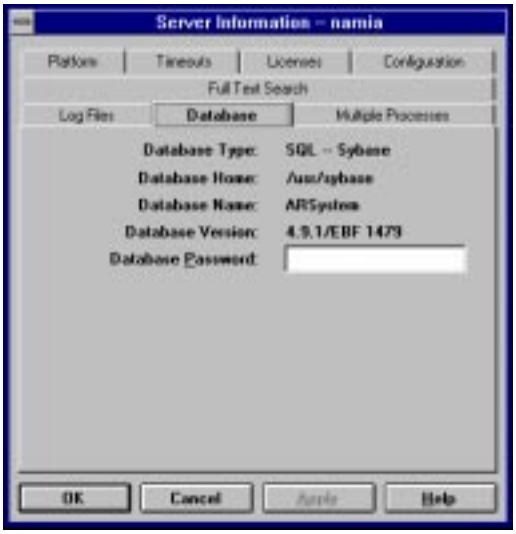


Figure 3-13 Server Information — Database

4. **The following fields and settings appear. Enter a value as required:**

Database Type — Information field displaying the type of database that the server is using.

Database Home — For UNIX only, information field displaying the directory path of the database that the server is using.

Database Name — Information field displaying the name of the database created for the AR System within the SQL database.

Database Version — Information field displaying the version of the SQL database that the server is using.

Database Password	For SYBASE, ORACLE, or SQL Server databases, this field allows you to define the password used by the AR System for access to the database. Note that the existing password is *not* displayed. Enter a value in this field to change the password. See the *Action Request System Troubleshooting and Error Messages Guide* for information on how to recover if you do not remember this password or have changed it outside the AR System and need to reflect the change within the AR System. The default user/table password created by the AR System for the database is `AR#Admin#`.

5. Click the OK or Apply button to save the option settings.

Multiple Process Server Option

If you are licensed for the multiple-process server option, see "Configuring Multiple Process Servers" on page 373 for information on configuring multiple processes from the Server Information window. This chapter also describes how to administer multi-process servers in the AR System.

If you have not licensed the multi-process server option, the Multiple Processes tab does not appear in the Server Information window.

Full Text Search Option

If you are licensed for the full text search (FTS) option, see "Configuring FTS in the AR System" on page 394 for information on configuring FTS from the Server Information window. This chapter also describes how to administer FTS in the AR System.

If you have not licensed the full text search option, the Full Text Search tab does not appear in the Server Information window.

Displaying License Information

To display information about licenses:

- Choose License Information from the File menu of the Administrator Tool Main window. This causes the License Information dialog box to appear, as shown in Figure 3-14 on page 54.

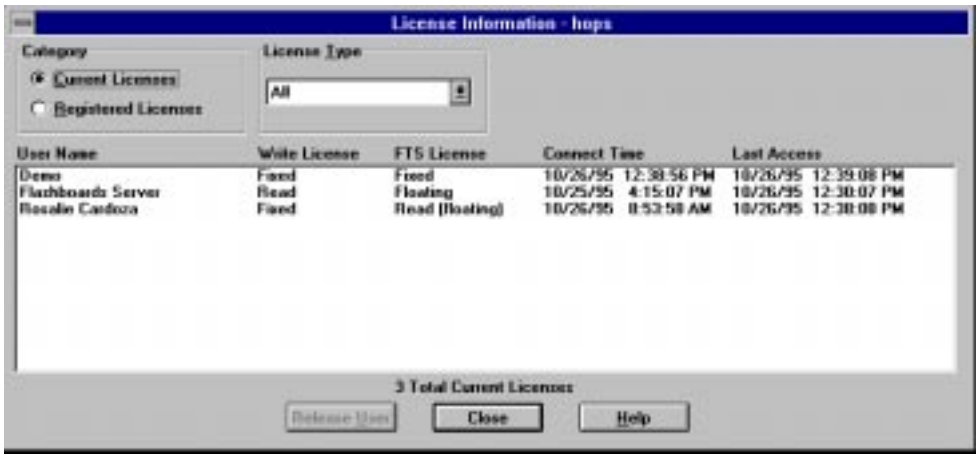


Figure 3-14 Current License Information Dialog Box

The License Information dialog box shows you information about the users on the currently selected server. You can get a list of registered users on the server or a list of the users who are currently connected to the system. You can select whether to see the registered or current users and for each, whether to see all the users or just the users in one of the six license categories: Fixed, Floating, Read, FTS Fixed, FTS Floating, or FTS None. Use the Category menu to choose the list and category of license within that list to be displayed. The type of information currently selected is shown at the bottom of the screen. For example, Figure 3-14 shows the total number of users with fixed write licenses currently connected the server.

Registered Licenses

When you display information about registered users (Figure 3-15 on page 55), you see information about all users of the selected category that are known to the system. You will see the name of the user, the type of license the user is assigned, if the user has an FTS license, the default notify mechanism for the user, and the email address for the user. By viewing this list, you can discover who is using floating licenses and who has write license access versus read-only access.

Figure 3-15 Registered License Information Dialog Box

See Chapter 5, for more information on defining users.

Current Licenses

When you display information about current licenses in use, you see information about the name of the user, the type of license the user is assigned, if the user has an FTS license, the connect time for the user during the current session, and the time the user last accessed the server during this session. The list shows only those users who are currently connected to the AR System.

Releasing a Floating License

If you are an Administrator, you can also use the License Information window to force the release of a floating license that has not yet timed out.

When using floating licenses, a timeout interval determines the point at which a user's floating license will automatically be released if the user has performed no action against the server within that interval. However, it is sometimes necessary to free a user license that has not yet timed out. (For example, if a Windows client fails and the user cannot get back onto the system, it may be necessary to release the license held by the PC user before the failure.)

To force the release of a floating license:

1. **Select the user name with the license that you want released from the Current Licenses List in the License Information window.**
2. **Click the Release User button at the bottom of the License Information window.**

If a user has a Fixed or Read license, this only removes the user from the list of current users; there is no effect on the user's connection to the server. They are not occupying a token on the server that prevents access by others; the next time they access the server, the license information for that server will reappear. If a user has a Floating license, however, the license token held by that user is freed. This means that another user could grab the token and start working. If the original user returns, they may not be able to get back into the system if there are no tokens available.

Setting Default Permissions

Choose Default Permissions under the File menu of the Administrator Tool Main window to display the Default Permissions dialog box, as shown in Figure 3-16 on page 57. You use this dialog box to set the default permissions for schemas, active links, and fields for any server that you can administer.

Setting default permissions for schemas, active links, and fields lets you easily define access control, especially when you are adding new objects to the AR System. New items use the default permissions you specify here.

Setting Default Schema Permissions

Click the Schema Permissions tab in the Default Permissions dialog box (Figure 3-16) to specify the values to be used as the default settings for new schemas. Schema permissions determine which groups have access to a schema.

Setting up default permissions allows you to establish initial permissions for new schemas. This is especially useful if you have a large number of groups.

Remember that in the Default Permissions window, you only create the *default* schema permissions. You actually set schema permissions in the Schema Properties dialog box. See "Defining Permissions for the User Tool" on page 132 for information on setting schema permissions.

To create default schema permissions:

1. **Select a server by double-clicking on it.**
2. **Choose Default Permissions from the File menu. The Default Permissions dialog box appears.**
3. **In the Default Permissions dialog box, click the Schema Permissions tab.**

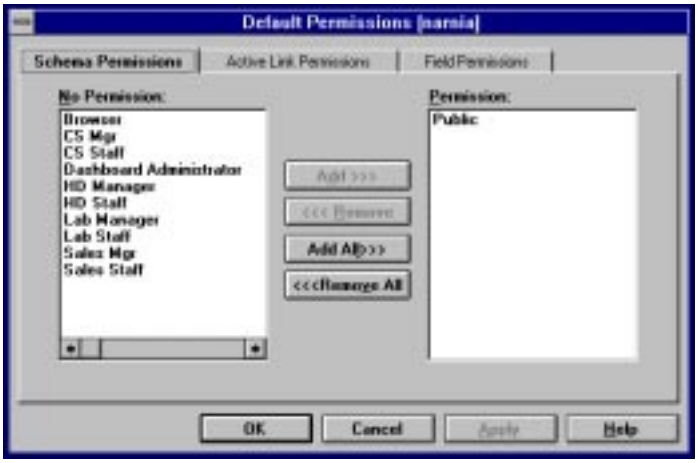


Figure 3-16 Default Schema Permissions

4. **From the No Permission list, double-click the group you want to have default schema access (or select one or more groups, then click the Add button).**
5. **Click the OK or Apply button to save the option settings.**

Setting Default Active Link Permissions

Click the Active Link Permissions tab in the Default Permissions dialog box (Figure 3-17 on page 58) to specify the values to be used as the default settings for new active links. Active link permissions determine which groups have access to an active link. Groups without access to an active link cannot fire it.

Setting up default permissions allows you to establish initial permissions for new active links. This is especially useful if you have a large number of groups.

Remember that, in the Default Permissions window, you only create the *default* active link permissions. You actually set active link permissions within the Active Links dialog box. See “Defining Permissions for Active Links” on page 306 for information on setting active link permissions.

To create default active link permissions:

1. **Select a server by double-clicking on it.**
2. **Choose Default Permissions from the File menu. The Default Permissions dialog box appears.**
3. **In the Default Permissions dialog box, click the Active Link Permissions tab.**

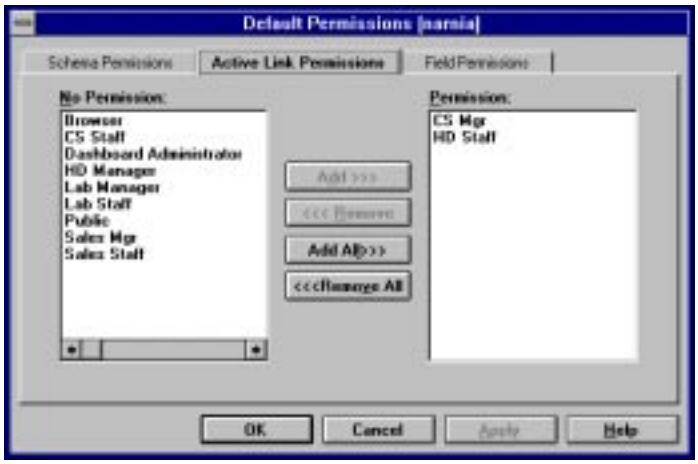


Figure 3-17 Default Active Link Permissions

4. **From the No Permission list, double-click the group you want to have default active link access (or select one or more groups, then click the Add button).**
5. **Click the OK or Apply button to save the option settings.**

Setting Default Field Permissions

Click the Field Permissions tab in the Default Permissions dialog box (Figure 3-18 on page 60) to specify the values to be used as default settings for fields. Field permissions determine which groups have view and change access to fields.

Setting up default permissions allows you to establish initial permissions for new fields. This is especially useful if you have a large number of groups you generally grant access to.

Remember that, in the Default Permissions window, you only create the *default* permissions. You actually set permissions within the Field Properties dialog box. See “Defining Permissions for Fields” on page 164 for information on setting field permissions.

When giving a group access to a field, you can specify either view or change access for the group. You add the group to the list of groups having access to the field and then define what type of access is allowed by selecting the View or Change option from the menu button in the Permissions list.

Selecting the View menu button gives a group *view permissions* only.

Selecting the Change menu button gives a group *both view and change permissions*.

To create default field permissions:

1. **Select a server by double-clicking on it.**
2. **Choose Default Permissions from the File menu. The Default Permissions dialog box appears.**
3. **In the Default Permissions dialog box, click the Field Permissions tab.**

Figure 3-18 Default Field Permissions

4. **From the No Permission list, double-click the group you want to have default field access (or select one or more groups, then click the Add button).**
   The group you selected appears in the Permission field with default view permissions.

5. **To assign Change access to the group, click the Change menu button. Remember that groups without change access can only view the field.**
   In Figure 3-18, the HD Staff and Lab Manager groups have only view permissions for the field, but the Flashboards Administrator and HD Manager groups have view and change permissions.

6. **Select the Allow Any User To Submit option to select the create mode for the field. You use this mode to determine access control (security settings) for the field at the time an AR is submitted.**
   - Selecting the Allow Any User To Submit check box allows anyone to assign a value to the field at submission time, regardless of whether or not the submitter belongs to a group that has change permission for the field.
   - Clearing the check box restricts data entry to users who belong to one or more groups with explicit change permission for the field.

7. **Click the OK or Apply button to save the option settings.**

Defining Preferences

Click Preferences under the File menu of the Administrator Tool Main window to display the Preferences dialog box, as shown in Figure 3-19. You use this dialog box to select desktop settings, confirmation warnings, schema font settings, and how menus are displayed in the Administrator Tool.

To set desktop preferences:

1. **Choose Preferences from the File menu. The Preferences dialog box appears.**
2. **In the Preferences dialog box, click the Desktop tab.**

Figure 3-19 Preferences — Desktop

3. **To select or clear an option, click on the option. You can set any of the following desktop options:**

Maximize on Startup	Select to have the Administrator Tool Main window fill the entire screen (maximize) when the tool first starts.
Show Status Bar	Select to cause the status bar to appear at the bottom of the window. Clear to hide the status bar.

Show Toolbar	Select to cause the toolbar to appear below the menu bar. Clear to hide the toolbar.
Save Windows' Position and Size on Close	Select to cause the AR System to remember the size and position of all types of windows (all menu windows, all active link windows, and so on) at the time you close the window. The size and position are used the next time you open a window of the same type.
Show Field Properties on Field Creation	Select to cause the Field Properties dialog box to appear when you create a new field. If you clear the check box, you must double-click the field to open the dialog box.
Keyboard Step Size	Defines the number of pixels a field is moved by when you select a field and press the arrow keys in a schema.
Date Format	Defines whether date is displayed in short or long date format (for example, in the change history).
AR Path	Specifies the directories where the Administrator Tool can access macros. Enter the entire directory name for each directory you want to access, separating each directory name with a semicolon. The default value is <*ar_config_dir*>`\arcmds`. You also can enter multiple pathnames by separating them with a semi-colon (;). You also can click the Browse button to specify a different directory.

4. Click the OK or Apply button to save the desktop option settings.

To set confirmation preferences:

1. Choose Preferences from the File menu. The Preferences dialog box appears.

2. In the Preferences dialog box, click the Confirmations tab.

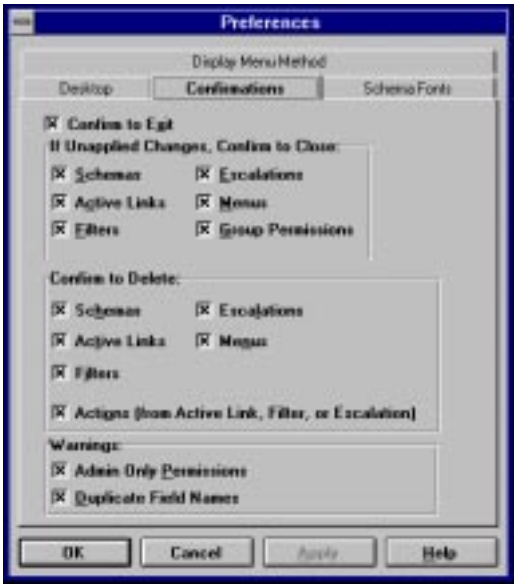


Figure 3-20 Preferences — Confirmations

3. To select or clear an option, click on the option. You can select any of the following confirmation options:

Confirm to Exit	Select to cause a confirmation box to appear each time you exit the Administrator Tool.
* Confirm to Close: * Schemas * Active Links * Filters * Escalations * Menus * Group Permissions	Select to cause a confirmation box to appear when you close an object window if you made changes and did not save them. You can choose a confirmation setting for each object type independently.
Confirm to Delete: * Schemas * Active Links * Filters * Escalations * Menus * Actions (from Active Link, Filter, or Escalation)	Select to cause a confirmation box to appear each time you delete an object or an action. You can choose a delete confirmation setting for each object type as well as for active link, filter, and escalation actions independently.

Warnings: Admin Only Permissions	Select to cause a warning message to appear if an administrator or subadministrator creates a field and does not give groups permissions to view or change the field. Clearing the check box suppresses the warning.
Warnings: Duplicate Field Names	Select to cause a warning message to appear if an administrator or subadministrator creates fields that have the same name. Clearing the check box suppresses the warning. **Note:** If you create fields with duplicate names, those fields will appear elsewhere in the Administrator Tool with their field IDs, for example, in the Fields drop-down list in the Set Fields action of a filter.

4. **Click the OK or Apply button to accept the confirmation options settings.**

To set schema fonts preferences:

Setting fonts allows administrators to design schemas using the same fonts in the Administrator Tool that AR users use in the User Tool. However, these schema font settings are local to the Administrator Tool. Users of the User Tool can still define their own font settings based on their own preferences.

Note – Changing the size of the fonts you use can affect schema layout. For example, if you choose a large font size for buttons, they may become too large to fit the space available for them on the schema. This will cause screen elements to overlap.

---

1. **Choose Preferences from the File menu. The Preferences dialog box appears.**
2. **In the Preferences dialog box, click the Schema Fonts tab.**

Figure 3-21 Preferences — Schema Fonts

3. Select a screen element from the Select Font For list by clicking on the drop down list box symbol and highlighting one of the choices. The current font type, style, and size is shown at the bottom of the Preferences dialog box and a sample is displayed in the Sample box. You can set the font for the following screen elements:

Edit Field	Specifies the font to use for data in fields.
Optional Field	Specifies the font to use for labels of optional fields. Default: normal font
Push Button	Specifies the font to use for buttons that you select to perform an action.
System Field	Specifies the font to use for labels of fields set by the AR System. Default: italic font
Radio Button	Specifies the font to use for radio buttons.
Required Field	Specifies the font to use for labels of fields required by the AR System. Default: bold font

Note – If you change the font used for required or system fields, it is a good idea to continue to use a font that differentiates these fields from normal (optional) fields and from each other.

4. **With the chosen screen element highlighted, click the Change Font button. The Font dialog box appears, as shown in Figure 3-22.**

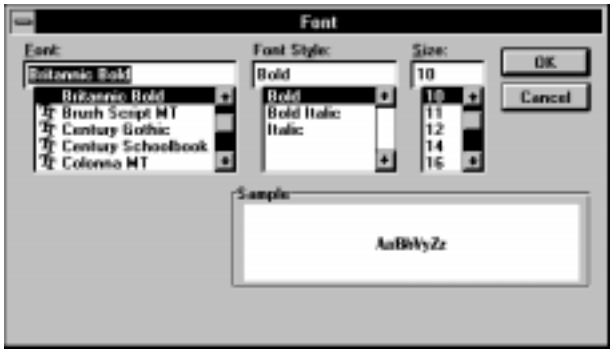


Figure 3-22 Font Dialog Box

5. **In the Font dialog box, select a font, font style, and size, and then click the OK button.**
6. **To change the font of additional screen elements, select the new element by repeating steps 3, 4 and 5.**
7. **When you have finished specifying font settings, click the OK or Apply button in the Preferences dialog box to accept the schema font settings.**

To set the display menu method:

1. **Choose Preferences from the File menu. The Preferences dialog box appears.**
2. **In the Preferences dialog box, click the Display Menu Method tab.**

Figure 3-23 Preferences — Display Menu Method

3. To select or de-select an option, click on the check box or radio button, or enter a value in the field to the right of the option. You can set the following display menu method preferences (popup menu is the default):

Popup Menu	Select to display standard popup menus in windows. Hierarchical menus will display with arrows indicating that you must pull to the right to view lower level menu selections. Be aware that large menus may cause display problems.
List Box	Select to display menus in a list box. You should choose this option if you need to display large menus. When you select this option you must also specify the settings below. **Always:** Select to display all menus as list boxes regardless of size. **Only If:** Select to specify item and level thresholds beyond which menus will display in list boxes. (Enter the threshold values in the fields.) Menus containing fewer items and fewer levels than specified will continue to display as popup menus. Menus containing more items or more levels than specified will display in list boxes.

Expand Items at Startup	For menus displayed in list boxes, select this option to cause all levels of hierarchical menus to display at the time the menu is first opened.

4. **When you have finished specifying display menu method preferences, click the OK or Apply button in the Preferences dialog box to accept the menu display method settings.**

Building and Using Change History

For each object that you build using the Administrator Tool (schemas, fields, menus, filters, escalations, and active links), the AR System automatically records information about the owner, the user who last modified the structure, and the date of the modification. You can view and modify this history information at any time by clicking the Change History tab in each object window.

The Change History window for an active link is shown in Figure 3-24 on page 69.

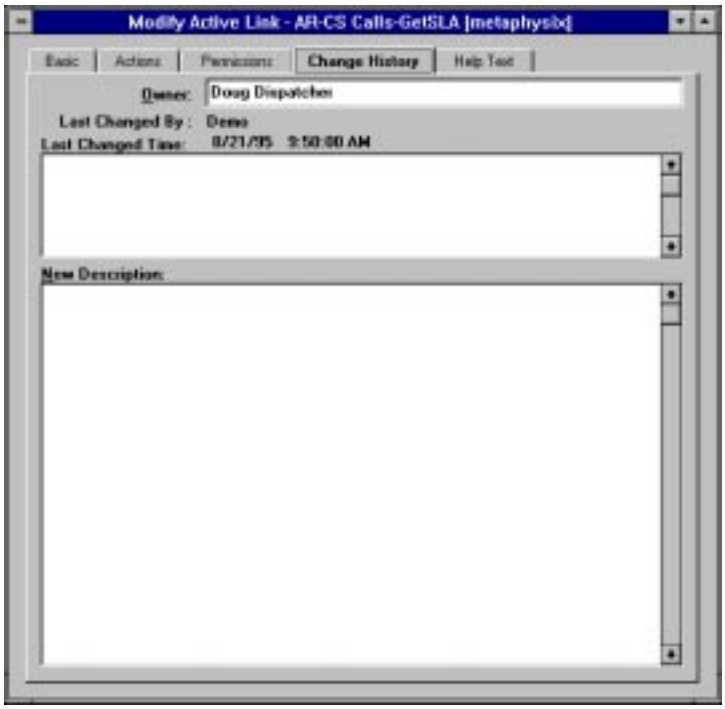


Figure 3-24 Change History Window

You can use the Change History window as a diary of changes made to each structure. The window works in a manner similar to diary fields in the User Tool. Each time you modify an object, you can update the change history to maintain a record of the changes made over time.

To update the change history:

1. **On the Create or Modify window of an object, click the Change History tab to open the Change History window (see Figure 3-24 on page 69).**
2. **If you want to change the ownership of the object, enter the name of the user who is to own (have responsibility for) that object from this point on in the Owner Field.**

Note – Any user with Administrator or Subadministrator permissions can modify an item regardless of who the specified owner is for the item.

3. **Enter information about the item or about the change you have just made in the New Description field. (You will not be able to type in the upper portion of the window to modify an entry once it has been made.)**
   You can use the standard Windows keyboard shortcuts to edit text (for example, `Ctrl+C` to copy text, and so on).
4. **Click the Save button on the toolbar. When you click the Save button, your entry will appear in the upper portion of the screen along with the time you made the entry and your user name.**
5. **Double-click the Control menu to close the Change History window.**

Setting Help

The help text you supply for schemas, fields, and active links is included in the context-sensitive help in the User Tool. The help text you supply for menus, filters, and escalations is available to the administrators and subadministrators who have access to these objects.

Context-Sensitive Help for End-Users

The context-sensitive help that you create for schemas, fields, and active links will be read by end-users and should be written accordingly. The Help Text window as displayed in the User Tool for schemas, fields, and active links contains a simple description of the feature, to which you then can add additional comments.

- For schemas, the AR System generates a listing of all the fields that are indexed for FTS and active links that activate on submit, modify, and display (the active link names, execute conditions, and any administrator-defined help text are included as well).
- For fields, the AR System generates a listing of field attributes and active links that activate on return or menu-choice.
- For active links that activate on a button, the AR System generates a listing of the active link name and execute conditions.

Any user running version 1.2 (or later) of the AR System User Tool can display this help text by choosing Field/Schema Help from the Help menu. If the user chooses Field/Schema Help from the menu, the pointer changes to a question mark; the user can then position the question mark over the field for which they want to view help text and click the mouse button.

Note – If you are creating context-sensitive help that will be viewed on a Windows client, limit the text to 28,000 characters; on a Macintosh client, limit the text to 32,000 characters.

To view help for schemas, fields, and active links, do the following:

- For active links that activate on a button, use context-sensitive help on the button.
- For help on fields or for active links that activate on a menu choice or a return, use context-sensitive help on the field.
- For help on schemas or for active links that activate on submit, modify, and set to defaults, use context-sensitive help on the schema window.

Help for Administrators

The help that you create for menus, filters, and escalations will be read by AR administrators and subadministrators who use the Administrator Tool. This help is available for viewing and editing only by AR administrators and subadministrators who have permission to access the objects.

3

Setting Up the AR System 4

The AR System is most appropriate where there are *frequent* events, the events move through *states*, and the action requests (ARs) are entered and worked on by a *group* of people. However, you can design schemas for almost any database application. You can create as many schemas as you require. How you use the AR System depends on many factors that are specific to your business needs.

This chapter provides some guidelines for setting up your application of the AR System. It covers the following topics:

- General factors to consider and questions to ask as you design your application.
- Schema and field design considerations.
- Menu design considerations.
- Filter design considerations.
- Escalation design considerations.
- Active link design considerations.
- Using macros as automation aids.

4

Note – The discussion and examples in this chapter are specific to the use of the AR System as a trouble tracking and reporting application. While this is a good example of one of the uses of the AR System, it is by no means the only possible application. You will be able to apply the basic information presented here about AR System design considerations regardless of how you are using the AR System.

To help set up the AR System, Appendix E provides worksheets you can reproduce to track your workflow and design schemas, active links, filters, and so on.

General Design Questions

The process of designing your application of the AR System involves several steps:

1. **Design a schema or schemas to contain and display needed information.**
2. **Define a process flow that determines actions that will occur based on specific AR System events.**
3. **Define users and groups of users who have access to some or all of the information in your schemas.**

When designing a new support application for the AR System, it is best to begin by evaluating how support requests and problems are currently resolved. The answers to a series of simple questions will help you evaluate your current problem-solving process and determine the best way to take advantage of the AR System's capabilities.

- The answers to the following questions will help you design schemas for your database.
  What stages does each problem pass through from discovery through resolution?

  What information needs to be collected and communicated during each of these stages?

  What is the source of each piece of information? Is there some information that is available from more than one source?

  Is there information that needs to be made available in more than one place?

  What information is most likely to be valuable in summary form or included in a report?

- The answers to the following questions will help you design the filters, escalations, and active links that will define the workflow process.
  What is your current workflow process? Create a simple process flowchart or other representation that describes how your current problem-solving process works. An example of a process flowchart is shown in Figure 4-1.

  What events occur that result in the need for specific actions? What, specifically, keys these actions?

- The answers to the following questions will help you define groups of users and determine the appropriate level of access for each group.
  What distinct functional groups are involved in your problem-solving process (for example, support staff, help desk, and end users)?

  Who in your organization needs to belong to each of these groups? Consider who needs to know what and at what stage in the problem-solving process.

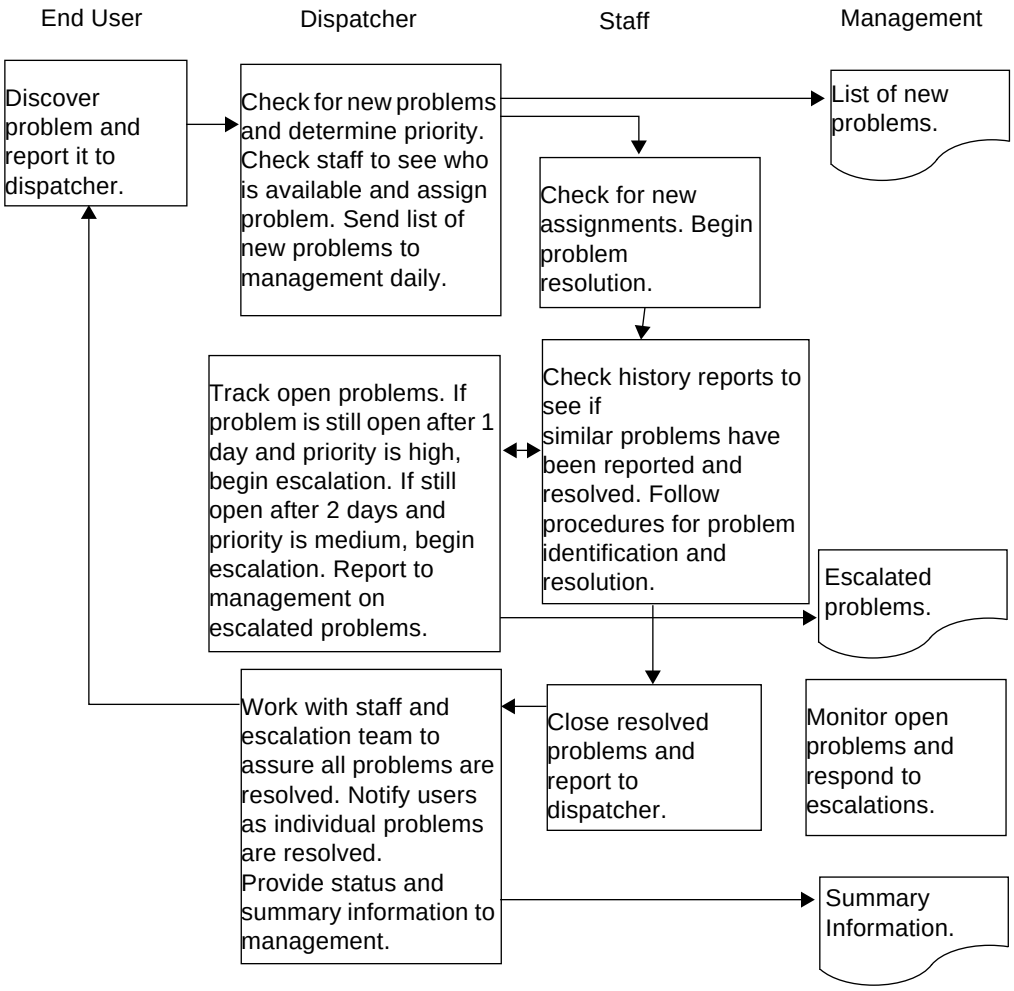


Figure 4-1 Workflow Process Flowchart Example

Designing Schemas

Once you understand the information requirements of your organization, you can start designing your schema.

A schema defines how information is stored in your database. When you open an AR System schema, you see a screen that contains a set of fields. The fields are where various pieces of information are entered and displayed.

When you design your schema, you should first decide whether you want to start from scratch to design a new schema or start with an existing schema that is similar to the schema you want to create. Starting with an existing schema, if an appropriate one exists, can often save you time since you may not have to create every field.

Note – The User and Group schemas contain several reserved fields that make these schemas special. You should never copy these schemas as you may introduce unintended access control problems into your environment.

The sections that follow describe the processes involved when you create a new schema from scratch or modify an existing schema to fit a new purpose.

Working with New Schemas

Create a new schema if there is no existing schema that you can easily modify and adapt to your needs. You will find detailed instructions for creating a schema in Chapter 6.

Core Fields

When you create a schema from scratch, the schema automatically contains a set of **core** fields. These are fields that all AR System databases are likely to need. Core fields help provide consistency when merging and sharing databases and when exchanging macros. You cannot delete core fields, though you can modify their appearance by altering labels, adding or changing menus, altering the display type, altering their location, or hiding them from view. You can also customize some aspects of specific core fields. For detailed information on each of the core fields, see Appendix C.

It is likely that some of the information you identified as needed when you analyzed your current process will be accounted for by the core fields.

A newly created schema is shown in Figure 4-2. Notice that the field labels appear in different styles. The styles have special meaning, as described below:

Italic text	**F**ield is system maintained; information is automatically updated by the AR System.
Bold text	Field is required; submitter must enter information in this field.
Plain text	Field is optional; submitter can submit a request without entering information in this field.

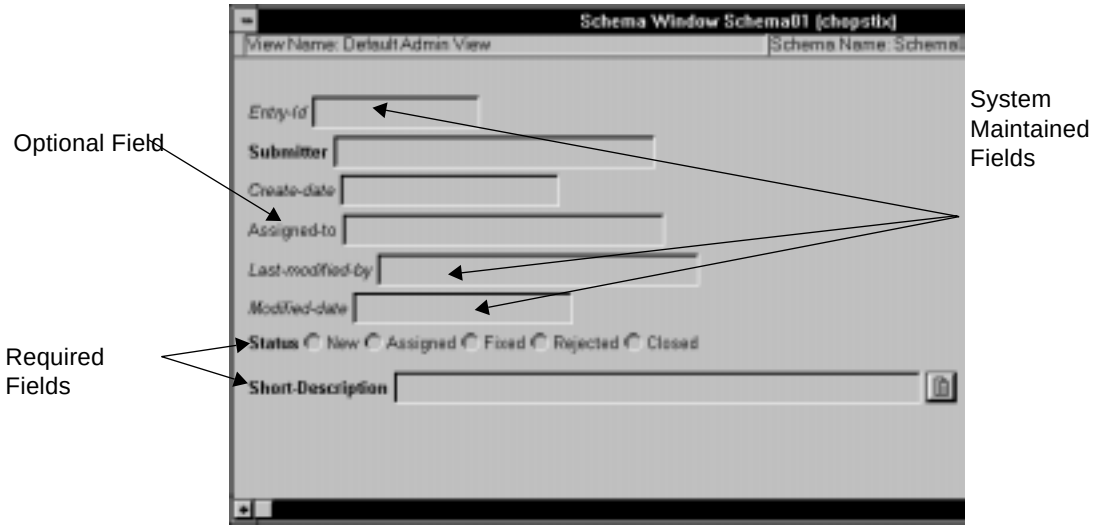


Figure 4-2 New Schema with Core Fields

Schema Layout

Once you have opened the new schema and decided what fields you need in addition to the core fields, you can begin to define the additional fields and design the schema so that it fits your needs. It is a good idea to sketch out the layout you want for the screen before you actually begin adding fields. That way you will have an idea of where you want to insert fields and in what order. When deciding where to place fields that will have character menus, text

editors, or diary editors associated with them, you will need to allow space for the icons that will appear next to the fields. (In some cases, a field may have both a menu icon and a text editor icon next to it.)

As you design your layout, take into account that users in different roles will need to manipulate different fields and that different users will have different access privileges to the fields.

You might want to lay out your schema so that it is convenient for use by the various types of users you have identified. For example, you can group fields that will be most significant to end users at the top of the schema and group fields that will be used only by dispatchers at the bottom. You can also arrange your layout so that fields that are of interest to only a few people will not show on the opening view of the schema.

You should also consider the platform on which your users will be running the User Tool. You can provide users with multiple views of the same schema, based upon the platform they are operating from, whether Motif, Windows, or Macintosh. If the schema you are designing will be used exclusively on personal computers, you can take advantage of that fact and lay out the schema in the way that looks best on that platform. If, on the other hand, your users are on a variety of platforms, you may want to create several different views, one for each environment.

Users with Administrator or Subadministrator access to a schema can customize the view on the User Tool, then export the view back to the server as an alternate admin view. For information on exporting customized views, see Chapter 4, *Customizing The Environment* in the *Action Request System User's Guide*.

Note – Users at ASCII terminals will not be able to customize their own views.

Working from Existing Schemas

If there is an existing schema that you can easily modify and adapt to your needs, you can use it as a basis for your new schema.

Note – The User and Group schemas contain several reserved fields that make these schemas special. You should never copy these schemas as you may introduce unintended access control functionality into your environment.

Modifying Fields

To adapt an existing schema to new needs, simply verify that the fields that currently exist are defined appropriately. If not, you can modify the field definitions according to the instructions in “Creating and Modifying Fields” on page 141. Add any additional fields that are required on the new schema, rearrange the fields on the schema, or change a field’s display properties to meet your new needs. Follow the guidelines for schema layout presented above.

Sample Schema and Database

You may want to look at the sample schemas that came with your AR System software to see if one of them can serve as a starting point for your schema design process. Use them to help you become familiar with the AR System or as starter schemas in your organization. See the *Action Request System Workflow Demonstration and Guide to Sample Schemas* for descriptions of the available sample schemas.

Default Schema Views

When you define a schema layout, from either a new or existing schema, you are defining a default (administrator) view. This is the view of the schema that users will see unless they customize their view or set a different default view.

Multiple Schema Views

You can create multiple views of a schema. It is easy to use the Modify Schema window to open a schema, copy it, then create a different “view” of the schema by rearranging or even hiding fields, based on which platform you are operating from or what role the user plays. You will find detailed instructions for modifying an existing schema and creating multiple schema views in “Schema Views” on page 173.

Schema Attribute Settings

For each schema, you can define attribute settings that control the behavior of that schema. You can set database indexing on selected fields, specify which of the schema’s fields will appear in the list in the Query List window, and set

overall access permissions that determine which users will be able to view or modify the fields on a schema. For information on how to set attributes for a schema, see Chapter 6.

Defining Fields

Once you have decided on the information that your schema will contain and designed the layout of the schema, you can begin defining the individual fields. It is the fields that determine the internal structure of the AR System application database.

Before adding a new field to a schema, you should consider carefully the purpose of the field and whether adding the field is the best way to handle your information requirements. The addition of new fields should be motivated by the planned use of the field for querying and reporting during the process that this schema is designed to manage. You may find it impractical to eliminate a field once users have come to rely on it.

Occasionally, you may want to include information that is also kept in another database. If the information is stable and unlikely to change frequently, then keeping it in two places may be manageable. However, if the information is changing at a rate that would require frequent updating just to keep it consistent with another database, the information is not a good candidate for adding to this schema. See the discussion of active links later in this chapter for ways you can cross-reference data in other places.

Field Definition and Display Properties

As you define each field on a schema, you describe field attributes that include its definition properties (such as the field's data type and attributes of the information it will contain), access control (such as group permissions and create mode), and global settings (such as whether or not it is a required field). You also can set a field's display properties that might apply only to a particular schema view (such as a field visible in one schema view but hidden in another view). Chapter 7 includes step-by-step instructions for defining fields and describes each of the field properties in detail.

4

Core Field Design Considerations

The following core fields have special characteristics that need to be considered when defining a new schema.

Short-Description Field

Fields that categorize problem and request types are essential to the efficient use of the AR System. A new schema includes a Short-Description field for this purpose. Unless you modify Query List fields when you define a schema's attributes, the contents of the Short-Description field are displayed by the Query List operation.

It is a good idea to define a character menu for the Short-Description field that will help users define the possible problem and request types. This makes AR submission easier and it creates a problem type "vocabulary" that the entire organization can use. A uniform vocabulary makes queries and reporting much more efficient.

If other short descriptive fields are necessary, you can add other fields with similar fill-in aids.

As you decide how many descriptive choices to set up in your menu, you should balance the need for query efficiency against the need for completeness of description.

Status Field

In your process, each event represented by an AR moves from the status (or state) of newly submitted to some resolved state. Along the way, an AR moves through different states as it is being worked on. The meaning of each individual state helps define the workflow process. The core schema includes a **Status field** that permits you to define any number of states. The AR System keeps additional information with the Status field as ARs move through their states. This information is called status history and includes the user name of the person who puts the AR into a particular state and the time the change occurred.

You should take some care in defining states. The Status field represents the problem resolution process more than any other field in the schema. The states must capture the important steps in the process. Often the best case process is

represented by four or five states, while the worst case process is defined by many more. The right number of states may be somewhere in between, with several states being defined, but not used during the resolution of a typical AR.

Note – As with all selection fields, it is difficult to modify the Status field choices once users have begun to use the schema. For example, if the current choices are `New`, `Assigned`, and `Closed`, and you add a choice labeled `Fixed` before the `Closed` selection, existing database entries with a status of `Closed` will now have a status of `Fixed` instead. This is because the data for a selection field is stored in the database as an integer that relates to the order of the choices, as in the following examples:

```
New = 0
Assigned = 1
Closed = 2
Fixed = 3
```

To avoid confusion, do *not* add selection choices to an active schema other than as the last choice of the selection field.

Designing Menus

You can design menus that you can then attach to any character field on any schema. You can attach each menu to as many character fields in as many different schemas as you would like. Each menu has a name that you specify and a set of options that you define using the Administrator Tool. There are three different styles of menus you can define:

Character	You define the menu by entering a series of labels and values into the fields of the Menu window.
File	You specify a file that contains a formatted character menu.
Query	You specify a query that lets you pull values from a schema.

Menus are defined and stored independently of schemas. This allows you to define a single menu and use it anywhere on any schema. For example, you might create a menu that includes the names of all members of your support group. You could then attach that menu to as many schemas as you desire. If

any change should occur in the members of the group, you would only need to update a single menu in order to change the menu selections on all schemas that list group members.

See Chapter 9 for information on creating each style of menu and attaching menus to the fields of a schema.

Designing Filters

Your workflow process is defined partly by your schema (especially the Status field), but mostly by the filters, escalations, and active links you create. This section describes how filters work and presents issues to consider in designing them.

Filters define what **actions** the server will take when an AR transaction meets certain **conditions**. For example, you can define a filter that automatically notifies the end user that his problem has been solved (action) when the Status field of the AR is changed to "Fixed" (condition).

Filter Conditions

You can design filters that act on the query, modify, submit, delete, or merge operation or any combination of those operations. You can also include a qualification in the condition to further refine the filter conditions.

Filter Actions

There are five kinds of actions you can define for a filter, as shown in Table 4-1. A single filter can invoke up to 25 multiple actions.

Table 4-1 Filter Actions *(1 of 2)*

Action	Description
Log to File	Records an entry in an audit trail log file.
Message	Sends an interactive error, warning, or note to the user who initiated the transaction.

Table 4-1 Filter Actions *(2 of 2)*

Action	Description
Notify	Sends text to a specified user or group.
Run Process	Runs a specified program.
Set Fields	Sets field values in the current AR to static or keyword values or to values retrieved from another data source. The data source may be a field in the same schema or another schema on the same server or another server, the results of an independent system process or the results of a mathematical calculation or a function.

Filter processes run on the server, as opposed to **active links**, which run on the client machine (see *Designing Active Links* on page -92). Filters are defined and modified from within the Administrator Tool *without programming*, by using convenient forms and other aids. You can use filters to guide ARs through each stage of the resolution process.

Filters run on the server with the same permissions as the administrator. You can use filters to restrict how users can submit or modify an AR. You can also use them to check for conditions in ARs that are submitted by a network management system for a device that it is monitoring; the filter can then automatically call a program to control that device. Filters can act upon virtually any condition that arises in manipulating an AR.

Note – You should always remain aware while designing filters that filters run on the server with Administrator privileges. This can have an impact on system security as well as on server performance.

Be conservative in designing your first filters. A user base may be initially excited about the prospect of being notified of each step in your process, only to become irritated by receiving too many notifications. The following are examples of useful filters.

Filter example #1, notify the assignee of an AR:

For every AR where the Status field is modified to the “Assigned” state, use the Notification Tool to notify the user whose name is in the Assigned-to field. Include some fixed text and the variable information text from the Entry ID and the Short Description fields.

Filter example #2, assign a particular problem to a specific support person:
For every newly submitted AR operation that has the word “print” anywhere in the description field, set the Assigned-to field to Sally, update the diary field to indicate that the AR has been assigned to Sally, and set the Status to “Assigned.”

When you create filters, you assign them an execution order so that multiple filters can act on a single server transaction. For the two example filters above, the filter assigning a problem (example #2) should be executed before the filter that notifies the assignee (example #1).

You can export filters from one site and import them to another site so organizations can share the definition of the workflow process.

Sending Notifications From Filters

You can greatly improve the efficiency of your workflow process by assuring that the support staff is proactively notified of new things to do and that end users are immediately told that their problem is fixed. Immediate notification can greatly reduce the length of time required by the process life cycle. The Notification Tool of the AR System gives immediate notification to the user — it acts as a “desktop beeper.” It is a low-overhead tool that is dormant unless the user is notified through some filter or escalation action. The tool can notify the user by beeping, displaying a pop-up dialog box, flashing its icon, or any combination of the above.

The Notification Tool also holds a memory of past notifications and allows the user to immediately open any AR for which a notification has occurred.

Alternatives to the Notification Tool are also available. A more passive notification option of electronic mail (email) is available. Notifications are sent to a specific name or a name contained in another field. You can also route the notification to a spooling file to be read by a program for integration with paging beepers and other notification alternatives.

Designing Escalations

Escalations function much like filters except that they occur at a specific time on a time interval instead of on a transaction to the database. Like filters, escalations define what **actions** the server will take when an AR transaction

meets certain **conditions**. For example, you can define an escalation that automatically sets the Assigned-Priority field to High (action) if a problem has not been solved within 24 hours (condition).

Escalation Strategy

There are some basic steps to help you decide when escalations should take place, as described in the following example of users submitting problems to a support staff responsible for resolving problems.

1. **Decide on the rules.**
   Think about the basic conditions under which you want to escalate an entry. Consider all the different possibilities and decide exactly what conditions determine when escalation is appropriate.

   You may determine that an entry that is not closed after 5 days should be escalated. You might also determine that a specific type of problem should be escalated after only three days.

   Typical categories of escalation include the following:

   - New problems not handled quickly enough. For example, you might decide that new problems with a critical priority should be assigned within 8 hours and those with a serious priority assigned within 24.
   - Assigned problems not closed soon enough. For example, you might decide that assigned problems, if critical, must be handled within 5 days of being submitted; if serious, within 14; and if medium, within 60.

2. **Decide on escalation actions.**
   Once you have defined the escalation criteria, you can determine the action you want to take when each of these criteria is encountered. For example, you may want to notify another person that you are escalating an entry.

   For new problems that are not handled quickly enough, you might want to assign ARs to Doug Dispatcher with a notification to him. For assigned problems not closed soon enough, you might want to notify the escalation manager, Marie Manager. You also might want to send a warning to the user name in the Assigned-to field when an escalation is about to occur.

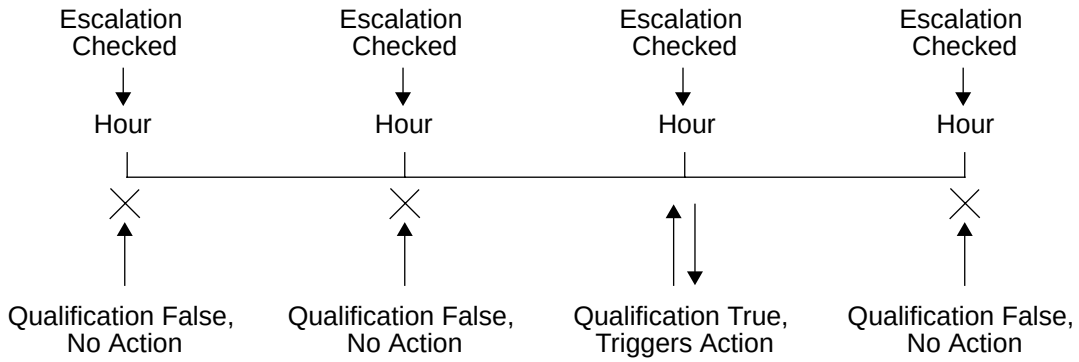
3. **Add escalation field(s)/state(s).**
   You may need to add one or more new fields or states to your schema to note the escalation cases. You may want to introduce new escalation states to the Status field in a schema or add a field to hold which escalation case was last applied. (Usually this is a selection field, though it could be any type.)

   To have a record of an escalation, you might create two new fields that are option selection-type fields: Assign-Escalate-State and Fix-Escalate-State. The selection values are None and Escalated for the Assign-Escalate-State field and None, Pre-Escalated, and Escalated for the Fix-Escalate-State field. The Pre-Escalate state is needed to issue the warning before escalation.

4. **Decide how often to check escalations.**
   You can define an escalation so that the AR System checks the conditions for activating the escalations at a specific time or at specified time intervals. You can also include a qualification in the condition to further refine the escalation conditions.

   When you set a specific time for execution (for example, first of month or every Monday), the server checks the escalation at the time defined. If the qualification is true, the escalation triggers the action. Otherwise, the server waits for the next scheduled time.

   In contrast, when you set an execution interval (for example, every hour), the server checks the escalation at the interval. Figure 4-3 illustrates how escalation intervals work:



(**Note:** Escalation is checked immediately when created, enabled, or modified.)

Figure 4-3 Escalation Intervals

Escalation intervals are immediately checked when the escalation is created or enabled or modified. Then the server waits for the defined interval and checks if the qualification is true.

- If the qualification is true, the escalation triggers the actions in order. The server then waits for the next interval.
- If the qualification is false, the escalation triggers no actions and the server waits for the next interval.

Escalations execute on the server machine. Each escalation is attached to a single schema on the server. How often you want the server to check an escalation is a question only you the AR administrator can answer. If you make frequent AR server checks (for example, 50 escalations that query the database every 2 minutes), you can seriously impact the performance of the AR system. Balance the load on the AR System against how often you actually need to check the escalation.

5. **Use the Escalations window to create the escalation, specifying the following:**
   - Conditions, including setting the time of escalations and transaction qualifications.
   - Actions, including notifying users, setting fields, and so on.

   Figure 4-4 illustrates how escalations are executed in the AR System.

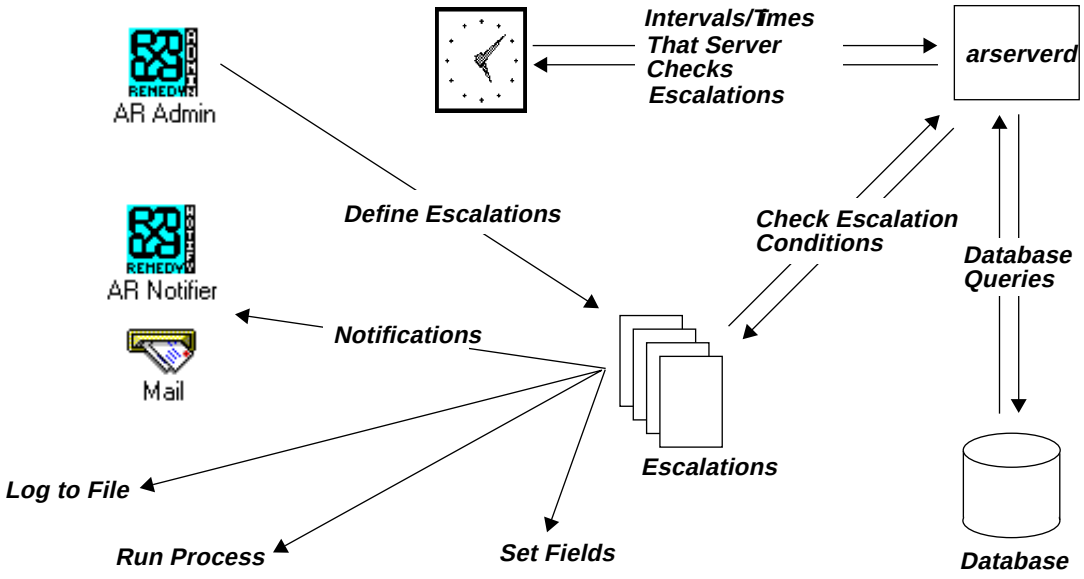


Figure 4-4 Escalations in the AR System

Escalation Conditions

You can define an escalation so that the AR System checks conditions for activating the escalations at a specific time or at specified time intervals. You can also include a qualification in the condition to further refine the escalation conditions.

Escalation Actions

There are four kinds of actions you can define for an escalation, as shown in Table 4-2. A single escalation can invoke up to 25 multiple actions.

Table 4-2 Escalation Actions

Action	Description
Log to File	Records an entry in an audit trail log file.

Table 4-2 Escalation Actions

Action	Description
Notify	Sends text to a specified user or group.
Run Process	Runs a specified program.
Set Fields	Sets field values in matching ARs to static or keyword values or to values retrieved from another data source. The data source may be a field in the same schema or another schema on the same server, the results of an independent system process or the results of a mathematical calculation or a function.

Escalation processes run on the server. Escalations are defined and modified from within the Administrator Tool *without programming*, by using convenient forms and other aids. You can use escalations to guide ARs through each stage of the resolution process.

Note – Be aware while designing escalations that escalations run on the server with Administrator privileges. This can have an impact on system security as well as on server performance.

Be conservative in designing your first escalations. It may seem like a good idea at the time to notify your user base of all the exceptions to normal process flow, but creating too many escalations might cause them to be less effective or even annoying.

The following are examples of useful escalations.

Escalation example #1, track open problems:

For every AR where the Priority field is set to “High” and the problem is still open after 24 hours, send a notification to the user whose name is in the Assigned-to field. Include some fixed text and the variable information text from the Entry ID and the Short Description fields.

Escalation example #2, assign escalated problems to management:

For every AR where the Priority field is set to “High” and the problem is still open after 48 hours, set the Assigned-to field to Management, update the diary field to indicate that the AR has been reported to Management, and set the Status to “Escalated.”

Unlike filters, there is no execution order field you can use when creating escalations. Instead, use the Time calendar in the Escalation window to set an execution order. First create an escalation and set a specific time for the server to check the escalation (for example, 2:00 AM). Then create another escalation and set a later time for the server to check the escalation (for example, 2:05 AM).

You can export escalations from one site and import them to another site so organizations can share the definition of the workflow process.

Sending Notifications From Escalations

Sending notifications from escalations works like sending notifications from filters. For more information, refer to “Sending Notifications From Filters” on page 86.

Designing Active Links

In addition to filters and escalations, which are executed on the server, you can define **active links**, which are executed on the client machine based on actions taken by the user. You can assign an execution order to active links so that more than one active link can execute based on a single user action. You can also specify basic conditions that must be met before an active link will execute.

Active link actions are performed on the data in the current user window. For example, you can define an active link that causes information to be retrieved from another AR, from the same schema, or from a different schema, and inserted in the AR the user is working on when the user presses Return in a particular field.

Active links are associated with a single schema and execute under explicit user control. Access control is supported for active links so that you can control which users will be able to execute a specific active link.

Note – When designing active links that launch other processes or tasks, you should take care if users in your environment are running on different platforms (UNIX, Windows, Macintosh, and so on). Not all OS commands are available on all platforms.

Active Link Conditions

As with filters and escalations, it is possible to define qualifications that must be met before an active link operation will occur. For example, you could define an active link that checks which hardware platform the tool is running on and uses that information to determine whether or not to execute.

By combining conditional execution with the ability to tie more than one active link to a single user action, you can design an active link that will execute a different operation based on conditions at the time the active link operation occurs. For example, you can design an active link that checks the name in the Submitter field and attaches a different menu to the Short Description field depending on the results. This would let you provide one set of descriptive options to Sally Smith and a different set to John Jones.

Execution Options

When you define an active link, you specify the user activity that will cause the active link to execute. You can choose from seven execution options, as shown in Table 4-3 below.

Table 4-3 Active Link Execution Options

Option	Description
Submit	Executes the active link when a user submits a new AR.
Modify	Executes the active link whenever a user modifies an existing AR for the schema. (Note that the active link does not execute if the operation is a Modify All operation.)
Display	Executes the active link when a user retrieves an AR for display.
Set Default	Executes the active link when the user selects the Set to Default option or when the AR System loads defaults prior to a new query or submit.
Return	Executes the active link when the user presses Return in a specified field or selects a radio button (if the field is a selection-type field).
Menu Choice	Executes the active link when the user selects a choice from a character menu.
Button	Places a button on the schema that the user can select. You can attach more than one active link to a button.

The Button, Return, and Menu Choice options are especially useful when you are designing an active link that displays additional information or retrieves information from other sources and inserts it in the current AR. For example, suppose you are designing a schema for a help desk and you want the help desk person to be able to verify a user's configuration before continuing with a call. You can design a button-activated active link that takes the value entered in the User Name field of the current AR and uses it as a parameter in a macro that displays configuration information for the given user. By simply pressing a button, a help desk person can get information from another schema without leaving the current AR.

The Submit, Modify, Display, and Set Default options are useful when you are designing an active link whose purpose is to insure complete and consistent data definition. For example, whenever a new AR is submitted, you may want an active link to retrieve the host name of the client and copy it into a field on the schema. This would guarantee that every submitted AR includes the hostname.

Actions

There are six kinds of actions you can define for an active link, as shown in Table 4-4 below. A single active link can invoke multiple actions (up to 25).

Table 4-4 Active Link Actions

Action	**Description**
Change Field	Changes the characteristics of a field. You can attach a new menu to the field, move the focus to the field, or change access permissions of the field based on conditions and qualifications specified in the active link.
DDE	Executes a DDE operation. (PC clients only)
Message	Sends an interactive error, warning, or note to the user who initiated the transaction.
Run Macro	Executes an AR System macro.
Run Process	Executes an independent system process on the client system.
Set Fields	Sets field values in the current AR to static or keyword values or to values retrieved from another data source. The data source may be a field in the same or another schema, the results of an independent system process, a DDE operation, or the results of a mathematical calculation or a function.

Using Filters Versus Active Links

Both filters and active links help you define your workflow process by allowing you to define actions that will occur based on specific events. Whether a filter or an active link would be better to accomplish a specific purpose is a decision you will have to make on a case-by-case basis. There may be times when either mechanism would suit your purpose. More often, however, the specifics of the work you are trying to accomplish will determine whether you use a filter or an active link.

When you determine how to manage your workflow process, it is important to be aware of both the differences and the similarities between filters and active links.

Table 4-5 summarizes the features of filters and active links.

Table 4-5 Filters versus Active Links *(1 of 2)*

	Filter	**Active Link**
Where Action Executed	On the server.	On the client.
Access control	Runs with Administrator permissions.	Runs with permissions of current user. Access can be restricted to certain users.
Acts on data	In the current transaction.	In the current window.
Conditions	Query, Modify, Submit, Delete, Merge.	Button, Return, Submit, Modify, Display, Menu Choice, Set Default.
Qualifications	Checks values in the current transaction, the database, or both the current transaction and the database.	Checks values in the current screen only.
Possible actions:		
Change Field	Not applicable.	Adjusts the characteristics of a field. Use to dynamically change character menus, move focus to a field, or change access to a field.
DDE	Not applicable.	Executes a DDE operation on a Windows client.

Table 4-5 Filters versus Active Links *(2 of 2)*

	Filter	**Active Link**
Log to File	Creates audit trail of transactions that meet conditions.	Not applicable.
Message	Displays error message, note, or warning to user.	Displays error message, note, or warning to user.
Notify	Provides active event notification.	Not applicable.
Run Macro	On UNIX, can launch a User Tool to run a macro. On Windows NT, can launch `runmacro.exe` to run a macro. Runs with Administrator permissions.	Runs a macro.
Run Process	Launches an independent system process. Runs under `arserver` process permissions on the server. Same for users on all clients.	Launches an independent system process. Runs under the user's permissions on the client. Client architecture dependent.
Set Fields	Loads data into fields on current AR. May be static values, keywords, data from field on same or other schema on the same server, or results of a function, an independent process, DDE operation, or a mathematical calculation. When you are assigning a value from another field and multiple matches to a qualification are found, a filter takes *only* the first AR that matches a qualification.	Loads data into fields on current screen. May be static values, keywords, data from other fields on same or other schema, or results of a function, an independent process, or a mathematical calculation. When you are assigning a value from another field and multiple matches to a qualification are found, an active link produces a selection list so that the user can select which AR to use.

Using Macros

The User Tool of the AR System is very simple to use for query, modification,

and reporting. Your users will become skilled at these operations in a few hours of use. To automate commonly used operations and further simplify your process, the AR System offers another capability: **macros**.

Macros allow users to capture commonly run queries and operations on ARs by a simple record and playback sequence. Any user can create a set of macros; moreover, you, as the AR administrator, can organize a library of useful macros. You can keep these organized by different roles, such as support staff or end user. Users can invoke macros from within the User Tool, from the command line, or from other tools. Macros can also use variables, so that parts of the query are specified at the time the macro executes. Macros can be shared with other AR System users, even those on different hardware platforms and operating environments. To share macros locally, specify a directory in the AR Path preference to define a search path where users can find these macros.

The following are examples of a few useful macros:

- Show the ARs assigned to a user, with the user name being a variable.
- Create a periodic report of unresolved, critical ARs, with the begin and end dates being variables.
- Create a statistics report of the average time to fix problems.
- Open a partially filled in Submit window for a schema.

For information on sharing macros as well as on specifying your AR Path preference, see *Sharing Macros and Custom Reports* on page 2-34 in the *Action Request System User's Guide for Windows*.

4

Setting Up Groups and Users 5

Once you have identified the users of your AR System application and determined the type of information each user will need to access, you can set up your users and establish their access to the system. You can also define groups to which various users will belong. It is group membership that ultimately determines which operations individual users can perform and which schemas, fields, and active links they can access.

This chapter includes the following:

- A discussion of access control and how it works.
- Instructions on how to create access control groups.
- Instructions on how to add users to the AR System.
- Instructions on how to set up and use Subadministrator access.

Understanding Access Control

The AR System access control mechanism lets you define groups of users and determine which of the groups have access to each schema and to each field within a schema. You define these groups of users, called **access control groups**, by submitting an entry to the Group schema through the User Tool. Then, when you define schemas, fields, or active links using the Administrator Tool, you specify the access each group will have to information in your database.

An access control group may reflect a functional area, such as “Tech Support,” or a general category, such as “Browsers.” Each user may be a member of several of these groups. In order for the user to be allowed to view or modify a field, at least one of the groups the user belongs to must have the appropriate View or Change access to the field. **View access** means the user is able to see the contents of the field. **Change access** means the user is able to modify the contents of the field. Even if users have view permissions to access a schema, they cannot see the field if they do not have view or change access to the field as well.

Groups are assigned their own View and Change permissions as well. The group access setting determines the *maximum* rights for the group, but not the specific rights the group will have for a field. It is the field definition that ultimately determines a particular group’s access to a specific field. For example, the “Tech Support” group may have Change access rights in general, but for the “Problem Description” field this group may be defined as having only View access.

The submitter and assignee of an AR are given special consideration in the access control mechanism. The **submitter** is the person who submits the AR (whose name is entered in the Submitter field). The **assignee** is the person who is assigned responsibility for resolving the AR (whose name is entered in the Assigned-to field). In the field definition, you can specify that the submitter or assignee of an AR have access to the field regardless of the access rights of the individual users who submit or are assigned the ARs.

Note – Except as described in “Special Submitter Access” on page 101, the submitter and assignee must have valid AR System write licenses to be able to take advantage of the Change access privileges given to these special groups.

The diagram shown in Figure 5-1 on page 101 illustrates how access control (or permission) to fields in a schema is defined. In this example, the field definition for a specific field gives the “CS Staff” group Change access to the field, and the “Browser” and “HD Staff” groups View access. This means that John can change the field, but Alice and Rick can only view its contents. Notice that John is a member of both the Browser and CS Staff groups. Notice also that even though Alice belongs to a *group* that has Change access rights, the field definition limits her to View access for this field.

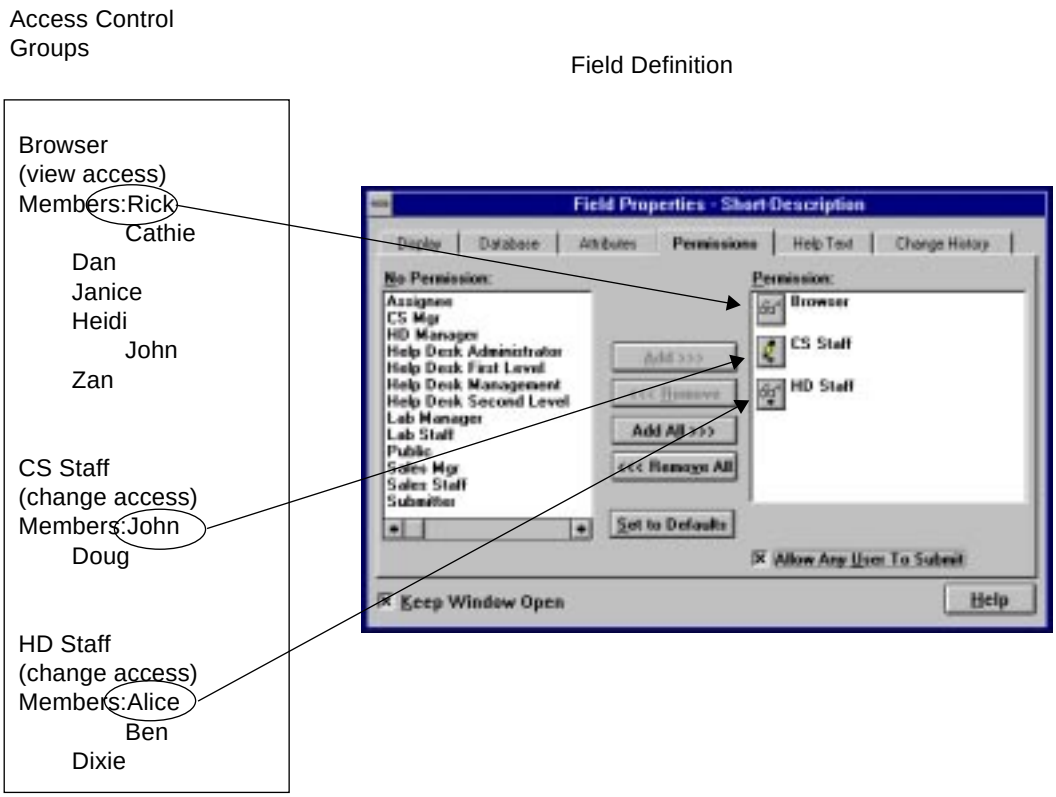


Figure 5-1 Specifying Field Access Control (or Permissions)

Special Submitter Access

If you select Locked for the Submitter Mode in the Server Information window, the Submitter field is “locked” (that is, it cannot be changed) once a ticket is submitted. Submitters *without* write licenses are allowed to write to or update AR tickets for which they are the submitter if the special Submitter group or a group they are a member of has been allowed Change access. This is one of the two instances where a user without a write license can update existing entries (see “Allowing Users to Modify Their Own Passwords” on page 113 for the other instance).

If you select Changeable for the Submitter Mode in the Server Information window, the Submitter field is not “locked” once a ticket is submitted. After a ticket is submitted, anyone with a valid write license and write permission to the field can change the name in the Submitter field. In Changeable mode, a user must have a fixed or floating license to change any record, including entries for which they are the submitter.

To set the submitter mode, see “License Information” on page 44.

Access Control Groups

Groups are used primarily to define user access to the various features of the AR System, including schemas, fields within a schema, and active links. They are also used to define groups of users to receive notifications (for example, you can designate an entire group to be notified in a filter action). A group can have Change, View, or no access. A user can be a member of more than one group.

Six special groups are provided by the AR System — Public, Administrator, Customize, Submitter, Assignee, and Subadministrator. (The Group ID numbers 0 through 5 are reserved for these groups.) You may want to set up additional groups to reflect various functional groups, such as a “Help Desk” or “Tech Support” group.

Of the special groups, the Administrator, Subadministrator, and Customize groups are **explicit** groups to which you can assign users. The Public group is a group to which every user belongs automatically. The Submitter and Assignee groups are **implicit** groups. Users belong to these implicit groups based on specific conditions; you do not assign users to these groups.

Details about each of the groups are as follows:

Administrator	The Administrator group defines users who have full and unlimited access to the AR System. Users who belong to this group can create schemas, menus, filters, escalations, and active links, or delete entries. They also can add or delete users and other groups. Users assigned to this group automatically have change access permission to all fields (the ability to change field contents). Users will belong to this group only if you explicitly assign them to it. Each member of the Administrator group *must* have a fixed license or the group assignment is ignored.

Sub-Administrator	The Subadministrator group provides a layer of *limited* administrative access to the AR System, allowing different functional administrative groups in a single AR System server. A user has subadministration access to a schema if (1) the user belongs to the Subadministrator group *and* (2) the user belongs to a group that is enabled for subadministrator access to the schema. Each member of the Subadministrator group *must* have a fixed license or the group assignment is ignored. For more information on subadministration in the AR System, see “Subadministrator Permissions” on page 114.
Customize	The Customize group grants users the right to customize their schema layout and create user commands in the User Tool. Users will belong to this group only if you explicitly assign them to it.
Public	Every user is a member of the Public group. You can use this group to define general View or Change access to fields or schemas. For any field or schema where the Public group is allowed View access, any user can view the contents of the field for any entry regardless of what groups they are a member of and what permissions are granted to those groups. Note that this includes users who are connected to the system as “guest” users (users who are not registered users of the AR System), if guest users are allowed on your server. For any field where the Public group is allowed Change access, any user with a fixed or floating license can update the entry regardless of the groups they belong to and the permissions granted to those groups. See “Configuration Information” on page 46 for information on allowing guest users.
Submitter and Assignee	The Submitter and Assignee groups are implicit groups. Users automatically belong to the Submitter group for ARs where their name is in the Submitter field, and to the Assignee group for ARs that have been assigned to them. If a field has change access defined for the Submitter or Assignee group, licensed users can change the contents of that field when they are the submitter or assignee of an AR even if they do not belong to any of the other groups that have change access for that field. For information on how Submitter Mode affects the Submitter group, see “Special Submitter Access” on page 101.

Row Level Access Control

The row level access feature of the AR System extends the access control capabilities of the system to allow per-entry control on the basis of group membership. Access to individual ARs, or "rows," and to the individual fields within those ARs can be controlled by the group membership of the current user.

Prior to row level access control, administrators were only able to define group access for entire schemas, for individual fields on all ARs in a schema and for individual entries of a specific person. With the addition of row level access control, administrators may now control access to individual fields on individual ARs on a group basis.

Implementation

To support row level access control, the AR System has been modified as follows:

- The `Assignee Group` group (ID 7) has been defined.
- Field number 112 has been defined as a reserved field.

To initiate row level access control in a schema, add field 112 as a character field with a length of 30. Enter field 112 into a group name. If an AR contains a group in field 112, and the current user belongs to that group, the user is granted the additional access defined for group name `Assignee Group`.

Once a schema contains field 112, you can set permissions for group name `Assignee Group` in the group permissions settings for each field on the schema. Users that gain access to the schema as members of group name `Assignee Group` are able to access each field to which that group has been granted access.

If group name `Assignee Group` has not been granted access to any fields in the schema, users will not be able to access the schema's contents based on their membership in the group in field 112. However, users may still access the schema through any other method available to them.

To establish row level access to a schema and fields:

1. **Add a field to the schema with field ID 112.**
   You may choose to hide this field. You may also choose to grant no access to any control group to see or change this field.

2. **Add workflow that inserts a group name into field 112 according to the business rules at your site.**
   For example, if you determine that group name `Assignee Group` should be set when the AR is created, you can create a filter that fires on submit and sets field 112 to a group name based on the contents of the current AR.

3. **Change the access control of the fields in the schema to either grant or deny access to users accordingly.**

Adding Groups

You add groups by running the User Tool and submitting new entries using the **Group** schema, shown in Figure 5-2. You can add as many new groups as you want.

When you create a new group, the group name is added to the list of groups that appears when you use the Administrator Tool to define group access to schemas, individual fields, and active links.

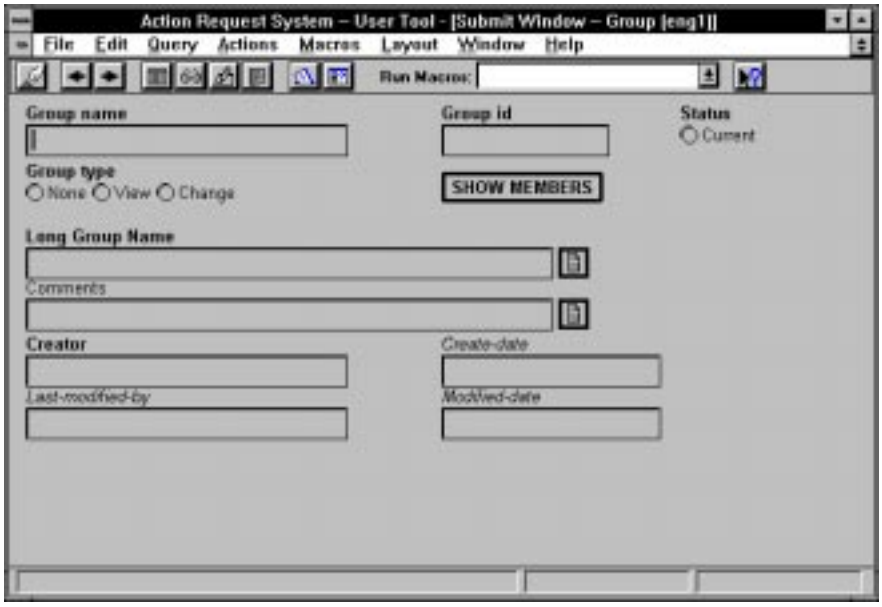


Figure 5-2 Submit Window — Group Schema

The key fields in the Group schema are:

Group name	The Group name is the alias name by which the access control group is known. This is the name you use in the User schema in its Group list field. It is also the name that appears in the Group Permissions list in the Field Properties window when you are defining schema fields, on the Schema Permissions window when you are defining schema attributes, and in the permissions lists for active links.
Group ID	Each access control group has an integer ID that is the real identity of the group. For groups that you create, the ID should be greater than 10. If you use the same ID with multiple group names, you must keep the Group type the same for each (you are really creating aliases for the same group in this case).

Group type	The Group type field holds the maximum permission type intended for the group. The alternatives are None (no access), View (view field contents), and Change (modify field contents). You can use the type None to disable all access allowed for the group without deleting the group itself. The group remains as a placeholder (and can be restored in the future), but all permissions for the group are lost. You might create a group with the type None if you want to define a group that will be used only for notifications.

Note – When field access permissions are granted during field creation or modification, the permissions granted for the group can be no greater than the type specified for the group in the Group schema. For example, if the group has a View type, you cannot assign Change permissions on a field for the group. However, if the group has Change permission, it *can* be limited to View permission only on the field.

If a group does not have access permission to a schema's Entry ID field (core field 1) or if a group does not have schema permissions, members of that group will not be able to access any information from that schema, regardless of the permission settings for other fields on the schema.

Long Group Name	The Long Group Name lets you enter additional information about the group. It should be descriptive of the group since this is the name that will appear by default in the Query List window in the User Tool.

To create a group:

1. **Start the User Tool by double-clicking the User Tool icon from the Remedy AR System group window. If this is the first time you have used the User Tool, the Login dialog box appears. Enter your user name and password, then select the OK button.**
   If there are no other Administrator users yet, you must log in as Demo.

   For more information on logging in as Demo, see the note on page 14.

2. **Open the Group schema in a Submit window (as shown in Figure 5-2).**

3. **Enter information in the appropriate fields.**
   Create a new group by specifying a group name, ID and type. There are additional fields in the Group schema for describing the meaning and attributes of the group more thoroughly. (If there are additional attributes

not represented on the Group schema that are important to your organization and you would like to specify these attributes in the group definition, you can use the Administrator Tool to add fields to the Group schema.)

Note – Privileges for a user are determined by the permissions assigned to the user's Group ID. If you later change the Group ID for a group, the users belonging to the original Group ID will still be attached to the old ID. If there is no group with the old ID, these users are no longer attached to any group.

4. **When you have finished entering information, select the Apply button.** When you receive a confirmation that your entry was successful, the new group has been added to the system.

After you have created a new group, you can assign users to the group by using the User schema (also from within the User Tool). Adding users to a group gives them the access rights of that group. (For more information, see "Adding Users" on page 109.)

Modifying Groups

Follow these steps to modify a group from the AR System.

To modify a group:

1. **Open the Group schema in the User Tool.**
2. **Select Query List from the Query menu to retrieve a list of currently defined groups.**
3. **Select one or more groups that you want to modify from the list.**
4. **Click the Modify button (or choose Modify Individual from the Query menu).**
5. **Modify information in the appropriate fields.**
6. **When you have finished entering information, select the Apply button to modify the record.**

Deleting Groups

Follow these steps to delete a group from the AR System.

To delete a group:

1. **Open the Group schema in the User Tool.**
2. **Select Query List from the Query menu to retrieve a list of currently defined groups.**
3. **Select the group that you want to delete from the list.**
4. **From the Query menu in the User Tool, choose Delete.**
5. **A confirmation box appears to verify that you want to delete the group entry. Click the OK button to confirm.**

AR System Users

When adding users to the system, keep in mind the limitations of your user licenses. The basic AR System product includes one server license, which allows unlimited users with submit and query access, and three fixed write user licenses — that is, three users with the ability to change ARs after they are submitted. A user with change access may belong to the Administrator or Subadministrator group or one or more groups with Change permission.

Note – If you want more than three users with change access, you must purchase the appropriate license from Remedy Corporation or an authorized reseller. Check with your sales representative for information on the types of licenses that are available.

Adding Users

You add users to groups by running the User Tool and submitting entries in a database provided by another special AR System schema, called the **User** schema (Figure 5-3).

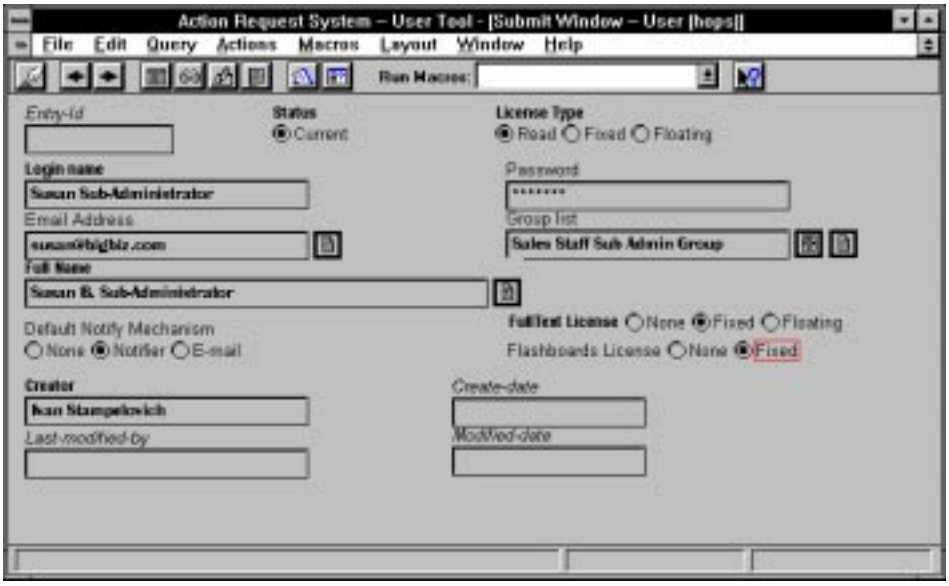


Figure 5-3 Submit Window — User Schema

The key fields in the User schema are:

License Type	The type of write license the user has: Read (includes submit and query permission), Fixed, or Floating. The default is Read.
Login name	The identifying name that the user will enter into the User Name field when starting the AR System. The login name for the AR System is distinct from any other login name the user may have elsewhere; however, it is convenient to use the same name to avoid confusion and extra maintenance.
Password	The identifying password that the user will enter when starting the AR System. It is a good idea to select a password that is different from ones used for other purposes. You can set options on a UNIX server to tie the password to the user's UNIX password or to use the `/etc/passwd` file for user validation. See "Configuration Information" on page 46 for more information.
Email Address	The email address that will be used to notify the user when email is the notification method.

Group list	Specifies the access control groups to which the user belongs. If this field is left empty, the user will have only basic submitter, assignee, or public permissions. When entering groups in the Group list, you can specify the groups either by name or ID.
Full Name	Holds the full name of a user. By default, this name appears along with the entry ID in the Query List window when users perform a Query List operation.
Default Notify Mechanism	The way in which the user will be notified of actions affecting them if no notify mechanism is specified or the default mechanism is specified at the time the action is taken.
Full Text License	The type of full text search license the user has: None, Fixed, or Floating. The default is None.

Whether or not users have permission to access an AR System database or specific fields or active links in a database is determined in part by the permissions given in the Group list field of the User database entry. (Even when users do not belong to an explicit group with appropriate access, they may be able to access fields by being the submitter or assignee for a particular entry.)

It is possible to add more than one user with the same login name as long as you specify a different password for each entry. It is the combination of user name and password that makes a user entry unique to the AR System.

The default view of the User schema contains fields in addition to the key fields listed above that allow you to collect information about the user you are adding to your system. As with all other schemas, you can change the field labels and add new fields to suit your needs.

To add users to the system:

1. **Run the User Tool on any machine on which you installed the software by double-clicking the User Tool icon from the Remedy AR System group window.**
   If this is the first time you have used the User Tool, the Login dialog box appears. Enter your user name and password, then select the Apply button.

   If there are no other users yet, you must log in as Demo.

   For more information on logging in as Demo, see the note on page 14.

2. **Open the User schema in a Submit window (as shown in Figure 5-3 on page 110).**

3. **Enter information in the appropriate fields.**
   Always set passwords, especially for AR administrators. It is recommended that you make Password a required field. For security reasons, the password you enter is masked in the Password field.

   In the Group list field, enter a list of the groups to which the user is to belong, separated by spaces. The list can include one or more of the special groups (Administrator, Subadministrator, or Customize) as well as any access control group defined in the Group schema. In the example in Figure 5-3 on page 110, Susan Subadministrator will be a member of the Sales Staff and Subadmin groups.

   - If the Administrator group is in the Group list, the user will be able to modify all fields, delete entries, and run the Administrator Tool to manage the objects in the system.
   - If the Customize group is in the Group list, the user will be able to use all features of the customize facility of the User Tool.
   - If the Subadministrator group is in the Group list, the user will be able to perform a subset of the Administrator functions as described in "Subadministrator Permissions" on page 114. For example, users will be able to modify all fields and delete entries and to manage objects in the system to which the Administrator has allowed Subadministrator access to other groups which the user is a member of.

   When first getting started, do not worry about specifying all the additional access control groups you may need. You can add groups to the Group list for a user's entry at any time and give those groups access to fields by modifying field definitions within schemas.

4. **When you have finished entering information, select the Apply button.**
   When you receive a confirmation that your entry was successful, the user has been added to the system. If adding a new user will cause you to exceeded your license agreement, an error message appears.

Note – You may need to delete the AR System demonstration users before you can add a user.

Allowing Users to Modify Their Own Passwords

If you desire, you can define your user entries so that users will have the ability to modify their own password. You can take advantage of the Assignee (or Submitter) group to accomplish this without allowing users to access any passwords other than their own.

To allow users to change their passwords:

1. **On the User schema entry for the user, make the user the Assignee by entering the same name in the Login name field and in the Assigned-to field. (Alternatively, you could make the user the submitter by entering the same name in the Submitter field as in the Login name field.)**
2. **Make sure that the Assignee (or Submitter) group has change permission to the Password field.**

Note – In addition to the Password field, you can grant change permission to the Default Notify Mechanism and Email Address fields.

Deleting Users

Follow these steps to delete a user from the AR System.

To delete a user:

1. **Open the User schema.**
2. **Select Query List from the Query menu to retrieve a list of currently defined users.**
3. **Select the user that you want to delete from the list.**
4. **From the Query menu in the User Tool, choose Delete.**
5. **A confirmation box will appear to verify that you want to delete the user entry. Click the OK button to confirm.**

Subadministrator Permissions

Granting subadministrator permissions to a user is a powerful feature of the AR System. Users can be granted subadmin permissions to a subset of available schemas, as shown in Figure 5-4. Inside a schema, subadministrators have the same privileges and permissions that an administrator has, including creating objects, viewing server settings, setting local preferences, and so on. Use subadministrator access wisely.

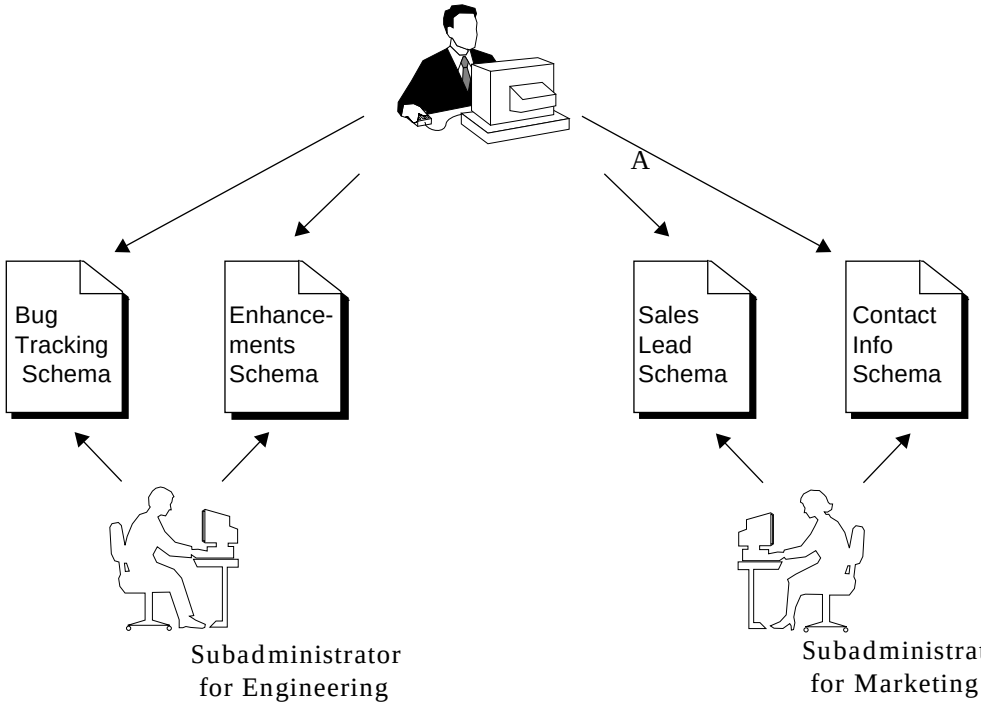


Figure 5-4 Users Subadministering Schemas

Only users who (1) belong to the Subadministrator group and (2) belong to a group with subadmin access to a schema can be a subadministrator and perform the following functions:

- Administer any schema that their group has subadministrator access to.
- Create and administer filters, active links, and escalations connected to schemas that their group has administrative access to.

- Create and administer menus.
- Create new schemas.
- View server info settings.
- Set Administrator Tool preferences.

However, members of the Subadministrator group cannot:

- Change server info settings.
- Release users currently accessing the AR System.
- View users of the AR System.
- Administer schemas they are not subadministrators for.

Allowing multiple subadministrators poses interesting administrative challenges. For example, if you allow two different groups (say, Engineering and Marketing) subadmin permissions to a schema, Engineering with their permissions theoretically could use the Administrator Tool to revoke the permissions of the Marketing group! However, the AR Administrator could ultimately restore schema permissions back to the Marketing group. Just be aware of potential problems.

To create a user with subadministrator capabilities:

1. **In the User Tool, open the User schema in a Submit window (as shown in Figure 5-3 on page 110).**
2. **Enter information in the appropriate fields.**

a. Always set passwords, especially for an AR subadministrator. It is recommended that you make Password a required field. For security reasons, the password you enter is not echoed in the Password field.

b. In the License Type field, assign the subadministrator a Fixed write license.

c. In the Group list field, use the menu to enter the groups to which the user is to belong. The list must include the Subadministrator group. Remember that giving users membership in the
Subadministrator reserved group only gives them the *potential* to be a subadministrator. For users to be subadministrators, they must belong both to the

Subadministrator group and also to a group with subadmin permissions to a schema. In the example in Figure 5-3 on page 110, Sarah Subadministrator will be a member of the Sales Staff and Subadministrator groups.

3. **When you have finished entering information, select the Apply button.** When you receive a confirmation that your entry was successful, the user has been added to the system as a subadministrator.

4. **Select the Subadmin Permissions tab (see Figure 6-12 on page 134) in the Schema Properties dialog box to give subadministrator permissions to a schema to a specific group or groups. For example, Sarah Subadministrator will not have subadmin permissions to a schema unless you explicitly give them to a group she is a member of. To define sub admin permissions, see "Defining Subadministrator Access for Schemas" on page 134.**

Defining Schemas 6

This chapter describes how to create and modify schemas. A **schema** consists of the data fields in a database. Each schema represents a database on an AR System server.

You should be familiar with the information in “Designing Schemas” on page 77 before you perform the operations described in this chapter.

The following topics are covered in this chapter:

- Using the Schema window.
- Opening schemas.
- Naming schemas.
- Deleting schemas.
- Creating or modifying active links from a Schema window.
- Defining permissions for multiple schemas.
- Setting schema properties, including:
  - Defining indexes.
  - Defining query list fields.
  - Defining schema permissions.
  - Defining group access to schema fields.
- Setting help for schemas.
- Building and using schema change history.

For information for defining and modifying fields on a schema, see Chapter 7.

Using the Schemas Window

When you open a schema, it is displayed in the Schema Window. Figure 6-1 shows a new schema containing only core fields.

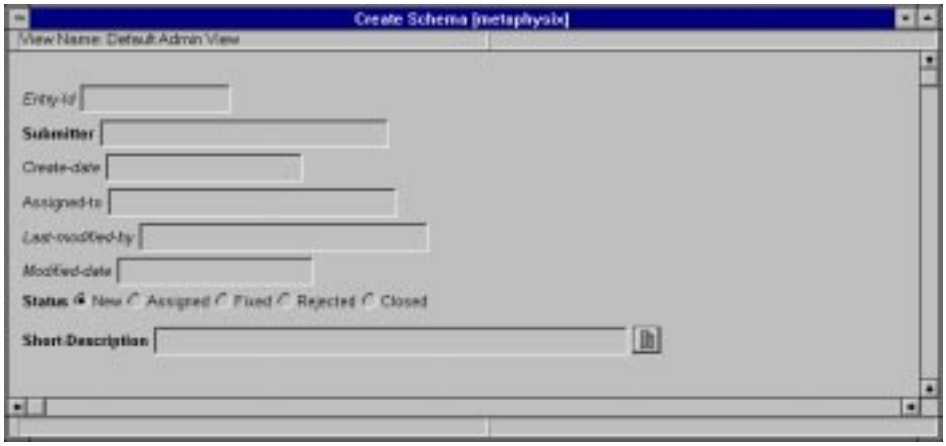


Figure 6-1 Schema Window

You use the Schema Window to perform the following tasks:

- Specify a schema name.
- Create and modify fields. For information on field properties, see Chapter 7.
- Move, align, and modify button-activated active links.
- Define, modify, and delete multiple schema views.
- Create help text for the schema.
- Define schema attributes such as indexing, fields returned in a query list, permissions for the schema, and subadministrator definitions for the schema.

This chapter describes the steps to follow to perform the tasks of defining schemas. Chapter 4 provides information about planning for all these tasks.

When the Schema window is the active window, new menus and additional menu items appear in the menu bar in the Admin Tool Main window. The following section provides a short description of the items in the File, Edit, Schema, and Layout menus. Toolbar buttons are also described.

The File Menu

The File menu from the Schema Window is shown in Figure 6-2.

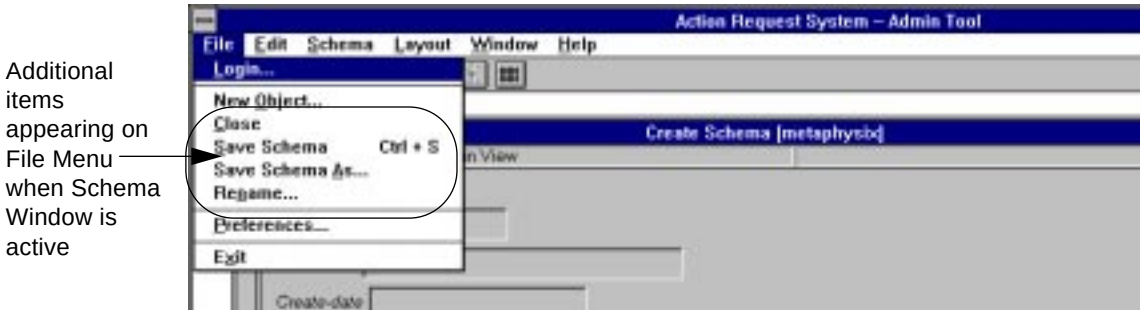


Figure 6-2 Schema Window — File Menu

The File menu provides the following additional options:

Close		Quits Schema window.
Save Schema (Ctrl+S)		Saves all changes made in the Schema window. You can also use the corresponding toolbar button to save changes.
Save Schema As		Allows you to copy a schema and save it under a different name but keep the original.
Rename		Allows you to give a different name to a schema.

The Edit Menu

The Edit menu from the Schema Window is shown in Figure 6-3 on page 120.

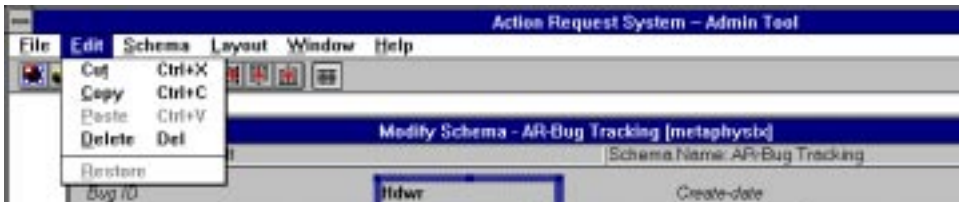


Figure 6-3 Schema Window — Edit Menu

The Edit menu provides the following options:

Cut (Ctrl+X)	Deletes highlighted field(s) and moves it to the internal clipboard.
Copy (Ctrl+C)	Copies highlighted field(s) and moves it to the internal clipboard.
Paste (Ctrl+V)	Pastes internal clipboard's current contents at the location of the cursor.
Delete (Del)	Deletes highlighted field(s) but does not move it to the internal clipboard.
Restore	Restores the previous field property settings from the database for the selected field(s).

The Schema Menu

The Schema menu from the Schema Window is shown in Figure 6-4.

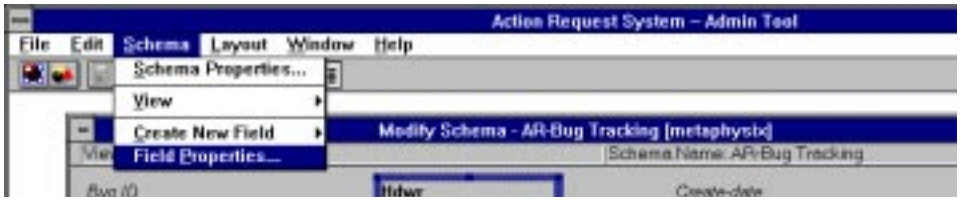


Figure 6-4 Schema Window — Schema Menu

The Schema menu provides the following options:

Schema Properties	Opens the Schema Properties dialog box, which you use to define query lists, indexes, permissions, subadministrator permissions, help text, and change history for schemas.

View	Allows you to select and modify a schema view, including the following options: * **Select**. Selects schema view to display. * **Copy**. Copies schema view. * **Delete**. Deletes schema view. * **Set Default View**. Sets default view that appears in Modify Schema window. For information, see “Schema Views” on page 173.
Create New Field	Allows you to create a new field. Use the cascading menu to select the data type for the field you want to create: * Character. * Date Time. * Diary. * Integer. * Real. * Selection. For information, see “Attributes Field Properties” on page 155.
Field Properties	After you select a field, displays the Field Properties window, which lets you create or modify properties for the selected field.

The Layout Menu

The Layout menu from the Schema Window is shown in Figure 6-5. Some Layout menu options also have corresponding buttons available on the toolbar.

Figure 6-5 Schema Window — Layout Menu

For the functions of the Layout menu, see “Using the Layout Menu to Arrange Fields” on page 178.

6

Creating Schemas

Follow these steps to create a new schema.

To create a schema:

1. **Open a Server Window.**
2. **Select a server from the Servers list.**
3. **Click the New Object button on the toolbar or select New Object from the File menu. The New Object dialog box appears (Figure 6-6).**

Figure 6-6 New Object Dialog Box

4. **Double-click Schema in the New Object list (or select Schema, then click the OK button).**
   A new schema appears in a Schema Window (see Figure 6-1 on page 118) and is assigned the name `Create Schema [Server_Name]`. You now can modify the new schema as needed.

Opening Schemas

Follow these steps to open and modify an existing schema.

To open a schema:

1. **Open a Server Window.**
2. **Select a server from the Servers list.**
3. **Double-click the Schemas object to display all existing schemas on this server.**

4. **Double-click a schema from the Schemas list. You also can select a schema from the Schemas list, then press Return.**
   The schema appears in the Schema Window (see Figure 6-1 on page 118). You now can modify the schema as needed.

Note – You can open as many schemas as you want but you cannot open the same schema twice.

Saving and Naming Schemas

For a newly created schema, `Create Schema` [*Server_Name*] appears as the title of the schema in the Schema window. When you save the schema, you replace this title with the name that you want to use for this schema. Schema names must be unique on each AR server. There is no enforced convention for specifying schema names, but it is helpful to make the name descriptive and indicative of the schema's function. Names may be up to 30 characters, including blanks.

Note – Users must log onto the server again or restart the User Tool to see a new or modified schema name.

To save and name a schema:

1. **Open a Server Window.**
2. **Select a server from the Servers list.**
3. 
   Click the New Object button on the toolbar or select New Object from the File menu. The New Object dialog box appears (Figure 6-6 on page 122).
4. **Double-click Schema from the New Object list (or select Schema, then click the OK button).**
   A new schema appears in a Schema Window (see Figure 6-1 on page 118) and is assigned the name `Create Schema [Server_Name]`.
5. **Modify the new schema.**
6. 
   Click the Save button on the toolbar (or select Save Schema from the File menu, or type `Ctrl+S`) to save the schema. The Save Schema As dialog box appears (Figure 6-7 on page 124).

Figure 6-7 Save Schema As Dialog Box

7. **In the Schema field, enter the name of the new schema.**
8. **From the View Name drop-down list, choose the default schema view for the new schema. You can use the default name or create a new name. For more information, see "Schema Views" on page 173.**
9. **Click the OK button to close the dialog box. The name of the new schema appears in the title bar.**

Saving a Schema Under a Different Name

When saving a schema under a different name, the new schema contains all the fields and properties of the original schema, including its views. The only difference is the schema name.

Note – Using the Save Schema As command copies *only* the schema definitions. Any objects associated with the schema (for example, active links, filters, and escalations) will not be copied.

To save a schema under a different name:

1. **Open a Server Window.**
2. **Select a server from the Servers list.**
3. **Double-click the Schemas object from the server you just connected to. The currently available schemas are listed in the Schemas list.**
4. **Double-click a schema to open it.**
5. **From the File menu, choose Save Schema As. The Save Schema As dialog box appears (see Figure 6-7 on page 124).**

6. **In the Schema field, enter the name of the copy of the schema.**
7. **From the View Name menu, choose the default schema view for the new schema. For more information, see “Schema Views” on page 173.**
8. **Click the OK button to make a copy of the schema.**

Renaming Schemas

Renaming a schema allows you to save a schema under a different name and overwrites the original. In this case, the original schema with its original name no longer exists.

To rename a schema:

1. **Open a Server Window.**
2. **Select a server from the Servers list.**

3. **Double-click the Schemas object from the server you just connected to. The currently available schemas are listed.**
4. **Double-click a schema to open it.**
5. **From the File menu, choose Rename. The Rename Schema dialog box appears.**

Figure 6-8 Rename Schema Dialog Box

6. **In the Schema field, enter the new name of the schema.**
7. **Click the OK button to rename the schema.**

6

Deleting Schemas

Deleting permanently removes a schema and all associated ARs. Any data, filters, escalations, or active links tied to this schema will also be deleted. Menus are *not* deleted. Follow these steps to delete an AR System schema:

To delete a schema:

1. **Open a Server Window.**
2. **Select a server from the Servers list.**

3. **Double-click the Schemas object from the server you just connected to. The currently available schemas are listed.**
4. **Select a schema from the Schemas list.**
5. **From the Edit menu, select Delete - Schema.**
   A confirmation message appears (if your preferences are set for this). Click the OK button to delete the schema. For more information, see “Defining Preferences” on page 61.

Note – Warning: The delete operation is permanent and cannot be undone. Make sure you no longer need a schema before deleting it. You cannot delete any schema that is currently open.

Setting Schema Properties

For each schema, you can define properties that determine characteristics of how that schema will look and act during operations performed in the User Tool. You can define the following schema properties in the Schema Properties dialog box:

Query List Fields	Allows you to specify which of the schema’s fields will appear in a query list for the schema.
Indexes	Allows you to define up to 16 indexes on the fields of the schemas you create. By setting an index on a field that users search on frequently, you can greatly increase the speed of access to items in the search.

Permissions	Allows you to specify which of the access control groups defined on the server are able to see the schema. By denying permission to a group, you can assure that no member of that group will be able to access the schema, unless they belong to another group with permissions.
Subadmin Permissions	Allows you to specify which groups have Subadministrator privileges on the schema.
Change History	Allows you to record information about the owner of a schema, the user who last modified it, and the date of the modification. You can add additional change history information as well.
Help Text	Allows you to define help text for the schema. In most cases, this help text is simply a description of the schema, what it does, and how it is used. User Tool users will be able to view this help text in the same way that they can view help text that is available for fields.

Instructions for defining each of the schema properties are provided in the following sections.

Defining Query List Fields

The Query List Fields schema property setting allows you to customize which fields appear when a user performs a query list operation in the User Tool. Normally, the user sees the contents of the Entry ID field and the Short Description field. By specifying this property, you can modify the query list to contain the contents of any fields on the schema. (The contents of the Entry ID field will always be returned.)

When you define the list of fields, you specify each field, the width to use for that field, and the string to use as a separator between that field and the next field in the list. The total string that you define can be no longer than 128 characters.

Note – Modifying the contents of the query list will also affect the contents of the Selection List window (pick list in the User Tool). The Selection List window appears when an active link that performs a set field operation based on a query returns more than one result. See the *Action Request System User's Guide* for more information on the Selection List window.

To define fields returned in a query list:

1. **Open the schema for which you want to define query list format.**
2. **Double-click an empty part of the schema. (Or choose Schema Properties from the Schema menu.) The Schema Properties dialog box appears.**
3. **Click the Query List Fields tab in the Schema Properties dialog box, as shown in Figure 6-9.**

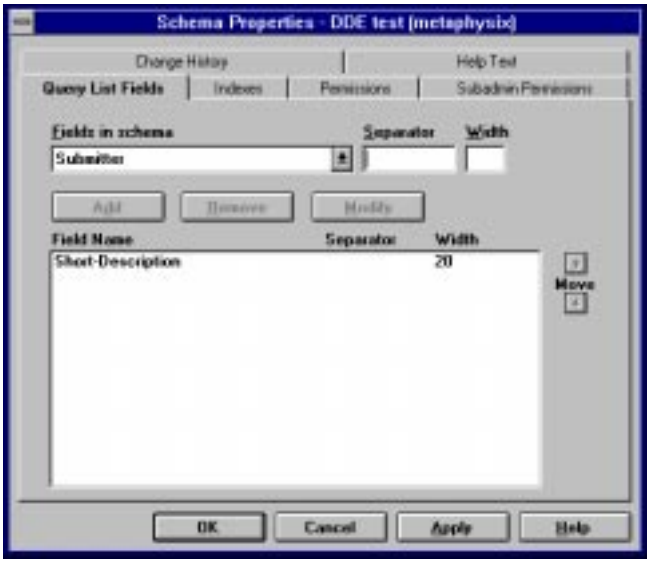


Figure 6-9 Schema Properties — Query List Fields

4. **From the Fields in schema drop-down list, select the name of the first field that you want to appear in the Field Name list.**

5. **In the Separator field, type a character or string to be used as the separator between that field and the next one in the list. The string may contain spaces as well as any of the following special characters:**

Special Character:	You Enter:
Backspace	\b
Return	\n
Tab	\t
Backslash	\\
ASCII Character	\<*nnn*> (this number is decimal)

   In the Width field, type a number to determine the width of the data that appears in the query list. If you set a width of 20, only the first 20 characters of the field value will appear in the list, regardless of the length of the actual entry. Remember that the total string, including separators, can be no longer than 128 characters.

6. **Click the Add button. The field appears in the Field Name list, along with its separator and width settings.**

7. **Enter the names of additional fields that you want to appear in the query list, along with their separator characters and widths. You can display up to 128 characters in the query list; the number of fields that you can display will vary depending on the width that you specify for each field.**
   - To remove a field from the list, select the entry in the Field Name list, then click the Remove button.
   - To modify a field's separator and width settings, select it from the Field Name list, make your changes, then click the Modify button.
   - To re-arrange the order of the fields in the list, select the entry in the Field Name list, then click the up or down arrow buttons.

8. **Click the OK button to save your query list definition and dismiss the Schema Properties window.**

9. **Click the Save button on the toolbar to save all changes to the schema.**

Defining Indexes

The Indexes schema property setting lets you define up to 16 indexes. Indexing can greatly decrease the time required for a database search.

Note – You can only index a relational database. Flat file databases do not support indexing.

You can specify up to 16 indexes and up to 16 fields for each index that you define. The sum of all field lengths in an index must be less than 255 bytes.

Good candidates for fields to index include fields that you search on frequently. The Entry ID field is already indexed, so there is no need to build a separate index for that field.

If you define an index for a character field, make sure the QBE Match type set for the field is Leading or Equal. An index on a field with an Anywhere match type will not save any search time. (For more information, see "QBE Match" on page 154.)

Note – You should be aware that for schemas with indexes defined, more time is required when you make modifications to the schema (such as adding new fields). The greater the number of indexes defined for the schema the more time and disk space is required. Additionally, submit and modify operations in the User Tool take longer on schemas with many indexes.

To define indexes for a schema:

1. **Open the schema for which you want to define an index.**
2. **From the Schema menu, choose Schema Properties. The Schema Properties dialog box appears.**
3. **Click the Indexes tab in the Schema Properties dialog box, as shown in Figure 6-10 on page 131.**

Figure 6-10 Schema Properties — Indexes

4. **To define the first index for the schema, select a field from the Fields in schema list, then click the Add button to enter the names of the schema's fields into the Index on list. You can enter up to 16 fields. These are the fields that will be included in the index. Enter the fields in the order that you want them indexed.**
   You can also select a field from the Index on list, then click the Remove button to delete a field from the index.

5. **Select the Unique check box to specify whether the index is a unique index. Unique means that the system will enforce a rule requiring each value (existing and new) in the index to be unique. For example, you would not define a unique index on a field that contains first names, since more than one person might have the same name. You might, however, define a unique index on a phone number field, since each phone number may be unique.**

6. **To create additional indexes for the schema, click the New Index button. Select the names of the fields from the Fields in schema list to use for this second index. Click the Unique check box, if appropriate. Repeat this step as many times as needed to create the indexes you want.**

7. **Click the Previous and Next buttons to move from one defined index to another, as you desire. If needed, click the Delete Index button to remove an index from the database.**
8. **Once you have created all the indexes that you need for the schema, click the OK button to save your index definition and dismiss the Schema Properties window.**
9. **Click the Save button on the toolbar to save all changes to the schema.**

Note – If you are creating or administering indexes on a schema for which a lot of data exists, this step may take a significant amount of time and disk space. Therefore, you may want to limit defining indexes during your normal production hours.

Defining Permissions for the User Tool

The Permissions schema property setting lets you determine whether users belonging to each access control group can see a schema in the User Tool or not. If the user cannot see the schema in the User Tool, they cannot see *any* field or *any* data from that schema, regardless of other permission settings on the schema. For example, if Public access is denied for a schema, users who do not belong to any group that *does* have access to the schema will not be able to see it even if the schema contains fields with Public read access. If a user is not in a group that has permission to see the schema, the schema will not appear in that user's Schema list.

If no permissions are set for a schema, only the administrator and any associated subadministrator will be able to see the schema.

To define permissions for a schema:

1. **Open the schema for which you want to define group access.**
2. **From the Schema menu, choose Schema Properties. The Schema Properties dialog box appears.**
3. **Click the Permissions tab in the Schema Properties dialog box, as shown in Figure 6-11 on page 133. A list of the access control groups defined on the server is displayed.**

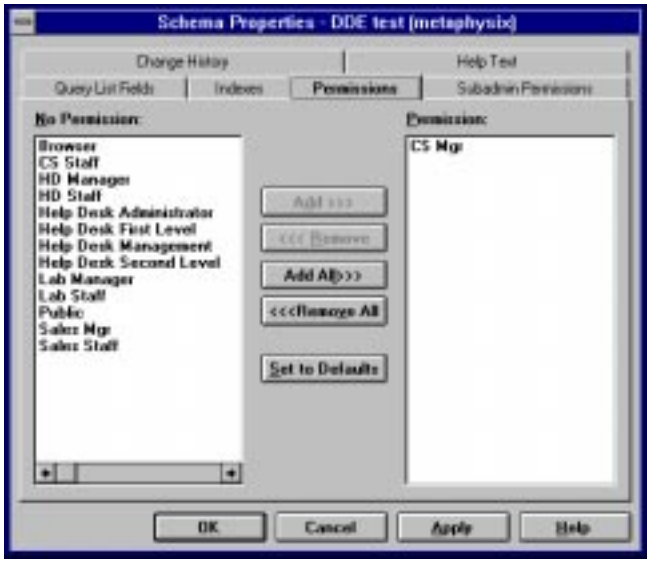


Figure 6-11 Schema Properties — Permissions

4. **In the No Permission list, double-click the group for which you want to allow access to the schema (or select a group, then press the Add button). Groups with access to the schema appear in the Permission list.**
   - To remove a group from the Permission list, select a group or groups, then click the Remove button.
   - To add all groups to the Permission list, click the Add All button.
   - To remove all groups from the Permission list, click the Remove All button.
   - Click the Set to Defaults button to reset the schema to its default permissions (for more information, see “Setting Default Schema Permissions” on page 56).
5. **Click the OK button to save your schema permissions and dismiss the Schema Properties window.**
6. **Click the Save button on the toolbar to save all changes to the schema.**

To allow all users to see a schema:

- Add the Public group to the Permission list.

Defining Subadministrator Access for Schemas

The Subadmin Permissions setting allows you to determine which groups have subadministrator privileges over the schema. Remember that inside a schema, subadministrators have the same privileges and permissions that an administrator has. For further information on subadministration, see "Access Control Groups" on page 102 and "Subadministrator Permissions" on page 114.

To define subadministrator permissions:

1. **Open the schema for which you want to define sub admin access.**
2. **From the Schema menu, choose Schema Properties. The Schema Properties dialog box appears.**
3. **Click the Subadmin Permissions tab in the Schema Properties dialog box, as shown in Figure 6-12. A list of the access control groups defined on the server is displayed.**

Figure 6-12 Schema Properties — Subadmin Permissions

4. **To add a group to the set allowed potential subadministrator access, select a group from the No Permission list, then click the Add button. Groups with subadministrator permissions over the schema appear in the Permission list.**
   - To remove a group from the Permission list, select the group, then click the Remove button.
   - To add all groups to the Permission list, click the Add All button.
   - To remove all groups from the Permission list, click the Remove All button.
5. **Click the OK button to save your subadministrator definitions and dismiss the Schema Properties window.**
6. **Click the Save button on the toolbar to save all changes to the schema.**

Building and Using Schema Change History

The AR System lets you record information about the owner of a schema, the user who last modified the schema, the date of the modification, and change description.

To define change history for a schema:

1. **Open the schema for which you want to define change history.**
2. **From the Schema menu, choose Schema Properties. The Schema Properties dialog box appears.**
3. **Click the Change History tab in the Schema Properties dialog box, as shown in Figure 6-13 on page 136.**

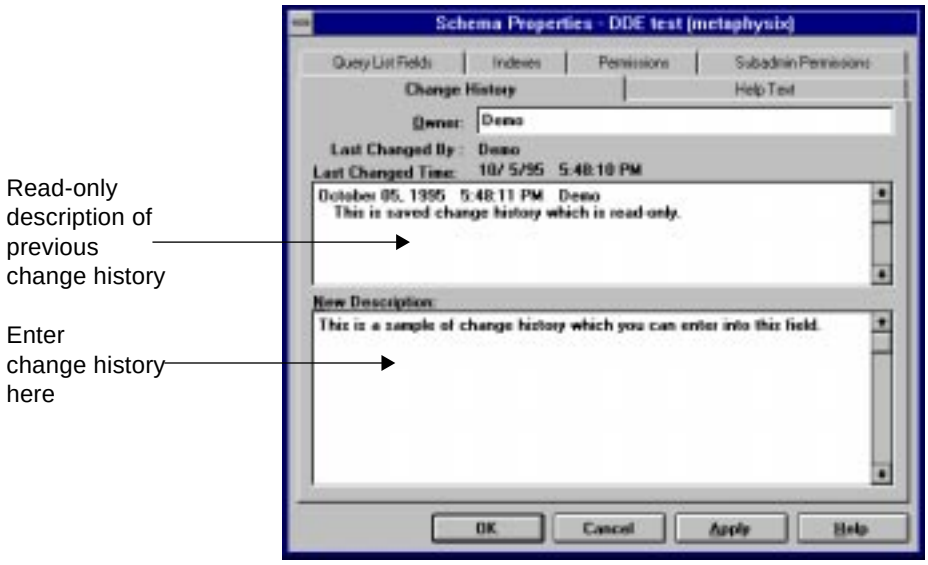


Figure 6-13 Schema Properties — Schema Change History

4. **If needed, assign a new owner of the schema in the Owner field.**
5. **In the New Description field, enter any information about modifications to the schema that you think will be helpful to other administrators or subadministrators of the AR System.**

Note – All previous change history is found in the read-only window above the New Description field. After you enter and save change history, it cannot be edited.

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6. **Click the OK button to save your change history and dismiss the Schema Properties window.**
7. **Click the Save button on the toolbar to save all changes to the schema.**

Creating End-User Help Text for Schemas

You can supply schema help text for end-users of the User Tool in the Schema Properties window. In most cases, this help text is simply a description of the schema and what it is used for. The text that you enter appears as context-sensitive help for end-users when they select Field/Schema Help from the Help menu or press the Help button on the toolbar.

To define help text for a schema:

1. **Open the schema for which you want to define help text.**
2. **From the Schema menu, choose Schema Properties. The Schema Properties dialog box appears.**
3. **Click the Help Text tab in the Schema Properties dialog box, as shown in Figure 6-14.**

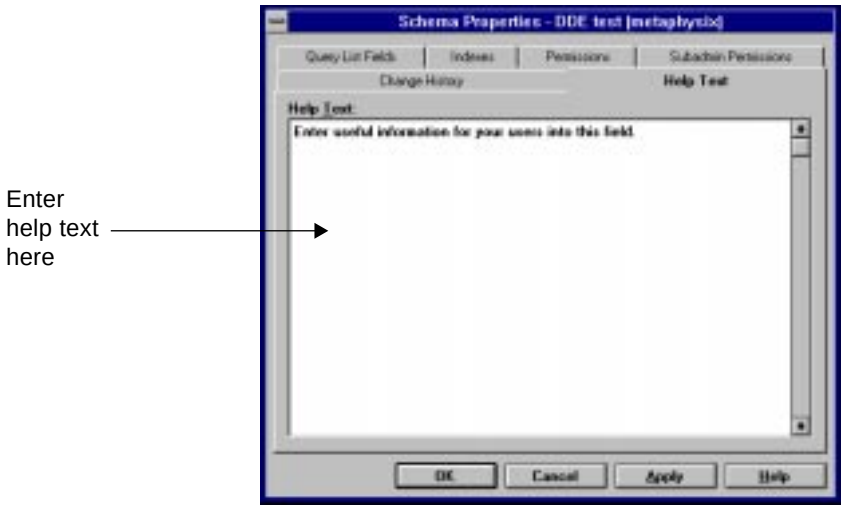

Figure 6-14 Schema Properties — Schema Help Text

4. **In the Help Text field, enter any information that you think will be helpful to end-users of your schema.**
5. **Click the OK button to save your help text entry and dismiss the Schema Properties window.**

6. **Click the Save button on the toolbar to save all changes to the schema.**

Defining Group Permissions for Multiple Schemas

The Administrator Tool lets you do bulk assignments of group permissions for all schemas within a server. Rather than going through each schema individually to assign permissions for a group, the Group Permissions dialog box lets you assign them all at once.

The Group Permissions dialog box is particularly useful when you have added a new access control group since the schemas were created. You use this dialog box to assign the new group access for every schema instead of having to open each schema and modify the conditions for each schema.

Note – The Administrator Tool offers several different ways to set permissions. For example, when creating a schema, you might give access to the Public group. However, if you decide that you want to deny the Public group access to schemas, you then can use the Group Permissions dialog box to set the group permissions for *all* schemas at the same time.

To define permissions for multiple schemas on a server:

1. **In the Server Window, select a server, then double-click Groups to see a list of groups defined on the server.**
2. **Double-click a group from the Groups list. The Group Permissions dialog box appears (Figure 6-15). You use this dialog box to set group permissions for schemas, fields, and active links.**
3. **Click the Schema Permissions tab. All the schemas defined for the server appear. You use this window to set schema permissions globally for each group defined for a server.**

Figure 6-15 Schema Group Permissions Dialog Box

4. **To assign schema permissions to a group, double-click the schema for which you want to define permissions (or select a schema, then press the Add button). You can also do the following:**
   - Click the Add All button to give permissions for all the schemas to the group.
   - Click the Remove button to delete a schema from the Permissions list.
   - Click the Remove All button to delete all the schemas from the Permissions list.
5. **Click the OK button to save the group permissions settings.**

6

Defining Fields 7

This chapter describes how to create and modify fields in schemas. You should be familiar with the information in “Designing Schemas” on page 77 before you perform the operations described in this chapter.

The following topics are covered in this chapter:

- Creating and modifying fields.
- Setting field properties, including:
  - Setting Display properties.
  - Setting Database properties.
  - Setting field Attributes.
- Creating selection field values.
- Defining permissions for fields.
- Defining permissions for multiple fields.
- Setting help for fields.
- Building and using field change history.

Creating and Modifying Fields

You can create new fields or modify existing fields in a schema at any time. Users can continue using the schema while you are creating and modifying fields. All changes take effect as soon as they are applied to the database. (Current users will need to reopen the schema in order to see the changes.)

There are a number of performance considerations that you should keep in mind when you are adding a field to an existing database, increasing the size of an existing field, activating or disabling a full text index, or deleting a field. These operations require a varying amount of time, depending on a number of factors including the size of the database, the amount of data currently stored in the database, and the number of indexes that are defined for the fields on the schema. Additionally, such modifications may require a great deal of disk space in both the log and data segments.

During these operations, users may not be able to access the AR System server. Clients may receive timeout messages; however, the operation the client is performing at the time of the message will continue.

Note – We recommend that you do not modify production schemas while they are in use.

To create a new field:

1. **Open the schema (see “Opening Schemas” on page 122).**
2. **From the Schema menu, select a data type from the New Field cascading menu. (See “Attributes Field Properties” on page 155 for more information on data types.)**

Note – You can only choose the data type for a new field; once you have made your choice here, you cannot modify its data type. However, for selection and integer fields, you can change their display types.

The new field appears at the upper-left corner of the Schema Window.

3. **Double-click the new field to open the Field Properties dialog box. You can also select the field, then choose Field Properties from the Schema menu (Figure 7-1 on page 143).**

Keeps Field Properties dialog box open if you

Figure 7-1 Field Properties Dialog Box (New Field)

4. **Specify the field's properties by filling in or modifying the values in the Field Properties dialog box. (See "Field Properties" on page 146 for information on the values you enter in the Field Properties dialog box.)**

5. **When you have finished setting up the new field, position it where you want it on the schema using the mouse to drag it into position. (You can specify more exact coordinates for the field using the display property settings.) See "Arranging Field Layout" on page 178 for more information.**

6. **Click the Save button on the toolbar (or select Save Schema from the File menu, or type `Ctrl+S`) to save all changes to the schema.**

7. **When you have entered the appropriate values in the Field Properties dialog box, you can double-click the Control menu to dismiss the dialog box.**

To modify a field:

1. **Open the schema.**

2. **Double-click the field to open the Field Properties dialog box. You can also select the field, then choose Field Properties from the Schema menu (see Figure 7-1).**

Note – You do not have to close the Field Properties dialog box to modify other fields in the schema. The Field Properties dialog box displays the properties of any field you select from the Schema Window. However, if you clear the Keep Window Open check box, the Field Properties dialog box closes when you select another field (see Figure 7-1 on page 143).

3. **Make the appropriate modifications to the field's properties by filling in or modifying the values in the Field Properties dialog box. (Note that you will not be able to modify the field data type.) For information on the values that you can enter in the Field Properties dialog box, see "Field Properties" on page 146.**
4. **Click the Save button on the toolbar to save the changes to the schema.**
5. **When you have modified the appropriate values in the Field Properties dialog box, double-click the Control menu to dismiss the dialog box.**

To restore field properties:

If you change your mind after performing modifications to a field's properties and have not saved the changes to the database, you can restore its properties by selecting one or more fields and choosing Restore from the Edit menu.

- *Before saving changes in the database to the field properties*, choose Restore from the Edit menu. The field's original values are restored.

Note – You *cannot* use Restore to recover a field that you delete.

To delete a field:

1. **Select one or more fields to delete. You cannot delete the core fields.**
2. **Choose Delete from the Edit menu. You also can select a field, then press the Delete key. A delete field warning appears.**
3. **Click the Yes button if you are sure you want to delete the field. If you are deleting multiple fields, click Yes To All. The field is removed from the screen.**

4. **Click the Save button on the toolbar (or select Save Schema from the File menu, or type `Ctrl+S`) to save your changes. A final warning message appears, alerting you that the fields will be deleted from the database.**
5. **Click the OK button. The field is deleted and your changes are saved.**

Note – Deleting a field deletes all the data associated with that field and frees this space in the database. The operation is expensive in the sense that it may take several minutes to complete. Your database may be unavailable for this time so your users will be impacted while the delete is occurring (they will not be able to access the server and may get time out messages). Accordingly, you may want to perform deletes off-hours so that users will not be impacted.

To make a field non-operational:

If you don't want to use a field but also don't want to delete it, you can make it non-operational by completing the following steps.

1. **Open the schema.**
2. **Double-click the field to open the Field Properties dialog box. You can also select the field, then choose Field Properties from the Schema menu.**
3. **Change the following properties**:
   - Click the Display tab and select the Hide Field check box.
   - Click the Database tab and select Optional for the Entry Mode.
   - Click the Attributes tab and delete any existing default information in the Default Value field.
   - Click the Permissions tab and click the Remove All button to clear all selection choices (so that no group has access to the field).
4. **Click the Save button on the toolbar to apply the changes to the database.** The field will no longer appear on any user's view of the schema. The field will not be hidden to current users of the schema until they re-open the schema or log in again.
5. **Double-click the Control menu to dismiss the Field Properties dialog box.**

To copy a field:

1. **Open the schema and select the field you want to copy. (The field must have the same data type as the field you want to create since you cannot change the data type of an existing field.)**
2. **Choose Copy from the Edit menu (or type `Ctrl+C`).**
3. **If necessary, open the schema that you want to copy the field to.**
4. **Choose Paste from the Edit menu (or type `Ctrl+V`). The new field appears on the schema. All settings for this field are the same as the original field except for the field ID.**
5. **Double-click the new field to open the Field Properties dialog box. You can also select the field, then choose Field Properties from the Schema menu. Make the appropriate modifications to the field's properties by filling in or modifying the values in the Field Properties dialog box. (Note that you will not be able to modify the field data type.) For information on the values that you can enter in the Field Properties dialog box, see "Field Properties" on page 146.**
6. **Position the field where you want it on the schema using the mouse to drag it into position. (You can specify more exact coordinates for the field using the display property settings.) See "Arranging Field Layout" on page 178 for more information.**
7. **Click the Save button on the toolbar to add the new field to the schema.**
8. **After you have made all your changes to the field definition, double-click its Control menu to dismiss the Field Properties dialog box.**

Field Properties

You use the Field Properties dialog box (Figure 7-2 on page 147) to modify a field's properties. You display this dialog box for an existing field by double-clicking the field or by selecting a field, then choosing Field Properties from the Schema menu.

Figure 7-2 Field Properties Dialog Box

Use the tabs in the Field Properties dialog box to change the following field properties:

Display	Allows you to specify the display properties or how the field will appear. Properties apply only to a particular schema view. For example, in one schema view a field might be visible while in another schema view, the field might be hidden or located somewhere else on the schema.
Database	Displays field ID and type and allows you to define field options in the database. Settings apply to *all* schema views.
Attributes	Allows you to define the attributes or parameters of the field definition. Settings apply to *all* schema views.
Permissions	Defines who can view and change individual fields of a schema. Settings apply to *all* schema views.
Help Text	Allows you to supply help text for the field. In most cases, this help text is simply a description of the field and how it is used. Entries apply to *all* schema views.
Change History	Allows you to record information about the owner of a field, the user who last modified it, and the date of the modification. You can add additional change history information as well. Entries apply to *all* schema views.

To create and modify fields in a schema view, see “Schema Views” on page 173.

The following information summarizes each of the settings in the Field Properties dialog box and provides guidelines for filling in the values in each field.

Note – The AR System lets you have multiple views of the same schema, including whether a field hidden in one schema view is displayed in a different schema view. Some field properties affect schema views while other field properties do not. For more information, see “Schema Views” on page 173.

Display Field Properties

The following settings appear in the Field Properties dialog box when you click the Display tab (see Figure 7-2 on page 147). Edit these display properties as needed.

Table 7-1 Display Properties *(1 of 3)*

Label	In the Label field, enter a name for the field that will appear in the currently selected view of the schema. Labels may be up to 30 characters long, including blanks. (However, do *not* include trailing blanks as part of the label.) Users can personalize labels later using the User Tool. If you leave this field blank, the field will appear on the screen with no label. You may use single quotes in field labels; however, when performing queries, users will need to enter *two* single quotes when specifying the label. This is because field labels that contain special characters must be enclosed in single quotes in queries and a single quote in the label would otherwise be interpreted as the end of the field label. **Note:** You can use the same label for more than one field on a schema. However, if duplicate field labels exist on a schema, the AR System will issue a warning message any time you apply changes to that schema. (You also can disable the warnings. See “Warnings: Duplicate Field Names” on page 64.) If you create fields with no labels or duplicate labels, those fields will appear elsewhere in the Administrator Tool with their field IDs, for example, in the Fields drop-down list in the Set Fields action of a filter.

Table 7-1 Display Properties *(2 of 3)*

Location	The Location drop-down list lets you specify whether a field label will appear above the field data segment or to the left of it on the schema. * Select Top to cause the label to appear above the data segment. * Select Left to cause the label to appear to the left of the data segment.
X / Y	The X / Y fields in the Position / Size box let you determine where the field is positioned on the schema. After dragging the field to a general location using the mouse, you can use the X / Y fields to specify a more exact location on the screen using X and Y coordinates. If you have a series of fields on the same line, these fields must have the same Y coordinate in order for tabbing between fields to work as you would expect. (Tabbing works from top-to-bottom, left-to-right.)
Width / Height	The Width and Height read-only fields in the Position / Size box shows you the pixel size of the field on the schema.
Length (Char)	For text or numeric fields, you enter a display length in the Position / Size box to determine how much room a field will occupy on the screen. Display length often differs from the setting of the maximum length allowed for data entered in the field. If a user enters more characters than can be displayed, the text will scroll off the end of the field, provided that the internal field length is greater than the display length. For more information about internal field and input lengths, see “Database Field Properties” on page 150.
Rows	For radio buttons, the number of rows in the Position / Size box determines the number of horizontal rows used for the buttons. A setting of 1 produces a single horizontal row. A setting of 2 or more will divide the choices evenly into 2 or more horizontal rows. For text or numeric fields, the number of rows determines the number of rows of text that are displayed.

Table 7-1 Display Properties *(3 of 3)*

Data Type	This read-only field in the Type box displays the kind of information contained by the field, including the following: * Character * Date Time * Diary * Integer * Real * Selection For information on these data types, see “Attributes Field Properties” on page 155.
Display Type	For Integer and Selection data types, the Display Type drop-down list in the Type box lets you toggle between the following choices: * For Selection fields, you can choose either Drop-Down List or Radio button display. * For Integer fields, you can choose either Edit or Numeric Spinner display.
Hide Field	This check box allows you to specify whether the field will be hidden or visible. Making a field hidden means the field will not appear in the user’s view. (Users with Customize permissions can make a hidden field visible.) A hidden field remains in the database and may be used by filters, active links, or programs that might access the field. You can also set administrator defaults for hidden fields.

Database Field Properties

The following settings appear in the Field Properties dialog box when you click the Database tab (Figure 7-2 on page 147).

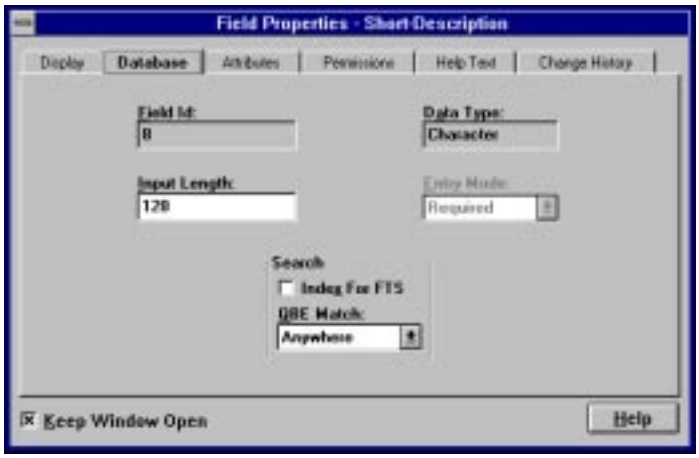

Figure 7-3 Database Properties

Edit the database properties listed in Table 7-2 as needed.

Table 7-2 Database Properties *(1 of 3)*

Field Id	Every field in a schema has an integer field ID that is unique on that schema. If you leave the field ID blank or set it to zero when you are defining a field, the AR System will assign a number from the unrestricted number set. Restrictions on field ID numbers are as follows: * Numbers 1 – 99 are reserved for core fields. You cannot assign an ID in this range unless you are creating a field that is compatible with one of the core fields obsoleted as of the 1.2 release of the AR System. See Appendix C, for information on these fields. * Numbers 100 – 536870911 are reserved for fields registered to Remedy Corporation. If you use an ID in this range, the field definition should match the definition registered with Remedy Corporation. You will receive a warning that the ID is in this range and must acknowledge it before you can use the ID. * Numbers 536870912 – 2147483647 are user defined. There are no restrictions on assigning numbers in this range. The field ID is used internally to identify the field throughout the AR System. The field ID remains constant even if the field label changes. You cannot modify the field ID after it is applied to the database. If you are creating multiple schemas and you are defining fields that serve the same purpose on more than one schema, it is a good idea to assign identical IDs to the identical fields in the different schemas. This allows you to have a consistent meaning for the ID across the schemas.
Data Type	This read-only field displays the type of data contained in this field: * Character * Date Time * Diary * Integer * Real * Selection For information on these data types, see “Attributes Field Properties” on page 155.

Table 7-2 Database Properties *(2 of 3)*

Input Length	For character fields, you can enter the maximum length of the information the field can contain. You will get the most efficient use of database storage if you set the maximum length of a character field to be less than or equal to 255 characters. When the field length is less than or equal to 255 characters, the allocated storage is equal to the length of field contents. If you set the maximum length to larger than 255 characters, storage is allocated in blocks that average 1-2K characters (depending on the database). A full block is allocated for the first character. When that block is filled with the field contents, another full block is allocated. Leaving the Length field blank or setting it to 0 (zero) specifies an unlimited length field. If the field length is 70 characters or more, the user will be able to open a Text Editor window by selecting the text edit icon to the right of the field. Remember that, for some databases, you cannot do searches on fields over 255 characters. If you have questions about the capabilities of your particular database, refer to your database reference guides. **Note:** When deciding on the length to specify for a field, you should keep in mind that the maximum amount of data that will be displayed is 100,000 characters on a UNIX platform and 32,000 characters on a PC or a Macintosh.
Entry Mode	The Entry Mode drop-down list allows you to specify whether the field will be required or optional. Making a field **required** forces the user to fill in that field when they submit a new AR. If a field is **optional**, each user is free to enter information in the field or not, as suits their needs. By default, a required field appears with a **bold** label to signify its importance to the user. The core schema has three required fields: Submitter, Short Description, and Status. You should only make a field required if it *must* be filled in for every AR. **Note:** You can also use filters and active links to require users to enter information in a field under specified circumstances. See the sample schemas for examples. For more information about filters, see “Designing Filters” on page 84 and Chapter 10. For more information about active links, see “Designing Active Links” on page 92 and Chapter 12.

Table 7-2 Database Properties *(3 of 3)*

Index for FTS	Lets you define whether to index the field for full text search (if you are using the FTS option). For more information, see "Defining a Field for FTS in the Field Properties Window" on page 404. If you are not licensed for FTS, this field does not appear.
QBE Match	For character fields, you can specify how a match will be determined when a user performs a query-by-example (QBE). You can select any of the following values: **Anywhere**A query will find a match if the value occurs anywhere in the field. For example, if the user enters `Bob` in the Submitter field, the query will return all ARs submitted by Bobby Jones, Bob Smith, and Jill Bobbington. **Leading**A query will find a match only if the value occurs at the beginning of the field entry. For example, if the user enters `Bob` in the Submitter field, the query will return all ARs submitted by Bob Smith and Bobby Jones, but not those submitted by Jill Bobbington. **Equal**A query will find a match only if the value entered in the query matches the value in the field exactly. For example, to find ARs submitted by Bob Smith, the user must enter `Bob Smith`, with exact spelling and capitalization, in the Submitter field. Searches on fields where the QBE match type is Leading or Equal will be faster than searches on fields where the match type is Anywhere, especially if the field is indexed. **Note:** Relational operators and wild cards will work during a query-by-example regardless of the QBE Match setting. This means that users will be able to specify an exact match in a field with a QBE Match setting of "Anywhere" by using the equal sign (=) relational operator. Users will also be able to use the percent sign (%) wild card at the beginning of the search string (`%abcd`) to override a QBE Match setting of "Leading" or "Equal." However, using the % wild card at the end of a string (`abcd%`) does not override the "Leading" or "Equal" setting. Overriding the Leading or Equal QBE Match settings will also override the performance benefits of using those settings.

Attributes Field Properties

The settings that appear in the Field Properties dialog box when you click the Attributes tab (Figure 7-4) differ based on the data type of the field. The Attributes tab lets you specify the kind of information that will be contained by the field you created. Edit these properties as needed.

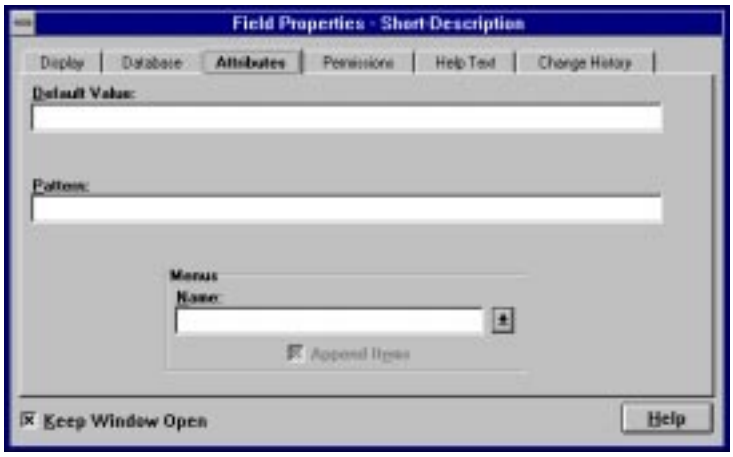

Figure 7-4 Character Data Type Attributes

Character Fields

Character fields accept strings of ASCII text (Figure 7-4). Character data types are useful when there is significant variation in the field contents or length of the content, for example, descriptive text, names of people, addresses, and keywords. Long character fields (70 characters or longer) can display a a pop-up text editing window for viewing and editing the field's contents. This allows you to conserve space on the users' view of the schema because the display length can be smaller than the input length attribute. A special icon will appear to the right of any field for which it is possible to open a text editing dialog box.

On UNIX platforms, a character field can hold up to 100,000 characters. On PCs and Macintosh computers, a character field can hold up to 32,000 characters.

Table 7-3 lists the meanings and use of attributes you can set for the character data type.

Table 7-3 Attributes for Character Data Type Fields *(1 of 2)*

Default Value	By entering an appropriate value in this field, you can assign an **administrator default** to any field on the schema. This value will be assigned to the field any time the user submits a ticket where no value has been assigned to the field. You also can enter the field value that you want to appear when users load default preferences into the Query or Submit windows in their User Tool. **Note:** Users can override any defaults you may have defined when you set up the schema.
Pattern	You can specify a **pattern** for the field contents. Specifying a pattern restricts what the user can enter as the contents of a character field. There are two types of character patterns that you can specify. The first type is a pattern similar to that used in the LIKE operator. This type of pattern allows you to enter any character pattern you wish to match. The pattern can include any of the wild card characters that are allowed in the LIKE comparison operation (see "Table of Operators" on page 444). The second type of pattern is a **keyword** that specifies a style for a character field. You can specify only one keyword for a pattern and the pattern keyword cannot be combined with a pattern of characters and wild cards: `$ALPHA$`Value must be alphabetic characters (and blank space). `$ALNUM$`Value must be alphabetic characters and digits (and blank space). `$DIGIT$`Value must be digits. `$LOWER$`Value may be any alphabetic character or digit (and blank space) *except* uppercase letters. `$MENU$`Value must match an item defined on the character menu for the field. `$PRINT$`Value must be printable characters. `$UPPER$`Value may be any alphabetic character or digit (and blank space) *except* lowercase letters.

Table 7-3 Attributes for Character Data Type Fields *(2 of 2)*

Name	Lets you select a **character menu** to attach to the diary field. A special menu icon appears to the right of any field with a character menu. The character menu provides users with a fill-in aid that can help standardize the text contents. Character menus give all users a common vocabulary for description and can therefore help improve the accuracy of queries made by the support staff. Note that, unless you specify a pattern match in the Pattern field (see "Pattern" on page 156), users are free to enter their own text even when character menus are defined for the field. See Chapter 9, for information on designing and creating a character menu.
Append Items	Lets you specify how text will be added to the field when a user selects an item from a character menu. * If you select Append Items, the menu text will be added to any text already in the field. * If you clear Append Items, the menu text will replace any text already in the field.

Date Time Fields

Date and time fields (Figure 7-5) are useful for information that is limited to calendar dates and time. The format is in local (language) time formats, such as 12/21/95 13:14:21 and December 21, 1995 1:14:21 PM. Date and time fields can play a significant role in providing metrics for your AR System implementation. You can perform queries and statistical evaluations on Date Time fields and use the results in a number of ways. For example, you can design a macro that generates a statistics report of the average time required to fix problems.

In the Default Value field, enter the field value, including keywords, that you want to appear when users load default preferences into the Query or Submit windows in their User Tool.

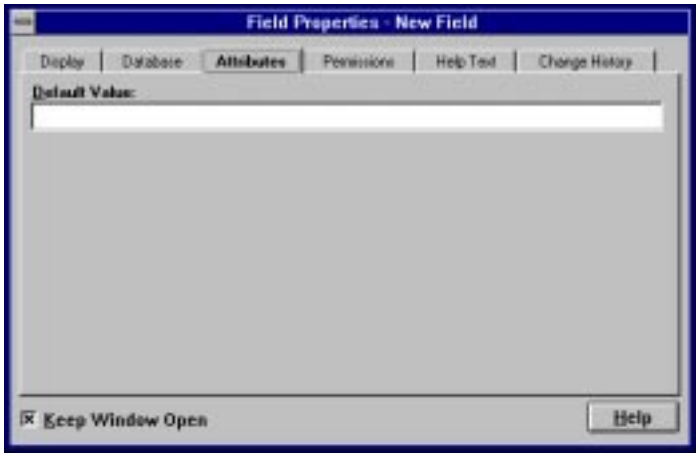

Figure 7-5 Date Time Data Type Attributes

Diary Fields

Diary fields (Figure 7-6 on page 159) are a special data type designed to capture a history of the resolution of an AR. Diary fields are designed so that each time an action is taken on an AR an entry to the diary field will be appended to previous entries. A text editor allows flexible entry of each new diary addition. A special icon will appear to the right of each diary field to allow users to open the diary text editor dialog box.

Every diary entry is stamped by time and user name. Once entered, entries cannot be modified.

You can add one or more diary fields as needed. You might, for example, designate one diary as the public diary and design another diary that will be seen only by support staff.

Different platforms can handle different sizes of character fields:

- On UNIX platforms, a diary field can hold up to 100,000 characters.
- On PCs, a diary field can hold up to 64,000 characters.
- On Macintosh computers, a diary field can hold up to 32,000 characters.

In the Default Value field, enter the field value, including keywords, that you want to appear when users load default preferences into the Query or Submit windows in their User Tool.

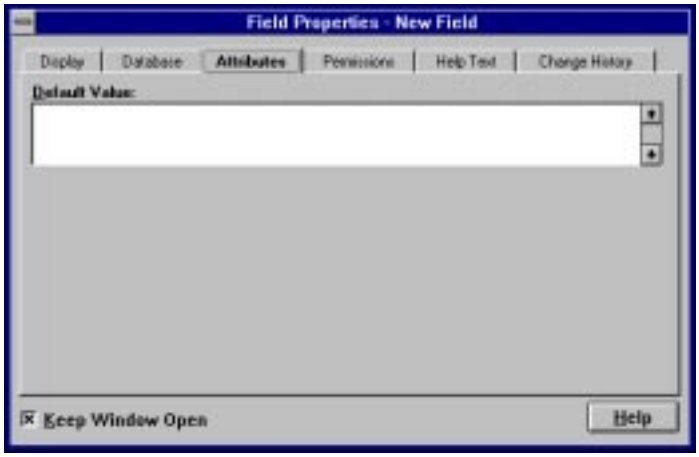

Figure 7-6 Diary Data Type Attributes

Integer Fields

Integer fields (Figure 7-7 on page 160) accept integer values between -2147483648 and 2147483647. You can limit the range for a particular field by entering values in the Minimum and Maximum fields.

Note – You display the integer data type either as an edit field or as a numeric spinner from the Display tab in the Field Properties dialog box.

You can use integer and real type fields to process statistical information. For example, you might use them in conjunction with a time field to calculate the cost of resolving certain types of problems.

For integer fields, you define a low and high limit specifying a range of values by entering numbers in the Minimum and Maximum fields. During data submission and modification, the user will be limited to entering values that fall within the range you specify.

In the Default Value field, enter the field value that you want to appear when users load default preferences into the Query or Submit windows in their User Tool.

Figure 7-7 Integer Data Type Attributes

Real Fields

Real fields (Figure 7-8 on page 161) accept and contain floating point numbers. This type of field permits you to store more quantitative information in an AR. You can limit the range for a particular field by entering values in the Minimum and Maximum fields. You can also set a limit on the number of decimal places that are displayed in the user's view by specifying a value in the Precision field. Values displayed with a precision setting are rounded off. Note that the precision setting affects only the number that is displayed in the user's view; the actual value stored in the database is not changed.

For real fields, you define the following:

- Low and high limit specifying a range of values by entering numbers in the Minimum and Maximum fields. During data submission and modification, the user will be limited to entering values that fall within the range you specify.
- Limit on the number of decimal places that are displayed in the user's view by entering a value in the Precision field. The number that is displayed is rounded off. (The data stored in the database is unchanged.)

In the Default Value field, enter the field value that you want to appear when users load default preferences into the Query or Submit windows in their User Tool.

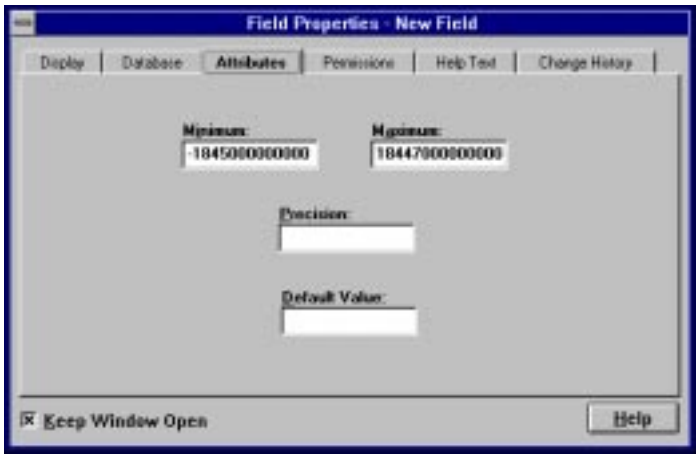

Figure 7-8 Real Data Type Attributes

Selection Fields

Selection fields (see Figure 7-9 on page 163) offer a flexible method for providing a small number of choices. The user *cannot* enter choices that are not included in the definition of the selection list. (This is one distinction between selection lists and character fields with menus.) You should use selection lists only in cases where you do not expect the options available to users to change over time.

Note – You specify the selection data type either as drop-down list or as a radio button from the Display tab in the Field Properties dialog box.

Creating Selection Field Values

Follow these steps to create (or modify) the values available in a selection data type field (a drop down list or radio button).

Note – You should take great care when modifying selection value choices for an existing database. If you change the order of existing selection field items, the meaning of data previously entered in the database will be changed. For example, in a Status field, if the current choices are `New`, `Assigned`, and `Closed`, and you add a choice labeled `Fixed` before the `Closed` selection, existing database entries with a status of `Closed` will now have a status of `Fixed` instead. This is because the data for a selection field is stored in the database as an integer that relates to the order of the choices.

To avoid confusion, do *not* add selection choices to an active schema other than as the last choice of the selection field.

Altering the choices in a selection list often alters views and may require modifications to the existing database. If it *is* necessary to add new choices to a selection list, add them to the end of the list to avoid having to modify the database

To create selection values:

1. **From the Schema menu, create a selection field.**
2. **Double-click the field to open the Field Properties dialog box. The Display properties appear under the Display tab.**
3. **Select either Drop-Down List or Radio Button from the Display Type drop-down list.**
4. **Click the Attributes tab. The Field Properties dialog box appears as shown in Figure 7-9 on page 163.**

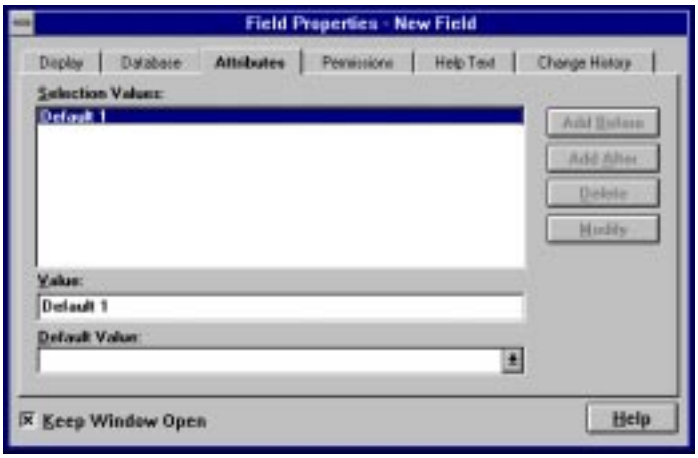

Figure 7-9 Drop-Down List Selection Field Attributes

5. **To modify a value, select the value in the Selection Values list, edit the information in the Value field, then click the Modify button. To add a new value, type the information in the Value field, then click the Add Before or Add After buttons to add the value to the Selection Values list.**
   The Selection Values list box in the Field Properties dialog box shows existing selection values. The order of values in the list box is the order in which they will appear in the selection field. You use the Value field to specify a new value or edit an existing one. The Add Before or Add After buttons let you specify where a new value is inserted in the list box. Add Before will add an item *before* the currently selected choice, while Add After will add the item *after* the currently selected choice.

6. **To delete a value, select the value in the Selection Values list, then click the Delete button. (See the note in "Creating Selection Field Values" on page 161 before adding or deleting choices in the middle of a selection field on an existing schema.)**
   If you delete the default value, the first selection value in the list becomes the new default.

7. **In the Default Value field, enter the field value that you want to appear when users load default preferences into the Query or Submit windows in their User Tool.**

8. **Click the Save button on the toolbar (or choose Save Schema from the File menu, or type `Ctrl+S`) to save your changes.**

Defining Permissions for Fields

You click the Permissions tab in the Field Properties dialog box (Figure 7-10 on page 166) to control who can view and change the contents of individual fields of a schema. You can prevent some groups from accessing the field while allowing full update permissions to other groups.

On the Field Properties dialog box, the groups listed under the Permissions tab are the groups defined for the server. When you add a group to the Permission list, you then select the appropriate view and change permissions. Pressing the menu button pops up a menu that lets you pick the permissions for that group.

* Clicking the View menu button gives a group view permissions *only* for schema fields.

* Clicking the Change menu button gives a group both view and change permissions for schema fields.

Note – Users who do not belong to a group that has permission to view a schema's Entry ID field (core field 1) will not be able to access *any* information from that schema, regardless of how permissions are set on other fields.

If you do not add a group to the Permission list, members of the group will not be able to view or change the field. (Keep in mind that users must be assigned a valid fixed or floating license in order to be able to change a field's content.)

You can also set permissions for the entire schema using the Permissions schema property setting. See "Defining Permissions for the User Tool" on page 132 for more information.

For more information on groups, permissions, and access control, see Chapter 5.

Note – The Administrator Tool offers two different ways to set permissions for fields. The first lets you set permissions as you create each field. For example, when creating the field, you might give change access to a particular group in the Field Properties dialog box. The second lets you assign permissions to one or more fields for a given group. For example, if you decide that you want to grant a particular group view access to the field, you can use the Group Permissions window to set permissions for all fields at the same time. For more information, see “Defining Group Permissions for Multiple Fields” on page 169.

To define field permissions for schema fields:

1. **From the Server Window, select Schemas from the Servers list. The Schemas list appears in the Server Window.**
2. **From the Schemas list in the Server Window, open a schema by double-clicking it. The Schema Window appears.**
3. **Select the field for which you want to define group permission by double-clicking it. (Or choose Field Properties from the Schema menu.) The Field Properties dialog box appears.**
4. **Click the Permissions tab to display the field permissions settings, as shown in Figure 7-10. You use these settings to define field permissions globally for each group defined for a server.**

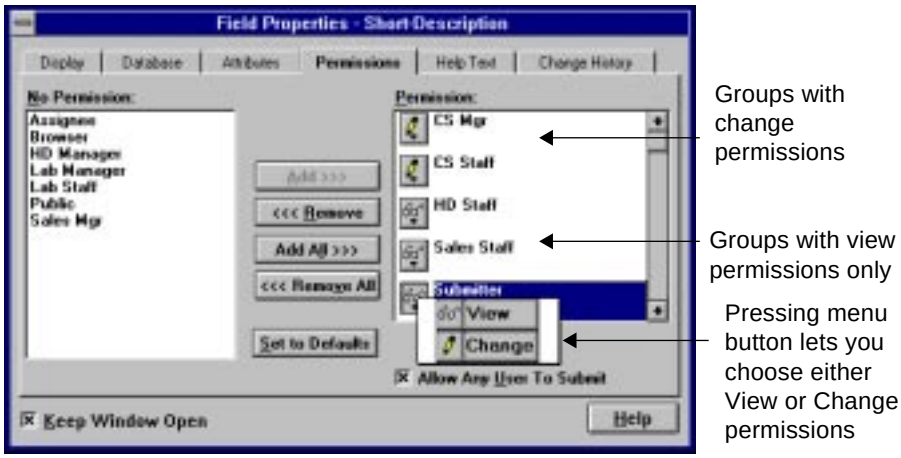

Figure 7-10 Permissions in Field Properties Dialog Box

5. **In the No Permission list, double-click the group for which you want to define field permissions (or select a group, then click the Add button). The group you selected appears in the Permission field. You can also do the following:**
   - Click the Remove button to delete a group from the Permission list.
   - Click the Add All button to add all the groups to the list.
   - Click the Remove All button to delete all the groups from the list.
   - Click the Set to Defaults button to reset the field to its default permissions (for more information, see "Setting Default Field Permissions" on page 59).

   Depending on the group you choose, you have different options in this dialog box. Groups with a group type of View only allow you to select View permissions for schema fields (for example, the Public group). However, groups with a group type of Change allow you to select View and Change permissions. (For more information, see "Group type" on page 107.)

6. **Set the permissions for each field. If you do not click the Change menu button, you allow users *only* to view the field data in the schema. Clicking the Change button allows users to view and change the field data in the schema.**

   In Figure 7-10 on page 166, the HD Staff and Sales Staff have only view permissions for the field, but the CS Mgr and CS Staff groups have view and change permissions.

7. **Select the Allow Any User To Submit check box to allow any user to enter a value into the field at submission time, regardless of permissions or group membership. Clearing the check box restricts data entry to users who belong to a group with explicit change permission for the field.** You use this check box in conjunction with the Group Permissions settings to determine access control (security settings) for the field at the time an AR is submitted. For more information, see "Defining Group Permissions for Multiple Fields" on page 169.

8. **Click the Save button on the toolbar (or choose Save Schema from the File menu, or type `Ctrl+S`) to save your changes.**

Creating End-User Help Text for a Field

You can supply field help text for end-users of the User Tool in the Field Properties dialog box. In most cases, this is simply a description of the field and its uses. The text that you enter appears as context-sensitive help for end-users when they choose Field/Schema Help from the Help menu or click the Help button on the toolbar.

To define help text for a field:

1. **From the Server Window, select Schemas from the Servers list. The Schemas list appears in the Server Window.**
2. **From the Schemas list in the Server Window, open a schema by double-clicking on it. The Schema Window appears.**
3. **Select the field for which you want to supply help text by double-clicking it. The Field Properties dialog box appears.**
4. **Click the Help Text tab, as shown in Figure 7-11.**

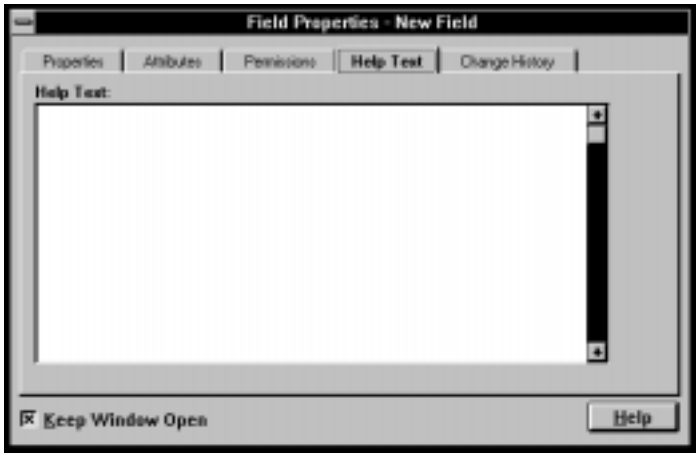

Figure 7-11 Field Help Text

5. **In the Help Text field, enter any information that you think will be helpful to end-users of your field. You can use the shortcut key sequencesstandard Windows keyboard shortcuts to edit text (for example, `Ctrl+C` to copy text, and so on).**
   However, you cannot use the Edit menu commands to edit text. Using the Edit menu with the Field Properties dialog box open affects the field itself, not the help text.

6. **Click the Save button on the toolbar (or choose Save Schema from the File menu, or type `Ctrl+S`) to save all changes to your schema.**

Building and Using Field Change History

The AR System lets you record information about the owner of a field, the user who last modified the field, and the date of the modification. You can display this information at any time by clicking the Change History tab.

To define change history for a field:

1. **From the Server Window, select Schemas from the Servers list. The Schemas list appears in the Server Window.**

2. **From the Schemas list in the Server Window, open a schema by double-clicking on it. The Schema Window appears.**

3. **Select the field for which you want to define change history by double-clicking it. The Field Properties dialog box appears.**

4. **Click the Change History tab, as shown in Figure 7-12 on page 169.**

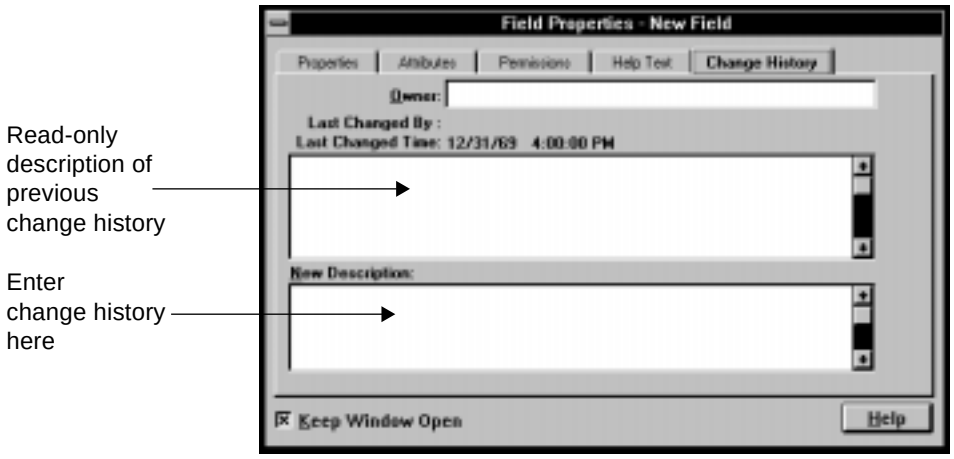

Figure 7-12 Field Change History

5. **In the New Description field, enter any information about modifications to the field that you think will be helpful to other administrators or subadministrators of the AR System.**

Note – All previous change history is found in the read-only field above the New Description field. After you enter and save change history, it cannot be edited.

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6. **Click the Save button on the toolbar (or choose Save Schema from the File menu, or type `Ctrl+S`) to save all changes to your schema.**

Defining Group Permissions for Multiple Fields

The Administrator Tool lets you do bulk assignments of field permissions for all schemas within a server. For example, rather than going through each field individually to assign permissions for a schema, the Group Permissions dialog box lets you assign them all at once.

Defining permissions for fields from the Group Permissions dialog box is particularly useful when you have added a new access control group since the fields were created. You use this dialog box to assign the new group access for every field instead of having to open each field and modify the properties for each field.

On the Group Permissions dialog box, the schemas and fields listed under the Field Permissions tab are those defined for the server. When you add a field to the Permission list, you then select the appropriate view and change levels. Pressing the menu button pops up a menu that lets you pick the permissions for that field.

Clicking the View menu button gives a group view permissions *only* for schema fields.

Clicking the Change menu button gives a group both view and change permissions for schema fields.

Note – The Administrator Tool offers several different ways to set permissions. For example, when creating a field, you might give access to the Public group. However, if you decide that you want to deny the Public group access to fields, you then can use the Group Permissions dialog box to set the group permissions for *all* fields at the same time.

To define permissions for multiple fields in a schema:

1. **In the Server Window, select a server, then double-click Groups to see a list of groups defined on the server.**
2. **Double-click a group from the Groups list. The Group Permissions dialog box appears (Figure 7-13). You use this dialog box to set group permissions for schemas, fields, and active links.**
3. **Click the Field Permissions tab. You use this dialog box to set field permissions globally for each group defined for a server.**

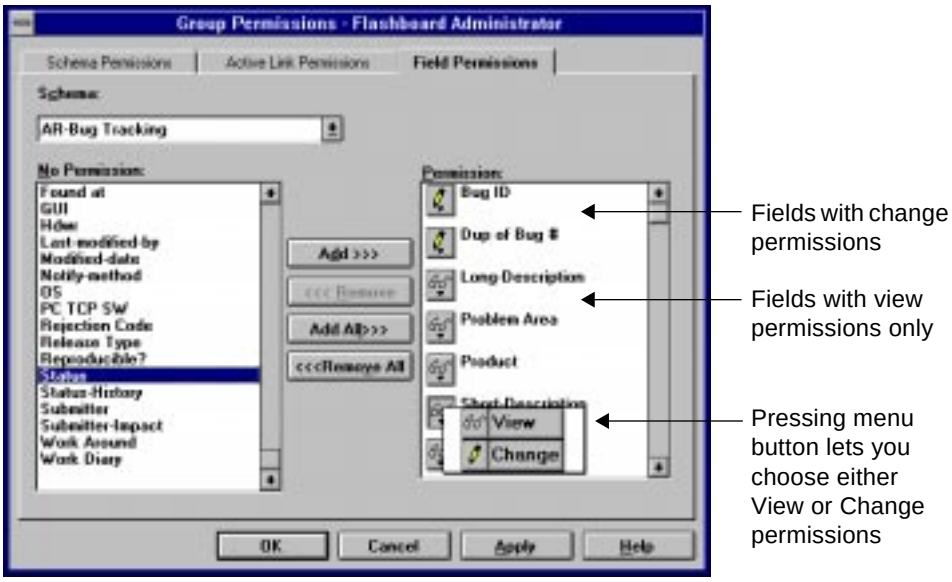


Figure 7-13 Field Group Permissions Dialog Box

4. **To assign a group permissions to a field, select a schema from the Schema drop-down list. All the fields for that schema appear in the No Permissions list.**

5. **Double-click the field for which you want to define permissions (or select a field, then click the Add button). You can also do the following:**
   - Click the Add All button to give permissions for all the fields to the group.
   - Click the Remove button to delete a field from the Permission list.
   - Click the Remove All button to delete all the fields from the Permissions list.

   The field you selected appears in the Permission list.

6. **Set the permissions for each field. If you do not click the Change menu button, you allow users *only* to view the field data in the schema. Clicking the Change menu button allows users to view and change the field data in the schema.**
   In Figure 7-13 on page 171, the Bug ID and Dup of Bug # fields have view and change permissions, but the Problem Area and Product fields have only view permissions.

7. **Click the OK or Apply buttons to save your permissions.**

Defining Schema Views 8

This chapter describes how to define and modify schema views. A **schema view** is what the user sees when they bring up a schema. You can create multiple schema views for your user community as needed.

You should be familiar with the information in Chapter 6 and Chapter 7 before you perform the operations described in this chapter.

The following topics are covered in this chapter:

- Creating and modifying schema views.
- Arranging field layout, including:
  - Moving fields.
  - Using the grid.
  - Aligning field segments to the grid.
  - Aligning multiple fields and objects.
  - Expanding the spacing between fields.

Schema Views

As an administrator, you can provide users with multiple views of the same schema. For example, you might use the Administrator Tool to create a schema with one view for Motif users and another for Windows users.

Note – Administrators or subadministrators also can customize a view on the User Tool, then export the view back to the server. The next time you open the schema in the Administrator Tool, the customized view you created in the User Tool now appears as one of the views you can select and modify in the Administrator Tool.

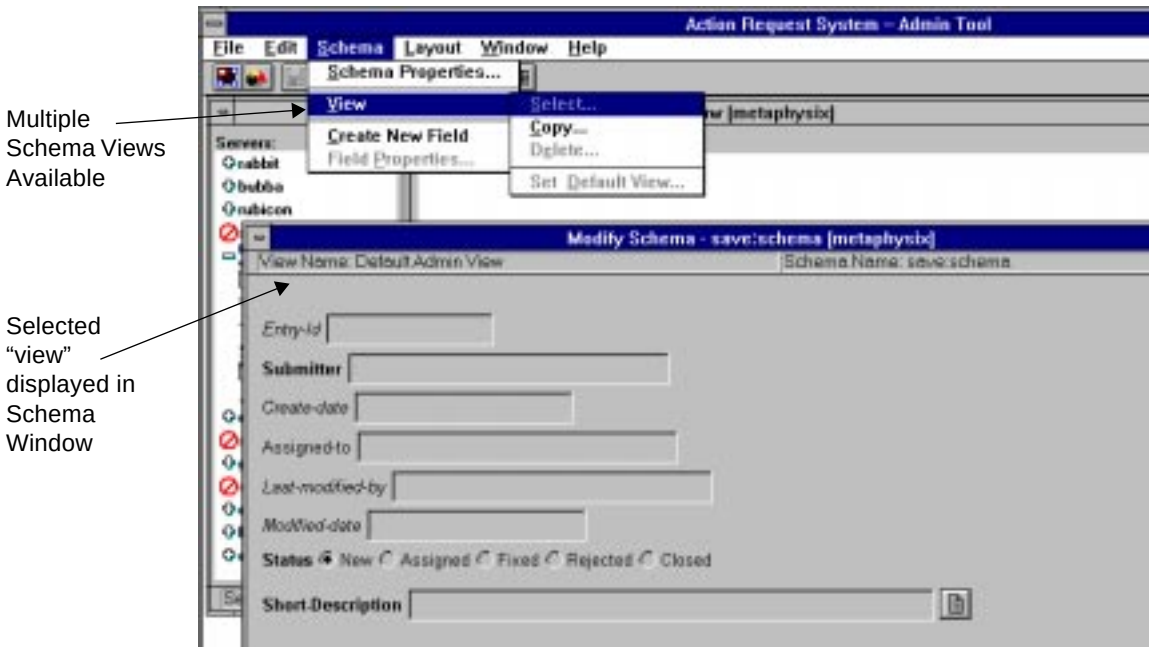


Figure 8-1 Schema Window — Multiple Views

The Administrator Tool lets you create as many schema views as you need for different users by doing the following:

- Rename the new view as appropriate. For example, for users of the Windows User Tool, you could create a view and call it `Windows View`. You cannot create multiple views with the same name. For more information, see "To copy a schema view:" on page 176.
- Drag fields and buttons to different positions, if needed. You also may want to hide certain fields. For more information, see "Using the Layout Menu to Arrange Fields" on page 178.

- Change the *display* properties for a field in each schema view as needed, including:
  - Label and label position.
  - Display length.
  - X and Y coordinates.
  - Number of rows.
  - Whether a field is visible or hidden.

  For more information on the display properties of a field, see “Display Field Properties” on page 148.

Note – For a particular schema view, you can only change the field’s *display* properties. If you make changes to any other field properties, as in a field’s *attributes* or *database* properties, these changes apply to *all* schema views. For example, changing a field’s QBE match setting applies to all schema views.

To select and modify a schema view:

1. **Open the schema whose view you want to select or modify.**
2. **From the Schema menu, display the View cascading menu (as shown in Figure 8-1) and choose Select. The Select View dialog box appears (Figure 8-2 on page 175).**

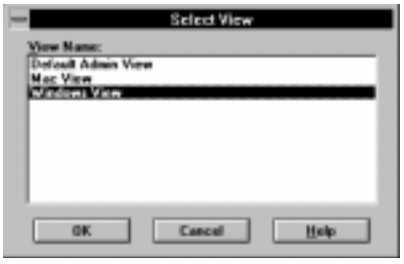


Figure 8-2 Select View

3. **Double-click the view that you want to display. Or choose one of the views, then click the OK button. The view appears in the Schema Window.**
4. **Modify the view as needed.**

5. **When you are ready to save your changes, click the Save button on the toolbar.**

To copy a schema view:

1. **Open the schema to display it (if it is not already displayed).**
2. **Choose View, then Copy from the Schema menu. The Copy View dialog box appears (Figure 8-3).**

Figure 8-3 Copy View

3. **Select a view from the View Name list.**
4. **Enter a new name in the New View Name field, then click the OK button. The new view (and its name) appear in the Schema Window.**

5. **When you are ready to save your changes, click the Save button on the toolbar.**

To select a default administrator view:

1. **Open the schema to display it (if it is not already displayed).**
2. **From the View cascading menu, as shown in Figure 8-1 on page 174, choose Set Default View. The Select Admin Default View dialog box appears (Figure 8-4 on page 177).**

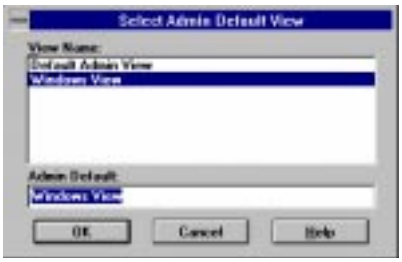


Figure 8-4 Select Admin Default View

3. **Select the view that you want to appear when you open the schema in the Administrator Tool, then click the OK button.**

4. **When you are ready to save your changes, click the Save button on the toolbar.**

To delete a schema view:

1. **Open the schema to display it (if it is not already displayed).**
2. **From the View cascading menu, as shown in Figure 8-1 on page 174, choose Delete. The Delete View dialog box appears (Figure 8-5).**

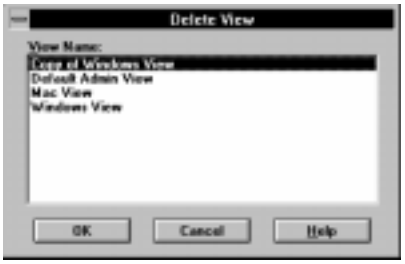


Figure 8-5 Delete View

3. **Select one or more views that you want to delete, then click the OK button.**
   If preferences are enabled, a warning message appears, listing the name of the views you want to delete. For more information, see “Defining Preferences” on page 61.

4. **Click the Yes button if you are sure you want to delete the view. If you are deleting multiple views, click Yes To All.**
   The view is removed from the Schema Window.

Note – You cannot delete all views for a schema. Each schema must have at least one view.

5. **When you have made all of the modifications you want to the different schema views, click the Save button on the toolbar.**

Arranging Field Layout

Depending on the needs of your user community, you can create multiple views by doing the following in the Windows Administrator Tool:

- Move single or multiple fields or active link buttons.
- Enable and display the grid for precise field alignment, including:
  - Defining the grid.
  - Aligning field label and data entry segments (the part of the field where you enter information) to the grid.
- Align multiple fields (either with the grid on or off).

Using the Layout Menu to Arrange Fields

You use the Layout menu from the Schema Window (Figure 8-6) to align fields.

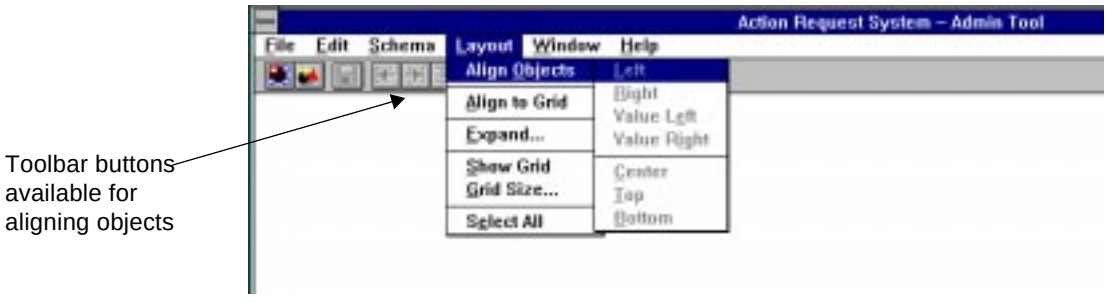


Figure 8-6 Schema Window — Layout Menu

The Layout menu provides the following options:

Align Objects	Aligns one object according to the position of a control field (see “Aligning Field Segments to the Grid” on page 184). Pull to the right (or use the toolbar) to select from the following options:  * **Left**. Aligns the left edges of the field labels.  * **Right**. Aligns the right edges of the fields, including any associated field menus, text edit, or diary icons.  * **Value Left**. Aligns the left edges of the data entry segment (the part of the field where you enter information) of the fields.  * **Value Right**. Aligns the right edges of the data entry segment (the part of the field where you enter information) of the fields. * **Center.** Centers the fields over each other.  * **Top.** Aligns the top edges of fields, allowing you to place fields side by side.  * **Bottom.** Aligns the bottom edges of fields, allowing you to place fields side by side.
Align to Grid	Defines what segment of a field is aligned to grid when you select and drag a field across the schema (see “Aligning Field Segments to the Grid” on page 184). Pull to the right to select from the following options: * **None.** Grid is turned off. * **Left**. Aligns the left edges of the field labels to the grid. * **Value Left**. Aligns the left edges of the data entry segment of the fields to the grid. * **Right**. Aligns the right edges of the fields, including any associated field icons, to the grid. * **Value Right**. Aligns the right edges of the data entry segment of the fields to the grid. A check mark next to the menu selection shows which option is activated.
Expand	Proportionally increase or decrease the distance between all fields and buttons on the schema. The Expand Control Spacing dialog box appears so you can specify a percentage of the current spacing, horizontally, vertically, or both. Enter percentages greater than 100 to move the fields farther apart. Enter percentages less than 100 to pull the fields closer together.
Show Grid	 Show the grid. A check mark next to the menu selection means the grid is displayed.

Grid Size	Specifies the distance between lines in the grid. The Set Grid Size dialog box appears to enter a width and height in pixels.
Select All	Selects all fields in the Schema Window, letting you reposition all the fields on the schema at one time.

Moving Fields

You can change the physical layout of a schema by dragging fields to reposition them, as shown in Figure 8-7 on page 181. Dragging a field past the bottom (or top) of the visible window moves the field onto the next (or previous) schema page.

For greater precision in locating fields on a schema, you also can align single or multiple fields to a grid. For more information on using the grid, see “Using the Grid” on page 182.

To move a field:

1. **Open the schema to display it (if it is not already displayed).**
2. **Select the field by clicking on it.**
3. **Drag the field to its new position, as shown in Figure 8-7 on page 181.**

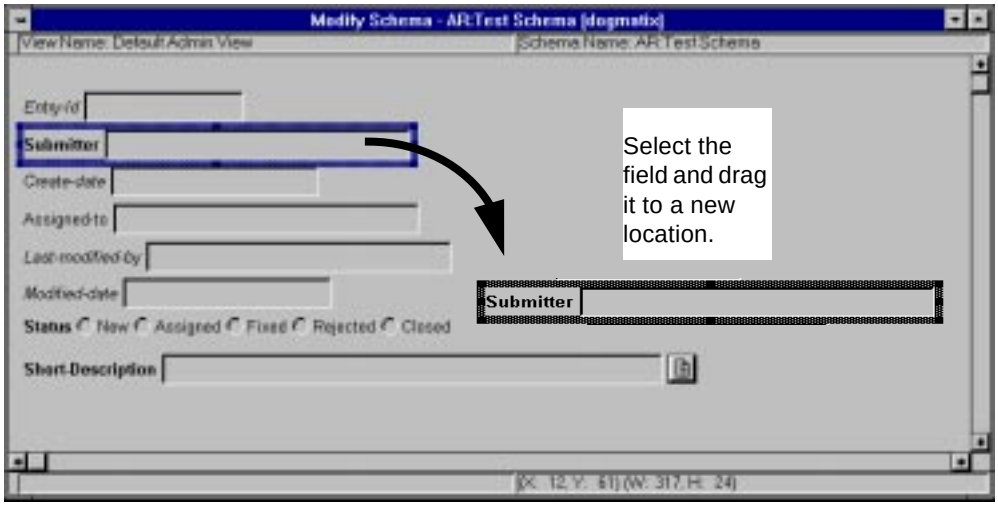


Figure 8-7 Rearranging a Field on a Schema

When you move a field, it redisplays to show its field length and its data entry segments (as shown in Figure 8-12 on page 185).

4. **You can continue modifying the schema by moving other fields, adding new fields, or aligning fields to the grid.**

5. **When you are ready to save your changes, click the Save button on the toolbar.**

To move multiple fields:

1. **Open the schema to display it (if it is not already displayed).**
2. **Use your mouse to select multiple fields or active link buttons that you want to move, as shown in Figure 8-8 on page 182.**
   - "Rubberband" (or region select) a number of fields to select and move them as a single object.
   - Hold down the Shift key and click with the left mouse button to select or clear other fields.

   Click anywhere else in the Schema window to clear the selections.

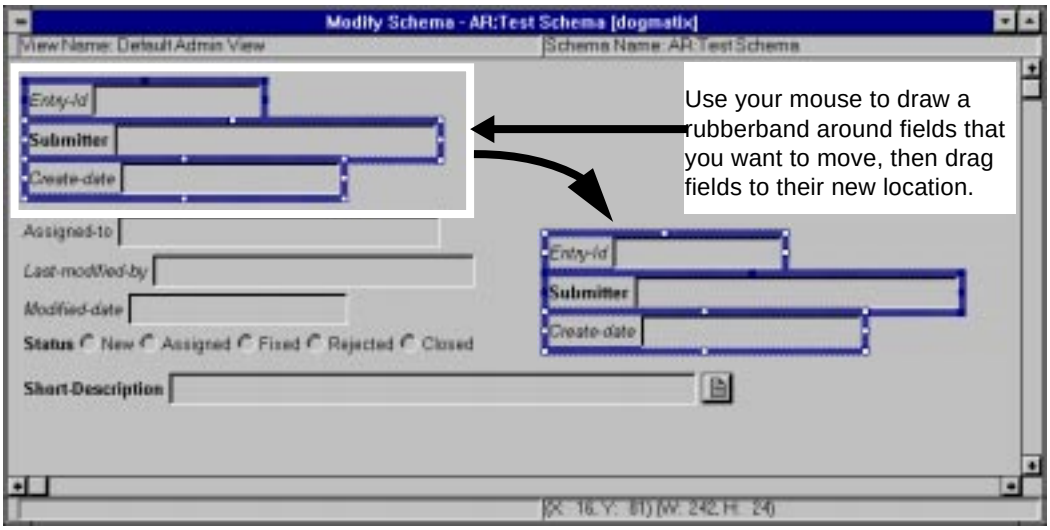


Figure 8-8 Rearranging Multiple Fields on a Schema

3. **Drag the fields to their new position, as shown in Figure 8-12 on page 185.** When you move fields, they redisplay to show their field length and their data entry segments.

4. **You can continue modifying the view by moving other fields or aligning fields to the grid.**

5. **When you are ready to save your changes, click the Save button on the toolbar.**

Using the Grid

The grid is particularly useful in creating schema views. You can use a grid for precise alignment of schema fields along a network of lines, either visible or invisible.

Note – You can override the grid by specifying X and Y coordinates in the Field Property window. If your Align to Grid is set, setting X and Y field coordinates overrides it. For more information, see “Field Properties” on page 146.

To enable and display the grid:

1. **Open the schema to display it (if it is not already displayed).**
2. **From the Layout menu, display the Align to Grid cascading menu and choose one of the grid options (see Figure 8-6 on page 178).**
   The grid becomes activated. The check mark next to the menu selection indicates which grid option is turned on. Any fields or objects that you move will "snap" to the grid. For more information, see *Using the Layout Menu to Arrange Fields* on page -178.
3. **Click the Show Grid button on the toolbar. Or choose Show Grid from the Layout menu. The grid appears on the schema (Figure 8-9).**

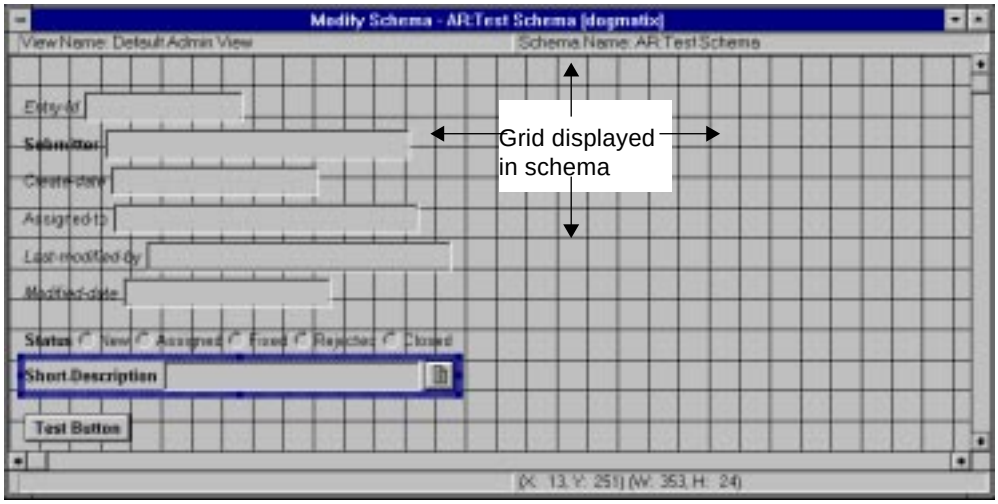


Figure 8-9 Displaying the Grid on a Schema

To define grid size:

1. **Open the schema to display it (if it is not already displayed).**
2. **Click the Show Grid button on the toolbar.**
3. **From the Layout menu, choose Grid Size. The Set Grid Size dialog box appears (Figure 8-10 on page 184).**

Figure 8-10 Set Grid Size

4. **In the Width and Height fields, enter the pixel size of the grid. The smaller the number of pixels, the smaller the grid and the more precisely you can align your fields.**
5. **Click the OK button. The grid reappears according to your new settings.**

Aligning Field Segments to the Grid

From the Layout menu, you also can specify what segment of the field will be aligned to the grid when you move the field (Figure 8-11). You can align the entire field to the grid, including its label and icon segments, or just the data entry segment of the field.

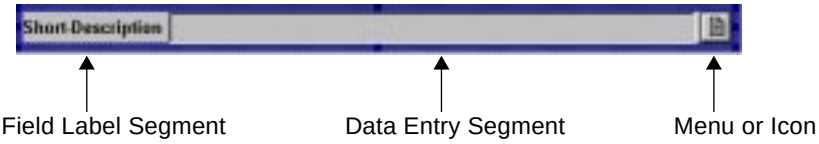


Figure 8-11 Field Segments That You Can Align to the Grid

For further information on using various grid options, see “Using the Layout Menu to Arrange Fields” on page 178.

To align fields to the grid:

1. **Open the schema to display it (if it is not already displayed).**
2. **Enable, display, or expand the grid as needed.**
3. **Choose Align to Grid options from the Layout menu or from the toolbar.** The check mark next to the menu selection indicates which align-to-grid option is turned on.

- If you select Left, the fields would align to their left edges on the grid.
- If you select Value Left, the fields would align to the left edges of their data entry segment on the grid.
- If you select Right, the fields would align to their right edges on the grid, including any associated field icons.
- If you select Value Right, the fields would align to the right edges of their data entry segment on the grid.

4. **Select and drag the fields to where you want them aligned.**
   When you move a field, it redisplays to show its field length and its data entry segments (Figure 8-12).

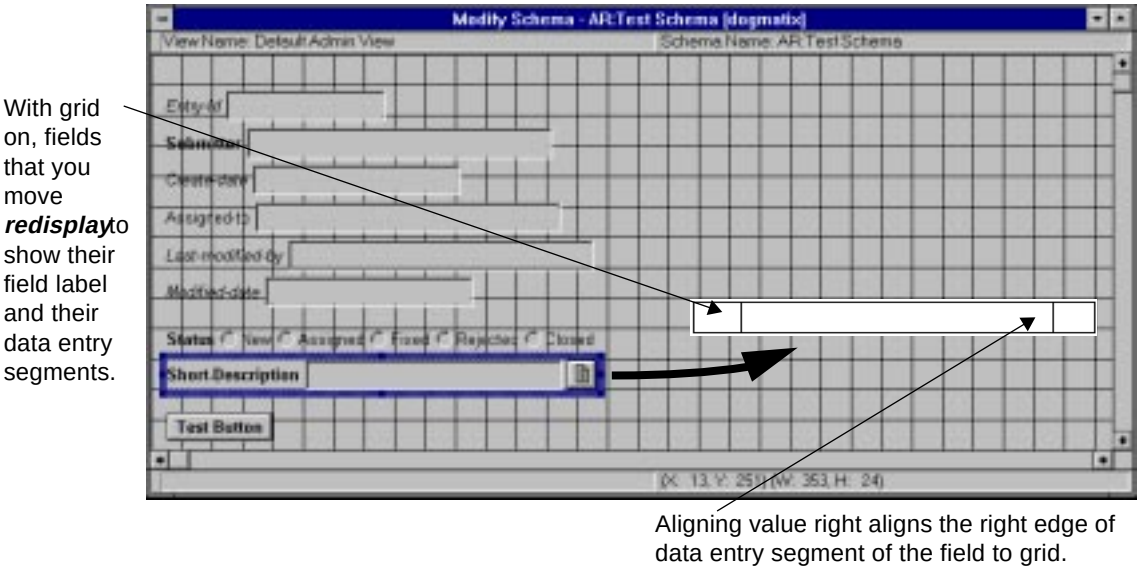


Figure 8-12 Using Align To Grid for Field Label and Data Segments

For example, if you selected Value Right from the Align to Grid menu and then moved the Short Description field, the right edge of the data entry segment of the field would align itself to the grid (as shown in Figure 8-12).

5. **When you are ready to save your changes, click the Save button on the toolbar.**

Aligning Multiple Fields and Objects

You can use the Align Object options to align multiple fields according to the position of another object on the schema, either with or without the grid. You also can expand the spacing between fields in the schema.

For information, see “Using the Layout Menu to Arrange Fields” on page 178.

To align multiple objects:

1. **Open the schema to display it (if it is not already displayed).**
2. **Enable, display, or expand the grid as needed.**
3. **Use your mouse to rubberband the fields that you want to align. (For more information on selecting multiple fields, see “Using the Layout Menu to Arrange Fields” on page 178.)**
   When you select multiple fields or active link buttons, the Align Objects buttons on the toolbar and menu items are activated. Also, one of the objects becomes the control object. The control object has dark control handles in the corners and sides.

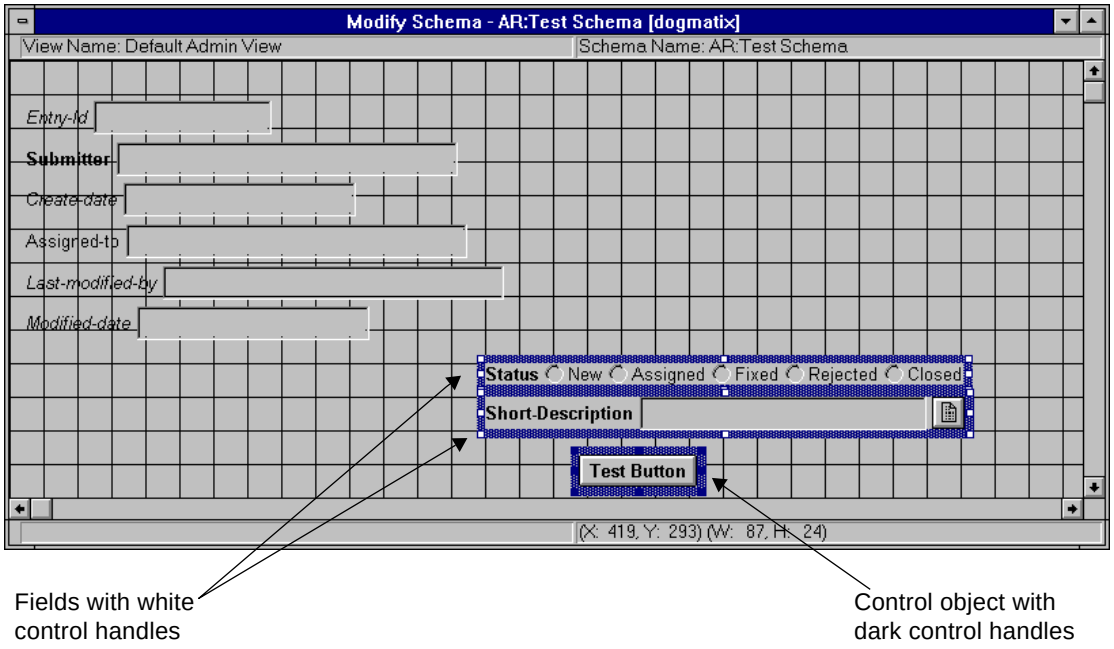


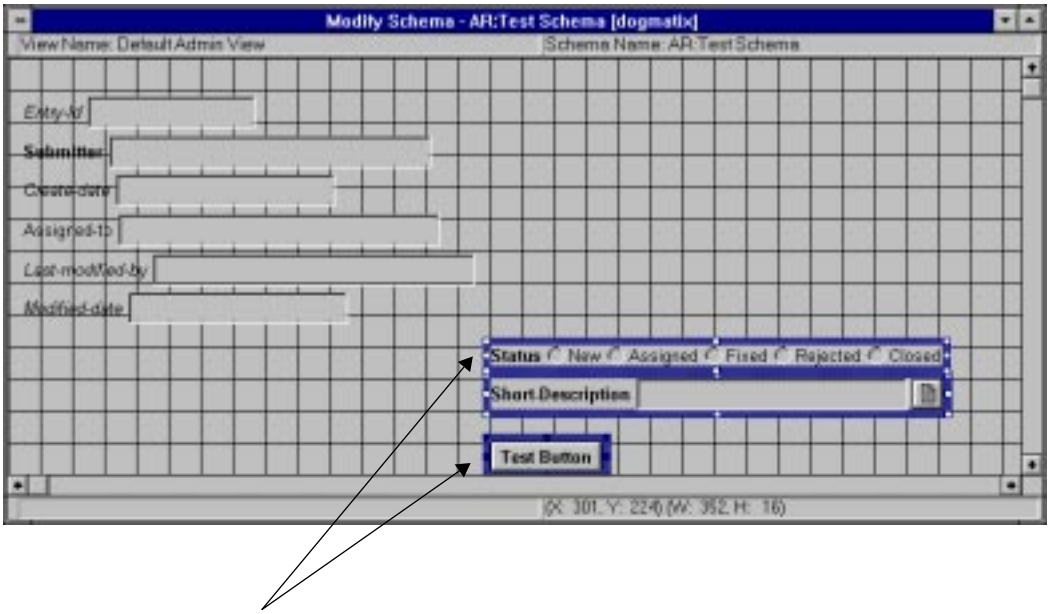
Figure 8-13 Aligning Multiple Fields / Objects (with Grid Displayed)

For example, in Figure 8-13, an active link labeled `Test Button` is the control object. The position of the control object defines how the other objects are aligned. The other fields with white control handles will be aligned according to the position of the control object.

4. **Select a control field or active link button by clicking it.**

5. **Use the Align to Grid options from Layout menu to define what segment of the fields that you want aligned *on the grid*.**

6. **Select and drag the fields to where you want them aligned.**
   You can use the Align Object choices from the toolbar or the Layout menu to align the fields for you. Remember that multiple fields are aligned according to the position of the control field. For example, if you select Left from the Align Objects menu, the `Status` and `Short-Description` fields would align to the left edge of the `Test Button` object on the grid, as shown in Figure 8-14 on page 188.



Aligning Left aligns fields on their left edges to the grid, according to position of the control object.

Figure 8-14 Aligning Multiple Fields to the Grid

7. **When you are ready to save your changes, click the Save button on the toolbar.**

To expand the spacing between fields:

1. **Open the schema to display it (if it is not already displayed).**
2. **From the Layout menu, choose Expand.**
3. **The Expand Control Spacing dialog box appears (Figure 8-15 on page 189).**

Figure 8-15 Expand Control Spacing

4. **In the Horizontal and Vertical Expansion fields, enter the percentages for spacing the fields. Numbers less than 100% decrease the distance between fields and numbers greater than 100% increase the distance between fields.**

5. **Click the OK button. The fields reappear according to your new settings.**

Note – When you open the Expand Control Spacing dialog box, the horizontal and vertical percentages always appear as 100%, even after you increase or decrease the spacing between fields.

8

Defining Menus 9

This chapter describes how to create and modify menus. Once you create a menu, you can attach the menu to any character field on any schema on the server. You can use the same menu for as many different fields as you desire.

You should be familiar with the information in Chapter 6 and Chapter 7 before you attempt to design and create a character menu.

The following topics are covered in this chapter:

- Using the Menu window.
- Creating and modifying menus.
- Defining character menus.
- Defining menus that use a file.
- Defining menus that query a schema.
- Building and using menu change history.
- Setting help for menus.

Using Menus in Schemas

You can create a menu and attach it to any character-type data field. A cascading menu with two levels is shown in Figure 9-1 on page 192.

9

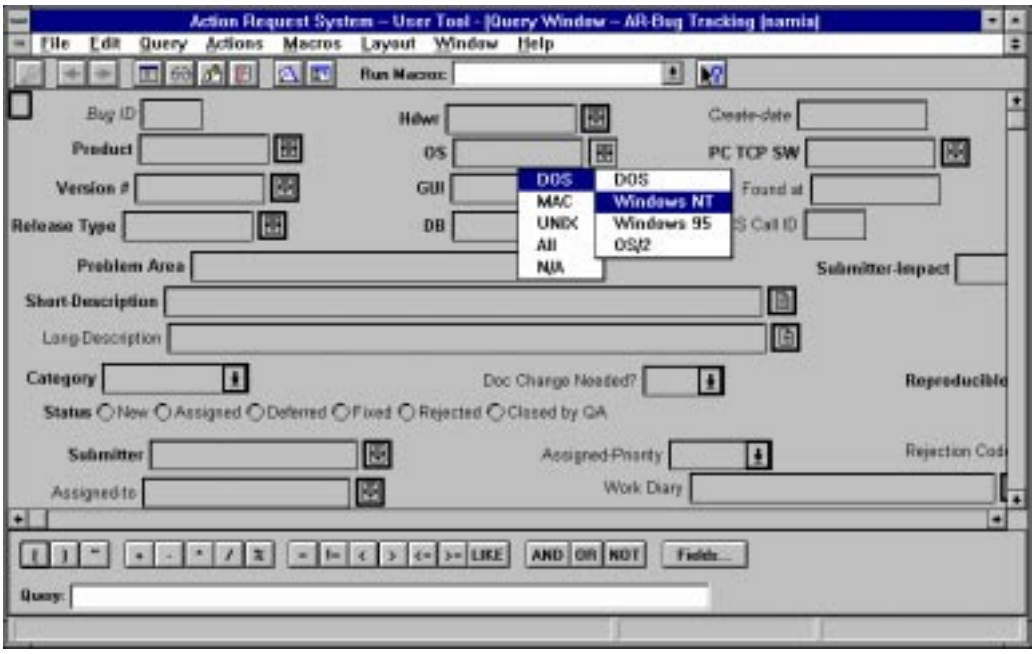


Figure 9-1 Cascading Menu

It is possible to define up to 14 menu levels, though you will probably want to limit most menus to three levels or less. You define character menus using a Create (or Modify) Menu window that appears when you click the New Object button on the toolbar and then double-click Menu on the New Object list.

Using the Menu Window

You create and modify menus from within the Menu window, as shown in Figure 9-2 on page 193.

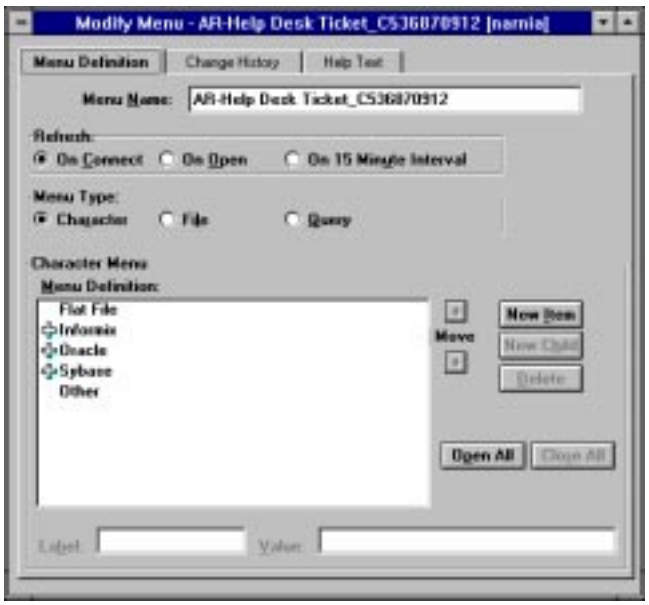


Figure 9-2 Menu Window

You can open multiple windows for creating or modifying menus.

You use the tabs in the Create Menu window to define the following:

Menu Definition	Defines the basic properties of the menu, including refresh mode and menu type.
Change History	Allows you to record information about the owner of a menu, the user who last modified it, and the date of the modification. You can add additional change history information as well.
Help Text	Shows the Help Text editing window. You can supply help text for the menu here. In most cases, this help text is simply a description of the menu, what it does, and how it is used.

Menu Styles

There are three styles of menus that you can define:

Character	You use the fields in the menu editing window to define the menu as a series of label and value entries.

File	You specify a file, located on either the client or the server, that contains a formatted character menu. You can update this file at any time; the changes will take effect the next time the menu is refreshed.
Query	You specify a query, with any conditions, on an AR System schema. You specify which field of matching entries to use as the label and which to use as the value. When a user accesses the menu, the AR System performs the query and places all items retrieved on the menu. This method allows you to create a dynamic menu that updates based on current conditions. In addition, because permissions are checked at the time of the query, users will only be able to see items to which they have permission.

Creating and Modifying Menus

Follow these steps to create a new menu or to open, copy, or delete an existing menu.

Note – The maximum number of items that can be displayed in a menu is 1600 for Motif clients, 1729 for Windows and Macintosh clients.

To create a menu:

1. **In the Server Window, choose a server to administer.**

2. **Click the New Object button on the toolbar. Or select New Object from the File menu. The New Object dialog box appears (Figure 9-3).**

Figure 9-3 New Object Dialog Box

3. **Select Menu from the New Object list, then click the OK button. The Menu window that you use for creating menus appears (Figure 9-4).**

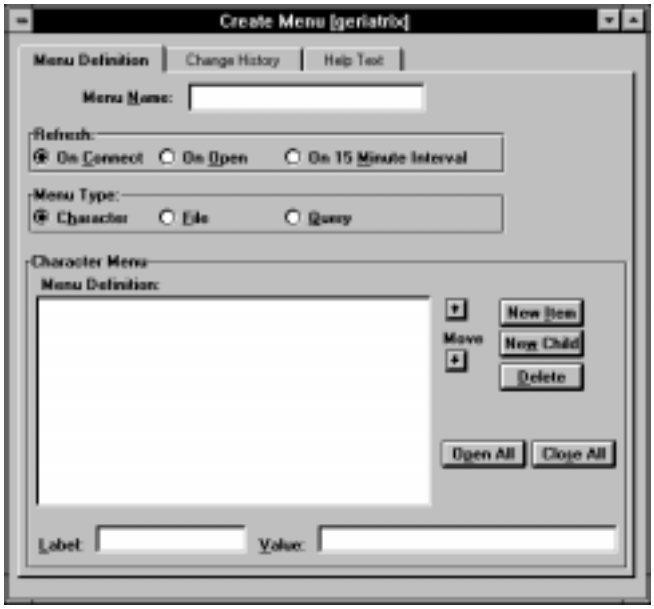


Figure 9-4 Create Menu Window

4. **Enter a name in the Menu Name field. Menu names must be unique on each AR server. There is no enforced convention for specifying menu names, but it is helpful to make the name descriptive and indicative of the menu's function. Names may be up to 30 characters, including blanks.**

5. **Select a refresh mode for the menu by choosing one of the following options:**

On Connect	Menu is retrieved when the user first opens it after selecting the schema. It will not be updated until the user selects the schema again.
On Open	Menu is retrieved each time the user opens the menu. (Note that frequent menu retrieval can have an impact on performance. You should select this option only if it is critical that the menu be absolutely up-to-date.)
On 15 Minute Interval	Menu is retrieved when the user opens the menu and after it has not been retrieved in the last 15 minutes. This choice provides a balance between the need to be current and the expense of constant menu retrieval.

Note – Refresh modes affect only a menu's *contents*, not its *definition* and work somewhat differently based upon the style of menu. The definitions of all menus are updated every time you re-connect to a schema. But the refresh modes which affect a menu's contents work somewhat differently for character menus than for file and query menus.

Note – For example, you cannot *dynamically* update the contents of a character menu, no matter which refresh mode you select. Connect, Open, and 15 Minute Interval all act the same way for character menus. The only way a character menu is updated is when you re-connect to a schema.

Note – If you select Open or 15 Minute Interval, the contents of file and query menus are dynamically updated. However, if you select Connect, their contents are updated only when you re-connect to a schema, just like character menus.

6. **Select a menu type for the menu by choosing the Character, File, or Query option. The remaining fields in the dialog box will change according to the menu type you select.**
   For more information, see "Menu Styles" on page 193.

7. **Fill in the rest of the fields in the dialog box as appropriate for the menu type you have selected by following the applicable set of instructions found later in this chapter:**
   - To define a character menu, see "Defining Character Menus" on page 200.
   - To define a file menu, see "Defining File Menus" on page 202.
   - To define a query menu that queries a schema, see "Defining Query Menus" on page 204.

8. **Click the Help Text tab to create help text for the menu. (See "Setting Help for Menus" on page 208 for more information.)**

9. **Click the Change History tab if you want to enter a note describing the menu you are creating. The Change History lets you keep a log of modifications made to a menu over time. (See "Building and Using Menu Change History" on page 207 for more information.)**

10. **When you are ready to save your menu, click the Save button on the toolbar (or choose Save Menu from the File menu, or type `Ctrl+S`). The new menu appears in the menu list on the Server Window.**

Opening Menus

Follow these steps to open and modify an existing menu.

Note – You can open as many menus as you want but you cannot open the same menu twice.

To open a menu:

1. **Open a Server Window.**
2. **Select a server from the Servers list.**

3. **Double-click Menus to see a list of menus currently defined on the server.**
4. **Select a menu from the Menus list, then double-click the menu to open it.** The menu appears in the Modify Menu window (Figure 9-5 on page 198). You now can modify the menu as needed.

Figure 9-5 Modify Menu Window

Saving Menus Under a Different Name

When saving a menu under a different name, the new menu contains all the properties of the original menu. The only difference is the name.

To save a menu under a different name:

1. **Open a Server Window.**
2. **Select a server from the Servers list.**
3. **Double-click Menus to see a list of menus currently defined on the server.**
4. **From the Menus list, open the menu that you want to copy.**
5. **From the File menu, choose Save Menu As. The Save Menu As dialog box appears (Figure 9-6 on page 199).**

Figure 9-6 Save Menu As Dialog Box

6. **In the Menu Name field, enter the new name of the menu.**
7. **Click the OK button to make a copy of the menu. The new menu will appear in the Menus list.**
   Double-click the menu to open it. You now can modify the menu as needed.

Deleting Menus

The delete operation is permanent and cannot be undone. Make sure you no longer need a menu before deleting it. You cannot delete any menu that is currently open in the Administrator Tool.

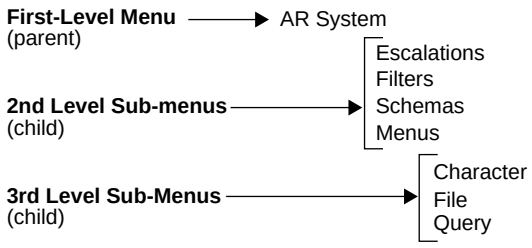
To delete a menu:

1. **Open a Server Window.**
2. **Select a server from the Servers list.**
3. **Double-click Menus to see a list of menus currently defined on the server.**
4. **From the Menus list, select the menu that you want to delete.**
5. **From the Edit menu, choose Delete - Menu.**
   A confirmation message appears (if your preferences are set for this). Click the OK button to delete the menu. For more information, see “Defining Preferences” on page 61.

9

Defining Character Menus

When creating a character menu, it is a good idea to plan out ahead of time what parent and child menus you want in your menu structure, as in the following example:



To define a character menu:

1. **Create a menu, edit the menu name, and select a Refresh mode (see "Using Menus in Schemas" on page 191).**
2. **Select the Character option from the Menu Type box. The Modify Menu window changes to let you define a character menu (Figure 9-7 on page 201).**
3. **Select the New Item button to create a menu item for whichever level you choose. For example, in a new menu, selecting the New Item button creates a first-level menu. But if you create and select a child menu, selecting the New Item button creates a menu entry for that same level.**
4. **Enter a label into the Label field (the text that will show up in the menu). Enter a maximum of 30 characters.**

Minus signs indicate that child menus are displayed. Hide the child menus by double-clicking the minus sign.

Plus signs indicate that child menus are hidden. Open the child menus by double-clicking the plus sign. Note that a child menu can have its own child menus.

Figure 9-7 Character Menu Window (with Parent and Child Menus)

5. **If the value that you want to appear when the user selects this menu item differs from the label text, enter the text you want to appear in the Value field. Enter a maximum of 255 characters. You can only supply a value for menu items that are selectable. For example, if a parent menu has a child menu item, you can only provide a value for the child item since you cannot select the parent menu.**
   If you do not enter different text, the label text (of the lowest menu level only) is selected when the user selects the item.

6. **To create second-level (or child) menus, select the first-level menu for which you want sub-menus, then select the New Child button. For example, for all the `Computer` child menus, you would select `Computer`, then you would add `Sun`, `HP`, and so on.**

7. **To create third-level (or child) menus, select the second-level menu for which you want sub-menus, then select the New Child button. For example, for all the `PC` child menus, you would select `PC`, then you could add `486`, `Pentium`, and so on.**

8. **Repeat steps 3 through 7 for as many items as are needed at that menu level.**
9. **Click the up or down arrows to move menu entries along the menu structure, as in the following examples.**
   - Re-arrange parent menus. For example, you could move `Computer` down and `Hub` up. (If you just want to re-arrange parent menus, hide the child menus first by double-clicking on them.)
   - Re-arrange child menus. For example, under the `Computer` first-level menu, you could move `PC` up or move `Sun` down.
   - Move a child menu to become a parent menu. For example, if you selected `Sun` and clicked the up arrow, `Sun` would become a first-level menu (its sub-menus now become second-level menus).
   - Move a parent menu and its child menus move with it. In Figure 9-7 on page 201, if you selected `Hub` and clicked the up arrow, `Hub` (and its children) become the child menus of `Computer`.
   - Use the Edit menu to cut, copy, paste, or delete menu entries as well.

Note – Moving parent and child menu items around the menu structure is good practice to learn the subtleties of menu design in the Administrator Tool.

10. **To save the menu definition, click the Save button on the toolbar.**

Defining File Menus

To define a menu that uses a file:

1. **Create a menu, edit the menu name, and select a Refresh mode (see "Using Menus in Schemas" on page 191).**
2. **Select the File option from the Menu Type box. The Modify Menu window changes to let you define a file menu (Figure 9-8 on page 203).**

Figure 9-8 File Menu Window

3. **Select a File Location option to indicate where the file is located:**
   - Select Server if the file is on the server system.
   - Select Client if the file is on the system where the client is running.
4. **In the Filename field, enter the name of the file that contains the menu definition. See the next section, "Menu File Format, for information on how this file is structured.**
5. **To save the menu definition, click the Save button on the toolbar.**

Menu File Format

A menu file is a file that contains a formatted menu structure. Each line in the file contains a definition of a menu entry in the format:

```
label\value
```

To create cascading sub-menu items under a specific item, use tabs to indicate a child menu. (You can omit the value specification for any label that has sub-items.)

Note – You must use the tab key, not spaces, to indicate child menus.

The following example shows a formatted menu file with three main items, two of which have sub-items:

```
OpenWindows\
    2.0\OpenWindows 2.0
    3.0\Openwindows 3.0
Motif\Motif 1.1
MS Windows\
    3.0\Windows 3.0
    3.1\Windows 3.1
```

You can use a # sign in the first column to comment out lines in the menu file.

Defining Query Menus

To define a menu that uses a query:

1. **Create a menu, edit the menu name, and select a refresh mode according to the previous instructions.**
2. **Select the Query option from the Menu Type box. The Modify Menu window changes to let you define a query menu (Figure 9-9 on page 205).**

Figure 9-9 Query Menu Window

3. **From the Server drop-down list, select the server where the schema that you are querying resides.**
4. **From the Schema drop-down list, select the schema that you want to query.**
5. **From the Label Field drop-down list, select a field on the schema you are querying. The contents of this field will be used as a label for the menu items you are creating.**
6. **From the Value Field drop-down list, select a field on the schema you are querying. The contents of this field will be used as the value for the menu items you are creating.**
7. **Select the Sort On Label option if you want the menu values sorted by their label.**
8. **From the Qualification drop-down list, build a qualification that will determine which items from the schema you are querying will be included in the menu list. The Qualification drop-down list contains a list**

of keywords and functions for you to use. Select as many as needed to build your qualification. It is a good idea to make the qualification as specific as possible to avoid building a list with an unmanageable number of items.
You can refer to current screen values by using $<*field_id*>$, for example, as in the following qualification:

```
'Problem Summary' = $8$
```

Note – If you refer to a field on the current screen in the qualification, do not use the pattern `$MENU$` for any field that the menu is attached to. The server cannot resolve the field references so the value will always be rejected.

9. To save the menu definition, click the Save button on the toolbar.

For example, you could build a menu that brings up the names of everyone with an open request to the help desk. To do so, you would select the server and schema that contain the information, in this case perhaps AR-Help Desk Tickets. You would then select the Submitter field as both the Label and Value. Finally, you would build a qualification that would search for tickets with a Status of Open, as shown in Figure 9-10 on page 207.

Figure 9-10 Query Menu with Qualification for Open Tickets

Once you have created the menu, you can attach it to any field on any schema. You might use the menu created in this example as an aid to performing queries on a particular caller's open tickets on the AR-Help Desk Calls schema.

Building and Using Menu Change History

The AR System lets you record information about the owner of a a menu, the user who last modified the menu, and the date of the modification. You can display this information at any time by selecting the Change History tab.

To define change history for a menu:

1. **From the Server Window, select Menu from the Servers list. The Menus list appears in the Server Window.**
2. **From the Menus list in the Server Window, open a menu by double-clicking on it. The Modify Menu window appears.**
3. **Click the Change History tab, as shown in Figure 9-11 on page 208.**

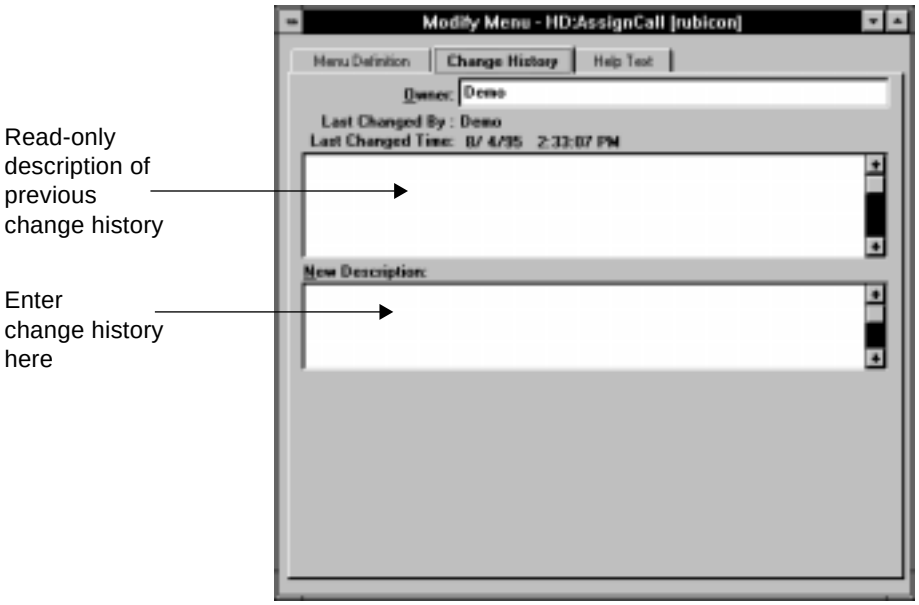


Figure 9-11 Menu Change History

4. **In the New Description field, enter any information about modifications to the menu that you think will be helpful to other administrators or subadministrators of the AR System.**

Note – All previous change history is found in the read-only field above the New Description field. After you enter and save change history, it cannot be edited.

---

5. **Click the Save button on the toolbar (or choose Save Menu from the File menu, or type `Ctrl+S`) to save your changes.**

Setting Help for Menus

Clicking the Help Text tab in the Menu window brings up a Menu Help Text editing window. You can supply help text for the selected menu here. In most cases, this help text is simply a description of the menu and what it is used for. It is available for viewing and editing by AR administrators who have the menu open.

To define help text for a menu:

1. **From the Server Window, select Menu from the Servers list. The Menus list appears in the Server Window.**
2. **From the Menus list in the Server Window, open a menu by double-clicking on it. The Modify Menu window appears.**
3. **Click the Help Text tab, as shown in Figure 9-12.**

Figure 9-12 Menu Help Text

4. **In the Help Text field, enter any information that you think will be helpful to AR System administrators or subadministrators. You can use the shortcut key sequences**
   standard Windows keyboard shortcuts to edit text (for example, `Ctrl+C` to copy text, and so on).
5. **Click the Save button on the toolbar (or choose Save Menu from the File menu, or type `Ctrl+S`) to save your changes.**

9

Defining Filters 10

This chapter describes how to use the Admin Tool to create and modify filters. A **filter** is a facility that tests every server transaction to see if certain conditions are met and responds to the conditions by taking a specific action or actions.

For example, you might define a filter that notifies support staff members when they are assigned responsibility for a new AR.

For a detailed discussion about filter design, refer to “Designing Filters” on page 84.

The following topics are covered in this chapter:

- Using the Filter window.
- Creating and modifying filters.
- Specifying filter conditions.
- Building filter qualifications.
- Specifying filter actions.
- Building and using filter change history.
- Setting help for a filter.

10

Using the Filter Window

You create and modify filters from within the Filter window, as shown in Figure 10-1.

Figure 10-1 Filter Window

You can open multiple windows for creating or modifying the filters that you have permission to administer.

Filters execute on the server machine. Each filter is attached to a single schema on the server.

You use the tabs in the Filter window to define the following:

Basic — Defines the basic properties of the filter and the conditions that will cause the filter to execute. For example, the condition may be that the user submits an AR.

Actions	Defines the actions the filter will take when specified conditions are met. For example, a filter condition may be to look for “hardware” in the Problem Type field. The filter action may be to automatically delegate the AR to the hardware support person.
Change History	Allows you to record information about the owner of a filter, the user who last modified it, and the date of the modification. You can add additional change history information as well.
Help Text	Shows the Help Text editing window. You can supply help text for the filter here. In most cases, this help text is simply a description of the filter, what it does, and how it is used.

Creating and Modifying Filters

Follow these steps to create a new filter or to open, copy, or delete an existing filter.

To create a filter:

1. **In the Server Window, choose a server to administer.**

2. **Click the New Object button on the toolbar. Or choose New Object from the File menu. The New Object dialog box appears (Figure 10-2).**

Figure 10-2 New Object Dialog Box

3. **Select Filter from the New Object list, then click the OK button.**
   The Filter window that you use for creating filters appears (see Figure 10-1 on page 212). For a new filter, the fields are empty.
4. **Specify or change filter specifications and conditions according to the steps described in “Specifying Filter Basics” on page 215.**
5. **Specify or change filter actions according to the steps described in “Building Qualifications” on page 218.**

Opening Filters

Follow these steps to open and modify a filter.

Note – You can open as many filters as you want but you cannot open the same filter twice.

To open a filter:

1. **Open a Server Window.**
2. **Select a server from the Servers list.**
3. **Double-click Filters to see a list of filters currently defined on the server.**
4. **Select a filter from the Filters list, then double-click the filter to open it.** The filter appears in the Modify Filter window (see Figure 10-1 on page 212). You now can modify the filter as needed.

Saving Filters Under a Different Name

When saving a filter under a different name, the new filter contains all the properties of the original filter. The only difference is the name.

To save a filter under a different name:

1. **Open a Server Window.**
2. **Select a server from the Servers list.**
3. **Double-click Filters to see a list of filters currently defined on the server.**
4. **From the Filters list, open the filter that you want to copy.**
5. **From the File menu, choose Save Filter As. The Save Filter As dialog box appears (Figure 10-3 on page 215).**

Figure 10-3 Save Filter As Dialog Box

6. **In the Filter Name field, enter the new name of the filter.**
7. **Click the OK button to make a copy of the filter. The new filter will appear in the Filters list.**
   Double-click the filter to open it.

Deleting Filters

The delete operation is permanent and cannot be undone. Make sure you no longer need a filter before deleting it. You cannot delete any filter that is currently open.

To delete a filter:

1. **Open a Server Window.**
2. **Select a server from the Servers list.**
3. **Double-click Filters to see a list of filters currently defined on the server.**
4. **From the Filters list, select the filter that you want to delete.**
5. **From the Edit menu, choose Delete - Filter.**
   A confirmation message appears (if your preferences are set for this). Click the OK button to delete the filter. For more information, see “Defining Preferences” on page 61.

Specifying Filter Basics

This section describes how you use the Filter window to specify filter specifications and conditions, as shown in Figure 10-4. The filter basics define the criteria that a transaction must meet before the corresponding filter actions take place. You specify basics including:

- Name of the filter.
- Whether the filter is enabled or not.
- The order in which the filter will execute in relation to other filters.
- The schema that the filter is to be applied to.
- The operations that will invoke the filter.
- The specific qualifications that limit the transactions on which the filter will execute.

Figure 10-4 Specifying Filter Basics

To specify or change filter conditions:

1. **Open the filter you want to work with (see the previous section).**

2. **If the correct name is not already assigned to the filter, specify the filter name in the Name field.**
   Filter names may be up to 30 characters, including blanks, and must be unique. There is no enforced convention for filter names, but it is helpful if the name is descriptive and indicative of the filter's function.

3. **Select or clear the Enable check box to set whether you want to activate the filter. For example, you may want to disable the filter during development or if you are diagnosing a problem.**

4. **Specify the filter execution order.**
   More than one filter may be designed to execute based on the same set of conditions with the output from one filter affecting another. The Execution Order field lets you specify the processing order for each filter. Valid values for Execution Order are numbers between 0 and 1000 inclusive. Filters with lower numbers are processed first. After a filter is completely processed, the filter with the next lowest number is then executed. This assures that the condition check for subsequent filters will be affected by actions of previous filters. You can assign the same number to multiple filters; however, there is no guarantee about the processing order for filters that have the same execution order.

5. **In the Schema Name drop-down list, select the name of the schema the filter will apply to.**

6. **In the Execute On box, specify which operations will activate the filter by selecting one or more of the options, as follows:**

Submit	Filter will act when an AR is submitted.
Modify	Filter will act when an AR is modified.
Delete	Filter will act when an AR is deleted.
Query	Filter will act when an AR is retrieved. You cannot use the Query option to perform the Set Fields action.
Merge	Filter will act when an AR is merged into the database from a different database. (You can merge ARs using the AR Import Tool, as described in Chapter 14. You cannot merge ARs through the User Tool.)

   You can select any combination of operations. If you select multiple options, the filter will act when any one of the operations takes place.

7. **You can further refine your filter selection criteria by entering a qualification statement in the Run If field. You can specify whether the qualification is to check conditions for the current transaction only, in the database only, or both in the current transaction and the database. You can**

enter the text directly, by typing it in, or build the qualification using the query bar palette and Run If field menu button, as described in Appendix D, "Operators, Wildcards, and Keywords."

8. **When you have finished specifying filter basic conditions and qualifications, go on to specify the filter actions.**

Building Qualifications

Qualifications help to narrow down the entries that will cause a filter (or an active link or an escalation) to execute. As shown in Figure 10-5, you can define qualification criteria using any of the following techniques:

- Type information directly into the Run If field.
- Add a field or keyword from the cascading menu button.
- Add an operator to a qualification from the palette.

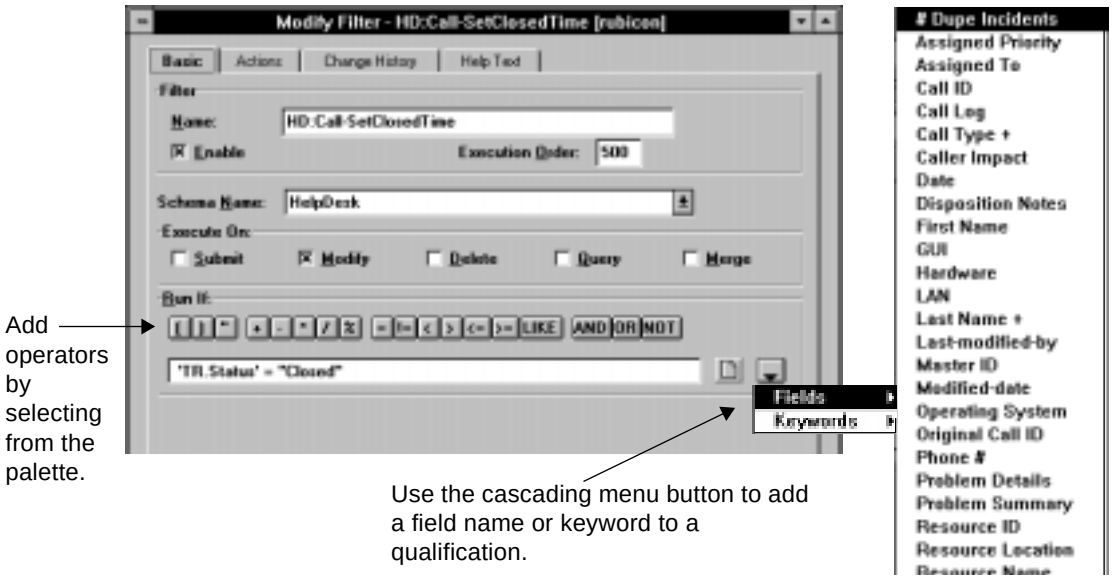


Figure 10-5 Building a Qualification in a Filter Window

You must follow a set of formatting conventions when you construct the qualification criteria in the Run If field. The formatting conventions are described below.

You will also use a set of operators and wild card symbols that have specific meaning to the AR System. You can concatenate a qualification string using keywords, operators, and wild cards, as in the following query:

```
'Login Name' LIKE ("%" + $Submitter$ + "%")
```

The operators, wild card symbols, and keywords are described in Appendix D.

Formatting Conventions

Use the following formatting conventions to construct qualification criteria in the Run If field:

Fields

Enclose field labels in single quotations. Single quotations are automatically added when you select fields from the menu button list.
Example: `'Short Description'`
If two fields have the same label, the menu button displays their field ID. You can also reference fields by using their internal field ID. If you use the ID, you must enclose it in single quotations.
For filters, you can specify whether the qualification is to check field values in the transaction only, in the database only, or in both the transaction and the database by using a prefix when you enter the field name. To check the value for the transaction only, enter the field name as `'TR.`*field*'. To check the value in the database only, enter the field name as `'DB.`*field*`'`. To check the value for the transaction first and then check the database if a new value is not found in the transaction, enter the field name with no prefix. For more information, see “Checking Transaction vs. Database Values” on page 220.
Examples (to check transaction only): `'TR.Submitter'`
Examples (to check database only): `'DB.Submitter'`
The `TR` and `DB` prefixes are not used for active link or escalation qualifications.

Note – If the label includes a single quote, specify two single quotes when entering the label. For example, if the field name is `Doug's Tickets`, enter it as `'Doug' 's Tickets'`. (This is done automatically when you select the field from the Fields menu button.)

Values	Non-numeric values (including time, field, and keyword values) must be enclosed in double quotations. Example: `''07/01/92''` When entering time values, note that any integer (unquoted) will be interpreted as a number of seconds. To specify a number of minutes or hours, use a relative time value within quotes. Example (to specify 10 hours): `''10:00''` Keyword values do not require surrounding quotes. (See "Table of Keywords" on page 447 for available keywords.) Example: `'Submitter' = $USER$` To query for ARs that have no value in a field, you can use the keyword `$NULL$`. Example (to query for ARs that have no value in the Assigned-to field): `'Assigned-to' = $NULL$`
Status History	Status History references must have the following information and format: The name or ID of the Status History field (followed by a period). The name or index of the status value you want to match (followed by a period). The keyword `USER` (for the user last changing to that status) or `TIME` (for the time last changed to that status). Example: `'Status-History.Fixed.TIME' < ''07/01/92''` This syntax is used automatically when you select the Status History reference from the Fields menu button list.

Note – It is only possible to use a Status History reference in a filter qualification if you are checking values in the database; Status History is not meaningful if you are checking the value of the current transaction. See "Checking Transaction vs. Database Values" on page 220 for more information on checking field values in the database or in the transaction.

You cannot use Status History references in active link Run If qualifications.

Checking Transaction vs. Database Values

In filter qualifications only, the qualification can access values in the database for the current record as well as in the current transaction. This makes it possible for you to perform state-transition checking using a filter qualification. For example, you could define a filter that would watch for transactions where

the status of an AR is changed to “Closed.” You can then check the database to verify that the current status of the AR is “Fixed,” and reject the operation if the status is anything other than “Fixed.”

There are three ways to specify a field reference in the filter qualification:

Transaction Only	Check the value of the field in the current transaction only. If the value is not changed in the transaction, it is considered to be $NULL$. If the operation is a query or a delete, it is considered to be $NULL$. To specify a check of the transaction only, use the format 'TR.<*field*>' when you enter the field name in the Run If or Set Field If fields.
Database Only	Check the value of the field in the database only. No check is made of the value in the current transaction. If the operation is a create operation (submit), it is considered to be $NULL$. To specify a check of the database only, use the format 'DB.<*field*>' when you enter the field name in the Run If or Set Field If fields.
Transaction or Database	Check the value of the field in the current transaction and use that value if changed. If not changed in the current transaction, check the value of the field in the database. To specify a check of both the transaction and the database, use the format '*field*' when you enter the field name in the Run If field.

Filter Qualification Examples

The examples below show the steps you would follow to create three different filter qualifications in the Run If field. The first example builds a qualification that will cause the filter to act on current transactions with a status of either “Fixed” or “Closed.” The second example builds a qualification that will cause the filter to act on entries that required more than 10 hours to resolve. The third example builds a qualification that causes the filter to test that a value has changed in a field.

Example 1:

The procedure below will build a qualification that causes the filter to act both on transactions with a “Fixed” status and transactions with a “Closed” status. (Note that while this example uses the menu button attached to the Run If field to build the qualification, you can also type the qualification directly into the Run If field in the Filter window.)

1. **In the Run If menu button, choose the** `Status` **field from the** `Fields` **option. The name of the field appears in single quotes in the Run If field:**
   `'Status'`
2. **To cause the filter to act on the current transaction only, move the cursor to the beginning of the field name (after the single quote) and enter the characters** `TR.` **before the field name.**
   `'TR.Status'`
3. **With the cursor positioned at the end of the qualification, click the = (equal sign) operator from the palette. The operator is added to the Run If field, as follows:**
   `'TR.Status' =`
4. **Type the field value Fixed into the Run If field, enclosed in double quotes. The Run If field now contains:**
   `'TR.Status' = ''Fixed''`
5. **Click the** `OR` **operator from the palette. The** `OR` **operator is added to the Run If field:**
   `'TR.Status' = ''Fixed'' OR`
6. **Choose the** `Status` **field from the** `Fields` **option again, then add the** `TR.` **prefix as before. Move the cursor to the end of the field and click the equal sign (=) operator. The Run If field contains:**
   `'TR.Status' = ''Fixed'' OR 'TR.Status' =`
7. **Complete your qualification by typing the field value Closed. Enclose it in double quotes. The Run If field now contains:**
   `'TR.Status' = ''Fixed'' OR 'TR.Status' = ''Closed''`

Example 2:

The procedure below will build a qualification that causes the filter to act on an entry in the database where the difference between the current time and the time the action request was entered in the AR System greater than 10 hours. This example uses a status history reference as one of its values.

1. **Choose TIMESTAMP from the** `Keywords` **option. The** `TIMESTAMP` **keyword will appear in the Run If field, enclosed in dollar signs:**
   `$TIMESTAMP$`

2. **Click the - (minus sign) operator from the palette. The operator is added to the Run If field**:
   `$TIMESTAMP$ -`

3. **From the** `Fields` **cascading option in the menu button, create the status history reference by choosing Status-History (for the field), then Time (the keyword for the time the AR was entered), then New (for the status value you want to match).**
   Your Run If field will contain the following:

   ```
   $TIMESTAMP$ - 'Status-History.New.TIME'
   ```

   This will cause the filter to calculate the difference between the time the AR was entered with a "New" status and the current time.

Note – When you use a status history reference in the qualification, the AR System assumes you are checking the value in the database, since status history has no meaning in the current transaction. You do not need to preface the field reference with "`DB`".

Note – You could also have directly entered the status history value by typing it into the Run If field.

---

4. **Continue building your filter qualification by clicking the > (greater than) operator from the palette**:
   `$TIMESTAMP$ - 'Status-History.New.TIME' >`

5. **Finally, enter a value of ten hours, enclosed in double quotes (see "Formatting Conventions" on page 219 for information on entering time values). Your qualification in the Run If field should now look like the following**:
   `$TIMESTAMP$ - 'Status-History.New.TIME' > ''10:00''`

   This will cause the filter to determine if the result of the calculation of the difference between the current time and the time of the entry's creation is greater than ten hours.

Example 3:

The procedure below will build a qualification that causes the filter to test that a value has changed in a field. (Note that while this example uses the menu button attached to the Run If field to build the qualification, you can also type the qualification directly into the Run If field in the Filter window.)

1. **In the Run If menu button, choose the field from the** `Fields` **option. The name of the field appears in single quotes in the Run If field:**
   `'<field>'`

2. **To cause the filter to check the value of the field on the current transaction only, move the cursor to the beginning of the field name (after the single quote) and enter the characters** `TR.` **before the field name.**
   `'TR.<field>'`

3. **With the cursor positioned at the end of the qualification, click the != (not equal sign) operator from the palette. The operator is added to the Run If field, as follows:**
   `'TR.<field>' !=`

4. **In the Run If menu button, choose the field again from the** `Fields` **option.**
   `'TR.<field>' != '<field>'`

5. **To check the value of the field in the database only, move the cursor to the beginning of the field name (after the single quote) and enter the characters** `DB.` **before the field name. The Run If field now contains:**
   `'TR.<field>' != 'DB.<field>'`

6. **Click the** `AND` **operator from the palette. The** `AND` **operator is added to the Run If field:**
   `'TR.<field>' != 'DB.<field>' AND`

7. **Choose the field from the** `Fields` **option again, then add the** `TR.` **prefix as before. Move the cursor to the end of the field and click the equal sign (=) operator. The Run If field contains:**
   `'TR.<field>' != ''DB.<field>' AND 'TR.<field>' =`

8. **Complete your qualification by choosing** `NULL` **from the** `Keywords` **option. The Run If field now contains:**
   `'TR.<field>' != ''DB.<field>' AND 'TR.<field>' = $NULL$`

Specifying Filter Actions

You can specify up to 25 filter actions to be performed when an AR transaction meets the conditions specified by the filter Run If conditions. For example, actions might include notifying a support staff person, setting the contents of certain fields, or running a predefined process. If you specify multiple actions, you can use the Move up or down arrows in the Current Actions list to set the order in which the actions will occur.

The following sections provide a detailed description of the attributes you must specify for each type of filter action as well as the steps involved in creating, modifying or deleting a filter action.

Note – Use this section to obtain information on how to set actions for escalations as well, since the Escalation Actions window looks and functions like the Filter Actions window. See “Types of Escalation Actions” on page 262.

To create a filter action:

1. **Open the filter you want to work with if it is not already open.**
2. **Make sure that the filter basic conditions are specified correctly, according to the instructions provided earlier in this chapter.**
3. **Click the Action tab in the Filter window. The window changes to allow you to specify a new action.**
4. **From the New Action drop-down list, select the action you want: Log to File, Message, Notify, Run Process, or Set Fields.**
   The window displays the attribute choices for the action you have selected.
5. **Set the attributes as appropriate, then click the Add Action button. Refer to the following sections for information about setting attributes for a specific action.**
6. **To create additional actions for the same filter, select an action from the New Action drop-down list.**
7. **Set attributes as appropriate for the additional action, then click the Add Action button to add the action to the Current Actions list.**

8. **When you have defined all the actions you want for the filter, click the Save button on the toolbar (or choose Save Filter from the File menu) to save the modified filter, then double-click its Control menu to close the window.**

To modify a filter action:

1. **Open the filter you want to work with if it is not already open.**
2. **Click the Action tab in the Filter window.**
3. **Select the action that you want to modify from the Current Actions list.**
4. **Change the various attributes as appropriate. Refer to the following sections for detailed information about setting attributes for a specific action.**
5. **When you have finished making changes, click the Modify Action button.**
6. **When you have made all of the modifications you want to the filter's actions, click the Save button on the toolbar to save the modified filter.**

To delete a filter action:

1. **Open the filter you want to work with if it is not already open.**
2. **Click the Action tab in the Filter window.**
3. **Select the current action that you want to delete from the Current Actions list.**
4. **Click the Delete Action button to remove the action.**
5. **When you have made all of the modifications you want to the filter's actions, click the Save button on the toolbar to save the modified filter.**

Ordering Filter Actions

The order in which the actions defined for a filter will execute is indicated when you click the Action tab in the Filter window.

You can change the order in which the actions execute by using the Move up and down arrow buttons located next to the Current Actions list. The Move buttons let you adjust the order of the filter actions.

To change the order of filter actions:

1. **Open the filter you want to work with if it is not already open.**
2. **Click the Action tab in the Filter window.**
3. **Select the action that you want to move forward or backward from the Current Actions list.**
4. **To move the action earlier or later in the action list, click the Move up or down arrow button.**
5. **Continue to move between actions and adjust their order using the arrow buttons until the actions are in the desired order.**
6. **Click the Save button on the toolbar to save the filter with the new action order.**

Types of Filter Actions

There are five types of filter actions you can specify:

- **Log to File** writes an audit trail message to a specified file.
- **Message** returns a message and displays it for the user who activated the filter. (Escalations do not support message actions.)
- **Notify** issues a notification message to the designated user.
- **Run Process** executes an operating system command or a program on the server.
- **Set Fields** assigns values to specific fields in the current AR.

Each of the types is explained in the following sections.

The Log to File Filter Action

When you choose the Log to File action, all operations meeting the filter conditions will be appended to an ASCII file on the AR server. Each log entry includes a date and time stamp, the name of the user whose action triggered the filter, the name of the schema, the entry's ID number, and the fields included in the transaction. This creates an audit trail of transactions meeting the filter condition.

Note – If for any reason or at any time there is a failure writing to the log file, a warning message is written to the `arerror.log` file and the AR System will log the filter or escalation activity to the `<ar_install_dir>/db/ar.log` file instead. This warning message appears only once, not at every instance of logging failure.

The `ar.log` file is used *only* when there is a failure to write to the log file you specify. The AR System continues to try to log filter or escalation activity to the log file you specify in this action, but if it is unsuccessful, will write to the `ar.log` file.

The next time the system successfully writes to your log file, a message is also written to the `arerror.log` file.

To define the Log to File filter action:

1. **Choose Log to File from the New Action drop-down list. The Filter Actions window will change to allow you to define the log to file action, as shown in Figure 10-6 on page 229.**
2. **Specify the full directory pathname of the file to log to in the File Name field.**
3. **When you have finished specifying the log to file filter action, click the Add Action button. All actions for this filter appear in the Current Actions list.**
4. **If you want to create an additional action for this filter, choose the action from the New Action drop-down list.**

Figure 10-6 Log to File Filter Action

5. **If you have finished defining basic conditions and actions for this filter, click the Save button on the toolbar then double-click the Control menu to close the window.**

The Message Filter Action

When you choose the Message action, an interactive error, warning, or note will be displayed by any application that initiates a transaction that meets the filter conditions.

Note – Escalations do not support message actions.

To define the Message filter action:

1. **Choose Message from the New Action drop-down list. The Filter Actions window will change to present the fields required to define the message filter action, as shown in Figure 10-7.**

Figure 10-7 Message Filter Action

2. **In the Message Text field, enter a string, up to 255 characters in length, which will be the text of the message. The text may include field substitution parameters or system keywords.**
   You can use the menu button next to the Message Text field to select the fields in the current schema as well as a list of keywords. You can simply select one of these fields or keywords to have it added to the text. In addition, you can click the text edit icon to open a text edit dialog box for easier data entry, if desired.

3. **Select a message type for the message. The message type will be displayed with the message. The available message types are:**

Note	Returns a note and continues the operation. The message type is displayed as ARNOTE.
Warning	Returns a warning and continues the operation. The message type is displayed as ARWARN.
Error	Returns an error and terminates the operation. The message type is displayed as ARERR. No actions after an error message action will be performed. For example, you can use an error type message to disallow entries with no value in a specific field, even if the field is not normally a required field.

4. **Specify a message number in the Number field. The message number will be displayed with the message. The number you specify must be greater than or equal to 10000. (Numbers under 10000 are reserved for AR System messages.)**

5. **If you have finished defining the message filter action, click the Add Action button. All actions for this filter appear in the Current Actions list.**

6. **If you want to create an additional action for this filter, choose the action from the New Action drop-down list.**

7. **If you have finished defining basic conditions and actions for this filter, click the Save button on the toolbar then double-click the Control menu to close the window.**

The Notify Filter Action

When you choose the Notify action, all requests meeting the filter conditions will use a mechanism you specify (such as email, the Notification Tool, or the user's default notify mechanism) to send a message to one or more users that you specify. For example, you could create a filter that would notify support staff that they have been assigned a new AR.

To define the Notify filter action:

1. **Choose Notify from the New Action drop-down list. The Filter Actions section will change to present the fields required to define the notify filter action, as shown in Figure 10-8 on page 232.**

Figure 10-8 Notify Filter Action

2. **In the Text field, enter a string, up to 255 characters in length, which will be the text of the notification message.**
   You can use the menu button next to the Text field to specify the fields in the current schema as well as a list of keywords (see “Table of Keywords” on page 447). You can simply choose one of these fields or keywords to have it added to the text. In addition, you can click the text edit button to open a text edit dialog box for easier data entry, if desired. The keyword or field will be expanded when the notification is sent.

   The email notify text can contain carriage returns. To place carriage returns in your notifier text you must open a text edit dialog box for the Notify Text field.

3. **In the User Name field, enter the name of the user to notify.**

Note – You can enter the name of a group instead of the name of a single user. This allows you to send notifications to all members of a group simultaneously. Do not put the group name in dollar signs ($) or in quotes.

You can enter a field name or ID within dollar signs ($) to indicate that the name of the user (or group) to notify is in a field on the AR. For example, to send a message to the user who submitted the problem, you would enter `$Submitter$`.

You can also use the menu button to enter fields or keywords. The field or keyword you select will append any value currently in the field (or replace the text if highlighted).

If the notification will be sent by email, you can enter the email address of the person to be notified.

4. **The Priority field is reserved for future use by Remedy Corporation.**

5. **Select a mechanism for delivery of the notification message. The available mechanisms are:**

Notifier Users will be notified with the specified text using the Notification Tool. User can be any user logged into the Notification Tool.
For more information on the Notification Tool, refer to Chapter 8, *Using the Notification Tool* in the *Action Request System User's Guide*.

E-Mail The supplied text will be sent to the address specified in the User Name field using electronic mail. The AR System will first try to resolve the contents of the User Name field by checking for a User entry. If the user is found, the email address is retrieved from the user record. If the user cannot be found, the AR System checks for a Group definition. If the name corresponds to a group name, the message is sent to all members of the group specified. Finally, if no User or Group definition is found, the contents of the User Name field are used as a literal address and the message is sent to the address specified via SMTP mail on UNIX servers or Microsoft Mail on NT servers. This address could be an email address representing users that are not AR System users, an alias for a group, or an email address representing a program.

User Default The filter will check the User record of the user to be notified and use the default notification method specified in the User record. If no default notify mechanism is specified on the User record, the filter will attempt to notify the user through the Notification Tool. If this attempt is not successful, no notification will be delivered.

Cross Reference	To use this notification mechanism, you identify another field on the schema that will contain the notification mechanism to use. The field selected must be a selection or integer type. When you choose Cross Reference as the notification mechanism, the Reference Field drop-down list is activated. (See the description of "Other Code" below for an explanation of how the value of the field is interpreted.)
Other	Allows you to specify the index for the mechanism to use. Used in conjunction with the Other Code field.
Other Code	When you choose Other as the notification mechanism, the Other Code field appears. Entering a value of 1 means notifier, a value of 2 means email, and a value of 3 means user default. Any value from 4 to 98 will send the notification to a file named `<ar_install_dir>\arserver\db\notify<`*`nn`*`>.arn`, where <*nn*> is the number you selected. You can read the notifications from this file or write a UNIX daemon (like a mail daemon) or an NT service to watch the file and take appropriate action. For example, you could create a paging beeper daemon in this way.

6. **The Reference Field is activated if you select Cross Reference. Use the Reference Field drop-down list to choose which field you want to use for the cross reference. The drop-down list lists the selection and integer type fields available on the current schema. Notification is based on the numeric value in the field of the current ticket, as defined by the "Other Code" (see above). For example, if you cross reference an integer field and the field has a value of 1, users will be notified by the notifier; if 2, by email; if 3, by user default, and so on. (Using 0 (zero) in an integer or selection field means do *not* notify users.)**

Note – If you cross reference the value of a selection field, remember that the first value stored in the database in a selection type field is 0 (zero), not one. As a result, selecting the first value in a selection field will *not* alert users by the notifier (because 0 means do not notify). In a selection field, 1 (for the notifier) is actually the second value, 2 (for email) is the third value, and so on.

---

7. **The Subject Line is activated if you select E-mail, User Default, Cross Reference, or Other. In the Subject Line field, you can enter text of up to 255 characters which will appear on the subject line of your email notification. You also can add any of the keywords defined by the system**

(see “Table of Keywords” on page 447) or the value of any field of the AR by entering the field name enclosed in dollar signs ($). The keyword or field will be expanded when the notification is sent.
In addition, the text edit icon allows you to open a text edit dialog box for easier data entry, if desired.

8. **The Include Fields drop-down list is activated if you select E-mail, Cross Reference, User Default, or Other. You then can choose from the Fields list to specify which fields to deliver with the Notification (in addition to the Notify text).**
   When you use any notification method other than the Notifier, you can send the contents of selected fields, as long as the user being notified has the appropriate permissions for those fields.

   You can choose the following delivery options for notification from the Include Fields drop-down list:

None	No fields are included with the notification.
All	All fields of the entry are included with the notification.
Selected	Selected fields from the list box are included with the notification.
Changed	Only fields which have changed in the current transaction are included with the notification.

   No fields can be delivered using the Notification Tool so this list is grayed when the Notifier choice is selected.

   If the Notify mechanism is User Default and the User record specifies that the Notification Tool is the default notify mechanism or the mechanism is Other and the Other Code is 1, field data will be ignored when the notification is delivered.

Note – The permissions of the target user are enforced when sending fields. Only fields that the user has permission to view are delivered from the list of fields specified. If no user match is found when sending email and the message is directed to an email address specified in the User Name field, only publicly viewable fields are delivered.

---

9. **If you have finished defining the notify filter action, click the Add Action button. All actions for this filter appear in the Current Actions list.**

10. **If you want to create an additional action for this filter, choose the action from the New Action drop-down list.**

11. **If you have finished defining basic conditions and actions for this filter, click the Save button on the toolbar then double-click the Control menu to close the window.**

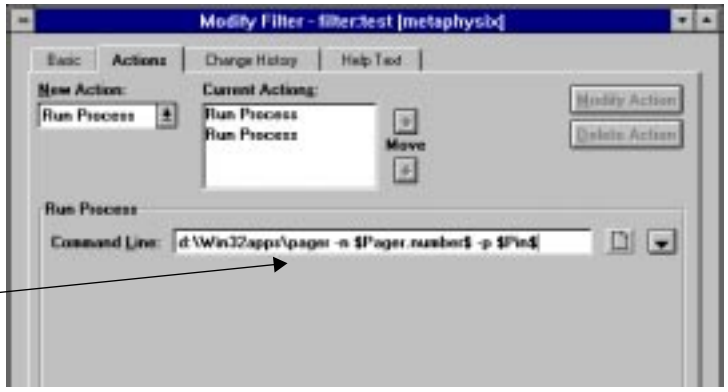
The Run Process Filter Action

Choosing the Run Process action allows you to execute a command to run a process on the server system. When an AR transaction meets the filter conditions, the system will execute the command specified in the Command Line field. For example, you could specify a program in the Command Line field that will automatically fix a problem described in the AR fields. The command line also accepts parameters.

Note – Security Alert: The process executed with the Run Process command will be executed with the same permissions as the AR server. You should consider this carefully when defining filter actions as it may have security implications for your system.

To define the Run Process filter action:

1. **Choose Run Process from the New Action drop-down list. The Filter Actions section will change to present the fields required to define the run process filter action, as shown in Figure 10-9 on page 236.**



Field contents can be passed as parameters. Enclose field name with $ symbols.

Figure 10-9 Run Process Filter Action

2. **In the Command Line field, enter the command that will execute when filter conditions are met.**
   You can specify any of the keywords defined by the system (see “Table of Keywords” on page 447) or you can substitute the value of any field of the AR generating the notification by enclosing the field name or ID in dollar signs ($) in the text. The keyword or field will be expanded when the process is run. If the expanded value contains spaces, remember to enclose the value within quotes so that the operating system will interpret it as a single value. If in doubt, use quotes. They will not interfere and they may prevent a problem.

   You can enter up to 255 bytes for your command definition. The command can be up to 4096 bytes once the substitution parameters are expanded.

   You can use the menu button next to the Command Line field to select the available keywords and fields in the current schema. You then simply select one of these fields to have it appended to the command. In addition, you can select the text edit icon to open a text edit dialog box for easier data entry, if desired.

Note – Remember to adjust your command syntax appropriately for whatever platform your server is running and include the explicit path to commands, for example, `/home/jim/bin/<command>`. In the Windows NT environment, you also need to specify the drive, for example, `d:\home\jim\bin\<command.bat>` (for the d: drive).

On the Windows NT server, you can only run a process that runs in a console (like a `.bat` script or `runmacro.exe`) or that creates its own window. If the process does create a window, the window appears on the server system where the AR System is running.

In the UNIX environment, the process will run under a Bourne shell.

For UNIX, use quotes around substituted fields when the values may contain blanks or other special characters, for example, `/bin/cmd "$<field>$"`

Substituted field values containing carriage return or other special characters may have unexpected results.

---

3. **If you have finished defining the run process filter action, click the Add Action button. All actions for this filter appear in the Current Actions list.**
4. **If you want to create an additional action for this filter, choose the action from the New Action drop-down list.**
5. **If you have finished defining basic conditions and actions for this filter, click the Save button on the toolbar then double-click the Control menu to close the window.**

Using the runmacro.exe Utility from the Command Line

For the Windows NT server, you can execute a Run Process filter action using `runmacro` from the Command Line field. The `runmacro.exe` utility, located in your `<ar_install_dir>\bin` directory, takes arguments from the command line to run macros, as in the following example:

```
c:\remedy\bin\runmacro  -h \\obelix\home  -e "TestMacro"
-p "Submitter"=$USER$ -x $SERVER$
```

Note – When creating macros, you can record a login with the proper permissions if you are performing actions that require those permissions, for example, an administrator deleting ARs. If your macro does not record a login, you must use the `-h` option to specify the directory that contains the `ar.ini` file.

Command Line Options

You can enter the following runmacro options in any order on the command line:

-h Use the -h option to specify a path to the <ar_config_dir> directory<*ar_config_dir*>\arcmds if you are using an ar.ini file that contains the user and password information for the user running the macro. If you do not specify the -d option, runmacro also looks in this directory for the <ar_config_dir> \arcmds directory that contains the macro to be run. You can create separate home directories for each user that you want to run a macro. To run a user's macros, copy the user's home directory from the machine where they run the User Tool to the Windows NT server and specify it with the -h option, or use the -h option to point to the user's home directory on the machine where they run the User Tool.
Warning: The ar.ini file contains the user and password information of the last person logged into the machine. If two people are sharing a PC, make sure that you access the correct ar.ini file.

-d If your macro is not in the <ar_config_dir>\arcmds directory or if you do not have a <ar_config_dir> directory, use the -d option to specify the directory that does contain the macros.

-e Specify the macro to be run.

-p Specify a value for a parameter. There may be more than one -p option in a command line. If the macro specified (using the -e option) has a parameter, a value can be supplied by naming that parameter and assigning a value. If either the parameter name or value includes a space or other special character that is interpreted by the command line, the parameter must be enclosed in quotes to stop the interpretation of the special characters.

-x Specify the name of a server to connect to. The -x option may be included more than once to connect to multiple servers.

The Set Fields Filter Action

When you choose the Set Fields action, the resulting filter will load specific values into selected fields for each transaction that meets the filter conditions. This allows you to automate field updates in entries. For example, you can define a filter that will automatically set the State field to "Assigned" every time the Assigned-to entry gets set to a support staff name.

Note – A Set Fields action will be ignored for filters that are based on a Query operation. This is because the system does not allow updates during a read operation.

The value you assign to a field can be a simple static value, a keyword, a field from another schema, the result of a function, or the results of an executing process or arithmetic operation. These options are described in detail in the following sections.

Note – You can also assign values to hidden fields.

If you assign a value to a diary field, the value is appended to any user text already in the field.

To define the Set Fields filter action:

1. **Choose Set Fields from the New Action drop-down list. The fields required to define the set fields filter action are displayed, as shown in Figure 10-10 on page 240.**

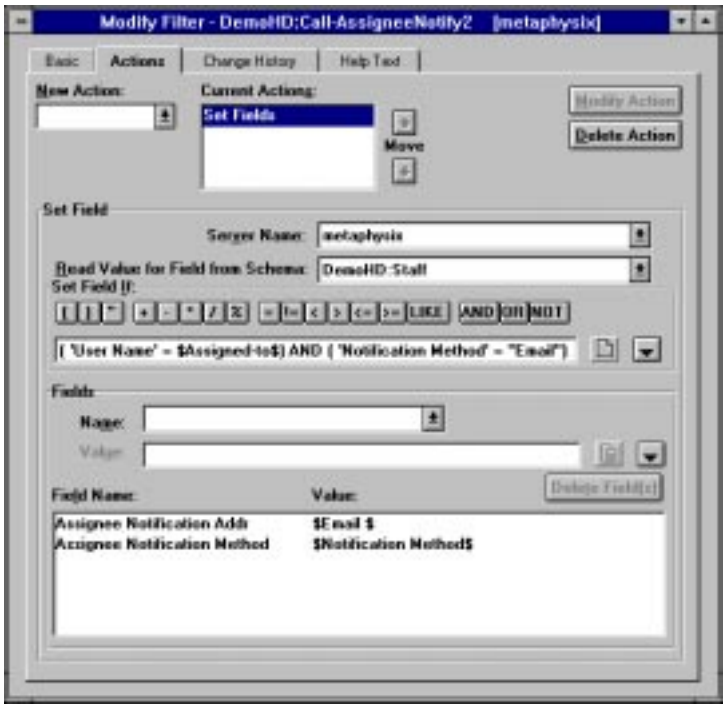


Figure 10-10 Set Filter Fields Window

2. **From the Server Name field, use the default** `CURRENT TRANSACTION` **if the value is to come from a field on the same AR or is to be only static values or keywords. From the drop-down list, you also can select the server from which the AR System is to retrieve the value for the field.**

3. **From the** `Read Value for Field from Schema` **drop-down list, select the name of the schema from which the AR System is to retrieve the value for the field. The default drop-down list choice is** `CURRENT TRANSACTION` **if the value is to come from another field on the same AR.**
   Selecting a schema from the `Read Value for Field from Schema` drop-down list works in connection with constructing qualification statements to locate ARs that contain specific data.

Note – If you enter a server name and schema different than the `CURRENT TRANSACTION` but you use a static value or a keyword or you do not actually set a field from the remote schema, the server name and schema revert to the `CURRENT TRANSACTION`.

---

4. **If the data or value you want is on a different AR, create a qualification in the** `Set Field If:` **field to locate the specific ARs.**

5. **In the Name field, enter the field that you want to be automatically set when the filter executes. You can use the drop-down list to select the available fields in the schema.**

6. **In the Value field, enter the values in the schema fields that you want to be automatically set when the filter executes. You can use the menu button next to the Value field to select the available fields, keywords, functions, or process in the schema.**

Note – Since filters and escalations execute with administrator permissions, field values set through a filter are updated regardless of whether or not the user has update permissions for the field.

You can set field values to any of the following:

- A static value. Enclose text values that include special characters, such as parentheses, single quotes, or arithmetic operators, in double quotes.
- A keyword value (see “Assigning Keyword Values” on page 242).
- A value from another field in the same schema or another schema on the server (see “Assigning Values from Other Fields” on page 242)

- The value resulting from a specified process (see “Assigning Values from Process Results” on page 244).
- The value resulting from an arithmetic operation (see “Assigning Values Using Arithmetic Operators” on page 246).
- The value resulting from a function (see “Assigning Values Using Function Results” on page 246).
- A combination of the above. You might want to combine a static text entry with a keyword, for example, `'Entry entered by' + $USER$`.

After you select both a name and a value, the field is automatically added to the Field Name list for the set fields action. Repeat steps 5 and 6 for as many fields as needed.

To delete fields from the list, select the fields and click the Delete Fields button. (You also can delete the Fields Value to remove the field from the list.)

7. **If you have finished defining the set fields filter action, click the Add Action button. All actions for this filter appear in the Current Actions list.**
8. **If you want to create an additional action for this filter, choose the action from the New Action drop-down list.**
9. **If you have finished defining basic conditions and actions for this filter, click the Save button on the toolbar then double-click the Control menu to close the window.**

Assigning Keyword Values

You can use any of the keywords listed in “Table of Keywords” on page 447 to set a field value. The data type of the keyword value must match the field data type. If there is no match, the system will attempt to convert the data type. Most conversions are automatic. Use the Keywords option in the menu button to choose from a list of available keywords.

Assigning Values from Other Fields

You can set a field to a value drawn from another field on the current transaction or an AR from the same or another schema on the same server. Each action can draw data only from a single AR. However, you can use data from multiple ARs by creating additional actions.

When you assign a value from an existing AR, you must specify the schema that you want and define the Set Field If condition that will locate the specific AR within that schema. If only one AR matches the qualification when the filter executes, the requested values are pulled from the AR and loaded as values on the current window. If no ARs match the qualification, the field is set to a null value. If multiple entries match, the values are drawn from the first AR that meets the qualifications. (This differs from active links, which provide a selection list in the case of multiple matches.)

Note – There will be no notification to the user that multiple matches were found in a set fields filter action.

To assign a value from another field in the current transaction:

1. **In the Set Fields Filter Action window, make sure the Server Name field is set to** `CURRENT TRANSACTION`**.**
2. **From the Fields Name drop-down list, select the field where you want the value loaded.**
3. **From the Fields Value menu button, select the field from which the value will be drawn when the filter executes. After you select both a name and a value, the field is automatically added to the Field Name list for the set fields action.**

To assign a value from a different AR:

The following steps apply to both filters and escalations.

1. **From the Server Name drop-down list in the Set Fields Filter window, select a server.**
2. **From the** `Read Value for Field from Schema` **drop-down list, select the schema from which you want to retrieve the data.**
3. **From the Fields Name drop-down list, select the field where you want the value loaded.**
4. **From the Fields Value menu button, select the field from which the value will be drawn when the filter executes. After you select a value, the field is automatically added to the Field Name list for the set fields action.**

5. **Use the Set Field If field to define the qualification criteria that will locate the specific AR from which the data will be drawn.**
   - Use the Fields cascading list to reference fields in the schema you are drawing data from. These fields will be delimited with single quotes.
   - Use the Keywords cascading list to reference the value of a field in the current transaction. These fields will be delimited with dollar signs ($).

   For example, if you want to find the AR where the Entry Id field of the From Schema contains the same ID as the Related-to field in the current transaction, the qualification would look like this:

   ```
   'Entry Id' = $Related-to$
   ```

   For a more detailed description of constructing qualification statements, see "Building Qualifications" on page 218.

6. **When you have finished specifying the qualification, click the Add Action button.**

7. **Click the Save button on the toolbar.**

Assigning Values from Process Results

You can set a field to the value resulting from running a specified process. For example, you may want to load information about the current system or information retrieved from another data source (such as an existing database holding contact information). To do so, you can define and run a process whose output will be used as the value for a field.

The syntax for loading the return of a process is as follows:

`$PROCESS$` *<process-to-run>*

Note – Security Alert: The process will run with the same privileges as the AR server. If the server is running with root privileges, the process will run with root privileges.

Note – Remember to adjust your command syntax appropriately for whatever platform your server is running and include the explicit path to commands, for example,

/home/jim/bin/<*command*>. In the Windows NT environment, you also need to specify the drive, for example, d:\home\jim\bin\<command.bat> (for the d: drive).

Note – On the Windows NT server, you can only run a process that runs in a console (like a .bat script or runmacro.exe) or that creates its own window. If the process does create a window, the window appears on the server system where the AR System is running.

Note – In the UNIX environment, the process will run under a Bourne shell.

Note – Use quotes around substituted fields when the values may contain blanks or other special characters, for example, $PROCESS$ /bin/cmd "$<*field*>$"

Note – ■Substituted field values containing carriage return or other special characters may have unexpected results.

The keyword $PROCESS$ indicates that all following text is a command line. The command line can include substitution parameters from the current screen to allow values from the current screen to be placed into the command line before it is executed. You can enter up to 255 bytes for your command definition. The command can be up to 4096 bytes once the substitution parameters are expanded. You can select substitution parameters (as well as the $PROCESS$ string) from the Fields Value menu button.

When the filter is performed, the specified command line will be executed on the server. All output will be read by the User Tool and processed according to the return of the process. If the process returns 0, the returned data is used as the value for the field. The data is expected in ASCII format and is converted as needed to match the data type of the target value. If the process returns a value other than 0, it is assumed there was an error and the process failed. In this case, the data returned is treated as the text of an error message and is returned to the user. All other server activity is blocked until the process completes or exceeds the process interval.

If the process does not complete within a defined interval, the server continues processing and ignores the process response. The process interval is configured using the Server Information window. See “Timeouts Information” on page 43 for information on setting time-outs.

Assigning Values Using Arithmetic Operators

You can use arithmetic operators to compute a value that you can then use in a Set Fields operation. You can combine an arithmetic operator with a static value, a keyword, a value from the current screen or an existing AR, a function, or a value from a process. The same arithmetic operators allowed for specifying qualifications are allowed to build a computed value (see “Table of Operators” on page 444). The operation must meet all the rules for arithmetic operators and produce a result whose type is compatible with the target field.

Note – If you include a process result in a mathematical operation, the process definition must *not* be contained within parentheses and it must be the last item in the operation since all data after the keyword `$PROCESS$` is considered to be part of the command line.

Here are some examples of valid arithmetic operators:

```
$TIMESTAMP$ - $CREATE-DATE$

$FIRST NAME$ + '' '' + $LAST NAME$

''hostname ='' + $PROCESS$ hostname
```

Assigning Values Using Function Results

The AR System supports a set of functions that you can use in the set fields action. The functions allow you to manipulate data so that you can control various aspects of values you are loading into fields. For example, you can use the UPPER function to convert the ASCII string loaded in a field to all uppercase.

To assign a value using a function in the set field operation:

1. **From the Fields Name drop-down list, select the field where you want the value loaded.**

2. **From the Fields Value menu button, choose the Function cascading option to see a list of the available functions.**
3. **Select the function you want to use. It will appear in the field with a set of parentheses to its right.**
4. **Within the parentheses, enter any arguments that are appropriate for the function you have selected. (With the exception of `$PROCESS$`, you can include keywords, field values, other functions, and arithmetic operations).**

Note – If the value of any of the arguments of a function is NULL, the result of the function is NULL (the field is blank). To avoid this result, use a qualification that tests that the transaction includes a value for all arguments.

Information about each of the functions supported by the AR System is provided in Table 10-1.

Table 10-1 Functions in Set Fields Actions *(1 of 5)*

Function	Return	Argument(s)	Description
DATE	char	(timestamp)	Returns the date portion of the timestamp.
DAY	long	(timestamp)	Returns the day of the timestamp (1 to 31).
HOUR	long	(timestamp)	Returns the hour of the timestamp (0 to 23).
LEFT	char	(char,long)	Returns the left most bytes of the first parameter (char) up to the number of bytes indicated by the second parameter (long). For example, to set the value of a field to the first ten characters of the Submitter name, you would enter: `LEFT($Submitter$,10)`
LENGTH	long	(char)	Returns the number of characters in the string (char).
LOWER	char	(char)	Returns all characters in the string (char) as lowercase characters (downshifts all characters).

Table 10-1 Functions in Set Fields Actions *(2 of 5)*

Function	Return	Argument(s)	Description
LPAD	char	(char,long,char)	Returns the value that results from padding the first parameter (char) to the left with the value of the third parameter (char) so that the resulting value is the length of the second parameter (long). For example, if you want the results of a set field operation to be a 15 character value prefixed with the word LEAD, followed by zeros, and ending in the contents of the integer field "Call #" you would enter: `LPAD($Call\ #$,15,"LEAD00000000000")` If the Call # field contains the number 947, the result of the set field operation will be LEAD00000000947. If the Call # field contains the number 122334556, the result of the set field operation will be LEAD00122334556.
LTRIM	char	(char)	Returns the value of (char) after deleting any blank spaces to the left.
MAX	any (matches input)	(any,any[,any]...)	Returns the maximum value of the set specified. The datatype of all values must match in order for the result to be meaningful. For example, to check the current time and the escalation time and return only the greater (latest) value of the two, you would enter: `MAX ($Escalate Date$,\ $TIMESTAMP$)`

Table 10-1 Functions in Set Fields Actions *(3 of 5)*

Function	Return	Argument(s)	Description
MIN	any (matches input)	(any,any[,any]...)	Returns the minimum value of the set specified. The datatype of all values must match in order for the result to be meaningful. For example, to check the current time and the escalation time and return only the lower (earliest) value of the two, you would enter: `MIN ($Escalate Date$,\ $TIMESTAMP$)`
MINUTE	long	(timestamp)	Returns the minute of the timestamp (0 to 59).
MONTH	long	(timestamp)	Returns the month of the timestamp (1 to 12).
REPLACE	char	(char,char,char)	Returns the value that results from replacing any occurrences of the second parameter (char) found in the first parameter (char) with the contents of the third parameter. For example, to replace the name Bob with the name Robert if Bob is found in the Submitter field, you would enter: `REPLACE($Submitter$,"Bob",\ "Robert")`
RIGHT	char	(char,long)	Returns the right most bytes of the first parameter (char) up to the number of bytes indicated by the second parameter (long). For example, to set the value of a field to the last four characters of an account code, you would enter: `RIGHT($Account#$,4)`
ROUND	long	(real)	Returns the rounded value of a real number. For example, 5.1 to 5.4 are rounded to 5, 5.5 to 5.9 are rounded to 6.

Table 10-1 Functions in Set Fields Actions *(4 of 5)*

Function	Return	Argument(s)	Description
RPAD	char	(char,long,char)	Returns the value that results from padding the first parameter (char) on the right with the value of the third parameter (char) so that the resulting value is the length of the second parameter (long).
RTRIM	char	(char)	Returns the value of (char) after deleting any blank spaces to the right.
SECOND	long	(timestamp)	Returns the second of the timestamp (0 to 59).
STRSTR	int	(char,char)	Returns an integer indicating the position of string 2 if it is found in string 1. If string 2 is not found, returns a -1.
SUBSTR	char	(char,long,[,long])	Returns the substring of characters in the first parameter (char) starting at the position indicated by the second parameter (long) and continuing to the position indicated by the third parameter (long). The string is 0 indexed (numbering of characters begins at 0). If the third parameter is not included, returns characters to the end of the string. For example, to set the value of a field to six characters of the Location field, skipping a three character prefix, you would enter: `SUBSTR($Location$, 3, 9)`
TIME	char	(timestamp)	Returns the time portion of the timestamp.
TRUNC	long	(real)	Returns the truncated value of a real number. For example, 5.1 through 5.9 are truncated to 5.

Table 10-1 Functions in Set Fields Actions *(5 of 5)*

Function	Return	Argument(s)	Description
UPPER	char	(char)	Returns all characters in the string (char) as uppercase characters (upshifts all characters).
WEEKDAY	long	(timestamp)	Returns the weekday of the timestamp (1 to 7, 1=Sunday, 7=Saturday).
YEAR	long	(timestamp)	Returns the year portion of the timestamp.

Building and Using Filter Change History

The AR System lets you record information about the owner of a filter, the user who last modified the filter, and the date of the modification. You can display this information at any time by clicking the Change History tab in the Filter window.

To define change history for a filter:

1. **From the Server Window, select Filter from the Servers list. The Filters list appears in the Server Window.**
2. **From the Filters list in the Server Window, open a filter by double-clicking on it. The Modify Filter window appears.**
3. **Click the Change History tab, as shown in Figure 10-11.**

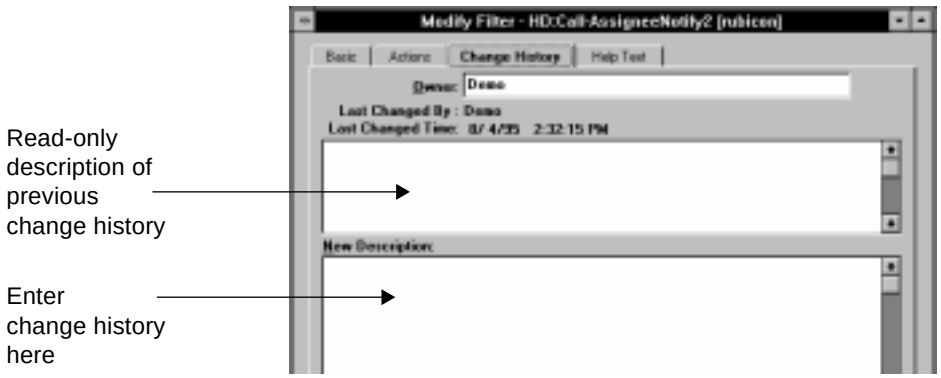


Figure 10-11 Filter Change History

4. **In the New Description field, enter any information about modifications to the filter that you think will be helpful to other administrators or subadministrators of the AR System.**

Note – All previous change history is found in the read-only window above the New Description field. After you enter and save change history, it cannot be edited.

5. **Click the Save button on the toolbar (or choose Save Filter from the File menu, or type `Ctrl+S`) to save your changes.**

Setting Help for Filters

Clicking the Help Text tab in the Filter window brings up a Help Text editing window. You can supply help text for the filter here. In most cases, this help text is simply a description of the filter, and is available for viewing and editing only by AR System administrators and subadministrators who have the filter open.

To define help text for a filter:

1. **From the Server Window, select Filter from the Servers list. The Filters list appears in the Server Window.**
2. **From the Filters list in the Server Window, open a filter by double-clicking on it. The Modify Filter window appears.**
3. **Click the Help Text tab, as shown in Figure 10-12.**

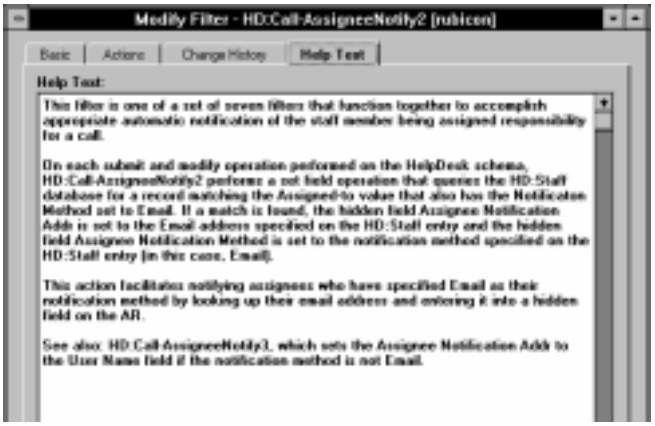


Figure 10-12 Filter Help Text

4. **In the Help Text field, enter any information that you think will be helpful to AR System administrators or subadministrators.**
5. **Click the Save button on the toolbar (or choose Save Filter from the File menu, or type `Ctrl+S`) to save your changes.**

Tracing Filter Activity

You can create a log file of filter activity on each server. This server option logs information about filter activity for each operation, including the filters that executed and whether or not filter execution was successful. By default, the log file is called `arfilter.log`. See “Log Files Information” on page 49 for more information on creating a filter log file.

10

Defining Escalations 11

This chapter describes how to use the Administrator Tool to create and modify time-based escalations. An **escalation** is a general purpose capability that allows a condition to be checked on a regular basis and, if met, performs one or more actions.

For example, you might define an escalation that sets the Assigned-Priority to Urgent if the trouble ticket is not closed within 24 hours. Or you may choose to escalate tickets to a Critical priority when they have not been addressed in one hour.

For a detailed discussion about escalation design, see “Designing Escalations” on page 86.

This chapter covers the following topics:

- Using the Escalation window.
- Opening escalations.
- Specifying escalation basics.
- Specifying escalation actions.
- Specifying escalation time criteria.
- Building and using escalation change history.
- Setting help for an escalation.

11

Using the Escalations Window

You create and modify escalations within the Escalation window, as shown in Figure 11-1.

Figure 11-1 Escalation Window

You can open multiple windows for creating or modifying the escalations that you have permission to administer.

Escalations execute on the server machine. Each escalation is attached to a single schema on the server.

You use the tabs in the Create Escalation window to define the following:

Basic — Defines the basic properties of the escalation and the conditions that will cause the escalation to execute. For example, the condition might be to create an escalation that executes when a ticket more than eight hours old has not yet been closed by support personnel.

Actions	Defines the actions the escalation will take when the specified qualifications are met at the defined intervals. For example, an escalation qualification might look for “New” in the Status field for any entry over 2 hours old. For all matches found, assign the entry to the manager.
Time Criteria	Defines how often the AR server will check the escalation conditions.
Change History	Allows you to record information about the owner of an escalation, the user who last modified it, and the date of the modification. You can add additional change history information as well.
Help	Shows the Help Text editing window. You can supply help text for the escalation here. In most cases, this help text is simply a description of the escalation, what it does, and how it is used.

Creating and Modifying Escalations

Follow these steps to create a new escalation or open, copy, or delete an existing escalation.

To create an escalation:

1. **In the Server Window, choose a server to administer.**

2. **Click the New Object button on the toolbar. Or choose New Object from the File menu. The New Object dialog box appears (Figure 11-2).**

Figure 11-2 New Object Dialog Box

3. **Select Escalation from the New Object list, then click the OK button.** The Escalation window that you use for creating escalations appears (see Figure 11-1 on page 256). For a new escalation, the fields are empty.

4. **Specify or change escalation basic specifications and conditions according to the steps described in “Specifying Escalation Basics” on page 260.**
5. **Specify or change escalation actions according to the steps described in “Specifying Escalation Actions” on page 261.**
6. **Specify or change escalation time criteria according to the steps described in “Specifying Escalation Time Criteria” on page 262.**

Opening Escalations

Follow these steps to open and modify an escalation.

Note – You can open as many escalations as you want but you cannot open the same escalation twice.

To open an escalation:

1. **Open a Server Window.**
2. **Select a server from the Servers list.**

3. **Double-click Escalations to see a list of escalations currently defined on the server.**
4. **Select an escalation from the Escalations list, then double-click the escalation to open it.**
   The escalation appears in the Modify Escalation window (see Figure 11-1 on page 256). You now can modify the escalation as needed.

Saving Escalations Under a Different Name

When saving an escalation under a different name, the new escalation contains all the properties of the original escalation. The only difference is the name.

To save an escalation under a different name:

1. **Open a Server Window.**
2. **Select a server from the Servers list.**

3. **Double-click Escalations to see a list of escalations currently defined on the server.**

4. **From the Escalations list, open the escalation that you want to copy.**

5. **From the File menu, choose Save Escalation As. The Save Escalation As dialog box appears (Figure 11-3).**

Figure 11-3 Save Escalation As Dialog Box

6. **In the Escalation Name field, enter the new name of the escalation.**

7. **Click the OK button to make a copy of the escalation. The new escalation will appear in the Escalations list.**
   Double-click the escalation to open it.

Deleting Escalations

The delete operation is permanent and cannot be undone. Make sure you no longer need an escalation before deleting it. You cannot delete any escalation that is currently open.

To delete an escalation:

1. **Open a Server Window.**

2. **Select a server from the Servers list.**

3. **Double-click Escalations to see a list of escalations currently defined on the server.**

4. **From the Escalations list, select the escalation that you want to delete.**

5. **From the Edit menu, choose Delete - Escalation.**
   A confirmation message appears (if your preferences are set for this). Click the OK button to delete the escalation. For more information, see “Defining Preferences” on page 61.

Specifying Escalation Basics

This section describes how you use the Escalation window to specify escalation specifications and conditions, as shown in Figure 11-4. The escalation basics define the criteria that a transaction must meet before the corresponding escalation actions take place. You specify basics including:

- The name of the escalation.
- Whether the escalation is enabled or not.
- The schema that the escalation is to be applied to.
- The specific qualifications that limit the ARs against which the escalation will execute, as described in “Building Qualifications” on page 218.

Figure 11-4 Specifying Escalation Basics

To specify or change escalation conditions:

1. **Open the escalation you want to work with (see the previous section).**

2. **If the correct name is not already assigned to the escalation, specify the escalation name in the Escalation Name field.**
   Escalation names may be up to 30 characters, including blanks, and must be unique. There is no enforced convention for escalation names, but it is helpful if the name is descriptive and indicative of the escalation's function.
3. **Select or clear the Enable check box to set whether you want to activate the escalation. For example, you may want to disable the escalation during development or if you are diagnosing a problem.**
4. **From the Schema Name drop-down list, select the schema the escalation will apply to in the Schema Name field.**
5. **You define escalation conditions by entering a qualification statement in the Run If field. You can enter the text directly, by typing it in, or build the qualification using the query bar palette and Fields menu, as described in "Building Qualifications" on page 218.**
6. **When you have finished specifying escalation conditions and qualifications, go on to specify the escalation actions.**

Specifying Escalation Actions

You can specify up to 25 actions to be performed when an entry meets the conditions specified by the escalation conditions. For example, actions might include loading a value into a field on the AR and notifying the escalation manager about the escalation.

The basic steps involved in creating, modifying, or deleting an escalation action are just like the steps to define filter actions as described in "Specifying Filter Actions" on page 225.

Ordering Escalation Actions

The order in which the actions defined for an escalation will execute is indicated in the Escalation Action window.

You can change the order in which the actions execute by using the Move up and down arrow buttons located next to the Current Actions list. The Move buttons let you adjust the order of the escalation actions.

The basic steps involved in ordering an escalation action are just like the steps to order filter actions as described in “Ordering Filter Actions” on page 226.

Types of Escalation Actions

There are four types of escalation actions you can specify. With one exception (escalations, unlike filters, do not support message actions), the Escalation Actions window looks and functions just like the Filter Actions window as described in “Types of Filter Actions” on page 227.

- **Log to File** writes an audit trail message to a specified file. To use the Log to File Escalation Action, see “The Log to File Filter Action” on page 227.
- **Notify** issues a notification message to the designated user. To use the Notify Escalation Action, see “The Log to File Filter Action” on page 227.
- **Run Process** executes an operating system command or a program on the server. To use the Run Process Escalation Action, see “The Run Process Filter Action” on page 236.
- **Set Fields** assigns values to specific fields in the current AR. To use the Set Fields Escalation Action, see “The Set Fields Filter Action” on page 239.

Specifying Escalation Time Criteria

This section describes how you use Time Criteria in the Escalation window to specify escalation time conditions, as shown in Figure 11-5 on page 263. The escalation time criteria define the interval or specific times when escalation conditions are checked.

Note – Creating escalations that check the server too frequently can cause performance problems.

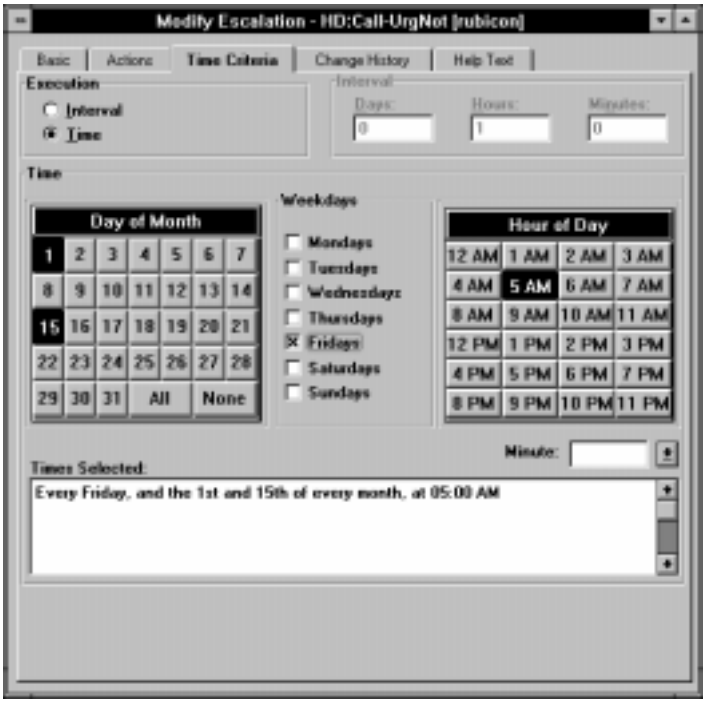


Figure 11-5 Time Criteria in Escalation Window

To specify or change escalation time criteria:

1. **Open the escalation you want to work with (see *Opening Escalations* on page -258).**
2. **Click the Time Criteria tab in the Escalations window. The window changes to allow you to specify time conditions.**
3. **In the Execution box, specify either Interval or Time.**
   - Select the Interval option button to cause an escalation to be checked at a regular interval (for example, every 30 minutes, every 6 hours, every 7 days, or any combination of days, hours, and minutes). The interval begins when you create, modify, or enable the escalation.

For more on setting execution intervals, see the following section, “Setting Execution Intervals.”

- Select the Time option button to cause an escalation to be checked at a specified time (for example, every day at 4:00 PM or 1600 hours). Unlike the Interval setting, the execution time is not checked immediately; the server waits until the time that you set. Selecting Time allows you to check escalations at regular or irregular intervals, for example, the 15th and 31st of every month or weekdays at 4:00 PM.

For more on setting execution times, see “Setting Execution Times” on page 265.

4. **When you have defined all the time criteria you want for the escalation, click the Save button on the toolbar, then double-click the Control menu to close the window.**

Setting Execution Intervals

You can set the AR server to check the escalation at regular intervals. The server checks the interval immediately and then at its set interval (for example, every 4 hours).

To set an execution interval:

1. **After you have specified the basic conditions for the escalation, click the Time Criteria tab. The window changes to allow you to specify times or intervals.**
2. **Select Interval from the Execution box. The Interval box is activated.**
3. **In the Days/Hours/Minutes fields, enter the check interval. The server checks the escalation at each interval you set (beginning when you set the interval). For example, if you set the interval to 1 hour, the server checks the escalation immediately, then every hour. Make the execution interval as large or as small as you need.**
4. **When you have defined the time criteria you want for the escalation, click the Save button on the toolbar, then double-click the Control menu to close the window.**

Setting Execution Times

Depending on your escalation, you can cause the AR server to check the escalation at different times and even at irregular intervals. For example, you can set Day, Hour, and Minute to execute escalations Monday through Friday at 8:15 (AM) and 16:15 hours (4:15 PM) or that execute on the 15th and 31st of every month at 8:00 AM.

To set an execution time:

1. **After you have specified the basic conditions for the escalation, click the Time Criteria tab. The window changes to allow you to specify times or intervals (see Figure 11-6).**
2. **Select Time from the Execution box. The Time box is activated. You can choose days of the month, weekdays, hours of the day, and minutes of the day, or any combination.**

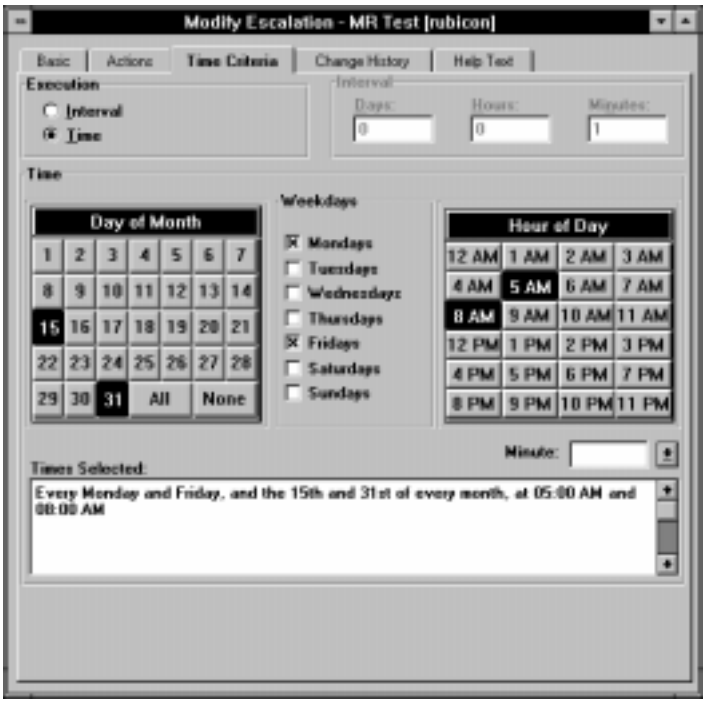


Figure 11-6 Escalation Time Criteria Window

3. **From the Time box, select any combination of days of month and weekdays to check the escalation on specific days of the month.**
   For example, if you select 15 and 31 from the Day of Month calendar *and* Mondays and Fridays from the Weekdays list, the server checks the escalations on the 15th and 31st as well as all Mondays and Fridays during the month. If a Friday occurs on a 15th or 31st, the server checks the escalation only once.

   - Clicking the All button selects the entire month.
   - Clicking the None button clears the entire month.

Note – In the AR System, selecting the 31st day of month creates an escalation on the last day of the month for *all* months, including those with less than 31 days.

4. **Select the hours of the day that you need.**
   You must set an hour to create an escalation but it must also be combined with a day of month or weekday setting. You cannot set an hour by itself.

   If you do not set an hour or if you set only the Hour field, the AR System returns an error message.

5. **In the Minute field, use the drop-down list to enter the minutes past the hour. (The minutes default for all hours is :00.) The Minute Field is particularly useful for staggering escalations so that they balance the load on the server. For example, you can order escalations so that the server checks some escalations on the hour, others at 15 minutes past the hour, still others at 30 minutes past the hour, and so on.**
   You can also type a specific time into the Minute field, for example, 34.

6. **When you have defined all the basic conditions, time criteria, and actions for the escalation, click the Save button on the toolbar to create the escalation, then double-click the Control menu to close the Escalation window.**

Building and Using Escalation Change History

The AR System automatically records information about the owner of an escalation, the user who last modified it, and the date of the modification. You can display this information at any time by clicking the Change History tab in the Escalation window.

The basic steps involved in building escalation change history are just like the steps to define filter change history as described in “Building and Using Filter Change History” on page 251.

Setting Help for Escalations

Clicking the Help Text tab in the Escalations window brings up a Help Text editing window. You can supply help text for the selected escalation here. In most cases, this help text is simply a description of the escalation, and is available for viewing and editing only by AR System administrators and subadministrators who have the escalation open.

The basic steps involved in creating escalation help text are just like the steps to define filter end-user help as described in “Setting Help for Filters” on page 252.

Tracing Escalation Activity

You can create a log file of escalation activity on each server. This server option logs information about escalation activity for each operation, including the escalations that executed and whether or not escalation execution was successful. By default, the log file is called `arescl.log`. See “Log Files Information” on page 49 for more information on creating an escalation log file.

11

Defining Active Links 12

This chapter describes how to use the Administrator Tool to create and modify active links. An **active link** is a specific operation that is defined by the AR administrator to be performed when an action is taken by the user.

For example, you might define an active link that runs a macro to display all problems reported for the current machine whenever a user presses return on the “Machine Name” field.

For a detailed discussion about active link design, see “Designing Active Links” on page 92.

This chapter covers the following topics:

- Using the Active Link window.
- Opening an active link.
- Specifying active link basics.
- Specifying active link actions.
- Defining group access for multiple active links.
- Building and using active link change history.
- Setting help for an active link.

12

Using the Active Link Window

You create and modify active links using the Active Link window, as shown in Figure 12-1. For active links that execute on a button, you can also open the Active Link window from the Modify Schema window.

Figure 12-1 Active Link Window

You can open multiple windows for creating or modifying the active links that you have permission to administer.

Active links execute on the client machine. Each active link is attached to a single schema on the server.

You use the tabs in the Create Active Link window to define the following:

Basic — Defines the basic properties of the active link and what the user will do to cause the active link to execute. For example, the condition may be that the user presses Return in a specified field or clicks a button on the user's view of the schema.

Actions	Defines the actions the active link will take when specified conditions are met. For example, an action may be to run a specified macro.
Permissions	Defines which groups will be able to use the active link.
Change History	Allows you to record information about the owner of an active link, the user who last modified it, and the date of the modification. You can add additional change history information as well.
Help Text	Shows the Help Text editing window. You can supply help text for the active link here. In most cases, this help text is simply a description of the active link, what it does, and how it is used. User Tool users will be able to view this help text in the same way that they can view help text that is available for fields.

Creating and Modifying Active Links

Follow these steps to create a new active link or to open, copy, or delete an existing active link.

To create an active link:

1. **In the Server Window, choose a server to administer.**

2. **Click the New Object button on the toolbar. Or choose New Object from the File menu. The New Object dialog box appears (Figure 12-2).**

Figure 12-2 New Object Dialog Box

3. **Select Active Link from the New Object list, then click the OK button.** The Active Link window that you use for creating active links appears (see Figure 12-1 on page 270). For a new active link, the fields are empty.

4. **Specify or change active link basic specifications and conditions according to the steps described in “Specifying Active Link Basics” on page 274.**
5. **Specify or change active link actions according to the steps described in “Specifying Active Link Actions” on page 280.**
6. **Specify or change active link permissions according to the steps described in “Defining Permissions for Active Links” on page 306.**

Opening Active Links

Follow these steps to open and modify an active link.

Note – You can open as many active links as you want but you cannot open the same active link twice.

To open an active link:

1. **Open a Server Window.**
2. **Select a server from the Servers list.**
3. **Double-click Active Links to see a list of active links currently defined on the server.**
4. **Select an active link from the Active Links list, then double-click the active link to open it.**
   The active link appears in the Active Link window (see Figure 12-1 on page 270). You now can modify the active link as needed.

To open an active link from the Modify Schema window:

- To create a new active link that executes on a button, do the following:

1. Click the New Object button on the toolbar, then select Active Link from the New Object list.
2. When the Create Active Link window appears, create the active link and attach it to your schema.
3. Select the Execute On Button checkbox. When you save the new active link, it will appear as a button at the upper left-hand corner of the Modify Schema window.

- To open an existing active link, double-click the active link button in the Modify Schema window.

For information on creating an active link that activates by clicking a button, see “Using Active Link Buttons” on page 278.

Saving Active Links Under a Different Name

When saving an active link under a different name, the new active link contains all the properties of the original active link. The only difference is the name.

To save an active link under a different name:

1. **Open a Server Window.**
2. **Select a server from the Servers list.**
3. **Double-click Active Links to see a list of active links currently defined on the server.**
4. **From the Active Links list, open the active link that you want to copy.**
5. **From the File menu, choose Save Active Link As. The Save Active Link As dialog box appears (Figure 12-3).**

Figure 12-3 Save Active Link As Dialog Box

6. **In the Active Link Name field, enter the new name of the active link.**
7. **Click the OK button to make a copy of the active link. The new active link will appear in the Active Links list.**
   Double-click the active link to open it.

Deleting Active Links

The delete operation is permanent and cannot be undone. Make sure you no longer need an active link before deleting it. You cannot delete any active link that is currently open.

To delete an active link:

1. **Open a Server Window.**
2. **Select a server from the Servers list.**
3. **Double-click Active Links to see a list of active links currently defined on the server.**
4. **From the Active Links list, select the active link that you want to delete.**
5. **From the Edit menu, choose Delete - Active Link.**
   A confirmation message appears (if your preferences are set for this). Click the OK button to delete the active link. For more information, see “Defining Preferences” on page 61.

Specifying Active Link Basics

This section describes how you use the Active Link window to specify active link specifications and conditions, as shown in Figure 12-4 on page 275.

Figure 12-4 Specifying Active Link Basics

The active link basics define the criteria that a transaction must meet before the corresponding active link actions take place. You specify basics including:

- The name of the active link.
- Whether the active link is enabled or not.
- The order in which the active link will execute in relation to other active links.
- The schema that will contain the active link.
- How users will activate the active link (for example, by clicking a button or by pressing Return).
- Specific qualifications that limit the ARs on which the active link will execute, as described in “Building Qualifications” on page 218.

To specify or change active link conditions:

1. **Open the active link you want to work with (see "Opening Active Links" on page 272).**

2. **If the correct name is not already assigned to the active link, specify the active link name in the Active Link Name field.**
   Active Link names must be unique. There is no enforced convention for specifying active link names, but it is helpful to make the name descriptive and indicative of the active link's function. Names may be up to 30 characters, including blanks.

3. **Select or clear the Enable checkbox to set whether you want to activate the active link. For example, you may want to disable the active link during development or if you are diagnosing a problem.**

4. **Specify the active link execution order.**
   There may be more than one active link designed to execute based on the same set of conditions. The output from one active link might affect another active link. The Execution Order field allows you to specify the processing order for the particular active link. Valid values for Execution Order are numbers between 0 and 1000 inclusive. Active links with lower numbers are processed first. You can assign the same number to multiple active links; however, there is no guarantee about the processing order for active links that have the same number.

5. **From the Schema Name drop-down list, select the schema the active link will apply to in the Schema Name field.**

Note – Changing the Schema Name field setting after you have already defined actions that reference the schema fields may invalidate the actions.

---

6. **In the Execute On box, select when the active link will be performed by clicking one or more of the options, as described in Table 12-1:**

Table 12-1 Active Link Conditions

Submit	Executes when a user submits an AR. The active link will be performed *before* the AR is submitted.
Modify	Executes when a user modifies an AR. (The active link will *not* execute during a Modify All operation.) The active link will be performed *before* the AR is modified.
Display	Executes when a user retrieves and displays an AR.
Set Default	Executes when the user selects the Set to Default command or the User Tool loads defaults prior to a new query or submit.
Return	Executes when a user presses Return in a specific field (or selects a radio button if the field is a selection data type field). If you choose this option, Field is activated to allow you to specify the field that will cause the active link to execute. **Note:** In multi-line text fields on the Motif User Tool, where Return inserts a line feed in the text, the user must press Shift-Return (or press the Enter key on the keypad) to activate the active link. On the Windows User Tool, you must press the F5 key.
Menu Choice	Executes when a user selects a choice from a menu. If you choose this option, the Field list is activated to allow you to specify the field for which a menu choice will cause the active link to execute. You can combine this condition setting with a qualification on the contents of the field to build an active link that executes only if the user chooses a specific menu selection.
Button	Executes the active link when a user clicks the active link button. For more information, see “Using Active Link Buttons” on page 278.

You can select any combination of the options. If you select multiple options, the active link will act when any one of the selected operations takes place.

7. **You can further refine your active link selection criteria by entering a qualification statement in the Run If field. You can enter the text directly, by typing it in, or build the qualification using the menu and text editor, as described in “Building Qualifications” on page 218.**

8. **When you have finished specifying active link conditions and qualifications, go on to specify the active link actions.**

Using Active Link Buttons

You can associate multiple active links with the same button simply by using the same button label for all. The AR System will place the buttons on top of one another so that to the user there appears to be a single button. A good use of this capability is to define active links that execute conditionally based on current conditions, such as the platform on which the tool is running.

For example, you could define an active link to execute only if the tool is running on a PC. You could then associate another active link with the same button, this time defining the active link so that it executes only if the tool is running on a UNIX machine. Users on either platform can then perform the same action to execute the appropriate active link for their platform.

Placing Active Link Buttons on Your Schema

When you create an active link button, it automatically appears in the top-left side of the schema that the active link applies to (Figure 12-5 on page 279). You then can define the button's physical characteristics as needed.

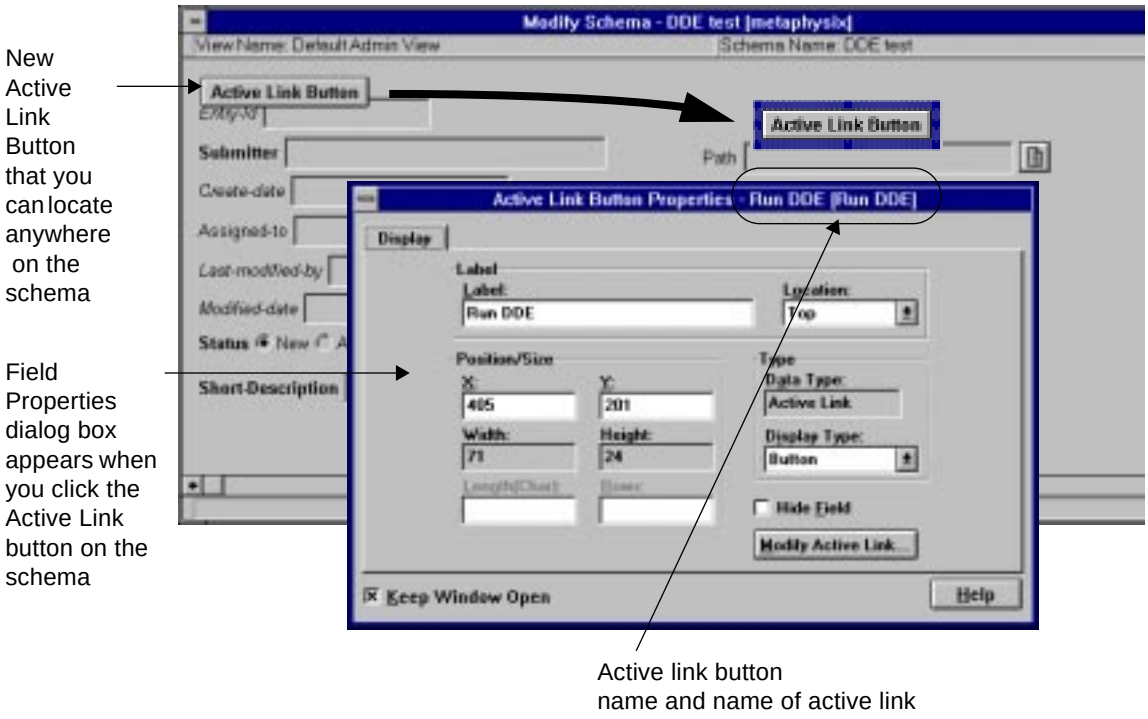


Figure 12-5 Defining Display Properties for an Active Link Button

To define display properties for active link buttons:

1. **Double-click the active link button on the schema. The Active Link Button Properties dialog box appears, displaying both the name of the active link button and the active link name (as shown in Figure 12-5). You use this dialog box to set display properties for active link buttons.**

Note – If you click on a field, the dialog box re-appears as the Field Properties dialog box and its field properties are displayed.

---

2. **Use the Label field to rename the active link to some more appropriate button label. For example, if the active link activates a DDE action, you might label it** `Run DDE`**.**

3. **Locate the buttons on the schema as needed, by doing the following:**

- Set the same X and Y coordinates precisely for each active link button by entering the coordinates into the Position/Size X and Y fields. If you are creating multiple active link buttons, you do not have to close the Field Properties dialog box to set other active link display properties in the schema. The Field Properties dialog box displays the properties of any active link button you select from the Schema Window.
- Drag the buttons on top of each other at the location that you want them to appear.

These actions ensure the location of the button as it appears to the user in the User Tool.

4. **Place the button with the lowest execution order where you want the button to appear to the user. The button with the lowest execution order is the button that will be visible in the User Tool.**

5. **To make modifications to the active link's other properties (for example, actions or permissions), click the Modify Active Link button on the Active Link Button Properties dialog box. Make any modifications when the Modify Active Link window appears.**

Note – If you clear the Keep Window Open check box, the Active Link Button Properties dialog box closes when you click the Modify Action Link button, allowing you to modify more easily the active link properties.

6. **When you have made all of the modifications you want to the active link, click the Save button on the toolbar to save the modified active link.**

Specifying Active Link Actions

You can specify up to 25 actions to be performed when an AR transaction meets the conditions specified by the active link conditions. For example, actions might include loading the hostname of the client, checking other problems reported for a machine, or running a pre-defined process. If you specify multiple actions, you can use the Move up or down arrows in the Action tab of the Active Link window to set the order in which the actions will occur.

The following sections provide a detailed description of the attributes you must specify for each type of active link action as well as the steps involved in creating, modifying or deleting an active link action.

To create an active link action:

1. **Open the active link you want to work with if it is not already open.**
2. **Make sure that the active link basics and qualifications are specified correctly, according to the instructions provided earlier in this chapter.**
3. **Click the Action tab in the Active Link window. The window changes to allow you to specify a new action.**
4. **From the New Action drop-down list, select the action you want: Change Field, DDE, Message, Run Macro, Run Process, or Set Fields.**
   The window displays the attribute choices for the action you have selected.
5. **Set the attributes as appropriate, then click the Add Action button. Refer to the sections that follow for information about setting attributes for a specific action.**
6. **To create additional actions for the same active link, select an action from the New Action drop-down list.**
7. **Set attributes as appropriate for the additional action, then click the Add Action button to add the action to the Current Actions list.**
8. **When you have finished specifying active link actions, go on to specify group access for the active link (see “Defining Permissions for Active Links” on page 306).**

To modify an active link action:

1. **Open the active link you want to work with if it is not already open.**
2. **Select the action that you want to modify.**
3. **Change the various attributes as appropriate. Refer to the following sections for detailed information about setting attributes for a specific action.**
4. **When you have finished making changes, click the Modify Action button.**
5. **When you have made all of the modifications you want to the active link’s actions, click the Save button on the toolbar to save the modified active link.**

To delete an active link action:

1. **Open the active link you want to work with if it is not already open.**
2. **Select the action that you want to delete.**
3. **Click the Delete Action button to remove the action.**
4. **When you have made all of the modifications you want to the active link's actions, click the Save button on the toolbar to save the modified active link.**

Ordering Active Link Actions

The order in which the actions defined for an active link will execute is indicated in the Active Link Action window.

You can change the order in which the actions execute by using the Move up and down arrow buttons located next to the Current Actions list. The Move buttons let you adjust the order of the active link actions.

To change the order of active link actions:

1. **Open the active link you want to work with if it is not already open.**
2. **Click the Action tab in the Active Link window.**
3. **Select the action that you want to move forward or backward in the action list.**
4. **To move the action earlier or later in the action list, click the up or down arrow buttons.**
5. **Continue to move between actions and adjust their order using the arrow buttons until the actions are in the desired order.**
6. **Click the Save button on the toolbar to save the active link with the new action order.**

Types of Active Link Actions

There are six types of active link actions you can specify:

- **Change Field** dynamically adjusts certain characteristics of a specified field.

- **DDE** activates a DDE operation for Windows clients.
- **Message** returns a message and displays it for the user who activated the active link.
- **Run Macro** causes a macro to run in the background.
- **Run Process** executes a command line on the client.
- **Set Fields** assigns values to specific fields in the current AR.

Each of these types is explained in the following sections.

The Change Field Active Link Action

The Change Field action allows you to dynamically adjust selected characteristics of fields in the current window. Based on conditions when the active link executes, you can specify and attach a different character menu to a field that already has a character menu, move the focus point to the field, or change the accessibility of the field.

To define the Change Field active link action:

1. **Choose Change Field from the New Action drop-down list. The fields required to define the change field action are displayed, as shown in Figure 12-6 on page 284.**

Figure 12-6 Change Field Active Link Action

2. **Choose from the Field Name drop-down list the name of the field in the current schema whose characteristics you want to set.**

3. **Specify the changes that you want to make:**
   - To select a character menu and attach it to the field, select the Attach Menu to Field option, then choose a menu from the menu button. (The field must already have a character menu assigned in order for you to be able to change to a different character menu.)
   - To change the current access settings for the field, choose one of the following options from the Field Access drop-down list:

Unchanged	Leave the access setting as it is.
Read Only	Set the field access to read only. The user will be able to read the contents of the field but will not be able to enter data.
Read / Write	Set the field access to read / write. The user will be able to read the contents of the field and enter data as required.

Disabled	Set the field access to disabled. The user will be able to read the field value but not able to write to the field and the field label will be grayed.

- To move the focus to the field, select the Set Focus to Field option.

4. **If you have finished defining the change field active link action, click the Add Action button. All actions for this active link appear in the Current Actions list.**
5. **If you want to create an additional action for this active link, choose the action from the New Action drop-down list.**
6. **When you have finished specifying active link actions, go on to specify the active link permissions (see "Defining Permissions for Active Links" on page 306).**

The DDE Active Link Action

Choosing the DDE action allows you to perform a **dynamic data exchange (DDE)** operation on a Windows client. DDE is a part of MS Windows and is a form of interprocess communication that uses shared memory to exchange data between applications.

DDE always takes place between a client application and a server application on the same PC. The client initiates the exchange by establishing a conversation with the server so that it can request data or services from the server. The server responds by providing the data or services to the client. A server can have many clients at the same time and a client can request data from multiple servers. Additionally, an application can be both a client and a server.

DDE uses a three-level hierarchy to uniquely identify a unit of data to be exchanged during a DDE conversation: service (application) name, topic name, and item name.

A **service name** is a string that a server application responds to when a client attempts to establish a conversation with the server.

A **topic name** is a string that identifies a logical data context.

An **item name** is a string that identifies a unit of data that a server can pass to a client during the transaction.

For two examples of using an active link action with DDE, see “Active Link DDE/Execute Action” on page 288 and “Active Link DDE/Poke Action” on page 289.

Refer to the Microsoft Windows documentation for more information on DDE. To integrate the AR System with other Windows applications, refer to Appendix C, *DDE Functionality in the AR System* in the *Action Request System User’s Guide for Windows*. To integrate with another application, refer to that application’s documentation as well.

Note – If you are designing an active link for a schema that is used by clients on platforms other than a PC, it is a good idea to verify that the current platform is a PC as a condition of activating the DDE action. To do this, include a qualification that uses the `$HARDWARE$` keyword to check the current platform. See “Building Qualifications” on page 218 for more information.

To define the DDE active link action:

1. **Choose DDE from the New Action drop-down list. The fields required to define the DDE active link action are displayed, as shown in Figure 12-7.**

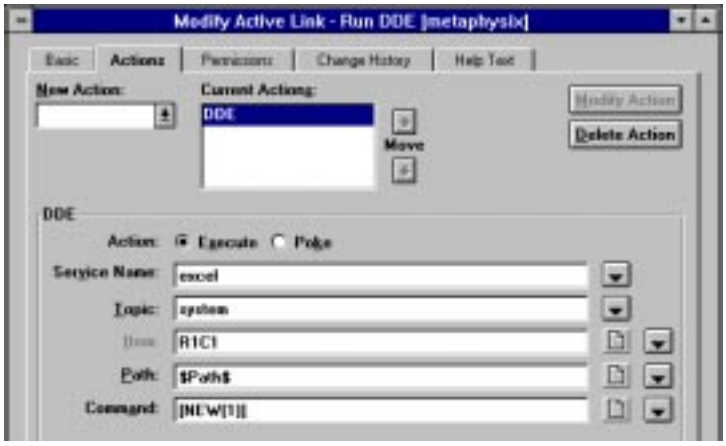


Figure 12-7 DDE Active Link Action

2. **Select an Action for the DDE operation. The available actions are:**

Execute	Client request for server to execute the command specified in the Command field.
Poke	Client alters data in the server application data on the contents of the Command field.

3. **In the Service Name field, enter the unique ID of the DDE application. You can use the menu button next to the Service Name field to select the available fields in the current schema. You then simply select one of these fields to have it appended to the service name.**

4. **In the Topic field, enter the DDE topic. You can use the menu button next to the Topic field to select the fields in the current schema.**

5. **In the Item field, enter the DDE item, if applicable. (Item is disabled if the DDE Action type is Execute.) You can use the menu button next to the Item field to select the fields in the current schema.**

6. **In the Path field, enter the path indicating the location of the service on the PC. You can use the menu button next to the Path field to select the fields in the current schema.**

7. **In the Command field, enter the command you want to execute. (You *must* enter a value in this field.) You can use the menu button next to the Command field to select the fields in the current schema as well as a list of keywords.**
   - If the action is Execute, the command is sent to the remote application.
   - If the action is Poke, the command is the data being set in the remote application.

8. **If you have finished defining the DDE active link action, click the Add Action button. All actions for this active link appear in the Current Actions list.**

9. **If you want to create an additional action for this active link, choose the action from the New Action drop-down list.**

10. **When you have finished specifying active link actions, go on to specify the active link permissions (see “Defining Permissions for Active Links” on page 306).**

Note – All data sent to the server is assumed to be in `cf_text` format.

See “Assigning Values from a DDE Request” on page 304 for information on how to load the result of a DDE request operation into a field using an active link that performs a Set Field operation.

Time-out Settings for DDE Transactions

All AR System DDE transactions are synchronous. If you need to set longer times for DDE transactions, you can create a [DDE] section in your ar.ini file and enter your own time-out settings:

```
[DDE]
AppResponseTimeout=<30>
TransactionTimeout=<20>
```

AppResponseTimeout is the active link time-out setting to load the application into memory after starting it. The default setting is 30 seconds.

TransactionTimeout is the active link time-out setting if the DDE server does not respond back with the requested DDE action. The default setting is 20 seconds.

Active Link DDE/Execute Action

You use the DDE/Execute action to execute specific commands or functions on another Windows application. The DDE Execute action requires the following components in the DDE Active Link Action window:

Service Name	Application DDE name.
Topic	Additional DDE definition, for example, a file name or a category of command (like the system command in Excel).
Path	Location of application executables. Make sure that you point the path to the DDE application in the Service Name field.
Command	Command or function being sent to the Windows application.

For example, you could create an active link button that launches a Windows application. Instead of the administrator hardcoding a specific DDE application in a specific directory into the Path field in the DDE Active Link Action window, Figure 12-7 on page 286 illustrates an active link that uses $Path$ to reference the Path field in the Run DDE schema.

As a result, users of the schema are free to enter their own application and path name, in this case, a spreadsheet application that starts with a blank page whenever they enter a path name and then click the Run DDE button, as shown in Figure 12-8.

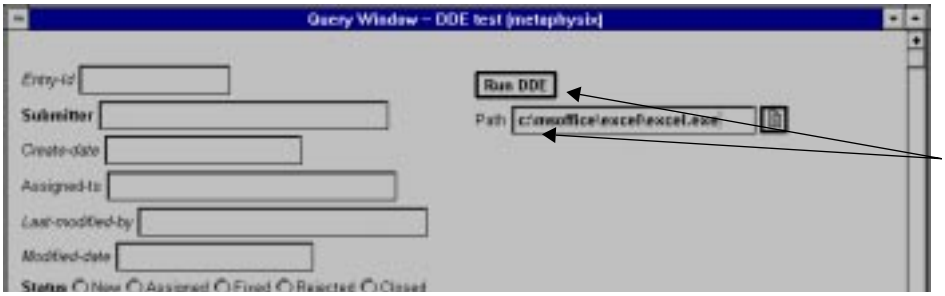


Figure 12-8 Creating and Using an Active Link Button for DDE Actions

Active Link DDE/Poke Action

You use the DDE/Poke action to send data to another Windows application. The DDE Poke action requires all five components in the DDE Active Link Action window:

Service Name	Application DDE name.
Topic	Additional DDE definition, for example, a file name or a category of command (like the `system` command in Excel).
Item	Multiple items which identify the details in a topic, for example, the cell location in a spreadsheet.
Path	Location of application executables. Make sure that you point the path to the DDE application in the Service Name field.
Command	Data being sent, which can either be a literal value or a data field value.

Figure 12-9 on page 290 illustrates creating an active link that sends the value of the `$Submitter$` field into cell R1C1 (row one and column one) of Sheet1 in a Windows application (like a spreadsheet). Users enter their own application and path name in the `$Path$` field in the User Tool, as in Figure 12-8.

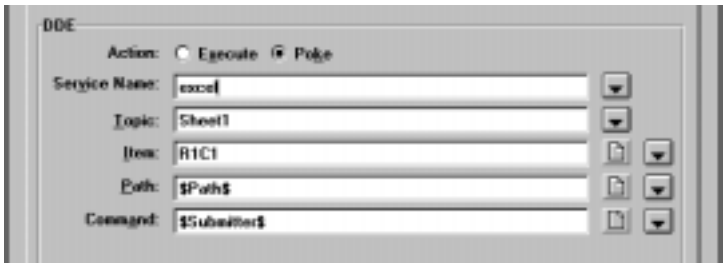


Figure 12-9 DDE/Poke Action

The Message Active Link Action

When you choose the Message action, an interactive error, warning, or note will be displayed by any application that initiates a transaction that meets the active link conditions. This is especially useful when combined with qualifications so that you can check some conditions on the action request and issue errors or warnings to the user if there is an unexpected condition.

To define the Message active link action:

1. **Choose Message from the New Action drop-down list. The fields required to define the message active link action are displayed, as shown in Figure 12-10.**

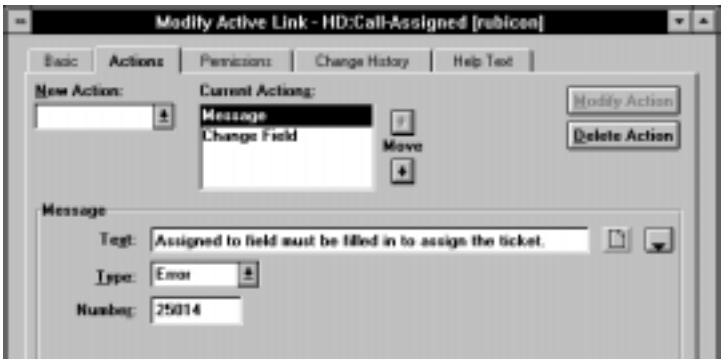


Figure 12-10 Message Active Link Action

2. **In the Message Text field, enter a string, up to 255 characters in length, which will be the text of the notification message. The text may include field substitution parameters or system keywords.**
   You can use the menu button next to the Message Text field to specify the fields in the current schema as well as a list of keywords. You can simply choose one of these fields or keywords to have it added to the text. In addition, you can click the text edit button to open a text edit dialog box for easier data entry, if desired.

3. **Select a message type for the message. The message type will be displayed with the message. The available message types are:**

Note	Returns a note and continues the operation.The message type is displayed as ARNOTE.
Warning	Returns a warning and continues the operation. The message type is displayed as ARWARN.
Error	Returns an error and terminates the operation. The message type is displayed as ARERR. No actions after an error message action will be performed.

4. **Specify a message number in the Number field. The message number will be displayed with the message. The number you specify must be greater than or equal to 10000. (Numbers under 10000 are reserved for AR System messages.)**

5. **If you have finished defining the message active link action, click the Add Action button. All actions for this active link appear in the Current Actions list.**

6. **If you want to create an additional action for this active link, choose the action from the New Action drop-down list.**

7. **When you have finished specifying active link actions, go on to specify the active link permissions (see “Defining Permissions for Active Links” on page 306).**

The Run Macro Active Link Action

The Run Macro action lets you specify a macro to run whenever the active link is executed. The macro may perform any operation or series of operations (including performing an operation on another schema). If the macro contains parameters, you can specify values for those parameters — including a value from a field in the current AR.

For example, you might designate the value entered in the “Customer Name” field of the current AR for use as the parameter value in a macro that queries the database for information about the specified “Customer.”

Note – To use a macro in an active link, you must first create the macro using the User Tool. For information about creating a macro, see Chapter 6, *Using Macros*, in the *Action Request System User’s Guide.*

The macro you specify is copied into the active link and recorded with the active link. Changes you make to this macro after the active link is created will *not* affect the operation of the active link. If you want the changes made to the macro to apply to the active link, you must modify the active link and specify the macro again.

To define the Run Macro active link action:

1. **Choose Run Macro from the New Action drop-down list. The fields required to define the Run Macro action are displayed, as shown in Figure 12-11.**

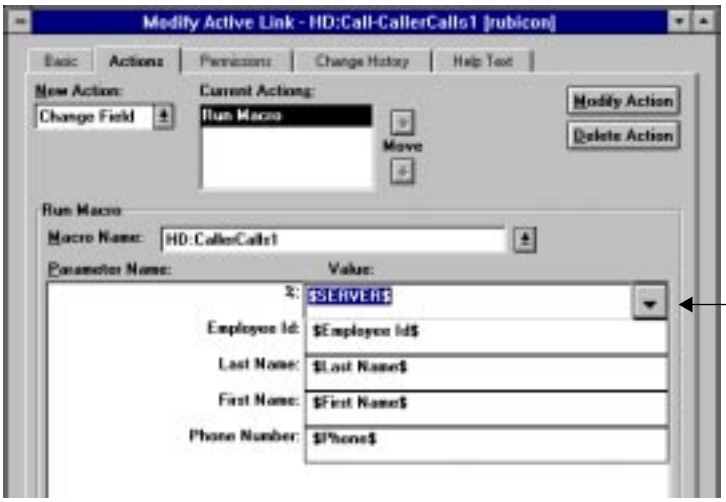


Figure 12-11 Run Macro Active Link Action

2. **Select the macro from the Macro Name menu button that you want to be performed when the active link is activated.**

3. **If the macro contains parameters, a list of parameters appears. You can enter any of the following as parameter values:**
   - A static value.
   - A keyword.
   - A reference to any field in the current schema.

   A field reference must be enclosed within dollar symbols. (You cannot use dollar symbols within the prompt.) For example, if you want the contents of the Customer Name field to be used for a particular parameter in the macro, enter **$Customer Name$**.

   You can enter a field reference by clicking a macro name field with the mouse. A drop-down list appears (see Figure 12-11 on page 292), which allows you to open a list containing all the fields for the schema. (You also can select from a list of keywords.) When you select a field from this list, the field is automatically entered with the correct syntax.

Note – If you specify a field as a parameter, the macro uses the value that it finds in the field on the window from which the active link was executed.

4. **If you have finished defining the run macro active link action, click the Add Action button. All actions for this active link appear in the Current Actions list.**
5. **If you want to create an additional action for this active link, choose the action from the New Action drop-down list.**
6. **When you have finished specifying active link actions, go on to specify the active link permissions (see “Defining Permissions for Active Links” on page 306).**

Hints for Creating Macros for Active Links

When you are creating a macro to be used in an active link, there are several important things to remember:

- Create the macro before you create the active link.
  The macro must exist before you open the Active Link window. If you forgot to create the macro in advance, you must close and reopen the Active Link window in order for it to recognize the new macro.

- If you modify the macro and want the modification to apply to the macro when it is executed by the active link, you must modify the active link and specify the macro again. This is because the macro is actually copied into and recorded as part of the active link definition.
- While recording the macro, size and position any windows as you want them to appear when the macro executes.
  Take advantage of the fact that the macro remembers the size and position of any window that it displays. For example, you may want to resize a window to appear in the upper right corner of the user's screen so that it will not interfere with other windows the user has open. (Remember that size and position of windows will vary according to the platform on which the client is running.)

The Run Process Active Link Action

Choosing the Run Process action allows you to execute a command to run a process. When the active link is executed, the system will execute the command specified in the Command Line field. For example, you could specify a program in the Command Line field that will launch a related process, such as a program to display a graphical representation of a machine.

The command line also accepts references to values on the current screen if you specify the field name enclosed in dollar signs ($). You can specify the field name by selecting the list icon to open a list containing all the fields for the schema. When you select a field from this list, the field is automatically entered with the correct syntax.

Note – The Run Process action simply executes an independent process — it does *not* return a value to the User Tool. This is not the same as inserting the results of a process into a field using the Set Fields action (see "Assigning Values from Process Results" on page 302).

When you design an active link that runs a process, it is important to be aware of the hardware platforms and operating systems your clients may be using. The process you are specifying may not be available on all platforms and operating systems. If your users run the client tools on more than one type of platform or operating system, you can build a qualification for the active link

using the $HARDWARE$ and OS keywords to verify that the client is running on an appropriate platform and operating system at the time the active link executes. See “Building Qualifications” on page 218 for more information.

To define the Run Process active link action:

1. **Choose Run Process from the New Action drop-down list. The fields required to define the run process active link action are displayed, as shown in Figure 12-12.**

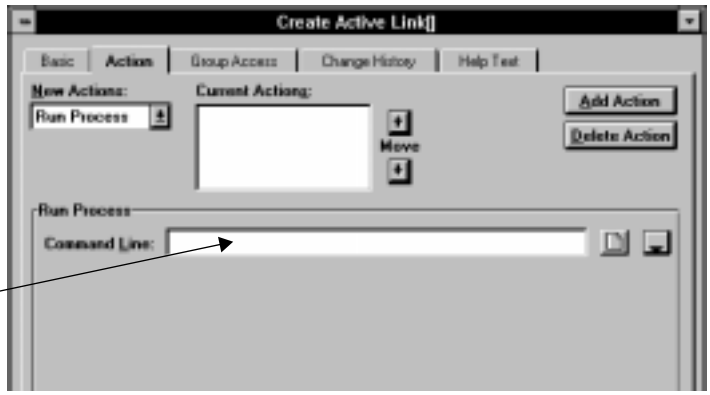


Figure 12-12 Run Process Active Link Action

2. **In the Command Line field, enter the command that will execute when active link conditions are met.**
   You can specify any of the keywords defined by the system (see “Table of Keywords” on page 447). You also can substitute the value of any field of the AR that the active link is firing on by enclosing the field name or ID in dollar signs ($) in the text, for example, $Submitter$. The keyword or field will be expanded when the process is run. If the expanded value contains

spaces, remember to enclose the value within quotes so that the AR System will interpret it as a single value. If in doubt, use quotes. They will not interfere and they may prevent a problem.

You can enter up to 255 bytes for your command definition. The command can be up to 4096 bytes once the substitution parameters are expanded.

You can use the menu button next to the Command Line field to select the available keywords and fields in the current schema. You then simply select one of these fields to have it appended to the command. In addition, you can select the text edit icon to open a text edit dialog box for easier data entry, if desired.

Note – Remember to adjust your command syntax appropriately for whatever platform your server is running and include the explicit path to commands, for example, `/home/jim/bin/<command>`. In the Windows environment, you also need to specify the drive, for example, `d:\home\jim\bin\<command.bat>` (for the d: drive).

In the UNIX environment, the process will run under a Bourne shell.

Use quotes around substituted fields when the values may contain blanks or other special characters, for example, `/bin/cmd "$<field>$"`

If clients are running on different platforms that do not all support the same process commands, use `$HARDWARE$` or `$OS$` keywords in the qualification to target the AR to run only on the appropriate platform.

Substituted field values containing carriage return or other special characters may have unexpected results.

---

3. **If you have finished defining the run process active link action, click the Add Action button. All actions for this active link appear in the Current Actions list.**
4. **If you want to create an additional action for this active link, choose the action from the New Action drop-down list.**
5. **When you have finished specifying active link actions, go on to specify the active link permissions (see “Defining Permissions for Active Links” on page 306).**

The Set Fields Active Link Action

When you choose the Set Fields action, the resulting active link will load specific values into selected fields for each transaction that meets the active link conditions. This allows you to automate field updates for an entry. As in filters, the value you assign to a field can be a simple static value, a keyword, a field from another schema, the result of a function, or the results of an executing process or arithmetic operation. For active links, you can also assign a value from a DDE request operation performed on a Windows client. The set field options are described in detail in the following sections.

Note – You can also assign values to hidden fields. A value assigned to a hidden field will not appear on the screen; however, the value will be used in any operation (including Submit and Modify operations) that includes hidden values.

If you assign a value to a diary field, the value is appended to any user text already in the field.

To define the Set Fields active link action:

1. **Choose Set Fields from the New Action drop-down list. The fields required to define the set fields active link action are displayed, as shown in Figure 12-13 on page 298.**

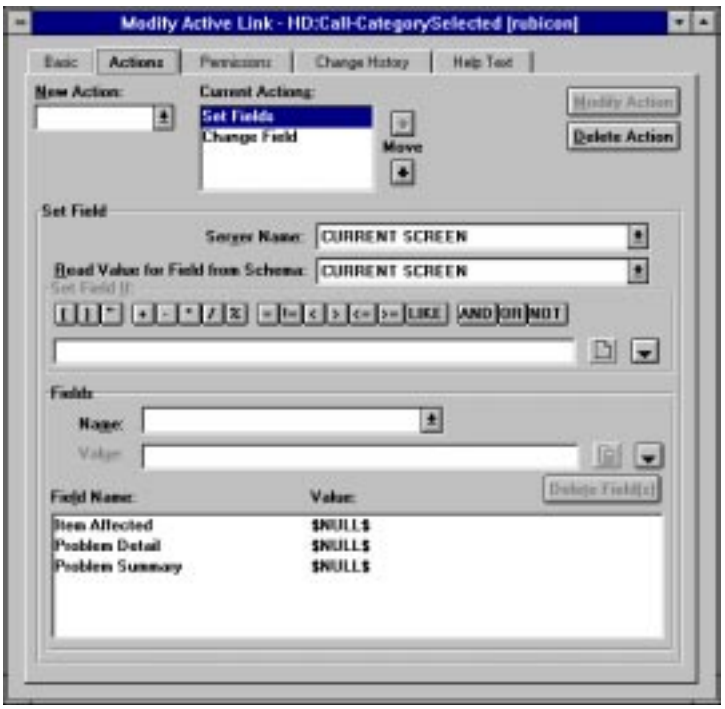


Figure 12-13 Set Fields Active Link Action

2. **From the Server Name drop-down list, select the name of the server from which the AR System is to retrieve the value for the field. The default drop-down list choice displays** `CURRENT SCREEN` **for the server you are currently accessing.**

3. **From the** `Read Value for Field from Schema` **drop-down list, select the name of the schema from which the AR System is to retrieve the value for the field. The default drop-down list choice is** `CURRENT SCREEN` **if the value is to come from another field on the same AR.**
   Selecting a schema from the `Read Value for Field from Schema` drop-down list works in connection with constructing qualification statements to locate ARs that contain specific data.

Note – If you enter a server name and schema different than the `CURRENT SCREEN` but you use a static value or a keyword or you do not actually set a field from the remote schema, the server name and schema revert to the `CURRENT SCREEN`.

4. **If the data or value you want is on a different AR, create a qualification in the `Set Field If:` field to locate the specific ARs.**
5. **In the Name field, enter the field that you want to be automatically set when the active link executes.**
6. **In the Value field, enter the values in the schema fields that you want to be automatically set when the active link executes. You can use the menu button next to the Value field to select the available fields, keywords, and functions from the schema name in the `Read Value for Field from Schema` field.**

Note – Since active links execute with the permissions of the user, field values set through an active link are updated only if the user has update permissions for the field.

You can set the field values to any of the following:

- A static value. Enclose text values that include special characters (such as parentheses, single quotes, or arithmetic operators) in double quotes.
- A keyword value (see “Assigning Keyword Values” on page 300).
- A value from another field in the same schema or another schema (see “Assigning Values from Other Fields” on page 300).
- The value resulting from a specified process (see “Assigning Values from Process Results” on page 302).
- The value resulting from a DDE request operation on a Windows client (see “Assigning Values from a DDE Request” on page 304).
- The value resulting from an arithmetic operation (see “Assigning Values Using Arithmetic Operators” on page 305).
- The value resulting from a function (see “Assigning Values Using Function Results” on page 305).

- A combination of the above. You might want to combine a static text entry with a keyword, for example, `'Entry entered by' + $USER$`.

After you select both a name and a value, the field is automatically added to the Field Name list for the set fields action. Repeat steps 5 and 6 for as many fields as needed.

To delete fields from the list, select the fields and click the Delete Field(s) button. (You also can delete the Fields Value to remove fields from the list.)

7. **If you have finished defining the set fields active link action, click the Add Action button. All actions for this active link appear in the Current Actions list.**
8. **If you want to create an additional action for this active link, choose the action from the New Action drop-down list.**
9. **When you have finished specifying active link actions, go on to specify the active link permissions (see "Defining Permissions for Active Links" on page 306).**

Assigning Keyword Values

You can use any of the keywords listed in "Table of Keywords" on page 447 to set a field value. The data type of the keyword value must match the field data type. If there is no match, the system will attempt to convert the data type. Most conversions are automatic. You can use the menu button next to the Value field to select from a list of the available keywords.

Assigning Values from Other Fields

You can set a field to a value drawn from another field on the current screen or an AR from the same or another schema (on the same or a different server). Each action can draw data only from a single AR. However, you can use data from multiple ARs by creating additional actions.

When you assign a value from an existing AR, you must specify the schema that you want and define the Set Field If condition that will locate the specific AR within that schema. If only one AR matches the qualification when the active link executes, the requested values are pulled from the AR and loaded as values on the current window. If no ARs match the qualification, an error message is displayed and no action is taken. If multiple entries match, a

selection list will appear so that the user can select the entry to use. (This differs from filters and escalations which take the first AR that meets qualifications if multiple matches are found.)

To assign a value from another field on the current screen:

1. **In the Set Fields Active Link Action window, make sure the Server Name and Read Value for Field from Schema field is set to** `CURRENT SCREEN`**.**
2. **From the Fields Name drop-down list, select the field where you want the value loaded.**
3. **From the Fields Value menu button, select the field from which the value will be drawn when the active link executes. The field is automatically added to the set fields action.**

To assign a value from a different AR:

1. **From the Server Name drop-down list, select a server.**
2. **Use the Read Value for Field from Schema field drop-down list to select the schema from which you want to retrieve the data.**
3. **From the Fields Name drop-down list, select the field where you want the value loaded.**
4. **From the Fields Value menu button, select the field from which the value will be drawn when the active link executes. The field is automatically added to the set fields action.**
5. **Use the Set Field If field to define the qualification criteria that will locate the specific AR from which the data will be drawn.**
   - Use the Fields cascading list to reference fields in the schema you are drawing data from. These fields will be delimited with single quotes.

- Use the Keywords cascading list to reference the value of a field in the current transaction. These fields will be delimited with dollar signs ($).

For example, if you want to find the AR where the Entry Id field of the From Schema contains the same ID as the Related-to field on the current screen, the qualification would look like this:

```
'Entry Id' = $Related-to$
```

You can also search for a field using wild cards. The following example would locate an AR where the contents of the Name field are LIKE the contents of the User Name field on the current screen:

```
'User Name' LIKE "%" + $Name$ + "%"
```

Use the same general techniques to construct an active link qualification statement as you use to construct a filter qualification. For a detailed description, see “Building Qualifications” on page 218.

6. **When you have finished defining the Set Fields active link action, click the Add Action button.**
7. **Click the Save button on the toolbar.**

Assigning Values from Process Results

You can set a field to the value resulting from running a specified process on a UNIX client (not supported in the Windows and Macintosh clients). For example, you may want to load information about the current system or information retrieved from another data source (such as an existing database holding contact information). To do so, you can define and run a process output will be used as the value for a field.

The syntax for loading the return of a process is as follows:

`$PROCESS$` <*process-to-run*>

Note – Remember to adjust your command syntax appropriately for whatever platform your server is running and include the explicit path to commands, for example, `/home/jim/bin/`<*command*>. In the Windows NT environment, you also need to specify the drive, for example, `d:\home\jim\bin\<command.bat>` (for the d: drive).

In the UNIX environment, the process will run under a Bourne shell.

Use quotes around substituted fields when the values may contain blanks or other special characters, for example, `$PROCESS$ /bin/cmd "$<`*field*`>$"`

Substituted field values containing carriage return or other special characters may have unexpected results.

The keyword `$PROCESS$` indicates that all following text is a command line. The command line can include substitution parameters from the current screen to allow values from the current screen to be placed into the command line before it is executed. You can enter up to 255 bytes for your command definition. The command can be up to 4096 bytes once the substitution parameters are expanded. You can select substitution parameters (as well as the `$PROCESS$` string) from the Fields Value menu button.

When the active link is performed, the specified command line will be executed and the User Tool will wait for the process to complete. All data returned will be read by the User Tool and processed according to the return of the process. If the process returns 0, the returned data is used as the value for the field. The data is expected in ASCII format and is converted as needed to match the data type of the target value. If the process returns a value other than 0, it is assumed there was an error and the process failed. In this case, the data returned is treated as the text of an error message and is displayed to the user in an error box.

When you design an active link that loads field values from process results, it is important to be aware of the hardware platforms and operating systems your clients may be using. The process you are specifying may not be available on all platforms and operating systems. If your users run the client tools on more than one type of platform or operating system, you can build a qualification for the active link using the `$HARDWARE$` and `$OS$` keywords to

verify that the client is running on an appropriate platform and operating system at the time the active link executes. See “Building Qualifications” on page 218 for more information.

Assigning Values from a DDE Request

You can set a field to the value resulting from a dynamic data exchange (DDE) request operation executed on a Windows client. DDE is a part of Microsoft Windows and is a form of interprocess communication that uses shared memory to exchange data between applications.

The syntax for loading the result of a DDE request operation is as follows:

```
$DDE$ <servicename>;<topic>;<pathtoprogram>[;<item>]
```

The DDE parameters hold the following information:

<*servicename*>The unique ID of the DDE application.

<*topic*>The topic name that identifies a logical data context.

<*pathtoprogram*>The location on the PC where the DDE service is found.

<*item*>(Optional) A string identifying a unit of data.

For example, you might enter the following:

```
$DDE$excel;sheet1;c:\excel\excel.exe;R1C1
```

This operation returns the contents of cell R1C1 of Sheet 1 in Excel to the current field.

Refer to the Microsoft Windows documentation for more information on DDE. To integrate the AR System with other Windows applications, refer to Appendix C, *DDE Functionality in the AR System* in the *Action Request System User’s Guide for Windows*. To integrate with another application, refer to that application’s documentation as well.

The keyword `$DDE$` indicates that all following text is a DDE command line. The command line can include substitution parameters from the current screen to allow values from the current screen to be placed into the command line before it is executed. You can select substitution parameters (as well as the `$DDE$` string) from the Fields Value menu button.

When the active link is performed on a Windows client, the specified DDE request is executed and the User Tool waits for the operation to complete. Whatever data the DDE request returns is then entered into the field.

If the active link is performed on a non-Windows client, an empty or null string is returned.

Assigning Values Using Arithmetic Operators

You can use arithmetic operators to load a computed value. You can combine an arithmetic operator with a static value, a keyword, a value from the current screen or an existing AR, a function, a DDE request, or a value from a process. The same arithmetic operators allowed for specifying qualifications are allowed to build a computed value (see “Table of Operators” on page 444). The operation must meet all the rules for arithmetic operators and produce a result whose type is compatible with the target field. If you include a process or DDE result in the operation, the process definition must not be contained within parentheses and it must be the last item in the operation since all data after the keyword `$PROCESS$` is considered to be part of the command line.

Note – If you include either a process result or a DDE operation in a mathematical operation, they must not be contained within parentheses and it must be the last item in the operation since all data after the keyword is considered to be part of the operation.

Here are some examples of valid arithmetic operators:

```
$TIMESTAMP$ - $CREATE-DATE$

$FIRST NAME$ +'' '' + $LAST NAME$

''hostname ='' + $PROCESS$ hostname
```

Assigning Values Using Function Results

The AR System supports a set of functions that you can use in the set fields action. The functions allow you to manipulate data so that you can control various aspects of values you are loading into fields. For example, you can use the UPPER function to convert the value loaded in a field to all uppercase.

To use a function in the set field operation:

1. **From the Fields Name drop-down list, select the field where you want the value loaded.**
2. **From the Fields Value menu button, choose the Function cascading list to see a list of the available functions.**
3. **Select the function you want to use. It will appear in the field with a set of parentheses to the right.**
4. **Within the parentheses, enter any arguments that are appropriate for the function you have selected. (With the exception of `$PROCESS$`, you can include keywords, field values, other functions, and arithmetic operations).**

Note – If the value of any of the arguments of a function is NULL, the result of the function is NULL (the field is blank). To avoid this result, use a qualification that tests that the transaction includes a value for all arguments.

Information about each of the functions supported by the AR System is provided in Table 10-1 on page 247.

Defining Permissions for Active Links

The Permissions active link property setting lets you determine which access control groups will be able to use the active link. By default, the group access for any new active links is already set to their default permissions.

Note – If a user has access to an active link, the link will execute for that user whenever the basic conditions for the link are met. If a user does not have access, the link does not execute and the user's view of the schema does not show an active link button, even if one is defined.

To define permissions for an active link:

1. **Select Active Link from the Server Window.**
2. **Select an active link from the Active Links list. The Modify Active Link window appears.**

3. **Click the Permissions tab (Figure 12-4 on page 275) to set active link permissions globally for each group defined for a server.**

Figure 12-14 Permissions — Active Link Window

4. **In the No Permission list, double-click the group for which you want to assign access (or select a group, then press the Add button). Groups with access to the active link appear in the Permission list.You can also do the following:**
   - Click the Remove button to delete a group from the Permission list.
   - Click the Add All button to add all the groups to the list.
   - Click the Remove All button to delete all the groups from the list.
   - Click the Set to Defaults button to reset the active link to its default permissions (for more information, see “Setting Default Active Link Permissions” on page 57).

5. **Click the Save button on the toolbar to save the group access settings.**

Defining Group Permissions for Multiple Active Links

The Administrator Tool lets you do bulk assignments of group permissions for all active links within a server. Rather than going through each active link individually to assign permissions for a group, the Group Permissions dialog box lets you assign them all at once.

The Group Permissions dialog box is particularly useful when you have added a new access control group since the active links were created. You use this dialog box to assign the new group access for each active link instead of having to open each active link and modify the conditions for each active link.

Note – The Administrator Tool offers several different ways to set permissions. For example, when creating an active link, you might give access to the Public group. However, if you decide that you want to deny the Public group access to active links, you then can use the Group Permissions dialog box to set the group permissions for *all* active links at the same time.

To define permissions for multiple active links on a server:

1. **In the Server Window, select a server, then double-click Groups to see a list of groups defined on the server.**
2. **Double-click a group from the Groups list. The Group Permissions dialog box appears (Figure 12-15 on page 309). You use this dialog box to set group permissions for schemas, fields, and active links.**
3. **Click the Active Link Permissions tab. All the active links defined for the server appear. You use this window to set active link permissions for each group defined for a server.**

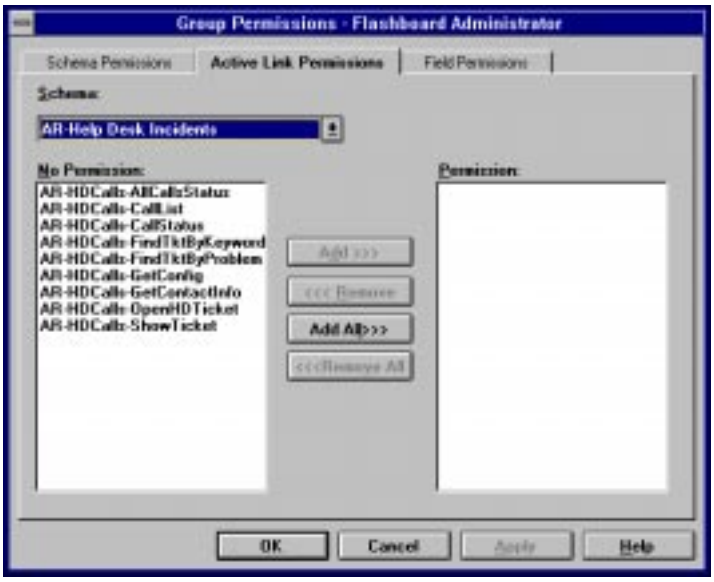


Figure 12-15 Active Link Group Permissions Dialog Box

4. **To assign active link access to a group, select a schema from the Schema drop-down list. All the active links for that schema appear in the No Permissions list.**
5. **Double-click the active link for which you want to define permissions (or select an active link, then press the Add button). You can also do the following:**
   - Click the Add All button to give permissions for all the active links to the group.
   - Click the Remove button to delete an active link from the Permissions list.
   - Click the Remove All button to delete all the active links from the Permissions list.
6. **Click the OK button to save the permission settings.**

12

Building and Using Active Link Change History

The AR System lets you record information about the owner of an active link, the user who last modified it, and the date of the modification. You can display this information at any time by clicking the Change History tab in the Active Link window.

The basic steps involved in creating active link change history are just like the steps to define filter change history as described in “Building and Using Filter Change History” on page 251.

Creating End-User Help for Active Links

Clicking the Help Text tab in the Active Link window brings up a Help Text editing window. You can supply help text for the active link here. In most cases, this help text is simply a description of the active link, what it does, and how it is used. User Tool users will be able to view this help text in the same way that they can view help text that is available for fields.

The basic steps involved in building active link help text are just like the steps to define filter end-user help as described in “Setting Help for Filters” on page 252.

Importing and Exporting Definitions

13

This chapter describes how to use the Import and Export commands to transfer schema, menu, filter, escalation, and active link definitions from one server to another. A **definition** is the structure in which the data in the AR System is organized and manipulated (for example, for fields or active links).

This chapter also describes how to create mail templates for submitting ARs using electronic mail.

This chapter covers the following topics:

- Importing definitions.
- Exporting definitions.
- Exporting mail templates.

Importing and Exporting Definitions

The Import and Export commands are located under the Tools menu in the Server window.

- The Import command lets you import schema, filter, active link, escalation, and menu definitions to a server. If you want to move a definition from one server to another, first export it from the current server (which saves the structure definition as an ASCII file), and then import the definition into the AR System on the destination server.
  To import data into your server, use the AR System Import Tool. The Import Tool can import data in the AR Export, CSV, and ASCII file formats. To use the AR Import Tool, refer to Chapter 14.
- The Export command lets you export schema, filter, active link, escalation, and menu definitions to a file.

Importing Definitions

Follow these steps to import definitions to a server.

Note – You cannot use the Windows Administrator Tool to import definition files larger than 32K from pre-2.0.2 UNIX servers. If this is an issue for you, use the Motif Administrator Tool instead.

This is not an issue for the 2.1 AR System NT server or 2.0.2 (or later) UNIX servers.

To import definitions:

1. **Open a Server Window.**
2. **Select a server from the Servers list. The currently available servers are listed.**
3. **Choose Import Definitions from the Tools menu.**
   The Import File selection dialog box appears.
4. **Specify the filename (generally with a** `.def` **extension) containing the definitions you wish to import.**
5. **Click the OK button. The Import Definitions dialog box appears, as shown in Figure 13-1 on page 313. The names of the object definitions in the file you specified are listed in the Import Definitions dialog box.**

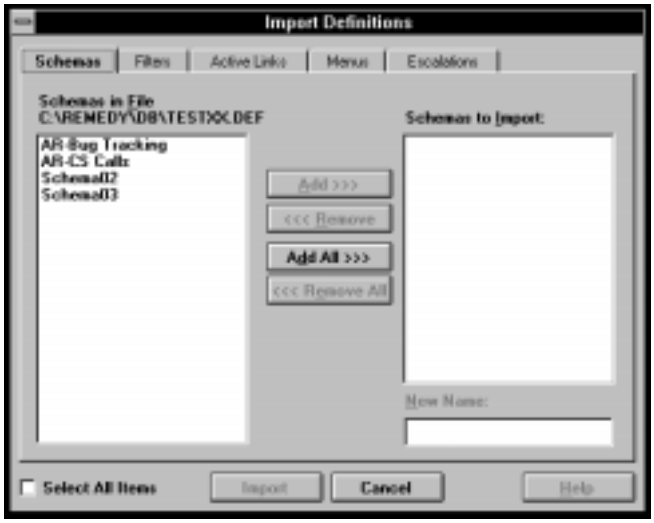


Figure 13-1 Import Definitions Dialog Box

6. **Click the tabs in the dialog box to select as many definitions as desired.**
   - Select a definition by choosing an item from the File list, then clicking the Add button.
   - Select all definitions for each object (for example, Schemas) by clicking the Add All button.
   - Select all definitions for the entire file by using the Select All Items check box.

Note – Import operations involving large amounts of data can take a great deal of time and require a great deal of space. You should make sure you have adequate resources before you begin the operation. You may want to perform such operations during hours when users do not require access to the system.

You may wish to rename a definition from the file prior to completing the import, since you may not import a definition whose name already exists in the target server. Change the definition name by selecting the name from the Import list and providing a new name in the New Name field.

7. **Click the Import button to import the definitions to the current server.**
   The new definition names will automatically appear as selections in their respective categories the next time that you start or log into the Administrator Tool.

Note – If you import an active link which sets a field to a specific value that uses the `$MENU$` pattern and the menu is not already present on the server, the import will fail. You *must* import the menu first and then import the active link.

Exporting Definitions

This section describes how to export definitions to a file. For information about exporting mail templates, see "Exporting Mail Templates" on page 316. For information on exporting data, refer to Chapter 5, *Reports* in the *Action Request System User's Guide for Windows*.

To export definitions:

1. **Open a Server Window.**
2. **Select a server from the Servers list. The currently available servers are listed.**
3. **Choose Export Definitions from the Tools menu.**
   The Export Definitions dialog box appears, as shown in Figure 13-2 on page 315. The Export Definitions dialog box lists all available schemas, filters, active links, menus, and escalations in a scrolling list. This is where you select the definitions you want to export.
4. **Choose the object definitions that you want to export by clicking the appropriate tab. For example, to export schema definitions, click the Schema tab.**

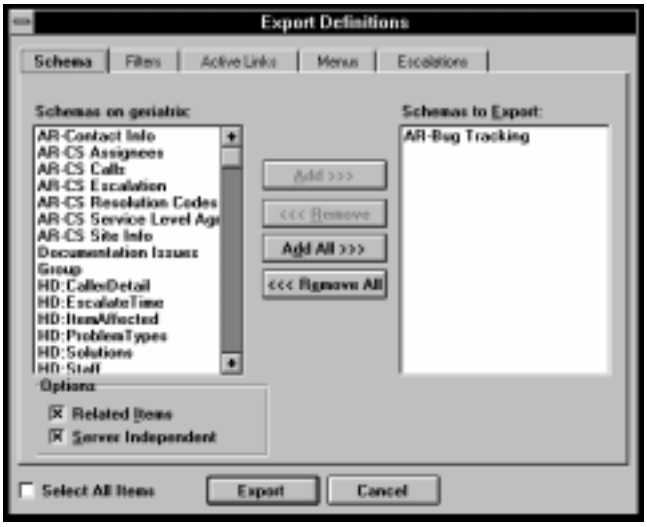


Figure 13-2 Export Definitions Dialog Box

5. **Select as many individual object definitions as desired from the list on the left. Use the scroll bars to see all items in the list.**
   - Add a definition for an object by double-clicking the item from the list on the left (or select an item, then click the Add button).
   - Remove a definition for an object by double-clicking the item in the Export list (or select the item, then clicking the Remove button).
   - Select all definitions for an object by using the Add All button.
   - Remove all definitions for an object by clicking the Remove All button.
6. **Select the Related Items check box to export all other definitions that are related to the item(s) selected for export, as follows:**
   - If you select a schema, the export operation will include all related filters, active links, escalations, and menus.
   - If you select a filter, the export operation will include all related schemas and all related items for those schemas.
   - If you select an escalation, the export operation will include all related schemas and all related items for those schemas.

- If you select an active link, the export operation will include all related menus and schemas and all related items for those schemas.

If you do not select the Related Items check box, the export operation will include only the selected items themselves.

7. **Select the Server Independent check box to specify that the export operation should remove references to the current server when the definitions are exported. Selecting this option allows connection to items on the new server when the definitions are imported.**

Note – When active links are exported with the server independent option, any server names in embedded macros are changed *only* if the server name is the current server; otherwise the server names remain intact.

---

8. **Click the Export button.**
   The Export File dialog box appears that you use for file selection.

9. **In the Export File dialog box, specify where you want the definitions stored.**
   By default, all the definitions you selected will be stored in a single file with a `.def` extension. However, you can specify any filename and extension you want. If you select a file that already exists, a File Exists dialog box appears, prompting you to overwrite, append, or cancel the action.

   The actual export will not occur until you complete your actions in the Export File dialog box. When the export is finished, an Export Complete message appears.

10. **Click the OK button.**

Exporting Mail Templates

A mail template is a form for submitting ARs to the User Tool through email. You can use the Export utility to generate mail template files for schemas. (You also can create these templates using an editor.) You can then distribute these files to users.

For more information about mail templates and how the AR System supports email, see Chapter 15.

To export a mail template:

1. **Choose Export Schema Mail Templates from the Tools menu.**
   The Export Mail Templates dialog box appears, as shown in Figure 13-3.

Figure 13-3 Export Mail Templates Dialog Box

2. **Select one or more schemas for which you want to generate mail templates.**

3. **Click the Export button.**
   An Export File dialog box appears that you use for file selection.

4. **In the Export File dialog box, specify where you want the templates stored.**
   By default, all the templates you select at a given time will be stored in a single file with a `.arm` extension. However, you can specify any filename and extension you want. If you select a file that already exists, a File Exists dialog box appears, prompting you to overwrite, append, or cancel the action.

   The actual export will not occur until you complete your actions in the Export File dialog box. When the export is finished, an Export Complete message appears.

5. **Click the OK button. The dialog box disappears.**
   The templates are saved in an ASCII file that you can distribute to users for use with their mail programs.

Using the Import Tool 14

The Action Request System Windows Import Tool allows you to bring data into a schema from a file. The Import Tool's mapping capability allows you to specify the information to be imported from the originating source and the fields that will contain that information on the destination schema. You can import data directly from AR Export files, Comma Separated Value (CSV) files, or ASCII files.

The Windows Import Tool runs on a PC-compatible client computer running Windows.

This chapter includes information on the following topics:

- Starting and exiting the Import Tool.
- Importing data into a schema.
- Mapping information from the source to the destination schema.
- Setting Import Tool preferences.

Import Tool Functions

You use the Import Tool to import data and records from other AR servers or from other applications into your AR server.

To import data into a schema, you *must* have modify permissions for the fields that you wish to import to. For system fields like Create-date, you must be the Administrator or Subadministrator of the schema.

The Import Tool includes the following functionality:

- Lets you import data from a wide variety of sources (for example, databases or spreadsheets) and formats (`.csv`, `.asc`, and `.arx`).
- Lets you "map" data sources to specific fields in your schemas, even if the data sources have different names than your fields.
- Lets you interactively handle bad records on a record-by-record basis with its sophisticated error-handling capability.

Note – You do not use the Import Tool to import *definitions* into the server. For information on importing definitions, see Chapter 13.

Starting the Windows Import Tool

Before you start the Import Tool, make sure you have the following:

- The Import Tool must be installed on a PC-compatible client computer running Windows. To install the Import Tool, see "Installing the Software on a Windows Client" on page 3.
- Your registered AR System user name and password.

Your user name and password identify you to the AR System and give you the appropriate access permissions.

To start the Import Tool:

Once the AR System Import Tool is installed, your desktop automatically displays the `Remedy AR System` group window containing the AR Import icon.

1. **To start the tool, double-click the AR Import icon.**
2. **If you are starting the Import Tool for the first time, the Login dialog box appears. Enter your registered user name and password, then choose the OK button.**

Logging In as a Different User

If the Import Tool was previously started by another user, you can change the user information and log in as yourself. This means that you can log in at any machine on the network that has access to the AR System server.

You also can change the login information of all users by clicking on the Login Information button on the Login dialog box. For more details, see “Login Information” on page 15.

Using the Toolbar

For many of the most commonly performed menu items, a corresponding button is available from the optional toolbar located below the menu bar on the Import Tool window. To select a function from the toolbar, simply click the mouse on the button for that function.

Table 14-1 shows the toolbar buttons and their functions.

Table 14-1 Toolbar Functions *(1 of 2)*

Button	Function	Key Sequence
	**Open Schema**. The Open Schema dialog box appears, which lets you select the schema that you want to import data into. (You also can choose Open Schema from the File menu.) The Open Schema button is disabled if you do not have access to any schemas on any server.	`Ctrl+O`
	**Open Import File**. The Open Import File dialog box appears, which lets you select an import file containing the information you want to import into the schema. (You also can choose Open Import File from the File menu.)	`Ctrl+I`

Table 14-1 Toolbar Functions *(2 of 2)*

Button	Function	Key Sequence
	**Load Mapping.** The Load Mapping dialog box appears, which lets you load a field mapping that you previously created. (You also can choose Load Mapping from the Mapping menu.)	`Ctrl+M`
	**Save Mapping.** The Save Mapping dialog box appears, which lets you create and save a mapping for future use. (You also can choose Save Mapping from the Mapping menu.) The Save Mapping button is disabled until you mapped at least one field.	`Ctrl+S`
	**Start Import**. Starts importing data from the import file into the schema. Confirmation warning appears. The Start Import button is disabled until you mapped at least one field. (You also can click the Import! menu.)	

Displaying Import Tool Help

Application help information is available on all Import Tool windows and commands. Help is also available on many of the procedures that you most commonly perform.

To display Import Tool help:

- From the Help menu, choose Contents to see an index of available help topics.
- Pressing the `F1` key or clicking the Help button when any Import Tool window or dialog box is open causes the help for that window to appear.

Exiting the Import Tool

To exit the Import Tool:

You can exit the Import Tool by any one of the following ways:

- Choose Exit from the File menu.

- Type `Alt+F, then X`.
- Type `Alt+F4`.
- Choose Close from the Control menu box in the upper left hand corner of the Main window.
- Double-click the Control menu box.

Note – If your Import Tool is in the middle of an import from the server, you will not be able to exit the Import Tool until the import is completed or you stop the import.

Displaying Version and Environment Information

To display version and environment information about the Import Tool:

- From the Help menu, choose About Import Tool to display information about the product.

Importing Information from Different Sources

You use the Import Tool to load data from another source into an AR System schema. The Import Tool expects the data to be in one of three formats:

Table 14-2 AR Import Data Formats

Data Format	Extension
AR Export.	`.arx`
Comma Separated Value (CSV).	`.csv`
ASCII.	`.asc`

Importing from an AR System Source

Data from an AR System source can be in any of the accepted formats. All formats must have all fields of each record on a single line.

The recommended format choice is the AR Export format. This is the most straightforward method of transferring AR System data.

If you cannot use the AR Export format, the second choice should be the CSV format.

Note – In CSV format, the Import Tool interprets \n in the data as a new line character. However, in ASCII format, \n is interpreted as a literal string "\n".

If you must use the ASCII format, then generate the data file from the User Tool in the Compressed Text format, and set the Title, Header, Footer, and Column Title separator strings to empty in the Report Preferences dialog box. You should also set the Page break per to None and the Column titles per to Page. Finally, make sure the column separator string does not appear anywhere in the data records. Set the column separator to a unique string. You *must* use the same separator string for the data import operation.

Note – You can only use the Windows Import Tool to load data fields up to 32,767 bytes (32K minus 1 byte) in size. If you need to update a data field larger than 32,767 bytes in size, use the Motif Import Tool instead.

Importing from a Non-AR System Source

Data from a source outside the AR System must be in comma separated value (CSV) format or, if it is not possible to generate CSV output, ASCII format.

If you generate a file for import and must use the ASCII format, save the data with a unique separator string. You *must* use the same separator specification for the data import operation.

The Import Tool can read data files in either the UNIX or DOS formats.

To import data using the Import Tool:

1. **Start the Import Tool according to the instructions in “Import Tool Functions” on page 319. The Import Tool window appears as shown in Figure 14-1 on page 325.**

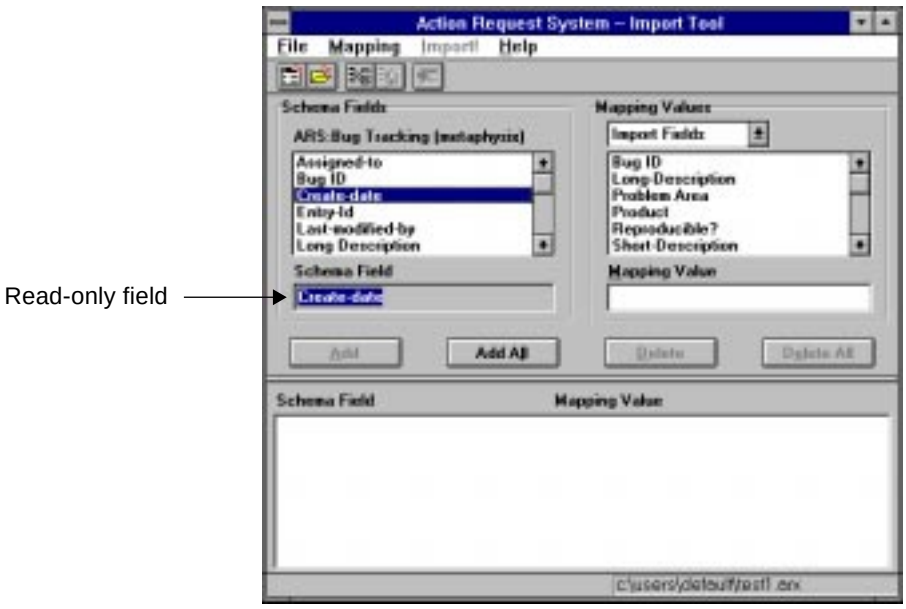


Figure 14-1 Import Tool Window

Note – All read-only fields in the Import Tool have a gray background.

2. **Open the schema that you want to import information into by clicking the Open Schema button on the toolbar (or choose Open Schema from the File menu), selecting the schema name from the list in the Open Schema dialog box, then choosing the OK button. The destination schema name will appear in the Schema Fields box in the Import Tool.**

Note – If your schema contains duplicate or empty field labels, those fields will appear in the Schema Fields list as their field IDs.

3. **Open the file that contains the information you want to import by clicking the File button on the toolbar (or choose Open Import File from the File menu). The Open Import File dialog box appears as shown in Figure 14-2 on page 326.**

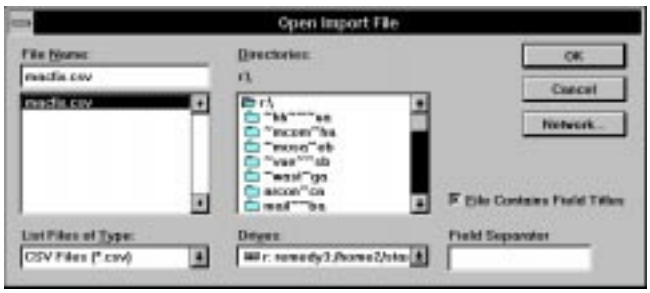


Figure 14-2 Open Import File Dialog Box

a. Select the file format of the file you want to import by choosing a file format (`*.arx`, `*.csv`, or `*.asc`) from the List Files of Type menu.

   If you have a file that is in one of these formats but does not have the above extensions, you can select the file type, then enter `*.*` in the File Name field to see all the files (for example, a `.txt` format), then select the file you want to import.

b. Use the Directories list to navigate through the directory structure in order to locate the import file. Then, click on the file name from the File Name list.

c. If the file is CSV or ASCII format, specify whether or not the file includes titles by selecting or clearing the File Contains Field Titles field check box.

   If you select this check box, the Import Tool treats the first record of the file as a list of field titles. Otherwise, it will generate default titles (for example, `Field-01`).

   If the file contains titles, you *must* select the File Contains Field Titles check box. Otherwise, the Import Tool will treat the first record the same as the rest of the data in the file and generate default titles.

d. If the file is ASCII format, enter a character string to be used as the field separator within the import file in the Field Separator field. For example, ",". Use \t for tab, \b for backspace, and \\ for \. The separator can be a maximum of 32 characters.

e. Click the OK button to load the fields from the import file into the Import Tool's main window. The Open Import File dialog box disappears.

Note – If your import file contains duplicate field titles, a warning dialog box appears. If your file is .arx format, the fields will appear as their field IDs. If your file is .csv or .asc formats, the fields will have a count appended, as in the following example:
<*field_title*> [1], <*field_title*> [2], and so on.

If the Import Tool warns that there is only one field in the import file, you may have specified the wrong file format. For example, if the file is in record format but you specified .csv or .asc, this warning will appear.

4. **Specify how the data you are importing should be mapped to the fields of the destination schema according to the instructions in "Mapping Import Fields" on page 328.**

5. **If desired, specify default field values for the import operation according to the instructions in "Defining Fallback Mappings" on page 335.**

6. **Click the Import button on the toolbar to load the source information into the schema. Each record in the source file will generate a single AR. (The import operation also creates an import log file. See "Using the Import Tool Log File" on page 337 for using information copied to the log file.)**

7. **After you click the Import button, a confirmation warning appears, asking if you are sure you want to start importing. Click the Yes button to continue. An import status message appears (Figure 14-3 on page 328), listing the number of records processed. If you need to stop importing for any reason, click the Stop button.**

Figure 14-3 Import Status Dialog Box

After you finish importing, an import information message appears, describing the following:

If your import...	Then the Import Information dialog box displays...
Succeeds	How many records were imported.
Partially succeeded or is stopped by you	How many records were processed and how many were imported. When the warning dialog appears, click the Yes button to copy unprocessed records to the import log file.
Failed.	An explanation of the error you received from the AR server.

Note – If you stop the import before it ends, you are prompted to copy unprocessed records to the log file. You may not want to copy unprocessed records to the log file if your import data file is large.

Mapping Import Fields

When you import information, you specify which pieces of information from the source file should be "mapped" (loaded) into which fields in the destination schema (see Figure 14-1 on page 325). You can map fields one at a time or all at once. Fields that you map to each other do not need the same name. In fact, you can even mismatch data if you are not careful, for example, mapping character data to selection field data or phone numbers into first names.

You can map multiple fields to more than one schema field. You can also map multiple import values to a single schema field or map fields to a keyword, as in the following:

CS Call ID	`$Product$ $Version$`
Modified-date	`$TIMESTAMP$`

The Import Tool in Figure 14-4 on page 329 maps two import fields into one schema field and, with a keyword, substitutes today's date for the create-date:

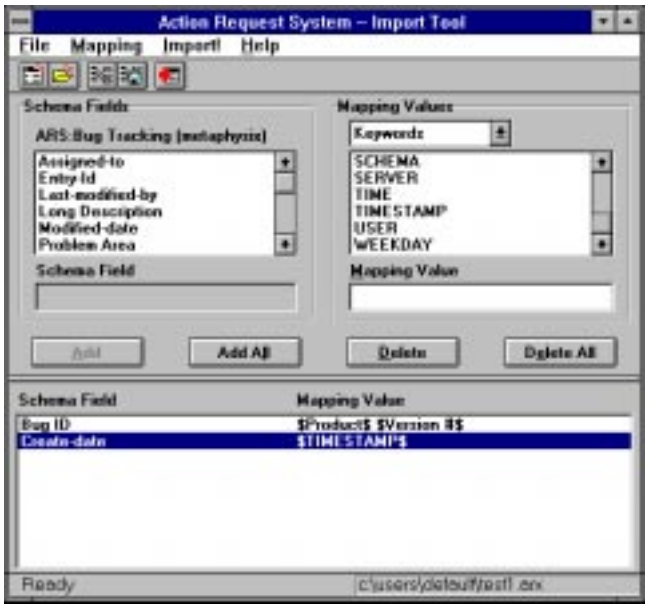


Figure 14-4 Import Tool Window (with Fields Mapped)

To map import file fields to schema fields:

1. **Select the destination schema and the import file in the Import Tool window and set the import parameters according to the instructions in the previous section, "Importing Information from Different Sources."**
2. **From the Schema Fields list, click on a field name. The name appears in the Schema Field entry field.**
3. **Choose either Import Fields or Keywords from the Mapping Values drop-down list. The drop-down list lets you choose either a list of the fields in the import file or a list of keywords.**
4. **Choose the import field or keyword you want mapped to the schema field you selected in Step 2**
   - You can click on a field name from the Import Fields list to display it in the Mapping Value field. The result will be a mapping of data from the import field in the file to the schema.

- You can click on a keyword from the Keywords list. For example, if you enter the Create-date field in the Schema Field entry field and you want each record in the import file to have today's date as the value of its Create-date field, you can click on DATE in the keywords list to insert it in the Mapping field. When you import the file, the resulting value will be the current date. For more information on keywords, see "Table of Keywords" on page 447.

If you prefer, you can type field names, keywords, or any string directly into the Mapping Value field.

You can map more than one value to a single schema field by entering characters after the first value then selecting (or typing) a second value.

5. **Click the Add button to create the mapping for the field.**
   Note that the field is removed from the Schema Fields list.

6. **Continue selecting schema fields and import field mappings until you have mapped all the fields you want to import.**

7. **To map all the import fields directly to the schema fields with the same ID or field name, click the Add All button. The Import Tool will try to match data to schema fields as follows:**

Import File Format	Matching (for Add All button only)
AR Export	Field IDs (attempted first) Field names, case insensitive (attempted second for fields not yet matched)
CSV	Field names, case insensitive
ASCII	Field names, case insensitive

   Make sure you double check the mappings to make sure all fields matched correctly. You can resolve unmatched or incorrectly matched fields by mapping the fields individually.

Note – If Add All is successful, no entries will be left in the Schema Fields list. If the matching was partially successful, it will add all the matches that it found. If it did not find any matches, an informational dialog will be posted saying it was not able to find any matching fields.

8. **To modify a field mapping, select the mapping in the Mapping list. The Add button will become a Modify button. Change the values in the Mapping Value field as required, then click the Modify button.**

9. **To delete a field mapping, select the mapping in the Mapping list and click the Delete button. Click the Delete All button to delete all the mappings from the list.**

10. **When you have completed your mapping, your Import Tool window will look similar to that shown in Figure 14-5.**

When all fields are mapped, Schema Fields box is blank.

Figure 14-5 Import Tool Main Window with Mappings Completed

11. **Once all settings in the Import Tool main window are as you want them, click the Import button on the toolbar to load the source information into the schema. Each record in the source file will generate a single AR. (The import operation also creates an import log file. (See “Using the Import Tool Log File” on page 337 for using information copied to the log file.)**

Note – You do not need to map all the schema fields before starting the import. You only need to map the fields that you want to import.

Saving Field Mappings

You may want to save a mapping you create for future use. This can save you a great deal of time if you regularly perform the same import operation.

When you save mappings, the entire set of information is saved. This includes the schema name, the server name, the import file name, all mappings, all fallback mappings, and all error-handling, data, and date/time preference information.

To save mapping information:

1. **Specify map settings in the Import Tool main window.**

2. **Click the Save Mapping button on the toolbar (or choose Save Mapping from the Mapping menu). The Save Mapping dialog box appears (Figure 14-6).**

Figure 14-6 Save Mappings Dialog Box

3. **Enter a name in the Mapping Name field. This name will become the file name for the mapping file.**
4. **Specify the directory that will contain the mapping file by choosing from the list of available directories. You also can type the directory name directly into the Path field.**
   You can click the Browse button to use the directory browser to locate the path where the mapping file is to be stored.
5. **Optionally, you can enter text in the Help Text field to describe the mapping file you are saving.**

6. **Click the Save Log Filename check box if you want to use the current directory and path name of the import log file when you load the mapping.**
   The import log file logs error messages encountered during the import process.

7. **Click the OK button to create the mapping file. If a file by the same name already exists, you will be asked if you want to overwrite the file. Click Continue to overwrite the file. Click Cancel to cancel the save operation.**

Note – The Windows Import Tool cannot write out or read in a mapping file of 64 kilobytes or greater. Use the Motif Import Tool for that size of mapping files.

The Windows Import Tool can only write out and read in mapping files in the PC format, that is, with CR LF at the end of each line. Mapping files in the Motif file format, with LF at the end of each line, need to be converted to the PC format before being loaded by the Windows Import Tool.

Using Saved Field Mappings

You can load mappings you previously saved by following the steps below.

To use an existing mapping file:

1. **Click the Load Mapping button on the toolbar (or choose Load Mapping from the Mapping menu). The Load Mapping dialog box appears (Figure 14-7 on page 334).**

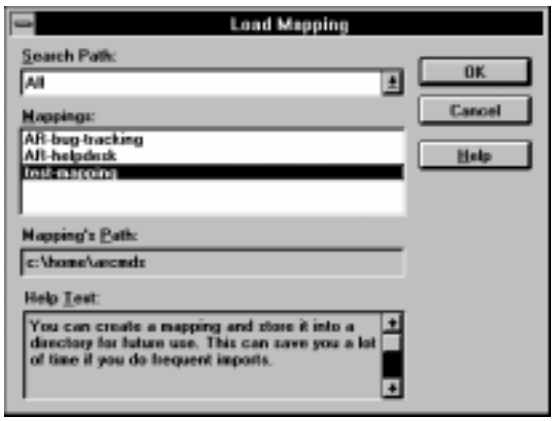


Figure 14-7 Load Mappings Dialog Box

2. **Specify the directory that contains the mapping file by choosing from the list of available directories.**
   Selecting All lists the mappings in all directory paths in which you stored mappings.

3. **Select the mapping file from the Mappings list. Its directory is listed in the Mapping's Path field.**

4. **Click the OK button. The mappings will be loaded into the Main window as well as the Fallback Mappings and Preferences dialog boxes.**

Note – Loading a mapping file will change your saved preferences to be the same as those in the mapping file.

Considerations for Importing Data

Because sizeable performance impacts can occur if you are importing a lot of data into a schema with Full Text Search (FTS) fields, you should consider shutting down FTS from the AR System Administrator Tool before importing the data. For instructions, see "Importing Data into Schemas with FTS Fields" on page 405.

You should factor in the following when deciding whether to shut down FTS:

- Size of the database.

- When will you re-index the database.
- How soon you need the data.

One more consideration: do not edit the import file between the time you start the Import Tool and the time you start the actual import of data. (See “Using the Import Tool Log File” on page 337 for using information copied to the log file.)

Defining Fallback Mappings

You can define fallback mappings to tell the Import Tool what to do if there is a problem importing data.

Fallback mappings are used when the import value is invalid for the schema field type. For example, if the schema field is of type integer and the import value is a string (such as “name”), the fallback mapping for the field will be used, if one is defined.

In cases where an error can only be detected by the server, the Fallback mappings will *not* be used. For example, the import data may be valid for the field type but not an acceptable value (for example, if the schema field has a range of 1 to 10 and the import value is 11 or if a required field has a null value).

To set fallback mappings:

1. **In the Import Tool main window, choose Define Fallback from the Mapping menu (or type `Ctrl+F`). The Fallback Mappings dialog box appears, as shown in Figure 14-8 on page 336. The Schema Fields list contains a list of the fields for the currently selected destination schema.**

Figure 14-8 Fallback Mappings Dialog Box

2. **Select the field you want to specify a fallback mapping for from the Schema Fields list. The field name appears in the Schema Field field.**

3. **Specify the fallback mapping by selecting a keyword from the Keywords list or by typing a value into the Fallback Mapping Value field.**
   If you prefer, you can type keywords directly into the field.

   You can map more than one keyword or string to a single schema field by entering a space or other character after the first value then selecting (or typing) a second value.

4. **Click the Add button to add the mapping to the Fallback Mapping list.**

5. **To modify a mapping, select the mapping in the Mapping list. The Add button will become a Modify button. Change the values in the Schema Field and Mappings fields as required, then click the Modify button.**

6. **To delete a mapping, select the mapping then click the Delete button. To delete all current fallback mappings, click the Delete All button.**

7. **Once you have specified all the fallback mappings you want to specify, click the OK button.**

Using the Import Tool Log File

The import operation creates a log file that you can use for diagnosing import problems. If you have set Import Tool preferences to alert you of bad records or to use fallback options, a dialog box appears (Figure 14-9), informing you that an error has occurred each time a record cannot be successfully imported.

Figure 14-9 Import Error Dialog Box

You can then select one of three options:

Yes	You can skip the record and import the rest of the data. The record in error will be written to the import log and the Import Tool will continue importing the remaining data.
Yes to All	You can skip all records with the same error(s) and import the rest of the data. The records in error will be written to the import log and the Import Tool will continue importing the remaining data.
Stop Import	You can stop the import operation at that point with the option to copy all remaining data to the import log.

You may also set error handling preferences so that records that cannot be imported are skipped automatically and recorded in the import log, or to use the fallback mapping, then only alert you if the fallback mapping also had an error.

No matter how you set preferences, the import log file contains detailed information on every error that occurred, including information that was not in the error dialog. It also contains a copy of every record that caused an error.

Once the import operation is ended, you can open the import log to examine the records in error. You can then edit the import log to correct the problem that caused the error and, if you copied all remaining records to the log file, you can choose to complete the data import operation by using the corrected import log itself as the import source file, after removing all non-data information from the file.

Alternatively, you can examine the import log to identify the cause of the problem then correct the problem in the original source file and re-import from that file. If you choose this alternative, be sure to delete any data from the source file that was imported successfully during the original import operation to avoid creating duplicate ARs.

Setting Import Tool Preferences

You can set preferences that control the behavior of the Import Tool, including how you want the tool to perform error handling and data transformations and other options you want to set.

Desktop Preferences

These preferences define the appearances of the Import Tool.

To set desktop preferences for the Import Tool:

1. **Choose Preferences from the File menu. The Import Tool Preferences window appears as shown in Figure 14-10.**

.

Figure 14-10 Import Tool Preferences — Desktop Dialog Box

2. **You can select any of the following desktop options:**

Maximize Application	Select to have the Import Tool Main window fill the entire screen (maximize) on startup.
Always Prompt for Login	Select if you want to be prompted for your login every time you open the Import Tool. This setting is useful when more than one user uses the same workstation.
Shows Status Bar	Select to cause the status bar to appear at the bottom of the window. Clear to hide the status bar.
Show Toolbar	Select to cause the toolbar to appear below the menu bar. Clear to hide the toolbar.
Save Window Size and Position on Close	Select to cause the AR System to remember the size and position of all windows. The size and position are used the next time you open that window.
AR Path	Specifies the directories where you can access mapping files. Enter the entire directory name for each directory you want to access. The default value is <*ar_config_dir*>`\arcmds`. You also can enter multiple pathnames by separating them with a semi-colon (;). You also can click the Browse button to specify a new directory to be added to the path.
Import Log File	Enter a directory and path name for a file that logs error messages encountered during the import process. The default value is <*ar_config_dir*>`\arimport.log`.
Reset Log File at Login	Select if you want to purge the import log each time you log into the Import Tool. If you do not reset the log file, you have to monitor the size of the file more closely. The log file can grow quite large depending on what is added to it during importing.

3. **Click the OK button to accept the options settings, or click another tab to set other options.**

Error Handling Preferences

These preferences define how the Import Tool deals with records that cannot be imported and records that contain entry-IDs which duplicate those already in the schema.

To set error handling preferences for the Import Tool:

1. **Choose Preferences from the File menu.**
2. **In the Preferences dialog box, click the Error Handling tab. The Import Tool Preferences window appears as shown in Figure 14-11 on page 340.**

Figure 14-11 Import Tool Preferences — Error Handling Dialog Box

3. To select or clear an option, click the option. You can select any of the following error handling options:

Bad Records	Alert User with Popup Dialog	The import process is interrupted and you receive an error dialog.
	Skip Bad Records	The record is not imported in the schema and the Import Tool will not alert the user before recording the error to the log file.
	Try Fallback Mapping before Alerting User	The Import Tool uses the fallback mapping that you specify for the field in the Fallback Mappings dialog box. If the fallback mapping also produces an error, it will alert the user.
Duplicate Entry ID	Generate New ID for All Records	New Entry IDs are assigned to all of the ARs in the import file.
	Reject Duplicate Records	The existing ID will be used for all entries imported. If an ID is already in use, an error will be returned.
	Generate New ID for Duplicate Records	Entries will be imported using their existing IDs. If an ID is already used, a new ID will be generated for the new record.

4. Click the OK button to accept the options settings, or click another tab to set other options.

Data Preferences

These preferences deal with how data and values are handled in import files.

To set data preferences for the Import Tool:

1. **Choose Preferences from the File menu.**
2. **In the Preferences dialog box, click the Data tab. The Import Tool Preferences window appears as shown in Figure 14-12.**

Figure 14-12 Import Tool Preferences — Data Dialog Box

3. **To select or clear an option, click the option. You can select any of the following data preference options:**

Remove leading and trailing spaces and tabs	If set, all leading and trailing white space (blanks and tabs) is removed from values before they are imported. If not set, values are imported as they are in the import file.
Truncate string exceeding field limit	If set, any character values that are too long for the target field are truncated. If not set, an error is reported if a value will not fit within the field limits.

4. **Click the OK button to accept the options settings, or click another tab to set other options.**

Date/Time Preferences

These preferences should reflect what data format is in your import file.

Note – Make sure the date/time preferences that you set here match the dates and times in your import file.

To set date/time preferences for the Import Tool:

1. **Choose Preferences from the File menu.**
2. **In the Preferences dialog box, click the Date/Time tab. The Import Tool Preferences window appears as shown in Figure 14-13.**

Figure 14-13 Import Tool Preferences — Date/Time Dialog Box

3. **To select or clear an option, click the option. You can select any of the following date/time options:**

Short Date Format	Select the format of the date fields in your import file and specify the separator character between the month, day, and year.
Long Date Format	Select the format of the date fields in your import file.

Time Format	Select either the 12 hour or 24 hour check box to match the format of your data. If 12-hour format, specify the string for before noon and after noon, and specify the separator character between the hour, minutes, and seconds.

Note – The Import Tool will accept either short or long date formats in your import file. It will also ignore leading zeros.

4. **Click the OK button to accept the options settings, or click another tab to set other options.**

Confirmation Preferences

These preferences deal with the warnings, messages, and alerts you receive when importing data.

To set confirmation preferences for the Import Tool:

1. **Choose Preferences from the File menu.**
2. **In the Preferences dialog box, click the Confirmations tab. The Import Tool Preferences window appears as shown in Figure 14-14.**

Figure 14-14 Import Tool Preferences — Confirmations Dialog Box

3. **To select or clear an option, click the option. You can select any of the following confirmation options:**

Confirm to Exit	Select if you want a confirmation message every time you exit the Import Tool.
Confirm to Delete all Mappings	Select if you want a confirmation message every time you click on the Delete All button in the Import Tool's Main or Fallback Mappings windows.
Confirm before Losing Mappings	Select if you want a confirmation message every time you create mappings but do not save them before exiting the Tool or changing the schema or file.
Confirm before Losing Fallback Mappings	Select if you want a confirmation message every time you create fallback mapping but do not save them before exiting the Tool or changing the schema or file.
Confirm before Losing New Mapping Value	Select if you want a confirmation message every time you add or modify a mapping value without clicking the Add/Modify button before exiting the dialog box or starting import.

4. **Click the OK button to accept the options settings, or click another tab to set other options.**

Electronic Mail Support 15

This chapter describes how the AR System makes use of electronic mail (email) to allow users without direct access to the AR System server to submit ARs, query ARs, or receive notifications. It describes how to set up and use the electronic mail handler (`armaild`) so that users can submit ARs. It also describes how users can receive notifications by email. The following topics are included:

- Overview of the electronic mail interface.
- Submitting ARs through email.
- Querying via email.
- Receiving notifications through email.

The AR System Electronic Mail Interface

Electronic mail (email) may be the interface of choice for submitting action requests and receiving notifications in environments where there is no high-speed network link between the user and the AR System server.

This chapter describes the setup and configuration for both the UNIX and Windows NT-based `armaild` services. While the capabilities of `armaild` are the same regardless of the platform it is running on, their operation and configuration are a little different. The differences for each of the platforms are clearly indicated throughout the chapter.

The main differences between the two platforms are described in Table 15-1:

Table 15-1 Differences Between armaild in UNIX and Windows NT

Function	UNIX	Windows NT
email	Uses SMTP for email.	Uses Microsoft Mail (MS Mail) for email.
Sending email Notifications	* Server sends email notifications. * In some circumstances, you can override who the email is sent from.	* armaild sends email notifications. * Notifications *always* come from the armaild Microsoft Mail logon account, which you *cannot* override.
Location of Configuration File	/etc/armaild.conf You can specify another filename and location through the command line. For more information, see "Starting the Mail Handler" on page 353.	<ar_install_dir>\conf\armaild.cfg In addition, the Windows NT armaild service has extra configuration values that reside in the ar.cfg configuration file.

The AR System mail handler (armaild) allows users to submit and query ARs using their email facility. The armaild daemon watches the mailbox designated for use by the AR System for new messages. When messages are received and processed, the mail handler creates the new AR and enters it into the AR System. If there is an error, the original message and error messages are returned to the submitter. If the AR server is not responding, the message is held and periodically resubmitted until the server responds.

The AR System also allows users to receive notifications via email. You may design filters and escalations to send specified text or the contents of selected fields to users via email notification. The AR System sends the notifications via the sendmail command on UNIX servers and via armaild on Windows NT servers.

Using Electronic Mail to Submit ARs

Before users can submit ARs using electronic mail, you need to perform the following administrative tasks.

1. **Establish a mailbox address for the mail handler. If you are in the Windows NT environment, create a user in Microsoft Mail for the `armaild` mail handler to use.**
2. **Install the mail handler and, optionally, specify a configuration file containing values that define the operational settings for the mail handler.**
3. **Generate one or more email templates for each schema you want to make available for users to submit via email.**

Details on how to perform each of these administrative tasks are included in this chapter.

Establishing a Mail Address

For UNIX Servers

The AR System mail handler must have a mail address somewhere in your system. By default, the AR System will look for the address `ARSystem`. However, you can use any address you want, if you specify the address in the `armaild` configuration file.

The mail address you specify should be used strictly for the AR System.

The most likely machine on which to establish the mail address is the machine running the AR server. However, this is not a requirement. You can establish a mail address on any machine in your network that has the ability to access the AR server by using the procedure that follows:

- Update the `/etc/aliases` file to add an entry for the mail address. For example, if you use the default name `ARSystem` for your mail address, you could add an entry of the form:

```
ARSystem:/usr/spool/mail/ARSystem
```

For all other nodes in the network, you need to make any changes that are required for them to forward mail targeted at the mail handler to the appropriate location. This may or may not require updates to the other nodes.

If you are using NIS services, you would make the changes noted above following the rules and guidelines for updating files under NIS.

For Windows NT Servers

The *only* machine on which to establish the `armaild` service is the system running the AR server. All mail sent by the `armaild` daemon will be from the Microsoft Mail ID configured at installation. Mail destined for the AR server should be sent to this Microsoft Mail address.

Setting Up the Mail Handler

The `armaild` daemon must have access to several types of information in order to process action requests through email. It must know the address of the AR System mailbox. It must also know other information, including what server to use, what schema to process a submittal for, and what to do if the transaction succeeds or fails.

There are several ways to supply needed information to the mail handler:

- You can accept AR System defaults, where defaults exist.
- You can specify a configuration file when you start the mail handler. This file should contain values for various options affecting how the mail handler operates. These settings will then become “defaults” for that run of the mail handler. Values set through a configuration file will override AR System defaults. See the section *Creating an Email Configuration File* that follows for information on defining the configuration file values.
- You can make sure that the mail templates available to users submitting ARs include all necessary specifications. Settings included in a template will override both system defaults and values set through a configuration file. See “Using Mail Templates” on page 354 for information on mail templates.

Creating an Email Configuration File

You can set a number of options for the AR System mail handler by including their specifications in an ASCII file. You then designate the file as the configuration file when you start the `armaild` daemon. The values set through the configuration file will be associated with that run of the mail handler process and the values for options specified in the configuration file will override the system defaults.

Table 15-2 shows the options that you can specify in the configuration file:

Table 15-2 `armaild` Configuration File Options *(1 of 3)*

Option	Function	System Default
`Address:`	The mail address the mail handler should watch for AR System messages. (UNIX only.)	`ARSystem`
`Default-Password:`	The AR System password to use if no password is specified in the submitted message.	No password
`Default-Schema:`	The schema to submit to if no schema is specified in the submitted message.	None. The schema must be specified here or in the message
`Default-Server:`	The AR System server to submit to if no server is specified in the submitted message.	The machine running the `armaild` process
`Default-User:`	The AR System login user to use if there is no login specified in the submitted message.	Mailer daemon
`Include-Original-On-Failure:`	A flag indicating whether to include the full text of the original message in a reply to a failed submission. Legal values are T and F.	T (include full text)
`Include-Original-On-Success:`	A flag indicating whether to include the full text of the original message in a reply to a successful submission. Legal values are T and F.	T (include full text)
`Poll-Interval:`	The number of seconds to wait between polls to the mailbox to check for new messages. The minimum interval is 5 seconds.	300 (5 minutes)
`Query-Match-Full:`	Defines the maximum number of matches that can be returned to a successful Full Format query request. For example, if a user submits a query request with Full format indicated, and the query matches 120 items, only the first 25 will be returned.	25

Table 15-2 `armaild` Configuration File Options *(2 of 3)*

Option	Function	System Default
`Query-Match-Short:`	Defines the maximum number of matches that can be returned to a successful Short Format query request. For example, if a user submits a query request with Short format indicated, and the query matches 120 items, only the first 50 will be returned.	50
`Reply-Failure:`	The email address to use for replies to failed submissions. Use to redirect replies for failed submissions to a third party rather than the message sender. This field only applies to submits, not queries. To suppress sending a message on reply failure, for UNIX, set the address to `/dev/null` (or to an address directed to `/dev/null` in the mail aliases file with a line like `nobody: /dev/null`). For Windows NT, set the address to `Discard`.	Reply to message sender. Use `Reply-to:` field, then `From:` field, and finally the `From` header to find user.

Table 15-2 `armaild` Configuration File Options *(3 of 3)*

Option	Function	System Default
`Reply-Success:`	The email address to use for replies to successful submissions. Use to redirect replies for successful submissions to a third party rather than the message sender. This field only applies to submits, not queries. To suppress sending a message on reply success, for UNIX, set the address to `/dev/null` (or to an address directed to `/dev/null` in the mail aliases file with a line like `nobody: /dev/null`). For Windows NT, set the address to `Discard`.	Reply to message sender. Use `Reply-to:` field, then `From:` field, and finally the `From` header to find user.
`Required-Schema:`	The only schema for which submissions will be accepted. If there is a `Schema:` line in the submitted message, it must contain this schema name or the submission will be rejected. If there is no `Schema:` line, the `Default-Schema:` setting in the configuration file must match this schema name or the submission will be rejected.	No required schema setting.
`Required-Server:`	The only server for which submissions will be accepted. If there is a `Server:` line in the submitted message, it must contain this server name or the submission will be rejected. If there is no `Server:` line, the `Default-Server:` setting in the configuration file must match this server name or the submission will be rejected.	No required server setting.

For Windows NT Servers

Table 15-3 on page 352 shows additional configuration parameters that are used for the Windows NT server. These parameters are located in the

<ar_install_dir>\conf\ar.cfg configuration file.

Table 15-3 Windows NT Server armaild Configuration File Options

Option	Function	System Default
MailNotifyDir:	Indicates the full pathname for the mailntfy directory that holds all of the email notifications the server passes to the armaild service. The armaild service deletes them after they are processed.	<*ar_install_dir*>\arserver\mailntfy
MailLogin:	Indicates the Microsoft Mail and NT account login name.	No default.
MailPassword:	Indicates the Microsoft Mail and NT account login password.	No default. Stored encrypted.
PO-Location:	Indicates the NT full pathname for the system and share file that hold the Microsoft Mail post office.	UNC (universal naming convention) name for the Microsoft Mail postoffice. No default.

Sample Email Configuration File

The following is an example of a configuration file that specifies a mailbox address of NewTickets and sets the default server to narnia and the default schema to TroubleTickets:

```
Address: NewTickets
Default-Server: narnia
Default-Schema: TroubleTickets
```

Starting the Mail Handler

For UNIX Servers

Once you have established a mail address for messages to be mailed to the AR System and set up a configuration file, if one is desired, you can run the AR System mail handler, `armaild`. The syntax for `armaild` is as follows:

```
armaild [-d][-f filename][-n number-of-intervals]
```

Command Options

The following command options may appear in any order on the command line:

`-d`	Set the system into debugging mode. This mode prints messages to `stdout` that detail the progress of the operations being performed. You should use debugging mode only to find problems with how the mail handler is running.
`-f` <*filename*>	Process the indicated configuration file for command options to the `armaild` process. The various options are described in "Creating an Email Configuration File" on page 348.
`-n` <*number-of intervals*>	The number of polling intervals this daemon will run. This setting allows you to limit the amount of time the mail handler will run. If this option is not specified, the daemon will run until terminated.

To start the mail handler:

The following example will start the mail handler using a configuration file called `mailopt`. (You will need read / write access to the file.)

```
% armaild -f mailopt &
```

You will probably want to add the command line you will use most often to start the mail handler to your system start-up script.

For Windows NT Servers

The mail handler is installed to run as a Windows NT service. The startup settings for the `armaild` service must start the service as the Windows NT account designated for use during installation, not as the `System Account`, as described in "Establishing a Mail Address" on page 347.

You also can use the following debug options with `armaild`:

- If you run `armaild` as a Windows NT service and use the `-d` debug option, debug messages are logged in the `<ar_install_dir>\arserver\db\armaild.log` file and do *not* appear on the screen.
- If you do *not* want to run `armaild` as a Windows NT service, you can run `armaild` in manual mode by adding the `-m` option to the command line, as in the following example.

```
%  armaild -d -f c:\remedy\armaild.cfg -m
```

Debug messages appear on screen and *not* in the `armaild.log` file.

For more information on the `armaild` command options, see "Command Options" on page 353.

Using Mail Templates

Users who wish to submit ARs using email will use the mail templates that are available to them according to the instructions provided in the *Action Request System User's Guide*. As the AR administrator, it is your responsibility to generate the mail templates and modify them so that they meet the needs of your users.

Generating Mail Templates

To generate a mail template for any schema, you use the Export operation of the Admin Tool. Instead of exporting the schema definition to a file, you choose the Export Schema Mail Definition menu choice to create an ASCII file that can then be used to submit ARs via mail. See *"Importing and Exporting Definitions" on page 311* for complete instructions on exporting mail templates.

The Export operation generates a template that looks like Figure 15-1. Only the fields shown below are available to all users during submission:

```
#
# File exported Sun Nov 17 14:30:02 1995
#
# AR-Message-Begin                Do Not Delete This Line

Schema: Schema01
Server: narnia
Login:
Password:
Action: Submit
#Values: Submit, Query
Format: Short
#Values: Short, Full

 Submitter! 2!:
 Short-Description ! 8!:
 Long-Description ! 9!:
 Notify-method !12!: None
# Values: None, Notifier, E-mail
 Submitter-Severity !13!: Low
# Values: Low, Medium, High

# AR-Message-End              Do Not Delete This Line
```

Figure 15-1 Email Template

Email templates have four pieces:

- The initial comment block stating when the template was generated.
- A header containing fields identifying the schema and user.
- A block of fields.
- Begin and end message comment lines.

The **comment block** is optional and can be retained or deleted as desired. Any line beginning with a # in column 1 will be treated as a comment. Comments can occur anywhere in the message.

The **header block** may contain a `Schema:` line with a valid schema named, a `Server:` line to identify the server on which the schema is located, a user login and password, and optional Action and Format lines to define the operation to perform.

If no schema is specified or the specified schema does not exist, the mail handler will check to see if a schema was defined in a configuration file that was specified when the mail handler was started. If not, the item will be rejected since a schema must be specified.

If no server is specified or the specified server does not exist, the mail handler will first check to see if a server was defined in a configuration file that was specified when the mail handler was started. If not, then the machine running the `armaild` process will be used as the server.

If no user name or password is specified, the mail handler will check to see if they were defined in a configuration file that was specified when the mail handler was started. If not, the user performing the operation is set to "Mailer daemon."

If no action line is specified, the mail handler defaults to Submit. If you make a query and do not specify a format, the mail handler uses the Short format.

The header block is considered ended when any field other than a comment or one of the header labels is encountered. The blank line shown in the example above is useful but not required.

The **field block** section of the email template contains the fields that can be set. The Export operation includes all fields open to all users at submit time. Field order is not significant. The Export operation generates fields in the same order as on the default administrator view of the schema.

A field consists of:

- An optional field name (the field name is just to provide a useful name, the ID is what the AR System uses).
- The field ID within exclamation points (!) (for example, field ID 9 would be !9!), with any single delimiter character after the second !. The character : (colon) is often used as a delimiter. Blanks are acceptable. If any characters other than digits and spaces are between the exclamation points, the reference is not recognized as a field ID.

- Values can be entered any place after the single delimiting character. Leading blanks are ignored when reading a value. When generated from the Export operation, fields with default values have the values loaded in the template.

You can place several field references on a single line as long as the second (or third) item starts far enough after the end of the previous item to leave enough room for a full-length value. For example, if the first field is a 10-byte maximum character string, the second field name or ID must start at least 10 bytes after the start of the value of the first item. Any diary type or character type with an unlimited length or length limit over 50 characters *cannot* have a following field on the same line. The export operation generates a single field on each line.

There is no significance to the positioning of the field IDs on a line. They can be placed to align for readability or not, as desired.

The AR-Message-Begin and AR-Message-End **comment lines** are recommended but not required. The begin and end message delimiters avoid `armaild` parsing problems that can be encountered when mail passes through mail gateways on its way to `armaild`.

Modifying Mail Templates

If necessary, you can modify mail templates before distribution, as long as the resulting template matches the rules discussed in this section.

When you export a mail template, the template contains only those fields that are available to *all* users during the submit operation; that is, all fields that have a create mode of Open. It is possible for you to add any of the fields that are not exported under this rule to the template; however, since they did not meet the requirements to be included in the template automatically, these fields have additional security protection. A user submitting an entry with a value for one of these additional fields must specify their Login and Password in order to gain access to these protected fields. If the Login and Password fields are not supplied in either the template or the configuration file specified when `armaild` was started, the submission defaults to Mailer daemon.

Submitting ARs Using Templates

Once you have established an email address for the AR System, set up and installed the mail handler, and generated email templates, AR System users will be able to use the templates to submit ARs. To do so, the user opens the appropriate email template in their email tool (or in any text editor), fills in the fields as required, and directs the resulting message to the AR System mailbox. Users will receive confirmation if their submission is successful, or receive a message identifying any errors if the submission is rejected. See the *Action Request System User's Guide* for more information on using email templates to submit action requests.

Querying via Electronic Mail

The `armaild` process also supports querying via email. AR System users can send the `armaild` process query requests encapsulated in specially formatted email messages and receive the query results by email.

Overview

Users now have the ability to query the AR System, in addition to the already established ability to submit to the AR System. The AR System administrator needs merely to modify the email template.

The query requests are supported in three formats:

Query by Entry ID	The simplest method is the query by entry-id, which requires that the user email a specific entry-id value.
Query by Field	The query by fields method allows the user to specify a selection on a field or fields for the schema they wish to query, much like the functionality of the user tool. This method can return multiple entries.
Query Bar Command	The query via a query bar request is the most powerful version of the query via email functionality. It provides an email based query-bar facility, anything you can enter in the query bar can also be done via email.

Formatting

All matching requests are listed in the body of the message one after another. In full format, each entry is separated by a line of dashes. If a request fails, an error envelope is returned with an indication of the cause of the failure.

If a query request returns more than one match, the beginning of the message indicates the total number of matches that were made. If a request exceeds the configured query match limit, an additional message is provided indicating this, as well as what the limit was. The maximum number of allowable matches are returned in the message.

The Action and Format keywords can appear anywhere in the header portion of the message. The user specifies whether the action to be performed is a query or a submission by typing `Query` or `Submit` after the Action keyword. If the Action keyword does not appear, the `armaild` daemon will treat the email message as a submit request.

The user can chose that requested information be formatted in full or short form using the Format keyword, as described below.

- The default format is short, and returns the information via the query list definition for the schema being queried.
- The full format lists the information for all accessible fields. The user controls the format through the Format keyword in the header portion of the email request.

The AR-Message-Begin and AR-Message-End **comment lines** are recommended for use in the email templates, but are not required. Gateways may add extra text or graphics before and after the body of a message. The beginning and end message delimiters prevent `armaild` from having trouble parsing these additions.

Additional Configuration File Options

To prevent large email responses, you can define limits on the total number of entries that can be returned in the `armaild` configuration file. The modifications needed for the `/etc/armaild.conf` file (for UNIX) or `<ar_install_dir>\conf\armaild.cfg file` (for Windows NT) are described in “Creating an Email Configuration File” on page 348.

These settings allow the administrator to limit the number of matches returned to the requester. All matching requests are listed in the body of the message one after another. In Full format, each entry is separated by a line of dashes. If a request fails, an error envelope is returned with an indication of the cause of the failure.

If a query request returns more than one match, the beginning of the message indicates the total number of matches that were made. If a request exceeds the configured query match limit, an additional message is provided indicating this happened and what the limit was. The maximum number of allowable matches are returned in the message.

The Format keyword is followed by the requested format, either Full or Short. This setting allows the requestor to control the information used in the summary. The Format keyword is only useful with query requests; it has no affect on submit requests.

Preparing the Electronic Mail Template

To create the format required to use the query capability, modify the email submit format you create using the Administrator Tool. For more information, see “Using Mail Templates” on page 354.

Follow the steps below to modify the email template.

To create the query by entry ID format:

1. **Export the schema mail template via the Administrator Tool for the schema that you want to query. Figure 15-2 shows an example of an exported schema mail template.**

```
#
# File exported Mon Dec 18 08:57:00 1995
#
# AR-Message-Begin          Do Not Delete This Line

Schema: AR-HD Calls
Server: narnia
Login:
Password:
Action: Submit
# Values: Submit, Query
Format: Short
# Values: Short, Full

# Values: Phone, AR System, email,
Method !536870914! Phone
 # Priority !536870915! Low
Phone Number !536870916!

# AR-Message-End            Do Not Delete This Line
```

Figure 15-2 Original Template for Query by Entry-ID

2. **Edit the exported file by doing the following:**
   a. **Make sure the Action keyword value is set to `Query`.**
   b. **In the body portion of the message, you can only define the entry-ID field. It must have a field-id value of 1.**
   c. **Fill in the data portion of the message with the entry ID of the ticket to be retrieved.**

d. Remove all other fields from the body of the template. The *only* field in the body should be `!1! TT00000000119`**.**

Figure 15-3 shows an exported file and how it was modified to become a query by entry ID message.

```
#
# File exported Mon Dec 18 08:57:00 1995
#
# AR-Message-Begin        Do Not Delete This Line

Schema: AR-HD Calls
Server: narnia
Login:
Password:
Action: Query
Format: Short

            !1! TT00000000119

# AR-Message-End            Do Not Delete This Line
```

Figure 15-3 Modified Template For Query by Entry-ID

The Action keyword and format can appear anywhere in the Header portion of the message. If the Action keyword and format does not appear, or the action keyword is present but specifies `Submit`, then the `armaild` daemon will treat the email message as a submit request.

To create the query by field format:

The query by field format requires the same Action keyword as the query by entry ID, but can have more that one field defined.

1. **Export the schema mail template via the Administrator Tool for the schema that you want to query. Figure 15-4 shows an example of an exported schema mail template.**

```
#
# File exported Mon Dec 18 08:57:00 1995
#
# AR-Message-Begin          Do Not Delete This Line

Schema: AR-HD Calls
Server: narnia
Login:
Password:
Action: Submit
# Values Submit, Query
Format: Short
# Values Short, Full

Source !5368737933! Phone
# Values: Phone, AR System, email,
#      NMP, ACD
Caller Impact !5368783455! Low
# Values: High, Medium, Low
Last Name !5386753452!
Phone Number !5386748345!

# AR-Message-End          Do Not Delete This Line
```

Figure 15-4 Original Template for Query by Fields

2. **Edit the exported file by doing the following:**
   a. **Make sure the Action keyword value is set to `Query`.**
   b. **Set the Format option as desired if you want other than the default (Short).**

c. Edit the body portion of the message to include the fields you are querying, but remove all other extra information. Only fields that have values are used in the request. Field that do not have values are ignored.

Figure 15-5 shows an exported file and how it was modified to become a query for multiple fields message.

```
#
# File exported Mon Dec 18 08:57:00 1995
#
# AR-Message-Begin          Do Not Delete This Line

Schema: AR-HD Calls
Server: narnia
Login:
Password:
Action: Query
Format: Full

Source !5368737933! Phone
Caller Impact !5368783455! Low

# AR-Message-End          Do Not Delete This Line
```

Figure 15-5 Modified Template For Query for Fields

Note – Compare Figure 15-5 on page 364 with Figure 15-4 on page 363. The Action keyword value has been changed to `Query`, and the unneeded fields (`Last Name` and `Phone Number`) have been removed

---

To create the query bar format:

The Query bar format requires the same Action keyword as the query via entry ID, but the field format is a little different.

1. **Export the schema mail template via the Administrator Tool for the schema that you want to query. Figure 15-6 shows an example of an exported schema mail template.**

```
#
# File exported Mon Dec 18 08:57:00 1995
#
# AR-Message-Begin        Do Not Delete This Line

Schema: AR-HD Calls
Server: narnia
Login:
Password:
Action: Submit
# Values: Submit, Query
Format: Short
# Values: Short, Full

Source !5368739331! Phone
# Values: Phone, AR System, email,
#      NMP, ACD
Caller Impact !5368783455! Low
# Values: High, Medium, Low
Last Name !5386753452!
Phone Number !5386748345!

# AR-Message-End        Do Not Delete This Line
```

Figure 15-6 Original Template for Query Bar Format

2. **Edit the exported file by doing the following:**
   a. **Make sure the Action keyword value is set to `Query`.**
   b. **Remove all fields in the body portion of the message to include a Query Bar line. The query bar formatted request must have the keyword `QueryBar` in the field label portion of the line. The field ID can be any non-negative value, though zero is recommended. The value portion of the field can be any valid query bar formatted query. All of the restrictions that apply to the query bar in the user tool apply to its usage when performed via email.**

c. Figure 15-7 shows an exported file and how it was modified to become a query bar format message.

```
#
# File exported Mon Dec 18 08:57:00 1995
#
# AR-Message-Begin        Do Not Delete This Line

Schema: AR-HD Calls
Server: narnia
Login:
Password:
Action: Query
Format: Short

QueryBar !0! 'Source' = "Phone" OR 'Source' = "email"

# AR-Message-End        Do Not Delete This Line
```

Figure 15-7 Modified Template For Query Bar Format

Note – Make sure that the value after the Query Bar keyword and its field ID is in valid AR System query-by-example format.

Using Electronic Mail for Notifications

You can define filters and escalations that direct AR System notifications to users via electronic mail by specifying `E-mail` as the delivery mechanism when you define the Notify filter or escalation action. You can send a text message or you can send the contents of selected fields, as long as the user being notified has the appropriate permissions for those fields.

See Chapter 10, and Chapter 11 for details on setting up a filter or an escalation to send notifications to users via email.

For UNIX Servers

The AR System will automatically generate a `sendmail` command to send the notification text (and field contents) to the designated user when the filter or escalation is triggered.

For Windows NT Servers

The AR System server automatically passes notifications to the `armaild` service, which then sends the notifications. This is different than the UNIX `armaild` daemon which only receives email tickets for submission to the AR System. To send email notifications, the `armaild` service on NT must be running.

The notification information is passed to `armaild` via the `<ar_install_dir>\arserver\mailntfy` directory. The `armaild` service periodically checks the directory for notifications and sends all that it finds. You define the frequency of the polling interval by setting the `Poll-Interval:` configuration parameter.

15

The Multi-Process Server Option 16

This chapter discusses the administration and performance of the multi-process (MP) server option in the AR System server. The topics covered include the following:

- Multi-processing and the AR System.
- Configuring an MP server.
- Administering an MP server.
- Using the MP server with different AR System clients.
- Using the MP server with private servers.

Note – The MP server option is a feature that you can purchase along with the AR System 2.0 (or later) UNIX server and may not be available on the server you are administering.

Multi-Processing and the AR System

To improve AR System performance, you may want to run more than one AR System server. Running multiple `arserverd` processes involves performance questions that only you, the administrator, can answer. Sometimes it makes sense to off-load certain operations to a different server, sometimes not.

Using multiple `arserverd` processes improves system performance by distributing the process load. For example, using several servers allows the AR System to do multiple database searches in parallel. If users feel that queries are taking too long, increasing the number of servers should create a noticeable improvement in performance.

The MP server is scalable from a single Admin server doing all server functions to multiple servers doing specific functions. The `arserverd` processes adapt to the configuration parameters defined and spread the load. You determine what amount of server resources to dedicate to the AR System.

Note – The 2.0 (or later) AR server is compatible with earlier versions of AR clients. However, the only way you can take advantage of the MP ability of the AR System is if you are using 2.0 (or later)
clients.

The MP server option provides the following features:

- All operations are hidden within the API.
- Scalability. You can add additional servers as needed.
- Compatibility with clients using older versions of our API.
- Allows users to run private servers (if needed).
- Provides a distinct and measurable gain in performance.

Figure 16-1 shows how the MP server design works and shows the server processes and their RPC socket numbers.

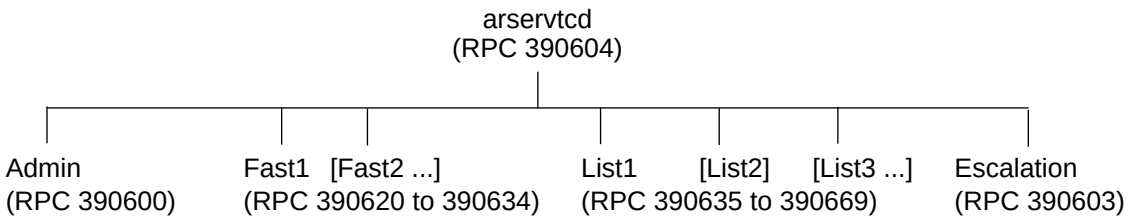


Figure 16-1 MP Server Design

You can start as many `arserverd` servers as you need. Note that there are five types of `arserverd` processes:

- Admin arserverd process.
- Fast arserverd processes.
- List arserverd processes.
- Escalation arserverd process.
- Private arserverd processes.

The following sections describe the admin, fast, list, and escalation arserverd processes. For private arserverd processes, see “Using the Multi-Process Server with Private Servers” on page 377.

Admin Server

The arserverd admin process is an AR System server that can perform *any* operation within the system. It performs *all* admin restructuring operations, guaranteeing the serialization and integrity of all restructuring operations. There can be only *one* admin server process at any time.

In addition to its role as the restructure server, the admin server is also the main server for older clients that do not handle MP server capabilities. In a worst case scenario (all older clients with an MP server running), *all* operations from *all* clients would be handled through the admin server.

If you do not have an MP server license or choose not to run any fast, list, or escalation servers, you will be running the arservtcd server and the admin server. For information on the arservtcd controller process, “Configuring Multiple Process Servers” on page 373.

Fast Servers

Fast servers handle all the *fast* operations of the AR System, that is, the operations that generally run to completion quickly without blocking access to the server. The arserverd fast servers handle all server operations *except* for admin operations that restructure the database (which use the Admin process), and the ARExport, ARGetListEntry, and ARGetEntryStatistics calls (which use the List processes).

User Tool operations that use a fast server include the following:

- Previous and Next buttons in the Display and Modify windows.

- Generating reports.
- Modify Individual and Modify All functions.
- Submit functions.
- Generating lists of schemas and fields.

For most sites, you probably only need a couple of fast servers. However, for larger sites, you might benefit from the use of additional fast servers. To configure the number of fast servers, see “Configuring Multiple Process Servers” on page 373.

List Servers

List servers handle operations of the AR System that may take some time: ARExport, ARGetListEntry (high-performance database searches), and ARGetEntryStatistics.

User Tool operations that use list servers include the following:

- Queries.
- Initial connection to a schema.

Most sites can benefit from using multiple list servers. For example, to eliminate waiting for access to the database, list server processes allow multiple searches to occur in parallel. To configure the number of list servers, see “Configuring Multiple Process Servers” on page 373.

Escalation Server

Typically, the admin server handles escalation processes. However, if you create and use many escalations with short intervals for checking conditions, putting the load on an `arserverd` server that handles only escalations makes a lot of sense.

As with all MP servers, sharing the processing load insulates the admin server from escalation overhead. However, you must juggle whether creating an escalation server is worth the performance cost to your system or whether you have enough escalation processes that merit creating an escalation server in the first place.

You can have only one escalation server. To enable the escalation server, see “Configuring Multiple Process Servers” on page 373.

Multi-Process Server Lock and Log Files

Normally, to prevent multiple instances of the `arserverd` process from running, a lock file is created (`ar.lck`). When using the MP server feature, to prevent multiple instances of the server running on the same RPC socket address, lock files related to the specific RPC socket address are created. The admin server creates a lock file named `ar.lck` while the servers using other RPC sockets create files named `ar.lck.`<*rpcnum*> where <*rpcnum*> is the RPC socket address. For example, if using the RPC socket address of 390680, the associated lock file would be `ar.lck.390680`. But, in general, you do not need to worry about these files.

If you specify an SQL, Filter, Escalation, User, or API log file using the Administrator Tool, a similar file naming strategy is followed. The system adds .<*rpcnum*> to the end of the log filename that you supply. This logs the operations related to each server into separate files.

Configuring Multiple Process Servers

To configure the multiple-process server environment, click the Multiple Processes tab (Figure 16-2 on page 374) in the Server Information dialog box to specify a multiple process server configuration. If you do not have a Multi-Process Server Option license, the Multiple Processes tab does not appear in the Server Information window.

To set the multiple-process server environment:

1. **Choose Server Information from the File menu. The Server Information dialog box appears.**
2. **In the Server Information dialog box, click the Multiple Processes tab, as shown in Figure 16-2 on page 374.**

Figure 16-2 Server Information — Multiple Servers

3. Select from the following options or enter settings as required:

Fast Servers	Number of processes to run as fast servers. For more information on fast servers, “Fast Servers” on page 371.
List Servers	Number of processes to run as list servers. For more information on list servers, “List Servers” on page 372.
Activate Escalation Server	If your site uses many escalations which the server checks frequently, select this check box to activate a separate escalation server. If you clear the check box, escalations are handled by the main Admin server. For more information on escalation servers, “Escalation Server” on page 372.

4. Click the OK or Apply button to save the option settings.

- If you increase the number of fast or list servers, the `arservtcd` server immediately starts the additional fast and list servers you configure.
- If you activate the escalation server, the `arservtcd` server does not start the escalation server until you stop and restart the `arservtcd` server.
- If you reduce the number of fast, list, or escalation servers, those processes are not killed until you stop and restart the `arservtcd` process.

Administering Processes

The AR System includes a controller process, `arservtcd`, that handles requests from clients for information on which socket to use for communicating with the various `arserverd` processes. The `arservtcd` server responds to requests for which RPC socket to use for the Fast and List processes. In addition, the `arservtcd` server starts and manages `arserverd` processes. While `arservtcd` is available to *all* AR System server licenses, it includes extra capabilities if you are running multiple-server processes.

All querying of the `arservtcd` server is done automatically within the API and is invisible to the user. Regardless of the client platform being used, the various fast and list server processes being used are invisible to the user.

Note – If the `arservtcd` process is not running, all clients default to using the Admin server (on RPC socket 390600).

The `arservtcd` process administers the MP servers for you, including the following:

- Launching configured processes at startup.
- Relaunching any child processes that shut down.
- Inheriting any running server (the `arservtcd` process checks every 15 minutes on inherited processes).
- Automatically launching new fast and list servers if the Administrator increases the number of processes in the Server Info window in the Administrator Tool.
- Sending `kill -15` (SIGTERM) to `arservtcd` will cause it to shut down all MP servers.
- Sending `kill -1` (SIGHUP) to `arservtcd` will cause it to synchronize all MP servers.

Figure 16-3 on page 376 illustrates how the `arservtcd` controller process handles requests from 2.0 (or later) clients and administers the escalation, fast, and list servers.

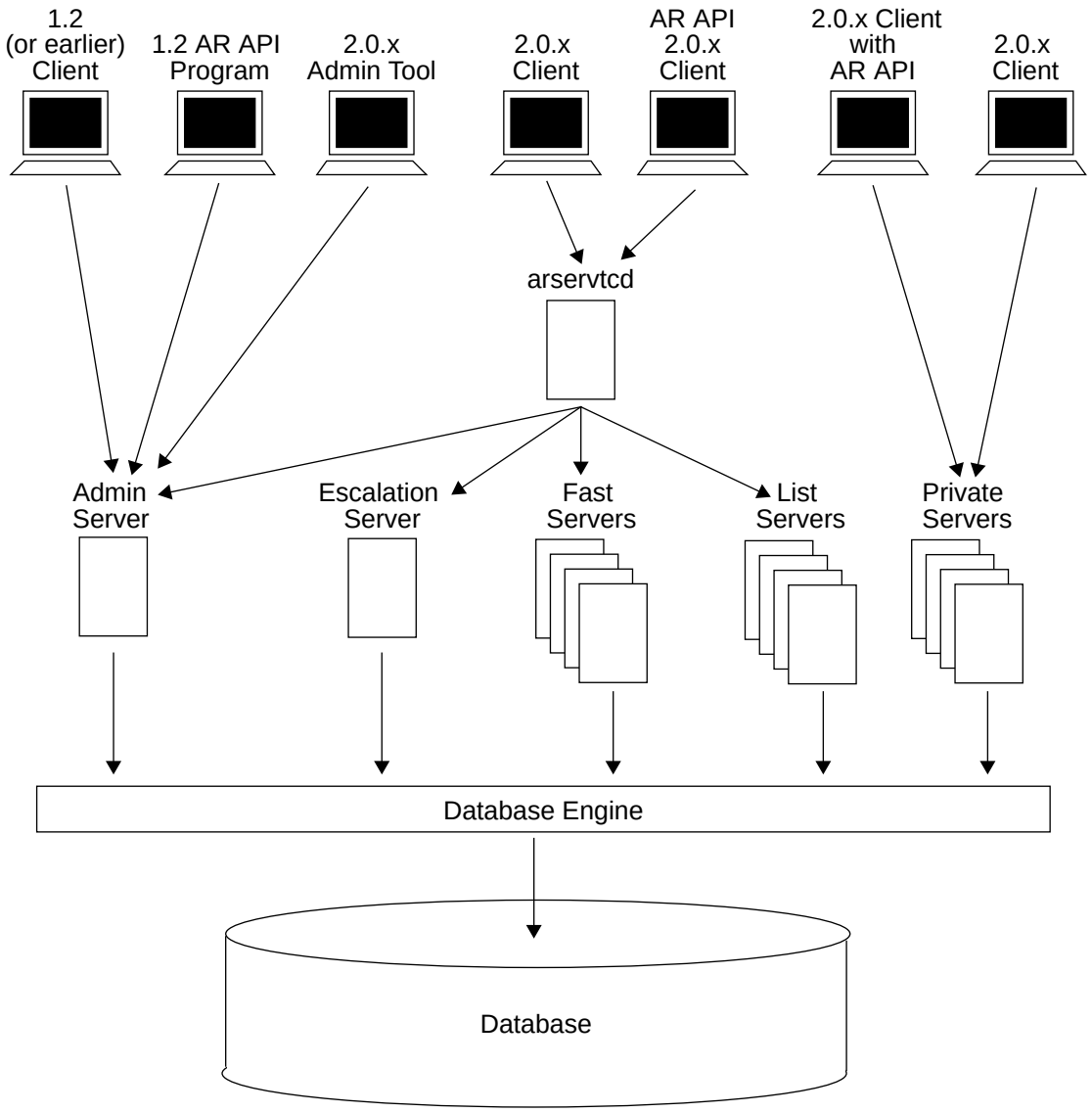


Figure 16-3 MP Server Environment

Using the Multi-Process Server with AR Clients

You can use the MP server with clients using older versions of the AR System API (1.2 and earlier). The AR System always runs a server process on RPC socket 390600 that responds to *any* and *all* client requests. Figure 16-3 on page 376 illustrates how older versions of the AR System fit in the 2.0 (or later) MP server environment.

1.2 AR System clients are compatible with the 2.0 (or later) release and can continue to be used without change. In fact, you can use 1.2 and 2.0 (or later) clients in any combination with 1.2 and 2.0 (or later) servers.

1.1 clients are also compatible with the 2.0 (or later) release but cannot take advantage of many of the features of the 2.0 (or later) release.

Note – You cannot use 2.0 (or later) clients against 1.1 servers.

Wherever possible, it is a good idea to allow customize privileges for users who will access a 2.0 (or later) server from a 1.1 client tool. This will allow the 1.1 users to deal with many of the cases where they cannot take advantage of 2.0 (or later) features. But in cases where this is not possible (for example, for users running the ASCII client tools), the schema designer will need to account for differences when designing a schema.

Using the Multi-Process Server with Private Servers

In addition to fast, list, and escalation servers, AR administrators also can create private servers for specific users who need more dedicated access to system operations. For example, you might create a private server for a user who is performing critical operations that you do not want blocked by other users of the AR System. The RPC socket numbers used for the multiple-process server do not overlap the socket numbers used for private servers.

Private servers support all operations except restructuring operations. These are supported only on the Admin server (“Admin Server” on page 371).

Note – Figure 16-3 on page 376 illustrates how private servers fit in an MP server environment. Notice that the private servers are *not* managed by the `arservtcd` process. As a a result, stopping or starting the `arservtcd` process does not stop or start these private servers. You must stop or start them separately.

Server RPC Socket Addresses

When using a private server, you must specify the RPC socket address that the server will use. You can specify an RPC address in one of two ways:

- Starting a private server by using the `-r` command line argument.
- Defining the `ARRPC` environment variable.

Starting a Private Server

To start a private server, enter the following UNIX command in a shell tool at the command line (first log in as root):

```
#arserverd -r <socketnumber> &
```

The -r option allows you to specify which server to run. In the AR System, socket numbers 390680 to 390694 are reserved for private servers.

Note – If you use the `-r` command line argument and also define the `ARRPC` environment variable, the value supplied with the `-r` command line argument takes precedence.

You can run one or more private servers as is appropriate for your environment. For example, to run two private servers in your environment, you could start the server processes as follows:

```
# arserverd -r 390680 &
# arserverd -r 390681 &
```

Note – You do not need to use the socket addresses in sequence. You can choose from among any of the available sockets. These servers are in addition to the servers managed by `arservtcd`.

Killing a Private Server

Killing the `arservtcd` process does not kill private servers. You must kill them separately.

To kill a private server:

1. **Log in as root and get the process ID number of the private `arserverd` process:**
   For SunOS systems, type the following:

```
# ps -ax
```

   For other systems, type the following:

```
# ps -ef
```

2. **Kill the `arserverd` process by typing the following UNIX command at the UNIX prompt:**

```
# kill <process_number_arserverd>
```

Note – Do *not* use the `kill -9` command to stop a private server. Doing so may leave your database in an inconsistent and unrecoverable state.

Defining the ARRPC Environment Variable

For users, the difference between the `arservtcd` server and the private server is transparent.

Note – The Administrator Tool always uses the admin server, no matter what the ARRPC environment variable is set to.

Using Motif Clients with a Private Server

When using a Motif client, you can connect clients to the private server processes by using the ARRPC environment variable to specify the RPC address of the private server.

- For the C shell, use the following commands:

```
% setenv ARRPC 390680
% aruser &
```

- For the Bourne shell, use the following commands:

```
% ARRPC=390680; export ARRPC
% aruser &
```

Using Windows Clients with a Private Server

To connect a Windows client to a private server, the user needs to add the following line in the [User] section of their ar.ini file before starting the tool:

```
[User]
RPCSocketNumber=<RPC_#_of_private_server>
```

Note – Each user of the Windows client on the same PC needs to add the RPCSocketNumber to their own ar.ini file.

Full Text Search 17

This chapter discusses some of the capability, performance, and administration issues of full text search (FTS) in the AR System. The topics covered include the following:

- Introduction to FTS, including an overview of FTS features.
- Who can perform an FTS search.
- How to use FTS to retrieve records, especially using the accrue operator (the `LIKE` operator with comma separators).
- Administering FTS.
- Licensing users for FTS.
- Configuring FTS in the AR System, including:
  - Setting search options.
  - Modifying the ignore words list.
  - Rebuilding the index for FTS.
  - Defining a field for FTS.
  - Estimating the size of the FTS index.
  - Weighting the results of an FTS.

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Note – Full text search is an optional feature that you can purchase for the AR System 2.0 or later UNIX server. It may not be available on the server you are administering.

What is Full Text Search?

Full text search (FTS) is an important and extremely useful feature of the AR System. For starters, FTS is typically much faster than searching in relational databases for long text fields.

FTS benefits also include making use of your knowledge base. For example, FTS lets you access your company's history of solving problems that are sometimes stored in long text fields. With the FTS option, you can easily search through long text fields to find solutions to related problems. You may even want to re-design schemas to require entering data into diary or long-text fields in order to build up a knowledge base that helps you learn from previous experience.

The FTS option provides quick and consistent access to the records (or ARs) that you are searching for. Unlike `OR` searches that retrieve records in random order, the FTS accrue operator presents the best solutions first to your query with a "weighted" order. The **accrue operator** lets you use multiple search terms in a query, for example, `computer`, `PC`, and an error number `3794`. Records that contain the most search terms receive a higher weight and appear higher on the list (if ordered in descending order of weight) and are more likely to contain the information you are looking for. In contrast, if an `OR` search yielded 20 records, you would have to look through all 20 records because you would have no way of knowing which records contain what information. For more information, "Accruing and Weighting Results in an FTS" on page 383.

FTS solves many problems that users confront when searching their databases, including the following:

- Searching long text fields. The FTS option lets you index character and diary fields for searching and matches entries from FTS-indexed fields against the search criteria you specify. Like database indexes, an FTS index can greatly decrease the time required for a database search.
- Searching for key words regardless of the underlying database, whether flat-file or relational.

Note – If you have questions about searching against text fields or the search capabilities in particular database products, refer to your database reference documentation.

- Improving search performance by searching large volumes of data. FTS organizes long text in a way that is typically quicker to access than when in relational databases.
- Defining how the server interprets wildcards used in queries on FTS-indexed fields in order to tailor search performance to your specific needs. For more information, “Configuring FTS Search Options” on page 397.
- Performing case-insensitive searches. Administrators can enable or disable case sensitivity. For more information, “Case” on page 396.
- Using the [ ] wildcards in an FTS field even if the underlying database does not support them. For example, you could enter `do[a-z]` to find ARs that include `doe`, `don`, and `dot`.

Accruing and Weighting Results in an FTS

As mentioned earlier, weighing results of an accrue search is a powerful FTS feature. FTS does not limit you to searches for key words in FTS-indexed fields. You also can use a special **accrue operator** (the `LIKE` operator with comma separated words) to cause the AR System to “accrue” and retrieve from the database all the ARs that contain any or all of the comma separated words. For more information, “Using the Accrue Operator” on page 386.

Records that are retrieved in an accrue operation are assigned a “weight” by the FTS engine. `WEIGHT` is a number that varies from 0 to 100. With `WEIGHT`, the AR System can sort the ARs in a query list using a “the more, the better” approach: if you set the Field Sort Order in the User Tool to include `WEIGHT` in descending order, the more search terms found in an AR, the earlier in the list it appears in the set of retrieved ARs. The closer the weight number is to 100, the better it matches the search criteria.

For more information about modifying Query List attributes to include FTS weights, “Placing FTS Weight in a Query List” on page 407.

Sorting Records by Weight

In the User Tool, users can sort records retrieved in an FTS by weight in descending or ascending order, by selecting `WEIGHT` and the sort order in the Field Sort Order window. For more information on setting the sort order, see *Sorting Query Operation Results* in the *Action Request System User's Guide.*

Using the Ignore Words List

You can tell the FTS engine to ignore frequently-used words (such as `and`, `the`, `because`, and so on) or words that you do not want indexed. Adding entries to the Ignore Words List saves space in the FTS index and speeds up text searches. The FTS option comes with a default set of ignore words that you can modify as needed. For more information, "Modifying the Ignore Words List" on page 401.

Be aware that accrue searches that contain words from the Ignore Words List will not find any matching ARs for those words. However, the accrue search will retrieve ARs with the other search terms of the query. For restrictions on FTS, "Limitations of FTS" on page 389.

Who Can Perform A Full Text Search?

Users must have a fixed or floating FTS license to use the FTS capability. Full text licenses are separate from AR System read / write licenses.

- If users are assigned a fixed FTS license, they can always perform a search in an FTS-indexed field.
- If users are assigned a floating FTS license but one is not currently available, they will get a warning the first time they perform a database operation in the User Tool. The system will use the search capabilities of the underlying database (to the degree available). When a floating license becomes available, each affected user will be alerted with a note and will then be able to perform a search using the FTS capability.

Note – Users can tell if a field is indexed for FTS by looking at the context-sensitive help for that field.

For more information, "Licensing Users for FTS" on page 393.

How Do I Use FTS?

FTS is transparent to end-users in queries:

- If an FTS license is available and the field is indexed for FTS, then FTS is used. If users are getting unexpected results in their searches, make sure that they have either a fixed or floating FTS license.
- If an FTS license is unavailable or the field is not indexed for FTS, the AR System uses the search capability of the underlying database.

To use FTS to retrieve ARs, you can either enter a query-by-example (QBE) value in any field indexed for FTS or you can enter a value into the query bar, just like an ordinary database query.

Performing a Query in an Field Indexed for FTS

Entering a string into a field indexed for FTS returns results consistent with the ordinary database searches most users expect. Users can still use the query strings and search patterns they are already familiar with. But FTS offers additional benefits. Unlike some databases, the FTS engine lets you index and search long-text fields for any text string in the entire field. Users might also notice enhanced performance in retrieving ARs.

Depending on factors like wildcards entered in the query or the QBE match settings of the field, the FTS engine uses that query to search the entire contents of all ARs indexed for that field. (This is also known as a "document search" or a "pattern search.")

For example, in a field indexed for FTS (with a QBE match setting of Anywhere and an FTS query option of Query Unchanged), searching for `turn` retrieves all ARs with these variations of `turn`:

turn
return
upturn
turns
turned
turnoff
turnabout

For more information on how QBE settings affect FTS, "How QBE Settings Affect FTS" on page 389.

Using the Accrue Operator

You can use a special accrue operator (the `LIKE` operator with comma separators) to search for ARs with multiple terms, as in the following entry in a field indexed for FTS:

```
ntclientd, notifier, turn
```

This search would retrieve *all* ARs with *any* of the search terms and their stems. (This is also known as a "word search.")

You also can perform an accrue search for a single word, as in the following:

```
turn,
```

When the FTS engine encounters a comma in the search string, it then begins using the accrue operator, even if there is only one search term. This search retrieves ARs with `turn` and its stems. For information on stemming, "Searching for Word Stems" on page 387.

Note – You can use the accrue operator only with fields indexed for FTS. Using the same operator for a field which is not FTS indexed will cause the AR server to search for the literal string.

Using the QBE Method

- If the QBE match property for the field is not set to Equal, you do not need to add any wildcards to the search string, as in the following:
  `ntclientd, notifier, turn`
- If the QBE match property for the field is set to Equal, you *must* add a leading wildcard to the string to use the accrue operator, as in the following QBE example that you would enter into the field on the schema:
  `%ntclientd, notifier, ntserverd`

For more information on how QBE settings affect FTS, "How QBE Settings Affect FTS" on page 389.

Using the Query Bar Method

Use the accrue operator in the Query bar, according to the following syntax:

```
<field> LIKE "ntclientd, notifier, ntserverd"
```

The accrue operator causes the AR System to retrieve ARs that contain one or more of the search terms, ntclientd or notifier or ntserverd. Remember that an FTS also returns weight information that is a function of the number of occurrences found.

Searching for Word Stems

For case-insensitive searches with no wildcards added, you can use the accrue operator to search for common variations of word stems. For example, the query `ntclientd, notifier, turn` in an field indexed for FTS would also retrieve ARs with the following variations of turn:

turns
turning
turned

However, the capability of searching for words stems will not return ARs with `turnabout`, `return`, or `upturn` in them.

Using Wildcards

You can also use the `%` wildcard for a search with the accrue operator, according to the following syntax:

<*field*> `LIKE "nt%, notifier"`

This query would retrieve all ARs that contain the search term `notifier` and words that start with `nt`, including `ntclientd`, `ntserverd`, and so on.

Combining FTS and Non-FTS Fields

You can include FTS and non-FTS fields in a query, as in the following:

<*field*> `LIKE "ntclientd, notifier, ntserverd" AND 'Create-date' > "01/01/95"`

This query bar search using the FTS accrue operator would retrieve all ARs that contained any of the search terms ntclientd or notifier or ntserverd and that were created after January 1, 1995.

Search Strategies and Issues

When querying fields within the AR System for which FTS indexing has been enabled, be aware of the following tips and strategies:

- Make your queries as specific as possible. As a rule of thumb, remember that the more defined and qualified that your queries are, the fewer hits to the database. In addition, it is more likely you will actually find the information that you really want (as opposed to having to search through hundreds of ARs). A more efficient query will also yield a quicker response time.
- Remove common words in FTS searches. Try using more specific, more particular search terms. For example, if you use the accrue operator against 5 words and the search yields hundreds of hits to the database, you may want to consider dropping more generic terms from the list to focus your query on a smaller set.

In conclusion, remember that some queries work better than others. If you receive unexpected results or a time-out, try reformulating your query.

FTS Issues When Performing Queries

Be aware of these issues when performing FTS queries:

- FTS queries that involve a field and an arithmetic operation result in the underlying database executing the query. For example, a search like '`Short Description`' `LIKE` '`Assigned To`' + "`ing`" will defer the query to the underlying database.
- FTS does not treat the following as literal characters in a search string, unless they are preceded by a backwards slash in the query. Instead, the special characters listed in Table 17-1 have unique functions in an FTS search.

Table 17-1 Special Punctuation in FTS Searches

,	comma	!	exclamation mark
{ }	curly brackets	?	question mark
[ ]	straight brackets	_	underscore
*	asterisk	\	backslash
%	percent sign		

For example, a search for "`Hello, world`" will be translated by the FTS engine into an accrue search for the terms `Hello` and `world`. To perform a literal search for the string, "`Hello, world`", enter a backwards slash before the comma, as in the following: "`Hello\, world`".

How QBE Settings Affect FTS

Enter a query-by-example (QBE) in any field indexed for FTS, according to the following syntax:

```
ntclientd, notifier, ntserverd
```

However, be aware the QBE property settings influence how an accrue works, as shown in Table 17-2:

Table 17-2 How QBE Property Settings Affect FTS

If the QBE Match property setting is...	**The server receives the following query:**
Anywhere	%ntclientd, notifier, ntserverd% The User Tool adds wild cards to the start and end of the query.
Leading	ntclientd, notifier, ntserverd% The User Tool adds a wild card to the end of the query.
Equal	ntclientd, notifier, ntserverd The User Tool does not add any wildcards to the search string, but it will use the Equal operator instead of the LIKE operator if the first character in the search string is not a %. Therefore, to use the accrue operator with a QBE property setting of Equal, users must either: Add a leading wild card to the string, as in the following: `%ntclientd, notifier, ntserverd` Use the Query bar to enter the accrue operator.

Note – When you index a field for FTS, we advise that *do not* set the QBE match property to Equal. For more information on QBE, see “QBE Match” on page 154.

Limitations of FTS

There are certain limits in doing an FTS, including the following:

- In accrue searches, you cannot search for most punctuation because they are treated as word separators. For more detail, see Table 17-1 on page 388. If you are searching for special punctuation like commas or dashes, use the backwards slash to include them in the search string. For example, if you are searching for the phrase `database, remedy` from the Short-Description field, you would enter the following in the Query bar:

  ```
  'Short-Description' LIKE "%database\, remedy%"
  ```

  Using QBE, you would enter the following:

  ```
  database\, remedy
  ```

- In accrue searches, do not use words from the Ignore Words List. For example, if the word `the` is in the Ignore Words List, searching on the phrase `the, database, remedy` in the Short-Description field may return records with the word in them but it was *not* used in the search itself. For additional information, “Modifying the Ignore Words List” on page 401.
- In queries that use FTS, be aware that newly submitted or modified ARs might not appear immediately in the query list, if you are searching on an FTS-enabled field. There is sometimes a short delay from the time the AR is submitted or modified in the database to the time that the AR is available for searching in the FTS index.

Administering FTS

This section describes how to administer FTS in the AR System.

Selecting Fields for FTS Indexing

You can only index character or diary fields for FTS. You should only index fields that are frequently searched. Work diaries and descriptions of problems are good candidates for FTS, especially if the underlying database does not support searches of these fields.

For example, you could search for one or more key words in a diary field that would retrieve and weight all the ARs that describe how to solve a problem suggested by those keywords. Here you would perform a search on key words or phrases, like the following:

- Schemas, tools, screens, hardware and software products, and so on.

- Descriptions of problems or solutions.
- Topics, subjects, or other areas of interest.

When you define a field as indexed for FTS, it may take some time before that field is available for full text searches. Indexing a field can take a long time (up to several hours), depending on the amount of data in that field, system load, and other factors. While a field is being indexed for FTS, you can still do non-FTS searches on that field if the underlying relational database permits it.

To index a field for FTS, “Defining a Field for FTS in the Field Properties Window” on page 404.

Remember that for each field that you index for FTS, the amount of disk space required for the FTS index can grow significantly. To estimate approximately how much space you will need for your FTS index, see “Estimating the Size of the FTS Index” on page 405.

Note – Do not define fields for FTS during normal production hours, especially if you have a lot of ARs in your database. The indexer accesses the database at the same time as the AR servers, which can significantly impact the performance of your system.

Re-Indexing

Most of the time, you should not have to rebuild your FTS index because the `arservftd` process automatically optimizes space after ARs are added or deleted. However, you might need to rebuild the FTS index (re-indexing) in the following circumstances:

- If you make changes to your Ignore Words List.
- If you delete ARs to reclaim disk space (normally they are simply marked as deleted in the FTS index, not removed). So if disk space is getting low on the partition that the FTS index resides on and a lot of ARs have been deleted, then administrators should schedule some time to do a full reindex.

For additional information, “Rebuilding the Full Text Search Index” on page 403.

Time Required to Rebuild an Index

Because re-indexing rebuilds your entire FTS index from scratch, it can take a long time, depending on the following factors:

- Amount of data in each FTS-indexed field in each AR.
- System load.
- Whether your indexes are on NFS-mounted or local directories. For more information on where to locate your FTS indexes, especially for performance reasons, “Estimating the Size of the FTS Index” on page 405.

Note – Do not rebuild an index during normal production hours.

After Modifying the Ignore Words List

When you modify the Ignore Words List and do not re-index, your changes affect only tickets that are inserted, deleted, or modified after that point in time. For example, if you added `network` to the Ignore Words List, the FTS would ignore the word `network` only for ARs added or modified from this time on. However, the FTS index with the word `network` would still exist for all ARs created before the Ignore Words List was modified, if there were ARs with the word `network` in them.

When you re-index all the fields in all your schemas that are currently flagged as indexed for FTS, you create a new FTS index that then ignores the word `network` in all ARs. To change the Ignore Words List, “Modifying the Ignore Words List” on page 401.

The FTS Server (arservftd) Process

The AR System uses the `arservftd` process to insert or delete all data in the FTS index. All changes to the FTS index are made through the `arservftd` process. In addition, the `arservftd` process optimizes the FTS index every 2000 index field commands (from the time that `arservftd` is started).

The AR System runs only one `arservftd` process at a time.

The arservftd process is started or stopped by the arservtcd process that administers all the other types of AR servers, if you have valid FTS user licenses.

When you are performing an FTS, it is the arserverd process that searches the FTS index for ARs. If the server's FTS operations are disabled when an AR is submitted, modified, or deleted, changes are still made to the FTS index. But if FTS operations are disabled when a query is made, the underlying database executes the query instead of the FTS engine.

Moving the FTS Index

The installation script for the AR System places the FTS index into the <ar_install_dir>/ftindex directory by default. If you have a large amount of data in a lot of ARs that are indexed for FTS, you may find that you need more disk space in which to locate the FTS index. Use the Administrator Tool first to disable FTS operations, then move the index as needed. For more information, "FTS Index Directory" on page 396.

If you decide to move the FTS indexes, first make sure that you relocate them in a directory with enough space. To estimate the size of FTS indexes, "Estimating the Size of the FTS Index" on page 405.

Licensing Users for FTS

To be able to perform an FTS, users must be assigned a fixed or floating FTS license. You specify the type of license that users have through their entry in the User schema (Figure 17-1), just like you would with their AR System write licenses.

To license a user for FTS:

1. **Open the User schema in the User Tool.**

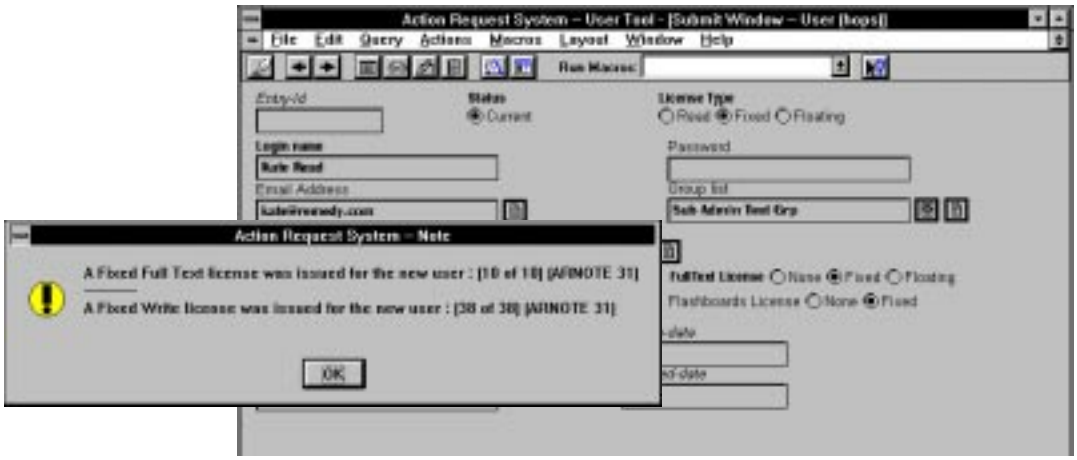

Figure 17-1 User Schema (with Full Text License Message)

2. **Query the database for the user you want to license for FTS. Or open the Submit window if you are creating a new user, as in Figure 17-1.**
3. **Select the type of FTS license that you want the user to have, whether fixed or floating.**
4. **Click the Apply button. If you issued the user a fixed FTS license, a message appears (Figure 17-1).**
5. **Click the OK button to dismiss the message.**

Configuring FTS in the AR System

Use the Administrator Tool to configure the operation of FTS. To configure the AR System's FTS capabilities, the system must have valid fixed or floating FTS licenses from Remedy Corporation.

FTS Options in the Server Information Window

Click the Full Text Search tab (Figure 17-2) to set FTS options in the Server Information window. If you do not have an FTS license, the Full Text Search category on the Server Info window is disabled and you cannot access this window.

To display and update information about full text search:

1. **Choose Server Information from the File menu. The Server Information dialog box appears.**

2. **In the Server Information dialog box, click the Full Text Search tab, as shown in Figure 17-2.**

Figure 17-2 Server Information — Full Text Search

3. **Select from the following options or enter settings as required:**

Enable Full Text Search	* Selecting the Enable check box activates the FTS engine; the system alerts you with a message that FTS will be started. The default is Enable. * Clearing the check box turns off the FTS engine; the system alerts you with a message that FTS will be stopped. Note that clearing the check box will disable the Case, Reindex, and Ignore Words List options and enable the FTS Index Directory field. Selecting the Enable check box does the opposite.

FTS Index Directory	Directory where the index files for FTS are located. The installation script puts this directory in a default location with the other AR System directories (`<ar_install_dir>/ftindex`), but if needed, you can relocate the index files in a different directory. Changing the location of the index directory requires that FTS capability be temporarily disabled. This prevents the system from trying to update files while they are being transferred. This field is disabled when FTS is enabled. You must temporarily disable FTS (by clearing the Enable check box) to change the location of the index directory. When moving your index, you need to be sure that there is sufficient space in the new location. * For more information, “Moving the FTS Index” on page 406. * For information on how much disk space is needed to store the index files, see “Estimating the Size of the FTS Index” on page 405.
Case	Selecting Sensitive *includes* case as a criterion for full text search. The full text search looks for specific upper- and lower-case letters in words. If you select Sensitive, you cannot use the stemming capability in accrue searches. (For more information, “Searching for Word Stems” on page 387.) By default, case is set to Insensitive. Selecting Insensitive *excludes* case as a criterion for full text search (the search engine will ignore case completely). For example, if you search for the word `project`, the search engine looks through the FTS index for `Project`, `project`, `PROJECT`, and so on.
Search Options	Use this menu to configure how wild cards are interpreted by the server in queries on fields indexed for FTS. For information on setting the FTS match operator and the types of responses users can expect, “Configuring FTS Search Options” on page 397. By default, Search Options is set to Query Unchanged.
Reindex	Selecting this check box rebuilds the FTS index. The default is off. For information on re-indexing, “Rebuilding the Full Text Search Index” on page 403. Note that re-indexing can take a long time.
Ignore Words List	Displays the Ignore Words List used for full text searches in the database. This window lets you specify which words will not be indexed. Using the Ignore Words List, the AR System *ignores* these words in the database. To use the Ignore Words List, “Modifying the Ignore Words List” on page 401.

4. Click the OK or Apply button to save the option settings.

Configuring FTS Search Options

In both accrue and non-accrue searches, the Search Options menu in the Full Text Search window (Figure 17-3 on page 400) allows you to configure how the server interprets queries on fields indexed for FTS. Whether or not users create FTS queries using wild cards, you can define how those queries will be interpreted by the server. This is important because the presence or absence of wild cards in an FTS query can significantly impact search performance.

Note – If the FTS search option is set to add wildcards to the search string, the stemming capability on accrue searches is disabled. For additional information, “Searching for Word Stems” on page 387.

For Searches Using the Accrue Operator

Table 17-3 lists FTS search option actions in the server when users enter an accrue operator in a query.

Table 17-3 FTS Search Option Actions for Accrue Operation *(1 of 3)*

Search Option	Search Term Passed to Server	Server Interprets	ARs Retrieved	Search Performance Results
Force Leading & Trailing Wildcard	`turn,`	`%turn%,`	Any AR with `turn as part of the word, including:` `* right turn` `* turn left` `* turned` `* return` `* turned left` `* user returned` `* turnabout is`	* Slowest search performance for users. * Maximum number of ARs retrieved.
	`%turn,`	`%turn%,`		
	`turn%,`	`%turn%,`		
	`%turn%,`	`%turn%,`		

Table 17-3 FTS Search Option Actions for Accrue Operation *(2 of 3)*

Search Option	Search Term Passed to Server	Server Interprets	ARs Retrieved	Search Performance Results
Ignore Leading & Force Trailing Wildcard	`turn,`	`turn%,`	Any AR starting with turn as the starting part of the word, including: * `right turn` * `turn left` * `turned` * `turned left` * `turnabout is`	Will not retrieve ARs with `return` in them. Creates performance results that users will most likely expect in an FTS, including: * Relatively fast search. * Retrieves the number of ARs most users probably anticipate from an FTS.
	`%turn,`	`turn%,`		
	`turn%,`	`turn%,`		
	`%turn%,`	`turn%,`		
Ignore Leading Wildcard	`turn,`	`turn,`	Any AR starting with word turn and possibly its stems, including: * `right turn` * `turn left` * `turned` * `turned left`	Will not retrieve ARs with `return` in them. * Relatively fast search. * May not retrieve the ARs that users expect because query does not consistently add a trailing wild card. For example, the search terms `turn%` and `%turn%` will retrieve ARs with `turnabout is` in them, the other search terms will not.
	`%turn,`	`turn,`		
	`turn%,`	`turn%,`		
	`%turn%,`	`turn%,`		

Table 17-3 FTS Search Option Actions for Accrue Operation *(3 of 3)*

Search Option	Search Term Passed to Server	Server Interprets	ARs Retrieved	Search Performance Results
Remove Leading & Trailing Wildcards	`turn,`	`turn,`	Any AR with word turn (and its stems), including: * `right turn` * `turn left` * `turned` * `turned left`	Will not retrieve ARs with `return` or `turnaround` in them. * Fastest search performance. * Potentially fewest ARs retrieved because query never contains wild cards.
	`%turn,`	`turn,`		
	`turn%,`	`turn,`		
	`%turn%,`	`turn,`		
Query Unchanged (default)	`turn,`	`turn,`	Retrieves ARs that match the the search string.	Depends on the wild cards specified by the user.
	`%turn,`	`%turn,`		
	`turn%,`	`turn%,`		
	`%turn%,`	`%turn%,`		

Note – Be aware that the QBE Match settings defined in the Field Properties window will affect the search terms that are passed to the server. For example, a QBE Match set to Anywhere adds additional wild cards to your search term (perhaps creating unexpected results in QBE searches). We recommend that the QBE Match not be set to Equal if a field is indexed for FTS.

For Non-Accrue Searches

The information in Table 17-3 on page 397 on how the server interprets wildcards also applies to non-accrue searches, with the following qualification. In non-accrue searches, the FTS engine searches the entire contents of all ARs indexed for that field. As a result, if you enter the query string `turn` and the server does not add or remove wildcards, you find exact matches if the *only* data in the AR is `turn`.

However, if you entered `turn%`, you would retrieve ARs with the following:

turn left
turned
turned left
turning
turnabout

To configure the FTS search option:

1. **With the Full Text Search tab selected in the Server Information dialog box (Figure 17-3), select an item from the Search Options drop-down list.**

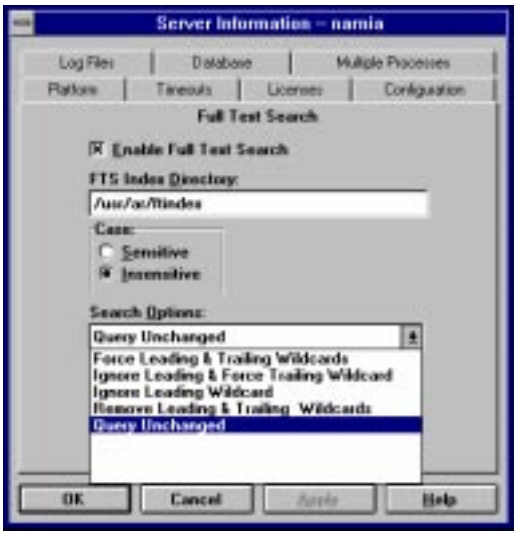

Figure 17-3 FTS Search Options Menu

2. **Click the OK or Apply button to save the search option settings.**

Modifying the Ignore Words List

The Ignore Words List (Figure 17-4) causes the full text search engine to ignore frequently-used words or words you do not want indexed (such as and, the, because, and so on).

Note – If you extensively modify the ignore words list, you should consider rebuilding the FTS index. Because the indexes are already created, the modified ignore words list affects only changes to the FTS index that are made *after* you click the OK button. To rebuild the index, "Rebuilding the Full Text Search Index" on page 403.

To modify the Ignore Words List:

1. **In the Server Information — Full Text Search dialog box, click the Ignore Words List button. The Ignore Words List dialog box appears, as shown in Figure 17-4. The Ignore Words list contains the words that are currently defined.**
   This dialog box lets you define which words will not appear in the index. You can either modify the existing list entry by entry or append a series of ignore words to the Ignore Words list by loading a file.

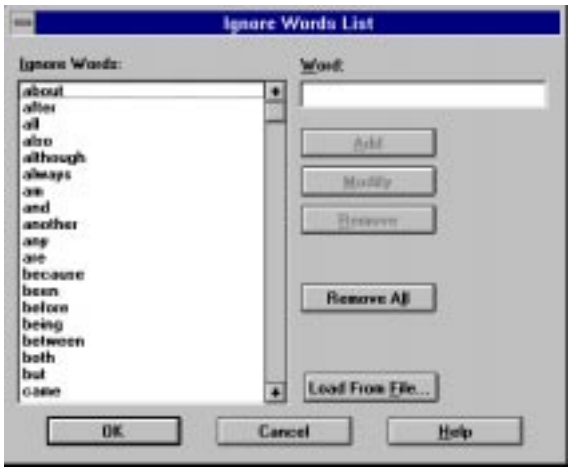

Figure 17-4 FTS Ignore Words List

2. **To modify the Ignore Words list, do one of the following:**

- To add a word to the Ignore Words list, type a word in the Word field, then click Add. Each entry in the Ignore Words list must be unique.
- To delete a word from the Ignore Words list, choose an entry, then click Remove.
- To modify an entry in the Ignore Words list, choose the entry from the list. The entry appears in the Word field. Edit the entry, then click Modify. The edited entry re-appears in the Ignore Words list.
- To delete all words from the Ignore Words list, choose Remove All.
- To append a list of words to the Ignore Words list, click Load From File, then select a file from the dialog box.

3. **Click the OK button in the Ignore Words List dialog box to save the settings.**
4. **Click the OK button in the Server Information dialog box to apply all the changes you made from the Full Text Search tab. Remember that the modified ignore words list affects only changes to the FTS index that are made *after* you click the OK or Apply buttons.**

Appending a List of Words to the Ignore Words List

You can append an entire list of words to the Ignore Words list rather than having to add words one at a time.

To append a list of words to the Ignore Words List:

1. **In the Ignore Words List dialog box, click the Load From File button. A dialog box will appear.**
2. **Specify a file name containing the list of words you want appended to the Ignore Words List. This file can contain only one word per line.**
3. **Click the OK button. The file entries appear in the Ignore Words list and the words *append* to the previous list.**
4. **Click the OK button in the Ignore Words List dialog box.**
5. **If needed, select the Reindex check box in the Server Information dialog box to rebuild the FTS index after making any changes in the Ignore Words List.**
6. **Click the OK button to save the option settings.**

Note – To *replace* the current Ignore Words List with a list from the file, first click Remove All, then load the list from the file.

Rebuilding the Full Text Search Index

If you need to rebuild the FTS index, be aware that rebuilding it can take several hours.

To re-build the FTS index:

1. **In the Server window, select the server that is licensed for FTS.**
2. **Choose Server Information from the File menu. The Server Information dialog box appears.**
3. **Click the Full Text Search tab (Figure 17-5).**

Figure 17-5 Server Information Dialog Box

4. **Select the Reindex check box.**

5. **Click the OK button to start the re-indexing process. You are prompted if you want to continue re-indexing. The Server Information dialog box closes when re-indexing is completed.**

Note – Remember that rebuilding your entire index could take several hours. Do not rebuild an index or define fields for FTS during normal production hours, especially if you have a lot of ARs in your database.

Defining a Field for FTS in the Field Properties Window

Use the Field Properties window (Figure 17-6) to create an FTS index of the text in character and diary fields.

Note – Do not define fields for FTS during normal production hours, especially if you have a lot of ARs in your database.

To define a field for FTS:

1. **Open the Field Properties window (Figure 17-6).**

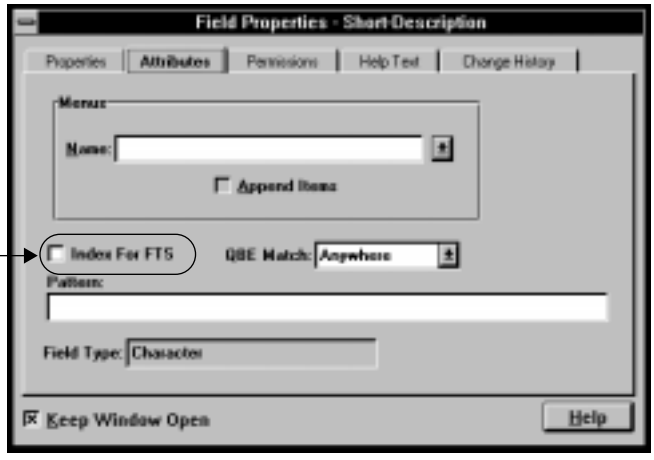

Figure 17-6 Index For FTS Setting in Field Properties Dialog Box

2. **Click the Attributes tab.**

3. **Select the Index For FTS check box.**
4. **Click the Save button on the toolbar. The AR System then begins to index the field for FTS.**

The FTS index for a field is automatically updated and does not require manual run-time administration when you create, delete, or modify entries.

Note – The Index For FTS check box does not appear for servers that do not support the FTS option.

Importing Data into Schemas with FTS Fields

Be aware that sizeable performance impacts can occur if you are importing a lot of data into a schema with FTS fields.

Note – Do not import data in schemas with FTS fields during normal production hours, especially if you have to disable Full Text Operation.

Estimating the Size of the FTS Index

Locate the FTS index in a directory that has sufficient disk space. Remedy recommends that the directory be large enough to accommodate approximately 1 to 1.5 times the amount of data that is indexed for FTS. For example, if the total amount of data in all fields you want to be indexed for FTS in all schemas is 100 MB, then you will need between 100 and 150 MB of disk space for the full text indexes.

Remember that this example of determining the size of an FTS index is an approximation only.

Note – For performance reasons, you should create indexes on local partitions in your system, *not* NFS-mounted partitions. Indexing and searching NFS-mounted directories takes significantly longer than when using local directories.

To estimate size of the FTS index:

Use the following steps to determine *approximately* how much disk space is occupied by the FTS index:

1. **Estimate the size of text in your database. For example, take a small sample of entries and calculate the average size of data in the field. Then multiply this average by the number of ARs to derive the size of text in your database.**
2. **Use a number between 1.0 and 1.5 as a percentage multiplier. The ratio of the size of the FTS index to source text can differ widely, based on, for example, the size of your Ignore Words List.**
   If the estimated size of text is 100 MB, the FTS index occupies between 100 and 150 MB of disk space: 100 MB * 1.0 = 100 MB as the lower boundary of the FTS index and 100 MB * 1.5 = 150 MB as the upper.

Moving the FTS Index

There may be situations when you need to move the FTS index, especially if it becomes quite large.

To move the FTS index:

1. **Estimate how much space you need in the new directory location to relocate the FTS index.**
2. **Before disabling FTS on the server, wait until the number of pending ARs in the** `<ar_install_dir>/db/arftp.lst` **file reaches 0 (zero).**
3. **Open the Server Information dialog box and disable FTS by clearing the Enable Full Text Search check box (Figure 17-7 on page 407).**

Figure 17-7 Server Information Dialog Box

4. **Copy the contents of the FTS index directory to its new location.**
5. **Enter the new location of the directory in the FTS Index Directory field.**
6. **Enable FTS.**
   You then can remove or delete the old FTS index, as needed. However, you do not have to copy the contents of the old directory if you re-index after changing the directory location and enabling FTS.

Placing FTS Weight in a Query List

In the Query List Fields Dialog Box (Figure 17-8 on page 408), you can display the FTS weight for all records retrieved in the query list.

To define fields returned in a query list:

1. **Create or open the schema for which you want to define the query list format.**
2. **Open the Schema Properties dialog box appears (Figure 17-8 on page 408).**

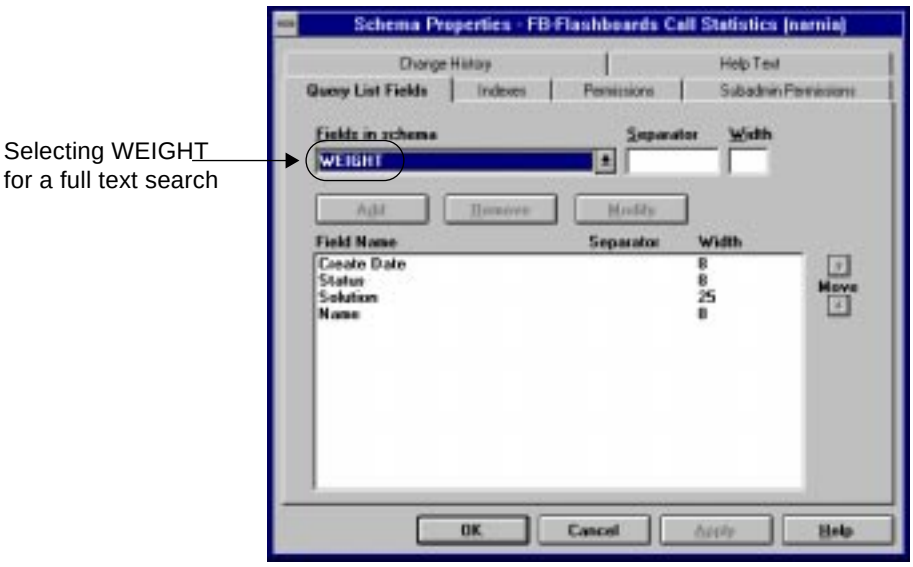

Figure 17-8 Query List Fields Dialog Box

3. **Click the Query List Fields tab in the Schema Properties dialog box.**
4. **From the Fields in schema menu, select `WEIGHT` along with any fields that you want to appear in the Field Name list.**
5. **Click the OK button, then click the Save button on the toolbar to save your query list definition.**

Including the `WEIGHT` value displays the weighted value of retrieved ARs when you do a query list in the User Tool. In the query results shown in Figure 17-9 on page 409, the FTS engine assigned different “weights” to the records retrieved and listed them in descending order, based on how many times the search terms were found.

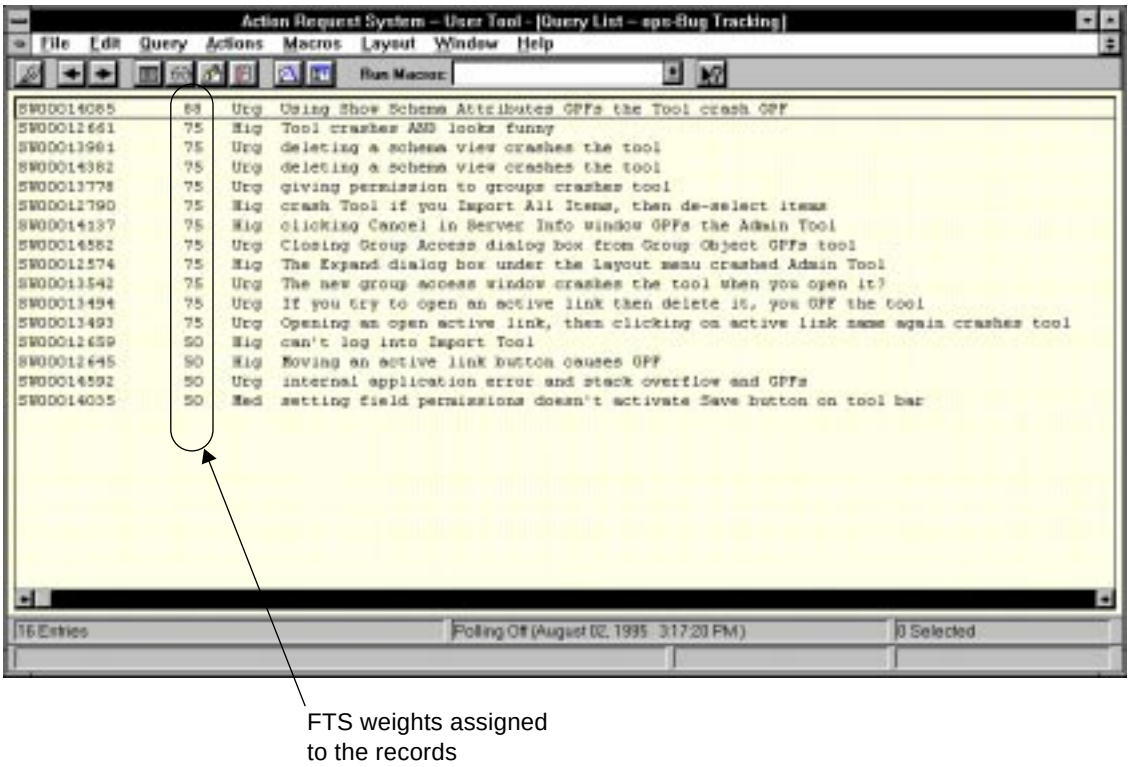

Figure 17-9 Query List Results with FTS Weighting

For further information on weights in an FTS, “Sorting Records by Weight” on page 384.

17

AR System Server Utilities 18

This chapter describes how to use the arcache and arreload utilities to administer your Windows NT server.

This chapter covers the following topics:

- Using arcache.
- Using arreload.
- Modifying the Windows NT registry to include additional servers.

Using the arcache Utility

You use arcache to update an entry in one or more user/group caches in the AR System. Use the following command and options from the command line:

```
arcache {-U | -G} {a | d} [ -d ] -e entryId [ -n name ] [ -s server ]
[ -g groupList ] [ -ld dashboardLicense ] [ -lf fulltextLicense]
[ -lw writeLicense ] [ -m mailAddress ] [ -p password ]
[ -x notifyMech ]
-i groupId ] [ -t groupType ]
```

The arcache utility allows you to update a single user/group entry in the access control cache for one or more AR System servers. You specify the operation you want to perform and the information about the item to update. The program will send that update to all the appropriate target servers to update their caches with the new information.

This program is only used in a multi-server environment where there is a desire to have a centralized access control scheme. All updates from a user/group schema to the local access control cache are performed automatically.

This program is generally run using a filter in the AR System. A set of four sample filters to add/delete from the user/group cache when deletes or submits/sets are made to the User or Group schemas are provided in the `<ar_install_dir>\arserver\samples` directory with an AR System installation. These filters allow the system to perform an appropriate update operation on all servers whenever the schemas that contain the user/group information are updated.

arcache Options

There is a set of common options that can be used with either users or groups and a set of options specific to one or the other. Each option is identified below according to which type of option it is.

The following settings and options to `arcache` may appear in any order on the command line:

Table 18-1 Settings and Options for the `arcache` utility *(1 of 3)*

Option	Action
`-d`	Set the system into debugging mode. This mode prints messages to stdout that detail the progress of the operations it is performing. Debugging mode should be used only to find problems with how the **arcache** process is running.
`-e`	Identifies the entry ID of the corresponding entry in the User or Group schema. This is the key for the entry and must be supplied for both users and groups.
`-g`	A list of groups defining the user's permissions in the system. This list consists of a set of one or more group IDs separated by semicolons. This field is used only when adding/updating users. For example, for a new user who was an administrator, the group list value would be `1;`. If the user had Customize capability and was a member of the Staff group (which had an ID of 43), the value would be `2; 43;`.

Table 18-1 Settings and Options for the `arcache` utility *(2 of 3)*

Option	Action
`-G`	Identifies this operation as an operation on the group cache. This tag must be followed by the type of operation to be performed: **a** — Add a new or update an existing group **d** — Delete an existing group This option is mutually exclusive with the **-U** option.
`-i`	The ID for the group. This field is used only when adding/updating groups.
`-ld`	The Flashboards license type (**0** — none, **1** — fixed, or **2** — floating) to be issued to this user. This field is used only when adding/updating users. If no Flashboards license type is specified, it will default to none.
`-lf`	The full text license type (0 - none, 1 - fixed, or 2 - floating) to be issued to this user. This field is used only when adding/updating users. If no full text license type is specified, it will default to none.
`-lw`	The write license type (0 - read, 1 - fixed, or 2 - floating) to be issued to this user. This field is used only when adding/updating users. If no write license type is specified, it will default to read.
`-m`	The email address for the user. The address is used by default when a message is to be sent to the user. This field is used only when adding/updating users.
`-n`	The name of the user/group. This field is required for add operations and is recommended (but not required) for delete operations. This field is used with both users and groups.
`-p`	The password for the user. This field is used only when adding/updating users.
`-s`	The name of a single server. Ordinarily, the program will update the entry in *all* servers in the system. It finds all servers by reading the `<ar_config_dir>\ar` file and contacting all AR System servers it identifies. With this option, you can identify a single specific server to be updated with the information. This field can be used with both users and groups. **Note:** If you do not specify a `-s` option, `arcache` will look for a list of servers from the Windows NT Registry. For more information, see "Creating and Modifying the Server List in the Windows NT Registry" on page 416.

Table 18-1 Settings and Options for the arcache utility *(3 of 3)*

Option	Action
-t	The type of the group (1 — view only or 2 — view/change). This field is used only when adding/updating groups.
-U	Identifies this operation as an operation on the user cache. This tag must be followed by the type of operation to be performed: a — Add a new or update an existing user d — Delete an existing user This option is mutually exclusive with the **-G** option.
-x	The default notify mechanism for the user. The notify mechanism is used when a notification is delivered to the user via the default notify method for that user. This field is used only when adding/updating users. If no notify mechanism is specified, it will default to 1 (notifier).

Using arcache from the Command Line

The following example adds a new user to all server caches. The new user is Fred Johnson with no password, an email address of fredj@remedy.com, and a default notify mechanism of 1. The entry ID of the entry in the User schema is 000000000000104. Fred will be added to the cache as a user who is a member of no access group.

```
arcache -Ua -e000000000000104 -n "Fred Johnson" -m \
"fredj@remedy.com" -x 1
```

Using the arreload Utility

You use arreload to reload all the user/group cache entries from a given schema. Use the following command and options from the command line:

```
arreload  { -u | -g } schema -a adminUser [ -d ] [ -f ]
[ -p adminPassword ]  [ -s server ]
```

The arreload utility allows you to reload the user/group caches from a given user/group schema to one or more AR System servers. The process will delete all the existing cached entries for the selected schema and load all the information from the schema into the cache. This is useful for bringing all the servers into sync.

Note – This process must be run on the same machine as the AR System server that contains the schema to be reloaded. You can only run `arreload` on a machine that is an AR server and it will only load users from that machine's schemas.

In a multi-server environment, this program is generally run as part of a periodic maintenance operation for the AR System. Setting up a job to run on a weekly or monthly basis that does a reload of the user / group caches helps insure that all the caches remain in sync with all the latest information. In a single-server environment, this program is generally unused (except to recover from disk crashes).

arreload Options

The following options to `arreload` may appear in any order on the command line:

Table 18-2 Settings and Options for the `arreload` utility *(1 of 2)*

Option	Action
`-a`	The user name of a user with Administrator access to the schema to be reloaded.
`-f`	Flush the user or group cache definition of entries from *all* servers before reloading the cache with the specified definitions. This option is especially useful when you are changing or renaming the machine that is running the AR System.
`-d`	Set the system into debugging mode. This mode prints messages to stdout that detail the progress of the operations it is performing.
`-g`	Identifies this operation as a group reload and supplies the name of the schema that is to be reloaded.

Table 18-2 Settings and Options for the `arreload` utility *(2 of 2)*

Option	Action
`-p`	The password for the Administrator user identified with the `-a` option. If there is a password for the Administrator identified (which is recommended), you must specify this option with the appropriate password.
`-s`	The name of a single server. Ordinarily, the program will update the entry in *all* servers in the system. It finds all servers by reading the `<ar_config_dir>\ar` file and contacting all AR System servers it identifies. With this option, you can identify a single specific server to be updated with the information. **Note:** If you do not specify a `-s` option, `arreload` will look for a list of servers from the Windows NT Registry. For more information, see "Creating and Modifying the Server List in the Windows NT Registry" on page 416.
`-u`	Identifies this operation as a user reload and supplies the name of the schema that is to be reloaded.

Using arreload from the Command Line

The following example reloads the user cache of all servers to remove any existing definitions from the user schema on this server and add entries for all the current users defined in the User schema. The administrator user is Admin with a password of password to allow access to the schema to get the information to be reloaded.

```
arreload -a Admin -p password -u User
```

Creating and Modifying the Server List in the Windows NT Registry

In the Windows NT environment, if you want to use `arcache` or `arreload` to update multiple servers (or to make the ARGetListServer API call), use the Registry Editor to modify the server list for your machine.

To create or modify the Windows NT Registry:

1. **Open the Register Editor by entering the following at a DOS command prompt:**

   `regedt32`

   The Registry Editor appears.

2. **Select the HKEY_LOCAL_MACHINE on Local Machine window, as shown in Figure 18-1.**

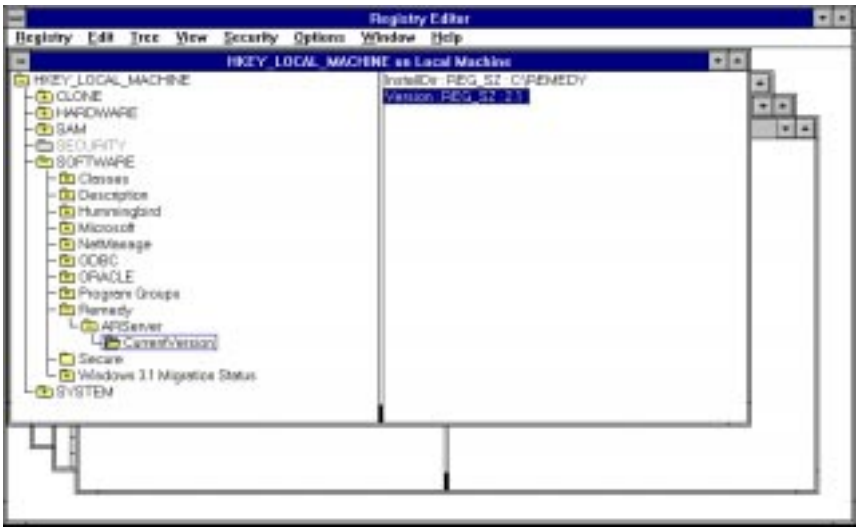

Figure 18-1 Register Editor

3. **Select the SOFTWARE\Remedy\ARServer\CurrentVersion directory.**

4. **If the ServerList entry already exists, double-click it to open the Multi-String Editor. Otherwise, perform steps a - c.**

   a. **From the Edit menu, choose Add Value. The Add Value dialog box appears (Figure 18-2).**

Figure 18-2 Add Value Dialog Box

   b. **In the Value Name field, enter the following:**

ServerList

c. From the Data Type drop-down list, choose REG_MULTI_SZ and click the OK button. The Multi-String Editor appears, as shown in Figure 18-3.

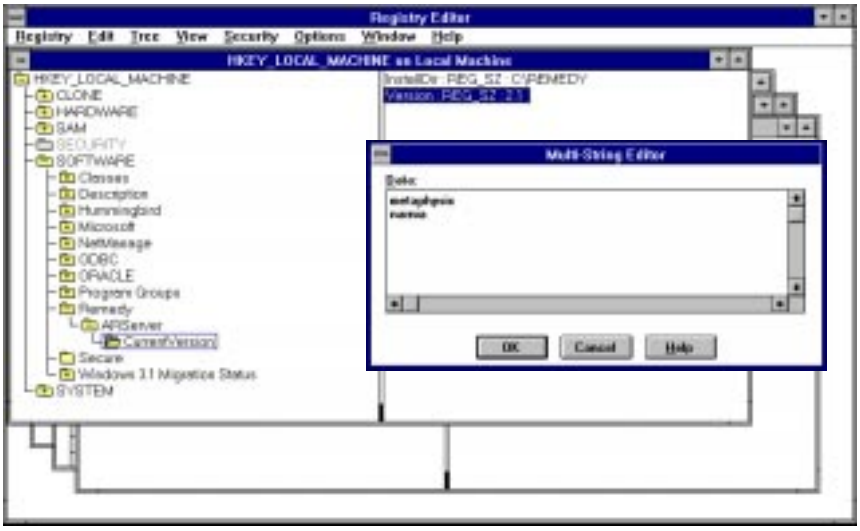

Figure 18-3 Multi-String Editor

5. Add any servers to the list that you want updated whenever you use `arcache`, `arreload`, or the ARGetListServer API call.

6. Click the OK button. The ServerList appears in the HKEY_LOCAL_MACHINE on Local Machine window, as shown in Figure 18-4 on page 419.

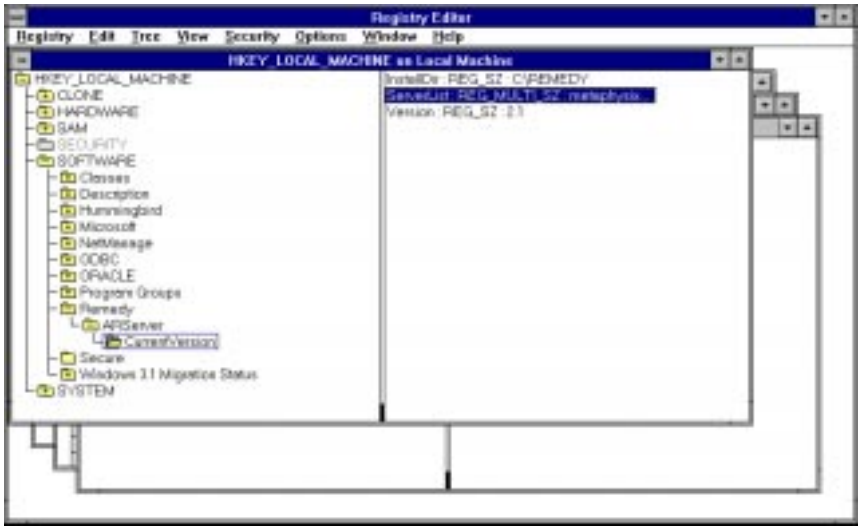

Figure 18-4 Server List Added to Registry

18

Networking Notes

A

To run the AR System Administrator Tool, you must have installed one of the following supported network stacks:

- Windows Sockets certified on one of the following:
  - Chameleon NFS by NetManage.
  - LAN WorkPlace by Novell.
  - Pathway by Wollongong.
  - PC-NFS by SunSelect.
  - PC/TCP by FTP.
  - Reflection Network Series 4.0 by Walker Richer & Quinn
  - Super TCP/NFS by Frontier.
  - TCP/IP by Microsoft.
  - TCP/IP for OS/2 by IBM.

Requirements for Supported Stacks

Chameleon by NetManage

Supported Versions

4.0 (with patch 4) or later

Additional Considerations

You need to acquire and install the latest winsock.dll. This patch may be obtained through the following:

- Call NetManage support at (408) 973-7171.

LAN WorkPlace by Novell

Supported Versions

4.12 or later

Additional Considerations

Purchase LAN WorkPlace or LAN WorkGroup from Novell.

Pathway by Wollongong

Supported Versions

3.2 or later

Additional Considerations

You need to acquire and install the latest winsock.dll. This patch may be obtained through the following:

- Call Wollongong support at (415) 962-7140.

PC-NFS by SunSelect

Supported Versions

5.1 or later

Additional Considerations

You need to have 500K of conventional memory free before and after you start Windows.

PC/TCP by FTP

Supported Versions

3.0 (VxD) or later

Additional Considerations

You need to acquire and install the latest winsock.dll. This patch may be obtained through the following sources:

- Anonymous ftp from vax.ftp.com.
- BBS dial-in to (508) 659-6240.
- Call FTP support at (800) 382-4FTP.

Reflection Network Series by Walker Richer & Quinn

Supported Versions

4.0 or later

Super TCP by Frontier

Supported Versions

4.0 (with patch) or later

A

TCP/IP by Microsoft

Supported Versions

TCP/IP-32 version 3.11a or later

Additional Considerations

You need to acquire and install the latest winsock.dll. This patch may be obtained through the following:

- Anonymous ftp from microsoft.com.
- BBS dial-in to (503) 531-8100
- Call Microsoft at (206) 882-8080.

TCP/IP for OS/2 by IBM

Supported Versions

IBM OS/2 Warp

TCP/IP Version 2.0 for OS/2: Base Kit
TCP/IP Version 2.0 for OS/2: DOS/Windows Access Kit

AR System File Locations

B

This Appendix describes the various files needed by and created by the AR System. The directory where the AR System executables are installed is referred to here as <*ar_install_dir*> (by default, this directory is `\remedy`). The directory specified to hold the user's configuration information is referred to here as <*ar_config_dir*> (by default, this directory is `\Home`).

AR System Administrator Tool Files

Admin Tool Executable	<*ar_install_dir*>\aradmin.exe
Admin Tool Control DLLs	<*ar_install_dir*>\miscdll.dll <*ar_install_dir*>\sh20w16.dll <*ar_install_dir*>\sh21w16.dll
RPC DLL	<*ar_install_dir*>\tirpc.dll
Macros	<*ar_config_dir*>\arcmds\<*macro_name*>.arq
Configuration File	<*ar_config_dir*>\ar.ini
AR Servers	<*ar_config_dir*>\ar
Help Information	<*ar_install_dir*>\arardmin.hlp

B

AR System Import Tool Files

Import Tool Executable	<*ar_install_dir*>\arimport.exe
Configuration File	<*ar_config_dir*>\ar.ini
AR Servers	<*ar_config_dir*>\ar
Import Tool Message Log	<*ar_config_dir*>\config.lst
Help Information	<*ar_install_dir*>\arimport.hlp

File Locations on the UNIX System Server

Note – Terminology Be aware in this appendix that, for some of the files listed, "NT" refers to the AR System Notification Tool, for example, `NTSystem`. When this appendix refers to the Windows NT operating system, it is described either as "the Windows NT operating system" or simply as "Windows NT."

AR System	**Executables**	*<ar_install_dir>*/bin
	Catalog	/usr/lib/locale/C/LC_MESSAGES **(for Sun workstations)**
		/usr/lib/nls/C **(for HP 9000 workstations)**
	X Application Default	/usr/lib/X11/app-defaults/ARSystem /usr/lib/X11/app-defaults/HyperHelp /usr/lib/X11/app-defaults/License
		/usr/openwin/lib/app-defaults/ARSystem /usr/openwin/lib/app-defaults/HyperHelp /usr/openwin/lib/app-defaults/License **(for Sun workstations running OpenWindows)**
	Man Pages	*<ar_install_dir>*/man/man1/*.1 *<ar_install_dir>*/man/man5/*.5
	Sample Databases	*<ar_install_dir>*/sample_db
	API	
	Libraries	*<ar_install_dir>*/api/lib/lib*.a
	Include files	*<ar_install_dir>*/api/include/*.h
	Man pages	*<ar_install_dir>*/api/man/man3/*.3
	Sample source	*<ar_install_dir>*/api/src

AR System (Cont.)	**AR Server Directory**	/etc/ar
	Full Text Search Index	*<ar_install_dir>*/ftindex
	Server Configuration	/etc/ar.conf
	User Configuration	*<ar_config_dir>*/config
	Macros	*<ar_config_dir>*/arcmds/*<macro_name>*.arq
	User Defaults	*<ar_config_dir>*/*<schema_name>*.ard
	User Views	*<ar_config_dir>*/*<schema_name>*.arv
	Custom Report Design	*<ar_config_dir>*/arcmds/*<report_name>*.arr
	Import Mappings	*<ar_config_dir>*/arcmds/*<mapping_name>*.arm
	Schema Definition Cache	*<ar_config_dir>*/*<schema_name>*.arf
	Server Error File	*<ar_install_dir>*/db/arerror.log
	HyperHelp	*<ar_install_dir>*/help
	License	/etc/remedy.lic
	AR Server Lock	*<ar_install_dir>*/db/ar.lck
	SNM Trap Mapping	*<ar_install_dir>*/db/snm.ar
	OV Trap Mapping	*<ar_install_dir>*/db/ov.ar
	NV Trap Mapping	*<ar_install_dir>*/db/nv.ar

Notification System	**Executables**	*<ar_install_dir>*/bin
	Catalog	/usr/lib/locale/C/LC_MESSAGES **(for Sun workstations)**
		/usr/lib/nls/C **(for HP 9000 workstations)**
	X Application Default	/usr/lib/X11/app-defaults/NTSystem
		/usr/openwin/lib/app_defaults/NTSystem **(for Sun workstations running OpenWindows)**
	Man Pages	*<ar_install_dir>*/man/man1/*.1
	API	
	Libraries	*<ar_install_dir>*/api/lib/lib*.a
	Include files	*<ar_install_dir>*/api/include/*.h
	Man pages	*<ar_install_dir>*/api/man/man3/*.3
	Notification Server Directory	/etc/ar

Flat-File Database	**Schema Definition**	*<ar_install_dir>*/db/*.def
	Schema Data	*<ar_install_dir>*/db/*.db
	Structure Definition	*<ar_install_dir>*/db/*.ar

File Locations on the Windows NT System Server

Note – Terminology Be aware in this appendix that, for some of the files listed, “NT” refers to the AR System Notification Tool, for example, `NTSystem`. When this appendix refers to the Windows NT operating system, it is described either as the Windows NT operating system” or simply as “Windows NT.”

AR System	**API**	
	Sample source	*<ar_install_dir>*\arserver\api\driver\
	Include files	*<ar_install_dir>*\arserver\api\include*.h
	Libraries	*<ar_install_dir>*\arserver\api\lib*.lib
	AR Server Lock	*<ar_install_dir>*\arserver\db\ar.lck
	Server Error File	*<ar_install_dir>*\arserver\db\arerror.log
	Default Log Files	*<ar_install_dir>*\arserver\db*.log
	Outgoing Mail Notifications	*<ar_install_dir>*\arserver\mailntfy
	Sample Schemas & Applications	*<ar_install_dir>*\arserver\samples
	Executables & DLLs	*<ar_install_dir>*\bin
	Server Configuration	*<ar_install_dir>*\conf\ar.cfg
	Mail Notification & Submission Configuration	*<ar_install_dir>*\conf\armaild.cfg
	License	*<ar_install_dir>*\conf\remedy.lic

Notification System	**Executables**	*<ar_install_dir>*/bin
	Catalog	/usr/lib/locale/C/LC_MESSAGES **(for Sun workstations)**
		/usr/lib/nls/C **(for HP 9000 workstations)**
	X Application Default	/usr/lib/X11/app-defaults/NTSystem
		/usr/openwin/lib/app_defaults/NTSystem **(for Sun workstations running OpenWindows)**
	Man Pages	*<ar_install_dir>*/man/man1/*.1
	API	
	Libraries	*<ar_install_dir>*/api/lib/lib*.a
	Include files	*<ar_install_dir>*/api/include/*.h
	Man pages	*<ar_install_dir>*/api/man/man3/*.3
	Notification Server Directory	/etc/ar

Flat-File Database	**Schema Definition**	*<ar_install_dir>*\db*.def
	Schema Data	*<ar_install_dir>*\db*.db
	Structure Definition	*<ar_install_dir>*\db*.ar

B

Core and Reserved Schema Fields

C

The AR System allows flexibility in creating schemas to address the varied needs of its users. While it is recognized that customization is vital, it is also recognized that the schemas created for resolving action requests have a set of concepts and information needs in common.

The AR System **core schema fields** are a set of fields that every schema must have. The commonality gained by such a convention is useful for conceptual consistency, sharing macros, sharing filters, and exchanging and merging databases.

The AR System **reserved fields** are special purpose data fields that exist on either the User schema or the Group schema, for row level access control, or that you can add to schemas if you are licensed with the Distributed Server Option. You can use the reserved fields in any schema, if desired. See Chapter 5, for more information on access control.

There are additional limits placed on the core fields, including the fact that some fields are required, others are maintained by the system, and others have fixed or maximum sizes. Core field limits cannot be changed. All the extra core field limits are noted in this appendix.

In addition to the core and reserved fields, a number of other fields are defined within the AR System. These are fields that were core fields in prior releases of the AR System. You can still use these fields on the schemas you design, as long as you follow the rules that pertain to them. These fields and their rules are also noted in this appendix.

C

Core Schema Fields

Note – Users can change these field labels.

The following list of fields are common to all schemas:

Table C-1 Core Schema Fields *(1 of 2)*

Field	Description
Entry-Id	A unique identification value for each request entering the system. It is created and maintained by the system; however it is possible to prepend a string to the value for descriptive purposes. Groups that have neither Change nor View access to a schema's Entry ID field will not be able to access information from any of the schema's fields, regardless of the permissions settings of the other fields. Data Type Character Max Length 15 Min Length 5 Field ID 1
Submitter	The name of the user who submitted the entry. It is usually the name of the AR System user who performed the submit operation, though it may not be (as in the case of someone submitting for someone else). Data Type Character Length 30 Field ID 2
Create-date	The time at which the entry was created in the system. This field is set by the AR System and cannot be modified. It serves as a reliable time-stamp for database entries. Data Type DateTime Field ID 3
Assigned-to	The name of the user who has been assigned responsibility for the AR. Data Type Character Length 30 Field ID 4

Table C-1 Core Schema Fields *(2 of 2)*

Field	Description
Last-modified-by	The name of the user who last altered the AR. This field is set by the AR System to the login name of the user who last changed the entry. It cannot be modified. Data Type Character Length 30 Field ID 5
Modified-date	The date the field was last modified. This field is set by the AR System to the time the last change to this entry was made. It cannot be modified. Data Type DateTime Field ID 6
Status	Indicates the current state of the entry. Users have control over this field. It must have a value at all times; there must be a default value in case there is no value specified by the user at create time. The actual names and values of the status field can be customized. Data Type Selection Field ID 7
Short-Description	A brief description of the reason for the request. A size limit forces the submitter to be concise, including only the key problem. This allows for quick delegation to appropriate support staff who can then investigate more descriptive fields. Data Type Character Max Length 128 Field ID 8
Status-History	The user who last changed and the time the change was made to each of the states identified by the Status field. This field is set and maintained by the AR System and cannot be modified. Data Type Character Field ID 15

C

Reserved Schema Fields

The AR System User schema contains eight reserved fields, as listed below.

Table C-2 Reserved Schema Fields *(1 of 2)*

Field	Description
Login name	The name of a user who is allowed to access the AR System. This is the name the user will enter in the User Name field on the Login dialog box when logging into the system. Data Type Character Length 30 Field ID 101
Password	The password of the user whose login name is in the Login name field. This is the password the user will enter when logging into the system. Data Type Character Length 30 Field ID 102
Email Address	The email address of the user whose login name is in the Login name field. Data Type Character Max Length 255 Field ID 103
Group list	The list of access control groups to which the user whose name is in the Login name field belongs. Group names are separated by spaces. Note that though you make entries to the Group list using the alias name (Group name for a group), the Group ID is actually stored as an integer value. Data Type Character Max Length 255 Field ID 104
License Type	The type of write license the user has. The choices are Read (includes Submit permission), Fixed, and Floating. Data Type Selection Selection Read/Fixed/Floating Field ID 108

Table C-2 Reserved Schema Fields *(2 of 2)*

Field	Description
Default Notify Mechanism	The notification method that is used if the user specifies that the default mechanism should be used. There are as many choices as there are notify mechanisms. Data Type Selection Field ID 109
Full Text License Type	The type of full text license the user has. The choices are None, Fixed, and Floating. Data Type Selection Selection None / Fixed / Floating Field ID 110
Flashboards License	The type of Flashboards license the user has. The choices are None and Fixed. Data Type Selection Selection None / Fixed Field ID 111

The AR System Group schema contains three reserved fields, as listed below:

Table C-3 Reserved Fields in Group Schema

Field	Description
Group name	The alias by which the access control group is known. This is the name used in the Group list field of the User schema and in the Group Permissions list of each schema field. Data Type Character Length 30 Field ID 105
Group id	The integer ID that is the identifier by which the AR System recognizes the group named in the Group name field. (For groups that you create, the ID should be greater than 10.) Data Type Integer Range 0-100 (can be expanded if desired) Field ID 106
Group type	The maximum permission type intended for the group named in the Group Name field. The choices are None, View, and Change. Data Type Selection Selection None / View / Change Field ID 107

You also can add a field to support row level access, as listed below:

Table C-4 Row Level Access Control Reserved Field

Field	Description
Assignee	The group assigned ownership of the entry. Data Type Character Field ID 112

The AR System Distributed Server Option contains the following reserved fields that you can add to schemas, as listed below:

Table C-5 Distributed Mapping Reserved Fields

Field	Description
Transfer Status	The status of a distributed server transfer operation. The choices are Success, Retry, Failure, Timeout, and Cancelled. Data Type Selection Selection Success / Retry / Failure / Timeout / Cancelled Field ID 301
Update Status	The status of a distributed server update operation. The choices are Success, Waiting, Retry, Failure, Timeout, and Cancelled. Data Type Selection Selection Success / Waiting / Retry / Failure / Timeout / Cancelled Field ID 302
Master Flag	Flag indicating whether or not the entry is the master. The choices are No and Yes. Data Type Selection Selection No / Yes Field ID 303
From Entry ID	The ID of the original entry from which this copy was transferred. Data Type Character Length 15 Field ID 307
From Schema	The schema from which this entry was transferred. Data Type Character Length 30 Field ID 310

Table C-5 Distributed Mapping Reserved Fields

Field	Description
From Server	The server from which this entry was transferred. Data Type Character Length 64 Field ID 311
To Mapping	The field which tells the Distributed Server Option the mapping to be used when transferring the entry. Data Type Character Length 30 Field ID 300
From Mapping	The mapping that was used during a transfer to create this entry. Data Type Character Length 30 Field ID 306
To Entry ID	The ID of the entry that the data was transferred to. Data Type Character Length 15 Field ID 308
To Schema	The schema to which to transfer the entry. Data Type Character Length 30 Field ID 312
To Server	The server to which to transfer the entry. Data Type Character Length 64 Field ID 313
Mapping History	A history tracking record created at transfer time, which includes the date/time of transfer, source entry ID, source schema, source server and the name of the specific mapping used. Data Type Character Field ID 309
Current Schema	The schema in which the master copy of the entry resides. Data Type Character Length 30 Field ID 304

Table C-5 Distributed Mapping Reserved Fields

Field	Description
Current Server	The server on which the schema with the master copy of the entry resides. Data Type Character Length 30 Field ID 305
When to Update	The frequency with which to update the original entry if a transferred copy is updated. The choices are Immediately, Hourly, Daily, On Return, and No Update. Data Type Selection Selection Immediately / Hourly / Daily / On Return / No Update Field ID 314
Transfer Mode	The type of transfer to perform. The choices are Data Only, Data + Ownership, Independent Copy, and Copy + Delete. Data Type Selection Selection Data Only / Data + Ownership / Independent Copy / Copy + Delete Field ID 315
Duplicate Entry ID Action	The action that will occur if you transfer an entry and there is already an entry with the same entry ID in the To schema. The choices are Error, Overwrite, and Create New. Data Type Selection Selection Error / Overwrite / Create New Field ID 316
Max Time to Retry	The maximum time (in hours and minutes) to keep re-trying a distributed operation on an entry before the system cancels the operation. Data Type Integer Field ID 317

Additional AR System Defined Fields

The following fields were defined as core fields in AR System versions prior to the 1.2 release. You may use these fields in schemas you design; however, you

must follow the rules specified below.

Table C-6 Additional AR System Defined Field

Field	Description
Long-Description	An open-ended description of the problem. The long description is used to expand upon the short description. Date Type Character Field ID 9
Disposition	A running log of the progress on the request, time and user stamped each time it is accessed. Once information in this field has been applied, it becomes read-only. This field will always accept new information. Data Type Diary Field ID 10
Related-to	Information about items this entry is related to, such as Entry IDs of other tickets with similar problems. Data Type Character Max Length 128 Field ID 11
Notify-method	How the submitter wishes to be notified of significant progress on the request. Data Type Selection Field ID 12
Submitter-severity	How critical the AR is to the submitter. It is a subjective assessment of the severity of the problem. Data Type Selection Field ID 13
Assigned-priority	The priority assigned to the request by the delegator or support staff. The value in this field can be used for generating statistics and reports, as well as setting priorities for support staff. Data Type Selection Field ID 14

C

Operators, Wildcards, and Keywords

D

The following information is provided in this appendix:

- Operators used in defining qualifications.
- Operator precedence.
- Wildcards.
- Keywords.

D

Table of Operators

Table D-1 Operators Used in Qualifications *(1 of 2)*

Operator	Action
AND &&	Logical AND of the result of two conditions (the result is true only if *both* conditions are true). For example, 'Status'=''New'' AND 'Assigned-to'=''Andy'' would find all new ARs assigned to Andy. You can use the symbol && instead of the word AND.
OR ||	Logical OR of the result of two conditions (the result is true if *either* condition is true). For example, 'Status'=''New'' OR 'Assigned-to'=''Andy'' would find all new ARs and all ARs assigned to Andy (no matter what their status). You can use the symbol || (two vertical lines) instead of the word OR.
NOT !	Negates the condition that follows (if the condition is false, the result is true). For example, NOT 'Status'=''New'' would find all ARs that are not new. You can use the symbol **!** instead of the word NOT.
LIKE	Performs a pattern search. For example, 'Submitter' LIKE ''Bob%ton'' would find all ARs with a submitter name that begins with the letters "Bob" and ends with the letters "ton" — such as Bob Compton and Bobby Fenton. The LIKE operator is useful only with character and diary type fields. For more information on wildcards, see Table D-2 on page 446. You also use LIKE along with comma separators as the accrue operator in full text searches. For further information, see "How Do I Use FTS?" on page 385.
+	* Adds two integer or real values. * Adds an integer or real interval to a time value. * Concatenates two character strings. For example, 'Create-date' > $DATE$ + 28800 would find all ARs that were created after 8:00 am today. (28800 is the number of seconds in 8 hours.)
-	* Subtracts two integer or real values. * Subtracts two time values (resulting in an integer). * Subtracts an integer or real interval from a time value. For example, 'Create-date' > $DATE$ - 604800 would find all ARs that were created within the past week. (604800 is the number of seconds in one week.)

Table D-1 Operators Used in Qualifications *(2 of 2)*

Operator	Action
*	Multiplies two integer or real values. For example, `'Quantity' * 'Price' > 50` finds all ARs where the contents of the Quantity field times the contents of the Price field is over 50.
/	Divides two integer or real values. For example, `'Total Expenses' / 'Total Income' = 1` would find all ARs where the total amount spent for expenses equaled the total amount brought in as income.
%	Supplies the modulo of two integer values (the remainder of a divide of the values). Since a percent sign is also a valid wild card symbol, the context when using a percent sign determines how it is interpreted. For example, `'ID' % 2 = 1` finds all ARs with an odd number in the ID field.
<	Matches contents that are *less than* the value. For example, `'Create-date' < ($DATE$ - 86400)` would find all ARs created more than 24 hours ago. (86400 is the number of seconds in 24 hours.)
>	Matches contents that are *greater than* the value. For example, `'Create-date' > "06/10/93 00:00:00"` would find all ARs with Create-dates that are more recent than June 10, 1993 at midnight.
!=	Matches contents that are *not equal to* the value. For example, `'Status' != "Closed"` finds all ARs that aren't closed.
<=	Matches contents that are *less than or equal to* the value. For example, `'Salary'<= 10000` would find all ARs where the contents of the Salary field is less than or equal to 10000.
>=	Matches contents that are *greater than or equal to* the value. For example, `'Create-date' >= "10/31/93"` would find all ARs with Create-dates equal to or more recent than October 31, 1993.
=	Matches contents that are *exactly equal to* the value. For example, `'Status' = 0` would find all ARs with a status value equal to the first selection value.

Operator Precedence

When you use multiple operators in constructing qualification criteria, they are evaluated in the following order.

1. ( )

2. **!,** `NOT`**, - (unary minus)**

3. `*, /, %`
4. `+, -`
5. `<, <=, >, >=, =, !=`
6. `&& (AND)`
7. `|| (OR)`

Operators of the same precedence are performed left to right.

Table of Wild Cards

The table below lists the wild cards that you can use with the `LIKE` operator in qualifications.

Table D-2 Wild Card Symbols

Wild Card	Action
%	Matches any string of 0 or more characters. Example: `J%son` matches Jackson, Johnson, Jason, and Json.
-	(Underbar) Matches any single character. Example: `B_b` matches Bab, Bob, and Bub.
[ ]	Matches any single character within a specified range or set. Example: `[a-f]` matches the range of characters `a` through `f`. `[abcf]` matches the set of characters `abc` and `f`.
[-]	(Hyphen) Indicates a character range. Used only within brackets ([ ]). Example: `[a-f]` matches the range of characters `a` through `f`.
[^]	Matches any single character *not* within the specified range or set. Example: `[^a-f]` matches all characters *except* the range `a` through `f`. `[^abcdf]` matches all characters *except* the set of `abcdf`.

Wild card symbols are only interpreted as wild cards when used with the `LIKE` operator; otherwise they are interpreted verbatim. To use the percent symbol (%), underbar (_), or open bracket ([ ) as an explicit text character within a `LIKE` operation, you must enclose the symbol in brackets. For example, [%] will match the `%` character — not find 0 or more characters. The close bracket ( ]) functions as a wild card only when it is accompanied by an open bracket ([ ). The hyphen functions as a wild card character only when preceded by an open bracket ([or [^).

You *must* use the % symbol when you want to include leading and trailing characters. For example, if you want to match Jill Bobbington, Bobby Fenton, and Bob Compton in the Submitter field, you could enter `'Submitter' LIKE ''%Bob%ton%''`.

Table of Keywords

You can use any of the keywords from Table D-3 in qualifications or to set a field value.

- In a qualification, the data type of the keyword value must match the field data type.
- In a set field, the system will attempt to correct the data type if it is not compatible.

Table D-3 Keywords *(1 of 2)*

Keyword	Value
$DATE$	The current date (time defaults to midnight).
$DEFAULT$	The default value for the field, if any.
$HARDWARE$	The hardware on which the process is running. This is the name that the hardware vendor has given to their hardware, as in the following: * On UNIX platforms, the name returned by the `uname -m` command (for example, `sun4c`). * On PC platforms, the processor type (for example, `PC i486`). You can use this keyword to build filters, escalations, and active links that execute only if the process is running on an appropriate platform. This is especially useful in an active link, if the action is to run a UNIX process and the current platform may be a PC.
$GROUPS$	The groups of which the current user is a member. (This keyword is an empty string for escalations.)
$NULL$	A null value (no value).

Table D-3 Keywords *(2 of 2)*

Keyword	Value

$OPERATION$	The current operation (CREATE, DELETE, GET, MERGE, SET, or QUERY). You can use this keyword in filter and active link qualifications to determine whether the current operation is one that should activate the filter or active link.
	For example, in the Modify Active Link window, you could use the $OPERATION$ keyword to set an "Audit Log" field to:
	`"Filter X executed on operation" + $OPERATION$`
	This entry would inform you if the filter fired during a submit operation (CREATE returned) or a modify operation (SET returned).
	You could also create a qualification that fires only for the Modify Individual window and not for the Display window, as in the following example:
	`$OPERATION$ = "SET"`
	Operation values indicate the following AR System actions:
	* CREATE — In active links, used on Submit window. In filters, during an operation to create a new entry.
	* DELETE — In filters, during a delete operation. (Unused in active links.)
	* GET — In filters, when an entry is retrieved. (Unused in active links.)
	* MERGE — Merge an existing entry. Used when loading an AR Export format file with the Import Tool. (Unused in active links.)
	* SET — In active links, used on Modify Individual and Modify All Selected windows. In filters, used on Modify operations.
	* QUERY — In active links, used on the Query window. (Unused in filters.)

OS	The operating system of the platform on which the process is running. You can use this keyword to build filters, escalations, and active links that execute only if the actions are supported under the operating system that is running.
$SCHEMA$	The name of the current schema.
$SERVER$	The name of the current server.
$TIME$	The current time as a character string (date defaults to current day).
$TIMESTAMP$	The current date/time as a character string.
$USER$	The current login user. (This keyword is AR_ESCALATOR for escalations.)
$WEEKDAY$	The current day of the week as a string.

D

Design Worksheets

E

For beginning AR System administrators and subadministrators, this appendix contains worksheets that you can reproduce as needed to create workflow diagrams and design the various AR System objects (for example, schemas, active links, and so on).

E

Workflow Worksheet

State Diagram

Objects You Need to Create

Schemas

Groups

Data Fields

Users

Filters

Macros

Escalation Criteria

Active Links

Schema Worksheet

Schema Name: _____

Permissions	Fields to Index	Query List Fields

E

Fields Worksheet

Schema Name: _____

Field Name (Label)	Required Field?	Create Mode	Index ?	QBE	Data Type	Length	Menu Needed ?	Access ?

Active Links Worksheet

Active Link Name					
Schema Name					
Purpose					
Execute On					
Order					
Permissions					
Qualification					
Actions & Descriptions	**Run Macros**	**Set Fields**	**Run Process**	**Message**	**Change Field**

E

Filters Worksheet

Filter Name					
Schema Name					
Purpose					
Execute On					
Order					
Qualification					
Actions & Descriptions	**Log to File**	**Message**	**Notification**	**Run Process**	**Set Fields**

Escalations Worksheet

Escalation Criteria		Escalation Responses	
State Criteria	**Time Criteria**	**Action**	**To Whom?**

New Fields Needed for Escalation?

Escalation Actions & Description

Notify
Log to File
Set Field
Run Process

E

Procedures

Here is a list of procedures and their locations.

F

F

Glossary

access control

Security feature that lets you limit the access users have to specific fields within a schema and to specific functions within the system.

See also access control group, permissions.

access control group

Facility of the Action Request System used primarily to define user access to the contents of a schema field. Each group can have its own member list defining users who belong to that group. The AR System defines a number of *special* groups: Public, Administrator, Subadministrator, Customize, Submitter, Assignee, and Flashboards Administrator. You can define additional groups through the Group schema. Once you have defined a group, you can specify the type of access that the group will have to specific fields within a schema.
See also access control, permissions.

access permissions

See permissions.

action request

AR. A collection of information that describes an event (transaction), such as a problem or a service request.

active link

A cause and effect relationship that you define on a per schema basis. Active links cause the Action Request System to perform specific operations in response to specific user actions. The AR System administrator can define active links that run macros, set fields to specified values, run independent

system processes, send an interactive message to the user, change field characteristics, or execute a DDE operation on a Windows User Tool. Active links run on the client machine.

administrator

Individual responsible for the management of the AR System, including setting up schemas, setting access rights for users, and designing the workflow process. To manage the AR System, you must be a member of the Administrator or Subadministrator group.

administrator default

Value that the administrator assigns to a field while designing the schema. When the user sets defaults, this value is used unless the user has assigned their own default. When a user submits an AR, the AR System automatically enters this value in the field unless the user has assigned their own default or has entered a different value.

Administrator group

One of several special access control groups provided by the AR System. Members of this group have full and unlimited access to the AR System, including unlimited ability to create schemas, filters, escalations, active links, menus, and administrator commands. S*ee also* Subadministrator group.

Administrator Tool

The part of the AR System used exclusively by administrators (and to a lesser extent, by subadministrators) to set up the system for use by support staff and end users. This includes setting up schemas, setting access permissions (users and groups), and creating filters, escalations, active links, menus, and administrator commands.

administrator view

The layout of a schema that was designed by the AR System administrator. This is the view that users will see unless they customize their view.

admin server

The arserverd process that can handle *any* AR System operation. The admin server performs *all* admin restructuring operations, guaranteeing the serialization and integrity of data. There can be only *one* admin server process at any time.

API

Application programming interface. A set of functions that provide application programmers with access to the full functionality of a product. The AR System API provides a complete interface to the AR System server.

AR

See action request.

arservtcd server

The controller server process that handles requests from clients for information on which socket to use for communicating with other server processes.

AR System client

1.Subset of AR System software necessary to allow a user to access an AR System server on the network and run the AR System tools on a local workstation.

2.Hardware (workstation, terminal, Macintosh, or PC) running the AR System client software.

AR System server

1.Full set of AR System software, including the arservtcd and the fast, list, and escalation arserverd processes. When installed on a workstation on the network, the server software provides access to the full feature set of the AR System and can be accessed by workstations, Macintoshes, terminals and PCs on the network that are running the AR System client software.

2.Hardware (workstation) running the AR System server software.

assignee

The person who is assigned responsibility for resolving an action request.

Assignee group

One of several special access control groups provided by the AR System. This is an *implicit* group; users automatically belong to this group and, if they have a valid AR System license, are granted change access for ARs for which they have been assigned responsibility (their name is in the Assigned-to field).

character data type

Data type used for fields where you will be entering text. The AR System administrator can specify a maximum length for the field or leave the length unlimited. The administrator can also specify a pattern to restrict the data that users can enter or attach a character menu to the field.

character menu

A type of menu that the AR system administrator can create and attach to any character-type data field. Character menus can be displayed as list boxes or pull-right menus.

client

See AR System client.

command line options

Parameters that you can combine with the commands to start the User, Administrator, Notification, and Import Tools that allow you to specify how the tools will run. For the User Tool, you can execute a macro or open to the Query or Submit window. For the Administrator Tool, you can attach to a specific server or open the tool with a specific category displayed.

configuration

1.The process of setting up hardware and/or software so that it operates in a manner consistent with the needs of a location.

2.The physical setup of a device or devices.

3.The operating characteristics of software.

core field

One of a set of basic fields that are common to all AR System schemas. Additional limits, such as fixed or maximum sizes, are placed on some core fields.

Customize group

One of several special access control groups provided by the AR System. This group grants users the right to customize their schema layout and create custom commands in the User Tool.

database

A collection of information maintained in the form of individual entries.

data type

Property of a field that determines what type of information the field contains. The choices are character, date/time, diary, integer, real, and selection.

date/time data type

Fields with this data type are limited to calendar dates and time.

DDE

Dynamic Data Exchange. This is a standard inter-application communication feature used in Windows applications. For more information, see your Windows documentation.

default

Administrator or user defined setting or value that automatically applies to a field if users do not supply a different setting or value when submitting a new action request.

diary data type

Fields with this data type allow you to capture a history of the actions taken for an AR. Each multiple character entry is stamped with the time, date, and name of the user who entered the item.

dynamic menu

Menu that performs a query at the time a user selects the menu icon and uses the results of the query to build the list of menu items from which the user chooses.

email

Electronic mail. The AR System allows you to set up an electronic mail handler so that users can submit ARs through email if they do not have access to a User Tool or if the AR server is inaccessible. (If you are running the client tools on a PC, your PC must be equipped with an SMTP gateway to allow email submissions.)

end user

In the AR System, an end user is the person who notifies support staff of problems and service requests by submitting ARs.

escalations

Facility that tests server transactions at specified times or regular intervals to see if certain conditions are met and responds to the conditions by taking a specific action or actions. The AR System administrator can define escalations to perform actions such as notify an individual, run a process, set specified fields, or make an entry to a log file.

This facility is useful if, for example, you want to notify support staff when ARs are in the Assigned state too long.

escalation server

The arserverd process that, if enabled, handles all escalation operations.

export

Facility that lets you move schemas, filters, active links, menus, administrator commands, and mail templates to a file. Exporting is useful if you want to share schemas, filters, active links, menus, and administrator commands with another server or generate mail templates.

fast server

The arserverd process that, if enabled, handles the operations that generally run to completion quickly without blocking access to the server.

filter

Facility that tests every server transaction to see if certain conditions are met and responds to the conditions by taking a specific action or actions. The AR System administrator can define filters that set fields to specified values, run independent system processes, send an interactive message to the user, notify the user when the state of an AR changes, or make an entry in an audit trail log file. Filters run on the server.

fixed license

Write license that is permanently assigned to a user so that the user always has access to the AR System.

See also floating license, write license.

Flashboards license

Fixed or floating license that allows a user access to the AR System Flashboards product.

floating license

Write license that exists on a server and is allocated to any user who requests a license and who is defined in the User database as having a floating license type. If no floating license is available at the time of the user request, the user must wait until a license becomes available.

See also fixed license, write license.

FTS

See full text search.

FTS license

Fixed or floating license that allows a user to perform a full text search in any large text or diary field indexed for FTS.

Full Text Search (FTS)

Facility that allows a user to quickly search for information in large text or diary fields. The fields must be indexed and FTS-enabled by the AR System administrator, and the user must have an FTS license.

group access

See group type.

Group schema

Schema that lets you add new groups, delete groups, and modify group permissions.

group type

The maximum permission type allowed for a group. May be None, View, or Change. (Note that permission may be set below the group's maximum at the field level.)

guest user

An unregistered user with a limited set of capabilities (submit ARs and possibly review those ARs). Unregistered users may not be allowed at your site.

hidden field

A field that exists but is not visible in a user's view of the schema.

import

Facility that lets you share schemas, filters, escalations, active links, menus, and administrator commands that were created on another server. First, you must export the definitions from the server on which they were created to an ASCII file, then you can import the file to your own server.

Import Tool

The part of the AR System that lets you transfer data from one server to another.

integer data type

Fields with this data type contain numeric values between -2147483648 and 2147483647. (The range for a particular field may be limited by the administrator.)

license

See Flashboards license, fixed license, floating license, FTS license, read license, write license.

list server

The arserverd process that, if enabled, handles the operations of the AR System that may take some time to complete: AR Export, ARGetListEntry (high-performance database searches), and ARGetEntryStatistics.

login window or dialog box

Window that allows you to login to the AR System when you first start an AR System tool.

macro

A set of operations recorded for later execution. Macros are useful for automating frequently used or complex query operations.

mail template

Template that contains the fields that you need to fill in to submit an action request using electronic mail. Templates are generated by the administrator from existing schema using the export facility. (If you are running the client tools on a PC, your PC must be equipped with an SMTP gateway to allow email submissions.)

multiple schema views

Ability of an administrator to create different *views* of what users see when they bring up a schema, including hiding or re-arranging fields by changing a field's display properties.

multi-process server

A product that allows the AR System administrator to distribute operations among different servers and, consequently, improve the performance of the AR System.

For example, the arservtcd process routes the load among the Admin server, Fast server, List server, Escalation server and Private servers as appropriate, automatically starts the specified arserverd processes and restarts the arserverd processes if they terminate.

notification

An alert that tells you that an AR System event has occurred. The alert may be a system beep, flash, the display of a notice window, or the opening of the Notification Tool.

Notification Tool

The part of the AR System that alerts you when specific changes are made to ARs. Also referred to as the Notifier.

operator

One of a number of functions that let you define complex queries or build qualifications. The AR System operators are available through use of the query bar palette or the qualification palette or you can type them in directly.

permissions

Property setting that allows you to control who can view and change individual fields of a schema. You also set permissions for schemas and active links. Permissions are defined for each access control group. View permission limits group members to reading the contents of a field. Change permission allows group members to read and write the contents of a field. *See also* access control group.

pick list

See selection list.

private server

An arserverd process that, if enabled, provides dedicated access to system operations for specific users.

property

An attribute that is defined. For example, the properties of a field include its data type, physical characteristics such as length, and whether it is required or optional.

Public group

One of several special access control groups provided by the AR System. Every user is automatically a member of this view only group.

pull-right menu

See character menu.

query

Process that lets you select a subset of ARs according to search criteria that you define and then perform one of several operations on the selected ARs. *See also* query operation.

query bar

Part of the Query window, Active Link Qualification window, and the Filter Qualification window that lets you define complex query criteria. Includes a palette of operators that you can use in the query you build.

query list

A list that includes a one-line summary of each AR matching a query.

query operation

Action that you can perform on the entries that match the criteria defined in a query. The possible operations are: Query List, Display, Modify, Report, and Delete.

query statement

A complete definition of query criteria constructed in the query bar.

Query window

The User Tool window that lets you search the database for ARs that match specific criteria and display the results of the search. You also use the Query window to view or modify an existing AR. *See also* Submit window.

range

Defines the upper and lower limits of acceptable values. For example, if a field's range is -10 to 100, you will be able to enter any number from negative 10 to positive 100 inclusive.

read license

License that allows a user to query the AR System schemas and submit new ARs but does *not* allow the user to modify existing ARs. *See also* write license.

real data type

Fields with this data type contain a floating-point number. The range is set by the administrator.

report format

The layout that you specify when you generate a report from an AR System query. You can format a report in columns or as a list of records. You can also choose selected fields to print or print them all. To create a more sophisticated layout, you can export the report to a file and import the file into a desktop publishing application.

reserved field

One of a set of fields defined with specific interpretations. You can use these fields in any schema, if desired.

schema

The definition of the data fields in a database. Each schema represents a database on an AR System server. The AR System comes with several sample schemas and you can build as many additional schemas as needed.

scroll bar

Window element that appears when there is more information to view than will fit in the window. You use the mouse to slide the scroll bar and shift the view area. A scroll bar at the bottom of the window lets you move the viewing area left and right. A scroll bar on the right side of the window lets you move the viewing area up and down.

selection data type

Fields with this data type present a set of mutually exclusive choices from which the user is to choose. The selections are displayed as radio buttons or as items on a menu.

selection list

List that appears as a result of an active link that performs a query that returns more than one AR. The selection list lets the user pick the appropriate AR so the active link can continue processing.

server

See AR System server.

status field

Core field that lets you keep a record as an AR moves through the various stages of the process you are using to resolve ARs. The defined states should reflect the workflow process.

status history

Information that shows the progress that has been made on an AR. You can view status history from the Display or Modify Individual window.

subadministrator

Individuals who have *limited* administrative access to the AR System. To be a subadministrator, you must be a member of the Subadministrator group and belong to a group with subadministrator access to a schema.

Subadministrator Group

One of several special access control groups provided by the AR System. Members of this group have *limited* access to the AR System. You must be a member of this group to be able to administer any schemas that your group has subadministrator access to and to create and administer filters, active links, and escalations connected to schemas that your group has administrative access to.

Submit window

The User Tool window that lets you enter the appropriate information to create and submit a new AR. *See also* Query window.

submitter

The person who submits an action request. The submitter's name is entered in the Submitter field.

Submitter group

One of several special access control groups provided by the AR System. This is an *implicit* group; users submitting ARs automatically belong to this group and, if they have a valid AR System license or if the Submitter Mode is set to Locked, are granted change access for ARs that are submitted with their name in the Submitter field.

support staff

Person or group responsible for resolving action requests. They assign and are assigned ARs, log their progress in appropriate fields, and use information stored in previous ARs to help resolve problems.

toolbar

Part of the Main window that allows easy access to some of the more commonly performed functions in the Windows Administrator Tool: New Server Window, New Object, Save, Align Left, Align Right, Align Value Left, Align Value Right, Align Top, Align Bottom, and Show Grid.

user default

Value that a user who has customize permission can assign to a field. When the user sets defaults, the AR System loads this value into the field. When the user submits an AR, the AR System automatically loads this value into the field unless the user has entered a different value.

User schema

Schema that lets you add users to the AR System and specify the type of access each user will have.

User Tool

The part of the AR System that lets users enter new ARs and track them through the troubleshooting process. Users can also query the database for ARs that match specified criteria, generate reports, and modify existing ARs with the User Tool.

user view

What the user sees when they bring up a schema. If users have permission to customize their views, they are able to change the physical layout and other properties of the schema and schema fields as they appear.

variable

Data element that changes according to user input. In macros, you can include variable definitions that will cause the AR System to prompt the user for certain information when the macro executes.

version

The system release number. To display the version of the AR System that you are running, select AboutOn Version under the Help menu in the User, Administrator, or Import Tools.

view layout

The location of fields in a user's view of a schema.

wild card

Character that you can enter to represent other characters in a query. In query statements in character and diary fields, for example, you can use wild card characters to match single characters, strings, or characters within a range or set.

write license

License that allows a user to modify and save data on existing ARs as field and schema permission settings allow. Write licenses may be either fixed (permanently attached to a single user) or floating (allocated to users as required).

See also fixed license, floating license, read license.

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