Action Request System™ Administrator's Guide for OSF/Motif

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Contents

Figures

Tables

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 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 also assumes that you are familiar with the UNIX and OpenWindowsUNIX and Motif environments for mouse and menu-driven applications on UNIX workstations. A modest understanding of how to administer distributed applications is also helpful.

Overview of This Document

Chapter 1, "Using the Administrator Tool," provides an introduction to the Administrator Tool window and menus and tells how to start the tool. 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 2, "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 3, "Setting Up Groups and Users," describes how to set up client users and establish client environments on user's machines. This chapter includes a discussion of access control.

Chapter 4, "Defining Schemas," describes how to create and maintain the schemas that define the information fields in your database.

Chapter 5, "Defining Menus," describes how to create and maintain character menus and how to attach the menus you create to any character field on any schema.

Chapter 6, "Defining Filters," describes how to create and maintain the filters that define your workflow process on the server and other conditional processing.

Chapter 7, "Defining Escalations," describes how to create and maintain the escalations that control the timing aspects of your workflow process and other conditional processing.

Chapter 8, "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 9, "Defining Administrator Commands," describes how to create and maintain extensions for the User Tool that allow users running the tool on UNIX workstations to invoke UNIX commands on the server.

Chapter 10, "Importing and Exporting Definitions," describes how to transfer schema, filter, active link, escalation, menu, and administrator command definitions.

Chapter 11, "Using the Import Tool," describes how to start and use the AR System Import Tool to import data into your database.

Chapter 12, "Electronic Mail Support," describes how to configure the mail handler so that ARs can be submitted using email, and explains the conventions used for mail templates.

Chapter 13, "The Multi-Process Server Option," describes how to use and administer the multi-process feature of the AR System.

Chapter 14, "Full Text Search," describes how to use and administer the full text search (FTS) feature of the AR System.

Chapter 15, “AR System Server Utilities,” describes how to use the arcache and arreload utilities with the Windows NT server.

Appendix A, “Changing Colors and Fonts,” describes how to change the colors and fonts used by the Administrator Tool.

Appendix B, “AR System Files,” 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, “Command Line Options,” tells you how to use the command line options to start the Administrator and Import tools.

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

Appendix G, “Procedures,” provides a list of procedures.

The **“Glossary”** lists and describes terms that you 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 the AR System software for all operating environments. There are separate Installation Guides for UNIX 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 document) 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 UNIX 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 ***Action Request System Help Desk Template Guide*** describes the Helpdesk application that runs in conjunction with the AR System to help you manage your internal help desk organization. The template takes full advantage of the rich feature set of the AR System and implements workflow and reporting mechanisms to simplify the task of working in or managing a help desk.

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.

The ***Action Request System Accessories*** binder provides a place to keep documentation for utilities and peripheral add-ons to the AR System. As shipped, the Accessories binder includes the documentation for the Network Management Platforms Integration Accessory.

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%`.

`bold computer font`

Indicates data to be entered by the user.

Example: **`aruser &.`**

< italic font in angle brackets>

Indicates a variable directory, file name, or string that you are to 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" on page xxviii.*

Italic type is also used for emphasis.

Example: *All* users will be affected.

Using the Mouse Buttons with Motif

Mouse buttons are referred to by SELECT (left),ADJUST (middle), and MENU (right).

Use the SELECT button to select items from the menu banner at the top of the window, set the location of the text cursor, and move fields. You can also use the SELECT button to open and select from menus as well as open text edit icons and diary icons.

Use the PASTE button to paste selected text.

Use the MENU button to pop up a menu that lets you open a text edit window and to select items from a pull-right menu for a field.

Mouse Button Activities

Select means to click once with the SELECT mouse button.

Drag means to click once with the SELECT mouse button and hold it down while moving an object.

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

Pull-right means to select a sub-menu item by holding down the MENU button while moving the mouse to the right to display and select a sub-menu item.

Using the Administrator Tool 1

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 schemas, character menus, filters, escalations, active links, and administrator commands.

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 server and licenses and how to build and use change history information for the 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.
- Starting and exiting the Administrator Tool.
- Using the Administrator Tool main window.
- Displaying and modifying server and preference information.
- Displaying license and version information.

- Building and using a history of changes made to schemas, menus, filters, escalations, active links, and administrator commands.

Administrator Tool Functions

You use the Administrator Tool primarily to create and maintain the AR System schemas, menus, filters, escalations, active links, and administrator commands. 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 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 database 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 2. For details on creating and modifying schemas and defining schema fields, see Chapter 4.

Creating and Modifying Menus

You can define **character 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 as system files, or menus that are built dynamically based on queries to AR System schemas. For details on creating menus and using them on a schema, see Chapter 5.

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 2. For details on creating and modifying filters, see Chapter 6.

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 2. For details on creating and modifying escalations, see Chapter 7.

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 2. For details on creating and modifying active links, see Chapter 8.

Creating and Modifying Administrator Commands

Administrator commands (extensions) are special menu extensions for the User Tool that let users invoke specific UNIX processes on the server. Administrator commands are available to users who are running the client tools on a UNIX platform and who have the appropriate access permissions. For details on creating and modifying administrator commands, see Chapter 9.

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 10.

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 10. For information on setting up and using the electronic mail handler, see Chapter 12.

Starting and Stopping the AR System Server Manually

The installation script automatically starts the AR System server for you. Under normal conditions, you will not need to stop the AR server. If the server seems to be unresponsive, you should determine whether or not someone is performing an operation that may take a long time, such as deleting a field from a schema, before you take any action that results in terminating the server. If at any time you feel it is necessary to stop the AR System server, you can use the **`kill`** command.You can stop and start the AR System server manually at any time.

Note – If the software is automatically started from a system startup file, you should not need to manually start the server when the system reboots.

To stop and start the AR System server manually:

1. Log in as root and get the process ID number of the `arservtcd` process:

For SunOS systems, type the following:

```
# ps -ax | grep arservtcd
```

For other systems, type the following:

```
# ps -ef | grep arservtcd
```

Kill the server by typing the following UNIX command at the UNIX prompt:

```
# kill <process_number_arservtcd>
```

Warning – Do **not** use the **`kill -9`** command to stop the AR server. Doing so may leave your database in an inconsistent and unrecoverable state.

2. Start the server by typing the following UNIX command at the UNIX prompt:

```
# <ar_install_dir>/bin/arservtcd &
```

The AR System server environment starts.

If the AR System software was installed by a non-root user (as described in the Action Request System Installation Guide), then to start the server you must use the same login and password as the user that performed the installation. For example, you would enter `su maris`, where `maris` is the login name.

Starting the Administrator Tool

Only users registered as AR administrators or subadministrators will be able to use the Administrator Tool. See Chapter 3 for information on how to add administrators and subadministrators to the AR System.

To start the Administrator Tool:

1. Type the following at the UNIX prompt:

```
%<ar_install_dir>/bin/aradmin &
```

where *<ar_install_dir>* is the directory containing the executables for the Administrator Tool.

2. If this is the first time you have started an AR System tool, you will see a warning message telling you that there is no user specified in your config file. Open the Login window (select Login from the File menu) and log in as Demo. The AR System is case sensitive. This means you must use `Demo`, not `demo` or `DEMO`. You do not need to enter a password the first time you log in to the AR System.

Note – 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 3 for information on adding a password.

The Administrator Tool Main window is displayed, as shown in Figure 1-1.

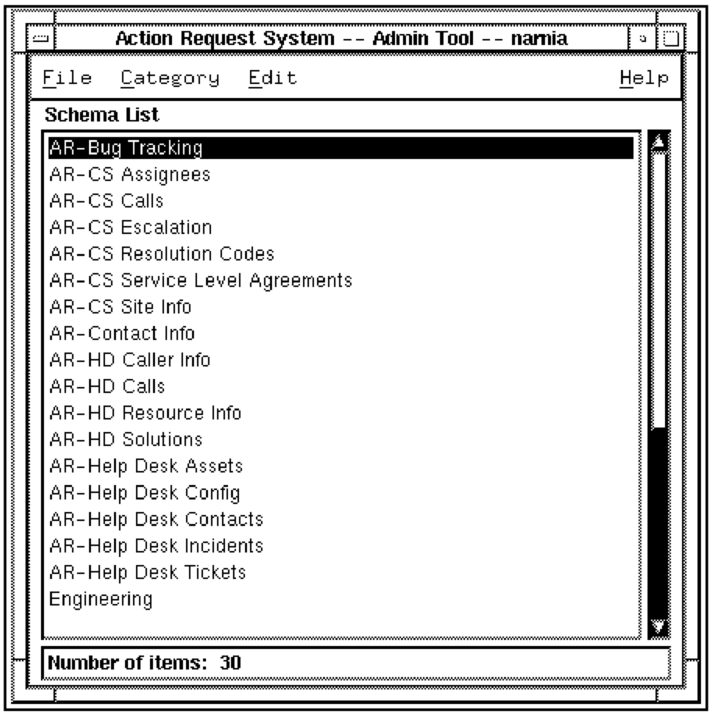

Figure 1-1 Admin Tool Main Window

After starting the Administrator Tool, refer to the appropriate chapter for information about specific tasks.

Command Line Options

A number of command line options are available that allow you to control the state that the Administrator Tool comes up in initially. You simply include the option in the command that you use to start the tool. For example, to start the Administrator Tool with the active link list displayed, you use the **-a** command line option, as follows:

```
%<ar_install_dir>/bin/aradmin -a &
```

The following command line options are available:

Table 1-1 Administrator Tool Command Line Options

Option	Action
-a	Start the Administrator Tool with the Active Links category displayed in the list.
-e	Start the Administrator Tool with the Admin Commands (admin extensions) category displayed in the list.
-f	Start the Administrator Tool with the Filters category displayed in the list.
-m	Start the Administrator Tool with the Menus category displayed in the list.
-s	Start the Administrator Tool with the Schemas category displayed in the list.
-t	Start the Administrator Tool with the Escalations category displayed in the list.
-x	Start the Administrator Tool and connect only to the specified server or servers. This option overrides the list of servers specified in the **/etc/ar** file. You can specify this option multiple times to connect with multiple servers. For example, to start the Administrator Tool and connect only to the servers named metaphysix and narnia, you would enter: *<ar_install_dir>***/bin/aradmin -x metaphysix -x narnia&**

Using the Administrator Tool Main Window

The Administrator Tool main window shown in Figure 1-1 on page 7 is the window from which you access all utility menus within the tool. Depending on the category you select from the Category menu, the window lists the available schemas, menus, filters, escalations, active links, or administrator commands.

This section provides a short description of the File, Category, Edit, and Help menus.

The File Menu

The File menu is shown in Figure 1-2.

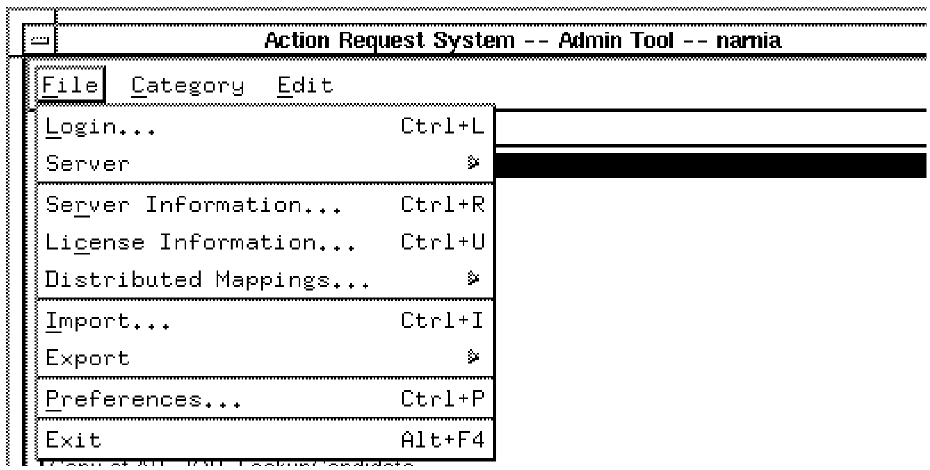

Figure 1-2 Admin Tool — File Menu

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.
Server	Shows servers listed in the **`/etc/ar`** file (or specified using the **-x** command option) so you can select the server you wish to administer.
Server Information	Displays information about the currently selected server. If you are a full administrator, it also allows you to set server options. See "Setting Server Information and Option Settings" on page 13.
License Information	Displays information about licenses that are available or in use on the currently selected server. If you are a full administrator, it also allows you to release a floating license if it becomes necessary to do so. See "License Information" on page 25.
Distributed Mappings	If you are licensed for the Distributed Server Option (DSO), displays the Distributed Mappings menu, which lets you select the Add Distributed Fields, Server Settings, and Distributed Pending windows. For more information, refer to the *Action Request System Distributed Server Option Administrator's Guide for OSF/Motif* manual.
Import	Allows you to import definitions that have been exported from the AR System. See "Importing and Exporting Definitions" on page 241.
Export	Exports selected definitions and generates mail templates. See "Importing and Exporting Definitions" on page 241.

Preferences	Allows you to define user-specific preferences when operating the Administrator Tool. See “Preferences” on page 28.
Exit	Exits the Administrator Tool.

The Category Menu

The Category menu, shown in Figure 1-3 on page 10, lets you select what you want to work with: schemas, menus, filters, escalations, active links, or administrator commands. The first time you start the Administrator Tool, the Schemas category is selected and the window shows a list of schemas. Thereafter when you start, the tool opens and displays the category you last selected.

Note – You can use one of the options described in “Command Line Options” on page 7 to cause the Administrator Tool to open with a specific category displayed.

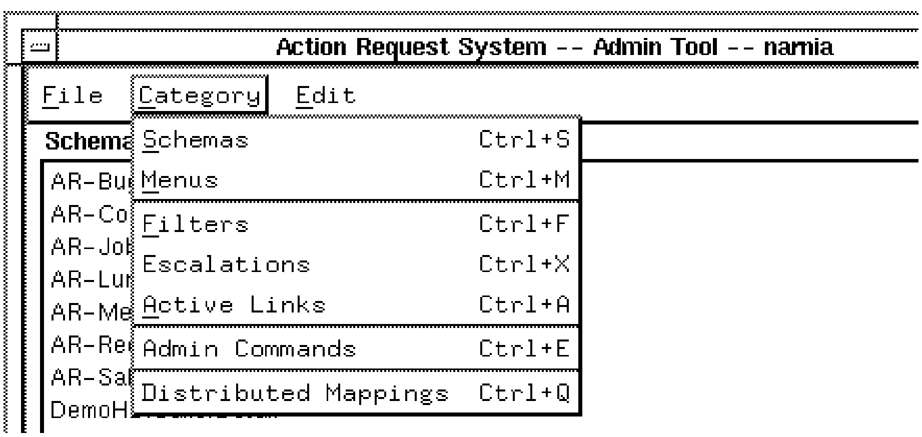

Figure 1-3 Admin Tool — Category Menu

The following categories are available through the Category menu:

Schemas	Lists schemas on the server.
Menus	Lists menus on the server.
Filters	Lists filters on the server.
Escalations	Lists escalations on the server.
Active Links	Lists active links on the server.

Admin Commands	Lists administrator commands (administrator extensions) on the server.
Distributed Mappings	Lists distributed mappings on the server. For more information, refer to the *Action Request System Distributed Server Option Administrator's Guide for OSF/Motif* manual.

The Edit Menu

The Edit menu, shown in Figure 1-4, provides a choice of actions you can perform on a selected item (you can select only one item at a time).

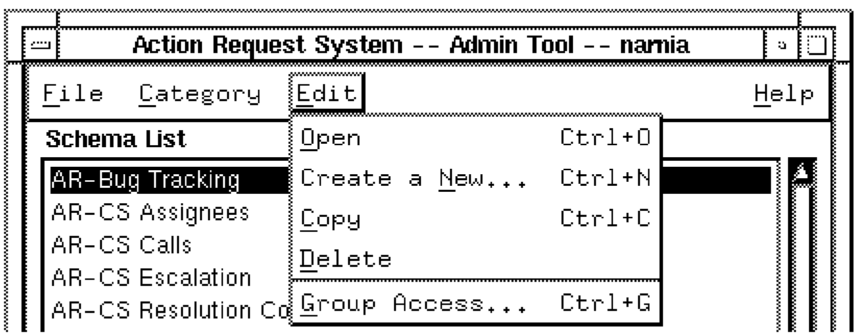

Figure 1-4 Admin Tool — Edit Menu

The Edit menu provides the following choices:

Open	Opens a window containing the item for viewing or editing.
Create a New	Creates and opens a new item.
Copy	Makes a copy of the item, naming it **`Copy of`** *<xxx>*, where *<xxx>* is the name of the item copied. Does not open the new item.
Delete	Deletes the item from the system. This is a permanent action and **cannot be undone**.
Group Access	Sets schema, active link, and admin command permissions globally for a specific group defined on a server.

The Help Menu

The Help menu, shown in Figure 1-5, displays the version number of the AR System software and the host name the Administrator Tool client is running on.

Figure 1-5 Admin Tool — Help Menu

Selecting a Server to Administer

You only need to run one Administrator Tool to administer all the servers running at your location. To select a server, select the Server sub-menu from the File menu of the Administrator Tool main window. The sub-menu appears, as shown in Figure 1-6.

To select a server:

1. Select the Server sub-menu from the File menu, as shown in Figure 1-6.

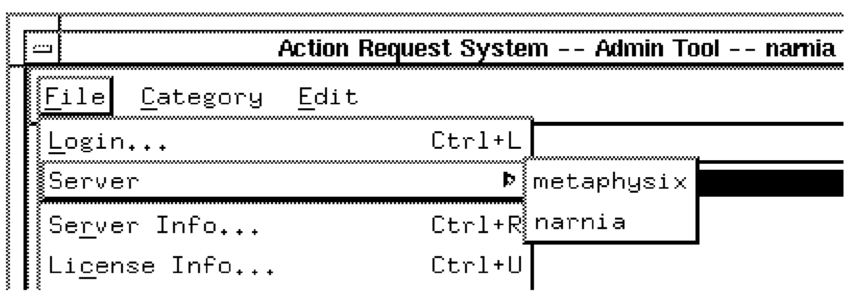

Figure 1-6 Admin Tool — Server Menu

2. Select a server to administer.

Depending on your level of permissions, the Administrator Tool then displays the items from the server that you chose. For example, if you selected the server **narnia,** only the schemas for that server that you have permission to administer appear on the list.

Setting Server Information and Option Settings

To display information about the currently selected server or to set server options, select the Server Information item under the File menu of the Administrator Tool main window (or type **Ctrl+R**). The Server Information window appears, as shown in Figure 1-7 on page 14.

The functions of the Server Information window are *server* specific. The information and settings on the Server Information window are global to the selected server and affect how the AR System works on that server.

Note – The Server Information window does not display 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 window contain display-only information that cannot be modified. Other fields in the window 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 window.

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

Platform Information

When the Server Information window (Figure 1-7 on page 14) 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 Server Information from the File menu. The Server Information window appears.**

2. **In the Server Information window, select Platform from the Category list, as shown in Figure 1-7.**

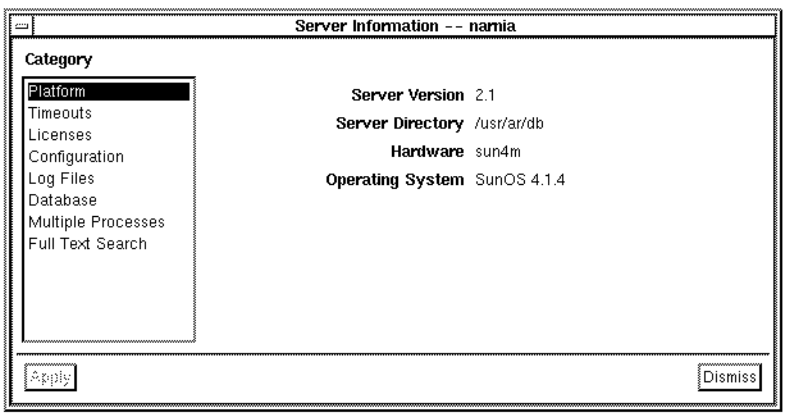

Figure 1-7 Server Information — Platform

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 data 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.

Timeouts Information

Select the Timeouts category (Figure 1-8 on page 15) to specify timeouts for the currently selected server.

To set timeouts:

1. **Select Server Information from the File menu. The Server Information window appears.**

2. **In the Server Information window, select Timeouts from the Category list, as shown in Figure 1-8.**

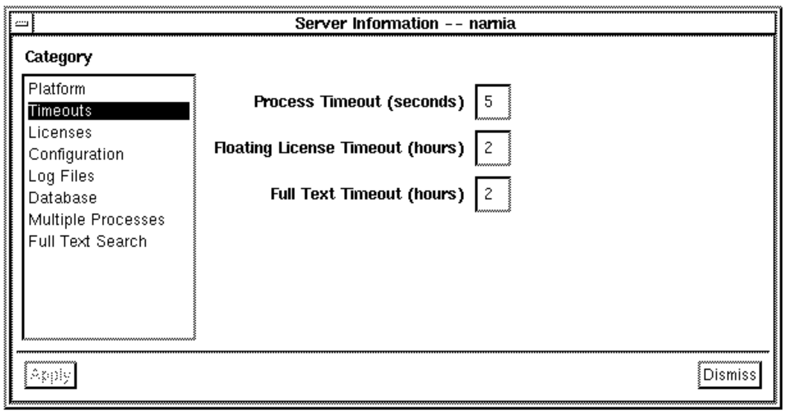

Figure 1-8 Server Information — Timeouts

3. **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.
Full Text Timeout (hours)	This field 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 to set a time limit, in hours. 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.

4. **Select the Apply button to save the option settings.**

License Information

Select the License category (Figure 1-9 on page 17) to display information about the type and number of AR System licenses. You also set the Submitter Mode in this window.

To display license information and set the Submitter Mode:

1. **Select Server Information from the File menu. The Server Information window appears.**

2. **In the Server Information window, select Licenses from the Category list, as shown in Figure 1-9.**

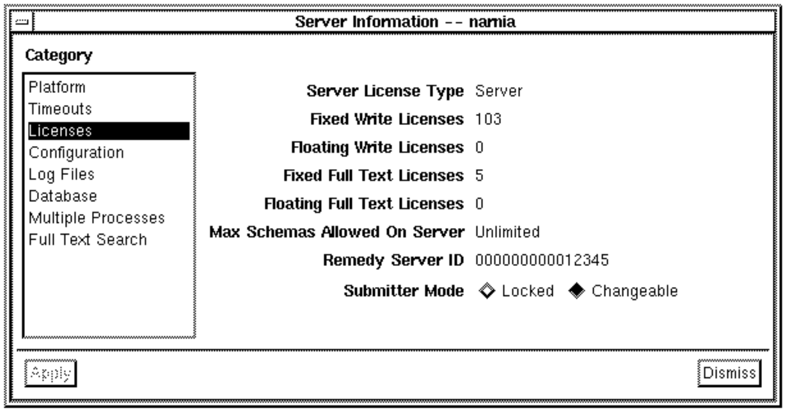

Figure 1-9 Server Information — Licenses

3. The following display-only fields and options appear:

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 you are licensed 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	This field lets 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 **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. * 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. The default is Changeable. **Note:** Changes to the Submitter Mode settings do not take effect until *after* the server is stopped and restarted. When the server restarts, the system alerts you with a confirmation message that you have made changes to the Submitter Mode. For more information on the role of submitters, licenses, and access control, see "Understanding Access Control" on page 69 and especially "Special Submitter Access" on page 71.

4. **Select the Apply button to save the option settings.**

Configuration Information

Select the Configuration category ("Server Information — Configuration" on page 19) to set various administrative options.

To set the configuration:

1. **Select Server Information from the File menu. The Server Information window appears.**

2. **In the Server Information window, select Configuration from the Category list, as shown in Figure 1-10.**

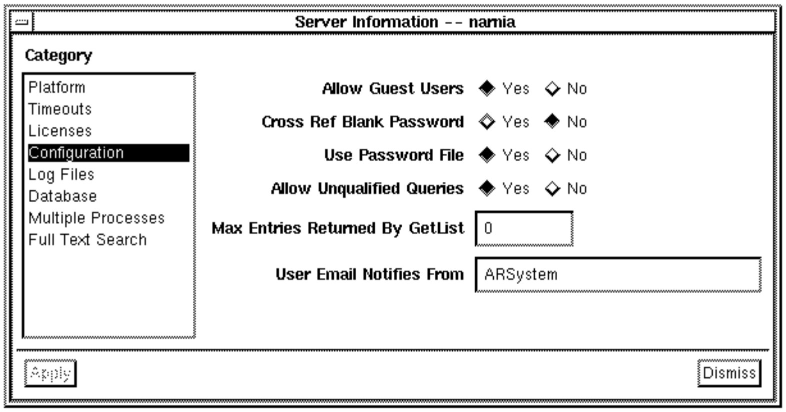

Figure 1-10 Server Information — Configuration

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

Allow Guest Users — This field 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 group has change permissions, they can modify any fields in the ARs they submit.
Set this option to Yes to allow guest users on this server. Set to No to disallow guest users. The default is Yes.

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.
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. Set to Yes to cause the server to reference the **`/etc/passwd`** file if the user is not registered with the AR System. Set to No to disallow checking of **`/etc/passwd`** and require registration with the AR System. The default is Yes. This setting is not displayed for Windows NT servers.
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. Set to Yes to allow a query with no qualifications on the data. Set to No to disallow such a query. The default is Yes.

Max Entries Returned By GetList	This option 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.
User Email Notifies From (UNIX servers only)	This option 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 user 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.

4. Select the Apply button to save the option settings.

Log Files Information

Select the Log Files category (Figure 1-11 on page 22) to set one or more of the debugging modes for the system. In debug trace mode, the AR System creates a log file containing information about system activity.

By default, each log file is located in the directory identified in the Log File field (by default, **`<ar_install_dir>/db`**). To change the location or name of one of the log files, enter a name and path in the appropriate Log File field below.

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. 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.

These fields allow you to enter a location and name other than the default location and name for each of the log files created in debug mode. Note that logging will not occur unless you also check the appropriate debug trace mode checkbox.

Note – If you are running a multi-process server, each server will write 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 Server Information from the File menu. The Server Information window appears.**

2. **In the Server Information window, select Log Files from the Category list, as shown in Figure 1-11.**

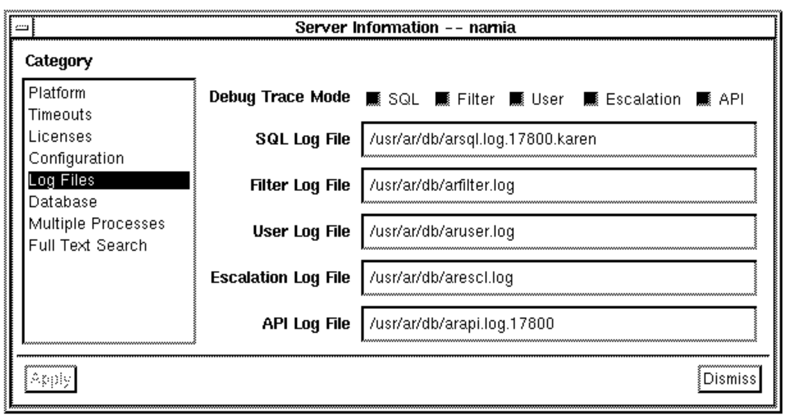

Figure 1-11 Server Information — Log Files

3. **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 log file name fields are disabled until you select the Debug Trace Mode. After you**

have enabled a trace mode, you can specify a different log file for the trace, if you desire, or leave the field unchanged to accept the default file name.

SQL Log File	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 Log File	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 Log File	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. By default, the log file is called **`aruser.log`**.
Escalation Log File	Logs information about escalation activity. Information includes that escalations were checked and whether or not the escalation qualification found any matches and escalation actions taken. By default, the log file is called **`arescl.log`**.
API Log File	Logs information about all API calls made by all clients. By default, the log file is called **`arapi.log`**.

4. **Select the Apply button to save the option settings.**

Database Information

Select the Database category (Figure 1-12) to display information about type, home directory, name, and version of the database you are using. You can also use this window to define the database password.

To display and update information about the database:

1. **Select Server Information from the File menu. The Server Information window appears.**

2. **In the Server Information window, select Database from the Category list, as shown in Figure 1-12.**

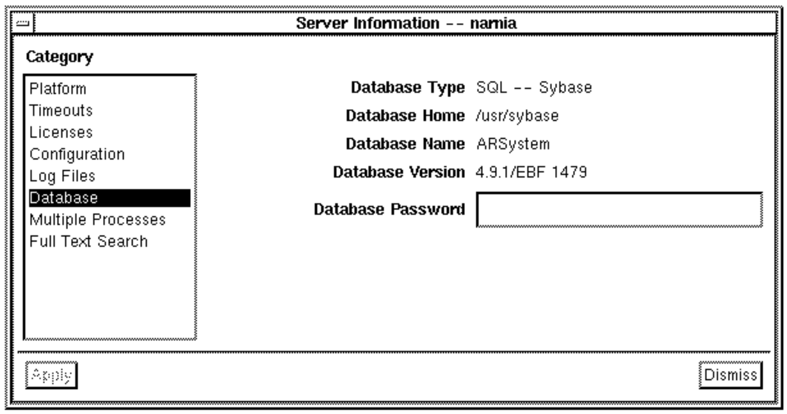

Figure 1-12 Server Information — Database

3. The following display-only fields and settings appear:

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. **Note:** The default user/table password created by the AR System for the database is **`AR#Admin#`**. If you changed the password and do not remember it or have changed it outside the AR System and need to reflect the change within the AR System, go into the database as the database administrator and change it back to the default. If the encrypted password is in the **`ar.conf`** configuration file, delete it from there.

4. Select the Apply button to save the option settings.

Multiple Process Option

If you are licensed for the multiple-process server option, see "Configuring Multiple Process Servers" on page 295 for further information on configuring the Multiple Processes category in the Server Information window. This chapter also describes how to administer multi-process servers in the AR System.

If you do not own a multi-server license, you cannot access the Server Information — Multiple Processes category.

Full Text Search Option

If you are licensed for the full text search (FTS) option, see "Configuring FTS in the AR System" on page 317 for further information on configuring the Full Text Search category in the Server Information window. This chapter also describes how to administer FTS in the AR System.

If you are not licensed for full text search, you cannot access the Server Information — Full Text Search category.

License Information

To display information about licenses:

- Select the License Information item under the File menu of the Administrator Tool main window (or type **`Ctrl+U`**). This causes an information window to appear, as shown in Figure 1-13.

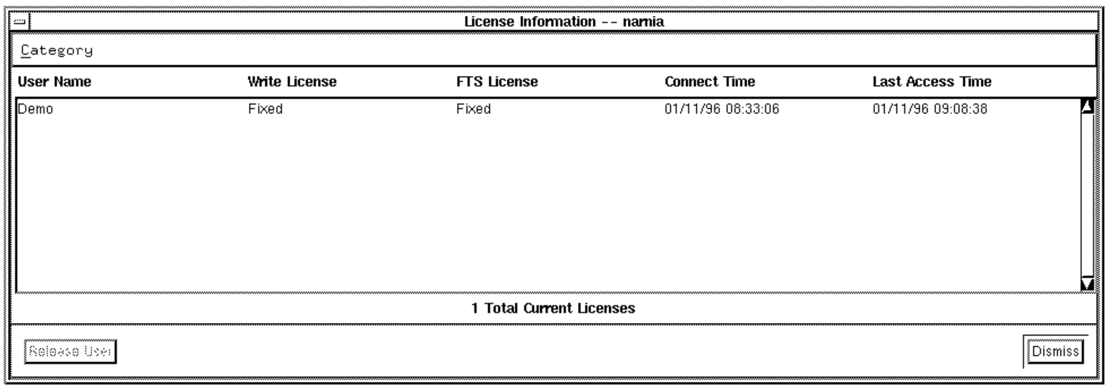

Figure 1-13 License Information Window — Current Licenses

The License Information window 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: Read, Fixed, Floating, 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 1-13 on page 26 shows the total number of all current licenses on the server.

Registered Licenses

When you display information about registered users, you see information about all users of the selected category that are known to the system, as shown in Figure 1-14. 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.

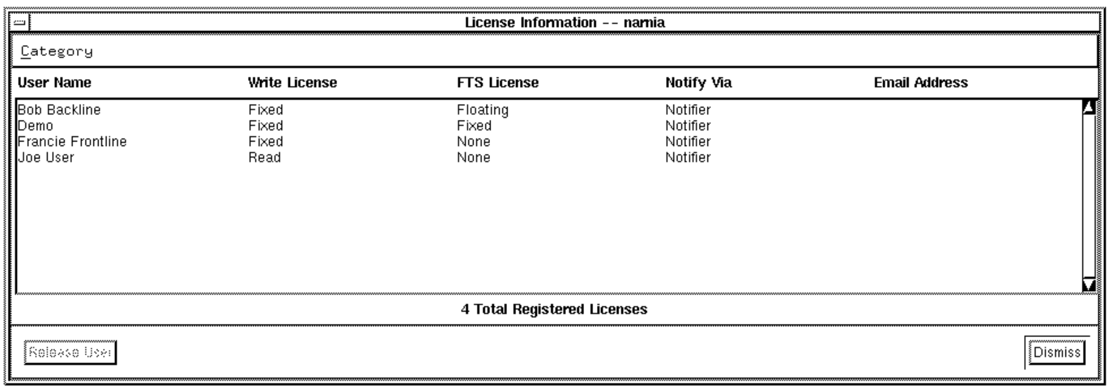

Figure 1-14 License Information Window — Registered Licenses

The AR System obtains the information displayed about each user from the entries in the User schema. (You can update the information for each user through that schema.) See Chapter 3 for more information on the User schema.

Current Licenses

When you display information about current licenses in use (as shown in Figure 1-13), 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.

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 license that you want released from the active list of licenses in the License Information window.**

2. **Select the Release User button at the bottom of the License Information window.**

If the user has a Fixed or Read license, the only action is to remove 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 the 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.

Preferences

Select Preferences under the File menu of the Administrator Tool main window (or type **`Ctrl+P`**) to display the Admin Preferences window, as shown in Figure 1-15 on page 29. You use this window to set warnings, default permissions for schemas, active links, and fields, and other Administrator Tool preferences.

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 specified.

In contrast to the Server Information window which you use to specify the operations of each AR System server administered by this Administrator Tool, the Preferences window lets you specify how the Administrator Tool itself will operate.

Warning Settings

When the Admin Preferences window (Figure 1-15) first appears, it displays warning settings. These settings determine the types of warning dialog boxes that appear during Administrator Tool processing.

To set warnings:

1. **Select Preferences from the File menu. The Admin Preferences window appears.**
2. **In the Admin Preferences window, select Warnings from the Category list, as shown in Figure 1-15.**

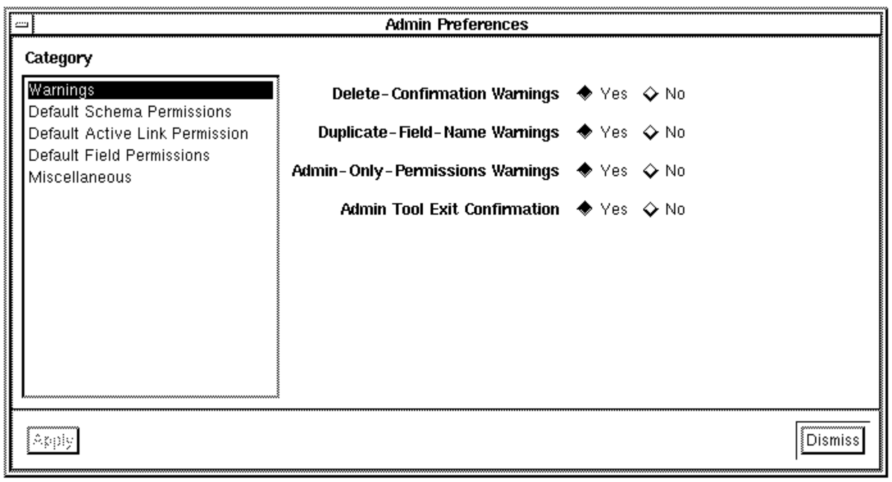

Figure 1-15 Admin Preferences — Warnings

3. **Select from the following options:**

Delete-Confirmation Warnings	Select Yes to display a confirmation dialog box each time you delete a schema, menu, filter, escalation, active link, or admin command. The default is Yes.
Duplicate-Field-Name Warnings	Select Yes to display a confirmation dialog box when you create a schema field with a duplicate name. The default is Yes.
Admin-Only-Permissions Warnings	Select Yes to display a confirmation dialog box that notifies you when a field or active link is accessible only to a user with Administrator access. The default is Yes.
Admin Tool Exit Confirmation	Select Yes to display a confirmation dialog box when you exit the Administrator Tool. The default is Yes.

4. **Select the Apply button to save the option settings.**

Setting Default Schema Permissions

Select Default Schema Permissions in the Admin Preferences window (Figure 1-16 on page 30) to specify the values to be used as the default settings of 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 you do *not* set the schema permissions themselves in the Admin Preferences window. This window only creates the default schema permissions for each group but does not set them. You can set the default schema permissions by selecting the Set to Defaults button on the Schema Permissions window. See "Defining Schema Permissions for the User Tool" on page 128 for information on setting schema permissions.

To set default schema permissions:

1. **Select Preferences from the File menu. The Admin Preferences window appears.**

2. **In the Admin Preferences window, select Default Schema Permissions from the Category list, as shown in Figure 1-16.**

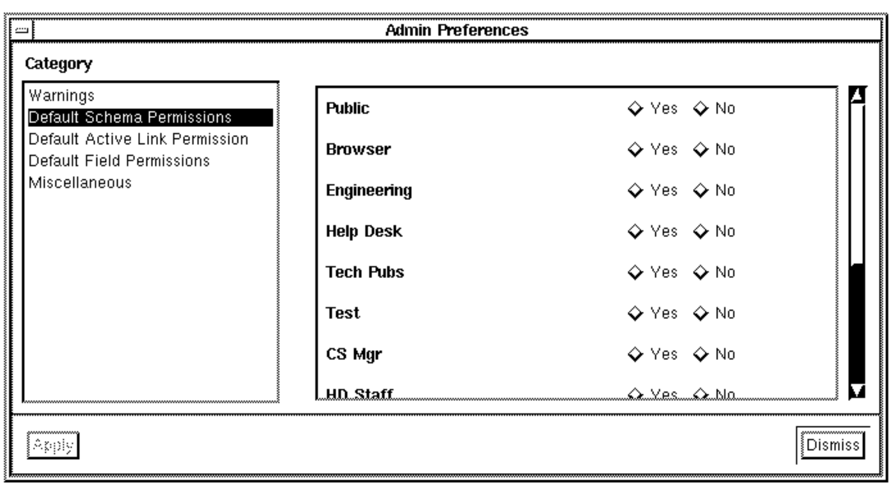

Figure 1-16 Admin Preferences — Default Schema Permissions

3. **For each group, choose a default setting of Yes or No. Yes lets the group have access to a schema while No denies access to a schema.**

4. **Select the Apply button to save the option settings.**

Setting Default Active Link Permissions

Select Default Active Link Permissions in the Admin Preferences window (Figure 1-17 on page 32) to specify the values to be used as the default settings of 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 you do *not* set the active link permissions themselves in the Admin Preferences window. This window only creates the default active link permissions but does not set them. You can set the default active link permissions by selecting the Set to Defaults button on the Active Links window. See "Specifying Active Link Conditions" on page 202 for information on setting active link permissions.

To set default active link permissions:

1. **Select Preferences from the File menu. The Admin Preferences window appears.**

2. **In the Admin Preferences window, select Active Link Permissions from the Category list, as shown in Figure 1-17.**

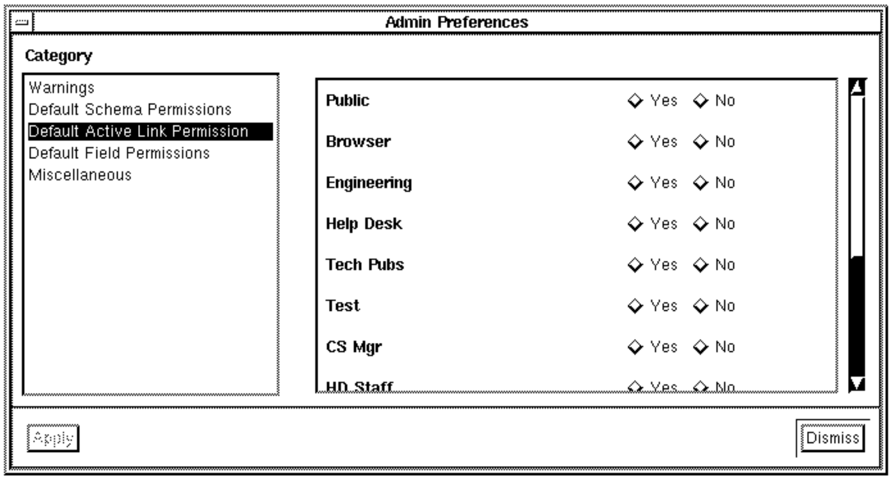

Figure 1-17 Admin Preferences — Default Active Link Permissions

3. **For each group, choose a default setting of Yes or No. Yes lets members of the group have access to the active link while No restricts members of the group from firing it.**

4. **Select the Apply button to save the option settings.**

Setting Default Field Permissions

Select Default Field Permissions in the Admin Preferences window 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 you do *not* set the field permissions themselves in the Admin Preferences window. This window only creates the default permissions but does not set them. You can set the default permissions by selecting the Set to Defaults button on the Field Properties window. See "Field Properties" on page 97 for information on setting field permissions.

To set default field permissions:

1. **Select Preferences from the File menu. The Admin Preferences window appears.**
2. **In the Admin Preferences window, select Default Field Permissions from the Category list, as shown in Figure 1-18.**

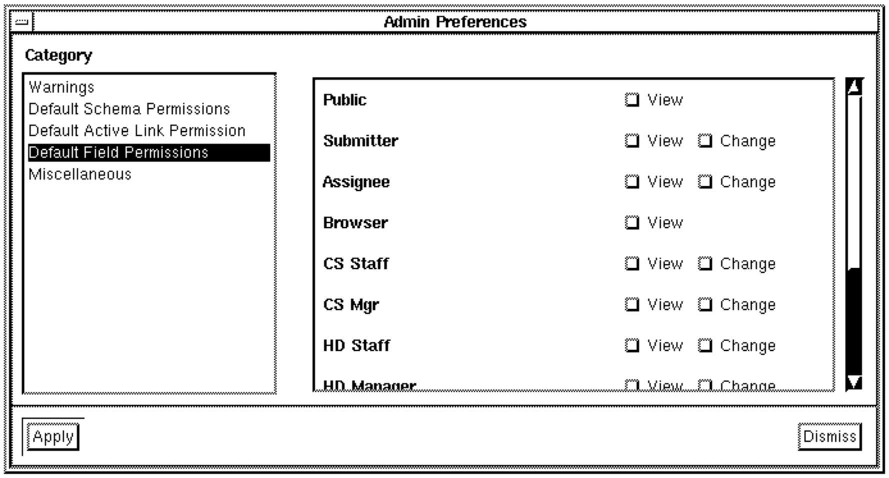

Figure 1-18 Admin Preferences — Default Field Permissions

3. **For each group, choose View or Change or neither option. View lets users read but not change the field value while Change lets you both view and change the value.**
4. **Select the Apply button to save the option settings.**

Setting Miscellaneous Options

Select Miscellaneous in the Admin Preferences window (Figure 1-19) to set various administrative functions such as allowing expandable menus on schema screens and prompting users for logins.

1. **Select Preferences from the File menu. The Admin Preferences window appears.**

2. In the Admin Preferences window, select Miscellaneous from the Category list, as shown in Figure 1-19.

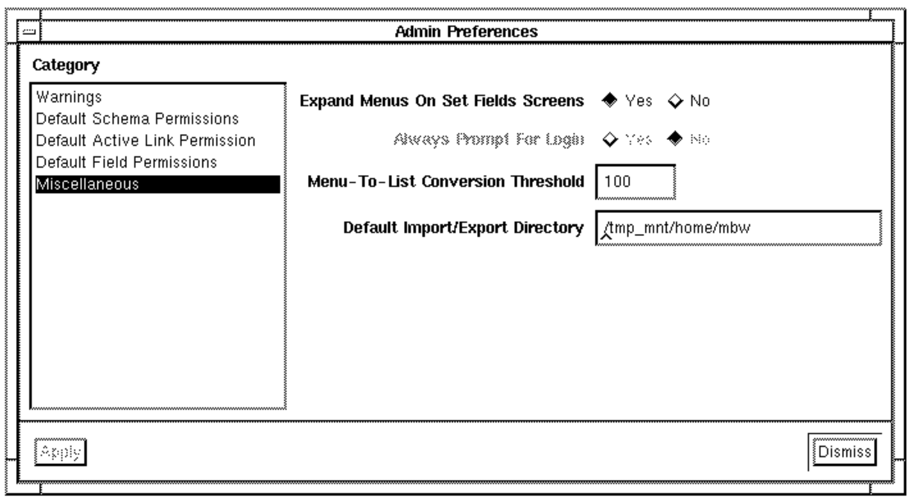

Figure 1-19 Admin Preferences — Miscellaneous

3. Select from the following options:

Expand Menus On Set Fields Screens	Selecting Yes lets you view all items in the menus in the Set Fields windows for active links, filters, and escalations. However, selecting Yes might slow down your system performance. Selecting No keeps you from being able to view the menus in the Set Fields window.
Always Prompt For Login	Selecting Yes means each time you run the User, Admin, and Notification Tools, you are prompted to supply your user name and password. The system does not save your user name and password in your config file. Selecting No means that you will *not* be prompted to supply your user name and password each time you run the User, Admin, and Notification Tools. The system saves your user name and password in your config file. No is the default value.

Menu-To-List Conversion Threshold	Enter the number of entries to use as a threshold to determine how menus in the modify menus, filters, escalation, and active link windows are displayed in the Administrator Tool. If the menu contains fewer entries than the number specified for this option, it is displayed as a pull-down menu. Otherwise, it is displayed as a listbox. Setting this option to 0 forces menus to display as listboxes. This threshold setting does not affect how menus are displayed in the Modify Schema window.
Default Import/Export Directory	Shows default directory where import and export definitions are stored when you import or export definitions. See Chapter 10. Enter another directory path if desired.

4. Select the Apply button to save the options.

Displaying Version Information

To display version information about the Administrator Tool:

- Select the On Version item under the Help menu of the Administrator Tool main window (or type `Ctrl+V`). This causes an information window to appear, as shown in Figure 1-20. You should be prepared to provide this information whenever you call Customer Support.

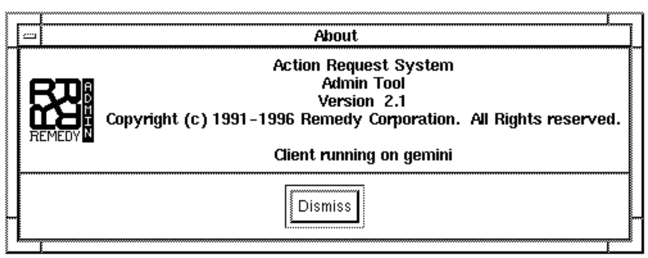

Figure 1-20 Admin Tool Version Information

Exiting the Administrator Tool

To exit the Administrator Tool:

- To exit the Administrator Tool, select the Exit item under the File menu (or type `Alt+F4`). You can also exit the tool by selecting the Close item from the Window menu.

Note – On some Sun workstations, the accelerator key combination that allows you to exit from the Administrator Tool is `Meta+F4`, rather than `Alt+F4` as shown on the menu.

Building and Using Change History

For each structure that you build using the Administrator Tool (schemas, fields, menus, filters, escalations, active links, and admin commands), the AR System automatically records information about the owner, the user who last modified the structure, and the date of the modification. You can display this information at any time by selecting the Change History button at the bottom of the window in which you build each structure. This button opens a Change History dialog box so that you can view and modify history information.

The Change History dialog box for a schema is shown in Figure 1-21.

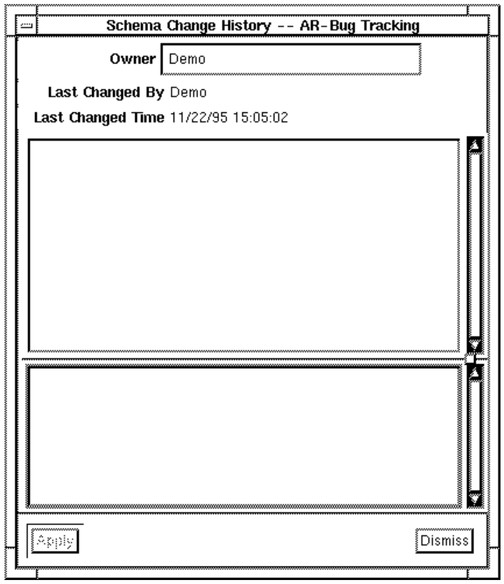

Figure 1-21 Change History Dialog Box

You can use the Change History dialog box as a diary of changes made to each structure. The dialog box works in a manner similar to diary fields in the User Tool. Each time you modify a schema, field, menu, filter, escalation, active link, or admin command, you can update the change history to maintain a record of changes made over time.

To update the change history:

1. **On the item window (schema, field, menu, filter, escalation, active link, or administrator command) you have created or modified, select the Change History button to open the Change History dialog box (Figure 1-21).**

2. **If you want to change the ownership of the item for which you are viewing change history, in the Owner field enter the name of the user who is to own (have responsibility for) that structure from this point on.**

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 lower portion of the dialog box. (You will not be able to type in the upper portion of the dialog box to modify an entry once it has been made.)**
4. **Select Apply in the Change History dialog box. Dismiss the dialog box then select Apply in the window you are using to modify the structure to update the change diary. The next time you display the Change History dialog box, your entry will appear in the upper portion of the screen along with the time you made the entry and your user name.**

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 of the User Tool and should be written accordingly. The Help Text window for 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 selecting the On Context item under the Help menu or by pressing the Help key (or F1 if no Help key) with the cursor on the field. If the user selects On Context 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. Accordingly, you should write the help text with your users in mind.

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, active links, and admin commands, 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, use context-sensitive help on the schema window.
- For help on admin commands, select the Run Admin Command option and select the command you want help for.

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 structures.

Setting Up the AR System 2

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 and custom user or administrator commands (extensions) as automation aids.

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 F 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 2-1 on page 44.

  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.

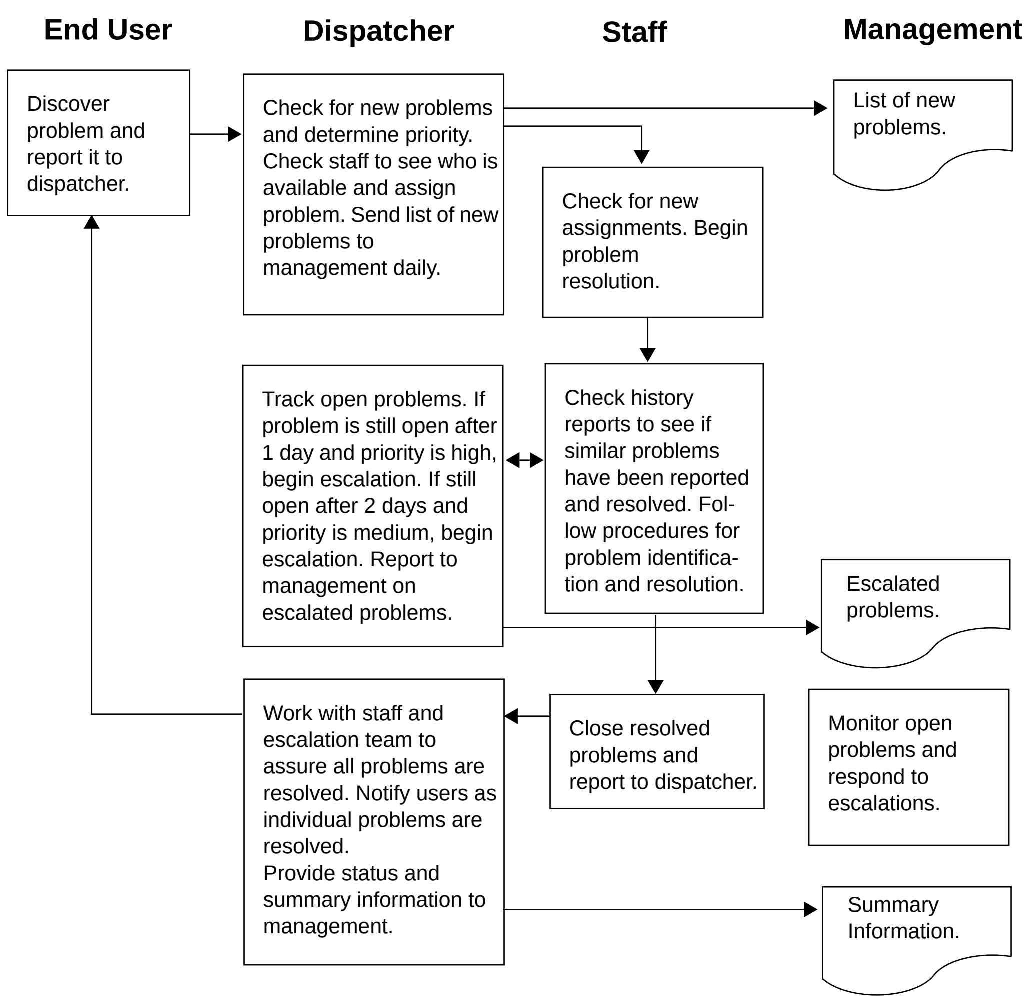

Figure 2-1 Workflow Process Flowchart Example

Designing Schemas

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

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 4.

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 2-2 on page 46. Notice that the field labels appear in different styles. The styles have special meaning, as described below:

Italic text	Field 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.

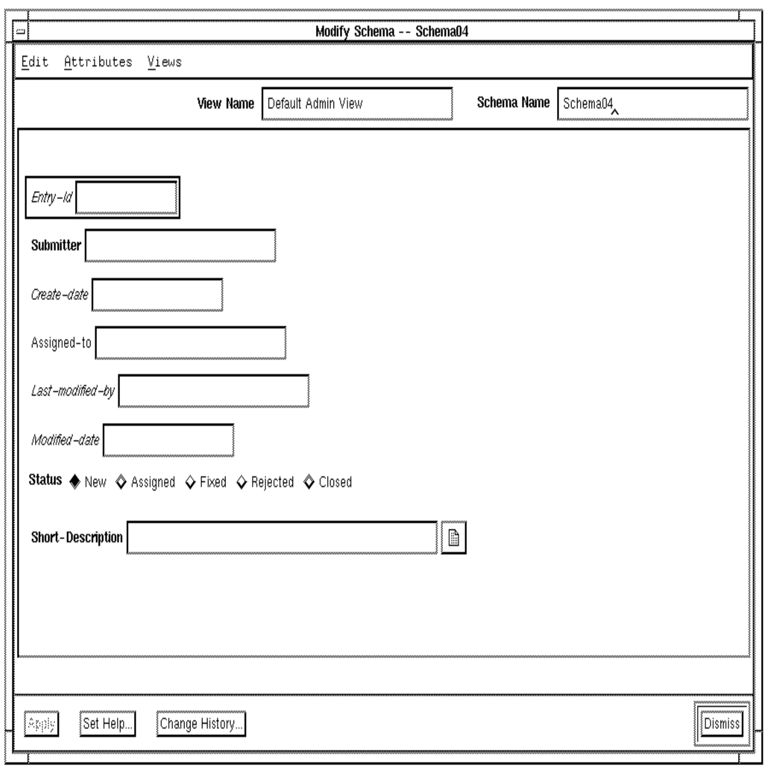

Figure 2-2 New Schema with Core Fields

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. Remember when deciding where to place fields that will have character menus, text editors, or diary editors associated with them that 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 your schema out 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 the schema out 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. For more information on the User and Group schemas, see Chapter 3.

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 Chapter 4. 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 Getting Started Guide and Sample Schemas* manual 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.

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 "Multiple Schema Views" on page 118.

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 schema. For information on how to set attributes for a schema, see Chapter 4.

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 4, includes step-by-step instructions for defining fields and describes each of the field properties in detail.

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 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 another 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 5, 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 2-1. A single filter can invoke up to 25 multiple actions.

Table 2-1 Filter Actions

Action	Description
Notify	Sends text to a specified user or group.
Message	Sends an interactive error, warning, or note to the user who initiated the transaction.
Log to File	Records an entry in an audit trail log file.
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, the results of an independent system process or the results of a mathematical calculation or a function.
Run Process	Runs a specified program.

Filter processes run on the server, as opposed to **active links**, which run on the client machine (see "Designing Active Links" on page 60). 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 or 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 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 Francie Frontline with a notification to her. 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 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: Assign-Escalate-State and Fix-Escalate-State. Both are Selection type fields and are optional. 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 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 2-3 illustrates how escalation intervals work:

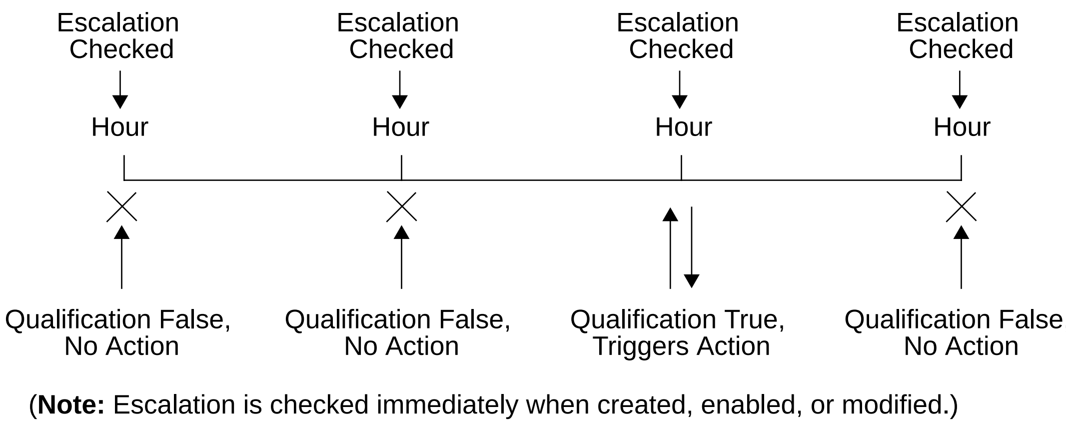

Figure 2-3 Escalation Intervals

Escalation intervals are immediately checked when the escalation is created or enabled or when the interval is 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 2-4 illustrates how escalations are executed in the AR System.

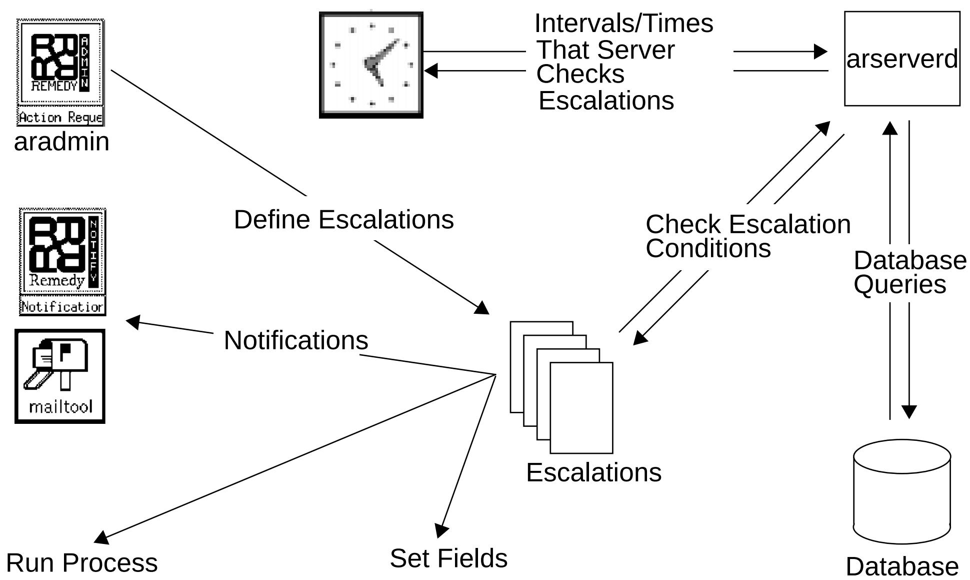

Figure 2-4 Escalations in the AR System

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 2-2. A single escalation can invoke up to 25 multiple actions.

Table 2-2 Escalation Actions

Action	Description
Notify	Sends text to a specified user or group.
Log to File	Records an entry in an audit trail log file.

Table 2-2 Escalation Actions

Action	Description
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.
Run Process	Runs a specified program.

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 54.

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 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 execution option, 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 2-3 below.

Table 2-3 Active Link Execution Options

Option	Description
Button	Places a button that the user can select on the schema. You can attach more than one active link to a button.
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).
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.)

Table 2-3 Active Link Execution Options

Option	Description
Display	Executes the active link when a user retrieves an AR for display.
Menu Choice	Executes the active link when the user selects a choice from a character menu.
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.

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 hostname 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 2-4 below. A single active link can invoke up to 25 multiple actions.

Table 2-4 Active Link Actions

Action	Description
Run Macro	Executes an AR System macro.
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.
Run Process	Executes an independent system process on the client system.
Message	Sends an interactive error, warning, or note to the user who initiated the transaction.
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)

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 are making determinations about how to manage your workflow process, it is important to be aware of both the differences and the similarities of filters and active links.

Table 2-5 summarizes the features of filters and active links.

Table 2-5 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.
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:		
Log to File	Creates audit trail of transactions that meet conditions.	Not applicable.
Notify	Provides active event notification.	Not applicable.
Message	Displays error message, note, or warning to user.	Displays error message, note, or warning to user.
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.
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.

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

	Filter	Active Link
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, 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.
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.

Automation Aids

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 two more capabilities: **macros** and **custom commands**.

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, users can set the **ARPATH** environment variable to define a search path for 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 recording and using macros as well as on the **ARPATH** variable, see the *Action Request System User's Guide*.

Custom Commands

Custom commands (extensions) can be created by you as the administrator or by users, if they are running the User Tool on a UNIX client. Custom commands are simply a facility for invoking other programs from within the User Tool. Examples of useful custom commands include the following:

- Start a shell or text editor with the file of all hosts on the network.
- Start a spreadsheet loading a statistics file.
- Start a network management system, such as SunNet Manager, HP OpenView, or IBM NetView / 6000.

Note – Because of the differences in the operating systems, it is not possible to run custom commands **on the Windows or Macintosh clients.**

Administrator commands are custom commands that you create using the Administrator Tool. Administrator commands are available to users with the appropriate permissions through the Actions menu of the Query window and execute on the server. See Chapter 9, for information on creating or modifying custom administrator commands.

User commands are custom commands that users create and run through the Actions menu of the User Tool's Query window. See the **Action Request System User's Guide** for information on creating and modifying user commands.

Custom commands can be executed from within a macro. For example, you can create a macro that generates a statistical report and starts a spreadsheet that loads the report.

Setting Up Groups and Users 3

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, active links, and admin commands 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 individual schema fields 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 71, the submitter and assignee must have valid AR System write licenses to be able to take advantage of the Change access privileges given to the special groups.

The diagram shown in Figure 3-1 on page 71 illustrates how access control is defined and operates. In this example, the field definition for a specific field gives the “Help Desk” 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 Help Desk 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.

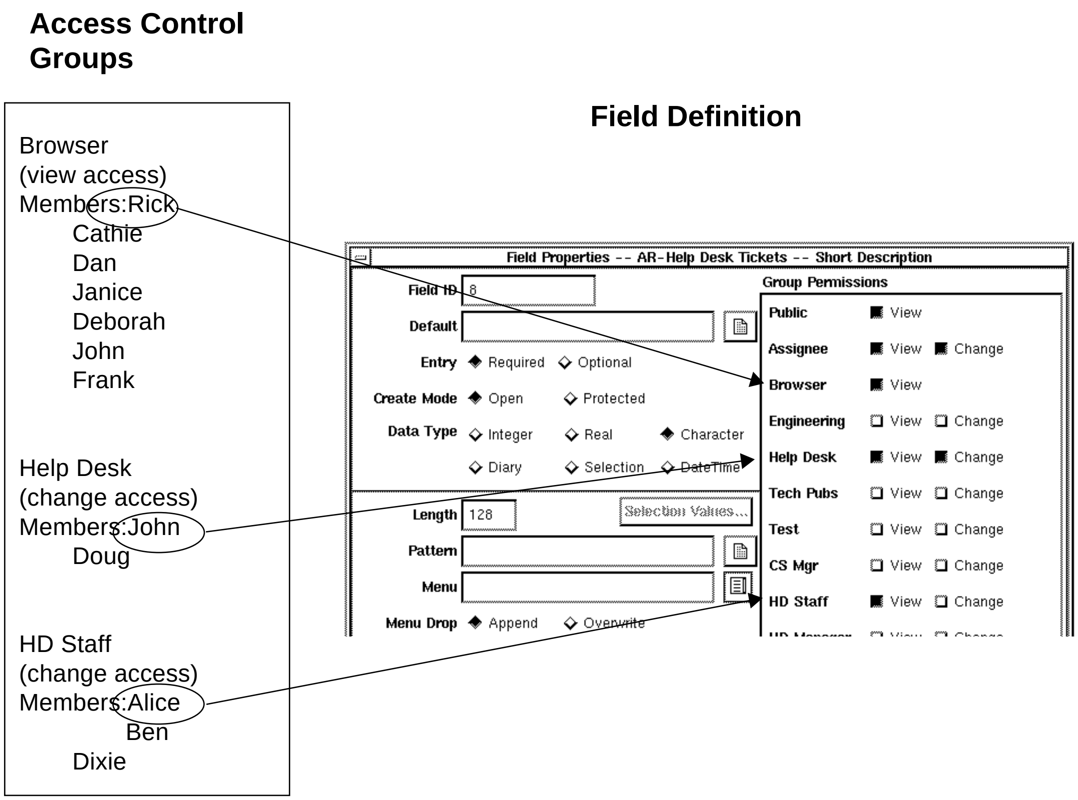

Figure 3-1 Access Control Operation

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 Password” on page 83 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 25.

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, active links, and administrator commands. They are also used to define groups of users to receive notifications. 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.

Subadministrator	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 84.
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 18 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 71.

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, active links, and administrator commands.

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 in a database provided by a special AR System schema, called the **Group** schema, shown in Figure 3-2 on page 76. 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.

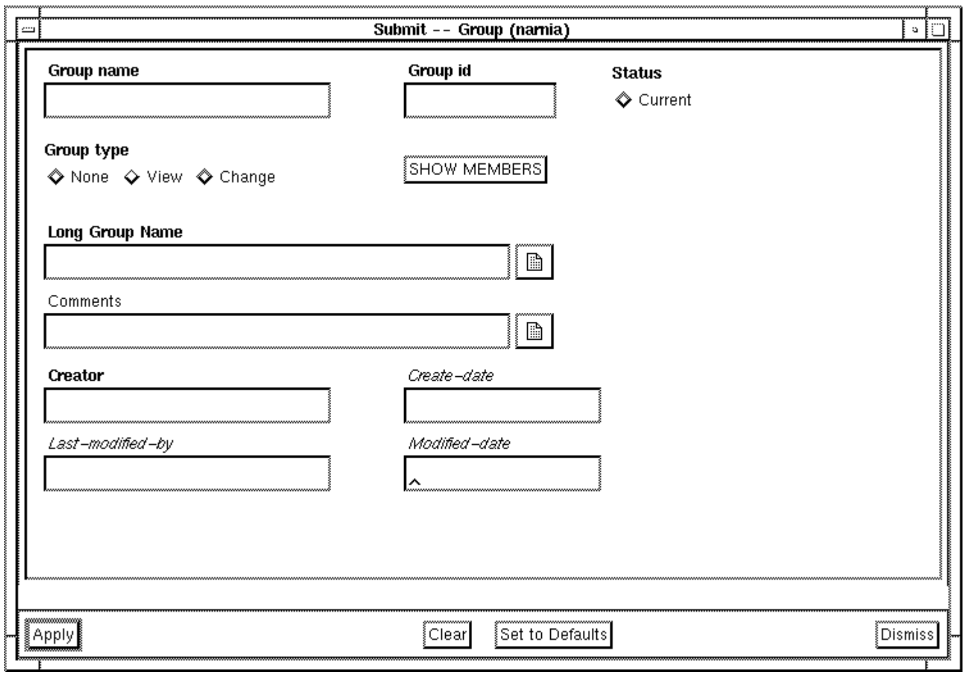

Figure 3-2 Submit Windows — Group Schema

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 12. 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 typing the following at the UNIX prompt:**

```
<ar_install_dir>/bin/aruser &
```

2. **If this is the first time you have used the User Tool, the Login window appears. Enter your user name and password, then select the Apply button.**

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

Note – For more information on the Demo user, see “Starting the Administrator Tool” on page 6.

3. **Select Open Schema from the File menu (or type `Ctrl+O`), then select the Group schema from the list in the Open Schema dialog box. Double-click on the name or select the Apply button to load the schema.**
4. **Once the Group schema is loaded in the Query window, select Open Submit from the File menu (or type `Ctrl+S`). The Group schema appears in the Submit window (as shown in Figure 3-2).**
5. **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.

6. **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 80.)

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 (or type `Ctrl+L`) 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. **Select Open Schema from the File menu (or type `Ctrl+O`) then select the Group schema from the list in the Open Schema dialog box. Double click on the name or select the Apply button to load the schema.**
2. **Select Query List from the Query menu (or type `Ctrl+L`) to retrieve a list of currently defined groups.**
3. **Select the group that you want to delete from the list.**
4. **Select Delete from the Query menu in the Query List window.**
5. **A confirmation box will appear to verify that you want to delete the group entry. Click the Apply button to confirm. Click the Dismiss button to cancel the delete operation.**

AR System Users

When adding users to the system, you'll need to 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, shown in Figure 3-3.

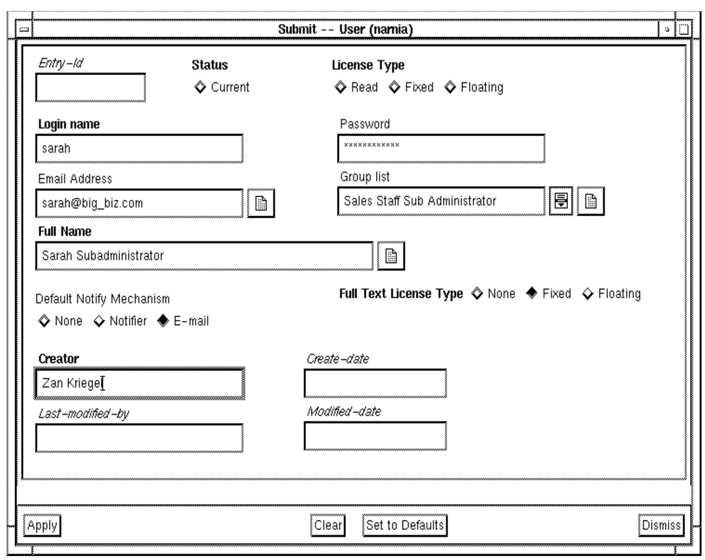

Figure 3-3 Submit Window — User Schema

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 18 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. For more information, see Chapter 14.

Whether or not users have permission to access an AR System database, specific fields or active links in a database, or specific administrator commands 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 typing the following at the prompt:

```
<ar_install_dir>/bin/aruser &
```

2. If this is the first time you have used the User Tool, the Login window 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.

Note – For more information on the Demo user, see “Starting the Administrator Tool” on page 6.

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3. Select Open Schema from the File menu (or type `Ctrl+O`) then select the User schema from the list in the Open Schema dialog box. Double-click on the name or select the Apply button to load the schema.

4. Once the User schema is loaded in the Query window, select Open Submit from the File menu (or type `Ctrl+S`). The User schema appears in the Submit window (as shown in Figure 3-3 on page 80).

5. Enter information in the appropriate fields.

Always set passwords, especially for the AR administrator. It is recommended that you make Password a required field. For security reasons, the password you enter is not echoed 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) and/or any access control group defined in the Group schema. In the example in Figure 3-3 on page 80, Susan Subadministrator will be a member of the Sales Staff and Subadministrator 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 structures 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 84. For example, users will be able to modify all fields and delete entries and to manage structures 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.

6. 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. For more information, see the *Action Request System Getting Started Guide and Sample Schemas* manual.

Allowing Users to Modify Their Password

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. **Select Open Schema from the File menu (or type `Ctrl+O`) then select the User schema from the list in the Open Schema dialog box. Double click on the name or select the Apply button to load the 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. **Select Delete from the Query menu in the Query List window.**

5. **A confirmation box will appear to verify that you want to delete the user entry. Click the Apply button to confirm. Click the Dismiss button to cancel the delete operation.**

Subadministrator Permissions

Granting subadministrator permissions to a user is a powerful feature of the AR System. Users can be granted subadministrator permissions to a subset of available schemas, as shown in Figure 3-4. 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.

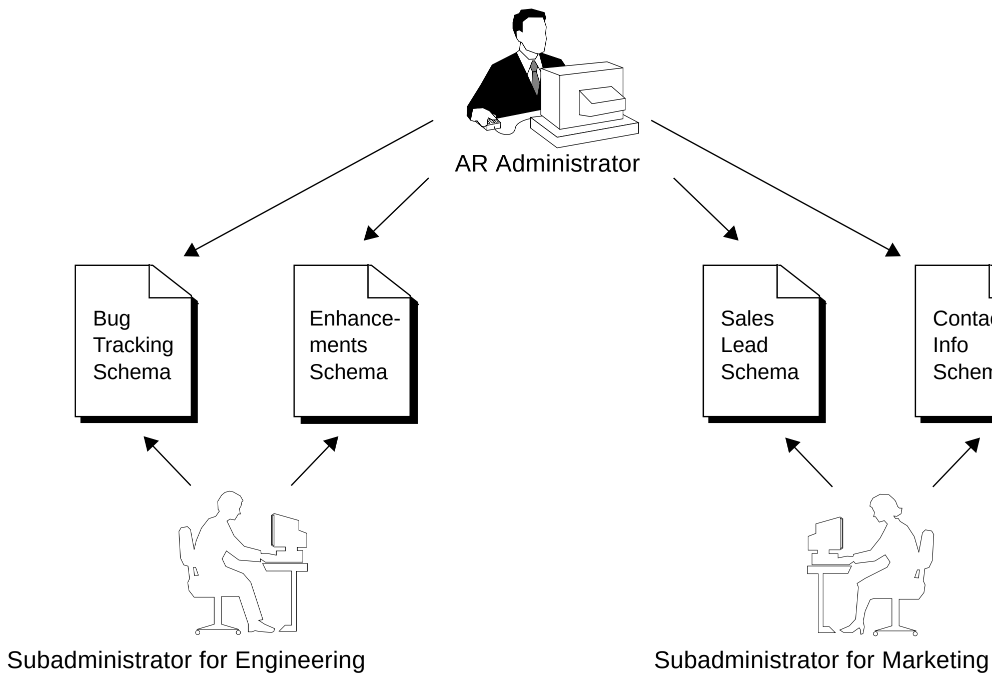

Figure 3-4 Users Subadministering Schemas

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

- Administer any schema that your group has subadministrator access to.
- Create and administer filters, active links, and escalations connected to schemas that your group has administrative access to.
- Create and administer menus.
- Create new schemas.
- View server information settings.
- Set local Administrator Tool preferences.

However, members of the Subadministrator group cannot:

- Change server information settings.
- Create or modify administrator commands (extensions).
- Release users currently accessing the AR System.
- View users of the AR System.

Allowing multiple subadministrators poses interesting administrative challenges. For example, if you allow 2 different groups (say, Engineering and Marketing) subadministrator 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 having subadministrator capabilities:

1. **In the User Tool, select Open Schema from the File menu (or type `Ctrl+O`) then select the User schema from the list in the Open Schema dialog box. Double-click on the name or select the Apply button to load the schema.**

2. **Once the User schema is loaded in the Query window, select Open Submit from the File menu (or type `Ctrl+S`). The User schema appears in the Submit window (as shown in Figure 3-3 on page 80).**

3. **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.**

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

   a. **In the Group list field, use the pull-right 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**

subadministrator permissions to a schema. In the example in Figure 3-3 on page 80, Sarah Subadministrator will be a member of the Sales Staff and Subadministrator groups.

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 as a subadministrator.

Use the Subadmin Permissions dialog box (see Figure 4-11 on page 130) in the Modify Schema window to give subadministrator permissions to a schema to a specific group or groups. For example, Sarah Subadministrator will not have subadministrator permissions to a schema unless you explicitly give them to her group. To define subadmin permissions, see "Defining Subadmin Access For Schemas" on page 130.

Defining Schemas 4

This chapter describes how to create and modify schemas. You should be familiar with the information in “Designing Schemas” on page 44 before you perform the operations described in this chapter.

The following topics are covered in this chapter:

- Creating or modifying schemas.
- Creating or modifying schema fields.
- Setting field properties.
- Rearranging field layout.
- Schema views.
- Creating or modifying active links from a Schema window.
- Setting schema attributes.
  - Defining indexes.
  - Defining query list fields.
  - Defining schema permissions.
  - Defining group access to schema fields.
- Setting help for a schema.
- Building and using schema change history.

Using the Modify Schema Window

When you open a schema, it is displayed in the Modify Schema window. Figure 4-1 shows a new schema containing only core fields.

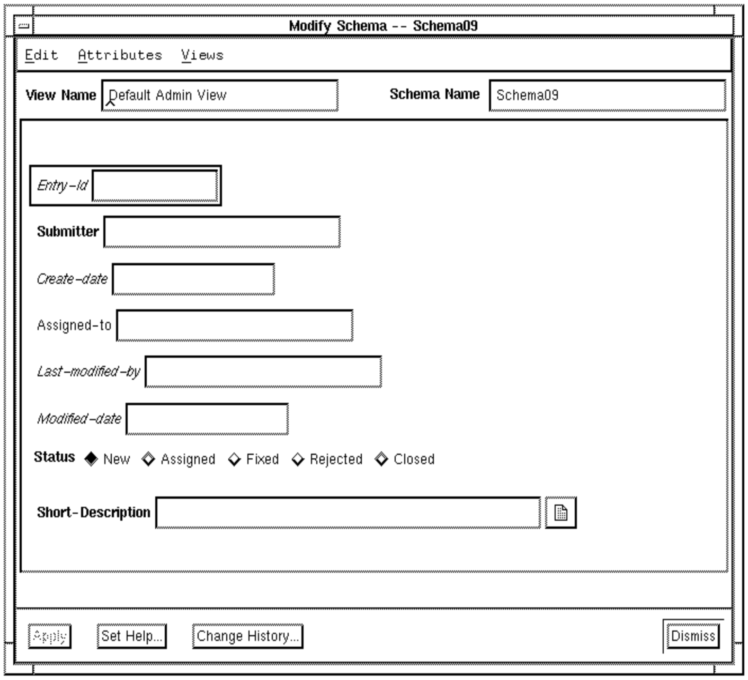

Figure 4-1 Modify Schema Window

You use the Modify Schema window to perform the following tasks:

- Specify a schema name.
- Create new fields.
- Set definition and display properties of fields, such as default value, data type, access control and permissions, field label, field length, and presentation.
- Create button-activated active links.
- Re-arrange the field layout.
- Define and select multiple schema views.

- Create help text for the schema and for the fields on the schema.
- Define schema attributes such as indexing, fields returned in a query, permissions for the schema, and subadministrator definitions for the schema.

This chapter describes the steps to follow to perform the tasks above. It also provides details about the field properties you define. Chapter 2, provides information about planning for these tasks.

Opening Schemas

Follow these steps to open a new or existing schema.

To open a schema:

1. Select Schemas from the Category menu in the Administrator Tool window (or type `Ctrl+S`).

The currently available schemas are listed.

2. To create a new schema, select Create a New from the Edit menu (or type `Ctrl+N`).

A new schema is created and assigned the name **`Schema`***<nn>*, where *<nn>* is an integer.

3. To modify a schema, select Open from the Edit menu, or type `Ctrl+O`, or double-click the schema in the window to open the schema. (If you just created a new schema, it is already opened.)

The schema appears in the Modify Schema window (Figure 4-1 on page 90).

Naming Schemas

For a newly created schema, the value in the Schema Name field will be **`Schema`***nn*, where *nn* is an integer. For a copy of an existing schema, the value in the Schema Name field will be **`Copy of`** *<xxx>*, where *<xxx>* is the name of the schema you copied. In either case, replace the value in the Schema Name field 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 schema name or a modification to a schema.

Deleting Schemas

Deleting permanently removes a schema and all associated ARs. Any filters or active links tied to this schema will also be deleted**.** Follow these steps to delete an AR System schema:

To delete a schema:

1. **Select Schemas from the Category menu (or type `Ctrl+S`).**

The currently available schemas are listed.

2. **Select the schema to be deleted.**

3. **Select Delete from the Edit menu.**

A confirmation message appears.

4. **Select Proceed with delete to delete the schema. Or select Cancel Delete to cancel the delete operation.**

Note – The delete operation is permanent and cannot be undone. Make sure you no longer need a schema before deleting it.

Creating or Modifying Fields

You can create new fields or modify existing fields at any time. You do not need exclusive access to the system; other users can continue using the schema. 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, setting the index for full text search, 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 for a full copy of the schema and its data to be possible.

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

To create a new field:

1. **Open the schema.**
2. **Select New Field from the Modify Schema window's Edit menu (or type `Ctrl+F`).**

The new field appears at the top of the Modify Schema window and the Field Properties window appears.

3. **Specify the field's properties by filling in or modifying the values in the Field Properties window. (See "Field Properties" on page 97 for information on the values you enter in the Field Properties window.)**
4. **In Group Permissions, select the Set To Defaults button to use the predefined settings from the Admin Preferences — Default Field Permissions window (see "Setting Default Schema Permissions" on page 30). If needed, however, you then can override individual default settings.**
5. **Select the Set Help button in the Field Properties window to open a Field Help Text window that lets you enter informational text about the field. (Users will see this text when they select Help On Context for the field.) Apply the changes and Dismiss the Field Help Text window when you are finished.**

6. Select Change History if you want to enter a note describing the field you are creating. The Change History lets you keep a log of modifications made to a field over time. (See “Building and Using Change History” on page 36 for more information.) Apply the changes and Dismiss the Change History window when you are finished.

7. When you have entered the appropriate values in the Field Properties window, select the Apply button, then select Dismiss to dismiss the Field Properties window.

8. 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 Field Properties window.) See “Rearranging Field Layout” on page 117 for more information.

9. Select the Apply button in the Modify Schema window to add the field to the schema.

To modify a field:

1. Open the schema (see “Opening Schemas” on page 91).

2. Select the field and open the Field Properties window by selecting Properties from the Modify Schema window’s Edit menu, double-clicking on the field, or typing `Ctrl+R`.

3. Make the appropriate modifications to the field’s properties by filling in or modifying the values in the Field Properties window. (Note that you will not be able to modify the field’s data type.) For information on the values that you can enter in the Field Properties window, see “Field Properties” on page 97.

4. Select the Set Help button to open a Field Help Text window that lets you modify the informational text about the field. (Users will see this information when they select Help On Context for the field in the User Tool.) Apply the changes and Dismiss the Field Help Text window.

5. Select the Change History button if you want to enter a note describing the modifications you are making to the field. The Change History lets you keep a log of modifications made to a field over time. (See “Building and Using Change History” on page 36 for more information.) Apply the changes and Dismiss the Change History window when you are finished.

6. **When you have modified the appropriate values in the Field Properties window, select the Apply button, then select Dismiss to dismiss the Field Properties window. You do not have to close the Field Properties window but can select another field to modify. The Field Properties window displays the properties of any field you select from the Modify Schema window. But any changes to the field properties are not saved until you select Apply in the Field Properties window.**

7. **Select the Apply button on the Modify Schema window to apply the changes to the database.**

To delete a field:

1. **Select the field to be deleted. You cannot delete the core fields.**

2. **Select Delete from the Modify Schema window's Edit menu.**

If you change your mind, you can restore the field at this point by selecting the field and choosing Un-Delete from the Edit menu.

3. **Select the Apply button on the Modify Schema window to perform the delete in the database. When the field is successfully deleted, it will be removed from the view on the screen and from the database. You will not be able to select Un-Delete at this point.**

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 (see "Opening Schemas" on page 91).**

2. **Select the field and open the Field Properties window by selecting Properties from the Modify Schema window's Edit menu, double-clicking on the field, or typing `Ctrl+R`. Change the following options:**

- In the Default field, delete any existing default information.
- For Entry, select Optional.
- For the Visible / Hidden choice, select Hidden.
- In the Group Permissions box, make sure all selection choices are deselected (so that no group has access to the field).

3. **Select the Apply button and dismiss the window.**
4. **Select Apply on the Modify Schema window 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.

To create a new field that is a copy of an existing 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. **Select Copy from the Modify Schema window's Edit menu (or type `Ctrl+C`).**

The new field appears at the top of the schema, named **`Copy of`** *<xxx>*, where *<xxx>* is the name of the field you copied. The Field Properties window appears.

All settings for this field are the same as the original field.

3. **Change any values as desired. Enter a new name in the Label field to change the field's name.**
4. **Select the Set Help button to open a Field Help Text window that lets you modify the informational text about the field. Apply the changes and Dismiss the window when you are finished.**
5. **Select the Change History button if you want to enter a note describing the field you are creating. The Change History lets you keep a log of modifications made to a field over time. (See "Building and Using Change History" on page 36 for more information.) Apply the changes and Dismiss the Change History window when you are finished.**

6. **After you have made all your changes to the field definition, select the Apply button to save the changes then dismiss the Field Properties window.**

7. **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 Field Properties window.) See "Rearranging Field Layout" on page 117 for more information.**

8. **Select the Apply button on the Modify Schema window to add the new field to the schema.**

Field Properties

When you create a new field (using either New Field or Copy from the Edit menu of the Modify Schema window), a Field Properties window appears, as shown in Figure 4-2 on page 98. You can also display this window for an existing (selected) field by selecting Properties from the Edit menu, by typing **`Ctrl+R`**, or by double-clicking the field.

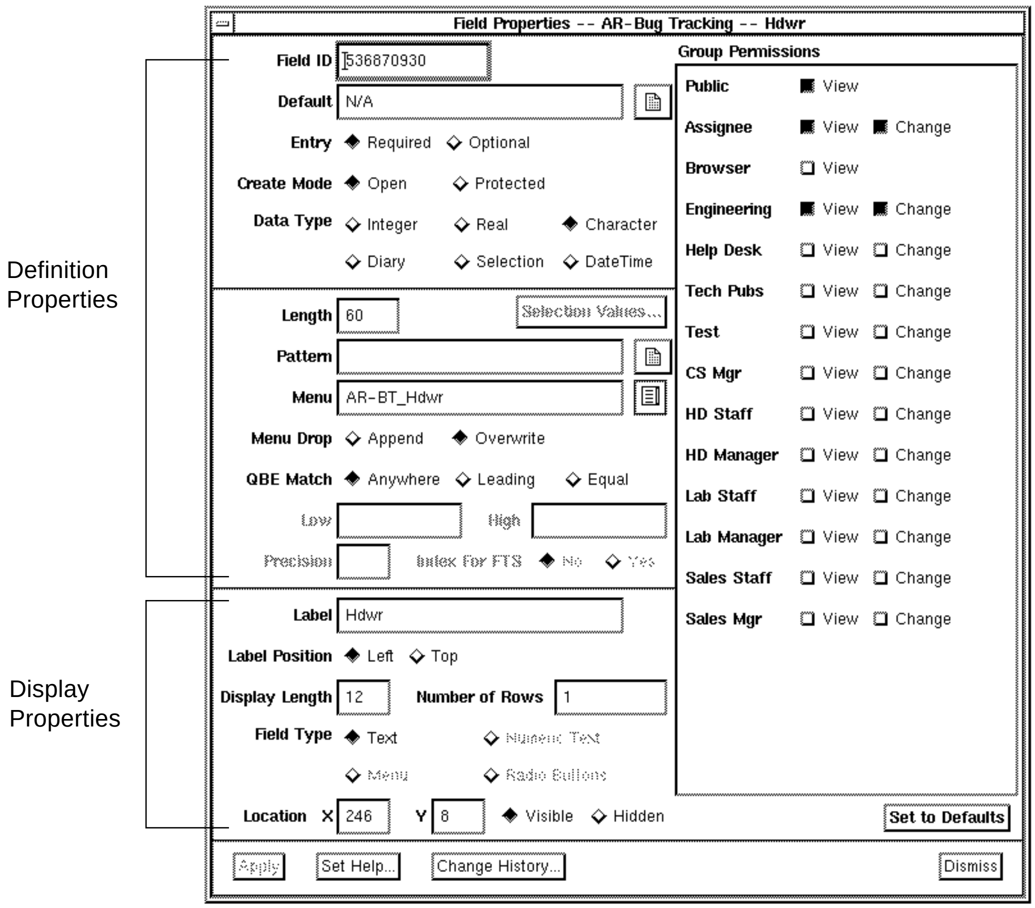

Figure 4-2 Field Properties Window

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. Use the Field Properties window to change a field's definition and display properties:

- **Definition** properties of a field apply to *all* schema views. For example, you can decide whether a field should be indexed for full text searches, what group permissions it should have, and so on.

- **Display** properties of a field 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.

To create and modify fields in a schema view, see “Multiple Schema Views” on page 118.

The following information summarizes each of the definition and display settings in the Field Properties window and provides guidelines for filling in the values in each field.

Field Definition Properties

The following field settings apply to *all* schema views.

Table 4-1 Field Definition Properties *(1 of 9)*

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.

Table 4-1 Field Definition Properties *(2 of 9)*

Default	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 unless the user enters a different value or has assigned a user default to the same field. You are limited to 255 characters. Also, the number of characters you enter into the Default field *cannot* exceed the number allowed in the Length 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.
Entry	The Entry option 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. 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 52 and Chapter 6. For more information about active links, see "Designing Active Links" on page 60 and Chapter 8.

Table 4-1 Field Definition Properties *(3 of 9)*

Create Mode	This choice allows you to select the create mode for the field. The create mode works in conjunction with the Group Permissions settings to determine access control (security settings) for the field at the time an AR is submitted. Select a create mode of Open to allow 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. Select a create mode of Protected to restrict data entry to users who belong to one or more groups with explicit change permission for the field. **Note:** If the submit mode is set to Protected, only users with write access to the field can set a value for that field. Since write access requires a write license, this means that only users with a fixed or floating write license will be able to set a value for the field. Setting the submit mode to Open will allow anyone to submit a value for the field, regardless of whether they have a write license.

Table 4-1 Field Definition Properties *(4 of 9)*

Data Type	The data type field property lets you specify the kind of information that will be contained by the field. There are six possible data types: * Character * Date Time * Diary * Integer * Real * Selection Table 4-2 on page 109 summarizes the meanings and use of the field data types. As you select a data type, other field property choices will be grayed out or activated according to the data type you select. This is because certain properties are relevant only to specific data types. Because the choices are grayed or activated automatically, you do not need to worry about whether or not a field property setting is meaningful for the data type you select. **Note:**You can only set the data type property for a new field; once you have applied your choice in the Field Properties window, you will not be able to modify the data type.

Table 4-1 Field Definition Properties *(5 of 9)*

Length	For character fields, 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 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 with the **SELECT** mouse button. 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.
Selection Values	For selection-type fields, you can set the selection values of the field. For more information, see "Creating Selection Field Values" on page 114.

Table 4-1 Field Definition Properties *(6 of 9)*

Pattern	For character fields, you can specify a **pattern** for the field contents. Specifying a pattern restricts what the user can enter as the contents of a 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 wildcard characters that are allowed in the LIKE comparison operation (see “Table of Operators” on page 366). The second type of pattern is a **keyword** that specifies a style for the field. You can specify only one keyword for a pattern and the pattern keyword cannot be combined with a pattern of characters and wildcards: **$ALPHA$** 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 blankspace) **except** uppercase letters. **$MENU$** Value must match an item defined on the character menufor the field. **$PRINT$** Value must be printable characters. **$UPPER$** Value may be any alphabetic character or digit (and blank space) **except** lowercase letters.
Menu	For character fields, you can enter the name of a menu to be used as a fill-in aid for the field. See Chapter 5 for information on creating and defining a menu. You can enter the menu name directly or you can use the mouse button to select the menu symbol and open a list of defined menus. You can then select a menu from the list.

Table 4-1 Field Definition Properties *(7 of 9)*

Menu Drop	For character fields, this choice allows you to specify how text will be added to the field when a user selects an item from a character menu. If you choose Append, the menu text will be added to any text already in the field. If you choose Overwrite, the menu text will replace any text already in the field.

Table 4-1 Field Definition Properties *(8 of 9)*

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 wildcards 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 (%) wildcard at the beginning of the search string (**`%abcd`**) to override a QBE Match setting of “Leading” or “Equal.” However, using the % wildcard 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.

Table 4-1 Field Definition Properties *(9 of 9)*

Mini-mum/Maxi-mum	For real and integer fields, you can define a minimum and maximum 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.
Precision	For real fields, you can set a limit on the number of decimal places that are displayed in the user's view. The number that is displayed is rounded off. (The data stored in the database is unchanged.) For flat-file databases, the maximum precision that can be represented is 10.
Index For FTS	If you are licensed for full text search, you can 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 326.

Data Types

Table 4-2 describes the various data types of fields you can create.

Table 4-2 Data Types *(1 of 3)*

Data Type	Summary
Character	Character fields accept strings of ASCII text. Character fields 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. Optionally, you can associate a **character menu** with a character 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 below), users are free to enter their own text in a character field even when character menus are defined for the field. See Chapter 5 for information on designing and creating a pull-right character menu. For character fields 70 characters and longer, users can also open a 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 length attribute. A special menu icon will appear to the right of any field for which it is possible to open a text editing window. For users with full text search licenses, you can also create a search index for long character fields. See "Defining a Field for FTS in the Field Properties Window" on page 326. 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 4-2 Data Types *(2 of 3)*

Date/Time	Date and time fields 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. Several date and time fields are part of the core set of fields. A date and time is also maintained with every state represented by the Status field (one of the core fields). This record is called the Status History.
Real	Real type fields 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.)
Integer	Integer type fields 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. Like real type fields, integer fields permit you to enter and store more quantitative information. 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.

Table 4-2 Data Types *(3 of 3)*

Diary	Diary type fields 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. 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. For users with full text search licenses, you can also create a search index for diary fields. See “Defining a Field for FTS in the Field Properties Window” on page 326. * 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.
Selection	Selection type fields offer a flexible method for providing a small number of choices. The user’s view shows the selections menu choices. The user **cannot** enter choices that are not included in the definition of the field. (This is one distinction between Selection fields and Character fields with menus.) You should use selections only in cases where you do not expect the options available to users to change over time. Altering the choices in a selection field often alters views and may require modifications to the existing database. If it *is* necessary to add new choices to a selection, add them to the end of the list to avoid having to modify the database. To specify the selection values for the field, select the Selection Values button and see “Creating Selection Field Values” on page 114.

Field Display Properties

You can define the following field settings for different schema views.

Table 4-3 Field 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, and should describe the meaning and purpose of the field. (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. It is possible to 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 (unless you set the Admin Preferences for this warning to No).
Label Position	This choice lets you specify whether a field label will appear above the field or to the left of it on the schema. Select Top to cause the label to appear above the field. Select Left to cause the field to appear to the left of the field.
Display Length	For text or numeric fields, you enter a display length 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.

Table 4-3 Field Display Properties *(2 of 3)*

Number of Rows	For radio buttons, the number of rows determines the number of horizontal rows used for the selection choices. 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.
Field Type	This choice allows you to set a field type, which determines how information will be presented. For character, date and time, diary, and real fields, the only choice is Text. For selection fields, you can choose . provide a visible set of choices from which to choose. For Integer type fields, you can choose Text or Numeric Text. Numeric Text provides increment and decrement arrows (▲▼).
Location	The Location fields 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 location 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.)
Visible/ Hidden	This choice allows you to specify whether the field will be visible or hidden. 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.

Table 4-3 Field Display Properties *(3 of 3)*

Group Permissions	The Group Permissions settings allow you to control who can view and change individual fields of a schema. You can prevent some groups from accessing the field while allowing full update permissions to other groups. A group permission of View means users who are members of the group are able to read the contents of the field. A group permission of Change means users who are members of the group may read and write the contents of the field. If neither permission is selected for a group, 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.) The groups listed in the Group Permissions area are the groups defined for the server. Select the appropriate View and Change levels for each group listed to determine the type of access that each group will have to this field. **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. Selecting View gives a group View permissions for schema fields while selecting Change gives a group View and Change permissions. You can use the Set to Defaults button to set the permissions to those defined in the Admin Preferences window (see "Setting Default Schema Permissions" on page 30). You can also set permissions for the entire schema using the Permissions schema property setting. See "Defining Schema Permissions for the User Tool" on page 128 for more information. For more information on groups, permissions, and access control, see Chapter 3.

Creating Selection Field Values

Follow these steps to create (or modify) the values available in a selection type field. You create selection field values in the Selection Values window shown in

Figure 4-3. You access the Selection Values window through the Field Properties window.

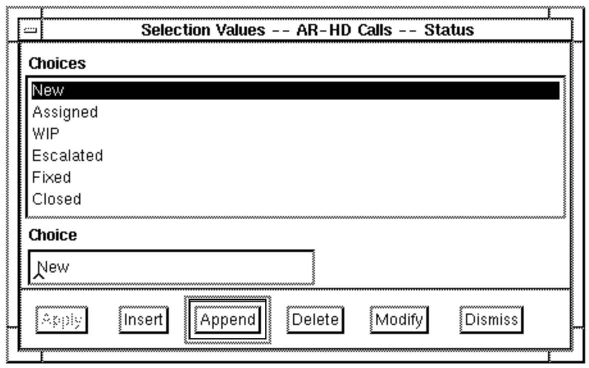

Figure 4-3 Selection Values Window

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.

To create selection values:

1. **Select the field.**

2. **Select Properties from the Edit menu, type `Ctrl+R`, or double-click the field to open the Field Properties window.**

3. **In the Field Properties window, select the Selection Values button, which is activated only for selection type fields. The Selection Values window appears (Figure 4-3).**

4. To add a new value, type the information in the Choice field, then use the Insert or Append buttons to add the value to the Choices list.

The list box in the Selection Values window 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 Choice field to specify a new value or edit an existing one. The Insert and Append buttons let you specify where a new value is inserted in the list box. Insert will add an item **before** the currently selected choice, while Append will add the item **after** the currently selected choice.

5. To delete a value, select the value in the Choices list, then select the Delete button.

(See the note above before adding or deleting choices in the middle of a selection field on an existing schema.)

6. To modify a value, select the value in the Choices list, edit the information in the Choice field, then use the Modify button.

7. Select the Apply button to save your changes.

Setting Help for a Field

Selecting the Set Help button in the Field Properties window brings up a Field Help Text editing window. You can supply help text for the selected field here. In most cases, this is simply a description of the field and its uses. For more information on setting help, see “Setting Help” on page 38.

Building and Using Field Change History

The AR System automatically records 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 selecting the Change History button at the bottom of the Field Properties window to open the Change History dialog box. For more information on viewing and modifying change history information, see “Building and Using Change History” on page 36.

Rearranging Field Layout

You can change the physical layout of a schema by dragging fields to reposition them, as shown in Figure 4-4. Dragging a field past the bottom (or top) of the visible window moves the field onto the next (or previous) schema page.

Note – You can reposition a field more precisely by specifying X and Y coordinates in the Field Properties window.

Select the field and drag it to a new location.

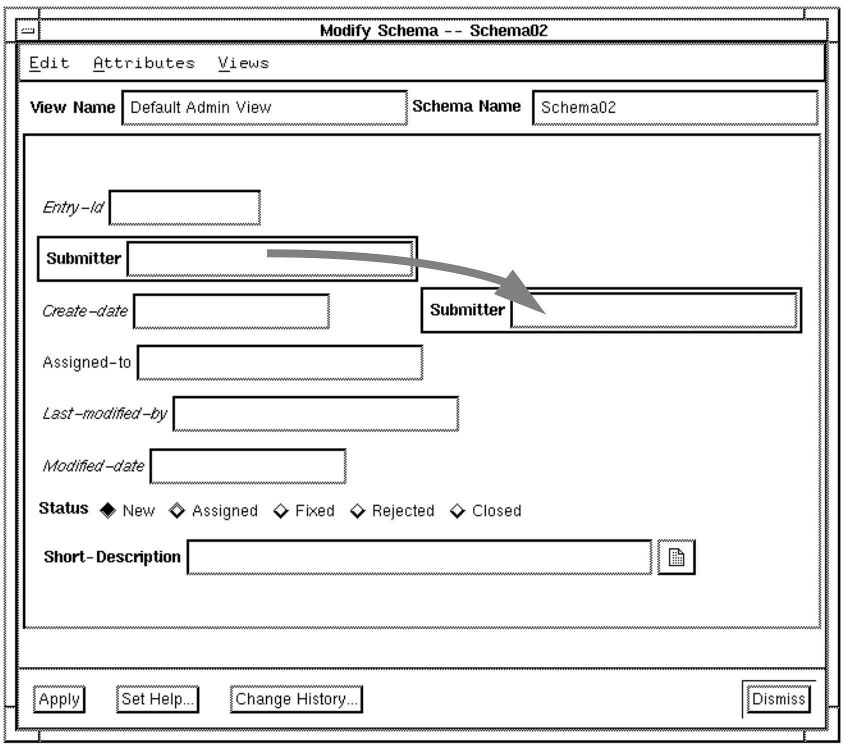

Figure 4-4 Rearranging Fields on a Schema

To move a field:

1. Open the schema to display it (if it is not already displayed).

2. **Select the field.**

3. **Drag the field to its new position.**

4. **You can continue modifying the schema by moving other fields, adding new fields, or setting the field definition or field layout. For more information, see the appropriate sections in this chapter.**

5. **When you are ready to save your changes, select the Apply button.**

Multiple Schema Views

As an administrator, you can provide users with multiple views of the same schema. For example, you might create a schema with one look 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.

The Administrator Tool lets you create as many schema views as you need for different users. Use the View menu to select a view, copy it, then create a different “view” of the schema by rearranging or even hiding fields.

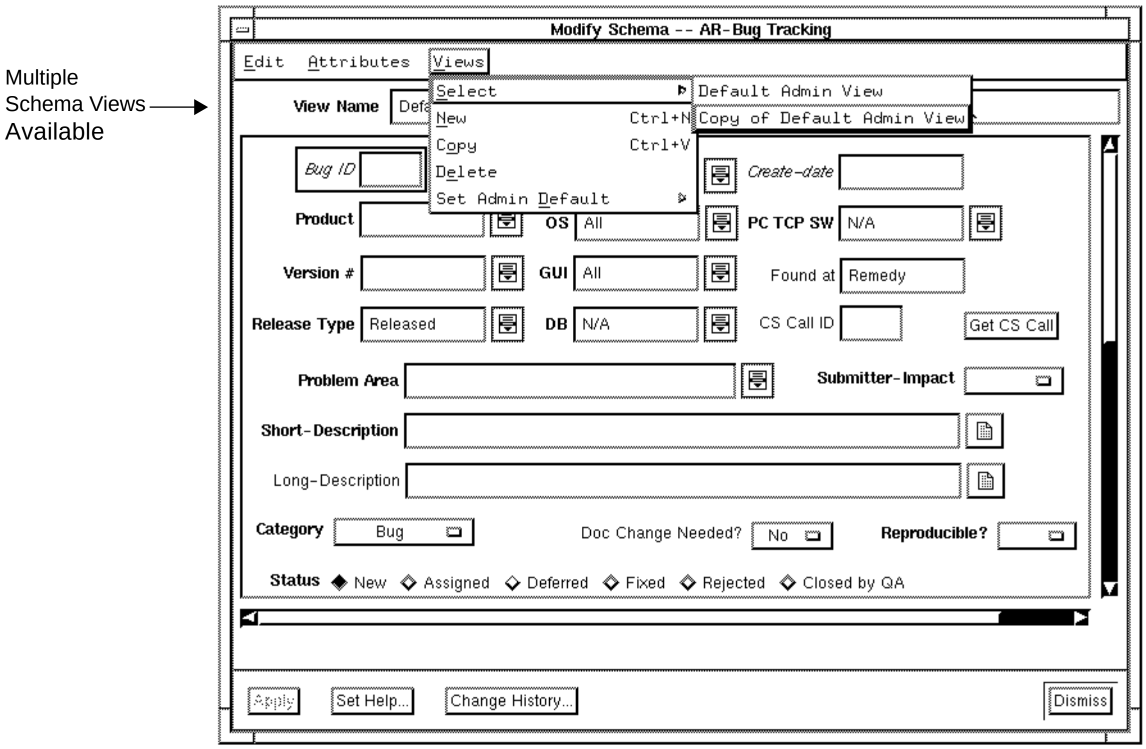

Figure 4-5 Modify Schema Window — Multiple Views

To define a schema view:

1. Open the Modify Schema window.

2. To create a new view, select New from the Views menu (or type `Ctrl+N`). Your first new view will be called `Copy of` *<xxx>* in the View Name field where *<xxx>* is the name of the original view.

To create a copy of a view, select the view you want to copy and then select Copy from the Views menu. The copied item will be called **`Copy of`** *<xxx>* in the View Name field where *<xxx>* is the name of the original view.

To open an existing view for modification, choose the Select sub-menu from the Views menu and choose one of the views.

The view appears in the Modify Schema window. Create new fields or re-arrange fields as needed.

3. **Rename the new view as appropriate, for example, `Windows Schema View`. You cannot create multiple views with the same name.**

4. **Drag fields to different positions, if needed.**

5. **To change the display properties of a field for this particular view, select the field by double-clicking on it. The Field Properties window appears.**

6. **Change the *display* properties for a field in each schema view as needed (see Figure 4-6). For example, you can hide the field, modify its label or display length, change label positions, and so on. For more information on the display properties of a field, see "Field Display Properties" on page 112.**

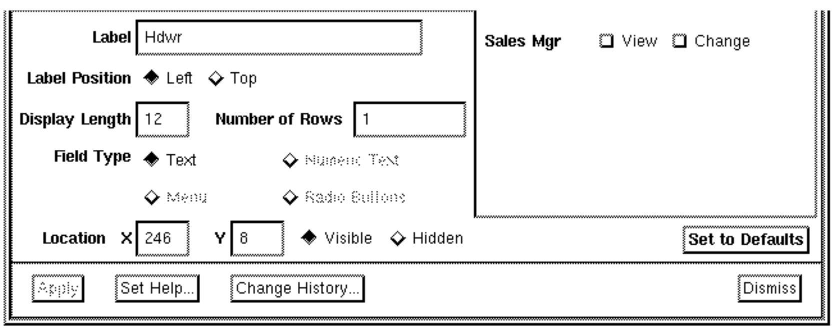

Figure 4-6 Field Display Properties

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.

---

7. **When you are ready to save your changes, select the Apply button in the Modify Schema window to save your definitions.**

To select and modify a schema view:

1. **Open the schema view to display it (if it is not already displayed).**

2. **From the Views menu, as shown in Figure 4-5 on page 119, choose a view from the Select sub-menu. Customized views created and exported from the User Tool also appear in the Select sub-menu. The name of the view you selected appears in the View Name window.**

3. **Make any needed changes.**

4. **When you are ready to save your changes, select the Apply button in the Modify Schema window to save your definitions.**

To delete a schema view:

1. **Open the schema view to display it (if it is not already displayed).**

2. **From the Views menu, as shown in Figure 4-5 on page 119, choose the view that you want to delete from the Select sub-menu.**

3. **Select the Delete button to delete the view.**

A warning message appears, listing the name of the view you want to delete.

4. **Press the Proceed with delete button if you are sure you want to delete the view.**

The view is removed from the Modify Schema window.

5. **When you have made all of the modifications you want to the Modify Schema window, select Apply to save the modified schema then select Dismiss.**

Creating or Modifying Active Links from the Modify Schema Window

For active links that are activated by a button, you can create, modify, or delete the active link directly from the Modify Schema window. This makes positioning the button and creating new active links for your schema much easier.

- To open the Active Link window, select New Active Link from the Edit menu of the Modify Schema window (or type `Ctrl+A`). See Chapter 8 for information on defining the active link.
- To modify an active link button, double-click the active link button and Modify Active Link window appears.

Defining Group Access For 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 Access dialog box lets you assign them all at once.

The Group Access — Schemas window is particularly useful when you have added a new access control group since the schemas were created and you want to set its access rights across a number of schemas. You can use this window to assign the new group access for each 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 Access window to set the group permissions for *all* schemas at the same time.

To define group access for schemas:

1. **Select Schemas under the Category menu of the Administrator Tool main window.**

2. **From the Edit menu, select Group Access (or type `Ctrl+G`). This causes the Group Access window to appear, as shown in Figure 4-7 on page 123. You use this window to set schema permissions globally for each group defined for a server.**

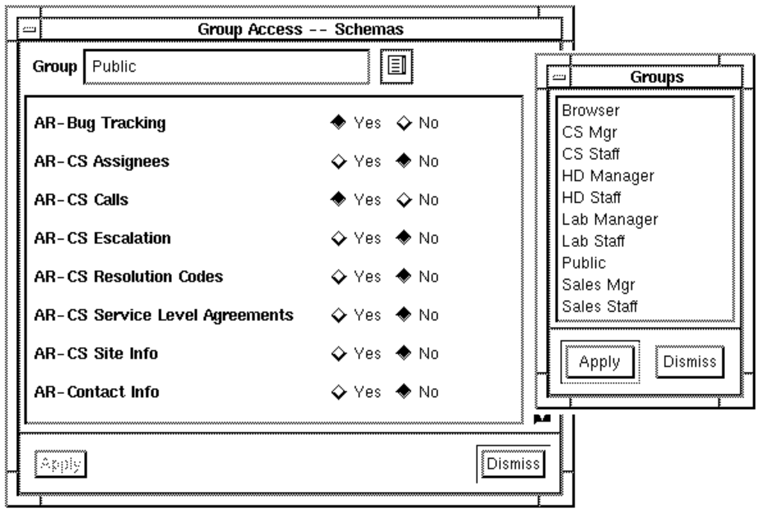

Figure 4-7 Group Access — Schemas Window

3. **Click the Group icon. The Groups dialog box appears.**
4. **Select a group from the dialog box, then click Apply (or double-click the entry). The Group Access window then lists all current permission settings for that group for all items in the current category.**
5. **For each item, set the schema permissions for the specified group. Selecting Yes gives the group permissions to access the schema.**
6. **Select the Apply button to save the option settings.**

Setting Schema Attributes

For each schema, you can define attributes (properties) that determine characteristics of how that schema will look and act during operations performed using the User Tool. You can define the following schema attributes:

Indexing	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.
Query List Fields	Allows you to specify which of the schema's fields will appear in a query list for the schema.

Schema 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 Subadministration privileges over the schema.
Field Group Access	Allows you to set permissions on all fields for a given group.

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

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 107.)

You should also avoid creating a large number of indexes on a schema, as this can be counterproductive.

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. **Create or open the schema for which you want to define an index.**

2. **Select Indexing from the Attributes menu (or type `Ctrl+I`). The Indexing dialog box will appear, as shown in Figure 4-8.**

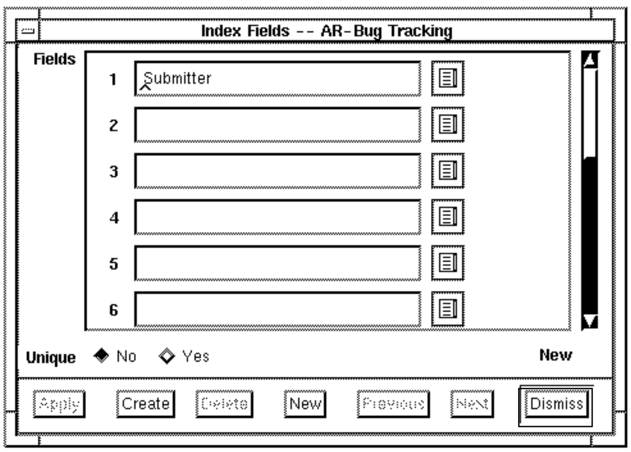

Figure 4-8 Index Fields Dialog Box

3. **Define the first index for the schema by entering the names of from one to 16 of the schema's fields in the data entry fields in the dialog box. These are the fields that will be included in the index. Enter the fields in the order that you want them indexed. You can use the character menu to select from a list of the existing schema fields.**

4. **Specify whether or not the index is a unique index by selecting the Yes or No radio button. Unique means that the system will enforce a rule requiring all values (existing and new) in the field or combination of fields 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.**

5. **When you have entered the names of the fields for the first index, select Create to create the index.**

6. **To create a second index for the schema, select the New button. A new set of data entry fields will appear. Enter the names of the fields to use for this index, select the Yes or No Unique indicator, if appropriate, and select the Create button to create the second index. Repeat this step as many times as needed to create the indexes you want.**

7. **Use the Previous and Next buttons to move from one defined index to another, as you desire.**

8. **Once you have created all the indexes that you need for the schema, select the Apply button in the Indexing dialog box then select Dismiss.**

9. **Select Apply in the Modify Schema window to save your definition. If you are creating indexes on a schema for which a lot of data already exists, this step may take a significant amount of time and disk space. Therefore, you may want to limit doing any defining of indexes during your normal production hours.**

Defining Query List Fields

The Query List Fields schema attribute setting allows you to customize which fields appear when a user performs a query list operation in the User Tool. By default, 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 is always 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. **Create or open the schema for which you want to define query list format.**

2. **Select Query List Fields from the Attributes menu (or type `Ctrl+Q`). The Query List Fields dialog box appears, as shown in Figure 4-9.**

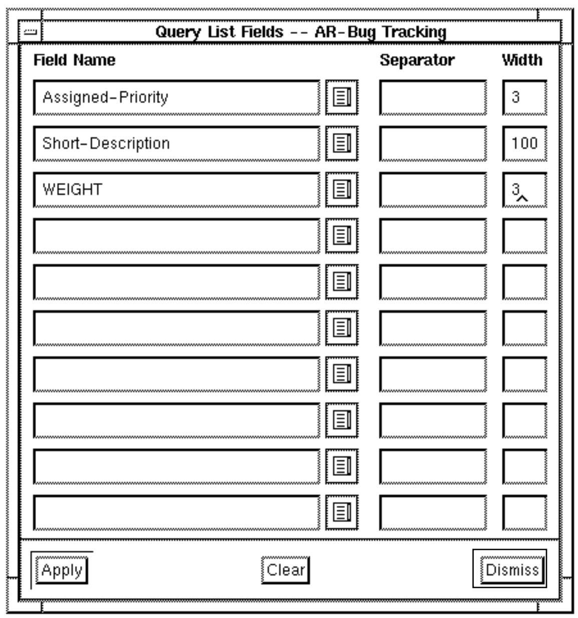

Figure 4-9 Query List Fields Dialog Box

3. **In the first Field Name field, enter the name of the first field that you want to appear in the list after the Entry ID field. You can type the name directly or use the list icon to select from a list of schema fields. Select as many fields as needed, but the total width of all fields cannot exceed 128 characters.**

If you have purchased the full text search option from Remedy Corporation, you can also select **`WEIGHT`** to display the weighted value of retrieved ARs when you do a query list in the User Tool. For further information, see "Accruing and Weighting Results in an FTS" on page 305.

4. **In the Separator field next to the field name you just entered, 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, not octal)

In the Width field next to the field name you just entered, 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. If you do not set a width, the width will be set to the full width of the field.

5. **Enter the names of additional fields that you want to appear in the query list, along with their separator characters and widths, in the remaining data entry fields. 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.**

6. **Select Apply to save your query list definition, then select Dismiss.**

7. **Select Apply in the Modify Schema window to save your definition.**

Defining Schema Permissions for the User Tool

The Schema Permissions dialog box allows you to 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 schema permissions:

1. **Create or open the schema for which you want to define permissions.**
2. **Select Schema Permissions from the Attributes menu (or type `Ctrl+P`). The Schema Permissions dialog box appears, containing a list of the access control groups defined on the server, as shown in Figure 4-10.**

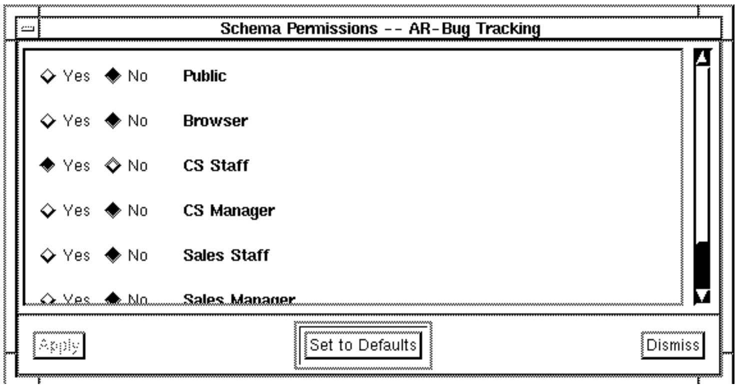

Figure 4-10 Schema Permissions Dialog Box

3. **For each listed group, select the Yes radio button to allow access to the schema, or the No radio button to disallow access.**
4. **To use default permissions, select the Set To Defaults button.**

Note – For information on default schema permissions, see “Setting Default Schema Permissions” on page 30.

---

5. **Select the Apply button to save your permissions, then select Dismiss.**
6. **Select Apply in the Modify Schema window to save your definition.**

To allow all users to see a schema:

- Select Yes for the Public group.

Defining Subadmin Access For Schemas

The Subadmin Permissions dialog box 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 72 and “Subadministrator Permissions” on page 84.

To define sub admin permissions:

1. **Create a new schema or open a schema to display the Modify Schema window (see Figure 4-1 on page 90).**
2. **From the Modify Schema window, select Subadmin Permissions from the Attributes menu (or type `Ctrl+S`). The Subadmin Permissions dialog box appears, containing a list of the access control groups defined on the server, as shown in Figure 4-11.**

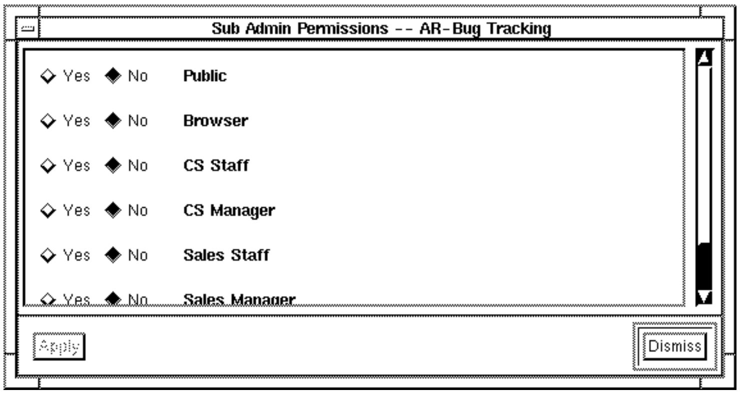

Figure 4-11 Subadmin Permissions Dialog Box

3. **For each listed group, select the Yes button to grant subadministrator access to the schema, or the No button to disallow access.**
4. **Select the Apply button to save your permissions, then select Dismiss.**
5. **Select Apply in the Modify Schema window to save your definition.**

Defining Group Access For Schema Fields

The Group Access — Schema Fields window (Figure 4-12 on page 132) allows you to determine View or Change access to field data. Group access for schema fields lets you do bulk assignments of permissions for a specific group for all fields within a schema. For example, rather than going through each field individually to assign permissions for a group, the Group Access window lets you assign them all at once. You then can modify access for specific fields individually, if required. (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.)

Group access is particularly useful when you have added a new access control group since the fields were created and you want to set its access rights across a number of fields. You can quickly assign the new group access for each field on one window instead of having to use the Field Properties window for each field.

For more information on groups, permissions, and access control, see Chapter 3.

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 window. 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 Access window to set permissions for all fields at the same time. For more information on setting individual field permissions, see "Group Permissions" on page 114.

To define group access for schema fields:

1. **From the Administrator Tool, select Schemas from the Category menu (or type `Ctrl+S`). The Schema List appears in the Administrator Tool.**

2. **From the Schema List in the Administrator Tool, open a schema by double-clicking on it (or select a schema, then type `Ctrl+O`). The Modify Schema window appears.**

3. **From the Attributes menu, select Field Group Access (or type `Ctrl+G`). This causes the Group Access — Schema Fields window to appear, as shown in Figure 4-12. You use this window to set schema permissions globally for each group defined for a server.**

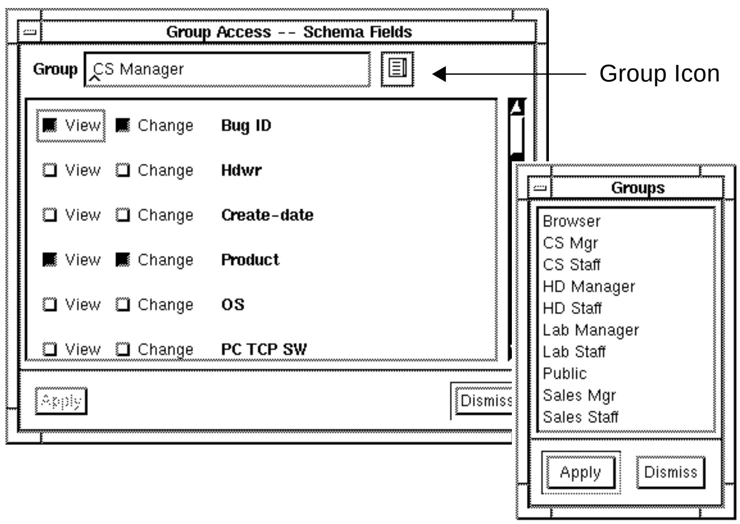

Figure 4-12 Group Access — Schema Fields Window

4. **Use the Group icon to select a group. The Groups dialog box appears.**

5. **Choose a group, then select Apply (or double-click the group).**

Depending on the group you choose, different buttons appear in the Group Access — Schema Fields window. Groups with a group type of View only allow you to select View permissions for schema fields. However, groups with a group type of Change allow you to select View and Change permissions.

6. **Set the permissions for each field. Selecting View allows users to view the field data in the schema. Selecting Change allows users to view and change the field data in the schema.**

7. **Select the Apply button to save the permission settings before selecting another Group to work on.**

8. **After you make all your changes, select the Apply button in the Modify Schema window. The changes you made are now applied to the schema.**

Setting Help for Schemas

Selecting the Set Help button in the Schema window brings up a Schema Help Text editing window. You can supply help text for the selected schema here. In most cases, this help text is simply a description of the schema and what it is used for. For more information on setting help, see "Setting Help" on page 38.

Building and Using Schema Change History

The AR System automatically records information about the owner of a schema, the user who last modified the schema, and the date of the modification. You can display this information at any time by selecting the Change History button at the bottom of the schema window to open the Change History dialog box. For more information on viewing and modifying change history information, see "Building and Using Change History" on page 36.

Defining Menus 5

This chapter describes how to create and modify pull-right menus. Once you create a menu, you can attach the menu to any 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 4 before you attempt to design and create a menu.

The following topics are covered in this chapter:

- Creating a menu.
- Defining a menu list.
- Defining a menu that queries.
- Defining a menu that uses a file.

Creating Menus

You can create a menu (pull-right or list box) and attach it to any character data field. A menu with two levels is shown in Figure 5-1.

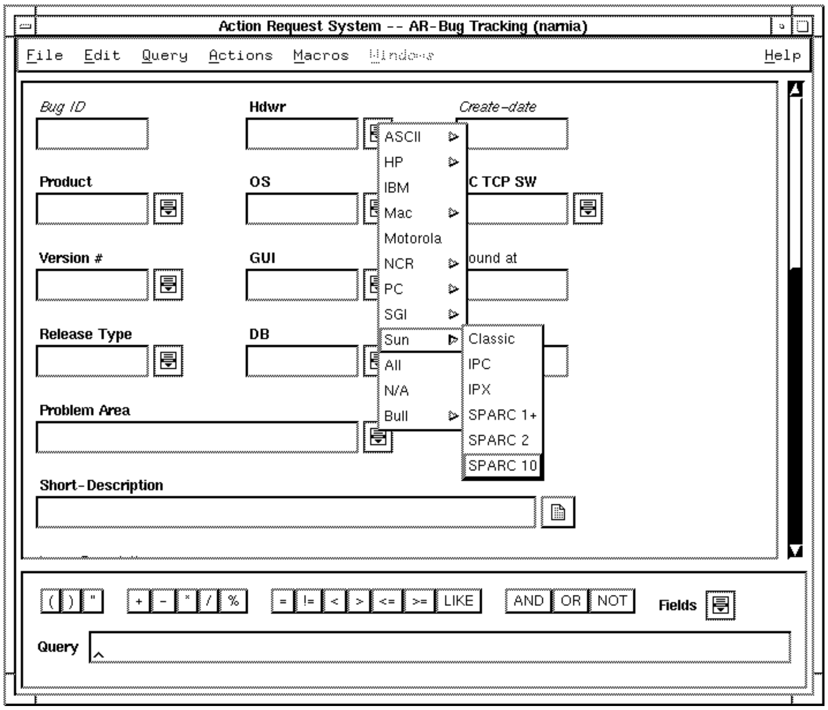

Figure 5-1 Character Menu

It is possible to define up to 15 menu levels, though you will probably want to limit most menus to five levels or less. You define menus using a Create (or Modify) Menu window that appears when you select Menu from the Category menu and then select the Open or Create a New option from the Edit 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.

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.

Query	You specify a query, with any conditions, on another 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, only those users who have permission to view the source fields and schema will be able to see the menu.
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 referenced.

To create a menu:

1. **In the Admin Tool window, select Menus from the Category menu (or type `Ctrl+M`) to see a list of menus currently defined on the server.**

2. **To create a new menu, select Create a New from the Edit menu (or type `Ctrl+N`).**

To open an existing menu for modification, select the menu and select Open from the Edit menu (or simply double-click the menu or type **`Ctrl+O`**).

To create and open a copy of a menu, select the menu you want to copy and then select Copy from the Edit menu (or type **`Ctrl+C`**). A new item will appear in the list box as the selected item. The new item will be called **`Copy of`** *<xxx>* where *<xxx>* is the name of the original menu. Select Open from the Edit menu (or simply double-click the copy) to open.

The Create (or Modify) Menu dialog box appears, similar to that shown in Figure 5-2 on page 138.

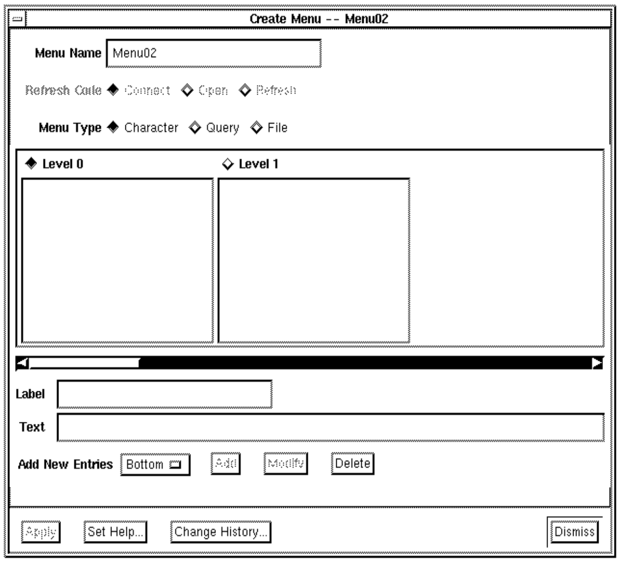

Figure 5-2 Create Menu — Character Window

3. **If the correct name is not already assigned to the menu, edit the name in the Menu Name field.**

4. **Select a value from the Refresh field 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 every 15 minutes. This choice provides a balance between the need to be current and the expense of constant menu retrieval.

Note – Refresh codes 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

codes which affect a menu's contents work somewhat differently for character menus than for file and query menus.
Refresh codes are disabled for character menus. The only way a character menu is updated is when you re-connect to a schema.
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.

5. **Select a menu type for the menu by choosing the Character, Query, or File option. The remaining fields in the dialog box will change according to the menu type you select.**

Note – You cannot change the menu type of an existing menu. If you are creating a menu by copying and modifying an existing menu, the menu you select to copy must have the same menu type as the menu you want to create.

---

6. **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 139.
- To define a menu that queries another schema, see "Defining Query Menus" on page 141.
- To define a file menu, see "Defining File Menus" on page 142.

7. **When you have finished defining the menu, select the Set Help button to enter help text for the menu. Select Apply to create the help text then dismiss the Menu Help Text window.**

8. **When you are ready to save the menu, select the Apply button.**

Defining Character Menus

To define a character menu:

1. **Create or open the menu, then edit the menu name according to the previous instructions.**

2. **Select a Menu Type of Character. This Menu Type choice will cause the window to appear similar to that shown in Figure 5-2 on page 138.**

3. Select the level for which you want to add or modify menu choices by selecting the radio button next to the level's label. To add or modify menu choices at the highest level, select Level 0. Select each successive menu level to modify the choices at that level.

Menu choices added at levels below the top level (level 0) will be sub-items of the selected item at the next highest menu level. For example, if you are adding items at level 3, the items you add appear as sub-items for level 2.

4. Enter a label (the text that will show up in the menu). Enter a maximum of 30 characters.

5. If the text 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. (This text only appears in the text field when a user selects the item. Nothing is put into the field if the user only pulls the menu open to an intermediate item.)

If you do not enter different text, the label text will be displayed when the user selects the item.

6. From the Add New Entries selection menu, select an option to determine whether the entry you are defining is added to the top of the current list of selections, the bottom of the list, or before or after the item that is currently selected.

7. Select Add to add the item to the list. Select Modify to replace the currently selected item with the new label and text.

8. Repeat steps 3 through 7 for the items at that menu level.

Note – You can put up to 99 items at each menu level.

---

9. To create a sub-menu item:

- Select the parent label in the current scrolling list (initially the list under Level 0).
- Select the sub-menu level by selecting the level button above the scrolling list for the sub-menu.

This indicates that the new label and text will belong at that level. If more levels must be accessed than fit on the Character Menus window, use the horizontal scroll bar.

10. **When you have finished creating menu items, select Apply to save the menu definition.**

Defining Query Menus

To define a menu that uses a query:

1. **Select a Menu Type of Query. This Menu type will cause the window to appear similar to the window shown in Figure 5-3 on page 141.**

2. **Create or open the menu, edit the menu name, and select a refresh code according to the previous instructions.**

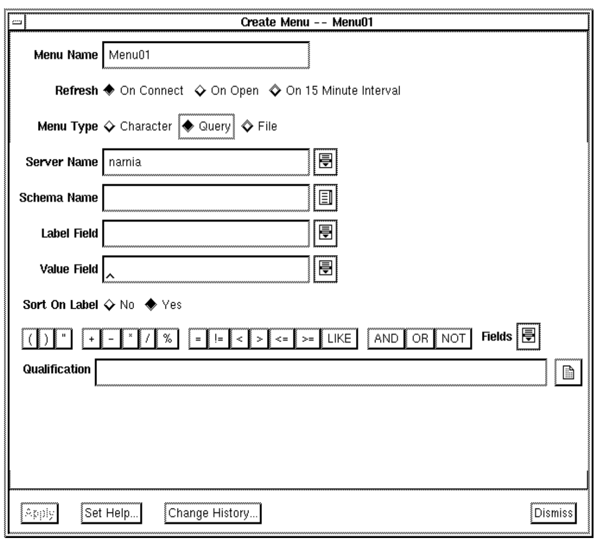

Figure 5-3 Create Menu - Query Window

3. **In the Server Name field, select the name of the server where the schema that you are querying resides.**

4. **In the Schema Name field, select a schema.**

5. **In the Label field, select the name of a field on the schema you are querying. The contents of this field will be used as a label for the menu you are creating.**

6. **In the Value field, select the name of a field on the schema you are querying. The contents of this field will be used as the value for the menu you are creating.**
7. **Select No or Yes to indicate whether or not you want the menu values sorted by their label.**
8. **In the Qualification field, build a qualification that will determine which items from the schema you are querying will be included in the menu list. 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:

```
'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. **Select Apply to save the menu definition.**

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.

Once you have created the menu, you can attach it to any character 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.

Defining File Menus

To define a menu that uses a file:

1. **Select a Menu Type of File. This Menu Type will cause the window to appear similar to the window shown in Figure 5-4 on page 143.**

2. **Create or open the menu, edit the menu name, and select a refresh code according to the previous instructions.**

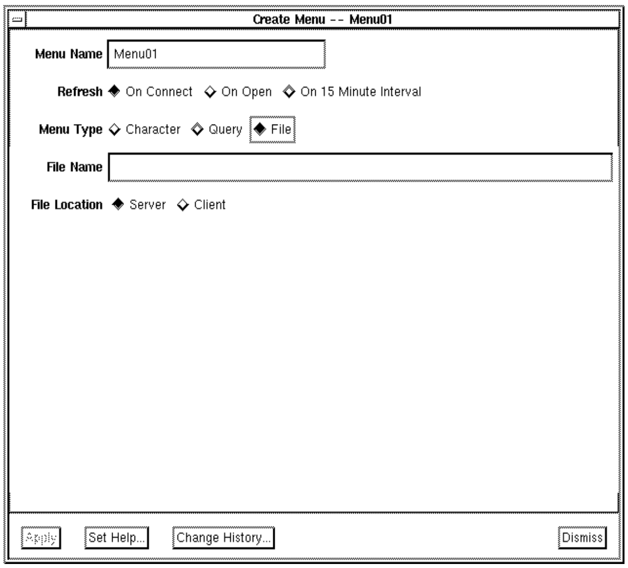

Figure 5-4 Create Menu - File Window

3. **In the File Name field, enter the name of the file that contains the menu definition. See the next section, "Menu File Format, for how to structure this file.**

4. **Indicate where the file is located by selecting a File Location of Server, if the file is on the server system, or Client, if the file is on the system where the Client is running.**

5. **Select Apply to save the menu definition.**

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\text
```

To create sub-menu items under a specific item, use tabs to indicate a child menu. (You can omit the text specification for any label that has sub-items.)

Note – You must use the tab key, not spaces, to indicate sub-menu items.

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.

Setting Help for Menus

Selecting the Set Help button in the Create Menu window brings up a Menu Help Text 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. For more information on setting help, see "Setting Help" on page 38.

Building and Using Menu Change History

The AR System automatically records information about the owner of 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 button at the bottom of the menu window to open the Change History dialog box. For more information on viewing and modifying change history information, see "Building and Using Change History" on page 36.

Defining Filters 6

This chapter describes how to use the Administrator Tool to create and modify filters. Once defined, filters test every server transaction to see if certain conditions are met and respond to the conditions by taking specific 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 52.

The following topics are covered in this chapter:

- The Filter window.
- Opening a filter.
- Specifying filter conditions.
- Building filter qualifications.
- Specifying filter actions.
- Types of filter actions.
- Setting help for a filter.

6

Using the Filter Window

You create and modify filters from within the Filter window, as shown in Figure 6-1 on page 146. The Conditions section of the Filter window (top section) is where you specify the conditions that will cause the filter to execute. For example, the condition may be that the user submits an AR.

The Actions section (bottom section) is where you specify 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.

Filters execute on the server machine. Each filter is attached to a single schema on the server.

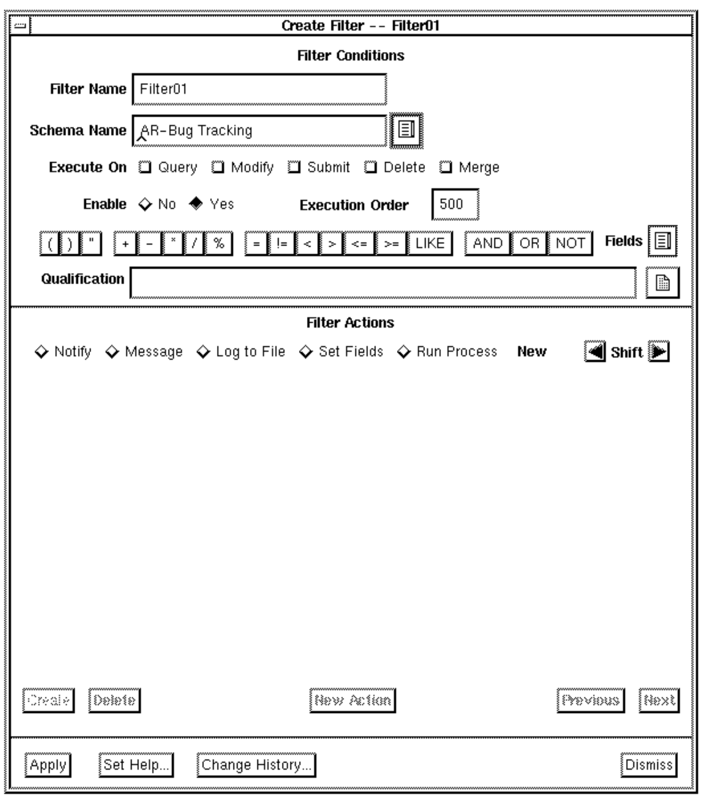

Figure 6-1 Filter Window

Opening Filters

Follow these steps to open an existing filter or to create and open a new filter.

To open a filter:

1. **In the Admin Tool window, select Filters from the Category menu (or type `Ctrl+F`) to see a list of filters available on the server.**

2. **To create a new filter, select Create a New from the Edit menu (or type `Ctrl+N`).**

To open an existing filter for modification, select the filter and select Open from the Edit menu (or simply double-click the filter or type **`Ctrl+O`**).

To create and open a copy of a filter, select the filter you want to copy and then select Copy from the Edit menu (or type **`Ctrl+C`**). A new item will appear in the list box as the selected item. The new item will be called **`Copy of`** *<xxx>* where *<xxx>* is the name of the original filter. Select Open from the Edit menu (or simply double-click the copy or type **`Ctrl+O`**) to open.

The Filter window appears (Figure 6-1 on page 146). For new filters, the window is blank. For existing filters or copies of existing filters, the current values are shown.

3. **Specify or change filter conditions according to the steps described in the following section, "Specifying Filter Conditions".**

4. **Specify or change filter actions according to the steps described in "Specifying Filter Actions" on page 157.**

Specifying Filter Conditions

This section describes how you use the top half of the Filter window to specify filter conditions, as shown in Figure 6-2 on page 148. The filter conditions define the criteria that a transaction must meet before the corresponding filter actions take place. You specify conditions including:

- Name of the filter.
- The schema that the filter is to be applied to.
- The operations that will invoke the filter.

- Whether the filter is enabled or not.
- The order in which the filter will execute in relation to other filters.
- The specific qualifications that limit the transactions on which the filter will execute, as described in the following section, “Building Qualifications” on page 150.

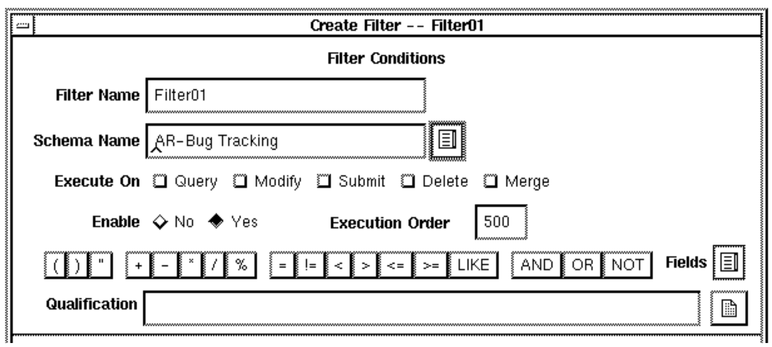

Figure 6-2 Specifying Filter Conditions

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 Filter 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. **Enter the name of the schema the filter will act on in the Schema Name field. You can select the list to choose from a list of schemas on the server.**

A filter will not do anything until it is applied to a schema.

4. **In the Execute On field, specify which operations will activate the filter by selecting one or more of the options, as follows:**

Query	Filter will act when an AR is retrieved. You cannot use the Query option to perform the Set Fields action.
Modify	Filter will act when an AR is modified.

Submit	Filter will act when an AR is submitted.
Delete	Filter will act when an AR is deleted.
Merge	Filter will act when an AR is merged into the database from a different database. (You can merge entries using the AR Import Tool, as described in Chapter 11. You cannot merge entries 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.

5. **In the Enable field, specify whether you want to activate the filter. Selecting Yes activates the filter; selecting No turns it off. The default is Yes.**

6. **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 each filter is processed, the AR System reevaluates the conditions to verify that the conditions have not changed as a result of the filter action, then executes the filter with the next lowest number. You can assign the same number to multiple filters; however, there is no guarantee about the processing order for filters that have the same number.

7. **You can further refine your filter selection criteria by entering a qualification statement in the Qualification 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 building the qualification using the query bar palette and Fields menu, as described in the next section, "Building Qualifications."**

8. **When you have finished specifying filter conditions and qualifications, go on to specify the filter actions (see "Specifying Filter Actions" on page 157).**

Building Qualifications

You can further refine the conditions that will activate a filter (or an active link or an escalation) by specifying qualification criteria. Qualifications help to narrow down the entries that will cause a filter, an active link, or escalation to execute. You can type qualification criteria directly in the Qualification field or you can build the qualification using the available palette and Fields menu, shown in Figure 6-3.

You can define qualification criteria using any of the following techniques:

- Type information directly into the qualification field.
- Select a field or keyword from the Fields menu or dialog box to add a field.
- Select an operator from the palette to add an operator.

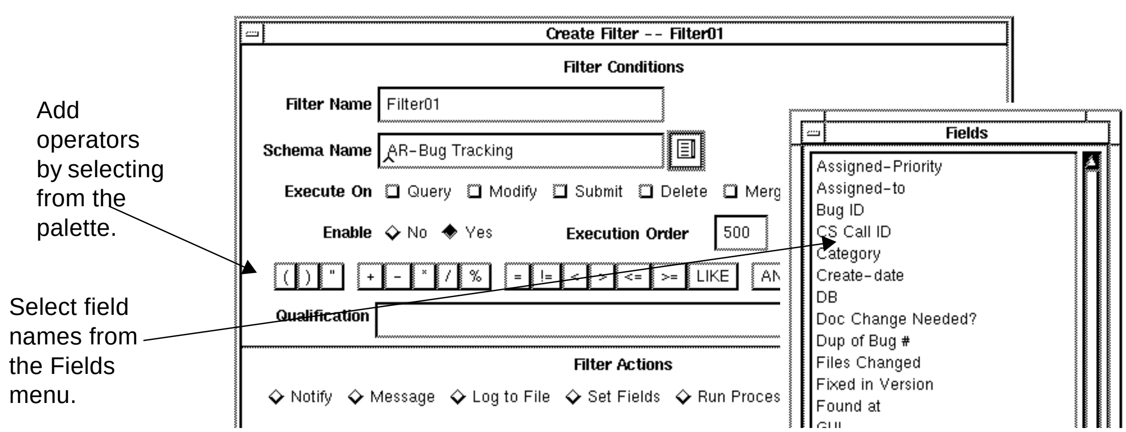

Figure 6-3 Building a Filter Qualification

You must follow a set of formatting conventions when you construct the qualifications criteria. The formatting conventions are described below.

You will also use a set of operators and wildcard symbols that have specific meaning to the AR System. You can concatenate a qualification string using keywords, operators, and wildcards, as in the following query:

```
'Login Name' LIKE ("%" + $Submitter$ + "%")
```

The operators and wildcard symbols are described in Appendix D.

Formatting Conventions

Use the following formatting conventions to construct qualification criteria in the Qualification 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 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 152.
Example (to check transaction only): **`'TR.Submitter'`**
Example (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.)

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 369 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.

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 152 for more information on checking field values in the database or in the transaction.
You cannot use Status History references in active link 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 is being 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. 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.

1. **In the Qualification field, select the Fields menu, then select the `Status` field. The name of the field appears enclosed in single quotes:**

`'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, select the = (equal sign) operator from the palette. The operator is added to the Qualification field, as follows:**

   `'TR.Status' =`

4. **Type the field value `Fixed` in the Qualification field, enclosed in double quotes. The Qualification field now contains:**

   `'TR.Status' = ''Fixed''`

5. **Select the `OR` operator from the palette. The `OR` operator is added to the Qualification field:**

   `'TR.Status' = ''Fixed'' OR`

6. **Select the Fields button and select the Status field again, then add the `TR.` prefix as before. Move the cursor to the end of the field and select the equal sign (=) operator. The Qualification field contains:**

   `'TR.Status' = ''Fixed'' OR 'TR.Status' =`

7. **Complete your qualification by typing the field value `Closed`. Enclose it in double quotes. The Qualification 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. **Select the Fields menu, then select `TIMESTAMP` from the `KEYWORDS` list. The TIMESTAMP keyword will appear in the Qualification field, enclosed in dollar signs:**

   `$TIMESTAMP$`

2. **Select the - (minus sign) operator from the palette in the filter Qualification field. The operator is added to the Qualification field:**

```
$TIMESTAMP$ -
```

3. **Begin building the status history reference by entering a single quote followed by the name of the status history field and a period, as follows:**

```
$TIMESTAMP$ - 'Status-History.
```

4. **Enter `New` to indicate the status value you want to match, followed by a second period, as follows:**

```
$TIMESTAMP$ - 'Status-History.New.
```

5. **Enter the keyword `TIME` to indicate the time that the AR was entered. Complete the value by entering a single quote. Your Qualification field should 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`**”.

You could also have entered the status history value by selecting it from the Fields menu.

---

6. **Continue building your filter qualification by selecting the > (greater than) operator from the palette:**

```
$TIMESTAMP$ - 'Status-History.New.TIME' >
```

7. **Finally, enter a value of ten hours, enclosed in double quotes (see “Formatting Conventions” on page 151 earlier in this chapter for information on entering time values). Your qualification 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.

1. **In the Qualification field, select the Fields menu, then select the field. The name of the field appears in the Qualification field enclosed in single quotes:**

   ```
   '<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 Qualification field, as follows:**

   ```
   'TR.<field>' !=
   ```

4. **In the Qualification field, choose the field again. The Qualification field now contains**

   ```
   '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 Qualification field now contains:**

   ```
   'TR.<field>' != 'DB.<field>'
   ```

6. **Click the `AND` operator from the palette. The `AND` operator is added to the Qualification field, as follows:**

   ```
   'TR.<field>' != 'DB.<field>' AND
   ```

7. **Choose the field again, then add the `TR.` prefix as before. Move the cursor to the end of the field and click the equal sign (=) operator. The Qualification field now contains:**

```
'TR.<field>' != ''DB.<field>' AND 'TR.<field>' =
```

8. **Complete your qualification by choosing `NULL` from the `KEYWORDS` list. The Qualification 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 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 Shift buttons in the Filter Actions section of the Filter window to set the order in which the actions will occur.

Here are the basic steps involved in creating, modifying or deleting a filter action. The following sections provide a detailed description of the attributes you must specify for each type of 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 197.

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 conditions and qualifications are specified correctly, according to the instructions provided earlier in this chapter.**
3. **If this is a newly created (blank) filter, go to Step 5**
4. **If this is an existing filter and you want to create an additional action, select the New Action button in the Filter window. The window changes to allow you to specify a new action.**
5. **Select the action you want: Notify, Message, Log to File, Set Fields, or Run Process.**

The window displays the attribute choices for the action you have selected.

6. Set the attributes as appropriate. Refer to the following sections for information about setting attributes for a specific action.
7. When you have finished setting the attributes, select the Create/Modify button to add the new action.
8. To create an additional action for the same filter, select the New Action button.
9. Set attributes as appropriate for the additional action, then select the Create button to add the action.
10. When you have defined all the actions you want for the filter, select Apply to create the filter, then select Dismiss.

To modify a filter action:

1. Open the filter you want to work with if it is not already open.
2. Use the Previous or Next button to page through action definitions to display the one 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, select the Modify button.
5. When you have made all of the modifications you want to the filter's actions, select Apply to save the modified filter then select Dismiss.

To delete a filter action:

1. Open the filter you want to work with if it is not already open.
2. Use the Previous or Next button to page through action definitions to display the one you want to delete.
3. Select the Delete button to remove the action.
4. When you have made all of the modifications you want to the filter's actions, select Apply to save the modified filter then select Dismiss.

Ordering Filter Actions

The order in which the actions defined for a filter will execute is indicated in the Filter Actions section. If only one action is defined, it is labeled as 1 of 1. If the action is one of 2 or more actions, it is labeled appropriately. If there are three actions defined, for example, each is labeled as 1 of 3, 2 of 3, or 3 of 3, as appropriate. When you move from one action to another using the Next and Previous buttons, you will see the order indicator numbers change.

You can change the order in which the actions execute by using the Shift arrow buttons located next to the order indicator. The shift buttons are left and right arrows that 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. **Use the Next and Previous buttons to locate the action that you want to move forward or backward in the execution order.**
3. **Use the left and right arrow Shift buttons to change the order in which the actions will execute.**
4. **Continue to move between actions and adjust their order using the Shift arrow buttons until the actions are in the desired order.**
5. **Select Apply to save the filter with the new action order then select Dismiss.**

Types of Filter Actions

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 197.

There are five types of filter actions you can specify:

- **Notify** issues a notification message to the designated user.
- **Message** returns a message and displays it for the user who activated the filter. (Escalations do not support message actions.)
- **Log to File** writes an audit trail message to a specified file.

- **Set Fields** assigns values to specific fields in the current AR.
- **Run Process** executes an operating system command or a program on the server.

Each of the types is explained in the following sections.

The Notify Filter Action

When you choose the Notify filter 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 text 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. **Select Notify in the Filter Actions section of the Filter window. The Filter Actions section will change to present the fields required to define the notify filter action, as shown in Figure 6-4.**

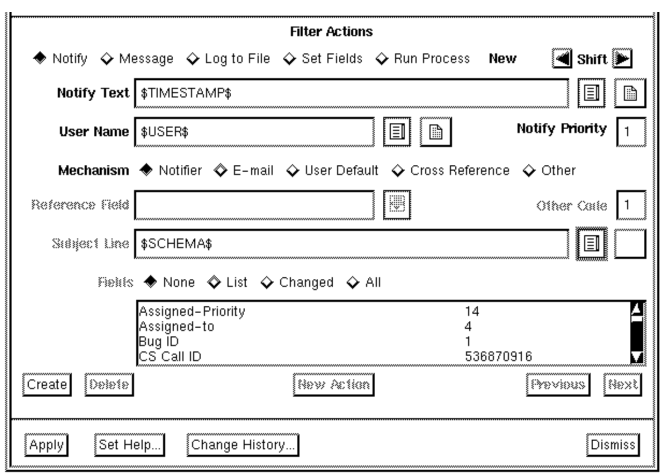

Figure 6-4 Notify Filter Action

2. **In the Notify Text field, enter a string, up to 255 characters in length, which will be the text of the notification message.**

You can specify any of the keywords defined by the system (see “Table of Keywords” on page 369) 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 notification is sent.

You can select the menu next to the Notify Text field to open a list of all 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 included in the text.

The email notify text can contain returns. To place returns in your notifier text you must open a text edit window for the Notify Text field. You can select the text edit icon to open a text edit window for easier data entry, if desired.

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 select the menu next to the User Name field to display all the available fields for the selected schema. The field you select will replace any value currently in the field.

If the notification will be sent by email, you can enter the email address of the person to be notified.

4. The Notify 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 Windows 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 is activated. (See the description of "Other" 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. 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>/db/notify`***<nn>***`.arn`**, where *<nn>* is the number you selected. You can read the notifications from this file or write a daemon (like a mail daemon) 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. Select the menu next to Reference Field to choose which field you want to use for the cross reference. The menu lists the selection and integer type fields available on the current schema.**

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 369) 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.**

Select the menu next to the Notify Text field to display all the fields in the current schema as well as a list of keywords. You can simply select one of these fields to have it included in the text. In addition, the Text Edit Window choice on the menu allows you to open a text edit window for easier data entry, if desired.

8. **The Fields list is activated if you select E-mail, Cross Reference, User Default, or Other. Select fields from the list to specify a set of fields to be delivered with the Notification (in addition to the Notify text).**

When you use email as a notification method, 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 from the following delivery options for notification:

None	No fields are included with the notification.
List	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.
All	All fields of the entry 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, any fields selected 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. **When you have finished specifying the Notify filter action, select the Create/Modify button.**

10. **If you want to create an additional action for this filter, select the New Action button. If you have finished defining conditions and actions for this filter, select the Apply button then select Dismiss.**

The Message Filter Action

When you choose the Message filter 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. **Select Message in the Filter Actions section of the Filter window. The Filter Actions section will change to present the fields required to define the message filter action, as shown in Figure 6-5.**

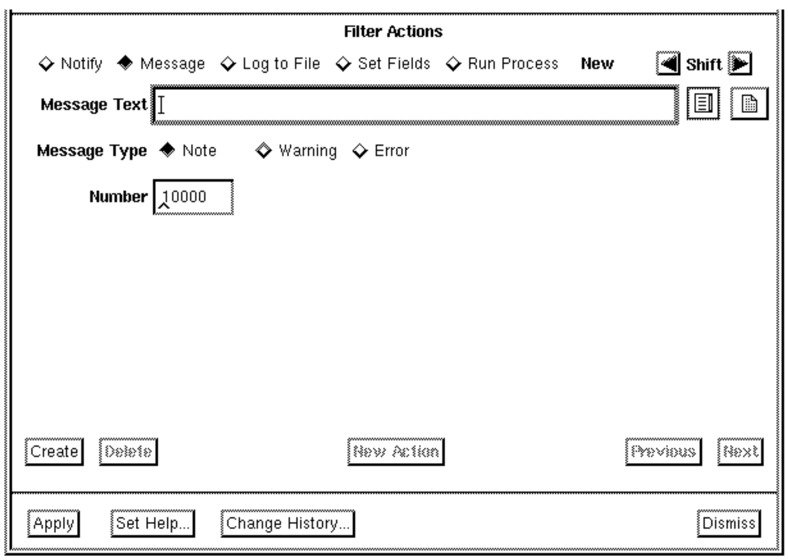

Figure 6-5 Message Filter Action

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 select the menu next to the Message Text field to display a menu containing a list of all 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 included in the text. In addition, you can select the text edit icon to open a text edit window 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**. For example, you can use an error type message to require users to enter a value into a field before submitting an AR 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. When you have finished specifying the message filter action, select the Create/Modify button.

6. If you want to create an additional action for this filter, select the New Action button. If you have finished defining conditions and actions for this filter, select the Apply button then select Dismiss.

The Log to File Filter Action

When you choose the Log to File filter 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. Select Log to File in the Filter Actions section of the Filter window. The Filter Actions section will change to allow you to define the log to file action, as shown in Figure 6-6 on page 167.

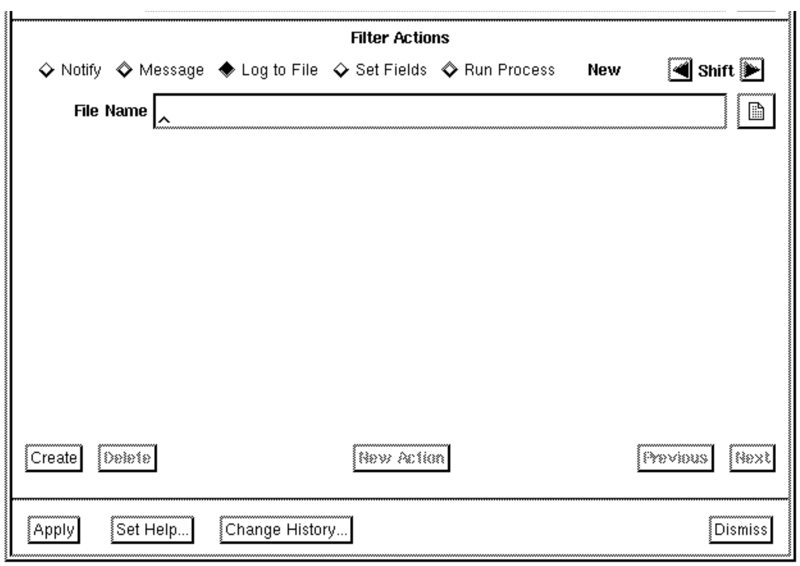

Figure 6-6 Log to File Filter Action

2. Specify the full directory pathname of the file to log to in the File Name field. If needed, you can select the text edit icon to open a text edit window for easier data entry.

3. When you have finished specifying the log to file filter action, select the Create/Modify button.

4. If you want to create an additional action for this filter, select the New Action button. If you have finished defining conditions and actions for this filter, select the Apply button then select Dismiss.

The Set Fields Filter Action

When you choose the Set Fields filter 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. Hidden fields are shown with dimmed labels in the Set Fields window.

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. **Select Set Fields in the Filter Actions section of the Filter window. A Set Fields button appears in the window. Select the Set Fields button to open the Set Filter Fields window, as shown in Figure 6-7.**

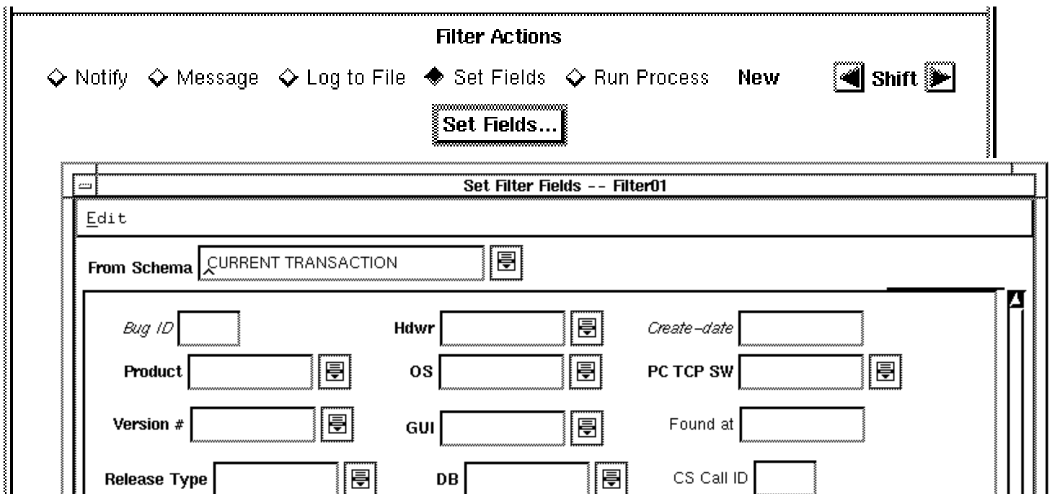

Figure 6-7 Set Filter Fields Window

2. **In the From Schema field, use the menu to enter `CURRENT TRANSACTION` if the value is to come from another field on the same AR or is to be only static values or keywords. You also can use the menu to enter the name of a schema on the server to specify from where the AR System is to retrieve the value for the field.**

Note – If you enter a 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 schema reverts to the **`CURRENT TRANSACTION`**.

---

3. **Enter the values in the schema fields that you want to be automatically set when the filter executes. You can use the commands available through the Edit menu of the Set Filter Fields window, as described below in "Using the Set Fields Edit Menu" on page 170. You can use the `MENU` button in a field to pull up a selection list of available fields, functions, and keywords or to open a text edit window.**

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 171).
- A value from another field in the same schema or another schema on the server (see “Assigning Values from Other Fields” on page 171)
- The value resulting from a specified process (see “Assigning Values from Process Results” on page 173).
- The value resulting from an arithmetic operation (see “Assigning Values Using Arithmetic Operations” on page 174).
- The value resulting from a function (see “Using Function Results in Set Fields” on page 175).
- A combination of the above. You might want to combine a static text entry with a keyword, for example, `'Entry entered by' + $USER$`.

4. **If the data or value you want is on a different AR, create a qualification to locate the specific AR.**
5. **When you have finished entering the values to set, select the Apply button on the Set Fields window to save the field values you want to load.**
6. **If you want to create an additional action for this filter, select the New Action button. If you have finished defining conditions and actions for this filter, select the Apply button then select Dismiss.**

Using the Set Fields Edit Menu

The Edit menu in the Set Filter Fields window contains the following commands to help you set values:

Clear	Clears all values in the window.
Reset	Resets the field values in the window to those defined when the settings in this window were last applied.

Toggle Field Display	Toggles (switches) the display type of the selected field between the type chosen for the field and a text display type. For example, you can toggle the display of a radio button field to a text display if you want to enter a field name to retrieve the value from another schema. If you toggle from a menu to a text field, you can enter the numeric value of a field as well as a label value (for example, **`FIXED`**).

Assigning Keyword Values

You can use any of the keywords listed in "Table of Keywords" on page 369 to set a field value. The data type of the keyword value must match the field data type. Use the **`MENU`** mouse button in any field to see and select 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 **qualification criteria** 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 Filter Fields window, make sure the From Schema field is set to `CURRENT TRANSACTION`.**

2. **If the field you are loading a value for is a radio button, selection menu, or numeric text field with arrows, use the Toggle Field Display command on the Edit menu to switch the field to a text line.**

3. **Place the mouse cursor in the field where you want the value loaded and use the `MENU` mouse button to pop up a menu of available fields.**

4. **From the menu, select the field from which the value will be drawn when the filter executes.**

To assign a value from a different AR:

The following steps apply to both filters and escalations.

1. **Use the** MENU **mouse button to open the From Schema field menu. Then select the schema from which you want to retrieve the data. Note that you can only access schemas that are on the same server.**

2. **If the field you are loading a value for is a boxradio button, selection menu, or numeric text field with arrows, use the Toggle Field Display command on the Edit menu to switch the field to a text line.**

3. **Place the mouse cursor in the field where you want the value loaded and use the `MENU` mouse button to pop up a menu of available fields. The fields that appear in the listing are from the schema shown in the From Schema field.**

4. **From the menu, select the field from which the value will be drawn when the filter executes.**

5. **Use the Qualification field at the bottom of the Set Filter Fields window to define the qualification criteria that will locate the specific AR from which the data will be drawn.**

Use the Fields menu to reference fields in the schema you are drawing data from. These fields will be delimited with single quotes.

Use the **`MENU`** button in the Qualification field 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 150.

6. **When you have finished specifying the qualification, select the Apply button in the Set Filter Fields window then select Dismiss.**

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 **`stdout`** 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).
■ 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.
■ 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 a pop-up menu on each field on the window.

When the filter is performed, the specified command line will be executed on the server. All data returned to **stdout** 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 in **stdout** 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 Chapter 1 for information on using the Server Information window.

Assigning Values Using Arithmetic Operations

You can use arithmetic operations to load a computed value. You can combine an arithmetic operation with a static value, a keyword, a value from the current screen or an existing AR, or a value from a process. The same arithmetic operations allowed for specifying qualifications are allowed to build a computed value (see “Table of Operators” on page 366). The operation must meet all the rules for arithmetic operations 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 operations:

```
$TIMESTAMP$ - $CREATE-DATE$
$FIRST NAME$ + '' '' + $LAST NAME$
''hostname ='' + $PROCESS$ hostname
```

Using Function Results in Set Fields

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 assign a value using a function in the set field operation:

1. **Use the MENU mouse button in the field. Display the `FUNCTION` submenu to see a list of the available functions.**
2. **Select the function you want to use. It will appear in the field with a set of parentheses to its right.**
3. **Within the parenthesis, enter any arguments that are appropriate for the function you have selected. (With the exception of `$PROCESS$`, you can include keywords, field values, 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 6-1.

Table 6-1 Functions in Set Fields Actions *(1 of 6)*

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 6-1 Functions in Set Fields Actions *(2 of 6)*

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.

Table 6-1 Functions in Set Fields Actions *(3 of 6)*

Function	Return	Argument(s)	Description
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 ($Escalate Date$, \`** **`$TIMESTAMP$)`**
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).

Table 6-1 Functions in Set Fields Actions *(4 of 6)*

Function	Return	Argument(s)	Description
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.
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.

Table 6-1 Functions in Set Fields Actions *(5 of 6)*

Function	Return	Argument(s)	Description
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.
UPPER	char	(char)	Returns all characters in the string (char) as uppercase characters (upshifts all characters).

Table 6-1 Functions in Set Fields Actions *(6 of 6)*

Function	Return	Argument(s)	Description
`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.

The Run Process Filter Action

Choosing the Run Process filter action allows you to execute a command to run a process. 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. **Select Run Process in the Filter Actions section of the Filter window. The Filter Actions section will change to present the fields required to define the run process filter action, as shown in Figure 6-8.**

Field contents can be passed as parameters. Enclose field name with $ symbols.

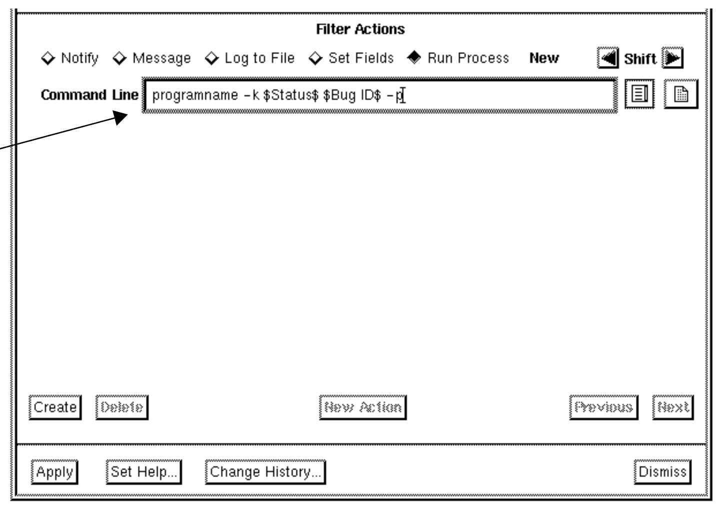

Figure 6-8 Run Process Filter Action

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 369) 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 select the menu next to the Command Line field to display 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 window 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. **When you have finished specifying the command for the filter action, select the Create/Modify button.**

4. **If you want to create an additional action for this filter, select the New Action button. If you have finished defining conditions and actions for this filter, select the Apply button, then select Dismiss.**

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.

Setting Help for Filters

Selecting the Set Help button 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**.** For more information on setting help, see “Setting Help” on page 38.

Building and Using Filter Change History

The AR System automatically records 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 selecting the Change History button at the bottom of the Filter window to open the Change History dialog box. For more information on viewing and modifying change history information, see “Building and Using Change History” on page 36.

Tracing Filter Activity

You can activate the filter debug trace mode on the server to create a log file of filter activity. 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 21 for more information on creating a filter log file.

Defining Escalations 7

This chapter describes how to use the Administrator Tool to create and modify time-based escalations within the AR System. 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 55.

This chapter covers the following topics:

- The Escalation window.
- Opening an escalation.
- Specifying escalation conditions.
- Specifying escalation actions.
- Types of escalation actions.
- Setting help for an escalation.

Using the Escalations Window

You create and modify escalations within the Escalation window, as shown in Figure 7-1. The Conditions section of the Escalation window (top section) is where you specify the conditions that will cause the escalation to be checked by the AR server.

The Actions section (bottom section) is where you specify actions the escalation will take when the execution intervals are checked by the server and specified qualifications are met. For example, an escalation qualification might look for “New” in the Status field. The escalation action then might automatically delegate the AR to the hardware support person.

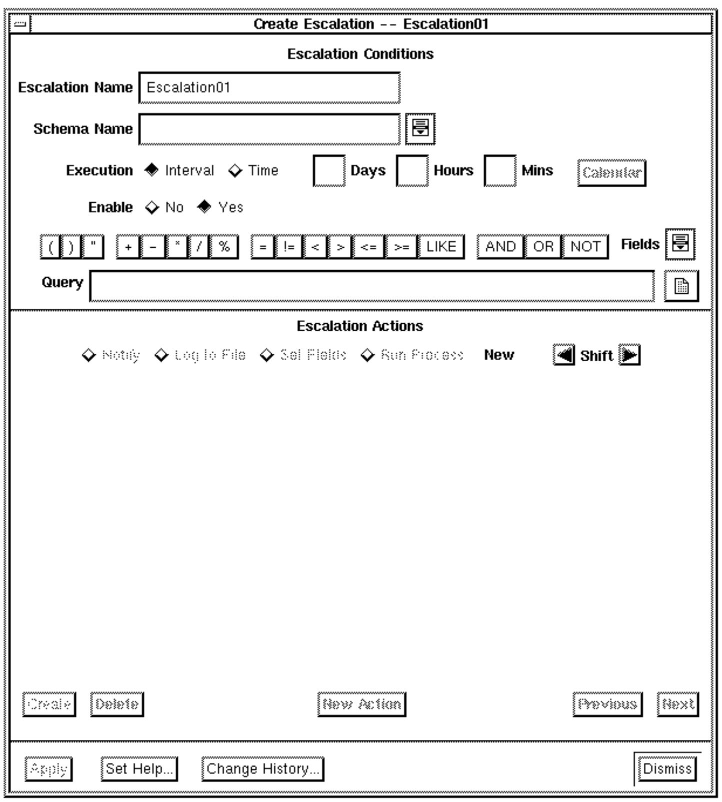

Figure 7-1 Escalation Window

Opening Escalations

Follow these steps to open an existing escalation or to create and open a new escalation.

To open an escalation:

1. **In the Admin Tool window, select Escalations from the Category menu (or type `Ctrl+X`) to see a list of escalations on the server.**

2. **To create a new escalation, select Create a New from the Edit menu (or type `Ctrl+N`).**

To open an existing escalation for modification, select the escalation and select Open from the Edit menu (or type `Ctrl+O` or simply double-click the escalation).

To create and open a copy of an escalation, select the escalation you want to copy and then select Copy from the Edit menu (or type `Ctrl+C`). The new item will appear in the list box as the selected item. The new item will be called `Copy of` *<xxx>* where *<xxx>* is the name of the original escalation. Select Open from the Edit menu (or type `Ctrl+O` or simply double-click the copy) to open.

The Escalation window appears (Figure 7-1 on page 188). For new escalations, the fields are blank. For existing escalations or copies of existing escalations, the current values are shown.

3. **Specify or change escalation conditions according to the steps described in the following section, "Specifying Escalation Conditions."**

4. **Specify or change escalation actions according to the steps described in "Specifying Escalation Actions" on page 195.**

Specifying Escalation Conditions

This section describes how you use the top half of the Escalation window to specify escalation conditions, as shown in Figure 7-2 on page 190. The escalation conditions define the criteria that a transaction must meet before the corresponding escalation actions take place. You specify conditions including:

- The name of the escalation.
- The schema associated with the escalation.

- The execution time settings that trigger the escalation, defined either at an interval or at a certain time.
- Whether the escalation is enabled or not.
- Specific qualifications that limit the entries on which the escalation will execute, as described in “Building Qualifications” on page 150.

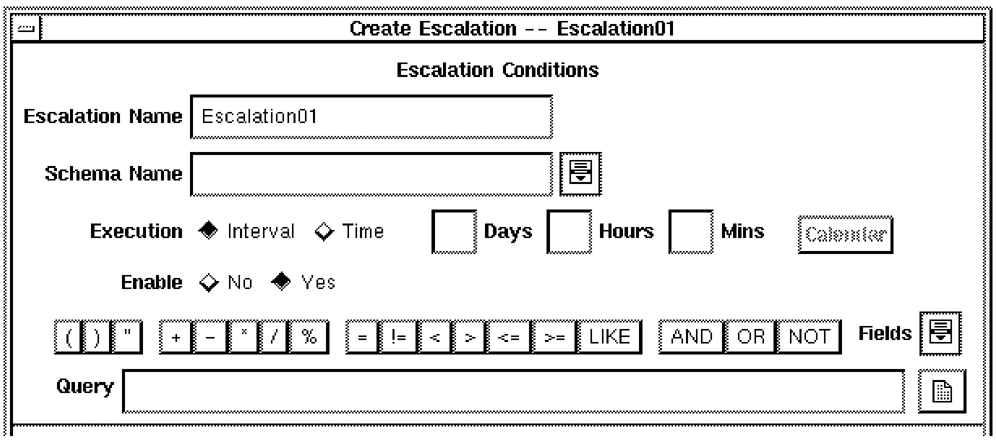

Figure 7-2 Specifying Escalation Conditions

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 must be unique. There is no enforced convention for specifying escalation names, but it is helpful to make the name descriptive and indicative of the escalation’s function. Names may be up to 30 characters, including blanks.

3. **Enter the name of the schema the escalation will apply to in the Schema Name field. You can select the list icon to choose from a list of schemas on the server.**

An escalation is associated with a single schema.

4. **In the Execution field, specify the time setting for the AR server to check the escalation.**

- Select Interval 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, *To set an execution interval.*

- Select Time 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 irregular intervals, for example, every 24 hours or the 15th and 31st of every month or weekdays at 4:00 PM.

For more on setting execution times, see “To set an execution time:” on page 192.

5. **In the Enable Escalation field, specify whether you want to activate the escalation. Selecting Yes activates the escalation; selecting No turns it off.**

6. **You can further refine your escalation selection criteria by entering a qualification statement in the Query field. You can enter the text directly, by typing it in, or building the qualification using the query bar palette and Fields menu, as described in “Building Qualifications” on page 150.**

7. **When you have finished specifying escalation conditions, go on to specify the escalation actions (see “Specifying Escalation Actions” on page 195).**

To set an execution interval:

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).

1. **After you have specified the Escalation Name and Schema name, select Interval in the Execution field.**

2. **In the Days/Hours/Mins fields, select the execution 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 small as you need.**

3. **When you have finished specifying escalation conditions, go on to specify the escalation actions (see "Specifying Escalation Actions" on page 195).**

To set an execution time:

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 use the Days of Week and Hours of Day categories to execute escalations Monday through Friday at 8:15 (AM) and 16:15 hours (4:15 PM). Or you can use the Days of Month and Hours of Day categories to create escalations that execute on the 15th and 31st of every month at 8:00 AM.

1. **After you have specified the Escalation Name and Schema name, select Time. The Calendar button is activated.**

2. **Click Calendar. The Escalation Time Specification window appears, as shown in Figure 7-3 on page 193. You can choose days of the month, days of the week, hours and minutes of the day, or any combination.**

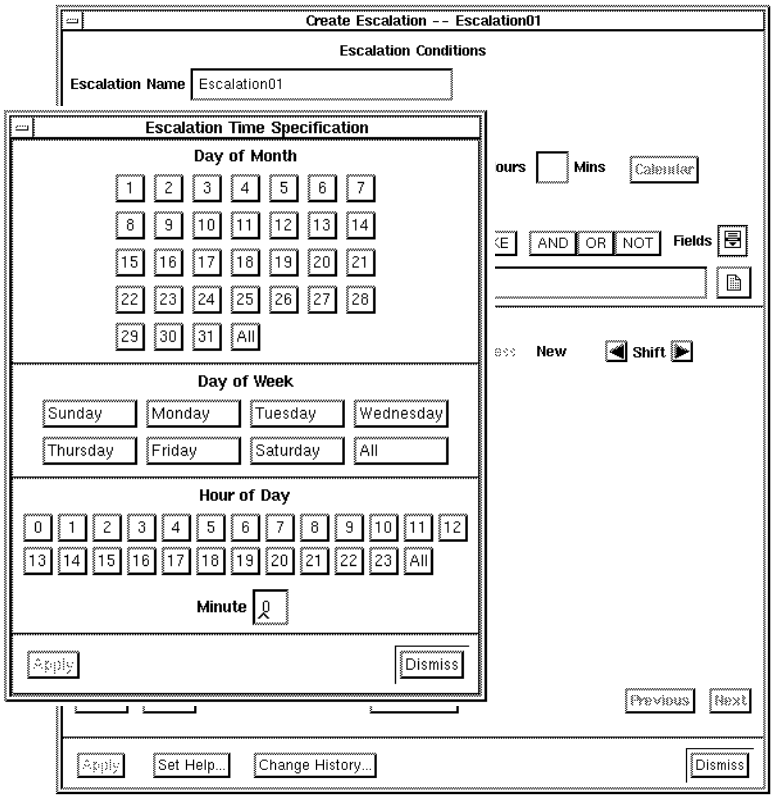

Figure 7-3 Escalation Time Specification Window

3. **If you want the server to check the escalation on a specific day or days of the month, select the days in the Day of Month field. Selecting All sets the entire month. If you do not select any minutes, the server checks the escalation at the default setting of 0 minutes and 0 seconds for the day of the month selected.**

4. **If you want the server to check the escalation on a specific day or days of the week, select the days in the Day of Week field. Selecting All sets the entire week. If you do not select any minutes, the server checks the escalation at the default setting of 0 minutes and 0 seconds for the day of the week selected.**

You can combine Day of Month with Day of Week. If you select the 15th and 31st days of month *and* Monday and Friday, 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.

Warning – In the AR System, selecting the 31st day of month creates an escalation on the last day of the month for *all* months, including February.

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5. In the Hour of Day field, select the hours of the day that you need.

You must set the Hour of Day field to create an escalation but it must also be combined with either Day of Month or Day of Week. You cannot set Hour of Day by itself. For example, you can combine the following:

- Day of Month with Hour of Day.
- Day of Week with Hour of Day.
- Day of Month and Day of Week with Hour of Day.

If you do not set an Hour of Day or if you set only the Hour of Day field, the AR System returns an error message when you select Apply on the Escalation window.

6. In the Minute field, enter the minutes past the hour. 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.

This window uses a 24-hour clock. For example, to trigger an escalation at 10:30 PM, select 22 from the Hour of Day field and enter 30 in the Minute field.

7. Select Apply.

8. Select Dismiss to close the Escalation Time Specifications window. When you have finished specifying escalation conditions, go on to specify the escalation actions (see "Specifying Escalation Actions" on page 195).

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. If you specify multiple actions, you can use the Shift buttons in the Actions section of the Escalation window to set the order in which the actions will occur.

Here are the basic steps involved in creating, modifying or deleting an escalation action.

To create an escalation action:

1. **Open the escalation you want to work with if it is not already open.**
2. **Make sure that the escalation conditions and qualifications are specified correctly, according to the instructions provided earlier in this chapter.**
3. **If this is a newly created (blank) escalation, go to Step 5**
4. **If this is an existing escalation and you want to create a new action, select the New Action button in the Escalation window. The window changes to allow you to specify a new action.**
5. **Select the action you want: Notify, Log to File, Set Fields, or Run Process.**

The window displays the attribute choices for the action you have selected.

6. **Set the attributes as appropriate.**
7. **When you have finished setting the attributes, select the Create button to add the new action.**
8. **To create an additional action for the same escalation, select the New Action button.**
9. **When you have defined all the actions you want for the escalation, select Apply to create the escalation, then select Dismiss.**

As a test, if you set an execution interval, the AR System immediately checks the escalation after you create or enable it.

To modify an escalation action:

1. **Open the escalation you want to work with if it is not already open.**
2. **Use the Previous or Next button to page through action definitions to display the one you want to modify.**
3. **Change the various attributes as appropriate.**
4. **When you have finished making changes, select the Create/Modify button.**
5. **When you have made all of the modifications you want to the escalation's actions, select Apply to save the modified escalation then select Dismiss.**

To delete an escalation action:

1. **Open the escalation you want to work with if it is not already open.**
2. **Use the Previous or Next button to page through action definitions to display the one you want to delete.**
3. **Select the Delete button to remove the action.**
4. **When you have made all of the modifications you want to the escalation's actions, select Apply to save the modified escalation then select Dismiss.**

Ordering Escalation Actions

The order in which the actions defined for an escalation will execute is indicated in the Escalation Actions section. If only one action is defined, it is labeled as 1 of 1. If the action is one of 2 or more actions, it is labeled appropriately. If there are three actions defined, for example, each is labeled as 1 of 3, 2 of 3, or 3 of 3, as appropriate. When you move from one action to another using the Next and Previous buttons, the order indicator numbers will change.

You can change the order in which the actions execute by using the Shift buttons located next to the order indicator. The shift buttons are left and right arrows that let you adjust the order of the escalation actions.

To change the order of escalation actions:

1. **Open the escalation you want to work with if it is not already open.**

2. **Use the Next and Previous buttons to locate the action that you want to move forward or backward in the execution order.**

3. **To move the action earlier or later in the execution order, select the right or left Shift arrow button.**

4. **Continue to move between actions and adjust their order using the Shift arrow buttons until the actions are in the desired order.**

5. **Select Apply to save the escalation with the new action order then select Dismiss.**

Types of Escalation Actions

There are four types of escalation actions you can specify. With one exception, the Escalation Actions window looks and functions like the Filter Actions window as described in "Types of Filter Actions" on page 159. (Escalations, unlike filters, do not support message actions)

- **Notify** provides active user notification of an event. To use the Notify Escalation Action, see the discussion under "The Notify Filter Action" on page 160.
- **Log to File** writes an audit trail message to a specified file. To use the Log to File Escalation Action, see the discussion under "The Log to File Filter Action" on page 166.
- **Set Fields** assigns values to specific fields in the current AR. To use the Set Fields Escalation Action, see the discussion under "The Set Fields Filter Action" on page 168.
- **Run Process** executes an operating system command or a program on the server. To use the Run Process Escalation Action, see the discussion under "The Run Process Filter Action" on page 181.

Setting Help for Escalations

Selecting the Set Help button 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**.** For more information on setting help, see "Setting Help" on page 38.

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 selecting the Change History button at the bottom of the Escalation window to open the Change History dialog box. For more information on viewing and modifying change history information, see “Building and Using Change History” on page 36.

Tracing Escalation Activity

You can activate the escalation debug trace mode on the server to create a log file of escalation activity. 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 21 for more information on creating an escalation log file.

Defining Active Links 8

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 60.

This chapter covers the following topics:

- The Active Link window.
- Opening an active link.
- Specifying active link conditions.
- Specifying active link actions.
- Types of active link actions.
- Setting help for an active link.

8

Using the Active Link Window

You create and modify active links using the Active Link window, as shown in Figure 8-1. For most active links you define, you open the Active Link window using the Administrator Tool menus. For active links that execute on a button, you can also open the Active Link window from the Modify Schema window.

The Conditions section of the Active Link window (top section) is where you specify 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 selects a button on the user's view of the screen.

The Actions section of the window (bottom section) is where you specify the actions the active link will take when specified conditions are met. For example, an action may be to run a specified macro.

Active links execute on the client machine. Each active link is attached to a single schema on the server.

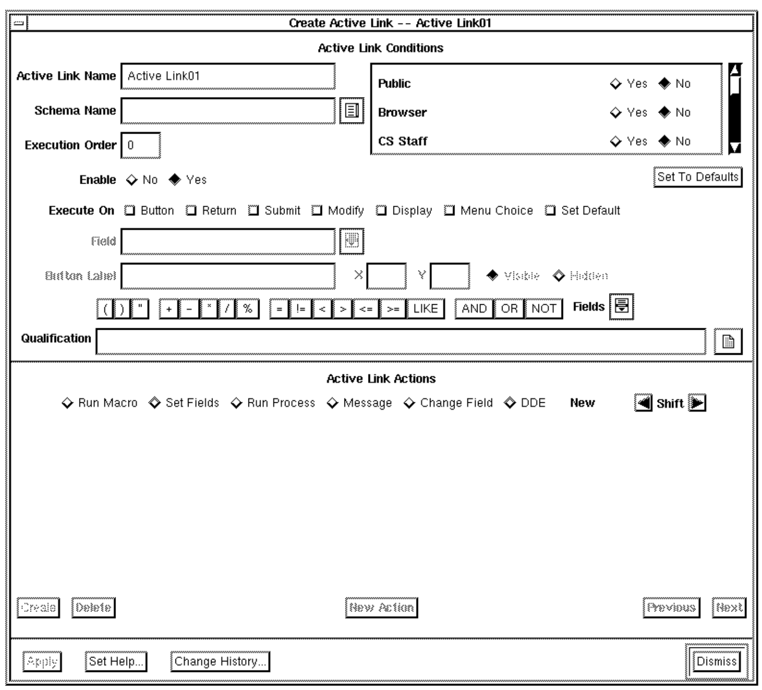


Figure 8-1 Active Link Window

Opening Active Links

Follow these steps to open an existing active link or to create and open a new active link.

To open an active link:

1. **In the Admin Tool window, select Active Links from the Category menu (or type `Ctrl+A`) to see a list of active links on the server.**

2. **To create a new active link, select Create a New from the Edit menu (or type `Ctrl+N`).**

To open an existing active link for modification, select the active link and select Open from the Edit menu (or type **`Ctrl+O`** or simply double-click the active link).

To create and open a copy of an active link, select the active link you want to copy and then select Copy from the Edit menu (or type **`Ctrl+C`**). The new item will appear in the list box as the selected item. The new item will be called **`Copy of`** *<xxx>* where *<xxx>* is the name of the original active link. Select Open from the Edit menu (or type **`Ctrl+O`** or simply double-click the copy) to open.

The Active Link window appears (Figure 8-1 on page 200). For new active links, the window is blank. For existing active links or copies of existing active links, the current values are shown.

3. **Specify or change active link conditions according to the steps described in "Specifying Active Link Conditions" on page 202.**

4. **Specify or change active link actions according to the steps described in "Specifying Active Link Actions" on page 206.**

To open an active link from the Modify Schema window:

- To create a new active link that executes on a button, select New Active Link from the Edit menu or type **`Ctrl+A`**.

- To Open an existing active link, select the active link button then select Properties from the Edit menu or type **`Ctrl+R`**. You can also open the Active Link window by double-clicking on the active link button.

Opening the active link from the Modify Schema window can make positioning button-activated active links on the schema much easier.

Specifying Active Link Conditions

This section describes how you use the top half of the Active Link window to specify active link conditions, as shown in Figure 8-2. The active link conditions define the criteria that a transaction must meet before the corresponding active link actions take place. You specify conditions including:

- The name of the active link.
- The schema that will contain the active link.
- The access control groups that are allowed to execute the active link.
- The order in which the active link will execute in relation to other active links.
- Whether the active link is enabled or not.
- How users will activate the active link (for example, by clicking a button or by pressing Return).
- Specific qualifications that limit the transactions on which the active link will execute, as described in “Building Qualifications” on page 150.

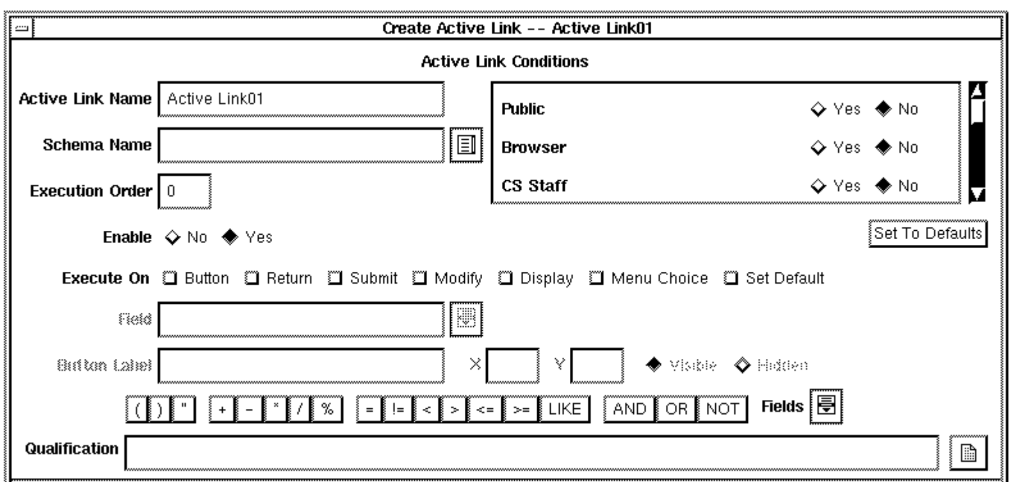


Figure 8-2 Specifying Active Link Conditions

To specify or change active link conditions:

1. Open the active link you want to work with (see the previous section).

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. **Enter the name of the schema the active link will apply to in the Schema Name field. You can select the menu icon to choose from a list of schemas on the server.**

An active link is associated with a single schema.

4. **Indicate which access control groups will be able to use the active link. Use the scroll bar to see all of the applicable access control groups. To set the default permissions, select the Set To Defaults button. If needed, you then can override the default settings for this particular active link.**

Select Yes for each group you want to have access and No for each group you do not want to have access. By default, access for all groups is set to No so that only the Administrator or Subadministrator group has access to the active link. Select Yes on the Public group to make the active link available to everyone.

Note – If a user has access to an active link, it executes for that user whenever the conditions for the link are met. If a user does not have access, it does not execute and the user's view of the schema does not show an active link button, if one is defined.

---

5. **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.

6. **In the Enable field, specify whether you want to activate the active link. Selecting Yes activates the active link; selecting No turns it off.**

7. **In the Execute On field, specify when the active link will be performed by selecting one or more of the options, as described in Table 8-1:**

Table 8-1 Active Link Conditions

Button	Places a button on the schema that executes the active link when a user with the appropriate access selects the button. If you choose this option, the Button Label, X and Y, Visible, and Hidden fields are activated to allow you to define the button's physical characteristics. You can associate multiple active links with the same button simply by using the same button label for both. 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. To determine where the buttons are located on the view that the user sees, you can do the following: * Set the buttons on top of each other at the location that you want them to appear. For example, you can set the same X and Y coordinates for each active link. This ensures the location of the button as it appears to the user in the User Tool. However, this also makes it harder to administer the various active links from the Modify Schema window in the Administrator Tool. * 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 to the viewer in the User Tool.

Table 8-1 Active Link Conditions

Return	Causes the active link to execute when a user with the appropriate access presses Return in a specific field (or selects a radio button if the field is a selection 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, 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.
Submit	Causes the active link to execute whenever a user with appropriate access submits a new entry for the schema via the User Tool. The active link will be performed *before* the entry is submitted.
Modify	Causes the active link to execute whenever a user with appropriate access modifies an existing entry for the schema via the User Tool Modify Individual operation. (The active link will **not** execute during a Modify All operation. However, any other conditions will execute.) The active link will be performed *before* the entry is modified.
Display	Causes the active link to execute whenever a user with appropriate access retrieves and displays an entry for the schema via the User Tool.
Menu Choice	Causes the active link to execute whenever a user selects a choice from a menu. If you choose this option, Field 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.
Set Default	Causes the active link to execute whenever the user selects the Set to Default command or the User Tool loads defaults prior to a new query or submit.

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.

8. **You can further refine your active link selection criteria by entering a qualification statement in the Qualification 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 the section titled "Building Qualifications" on page 150.**

9. **When you have finished specifying active link conditions, go on to specify the active link actions.**

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 Shift buttons in the Actions section 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 conditions and qualifications are specified correctly, according to the instructions provided earlier in this chapter.**

3. **If this is a newly created (blank) active link, go to Step 5**

4. **If this is an existing active link and you want to create a new action, select the New Action button in the Active Link window. The window changes to allow you to specify a new action.**

5. **Select the action you want: Run Macro, Set Fields, Run Process, Message, Change Field, or DDE.**

The window displays the attribute choices for the action you have selected.

6. **Set the attributes as appropriate. Refer to the sections that follow for information about setting attributes for a specific action.**

7. When you have finished setting the attributes, select the Create button to add the new action.
8. To create an additional action for the same active link, select the New Action button.
9. Set attributes as appropriate for the additional action, then select the Create button to add the action.
10. When you have defined all the actions you want for the active link, select Apply to create the active link, then select Dismiss.

To modify an active link action:

1. Open the active link you want to work with if it is not already open.
2. Use the Previous or Next button to page through action definitions to display the one 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, select the Modify button.
5. When you have made all of the modifications you want to the active link's actions, select Apply to save the modified active link then select Dismiss.

To delete an active link action:

1. Open the active link you want to work with if it is not already open.
2. Use the Previous or Next button to page through action definitions to display the one you want to delete.
3. Select the Delete button to remove the action.
4. When you have made all of the modifications you want to the active link's actions, select Apply to save the modified active link then select Dismiss.

Ordering Active Link Actions

The order in which the actions defined for an active link will execute is indicated in the Active Link Actions section. If only one action is defined, it is labeled as 1 of 1. If the action is one of 2 or more actions, it is labeled appropriately. If there are three actions defined, for example, each is labeled as 1 of 3, 2 of 3, or 3 of 3, as appropriate. When you move from one action to another using the Next and Previous buttons, the order indicator numbers will change.

You can change the order in which the actions execute by using the Shift buttons located next to the order indicator. The shift buttons are left and right arrows that 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. **Use the Next and Previous buttons to locate the action that you want to move forward or backward in the execution order.**
3. **To move the action earlier or later in the execution order, select the right or left Shift arrow button.**
4. **Continue to move between actions and adjust their order using the Shift arrow buttons until the actions are in the desired order.**
5. **Select Apply to save the active link with the new action order then select Dismiss.**

Types of Active Link Actions

There are six types of active link actions you can specify:

- **Run Macro** causes a macro to run in the background.
- **Set Fields** assigns values to specific fields in the current AR.
- **Run Process** executes a command line on the client.
- **Message** returns a message and displays it for the user who activated the active link.
- **Change Field** dynamically adjusts certain characteristics of a specified field.

- **DDE** allows the definition of a DDE operation for Windows clients.

Each of these types is explained in the following sections.

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. **Select Run Macro in the Active Link Actions section of the Active Link window. The Active Link Actions section will change to present the fields required to define the Run Macro action, as shown in Figure 8-3 on page 210.**

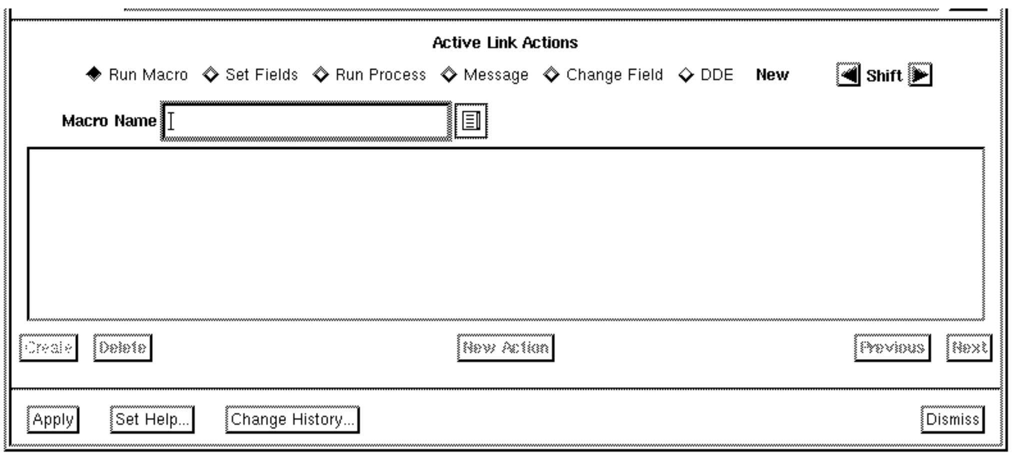


Figure 8-3 Run Macro Active Link Action

2. **Select the list icon for the Macro Name field and select the macro 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 selecting the Macro Name field with the MENU mouse button to open a menu 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 – 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. **Select the Create button to add this action to the active link.**

5. **If you want to create an additional action for the active link, select the New Action button. If you have finished defining conditions and actions for this active link, select the Apply button, then select Dismiss.**

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 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 Set Fields Active Link Action

When you choose the Set Fields active link 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. Hidden fields are shown with dimmed labels in the Set Active Link Fields window. 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. **Select Set Fields in the Active Link Actions section of the Active Link window. A Set Fields button appears in the window. Select the Set Fields button to cause a Set Active Link Fields window with a schema view to appear, as shown in Figure 8-4.**

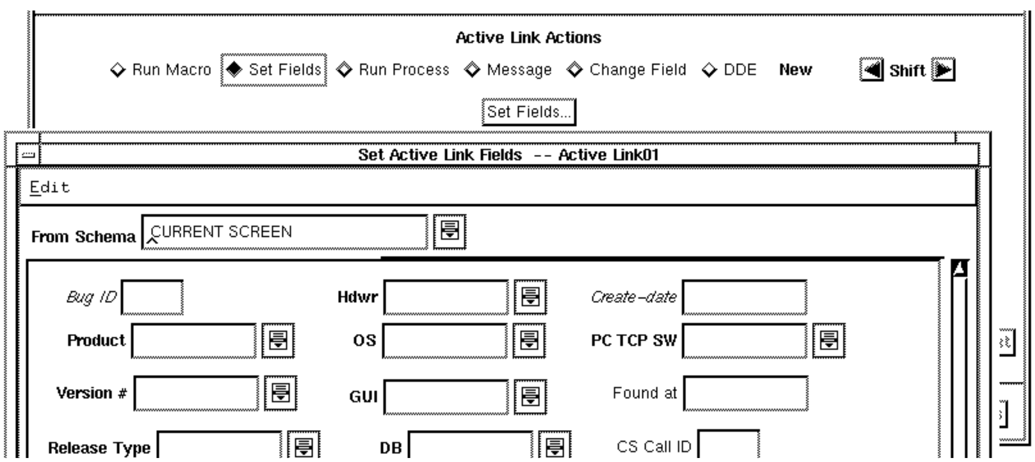


Figure 8-4 Set Fields Active Link Action

2. **In the From Schema field, use the pull-right menu to select the name of the schema from which the AR System is to retrieve the value for the field. You also can use the menu to enter `CURRENT SCREEN` if the value is to come from another field on the same entry.**

Selecting a schema in the From Schema field works in connection with constructing qualification statements to locate ARs that contain specific data.

3. **Enter the values in the schema fields that you want to be automatically set when the active link executes. You can use the commands available through the Edit menu of the Set Active Link Fields window, as described below in "Using the Set Fields Edit Menu" on page 214. You can use the `MENU` button in a field to display a selection list of available fields, functions, and keywords.**

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 214).
- A value from another field in the same schema or another schema (see "Assigning Values from Other Fields" on page 214).
- The value resulting from a specified process (see "Assigning Values from Process Results" on page 216).
- The value resulting from a DDE request operation on a Windows client (see "Assigning Values from a DDE Request" on page 218).
- The value resulting from an arithmetic operation (see "Assigning Values Using Arithmetic Operations" on page 219).
- The value resulting from a function (see "Assigning Values Using Function Results" on page 219).
- A combination of the above. You might want to combine a static text entry with a keyword, for example, **`'Entry entered by' + $USER$`**.

4. **If the data or value you want is on a different AR, create a qualification to locate the specific AR.**

5. **Select the Apply button on the schema view to save the field values you want to load, then dismiss the Set Active Link Fields window.**

6. **If you want to create an additional action for this active link, select the New Action button. If you have finished defining conditions and actions for this active link, select the Apply button then select Dismiss.**

Using the Set Fields Edit Menu

The Edit menu in the Set Active Link Fields window contains the following commands to help you set values:

Clear	Clears all values in the window.
Reset	Resets the field values in the window to those defined when the settings in this window were last applied.
Toggle Field Display	Toggles (switches) the display type of the selected field between the type chosen for the field and a text display type. For example, you can toggle the display of a radio button field to a text display if you want to enter a field name to retrieve the value from another schema. If you toggle from a menu to a text field, you can enter the numeric value of a field as well as a label value (for example, **FIXED**).

Assigning Keyword Values

You can use any of the keywords listed in Table D-3 on page 369 to set a field value. The data type of the keyword value must match the field data type. Use the **MENU** button in any field to see and 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 **qualification criteria** 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 Active Link Set Fields window, make sure the From Schema field is set to `CURRENT SCREEN`.**

2. **If the field you are loading a value for is a radio button, use the Toggle Field Display command on the Edit menu to switch the field to a text line.**

3. **Place the mouse cursor in the field where you want the value loaded and use the `MENU` mouse button to pop up a menu of available fields.**

4. **From the menu, select the field from which the value will be drawn when the active link executes.**

To assign a value from a different AR:

1. **Use the** MENU **mouse button to open the From Schema field menu then select the schema from which you want to retrieve the data.**

2. **If the field you are loading a value for is a radio button, selection menu, or numeric text field, use the Toggle Field Display command on the Edit menu to switch the field to a text line.**

3. **Place the mouse cursor in the field where you want the value loaded and use the `MENU` mouse button to pop up a menu of available fields. The fields that appear in the listing are from the schema shown in the From Schema field.**

4. **From the menu, select the field from which the value will be drawn when the active link executes.**

5. **Use the Qualification bar at the bottom of the Set Active Link Fields window to define the qualification criteria that will locate the specific AR from which the data will be drawn.**

Use the Fields menu to reference fields in the schema you are drawing data from (shown in the From Schema field in the Set Active Link Fields window). These fields will be delimited with single quotes.

Use the **MENU** button in the Qualification field to reference the value of a field on the current screen. 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 wildcards. 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 150.

6. **When you have finished specifying the qualification, select the Apply button in the Set Active Link Fields window then select Dismiss.**

Assigning Values from Process Results

You can set a field to the value resulting from running a specified process on a UNIX client. 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 **stdout** 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 a menu on each field on the window.

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 to **stdout** 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 in **stdout** is treated as the text of an error message and is displayed to the user in an error dialog 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 150 for more information.

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.

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 MS 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:

DDEexcel;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 MS 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 a menu on each field on the window.

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 string is returned (the field will contain no value).

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 **DDE** is considered to be part of the DDE definition.

Assigning Values Using Arithmetic Operations

You can use arithmetic operations to load a computed value. You can combine an arithmetic operation with a static value, a keyword, a value from the current screen or an existing AR, or a value from a process. The same arithmetic operations allowed for specifying qualifications are allowed to build a computed value (see “Table of Operators” on page 366). The operation must meet all the rules for arithmetic operations 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.

Here are some examples of valid arithmetic operations:

```
$TIMESTAMP$ - $CREATE-DATE$
$FIRST NAME$ +'' '' + $LAST NAME$
''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. **Use the `MENU` mouse button in the field. Select `FUNCTION` from the menu that appears and pull right to see a list of the available functions.**

2. **Select the function you want to use. It will appear in the field with a set of parentheses to the right.**

3. **Enter any arguments that are appropriate for the function you have selected within the parenthesis.**

Information about each of the functions supported by the AR System is provided in Table 6-1 on page 176.

The Run Process Active Link Action

Choosing the Run Process active link action allows you to execute a command line 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 icon to open a menu 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 216).

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 150 for more information.

To define the Run Process active link action:

1. **Select Run Process in the Active Link Actions section of the Active Link window. The Active Link Actions section will change to present the fields required to define the run process active link action, as shown in Figure 8-5.**

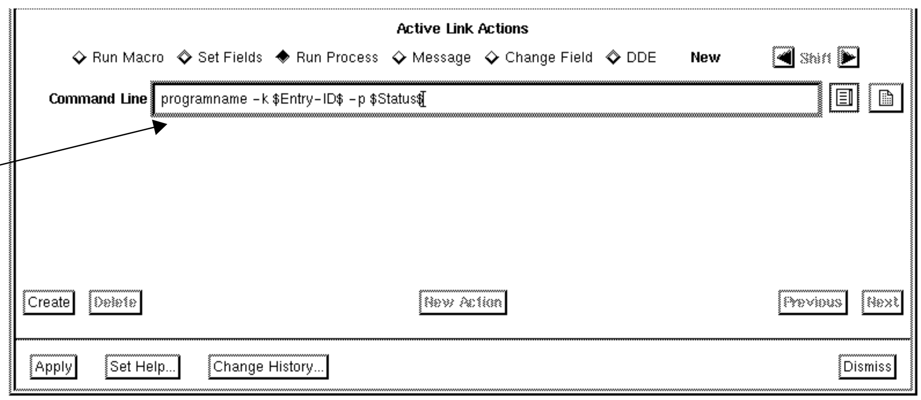


Figure 8-5 Run Process Active Link Action

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 369) 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 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 select the icon next to the Command Line field to open a menu containing 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 window 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. **When you have finished specifying the command for the active link action, select the Create button.**

4. **If you want to create an additional action for this active link, select the New Action button. If you have finished defining conditions and actions for this active link, select the Apply button, then select Dismiss.**

The Message Active Link Action

When you choose the Message active link 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. **Select Message in the Active Link Actions section of the Active Link window. The Active Link Actions section will change to present the fields required to define the message active link action, as shown in Figure 8-6 on page 223.**

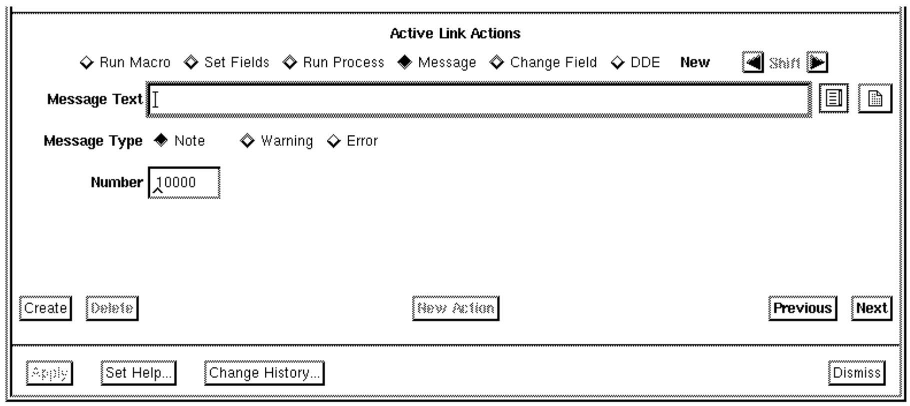


Figure 8-6 Message Active Link Action

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 select the icon next to the Message Text field to display a menu containing a list of all 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 select the text edit icon to explode the line into a text edit window for easier data entry, if desired.

3. Select a message type for the notification message. The message type will be displayed with the notification 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`**.

4. Specify a message number in the Number field. The message number will be displayed with the notification message. The number you specify must be greater than or equal to 10000. (Numbers under 10000 are reserved for AR System messages.)

5. **When you have finished specifying the message active link action, select the Create button.**

6. **If you want to create an additional action for this active link, select the New Action button. If you have finished defining conditions and actions, select the Apply button then select Dismiss.**

The Change Field Active Link Action

The Change Field active link 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 within the window to the field, or change the accessibility of the field.

To define the Change Field active link action:

1. **Select Change Field in the Active Link Actions section of the Active Link window. The Active Link Actions section will change to present the fields required to define the change field action, as shown in Figure 8-7.**

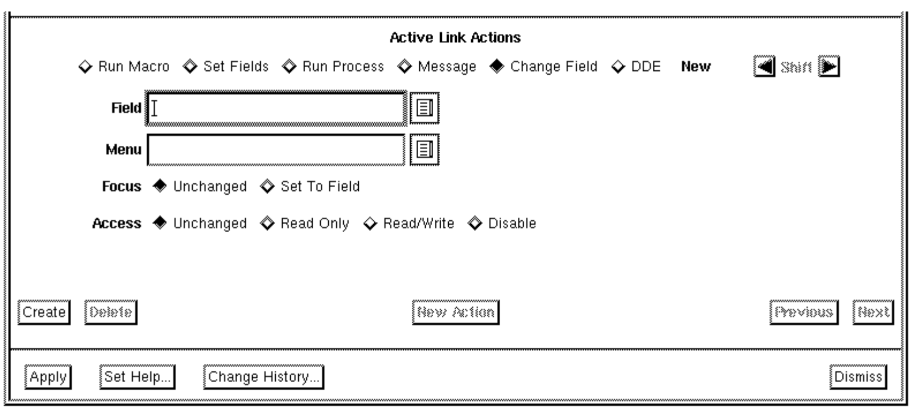


Figure 8-7 Change Field Active Link Action

2. **In Field, enter the name of the field in the current schema whose characteristics you want to set. You can type directly into the field or select the list icon next to the field to open a list containing the schema fields.**

3. **Specify the changes that you want to make:**

- To select a new character menu and attach it to the field, enter the name of the menu in the Menu field. You can type the menu name directly into the field or select the icon to display the available menus. (The field must already have a character menu assigned in order for you to be able to change to a different character menu.)
- To move the focus to the field, select the Set To Field radio button. To leave the focus as it is, select the Unchanged radio button.
- To change the current access settings for the field, select the appropriate Access radio button. You can choose from the following:

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.

4. **When you have finished specifying the change field active link action, select the Create button.**

5. **If you want to create an additional action for this active link, select the New Action button. If you have finished defining conditions and actions, select the Apply button then select Dismiss.**

The DDE Active Link Action

Choosing the DDE active link 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 229 and "Active Link DDE/Poke Action" on page 230.

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*.

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 150 for more information.

To define the DDE active link action:

1. **Select DDE in the Active Link Actions section of the Active Link window. The Active Link Actions section will change to present the fields required to define the DDE active link action, as shown in Figure 8-8 on page 227.**

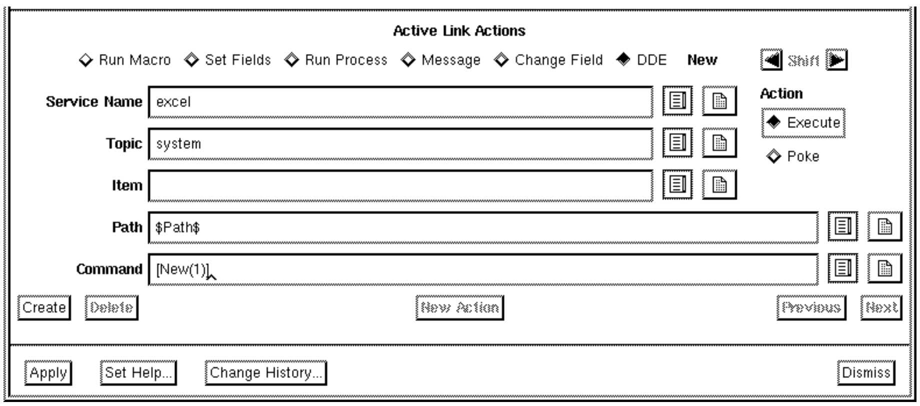


Figure 8-8 DDE Active Link Action

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.

4. In the Topic field, enter the DDE topic.

5. In the Item field, enter the DDE item, if applicable. (Item is ignored if the DDE Action type is Execute.) You can select the list icon next to the Item field to pop up a menu containing a list of all the fields in the current schema as well as a list of keywords.

6. In the Path field, enter the path indicating the location of the service on the PC. You can select the list icon next to the Path field to pop up a menu containing a list of all the fields in the current schema as well as a list of keywords.

7. In the Command field, enter the command you want to execute. (You must enter a value in this field.) You can select the list icon next to the Command field to pop up a menu containing a list of all 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. **When you have finished specifying the DDE active link action, select the Create button.**

9. **If you want to create an additional action for this active link select the New Action button. If you have finished defining conditions and actions, select the Apply button then select Dismiss.**

Note – All data sent to the server is assumed to be in **`cf_text`** format.

See "Assigning Values from a DDE Request" on page 218 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 8-8 on page 227 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 8-9.

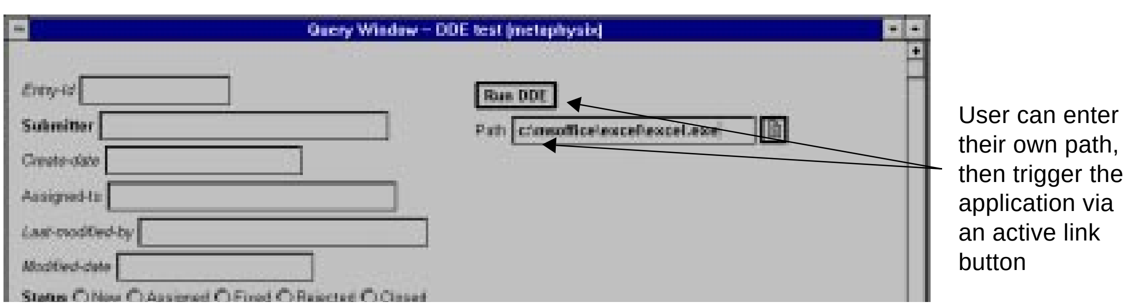


Figure 8-9 Creating and Using an Active Link Button for DDE Actions

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 8-10 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 8-9 on page 229.

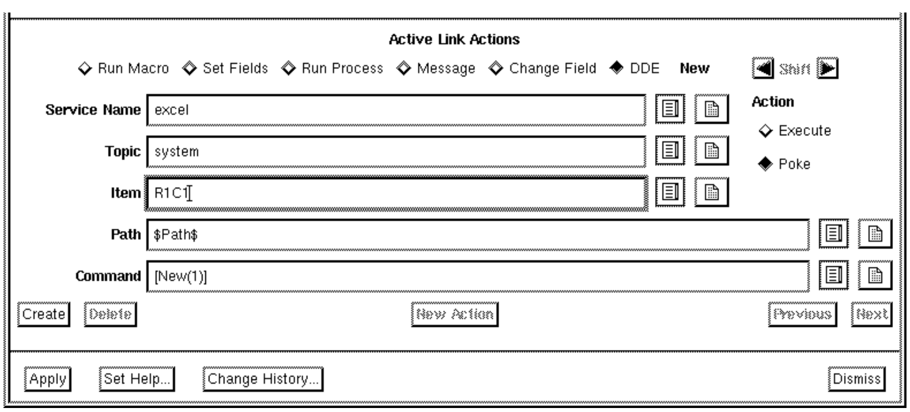


Figure 8-10 DDE/Poke Action

Defining Group Access For 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 Access window lets you assign them all at once.

The Group Access window is particularly useful when you have added a new access control group since the active links were created and you want to set its access rights across a number of active links. You can use one window 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 Access window to set the group permissions for *all* active links at the same time.

To define group access for active links:

1. **Select Active Links under the Category menu of the Admin Tool main window.**

2. **From the Edit menu, select Group Access (or type `Ctrl+G`). This causes the Group Access window to appear, as shown in Figure 8-11 on page 232. You use this window to set active link permissions globally for each group defined for a server.**

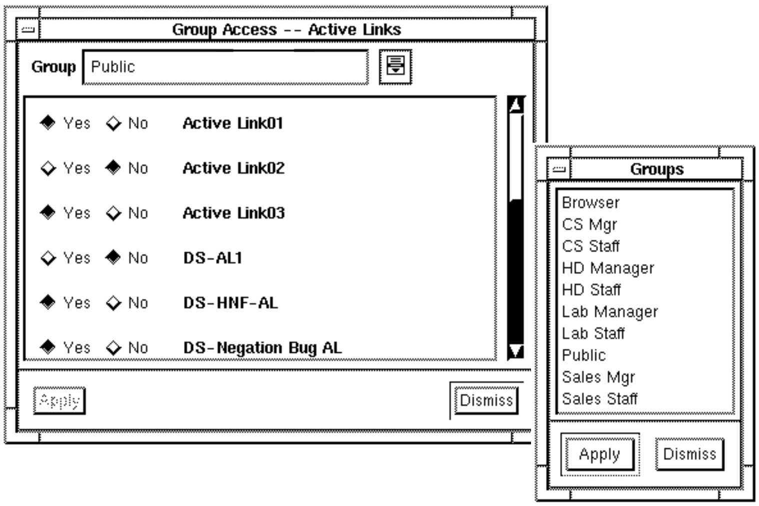


Figure 8-11 Group Access — Active Link Window

3. **Click the Group list icon. The Groups dialog box appears.**
4. **Select a group from the dialog box, then click Apply (or double-click the entry). The Group Access window then lists all current permission settings for that group for all items in the current category.**
5. **For each item, set the active link permissions for the specified group. Selecting Yes gives the group permissions to access the active link.**
6. **Select the Apply button to save the permission settings.**

Setting Help for Active Links

Selecting the Set Help button 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. See "Setting Help" on page 38 for information on how users can access help information.

Building and Using Active Link Change History

The AR System automatically records 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 selecting the Change History button at the bottom of the Active Link window to open the Change History dialog box. For more information on viewing and modifying change history information, see “Building and Using Change History” on page 36.

Defining Administrator Commands 9

This chapter describes how to use the Administrator Tool to create special menu extensions for the User Tool that let users invoke specific commands running on the server. Administrator commands are available to *all* users who belong to a group that has permission to access the command and are running the User Tool on a UNIX workstation. (User commands, which are defined by individual users from within the User Tool, appear only on that user's local system.)

Note – Admin commands execute with the same permissions as `arserverd`. The root user (or whoever starts `arserverd`) is the owner of the admin commands.

The following topics are covered in this chapter:

- The Admin Command window.
- Opening an administrator command.
- Creating or modifying an administrator command.
- Deleting an administrator command.
- Setting help for an administrator command.

Using the Admin Command Window

Administrator commands are displayed in the Admin Command window. Figure 9-1 shows the Admin Command window containing a currently existing administrator command.

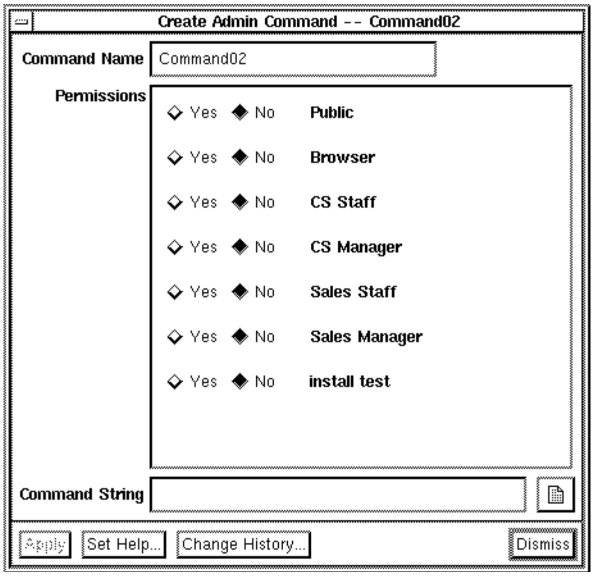


Figure 9-1 Admin Command Window

You use the Admin Command window to create, modify, and delete administrator commands.

Note – Admin commands only work on UNIX clients.

Opening Administrator Commands

Follow these steps to open a new or existing administrator command.

To open an administrator command:

1. **In the Admin Tool window, select Admin Commands from the Category menu to see a list of administrator commands available on the server.**

2. **To create a new administrator command, select Create a New from the Edit menu.**
   To open an existing administrator command for modification, select the administrator command and select Open from the Edit menu (or type `Ctrl+O` or simply double-click the administrator command).

   To create and open a copy of an administrator command, select the administrator command you want to copy and then select Copy from the Edit menu (or type `Ctrl+C`). A new item will appear in the list box as the selected item. The new item will be called `Copy of` *<xxx>* where *<xxx>* is the name of the original administrator command. Select Open from the Edit menu (or type `Ctrl+O` or simply double-click the copy) to open.

   The Create (or Modify) Admin Command window appears (Figure 9-1 on page 236). For new administrator commands, the Command String field is blank. For existing administrator commands or copies of existing administrator commands, the current value is shown.

3. **Specify or change the administrator command according to the steps described in the following section, “Defining Administrator Commands.”**

Defining Administrator Commands

Follow the steps below to define an administrator command.

To define an administrator command:

1. **Open the administrator command. The Admin Command window appears, as shown in Figure 9-1 on page 236.**

2. **Type or edit the name for the command in the Command Name field.**
   This is the name that users will see in the Select Admin Command window accessed through the Query Window of the User Tool.

3. **For each group listed in the Permissions list, select Yes to allow members of the group to see and execute the administrator command or select No to deny members of the group access to the command. Select Yes for the Public group to make the command available to everyone. Use the scroll bars, if needed, to see the complete list of groups.**

4. **Type or edit the command string that will invoke the operation in the Command String field. You can enter up to 255 characters.**

5. **You may also want to select the Set Help button and enter help text and the Change History button to update the change diary for the command.**
   Help text is useful to remind users of what the command does. This text will be displayed when selecting a command to run.

6. **Select the Apply button to add the command.**
   The name will appear in the list of administrator commands available from the Select Admin Command window that opens when users select Run Admin Command from the Actions menu of the User Tool. (Users who are currently running the User Tool will need to restart the tool or log in again to see the new command.)

Deleting Admin Commands

Deleting a command removes its name from the list of administrator commands in the Select Admin Command window of the User Tool.

To delete an administrator command:

1. **Select Admin Commands from the Category menu (or type `Ctrl+E`).**

2. **The currently available administrator commands appear in the list box.**

3. **Select the administrator command to be deleted, and select Delete from the Edit menu.**

4. **A confirmation message appears.**

5. **Select the Proceed with Delete button to delete the admin command.**

Defining Group Access For Admin Commands

Group access for admin commands lets you do bulk assignments of group permissions for all admin commands within a server. Rather than going through each admin command individually to assign permissions for a group, the Group Access window lets you assign them all at once.

Group access is particularly useful when you have added a new access control group since the admin commands were created and you want to set its access rights across a number of admin commands. You can use one window to assign the new group access for each admin command instead of having to open each admin command and modify the conditions for each admin command.

Note – The Administrator Tool offers several different ways to set permissions. For example, when creating an admin command, you might give access to the Public group. However, if you decide that you want to deny the Public group access to a particular admin command, you then can use the Group Access window to set the group permissions for *all* admin commands at the same time.

To define group access for admin commands:

1. **Select Admin Command under the Category menu of the Admin Tool main window. This enables the Group Access item under the Edit menu.**
2. **Select Group Access (or type `Ctrl+G`). This causes the Group Access — Admin Commands window to appear, as shown in Figure 9-2. You use this window to set admin command permissions globally for each group defined for a server.**

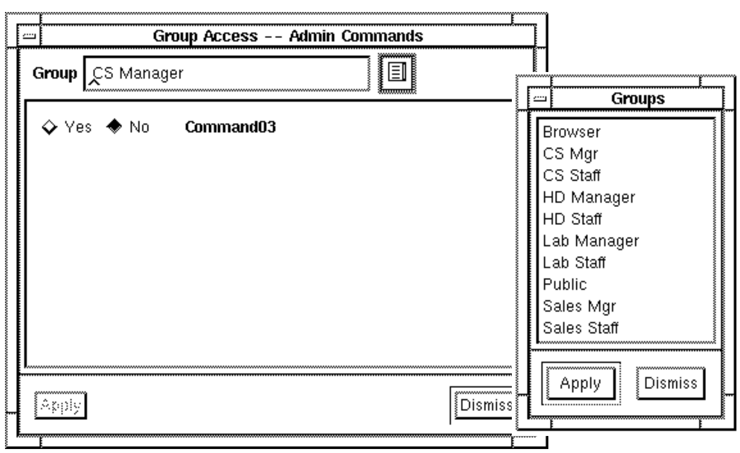


Figure 9-2 Group Access — Admin Commands Window

3. **Click the Group list icon. The Groups dialog box appears.**

4. **Select a group from the dialog box, then click Apply (or double-click the entry). The Group Access window then lists all current permission settings for that group for all items in the current category.**

5. **For each item, set the permissions for the specified group. Selecting Yes gives the group permissions to access the admin command.**

6. **Click the Apply button to save the option settings.**

Setting Help for Administrator Commands

Selecting the Set Help button in the Create Admin Commands window brings up an Admin Commands Help Text editing window. You can supply help text for the selected command here. In most cases, this help text is simply a description of the command and what it is used for. Users will see this help text when they select an administrator command from the Select Admin Command window. For more information on setting help, see "Setting Help" on page 38.

Building and Using Admin Commands Change History

The AR System automatically records information about the owner of a command, the user who last modified the command, and the date of the modification. You can display this information at any time by selecting the Change History button at the bottom of the Admin Commands window to open the Change History dialog box. For more information on viewing and modifying change history information, see "Building and Using Change History" on page 36.

Importing and Exporting Definitions 10

This chapter describes how to use the Import and Export commands to transfer schema, menu, filter, escalation, active link, and admin command 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).

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 File menu in the Admin Tool window.

- The Export command lets you export schema, filter, active link, escalation, menu, and admin command definitions and schema mail templates to a file.
- The Import command lets you import schema, menu, filter, escalation, active link, and admin command 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 Import Tool. The Import Tool imports data in the AR Export, CSV, and ASCII file formats. To use the AR Import Tool, refer to Chapter 11.

Importing Definitions

Follow these steps to import definitions to a server. For information on importing data records into the database, refer to Chapter 11.

To import definitions:

1. **Copy the exported ASCII file to the destination server.**
2. **Select Import from the File menu (or type `Ctrl+I`).**
3. **Specify the filename containing the definitions you wish to import.**
4. **Select Apply. The Import Definitions window appears, as shown in Figure 10-1. The names of the definitions in the file you specified are listed in the Import Definitions window.**

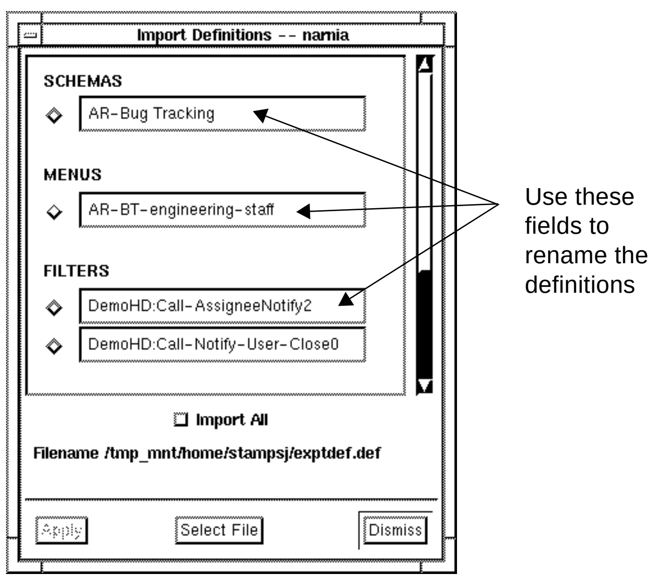


Figure 10-1 Import Window

5. **Select as many definitions as desired, or select them all using the Import All checkbox.**

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 (as shown in Figure 10-1 on page 242), since you may not import a definition whose name already exists in the target server. Change the definition name by selecting the name and editing it. (You must make sure the Import All checkbox is deselected to allow editing of definition names.)

6. **Select the Apply button to import the definitions to the current server.**

The new definition names will automatically appear as selections in the respective categories the next time the tools are invoked.

7. **If desired, select the Select File button to choose a different set of definitions for import. The Import Definitions window will reappear.**

8. **When you have finished importing definitions, select the Dismiss button to dismiss the Import Definitions window.**

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 operation 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 the following section, “Exporting Mail Templates.” For information on exporting data, refer to Chapter 5, *Reports* in the *Action Request System User’s Guide*.

To export definitions:

1. **Choose Export Definitions from the File menu (or type `Ctrl+D`).**

The Export Definitions window appears, as shown in Figure 10-2. The Export Definitions window lists all available schemas, menus, filters, escalations, active links, and admin commands in a scrolling list. This is where you select the definitions you want to export.

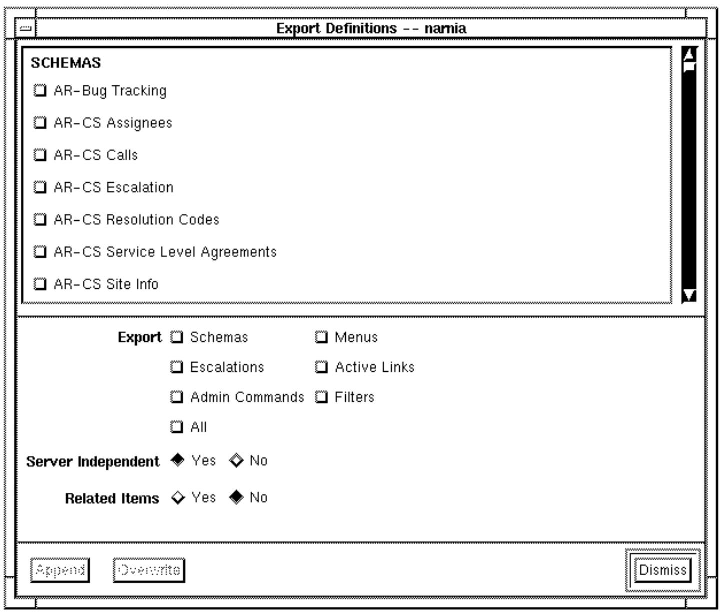


Figure 10-2 Export Definitions Window

2. Select as many individual definitions as desired by selecting the checkbox next to the definition in the scroll list. Use the scroll bars to see all items in the list.

You can select all of a specific type of definition for export by selecting the appropriate Export checkbox. For example, to export all filters defined on the server, select the Filters checkbox.

You can select *all* definitions on the server by using the All checkbox.

Note – When exporting object definitions that reference other objects (for example, menus that reference schemas), always make sure that you export the schemas *first*. Otherwise, the import operation will fail.

---

3. **In the Server Independent field, select the Yes or No radio button to specify whether or not 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.

---

4. **In the Related Items field, select the Yes or No radio button to specify whether or not to export any 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.
- If you select an escalation, the export operation will include all related schemas.
- If you select an active link, the export operation will include all related schemas and menus.

If you choose No for the Related Items option, the export operation will include only the selected item itself.

5. **Select the Append button to append the definitions to an existing file. Select the Overwrite button to overwrite the contents of an existing file.**

A file selection window appears.

6. **In the file selection window, specify where you want the definitions stored.**

All the definitions you selected will be stored in a single file.

The actual export will not occur until you complete your actions in the file selection window.

Exporting a Range of Definitions to a File

Because of limits imposed by the X window system, all the structures on a server cannot always be included in a single export window. For that reason, the AR System only allows a maximum of 700 items per export.

To export a range of definitions:

1. Choose Export Definitions from the File menu (or type `Ctrl+D`).

The Export Range window appears, as shown in Figure 10-3.

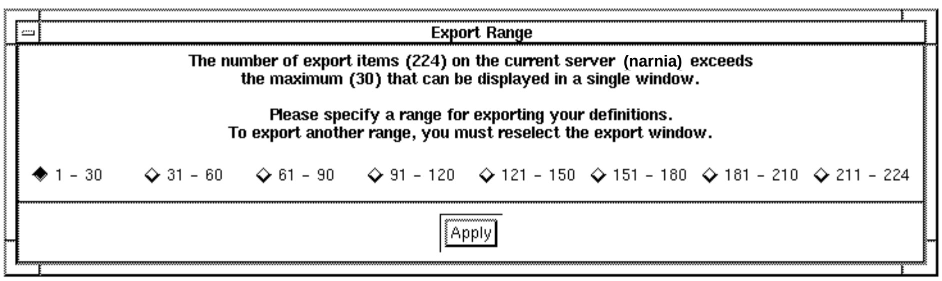


Figure 10-3 Export Range Window

2. Select the range of definitions you want to export to a file. Note that in the example the total number of definitions in the server (224) is divided into groups of 30.

3. Select the Apply button.

The Export Definitions window appears (Figure 10-2 on page 244). The bottom of the window lists the range of definitions that you selected.

4. Follow the rest of the export definitions procedure that is described in "Importing Definitions" on page 242.

Exporting Mail Templates

A mail template is a form for submitting ARs to the User Tool through email. You use the Export utility to generate mail template files for schemas. You can then distribute these files to users. For more information about mail templates and how the AR System supports email, see Chapter 12.

To export a mail template:

1. **Choose Export Schema Mail Templates from the Admin Tool File menu (or type `Ctrl+T`).**

The Export Mail Templates window appears, as shown in Figure 10-4.

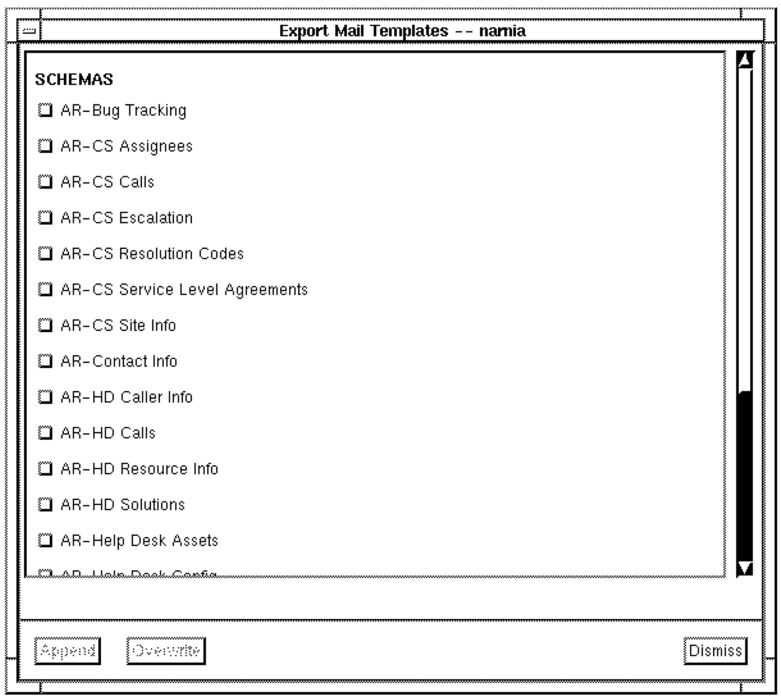


Figure 10-4 Export Mail Templates Window

2. **From the Schemas list, select the schema for which you want to generate a mail template by clicking the box next to the title.**

Note – If you want to export more than one schema, create a separate email template for *each* schema.

---

3. **Select the Append button to append the mail template to an existing file. Select the Overwrite button to overwrite the contents of an existing file.**

A file selection window will appear.

4. **In the file selection window, specify where you want the templates stored.**

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 11

The Action Request System Import Tool allows you to bring data into a schema from another AR System schema or from a different data source. 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.

This chapter includes information on the following topics:

- Starting and exiting the Import Tool.
- Importing information 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 (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 Action Request System Administrator’s Guide error-handling capability.

Note – You do not use the Import Tool to import *definitions* into the server. For information on importing definitions, see Chapter 10.

Starting the Import Tool

You can start the Import Tool from any UNIX workstation on the network that is running the 2.1 version of the client tools. Before you start the Import Tool, make sure you have the following information from your AR System administrator:

- The directory that contains the executables for the Import Tool (by default, this directory is `/usr/ar/bin`).
- Your registered AR System user name and password.

Note – The Import Tool uses the same configuration directory as the AR System User Tool.

Your user name and password identify you to the AR System and give you the appropriate access permissions.

In the following steps, *<ar_install_dir>/bin* refers to the directory containing the executables for the AR System client tools.

See Appendix E for information on the command line options that are available when you start the Import Tool.

***To start the Import Tool*:**

1. Type the following at the UNIX prompt:

```
% <ar_install_dir>/bin/arimport &
```

2. **If you are starting the Import Tool for the first time, the Login window appears. Enter your registered user name and password, then select the Apply button.**

Once you have logged into the Import Tool, your login name is included in the title of the Import Tool window.

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.

Note – If you log into the Import Tool on a system where someone else is logged into the UNIX operating system, before you change the user information and log in as yourself in the Import Tool, you might want to change the other user's `ARHOME` environment variable to point to the directory defined by your `ARHOME` environment variable. If you do not, and you save mappings during your Import Tool session, they will be saved to the AR System configuration directory of the user who is logged in at the UNIX operating system level. For information on changing the `ARHOME` environment variable, see Chapter 2, *Getting Started with the User Tool* in the *Action Request System User's Guide for OSF/Motif*.

Displaying Version Information

To display version information about the Import Tool:

- From the Help menu, choose On Version to display information about the product. You should be prepared to provide this information whenever you call for Customer Support.

Exiting the Import Tool

To exit the Import Tool:

- To exit the Import Tool, select Exit from the File menu (or type `Alt+F4`). You can also exit the tool by selecting Quit from the Window menu.

Importing Information Using the Import Tool

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 11-1 AR Import Data Formats

Data Format	Filename 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. (You can specify each of these formats when you generate a file using the Report query operation in the User Tool. See Chapter 5, *Reports*, in the *Action Request System User's Guides* for information.)

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.

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.

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".

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 specified separator string. You can then 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 249. The Import Tool window appears as shown in Figure 11-1.**

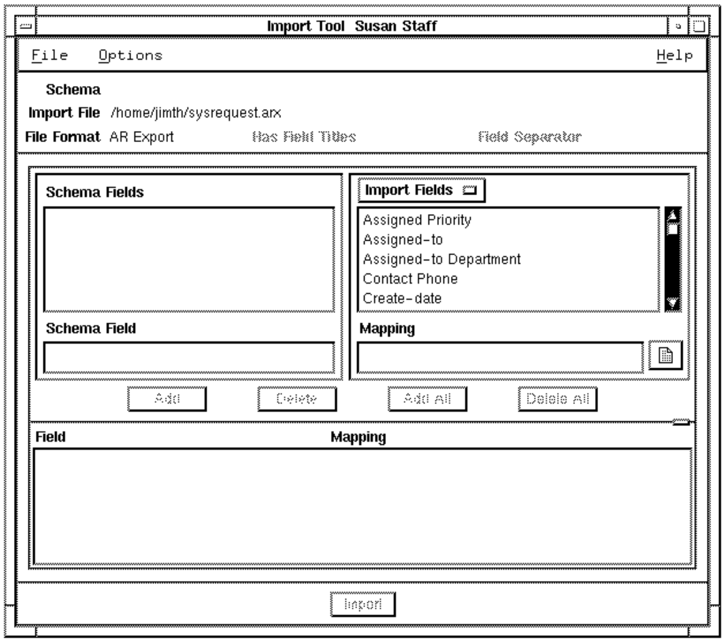


Figure 11-1 Import Tool Window

2. **Open the schema that you want to import information into by selecting Open Schema from the File menu, selecting the schema name from the list in the Open Schema window, then selecting Apply. The destination schema name will appear in the Schema area at the top of the Import Tool window.**

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 selecting Open Import File from the File menu. The Open Import File window appears as shown in Figure 11-2 on page 255.**

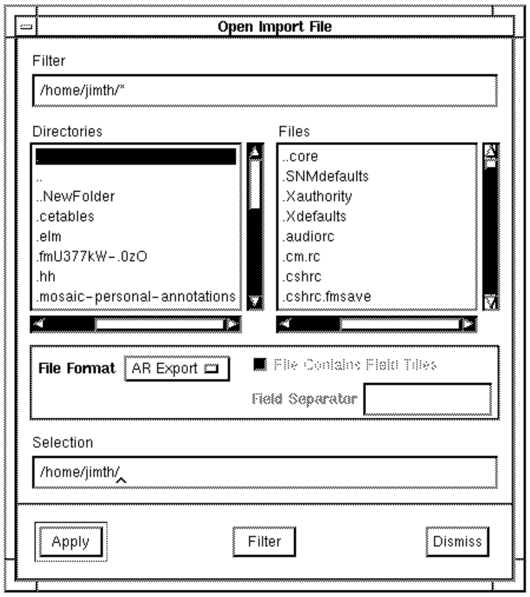


Figure 11-2 Open Import File Window

a. **Use the Directories list and the Filter button to navigate through the directory structure in order to locate the import file. Then, click on the file name in the Files list to add it to the directory path in the Selection field. (If you choose, you can type the directory path and file name directly into the Selection field.)**

b. **Select the file format of the file you want to import by choosing AR Export, CSV, or ASCII in the File Format selection field.**

c. **If the file is CSV or ASCII format, specify whether or not the file includes titles by selecting or deselecting the File Contains Field Titles field checkbox. If the file contains titles and you do not select the File Contains Field Titles button, the Import Tool will treat the titles the same as the rest of the data in the file and generate default titles (for example,** `Field-01`**).**

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 and** `\b` **for backspace. The separator can be a maximum of 32 characters.**

e. **Click on the Apply button to load the fields from the import file in the Import Tool's main window.**

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` format, 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 the following section, "Mapping Import Fields."**

5. **If desired, specify default mappings for the import operation according to the instructions in "Defining Fallback Mappings" on page 261.**

6. **Select the Import button to load the source information into the schema. Each record in the source file will generate a single AR. A dialog allows you to stop the import process before it completes. If you cancel the operation, you will be prompted to decide whether to copy the remaining records to the log file. (See "Using the Import Tool Log File" on page 263 for how to use the information copied to the log file.)**

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. 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	`$TIMESTAMP$`

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 "Importing Information Using the Import Tool" on page 252.**

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 selection menu above the Import Fields/Keywords list. The list will contain either a list of the fields in the import file or a list of keywords, according to your choice.**

4. **Select the field or keyword you want mapped to the schema field you selected in Step 2**

- If the field names from the import file appear in the Import Fields/Keywords list, you can click on a field name to display it in the Mapping field. The result will be a direct transfer of data from the import file to the schema.

- If keywords appear in the Import Fields/Keywords list, you can click on a keyword from the list. For example, if you enter the Create-date field in the Schema Field entry field and you want each date in the import file to reflect the current day's date, 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.

If you prefer, you can type field names or keywords directly into the list or select the icon to the right of the Mapping field to open a Text Edit - Mapping dialog box.

You can map more than one keyword or value to a single schema field by entering a space or other separator character after the first value then selecting (or typing) a second value.

5. **Select the Add button to create the mapping for the field.**

Note that the field is removed from the list of fields on 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 name, select 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	1. Field IDs (attempted first) 2. Field names, case insensitive (attempted second for fields not yet matched)
CSV	Field names, case insensitive
ASCII	Field names, case insensitive

8. **Make sure you double check the mappings to make sure all fields matched. You can resolve unmatched 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.

---

9. **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 Schema Field and Mappings fields as required, then select the Modify button.**

10. **To delete a field mapping, select the mapping in the Mapping list and select the Delete button. Select Delete All to delete all the mappings from the list.**

11. **When you have completed mapping, your Import Tool window will look similar to that shown in Figure 11-3 on page 259.**

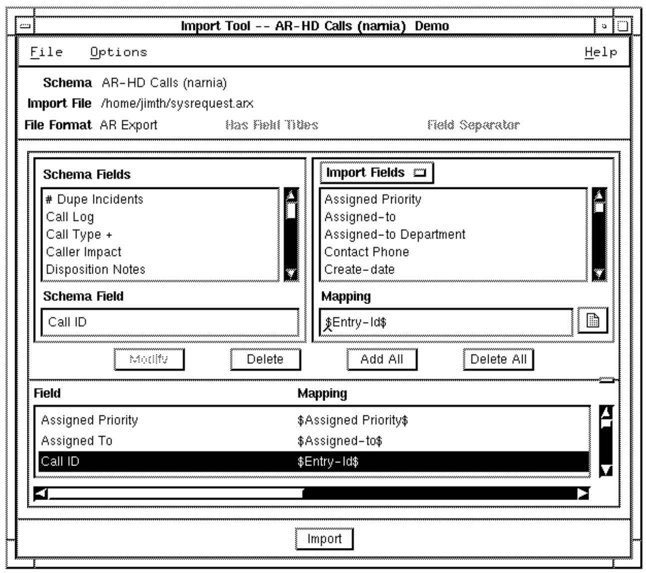


Figure 11-3 Import Tool Window with Mappings

12. Once all settings in the Import Tool main window are as you want them, select the Import button to load the source information into the schema. Each record in the source file will generate a single AR. A dialog allows you to stop the import process before it completes. If you cancel the operation, you will be prompted to decide whether to copy the remaining records to the log file. (See "Using the Import Tool Log File" on page 263 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 a similar import operation.

When you save mappings, the entire set of information is saved. This includes the schema name, the server, the import file name, all mappings, all fallback mappings, all error handling data information, and preferences.

To save mapping information:

1. **Specify map settings in the Import Tool main window.**
2. **Select Save Mapping from the File menu. The Save Mapping dialog box appears.**
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 typing the directory name in the Directory field or by selecting the menu button beside the field to choose from the list of available directories.**
5. **Optionally, you can enter text in the Help Text field to describe the mapping file you are saving.**
6. **Select Save 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. Select Continue to overwrite the file. Select Cancel to cancel the save operation.**

Using Saved Field Mappings

You can load mappings you previously saved by following the steps below.

To use an existing mapping file:

1. **Select Load Mapping from the File menu. The Load Mapping dialog box appears.**
2. **Specify the directory that contains the mapping file by typing the directory name in the Directory field or by selecting the menu icon beside the field to choose from the list of available directories.**
3. **Select the mapping file from the Available Mappings list.**
4. **Select the Load button.**

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, “Configuring FTS in the AR System” on page 317.

Your 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. (For more information, “Using the Import Tool Log File” on page 263.)

Defining Fallback Mappings

You can define fallback mappings to tell the Import Tool what to do should a problem with data mapping occur during an import operation.

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 character 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).

To set fallback mappings:

1. **In the Import Tool main window, select Fallback Mapping from the Options menu (or type `Ctrl+F`). The Fallback Mappings window appears, as shown in Figure 11-4. The Schema Fields list contains a list of the fields for the currently selected destination schema.**

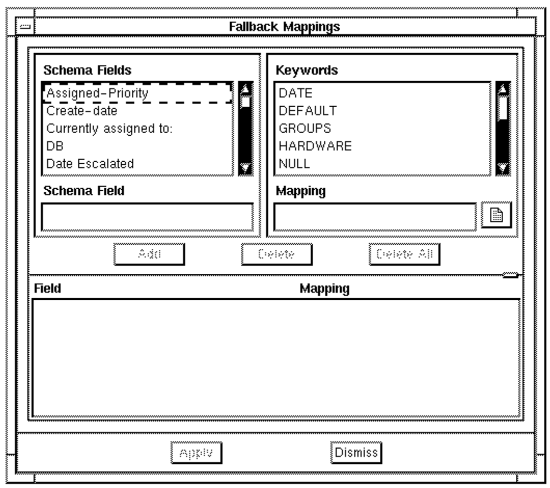


Figure 11-4 Fallback Mappings Window

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 Mapping field.**

If you prefer, you can type keywords directly into the field or select the icon to the right of the Mapping field to open a Text Edit dialog box.

You can map more than one keyword to a single schema field by entering a space or other separator character after the first value then selecting (or typing) a second value.

4. **Select the Add button to add the mapping to the 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 select the Modify button.**

6. **To delete a mapping, select the mapping then select the Delete button. To delete all current mappings from the list, select the Delete All button.**

7. **Once you have specified all the mappings you want to specify, select the Apply button.**

Using the Import Tool Log File

During each import operation, a dialog appears to let you know the status of the operation. If you have set Import Tool preferences to alert you of bad records or to use fallback options, the dialog informs you that an error has occurred each time a record cannot be successfully imported. You can then select one of three options:

- You can skip the record and import the rest of the data. The record in error will be written to the error log and the Import Tool will continue importing the remaining data.
- You can skip all records with the same type of error and import the rest of the data. The records in error will be written to the error log and the Import Tool will continue importing records that are not in error.
- You can stop the import operation at that point with the option to copy all remaining data to the error log.

You may also have set error handling preferences so that records that cannot be imported are skipped automatically and recorded in the error 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 error 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 error 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 set.

To set preferences for the Import Tool:

1. Select Preferences from the Options menu. The Preferences window appears as shown in Figure 11-5.

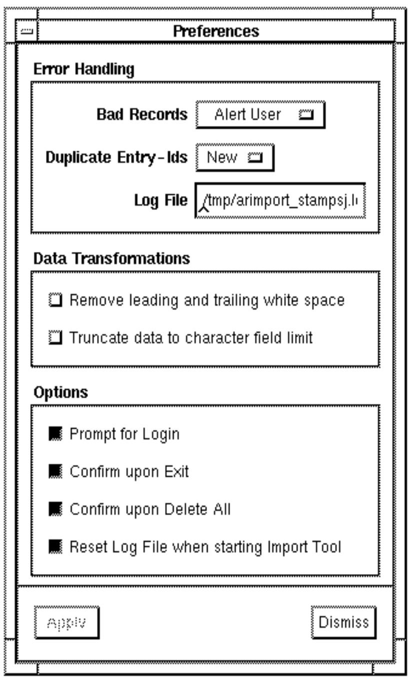


Figure 11-5 Import Tool Preferences Dialog Box

2. **Set options by selecting from the selection menus, typing information in the fields, or selecting choices. You can set the following Import Tool preferences:**

   a. **You can set the following Error Handling preferences:**

Bad Records	Alert User	The import process is interrupted and you receive an error dialog.
	Skip	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.
	Use Fallback	The Import Tool uses the fallback mapping that you specify for the field in the Fallback Mappings window. If the fallback mapping also produces an error, it will alert the user.
Duplicate Entry-IDs	New	New Entry IDs are assigned to all of the ARs in the import file.
	Old	The existing ID will be used for all entries imported. If an ID is already in use, an error will be returned.
	Fixup	Entries will be imported using their existing IDs. If an ID is already used, a new ID will be generated for the new record.
Log File		Enter a directory and path name for a file that logs error messages encountered during the import process.

   b. **You can set the following Data Transformation preferences:**

Remove leading and trailing white space	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 data to character 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.

   c. **You can set the following Options preferences:**

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 works on one workstation.
Confirm upon Exit	Select if you want a confirmation message every time you exit the Import Tool.

Confirm upon Delete All	Select if you want a confirmation message every time you click on the Delete All button in the Import Tool window.
Reset Log File when starting Import Tool	Select if you want to purge the error log each time you start 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 error handling.

3. **Once you have chosen your preference settings, select the Apply button to accept the settings or select Dismiss to dismiss the Preferences dialog box without changing the old preference settings.**

Electronic Mail Support 12

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 12-1:

Table 12-1 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 275.	`<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 276 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 12-2 shows the options that you can specify in the configuration file:

Table 12-2 `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)

Table 12-2 armaild Configuration File Options *(2 of 3)*

Option	Function	System Default
`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
`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 12-2 `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 12-3 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 12-3 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 270.
`-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 269.

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 275.

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 Administrator 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 Definitions” on page 242 for complete instructions on exporting mail templates.

The Export operation generates a template that looks like Figure 12-1. 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 12-1 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 270.

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 276.

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 12-2 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 12-2 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 12-3 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 12-3 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 12-4 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 12-4 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 12-5 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 12-5 Modified Template For Query for Fields

Note – Compare Figure 12-5 with Figure 12-4 on page 285. 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 12-6 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 12-6 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.**

Figure 12-7 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 12-7 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 6 and Chapter 7 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.

The Multi-Process Server Option 13

This chapter discusses the administration and performance of the multi-process (MP) server option in the AR System. 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 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 can be licensed to run the MP server option. 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 for AR users:

- 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 13-1 shows how the MP server design works and shows the server processes and their RPC socket numbers.

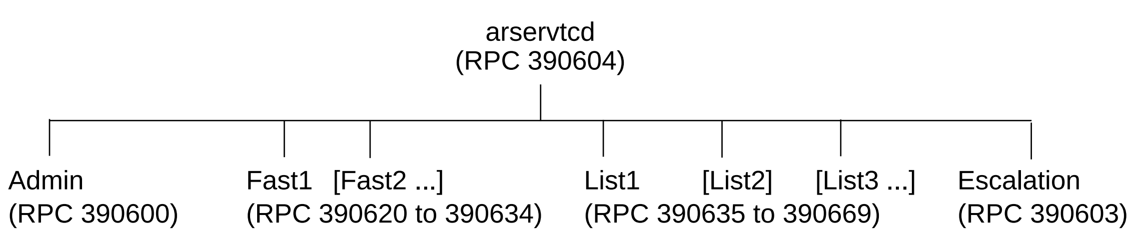


Figure 13-1 MP Server Design

You can configure the number of `arserverd` servers 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, “Using the MP Server with Private Servers” on page 299.

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 catch-all 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 295.

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 295.

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 queuing 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 295.

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 295.

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 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, select the Multiple Processes category (Figure 13-2 on page 296) in the Server Information window to specify a multiple process server configuration. If you do not have a Multi-Process Server Option license, you cannot access the Server Information — Multiple Processes category.

To set the multiple-process server environment:

1. **Select Server Information from the File menu. The Server Information window appears.**

2. **In the Server Information window, select Multiple Processes from the Category list, as shown in Figure 13-2 on page 296.**

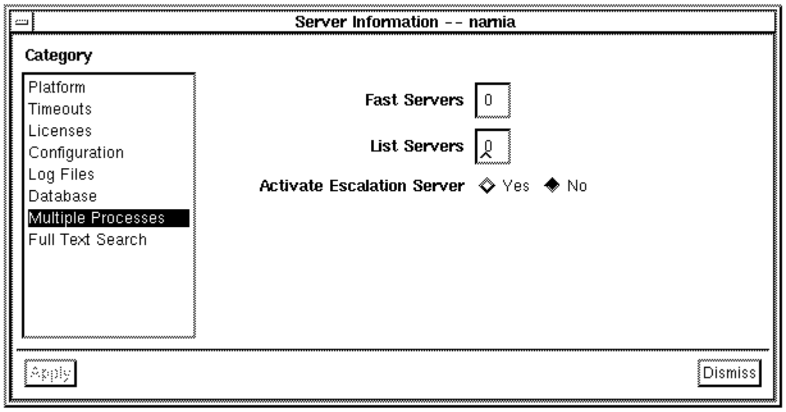


Figure 13-2 Server Information — Multiple Servers

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 293.
List Servers	Number of processes to run as list servers. For more information on list servers, "List Servers" on page 294.
Activate Escalation Server	If your site uses many escalations which the server checks frequently, select Yes to activate a separate escalation server. If you select No, escalations are handled by the main Admin server. For more information on escalation servers, "Escalation Server" on page 294.

4. Select the 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`, `arservdsd`, and `arservftd` processes. While `arservtcd` is available to *all* AR System users, it includes extra capabilities if you are running multiple-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 admin, fast, list, and escalation processes at startup, including the optional `arservftd` and `arservdsd` processes.
- 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 13-3 illustrates how the `arservtcd` controller process handles requests from 2.0 clients and administers the escalation, fast, and list servers.

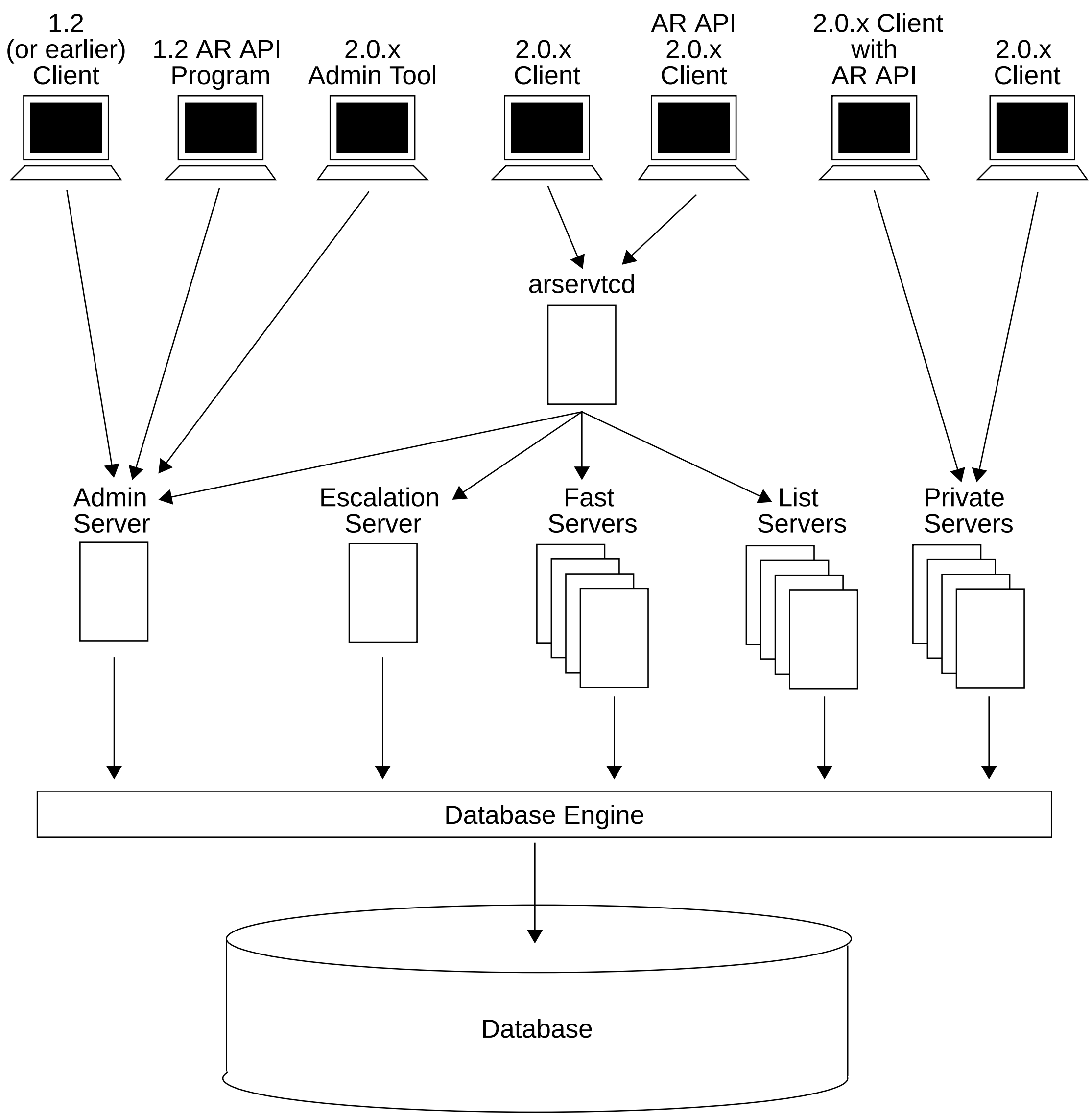


Figure 13-3 MP Server Environment

Using the MP 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 13-3 on page 298 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 clients in any combination with 1.2 and 2.0 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 release.

Note – You cannot use 2.0 (or later) clients against 1.1 servers.

Note – 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, the schema designer will need to account for differences when designing a schema.

Using the MP 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 293).

Note – Figure 13-3 on page 298 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:

- 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, two, 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>
```

Warning – 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 14

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.

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.

14

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 305.

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 320.
- Performing case-insensitive searches. Administrators can enable or disable case sensitivity. For more information, “Case” on page 319.
- 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 307.

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 329.

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 323.

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 311.

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 316.

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 311.

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 309.

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, ntclientd, 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 311.

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. For efficient searches with better performance, group *all* FTS fields at the front of complex query expressions.

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.
- Group FTS fields at the front of complex query expressions.
- 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 14-1 have unique functions in an FTS search.

Table 14-1 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 14-2:

Table 14-2 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.

Warning – 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 107.

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 14-1 on page 310.

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 323.
- 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 326.

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 327.

Warning – 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 326.

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 327.

Warning – 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 323.

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.

Debugging FTS

You can activate the debug trace mode on the server to create a log file of FTS activity. All debug tracing for FTS is logged in the <ar_install_dir>/db/arft.log file.

To enable FTS debugging:

1. **Add the following line to your `ar.conf` file:**

```
FTS-Debug-mode: 15
```

A setting of `15` logs *all* VDK failure messages. You also can set the following trace options:

- `2` for incoming index commands.
- `4` for index drop commands
- `8` for VDK commands.

2. **Use the UNIX `ps` command to get the process ID number of the `arservftd` process.**

3. **Stop the `arservftd` process by entering the following:**

kill -15 <*process_number_arservftd*>

The `arservtcd` process will automatically restart the arservftd process and begin logging immediately.

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 319.

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 327.

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 14-1 on page 317), 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 14-1 on page 317).

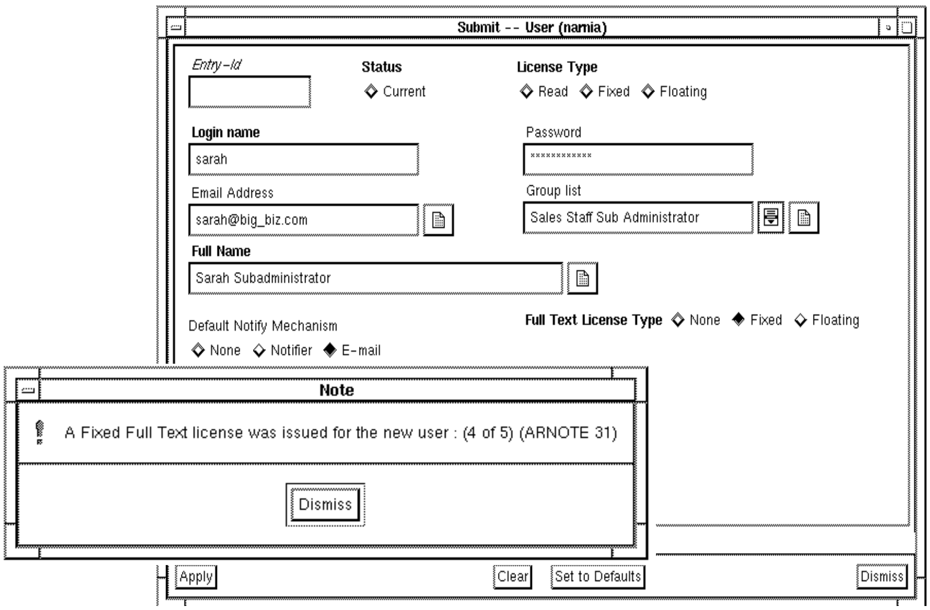


Figure 14-1 The User Schema (with Full Text License Message)

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.**

3. **Select the type of FTS license that you want the user to have, whether fixed or floating.**

4. **Select the Apply button. If you issued the user a fixed FTS license, a message appears (Figure 14-1).**

5. **Select the Dismiss 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 14-2) to set FTS options in the Server Information window. If you do not have an FTS license, you cannot access the Full Text Search category on the Server Information window.

To display and update information about full text search:

1. **Select Server Information (`Ctrl+R`) from the File menu. The Server Information window appears.**

2. **In the Server Information window, select Full Text Search from the Category list, as shown in Figure 14-2 on page 318.**

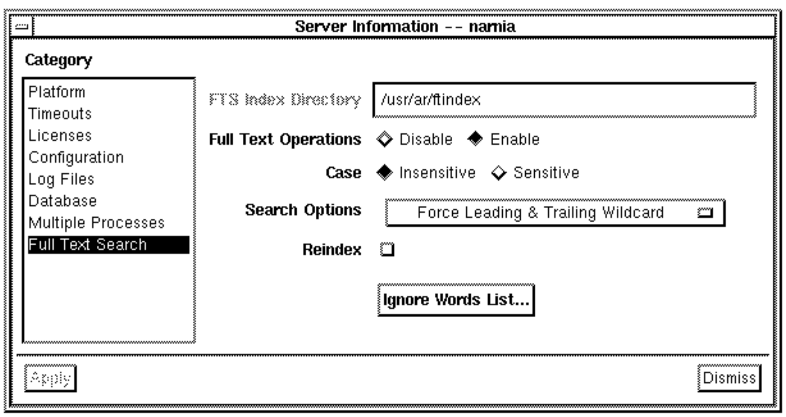


Figure 14-2 Server Information — Full Text Search

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

Enable Full Text Search	* Selecting Disable turns off the FTS engine; the system alerts you with a message that FTS will be stopped. * Selecting Enable activates the FTS engine; the system alerts you with a message that FTS will be started. The default is Enable. Note that selecting Disable will disable the Case, Reindex, and Ignore Words List options and enable the FTS Index Directory field. Selecting Enable 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 information on how much disk space is needed to store the index files, see “Importing Data into Schemas with FTS Fields” on page 327.
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 309.) 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 320. By default, Search Options is set to Query Unchanged.
Reindex	Selecting this button rebuilds the FTS index. The default is off. For information on re-indexing, “Rebuilding the Full Text Search Index” on page 326. 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 323.

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 14-3) 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 309.

For Searches Using the Accrue Operator

Table 14-3 lists FTS search option actions in the server when users enter an accrue operator in a query.

Table 14-3 FTS Search Option Actions for Accrue Operations *(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 14-3 FTS Search Option Actions for Accrue Operations *(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 14-3 FTS Search Option Actions for Accrue Operations *(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 you do *not* set the QBE Match to Equal if a field is indexed for FTS.

For Non-Accrue Searches

The information in Table 14-3 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 category selected in the Server Information window (Figure 14-3), select an item from the Search Options menu.**

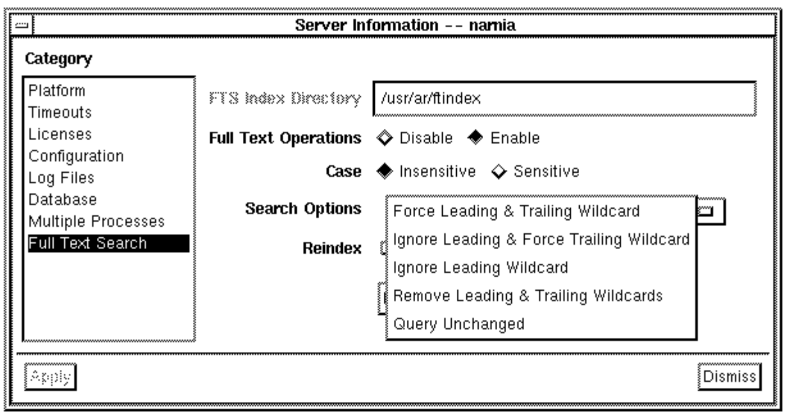


Figure 14-3 Search Options Menu

2. **Select the Apply button to save the search option settings.**

Modifying the Ignore Words List

The Ignore Words List (Figure 14-4 on page 324) 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 326.

To modify the Ignore Words List:

1. In the Server Information — Full Text Search window, select the Ignore Words List button. The Full Text Search Ignore Words window appears, as shown in Figure 14-4. The Choices list contains the words currently defined for the Ignore Words List.

This window 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 Choices list by loading a file.

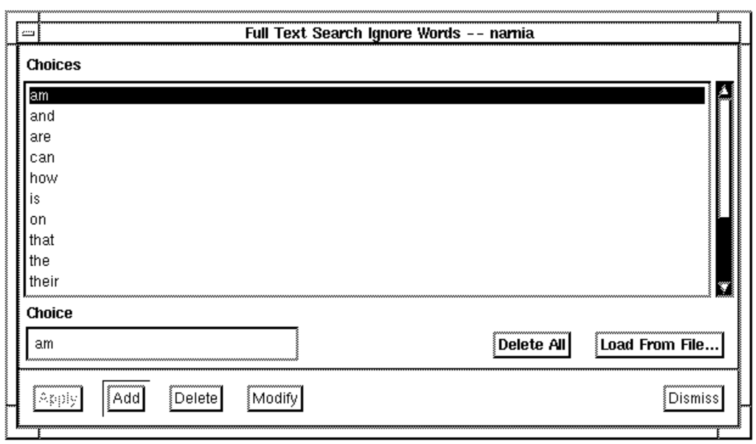


Figure 14-4 Full Text Search Ignore Words Window

2. To modify the Choices list, do one of the following:

- To add a word to the Choices list, type a word in the Choice field, then select Add.
- Each entry in the Choices list must be unique.
- To delete a word from the Choices list, choose an entry, then select Delete.

- To modify the Choices list, choose an entry from the list. The entry appears in the Choice field. Edit the entry, then select Modify. The edited entry re-appears in the Choices list.
- To delete all words from the Choices list, choose Delete All.
- To append a list of words to the Choices list, select Load From File, then select a file from the Directory — File Selection window.

3. **Select the Apply button in the Ignore Words window to save the settings.**
4. **Select the Apply button in the Server Information window to apply all the changes you made from the Full Text Search category. Remember that the modified ignore words list affects only changes to the FTS index that are made *after* you select the Apply button.**

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. **Select Load From File. A file selection window 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. **Select the Apply button. The file entries appear in the Full Text Search Ignore Words window and the words *append* to the previous list.**
4. **Select the Apply button in the Ignore Words List.**
5. **If needed, select Reindex to rebuild the FTS index after making any changes in the Ignore Words List.**
6. **Select the Apply button to save the option settings.**

Note – To *replace* the current Ignore Words List with a list from the file, first select Delete 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:

- In the Server Information — Full Text Search window (Figure 14-2 on page 318), select Reindex, then select the Apply button.

Warning – 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 14-5 on page 327) to create an FTS index of the text in character and diary fields.

Warning – 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:

- In the Field Properties window (Figure 14-5 on page 327), select Yes in the Index For FTS category.

The full text search index for a field is automatically updated and does not require manual run-time administration when you create, delete, or modify entries.

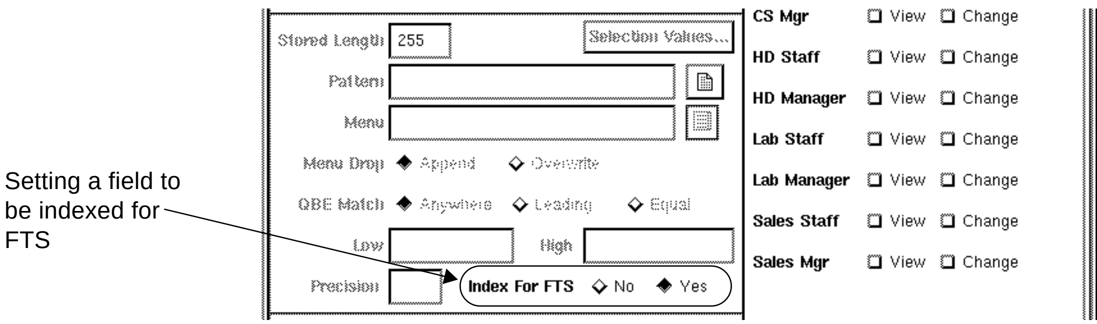


Figure 14-5 Index For FTS Setting in Field Properties Window

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.

Warning – Do not import data in schemas with FTS fields during normal production hours. To import data, set the `Index for FTS` settings for each field to `No` for each FTS-indexed field, import the data, then turn the FTS indexing back on.

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.

Warning – 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 14-6 on page 329).**

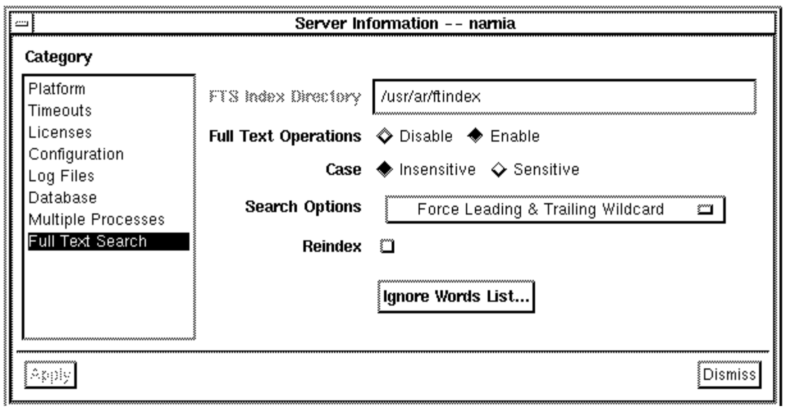


Figure 14-6 Server Information Dialog Box

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 14-7 on page 330), you can display the FTS weight for all records retrieved in the query list.

To define fields returned in a query list:

- For fields indexed for full text search, see "Defining Query List Fields" on page 126 to define query lists but include `WEIGHT` as well.

Including the `WEIGHT` value displays the weighted value of retrieved ARs when you do a query list in the User Tool, as shown in Figure 14-7 on page 330.

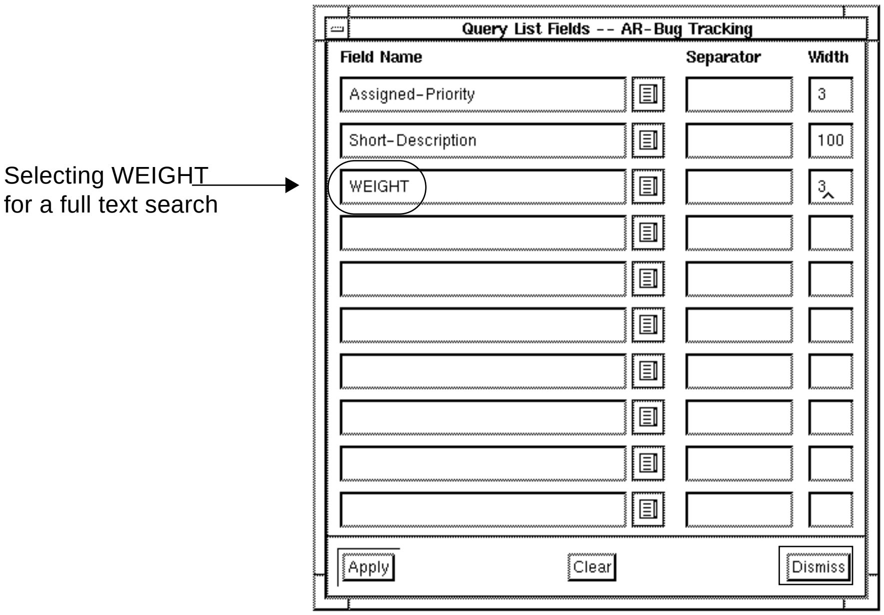
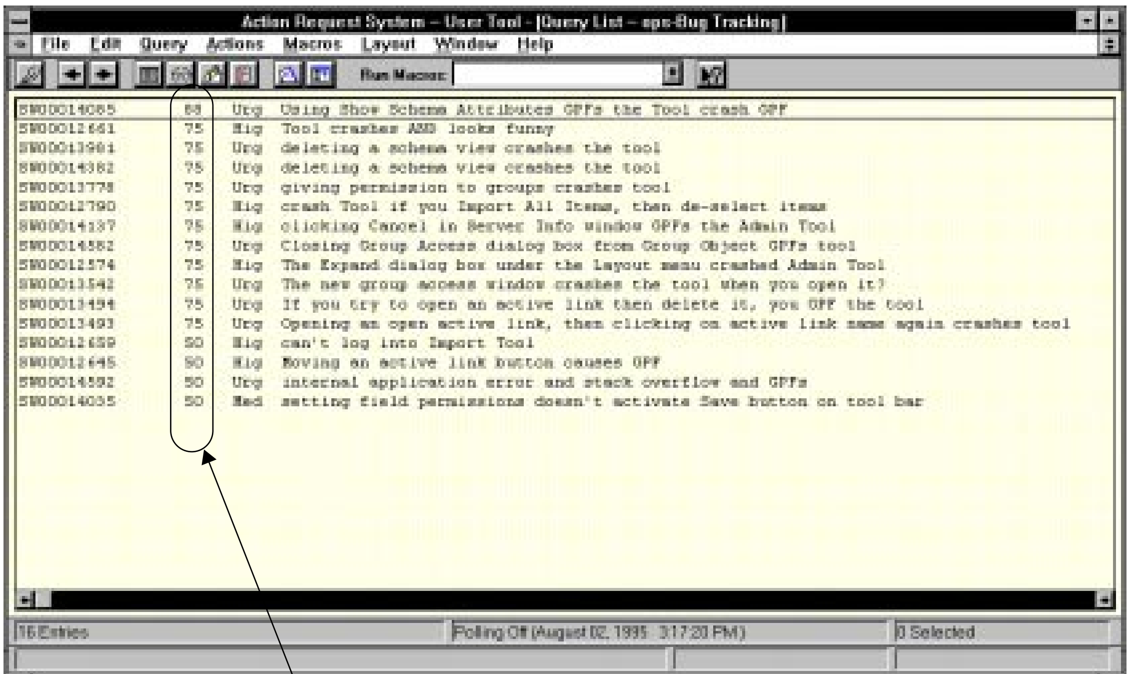


Figure 14-7 Query List Fields Dialog Box

For further information on weights in an FTS, “Re-Indexing” on page 313.

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 14-8 on page 331, the FTS engine assigned different “weights” to the records retrieved and the User Tool listed them in descending order, based on how many times the search terms were found.



FTS weights assigned
to the records

Figure 14-8 Query List Results with FTS Weighting

Note – If your query does not use the accrue operator, all entries returned in the list are given the default weight value of 100.

For further information on weights in an FTS, “Sorting Records by Weight” on page 305.

AR System Server Utilities 15

This chapter describes how to use the **arcache** and **arreload** utilities to administer your Windows NT AR System 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]

Note – Items between square brackets ([ ]) are optional. You must choose one of the items between braces ({ }). Vertical bars (|) separate the available choices. You can list more than one server.

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.

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 15-1 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 15-1 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 338.

Table 15-1 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 15-2 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 15-2 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 338.
-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 15-1.**

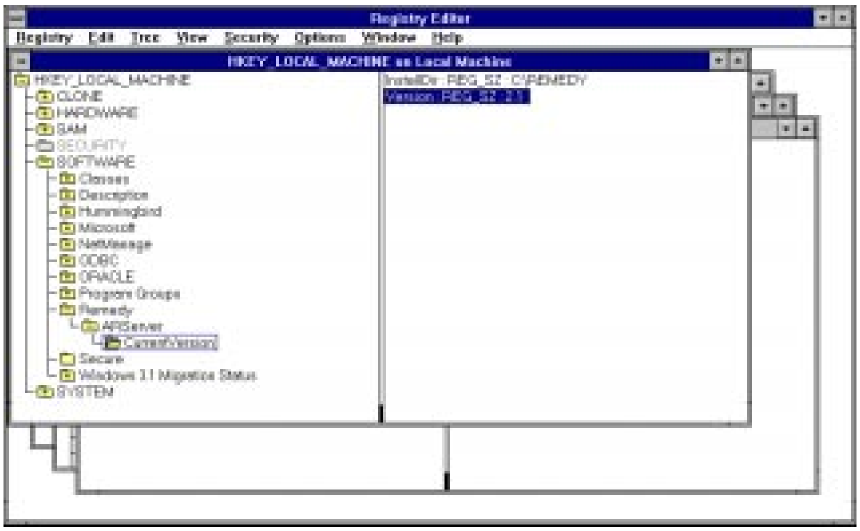


Figure 15-1 Register Editor

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 15-2).**

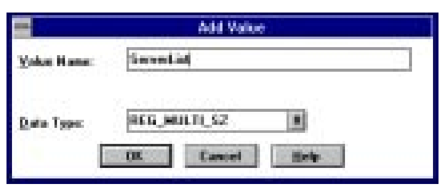


Figure 15-2 Add Value Dialog Box

   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 15-3.**

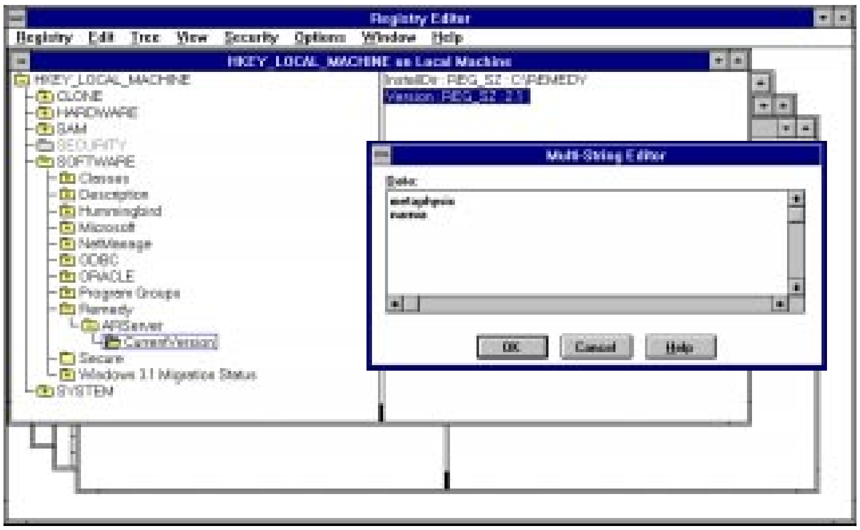


Figure 15-3 Multi-String Editor

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 15-4 on page 341.**

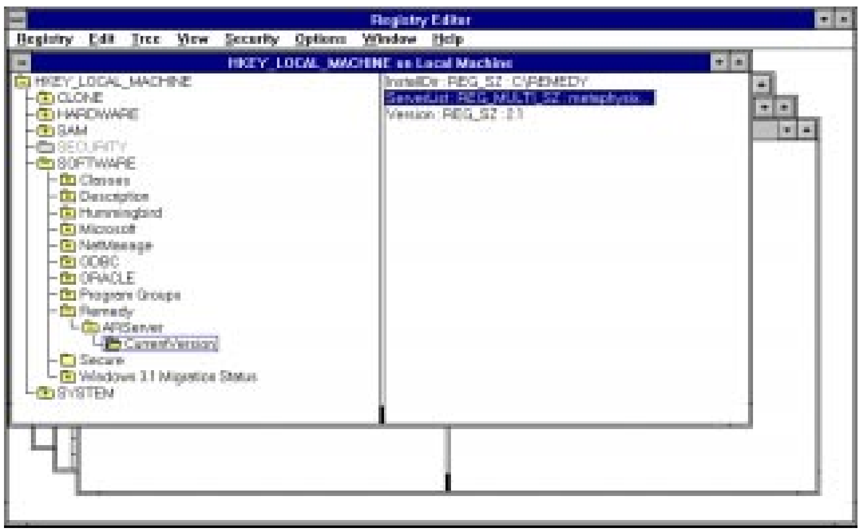


Figure 15-4 Server List Added to Registry

Changing Colors and Fonts A

You can change colors and fonts used by the Administrator Tool, although usually the defaults supplied will be sufficient. For your reference, the default fonts and colors are provided in a sample file, called `ARSystem`, located in the *<ar_install_dir>*`/bin` directory. To change colors or fonts, you simply update the `.Xdefaults` file in your home directory, or you can copy the sample file (`ARSystem`) to your home directory and change the default settings to the settings you want.

In order to have changes to the file recognized, you will need to do one of the following:

- Run the program `xrdb` as follows:

```
cd  (to change to your home directory)
xrdb -merge .Xdefaults
```

From then on, all instances of the Administrator Tool will use the new colors and fonts.

Customizing Color

You can change the colors used in a number of areas within the Administrator Tool windows. To see a listing of available colors, at the command line type **showrgb**.

Administrator Tool color resources:

ARSystem*admin*background:

The default background color of all Administrator Tool windows, unless you override it for a specific pop-up window (see resources below).

ARSystem*admin*XmText*background:

The background color of the text fields in all windows.

ARSystem*admin*menubar*background:

The background color of the menu bar in all windows.

ARSystem*admin*footer*baceekground:

The background color of the footer in all windows.

ARSystem*MessagePopup*background:

The background color of the warning pop-up messages.

ARSystem*MessagePopup*foreground:

The foreground color of the warning pop-up messages.

ARSystem*PopupWindow*XmText*background:

The background color of the text fields in pop-up windows.

ARSystem*PopupWindow.Schema*background:

The background of the scrollable portion of the Schema window.

ARSystem*PopupWindow.SetFields*background:

The background of the area within the Set Fields window that contains the schema fields when defining a set fields operation.

ARSystem*PopupWindow.GetListFields*background:

The background color of the Query List Fields window.

`ARSystem*PopupWindow.SchemaIndex*background:`

The background color of the Index Fields window.

`ARSystem*PopupWindow.License*background:`

The background color of the License Info window.

ARSystem*PopupWindow.History*background:

The background color of all Change History windows.

ARSystem*PopupWindow.DefProp*background:

The background color of the Field Properties window.

ARSystem*PopupWindow.HelpText*background:

The background color of all Help Text windows.

ARSystem*PopupWindow.ServerInfo*background:

The background color of the Server Info window.

ARSystem*PopupWindow.AdminCommands*background:

The background color of the Admin Command window.

ARSystem*PopupWindow.Schema*XmText.background:

The background color of the text fields in the Schema window.

ARSystem*PopupWindow.SetFields*XmText.background:

The background color of the text fields in the Set Fields window.

ARSystem*PopupWindow.ServerInfo*XmText.background:

The background color of the text fields in the Server Info window.

ARSystem*PopupWindow.AdminCommands*XmText.background:

The background color of the text fields in the Admin Command window.

ARSystem*PopupWindow.ActiveLink*background:

The background color of the Active Link window.

ARSystem*PopupWindow.ActiveLink*ActiveLinkConditions*background:

The background of the top area of the Active Link window, where the active link conditions are defined.

ARSystem*PopupWindow.ActiveLink*ActiveLinkActions*background:

The background of the bottom area of the Active Link window, where the active link actions are defined.

ARSystem*PopupWindow.Filter*background:

The background color of the Filter window.

ARSystem*PopupWindow.Filter*FilterConditions*background:

The background of the top area of the Filter window, where the filter conditions are defined.

ARSystem*PopupWindow.Filter*FilterActions*background:

The background of the bottom area of the Filter window, where the filter actions are defined.

Customizing Fonts

You can change the font used for labels on the schema windows. If you decide to change the font, you can specify any combination of fonts for the optional, required, and system fields. Since the AR System uses normal, bold, and italic fonts respectively to represent visually the style for each field, it is important that you specify a font with the appropriate weight when configuring fonts. You can use any font that is listed by the `xlsfonts` X-window utility. Reports require a fixed-width font.

Configurable fonts:

`ARSystem*menubar*fontList:`	**Font used for menus.**
`ARSystem*fontList:`	Default font used by AR System.
font	Font used for optional fields.
font`=Italic`	Font used for system supported fields.
font`=Bold`	Font used for required fields.

For example, to use Helvetica font add the following lines to your `.Xdefaults`:

```
ARSystem*fontList:      -adobe-helvetica-medium-r-*--12-*, \
                        -adobe-helvetica-medium-o-*--12-*=Italic, \
                        -adobe-helvetica-bold-r-*--12-*=Bold
```

AR System Files B

This appendix describes the various files needed by and created by the AR System. The directory where the AR System is installed is referred to as <*ar_install_dir*> (usually, this directory is `/usr/ar` on UNIX workstations, and `\remedy` on Windows and Windows NT machines). The directory specified to hold the user's configuration information is referred to as <*ar_config_dir*> (usually, this directory is `/home/`<*user_name*>`/arHome` for UNIX workstations, and `\home` on Windows and Windows NT machines).

To access the UNIX manual pages, you must add the <*ar_install_dir*>`/man` and the <*ar_install_dir*>`/api/man` directories to your `MANPATH` environment variable. For more information about the UNIX manual pages, see Chapter 5 in the ***Action Request System Programmer's Guide***.

Note – For some of the files listed in this appendix, "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".

B

UNIX Server File Locations

Table B-1 UNIX Server File Locations

Category	**Location**
Executables	<*ar_install_dir*>`/bin`
Catalog	`/usr/lib/locale/C/LC_MESSAGES` (for Sun, AT&T, SGI, and Motorola workstations)
	`/usr/lib/nls/msg/En_USAction Request System Administrator's Guide` (for IBM workstations)
	`/usr/lib/nls/C` (for HP 9000 workstations)
Man Pages	<*ar_install_dir*>`/man/man1/*.1` <*ar_install_dir*>`/man/man5/*.5`
Sample Databases	<*ar_install_dir*>`/sample_db`
AR Server Directory	`/etc/ar`
Full Text Search Index	<*ar_install_dir*>`/ftindex`
Server Configuration	`/etc/ar.conf`
Server Error File	<*ar_install_dir*>`/db/arerror.log`
Default Log Files	<*ar_install_dir*>`/ar/db/*.log`
License	`/etc/remedy.lic`
AR Server Lock	<*ar_install_dir*>`/db/ar.lck`

UNIX Client File Locations

Table B-2 UNIX Client File Locations *(1 of 2)*

Category	**Location**
Executables	*<ar_install_dir>*`/bin`
Catalog	`/usr/lib/locale/C/LC_MESSAGES` (for Sun, AT&T, SGI, and Motorola workstations)
	`/usr/lib/nls/msg/En_US` (for IBM workstations)
	`/usr/lib/nls/C` (for HP 9000 workstations)

X Application Defaults	`/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 Include Files Man Pages Sample Source	 *<ar_install_dir>*`/api/lib/lib*.a` *<ar_install_dir>*`/api/include/*.h` *<ar_install_dir>*`/api/man/man3/*.3` *<ar_install_dir>*`/api/src`
AR Server Directory	`/etc/ar`
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`
Report Design	*<ar_config_dir>*`/arcmds/`*<report_name>*`.arr`

Table B-2 UNIX Client File Locations *(2 of 2)*

Category	**Location**
Import Mappings	<*ar_config_dir*>`/arcmds/`<*mapping_name*>`.arm`
Schema Definition Cache	<*ar_config_dir*>`/`<*schema_name*>`.arf`
HyperHelp	<*ar_install_dir*>`/help`

UNIX Notification System File Locations

Table B-3 UNIX Notification System File Locations

Category	**Location**
Executables	<*ar_install_dir*>`/bin`
Catalog	`/usr/lib/locale/C/LC_MESSAGES` (for Sun, AT&T, SGI, and Motorola workstations)
	`/usr/lib/nls/msg/En_US` (for IBM workstations)
	`/usr/lib/nls/C` (for HP 9000 workstations)
X Application Defaults	`/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 Include Files Man Pages	 <*ar_install_dir*>`/api/lib/lib*.a` <*ar_install_dir*>`/api/include/*.h` <*ar_install_dir*>`/api/man/man3/*.3`
NT Server Directory	`/etc/ar`

UNIX Flat-File Database File Locations

Table B-4 UNIX Flat-File Database File Locations

Category	Location
Schema Definitions	<*ar_install_dir*>/db/*.def
Schema Data	<*ar_install_dir*>/db/*.db
Structure Definitions	<*ar_install_dir*>/db/*.ar

Windows NT Server File Locations

Table B-5 Windows NT Server File Locations

Category	Location
Executables and DLLs	<*ar_install_dir*>\bin
Sample Schemas and Applications	<*ar_install_dir*>\arserver\samples
Server Configuration	<*ar_install_dir*>\conf\ar.cfg
Server Error File	<*ar_install_dir*>\arserver\db\arerror.log
Default Log Files	<*ar_install_dir*>\arserver\db*.log
License	<*ar_install_dir*>\conf\remedy.lic
AR Server Lock	<*ar_install_dir*>\arserver\db\ar.lck
API Libraries Include Files Sample Source	 <*ar_install_dir*>\arserver\api\lib*.lib <*ar_install_dir*>\arserver\api\include*.h <*ar_install_dir*>\arserver\api\driver
Mail Notification and Submission Configuration	<*ar_install_dir*>\conf\armaild.cfg
Outgoing Mail Notifications	<*ar_install_dir*>\arserver\mailntfy

Windows Client File Locations

Table B-6 Windows Client File Locations

Category	Location
Executables	<ar_install_dir>*.exe
Control DLLs	<ar_install_dir>\miscdll.dll <ar_install_dir>\sh20w16.dll <ar_install_dir>\sh21w16.dll
RPC DLL	<ar_install_dir>\tirpc.dll
AR System Servers	<ar_config_dir>\ar
User Configuration	<ar_config_dir>\ar.ini
Help Information	<ar_install_dir>*.hlp
Macros	<ar_config_dir>\arcmds\<macro_name>.arq
User Defaults	<ar_config_dir>\<schema_name>.ard
User Views	<ar_config_dir>\<schema_name>.arv
Report Design	<ar_config_dir>\arcmds\<report_name>.arr
Report Printer Setup	<ar_config_dir>\arcmds\<report_name>.arp
Schema Definition Cache	<ar_config_dir>\<schema_name>.arf
Import Tool Message Log	<ar_config_dir>\config.lst

Windows NT Notification System File Locations

Table B-7 Windows NT Notification System File Locations

Category	Location
Executables and DLLs	<ar_install_dir>\bin
API Libraries Include Files	 <ar_install_dir>\arserver\api\lib*.lib <ar_install_dir>\arserver\api\include*.h
Saved Notifications	<ar_install_dir>\arserver\db\ntserver.log
Users Logged in to Notification Server	<ar_install_dir>\arserver\db\ntusers

Windows NT Flat-File Database File Locations

Table B-8

Category	Location
Schema Definitions	<*ar_install_dir*>`\db\*.def`
Schema Data	<*ar_install_dir*>`\db\*.db`
Structure Definitions	<*ar_install_dir*>`\db\*.ar`

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 3 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 other 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.

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 Label	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 Label	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

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 Label	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 Label	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 Label	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 must 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 Label	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 Label	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 Label	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 Label	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 Label	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

Operators, Wildcards, and Keywords

D

The following information is provided in this appendix:

- Operators used in defining qualifications.
- Operator precedence.
- Wildcards.
- Keywords.

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 368. 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 306.
+	* 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 wildcard 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 Wildcards

The table below lists the wildcards that you can use with the LIKE operator in qualifications.

Table D-2 Wildcard Symbols

Wildcard	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.

Wildcard symbols are only interpreted as wildcards 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 wildcard only when it is accompanied by an open bracket ([ ). The hyphen functions as a wildcard 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.

Command Line Options

E

You start the Administrator and Import Tools from the command line. For the Administrator Tool, you can include any of the various command line options. For example, you can include the `-i` or `-e` command line option to execute a macro when the Administrator Tool starts. You can also use most of the X11 Toolkit Intrinsics command line options. For more information about X11 Toolkit Intrinsics command line options, see the X11 man page or your system administrator.

Note – If you run the Administrator or Import Tools from within a shell or script, be sure to set any necessary environment variables before executing the tool, for example.

Administrator Tool (aradmin)

The command to run `aradmin` is:

```
aradmin [-a | -e | -f | -m | -s | -t ] [-x server]
```

Note – Items between square brackets ([ ]) are optional. You must choose one of the items between braces ({ }). Vertical bars (|) separate the available choices. You can list more than one server.

Names containing spaces or special characters must be entered within quotes.

Syntax Options

The following options to `aradmin` may appear in any order on the command line:

Option	Function
`-a`	Start the Administrator Tool with the Active Links category displayed in the list.
`-e`	Start the Administrator Tool with the Admin Commands (admin extensions) category displayed in the list.
`-f`	Start the Administrator Tool with the Filters category displayed in the list.
`-m`	Start the Administrator Tool with the Menus category displayed in the list.
`-s`	Start the Administrator Tool with the Schemas category displayed in the list.
`-t`	Start the Administrator Tool with the Escalations category displayed in the list.
`-x`	Start the Administrator Tool and connect only to the specified server or servers. This option overrides the list of servers specified in the `/etc/ar` file. You can specify this option multiple times to connect with multiple servers. For example, to start the Administrator Tool and connect only to the servers named metaphysix and narnia, you would enter: *<ar_install_dir>***/bin/aradmin -x metaphysix -x narnia&**

Example Using Syntax Options

Open the Administrator Tool with filters appearing in the main window and connecting to two servers:

```
% <ar_install_dir>/bin/aradmin -f -x narnia -x metaphysix &
```

Import Tool (arimport)

The command to run `arimport` is:

```
arimport [[ -x server ] ...] [ -d directory ] [ -m mappingName ] [ -b ]
```

The following options to `arimport` may appear in any order on the command line:

Options	Function
`-b`	Load the indicated mapping at tool startup and exit the tool when the mapping has been completed. The tool does not display any windows when this option is used.
`-d`	The directory that the mapping indicated by the **`-m`** parameter is located in. This parameter is optional. If it is not specified, the mapping is assumed to be in the default location for the user running the command (`$ARHOME/arcmds`).
`-m`	Load the indicated mapping at system startup. This option is good for loading an initial mapping.
`-x`	Specify the name of a server to connect to. This option may be included more than once to connect to multiple servers. By default, the list of servers the tool will connect to is defined in the directory file `/etc/ar`. If this option is not specified, this file will be used to determine where to connect. If this option is specified one or more times, the servers specified in these options will be used.

Examples Using Syntax Options

```
% <ar_install_dir>/bin/arimport -m "DB Mapping" &
```

Start `arimport` and load the mapping named “DB Mapping”. The program will remain running after the mapping is loaded.

```
% <ar_install_dir>/bin/arimport -m "DB Mapping" -d /usr/mappings -b
```

Start `arimport` and load the mapping named "DB Mapping" from the directory /usr/mappings, then import the data from the import file specified in the mapping. The program will exit after the file is imported.

```
% <ar_install_dir>/bin/arimport -x fred &
```

Start `arimport` specifying the machine `fred` as the machine running the AR System server process. The directory file `/etc/ar` is not accessed.

Design Worksheets F

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).

F

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

F

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**

F

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	

Procedures G

Here is a ist of procedures with their locations.

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 program 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. Also restarts servers if they terminate.

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.

ARWeb license

Fixed or floating license that allows a user access to the ARWeb product.

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).

broadcast operation

A distributed operation in which one source server simultaneously transfers data-only copies of entries to two or more target servers.

chained operation

A distributed operation in which one source server transfers an entry to a target server, and the target server in turn transfers the entry to another server. This operation is used in environments containing three or more servers.

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. (Also called list menu.)

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.

default mapping

The mapping selected by the Distributed Server Option if the AR System finds multiple mappings which apply to the specified transfer criteria.

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.

distributed delete

To remove an entry from the AR System. In a distributed environment, a copy of an entry may be deleted on one server if the master copy is deleted on another server.

distributed fields

Fields you can add to an AR System schema which allow you to manipulate certain mapping controls. The amount and type of fields added to a schema is determined by the mapping type selected.

distributed processes

These processes control the action that is taken when filter or escalation criteria is met within a given schema. There are three distributed processes you can select as the Run Process action in a filter or escalation: Distributed-Transfer, Distributed-Return, and Distributed-Delete.

distributed return

A distributed operation that returns the latest copy of an entry, with ownership, to the requesting server.

distributed server

An AR System server that exists within a multi-server, distributed environment.

distributed transfer

A distributed operation that sends a copy of an entry, with or without ownership, from one server to another.

distributed update

A distributed operation that refreshes a copy of an entry on one server when the master copy, on another server, is modified.

duplicate entry IDs

A condition that may occur in a distributed operation when an entry transferred from the source server has the same entry ID as an entry on the target server. The Distributed Server Option provides several options to handle this issue.

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.

extension

See user command, administrator command.

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.)

mapping

The parameters for a particular distributed operation, such as To and From servers and schemas, data control issues, and field-to-field mapping definitions.

mapping history

A history tracking record created when a distributed operation occurs. This record includes the date and time of transfer, source entry ID, source schema, source server, and the name of the specific mapping used.

master copy

The copy of a distributed entry which currently has ownership.

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.

pending operation

A distributed operation that is waiting to occur. Pending operations are typically due to a specified transfer interval that has not yet been met, or because there are network or server-related problems within the distributed environment.

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.

return mapping

The specific field-to-field mappings used when an entry is returned.

row level access control

The ability to control a user's access to particular rows, or parts of rows, within AR System database tables.

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.

transfer

A distributed operation that sends a copy of an entry, with or without ownership, from one server to another.

transfer mapping

The specific field-to-field mappings used when an entry is sent from one server to another.

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 About under the Help menu in the User, Administrator, Notification, 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.

Index

B

C

E

F

G

H

I

K

L

M

N

Q

R

T

U

V

W

Y