Process Administrator's and Business Manager's Guide

iPlanet™ Process Manager

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Preface

About This Manual

This manual, *iPlanet Process Administrator's and Business Manager's Guide*, provides information for administering iPlanet Process Manager clusters, applications, process instances and work items.

This manual assumes you have installed Process Manager on your system. For installation instructions, see the *Process Manager Installation Guide*.

Administering iPlanet Process Manager

Typically, two different roles are involved in administering Process Manager: information technology administrators (IT administrators) and business managers.

- IT administrators are responsible for installing and maintaining Process Manager and for managing clusters and deployed applications.
- Business managers perform administrative tasks for managing process instances and work items.

During the development phase, developers may find themselves performing both roles—they need to administer applications to clean up test applications and they need to administer process instances to clean up test process instances and work items.

- Chapter 1, "Introduction" describes the components of Process Manager. Both IT Administrators and Business Process Managers should read this chapter.
- Chapters 2 through 6 provide information needed by IT Administrators.
- Chapters 7 and 8 provide information needed by Business Process Managers.

Conventions Used in This Manual

File and directory paths are given in Windows format (with backslashes separating directory names). For Unix versions, the directory paths are the same, except slashes are used instead of backslashes to separate directories.

This guide uses URLs of the form:

`http://`*server*`.`*domain*`/`*path*`/`*file*`.html`

In these URLs, *server* is the name of server on which you run your application; *domain* is your Internet domain name; *path* is the directory structure on the server; and *file* is an individual filename. Italic items in URLs are placeholders.

This guide uses the following font conventions:

- The `monospace` font is used for sample code and code listings, API and language elements (such as function names and class names), file names, path names, directory names, and HTML tags.
- *Italic* type is used for book titles, emphasis, variables and placeholders, and words used in the literal sense. It is also used for glossary terms.

Viewing Documentation

For your convenience, iPlanet Process Manager manuals are provided in both PDF and HTML formats. You can access the documentation from the Help menu of each Process Manager component. You can access context-sensitive documentation by clicking a Help button or link in each Process Manager component.

The location of the documentation in your distribution is at:

iPM_Install_Dir`/builder/manual`

The documentation is also available at the Sun documentation web site:

`http://docs.sun.com/`

For Further Information

Table 1 summarizes the tasks involved in using Process Manager and explains where to go for more information about each task.

Table 1 Summary of Process Manager Components

Do What?	Which Process Manager Component?	Comments
Install Process Manager	Installation component	For more information about installing Process Manager, see the *Process Manager Installation Guide*
Build a process application	Process Builder	Process Builder is a graphical user interface for building process applications. For more information, read the *Process Builder's Guide*.
Perform the steps in a process	Process Express	Process Express is a web-based interface used by the people who perform tasks in a process. It includes a customized worklist for each qualified user as well as a web-based form for each task. For more information about Process Express, see the *Process Express User's Guide*.
Administer a process application	Process Administrator and Business Manager	Process Administrator and Business Manager are a set of web-based interfaces for performing administration tasks such as: creating, deleting, and joining Process Manager clusters, and administering process applications deployed to clusters. For more information, read the *Process Administrator's and Business Manager's Guide*.
Build Java custom data fields and activities in Java. Also use the Java API to programmatically interact with Process Manager.	Process Manager Java classes and API which are available in a JAR file.	Java programmers can build custom data fields and custom activities in Java that can be imported into the Process Builder. Programmers can also create Java applications that embed Process Manager functionality or present customized front ends to Process Manager. Additionally, programmers can create SOAP clients that access web services APIs exposed by Process Manager applications. For more information, see the *Process Manager Programmer's Guide*.

NOTE Process Manager runs on top of iPlanet Application Server (iAS). For more information about iAS and other iPlanet products, see the Sun documentation web site at http://docs.sun.com/.

Chapter 1

Introduction

Process Manager is a system for automating the flow of control for business processes. The components that make up Process Manager include a graphical design interface for defining processes, two administrative interfaces for configuring Process Manager and managing applications, and an end-user interface for creating work requests, handling work items, and performing searches.

This guide focuses on using the two administrative interfaces for configuring Process Manager and managing applications. Typically, two different roles are involved in administering Process Manager:

- Information Technology (IT) administrators

  are responsible for installing and maintaining Process Manager and for managing clusters and deployed applications. These tasks are performed in the Process Administrator interface.

- Business managers

  are responsible for performing administrative tasks and for managing process instances and work items. These tasks are performed in the Process Business Manager interface.

During the development phase, developers often find themselves performing both roles. They perform the role of IT administrator when they clean up test applications and they perform the role of business manager when they delete process instances and work items.

This chapter contains the following sections:

Overview of Process Manager Components

Process Manager consists of the following components:

Process Administrator	An application accessible through your web browser that is used for managing clusters and applications in Process Manager.
Process Business Manager	An application accessible through your web browser that is used for managing processes and statistics for Process Manager.
Process Builder	The Java application for building Process Manager applications.
Process Express	The HTML-based interface for end-users who are accessing Process Manager applications.
Process Engine	The software internal to Process Manager.

Process Manager also uses these other components, which it associates into a *cluster*:

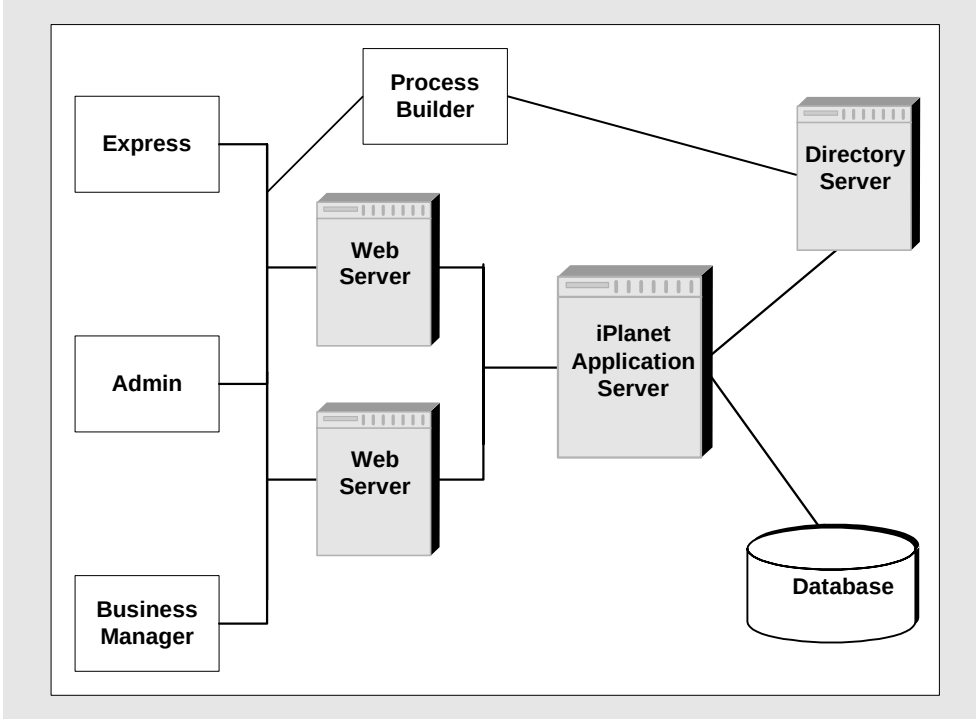
- a corporate user LDAP directory service
- a configuration LDAP directory service that stores the application definitions
- a relational database for user data, such as the products available from Informix, Oracle, and Sybase
- a mail server for notifications

When an application developer using Process Builder deploys an application they must identify the cluster on which to deploy that application. All successfully deployed applications are available to any valid end user on any iPlanet Application Server across that cluster.

All applications in a cluster share the same common database and directories. They access the same Directory Server for their process definitions and they use the same set of cross-application tables in the database, as well as the same corporate users and groups directory.

End users use Process Express to access the applications built in Process Builder. As they create new work requests and other examples of business processes, called *process instances*, and as they complete their assigned tasks, called *activities* in the Process Builder and *work items* in Process Business Manager, they are generating user data that is stored in the cluster's database.

Figure 1-1 Process Manager Components



IT Administrator Tasks

IT Administrators are responsible for installing Process Manager, for creating and maintaining clusters, and for managing deployed applications.

The first task is to install the Process Manager components and make sure they are configured correctly for your environment. See the *Process Manager Installation Guide* for details.

The next step is to use the Administrator interface to create a cluster so that Process Builder can deploy applications that can be used across the enterprise. You can continue to manage and update the cluster as needed. For example, you may need to switch to a different corporate user directory or you may want to add other iPlanet Application Servers to the cluster.

IT administrators can use the Administrator interface for tasks involving clusters, such as creating and joining clusters. For some other tasks, such as switching to a different corporate directory, you need to use other interfaces such as the iPlanet Console on the iPlanet Application Server or the iPlanet Web Server administration interface.

IT administrators should understand clusters and be familiar with directory servers.

IT administrators should read the following chapters:

- Chapter 2, "Overview of Cluster and Application Administration"

  This chapter discusses the concept of clusters, explains how to access the Administrator interface, and discusses directory server concepts and terms.

- Chapter 3, "Configuration Files"

  This chapter discusses the folders and files that Process Manager uses or modifies.

- Chapter 4, "Managing Clusters"

  This chapter discusses clusters, the difference between a single and multiple cluster implementation, and explains how to create, join, and delete clusters and how to view logs.

- Chapter 5, "Managing Applications"

  This chapter discusses how to manage deployed applications, including how to start and stop them, close and uninstall them, view the application logs and export and delete data.

- Chapter 6, “Databases”

  This chapter provides general guidelines for using databases with Process Manager.

Business Manager Tasks

Business managers use the Process Business Manager interface to perform administrative tasks for managing process instances and work items, for example, deleting process instances that need to be removed from the system.

Business Managers should read the following chapters:

- Chapter 7, “Managing Process Instances and Work Items”

  This chapter discusses how to access the Business Manager interface. It explains how to search for process instances and work items, move a process instance to an exit point, view details and history, and change the state of work items.

- Chapter 8, “Statistics”

  This chapter describes how to view statistics about process instances and work items, such as how many process instances are started, suspended and closed for a particular application.

Process Manager Clients

Process Manager provides three clients to perform Administrative, Business Manager, and process application end-user tasks. Table 1-1 outlines how each of the three clients are used and how users can access them. For more information about the difference between Process Manager single cluster and multiple cluster implementations, see the section “About Clusters” in Chapter 4, “Managing Clusters.”

The Process Administrator and Process Business Manager clients are discussed in detail in this manual. The Process Express client is discussed in detail in the *Process Express User's Guide*.

Table 1-1 List of Process Manager client applications

Single iPM Cluster Implementation	Multiple iPM Cluster Implementation

Client: Process Administrator
User: IT Administrator
URL: `http://`*yourserver*`/Administrator.apm`
Comments: Allows you to create and administer a single cluster and its deployed applications.
	Client: Process Administrator
	User: IT Administrator
	URL:
	`http://`*yourserver*`/SiteAdmin.apm`
	`http://`*yourserver*`/ClusterAdmin.apm`
	Comments: The first URL manages a site of Process Manager clusters. It allows you to create a new cluster, join an existing cluster, and access a particular cluster's client URL (Process Administrator, Process Business Manager, Process Express) from a list of all existing clusters.
	The second URL manages a single Process Manager cluster in a multiple cluster implementation. It allows you to change a particular cluster's properties and manage its deployed applications.

Client: Process Business Manager **User:** Business Manager **URL:** `http://`*yourserver*`/Business.apm`	**Client:** Process Business Manager **User:** Business Manager **URL:** `http://`*yourserver*`/ProcessBusiness.apm` **Comments:** To access this client, in addition to a user ID and password, the user needs to have the name of the cluster for authentication.
Client: Process Express **User:** Process Application End-user **URL:** `http://`*yourserver*`/Express.npm`	**Client:** Process Express **User:** Process Application End-user **URL:** `http://`*yourserver*`/ProcessExpress.npm` **Comments:** To access this client, in addition to a user ID and password, the user needs to have the name of the cluster for authentication.

Chapter 2

Overview of Cluster and Application Administration

This chapter contains information that is essential to IT administrators. This chapter introduces the concept of clusters, discusses the duties of the IT administrator, discusses the use of directory servers in Process Manager, and discusses security issues.

This chapter contains the following sections:

About Clusters

Process Manager is an application that runs on iPlanet Application Server. Process Manager uses the application server to run the HTML-based Process Administrator, Process Business Manager, and Process Express clients.

Process Manager associates a configuration directory, a corporate user directory, and a relational database into a *cluster*.

As the administrator, you can perform these iPlanet Application Server-related tasks:

- Join your local iPlanet Application Server to an existing cluster.
- Remove your local iPlanet Application Server from a cluster.

Each cluster must have at least one application server, but there can be more than one if several networked systems use the same cluster. All applications are replicated to all iPlanet Application Server machines in a cluster.

Process Manager Applications

All Process Manager applications run as applications on each iPlanet Application Server machine in a cluster. Deployed applications are deployed to all application servers in a cluster, so if one server is unavailable, the application continues to run on the other machines in a cluster.

When a specific iPlanet Application Server machine shuts down, all the applications on that server also shut down. When the server comes back up, it automatically restarts all its applications.

Overview of Process Administrator Tasks

The information technology administrator performs these primary types of tasks:

- installs and configures the software

  The first task is to install the Process Manager components and make sure they are configured correctly for your environment. See the *Process Manager Installation Guide* for details.

- creates clusters

  The next step is to create a cluster so that Process Builder can deploy applications that can be used across the enterprise. To create a cluster you use the Process Administrator interface, as discussed in Chapter 4, "Managing Clusters."

- manages clusters and applications

  You can continue to manage and update clusters as needed. For example, you may need to switch to a different corporate user directory or you may want to add other iPlanet Application Servers to the cluster. For more information about managing clusters, see Chapter 4, "Managing Clusters."

  You can also manage deployed applications. For example, you may need to shut down a test application, as discussed in Chapter 5, "Managing Applications."

Accessing Process Administrator

Process Administrator is a web-based interface for creating and managing clusters and managing deployed applications.

The URL Administrators use to access the Process Administrator client depends on the implementation of iPM clusters you set up. There are two possible cluster implementations:

- single cluster
- multiple cluster

Table 2-1 shows the information an Administrator needs to access the Process Administrator client based on the above cluster implementations.

Table 2-1 User information required to log in to Process Administrator

Cluster Implementation:	Administrator Login Fields:	Process Administrator URL:
Single Cluster	User Name, Password	`http://`*server_name*`/Administrator.apm/` comments: This Process Administrator URL allows you to create and manage a single cluster and all of its deployed applications.
Multiple Cluster	User Name, Password	`http://`*server_name*`/SiteAdmin.apm/` comments: This Site Administrator URL allows you to create multiple clusters or join an existing cluster. It also allows you to log in to a specific cluster from a list of all available clusters.

Table 2-1 User information required to log in to Process Administrator *(Continued)*

Cluster Implementation:	Administrator Login Fields:	Process Administrator URL:
Multiple Cluster	User Name, Password, Cluster Name	`http://`*server_name*`/ClusterAdmin.apm/` comments: This Process Administrator URL allows you to manage individual clusters and the applications deployed to them in a multiple cluster implementation.

For more information about the difference between Process Manager single cluster and multiple cluster implementations, see the section "About Clusters" on page 41.

About the Process Administrator Interface

Process Administrator uses a tabbed HTML-based interface that provides access to management functions in these areas:

- Add/Join Cluster

  The Add/Join Cluster tab is only available in a multiple cluster implementation on the Site Administrator at `http://`*server_name*`/SiteAdmin.apm/`. This tab allows you to create new clusters or join existing clusters. For details, see Chapter 4, "Managing Clusters."

- Cluster List

  The Cluster List tab is only available in a multiple cluster implementation on the Site Administrator at `http://`*server_name*`/SiteAdmin.apm/`. The form displays links to the Process Manager clients available for all existing clusters. You select a specific cluster's client from this list and the link takes you to that client's log in screen. For details, see Chapter 4, "Managing Clusters."

- Cluster Management

  The Cluster Management tab displays different sets of forms depending on the situation: one set is for use in creating or joining a cluster and the other set is for managing existing clusters. In a multiple cluster implementation, you use this tab to manage an existing cluster only. Use the Add/Join Cluster tab explained above to create or join a cluster. For details, see Chapter 4, "Managing Clusters."

- Applications

  Process Administrator provides several management forms for applications. You can change the state of an application, check its logs, and archive and delete its data. For details, see Chapter 5, "Managing Applications."

Directories in Process Manager

Process Manager uses directories for two purposes:

- to store Process Manager configuration information, such as process definitions
- to provide a list of the users and groups within a corporation who can be assigned to activities

The Configuration Directory

The configuration directory must be iPlanet Directory Server, which is included in the build for Process Manager. This directory stores Process Manager configuration information, including the application definitions for all deployed applications. The directory can also be used as a central repository for applications that are still being designed but are not yet deployed. The cluster creation procedure extends this directory's schema to include the attributes and object classes required for Process Manager.

Once you define a cluster to use a particular configuration directory, you cannot switch to use another Directory Server in the cluster for your configuration information. (You can, however, create a new cluster that uses a different configuration directory).

The Corporate User Directory

The corporate user directory must be iPlanet Directory Server, which is included in the build for Process Manager. This directory contains the set of corporate users who can be the assignee for a work item.

When you install Process Manager using all the defaults, you install a single Directory Server that you use for both types of information: users and configuration. This works well for using the sample applications and for initial testing of new applications where you can create a sample set of corporate users that you can test reliably.

Changing Your User Directory

To test applications in an environment that simulates your production environment or to move an application into production, you need to be able to access the actual users in your corporation. To do this, you need to change several default values to point to your company's corporate Directory Server, including the following:

- the directory that Process Manager uses for authenticating users and groups
- the access control rules (ACLs) for Process Manager-specific configuration styles
- your cluster's corporate directory
- make sure your sample applications have valid users

NOTE All Application Servers in a cluster must use the same information for all these settings.

To change the user directory, perform the following task:

- "Change the Directory for Authentication"

Change the Directory for Authentication

Process Manager does not perform web server-based authentication. The authentication is done from the Application Server. The Application Server has a notion of a corporate directory which is used to store users, groups and roles. The Application Server authenticates users against this particular corporate directory.

Process Manager leverages the same corporate directory to authenticate users. For information about changing the directory for authentication, please refer to the Application Server documentation.

Using a New Directory Server

There are two ways to make your applications use the new Directory Server:

- "Make an Existing Cluster Point to a New Corporate Directory"
- "Create a New Cluster"

Make an Existing Cluster Point to a New Corporate Directory

➤ **To make an existing cluster point at the new directory**

1. In Process Administrator, use the Change Cluster Information page to update the cluster with the new corporate user directory URL. See "Changing Cluster Information" on page 62 for instructions.
2. Make sure you have access to the right directory from Process Builder. There are two ways of doing this:
   - If you have a cluster available during the design phase, you don't need to include the new corporate user directory's URL in the `preferences.ini` file. Instead, make sure your application uses the cluster's corporate directory. To do this, open the application's main properties inspector and set the Corporate Directory to be based on the cluster.
   - If you are designing an application without access to a cluster during the design phase, you need to add the new LDAP URL to the `preferences.ini` file. In this case, make sure your application uses a specific corporate directory. To do this, open the application's main properties inspector and pick the Corporate Directory you want to use. Note that if you deploy to a cluster that uses the same directory, the assignments work as designed.

Create a New Cluster

➤ **To create a new cluster**

1. In Process Administrator, create a new cluster using the new directory. For more information, see "Creating a Cluster" on page 45.
2. In Process Builder, redeploy your existing applications to the new cluster.

Making Applications Work with a New Corporate Directory

If the users and groups you use in your existing Process Manager applications also exist as valid users and groups in the new corporate directory your applications will work as is.

However, if your applications have groups and roles whose members do not exist in the new corporate directory, you have a choice of two ways to make the applications work with the new corporate user directory:

- Change the groups and roles to include members in the new corporate directory.
- Add the required users to the new directory.

If the original users and groups are not valid any more, you must change them so that they can be found in the new Directory Server and then redeploy the applications.

Changing Members of Groups and Roles

➤ **To change the members of groups or roles**

1. In the Process Builder, select a group or role in the application tree.
2. Open its properties inspector.
3. Update the members in the group or role.

➤ **To add users or groups to the new directory**

1. Launch iPlanet Console.
2. On the authentication dialog box, enter this information:
   - administrative user name
   - administrative password
   - administration URL for the new directory server's Administration Server, including the port number
3. Select the User and Groups tab.

4. Select New User or New Group from the drop-down list in lower right corner and select Create.
5. Enter new user or group information.
6. Select OK to register your new user or group information.

Directory Server Terms and Attributes

Because much of Process Manager is dependent on Directory Servers, this section is included to help clarify some of the most relevant concepts and terminology.

Whether you are accessing the corporate user directory for your set of users or defining a cluster in the configuration directory, you need to understand how to identify the directory and the specific cluster entry within the server.

There are some standard LDAP terms and attributes that you may need to understand before you can create Directory Server entries. This section briefly describes them for your convenience. For detailed information, see the Directory Server manuals, which you can access by clicking on any help button in a Directory Server product.

LDAP Terms

In general, iPlanet Directory Servers use standard LDAP terminology, but different administrative forms may use slightly different sets of equivalent terms. Common terminology you may encounter as you install and use the Directory Server includes the following:

Distinguished Name (DN) A series of comma-delimited attributes that uniquely identify the directory entry location within the directory tree. This could be a person, a group, an organization, or any other object for which you want to maintain information in a directory. In the case of Process Manager, information about a cluster is maintained in a directory.

Base DN The entry at which to start directory searches, sometimes referred to as the *search base*. This base is often the root entry, that is, the search starts at the top of the directory tree.

Bind DN The DN used to access the directory. Directory Server authentication is referred to as *binding* to the directory. Which DN you use as the Bind DN determines the level of directory access permitted. This is often the root DN, who has complete access to the directory, and so the Bind DN is sometimes referred to as the *unrestricted user*. The default Bind DN for iPlanet Directory Servers is `cn=Directory Manager`.

Directory Suffix A distinguished name (DN) suffix for your local directory. All incoming LDAP queries must contain this suffix, which is equivalent to the root entry of your Directory Server structure. This provides the highest level of identification for a specific directory. For example, `dc=iplanet, dc=com`. Everything contained within a directory is underneath this entry. If you know the directory suffix or root entry for a directory, you know which directory it is.

Root Entry The first entry in a directory tree, that is the top of the tree. This is often, but not always the Base DN. The root entry corresponds to the directory suffix. If you know the root entry or directory suffix for a directory, you know which directory it is.

LDAP Attributes

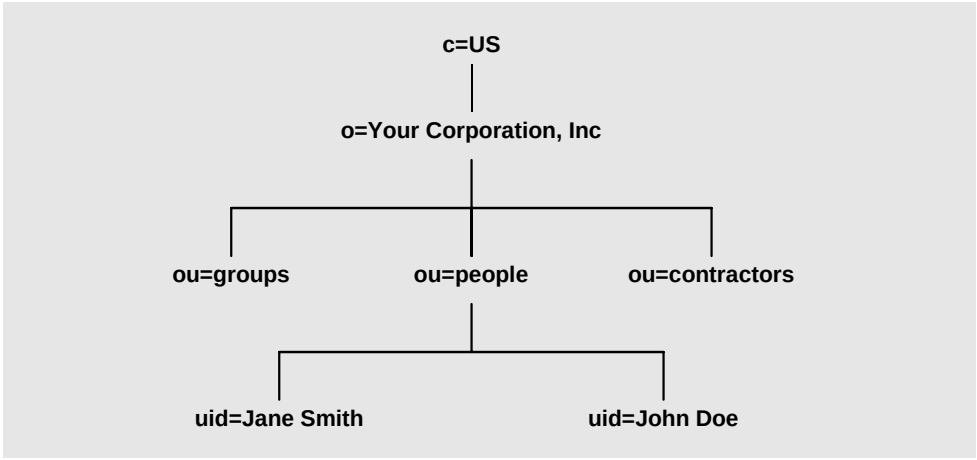
When you identify a directory's location in a Directory Server's tree, such as when you define a cluster within the configuration directory, you typically need to use only a small set of LDAP attributes. These include the following:

- c (country)
- dc (domain component)
- o (organization)
- ou (organizational unit)
- cn (common name)
- uid (user ID)

The common name entry of `cn=Directory Manager` is the default administrative user identifier for Directory Servers. It is set when you perform a default installation of the Directory Server.

NOTE You cannot use commas within an attribute value, only as delimiters between attributes.

Figure 2-1 A sample corporate user directory structure



Directory Structure

The Directory Server uses a tree structure to define different sets of data. In a simple case, such as identifying a cluster, you could have a structure like this:

- `o=airius.com` (tree root level)
- `cn=My Cluster` (specific cluster branch)

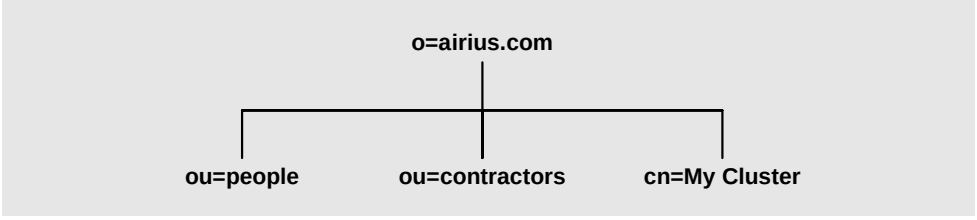
If you had another cluster in the tree, you could have these values:

- `o=airius.com` (the same tree root level)
- `cn=Your Cluster` (a different branch of the Directory Server tree)

Together these two values uniquely identify the location of the cluster's directory entry in the Directory Server and are referred to as the cluster's *distinguished name*, or *DN*. When you want to uniquely identify the cluster, you need to include the entire DN, with attributes separated by commas and listed in order from most specific to highest level. For example, for a cluster, you could use this DN:

```
cn=My Cluster, o=airius.com
```

Figure 2-2 A sample directory containing a cluster



LDAP URLs

You use these attributes to identify the corporate user directory and your cluster entry to the Process Builder in the `preferences.ini` file after creating a cluster. This file requires you to use a specific LDAP URL format when you enter this information.

The Corporate Directory URL

If you do not require user authentication, as is typical for the corporate user directory, use this format:

`ldap://`*`yourDirServer`*`:`*`port`*`/`*`Base DN`*

For example:

```
ldap://iplanet.mcom.com:389/o=mcom.com
```

The Cluster URL

If you require user authentication, as you do for the cluster entry, use this format:

`ldap://`*`Bind DN`*`:`*`Bind Password`*`@`*`yourDirServer`*`:`*`port`*`/`*`cluster DN`*

For example:

```
ldap://cn=Directory Manager:iplanet@iplanet.airius.com:389/cn=HR
Cluster, o=mcom.com
```

Security in Process Manager

Process Manager supports additional security features such as using SSL-enabled iPlanet Web Servers to provide secure content and access. Process Manager also allows designers to build applications that use certificates and digital signatures as part of their processing.

If you want to enable SSL on your web server, see the *iPlanet Web Server Administrator's Guide*. You can access the iPlanet Web Server help system by clicking any Help button when working in the web server administration interface.

If you want to include digital signatures in a form, read the Chapter "Defining Data Fields," in the *Process Builder's Guide*. Digital signatures are stored in a special database table, `wf_blobs`, so the administrator can query the database as needed to verify a signature. For more information, see "Storing Digital Signatures" on page 94.

For information on secure deployment of process applications using Process Builder, see the Chapter "Introduction to Process Builder" in the *Process Builder's Guide*.

For further information about security in general and about how to use the security features available in iPlanet products, see the Security Documentation page on the iPlanet web site, at the following location:

`http://docs.iplanet.com/docs/manuals/security.html`

Chapter 3

Configuration Files

Process Manager uses several configuration files to define installation values, server configurations, clusters and application versions.

Much of what configuration files do is behind the scenes, but you may need to know about them from time to time. This chapter describes what you need to understand about configuration files and how you might need to modify them.

This chapter contains the following sections:

Overview

Configuration files are included in the components that you install as part of Process Manager. The configuration files that are important for Process Manager administrators touch on several areas:

The iPlanet Web Server Files

The IPlanet Web Server has several configuration files, but the single one that is relevant to Process Manager is the web server object configuration file (`obj.conf`).

The iPlanet Web Server `obj.conf` file is used to do some name translation. The following lines are added to your `obj.conf` file as part of the Process Manager installation:

```
NameTrans fn="pfx2dir" from="/SiteAdmin.apm"
dir="<path_to_ipm_install_directory>/bpm/html/SiteAdmin.apm/en"
NameTrans fn="pfx2dir" from="/ClusterAdmin.apm"
dir="<path_to_ipm_install_directory>/bpm/html/ClusterAdmin.apm/en"
NameTrans fn="pfx2dir" from="/ProcessBusiness.apm"
dir="<path_to_ipm_install_directory>/bpm/html/ProcessBusiness.apm/en"
NameTrans fn="pfx2dir" from="/ProcessExpress.npm"
dir="<path_to_ipm_install_directory>/bpm/html/ProcessExpress.npm/en"
NameTrans fn="pfx2dir" from="/Administrator.apm"
dir="<path_to_ipm_install_directory>/bpm/html/Administrator.apm/en"
NameTrans fn="pfx2dir" from="/Business.apm"
dir="<path_to_ipm_install_directory>/bpm/html/Business.apm/en"
NameTrans fn="pfx2dir" from="/Express.npm"
dir="<path_to_ipm_install_directory>/bpm/html/Express.npm/en"
NameTrans fn="pfx2dir" from="/PMResources"
dir="<path_to_ipm_install_directory>/bpm/resources"
NameTrans fn="pfx2dir" from="/BPM"
dir="<path_to_ipm_install_directory>/bpm"
```

NOTE Make sure that each corresponding `NameTrans` and `dir` translation is on a single line.

The Process Builder Preferences File

The Process Builder has a `preferences.ini` file that identifies the cluster and corporate directory to use when designing applications.

You can add multiple cluster and directory entries to offer a choice to designers as they build applications in Process Builder. Each application can only belong to one cluster at a time and have access to a single user directory at a time, but a designer may work with several clusters at a time.

The `preferences.ini` file provides the unique cluster DN and identifies which corporate user directory is included in the cluster. If you cut and paste the two lines that result from a successful cluster creation, you are providing the `preferences.ini` file with one cluster and one corporate user directory.

For information on how to update each Process Builder's `preferences.ini` file after you create a cluster, see the section, "Creating a Cluster" on page 45. For details about how to structure LDAP information, see "Directory Server Terms and Attributes" on page 31.

NOTE If the process designer and the administrator are not the same individual, the administrator must give the following URLs to the process designer for inclusion in the `preferences.ini` file.

- To add a cluster entry, use this LDAP URL format:

  `cluster=ldap://`*Bind DN*`:`*Password*`@`*yourConfigDirServer*`:`*port*`/`*clusterDN*

- To add an entry for a corporate user Directory, use this LDAP URL format:

  `corp_dir=ldap://`*corporateDirectoryServer*`:`*port*`/`*corpDirectoryBaseDN*

Process Manager Files and Folders

The Process Manager installer adds many files and folders to your local system as it installs the Process Manager components.

The Process Manager files are added to *serverRoot*`/bpm`.

Process Builder files and folders are added to the *serverRoot*`/builder` folder.

Error Messages and Logs

There are several logs in Process Manager: some are for Process Administrator errors or information, others are specific to an application. You can directly open an application's logs or the Process Manager logs in your web browser window.

- Process Builder logs are located at: *serverRoot*`/builder/support/log/errorLog.html` and `warningLog.html`.
- Process Administrator logs are located in the *serverRoot*`/bpm/<`*ClusterName*`>/admin/logs` folder, where <*ClusterName*> is the name of the cluster. In a single cluster implementation the default name of the cluster is "PMCluster".

  The log names are: `info.html`, `error.html`, and `security.html`.

- Process Manager applications use several log files, with each application server in a cluster having its own set of log files. Process Manager administrators can view these application logs that are maintained for each application on a per-server basis:
  - information log (`info.html`): shows information about the application's operations.
  - error log (`error.html`): shows the errors that have occurred with the application.
  - security log (`security.html`): shows the security violations that have occurred with the application.

  The application log files are located at *serverRoot*`/bpm/`*<ClusterName>*`/applications/`*applicationName*`/logs`, where *<ClusterName>* is the name of the cluster where the application is deployed. In a single cluster implementation the default name of the cluster is "PMCluster".

There are other log files for each of the other servers:

- Web Server: *serverRoot*`/https-`*yourWebServer*`/logs`
- Administration Server: *serverRoot*`/admin-serv/logs`
- Directory Server: *serverRoot*`/slapd-`*yourDirServer*`/logs`

Chapter 4

Managing Clusters

Process Manager associates a configuration directory, a corporate user directory, and a relational database into a *cluster*. When Process Manager application designers deploy a new application, they must identify its Process Manager cluster. Process Manager replicates all deployed applications across all iPlanet Application Servers in a cluster.

This chapter contains the following sections:

About Clusters

A Process Manager cluster associates the following components with each other:

- an LDAP-compliant corporate user directory
- an LDAP-compliant configuration directory
- a relational database

The initial cluster includes one iPlanet Application Server. Later you can join additional application servers to an existing cluster as needed.

Each Process Manager-enabled application server has its own Process Administrator client. You can use any Process Administrator client and get the same view of a cluster because all applications are fully replicated to all application servers in a cluster.

As the Process Manager administrator, you can use the Process Administrator client to perform the following tasks that relate to clusters:

- Create a new cluster
- Join your iPlanet Application Server to an existing cluster
- Change cluster information
- View the Process Administrator logs
- Remove your iPlanet Application Server from a cluster
- Delete a cluster

Single and Multiple Clusters

As a Process Manager Administrator you can set up either single or multiple clusters, as described below:

- single cluster

  Choose this option if you use only one type of database to collect and manage Process Manager process application data, and one configuration or corporate directory.

- multiple clusters

  Choose this option if you use more than one type of database to collect and manage Process Manager process application data, or use different configuration or corporate directories.

  A multiple cluster implementation allows you to configure a separate cluster to accommodate each department's database, configuration directory, and corporate directory requirements. For example, your marketing department uses Sybase to manage its process application data, while your sales department requires the use of an Oracle database. They also use different configuration directories to store application definitions.

  In many cases, you use the multiple cluster implementation to create only a single cluster. This implementation allows you the ability to create another cluster at a later time.

As an administrator, You use specific URLs to access a cluster's Process Administrator, Process Business Manager, and Process Express clients depending on the cluster implementation you choose to use with Process Manager.

If you already have applications deployed using a single cluster implementation, and you want to migrate to multiple clusters, you need to redeploy these applications to a cluster created using the multiple cluster URL. For information about migration from earlier releases of Process Manager, see the Release Notes.

NOTE Make sure that your business managers and process application end-users are aware of the cluster schema you use. They must access different URLs based on your cluster set up. For a list of these URLs, see Table 1-1 on page 22.

In a multiple cluster implementation, business managers and process application end-users must know the name of the specific cluster they want to log in to when working with applications.

Before Creating a Cluster

Before you create a Process Manager cluster, you must:

1. Decide which cluster implementation to use. For more information, see "Single and Multiple Clusters" on page 42.
2. Establish database connectivity for your iPlanet Application Server.
   - Solaris

     You are required to set up database connectivity if you use native or third-party JDBC database drivers on Solaris before you create a cluster. You do this using the `db-setup` utility, located in the <*ipm_install_directory*>`\ias\bin` directory. For more information on the `db-setup` utility, see the *iPlanet Application Server Administrator's Guide*.
   - Windows

     You are required to set up database connectivity for third party JDBC drivers on Windows. If you use native database drivers, you do not need to set up database connectivity for Windows. You establish database connectivity for third-party JDBC drivers using the `jdbcsetup` utility, located in the <*ipm_install_directory*>`/ias/bin` directory. For more information on the `jdbcsetup` utility, see the *iPlanet Application Server Administrator's Guide*.

NOTE After you establish database connectivity, restart your iPlanet Application Server for your new settings to take effect.

For information on configuring specific third-party JDBC drivers with iAS, see iPlanet Knowledge Base article number 7831, entitled "Registering Third-party JDBC Drivers with iAS for Database Connectivity with iPM Applications."

3. Decide whether to use a second directory server for failover for either the configuration directory or the corporate directory in your Process Manager cluster.

   Process Administrator's Create Cluster form allows you to specify multiple directory servers to associate with the Process Manager cluster for failover. A primary directory server is called a *supplier* and a secondary directory server is called a *consumer*. For information on how to configure a supplier and consumer directory server for failover, see the *iPlanet Directory Server Administrator's Guide*.

4. Decide whether to create a cluster using the Basic or Advanced Create Cluster form (multiple cluster implementation only).

   When you use Process Administrator to create a cluster, the Basic Create Cluster form appears by default. This Basic Create Cluster form allows you to create a cluster without specifying the configuration directory port, corporate directory port, and mail server information.

   When you create a cluster using the Basic form, you create a cluster using the default corporate directory port, default configuration directory port, and default mail server on the host machine you specify.

NOTE You can only use the Basic Create Cluster form if your directory server runs on the default installation port of 389. If your directory server is not running on port 389, or you want to specify more than one directory server for failover, you must select the Advanced link.

You must register a local datasource with the iPlanet Application Server before you create a cluster using the Basic Create Cluster form. You can do this in one of two ways:

- create an xml file that defines your local datasource and use the `iasdeploy resreg` command to register the file with the application server
- use the iPlanet Application Server Administration Tool UI to register the datasource

For more information about registering a local datasource with the iPlanet Application Server, see the *iPlanet Application Server Administrator's Guide*.

Creating a Cluster

You administer Process Manager through the Process Administrator client interface on an enterprise server. The first time you access the Process Administrator client after installing Process Manager, Process Administrator detects that the iPlanet Application Server is not yet associated with any cluster and immediately prompts you to create or join a cluster.

➤ **To create a cluster**

1. Enter the correct Process Administrator client URL in the location bar of your browser.

   Single cluster implementation:

   `http://`*server_name*`/Administrator.apm/`

   Multiple cluster implementation:

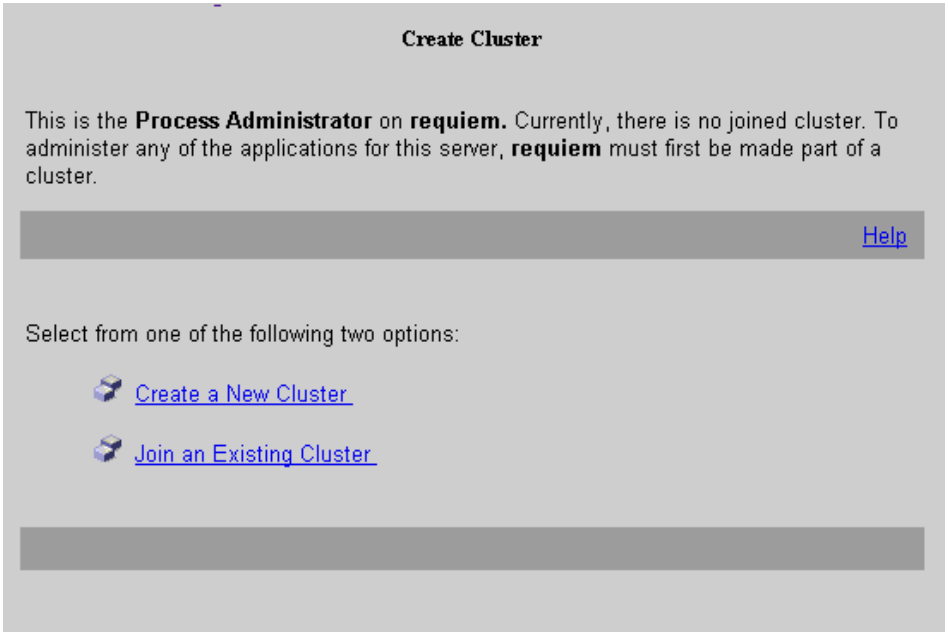
   `http://`*server_name*`/SiteAdmin.apm/`

   A login screen appears.

2. Log in to the Process Administrator client.

   This initializes Process Administrator client and displays the Create or Join Cluster page.

Figure 4-1 The Create or Join Cluster page



3. Select the Create a New Cluster link to display the Create Cluster form.

NOTE If you are creating a cluster in a multiple cluster implementation you have two options: Basic or Advanced. For more information about using the Basic Create Cluster form, see the section "Before Creating a Cluster" on page 43.

4. Enter the following into the fields provided.
   - "General Cluster Information"
   - "Corporate User Directory Information"
   - "Configuration Directory Information"

- "Database Information"
- "Mail Server Information"
- "Event User Information" (single cluster implementation only)
- "Cluster Administrators Information" (multiple cluster implementation only)

For details on the above options, see "New Cluster Information" on page 48.

5. Select Create Cluster when you are done.

   A series of diagnostic messages are displayed onscreen as the Process Administrator creates the cluster. The last few lines contain instructions for modifying the Process Builder `preferences.ini` file.

6. Copy the lines from the onscreen message and paste them into the `preferences.ini` file.

   The Process Builder's `preferences.ini` file is located in the Process Builder root directory. This is the <*iPM_install_directory*>`/builder` directory by default.

   The lines you copy to this file identify to the Process Builder which Directory Server to use as the corporate user directory and where one or more clusters are located in the configuration directory. You must copy the Directory Server references to every Process Builder client's `preferenes.ini` file that you want to use with this cluster.

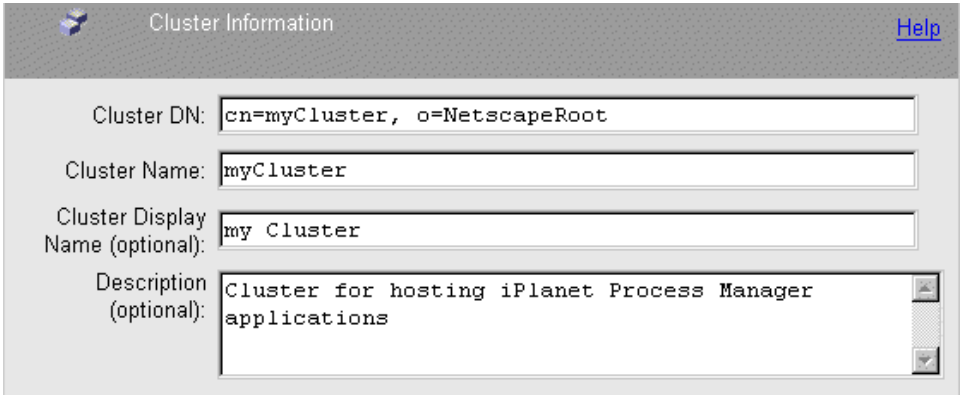
Once you complete these steps, Process Builder application designers can deploy applications to this new cluster. For more information on deploying applications to a cluster, see the *Process Builder's Guide*.

New Cluster Information

You must provide information about your new cluster. The only general restriction on the field entries you provide is that you cannot use double quotation marks.

General Cluster Information

Figure 4-2 General Cluster Information



Cluster DN The full distinguished name for your cluster.

The directory path for the cluster data. For example, `cn=PM Cluster, o=NetscapeRoot`. For details on which LDAP attributes to enter here, see "Directory Server Terms and Attributes" on page 31.

This field is not available when you choose the Basic Create Cluster form in a multiple cluster implementation.

Cluster Name The name that is used to differentiate the cluster from others in a multiple cluster implementation.

NOTE The Cluster Name cannot contain spaces.

This is the cluster name that administrators, business managers, and process application end-users specify to log in to the cluster. It is also the cluster name that process application designers use to programatically access a specific cluster.

This field is not available in the Create Cluster form in a single cluster implementation.

Cluster Display Name (Optional) The display name you choose for your cluster.

Description (Optional) A more meaningful description of the cluster.

This field is not available when you choose the Basic Create Cluster form in a multiple cluster implementation.

Corporate User Directory Information

You cannot use the Basic Create Cluster form if your directory server is installed on any other port than the default installation port of 389. If this is the case, use the Advanced Create Cluster form.

Figure 4-3 Corporate User Directory Information

For details on Directory Server terminology, see "LDAP Terms" on page 31.

Host Name(s) The full host name for the Directory Server you plan to use for your corporate user directory. For example, `mycorp.iplanet.com`.

Port Number(s) The port number for this directory server.

This field is not available when you choose the Basic Create Cluster form in a multiple cluster implementation. If the port number used by the directory server specified in the Host Name field is not the default installation port of 389, you cannot use the Basic Create Cluster form to create a cluster.

Base DN The base distinguished name for the directory. For example, `dc=iplanet, dc=com`. For details about which LDAP attributes to enter here, see "Directory Server Terms and Attributes" on page 31.

Bind DN (Optional) A valid user ID for a user of this directory. Leave this blank if Process Manager will be accessing the corporate directory as an anonymous user, which is the default. This allows read-only access.

This field is not available when you choose the Basic Create Cluster form in a multiple cluster implementation. If the bind DN is anything other than the default installation ID of anonymous user, you cannot use the Basic Create Cluster form to create a cluster.

Bind Password(s) (Optional) The password for this directory user. Leave this blank if Process Manager will be accessing the corporate directory as an anonymous user.

This field is not available when you choose the Basic Create Cluster form in a multiple cluster implementation.

NOTE Single cluster and multiple cluster (Advanced) implementations only: If you want use multiple corporate directory servers for failover in your cluster, place the host names, ports, and bind passwords in a comma-separated list of those servers, in corresponding order, in each of their respective fields.

Configuration Directory Information

You cannot use the Basic Create Cluster form if your directory server is installed on any other port than the default installation port of 389. If this is the case, use the Advanced Create Cluster form.

Figure 4-4 Configuration Directory Information

For details on Directory Server terminology, see "LDAP Terms" on page 31.

Host Name(s) The full host name for the Directory Server that you plan to use for your cluster and application configuration. For example, `myconfig.iplanet.com`.

Port Number(s) The port number for this directory.

This field is not available when you choose the Basic Create Cluster form in a multiple cluster implementation. If the port number used by the directory server specified in the Host Name field is not the default installation port of 389, you cannot use the Basic Create Cluster form to create a cluster.

Bind DN A valid user ID for a user of this directory. This user must have full Directory Server privileges. For example, the installation default is `cn=Directory Manager`. For details about which LDAP attributes to enter here, see "Directory Server Terms and Attributes" on page 31.

Bind Password The password for this directory user.

NOTE Single cluster and multiple cluster (Advanced) implementations only: If you want use multiple configuration directory servers for failover in your cluster, place the host names, ports, and bind passwords in a comma-separated list of those servers, in corresponding order, in each of their respective fields.

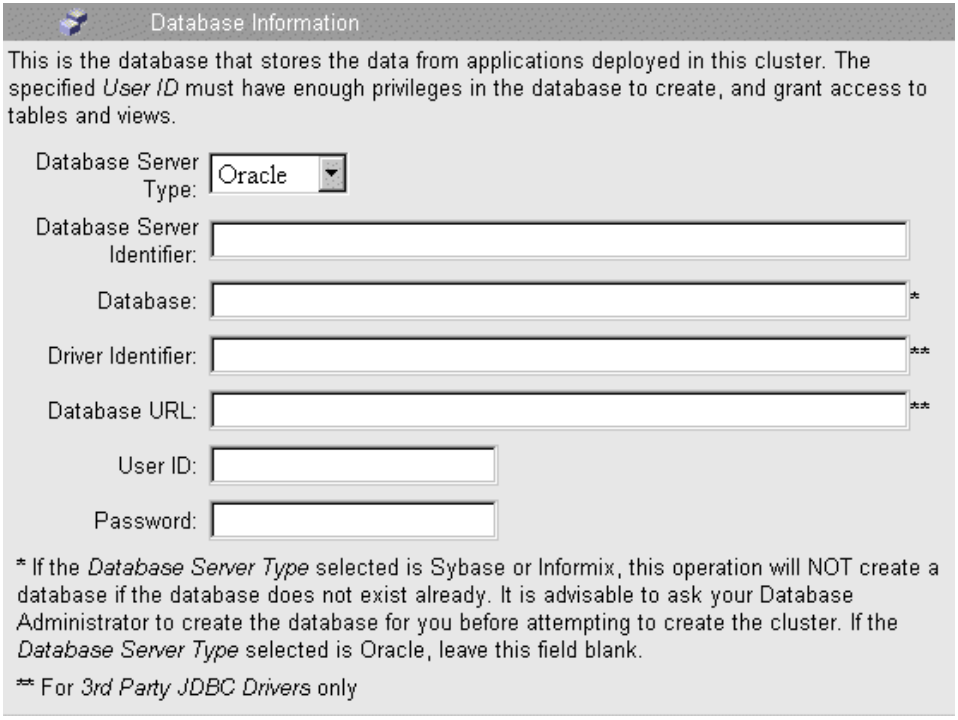
Database Information

The database information fields you fill in are different depending on the Create Cluster form you choose:

- "Single Cluster or Advanced Create Cluster form database information"
- "Basic Create Cluster form database information"

Single Cluster or Advanced Create Cluster form database information

Figure 4-5 Database Information (Single Cluster and Advanced Create Cluster form)



Database Server Type Select the type of database you are using from the drop-down list. The choices are: Informix, Oracle, and Sybase.

Database Server Identifier (Required for native drivers only) The database server name that you used when you installed the database. Leave this field blank when using a third-party JDBC driver. See Chapter 6, "Databases" for more information about databases.

Database For Oracle, leave this field blank. For Informix and Sybase, use the name for the database that Process Administrator should use for creating tables and views.

NOTE This database must already exist.

Driver Indentifier (Required for third-party JDBC drivers only) The name of the driver used when you configured the third-party JDBC driver. Leave this field blank when using a native driver. For more information about setting up third-party database drivers see, the *iPlanet Application Server Administrator's Guide*.

Database URL (Required for third-party JDBC drivers only) The URL that specifies the subprotocol (the database connectivity mechanism), the database and list of properties. Leave this field blank when using a native driver. The format of the database URL is specific to each driver. (Check the database manufacturer's documentation for the database-specific URL format.)

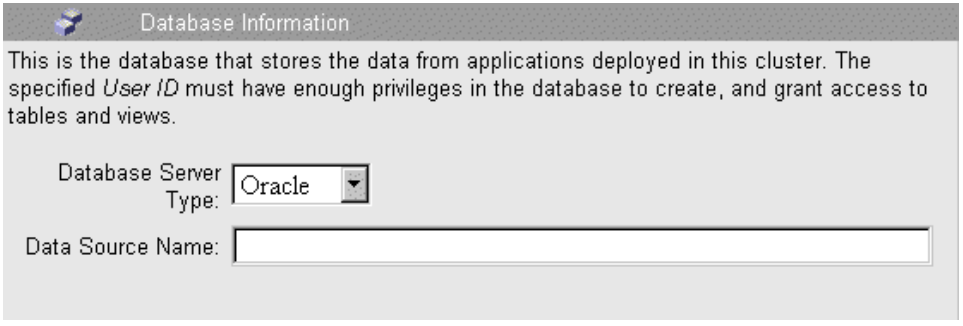
User ID (Required for native drivers; optional for third-party JDBC drivers) The user ID for a valid user for this database. The user must have enough privileges to create tables and views. For third-party JDBC drivers, the User ID can be part of the Database URL field above. (Check the database manufacturer's documentation for the database-specific URL format.)

Password (Required for native drivers; optional for third-party JDBC drivers) The password for this database user. The user must have enough privileges to create tables and write to them. For third-party JDBC drivers, the Password can be part of the Database URL field above. (Check the database manufacturer's documentation for the database-specific URL format.)

NOTE If you are using Sybase on Windows NT, be sure that your DSQuery system environment is set to point to the correct Sybase database server to enable connection to the database.

Basic Create Cluster form database information

Figure 4-6 Database Information (Basic Create Cluster form)



Database Server Type Select the type of database you are using from the drop-down list. The choices are: Informix, Oracle, and Sybase.

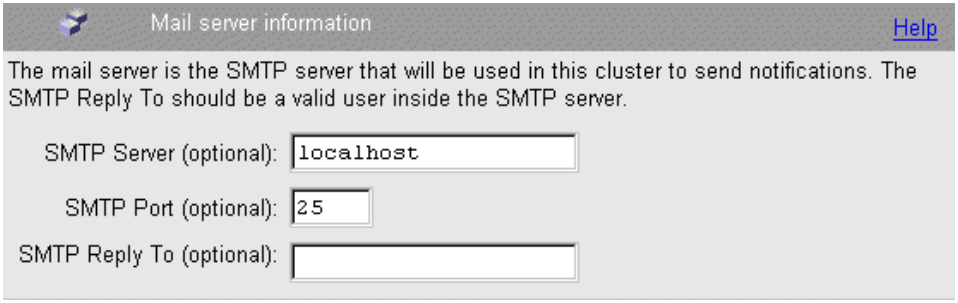
Data Source Name The JNDI Name used for the database when you registered your datasource with the iPlanet Application Server using the iAS Administration Tool or the `iasdeploy resreg` command.

For more information about registering a local datasource with the iPlanet Application Server, see the *iPlanet Application Server Administrator's Guide*.

Mail Server Information

The Mail Server information section is not available when you use the Basic create cluster screen to create a cluster. The cluster uses the default localhost identified by the Directory Server in this implementation as the mail server.

Figure 4-7 Mail Server Information



SMTP Server (Optional) The mail server associated with the cluster.

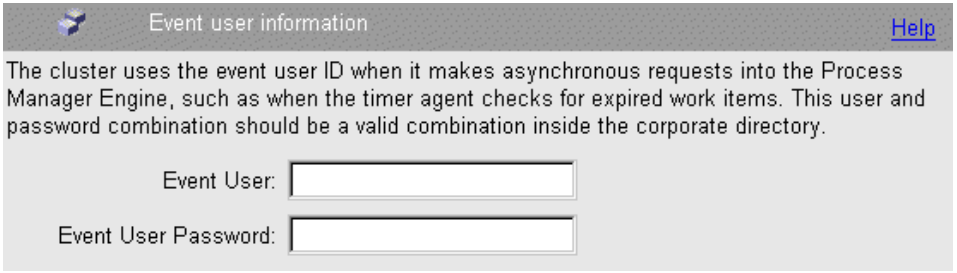
SMTP Port (Optional) The mail server port.

SMTP Reply To (Optional) The reply-to address that appears on notifications sent to users by Process Manager applications. This address could be set to the Process Manager administrator's email address, so that the administrator would be the one handling any notification replies users send.

Event User Information

The Event User information section is not available when you create a cluster in a multiple cluster implementation.

Figure 4-8 Event User Information



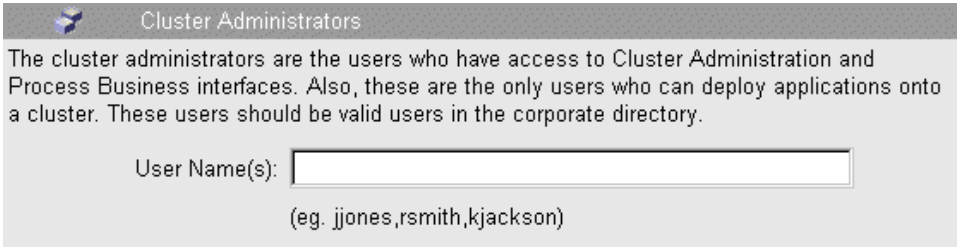
Event User Process Manager uses a timer event to expire work items and execute expiration handler scripts of process instances. The timer event is a feature provided by the Application Server. The timer event is created during the creation of the cluster. It is executed every two minutes and makes a HTTP POST to one of the Process Manager servlets every time it executes. Since the servlets are protected, the timer event has to make a POST with a valid user name and password. This user name should be an existing user in the corporate directory.

Event Password The password for the event user.

Cluster Administrators Information

The Cluster Administrators information section of the Create Cluster form is only available in a multiple cluster implementation.

Figure 4-9 Cluster Administrators Information



User Name(s) A comma-separated list of LDAP user IDs of people who have administrative permission to access Process Administrator and Process Business Manager interfaces on this cluster, and to deploy applications to this cluster. You must provide at least one LDAP user ID in this field.

What Happens at Cluster Creation

When you create a new cluster, Process Administrator performs the following operations:

- creates entries in the configuration directory
- creates database tables
- creates a cluster definition file (`PMExtensionManager.properties`) in your local Process Manager folder, at *serverRoot*`/bpm/ <`*ClusterName*`>`, where *ClusterName* is the name of the cluster. In a single cluster implementation, the default name of the cluster is "PMCluster".

  This file stores the machine name, port number, bind DN, and bind password for the configuration directory.
- displays the URLs for the cluster and the corporate user directory so you or the designer can paste these lines into the `preferences.ini` file.

Joining an Existing Cluster

The initial cluster includes one iPlanet Application Server, but you can add more servers any time. Whenever you access Process Administrator for the first time from a new application server, Process Administrator checks the cluster relationship for that server. If the server is not associated with a cluster, you are prompted to create a cluster or join an existing cluster.

NOTE Application servers must join a cluster one at a time. You must shut down all application servers joined to a cluster before you attempt to join a new application server to that cluster. Once you successfully join your server to the cluster, you can start up all application servers that belong to that cluster.

➤ **To join an existing cluster**

1. Enter the correct Process Administrator client URL in the location bar of your browser.

   Single cluster implementation:

   `http://`*server_name*`/Administrator.apm/`

   Multiple cluster implementation:

   `http://`*server_name*`/SiteAdmin.apm/`

   A login screen appears.

2. Log in to the Process Administrator client.

   This displays the Create or Join Cluster page.

3. Select the Join an Existing Cluster link.

   This displays the Join Cluster form.

4. Enter information for the following components:

   - the cluster you want to join
   - the cluster's configuration directory

   For details on the above options, see "Existing Cluster Information" on page 58.

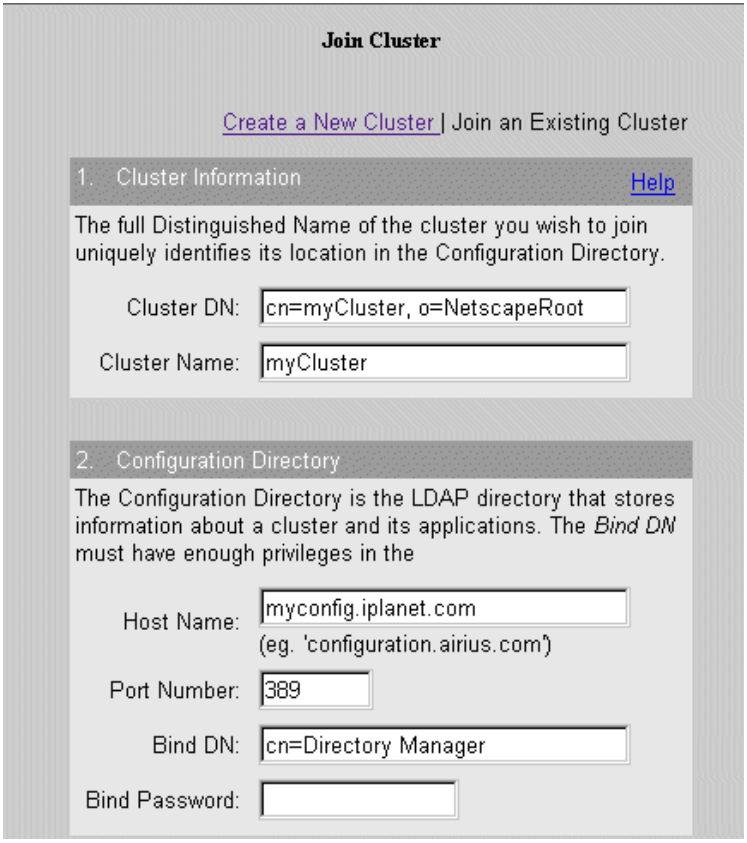
5. Select Join Cluster when you are done.

   Joining a Cluster creates a cluster definition file in the Process Manager folder on your local machine at *serverRoot*`/bpm/`<*ClusterName*>`/PMExtensionManager.properties`, where <*ClusterName*> is the name of the cluster. In a single cluster implementation, the default name of the cluster is "PMCluster".

Existing Cluster Information

The administrator must provide this information about an existing cluster. The only general restriction on the field entries you provide is that you cannot use double quotation marks.

Figure 4-10 Join Cluster form



General Cluster Information

Cluster DN The full distinguished name for your cluster. This is the directory path for the cluster data. For example, you could enter `cn=PM Cluster, dc=iPlanet, dc=com`.

For details about which LDAP attributes to enter here, see "Directory Server Terms and Attributes" on page 31.

Cluster Name The name that is used to differentiate the cluster from others in a multiple cluster implementation.

NOTE The cluster name cannot contain spaces.

This is the cluster name that administrators, business managers, and process application end-users specify to log in to the cluster. It is also the cluster name that process application designers use to programatically access a specific cluster.

This field is not available if you created your cluster using a single cluster implementation.

Configuration Directory Information

Host Name The full host name for the Directory Server you plan to use for your cluster and application configuration. For example, `myconfig.iplanet.com`.

Port Number The port number for this directory.

Bind DN A valid user ID for a user of this directory. This user must have full Directory Server privileges.

If you installed your directory server using the default anonymous user, you should enter `cn=Directory Manager`. For more information about what LDAP attributes to enter here, see "Directory Server Terms and Attributes" on page 31.

Bind Password The password for this directory user.

What Happens at Cluster Joining

When you join an existing cluster, Process Administrator performs the following actions:

- creates a cluster properties file on the local iPlanet Application Server machine at

  `bpm/<`*ClusterName*`>/PMExtensionManager.properties`

  where <*ClusterName*> is the name of the cluster. In a single cluster implementation, the default name of the cluster is "PMCluster".

- registers all applications that are stored in the cluster's directory server to the local application server you just joined to the cluster.

Managing a Cluster

Process Administrator provides a main Cluster Management page at the Cluster Management tab.

This section includes the following topics:

- "Changing Cluster Information"
- "Accessing Directory Server Information"
- "Viewing the Process Administrator Logs"
- "Unjoining From a Cluster"
- "Deleting a Cluster"

The URL Administrators use to access the Process Administrator client depends on the implementation of Process Manager clusters you set up:

- Single Cluster
- Multiple Clusters

Table 4-1 shows the information an Administrator needs to access the Process Administrator client to manage a cluster based on the above cluster implementations.

Table 4-1 User Information Required for Process Administrator Log In

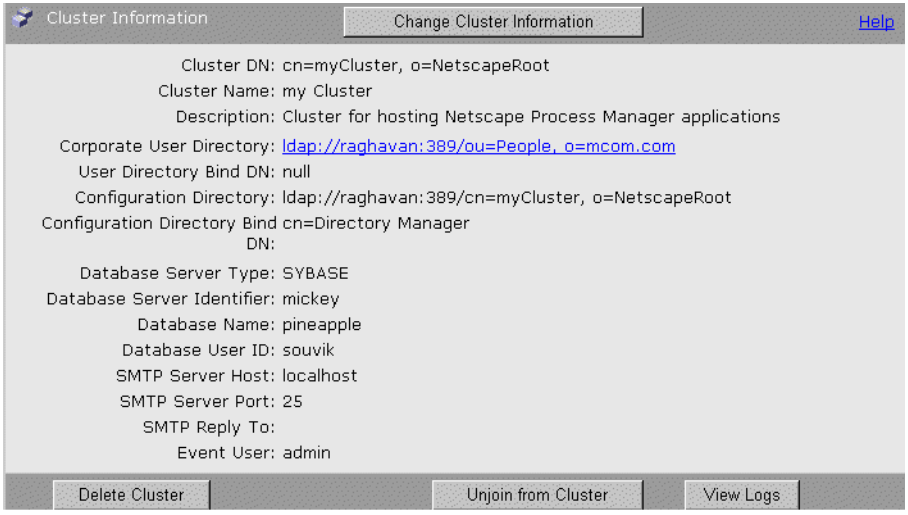
Cluster Implementation:	Administrator Login Fields:	Process Administrator URL:
Single Cluster	User Name, Password	`http://`*server_name*`/Administrator.apm/`
Multiple Clusters	User Name, Password, Cluster Name	`http://`*server_name*`/ClusterAdmin.apm/`

For information on the difference between single and multiple cluster implementations, see "About Clusters" on page 41.

NOTE You can also access the Process Administrator for management of a specific cluster in a multiple cluster implementation using the Site Administrator:

1. Log in to the Site Administrator URL: `http://`*server_name*`/SiteAdmin.apm`
2. Select the Cluster List tab.
3. Select the Process Administrator client link for the cluster you want to manage.

Figure 4-11 The Cluster Management Page



Changing Cluster Information

As an administrator, you can change some cluster information. You can change the cluster's name and description and you can change which corporate user directory you include in the cluster You cannot switch to use a different configuration directory or database in this cluster.

NOTE If you change the corporate user directory, you should update each Process Builder `preferences.ini` file with its LDAP URL. When Process Builder designers want to revise a deployed application, if they define the application's corporate directory as cluster-based, then the new user directory is automatically used. Designers need to check that their group and role assignments are still valid whenever the corporate user directory changes.

You must also change the corporate directory on your Enterprise Server to match that of the LDAP URL. You can change this in the `dbswitch.conf` file.

➤ **To change a cluster's information**

1. Enter the correct Process Administrator client URL in the location bar of your browser.

   Single cluster implementation:

   `http://`*server_name*`/Administrator.apm/`

   Multiple cluster implementation:

   `http://`*server_name*`/ClusterAdmin.apm/`

   A login screen appears.

2. Log in to the Process Administrator client.
3. Select the Cluster Management tab.
4. Select Change Cluster Information.

   The Change Cluster Information form appears.

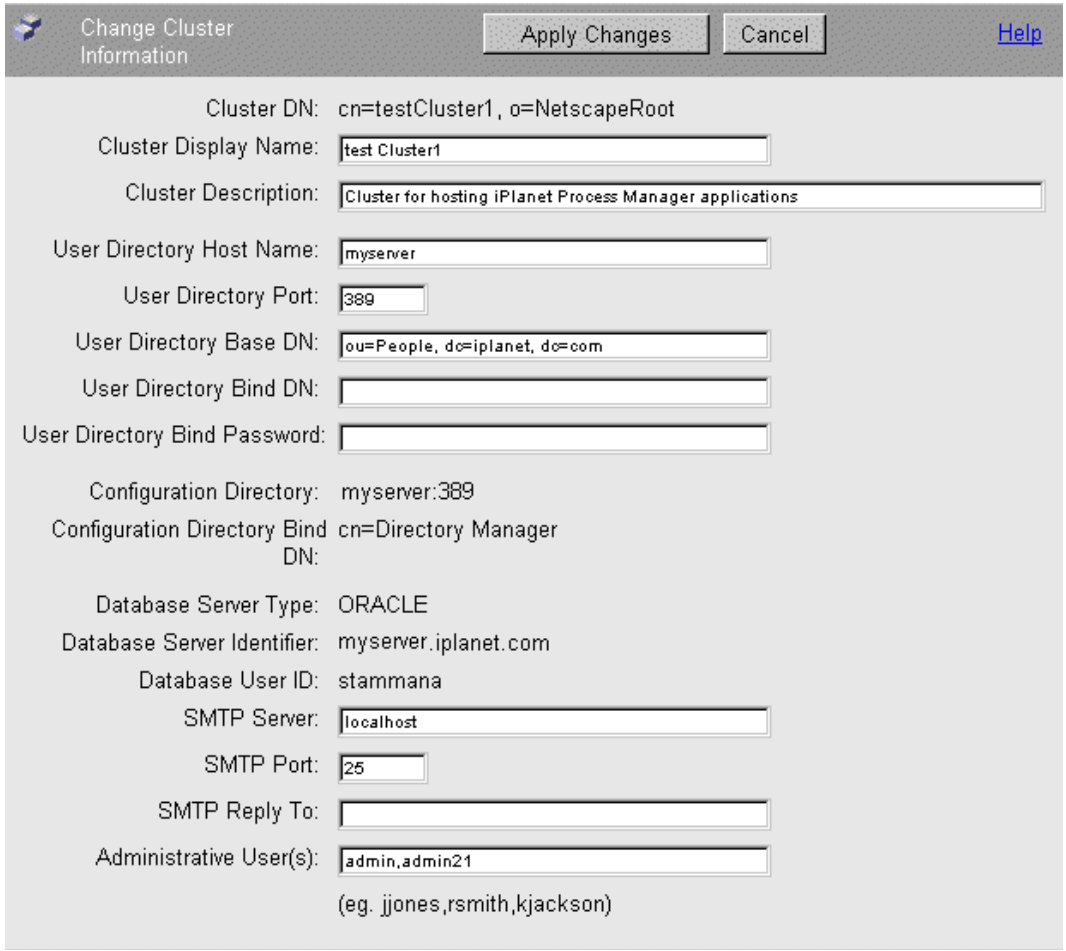
5. Enter information about the following components:
   - cluster (name, description, directory server information, and administrator IDs)
   - database (user ID and password only)

For details on the above options, see "Change Cluster Information Fields" on page 64.

6. Select Apply Changes.

NOTE If you log in to a cluster that is part of a multiple cluster implementation, you must log out of the Process Administrator client before you can access any other cluster. To do this, select the Logout link in the Process Administrator client.

Figure 4-12 The Change Cluster Information page



Change Cluster Information Fields

The administrator can modify the following information about an existing cluster.

NOTE You cannot use double quotation marks (") in any of the Change Cluster Information entries.

Cluster Name The user-defined display name for the cluster.

Cluster Description Text describing the cluster.

User Directory Host Name The server name for the corporate user directory.

User Directory Port The port number for the corporate user directory.

User Directory Base DN The directory suffix (or "base DN") for the corporate user directory. For details on which LDAP attributes to enter here, see "Directory Server Terms and Attributes" on page 31.

User Directory Bind DN (Optional) The user ID for a user of this directory server. Leave this blank if Process Manager will be accessing the corporate directory as an anonymous user.

User Directory Bind Password (Optional) The password for this directory user. Leave this blank if Process Manager will be accessing the corporate directory as an anonymous user.

SMTP Server Host The mail server associated with the cluster.

SMTP Server Port The mail server port.

SMTP Reply To The reply-to address that appears on notifications sent to users by Process Manager applications.

This address could be set to the Process Manager administrator's email address, so that the administrator would be the one handling any notification replies users send.

Event User (Single cluster implementation only) The timer event user.

Event User Password (Single cluster implementation only) The password for the timer event user.

Administrative User(s) (Multiple cluster implementation only) A comma-separated list of LDAP user IDs of people who have administrative permission to access Process Administrator and Process Business Manager interfaces on this cluster, and to deploy applications to this cluster. You must provide at least one LDAP user ID in this field.

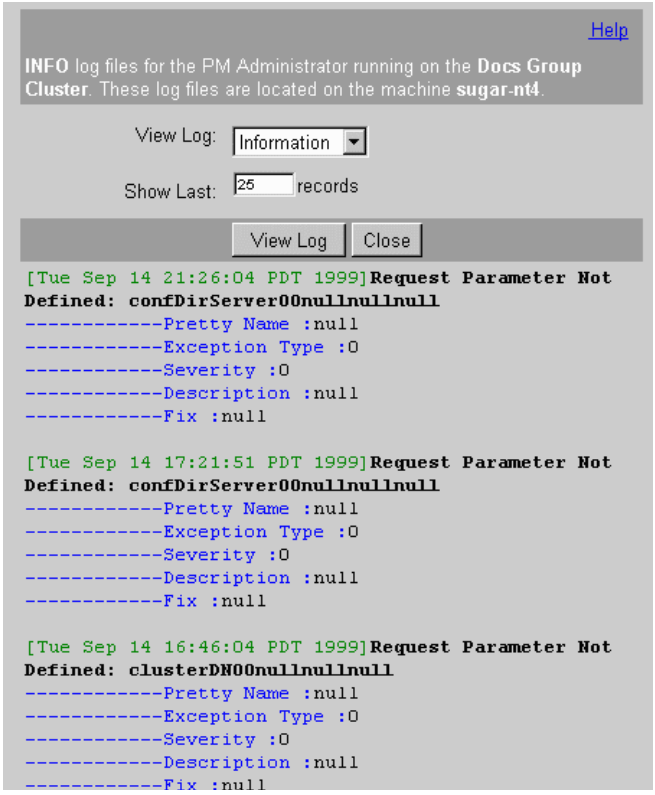
Accessing Directory Server Information

You can access Directory Server information by selecting one of the LDAP directory links on the Cluster Management page.

Viewing the Process Administrator Logs

You can view the Process Administrator logs by selecting the View Logs button.

Figure 4-13 A sample Process Administrator log



If Process Administrator is not available, you can access the Process Administrator logs (`error.html`, `info.html`, and `security.html`) at the following location:

serverRoot`/bpm/`<*ClusterName*>`/admin/logs`

<*ClusterName*> is the name of the cluster. In a single cluster implementation, the default name of the cluster is “PMCluster”.

Unjoining From a Cluster

You can unjoin an application server from a cluster. This revises the entries in the configuration directory and removes the applications that are stored on that server machine.

➤ **To unjoin an application server from a cluster**

1. Enter the correct Process Administrator client URL in the location bar of your browser.

   Single cluster implementation:

   `http://`*server_name*`/Administrator.apm/`

   Multiple cluster implementation:

   `http://`*server_name*`/ClusterAdmin.apm/`

   A login screen appears.

2. Log in to the Process Administrator client.
3. Select the Cluster Management tab.
4. Select the Unjoin from Cluster link located at the bottom of the page.

After you unjoin the server from its cluster, the next time you access Process Administrator, you will be prompted to create or join a cluster.

When you unjoin a server from a cluster, Process Administrator performs the following operations:

- removes that server's entry from the configuration directory
- deletes the `PMExtensionManager.properties` file from the server's file system

Deleting a Cluster

You can delete a cluster that you no longer need. When you delete a cluster, Process Administrator deletes the cluster entry in the configuration directory and deletes the local application server copy of the `PMExtensionManager.properties` file. You can also choose to delete the database tables.

NOTE When you delete a cluster, you need to inform designers using Process Builder that the cluster's entry in the Process Builder `preferences.ini` file is no longer valid. If they do not want to delete the references to the cluster in the `preferences.ini` file, the cluster appears in their Select An Application window with a red X through it, indicating that it is unavailable.

➤ **To delete a cluster**

1. Enter the correct Process Administrator client URL in the location bar of your browser.

   Single cluster implementation:

   `http://`*server_name*`/Administrator.apm/`

   Multiple cluster implementation:

   `http://`*server_name*`/ClusterAdmin.apm/`

   A login screen appears.

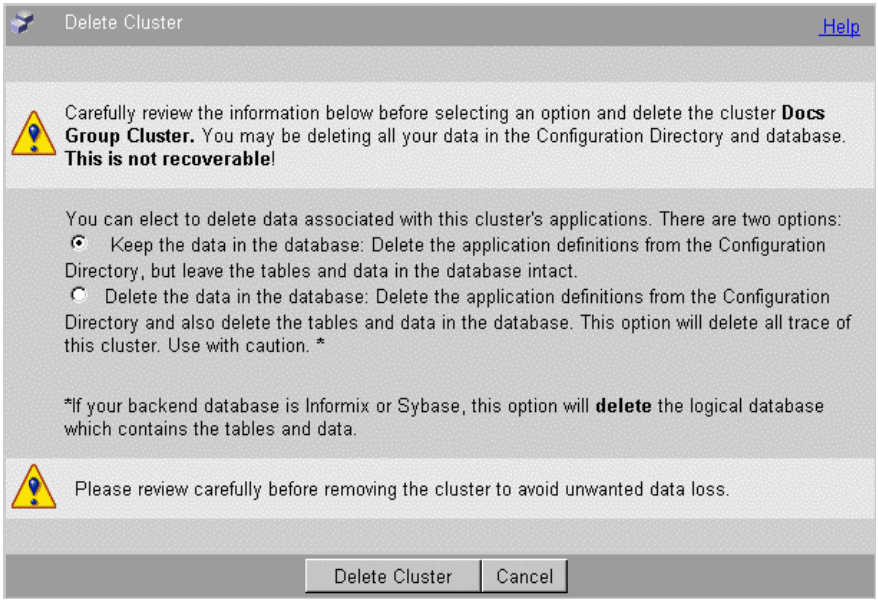
2. Log in to the Process Administrator client.
3. Select the Cluster Management tab.
4. Select the Delete Cluster button at the bottom of the page.

   This displays the Delete Cluster page.

NOTE You can choose to delete the application data for all cluster applications, which also deletes the application-specific database tables. This is not recoverable.

If you are not sure whether you want to do this, even for an old unused cluster, first archive the application data. For details, see the section "Exporting and Deleting Data" on page 82.

Figure 4-14 The Delete a Cluster Page



5. Select the Keep the data in the database radio button if you want to keep the application data.

   or

   Select the Delete the data in the database radio button if you want to delete the application data.

6. Select Delete Cluster to delete the cluster (and your user data if you chose that option).

If you try to delete a cluster that still has other active servers running, Process Administrator first removes the other servers, then it removes your local server and deletes the cluster.

Note that this also removes the `PMExtensionManager.properties` file from your local server, so the next time you try to access Process Administrator, you are "initializing" it again and you will have to create a new cluster.

Chapter 5

Managing Applications

Applications that handle business processes are at the heart of the Process Manager. Process Manager provides several forms for managing applications. You can change an application's state, view its logs, and export and delete its data.

This chapter contains the following sections:

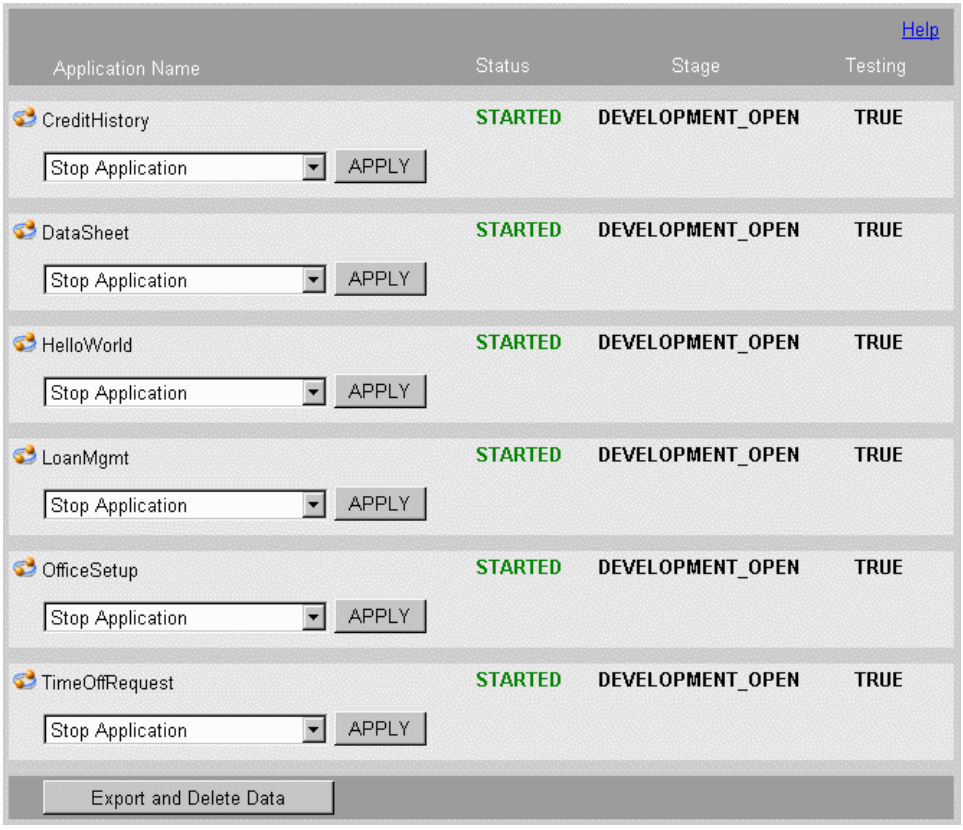
About Applications

Designers use Process Builder to define a Process Manager application. When the application is complete, the designer can deploy it to a cluster for final testing or for normal production use by Process Express end-users. For more information about deploying Process Manager applications, see the *Process Builder's Guide*.

A deployed *application* consists of a process definition that is stored in the configuration directory and a set of user data stored in the cluster's database.

Once an application is deployed, Process Administrator maintains information about its state. As the administrator, you can change this information, and as you do so, Process Administrator keeps the application information up to date in the configuration directory.

Figure 5-1 The Deployed Applications page



Application states include both their status and their stage. An application's **status** indicates whether it is currently running or not. An application's **stage** indicates whether it is in development or production, and whether it is available to end users.

Application statuses are:

- Started (On): End users and administrators can access the application to initiate and manage process instances and work items.
- Stopped (Off): End users cannot initiate new process instances for the application and cannot execute actions on existing process instances.

Administrators can stop started applications or start a stopped application.

Designers deploy to either Development or Production stages. If they deploy to a Development stage, they can still change almost all aspects of the application. If they deploy to a Production stage, they are very limited in what changes they can make.

Application stages are:

- Open: This is the initial stage after a designer has deployed the application.
- Closed: The administrator has closed down the application. End users can complete existing process instances but cannot initiate any new process instances. The Process Manager administrator can reopen closed applications at any time.

An application can also be in testing mode. In this mode, the designer has deployed the application, but all work items are set as assigned to their initiator (which is typically the designer or the administrator) to permit further testing of all aspects of the process definition. Once an application is deployed to production, it can no longer return to the testing stage.

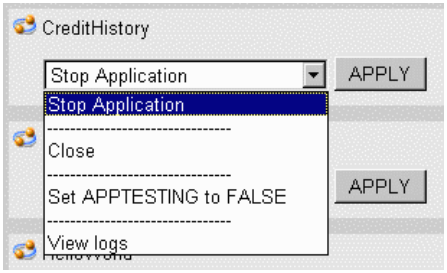
When the administrator changes an application's stage, Process Administrator updates the application definition in the configuration directory.

NOTE If a designer deploys a locally saved version of an already deployed application, and the two applications do not have the same stage value, the local version does not overwrite the stage of the application already deployed to the cluster.

Stopping & Starting Applications

Among the actions that an administrator can perform on an application are stopping and starting it. These actions change the application's status, which is maintained in the configuration directory as part of the persistent application data that describes all instances of the application across the cluster.

Figure 5-2 Application administration actions



If an application is started and the administrator stops it, this action shuts the application down everywhere across the cluster. This action also sets the application's status to Stopped, which does not allow access to process instance detail by end-users

If an application is stopped and the administrator starts it, this action sets the application's status to Started, which allows full access to process instances and work items by end-users and administrators.

When Process Administrator starts an application, either as part of an autostart or as part of a manual start, it performs these operations:

- Retrieves the application's definition from the configuration directory.
- Establishes a connection with the database.

Autostart

Whenever an end-user accesses an application in the Process Express, Process Manager checks the application's status. If the application's status is Started but it is not running, Process Manager performs an autostart. This can occur in two situations:

- The application has just been newly deployed.
- The server through which an end user is accessing the application was unavailable and has now been restarted.

Because Process Administrator has to perform several operations when it starts an application, there can be a time delay for the first end-user who accesses an application in these situations. As a result, some administrators may prefer to force initialization of an application immediately after it is newly deployed, or to force initialization of all applications after restarting a server.

Stop

You can use Process Administrator on a given iPlanet Application Server to stop an application. For example, you may want to stop an application when you do not want end-users to be able to access it. Stopping an application sets its status to Stopped in Process Administrator.

If an administrator stops an application, users are prevented from creating new process instances, work items, or otherwise accessing that application. Database transactions running when the administrator stops the application are allowed to complete.

The URL that Administrators use to access the Process Administrator client depends on the implementation of iPM clusters you set up:

- Single Cluster
- Multiple Cluster

Table 5-1 shows the information an Administrator needs to access the Process Administrator client based on the above cluster implementations.

Table 5-1 User Information Required for Process Administrator Log In

Cluster Implementation:	Administrator Login Fields:	Process Administrator URL:
Single Cluster	User Name, Password	`http://`*server_name*`/Administrator.apm/`
Multiple Clusters	User Name, Password, Cluster Name	`http://`*server_name*`/ClusterAdmin.apm/`

➤ **To stop an application**

1. Enter the correct Process Administrator client URL in the location bar of your browser.

   Single cluster implementation:

   `http://`*server_name*`/Administrator.apm/`

   Multiple clusters implementation:

   `http://`*server_name*`/ClusterAdmin.apm/`

   A login screen appears.

2. Log in to the Process Administrator client.

3. Select the Applications tab.

   This displays the list of applications in the cluster.

4. Choose the Stop Application command from the drop-down list for the application you want to stop.

5. Select Apply.

Now you and your end-users cannot access the process instance detail for the application. End-users cannot initiate new process instances or continue working on existing work items.

NOTE If you log in to a cluster that is part of a multiple cluster implementation, you must log out of the Process Administrator client before you can access any other cluster. To do this, select the Logout link in the Process Administrator client.

Start

You can start a stopped application. When you start an application, you are setting its status to Started in Process Administrator.

➤ **To start an application**

1. Enter the correct Process Administrator client URL in the location bar of your browser.

   Single cluster implementation:

   `http://`*server_name*`/Administrator.apm/`

   Multiple cluster implementation:

   `http://`*server_name*`/ClusterAdmin.apm/`

   A login screen appears.

2. Log in to the Process Administrator client.

3. Select the Applications tab.

   This displays the list of applications in the cluster.

4. Select the Start Application command from the drop-down list for the application you want to start.

5. Select Apply.

Now you and your end users can access the process instance detail for the application from any server in the cluster. End users can initiate new process instances and continue working on existing work items.

NOTE If you log in to a cluster that is part of a multiple cluster implementation, you must log out of the Process Administrator client before you can access any other cluster. To do this, select the Logout link in the Process Administrator client.

Closing Applications

Closing an application means that end users cannot initiate any new process instances, but they can continue to complete existing process instances. Closing an application sets its stage to Closed.

When you no longer need an application, you can close it. When you uninstall an application, you cannot "reinstall" it.

End-users can continue to work on work items until there are no open work items for the application, at which time you can uninstall the application.

➤ **To close an application**

1. Enter the correct Process Administrator client URL in the location bar of your browser.

   Single cluster implementation:

   `http://`*server_name*`/Administrator.apm/`

   Multiple cluster implementation:

   `http://`*server_name*`/ClusterAdmin.apm/`

   A login screen appears.
2. Log in to the Process Administrator client.
3. Select the Applications tab.

   This displays the list of applications in the cluster.
4. Choose the Close Application command from the drop-down list for the application you want to close.
5. Select Apply.

When an application is in the closed state, end-users cannot initiate new process instances, but they can continue working on existing work items.

NOTE If you log in to a cluster that is part of a multiple cluster implementation, you must log out of the Process Administrator client before you can access any other cluster. To do this, select the Logout link in the Process Administrator client.

Uninstalling Applications

If you have an application that you no longer need, you can manually uninstall it. The application must already be in a closed stage with no remaining open process instances.

Typically, a Process Manager administrator follows this sequence of operations:

1. Leaves an application in the closed stage for a while.
2. Manually terminates any open process instances that do not complete within a certain period of time.
3. Exports the application's process instances (user data) and may choose to delete them from the database.
4. Uninstalls the application from the cluster.

NOTE If you are planning to delete a cluster, it is strongly recommended that you first uninstall each of its applications to avoid additional manual clean-up tasks in the database after you delete the cluster.

Occasionally, you may have applications that you no longer want to use, and that you want to remove from the end-user interface. You can uninstall a closed application. When you uninstall an application, you prevent end-users from initiating any new process instances from the New Process page.

When you choose the Uninstall command, you are asked if you want to delete the application-specific database tables. If you confirm the deletion, the application's user data is removed. If not, the data is left intact.

NOTE You cannot uninstall an application that has any open process instances. You need change the state of any open process instances to terminated if you want to continue with uninstalling the application.

➤ **To uninstall a closed application**

1. Enter the correct Process Administrator client URL in the location bar of your browser.

   Single cluster implementation:

   `http://`*server_name*`/Administrator.apm/`

   Multiple cluster implementation:

   `http://`*server_name*`/ClusterAdmin.apm/`

   A login screen appears.

2. Log in to the Process Administrator client.
3. Select the Applications tab.

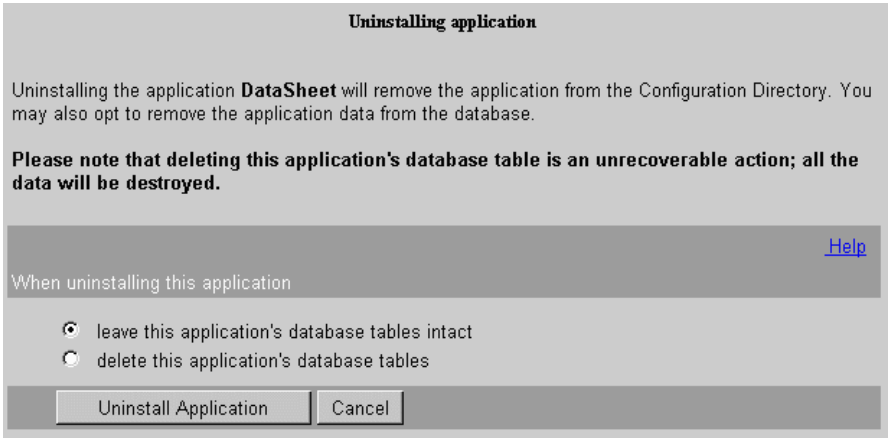
   This displays the list of applications in the cluster.

4. Choose the Uninstall Application command from the drop-down list for the application you want to uninstall.
5. Select Apply.

   The Uninstall Application dialog appears.

6. Check the radio button to leave the application's database table intact or to delete it, depending on your situation.
7. Select Uninstall Application.

Figure 5-3 The Uninstall Application dialog box



Now you and your end-users cannot access the process instance detail for the application. End-users cannot initiate new process instances or continue working on existing work items.

NOTE If you log in to a cluster that is part of a multiple cluster implementation, you must log out of the Process Administrator client before you can access any other cluster. To do this, select the Logout link in the Process Administrator client.

Viewing the Application Logs

Process Manager applications use several log files, with each iPlanet Application Server in a cluster having its own set of log files. Process Manager administrators can view these application logs that are maintained for each application on a per-server basis:

- warning log (`warningLog.html`) -- shows warnings that affect the application.
- error log (`errorLog.html`) -- shows the errors that have occurred with the application.

These files are located at *serverRoot*`/builder/support/log`.

➤ **To view an application's logs**

1. Enter the correct Process Administrator client URL in the location bar of your browser.

   Single cluster implementation:

   `http://`*server_name*`/Administrator.apm/`

   Multiple cluster implementation:

   `http://`*server_name*`/ClusterAdmin.apm/`

   A login screen appears.

2. Log in to the Process Administrator client.
3. Select the Applications tab.

   This displays the list of applications in the cluster.

4. Choose the View Logs command from the drop-down list for the application whose logs you want to view.
5. Select Apply.
6. Select View Log File.
7. If a dialog box prompts you to enter a user ID and password, enter the ones that you defined for your Administration Server.

   For example, `admin/admin`. When they are authenticated, the View Application Logs page is displayed.

8. Select the log you want to view from the drop-down list from the View Application Logs page.
9. Indicate how many log records you want to view.

   The log file display starts at the end of the file, so indicating "12" would show the last 12 records in the file.

10. Select View Log to see the log file.

NOTE If you log in to a cluster that is part of a multiple cluster implementation, you must log out of the Process Administrator client before you can access any other cluster. To do this, select the Logout link in the Process Administrator client.

Exporting and Deleting Data

As Process Manager administrator, you can export or delete application user data that is no longer in use. You can only export and delete data from closed process instances. You cannot delete or export work items separately from the process instances that they are part of.

You can choose to export only, export and then delete, or delete only. You can perform the action for a single application or for all applications at once.

You can access this function through the Export and Delete Data button at the bottom of the main Applications page.

➤ **To export or delete user data**

1. Enter the correct Process Administrator client URL in the location bar of your browser.

   Single cluster implementation:

   `http://`*server_name*`/Administrator.apm/`

   Multiple cluster implementation:

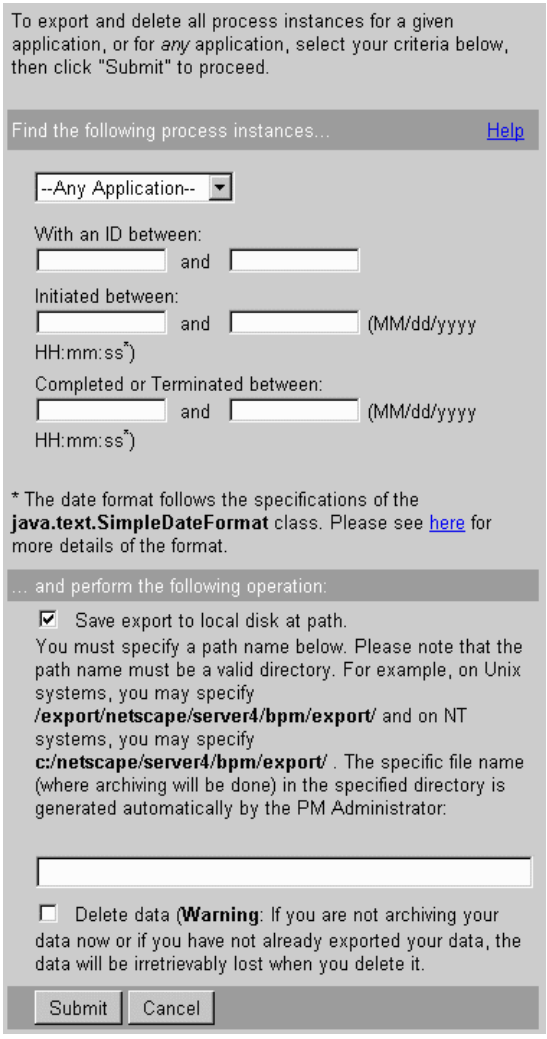
   `http://`*server_name*`/ClusterAdmin.apm/`

   A login screen appears.

2. Log in to the Process Administrator client.
3. Select the Applications tab.
4. Select the Export and Delete Data button at the bottom of the page below the list of applications.

   Figure 5-4 shows the Export and Delete Data dialog that appears:

Figure 5-4 The Export and Delete Data page



5. Select a specific application or “Any Applications” from the drop-down list.

6. Enter search criteria.

   You search for process instances based on one or more of the following criteria:

   - process instance IDs
   - time the process instance was created
   - time the process instance was completed or terminated

7. Check Save export to local disk at path to export the data.

   NOTE On Windows NT, the disk must be local. You cannot use an NFS-mounted drive.

8. Enter the absolute physical path to the folder in your local file system that you want to use for archiving.

   If you checked the Save export... checkbox, you must enter a path or you get an error when you try to perform the operation.

9. Check Delete data to delete the data.

   You will lose any data that you have not exported previously or as part of this operation.

10. Select Submit to export (and also delete if you checked the delete box) all the application data that meets your criteria.

    NOTE You should export all data before deleting it.

    You can delete data without archiving it, although this is a very risky action to take. This action is not recoverable.

Exported process instance data is written to flat files in a directory the administrator specifies. Each process instance's data is exported to a separate file. The file name for each process instance is generated automatically in the following format:

`process_instance`*_applicationName_processInstanceID_year_month_day_hour_minute_second*

For example:

```
c:\tmp\process_instance_CreditHistory_10_1999_10_11_10_31_51.xml
```

Here, the archival file was written to the directory `c:\tmp\`, the application name is CreditHistory, the process instance ID is 10, and the archival was done on October 11, 1999 at 10:31 and 51 seconds.

Exported data is stored in an xml file with the following format:

```
<PROCESS_INSTANCE>
<INSTANCE_DATA>

<!-- This section contains data from the process_instance table.
-->

</INSTANCE_DATA>
<HISTORY_EVENT_LIST>
<HISTORY_EVENT>

<!-- This section contains data from one history event in the
history table. There may be more than one history event listed
here. -->

</HISTORY_EVENT>
</HISTORY_EVENT_LIST>
<DATA_ELEMENT_LIST>

<!-- This section contains a list of all data elements and their
corresponding values. This section also contains custom field
data. -->

</DATA_ELEMENT_LIST>
</PROCESS_INSTANCE>
```

NOTE If you log in to a cluster that is part of a multiple cluster implementation, you must log out of the Process Administrator client before you can access any other cluster. To do this, select the Logout link in the Process Administrator client.

Chapter 6

Databases

Process Manager stores user data in a relational database. The database provides a centrally available repository for user data for each application in a cluster, plus a common set of tables that all applications can share. In addition, there are adapters for each type of database that handle mapping between Process Manager types and the data types used by each kind of database, so process designers can design process definitions that are database independent.

This chapter contains the following sections:

NOTE This chapter only provides general guidelines for using databases with Process Manager. For specific situations and error conditions, consult your database administrator (DBA). For example, if you encounter a Sybase log full error, you should refer the problem to your database administrator for a solution.

Overview

Process Manager uses an Informix, Oracle or Sybase database to store process instance data, so you must have a database available to you on your local system or available over a network on another system. If you are using a remote database, you must have the appropriate database client installed on your local system. You need to have enough privileges to create tables, write to tables, and to create views.

For that list of databases that Process Manager supports, see the Release Notes Process Manager at docs.iplanet.com

There are several ways a Process Manager end user and administrator interact with database tables. Sometimes they need read-only access, but sometimes they add new data or update existing data. Note that the database access is transparent to the end user or administrator. They are only aware that they are viewing, adding, or modifying process instance data.

End users are accessing a database when they perform these operations:

- Create a new process instance: Adds new data to all tables in the database.
- Work on a work item: Adds new application-specific data and updates some of the cross-application tables.
- View a process instance detail: Reads from several tables.
- View a process instance's history: Reads from the history table.

Administrators are accessing a database when they perform these operations:

- View a process instance detail: Reads from several tables.
- View a process instance's history: Reads from the history table.
- Request process instance statistics: Reads from several tables.
- Archive data: Updates some tables by flagging the database records that match the archiving criteria.
- Delete data through the Archive and Delete page: Updates some tables by removing the database records that match the deletion criteria. This is not recoverable.
- Delete data when uninstalling an application: Deletes the application-specific table for the application. This is not recoverable.
- Delete data when removing a cluster: Deletes the application-specific and the cross-application tables. This is not recoverable.

At each database operation, Process Manager collects data into implicit database transactions to protect application data in the database. Transaction-based processing allows rollbacks and automatic database cleanup if any Process Manager operation fails.

NOTE Each of these transactions generates an entry in the database transaction log, so make sure you have plenty of space available for the log. If you are using a Sybase database, it disconnects automatically when there is not enough space for additional transaction log entries. You can increase the transaction log size for your Sybase database to help avoid this problem.

Using Databases With Process Manager

To provide consistency across all applications in a cluster, all applications share a single relational database.

This section includes these topics:

Cross-Application Tables

The database has six common, cross-application tables that are shared across all applications and one application-specific table for each application (this value is used in the DB Application Table field in the application's definition in Process Builder). The cross-application tables contain standard data for each process instance and work item, while the application-specific tables contain the user data that is unique to each application.

The cross-application tables are:

- **process_instance table:** Maintains process_instance data such as each process instance's state, application, and creation and modification dates. It also tracks who initiated the process instance and who last worked on it.
- **work_item table:** Tracks work item data such as each work item's expiration date and to whom the work item is currently assigned.
- **history table:** Maintains all historical data for each process instance.
- **wf_id_range table:** Generates a new unique process instance ID whenever an end-user initiates a new process instance. This table has a single field, `next range`, indicating the next ID to create.
- **wf-blobs table:** Stores digital signatures.
- **dynamic_group table:** Stores entries for groups that are not statically defined in the corporate directory or in the application definition.

Table 6-1 Cross-application tables

process_instance	work_item	history	wf_blobs	dynamic_group
wf_instance_id	wf_instance_id	wf_instance_id	wf_instance_id	wf_instance_id
wf_creation_date	wf_fork_id	wf_fork_id	wf_field_cn	wf_fork_id
wf_creator_dn	wf_node_cn	wf_event_id	wf_blob_content	wf_node_cn
wf_title	wf_wi_state	wf_event_type		wf_group_id
wf_priority	wf_expired_flag	wf_event_date		wf_group_flag
wf_entry_cn	wf_wi_cdate	wf_wi_cdate		wf_user_id
wf_exit_cn	wf_exp_date	wf_wi_exp_date		
wf_last_modified	wf_user_dn	wf_user_dn		
wf_pi_state	wf_target_cn	wf_app_cn		
wf_app_cn	wf_performer_url	wf_comment		
wf_observer_url	wf_automated_flag	wf_node_cn		
wf_performer_url	wf_deferred_flag			
wf_archived_flag	wf_app_cn			
	wf_execution_stage			

NOTE In a Sybase database, the maximum number of bytes per row is 1962. If you create tables with varchar, nvarchar, or varbinary columns whose total defined width is greater than 1962 bytes, a warning message appears, but the table is created.

Primary & Foreign Keys

The database tables are set up to share the process instance, `wf_instance_id`, as a key. The process_instance table uses the `wf_instance_id` field as the primary key. The `wf_instance_id` field in other tables is considered as a foreign key. The work_item table uses a concatenated key of `wf_instance_id`, `wf_fork_id`, and `wf_node_cn` to precisely identify a work item in a parallel processing application, where there may be several work items for a specific process instance.

Database Views

To allow simplified queries, Process Manager provides some standard views into the database information. These offer a predefined subset of the data available in the database.

Process Manager constructs these views:

- closed_process: Uses the process_instance table in this query:

```
SELECT wf_instance_id, wf_creation_date,
wf_creator_dn, wf_title,
wf_priority, wf_entry_cn,
wf_exit_cn wf_node_cn, wf_last_modified,
wf_pi_state, wf_app_cn,
wf_observer_url, wf_performer_url,
wf_archived_flag
FROM process_instance WHERE wf_pi_state >= 4
```

- worklist: Uses the process_instance and work_item tables in this query:

```
SELECT  wi.wf_instance_id, wi.wf_performer_url,
wf_observer_url, wf_fork_id,
wf_node_cn, wf_wi_state,
wf_expired_flag, wf_wi_cdate,
wf_exp_date, wf_user_dn, wf_title,
wf_priority, wf_creation_date,
wf_creator_dn, wf_entry_cn,
wf_last_modified, wf_pi_state,
wf_target_cn, wf_app_cn
wf_automated_flag, wf_deferred_flag,
wf_execution_stage
FROM process_instance pi, work_item wi
WHERE wi.wf_instance_id = pi.wf_instance_id
```

- application-specific view: Uses the process_instance and the application-specific tables in a query such as this:

```
SELECT  pi.wf_instance_id, fieldrole, datefield, textfield,
radio,
wf_creation_date, wf_creator_dn,
wf_last_modified, wf_app_cn,
wf_ pi_state, wf_entry_cn, wf_title,
wf_priority, wf_exit_cn, wf_archived_flag,
wf_performer_url,wf_observer_url
FROM user1.process_instance pi, child app
WHERE pi.wf_instance_id = app.wf_instance_id
```

- searchlist view: Uses the process_instance table in a query such as this:

```
SELECT pi.wf_instance_id wf_instance_id,
wf_creation_date,  wf_creator_dn, wf_title, wf_priority,
wf_entry_cn, wf_exit_cn, wf_last_modified, wf_pi_state,
wf_app_cn, wf_observer_url, wf_archived_flag, wf_fork_id,
wf_node_cn, wf_wi_state, wf_expired_flag, wf_wi_cdate,
wf_exp_date, wf_user_dn, wf_target_cn, wi.wf_performer_url,
wf_deferred_flag
wf_deferred_flag, wf_automated_flag, wf_execution_stage
from process_instance pi, work_item wi
where pi.wf_instance_id = wi.wf_instance_id (+))
```

Database Users

There are three kinds of database users:

- Administrator

  Has create and write access to all cross-application and application-specific tables and views. This is the database user that you identify when creating a cluster. This administrator is responsible for setting up your database.

- Business Manager

  Also has create and write access to all cross-application and application-specific tables and views. This business manager is responsible for process instance-specific database issues.

- application-specific user

  Has create and write access to their own application's tables and views. Has read-only access to cross-application tables and views. Has no access to other application-specific tables.

  If you have an application-specific database user, the Process Builder designer identifies this as the DB User in the application's properties window when deploying the application.

Database Adapters

Each type of database supported by Process Manager has its own adapter. After the database type is determined, the adapter handles storing data in the database and takes care of such database-specific characteristics as type mapping.

Because type mapping in Process Manager is handled by the database adapters, Process Builder designers can use a single set of types that can be correctly interpreted for each type of database. Designers do not need to concern themselves about how their data types are stored in a given database.

NOTE Designers who write their own customized scripts cannot use certain transaction control statements in their scripts such as begin, commit, and abort. In addition, if they are using an Oracle database, they cannot use DDL in their script statements. Also, Process Builder does not check for all reserved words for every database. If a custom script contains a reserved word, your application deployment may fail.

Storing Digital Signatures

Process Manager has a special database table for storing digital signatures, wf_blobs.

Table 6-2 Fields in the wf_blobs database table

wf_blobs
wf_instance_id
wf_field_cn
wf_blob_content

You can perform `dbadmin` queries against this table to verify digital signatures as required. For example, you could execute this query:

```
SELECT * from wf_blobs WHERE wf_instance_id = <ID> and wf-field_cn = '<sig-field>'
```

to obtain the user ID, user name, and digital signature for a specific process instance. Note that to do this, you will need the process instance ID.

Setting Up Your Database

Process Manager requires the use of an existing Informix, Oracle or Sybase database. You can use whatever database server you already have installed, or you can install a new database server for your Process Manager data.

Informix and Sybase databases are not created during cluster creation. Note that if you are using Informix or Sybase, a database must already exist for Process Manager's use. The database administrator of your enterprise should create this database before creating a cluster. The database administrator must make sure the Process Manager administrative user has create table/create view privileges on that database.

See the *iPlanet Application Server Installation Guide* and the *iPlanet Application Server Administrator's Guide* for more information about setting up database connectivity and registering third-party jdbc drivers. You can locate iPlanet Application Server documentation in the following location: *serverRoot*`/ias/docs/index.htm`

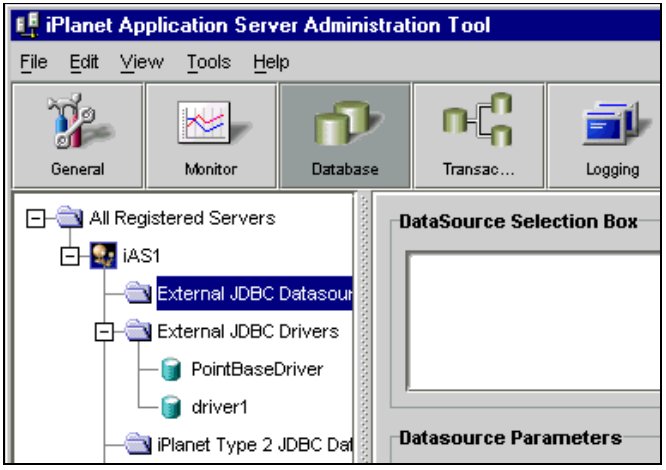
Database Connections

Database connections are maintained through iPlanet Application Server. You can set connection parameters using the iPlanet Application Server (iAS) Administration Tool.

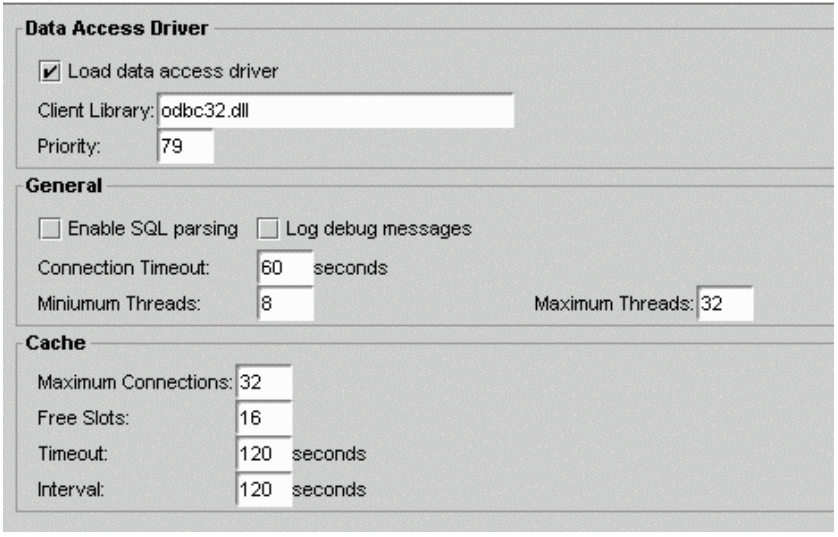
➤ **To set the database timeout connection parameters**

1. From iPlanet Console, launch iAS Administrator.
2. Select the Database button on the iAS Administrator toolbar to open the Database window.

3. In the left pane of the Database window, select the database for which you want to adjust the timeout parameter.



4. In the right pane of the Database window, enter the desired connection timeout duration as a number in seconds in the Connection Timeout field.

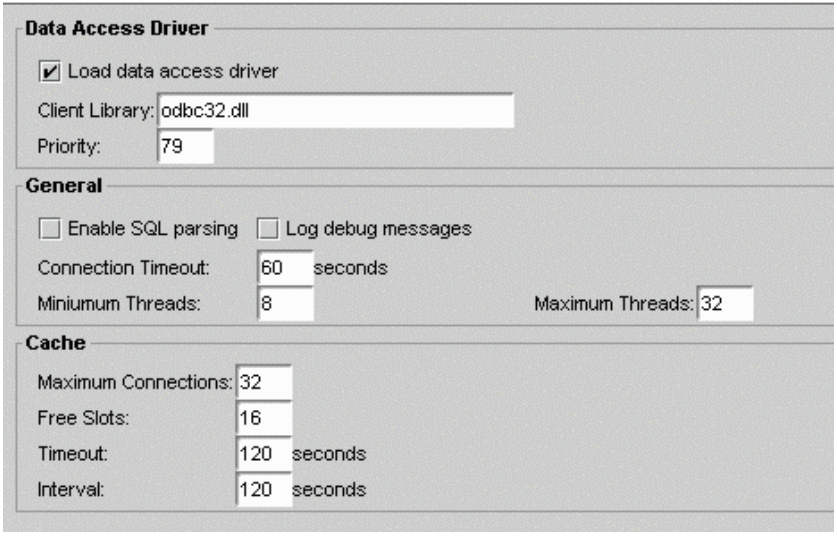


You can also set the minimum and maximum number of threads available for database connections. The thread parameters determine how many threads iAS allocates for asynchronous database queries. Such threads are usually used for queries returning a large number of rows and allowing the application to do other tasks while waiting for the query to finish. Asynchronous database queries are not supported by JDBC 2.0, a Java programming interface used to build on top on database drivers.

The default thread allocations are adequate for most applications. If an application developer uses many asynchronous queries, you might want to increase the maximum number of available threads. Keep in mind that each thread does use a small stack allocation and pulls from the total number of available system threads. Therefore, if an application does not use any asynchronous queries, you can increase performance by setting the maximum available threads to zero.

➤ **To set the minimum and maximum database thread parameters**

1. With the iAS Administrator Database properties window still open, enter the desired number of minimum threads in the Minimum Threads field.



2. Enter the desired number of maximum threads in the Maximum Threads field.
3. Select Apply Settings to save the changes to the Application Server.

The database cache is an array used to hold active and recently used database connections. iPlanet Application Server adds database connections to cache when an application creates a database connection.

While the application is using that database connection, iAS marks that connection "in use." Once the database operations are finished, the server marks the database connection "free." The cache then holds the free connection in the cache for a configured period of time. This allows the server to use the free cached connection and quickly handle a new request to the same database. Once a free connection exceeds the timeout, a cleaning thread removes the connection from the cache and opens a slot for a new connection to be cached.

NOTE Process Express, Process Administrator, and Process Business Manager each use a database connection. Whenever you are tracking the number of connections in use at a given time, remember that two connections are always taken by these components.

You can adjust the following cache parameters:

- the maximum number of connections allowed in the cache
- the number of slots held solely for free connections
- the timeout limit, in seconds, for free connections
- the interval, in seconds, at which the cache cleaner thread removes timed-out free connections

The default values are adequate for most applications, so adjustments are not usually required for initial application installations.

iAS dynamically adjusts the cache up to the maximum number of allowable connections. If there are no connections to cache, the array is allocated to zero spaces.

➤ **To adjust database cache parameters**

1. With the iAS Administrator Database properties window still open, enter the desired values for the following parameters in the Cache property fields:
    - Maximum Connections
    - Free Slots
    - Timeout
    - Interval
2. Select Apply Settings to save the changes to Application Server.

Chapter 7

Managing Process Instances and Work Items

This chapter and the next one present information needed by business managers to use Process Business Manager to manage and monitor process instances and work items.

This chapter contains the following sections:

About Process Instances and Work Items

A *process instance* is an instance of a deployed Process Builder application that has been initiated by an end user in Process Express. For example, if a user wants to issue a request for time off, they could initiate a new time off request in Process Express. When they do this, a new instance of the Time Off application is created in the database. This application consists of several tasks, called *work items*, each of which is assigned to a different user. (In Process Builder, work items are referred to as *activities*.)

For example, an employee, her manager, and her HR representative may be assigned to different activities in a process map in Process Builder. In Process Express, each has their assigned task appear as work item in their work list. As each person completes their assigned task, the request is routed to the next assignee's work list as a work item that they must act upon. Each time the process instance moves to a new work item, is accepted, or is completed, the process instance and work item states are updated internally.

Process Manager has the concept of *parallel processing* and *subprocesses*. When a parallel processing application such as Office Setup is initiated by an end user in Process Express, a single process instance can have many work items that are active simultaneously. This results in a one-to-many relationship between the process instance and its work items, and they can be in different states. For example, a process instance may be open and in a running state, but one of its work items could be suspended.

When a parent process arrives at the subprocess activity in the process map, it generates a subprocess. A single work item is created in the parent process to track the subprocess as a whole. This work item is unusual in that no one is assigned to the task, but it allows the Process Engine to track the start and end of the subprocess, so that it knows when to continue with the other activities in the process. In addition to the single subprocess work item in the parent process, individual work items are created as usual for each defined subprocess activity as the subprocess continues through its own defined process.

At any given time, a process instance or its work items can be in one of several different states. As business manager, you can move them from one state to another. For example, you may want to suspend a particular process instance when an assigned user ID is no longer valid.

NOTE When you change the state of a process instance, you may be affecting the state of its constituent work items. For example, when you suspend a process instance, all of its work items are also suspended. When you resume the process instance, the work items are also resumed. The reverse is not true: When you suspend a work item, the parent process instance is not also suspended.

Table 7-1 Process instance state definitions

State Name	Description
Open:	
running	The process instance has been created and is executing according to the process map. There is no exception or error condition
suspended	The process instance is unavailable, and assignees cannot take any action on it until the process has returned to the running or active state. **Note:** When you suspend a process instance, all of its work items are also suspended and are inaccessible. When you resume the process instance, the work items are also resumed.
Closed:	
completed	The process instance has finished normally without manual intervention.
terminated	The process instance is aborted before its normal completion. This also terminates all the work items associated with the process instance.

As with process instances, at any given time, a work item can be in one of several different states. As business manager, you can move them from one state to another. For example, you may want to suspend a particular work item when an assigned user ID is no longer valid. When you suspend a work item, you do not affect the other work items in the process instance nor do you affect the state of the process instance itself. Completed work items are removed immediately from the database, so they are no longer in any state.

Table 7-2 Work item state definitions

State Name	Description
Open:	
available	The work item has been created but is not yet owned by anyone. The assignee (or one of a group of possible assignees) for a work item has not yet accepted it.
active	The assignee (or one of a group of possible assignees) for a work item has accepted the work item.

Table 7-2 Work item state definitions *(Continued)*

State Name	Description
suspended	The work item is unavailable, and assignees cannot take any action for it until it has returned to the running or active state. The work item can be suspended on its own or as part of a process instance. **Note:** If the process instance that the work item is part of has been suspended, all of its work items are also suspended. When the process instance is resumed, the work item is also resumed.

As business manager, you can make some state changes for open process instances and work items, but not for closed ones. The table here identifies the permitted state changes.

Table 7-3 Permitted process instance and work item state changes

Can change from:	To these new states:
running	suspended, terminated (process instances)
active (process instances)	suspended, terminated (process instances)
available (work items)	
suspended	resumed to previous state, terminated (process instances)

Although expiration is not a state, a work item can be flagged as *expired*. Timer agents periodically check for expired work items. A work item can become expired if it has an expiration setter script set up for it in Process Builder and it has not been acted upon in Process Express before the date indicated in the script.

The Process Builder designer can use expiration setter scripts to define an absolute or a relative expiration date for each work item. The designer can define a change of state as part of a work item's expiration handler script. A typical example is that upon expiration a work item's state changes to a suspended or terminated state.

Whenever a timer finds an expired work item, it is flagged as overdue (expired) in Process Express and in Process Business Manager with a warning icon  in the Due Date column. You can extend the expiration date for any work item that has passed its expiration date. See "Administering a Work Item" on page 114 for more information.

Accessing Process Business Manager

Process Business Manager is a web-based interface for managing and monitoring process instances and work items. You access Process Business Manager's interface in a web browser using a specific client URL.

Process Business Manager uses a tabbed HTML-based interface that provides access to management functions in these areas:

- Process Instance Forms

  Process Business Manager provides several forms for finding and administering process instances. You can find all process instances that match certain criteria, or you can manage a specific process instance and view its details and history. You can also administer work items that belong to a process instance.

  For more information, see "Managing Process Instances" on page 104 and "Managing Work Items" on page 111.

- Statistics Forms

  Process Business Manager provides two forms for obtaining statistics about process instances. You can set up criteria for the process instances you are interested in and you can obtain a report about them.

  For more information, see Chapter 8, "Statistics."

The URL that business managers use to access for Process Business Manager depends on the implementation of iPM clusters an Administrator sets up:

- Single Cluster
- Multiple Clusters

Table 7-4 shows the information a Process Business Manager user needs to access the Process Business Manager client based on the above cluster implementations. Your Process Manager Administrator should set you up with an account (User Name, Password, Cluster Name, if needed) and tell you which url to use.

Table 7-4 User information Required for Process Business Manager Log In

Cluster Implementation:	User Login Fields:	Process Business Manager URL:
Single Cluster	User Name, Password	`http://`*server_name*`/Business.apm/`
Multiple Clusters	User Name, Password, Cluster Name	`http://`*server_name*`/ProcessBusiness.apm/`

➤ **To access Process Business Manager**

1. Enter the correct Process Business Manager client URL in the location bar of your browser.

   Single cluster implementation:

   `http://`*server_name*`/Business.apm/`

   Multiple cluster implementation:

   `http://`*server_name*`/ProcessBusiness.apm/`

   A login screen appears.

2. Log in to the Process Business Manager client.

   The Process Business Manager client appears.

NOTE If you log in to a cluster that is part of a multiple cluster implementation, you must log out of the Process Business Manager client before you can access any other cluster. To do this, select the Logout link in the Process Business Manager client.

Managing Process Instances

You can view and modify the process instances in your cluster. You can obtain a list of process instances by defining a set of search criteria such as by user, by application, across all applications in cluster, for specific creation or modification time periods, by expiration date, or by state.

NOTE All existing process instances disappear if a process developer revises, then redeploys, an application that has been previously deployed to development. This does not occur to applications deployed to production; process developers cannot add or delete data fields to applications deployed to production.

This section includes these topics:

- "Finding Process Instances"
- "The Process Instances List"
- "Administering a Process Instance"
- "Viewing Details and History"

➤ **To manage your process instances**

1. Log in to the Process Business Manager.

   For instructions on how to do this, see "Accessing Process Business Manager" on page 103.

2. Select the Process Instances tab.

   This displays the Find Process Instances page.

3. Enter search criteria for process instances.

   - by application
   - by user
   - by initiation and modification date
   - by state

   For details on the above search criteria options, see "Finding Process Instances" on page 106.

4. Select Find.

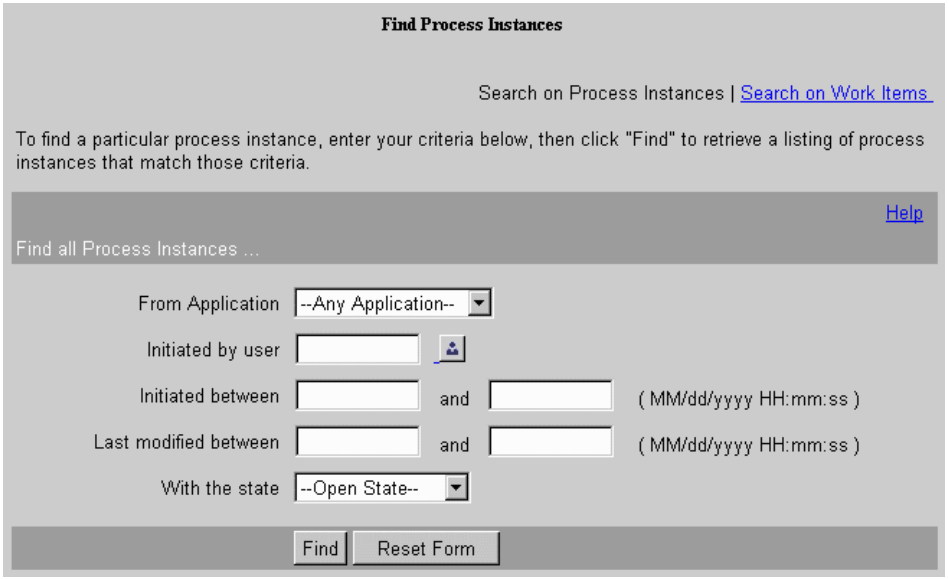
   A list showing all matching process instances appears.

Finding Process Instances

You can get a list of process instances based on the values you enter for one or more of these fields. For more general, conceptual information, see "About Process Instances and Work Items" on page 99.

NOTE If you enter no find criteria, all range fields default to "all-inclusive." Whatever criteria you specify are ANDed together, limiting the search to those process instances that fit all the criteria. If you enter a value in only the first part of a range, the criterion for that range becomes "after and including that data point." Likewise, if you only enter a value in the second part of a range, the criterion for that range becomes "up to and including that data point."

Figure 7-1 The Find Process Instances page



From application Select Any Application or a specific application from the drop-down list.

Initiated by user Enter the user ID of a Process Express end user.

Initiated between Enter a from and to range of dates formatted as *mm/dd/yyyy* [*hh*:*mi*:*ss*]. Note that this field uses a 24-hour clock.

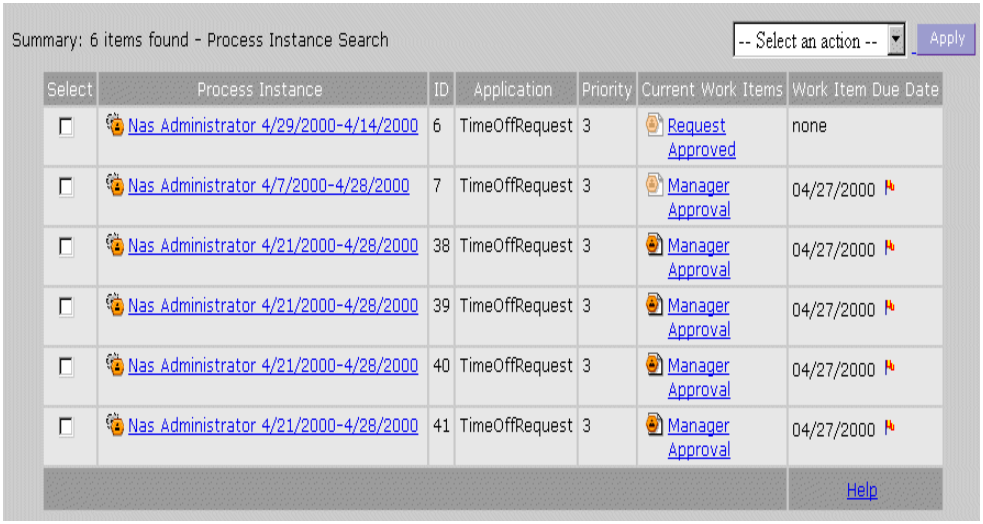
Last modified between Enter a from and to range of dates formatted as *mm/dd/yyyy* [*hh*:*mi*:*ss*]. Note that this field uses a 24-hour clock.

With the state Select Open State or a specific state from the drop-down list.

The Process Instances List

Once you submit your process instance criteria, the Process Manager displays a list of all process instances that meet your criteria.

Figure 7-2 The Process Instances List



Descriptions of column headings for the list:

- **Select:** This radio box can be used to select/deselect many process instances at the same time. Multiple process instances can be suspended or resumed by selecting the radio boxes and hitting the "Apply" button.
- **(State Icon):** An icon indicating whether the process instance is currently running (normal orange activity icon), suspended (dimmed out), completed (green), or terminated (X).

- **Process Instance:** The name of the process instance, such as Joe's Timeoff Request. This name is a link to the Display Process Instance page for that process instance. (For details, see "Administering a Process Instance" on page 108.)

  NOTE If the application is in the Testing stage, all process instances are renamed to the user ID of their initiator.

- **ID:** The process instance ID number. With parallel processing applications, there may be multiple work items for a single process instance ID.
- **Application:** The application that the process instance belongs to.
- **Priority:** The priority level for the current activity. The default value is 3.
- **Current Work Items:** The work items that are currently active. There may be several for a parallel processing application. If the item is an exception handler or a subprocess, a specific icon is displayed. For example, the last work item in Figure 7-2 is a subprocess. The work item is a link to the Display Work Item page.
- **Work Item Due Date:** The date when the current activity is due to expire. Items that are due on that day have a flag icon next to them. Items that are overdue (expired) show a warning icon next to them.

Administering a Process Instance

You can select an open process instance from the listings page and administer it by changing its state.

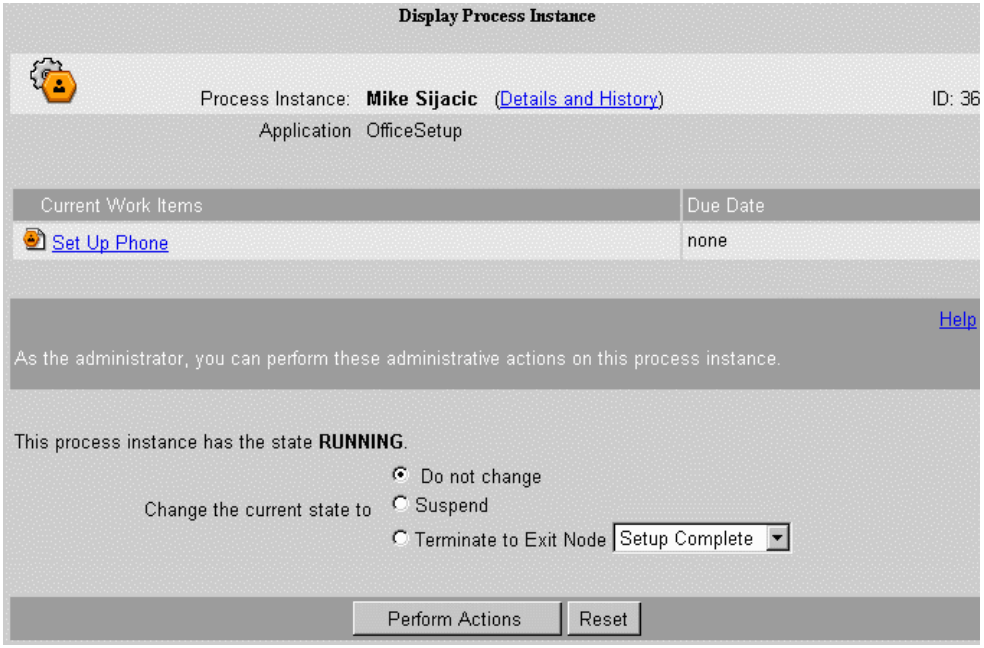
➤ **To administer a process instance**

1. Select the link for a specific process instance in the Process Instances List page.

   The Display Process Instance page is displayed.

2. Choose one or more actions for that process instance.
3. Select Perform Actions when you are done.

Figure 7-3 The Display Process Instance page



This page allows you to change the process instance's state.

Changing the State of a Process Instance

You can change the state of open process instances, but you can only change them to certain other states. See Table 7-3 on page 102 for details.

➤ **To change a process instance's state**

1. Select the radio button that reflects your choice:
   - Do not change
   - Suspend (suspend the process instance and all of its constituent work items)
   - Resume (resume a suspended process instance and any of its work items that are suspended to their previous state)

- Terminate (abnormally terminate the process instance) If you choose this option, you must select the exit point you want to use as the designated termination activity. This automatically terminates its constituent work items. You can select any exit point in the process map to terminate a process instance.

2. Select Perform Actions to change the state.

Viewing Details and History

The heading of the Display Process Instance page includes a link to the Details and History page. This provides a detailed history of every action users have performed for every work item for the process instance.

➤ **To view the details and history page**

1. Log in to the Process Business Manager.

   For instructions on how to do this, see "Accessing Process Business Manager" on page 103.

2. Select the Process Instances tab.
3. Enter search criteria and select Submit.
4. Select a process instance link on the Process Instances List.

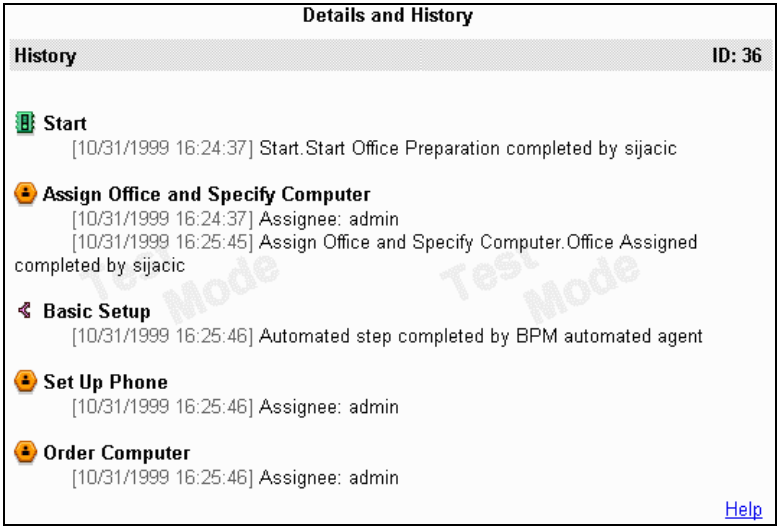
   This displays the Display Process Instance page.

5. Select the View Details & History link in the heading at the top of the page.

   This displays the details and history for that process instance.

6. Close the window when you are done.

Figure 7-4 The Details and History page



Managing Work Items

You can view and modify the work items for the process instances in your cluster. You can obtain a list of work items by defining a set of search criteria such as by user, by application, across all applications in cluster, for specific creation or modification time periods, by expiration date, or by state.

This section includes these topics:

- "Finding Work Items"
- "The Work Item List"
- "Administering a Work Item"

➤ **To manage your work items**

1. Log in to the Process Business Manager client.

   For instructions on how to do this, see "Accessing Process Business Manager" on page 103.

2. Select the Process Instances tab.

   The Find Process Instances page is displayed.

3. Select the Search on Work Items link.

   The Find Work Items page is displayed.

4. Enter search criteria for work items.

   - by application
   - by user
   - by expiration date
   - by state

   For details on the above options, see "Finding Work Items."

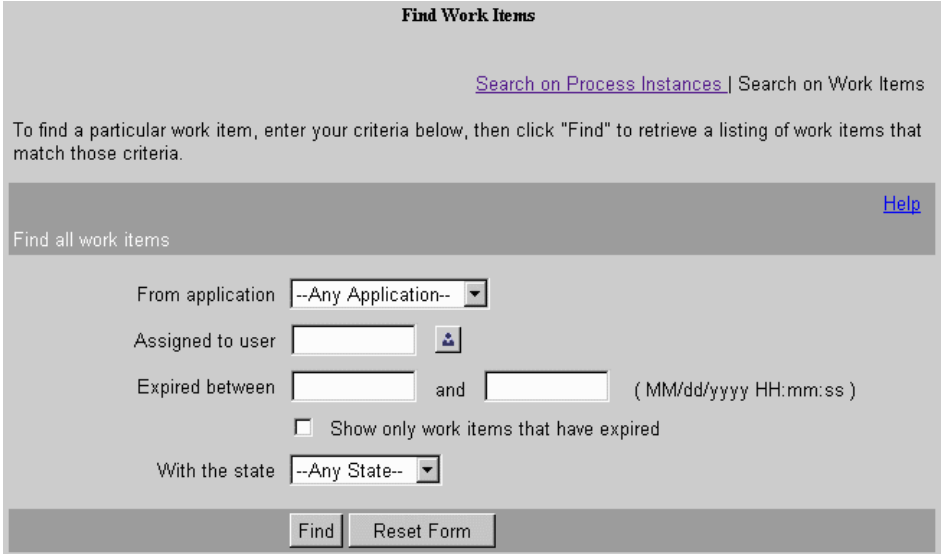
5. Select Find.

   A list showing all matching work items appears.

Finding Work Items

You can get a list of work items based on the values you enter for one or more of these fields.

Figure 7-5 The Find Work Items page



From application Select "Any Application" or a specific application from the drop-down list.

Assigned to user Enter the user ID of a Process Express end user.

Expired between Enter a from and to range of dates formatted as *mm/dd/yyyy* [*hh:mi:ss*]. Note that this field uses a 24-hour clock. This applies only to the work items of open process instances.

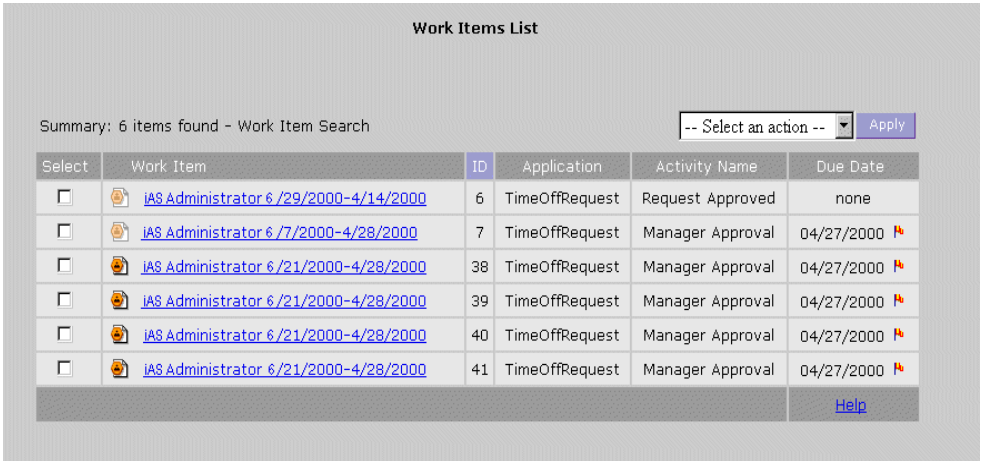
Show only work items that have expired This checkbox allows you to limit the listing to only those work items that have expired. This applies only to the work items of open process instances.

With the state Select "Any State" or a specific state from the drop-down list.

The Work Item List

Once you submit your work item criteria, Process Manager displays a list of all work items that meet your criteria.

Figure 7-6 The Work Items List page



The columns of data for the listing are:

- **Select:** This radio box can be used to select/deselect many work items at the same time. Multiple work items can be suspended or resumed by selecting the radio boxes and hitting the "Apply" button.
- **(State Icon):** An icon indicating whether the work item is currently available (orange activity icon) or suspended (dimmed out).
- **Work Item:** The name of the work item. This name is a link to the Display a Work Item page for that work item. (For details, see the next section, "Administering a Work Item.")
- **ID:** The ID number for the process instance that this work item belongs to.
- **Application:** The display name of the application for which this work item was created.
- **Activity Name:** The name of the activity that the work item performs, as defined in Process Builder.
- **Due Date:** The date when the current activity is due to expire. Items that are due on that day have a flag icon next to them. Items that are overdue (expired) show a warning icon next to them.

Administering a Work Item

You can select an open work item from the listings page and perform additional administrative actions on it. If you choose to perform more than one administrative action, and one of the actions is to move the work item to another activity, the move operation is executed first.

The administrative page, Display a Work Item, can be displayed in two formats: the administrative portion alone or a form with the administrative portion at the bottom. If no form was defined for the administrator by the designer in Process Builder, then only the administrative portion is displayed. If a form was defined, then that form is displayed with a section at the bottom where you can perform administrative actions.

➤ **To administer a work item**

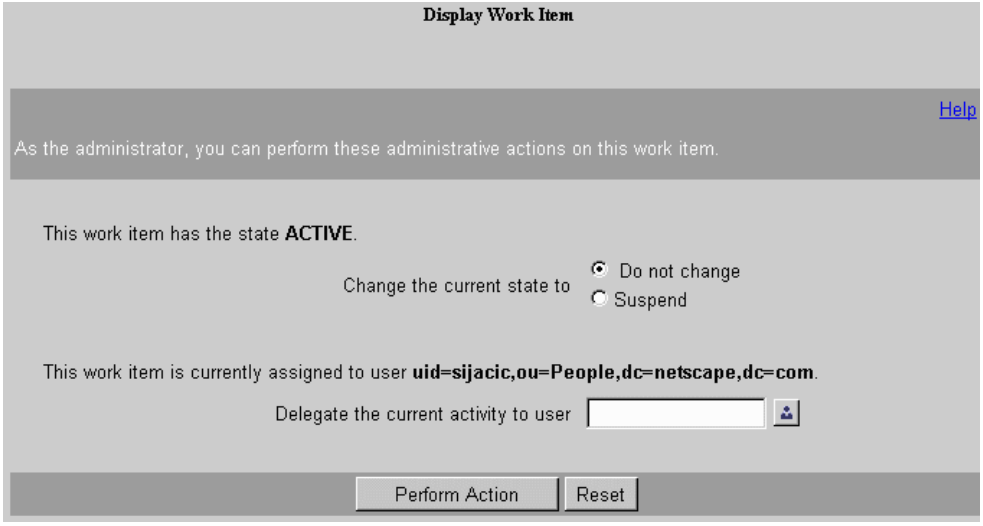
1. Select the link for a specific work item in the Work Item List page.

   This displays the Display a Work Item page for that work item.

2. Choose one or more actions for that work item.

3. Select Perform Actions when you are done.

Figure 7-7 The Display and Administer a Work Item page



The choices for actions you can perform are:

- change the work item's state
- extend the current activity's expiration date (only displayed when the activity has already been flagged as expired)
- move the current activity to a different activity
- delegate the current activity to another user

This page allows you to change the work item's state.

Changing the State of a Work Item

You can only change the state of open work items, and you can only change them to certain other states. See Table 7-3 on page 102 for details.

➤ **To change a work item's state**

1. Select the radio button that reflects your choice:
   - Do not change
   - Suspend (suspend the work item)
   - Resume (resume a suspended work item to its previous state)
2. Select Perform Actions to change the state.

Extending the Expiration Date

You can extend the expiration date for an open work item if its due date has already passed.

➤ **To extend the work item's due date**

1. Enter the new expiration date in the format *MM/DD/YY* [*hh*:*mm*:*ss*]. The date or time must be in the future.
2. Select Perform Actions to extend the work item's due date.

Moving to a Different Activity

You can change the current work item to any other activity that is defined for the application. That is, you can switch to an activity that is further along in the process definition or to one that precedes the current activity. You can move to a different activity even if the current activity is unfinished.

For parallel processing applications, you can only change to an activity that is on the same processing branch as the current work item.

NOTE Switching the current work item can damage the integrity of your application data because you may skip a critical step or you may perform another step twice. You must understand the consequences and define possible remedies as needed before making a switch. You need to be sure that this process instance can still complete or you may have to manually terminate the individual process instance.

➤ **To move the work item to another activity**

1. Choose an activity from the drop-down list.

   Process Business Manager only displays the activities that are defined for this process instance.

2. Select Perform Actions to change the activity.

NOTE No notification goes to the initiator or to the previous assignee about the switch.

Delegating to Another User

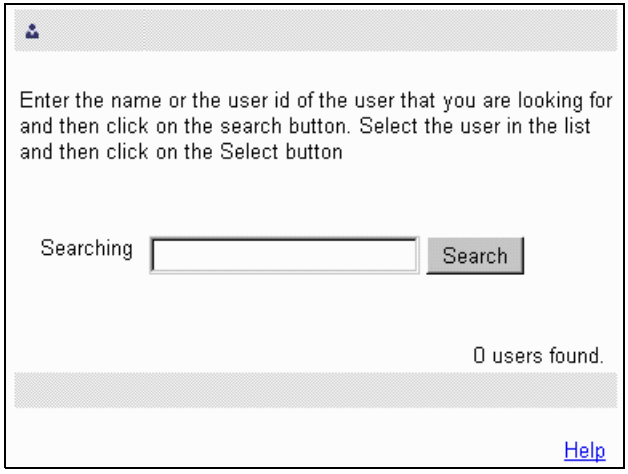
You can reassign an open work item to another user.

➤ **To delegate the work item**

1. Enter the user ID for the person or group to whom you want to reassign the work item.
2. Select the Find User icon if you do not know the user ID or group ID.

   This displays the Find User page.

Figure 7-8 The Find User page



3. Enter a partial name and select Search.

   This displays a second Find User page that lists all matching user IDs.

4. Select a user from the displayed list and choose Select.

   This returns you to the Display and Administer a Work Item page.

5. Select Perform Actions to delegate the activity.

Chapter 8

Statistics

The Process Business Manager interface allows you to get statistics on both process instances and work items.

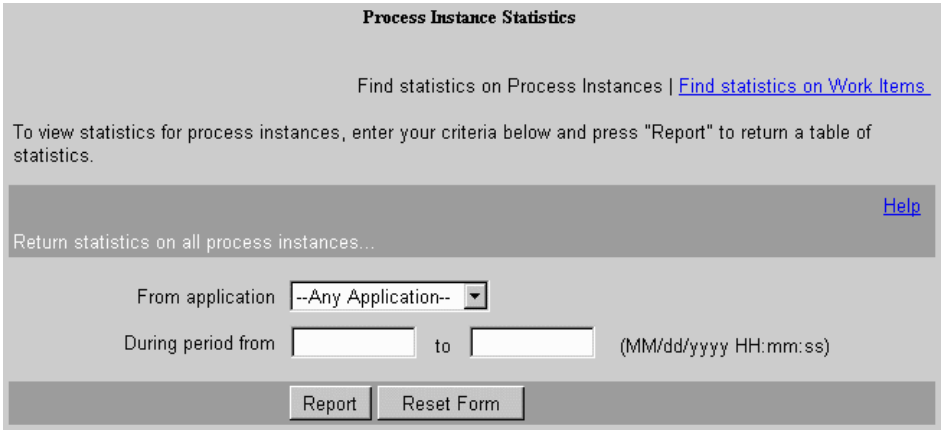
This chapter contains the following sections:

Obtaining Process Instance Statistics

To obtain statistics, you must log in to the Process Business Manager client. For information about accessing the Process Business Manager client, see "Accessing Process Business Manager" on page 103.

When you select the Statistics tab, the Process Instances Statistics page is displayed. You use this page to request a statistics report for all process instances for one or all applications that are initiated or modified within a given time period. There is an equivalent page for work items. See "Obtaining Work Item Statistics" on page 122 for details.

Figure 8-1 The Process Instances Statistics page



NOTE If a process instance is not initiated or modified during the time period, it is not included in the statistics.

If you enter no criteria, the date range defaults to "all-inclusive." If you enter a value in only the first part of a range, the criterion for that range becomes "after and including that date." Likewise, if you only enter a value in the second part of a range, the criterion for that range becomes "until and including that date."

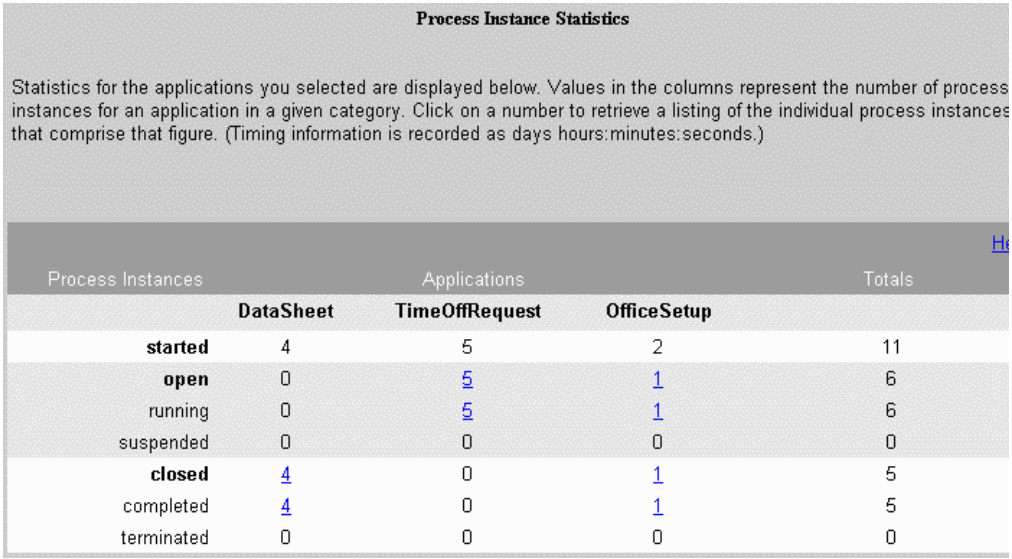
➤ **To obtain a statistics report**

1. Log in to the Process Business Manager client.

   For information about accessing the Process Business Manager client, see "Accessing Process Business Manager" on page 103.

2. Select the Statistics tab.
3. Select an application to report against by choosing Any Application or a specific application from the drop-down list.
4. Enter a range of dates or leave blank to include all.
5. Select Submit to display the Process Instances Statistics Report.

Figure 8-2 The Process Instances Statistics Report



Process Instance Statistics

Statistics for the applications you selected are displayed below. Values in the columns represent the number of process instances for an application in a given category. Click on a number to retrieve a listing of the individual process instances that comprise that figure. (Timing information is recorded as days hours:minutes:seconds.)

Process Instances	Applications			Totals
	DataSheet	**TimeOffRequest**	**OfficeSetup**	
started	4	5	2	11
open	0	5	1	6
running	0	5	1	6
suspended	0	0	0	0
closed	4	0	1	5
completed	4	0	1	5
terminated	0	0	0	0

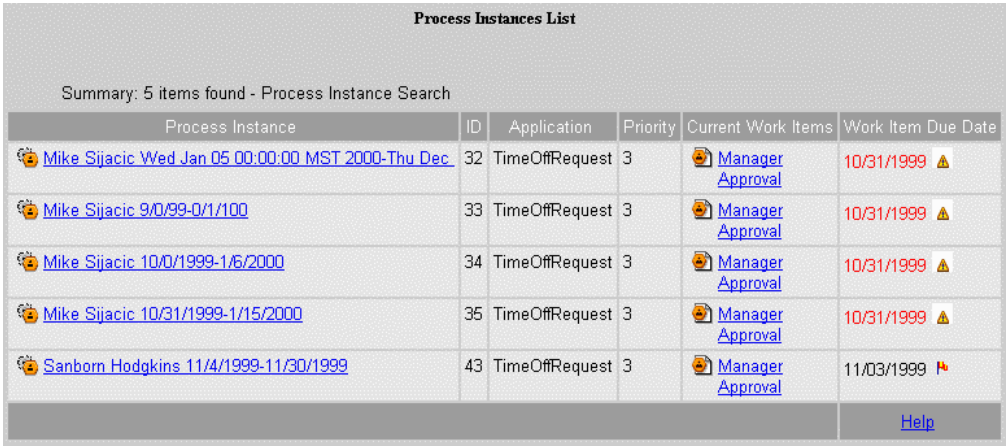
Each blue-underlined number in the report is a link to a Process Instances List of all the instances that were combined to make up that number. See Figure 8-3 for an example.

On the Statistics Report, statistics are provided for these categories:

- All process instances for an application
- Started
- Open process instances
  - running
  - suspended
- Closed process instances
  - completed
  - terminated

NOTE The set of process instances on the listings page could include more process instances than indicated in the Statistics Report if the end date is blank or is in the future because additional instances could have been initiated or modified after the report was run.

Figure 8-3 The Process Instance List Resulting From the Statistics Report



Process Instances List

Summary: 5 items found - Process Instance Search

Process Instance	ID	Application	Priority	Current Work Items	Work Item Due Date
Mike Sijacic Wed Jan 05 00:00:00 MST 2000-Thu Dec	32	TimeOffRequest	3	Manager Approval	10/31/1999
Mike Sijacic 9/0/99-0/1/100	33	TimeOffRequest	3	Manager Approval	10/31/1999
Mike Sijacic 10/0/1999-1/6/2000	34	TimeOffRequest	3	Manager Approval	10/31/1999
Mike Sijacic 10/31/1999-1/15/2000	35	TimeOffRequest	3	Manager Approval	10/31/1999
Sanborn Hodgkins 11/4/1999-11/30/1999	43	TimeOffRequest	3	Manager Approval	11/03/1999

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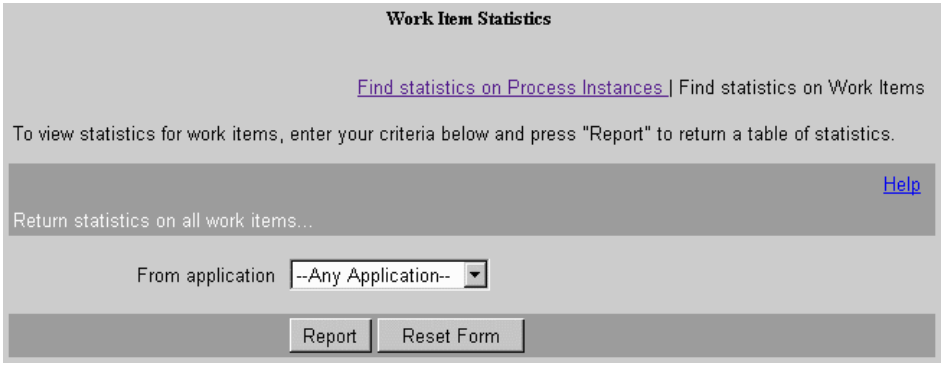
If you select the Process Instance link, you can administer the process instance through the Display Process Instance page.

If you select the Current Work Item link, you can administer the work item through the Display Work Item page.

Obtaining Work Item Statistics

When you select the Statistics tab and then the Find Statistics on Work Items link, the Work Item Statistics page is displayed. You use this page to request a statistics report for all work items for one or all applications that are initiated or modified within a given time period.

Figure 8-4 The Work Item Statistics Page



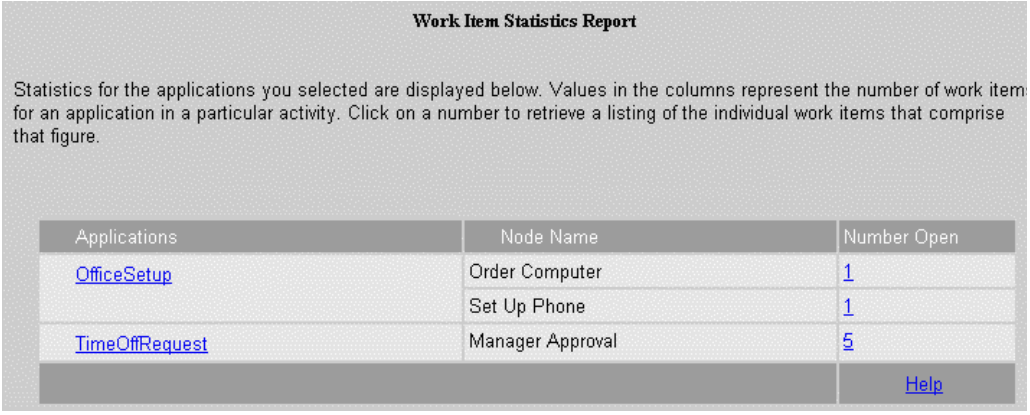
➤ **To obtain a statistics report**

1. Log in to the Process Business Manager client.

   For information about accessing the Process Business Manager client, see "Accessing Process Business Manager" on page 103.

2. Select the Statistics tab.
3. Select the Find Statistics on Work Items link.
4. Select an application to report against by choosing Any Application or a specific application from the drop-down list.
5. Select Report to display the Statistics Report.

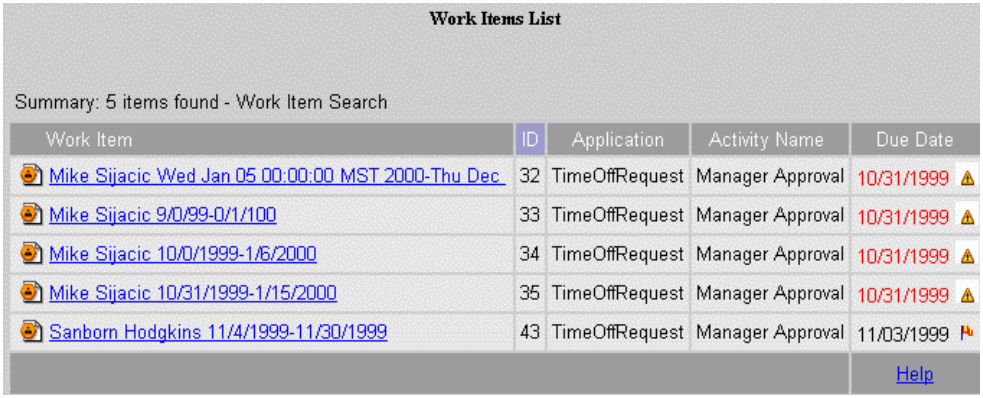
Figure 8-5 The Work Item Statistics Report



If you select the Application link and the process designer saved the process map as a JPEG file before deploying the application, the process map JPEG file is displayed. At each activity with one or more work items currently active, there is a highlighted number indicating the quantity. If the map was not saved as a JPEG file, you get a “file not found” error message.

If you select a blue-underlined number, a Work Items List is displayed that lists all the instances that were combined to make up that number.

Figure 8-6 The Work Item List Resulting From the Statistics Report



Work Items List

Summary: 5 items found - Work Item Search

Work Item	ID	Application	Activity Name	Due Date
Mike Sijacic Wed Jan 05 00:00:00 MST 2000-Thu Dec	32	TimeOffRequest	Manager Approval	10/31/1999
Mike Sijacic 9/0/99-0/1/100	33	TimeOffRequest	Manager Approval	10/31/1999
Mike Sijacic 10/0/1999-1/6/2000	34	TimeOffRequest	Manager Approval	10/31/1999
Mike Sijacic 10/31/1999-1/15/2000	35	TimeOffRequest	Manager Approval	10/31/1999
Sanborn Hodgkins 11/4/1999-11/30/1999	43	TimeOffRequest	Manager Approval	11/03/1999

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Glossary

activity A step in an application where an assignee needs to perform an action. This is referred to as a *work item* in Process Express.

application A Process Manager application defines the tasks, routing and assignments in a business process. Designers build applications in the Process Builder.

assignee The person assigned to an activity for a particular process instance.

automated activity A step in an application where an action is performed automatically, without an assignee.

builder The person who creates the application using Process Builder.

child process In subprocesses, the subordinate process that is called by the main or parent process.

class ID The identifier of a group of fields with certain common properties.

CGI Common Gateway Interface. The specification for communication between an HTTP server and gateway programs on the server. Allows web interfaces to databases and enables the dynamic generation of HTML documents by gateway programs.

cluster The association of a configuration directory, a corporate user directory, one or more application servers, and a database.

configuration directory The Directory Server where Process Manager cluster and application information is stored.

content store The web server folder in which file attachments and the user and password needed to access them are stored.

corporate user directory The LDAP directory service used to store the user and group information for a corporation. Process Builder reads from it when a designer sets up an application's users and groups and assigns work items. Process Express, Process Administrator, and Process Business Manager read from it when identifying a work item's assignee or when an assignee wants to delegate a task to another user.

creator The person who initiates a process instance. In Process Express, Process Administrator, and Process Business Manager, called the *initiator*.

database The relational database that stores the information generated by process instances. For example, the database could be Informix, Oracle or Sybase.

decision point A point at which a process map branches depending upon conditions defined in the decision point.

deploy To copy an application stored locally to a cluster. It can be deployed for storage only, or it can be deployed for testing or production. If it is deployed for testing or production, the application information is deployed to the configuration directory, and the application is activated on the application server.

entry point A point in the process where a user can initiate a process instance.

exception handler Used in subprocesses, a step in an application that allows the administrator to intervene manually if errors occur in the interaction between a parent and child process.

exit point A point in the process where the process ends.

extranet An extension of a company's intranet onto the Internet, to allow customers, suppliers, and remote workers access to the data.

form A part of an application a user fills out to complete a process instance, or uses to view information on a process.

group A set of users defined in the corporate user directory or within an individual application to whom the designer can assign an activity, or work item,

HTML HyperText Markup Language. A markup language (derived from SGML) used to create web documents.

HTTP HyperText Transfer Protocol. A protocol for communication between web clients and servers.

iAS iPlanet Application Server.

iPM iPlanet Process Manger.

initiator The person who initiates a process instance. In Process Builder, called the *creator*.

intranet A network which provides similar services within an organization to those provided by the Internet outside it but which is not necessarily connected to the Internet.

nested parallel process A parallel process nested within a larger parallel process. The activities in the nested process are considered to be part of the nested process and not the larger process.

parallel processing A step in an application that branches between two or more branches so that two or more activities can execute in parallel.

parent process In subprocesses, the main process that calls the subordinate or child process.

participant A user of Process Express.

Process Administrator A web-based interface that IT administrators use to administer Process Manager clusters and applications.

Process Express Q web-based interface that end users use to initiate process instances, complete work items, and search for process instances.

Process Builder The component of Process Manager that designers use to build and deploy applications.

Process Business Manager A web-based interface that business managers use to administer Process Manager work items and process instances.

Process Engine The Process Manager software component that contains Process Express, Process Administrator, Process Business Manager and the internal software that runs Process Manager.

process A process is a series of activities, or *work items*, that can be completed by end users using Process Express.

process instance A particular instance of a Process Manager process; for example, in a time off process, a process instance would be a particular request by an employee for vacation time off for a specific period of time.

PAE Netscape Application Server: Process Automation Edition. This was the name for Process Manager in the 4.0 release.

process map The visual representation of the process in a Process Manager application.

processing branch A set of activities that progress from a given split to its corresponding join. Also called a *thread*.

property An attribute of an item or component used in an application that contains information about the item. For example, an activity has properties containing information such as the name of the activity and what script is run when it is completed.

role A role is the part a user plays in a specific process instance.

script IProcess Manager scripts, such as assignment and completion scripts, run as server-side Javascript scripts. Toolkit scripts define functions that can be called by other server-side scripts.

subprocess A fully functional process that is called from within another process. The process that calls the subprocess is the parent process and the subprocess is its child process.

trusted user A group in a subprocess. By adding a user to this group that matches the AppUserID in the parent process, you can set up a reliable secure handshake between two specific applications.

transition The links between steps in a process. On the process map, they are represented by lines with arrows that lead from one item to another.

work item A work item is an individual task in a process as it appears to the end user on a work list. This is referred to as an *activity* in Process Builder.

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