HP Project and Portfolio Management Center

Software Version: 7.5

System Administration Guide and Reference

Document Release Date: June 2008
Software Release Date: June 2008

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Contents

1 Introduction

Administering HP Project and Portfolio Management Center

This document provides information about how to install, configure, and maintain the HP Project and Portfolio Management Center (PPM Center) system, including:

- The PPM Server or server cluster
- The Oracle® database and database schema used with PPM Center
- Other system components

If you are not installing PPM Center for the first time, but need instructions on how to upgrade from an earlier version, see the *Upgrade Guide.*

The chapters in this document provide the following information about PPM Center and how to administer the system:

- Overview of PPM Center system architecture and of single-server and server cluster system configuration (Chapter 2, *System Overview,* on page 19)
- Information about product licensing and optional programs that you can install (Chapter 3, *Installing PPM Center,* on page 35)
- Instructions on how to create the required database schemas, verify installation, and install service packs and HP Deployment Management Extensions (Chapter 3, *Installing PPM Center,* on page 35)

- Details on how to configure all components of the PPM Center system and to start and stop the PPM Server (Chapter 4, *Configuring the System,* on page 75)
- Information that PPM Center users need to know in order to use the PPM Workbench (Chapter 4, *Configuring the System,* on page 75)
- Advanced configuration information, including details on how to configure an external Web server and PPM Server clusters (Chapter 5, *Advanced System Configuration,* on page 109)
- Information on how to integrate PPM Center with an LDAP server (Chapter 5, *Advanced System Configuration,* on page 109)
- Details on how to maintain the PPM Center and the database after installation and configuration (Chapter 7, *Maintaining the System,* on page 173)
- Information about the kinds of performance issues that can arise, and how to identify and resolve them (Chapter 8, *Improving System Performance,* on page 199)
- Information on how to migrate entire instances of PPM Center, and on how to migrate just the database schemas (Chapter 10, *Migrating Instances,* on page 263)
- Details on how to use the HP entity migrators to migrate specific kinds of PPM Center entities and associated objects between instances of PPM Center (Chapter 9, *Migrating Entities,* on page 221)
- PPM Server configuration parameters (Appendix A, *Server Configuration Parameters,* on page 279)
- Details about PPM Center directories and the scripts and tools they contain (Appendix B, *Server Directory Structure and Server Tools,* on page 351)
- Checklists of the tasks to perform on the application server (or servers), database server, client machines, and the network before you install and configure PPM Center for your organization (Appendix C, *Preinstallation Checklists,* on page 367)

This document is written for:

- Application developers and configurators
- System and instance administrators
- Database administrators (DBAs)

The information in this document is directed toward users who are moderately knowledgeable about enterprise application development and skilled in enterprise system and database administration.

Related Documents

The following documents provide installation information for system administrators and DBAs:

- *System Requirements and Compatibility Matrix*

  Before you install PPM Center, check this document to make sure that your operating environment meets *all* of the minimum system requirements.

- *Release Notes*

  This document provides product information that is not included in the regular documentation set.

- *Customizing the Standard Interface*

  Refer to this document for information on how to tailor the look and feel of the PPM Center standard interface for your organization. This document also contains information about how to provide product documentation for the users in your organization.

- *Creating Portlets and Modules*

  Refer to this document for information on how to create and maintain your own PPM Dashboard pages, modules, and portlets for display in the standard interface.

- *Upgrade Guide*

  If you plan to upgrade from an earlier version of PPM Center, see this guide for information on supported upgrade paths, what to do to prepare to upgrade, and how to perform and then verify the upgrade.

Additional documents that you might find useful as you configure or maintain PPM Center include:

- *Commands, Tokens, and Validations Guide and Reference*
- *Open Interface Guide and Reference*
- *Web Services Guide*
- *Creating Portlets and Modules*
- *Security Model Guide and Reference*
- *HP-Supplied Entities Guide* (includes descriptions of all portlets, request types, and workflows in PPM Center)

Accessing PPM Center Documentation

To obtain all of the HP PPM Center documentation, go to the HP Software Product Manuals Web site (h20230.www2.hp.com/selfsolve/manuals). To access this Web site, you must first set up an HP Passport account.

Configuring the PPM Documentation Library

After you install PPM Center, you can configure the PPM Documentation Library so that your PPM Center users can access documentation from the product itself. For information on how to configure the PPM Documentation Library, see *Customizing the Standard Interface.*

2 System Overview

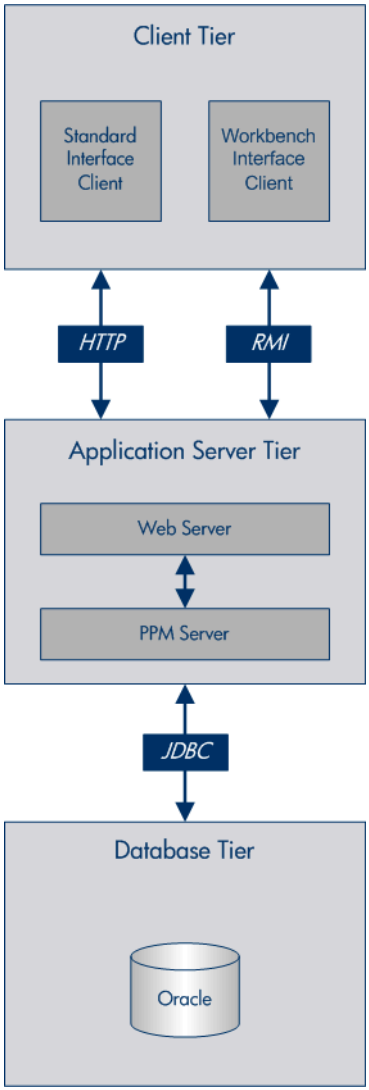
Overview of PPM Center Architecture

PPM Center is based on a three-tier architecture that consists of:

- An unlimited number of client browsers (client tier)
- One or more middle-tier J2EE servers (application server tier)
- A single Oracle relational database (database tier)

This arrangement is shown in *Table 2-1*.

Figure 2-1. PPM Center architecture



Browser clients use HTTP or HTTPS (HTTPS requires an external Web server) to communicate with the PPM Center Web and application servers. PPM Workbench clients (Java™ applet) use Remote Method Invocation (RMI). The following sections provide information about each tier.

Client Tier

The client tier of the system consists of:

- The PPM Center standard interface. The standard interface is rendered using Java Server Pages (JSP) and is accessed using a Web browser.
- The PPM Workbench interface is displayed using a Java applet installed on the client machine, and is started using the Sun Java plug-in to a Web browser.

The client and application server tiers communicate as follows:

- For the standard interface, the client and application server communicate using HTTP or HTTPS, with no code required on client machines. The client accesses information from the database through the J2EE application server using a shared database session pool.

To use HTTPS, you must also use an external Web server.

- For the PPM Workbench interface, the client and application server communicate using Remote Method Invocation (RMI) or Secure Remote Method Invocation (SRMI), which is optimized for use in PPM Center.

  The architecture and communication protocols are created to minimize the number of round trips between the applet and server, and the volume of data transferred.

For more information about the PPM Center standard and PPM Workbench interfaces, see the *Getting Started* guide.

Application Server Tier

The application server (PPM Server):

- Runs on the Microsoft® Windows®, Sun Solaris, HP-UX, IBM AIX, and Red Hat Linux, and SUSE Linux platforms
- Uses the JBoss Application Server
- Houses workflow, scheduling, notification, and execution engines that drive automated tasks such as code deployment to remote systems, dynamic routing, and email notifications
- Can run on multiple machines as a cluster to improve performance and scale hardware as usage increases
- Can run with external Web servers such as Sun Java System Web Server, Microsoft IIS, Apache HTTP Server, Apache-based Web Server (from HP), and IBM HTTP Server

For detailed information on which Web server versions PPM Center supports, and on which platforms, see the *System Requirements and Compatibility Matrix*.

- Maintains a database connection pool that caches connections to the database, which eliminates the need to restart the PPM Server if the database shuts down for scheduled maintenance or because of system failure

The application server and the PPM Web server communicate using Apache JServ Protocol version 1.3, or AJP13. The AJP13 protocol is similar to HTTP that has been optimized for performance. The application server and database tiers communicate using Java Database Connectivity (JDBC).

For more information about configuring an external Web server, see *Configuring an External Web Server* on page 109.

Database Tier

The database tier consists of an Oracle database that contains the tables, procedures, PL/SQL packages, and other components that the PPM Center products use. All transaction, setup, and auditing data are stored in the database. PPM Center can run on a single database instance, or can leverage Oracle RAC (Real Application Cluster) configuration for load balancing, redundancy, and failover.

The database consists of the following two database schemas:

- The central schema contains the core PPM Center data model and PL/SQL package code. The core data model contains all PPM Center configuration and transaction data.
- The Reporting Meta Layer (RML) schema contains a set of database views to facilitate reporting on PPM Center data.

PPM Center supports the following Oracle database features:

- A relational data model
- Use of Oracle stored procedures to implement business logic (for example, workflow processing)
- Use of a database connection pool to eliminate the need to create a separate database session for each user or transaction
- Database caching of frequently used data, programs, and procedures to improve performance

System Configurations

The three-tier architecture of PPM Center supports a variety of system configurations. You can deploy PPM Servers in a single-server configuration or a server cluster configuration. The following sections provide detailed information about these configurations.

Single-Server Configurations

PPM Center configurations are typically single-server configurations that consist of one PPM Server and one Oracle database. The single PPM Server handles the entire user load and functions as the Web server. It also houses the file system for the program code, reports, execution logs, and attachments files. The Oracle database stores all other data.

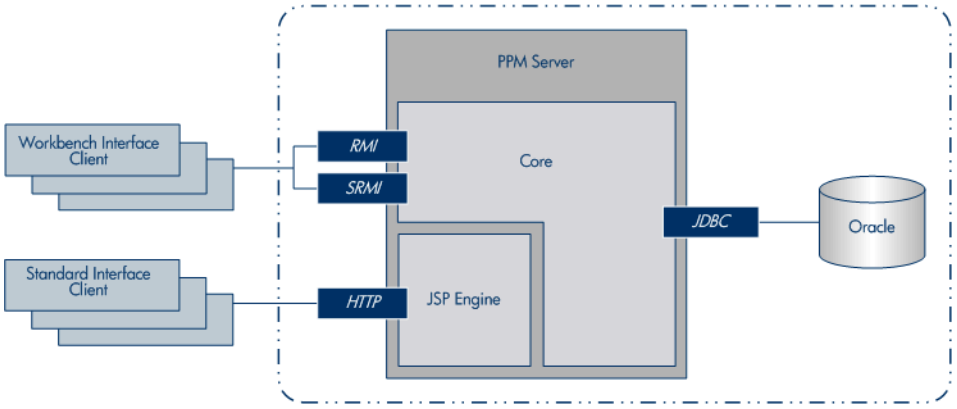
You can set up the following types of single-server configurations:

- Single-server/single-machine configuration
- Single-server/multiple-machine configuration
- Single-server/external Web server configuration

Single-Server/Single-Machine Configuration

The single-server/single-machine configuration shown in *Figure 2-2* consists of one machine that hosts both the PPM Server and the Oracle database.

Figure 2-2. Single-server/single-machine configuration



Standard interface clients communicate with the PPM Server using HTTP, or, for secure communication, HTTPS (requires that you use an external Web server). PPM Workbench interface clients communicate with the PPM Server using RMI, or, for secure communication, SRMI.

The machine that houses the PPM Server also contains the Oracle database. The PPM Server uses JDBC to communicate with the Oracle database.

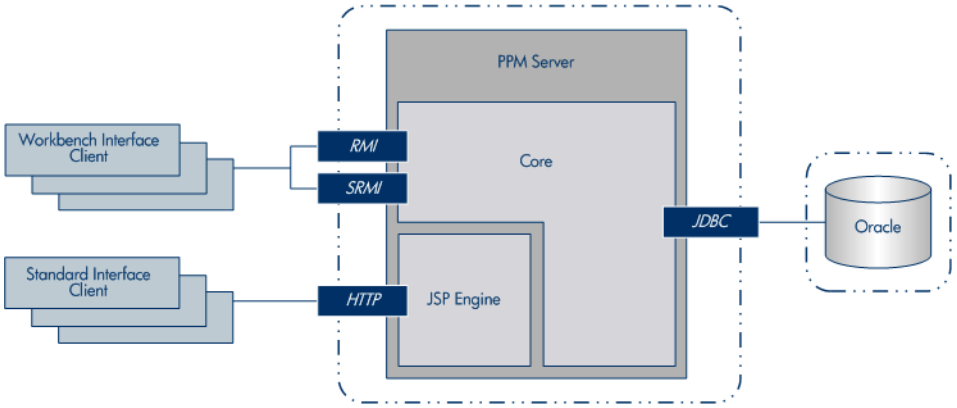
An organization typically uses this configuration if it requires a dedicated machine for all PPM Center services and database operations. User load, transaction capacity, and system performance depend on the available resources on a machine. This configuration does not support load balancing or server failover features.

For information about how to set up a single-server/single-machine configuration, see Chapter 3, *Installing PPM Center,* on page 35.

Single-Server/Multiple-Machine Configuration

In the single-server/multiple-machine configuration shown in *Figure 2-3*, the PPM Server and the Oracle database reside on separate machines. This configuration offers additional performance capacity and modularizes the maintenance of the application server and database tiers. The separate machines can run on different operating systems, thereby allowing greater flexibility.

Figure 2-3. Single-server/multiple-machine configuration



Standard interface clients communicate with the PPM Server using HTTP, or HTTPS for secure communication. (To use HTTPS, you must use an external Web server.) PPM Workbench interface clients communicate with the PPM Server using RMI, or SRMI for secure communication. The PPM Server and Oracle database use JDBC to communicate.

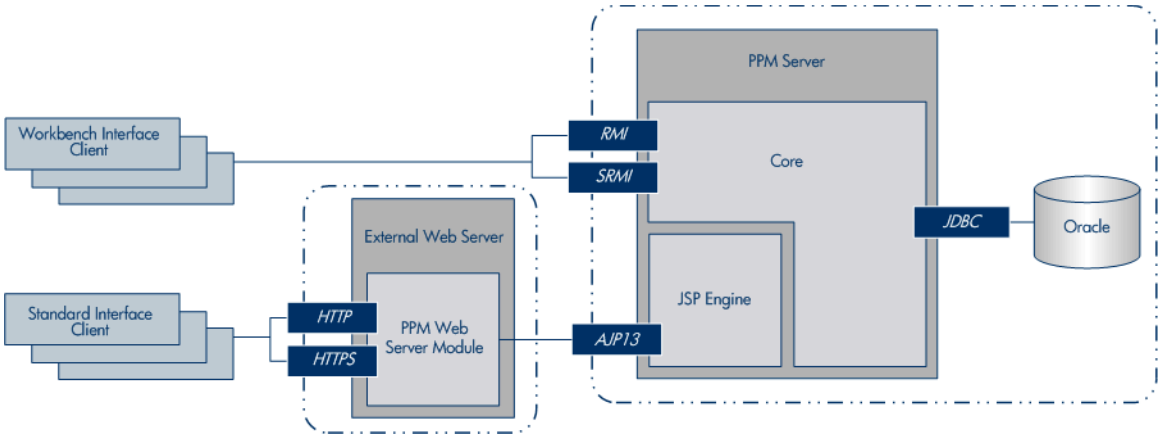
An organization typically uses the single-server/multiple-machine configuration if it requires a separate machine for database operations. User load, transaction capacity, and system performance depend on the resources available on the PPM Server machine. This configuration does not support load balancing or server failover features.

For information about how to set up a single-server/multiple-machine configuration, see Chapter 3, *Installing PPM Center,* on page 35.

Single-Server/External Web Server Configuration

In the single-server/external Web server configuration shown in *Figure 2-4*, Web traffic comes into the Web server and is then passed to PPM Center. The external Web server and the PPM Server communicate using AJP13, a proprietary protocol that is more efficient for this configuration type than HTTP or HTTPS.

Figure 2-4. Single-server/external Web server configuration



- Standard interface clients communicate with an external Web server using HTTP, or, for secure communication, HTTPS. The external Web server and PPM Servers use AJP13 to communicate.
- PPM Workbench interface clients communicate directly with the PPM Server using RMI, or, for secure communication, SRMI.
- The machine that houses the PPM Server also contains the Oracle database. The PPM Server communicates with the Oracle database using JDBC.
- The PPM Server and Oracle database can reside on separate machines.

This configuration is suitable if your organization:

- Already uses a standard Web server within the network infrastructure.
- Must prevent clients from having direct access to the PPM Server.

IT departments often have standards for the Web server used for HTTP traffic. Running the HTTP listener allows for PPM Center integration with enterprise-specific architecture.

System administrators typically prefer HTTP traffic configured on port 80. On UNIX® systems, processes must run as root to listen on a port number less than 1024. However, HP recommends that you not run the PPM Server as root. If you want to configure HTTP traffic on a port number less than 1024, consider integrating with an external Web server.

As with other single-server configurations, user load, transaction capacity, and system performance depend on available resources on the PPM Server machine. This configuration does not support load balancing and server failover features.

HP recommends that you use the internal Web server built into the PPM Server unless you have the kind of special Web server requirements described in this section.

For information about how to set up a single-server/external Web server configuration, see Chapter 3, *Installing PPM Center,* on page 35 and Chapter 5, *Advanced System Configuration,* on page 109.

For a list of supported Web servers, see the *System Requirements and Compatibility Matrix*. For information on how to access this and other PPM Center documents, see *Accessing PPM Center Documentation* on page 18.

Server Cluster Configurations

Server cluster configurations improve performance on systems that handle high transaction volumes or large numbers of concurrent users. In addition to handling higher user loads and providing greater scalability, server cluster configurations support load balancing and server failover features to help ensure that mission-critical systems provide constant and optimal access to users.

To handle large numbers of concurrent users, server cluster configurations use either an external Web server or a hardware-based load balancer to distribute user connections evenly across multiple PPM Servers. If a PPM Server shuts down, the activities running on that server are automatically transferred to an

available PPM Server in the cluster. This server failover feature helps ensure that PPM Center system services such as email notifications and scheduled executions remain operational.

Server cluster configurations contain two or more PPM Servers and an Oracle database. The first PPM Server installed and configured is the *primary server*. The other server (assuming a two-server setup) is the *secondary server*. The two servers can act as peers in a load-balancing situation, or one can act as a backup machine for the other.

A server cluster setup can include multiple databases. If a database in a setup such as this goes down, the Oracle JDBC driver manages database connectivity.

You can implement server cluster configurations on a single machine or on multiple machines. To run multiple PPM Servers on a single machine, the machine's memory capacity and CPU usage must meet the same memory and CPU requirements for multiple servers. To run multiple servers on multiple machines, the servers must share a common file system for reports, execution logs, and attachment files. Although each machine can contain its own instance of the PPM Center application code, only a single copy is required for each machine, regardless of the number of servers running on that machine.

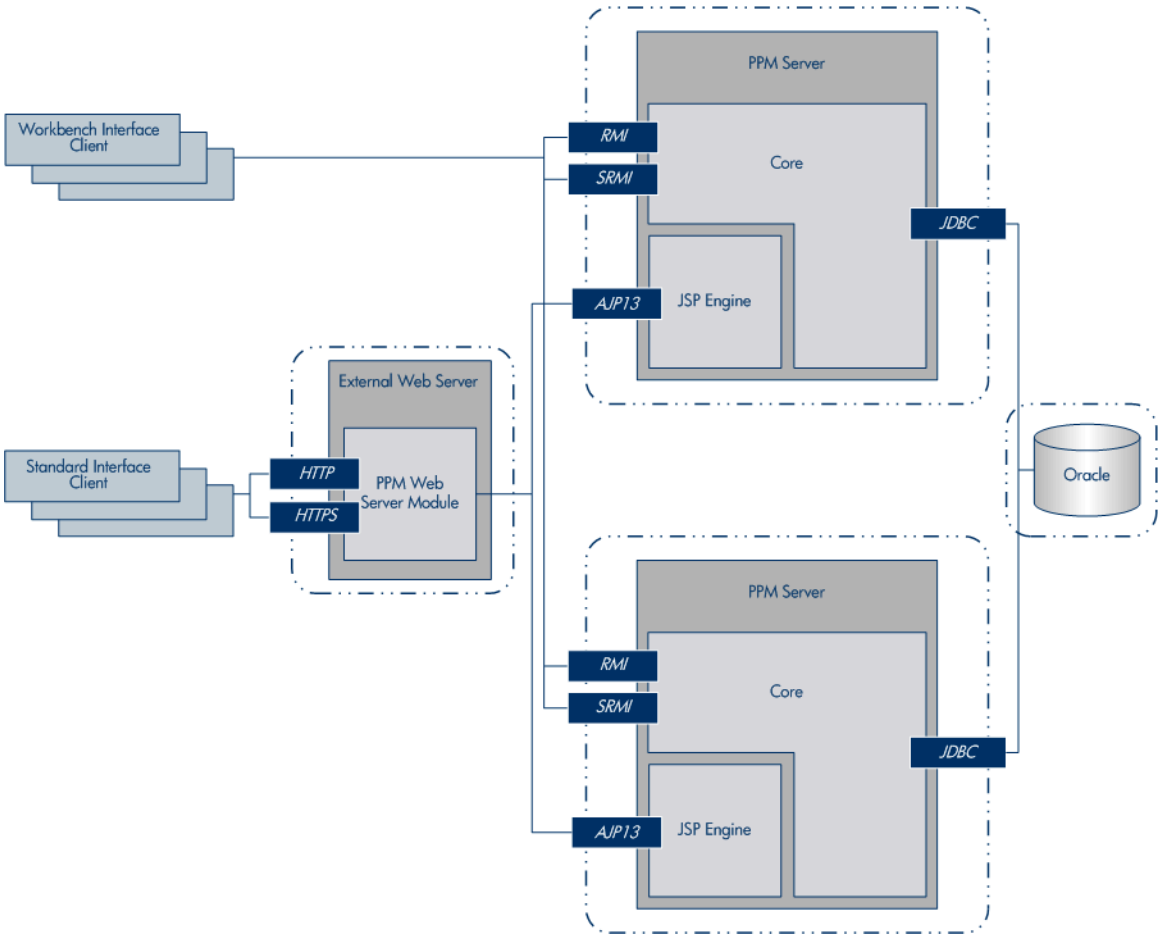
You can set up server clusters with an external Web server, or with a hardware load balancer. The following sections describe these two setups.

Server Cluster/External Web Server Configuration

The server cluster/external Web server configuration (see *Figure 2-5*) distributes client connections evenly among any number of PPM Servers, based on Web traffic and server load. This configuration is typically used for organizations that need to load-balance Web traffic across multiple PPM Servers (as an alternative to hardware-based load balancing). It can also be useful to an organization that already uses a standard Web server within its network infrastructure.

You can usually improve user load, transaction capacity, and system performance with this configuration. The extent of improvement depends on the number of PPM Servers in the cluster and their available resources. This configuration supports load balancing and server failover features.

Figure 2-5. Server cluster/external Web server configuration



The external Web server listens for HTTP or HTTPS requests from standard interface clients. PPM Servers run in the background and are transparent to users. Users access only the URL to the external Web server.

The HP PPM Web server module forwards HTTP or HTTPS requests to one of the PPM Servers. The HP PPM Web server module and the PPM Servers communicate using Apache JServ Protocol version 1.3 (AJP13).

The PPM Servers also accept RMI or SRMI connections from PPM Workbench users who run applets in browsers to directly connect to the PPM Server using this protocol. The PPM Server uses JDBC to communicate with the Oracle database.

You cannot use a single Web server installation on a Windows-based system for multiple PPM Center instances. If you must use an external Web server for multiple PPM Center instances, HP recommends that you either use a UNIX machine to host the Web server, or use a hardware load balancer.

Software Load Balancing

You can use the PPM Center Web server module as the software load balancer for a PPM Server cluster configuration. In this configuration, the PPM Servers running in the cluster do not accept HTTP requests directly.

The request sequence is as follows:

1. A user submits an HTTP request to the Web server.
2. The Web server forwards the request to the HP PPM Web server module.
3. The HP PPM Web server module sends the request to a PPM Server.

Integrating with a Single Sign-On Product

With the server cluster/external Web server configuration, you can implement single sign-on using a product such as CA SiteMinder. For instructions on how to implement single sign-on with PPM Center, see Chapter 6, *Implementing User Authentication,* on page 147.

Using SSL Accelerators

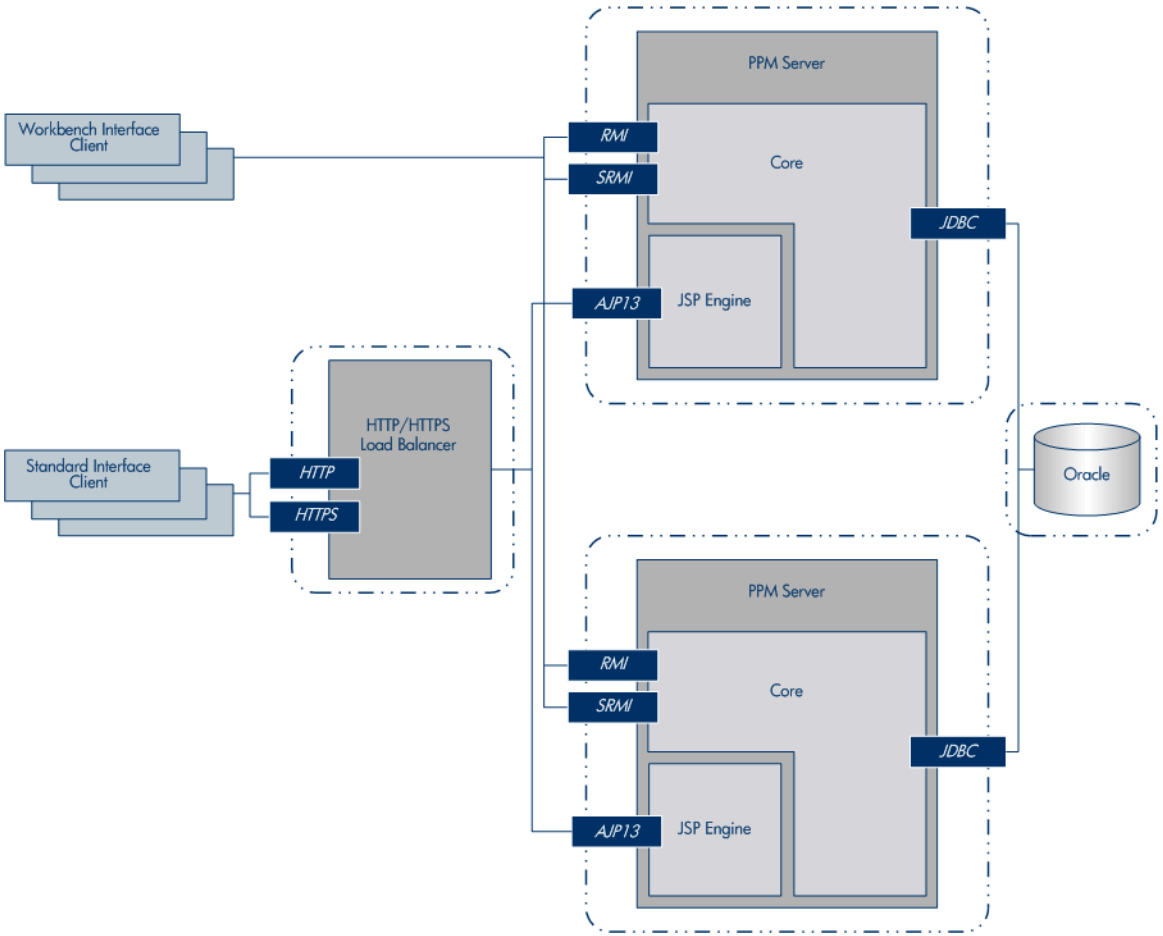
For PPM Server cluster configurations running HTTPS, you must integrate an external Web server that supports the appropriate accelerator to leverage a hardware-based SSL accelerator.

The external Web server and PPM Servers communicate using AJP13, a proprietary protocol that can be more efficient than HTTP for communicating with PPM Servers using an external Web server. For information about how to set up a server cluster with an external Web server, see Chapter 5, *Advanced System Configuration,* on page 109.

Server Cluster Hardware Load Balancer Configuration

The server cluster/hardware load balancer configuration (shown in *Figure 2-6*) is similar to the server cluster/external Web server configuration. However, in place of an external Web server, a hardware load balancer is used to balance client HTTP sessions across PPM Servers. This configuration enables the even distribution of client connections among PPM Servers based on server load and availability.

Figure 2-6. Server cluster/hardware load balancer configuration



In this configuration:

- Standard interface clients communicate with PPM Servers using HTTP (or, for secure communication, HTTPS) through the use of a hardware load balancer. The hardware load balancer behaves like a reverse proxy server and PPM Servers listen for HTTP or HTTPS requests that it distributes.

  To use HTTPS, you must also use an external Web server.

  Many hardware load balancers support handling HTTPS and forwarding plain HTTP. In this case, the hardware load balancer handles the encryption and decryption of requests, and the PPM Servers perform other tasks. Setting up your system this way can improve its performance.

- PPM Workbench interface clients communicate directly with the PPM Server using RMI, or SRMI for secure communication.

- The PPM Server and Oracle database reside on separate machines and communicate with each other using JDBC.

  Although *Figure 2-6* on page 32 shows multiple PPM Servers and just a single database, the system can support multiple databases or a single database mirrored for redundancy across multiple machines (equal to the number of PPM Servers).

Using this configuration improves user load distribution, transaction capacity, and system performance. The degree of improvement depends on the number of PPM Servers in the cluster and the resources available to each. Load balancing and server failover features are supported in this configuration.

For information about how to set up a server cluster/hardware load balancer configuration, see Chapter 5, *Advanced System Configuration,* on page 109.

3 Installing PPM Center

Key Considerations

To prepare to install PPM Center, review this section.

For information about how to upgrade to PPM Center version 7.5 from an earlier version, see the *Upgrade Guide*.

Installing for the First Time

To prepare to install PPM Center version 7.5:

1. Ensure that your organization has obtained the installation software.
2. Read the rest of this chapter.
3. Read the *System Requirements and Compatibility Matrix,* which is described in *Related Documents* on page 17.
4. Read the *Release Notes,* which are described in *Related Documents* on page 17.
5. To ensure that you have performed all required preinstallation tasks, use the preinstallation checklists provided in Appendix C, *Preinstallation Checklists,* on page 367.

6. If you plan to install one of the HP Deployment Management Extensions, see the documentation for the product.

For information on how to access documentation for HP Migrators and HP Deployment Management Extensions, see *Accessing PPM Center Documentation* on page 18.

7. Make certain that you have the valid licenses required for all of the products you plan to install.
8. For instructions on how to install PPM Center, see *Installing PPM Center* on page 61.

   That section addresses how to:

   - Prepare to install the product
   - Install the product
   - Verify the installation
9. Configure the PPM Server and system environment.

   For information about how to configure PPM Center, see Chapter 4, *Configuring the System,* on page 75.
10. Install and configure optional products you have purchased to work with PPM Center.

After you install and configure PPM Center, you can install Extensions, or Migrators in any order you choose. For information about how to install and configure optional products, see *Optional Installations* on page 72.

Installing PPM Center Managing Application Change Software

HP's solutions for Business Technology Optimizations for PPM Center includes the Managing Application Change (MAC) integration. PPM Center MAC software provides entities such as request types, workflows, portlets, reports, and special commands that you can install in PPM Center to support Information Technology Infrastructure Library (ITIL) processes for change management and release management.

MAC enhances PPM Center functionality, and facilitates PPM Center integration with service desk applications, HP Quality Center, HP Change Control Management, and Mercury Application Mapping. For detailed information about MAC and how to install it, see the *HP Managing Application Change Guide.*

Plug-in for PPM

If you plan to integrate Microsoft Project with HP Project Management by installing the Plug-in for PPM, be aware of the following:

- The Plug-in for PPM is an ActiveX/COM DLL that adds a menu to Microsoft Project and a toolbar, which you can use to synchronize Microsoft Project and HP Project Management data. All communication with the PPM Server is done using HTTP requests to the PPM Server, and the data is returned in XML format.
- Microsoft Project functionality is affected only while integrated with PPM Center (for example, while loading tasks, filling in actual effort, and so on).

For information on the requirements and instructions for installing the Plug-in for PPM, see the *HP Project Management User's Guide.*

Installing Document Management

The optional HP document management module in PPM Center gives you more control over document search and storage than you otherwise have in PPM Center. You can use the document management module to track, index, and search multiple versions of supporting documents attached to PPM Center entities in HP Demand Management, HP Portfolio Management, HP Program Management, and HP Project Management.

If you plan to use the document management module, you must perform a separate installation. For more information, see the *Document Management Guide and Reference.*

Installing HP Object Migrator or HP GL Migrator

If you are running PPM Center in the Oracle environment, and plan to use HP Object Migrator or HP GL Migrator software, you must consult not only the installation instructions in this document, but also the instructions in the HP Object Migrator or HP GL Migrator documentation.

For information about the HP Object Migrator and the HP GL Migrator, see the *HP Object Migrator Guide* and the *HP GL Migrator Guide,* respectively.

Installing an HP Deployment Management Extension

If you purchased an HP Deployment Management Extension, be sure to consult not only the installation instructions in this document, but also the instructions in the HP Deployment Management Extensions documentation.

To complete an Extension installation successfully, you must ensure that you have the required system privileges. For information about these privileges, and how to grant them, see *Key Decisions* on page 40.

Obtaining License Keys

Make sure that you have purchased the HP products you intend to install (you can purchase and install additional products later), and that you have obtained the required license file for the purchased version. PPM Center license keys are delivered in the `license.conf` file, which you can find in the `<PPM_Home>/conf` directory after installation.

Checking System Requirements

Before you start to install PPM Center, make sure that your system environment meets all the requirements. For information about the system requirements, see the *System Requirements and Compatibility Matrix*. For information on how to access this and other PPM Center documents, see *Accessing PPM Center Documentation* on page 18.

Appendix C, *Preinstallation Checklists,* on page 367 provides checklists that include all of the preliminary tasks you must perform on your network, the PPM Server(s), the database server, and PPM Center clients. HP recommends that you use these checklists to track the tasks that you must perform before you start to install PPM Center.

Key Decisions

This section addresses several decisions you must make before you begin to install your PPM Center products.

Table 3-1. Decisions to make before you install (page 1 of 2)

Decision	What to Consider
When do I configure the PPM Server?	Before you can start the PPM Server, you must configure it. The installer prompts you for several server parameter values. If you do not configure during installation, the installer saves the values you provide to the server configuration file, and you can complete server configuration after installation, without having to re-enter the values. If the server information you provide (for example, valid port numbers) is unavailable during installation, you might have to configure the server after installation. For instructions, see *Configuring or Reconfiguring the Server* on page 79.
When do I create the database schemas?	The PPM Server requires two database schemas to store application data. You can create these schemas before you install PPM Center, or you can create them automatically during installation. To create the schemas before installation, follow the instructions provided in *Creating the Database Schemas* on page 57. If you set up the schemas before installation, the installer populates them with the entities and data required to run the PPM Server.
When do I set up grants to the database schema?	To improve PPM Center performance, the installer rebuilds statistics for the Oracle optimizer during installation. You cannot successfully complete the installation until you grant privileges and rebuild the statistics.

Table 3-1. Decisions to make before you install (page 2 of 2)

Decision	What to Consider
What privileges do I grant the database schema user?	To rebuild the statistics, the PPM Center database schema user must be granted the following privileges (as SYS DBA on Oracle): • `grant select on v_$parameter to <PPM_Schema>` • `grant select on v_$mystat to <PPM_Schema>` • `grant select on v_$process to <PPM_Schema>` • `grant select on v_$session to <PPM_Schema>` • `grant execute on dbms_stats to <PPM_Schema>` If you have access to SQL*Plus, you can run the script `sys/GrantSysPrivs.sql` (located in the `<PPM_Extract>/mitg750/sys` directory), which grants all required privileges for you. You can run the script before installation (as SYS DBA) or during installation. If you are logged on as SYS DBA, you can run the script after installation. In this case, the installer does not gather statistics or install Best Practices.
Do I run the install program in graphic mode or in console mode?	On Windows platforms, you can only install the PPM Server in graphic (or *swing*) mode. On UNIX platforms, you can either install the PPM Server in graphic mode or in console mode (from the command line).

About PPM Center Best Practices Installation

In addition to installing the foundation product, the database, and the application server (PPM Server), you can install Best Practices on your system. Best Practices provides you with experience-derived information and advice on how to configure and use HP Portfolio Management and HP Program Management.

Best Practices Content

HP Project Management and HP Portfolio Management access the request type content installed as part of Best Practices. This includes HP-supplied menu items that attempt to access these request types. *Table 3-2* lists the Best Practices request types and their associated workflows, and provides descriptions of the product functionality they provide.

HP Demand Management and HP Portfolio Management Best Practices content also includes scripts that populate the Default Demand Set and Default Scoring criteria information.

Requirements for Installing Best Practices

You can install Best Practices if *all* of the following conditions are met:

- You have Oracle SYS DBA privileges.
- You have licenses for both the HP Portfolio Management and HP Program Management.

For detailed instructions on how to install Best Practices separately, see *Installing HP Project and Portfolio Management Best Practices* on page 72.

The Best Practices content supplied with this version of PPM Center includes the request types and workflows listed in *Table 3-2* and *Table 3-3*.

In order for PPM Center software to function correctly, Best Practices request types must be installed on your system and correctly associated with the menu items and project types.

Table 3-2. Best Practices request types (page 1 of 3)

Best Practices Request Type	Description	Menu Selection	Field Groups
PFM - Proposal	Represents a project proposal within the HP Portfolio Management module.	Main menu: Portfolio Management > Create a Proposal	PFM Proposal
PFM - Asset	Represents the ongoing costs and maintenance of the result of a project in the HP Portfolio Management system.	Main Menu: Portfolio Management > Create an Asset	PFM Asset
PFM - Project	Represents data and process associated with project. This request type is connected to a project type.	No direct access. The request type must be connected to a project type.	PFM Project
Project Issue	Represents issues that are associated with a project.	Main menu: Project Management > Search Project Issues Project Management > Submit a Project Issue Program Management > Issues > Search Project Issues Also associated with a project type to enable creating from within the Project Overview page.	• Project Reference • Project Issue

Table 3-2. Best Practices request types (page 2 of 3)

Best Practices Request Type	Description	Menu Selection	Field Groups
Project Risk	Represents risks associated with a project.	Main Menu: Project Management > Search Risks Project Management > Submit a Risk Program Management > Issues > Search Risks Also associated with a project type to enable creating from within the Project Overview page.	• Project Reference • Project Risk
Project Scope Change Request	Represents scope changes associated with a project.	Main Menu: • Project Management > Search Scope Changes • Project Management > Submit a Scope Change • Program Management > Scope Changes > Search Scope Changes Also associated with a project type to enable creating from within the Project Overview page.	• Project Reference • Project Scope Change
Program Issue	Represents issues associated with a program.	Main Menu: Program Management > Issues > Search Program Issues Program Management > Issues > Submit a Program Issue	• Program Issue • Program Reference

Table 3-2. Best Practices request types (page 3 of 3)

Best Practices Request Type	Description	Menu Selection	Field Groups
DEM - Application Enhancement	Used to request new functionality in IT current applications.	Main Menu: Demand Management > Create a Request	• Demand Management SLA Fields • Demand Scheduling Fields
DEM - Database Refresh	Database refresh requests can be made for all IT Ops applications in the testing phase. Standard IT Ops service levels apply.	Main Menu: Demand Management > Create a Request	• Demand Management SLA Fields • Demand Scheduling Fields
DEM - Application Bug	Used to report problems in current IT applications.	Main Menu: Demand Management > Create a Request	• Demand Management SLA Fields • Demand Scheduling Fields
DEM - Initiative	Used to request key projects for future quarters. Provided approval from key stakeholders, initiative requests are reviewed in the third week of each quarter.	Main Menu: Demand Management > Create a Request	• Demand Management SLA Fields • Demand Scheduling Fields

You can create your own versions of the Best Practices request types by adding the appropriate field group, and then either editing the menu XML files or associating the request type with the project type (for Project Issue, Project Risk, and Project Scope Change).

Table 3-3 lists the functionality that Best Practices workflows content enabled in this version of PPM Center.

Table 3-3. Best Practices workflows

Best Practices Workflow	Description
PFM - Proposal	HP Portfolio Management process for requesting a new project.
PFM - Asset	HP Portfolio Management process for an asset life cycle.
PFM - Project	HP Portfolio Management process for a project life cycle.
DEM - Enhancement Request Process	HP Demand Management process for enhancement requests for new functionality in applications.
DEM - Database Refresh	HP Demand Management process for database refresh requests.
DEM - Bug Request Workflow	HP Demand Management process for application bug requests.
DEM - Project Initiative Process	HP Demand Management process for initiative requests for key projects.
Risk Management Process	Automated process for risk management.
Scope Change Request Process	Automated scope change request process with three levels of severity.
Issue Management Process	Automated process for issue management.

Preparing to Install PPM Center

Before you start to install PPM Center, complete the following tasks:

1. Check the *System Requirements and Compatibility Matrix* to make sure that your system meets *all* of the minimum requirements.
2. Ensure that you have at least 300 MB temporary space and 0.5 to 1 GB swap space on your operating system.
3. Set several Oracle database parameters to the values recommended for the system environment and optimum system performance. For details, see *Configuring or Reconfiguring the Database* on page 93.
4. Collect the information required for installation.

   For information about what information is required, see *Collecting Required Information* on page 49.
5. Obtain the installation files, and save them to a temporary directory (`<PPM_Extract>`).

   The placeholder `<PPM_Extract>` represents the root directory to which you save the installation files. The name and location of this directory are up to you.
6. Install the JDK.

   For information on which version of the JDK to install, see the *System Requirements and Compatibility Matrix*. For information on how to install the JDK, see *Installing the Java Development Kit (JDK)* on page 53.
7. Verify that the `JAVA_HOME` environment variable is set.
8. Verify that the `ORACLE_HOME` environment variable is set.

   To set the `ORACLE_HOME` environment variable, you must have Oracle client installed on the server machine.

To install PPM Center and maintain the system after installation, you must create a system user. After you do, always log on to the server machine as this user to perform any PPM Server maintenance—for example, stopping and restarting the PPM Server. This helps to avoid file system permission issues, which can be difficult to track.

9. Create a PPM Center user.

   To create PPM Center users, you must have the Demand Management User Administration License. For instruction on how to create a PPM Center user, see *Creating a PPM Center User* on page 56.

10. Set up the Oracle tablespaces required to create the schemas and database objects.

    To create schemas and database objects, you must first create the data, index, and character large object data type (CLOB) tablespaces.

11. Set the Oracle database parameter `NLS_LENGTH_SEMANTICS` value to `CHAR`.

    After you set `NLS_LENGTH_SEMANTICS` to `CHAR`, the `VARCHAR2` columns in tables use character-length semantics. This means that if, for example, you declare a column as `VARCHAR2(30)`, the column stores 30 characters, and not 30 bytes. In a multi-byte character set, this ensures that adequate space is available.

    If you are using a single-byte character set, setting `NLS_LENGTH_SEMANTICS` to `CHAR` makes it easier to transition to a multi-byte character set later.

12. Verify that the required ports are open through the firewall and that other applications are not using them.

The following sections provide detailed information about each of these tasks.

The placeholder <*PPM_Home*>, which is used throughout this document, refers to the root directory where PPM Center is installed. The name and location of this directory are up to you.

Do not unzip the installation files in your <*PPM_Home*> directory—instead, choose a temporary directory in another location. The directory to which you extract the installation files is referred to in this document as <*PPM_Extract*>.

For checklists that include all of the preliminary tasks you are required to perform on your network, the PPM Server(s), the database server, and PPM Center clients, see *Preinstallation Checklists* on page 367. HP recommends that you use these checklists to track the tasks that you must perform before you start to install PPM Center.

After you complete the checklists, give them to your HP Professional Services representative. The checklists will help your representative make the necessary preparations and speed up installation.

Collecting Required Information

The PPM Center installer prompts you to enter several parameters values that are used to create and configure the PPM Server. The installer validates each value you enter before it continues the installation. *Table 3-4* lists the information required for installation.

Table 3-4. Required installation information (page 1 of 4)

Prompt	Description
Install Location	Directory in which the PPM Server is to be installed and configured. If the directory does not exist, the installer creates it. The directory path cannot contain spaces.
License Configuration File	This file contains valid PPM Center license keys. The PPM Server is enabled by license keys provided in a `license.conf` file, which you must obtain before installation. If you do not have a valid `license.conf` file, contact HP Software Support Web site (hp.com/go/hpsoftwaresupport).
JAVA_HOME	On Windows and UNIX systems, the directory in which Java is installed. On UNIX systems, this environment variable is set in the profile file (a `*.profile` or `*.cshrc` file) of the user who is installing PPM Center. Windows example `C:\j2sdk1.5`
ORACLE_HOME	Specify the home directory for the Oracle client tools on the PPM Server machine. The directory path cannot contain spaces.

Table 3-4. Required installation information (page 2 of 4)

Prompt	Description
SQL*PLUS	Location of the SQL*Plus utility. SQL*Plus is not required for installation, but is required for the PPM Server. Example `C:\Oracle\bin\sqlplus.exe` If the `ORACLE_HOME` environment variable is set, then this parameter is detected automatically.
System Password	If you create database users during installation, use your system password.

Table 3-4. Required installation information (page 3 of 4)

Prompt	Description
Database Access Information	In addition to installing the PPM Center file system, the installer can create and populate the database schemas needed to store application data. To access the database, the installer prompts you for a user name and password, and the valid components of a JDBC URL. If you want the installer to create the database schemas, you must provide the system user name and password. If you created the database schemas before installation, you provide the PPM Center database schema user name and password. The PPM Server uses the JDBC URL to connect to the Oracle database. The URL short format is `jdbc:oracle:thin:@<Host_Name>:<Port>:<SID>` where • *<Host_Name>* is the host name or IP address of the computer running the database • *<Port>* is the port number that SQL*Net uses to connect to the database. Its value is typically 1521. To get the actual value, look at the corresponding entry in `tnsnames.ora` • *<SID>* is the security identifier of the database. This is usually identical to the database connect string. If it is different, an extra parameter is required. For Oracle Real Application Clusters (RAC), the `JDBC_URL` parameter must contain the host and port information for all databases to which the PPM Server is to connect. Following is an example of database access information used to allow the PPM Server to communicate with databases on two servers named Jaguar1 and Jaguar2: `jdbc:oracle:thin:@(DESCRIPTION=(ADDRESS_LIST=(ADDRESS=(PROTOCOL=TCP) (HOST=jaguar1) (PORT=1521)) (ADDRESS=(PROTOCOL=TCP) (HOST=jaguar2)(PORT=1521))) (CONNECT_DATA=(SERVICE_NAME=J920)))`
PPM Center Schema	If you create the database schema during installation, supply the user name and password for the PPM Center database schema.
Reporting Meta Layer Schema	Username and password for the PPM Center Reporting Meta Layer (RML) schema.

Table 3-4. Required installation information (page 4 of 4)

Prompt	Description
Tablespaces	Data, index, and character large object data type (CLOB) tablespaces of the Oracle database. These are required to create schemas and database objects.
Windows Service Name	Name of the Windows service for the PPM Server. The installer prefixes the service name with “HP PPM” to identify it. The installer also uses the service name to create the **Start** menu item.
Holiday Schedule	Holiday schedule on which the PPM Center regional calendar is to be based. If you choose **None,** a new calendar with no holidays is set as the system default regional calendar, which you must name in the System Calendar prompt.
System Calendar	If you specify a Holiday Schedule value of **None,** the name of the system default regional calendar. **Note:** PPM Center supports the configuration of flexible budget periods. After you install PPM Center, you can define your organization's fiscal year, change month boundaries, and generate periods. For information about this functionality, see the *HP Portfolio Management Configuration Guide.*
Currency Code	Three-letter code for the default currency. The system default is US dollars (USD). For information on currency codes for other countries, see the *HP Financial Management User’s Guide.* **Warning:** Once you choose your currency during installation, you cannot change it.
Region Name	Name of the region for the installation, which is defined by a combination of calendar and currency. If your organization operates in only one region, use “Enterprise” or your company name.
Configure Server	If you answer **Yes** to this prompt, a wizard prompts you for values for the required (also called “standard”) set of server configuration parameters. You can configure the server now or later. *Table A-1* on page 282 lists the server configuration parameters. Required parameters are marked with an asterisk.

Unzipping the Installation Files

Before you run the installation driver script, extract your installation files for the PPM Center software to the <*PPM_Extract*> directory. The extraction procedure creates a new subdirectory named `mitg750`. Run the extraction command in a directory other than the <*PPM_Home*> directory.

Installing the Java Development Kit (JDK)

Because the PPM Server is based on Java, the machine that hosts it must also host a Java Virtual Machine (JVM), which is part of the Java Development Kit (JDK). JDKs native to the operating systems supported by PPM Center are available from either Sun Microsystems or from the operating system vendor.

You must install the complete JDK. The Java Runtime Environment (JRE) alone is not supported.

For a list of required JDKs, see the *System Requirements and Compatibility Matrix*. For information on how to access this and other PPM Center documents, see *Accessing PPM Center Documentation* on page 18.

To install the JDK:

1. Download the JDK for your operating system from the Javasoft Web site or from your operating system vendor's Web site.

   Example

   java.sun.com

2. Install the JDK according to the instructions provided by the vendor.

   Many operating systems require that you apply operating system–specific patches before you install the JDK. Make sure that you follow all instructions that the vendor provides.

Some vendors provide custom installation packages that you can install automatically using a command such as `pkgadd`. Other vendors provide a TAR file that you must extract.

The directory path name must not contain spaces.

3. Verify that your user name has the Java executable in its path by logging on and running the following the command:

   ```
   java -version
   ```

   This returns the Java version. If an error message is displayed, modify the path environment variable, as required.

For information on supported JDK software, see the *System Requirements and Compatibility Matrix.*

4. Verify that the `JAVA_HOME` environment variable is set correctly. If the path set for `JAVA_HOME` is not correct, set it to the correct value.

For information about how to check for and set the `JAVA_HOME` environment variable, see *Verifying that the JAVA_HOME Environment Variable Is Set*.

Verifying that the JAVA_HOME Environment Variable Is Set

PPM Center requires that you set `JAVA_HOME` in the system environment of the user account to be used to start the PPM Server. It is important that the `JAVA_HOME` environment variable be set for the same shell and user who runs the installation.

Determining the JAVA_HOME Value in DOS

To determine the `JAVA_HOME` value in DOS, at the command line, type **`echo %JAVA_HOME%.`**

Determining the JAVA_HOME Value in UNIX

To determine the `JAVA_HOME` value in a UNIX shell (SH, BASH, or KSH), at the UNIX prompt, type **`echo $JAVA_HOME.`**

Setting the JAVA_HOME Value in Windows

To set the value of `JAVA_HOME` in Windows:

1. Open the Control Panel.
2. Open the System Properties window.
3. Click the **Advanced** tab.
4. Click **Environment Variables.**
5. Under **System Variables,** click **New.**

   The New System Variable dialog box opens.
6. In the **Variable name** field, type **`%JAVA_HOME%`.**
7. In the **Variable Value** field, type the full Java install directory path.
8. Click **OK.**
9. Click **OK.**

Setting the JAVA_HOME Value in DOS

To set the value of `JAVA_HOME` in DOS, run the following:

```
set JAVA_HOME=<JVM_Install_Directory>
```

Setting the JAVA_HOME Value in UNIX

To set the value of `JAVA_HOME` in UNIX using the Bourne shell (SH, BASH, or KSH), run the following:

```
JAVA_HOME=<JVM_Install_Directory> export JAVA_HOME
```

Creating a PPM Center User

To install PPM Center and maintain the system after installation, you must create a system user. After you do, always log on to the server machine as this user to perform any PPM Server maintenance—for example, stopping and restarting the PPM Server. This helps to avoid file system permission issues, which can be difficult to track.

Configuring a PPM Center User in Windows

In Windows, configure the user to be a member of the Administrators and Domain Users groups, at a minimum. Provide the user with full access to the installation directory for PPM Center and all of its subdirectories. Provide the Administrators screen group with at least read access to these directories.

Configuring a PPM Center User in UNIX

In UNIX, PPM Center does not require root access for installation. Do not install the server as the root user.

Configure your PPM Center user with the following:

- In the `.profile` file, set the `JAVA_HOME` environment variable.
- In the `.profile` file, set the `ORACLE_HOME` environment variable.
- Set the term to dumb option.

Installing a UNIX Emulator and Telnet Server (Windows)

To run PPM Center on Microsoft Windows, you must have a UNIX emulator such as Cygwin, and a Telnet server such as Microsoft Telnet. For a list of supported UNIX emulators and Telnet servers, see the *System Requirements and Compatibility Matrix*.

To configure private key authentication with secure shell (see *Configuring Private Key Authentication with Secure Shell* on page 84), you use the ssh-keygen utility, which is part of the Cygwin installation. To get this utility, you must enable the Open SSH components during Cygwin installation.

Creating the Database Schemas

To create the empty database schemas (with tables to be populated during installation):

1. Set up the required data, index, and CLOB tablespaces for the PPM Center database schema.

For information on the minimum size recommended for these tablespaces, see the *System Requirements and Compatibility Matrix.*

Use locally-managed SYSTEM tablespaces with automatic segment-space management.

Locally-managed tablespaces eliminate extent fragmentation and provide better performance than dictionary-managed tablespaces.

2. Create each tablespace as shown in the following example for a data tablespace.

```
CREATE TABLESPACE <PPM_Data>
datafile <'/u0/oracle/oradata/G1010/ppm_data01.dbf'>
size <1024m>
AUTOEXTEND ON MAXSIZE <4096m>
EXTENT MANAGEMENT LOCAL AUTOALLOCATE
SEGMENT SPACE MANAGEMENT AUTO;
```

3. Generate at least one rollback segment for each tablespace and use an undo tablespace.

   These rollback segments must reside in a separate tablespace reserved for rollback segments. Generate them with the `OPTIMAL` size constraint so that the rollback segments automatically deallocate space as it becomes free.

In Oracle 10g undo management is automated. However, it is not automated In Oracle 9i, so you must set it.

4. Generate unlimited quota on the data, index, and CLOB tablespaces for PPM Center.

Oracle has the default TEMP tablespace, which you can resize to improve performance.

The PPM Server requires two separate database schemas to store application data. A DBA can create these schemas before installation. Creating database schemas requires privileges that a DBA might not want to grant to a PPM Center administrator. Either create the database schemas before installation or make sure that a DBA is available during installation.

To create the database schemas and grant the permissions between them:

1. Unpack the PPM Center installation bundle as outlined in *Installing PPM Center* on page 61.

   The `<PPM_Extract>/mitg750` directory is created. The `<PPM_Extract>mitg750/sys` and `<PPM_Extract>/mitg750/system` directories contain the scripts required to create the database schemas.

2. Run the script `CreateKintanaUser.sql` (located in `<PPM_Extract>mitg750/system`) against the database into which you plan to install PPM Center.

   The script prompts for a user name and password, and the tablespaces that the PPM Center database schema are to use.

   ```
   sh> sqlplus system/<Password>@<SID> \
   @CreateKintanaUser.sql \
   <PPM_Username> \
   <Password> \
   <Data_Tablespace> \
   <Index_Tablespace> \
   <CLOB_Tablespace>
   ```

3. Run the `CreateRMLUser.sql` script, which is located in the `/system` directory.

   The script prompts for a user name and password for the Reporting Meta Layer (RML) schema, tablespace information, and the PPM Center database schema user name. The script creates the RML schema and establishes the permissions between the RML and the PPM Center database schema.

Because the RML schema contains only views (and no physical objects), it does not require a separate tablespace.

```
sh> sqlplus system/<Password>@<SID> \
@CreateRMLUser.sql \
<RML_Username> \
<RML_Password> \
<Data_Tablespace> \
```

4. As the SYS DBA user, run the `GrantSysPrivs.sql` script, which is located in the `<PPM_Extract>/mitg750/sys` directory.

   This script grants the privileges that the PPM Server requires.

If you created the schemas before installation, select **Please use existing schemas** when prompted during installation. Supply the same values as those used in this procedure (that is, the values `<PPM_Username>` and `<RML_Username>`).

Verifying Port Availability

To successfully install and configure PPM Center, specific ports must be available through the firewall. To expedite installation, make sure that the ports are available before you start to install the product. *Table 3-5* contains summary information about the ports and protocols that PPM Center system components use to communicate.

If you are using an external Web server, you must assign it a port number other than the one assigned to the internal Web server.

Table 3-5. Summary of PPM Center ports and protocols (page 1 of 2)

Communication Channel	Protocols	Ports
Web Browser <—> Web Server	HTTP/HTTPS	80/443 (configurable)
	If you do not use the default port, you must specify the port number in the URL. Example: `http://Xyz.com:<Port>` You may also be required to open the firewall for ports other than the defaults. On UNIX systems, only processes started by the root user can be assigned a port number that is less than 1024.	
PPM Workbench <—> App Server	RMI / SRMI	1099 (configurable)
External Web Server <—> App Server	AJP13	8009 (configurable)
App Server <—> Database	JDBC	1521 (configurable)
App Server <—> Mail Server	SMTP	25
App Server <—> LDAP Server	LDAP	389
App Server <—> LDAP Server	LDAP over SSL	636
App Server <—> External System	Telnet	23

Table 3-5. Summary of PPM Center ports and protocols (page 2 of 2)

Communication Channel	Protocols	Ports
App Server <—> External System	SSH	22
App Server <—> External System	FTP (control)	21
App Server <—> External System	FTP Data	Dynamic
App Server <—> External System	SCP (Secure Copy)	22

Installing PPM Center

This section provides the detailed steps used to install the database objects and data that the PPM Server uses. You can perform these steps on any computer (running UNIX or Windows) that has SQL*Net connected to the database on which the PPM Center database objects are to be installed.

Ensure that you have at least 300 MB temporary space and 0.5 to 1 GB swap space available on your operating system.

Installing PPM Center on Windows

The installation utility for a Windows server is an executable file that performs the steps required for a basic server installation. The executable and supporting files are contained in a Zip file. The typical installation automatically installs the following components on the server:

- PPM Center program files
- PPM Center database objects
- Start menu item
- Windows service

You cannot install PPM Center unless you have SYS DBA privileges or a DBA has already created the required schemas. For more information, see *Key Decisions* on page 40.

To install the PPM Server on Windows:

1. Ensure that you have a UNIX emulator (such as Cygwin) and a Telnet server (such as Microsoft Telnet) installed.

   For a list of supported UNIX emulators and Telnet servers, see the *System Requirements and Compatibility Matrix.*

   To configure private key authentication with secure shell (see *Configuring Private Key Authentication with Secure Shell* on page 84), you use the ssh-keygen utility, which is part of the Cygwin installation. To get this utility, you must enable the Open SSH components during Cygwin installation.

2. Extract all files from `mitg-750-install.zip` to the file system.

   The extraction creates the `<PPM_Extract>` `mitg750` directory, which includes the `install.exe` file, JAR files, a `system` directory, a `sys` directory, various scripts, and more.

3. Locate, and then double-click the `install.exe` file.

   The installer prompts for the directory for the software installation (the `<PPM_Home>` directory). You can specify any install path.

4. Provide all required information as the installer prompts you for it (see *Collecting Required Information* on page 49).

   After you provide all required information, the installer installs the PPM Center files and configures the database. Status bars indicate installation progress. An installation summary page displays any problems encountered during installation.

   After successful installation, PPM Center is installed as a Windows service. You can view the properties for this service through the Services Control Panel item.

5. To complete the service setup:

   a. Open the Control Panel.

   b. Double-click **Administrative Tools.**

   c. Double-click **Services.**

d. Right-click the PPM Center service name, and then click **Start** on the shortcut menu.

   HP recommends that you set the startup type to **Automatic** so that the PPM Server restarts automatically after the computer is restarted. If you have generated a custom PPM Center user (as recommended), specify this user name for the "Log On As" value.

e. Close the Administrative Tools window.

6. Click **Save.**

An item that corresponds to the Windows service name that you specified during installation is added to the **Start** menu. The menu provides links to PPM Center documentation and an uninstall program.

If you did not configure the PPM Server during installation, see *Configuring or Reconfiguring the Server* on page 79.

Do not map the <*PPM_Home*> directory so that it is accessible from an external Web server. This introduces a potential security risk. HP recommends that you use the HP-supplied Web server, unless you have the special requirements described in *Single-Server/External Web Server Configuration* on page 27.

Installing PPM Center on UNIX

To install the PPM Center on UNIX:

1. To extract the files into an empty directory from the download bundle, at a command prompt, type one of the following.

   `unzip mitg-750-install.zip`

   Alternatively,

   `jar xvf mitg-750-install.zip`

   All the files and scripts required for PPM Center installation are extracted (to <*PPM_Extract*>). The installer prompts for the software install directory. You can specify any directory for installation.

The <*PPM_Extract*>/mitg750 directory that results from the extraction contains the following:

- The install.sh shell script
- Several JAR files
- A system directory
- A sys directory

2. To start the installation, run the installation script (as the SYSTEM user) and specify the installation mode.

   Example

   ```
   sh ./install.sh [-swing|-console]
   ```

   where

   -swing — Swing mode is an interactive, GUI-based installation mode. This mode, requires an X Window session. A wizard guides you through the installation steps.

   -console — Console mode is an interactive command-line mode. In this mode, the installation script runs within the terminal session and you respond to the prompts.

Running the install.sh shell script is not supported on Windows operating systems, even with a UNIX emulator such as Cygwin.

The installation script performs the following actions:

- Prompts for information required to install the server (see *Collecting Required Information* on page 49).
- Generates all database tables in the specified tablespace.
- Creates all database objects (indexes, packages, views) and application data.
- Generates password security keys.

- Generates the server configuration file.
- Rebuilds statistics for the Oracle optimizer. This is done to optimize system performance. For the installation procedure to perform this step, the following grants to the schema must be in place:
  - `grant select on v_$parameter to <PPM_Schema>`
  - `grant select on v_$mystat to <PPM_Schema>`
  - `grant select on v_$process to <PPM_Schema>`
  - `grant select on v_$session to <PPM_Schema>`
  - `grant execute on dbms_stats to <PPM_Schema>`

  The `GrantSysPrivs.sql` script (located in the `<PPM_Extract>/mitg750/sys` directory) performs these required grants.

  To run this script, you must have SYS DBA privileges.
  You cannot run PPM Center until the grants are in place.

  If you did not run the `GrantSysPrivs.sql` script before you started installation, do it now (with SYS DBA access).

HP recommends that, after you install PPM Center, you change the password for the administrator user.

Configuring the FTP Server on Windows

PPM Center uses FTP to move files between machines. To transfer files between machines on a network, each source and destination machine must be running an FTP server. On UNIX platforms, this is standard functionality, but machines running Windows require additional FTP server configuration to function with PPM Center.

Before you configure the FTP server on a machine, make sure that the Windows user account (which PPM Center uses to open a connection) has access to the directories to which files will be moved. Some FTP servers

require that you map these directories to FTP aliases, and a configuration utility is usually provided for this (for example, for Microsoft IIS, the utility is Internet Services Manager).

On Windows, most FTP servers, including Microsoft IIS, do not support drive letters. If you use FTP in PPM Center, the drive letter is removed from the base path. If your base path is `d:\ppm750`, then FTP tries to start from the ftp root directory and FTP fails.

To work around this, you must create an FTP alias. (For example, map `/ppm750` to `D:\ppm750`.) This way, FTP and Telnet point to the same disk location.

Configure the FTP server according to directions that the vendor has provided. For the File and Directory Chooser components to work, you must set the FTP server directory listing style to UNIX, and not to MS-DOS.

To set the directory listing style to UNIX:

1. In Windows, open the Internet Services Manager.
2. In the left pane, under **Console Root,** open the Internet Information Server.
3. Select the machine name.
4. Right-click the Default FTP site displayed in the right pane, and then click **Properties** on the shortcut menu.

   The Default FTP Site window opens.
5. Click the **Home Directory** tab.
6. Under **Directory Listing Style,** click **UNIX.**
7. Click **OK.**

To test the connection, try to open a session manually. If you can open an FTP session and navigate from one directory to another, then PPM Center can do this too.

Verifying the Installation

To verify the installation:

1. Check the logs produced during installation.
2. Log on to PPM Center.
3. Start the PPM Workbench.
4. Run a report.
5. Create a request.
6. Test the graphical view of the request.

If you encounter a problem that you cannot solve, contact HP Software Support Web site (hp.com/go/hpsoftwaresupport).

Contacting Support

If you encounter problems with your installation or if have questions, contact HP Software Support Web site (hp.com/go/hpsoftwaresupport). Before you contact HP-Mercury support, have the following information ready:

1. Open the `ppm_install.log` file (located in the `<PPM_Home>` directory) in a text editor such as Notepad.

   This file provides information about what part of the installation failed.

2. Search the `mitg_install.log` file for an error message that is specific to installation failure.

3. Place all of the files in the `<PPM_Home>/Install_750/logs` directory in a compressed file.

   The installation utility creates a separate log directory for each installation attempt. In the most recent directory, examine each file to determine exactly where the PPM Server has failed. The log file contains information about which failed action it attempted.

Installing Service Packs

HP occasionally delivers product service packs to licensed PPM Center customers. You can use the `kDeploy.sh` script (a command-line tool) to install service packs.

To install a service pack, you must ensure that you have the required system privileges. For information about these privileges, and when to grant them, see *Key Decisions* on page 40.

PPM Center service packs are distributed as deployments. Deployments are software bundles that contain files and data, and are in the following format.

`mitg-<Ver>-<ID>[.#].jar`

where

`<Ver>` represents the PPM Center version for which you can install the service pack

`<ID>` represents the unique identifier for service pack

`[.#]` represents an optional revision number for the deployment, and may not be included in the deployment name.

Example

To install Service Pack 1:

1. Back up your database.
2. Stop the PPM Server.

   You cannot install the service pack on an active server. For information about how to start and stop the server, see *Starting and Stopping the PPM Server* on page 75.
3. Run the following command:

   ```
   sh ./kDeploy.sh -i SP1
   ```
4. As the script runs, respond to the prompts.

5. Start the PPM Server.

To obtain a list of all service packs applied to your PPM Center instance, run the command `sh ./kDeploy.sh -l`.

For more information about the `kDeploy.sh` script, see *kDeploy.sh* on page 355.

Handling Backup Files Related to Service Pack Installation

During a service pack installation, the installer backs up all of the existing files that are to be replaced. After multiple service pack installations, the backup files can take up significant space.

Eventually, the backed up files can consume so much space that service pack installation fails. To prevent this from occurring, do one of the following:

- Use the `kDeploy.sh` script to install service packs without creating backup files.

  Example

  To install Service Pack 3 without creating a backup, run the script as follows:

  ```
  sh ./kDeploy.sh -i SP3 -B
  ```

- Specify that backed up files are deleted after service pack installation. To do this, run the `kDeploy.sh` script, as follows:

  ```
  sh ./kDeploy.sh -tidy
  ```

Contacting Support

If problems occur during service pack installation, go to the HP Software Support Web site (hp.com/go/hpsoftwaresupport).

Installing Language Packs

After you install PPM Center, you can apply a foreign language pack to replace the English language text in the user interface with text in a different language. Language pack are available in French, Italian, German, Spanish, Brazilian Portuguese, and Korean versions.

System Requirements for Language Pack Deployment

The requirements for language pack deployment are as follows:

- You must deploy the language pack on top of a clean installation of the English version of PPM Center.
- Before you apply the language pack, set the following Oracle database properties:
  - `NLS_LENGTH_SEMANTICS = CHAR`
  - `NLS_CHARACTERSET = UTF8`
  - `NLS_NCHAR_CHARACTERSET = UTF8`

Installing a Language Pack

To install a language pack:

1. Install PPM Center on an English language operating system.
2. Copy the `PPM_750_LP_<LP>.jar` file to `<PPM_Home>`, where `<LP>` represents one of the following language codes:
   - fr (French)
   - it (Italian)
   - de (German)
   - es (Spanish)
   - pt_BR (Brazilian Portuguese)

- ko (Korean)
- tr (Turkish)

3. Extract the JAR file contents to `<PPM_Home>`.

   This copies the individual jars into the `LP` directory and deploys the `kDeploy.sh` script into the `<PPM_Home>/bin` directory).

4. Using either console mode (UNIX) or Cygwin (Windows), navigate to the `<PPM_Home>/bin` directory, and then run the `kDeploy.sh` script as follows.

   ```
   sh ./kDeploy.sh -lang <LP>
   ```

   where `<LP>` is the language code.

5. Follow the script instructions.

6. Restart all PPM Center components on the machine.

Do not install any service packs after you install a language pack. Doing so disables the foreign language user interface and may cause functional problems.

After you install the language pack, you can install Best Practices content just as you would install it over an English language instance. For information on Best Practices installation, see *About PPM Center Best Practices Installation* on page 42 and *Installing HP Project and Portfolio Management Best Practices* on page 72.

Optional Installations

This section provides descriptions of additional products that you can install and set up to work with PPM Center.

Installing HP Project and Portfolio Management Best Practices

HP PPM Best Practices provides customers with experience-derived information and advice about configuring and using HP Portfolio Management and HP Program Management. Best Practices installation places various workflows and request types on your system to help optimize your use of HP Program Management and HP Portfolio Management.

For more information, see *About PPM Center Best Practices Installation* on page 42. Before you start to install Best Practices, ensure that *all* of the conditions described in *Requirements for Installing Best Practices* on page 42 have been met.

To install Best Practices:

1. Start the PPM Server.
2. Run the `kDeploy.sh` script, as follows.

```
sh ./kDeploy.sh -best-practices
```

For more information about the `kDeploy.sh` script, see *kDeploy.sh* on page 355.

Verifying HP Project and Portfolio Management Best Practices Installation

To verify that Best Practices is successfully installed, run the `kDeploy.sh` script, as follows.

```
sh ./kDeploy.sh -l
```

This returns a list of the deployed bundles in an instance.

Installing HP Deployment Management Extensions

If you plan to install an HP Deployment Management Extension, you must do so after you install and configure PPM Center, and before you use PPM Center for processing.

You are not required to stop the PPM Server(s) before you install an Extension. However, HP recommends that you install the Extension when no users are logged on to the system. Consider placing the server in “restricted” mode before you install.

For specific information on how to install an HP Deployment Management Extension, see the documentation for the Extension you purchased.

To install an Extension successfully, you must ensure that you have the required system privileges. For information about these privileges, and how to grant them, see *Key Decisions* on page 40.

What to Do Next

After you have successfully installed PPM Center, delete all subdirectories of the `install_750` directory, except for the `logs` subdirectory.

Proceed to Chapter 4, *Configuring the System,* on page 75.

4 Configuring the System

Starting and Stopping the PPM Server

This section provides information about how to start the PPM Server on a single-server system. For information about configuring and running a clustered configuration, see *Server Cluster Configurations* on page 28 and *Configuring a Server Cluster* on page 131.

Unless otherwise indicated, “the server” refers to the PPM Server, and not the server machine.

Setting the Server Mode

PPM Center supports the following server modes:

- **Normal.** In normal mode, all enabled users can log on, and all services are available, subject to restrictions set in `server.conf` parameters.
- **Restricted.** In restricted mode, the server allows only users with Administrator access granted to log on. The server cannot run scheduled executions, notifications, or the concurrent request manager while in this mode.

  Before you can install an HP Deployment Management Extension, you must set the server to restricted mode.
- **Disabled.** Disabled mode prevents server startup. A server enters disabled mode only after a PPM Center upgrade exits before the upgrade is completed.

Setting the Server Mode with setServerMode.sh

The `setServerMode.sh` script, located in the `<PPM_Home>/bin` directory, sets the server mode in situations where you want to obtain exclusive access to a running server.

To set the server mode using the `setServerMode.sh` script:

1. From the desktop, select **Start > Run.**

   The Run dialog box opens.

2. In the **Open** field, type the following:

   ```
   sh ./setServerMode.sh <Mode_Name>
   ```

   where `<Mode_Name>` represents the `NORMAL, RESTRICTED,` or `DISABLED` server mode.

   Example

   To set the server to restricted mode, in the **Open** field, type:

   ```
   sh ./setServerMode.sh RESTRICTED
   ```

3. Click **OK.**

Setting the Server Mode Using kConfig.sh

You can use the `kConfig.sh` script to set the server mode.

To set the server mode using the `kConfig.sh` script:

1. Run `sh ./kConfig.sh` (located in the `<PPM_Home>/bin` directory).
2. Select **Set Server Mode.**
3. In the list, select **Restricted Mode.**
4. Click **Finish.**

For more information about the `setServerMode.sh` script, see *Setting the Server Mode* on page 75. For more information about the `kConfig.sh` script, see *kConfig.sh* on page 354.

Starting and Stopping the Server on Windows

To start the server on a Windows system:

1. If you are installing one of the HP Deployment Management Extensions, set the server to restricted mode.

   For information about how to set the server mode, see *Setting the Server Mode* on page 75.

2. Open the Control Panel.
3. Double-click **Administrative Tools.**
4. Double-click **Services.**
5. Right-click the name of the PPM Center service, and then click **Start** on the shortcut menu.

   The service name starts with “HP PPM.”

6. If you have installed an Extension, set the server to Normal mode.

   For information about how to set the server mode, see *Setting the Server Mode* on page 75.

If you prefer to use the Windows shell command line to start servers instead of using Windows Services, you can use the `kStart.sh` script.

To stop the server on a Windows system:

1. Open the Control Panel.
2. Double-click **Administrative Tools.**
3. In the Administrative Tools window, double-click **Services.**
4. In the Services window, right-click the name of the PPM Center service, and then click **Stop** on the shortcut menu.

   The service name begins with “HP PPM.”

To help ensure your system operates smoothly, HP recommends that you stop and restart the PPM Server once a month.

Starting and Stopping the Server on UNIX

To start the server on UNIX:

1. If you are installing an HP Deployment Management Extension, set the server to restricted mode.

   For information about how to set the server mode, see *Setting the Server Mode*.

2. Change to the `<PPM_Home>/bin` directory.

3. Run the `kStart.sh` script, as follows.

   ```
   sh ./kStart.sh
   ```

4. If you have installed an Extension, set the server to normal mode.

For more information about `kStart.sh`, see *kStart.sh* on page 360. For information about how to start servers in a cluster, see *Starting and Stopping Servers in a Cluster* on page 142.

To stop the server on UNIX:

1. Navigate to the `<PPM_Home>/bin` directory.

2. Run the `kStop.sh` script as follows.

   ```
   sh ./kStop.sh -now -user <User_Name>
   ```

   Make sure that you type a valid user name that has Administrator privileges.

To help ensure your system operates smoothly, HP recommends that you stop and restart the PPM Server once a month.

For more information about `kStop.sh`, see *kStop.sh* on page 360. For information about how to stop servers in a cluster, see *Starting and Stopping Servers in a Cluster* on page 142.

Configuring or Reconfiguring the Server

If you configured the PPM Server during installation, it is probably not necessary to reconfigure it, unless your environment or requirements have changed. If you did not configure the server during installation, configure it now.

You can perform most of the configuration using the configuration procedure described in the next section, *Standard Configuration*. In some cases, however, configuration requires custom parameters. For information about when and how to configure the server using custom parameters, see *Defining Custom and Special Parameters* on page 81.

The server configuration tool runs in both console and graphical modes. To run in graphical mode in a Windows environment, the tool requires an X Window session.

Standard Configuration

This section provides the steps for standard configuration and all of the settings required for a typical installation.

To configure the PPM Server:

1. From a DOS or UNIX command line, run the `kConfig.sh` script (located in the `<PPM_Home>/bin` directory) as follows.

   - To run the script in graphical mode, type:

     ```
     sh ./kConfig.sh -swing
     ```

     Run this utility in an X Window session.

   - To run the script in console mode (UNIX only), type:

     ```
     sh ./kConfig.sh -console
     ```

2. Follow the configuration wizard prompts to complete the configuration.

   Specify a value for every parameter required for your system environment. To determine the correct value to provide for a parameter, move your cursor over the parameter name and display the tooltip text. For more information, see *Server Configuration Parameters* on page 279.

   All confidential information (such as passwords) is hidden and encrypted before it is stored.

   Do not change default values unless you are sure that the default value does not meet the requirements of your organization.

   Always use forward slashes (/) as a path separator, regardless of your operating system environment. PPM Center automatically uses the correct path separators when communicating with Windows, but expects to read only forward slashes on the configuration file.

   Specify any required parameters on the Custom Parameters page.

3. If you have no custom parameters to add, leave **Custom Parameters** empty. If you require custom parameters, see *Defining Custom and Special Parameters* for instructions on how to specify them.

4. After you finish configuring the server, click **OK.**

   The configuration wizard writes the configuration parameters to the `server.conf` file and generates other files that the PPM Server requires (for example, `jboss-service.xml`).

5. Stop, and then restart the server.

   For information about how to stop and start the server, see *Starting and Stopping the PPM Server* on page 75.

   You can also modify parameters directly in the server configuration file, which is described in Appendix A, *Server Configuration Parameters,* on page 279.

   If you modify parameters directly, be sure to run the script `kUpdateHtml.sh` after you make your changes.

Defining Custom and Special Parameters

In addition to the standard parameters that HP supplies, PPM Center supports two additional kinds of server parameters:

- You can define your own custom parameters.

  Custom parameter names must have the prefix `com.kintana.core.server.`

  Example

  To add a custom parameter named `NEW_PARAMETER`, in the **Key** field, type the following:

  `com.kintana.core.server.NEW_PARAMETER`

  Parameters that you add to the custom parameters list are accessible as tokens from within the application. These tokens are in the format `[AS.parameter_name]`.

- HP has created configuration parameters that you can use in special situations after you add them to the custom parameters folder. *Table 4-1* lists these special parameters.

If you edit the `server.conf` file directly, you must then run the `kUpdateHtml.sh` script to rebuild the startup files. To implement your changes, you must stop, and then restart, the PPM Server. After you restart the server, you can run the Server Configuration Report to view the new or modified parameter values in the `server.conf` file.

Instead of modifying the `server.conf` file directly and then running the `kUpdateHtml.sh` script, you can run the `kConfig.sh` script (located in the `<`*`PPM_Home`*`>/bin` directory). The `kConfig.sh` calls the same Java code that the `kUpdateHtml.sh` does to rebuild the startup files. If you use the `kConfig.sh` script, you are not required to run the `kUpdateHtml.sh` script. However, to apply your changes, you must stop and restart the PPM Server.

For information about the `kConfig.sh` script, see *kConfig.sh* on page 354. For information about the `kUpdateHtml.sh` script, see *kUpdateHtml.sh* on page 362.

Table 4-1. Special configuration parameters

Parameter Name[a]	Description	Sample Value
DB_ CONNECTION_ STRING	If the `JDBC_URL` parameter is specified, then the security identifier (SID) of the database on which the PPM Center schema resides is requested. It is assumed that the connect string for this database is the same as the SID. However, this is not always the case. If the connect string (for connecting to the database using SQL*Plus from the server machine) is different than the database SID, add this parameter and supply the correct connect string.	PROD
NON_DOMAIN_ FTP_ SERVICES	**Windows environment only:** To open an FTP session, FTP servers on Windows typically require the Windows domain name and user name (in the form `Domain\User name`). By default, PPM Center includes the domain name and user name in an FTP session to a Windows computer. If you use an FTP server that does not require the domain name, you can use this parameter to override the default functionality. For more information, contact HP Software Support Web site (hp.com/go/ hpsoftwaresupport).	WAR-FTPD
TEMP_DIR	This parameter defines a PPM Center temporary directory. This defaults to a `temp` subdirectory of the `logs` directory. If you use this parameter, make sure that you provide the full directory path.	`C:/ppm/ logs/temp`

a. The parameter names listed in the table are shortened versions of the actual names, all of which start with the string com.kintana.core.server. For example, the full name of the `TEMP_DIR` parameter is `com.kintana.core.server.TEMP_DIR`.

Enabling Secure RMI (Optional)

To enable SRMI (RMI over SSL):

1. Create a keystore for SSL to use.

   You can use the Java keytool application to create a keystore. For information about the keytool application, see the JDK Tools and Utilities Web site (java.sun.com/j2se/1.5.0/docs/tooldocs/index.html#security).

   Use the keystore password that you use to run keytool to define the `KEY_STORE_PASSWORD` (see step 2).

2. In the `server.conf` file, specify values for the three parameters:

   - `RMI_URL`
   - Set the `KEY_STORE_FILE` parameter to point to the keystore file.
   - Set the `KEY_STORE_PASSWORD` to the keystore password you created in step 1. This password can be encrypted.

Example

If you ran keytool to create the file `security/keystore` relative to the `<PPM_Home>` directory, and you used the password "welcome," ran on host "caboose," and listened on port 1099, your `server.conf` parameters would look as follows.

```
com.kintana.core.server.RMI_URL=rmis://caboose:1099/
KintanaServer
com.kintana.core.server.KEY_STORE_FILE=security/keystore
com.kintana.core.server.KEY_STORE_PASSWORD=welcome
```

You can create a self-signed certificate.

Configuring Private Key Authentication with Secure Shell

This section provides information on how to configure private key authentication with secure shell (SSH). The procedure is based on the following assumptions:

- SSH is installed.
- The SSH server is configured for private key authorization.
- The ssh-keygen utility is part of the Cygwin installation. (To get this utility, you must enable the Open SSH components during Cygwin installation.)

Before you configure private key authentication, do the following:

- Verify that the PPM Center user account can be used to log on to the remote host through the SSH session.
- Add the RSA certificate information of the remote host to the ssh `known_hosts` file, which is located in the `<PPM_Home>` directory.

To add the RSA certificate of the remote SSH host to the PPM Server SSH `known_hosts` file:

1. Log on to the PPM Server as the PPM Center user.
2. From the command line, run the following:

   `ssh <User_ID>@<Remote_Host>`

   The first time you run this command, you are prompted to indicate whether you want to continue.
3. Type **`yes.`**
4. Terminate the SSH connection with the remote host.

To set up private key authentication with SSH:

1. Generate the private/public key pair on the PPM Server.
2. Add the generated public key to the remote `SSH Authorized_Key` file.
3. Configure the PPM Server.

The following sections provide the steps required to perform each of these tasks.

Generating the Private and Public Keys

To generate the private/public key pair on the PPM Server:

1. Log on to the PPM Server machine as the PPM Center user.
2. Change directory to the home directory defined for the PPM Center user on the operating system.
3. Run the following SSH utility.

   ```
   ssh-keygen -t rsa -b 1024
   ```

   PPM Center only supports the RSA key type, and not the DSA key type.

   Do not provide the “passphrase.”

4. Press **`Enter`** twice.
5. Verify that the `<PPM_Home>/<PPM_User>/.ssh` directory now contains the `id_rsa` (the private key) and `id_rsa.pub` (the public key) files.

Adding the Public Key to the SSH authorized_keys File on the Remote Host

To append the public key to the remote SSH `authorized_keys` file (remote hosts):

1. Transfer the `id_rsa.pub` file to the remote SSH host machine, in the `/<PPM_User_Home_Directory>/.ssh` directory as `ppm_id_rsa.pub`.

   On the remote UNIX host, the `.ssh` directory is in the `/home/<PPM_User>/` directory. On Windows, the location depends on the user home directory defined during Cygwin installation.

2. Log on to the remote host with the user ID that the PPM Server is to use to connect.
3. Change directory to the `<PPM_Home>/<User_ID>/.ssh` directory and locate the `authorized_keys` file.

   If the `authorized_keys` file does not exist, create it.

4. Append the contents of the `itg_id_rsa.pub` file to the `authorized_keys` file, by running the command:

   ```
   cat ppm_id_rsa.pub > authorized_keys
   ```

5. Repeat these steps on the PPM Server to allow public key authentication from the PPM Server back to itself.

Configuring the PPM Server

To configure the PPM Server:

1. Open the `server.conf` file in a text editor such as Notepad.
2. Add the following server directive to the file.

   ```
   com.kintana.core.server.SSH_PRIVATE_IDENTITY_FILE=/<PPM_Home>/<PPM_User>/.ssh/id_rsa
   ```

3. Change to the `<PPM_Home>/bin` directory.
4. To update the required startup files, run the `kUpdateHtml.sh` script.

5. Restart the PPM Server.

Verifying Server Configuration

To verify the configuration:

1. Open a command-line window outside of the PPM Server.
2. Log on to the PPM Server machine as the PPM Center user, as follows.

   ```
   ssh <User_ID>@<Remote_Host>
   ```

   You should not be prompted for the password. It should log on to the remote host using the RSA key file.

3. On the PPM Server, log on to PPM Center.
4. From the menu bar, select **Administration > Open Workbench.**

   The PPM Workbench opens.
5. From the shortcut bar, select **Environments > Environments.**

   The Environment Workbench page opens.
6. Click **New Environment.**

   The Environment: Untitled window opens.
7. In the **Environment Name** field, type the name of the remote host.
8. In the **Server** section, do the following:
   a. In the **Name** field, type the remote server name.
   b. In the **Type** list, select the operating system type on the remote server.
   c. In the **Username** field, type the user ID you provided in step 2.
   d. In the **Password** field, click the Password () button.

      The Enter or Change Password dialog box opens.

      The PPM Workbench requires that you provide a password, regardless of whether the authentication uses RSA.

e. In the **Enter New Password** and **Confirm New Password** fields, type the password for the user ID you provided in step 2.

f. Click **OK.**

g. In the **Base Path** field, type the base path.

h. In the **Connection Protocol** list, select **SSH2.**

i. In the **Transfer Protocol** list, select **Secure Copy 2.**

9. Clear the **Enable Client** and **Enable Database** checkboxes.

The user name specifies the user ID to be used to log on to the destination SSH server. The Environment Checker requires the password. Package line uses the public key file for authentication.

10. Click **Save.**

11. At the bottom left of the window, click **Check.**

    The Check Environment window opens.

12. In the left pane, expand the **Server** folder, and then click **SSH2 Server.**

13. Click **Check.**

In the left pane, an icon to the left of the selected server indicates whether the check succeeded or failed. The right pane displays the details.

Generating Password Security (Optional)

For password security, PPM Center uses a client/server encryption model based on the ElGamal algorithm, which generates a public/private key pair. Passwords are encrypted using the server's public key. Only the server can decrypt the data using the private key. The client application does not have access to decrypted data.

The public and private keys, which are generated during PPM Center installation, reside in `<PPM_Home>/security`. Generate the key pair only once, unless you think that server security has been breached. In that case, regenerate the key pair and reencrypt all passwords.

To regenerate the private and public key pair:

1. From a DOS or UNIX prompt, run the `kKeygen.sh` script, which is located in the `<PPM_Home>/bin` directory.

   ```
   sh ./kKeygen.sh
   ```

2. If information is not available in `server.conf`, you are prompted for the following information:

   - `JDBC_URL` (which the server needs to communicate with the database)

     Example

     ```
     jdbc:oracle:thin: @DBhost.domain.com: 1521:SID
     ```

   - `DB_USERNAME` (the username for the PPM Center database schema)
   - `DB_PASSWORD` (the password for the PPM Center database schema)

     If you generate new public or private keys, users cannot log on. The old passwords stored in the database are encrypted using the old key. All of the passwords encrypted using the new keys do not match those stored in the database.

As the script run completes, the following two key files are placed in the `<PPM_Home>/security` directory:

- `public_key.txt`
- `private_key.txt`

On Windows, anyone can read these files. As the system administrator, make sure that non-trusted users do not have read privilege to the files.

On UNIX, the files are read-only for the user running the script. If the user running the script is not the user who started the server, the server cannot read the keys and cannot start.

For more information about the `kKeygen.sh` script, see *kKeygen.sh* on page 359.

Configuring Solaris and Linux Environments to Use HP Deployment Management

PPM Center can connect to a machine on which the environment variable TERM is set to dumb. To enable HP Deployment Management to work in Solaris and Linux environments, you must set this environment variable.

To set the TERM value on Solaris, run:

```
.login:
if ("$TERM" == "dumb") ksh
```

To set the TERM value on Linux, run:

```
.profile:
if [ "$TERM" = "dumb" ]
then
   EDITOR=null
   SHELL=/bin/ksh
   export EDITOR
   VISUAL=null
   export VISUAL
   stty erase '^H'
fi
```

To set the TERM value on Linux 2.1, run:

```
.cshrc:
if ("$TERM" == "dumb") sh
```

Verifying Client Access to the PPM Server

All PPM Center clients use the same URL to log on. To specify the URL for PPM Center, append `/itg/web/knta/global/.jsp` to the value of the `BASE_URL` server configuration parameter.

`<Server.Mydomain.com>:<Port>/itg/web/knta/global/Logon.jsp`

To verify client access to the PPM Server after installation, log on to a client machine as administrator.

To log on to PPM Center as administrator:

1. On a client machine, start a supported browser, and then specify the URL for your PPM Center site.

   The PPM Center logon screen opens.

2. In the **Username** field, type **`admin`**.

3. In the **Password** field, type **`admin`**.

   PPM Center provides this default account for logging on the first time. HP recommends that you disable the admin account or change the password after you generate accounts for all of your users.

4. Click **Submit.**

The PPM Center standard interface opens.

For more information about how to configure licenses and user access, see the *Security Model Guide and Reference*.

Accessing the JBoss JMX Console

The JMX console is an application that ships with JBoss and provides visibility into the JMX MBeans that make up the JBoss application server. You can use the console to view all registered services that are active in the application server and that can be accessed either through the JMX console or programmatically from Java code.

If your PPM Center instance is installed on an AIX system, see *Accessing the JBoss JMX Console on AIX* for information on how to access the JMX console.

To access the JMX console, go to the following URL:

`http://<Server>:<Port>/admin-jmx`

The user name and password required to access the JMX console are encrypted to prevent unauthorized access to the information that the JMX console makes available. They are both stored as SHA-1 hash output in the `jmx-console-users.properties` file, which is located in the `<PPM_Home>/conf/props` directory.

The default user name for the JMX console is “admin.” The default password is “mercitg.”

To change the user name:

1. Open the `jmx-console-users.properties` file.
2. Change the value of the `ADMIN` parameter.
3. Save and close the file.

To obtain the hashed password:

- Run the `kHash.sh` script, (located in the `<PPM_Home>/bin` directory):

  ```
  sh ./kHash.sh -t <Password_Text>
  ```

You cannot change the JMX console password.

Accessing the JBoss JMX Console on AIX

Because of a conflict between Bouncy Castle and IBM security providers, you must do the following to ensure that the JMX console login works correctly:

1. Stop the PPM Server.
2. Navigate to the `<PPM_Home>/server/<PPM_Server_Name>/deployed/itg.war/WEB-INF/lib` directory and locate the `bcpprov-jdk13-133.jar` file.
3. Copy the `bcpprov-jdk13-133.jar` file to the `<JAVA_Home>/jre/lib/ext` directory.
4. Navigate to the `<JAVA_Home>/jre/lib/security` directory and open the `java.security` file.
5. Add the following to the security provider list.

   ```
   security.provider.5=org.bouncycastle.jce.provider.
   BouncyCastleProvider
   ```

6. Navigate to the `<PPM_Home>/server/<PPM_Server_Name>/deployed/itg.war/WEB-INF/lib` directory and delete the `bcpprov-jdk13-133.jar` file.
7. Start the PPM Server.

Configuring or Reconfiguring the Database

The settings described in this section are intended to serve as starting values only. Monitor the database and analyze performance data to fine-tune the settings for your system environment. Tuning an Oracle database involves an Oracle SYS DBA.

The recommendations provided in this section are based on the assumption that PPM Center is the only application that uses the database instance. If other applications share the database, adjust the recommended parameter values accordingly.

Database Parameters

This section describes the key Oracle database parameters that can affect PPM Center system performance. It also provides parameter settings recommended for the PPM Center environment.

For detailed information about the Oracle parameters described in the following sections, see your Oracle database documentation.

_B_TREE_BITMAP_PLANS

The `_B_TREE_BITMAP_PLANS` parameter enables creation of interim bitmap representation for tables in a query with only binary index(es).

Recommended Setting

Set the `_B_TREE_BITMAP_PLANS` parameter value to `false`. HP recommends that you set this parameter at the *instance* level instead of at the system level. You can use the `ON LOGON` trigger so that the setting does not interfere with other application schemas that use the database.

To set the parameter to `false`, run:

```
ALTER SYSTEM SET "_B_TREE_BITMAP_PLANS"=false scope=both
```

This prevents Oracle from unnecessary conversions between ROWID and BITMAPS when running queries.

_CURSOR_SHARING

The `_CURSOR_SHARING` parameter determines what kind of SQL statements can share the same cursors. Although this optional parameter accepts the following three values, PPM Center supports only the values `SIMILAR` and `EXACT`. `FORCE` is not supported.

- `FORCE`. This value forces statements that may differ in some literals, but are otherwise identical, to share a cursor, unless the literals affect the meaning of the statement.

Setting `_CURSOR_SHARING=FORCE` results in errors during PPM Center project creation.

- `SIMILAR`. This value causes statements that may differ in some literals, but are otherwise identical, to share a cursor, unless the literals affect either the meaning of the statement or the degree to which the plan is optimized.
- `EXACT`. This value only allows statements that have identical text to share a cursor.

_LIKE_WITH_BIND_AS_EQUALITY

In situations in which the `LIKE` pattern is expected to match very few rows, you can set the hidden parameter `_LIKE_WITH_BIND_AS_EQUALITY` to `true`. The optimizer treats the predicate as though it were `COLUMN = :BIND`, and uses column density as the selectivity instead of a fixed five percent selectivity factor. The optimizer treats expressions in the format `[indexed-column like :b1]` as it does expressions in the format `[index-column = :b1]`.

Oracle uses some defaults to estimate column selectivity for the `LIKE` operator, but most of the time this estimate is not precise and can cause an index path access to be rejected.

Default selectivity varies between releases. For Oracle releases earlier than 9.2.x, the default selectivity is 25 percent, whereas in 9.2.x and later releases, default selectivity is five percent.

As of Oracle 9i, the `_LIKE_WITH_BIND_AS_EQUALITY` parameter also enables equality costing for expressions in the following format.

```
function(column) LIKE function(:bind)
```

Recommended Setting

Set the parameter value to `true`.

_SORT_ELIMINATION_COST_RATIO

For certain restrictive (with good filters specified) and limited (returns few records) searches, PPM Center uses the FIRST_ROWS_N optimization mode.

If a search such as this also uses SORT on one or more fields returned by the search, Oracle uses the INDEX on the sorted columns under the FIRST_ROW_N optimization, even if other indexes on supplied filters may yield to a better execution plan for a SQL statement. This often leads to a less desirable INDEX FULL SCAN on the index on sorted column.

Recommended Setting

Set the parameter value to 5. This directs Oracle to consider an execution plan with `ORDER BY` sort elimination, as long as the plan is no more expensive than five times the cost of the best-known plan (that uses sort).

DB_BLOCK_SIZE

The `DB_BLOCK_SIZE` parameter is used to specify the size (in bytes) of Oracle database blocks. After the database is created, you cannot change this parameter.

Recommended Setting

Set the `DB_BLOCK_SIZE` parameter value to 8192 (8 KB).

DB_CACHE_SIZE

The `DB_CACHE_SIZE` parameter value specifies the size (in `KB` or `MB`) of the default buffer pool for buffers with the primary block size (the block size defined by the `DB_BLOCK_SIZE` parameter).

Recommended Setting

Specify a `DB_CACHE_SIZE` parameter value of at least 500 (expressed in MB).

HP recommends that you set a value for this parameter, even if `SGA_TARGET` is set.

GLOBAL_NAMES

The `GLOBAL_NAMES` parameter value determines whether a database link must have the same name as the database to which it connects.

Recommended Setting

Set `GLOBAL_NAMES` to `false`. If you set the value to `true`, loopback database link creation fails.

If multiple PPM Center test instances use the same database instance, you must set `GLOBAL_NAMES` to `false`.

To create a loopback database link with this parameter set to `true`:

```
create database link <User_Name.Oracle_SID.Domain_Name> connect
to <User_Name> identified by <Password> using <Oracle_SID>
```

Example 1

```
create database link kinadm.dlngrd02.world connect to kinadm
identified by <Password> using 'dlngrd02'
```

To use the database link you created:

```
select * from <Table_Name>@<Oracle_SID>
```

Example 2

```
select * from clis_users@dlngrd02
```

LOG_BUFFER

The `LOG_BUFFER` parameter value determines the size (in bytes) of the memory area used to save transaction change information. When data is committed, the log buffer is flushed to disk. Small log buffers cause more frequent flushes to disk.

Recommended Setting

For systems with 50 or more concurrent users, set the parameter value to 1 (expressed in MB).

MAX_COMMIT_PROPAGATION_DELAY (RAC Only)

The `MAX_COMMIT_PROPAGATION_DELAY` parameter value determines the time delay (in milliseconds) after a change committed on one instance is applied to other instances on the RAC (Real Application Clusters) system.

Recommended Setting

Set the `MAX_COMMIT_PROPAGATION_DELAY` parameter value to 0.

NLS_LENGTH_SEMANTICS

The initialization parameter NLS_LENGTH_SEMANTICS lets you create CHAR and VARCHAR2 columns using either byte- or character-length semantics.

Recommended Setting

Set the NLS_LENGTH_SEMANTICS parameter to CHAR. After you do, the VARCHAR2 columns in tables use character-length semantics. This means that if, for example, you declare a column as VARCHAR2(30), the column stores 30 characters, and not 30 bytes. In a multi-byte character set, this ensures that adequate space is available.

If you are using a single-byte character set, setting NLS_LENGTH_SEMANTICS to CHAR makes it easier to transition to a multi-byte character set later.

OPEN_CURSORS

Oracle uses cursors to handle updates, inserts, deletes, and result sets that queries return. The OPEN_CURSORS parameter value determines the number of cursors one session can hold open at a given time.

Recommended Setting

Set the OPEN_CURSORS parameter value to 1000 or higher.

OPEN_LINKS

The OPEN_LINKS parameter setting affects only HP Deployment Management. It determines the number of open database link connections to other databases that can be active at a given time.

Recommended Setting

Set the OPEN_LINKS parameter value to 20.

OPTIMIZER_INDEX_CACHING

The OPTIMIZER_INDEX_CACHING parameter gives the optimizer an estimate of the percentage of indexes cached in the buffer cache. The default value is 0. At this setting, Oracle does not "expect" any index to be cached while deciding the best access plan for a query. If you set this parameter to a higher value, Oracle favors using an index in the 'IN-list iterator' and nested loop joins.

Recommended Setting

For most PPM Center deployments, set the OPTIMIZER_INDEX_CACHING parameter value to 75.

OPTIMIZER_INDEX_COST_ADJ

The OPTIMIZER_INDEX_COST_ADJ parameter is used to tune optimizer behavior for access path selection by making the optimizer more or less prone to selecting an index access path over a full table scan. The lower this parameter value, the likelier it is that the optimizer will choose index scan over table scan.

The default for this parameter is 100%. With this default value, the optimizer evaluates index access paths at regular cost. With any other value, the optimizer evaluates the access path at that percentage of the regular cost. For example, a setting of 50 makes the index access path look half as expensive as with the default value.

Recommended Setting

Although there is no perfect OPTIMIZER_INDEX_COST_ADJ value for every PPM Center deployment, HP recommends that you first set this parameter to between 25 and 40, test the performance of the application at this setting, and, based on the results, adjust the value.

PGA_AGGREGATE_TARGET

The PGA_AGGREGATE_TARGET parameter value determines the aggregate Program Global Area (PGA) memory available to all PPM Server processes attached to the instance. This parameter allows for the automatic sizing of SQL working areas used by memory-intensive SQL operators such as sort, group-by, hash-join, bitmap merge, and bitmap create.

PGA_AGGREGATE_TARGET replaces the traditional SORT_AREA_SIZE parameter. Use it with the WORKAREA_SIZE_POLICY parameter set to AUTO.

Recommended Setting

Set the PGA_AGGREGATE_TARGET parameter value to a minimum of 450 MB. For very large databases, you can set the parameter to 1 GB.

PROCESSES

The PROCESSES parameter value determines the maximum number of operating system user processes that can simultaneously connect to the Oracle database. PPM Center uses a pool of database connections. When database activity is required, connections are picked from the pool and the database activity is performed on this existing connection. This process saves the overhead of creating and cleaning up database connections.

Recommended Setting

Set the PROCESSES parameter value to 20 plus the number of total connections that might be used.

Although concurrent usage and usage nature are factors used to determine the number of connections used, a PPM Server rarely uses more than 25 database connections. If a PPM Server cluster configuration is used, each PPM Server might use 25 database connections.

For single-server configurations, set the parameter value to 45 (the default). For a PPM Server cluster configuration running three servers, set the parameter value to (3 x 25) + 20 = 95.

SGA_TARGET (Oracle 10G or Later)

The SGA_TARGET parameter value determines the maximum size of all System Global Area (SGA) components combined in the instance. If you specify SGA_TARGET, it is not necessary to specify individual values for SGA components such as SHARED_POOL_SIZE, JAVA_POOL_SIZE, LARGE_POOL_SIZE, and DB_CACHE_SIZE.

Recommended Setting

Set the SGA_TARGET parameter value to 1.66 GB. If you also set the SGA_MAX_SIZE parameter, its value must be higher than the value set for SGA_TARGET.

SHARED_POOL_RESERVED_SIZE

The SHARED_POOL_RESERVED_SIZE parameter helps to ensure that a portion of the shared pool (determined by the SHARED_POOL_SIZE parameter) is set aside for large objects. Reserving an area for large objects helps to make sure that requests for a large number of bytes will not fail as a result of shared pool fragmentation.

If you want to place an object in the reserved area, make sure that the object is larger than the SHARED_POOL_RESERVED_MIN_ALLOC value. HP recommends that you use the default value for the SHARED_POOL_RESERVED_MIN_ALLOC parameter.

Recommended Setting

Set the SHARED_POOL_RESERVED_SIZE parameter value to 10 percent of the shared pool (as determined by the SHARED_POOL_SIZE parameter).

SHARED_POOL_SIZE

The shared pool contains shared cursors and stored procedures. The SHARED_POOL_SIZE parameter value determines the size (in bytes) of the shared pool. Larger values can improve performance in multiuser systems, but they use more memory. Smaller values use less memory, but they can degrade the performance of multiuser systems.

Recommended Setting

Set the SHARED_POOL_SIZE parameter value to at least 350 MB.

WORKAREA_SIZE_POLICY

The `WORKAREA_SIZE_POLICY` parameter value determines whether work areas operate in automatic or manual mode. If the value is set to AUTO, work areas used by memory-intense operators are sized automatically based on the PGA memory that the system uses and the target PGA memory set for the `PGA_AGGREGATE_TARGET` parameter. If the value is set to `MANUAL`, work areas are set manually and based on the value of the `*_AREA_SIZE` parameter.

Recommended Setting

Set the parameter value to AUTO.

Granting Select Privileges to v_$session

If you want PPM Center to keep track of the open database sessions it uses, make sure that a public grant exists on the v_$session dynamic performance table. To do this, connect as SYS to the database that contains the PPM Center database schema, and then issue the following SQL statement.

```
grant select on v_$session to public
```

You typically assign this grant during PPM Center installation or upgrade.

Generating Database Links (Oracle Object Migration)

PPM Center can use database links to communicate with other databases. Usually a database link created and associated with a particular environment in PPM Center can be used in situations such as AutoCompleteSQL.

The following are examples of situations in which database links are used:

- Custom object types designed to provide parameter value lists directly from a source or destination database during HP Deployment Management activities
- Some HP Deployment Management Extensions, such as the Extension for Oracle E-Business Suite, to facilitate HP Deployment Management activities

You can define database links on an as-needed basis. For each database link you require (this probably includes a link to the PPM Center database), issue an SQL statement similar to the following in the PPM Center database schema.

```
create database link DEV_LINK
connect to APPS identified by APPS
using 'DEV'
```

For more information about database links, see:

- *HP Deployment Management Extension for Oracle E-Business Suite Guide*
- *HP Object Migrator Guide*
- *HP GL Migrator Guide*
- Oracle's reference document on the SQL language

Configuring the PPM Workbench to Run as a Java Applet

This section provides the steps to follow to perform the following tasks:

- Enable the SOCKS proxy feature in PPM Center
- Run the PPM Workbench with secure RMI in place
- Provide users on client machines with the required version of the Java plug-in

Enabling SOCKS Proxy (Optional)

Using the SOCKS proxy feature in PPM Center improves security. With SOCKS proxy enabled, all RMI connections are routed through a central server so that each and every PPM Workbench is not required to contact the application server directly. The SOCKS proxy feature also makes it easier to monitor RMI traffic.

To enable the SOCKS proxy feature in PPM Center:

1. Open the `server.conf` file in a text editor.
2. Set the following two parameters:
   - `com.kintana.core.server.SOCKS_PROXY_HOST`
   - `com.kintana.core.server.SOCKS_PROXY_PORT`

   For the `com.kintana.core.server.SOCKS_PROXY_HOST` value, provide the hostname of the SOCKS proxy server.

   For the `com.kintana.core.server.SOCKS_PROXY_PORT` value, specify the port on the SOCKS proxy host that accepts proxy connections.

The PPM Server passes the SOCKS proxy configuration forward to the client applet launcher. Users are not required to configure anything.

To specify a different JRE version in the `server.conf` file, reset the `com.kintana.core.server.WORKBENCH_PLUGIN_VERSION` parameter.

Example

```
com.kintana.core.server.WORKBENCH_PLUGIN_VERSION=1.5.0_02
```

Running the PPM Workbench with Secure RMI (Optional)

To run the PPM Workbench as a Java applet with secure RMI:

- Specify the complete RMI URL, in the following format, when you start the PPM Workbench:

  ```
  java com.kintana.core.gui.LogonApplet rmis://<Host>:<RMI_Port>/<KintanaServer>
  ```

  You can type the RMI URL at the command line or, on Windows, specify it in a shortcut.

Providing Users with the Java Plug-In

The Java plug-in is required to access the PPM Workbench interface. When a user starts the PPM Workbench, the system checks the client browser for the Java plug-in, and then determines whether the correct version is installed.

The supported Java plug-in version is specified by the `WORKBENCH_PLUGIN_VERSION` parameter in the `server.conf` file. If the system cannot find the required version, it directs the user to the Sun Microsystems site where the user can download the plug-in and follow the installer wizard prompts to install it.

HP recommends that you leave the `WORKBENCH_PLUGIN_VERSION` parameter default value.

If users who access the PPM Workbench from client machines cannot access the Sun Microsystems Web site to download and install the Java plug-in, you must download the plug-in and make it available to users from within the firewall. You can obtain the plug-in directly from Sun Microsystems at `java.sun.com`.

Consider restricting PPM Workbench access to users who must perform the kind of configuration and administration tasks performed through the PPM Workbench.

Using the PPM Workbench: What Users Need to Know

This section provides the information that users require to start the PPM Workbench on client machines. It also includes information on how to address JVM-related problems that can arise on client machines. For information on how to set up your Web browser to access the PPM Workbench, see the *Getting Started* guide.

For information on how to access this and other PPM Center documents, see *Accessing PPM Center Documentation* on page 18. For more information about the PPM Workbench, see the *Getting Started* guide.

Installing and Configuring the Java Plug-In on Client Machines

The `server.conf` contains one parameter that is associated with the Java plug-in. The `JAVA_PLUGIN_XPI_PATH` parameter specifies the Web location for downloading the cross-platform Java plug-in installer for Firefox browsers. The default setting for this parameter is `java.com/en/download/windows_xpi.jsp`.

For information about the Java plug-in supported for the current PPM Center version, see the *System Requirements and Compatibility Matrix*. For information about server configuration parameters, see *Server Configuration Parameters* on page 279.

Setting the Default Web Browser

To run the PPM Workbench interface as an application, users must specify the default browser setting in their user profiles.

To set the default browser setting:

1. From the shortcut bar in the PPM Workbench, select **Edit > User Profiles.**
2. On the **General** tab, in the **Default Browser** field, type the full path of the default Web browser.

If access to a URL is required, the PPM Workbench uses the default Web browser.

Starting the PPM Workbench on a Client Machine

To start the PPM Workbench from the PPM Center standard (HTML) interface:

- On the menu bar, select **Administration > Open Workbench.**

If a pop-up blocker is installed and enabled on the Web browser, the PPM Workbench cannot open. The user can configure the blocker to allow pop-ups from PPM Center.

Troubleshooting Default JVM Problems on Client Machines

If the Java plug-in sets itself as the default JVM for the browser, users can encounter the following problems in the PPM Workbench:

- The PPM Workbench displays a “class not found” exception error.
- Problems occur because other applications you are using require different versions of the Java plug-in.

To resolve these issues, make sure that an installed Java plug-in is not specified as the default.

To remove the default browser association to the Java plug-in:

1. Open the Windows control panel.
2. Double-click the **Java Plug-in** icon.

   The Java Plug-in Control Panel window opens.
3. Click the **About** tab.

   This tab lists the Java plug-in that PPM Center uses, as well as any other Java plug-ins installed.
4. Click the **Browser** tab.
5. Under **Settings,** deselect the checkbox (or checkboxes) for the installed browser (or browsers).

6. Click **Apply.**

   The Java Control Panel displays a message to indicate that you must restart the browser(s) to apply your changes.

7. Click **OK.**

8. Close the Java Plug-in Control Panel window.

After you make this change, other applications can use the Java plug-in version they require, and the PPM Workbench functions correctly.

What to Do Next

If you plan to perform any of the optional installations described in *Optional Installations* on page 72 (for example, if you plan to install an HP Deployment Management Extension), perform them now. If you have completed your installation tasks, test your system. As you do, be sure you understand the system maintenance tasks you must perform periodically. Those tasks are described in Chapter 7, *Maintaining the System,* on page 173.

5 Advanced System Configuration

Overview of Additional Installations and Configurations

The following sections provide information about installations, integrations, and configurations in addition to the primary PPM Center setup. They include information about installing optional products such as HP Deployment Management Extensions and the service packs that are delivered after the main PPM Center version.

For information on how to integrate the HP PPM Center product Web service component with external single sign-on systems, see Chapter 6, *Implementing User Authentication,* on page 147.

Configuring an External Web Server

HP recommends that you use the Web server that is built into the PPM Server unless you have the special Web server requirements described in *Single-Server/External Web Server Configuration* on page 27 and *Server Cluster/External Web Server Configuration* on page 29. The following sections provide information about how to configure an external Web server to work with a PPM Center Server cluster.

PPM Server can run with external Web servers such as Sun Java System Web Server, Microsoft IIS, Apache HTTP Server, Apache-based Web Server (from HP), and IBM HTTP Server. For detailed information on which Web server versions PPM Center supports, and on which platforms, see the *System Requirements and Compatibility Matrix.*

Using an External Web Server for Multiple PPM Center Instances

You cannot use a single Web server installation on a machine running Windows for multiple instances of PPM Center. The Windows registry imposes this limitation. Integration with an external server involves specifying the worker_file registry directive that points to the `workers.properties` file. The `workers.properties` file tells the redirector (`isapi_redirect.dll`) where to forward the request.

Redirecting to two different instances does not work because each instance requires different workers properties. However, a single Windows registry points to only a single `workers.properties` file.

If you must use an external Web server for multiple PPM Center instances, HP recommends that you either use a UNIX machine to host the Web server, or use a hardware load balancer.

Overview of External Web Server Configuration

PPM Server can run with several external Web servers, including Sun Java System Web Server, Microsoft IIS, Apache HTTP Server, Apache-based Web Server (from HP), and IBM HTTP Server. To configure an external Web server, you perform the following tasks. Detailed instructions for performing each of these tasks are provided in subsequent sections.

For detailed information on which Web server versions PPM Center supports, and on which platforms, see the *System Requirements and Compatibility Matrix*.

To configure an external Web server:

1. Choose an external Web server.
2. Choose an external Web port.
3. Configure a `workers.properties` file.
4. Configure a `uriworkermap.properties` file (Microsoft IIS and Apache-based servers only).
5. Configure the external Web server.
6. Integrate the external Web server with the PPM Server.

7. (Optional) Enable cookie logging on the external Web server.

The next sections provide information about how to perform the following tasks, which are required to configure an external Web server.

Choosing an External Web Port

Choose the port through which the external Web server and the PPM Server(s) are to communicate. Select a port that is not in use on the machine running PPM Center. Later, you identify this port in the PPM Center `server.conf` file and your `workers.properties` file.

If you are integrating with an external Web server, you must set the `EXTERNAL_WEB_PORT` parameter on the PPM Server. This port number is then specified in the `workers.properties` file that is used by the jakarta 1 redirector.

Configuring the Workers Properties File

The `workers.properties` file stores information about the PPM Server(s), including the machine name, ports, and load balance. The external Web server uses this information to direct traffic to PPM Center applications, as required.

The following sections describe how to configure the `workers.properties` file for Sun Java System Web Server, Microsoft IIS, and Apache-based servers such as Apache HTTP Server, HP-UX, and IBM HTTP Server.

Configuring the workers.properties File for a Single Server

The *Sample File* on page 112 shows the contents of a sample `workers.properties` file for a single-server configuration. Information that pertains to a clustered configuration is commented out.

As you edit the `workers.properties` file, keep the following two requirements in mind:

- The worker name must match the name of PPM Center instance defined for the `KINTANA_SERVER_NAME` parameter in the `server.conf` file.
- For Web servers such as Sun Java System Web Server, you must specify `connection_pool_size`, `connection_pool_minsize` and `connection_pool_timeout` (see comments in the sample file).

Sample File

```
# JK 1.2.X configuration file. This file tells the external Web
# server how to connect to the PPM Servers.
# Place this file in the location you indicated in your Web
# server configuration.
# List of workers for handling incoming requests.
worker.list=load_balancer
# If "status" worker is defined (see below), then add it to the
# list of workers.
# worker.list=load_balancer,jkstatus
# Defines the PPM Server instances. The
# worker name is the value between the first and second period
# (server1, in this case). Copy this block for each additional
# server in the server cluster. Make sure the port number
# matches the port defined in the EXTERNAL_WEB_PORT parameter
# of the server.conf file, and that the worker name matches the
# PPM Center instance name defined by the
# KINTANA_SERVER_NAME parameter of the server.conf file. Please
```

```
# note that, for a server cluster setup, each HP PPM Center node
# has its own KINTANA_SERVER_NAME parameter.
worker.server1.host=localhost
worker.server1.port=8009
worker.server1.type=ajp13
worker.server1.lbfactor=1
# The following three parameters are required for
# Netscape-based Web servers such as Sun ONE Web Server and for
# Microsoft IIS. For Netscape-based Web servers, set the
# connection_pool_size equal to RqThrottle parameter in the Web
# server's magnus.conf file. Keep connection_pool_minsize at 1
# and connection_pool_timeout at 600. For Microsoft IIS, set
# the connection_pool_size parameter to 512 or higher, as
# necessary, to accomodate the load.
# HP recommends that you not use these parameters with
# Apache-based servers, including IBM HTTP Server, HP Web
# Server, and Apache itself.
#worker.server1.connection_pool_size=128
#worker.server1.connection_pool_minsize=1
#worker.server1.connection_pool_timeout=600
# Clustered configurations only.
# Defines a second PPM Server instance.#
# worker.server2.host=localhost
# worker.server2.port=8010
# worker.server2.type=ajp13
# worker.server2.lbfactor=1
#See comments above regarding setting the following three
# parameters.
#worker.server2.connection_pool_size=128
#worker.server2.connection_pool_minsize=1
#worker.server2.connection_pool_timeout=600
# Defines the load balancer. Be sure to list all servers in the
# PPM cluster in the balanced_workers group.
worker.load_balancer.type=lb
worker.load_balancer.balanced_workrs=server1,server2
# Optional. Define a special "status" worker. It allows
# monitoring of jk plugin status. If enabled, add it to the list
# of available workers (see above).
#worker.jkstatus.type=status
```

For more information about how to configure a server cluster, see *Configuring a Server Cluster* on page 131.

Configuring the workers.properties file

To configure a `workers.properties` file:

1. Navigate to the `<PPM_Home>/integration/webserverplugins/configuration` directory and open the `workers.properties` file in a text editor such as Notepad.
2. Set the `worker.list` parameter to `load_balancer`.
3. For the single server (or for each PPM Server in a cluster), configure the following values:
   a. Set `<Worker_Name>` to the name of PPM Center instance to which this worker connects. This is the name defined by the `KINTANA_SERVER_NAME` server configuration parameter in the `server.conf` file.

      For a clustered setup, each PPM Server has its own `KINTANA_SERVER_NAME` parameter.

   b. Set the `worker.server#.host` parameter to the network address of the machine on which PPM Center is installed.

      If the PPM Center instance runs on the same machine as the Web server, you can use `localhost`.

   c. Set the `worker.server#.port` parameter to the external Web port (`EXTERNAL_WEB_PORT` parameter) to use.
   d. Set the `worker.server#.type` parameter to `ajp13`, which is the protocol used to connect to the remote server.
   e. Set the `worker.server#.lbfactor` parameter to the load balancing factor used to distribute load to the PPM Servers.

      If all servers can handle approximately the same load, assign “1” to each server. If a server can handle twice as much load as another server, assign “2” to that more robust server and “1” to the other server.
4. Set the `worker.load_balancer.type` parameter to `lb`.

5. Set the `worker.load_balancer.balanced_workers` parameter to a comma-delimited list of all servers in the cluster (as configured in step 3).

   Example:

   ```
   worker.load_balancer.balance_workers=worker1,worker2,worker3
   ```

6. (Optional) To enable the JK status page, add a worker of special type "status" (`worker.jkstatus.type=status`), and then add this worker to the list of workers (`worker.list`).

Configuring the uriworkermap.properties File (for Microsoft IIS and Apache-based servers only)

The `uriworker.properties` file is used to specify mappings between a given URL (or URL pattern) and worker name. The following shows the contents of a sample `uriworker.properties` file.

```
# /itg/* must be mapped to one of the workers
/itg/*=load_balancer
# You can access the JK status page at
# http://web_server_host:web_server_port/jkmanager.
# If you want to enable the JK status page, uncomment the
# following line.
#/jkmanager=jkstatus
```

Each line of `uriworker.properties` file represent a single mapping in the format *<URL_Pattern> = <Worker_Name>*. If the Web server processes a URL that matches *<URL_Pattern>*, then *<Worker_Name>* is used to serve this request. *<Worker_Name>* must be defined in the `workers.properties` file.

Configuring the External Web Server

This section provides information about how to set up the following external PPM Center–supported Web servers:

- Sun Java System Web Server
- Microsoft IIS
- Apache HTTP Server
- HP-UX Apache-based Web Server
- IBM HTTP Server

For a list of supported versions, see *System Requirements and Compatibility Matrix*.

Configuring the Sun Java System Web Server

To configure the Sun Java System Web Server to run as the external Web server for the PPM Server:

1. Connect to the Sun Java System administration server and create a new server named "PPM."

   The `https-PPM` directory is created. This directory contains two files: `magnus.conf` and `obj.conf`.

2. Stop the PPM Server.

   For information about how to stop the PPM Server, see *Starting and Stopping the PPM Server* on page 75.

3. Place the configured `workers.properties` file (see *Configuring the Workers Properties File* on page 112) in the `<Sun_Home>/https-<Web_Server_Name>/config` directory.

4. Copy the `nsapi_redirector.so` plug-in to any directory on the machine running the Sun Java System Web Server.

   The Web server must have permissions to read and execute this file.

5. Add the following two lines to the `magnus.conf` file (the text can wrap, but each "`init fn=`" must be a continuous line with no spaces).

   ```
   Init fn="load-modules" shlib="<Path_To_NSAPI_Redirector>/
   nsapi_redirector.so" funcs="jk_init,jk_service"

   Init fn="jk_init" worker_file=<PPM_Home>/workers.properties
   log_level="error" log_file=<Path_To_Log_Files>/ppm_
   server.log
   ```

6. Add the following line to `obj.conf` at the beginning of the "Object" section (that is, after `<object name=default>`).

   ```
   NameTrans fn="assign-name" from="/ppm/*"name=<PPM_Servlet>
   ```

7. Place the following text after the "Object" section (after `</Object>`).

   ```
   <Object name="ppm_servlet">
   Service fn="jk_service" worker=<Load_Balancer>
   </Object>
   ```

   The `<PPM_Servlet>` strings must match.

   The `worker` attribute specifies the name of the JK worker used to serve requests with URLs that match the `path` attribute, which is `/ppm/*` in this case.

8. Enable content compression.

   For information on how to enable dynamic content compression, see *Enabling Dynamic Compression On an External Web Server* on page 126.

Enabling Cookie Logging on the Sun Java System Web Server (Optional)

To enable cookie logging:

1. Stop the Sun Java System Web Server.
2. In the `magnus.conf` file, find the line that initializes flex. The line begins with the following text.

   ```
   Init fn=flex-init
   ```

3. Append the following string to the end of this line:

   ```
   %Req->headers.cookie.JSESSIONID%
   ```

The resulting modified line is:

```
Init fn=flex-init access="$accesslog" format.access=
"%Ses->client.ip% - %Req->vars.auth-user%[%SYSDATE%]
\"%Req->reqpb.clf-request%\" %Req->srvhdrs.clf-status%
%Req->srvhdrs.content-length%"
JSESSIONID=%Req->headers.cookie.JSESSIONID%
```

4. Restart the Web server.

Configuring the Microsoft Internet Information Services 6.0 Web Server

To configure the Microsoft Internet Information Services (IIS) 6.0 Web server on Windows:

1. Create a virtual directory named `jakarta` that points to the IIS scripts directory, as follows:

   a. Select **Start > Control Panel > Administrative Tools > Internet Information Services Manager.**

   b. Copy the `workers.properties` file, the `uriworkermap.properties` file, and `<PPM_Home>/integration/webserverplugins/iis/windows/x86-32/isapi_redirect.dll` file to the `c:\inetpub\scripts` directory.

   c. In the IIS Services Manager, right-click the Web site you plan to integrate with the PPM Server, and then select **New > Virtual Directory** on the shortcut menu.

   d. On the first page of the Virtual Directory Creation Wizard, click **Next.**

   e. On the Virtual Directory Alias page, under **Alias,** type **`jakarta`.**

   f. Click **Next.**

   g. On the Web Site Content Directory page, under **Directory,** type the full path to the `isapi_redirect.dll` file (`C:\inetpub\scripts\isapi_redirect.dll`).

   Depending on the IIS root directory configuration, the drive and directory may vary. This directory must have run permission.

   h. Click **Next.**

i. On the Access Permission page, select **Read, Run scripts (such as ASP),** and **Execute (such as ISAPI application or cgi),** and then click **Next.**

j. Click **Finish.**

2. Change directory security to set up anonymous access, as follows:

Anonymous access allows anyone to visit the public areas of your Web site but prevents unauthorized users from gaining access to your Web server's critical administrative features and restricted information.

If you do not change directory security, you may encounter an "Access Denied" error message.

a. From the Control Panel, open **Administrator Tools,** and then open the Windows Internet Information Services Manager.

b. In IIS Manager, click **Web Sites,** right-click the Web site instance you are integrating with PPM Server, and then select **Properties** on the shortcut menu.

c. Click the **Directory Security** tab.

d. In the **Authentication and Access Control** section, click **Edit.**

e. Select the **Enable anonymous access** checkbox, and then browse for IUSR_<HOST>.

f. Clear everything selected in the **Authenticated access** section.

g. Click **OK.**

3. Configure a `workers.properties` file and a `uriworkermap.properties` file, as described in *Configuring the Workers Properties File* on page 112 and *Configuring the uriworkermap.properties File (for Microsoft IIS and Apache-based servers only)* on page 115.

4. Configure IIS to load `isapi_redirect.dll` as a filter, as follows:

   a. To define registry values for IIS with Apache Jakarta Tomcat Connector (JK):

      i. Add the following registry key.

      ```
      HKEY_LOCAL_MACHINE\SOFTWARE\Apache Software
      Foundation\Jakarta Isapi Redirector\1.0
      ```

      ii. Add a string value with the name `extension_uri` and set `/jakarta/isapi_redirect.dll` as its value.

      The `extension_uri` key in the Windows registry must point to the full path of the `isapi_redirect.dll` file.

      iii. Add a string value with the name `worker_file` and set its value as the full path to the `workers.properties` file. That is, `<ISAPI_Redirector_Home>\workers.properties`

      Example

      ```
      c:\inetpub\scripts\workers.properties
      ```

      iv. Add a string value with the name `log_level` and set `ERROR` as its value.

      For more verbose logging, use `DEBUG` or `INFO`.

      v. Add a string value with the name `log_file` and specify the directory in which you want the log file to reside. (Include the log file name.

      Example

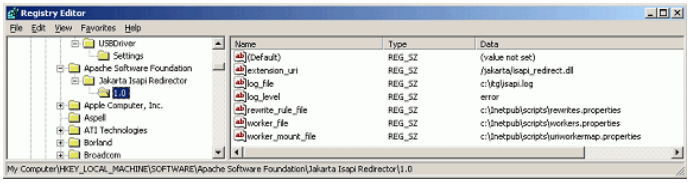
      ```
      c:\inetpub\scripts\isapi.log
      ```

      vi. Add a string value with the name `worker_mount_file` and a value that is the full path to your `uriworkermap.properties` file (`c:\inetpub\scripts\uriworkermap.properties`).

vii. Create an empty file named `rewrites.properties`, and save it to `c:\inetpub\scripts`. Add a string value with the name `rewrite_rule_file` and assign it a value that is the full path to the `rewrites.properties` file (`c:\inetpub\scripts\rewrites.properties`).

The previous step is required as the result of a known issue in JK 1.2.18. For detailed information about this issue, go to the Web site issues.apache.org/bugzilla/show_bug.cgi?id=40384.

The following figure shows a correctly configured registry.



b. Restart your Windows system.

c. Select **Start > Control Panel > Administrative Tools > Internet Information Services Manager.**

Perform the following steps at the Web-sites level.

d. Right-click the Web site name, and then click **Properties** on the shortcut menu.

The Properties dialog box opens.

e. Click the **ISAPI Filter** tab.

f. Click **Add.**

The Filter Properties window opens.

g. In the **Filter Name** field, type **`jakarta.`**

h. In the **Executable** field, type the full path to the `isapi_redirect.dll` file (`c:\inetpub\scripts\isapi_redirect.dll`).

i. Click **OK.**

5. Allow Tomcat's redirector DLL in Web service extensions, as follows:
   a. In the Windows management console, click **Web Services Extensions.**
   b. Select **Add a new Web service extension.**
   c. Type the extension name.

      Example

      `Jakarta-Tomcat`
   d. Type the path to the `isapi_redirect.dll` file `(c:\inetpub\scripts\isapi_redirect.dll)`.
   e. Select **Set extension status to Allowed.**
   f. Click **Add.**
   g. Click **OK.**
6. Restart the IIS service.

Restarting the Web site is not enough. You must restart World Wide Web Publishing Service from the Services management console.

7. Start the PPM Server(s).
8. Enable dynamic compression of assets. For instructions, see *Enabling Dynamic Compression On an External Web Server* on page 126.

Enabling Cookie Logging on Microsoft IIS 6.0 (Optional)

To enable cookie logging on IIS 6.0:

1. Open IIS.
2. Select a Web or FTP site and open its property sheets.
3. Select **Enable Logging.**
4. Click **Properties.**
5. On the **Extended Properties** page, select **Cookies.**
6. Click **Apply.**

Configuring an Apache-Based Web Server (Apache HTTP Server, HP-UX Apache-based Web Server, or IBM HTTP Server)

This section provides the steps you use to:

- Compile a binary of JK. (Do this if, and only if, a precompiled binary does not work on your system.)
- Configure Apache HTTP Server

Compiling a Binary JK Module

Configuring an Apache-based Web server on UNIX requires a dynamically linkable JK module binary named `mod_jk.so`. In most cases, the `<PPM_Home>/integration/webserverplugins/<Web_Server_Name>` directory contains precompiled binaries of JK for several operating systems. Before you try to compile the JK module, check this directory to determine whether it contains the binaries required for your system.

If a precompiled binary is unavailable, perform the following steps.

To compile a binary JK module:

1. Download and unpack a source code bundle from the following Web site.

   tomcat.apache.org/connectors-doc/index.html

2. Change to the following directory:

   `tomcat-connectors-<Version>-src/native`

3. Run the configuration script, as follows:

   `./configure --with-apxs=/<Path_To_Apache_Bin>/apxs`

   The configuration script generates the `make` files for the current machine environment. The `make` files are required to run the `make` command, as described in the next step.

4. Run the `make` command to build the Apache module that forwards requests from the Apache HTTP Server to the PPM Server using the AJP13 protocol.

For more details on how to recompile the connector, go to the following Web site.
tomcat.apache.org/connectors-doc/index.html

Enabling Content Compression

Configuring an Apache-based Web server also involves enabling dynamic content compression. For information on how to enable content compression, see *Enabling Dynamic Compression On an External Web Server* on page 126.

Enabling Cookie Logging on Apache 2.0 (Optional)

To enable cookie logging on Apache 2.0:

1. Open the Apache `httpd.conf` file in a text editor.
2. Find the line of text that begins with the following string.

   ```
   LogFormat "%h %l %u %t \"%r\"%>s %b
   ```

3. After "`%b,`" type the following:

   ```
   %{Cookie}i"
   ```

   The log format and custom log lines now look as follows.

   ```
   LogFormat "%h %l %u %t \"%r\"%>s %b %{Cookie}i" common
   CustomLog logs/access_log common
   ```

4. Save and close the `httpd.conf` file.

For information about how to configure an Apache-based Web server to work with a PPM Server cluster, see the *System Administration Guide and Reference* for PPM Center.

Enabling Secure Sockets Layer on an External Web Server

To enable Secure Sockets Layer (SSL) on the Web server:

1. Generate a certificate signing request (CSR) for the server on which you plan to install the SSL certificate.

   To do this, use the software that your external Web server provides. If you do not know what software your server uses, contact the Web server vendor for that information.

2. Submit the CSR to a certificate authority (such as VeriSign).

It may take several days for the certificate authority to validate the company.

3. After you obtain the SSL certificate, install it on your Web server.
4. Contact your Web server administrator or Web server vendor to help you enable SSL on the Web server.
5. If your external Web server or hardware load balancer uses SSL, open the `server.conf` file and change the server configuration parameter `BASE_URL` to `https://<Web_Server>:<Port>`.

By default, the HTTPS typically runs on port 443 on the Web server. If you use a port other than 443, you must specify the port number in the `BASE_URL`.

6. Restart the Web server.

Enabling Dynamic Compression On an External Web Server

Wide area networks (WANs) often have both low bandwidth and high latency (delays in network data processing), which significantly degrade network performance. Users who access applications over a WAN experience poorer response times than users who access the same applications through a local area network (LAN).

HP Project and Portfolio Management Center leverages application content compression to minimize the performance overhead imposed by operating in a WAN environment. Rather than compress content within the application code, PPM Center uses the compression capabilities of both the Tomcat Web container that runs in JBoss and the compression capabilities in third-party Web servers (Microsoft Internet Information Services 6.0, Apache-based Web server, or Sun Java System Web Server).

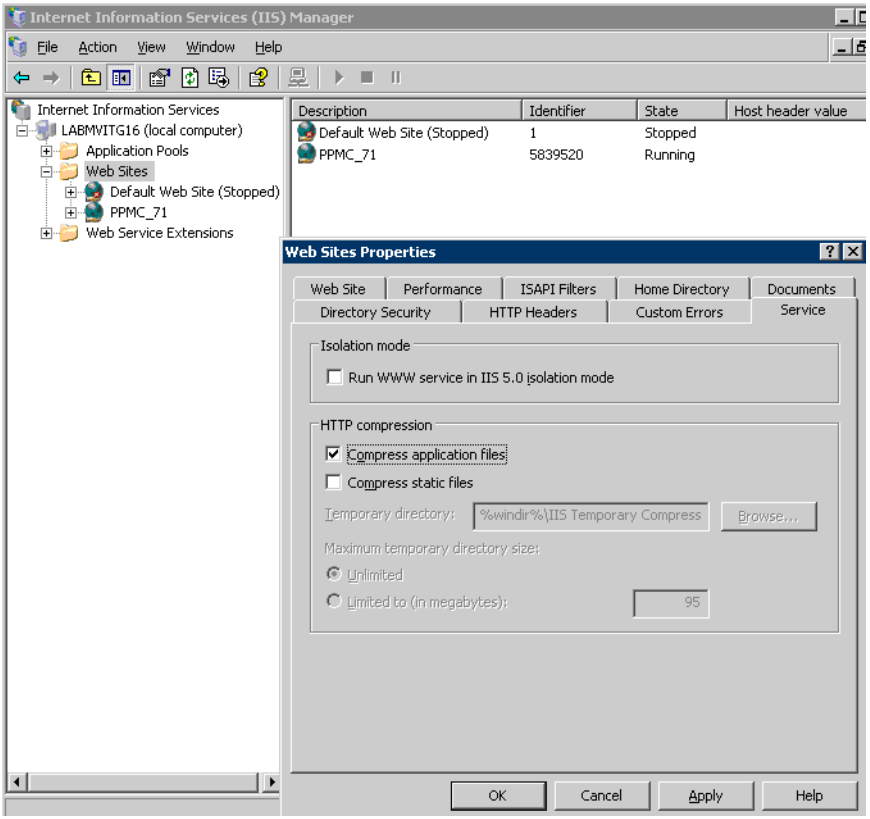
If you deploy PPM Center without an external Web server, the application content is compressed by default, and no additional configuration is required. If, however, you deploy an external Web server as the Web tier, then you must enable compression for that Web server. Otherwise, application content is delivered uncompressed, which results in poor response times for users over the WAN.

Enabling Dynamic Content Compression on Microsoft Internet Information Services 6.x

To enable HTTP compression through the Microsoft Internet Information Services (IIS) 6.x Manager console:

1. Open the Internet Information Services (IIS) Manager window.
2. Under the name of the computer that hosts the IIS site, right-click the **Web Sites** folder, and then select **Properties** on the shortcut menu.

   The Web Sites Properties window opens.
3. On the **Service** tab, select the **Compress application files** checkbox, and then click **OK.**



4. From either the services Control Panel or the command line, stop and then restart the World Wide Web Publishing Service.

If you need to enable compression for a subset of the Web sites hosted by the server, see *Enabling HTTP Compression (IIS 6.0)*, which is available on the Microsoft TechNet Web site.

Enabling Dynamic Content Compression on Apache-Based Web Servers

This section provides information on how to enable dynamic compression on an Apache-based Web server that either has been compiled with the `mod_deflate` module enabled or that can load the dynamic module. Apache Web server installation documentation provides instructions on how to enable modules within the application server. If `mod_deflate` is not loaded in Apache, the following steps will fail to enable content compression.

To enable compression of dynamic assets on an Apache-based Web server:

1. Navigate to the `<Apache_Home>/conf` directory and open the `httpd.conf` file in a text editor.
2. Add the following to the `httpd.conf` file.

```
# gzip config begin
LoadModule deflate_module modules/mod_deflate.so
<Location /itg>
SetOutputFilter DEFLATE
BrowserMatch ^Mozilla/4 gzip-only-text/html
BrowserMatch ^Mozilla/4\.0[678] no-gzip
BrowserMatch \bMSI[E] !no-gzip !gzip-only-text/html
SetEnvIfNoCase Request_URI \
   \.(?:gif|jpe?g|png)$ no-gzip dont-vary
Header append Vary User-Agent env=!dont-vary
</Location>
# gzip config end
```

3. Save and close the `httpd.conf` file.

Enabling Dynamic Content Compression on Sun Java System Web Server

To enable compression of dynamic assets on Sun Java System Web Server:

1. On the machine running the Sun Java System Web Server, navigate to the `<Sun_Home>/https-<Web_Server_Name>/config` directory, and open the `obj.conf` file.

   During the initial Sun Java System Web Server configuration, installation of jk_service required that the following text be added to the `obj.conf` file (after `</Object>`).

   ```
   <Object name="ppm_servlet">
   Service fn="jk_service" worker=<Load_Balancer>
   </Object>
   ```

2. Modify that text, as follows.

   ```
   <Object name="ppm_servlet">
   Service fn="jk_service" worker=<Load_Balancer>
   Output fn="insert-filter" filter="http-compression"
   vary="off" compression-level="6"
   </Object>
   ```

Integrating an External Web Server with a PPM Server

To integrate an external Web server with the PPM Server, perform the following tasks:

1. Stop the PPM Server.

   For information about how to do this, see *Starting and Stopping the PPM Server* on page 75.

2. Set the server configuration parameter values.

3. Validate the integration.

The following sections provide the steps you use to set the `server.conf` parameters and verify the integration.

Setting the Server Configuration Parameters

To set the server configuration parameters:

1. Back up the `<PPM_Home>/server.conf` file.
2. Open the `server.conf` file in a text editor such as Notepad.
3. Add `com.kintana.core.server.EXTERNAL_WEB_PORT`, and set it to the port number in the `workers.properties` file.
4. Change `BASE_URL` to the base URL of the external Web server.

If your external Web server or hardware load balancer uses Secure Sockets Layer (SSL), you must change the BASE_URL parameter value to `https://<Web_Server>:<Port>`.

By default, the HTTPS runs on port 443 on the Web server. If you use a port other than 443, you must specify that port number in the BASE_URL.

5. Save and close the `server.conf` file.
6. Run the `kUpdateHtml.sh` script.

For more information about the `BASE_URL` parameter, see Appendix A, *Server Configuration Parameters,* on page 279. For more information about the `kUpdateHtml.sh` script, see *kUpdateHtml.sh* on page 362.

Verifying the Integration

To verify the integration between the external Web server and the PPM Server:

1. Start the external Web server and check for errors.
2. Start the PPM Server and check for errors.
3. In a supported browser, open the page `<Host>:<Port>/ppm/dashboard/app/portal/PageView.jsp`. (You must use the complete path. Specifying only `<Host>:<Port>/ppm` does not work.)

For information about how to start the PPM Server, see *Starting and Stopping the PPM Server* on page 75. For information about supported browsers, see the *System Requirements and Compatibility Matrix.*

Configuring a Server Cluster

This section provides the following information about server clustering in the PPM Center environment:

- Server clustering overview
- Server clustering configuration
- Starting and stopping servers in a cluster
- Validating the cluster configuration

Overview of Server Clustering

Before you begin to set up a PPM Server cluster, review the information provided in Chapter 2, *System Overview,* on page 19, particularly *Server Cluster Configurations* on page 28. The concepts described in that section are key to understanding configuring server clusters.

KINTANA_SERVER_NAME and the <*PPM_Home*>/server directory

A PPM Server consists of the common code located in the `<PPM_Home>` directory, as well as the directory of files that make up the actual PPM Server. These are separate directories in the `<PPM_Home>/server` directory.

Server nodes are the individual PPM Servers that comprise the server cluster. Each node, or server, in a cluster requires a separate directory in the `<PPM_Home>/server` directory. The directory names are the server names, and they are configured in `server.conf` with the `KINTANA_SERVER_NAME` parameter. Each server directory in `<PPM_Home>/server` must have a corresponding `KINTANA_SERVER_NAME` defined in `server.conf`, all with the same assigned value.

Server directories cannot contain spaces, commas, or other non-alphanumeric characters, except for hyphens (-) or underscores (_). For example, `server1_1` is a valid name, but `server 1,1` is not.

@node Directive in the server.conf File

The `@node` directive in the `server.conf` file (that is, `@node` alone on a line) tells the PPM Server that the parameters after `@node` are specific to one node in the cluster. You must specify one `@node` directive for each server in your cluster. Parameters displayed before the first `@node` are common to all servers.

If you plan to deploy multiple nodes on a single host machine, ensure that each node has its own dedicated ports (HTTP, RMI, SRMI, and so on) that do not conflict.

A common practice in single-server environments is to append new server configuration parameters to the bottom of the file. If you add a configuration parameter to the end of a file associated with a clustered environment, the parameter applies only to the last node defined in the file.

Make sure that you add parameters that are common to all nodes in a cluster to the top of the `server.conf` file, before the first `@node` directive.

Server Parameters Affected by Clustering

Table 5-1 shows which server configuration parameters to define for each server in a server cluster, based on the type of clustering used. For more information about these parameters, see *Server Configuration Parameters* on page 279.

Table 5-1. Server configuration parameters affected by clustering (page 1 of 2)

Parameter Name [a]	External Web Server, Single Machine	External Web Server, Multiple Machines	Hardware Load Balancer, Multiple Machines
KINTANA_SERVER_NAME	X	X	
ATTACHMENT_DIRNAME		X	X

Table 5-1. Server configuration parameters affected by clustering (page 2 of 2)

Parameter Name [a]	External Web Server, Single Machine	External Web Server, Multiple Machines	Hardware Load Balancer, Multiple Machines
BASE_PATH		X The `BASE_PATH` specified for the core server is inherited by all of the `@node` sections. Specify this in an individual `@node` only if the value is different for that specific instance.	X
ORACLE_HOME		X	X
BASE_URL	X	X	X
BASE_LOG_DIR		X	
HTTP_PORT	X	X	X
EXTERNAL_WEB_PORT	X	X	
RMI_URL	X	X	X
TRANSFER_PATH		X	X
PACKAGE_LOG_DIR		X	X
REPORT_DIR		X	X
REQUEST_LOG_DIR		X	X

a. The parameter names listed in the table are shortened versions of the actual names, all of which start with the string com.kintana.core.server. For example, the full name of the `TEMP_DIR` parameter is `com.kintana.core.server.TEMP_DIR`.

If the servers in a server cluster are running on different operating systems, then each `@node` section requires the `SERVER_NAME=<`*`Host_Name`*`> server.conf` directive.

Overview of Server Cluster Configuration

To configure a server cluster:

1. If you are using an external Web server, set up your PPM Server for integration with an external Web server in single-server mode.
2. Stop the PPM Server.

   For information about how to stop the PPM Server, see *Starting and Stopping the PPM Server* on page 75.
3. If you are using an external Web server:
   a. Stop the external Web server.
   b. Configure the `workers.properties` file to include information for the multiple cluster nodes. Each node requires an external Web port defined (using the `EXTERNAL_WEB_PORT` configuration parameter).

      For information about how to configure the `workers.properties` file, see *Configuring the Workers Properties File* on page 112.
4. Configure the server nodes on the file system.
5. Configure the server nodes in the `server.conf` file.

Server Cluster Configuration

This section provides the steps you use to configure the following server cluster setups (*Table 5-1*):

- External Web server, single machine
- External Web server, multiple machines
- Hardware load balancer, multiple machines

External Web Server, Single Machine

To set up a cluster with an external Web server on a single machine:

1. Stop the PPM Server.

   For information about how to stop the PPM Server, see *Starting and Stopping the PPM Server* on page 75.

2. Stop the external Web server.

3. Add the new node and relevant information to the `workers.properties` file.

   For information about how to configure the `workers.properties` file, see *Configuring the Workers Properties File* on page 112.

   Example for a Sun Java System Web Server

```
# node1, already defined when integrating with
# the external Web server
worker.server1.host=machine1
worker.server1.port=8009
worker.server1.type=ajp13
worker.server1.lbfactor=1

# node2, as part of a cluster
worker.server2.host=machine1
worker.server2.port=8010
worker.server2.type=ajp13
worker.server2.lbfactor=1

# Define the load balancer. Be sure to list all servers
# in the PPM Server cluster in the
# balanced_workers group. When adding new nodes,
# add them in the last line to ensure that the load
# is balanced.
worker.load_balancer.type=lb
worker.load_balancer.balanced_workers=server1,server2
```

4. Create the new <*PPM_Home*>/server directory.

   Make a copy of the first server directory (the entire directory) at the same level as the first.

   Example:

   ```
   <PPM_Home>
   + server
         + node1
         + node2
   ```

   Use the value specified for the KINTANA_SERVER_NAME parameter in the server.conf file that corresponds to the subdirectory node for that system.

5. Configure server.conf to include the new node.

   For a single-machine clustered environment, the following is a typical server.conf excerpt.

   ```
   # Map the name of the first server to server/node1
   # and set the Web port.
   # These values should match the workers.properties file.
   com.kintana.core.server.KINTANA_SERVER_NAME=node1
   com.kintana.core.server.EXTERNAL_WEB_PORT=8009

   @node
   # Map the name of this node to server/node2
   # If the instance, @node, is on different system than the
   # primary, you must specify the host machine name:
   # "com.kintana.core.server.SERVER_NAME=<HOST_NAME>"
   com.kintana.core.server.KINTANA_SERVER_NAME=node2
   com.kintana.core.server.EXTERNAL_WEB_PORT=8010
   # Each node must have its own RMI_URL for the Workbench
   com.kintana.core.server.RMI_URL=
   rmi://machine1:21601/KintanaServer
   # Each node must have its own internal Web port
   com.kintana.core.server.HTTP_PORT=21700
   ```

6. To apply the changes to all the servers in the cluster, from <*PPM_Home*>/bin, run kUpdateHtml.sh.

7. If you have additional nodes in your cluster, repeat step 1 through step 6.

8. If the PPM Server is running in a Windows environment, start it using the Windows service called "PPM Server_name," where server_name is the value of the KINTANA_SERVER_NAME parameter for the node in the cluster.

9. Generate a new service for the new node, as follows:

   a. From <*PPM_Home*>/bin, run kConfig.sh.

      The configuration wizard starts up.

   b. Select **Configure Windows Services.**

   c. Follow the wizard prompts to create the service.

10. To validate the cluster, use the procedure provided in *Verifying Successful Cluster Configuration* on page 143.

External Web Server, Multiple Machines

In a server cluster, an <*PPM_Home*> directory must reside on each machine, each with a server running against the same database.

To set up a cluster with an external Web server on multiple machines:

1. Install the PPM Server on the first machine in the cluster and configure it so that it is integrated with an external Web server.

   For information about how to configure a machine for integration with an external Web server, see *Configuring an External Web Server* on page 109.

2. Stop the PPM Server.

   For information about how to stop the PPM Server, see *Starting and Stopping the PPM Server* on page 75.

3. Stop the external Web server.

4. Make sure that the common directories that the servers use (<*PPM_Home*>/logs, <*PPM_Home*>/reports, <*PPM_Home*>/attachments, and <*PPM_Home*>/transfers) are shared.

Set the permissions for the shared directories so that users of each machine in the cluster can read from and write to them.

5. Add the new node and relevant information to the `workers.properties` file.

   Example of a `workers.properties` file on Sun Java System Web Server:

```
# node1, already defined when integrating with
# the external Web server
worker.server1.host=machine1
worker.server1.port=8009
worker.server1.type=ajp13
worker.server1.lbfactor=1

# node2, as part of a cluster on a different host
worker.server2.host=machine2
worker.server2.port=8010
worker.server2.type=ajp13
worker.server2.lbfactor=1

# Define the load balancer. Be sure to list all servers
# in the PPM Server cluster in the
# balanced_workers group. When adding new nodes,
# add them in the last line to make sure the load
# is balanced.
worker.load_balancer.type=lb
worker.load_balancer.balanced_workers=server1,server2
```

6. Configure `server.conf` to include the new node.

   The following is a typical `server.conf` excerpt for a multiple-machine clustered environment.

If the servers in a server cluster are running on different operating systems, then each `@node` section requires the `SERVER_NAME=<Host_Name> server.conf` directive.

```
@node
#
# The name that identifies this server instance. If you are
# running multiple servers on the same machine, this name
# must be unique for each server. This value is also used as
# the Windows service name.
# NOTE: All HP PPM Server services are prefaced with the
# string 'HP PPM'.
#
com.kintana.core.server.KINTANA_SERVER_NAME=PPM750
#
# DNS name or IP address of the machine that hosts the
# PPM Center.
#
com.kintana.core.server.SERVER_NAME=servername
```

```
#
# The PPM Server uses the HTTP_PORT value
# to identify which port is used to communicate with the
# built-in HTTP server. This is a unique port number,
# distinct from Web server, SQL*Net, and RMI ports. The
# default HTTP port is 8080, but any port number above 1024
# is valid, depending upon system restrictions.
#
com.kintana.core.server.HTTP_PORT=8085

#
# Include pointers to shared log directories.
com.kintana.core.server.BASE_LOG_DIR=/shared/logs
com.kintana.core.server.PACKAGE_LOG_DIR=/shared/logs
com.kintana.core.server.REPORT_DIR=/shared/reports
com.kintana.core.server.REQUEST_LOG_DIR=/shared/logs
com.kintana.core.server.TRANSFER_PATH=/shared/transfers
```

You must specify the `BASE_LOG_DIR, REPORT_DIR, ATTACHMENT_DIRNAME,` and `TRANSFER_PATH.` The rest of the log directories are derived from these four directories. Consider specifying these before the first `@node` so that you do not have to specify them in each and every `@node` section.

On a Windows system, you must use the UNC format (`\\<Host_Name>\<Drive_Letter>\<path>`). You cannot use the local shared drive letter. Use forward slashes.

Example

`//<Host_Name>/<Drive_Letter><Path>)`

To enable a node to share these directories, you must start the PPM Windows services using the PPM Center user account that has read and write permission on the shared host.

Example

```
//com.kintana.core.server.TRANSFER_PATH=//kiwi/e$/PPM_Prod/
transferpath
```

On a UNIX system, you must NFS-mount the shared directories locally with the same directory structure.

```
# ORACLE_HOME of machine2
com.kintana.core.server.ORACLE_HOME=/opt/oracle

# <PPM_Home> for this node
com.kintana.core.server.BASE_PATH=/home/PPM

# Note that machine2 and 8010 should match
# the workers.properties file.
com.kintana.core.server.RMI_URL=
rmi://machine2:20001/KintanaServer
com.kintana.core.server.EXTERNAL_WEB_PORT=8010
com.kintana.core.server.KINTANA_SERVER_NAME=node2
```

```
#
# The absolute pathname to the directory where attachments
# are to be stored. Because this directory has the potential
# to grow very large, HP recommends that you not place
# it in the <PPM_Home> directory tree.
# NOTE: This directory must give read/write access to
# Web browsers.
#
com.kintana.core.server.ATTACHMENT_DIRNAME=C:/PPM750/
attachments
```

7. Repeat step 1 through step 6 for all nodes in the cluster.
8. After you configure the first server to include all additional nodes, copy the entire `<PPM_Home>/server` directory from machine1 to machine2, to the `BASE_PATH` defined in the `@node` directive.

   Zip the file, send it using FTP, and then unzip it at the destination.
9. After you copy the file, change the directory to `<PPM_Home>/server` on the new machine, and then rename the `node1` directory to `node2`.

   The server name must match the value set for the `KINTANA_SERVER_NAME` parameter.

   Example

   The directories on machine1 could be:

   ```
   <PPM_Home>
      + server/
         + node1
   ```

   The directories on machine2 could be:

   ```
   <PPM_Home>
      + server/
         + node2
   ```
10. Put a new license on machine2, as required by the new IP address.
11. Run `kUpdateHtml.sh` on all servers to apply the `server.conf` changes.
12. Start the PPM Server using the Windows service.

    In a multiple-machine configuration, you must generate the services on all machines running Windows.

13. Generate a new service for the new node, as follows:

    a. From <*PPM_Home*>/bin, run kConfig.sh.

       The configuration wizard starts up.

    b. Select **Configure Windows Services.**

    c. Follow the prompts to create the service.

The keys in the security directory are required to read encrypted values in server.conf and the database. The same keys must be present on all nodes in the cluster.

Hardware Load Balancer, Multiple Machines

You can use a hardware load balancer as the front end of a PPM Server cluster configuration. A hardware load balancer is similar to an HTTP reverse-proxy server and forwards HTTP requests.

All PPM Servers in a server cluster must listen for HTTP requests on a unique port. Each server in the cluster must have its HTTP_PORT parameter set to a unique value that does not conflict with other external applications. You specify this parameter value for all servers in a cluster in the @node section of the server.conf file.

Sticky sessions are required for hardware load balancing in the PPM Center environment.

Starting and Stopping Servers in a Cluster

If you stop any server in a PPM Server cluster, the PPM Server cluster continues to operate as long as at least one server in the cluster is running. If a server stops, the HP PPM Web server module detects that the server is unavailable and stops sending it HTTP requests. When the server becomes available again, the HP PPM Web server module detects the server and sends it requests again.

The procedures used to start and stop the primary server in a cluster are identical to the procedures used to start and stop the server in a single-server configuration. For information, see *Starting and Stopping the PPM Server* on page 75.

To start a secondary server, use the `-name server-name` argument in the `kStart.sh` script, as follows.

```
sh ./kStart.sh -name=<Secondary_Server> -now -user <User_Name>
```

To stop a secondary server, use the `-name server-name=KINTANA_SERVER_NAME=server/server-name` argument in the `kStop.sh` script, as follows.

```
sh ./kStop.sh -name=<Secondary_Server> -now -user <User_Name>
```

On Windows, there is one service (called "`HP PPM <PPM_Server_Name>`") per server. If you prefer to use the Windows shell command line to start servers instead of using Windows Services, you can use the `kStarts.sh` script.

If you do not have a script to start or stop all servers in a cluster, you can write custom scripts to perform these tasks.

Example

The following script for the UNIX environment starts all three servers in a cluster configuration (if all nodes are on the same machine).

```
#!/bin/sh
./kStart.sh -name serv1
./kStart.sh -name serv2
./kStart.sh -name serv3
```

The following script stops all three servers in a cluster configuration.

```
#!/bin/sh
./kStop.sh -name serv1
./kStop.sh -name serv2
./kStop.sh -name serv3
```

If you make a change to the `server.conf` file that affects more than one server in a cluster, you must:

- Stop and restart all the servers in the cluster.
- Update the server configuration file (`server.conf`) on all machines.

Verifying Successful Cluster Configuration

To verify successful server cluster configuration:

1. If you are using an external Web server, start it and check for errors.

   If the server does not start, make sure that the values in the `workers.properties` file are correct. If you have already validated the external Web server configuration, the problem is likely in this file.

2. Start, and then try to connect to, one of the servers.

   If you cannot connect to the server, check the `server.conf` file and correct any errors you find.

3. Start the remaining servers in the cluster.

4. Use the `kStatus.sh` script to confirm that all server nodes are running.

   If a node is not running, check the server log files in `<`*`PPM_Home`*`>/server/<`*`PPM_Server_Name`*`>/log` for errors.

Example:

```
> cd <PPM_Home>/bin
> sh ./kStatus.sh
delorean[6]bin: sh kStatus.sh
JAVA_HOME = /usr/j2sdk1.5
java version "1.5"
Java(TM) 2 Runtime Environment, Standard Edition (build
1.5-b03)
Java HotSpot(TM) Client VM (build 1.5-b03, mixed mode)
Checking rmi://machine1:28001/KintanaServer
--> running (load: 0.0, mode: NORMAL)

Checking rmi://machine2:29001/KintanaServer
--> running (load: 1.0, mode: NORMAL)
```

In addition, ensure that:

- Multiple users logging on are automatically distributed to all servers. Use server reports to verify which users are logged on to which servers.
- If you shut down a server, users logged on to the other servers can continue to work. Users logged on to the shut down server can log on again and continue to work.
- If you shut down a server that was running services, those services automatically start on one of the other servers. You can use server reports to determine which server is running services.

For information about server reports and how to run them, see *Running Server Reports from the Admin Tools Window* on page 178 and *Running Server Reports from the Command Line* on page 182.

Multicast Settings for Server Cluster Configurations

Multicast must be enabled on network components such as network cards, switches, and routers. To avoid conflicts between cluster environments, consider the following:

- Each cluster environment must have `MULTICAST_IP` and/or `MULTICAST_PORT` values specified both in the `server.conf` file, and in the `cache.conf` file.
- All members in a cluster, such as a production cluster, must use the same `MULTICAST_IP` and `MULTICAST_PORT` settings.
- If several cluster environments (for example, for Development, Test, and Production) are on the same network segment, you must change the `MULTICAST_IP` and `MULTICAST_PORT` parameters in the `server.conf` file, and the corresponding settings in `cache.conf` file.
- On Linux systems, if multiple clusters use the same `MULTICAST_IP` and `MULTICAST_PORT` parameter values, the PPM Server(s) may not start up.
- If clusters other than those related to PPM Center are set up, and these use the same multicast IP/port, the environment may also conflict.

6 Implementing User Authentication

Overview of Implementing User Authentication

PPM Center uses a framework similar to Java Authentication and Authorization Service (JAAS) to integrate with pluggable authentication schemes. Integration of PPM Center with CA SiteMinder and LDAP is supported. This chapter provides information on how to integrate PPM Center with SiteMinder and LDAP, as well as instructions on how to implement either Web remote single sign-on or generic single sign-on with PPM Center.

The following sections address different types of user authentication methods supported for use with PPM Center. They provide instructions on how to:

- Integrate PPM Center with an LDAP directory server
- Implement Web remote single sign-on with PPM Center
- Implement generic single sign-on with PPM Center
- Integrate PPM Center with SiteMinder

Integrating with an LDAP Server

You can integrate PPM Center with any LDAP v3-compliant server such as Microsoft Windows Active Directory. Integrating with an LDAP server helps minimize the setup and maintenance costs associated with user account management. With an LDAP server, the PPM Server authenticates users directly to the LDAP directory server, and does not store passwords in the PPM Center database.

This section addresses LDAP directory server integration with a PPM Center. For information on how to import users from LDAP and on LDAP authentication, see the *Open Interface Guide and Reference.*

In an LDAP environment, the PPM Server authenticates users in the following way:

- The PPM Server binds to the LDAP server using the credentials supplied in the `KINTANA_LDAP_ID` and `KINTANA_LDAP_PASSWORD` server configuration parameters. If passwords are not supplied in the `server.conf` file, the PPM Server performs anonymous authentication.
- The PPM Server tries to obtain the user name by supplying a search filter to the LDAP server in the format `uid=user name`. The `uid` attribute can vary from one LDAP server to another, depending on the information supplied in the `server.conf` file.
- If the PPM Server obtains a name, it tries to rebind to the LDAP server using the name and the password supplied by the user.
- If more than one LDAP server has been specified in the `LDAP_URL server.conf` parameter, the PPM Server tries to authenticate against all LDAP servers until it succeeds. If the referral option is enabled, and the user is not logged on to the primary server, the PPM Server also checks the referral server for authentication.

Integrating PPM Center with an LDAP Server

To integrate PPM Center with an LDAP server:

1. Collect the following LDAP server information:
   - LDAP server URL (the default port is 389), in the following format.

     `Ldap://<LDAP_Server>:PORT`
   - LDAP base distinguished name (DN) for PPM Center users, in the following format:

     `CN=Users,DC=PPMAD,DC=com`
   - LDAP user account and password. (The PPM Server uses this information to look up users.)
   - If you are integrating with SSL-enabled LDAP, collect the following additional information.
     - Entire certificate chain. That is, `root_certificate_authority/intermediate_certificate/host_certificate`, in the BASE-64 encoded X509 (`.cer`) file format.
     - LDAP SSL port number (the default is typically 636).
2. From `<PPM_Home>/bin` on the PPM Server, run the `kConfig.sh` script.
3. Provide the information that you collected in step 1 for the following server configuration parameters in the `server.conf` file:
   - `AUTHENTICATION_MODE=PPM,LDAP`
   - `LDAP_URL`. Specify the comma-delimited list of LDAP URLs that the PPM Server queries (in the order queried). If you do not specify a port number, the server uses port number 389.

     Example

     `ldap://ldap.theurl.com:389`
   - `KINTANA_LDAP_PASSWORD`. Specify the PPM Center password on the LDAP server.

Example

```
#!#ghengis#!#
```

If you run the `kConfig.sh` script, the PPM Server configuration utility automatically encrypts this password. In this case, you must type the exact password string.

If you modify the `server.conf` file manually, you must encrypt the password string by enclosing it with the `#!!#` character delimiters (as shown in the example), and then set this encrypted string as the `KINTANA_LDAP_PASSWORD` parameter value.

- `KINTANA_LDAP_ID`. Specify the PPM Center account on the LDAP server. The PPM Server uses this to bind to the LDAP server.

  Examples

  - `KINTANA_LDAP_ID=kintana`
  - `\KINTANA_LDAP_ID=CN=kintana,CN=Users,DC=PPMAD,DC=com`

- `LDAP_BASE_DN`. Specify the base in the LDAP server from which the search is to start. If you do not specify a value, the server queries the LDAP server to determine the base.

  Example

  ```
  LDAP_BASE_DN=CN=Users,DC=PPMAD,DC=com
  ```

For an SSL-enabled LDAP server, provide the following additional information:

- `LDAP_SSL_PORT=636`
- `LDAP_KEYSTORE=<JAVA_Home>/jre/lib/security/cacerts`
- `LDAP_KEYSTORE_PASSWORD=changeit`

The script run makes the required changes to the `server.conf` file, encrypts the LDAP password, and updates the required PPM Center startup files.

4. On the PPM Server, back up the existing `LdapAttribute.conf` file, which is located in the `<PPM_Home>/integration/ldap` directory.

   The `LdapAttribute.conf` file is required for user importation and authentication. The `<PPM_Home>/integration/ldap` directory contains LDAP attribute configuration files for different types of LDAP servers.

5. Copy the appropriate `LdapAttribute_<Vendor_Name>.conf` file and overwrite the `LdapAttribute.conf` file in the same directory.

   If you are using Microsoft Active Directory, replace the `LdapAttribute.conf` file with the `<PPM_Home>/integration/ldap/LdapAttribute_AD.conf` file.

   If you are using a Sun Java System Active Server Pages LDAP server, replace the `LdapAttribute.conf` file with the `<PPM_Home>/integration/ldap/LdapAttribute_Netscape.conf` file.

6. If you are integrating with an SSL-enabled LDAP server, do the following:

   a. Get the entire trusted certificate chain of the LDAP server (`Root CA/Intermediate Certificate/host Certificate`, exported as Base-64 encoded `X509.cer` format) from your LDAP server administrator.

   If the certificate chain is not in the correct `X509.cer` format, you can import it to Internet Explorer, and then export it in the correct format.

   b. Use the JDK Keytool utility (from jdk 1.4.2 or later) to import the certificate into the `<JAVA_Home>/jre/lib/security/cacerts keystore` file.

   Your system administrator can help you use the JRE Keytool utility to import the LDAP server certificate chain into the JDK cacerts file.

c. Change to the `<JAVA_Home>/jre/lib/security` directory, and run the command:

```
keytool -import -trustcacerts -alias <SSL_LDAP_Host>
-file <SSL_LDAP_CERT.cer> -keystore cacerts
```

The default cacerts keystore password is “changeit.” For tighter security, you may want to change this password.

7. To enable entity ownership and security, do the following:

   a. Ensure that the PPM Server is running.

   b. Use the Import Users report to import the LDAP user into the KNTA_USERS table on the PPM Server.

      For instructions on how to run the Import Users report, see the *Open Interface Guide and Reference.*

      If you are running the Import Users report for the first time, edit the `LdapAttribute.conf` file and comment out the `MANAGER_USERNAME`, `LOCATION_MEANING`, and `DEPARTMENT_MEANING` parameters. If you do not make these changes, the import fails and an error message such as “Unknown Manager,” “Unknown Location,” or “Unknown Department” is displayed. The error occurs because the import tries to validate the data before the data is imported.

   c. For the **LDAP Import?** option, click **Yes.**

Authenticating Against Multiple LDAP Domains

PPM Center can handle multiple domains during LDAP authentication. To configure this feature, you add the server configuration parameter `LDAP_URL_FULL` to the `server.conf` file.

The values for the `LDAP_URL_FULL` parameter include a space-delimited (not comma-delimited) list of full LDAP URLs. Each LDAP URL must specify a base distinguished name (DN), which is used in place of the `LDAP_BASE_DN` server configuration parameter.

Example of how to set the `LDAP_URL_FULL` parameter:

```
com.kintana.core.server.LDAP_URL_FULL=ldap://<Host>.<Your_
Domain>.com/CN=Users,DC=<Your_Domain>,DC=com ldap://
<Host>.<Your_Domain>.com/OU=Users2,DC=<Your_Domain>,DC=com
```

The `LDAP_URL_FULL` parameter supersedes the `LDAP_URL` parameter. That is, if both are specified in the `server.conf` file, PPM Center uses the value set for `LDAP_URL_FULL`. If the URLs provided for `LDAP_URL_FULL` do not have a DN value, PPM Center uses the value set for `LDAP_BASE_DN`.

To specify a space character inside of an URL, use the URL-encoding scheme, and replace the space with `%20`. For example, if you have an organizational unit called My Org Unit, then specify `My%20Org%20Unit` in the LDAP URL.

For more information about server parameters related to LDAP integration, see *LDAP Attribute Parameters* on page 348.

Validating LDAP Parameters

You can use any of several available tools to validate and troubleshoot the LDAP configuration parameters. For example, Softerra provides Softerra LDAP Browser freeware, which you can download and install. You can then use the LDAP server information you collected in step 1 to create a new LDAP server profile. This will confirm that the information is correct. On the LDAP browser windows at the top, blue line, you can view the DN for a specific resource. Use this to determine the base DN as well as the search filter for the Import Users report.

To download the Softerra LDAP Browser software, go to the following Web site:

ldapadministrator.com/download/index.php?PHPSESSID=793cd9e97a2be8f9cabcf7c148b14cf4

Implementing Web Remote Single Sign-On with PPM Center

This section provides information on how to implement Web remote single sign-on with PPM Center. This implementation is based on NTLM authentication and requires that the PPM Server(s) be integrated with an external Web server running Microsoft IIS.

Web remote single sign-on works with PPM Center as follows:

1. A user logs in to a Windows desktop.
2. The user accesses PPM Center through the external (IIS) Web server.
3. The user is authenticated through the Windows user account to IIS and the user name is passed to the PPM Server by way of the `REMOTE_USER` HTTP header field.
4. If the user is a valid PPM Center user, the standard interface and PPM Dashboard will open.

Requirements for Implementing Web Remote Single Sign-On

To implement Web remote single sign-on, your system must meet the following requirements:

- PPM Center must be set up with an external Microsoft IIS Web server. For information on how to do this, see *Integrating an External Web Server with a PPM Server* on page 129.
- Clients must use Microsoft Internet Explorer to log on to PPM Center. Logon credentials are not automatically passed from Web browsers other than Internet Explorer (for example, Firefox) when connecting to IIS.

Setting Up Web Remote Single Sign-On with PPM Center

To configure Web remote single sign-on with PPM Center:

1. Integrate the external IIS Web server with the PPM Server(s).

   For information about how to integrate the external Web server with a PPM Server, see *Integrating an External Web Server with a PPM Server* on page 129.

2. On the PPM Server, do the following:

   a. Stop the PPM Server.

   b. Open the `server.conf` file in a text editor, and then add to it the following:

   ```
   com.kintana.core.server.SINGLE_SIGN_ON_PLUGIN
   =com.kintana.sc.security.auth.WebRemoteUserSingleSignOn
   ```

   For information on how to edit the `server.conf` file, see *Server Configuration Parameters* on page 281.

   c. Save and then close the `server.conf` file.

   d. Run the `kUpdateHtml.sh` script.

   For information about the `kUpdateHtml.sh` script, see *kUpdateHtml.sh* on page 362.

3. On the IIS external Web server, do the following:

   a. From IIS Microsoft Management Console, select the default Web site.

   b. Right-click the default Web site, and then click **Properties** on the shortcut menu.

   c. Click the **Directory Securities** tab.

   d. Under **Anonymous access,** click **Edit.**

   e. Deselect the **Anonymous Access** checkbox.

   f. Leave the **Integrated Windows authentication** checkbox selected.

g. Click **OK.**

h. Click **OK.**

i. Stop, and then restart the IIS Windows service.

Do not use Basic Authentication. If you do, the Web server does not force the browser to authenticate, and so does not result in a single sign-on solution.

4. Stop, and then restart the PPM Server.

For information on troubleshooting issues you may encounter with Web remote single sign-on, see *Troubleshooting Your Single Sign-On Implementation* on page 158.

Implementing Generic Single Sign-On with PPM Center

This section provides information on how to configure PPM Center to use the generic single sign-on module to integrate with third-party authentication servers.

Single sign-on works as follows:

1. A user logs on to a portal that has been configured to use a third-party authentication application.
2. The user accesses the PPM Center standard interface through an external Web Server integration that is part of the logged-in domain.
3. The PPM Server receives the user information through the HTTP header specified in the `sso.conf` file.
4. If the user is a valid PPM Center user, he is granted access to the PPM Center standard interface and PPM Dashboard.

Requirements for Implementing Generic Single Sign-On

To implement generic single sign-on with PPM Center, your PPM Center system be integrated with an external Web server (Sun Java System Web Server, an Apache-based server, or IIS).

Setting Up Generic Single Sign-On with PPM Center

To implement generic single sign-on:

1. Regarding the third-party authentication application you plan to use:
   a. To configure the third-party application, follow the instructions provided with the application.
   b. Verify that the PPM Center user is also a valid single sign-on user and can be authenticated.
2. External Web server:
   a. Integrate PPM Center with the external Web server.

      For information on how to integrate an external Web server, see *Integrating an External Web Server with a PPM Server* on page 129.
   b. Configure the external Web server to integrate with the third-party authentication application. For information on how to do this, see the documentation provided with the with third-party authentication application.
   c. Ensure that the authenticated user's HTTP request is forwarded to the PPM Server with the user ID inserted into the HTTP header specified in the `sso.conf` file.

      You can find the `sso.conf` file in the `<PPM_Home>/integration/sso` directory.
3. PPM Server configuration
   a. Verify that the `sso.conf` file has the following setting.

      `USERNAME=<Authenticated_User_Header>`

      where `<Authenticated_User_Header>` is the header your single sign-on system uses to store the user ID of the authenticated user. For example, CA SiteMinder uses `HTTP_SM_USER`.

b. Add the following line to the `server.conf` file.

```
com.kintana.core.server.SINGLE_SIGN_ON_
PLUGIN=com.kintana.sc.security.auth.GenericSingleSignOn
```

c. Run the `kUpdateHtml.sh` script, which is located in the `<PPM_Home>/bin` directory.

4. Stop, and then restart the PPM Server.

For information on troubleshooting issues you may encounter with single sign-on, see *Troubleshooting Your Single Sign-On Implementation*.

Troubleshooting Your Single Sign-On Implementation

Determine the header information that the single sign-on server is sending.

1. Check the timestamp as follows:

a. Open the `server.conf` file in a text editor, and set the value of the `ENABLE_WEB_ACCESS_LOGGING` parameter to `true`.

For information on how to edit the `server.conf` file, see *Server Configuration Parameters* on page 281.

b. Run the `kUpdateHtml.sh` script.

c. Restart the PPM Server.

For details on how to stop and start the PPM Server, see *Starting and Stopping the PPM Server* on page 75.

d. Log on to PPM Center.

e. Check the timestamp on the PPM Server.

f. Navigate to the `<PPM_Home>/server/<PPM_Server_Name>/log` directory.

g. Open the `<Date>.access.log` file and check the timestamp.

2. Open the `logging.conf` file (located in the `<PPM_Home>/conf` directory) in a text editor, and add the following text.

```
com.kintana.core.logging.PRODUCT_FUNCTION_LOGGING_LEVEL =
com.kintana.web.filter.debug, DEBUG
com.kintana.core.logging.PRODUCT_FUNCTION_LOGGING_LEVEL =
com.kintana.sc.authentication, DEBUG
com.kintana.core.logging.SYSTEM_THRESHOLD = DEBUG
```

3. Restart the PPM Server by running the following:

```
sh ./kStart.sh -debug
```

   The information is written to the `<PPM_Home>/bin/serverLog_<Debug_Timestamp>.txt` file.

4. Enable logging on the single sign-on agent side, and then check the information passed back and forth. Check for any error messages reported.

After you check for problems and error messages, you can remove the debugging code you added to the `logging.conf` file in step 2.

Integrating PPM Center with CA SiteMinder

You can configure PPM Center to delegate user authentication to CA SiteMinder for both the standard (Web) and PPM Workbench interfaces. The configuration supports two authentication modes: mixed and Single Sign-On (SSO).

Mixed Mode

In the mixed mode configuration, PPM Center users can continue to log on using the PPM Center logon page. Within the PPM Server, the integrated SiteMinder Authentication Module routes the logon request to an existing SiteMinder Policy Server for authentication. This mode is referred to as mixed because you can configure PPM Center to use both SiteMinder and its own authentication simultaneously. In this case, the authentication mode to be used must be specified in each PPM Center user account.

Integration Architecture for Mixed Mode

In a mixed mode configuration, users log on to PPM Center, and the integrated SiteMinder Authentication Module passes logon information to the SiteMinder Policy Server for authentication.

To use mixed mode, you must configure the integrated SiteMinder Authentication Module correctly. An external Web server can be used, but is not required. For information about external Web servers supported, see the *System Requirements and Compatibility Matrix.*

For PPM Workbench clients, once the user provides a username and password in the logon page, the user authentication information is passed to the SiteMinder Policy Server for verification. Once verified, the information is passed to the PPM Workbench applet for automatic logon. After it starts, the applet communicates directly with the PPM Server.

Figure 6-1 shows a system diagram of the SiteMinder integration in mixed mode. *Figure 6-2* shows the integration architecture for mixed mode with the optional external Web server.

Figure 6-1. SiteMinder integration architecture for mixed mode

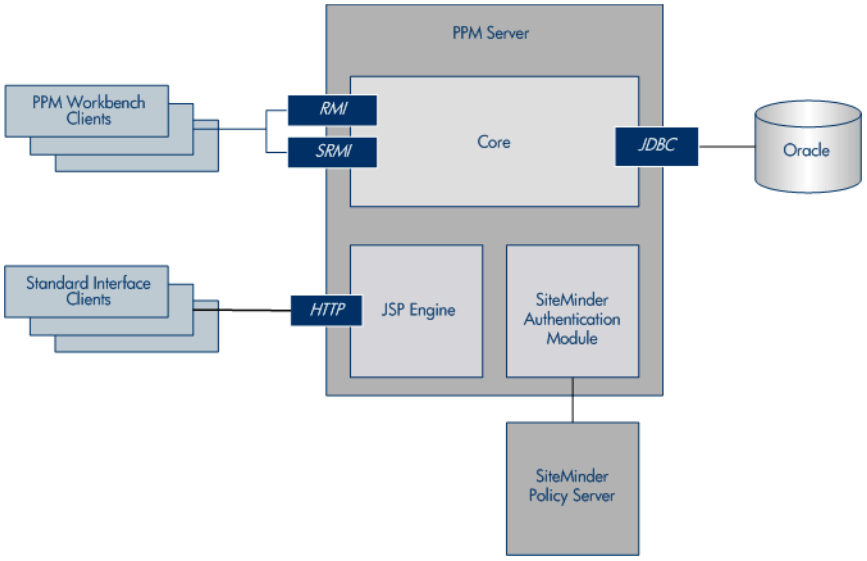
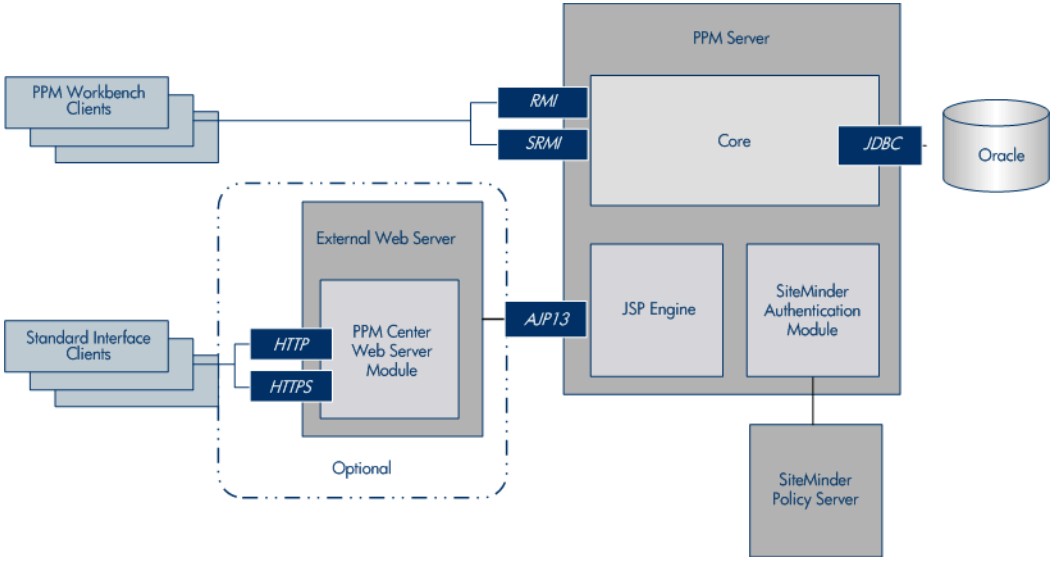


Figure 6-2. SiteMinder integration architecture for mixed mode with optional external Web server



Single Sign-on Mode

In the SSO mode configuration, Web requests are authenticated before being passed to PPM Center, bypassing the PPM Center logon page. To enable SSO mode, the SiteMinder Web Agent must be plugged into any third-party Web server software that PPM Center supports, and be configured to communicate with a SiteMinder Policy Server. The SiteMinder Web Agent intercepts Web requests and checks with the Policy Server to ensure they are authenticated before passing them to PPM Center.

Note that you cannot use SiteMinder to manage PPM Center application-level authorization for controlling access to various screens and functions. Application-level authorization is controlled by the PPM Center security model using security groups, access grants, product licensing, and so on. Therefore, user accounts must exist in both PPM Center and the SiteMinder Policy Server, but PPM Center does not have to maintain the associated passwords.

Integration Architecture for Single Sign-On Mode

Single sign-on configuration requires that PPM Center be integrated with an external Web server that has both the SiteMinder Web Agent and PPM Center Web Server Module installed. (The PPM Center internal Web server does not support SiteMinder SSO because there is no compatible Web agent or a suitable API to create one.)

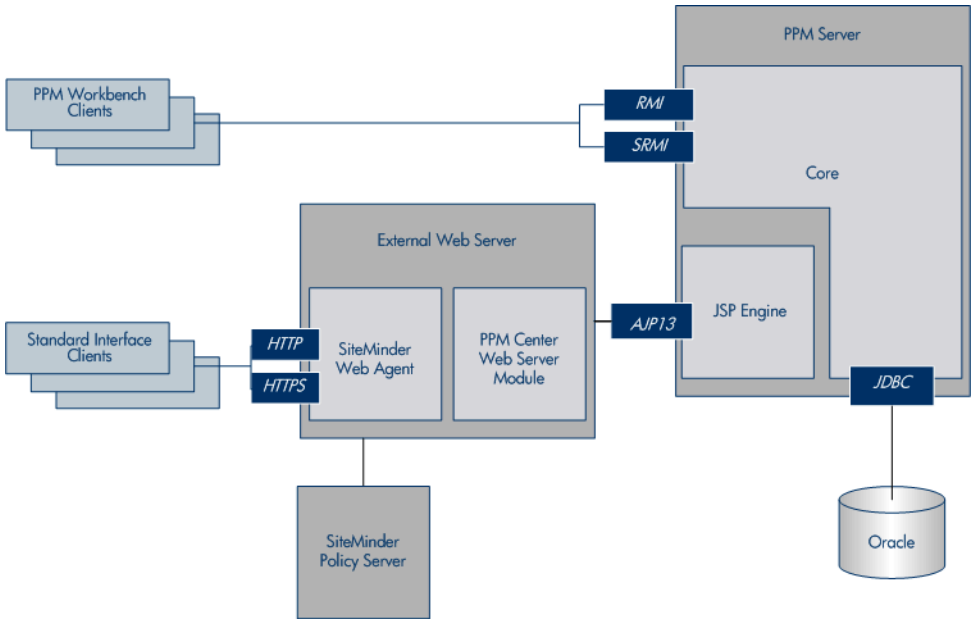
The SiteMinder Web Agent is the single access point for all Web clients. The SiteMinder Web Agent intercepts all incoming requests and ensures that they are authenticated before passing them to the PPM Center Web Server module. The requests then proceed to the PPM Server.

For PPM Workbench clients, the SiteMinder Web Agent protects access to the PPM Workbench logon page. After the user provides a username and password, the authentication information is passed to the PPM Workbench applet for automatic logon. Once started, the applet communicates directly with the PPM Server.

PPM Workbench does not support SSO mode if you start it as an application (from the menu bar, select **Administration > Open Workbench on Desktop**). However, if PPM Center is launched as an application, it uses SiteMinder to authenticate. See *Configuring the PPM Workbench to Run as a Java Applet* on page 104.

Figure 6-3 shows a system diagram of SiteMinder integration in SSO mode.

Figure 6-3. SiteMinder integration architecture for SSO mode



Requirements for Integrating with SiteMinder

The requirements for integrating PPM Center with SiteMinder are as follows:

- An External Web server (required for SSO mode, optional for mixed mode)
- PPM Center Web Server Module
- CA SiteMinder version 6.0 (for both SSO and mixed modes) is installed and functioning correctly

For information on how to install SiteMinder, see the product documentation.

- SiteMinder Java Agent API is installed (for mixed mode only)

Overview of Integrating PPM Center with SiteMinder

PPM Center integration with SiteMinder involves the following tasks:

1. Configure PPM Center for integration with SiteMinder
2. Configure SiteMinder for integration with PPM Center.

The configuration of SiteMinder for integration with PPM Center must be performed by a SiteMinder administrator.

The following sections provides instructions for performing these tasks.

Configuring PPM Center for Integration with SiteMinder

To configure PPM Center to integrate with SiteMinder, perform the following steps:

1. Verify that your PPM Center installation is functioning correctly.
2. (Mixed mode only) If you plan to use mixed authentication mode, do the following:
   a. Install the SiteMinder Java Agent API on the PPM Server:
      - On a Windows system, copy the `smjavaagentapi.jar` file to the `<PPM_Home>\server\<PPM_Server_Name>\deploy\itg.war\WEB-INF\lib` directory.
      - On a UNIX system, copy the `smjavaagentapi.jar` file to the `<PPM_Home>/server/<PPM_Server_Name>/deploy/itg.war/WEB-INF/lib` directory.

      
      This JAR file is available on the SiteMinder Developer SDK CD. The PPM Server automatically includes the JAR file in its CLASSPATH upon server startup.

   b. Install the SiteMinder Agent native code:
      - On a Windows system, copy the `smjavaagent.dll` file to the `<PPM_Home>\integration\siteminder` directory.

      
      If you prefer to copy the file to a different directory, ensure that the directory path is included in the PATH system environment variable.

      - On a UNIX system, copy the `libsmjavaagent` API library file to the `<PPM_Home>/integration/siteminder` directory.

      
      If you prefer to copy the file to a different directory, ensure that the directory path is included in the LD_LIBRARY_PATH system environment variable.

3. (Mixed mode only) Open the `siteminder.conf` file (located in the `<PPM_Home>/integration/siteminder` directory), and ensure that the settings for the following SiteMinder parameters match the corresponding settings in the SiteMinder setup:

   - `SM_ACCOUNTING_PORT`
   - `SM_AGENT_NAME`
   - `SM_AUTHENTICATION_PORT`
   - `SM_AUTHORIZATION_PORT`
   - `SM_CONNECTION_MAX`
   - `SM_CONNECTION_MIN`
   - `SM_CONNECTION_STEP`
   - `SM_CONNECTION_TIMEOUT`
   - `SM_POLICY_SERVER`
   - `SM_PROTECTED_URL`
   - `SM_SHARED_SECRET`

   Pay particular attention to the value set for `SM_AGENT_NAME`.

   If any SiteMinder settings are modified later, you must update the `siteminder.conf` file to reflect these changes.

4. (Optional, but recommended) Create a backup copy of the PPM Server `server.conf` file.

5. For mixed mode authentication only:

   a. To enable selection of either SiteMinder or PPM authentication for PPM Center users, in the `server.conf` file, modify the authentication mode as follows:

      ```
      com.kintana.core.server.AUTHENTICATION_MODE
      =PPM,SiteMinder
      ```

b. Comment out the following parameter setting in the `server.conf` file.

```
com.kintana.core.server.SINGLE_SIGN_ON_PLUGIN
=com.kintana.sc.security.auth.SiteMinderSingleSignOn
```

c. Stop, and then restart the PPM Server.

d. From the User Workbench, (from the PPM Workbench shortcut bar, select **Sys Admin > Users**), change the users' authentication mode to SiteMinder.

You may want to set a few user accounts to use the PPM authentication mode. to enable access to PPM Center in the event that the SiteMinder Policy Server is unavailable.

6. For SSO mode only:

a. To enable only SiteMinder authentication for PPM Center users, in the `server.conf` file, change the authentication mode as follows.

```
com.kintana.core.server.AUTHENTICATION_MODE=SiteMinder
```

b. In the `server.conf` file, specify the use of SSO as follows.

```
com.kintana.core.server.SINGLE_SIGN_ON_PLUGIN
=com.kintana.sc.security.auth.SiteMinderSingleSignOn
```

When both the SiteMinder Web Agent and PPM Center Web server module are installed on the external Web server, the SiteMinder Web Agent always takes precedence for requests in the form of `/itg/*`.

7. Stop, and then restart the PPM Server.

Configuring PPM Center Users

To configure PPM Center users to authenticate using SiteMinder, complete the following steps:

1. Ensure that the usernames for PPM Center users match those used by SiteMinder.
2. Ensure that PPM Center users are set up to use SiteMinder authentication.

In SSO mode, users whose authentication mode is set to anything other than SiteMinder will be forced to log on to SiteMinder. Users not set up correctly in SiteMinder will be locked out of PPM Center. If this occurs, revert to the `server.conf` file you created in step 4 on page 166, and then make the necessary changes to the user accounts before resetting the authentication mode in the `server.conf` file.

Configuring SiteMinder for Integration with PPM Center

Before you configure SiteMinder for use with PPM Center, ensure that the Policy Server is working correctly and that the User Directory to be used for PPM Center authentication is correctly configured. The SiteMinder Test Tool is useful for verifying that the installation is functioning correctly.

Configuring SiteMinder for PPM Center is the same as configuring any other type of protected resource in SiteMinder. Use the SiteMinder Policy Server User Interface to update the SiteMinder configuration entities as necessary. For both mixed and SSO modes, four standard SiteMinder configurations should exist: Host Configuration Object, User Directory, Policy Domain, and Policy.

To configure SiteMinder for integration with PPM Center, perform the following steps.

These steps must be performed by a SiteMinder administrator.

1. Create a new Web agent.
2. (Mixed mode only) If you plan to use mixed-mode authentication, then after you create a new Web agent, do the following:
   a. Ensure that the 4.x compatibility flag is set.
   b. Specify the name of the PPM Server, and a secret password.
   c. In the `siteminder.conf` file, set the following parameters:
      - Set the `SM_AGENT_NAME` parameter value to the PPM Server name.
      - Set the `SM_SHARED_SECRET` parameter value to the secret password you specified.
3. Create a new Web Agent Conf object.
4. Double-click the new Agent Conf Object to open the Properties window.

5. Add the new property value LogOffUri to `/itg/web/knta/global/Logout.jsp`.

PPM Center uses the `LogoffUri` property to log off users correctly when they log off of the PPM Center standard interface.

6. Create a realm for PPM Center to protect resource `/itg/*`, and specify the name of the agent you created in step 3 for this realm.
7. Configure and enable two rules for the realm (one to allow HTTP on GET, POST, and PUT actions, and another to enable OnAuthAccept action as the authentication event) with the following settings:
   - Rule 1. Set the **Name** field to **AllowHTTP,** the **Resource** field to **/itg/*,** and the **Action** field to **GET,POST,PUT.**
   - Rule 2. Set the **Name** field to **OnAuthAccept,** the **Resource** field to **/itg/*,** and the **Action** field to **OnAuthAccept.**
8. Specify URLs for the CookieDomain and CookieProvider parameters in the agent configuration object for the SiteMinder Web Agent that is to authenticate PPM Center Web requests.

Cookies are used to track session and idle timeouts.

The format used to specify the value for CookieProvider depends upon the external Web server you use:

- For Microsoft IIS, Sun ONE, and Sun Java System Web servers, use the following format.

  `http://<Server_Domain>:<Port>/siteminderagent/SmMakeCookie.ccc`

  represents the host name or IP address where your PPM Center instance is accessed.

- For Apache, use the following format.

  `http://<Server_Domain>:<Port>/SmMakeCookie.ccc`

It is important to understand that PPM Center reads the information that SiteMinder automatically injects into the HTTP Request header.

PPM Center relies on the following user attributes:

- `SM_USER`. For an authenticated user, this parameter specifies the user distinguished name (DN). For an unauthenticated user, this is the user ID as specified by the user at logon.
- `SM_SERVERSESSIONID`. This parameter specifies the session ID of a user who has already authenticated, or the session ID that is to be assigned to the user upon successful authentication.
- `SM_SERVERSESSIONSPEC`. This parameter specifies the user's session ticket.

For configuration details for these and other SiteMinder parameters, see the SiteMinder documentation.

7 Maintaining the System

Overview of Administration Tools and System Maintenance

Two kinds of administration tools and facilities are available to PPM Center system administrators:

- Administration tools accessible from the standard interface

  These tools let you:

  - View and cancel running reports
  - View running executions
  - View interrupted executions

- Administration tools accessible from the PPM Workbench

  These tools include:

  - Admin Tools let you submit and view server reports
  - SQL Runner lets you submit SQL statements against the PPM Center database

The following sections provide information about these tools and facilities.

This chapter also provides information about how to:

- Access and use log files
- Periodically stop and restart the PPM Server
- Maintain the database and back up PPM Center instances

Administration Tools in the Standard Interface

The PPM Center standard interface includes tools that you can use to:

- View running reports

For information about viewing running reports, see the *Reports Guide and Reference.*

- View running executions
- View interrupted executions

You can access these tools in the standard interface through the **Administration** menu.

Viewing Running Executions

To view running executions:

1. Log on to PPM Center.
2. From the menu bar, select **Administration > View Running Executions.**

   The View Running Executions page opens, and the **Summary** section lists any distributions, reports, requests, or packages that are running.
3. If any reports are listed as running, click **View Running Reports.**

Viewing Interrupted Executions

This section provides the steps you use to view interrupted executions (including reports).

To view interrupted executions:

1. Log on to PPM Center.
2. From the menu bar, select **Administration > View Interrupted Executions.**

   The View Interrupted Executions page opens, and, if any interrupted executions exist, the page lists them.
3. In the list below **View Interrupted Executions for a Server Startup,** select the date of the interrupted execution you want to view.
4. Click **View** to view the details of the selected interrupted execution listed in the **Failed Executions** section.

Server Tools In the PPM Workbench

You can use the server tools in the PPM Workbench to:

- View the technical status of the PPM Server in the Admin Tools window
- Access the database directly and run SQL statements from the SQL Runner window
- Edit server settings

Access Grants Required to Use Server Tools

Table 7-1 lists the names and descriptions of the three access grants that give users various levels of access to the Server Tools window.

Table 7-1. Server tools access grants

Access Grant	Description
Sys Admin: View Server Tools	Lets the user view the Admin Tools and SQL Runner windows in read-only mode.
Sys Admin: Server Tools: Execute Admin Tools	Lets the user: • Run server reports in the Admin Tools window • View the SQL Runner window in read-only mode
Sys Admin: Server Tools: Execute SQL Runner	Lets the user: • Run SQL queries in the SQL Runner window • View the Admin Tools window in read-only mode

For more information about security groups and access grants, see the *Security Model Guide and Reference.*

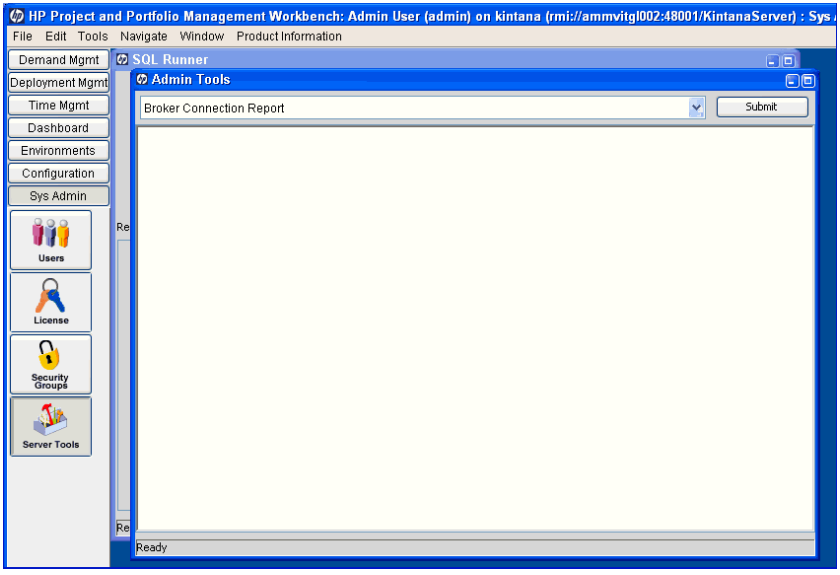
Accessing and Using the PPM Workbench Server Tools

To access the server tools in the PPM Workbench:

1. Log on to PPM Center.
2. From the menu bar, select **Administration > Open Workbench.**

   The PPM Workbench opens.
3. From the shortcut bar, select **Sys Admin > Server Tools.**

   The Admin Tools and the SQL Runner windows open.



Running Server Reports from the Admin Tools Window

Use the Admin Tools window to run server reports such as Server Status Report and Cache Manager Statistics. *Table 7-2* on page 180 contains descriptions of the server reports.

To select a report to run:

1. In the expanded report list, select a report.

2. Click **Submit.**

The Admin Tools window displays the output of the selected report.

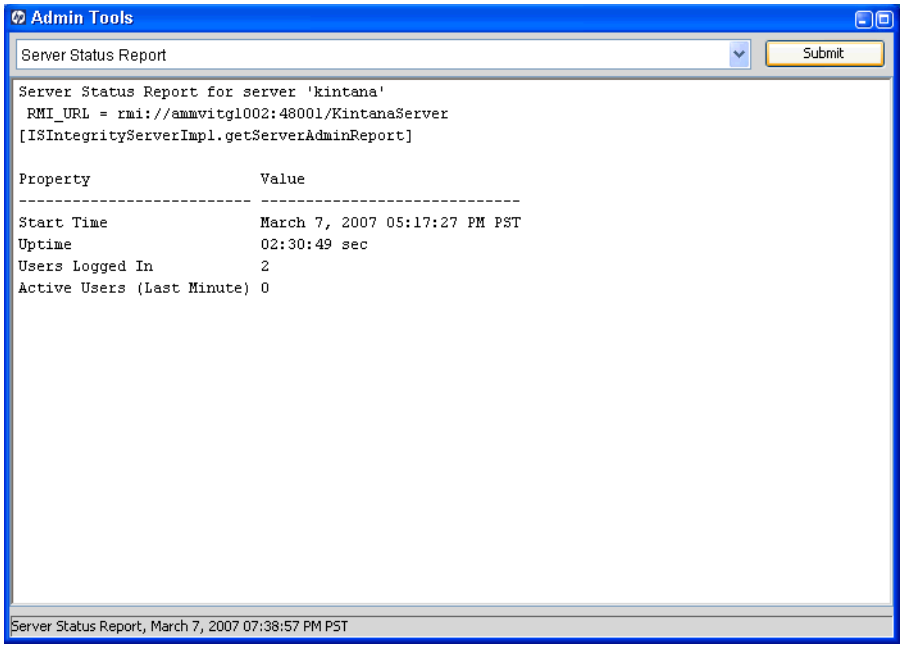


Table 7-2. Server reports (page 1 of 3)

Report Name	Description
Broker Connection	Information about open database pool connections, organized by connection ID.
Broker In Use Sessions	Information about database pool connections in use, organized by user. If the server parameter `DB_SESSION_TRACKING` is set to `true`, this report also shows stack traces of where the connection was allocated.
Broker Performance	Statistics on database connection usage in the connection pool, to help assess system performance. For performance reasons, the PPM Server holds a connection pool to the database and reuses these connections for accessing the database. Prepared statements created within a connection are also held open in a cache. If the PPM Server cannot allocate more connections, threads that need to access the database might need to wait for a connection. This report also shows: • Number of threads waiting for connections • Average duration threads had to wait for connections • Percentage of threads that had to wait for connections • Total number of connection requests, and if JDBC logging is enabled • Statement cache hit rate percentage (over the last 100 statements)
CacheManager Sizes	Displays the number of objects in the cache of each entity, the total cache size (in KB), and the average size of each cached object type.
CacheManager Statistics	Displays useful statistics on the caching behavior of each cacheable entity in PPM Center, including: • Hits, misses, and hit rate • Number of cache flushes (broken down by the categories "old," "idle," "reclaimed," and "max cache size reached") • Average load time • Cached object count and maximum idle time

Table 7-2. Server reports (page 2 of 3)

Report Name	Description
Client Font	All supported fonts for the PPM Center installation.
Client Property	Details about the environment of the client computer currently running the PPM Workbench.
Client Time Zone	All time zones recognized by the client.
Execution Dispatcher Manager	Batch executions in progress.
Execution Dispatcher Pending Batch	Batches pending execution due to the lack of available execution manager threads.
Execution Dispatcher Pending Group	Batches pending group execution (batches that are grouped together) due to the lack of available Execution Manager threads.
Installed Extensions	Displays the names and versions of HP Deployment Management Extensions installed (if any).
JVM Memory	Free and total memory in the PPM Server JVM.
Kintana RMI	All RMI connection threads.
Server Cache Status	Shows the following cache information: • Cached entities • Number of units that can be cached • Number of free units • The number of hits and misses, and the miss rate • Number of entities swapped • Amount of memory taken up by the cache **Note:** Although this report displays information that is similar to the that displayed in the CacheManagerStatistics report, the data is for a different set of cached objects.
Server Configuration	All server parameters in effect for each of the active servers. Includes parameters not specifically set in the `server.conf` file.

Table 7-2. Server reports (page 3 of 3)

Report Name	Description
Server Event Listener	Event messages that the PPM Server can send to the client.
Server Logon	Information about all users logged on to the PPM Server(s) and logon information such as IP address and idle time. This information is used to determine PPM Server load. If server clustering is used, this report provides a picture of load distribution.
Server Status	Status information about PPM Server(s): • Whether the server is available and its start time • Length of time the server has been available • Number of users logged on to the server • Number of users active during the last minute
Server Thread	Information about running threads within a PPM Server(s). This information is used to determine which services are running. If a server cluster is used, this report also provides information about which server is running these services.
Service Controller	Enabled services for the PPM Server(s), when services were last run, and when they are scheduled to run again.

Running Server Reports from the Command Line

You can also run server reports directly from a command line on the PPM Server using the `kRunServerAdminReport.sh` script, which is located in the `<PPM_Home>/bin` directory. For more information about the `kRunServerAdminReport.sh` script, see *kRunServerAdminReport.sh* on page 360.

Running SQL Statements in the SQL Runner Window

You can use the SQL Runner window to run database queries directly against the PPM Center database schema using the PPM Workbench instead of using an external program such as SQL*Plus. One benefit of using SQL Runner is that you can gain access to the database directly, without having to submit the database password. Developers and administrators can also use the SQL Runner window to test custom validations and request rule SQL, among other things.

To run an SQL statement from the SQL Runner window:

1. If the Admin Tools window hides the SQL Runner window, minimize it.
2. In the **SQL Statement** field, type the SQL statement to run.

Ensure that your SQL statement does not end with a semicolon (;).

3. To run the SQL statement, click **Run SQL.**

   The SQL Runner window displays the list of results in the table below the SQL statement. It also displays timing information such as how long the statement took to run, and how much of that time was spent in the database.
4. To view the results as text, click **Open As Text.**

Table 7-3 lists the controls in the SQL Runner window, along with a description of each.

Table 7-3. Controls in the SQL Runner window

Control Name	Control Type	Description
SQL Statement	Text box	Use this box to type an SQL query for running and testing purposes. **Note:** Make sure that you do not include a semicolon (;) at the end of your SQL statement.
Server Roundtrip	Read-only text box	Amount of time (in milliseconds) spent sending the SQL statement out to the network and back. Used to show network latency and performance.
SQL execution	Read-only text box	Amount of time (in milliseconds) the database spent actually executing the SQL statement. Use the displayed information to tune validations or write complex statements to address performance concerns.
ResultSet Extraction	Read-only text box	Amount of time (in milliseconds) that the server spent processing the SQL statement results.
Total time	Read-only text box	Total amount of time (in milliseconds) spent running the SQL statement.
Run SQL	Button	Runs the SQL statement displayed in the **SQL Statement** field.
Clear	Button	Clears the window.
Ping Server	Button	Tests the connection speed between the client and the PPM Server.
Ping DB	Button	Tests the connection speed between the client and the database (through the PPM Server).
Open As Text	Button	Opens results in a text window. You can cut and paste information from this window.

Running an SQL Script with SQL*Plus on a Windows System

If your PPM Center instance is running on a Windows system, and you are using the SQL*Plus utility to run an SQL script, the utility "expects" to get the exact number of parameters defined in the script. Some versions of SQL*Plus ignore null command-line parameters and get hung up waiting for missing parameter values.

Example

In the following line, the second parameter is null. But, because SQL*Plus is a command-line utility, it waits for the user to input the second parameter value.

```
ppm/ppm@ppm10a @somescript.sql "Y" ""
```

To work around this problem, add the following to the `server.conf` file:

```
SQLPLUS_VERSION=<SQL_Plus_Version_Number>
```

A valid version number is `90101`.

Setting Debugging and Tracing Parameters

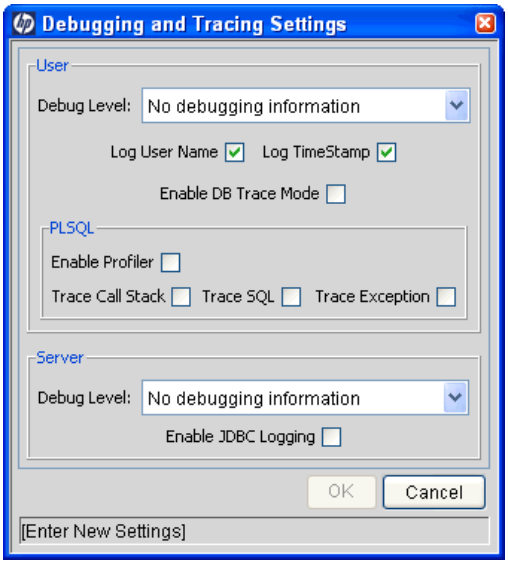
You use the Debugging and Tracing Settings dialog box to set debugging and tracing parameters at both the user and server levels.

To open the Debugging and Tracing Settings dialog box:

1. Log on to PPM Center.
2. From the menu bar, select **Administration > Open Workbench.**

   The PPM Workbench opens.

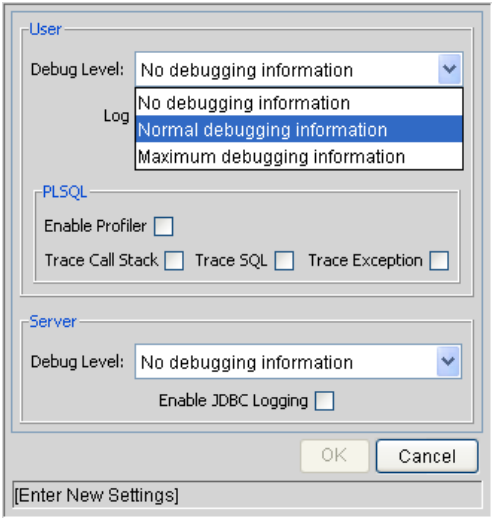
3. From the shortcut bar, select **Edit > Debug Settings.**



User Settings

To override the default debug level set for your PPM Center sessions:

- From the **Debug Level** list in the **User** section, select a different value.



The **Debug Level** list values map to `DEFAULT_USER_LOGGING_LEVEL` values in the `server.conf` file as follows:

- **No debugging information** is equivalent to the parameter value `ERROR`. Only errors are logged.
- **Normal debugging information** is equivalent to the parameter value `INFO`. Errors and information that describes the normal tasks that the running server is performing are logged.
- **Maximum debugging information** is equivalent to the parameter value `DEBUG`. This setting provides the most logging information. In addition to the normal debugging information, information is also logged for various server functions.

  This additional debugging information can be useful for troubleshooting any problems you encounter in PPM Center. If a problem arises, you can set the debug level to **Maximum debugging information,** perform the problematic action again, and then check the server logs for information that can help resolve the issue.

  Make sure that you do not to leave the server running in debug mode for too long. A large volume of extra information is written to the logs, taking up disk space much more quickly than during normal operation. The extra logging overhead can affect system performance.

Log User Name Setting

If you want your user name written into the log for each line of debugging text that corresponds to actions you have performed, select this checkbox. This can be helpful if you need to sift through the server logs to find information relevant to your user session. (The **Log User Name** checkbox corresponds to the `ENABLE_SQL_TRACE` configuration parameter.)

Log TimeStamp Setting

If you want a timestamp written into the log for each line of debugging text that corresponds to actions you have performed, select this checkbox. The timestamp can help you locate information in the server log files about events that occurred at a specific time, or to determine how much time elapsed between specific logged statements.

Bear in mind that including the timestamp adds text to each logged statement. This bloats the log file and can make it more difficult to read. (The **Log TimeStamp** checkbox corresponds to the `ENABLE_TIMESTAMP_LOGGING` parameter in the `server.conf` file.)

Enable DB Trace Mode Setting

To enable the SQL trace facility during your PPM Center session, select the **Enable DB Trace Mode** checkbox. This facility ensures that performance statistics for all SQL statements that you run are placed into a trace file. (The **Enable DB Trace Mode** checkbox corresponds to the `ENABLE_SQL_TRACE` server configuration parameter.)

PL/SQL Settings

The **PLSQL** field provides the following Procedural Language/Structured Query Language (PL/SQL) options:

- Select the **Enable Profiler** checkbox to profile the run-time behavior of the PL/SQL code that PPM Center applications use by calling the Oracle-supplied PL/SQL package `DBMS_PROFILER`.

You must set up the PL/SQL package. For an example of how to do this, see *Example of how to set up the Oracle profiler:* on page 189.

The profiling information is logged in a JDBC log file in the PPM Center `log` directory. Enabling the profiler can help you to identify performance bottlenecks.

Because running the `DBMS_PROFILER` package might slow system performance and reduce storage space, HP recommends that you use it only for debugging.

Example of how to set up the Oracle profiler:

```
CONNECT sys/password@service AS SYSDBA
@$ORACLE_HOME/rdbms/admin/profload.sql

CREATE USER profiler IDENTIFIED BY profiler DEFAULT
TABLESPACE users QUOTA UNLIMITED ON users;
GRANT connect TO profiler;

CREATE PUBLIC SYNONYM plsql_profiler_runs FOR
profiler.plsql_profiler_runs;
CREATE PUBLIC SYNONYM plsql_profiler_units FOR
profiler.plsql_profiler_units;
CREATE PUBLIC SYNONYM plsql_profiler_data FOR
profiler.plsql_profiler_data;
CREATE PUBLIC SYNONYM plsql_profiler_runnumber FOR
profiler.plsql_profiler_runnumber;

CONNECT profiler/profiler@service
@$ORACLE_HOME/rdbms/admin/proftab.sql
GRANT SELECT ON plsql_profiler_runnumber TO PUBLIC;
GRANT SELECT, INSERT, UPDATE, DELETE ON plsql_profiler_data
TO PUBLIC;
GRANT SELECT, INSERT, UPDATE, DELETE ON plsql_profiler_units
TO PUBLIC;
GRANT SELECT, INSERT, UPDATE, DELETE ON plsql_profiler_runs
TO PUBLIC;
```

- Select the **Trace Call Stack, Trace SQL,** and **Trace Exception** checkboxes to enable the Oracle `DBMS_TRACE` package functionality that the PL/SQL programs (used by PPM Center applications) use.

  The output of the profiling information is saved to a JDBC log file in the `<PPM_Home>/server/<PPM_Server_Name>/log` directory.

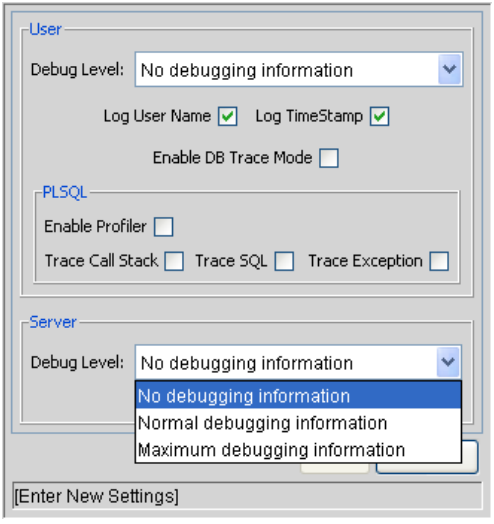
Because running the `DBMS_TRACE` package can have a negative effect on system performance and storage space, use it only for debugging.

Server Settings

To override the default logging level for the entire PPM Server, and not just your user session:

1. Under **Server,** in the **Debug Level** list, select one of the following.

The following settings correspond to the settings for the `DEFAULT_SERVER_LOGGING_LEVEL` server configuration parameter. The value names, however, are different.



- **No debugging information** is equivalent to the `DEFAULT_SERVER_LOGGING_LEVEL` parameter value `ERROR`. Only errors are logged.
- **Normal debugging information** is equivalent to the parameter value `INFO`. Errors and information that describes the normal tasks that the running server is performing are logged.
- **Maximum debugging information** is equivalent to the parameter value `DEBUG`. This setting provides the most logging information. In addition to the normal debugging information, information is also logged for various server functions.

  This additional debugging information can be useful when troubleshooting any problems you encounter in PPM Center. If a problem arises, you can set the debug level to **Maximum debugging**

information, perform the problematic action again, and check the server logs for information that can help resolve the issue.

For more information about the `DEFAULT_SERVER_LOGGING_LEVEL` parameter, see *Server Configuration Parameters* on page 279.

2. To have the PPM Server(s) maintain a Java Database Connectivity (JDBC) log file, select the **Enable JDBC Logging** checkbox.

Getting Information from Log Files

The PPM Server generates log files in the file system. Depending on the type of log file, certain maintenance practices should be employed to maintain the file system. The following sections provide maintenance recommendations for each type of log file.

Server Log Files

Server log files are stored in the `<PPM_Home>/server/<PPM_Server_Name>/logs` directory. Server log files are named `serverLog.txt` and `serverLog_timestamp.txt`. The log timestamp setting (see *Log TimeStamp Setting* on page 187) uses the format `YYYYMMDD_HHMMSS` for the date and time the log was rotated.

Active PPM Servers log their output to the `serverLog.txt` file. The `serverLog_timestamp` files are archived versions of the `serverLog.txt` file. The size of these old log files are determined by the `ROTATE_LOG_SIZE` server parameter in the `server.conf` file. This parameter may be set to any value (in kilobytes) to control the rotation. A high value results in fewer but larger log files.

Generally, server log files are required only when contacting HP-Mercury support to resolve server issues. In most cases, it is safe to delete these log files on a regular basis.

The following parameters determine the data volume to be written to the logs by the server:

- DEFAULT_SERVER_LOGGING_LEVEL
- DEFAULT_USER_DEBUG_LEVEL
- RMI_DEBUGGING

In the server.conf file, set these parameters to their default values:

```
com.kintana.core.server.SERVER_DEBUG_LEVEL=none
com.kintana.core.server.DEFAULT_USER_DEBUG_LEVEL=none
com.kintana.core.server.RMI_DEBUGGING=false
com.kintana.core.server.ENABLE_LOGGING=true
```

By setting these parameters to their default settings, only critical error events are written to the server logs. This decreases the number of server logs generated in the file system, thereby improving system performance.

If the server experiences technical difficulties or server logs are required by HP-Mercury support, increase the debug level.

Unless instructed otherwise by HP-Mercury support, always set the RMI_DEBUGGING parameter to false.

To change the USER_DEBUG_LEVEL parameter dynamically at runtime, change the DEFAULT_USER_DEBUG_LEVEL parameter in the **Edit > Debug Settings** screen group in the PPM Workbench interface. You can also retrieve current server settings by accessing the Server Tools window and running the Server Configuration report.

Unless instructed by HP-Mercury support, do not run a production server with the debug levels set to Maximum. This can generate very large log files in the file system that could degrade system performance.

Enabling HTTP Logging

Do not enable HTTP logging if you use an external Web server.

To enable HTTP logging:

1. Stop the PPM Server.
2. Set the `ENABLE_WEB_ACCESS_LOGGING` server configuration parameter to `true`.
3. Run the `kUpdateHtml.sh` script.
4. Start the server.

The internal Web log is saved in NCSA Common format.

```
host rfc931 username date:time request statuscode bytes
referrer user_agent cookie
```

Example

```
127.0.0.1 - - [11/Jan/2008:1908:16 +0000] "GET/ppm/web/knta/
global/images/date_time.gif HTTP/1.1"200 155 "http://
localhost:8080/ppm/web/knta/crt/RequestCreateList.jsp"
"Mozilla/4.0 (compatible; MSIE 6.0; Windows; .NET CLR 1.0.3705;
.NET CLR 1.1.4322)" JSESSIONID=5pk1oof3fd65q
```

Report Log Files

Report execution log files are stored in the `<PPM_Home>/logs/reports` directory. Report execution log files are named `rep_log_ID.html`. The report log ID setting corresponds to the report submission ID.

Use report execution log files to determine why a report executions failed or took too much time to complete.

These log files are not purged automatically. Generally, report log files are required only to debug timely report requests. In most cases, it is safe to delete these log files on a regular basis.

Execution Log Files

During normal package and request processing, execution log files are generated:

- For workflow steps running as EXECUTE_OBJECT_COMMANDS or EXECUTE_REQUEST_COMMANDS
- When resolving a validation defined using command execution logic

Execution log files from these executions are stored in the following directories:

- <*PPM_Home*>/logs/PKG_Package_ID
- <*PPM_Home*>/logs/REQ_Request_ID
- <*PPM_Home*>/logs/VAL_Validation_ID

If disk space becomes limited over time, you might need to purge or archive these log files. If the log files are deleted, the detailed execution logs are no longer available for a package or request.

Execution Debug Log Files

If the USER_DEBUG_LEVEL or SERVER_DEBUG_LEVEL parameter is set to HIGH, additional execution debugging data is written to the execution debug log file. This file is named exe_debug_log.txt and is located in the <*PPM_Home*>/logs/ directory.

If the server is running with full debugging enabled, this file grows over time. Generally, execution debug log files are required only by HP-Mercury support to debug the execution engine. In most cases, it is safe to delete these log files on a regular basis.

Temporary Log Files

Various other files generated in the <*PPM_Home*>/logs/temp directory are stored for temporary purposes. Unless requested otherwise by HP-Mercury support, you can delete these log files on a regular basis.

Periodically Stopping and Restarting the Server

The PPM Server generally requires very little maintenance. To help ensure your system operates smoothly, HP recommends that you stop and restart the PPM Server once a month.

For information about starting and stopping the PPM Server, see *Starting and Stopping the PPM Server* on page 75.

Maintaining the Database

Many IT departments have a policy of periodically changing the passwords of their database schemas. This section covers common topics related to maintaining the Oracle database that is part of PPM Center.

Changing the Database Schema Passwords

If you must change the PPM Center database schema passwords, be sure to change them both in the database and in the `server.conf` file. Before you change all the database schema passwords, consider the following:

- Check your environment definitions to determine whether any contain a password that is to be changed. You can use the tool `<PPM_Home>/bin/kEnvUpdatePassword.sh` to automatically change all occurrences of a specific password for a particular host and user name.

  This functionality is also available from the **Environments** section of the PPM Workbench. (Open an environment on the Environment page, and then, on the menu bar, select **Environment > Update Password.**)

  - Check both server and client passwords, as well as database passwords.
  - Check passwords associated with application codes.

- Although it is not a recommended practice, you can hard-code passwords into commands in workflow steps, requests, and object types.
- There is no need to change commands that use tokens for passwords (that is, `SOURCE_ENV.DB_PASSWORD`), as long as the password was changed in the respective environment definitions.

To change the PPM Center database schema passwords:

1. Make sure that all users are logged off the system.
2. Stop the PPM Server.

   For information about how to stop PPM Servers, see *Stopping the PPM Server* on page 266.
3. Change passwords, as necessary in the database.
4. To change the passwords in the `server.conf` file, run the `kConfig.sh` script to set the `DB_PASSWORD`, `CONC_REQUEST_PASSWORD`, and `RML_PASSWORD` server parameters.

   When changing the passwords, do not edit the `server.conf` file directly. To encrypt password values correctly, use the `kConfig.sh` script.
5. Restart the PPM Server.

   For information about restarting PPM Servers, see *Starting and Stopping the PPM Server* on page 75.

Maintaining Temporary Tables

The PPM Server uses several tables for temporary storage during processing (for example, during package migration) for:

- Logon attempts
- Debug messages
- Commands and parameters

PPM Server uses a set of services to monitor and clean up these temporary tables. Make sure the cleanup parameters (described in *Cleanup Parameters* on page 213 and in Appendix A, *Server Configuration Parameters,* on page 279) are set so that the temporary tables do not use too much database space.

KNTA_LOGON_ATTEMPTS Table

The KNTA_LOGON_ATTEMPTS table contains information about attempts to log on to the PPM Server over the previous 14 days. This information includes:

- USER_ID of users who attempted to log on
- Status (success or failure) of each logon attempt
- Messages generated during the logon attempt

The KNTA_LOGON_ATTEMPTS table is only for auditing purposes. The PPM Server does not require the data to function.

If logon attempts succeed, the records for those most of those attempts are purged. However, the last successful logon based on a combination of USER_ID and IP address is retained.

If a logon attempt fails, the corresponding record remains in the table for future reference. You must delete the failed logon attempt records manually. the record of the last successful logon attempt also remains in the KNTA_LOGON_ATTEMPTS table.

The data is automatically purged after the time interval specified by the DAYS_TO_KEEP_LOGON_ATTEMPT_ROWS server parameter setting.

KNTA_DEBUG_MESSAGES Table

The KNTA_DEBUG_MESSAGES table contains any debugging text that HP PL/SQL database packages generate. After you analyze this data, you can safely purge it. The PPM Server purges this data automatically at the frequency determined by the HOURS_TO_KEEP_MESSAGE_ROWS server configuration parameter setting.

Backing Up PPM Center Instances

Backing up a PPM Center instance involves backing up both the file system and the database schema. HP stores all PPM Center configuration and transaction data in its associated database schema.

Because this information is so important, HP also recommends that you back up the database schema daily. You can use the Oracle export command to perform the backup, or use the hot backup procedure, which does not require that you shut down the PPM Server. For information about how to export a database schema, see your Oracle database documentation.

HP recommends that you back up the `<PPM_Home>/logs` directory daily. This directory contains transactional history files for each migrated package or request.

Before you make critical changes to PPM Center, perform a full backup of the database schema and complete `<PPM_Home>` directory.

It is not necessary to back up registry settings.

8 Improving System Performance

Identifying Performance Problems

This chapter provides information about how to isolate performance problems, collect statistics about the database schema, and troubleshoot performance problems.

Isolating Performance Problems

Configuring or Reconfiguring the Database on page 93 and Appendix A, *Server Configuration Parameters,* on page 279 contain information on the initial settings that HP recommends for the Oracle database and PPM Server. If performance slows after these settings are in place, use the methodologies outlined in the flowcharts shown in *Figure 8-1* on page 200, *Figure 8-2* on page 201, and *Figure 8-3* on page 202 to isolate performance problems and determine how to fix them.

Figure 8-1. Identifying and addressing system performance problems

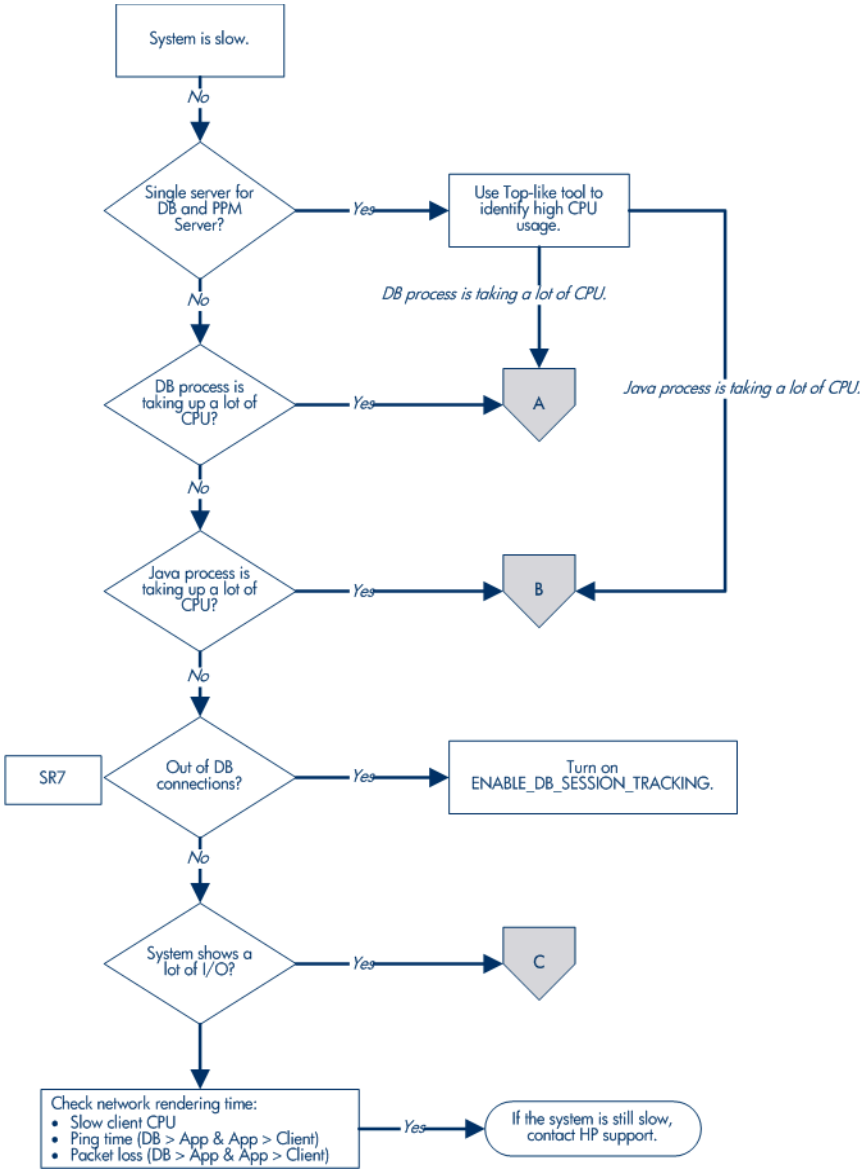


Figure 8-2. Identifying and addressing database performance problems (A)

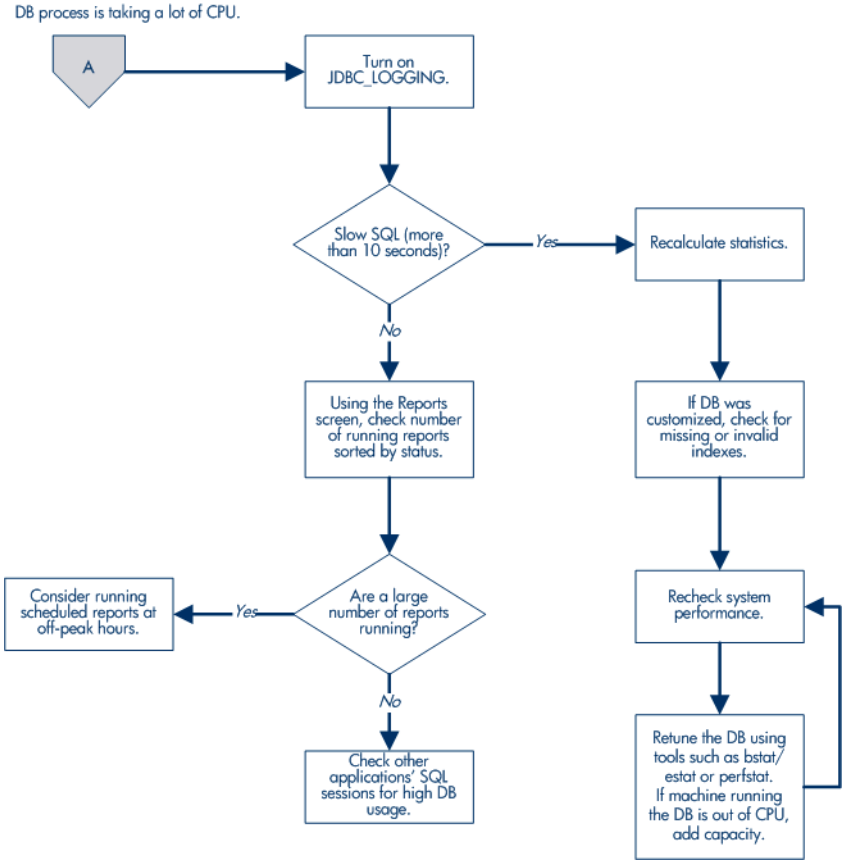


Figure 8-3. Identifying and addressing Java process performance problems (B)

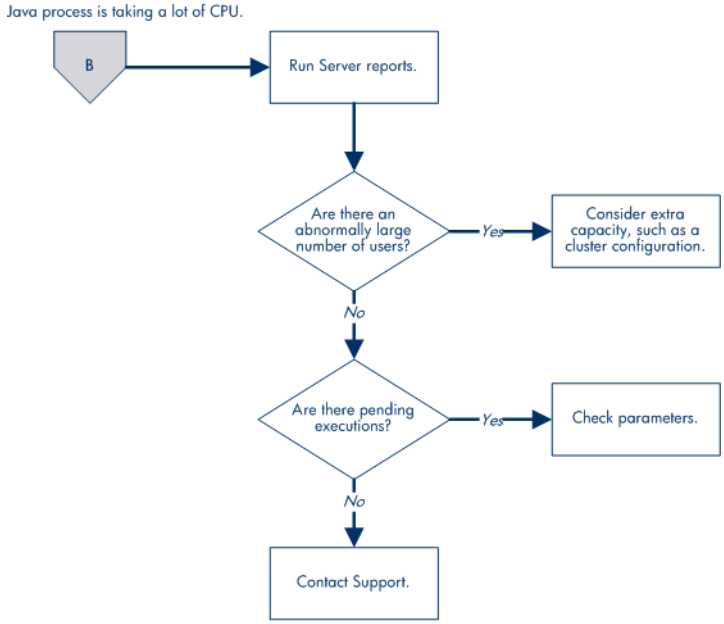
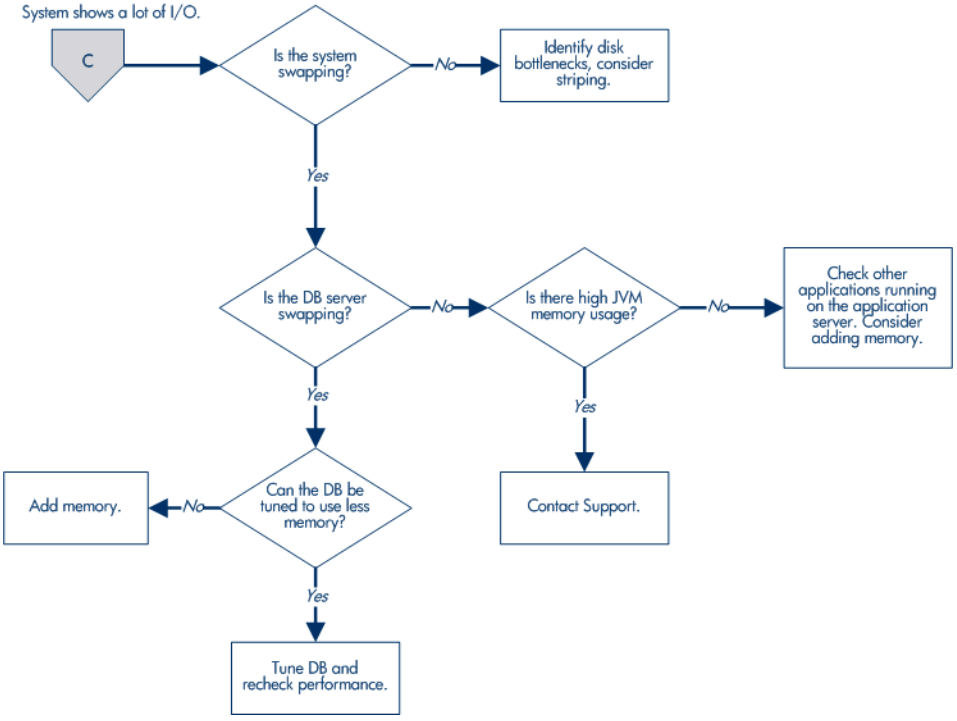


Figure 8-4. Identifying and addressing I/O performance problems (C)



Collecting Database Schema Statistics

This section provides information about collecting statistics on the Oracle database schema.

Collecting Statistics by Setting Server Parameters

Collect database schema statistics if you are:

- Applying field-level security to a request type with existing requests in the system
- Applying dynamic security to a workflow with existing instances in the system
- Adding field group(s) for Distributed Management Objects (DMO) or PMO
- Using Microsoft Project to import large projects or many projects

You can set a PPM Center service to automatically collect the database schema data periodically. To schedule data collection on a PPM Server, use the following parameters:

- `ENABLE_STATISTICS_CALCULATION` determines whether database statistics are collected automatically for the cost-based optimizer.
- `STATS_CALC_WAKE_UP_TIME` determines the hour of the day at which database statistics are to be calculated.
- `STATS_CALC_DAY_OF_WEEK` determines the day of the week on which database statistics are to be calculated.
- `STATS_CALC_WEEK_INTERVAL` controls the frequency with which statistics are calculated.

For descriptions ofPPM Center server configuration parameters, see *Server Configuration Parameters* on page 279.

Using the dbms_stats Package to Collect Additional Statistics

If the statistics that the PPM Center service collects are insufficient, you can use the `dbms_stats` package to gather additional statistics. Oracle provides this package as part of the database.

To gather additional statistics, run the following script.

```
begin
dbms_stats.gather_schema_stats (ownname => <PPM_User>,
cascade => TRUE,
method_opt => 'FOR ALL COLUMNS SIZE SKEWONLY'
);
end;
/
```

You typically run the `dbms_stats` package as the SYSTEM user. To run it as a PPM Center user, grant the privilege to run the package by running the following SQL statement as the SYSTEM user from an SQL*Plus session.

```
grant execute on dbms_stats to <PPM_User>;
```

The first time you run the `dbms_stats` package, use `method_opt => 'FOR ALL COLUMNS SIZE SKEWONLY'`. After the system has been up and running for a while, use `method_opt => 'FOR ALL COLUMNS SIZE AUTO'`.

Sampling a Percentage of Data

With large databases, analysis can take up to three hours to run to completion. For large PPM Center installations, you can sample a percentage of data in each object instead of data from the entire PPM Center database schema.

Sampling a percentage of data may not be effective for small data sets. However, after the data set has grown, this method is almost as effective as calculating statistics for the entire database schema.

To calculate statistics on a percentage of the data, run the following script.

```
begin
dbms_stats.gather_schema_stats (ownname => <PPM_User>,
cascade => TRUE,
method_opt => 'FOR ALL COLUMNS SIZE SKEWONLY',
estimate_percent => <Percentage_To_Sample>
);
end;
/
```

Troubleshooting Performance Problems

This section provides information about common performance problems and how to correct them. If you are not using the default or recommended settings, reset your parameters to those values before you try other solutions.

Consider upgrading to the latest PPM Center service pack. HP has a regular and well-established service pack release cycle. Much of the development effort that goes into these service packs is focused on resolving known performance issues. Review the *Release Notes* for the latest service pack to determine whether it addresses the performance problem you are experiencing.

Scheduled Reports Do Not Run on Schedule

Problem

Although the PPM Server has capacity available, the next scheduled tasks do not start.

Possible source

This may be caused by a limitation specified in the `MAX_WORKER_THREADS` server configuration parameter.

Solution

To run more scheduled reports simultaneously, set the `MAX_WORKER_THREADS` parameter to a higher value. For information about this parameter, see *Server Configuration Parameters* on page 279.

Packages Do Not Execute

Problem

Packages do not execute.

Possible source

There are not enough execution managers available to service the packages that the system processed.

Solution

Increase the `MAX_EXECUTION_MANAGERS` server configuration parameter value. For information about this parameter, see *Server Configuration Parameters* on page 279.

Nightly Reports on Sunday Do Not Finish On Time, System Slows on Monday

Problem

By default, database server statistics are collected at 1:00 a.m. on Sundays. For large installations, collection take so long that it is not completed on time and system performance is slower on Monday.

Solution

Reschedule the statistics collection to a time that works better for your organization. Determine the most active system time by running the Server Logon report, which checks the number of active users. For details on how to run the report, see *Running Server Reports from the Admin Tools Window* on page 178 and *Running Server Reports from the Command Line* on page 182.

Consider using the estimate method instead of the compute method to gather statistics.

Monitor CPU use. If the system slows because of high peak load, you might require more hardware or faster hardware.

For more information about gathering statistics, see *Collecting Database Schema Statistics* on page 204.

Improving System Performance

This section provides information on how you can improve system performance.

Tuning Java Virtual Machine (JVM) Performance

Because the PPM Server uses JSP, a Java compiler must be available in the environment path where the server is started.

Running in Interpreted Mode

To improve performance, the Java virtual machine (JVM) uses a just-in-time (JIT) compiler. For debugging purposes, you can disable the JIT compiler and run the JVM in interpreted mode. Exceptions that you encounter while running in interpreted mode contain line numbers that are helpful in debugging.

To run the JVM in interpreted mode, set a variable in the server environment, as follows (use the Bourne or K shell):

```
JAVA_COMPILER=None
export JAVA_COMPILER
```

To avoid performance degradation, do not run the JVM in interpreted mode for extended periods in a production environment.

Debugging

The PPM Server startup script (`kStart.sh`) contains several parameters that you can use for debugging. The `kStart.sh` JVM debugging parameters are `-ms550m` and `-mx550m`. These specify that the JVM starts up with a heap size of 550 MB, and is limited to a maximum heap size of 550 MB.

These settings are usually sufficient. For sites with heavy usage, however, consider increasing the `-ms550m` and `-mx550m` values. Required memory depends on factors such as cache sizes and number of Oracle connections.

After you first start the PPM Server following an installation or upgrade, the server occupies approximately 750 MB in memory. As you use the product, the cache fills up and the JSPs are loaded into memory. Over time, the system gradually uses more memory. This is normal, and memory usage levels out over time. In most cases, memory usage can increase to a maximum of 1 GB.

Tuning Server Cluster Performance

High transaction volumes and a large number of concurrent users on a PPM Server can degrade server response time. If the PPM Server is running on a multiprocessor system, spare CPU may be available, but JVM limitations can prevent the system from using the spare CPU.

In this case, consider using a PPM Server cluster. In this system configuration, multiple PPM Servers point to the same database instance and can be started on one or more systems. In addition to added capacity, running on multiple systems increases availability.

To use your multiple-CPU system effectively, this may be necessary on a two-CPU system, and it is required on systems with more than two CPUs.

For information about how to set up a server cluster, see *Configuring a Server Cluster* on page 131.

Improving Input/Output Throughput

The distribution of input and output across multiple disks is an important factor in database performance. If consistently high input/output (I/O) occurs on one or more disks housing the database, service time on that disk degrades. To address this problem, replan the database layout to improve application performance.

You can split the PPM Center database into the following segments:

- PPM Center tables
- PPM Center indexes
- Redo logs
- Rollback tablespaces
- Temporary tablespaces
- System tablespace
- Tablespace for management and related utilities

HP recommends that PPM Center database instances with moderate transaction volume (instances with more than 5,000 requests per month) have at least four discrete disks, divided as shown in *Table 8-1*.

Table 8-1. Database disk recommendations

Disk	Recommendations for Data Placement
1	PPM Center tables
2	PPM Center indexes
3	Redo logs
4	• Rollback tablespaces • Temporary tablespaces • System tablespace • Tablespace for management and related utilities

For PPM Center database instances that have higher transaction volumes (more than 10,000 requests per month), HP recommends that you do the following:

- Place each piece of the database on its own separate disk.
- Stripe the data and index tablespaces across multiple disks to provide adequate disk throughput.

For PPM Center database instances with an extremely high transaction volume (over 25,000 requests per month), move specific tables and indexes to separate tablespaces on separate disks. This provides better control and further increases available I/O throughput.

Improving Advanced Searches

PPM Center users can search for requests based on custom fields defined in request types, request header types, and user data. Users can perform advanced searches to locate requests based on information that is defined as critical to business processes.

As the number of requests logged increases, users performing advanced searches can experience slower performance. To improve performance during advanced searches, use the following guidelines:

- Specify additional request header fields in the advanced searches. Header fields are automatically indexed by PPM Center, and therefore yield faster returns.
- Add indexes to a limited number of detail fields, preferably fields that are commonly used in advanced searches. Take care not to add too many indexes, since this can affect the performance of inserts and updates to the database.
- Set the `DEFAULT_REQUEST_SEARCH_ORDER_BY_ID` server configuration parameter value to `true` to remove the sort order column on a request search. Record sorting slows performance.
- Change the value set for the `REQUEST_SEARCH_RESULTS_MAX_ROWS` server configuration parameter to restrict the maximum number of records retrieved.
- For portlet search queries, lower the value set for the `PORTLET_MAX_ROWS_RETURNED` server configuration parameter. For most portlets, 20 to 50 records is adequate. The default is 200.

Adjusting Server Configuration Parameters

This section provides information about PPM Server parameters related to system performance and usage considerations for these parameters.

Parameter categories are:

- Cleanup parameters
- Debug parameters
- Timeout parameters
- Scheduler/services/thread parameters
- Database connection parameters
- Cache parameters

Most of the parameters are defined in the `server.conf` file. For a list of PPM Server parameters, see *Server Configuration Parameters* on page 279. The following sections provide descriptions of the parameters in each system performance parameter category.

Cleanup Parameters

Cleanup parameters, which are all defined in the `server.conf` file, determine when the PPM Server invokes services to clean up database tables:

- `DAYS_TO_KEEP_INTERFACE_ROWS` determines how many days to keep records of all interfaces.
- `DAYS_TO_KEEP_LOGON_ATTEMPT_ROWS` determines how many days to keep records of all logon attempts.
- `ENABLE_INTERFACE_CLEANUP` periodically removes old records from the database open interface tables. You can use the associated parameter `INTERFACE_CLEANUP_INTERVAL` to specify the run frequency for this thread, and the parameter `DAYS_TO_KEEP_INTERFACE_ROWS` to specify how long to keep records in the interface tables.

- `HOURS_TO_KEEP_DEBUG_MESSAGE_ROWS` determines how long (in hours) to keep rows in the `KNTA_DEBUG_MESSAGES` table.
- `NOTIFICATIONS_CLEANUP_PERIOD` determines the cleanup interval (in days) for notifications sent previously.

If periodic slowdowns occur, check these parameters and the Service Controller report to check for a correlation between the times when cleanup services run and the slowdowns occur. If necessary, change these parameters to avoid running cleanup services during peak periods.

For information about the Service Controller report, see *Table 7-2* on page 180. For more information about the cleanup parameters, see *Server Configuration Parameters* on page 279.

Debug Parameters

Debug parameters control the debug and log output from the PPM Server. Debug parameters are either high- or low-level.

High-Level Debug Parameters

You can change high-level debug parameters without causing system downtime on the PPM Server. Users who have the required privileges can configure these parameters by selecting **Edit > Debug Settings** from the PPM Workbench.

The high-level debug parameters are:

- `DEFAULT_USER_DEBUG_LEVEL` (defined in the `logging.conf` file) control the debugging level.
- `ENABLE_JDBC_LOGGING` (defined in the `server.conf` file) determines whether the server maintains a JDBC log file. If it is enabled, JDBC logging records SQL runs against the database, the amount of time required to run the SQL, and the amount of time required to retrieve the results.
- `ENABLE_SQL_TRACE` (defined in the `server.conf` file) determines whether performance statistics for all SQL statements run are placed into a trace file.

- `SERVER_DEBUG_LEVEL` (defined in the `logging.conf` file) controls the verbosity of logs generated by independent server processes such as EmailNotificationAgent.

For more information about the high-level debug parameters, see *Server Configuration Parameters* on page 279 and *Logging Parameters* on page 344.

Low-Level Debug Parameters

Enable the low-level debug parameters only if you require debugging information for a specific area. Enabling these parameters can degrade system performance because they consume additional CPU and generate large log files.

HP strongly recommends that you consult HP-Mercury support before you enable low-level debug parameters.

The low-level debug parameters, which are all defined in the `logging.conf` file are:

- `ENABLE_DB_SESSION_TRACKING`
- `ENABLE_LOGGING`
- `ENABLE_TIMESTAMP_LOGGING`
- `EXECUTION_DEBUGGING`
- `JDBC_DEBUGGING`
- `WEB_SESSION_TRACKING`

For more information about low-level debug parameters, see *Logging Parameters* on page 344.

Timeout Parameters

Timeout parameters determine how long the PPM Server waits before it times out. You can set timeout values for logon sessions, command runs, and workflows.

The timeout parameters, which are all defined in the `server.conf` file, are:

- `CLIENT_TIMEOUT` determines the interval (in minutes) at which PPM Workbench sessions send a message to inform the PPM Server that the client is active.
- `DB_LOGIN_TIMEOUT` determines the duration (in seconds) for the PPM Server to keep trying to log on to the database before reporting that the database is unavailable.
- `DEFAULT_COMMAND_TIMEOUT` determines the duration (in seconds) for the PPM Server to keep trying to run commands before timing out.
- `PORTLET_EXEC_TIMEOUT` determines the duration (in seconds) after which portlets time out.
- `SEARCH_TIMEOUT` determines the duration (in seconds) after which searches time out.

Scheduler/Services/Thread Parameters

Scheduler/services/thread parameters, which are all defined in the `server.conf` file, control scheduling, services, and thread-related server activities.

The scheduler/services/thread parameters are:

- `AUTOCOMPLETE_STATUS_REFRESH_RATE` determines the frequency (in seconds) with which the command status is refreshed to provide a list of values in an auto-complete field.
- `EMAIL_NOTIFICATION_CHECK_INTERVAL` determines the frequency (in seconds) with which the PPM Server checks for pending email notifications.

- `ENABLE_EXCEPTION_ENGINE` enables the exception engine, which runs a process to determine whether active projects are running on time.
- `EXCEPTION_ENGINE_INTERVAL` determines the frequency (in seconds) with which the exception engine process runs (if `ENABLE_EXCEPTION_ENGINE = true`).
- `EXCEPTION_ENGINE_WAKE_UP_CHECK_FREQUENCY` determines the interval (in seconds) that elapses before a task is verified for exceptions (if `ENABLE_EXCEPTION_ENGINE = true`).
- `EXCEPTION_ENGINE_WAKE_UP_TIME` determines the time at which the exception engine process runs (if `ENABLE_EXCEPTION_ENGINE = true`).
- `MAX_EXECUTION_MANAGERS` determines the number of command executions that can run simultaneously. Organizations processing a high volume of packages may require a larger number of execution managers.
- `MAX_RELEASE_EXECUTION_MANAGERS` determines the number of command executions that can run in a release distribution simultaneously. Organizations that process a high package volume may require more release execution managers.
- `MAX_WORKER_THREADS` determines the number of threads that can run simultaneously to process scheduled tasks (for example, reports or request commands). If the PPM Server is heavily loaded, specify a lower value to reduce the server workload. If there are many pending tasks, and additional capability is available on the server, set a higher value to improve performance.
- `REPORTING_STATUS_REFRESH_RATE` determines the frequency (in seconds) with which the report status is refreshed and displayed to the user.
- `SCHEDULER_INTERVAL` determines the number of seconds after which the scheduler checks for services to be run.
- `THREAD_POOL_MAX_THREADS` determines the maximum number of packages to run simultaneously within a release distribution. If a large number of packages in a distribution are processing, increase this value to improve performance.

- `THREAD_POOL_MIN_THREADS` determines the minimum number of packages to be run simultaneously within a release distribution.
- `TURN_ON_WF_TIMEOUT_REAPER` turns on the timeout reaper, which scans all active workflow steps to verify that they have timed out according to the settings for the step.
- `TURN_ON_NOTIFICATIONS` turns on the notification service. Use this to turn off notifications for copies of production instances being used for testing, and to turn them on again when the system goes to production.
- `TURN_ON_SCHEDULER` turns on the scheduler. Use this to improve performance. Turn off the scheduler in non-production instances.
- `WF_SCHEDULED_TASK_INTERVAL` establishes the frequency (in seconds) with which the PPM Server checks for pending scheduled tasks, and starts the tasks if worker threads are available.
- `WF_SCHEDULED_TASK_PRIORITY` determines the priority of scheduled tasks. Because scheduled tasks run in the background, it may be useful to run these tasks at a lower priority than the threads servicing user-oriented interactive tasks.
- `WF_TIMEOUT_REAPER_INTERVAL` determines the frequency (in seconds) with which the service checks for information (if `TURN_ON_WF_TIMEOUT_REAPER = true`).

Database Connection Parameters

Database connection parameters relate to the management of the database connection pool that the PPM Server maintains. After the PPM Server starts, one database connection is established. Increased usage spawns additional database connections.

These parameters, which are all defined in the `server.conf` file, are:

- `DASHBOARD_DB_CONNECTION_PERCENTAGE` determines the percentage of `MAX_DB_CONNECTIONS` that the PPM Dashboard module can use for database connections.
- `DB_LOGIN_TIMEOUT` determines the amount of time that the PPM Server is to continue to try to log on to the database (acquire the JDBC connections that make up the connection pool) before reporting that the database is unavailable.
- `MAX_DB_CONNECTION_IDLE_TIME` determines the amount of time (in minutes) that an unused database connection is held open before it is closed and removed from the pool.
- `MAX_DB_CONNECTION_LIFE_TIME` determines the duration (in minutes) that a database session is held open before it is closed and removed from the pool. Some Oracle cleanup operations that should be run periodically occur only at the end of database sessions. Do not keep database sessions open for the life of the PPM Server.
- `MAX_DB_CONNECTIONS` determines the number of database connections to hold open. In a server cluster configuration, this is the number of database connections for each PPM Server. Once this number is reached, user sessions queue for the next available database connection.
- `MAX_PPM_DB_CONNECTIONS` determines the maximum number of connections that the database pool is to maintain. When this number is reached, subsequent requests for database connection must wait until a database becomes available.
- `MAX_STATEMENT_CACHE_SIZE` determines the maximum number of prepared statements cached per database connection.

Logging Parameters

The logging parameters are in the `logging.conf` file. For more information, see *Logging Parameters* on page 344.

9 Migrating Entities

About Entity Migration

Entity migrators are HP Deployment Management object types. Each migrator is designed to migrate a specific kind of PPM Center entity and all of its dependent objects from one PPM Center instance to another.

You can use HP Deployment Management to manage configuration changes to PPM Center. HP Deployment Management comes with an out-of-the-box set of object types, or *entity migrators,* that you can use to move PPM Center configuration entities (workflows, request types, and so on) between PPM Center instances. If you maintain scratch instances for developing and testing PPM Center configurations before you deploy them into your production instance, you must use these entity migrators, and develop a workflow that drives configuration changes through your source configuration management deployment process.

Migrating configurations using entity migrators and workflows lets you automate and standardize a change-control process for your PPM Center implementation. You can build a workflow for every migrator object type, or create a single generic workflow for all migrator object types.

You can only migrate entities between PPM Center instances of the same version.

You can migrate the following PPM Center entities:

- Special commands
- Object types
- Portlet definitions
- PPM Dashboard modules
- PPM Dashboard data sources
- Project types
- Work plan templates
- Report types
- Request header types
- Request types
- User data contexts
- Validations
- Workflows

Migration Order

If you plan to migrate request type, workflow, project type, and work plan template configurations that are related to each other, you must perform the migration in the following order:

1. Request type
2. Workflow
3. Request type again (if circular references exist between request type and workflow)
4. Work plan template
5. Project type

Overview of Entity Migration

Consider a scenario in which you want to migrate configuration entities between your “QA” and “Production” instances of PPM Center. You can automate and track the migration using either the source instance (QA) or the destination instance (Production). In the example that follows, you are using the destination instance to control the migration.

You migrate PPM Center entities in the same way that you perform any other deployment management process. To prepare for the entity migration you do the following:

- Set up the environment definitions for your “QA” and “Production” instances.
- Configure a workflow that directs the migration process (necessary approvals, and an automated execution step that specifies your “QA” and “Production” environments as source and destination, respectively).

After you perform these tasks, you can use HP Deployment Management packages to specify the entities to migrate. Create a package, specify your migration workflow, and add package lines using the entity migratory object types for each PPM Center configuration entity that you want to migrate.

When the automated migration execution workflow step is run, the following events occur (remember that, in this example, you are running the migration in the destination, or Production, environment):

1. The Production server connects to the QA server using Telnet or SSH, and then submits a request for the specified configuration data.
2. The QA server extracts the requested configuration data from its database and generates an XML representation of the data.
3. The QA server writes the extracted XML data into a set of temporary XML files, and packages that set of files together in a Zip file.

4. The Production server copies the Zip file that contains the bundled XML data from QA to Production.

If you want to perform version control on changes to PPM Center configuration entities as they are migrated, you can version the compressed file that is extracted from the source instance.

HP recommends that you not extract this file manually, except for debugging purposes.

5. The Production server unpacks the migrated compressed file into temporary storage, and reads the associated XML files.
6. The Production server imports the configuration data to its database, and then generates an execution log.

Example Migration: Extracting a Request Type

The following example shows a procedure that you can use to migrate a request type from a QA instance of PPM Center to a production instance.

To create, submit, and process migrations, you must have the required licenses and access grants. For more information, see the *Security Model Guide and Reference*.

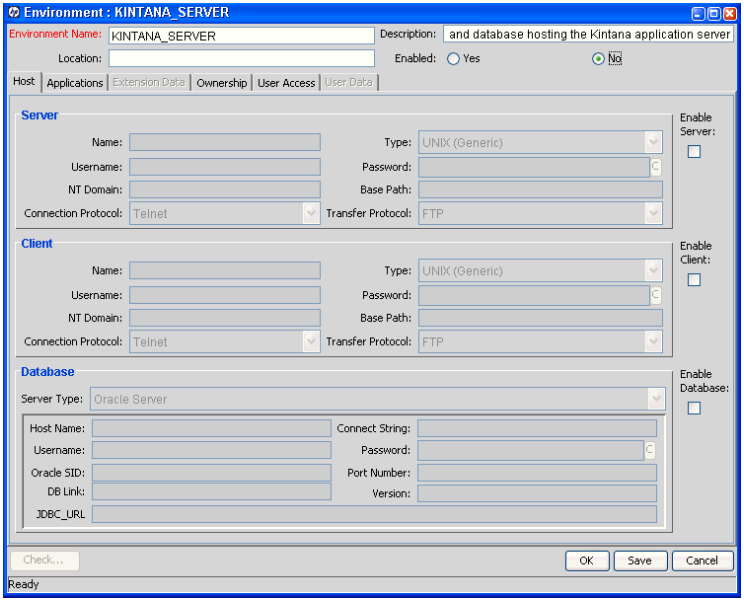
Before you perform the following steps, make sure that you have a valid user account in both the source and destination instances, and that these accounts have the same user name. When the migrator extracts an entity from the source instance, and then imports it into the destination instance, it provides your security information.

To migrate a request type:

1. If the environment definition for the PPM Server is not configured, then you must first create the `KINTANA_SERVER` environment, as follows.

Because you control this migration from the production instance, the environment you define represents the destination for entity migrations.

   a. In the Environment Workbench, open the `KINTANA_SERVER` environment.



b. To the right of the **Server** section, select the **Enable Server** checkbox.

c. Provide the server information.

Because this environment definition represents the PPM Server that you are using to run the migration, there is no need to specify connection information for it. The migrator performs the required actions locally, without opening a separate Telnet or SSH session.

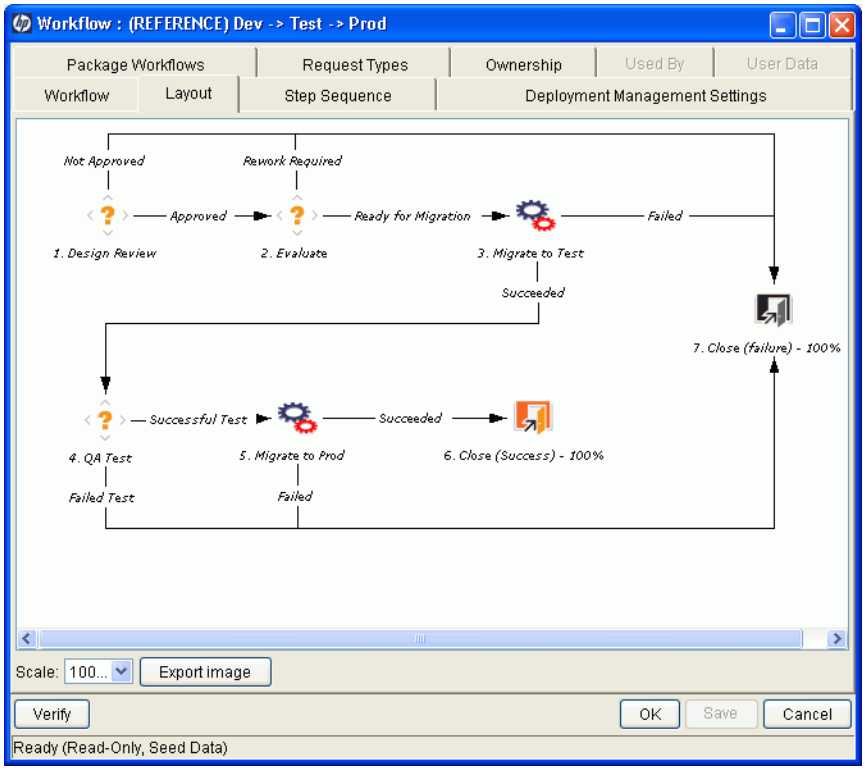
d. Define and enable the source environment.

You must specify connection information for the source environment, including the user name and password, base path, and connection and transfer protocols.

2. Create a deployment management workflow.

For information about how to create a workflow, see the *HP Deployment Management Configuration Guide.*

Specify the QA environment as the source, and the production environment (KINTANA_SERVER) as the destination of the execution step.



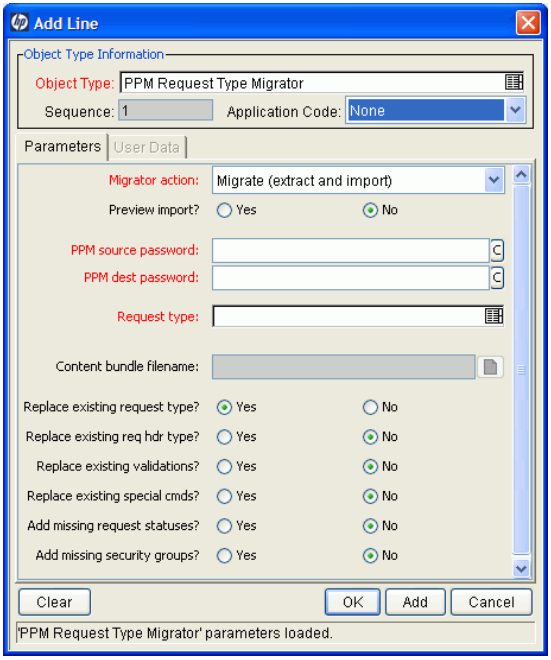
3. Create a package.

   For information about packages and how to create a package, see the *HP Deployment Management User's Guide.*

4. In the Package: <*Package_Name*> window, in the **Workflow** field, specify the workflow you created.

5. Click **New Line.**

   The Add Line dialog box opens.



6. In the **Object Type** field, type **`PPM Request Type Migrator.`**

7. On the **Parameters** tab, provide the required information described in the following table.

Field Name (*Required)	Description
*Migrator action	To control how extensive a migration to perform, in this list, select **Extract only.**
*PPM source password	In this field, type the password for your PPM Center account on the source instance.
*PPM dest password	In this field, type the password for your PPM Center account on the destination instance.
*Request type	In this field, type the name of the request type that you want to migrate.

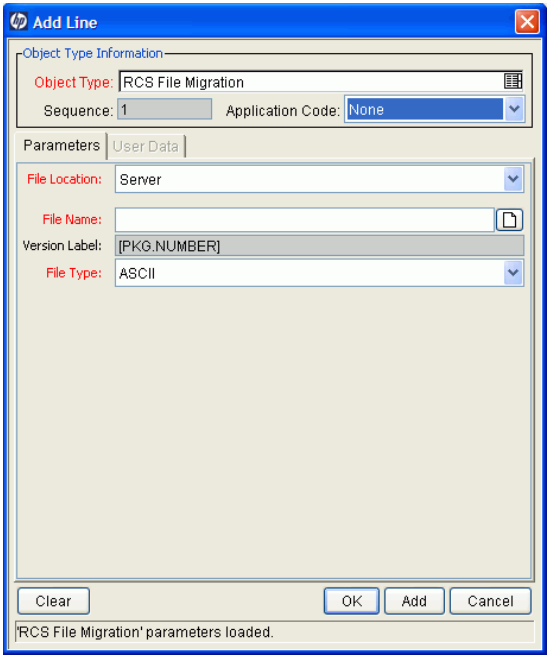
For information on **Migrator action** list dependencies, see *Migrator Action List*.

8. Click **OK.**
9. Submit the workflow.
10. Process the workflow.
11. Check the execution log to verify that the migration was successful.

Defining Entity Migrators

Each object type for the PPM Center entity migrators has a set of parameters similar to those described in this section (and as shown in the previous example). The RCS File Migrator shown in *Figure 9-1* is an example.

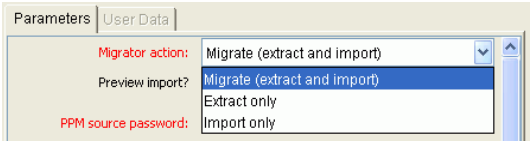
Figure 9-1. Add Line dialog box for the RCS File Migrator



Migrator Action List

To control how extensive a migration to perform, use the **Migrator action** list on the **Parameters** tab of the Add Line dialog box. *Figure 9-2* shows the **Migrator action** list.

Figure 9-2. Migrator action list



In the **Migrator action** list, you can select one of the following actions:

- **Migrate (extract and import)**
- **Extract only**
- **Import only**

Table 9-1 lists the controls in the Add Line dialog box that are affected by the migrator action you select, and provides information about how each control is affected.

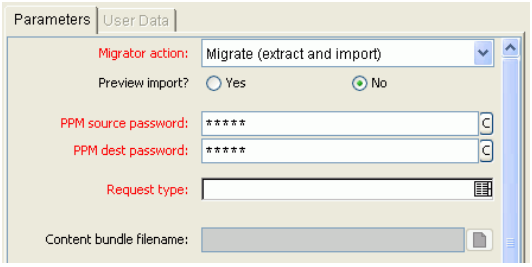
Table 9-1. Migrator action list dependencies

Control and Control Set Names	Extract and Import	Extract Only	Import Only
Preview Import	Enabled	Disabled	Enabled
Target entity field	Required	Required	Disabled
Content bundle fields	Disabled	Enabled	Required
Import behavior fields	Enabled	Disabled	Enabled
Source password	Required	Required	Disabled
Destination password	Required	Disabled	Required

Basic Parameters

Whether the basic parameters are required or simply available depends on the migrator action you select. In *Figure 9-3*, the parameters are the entity name (in this case, the request type), content bundle directory, and content bundle filename.

Figure 9-3. Basic parameters



Content Bundle Controls

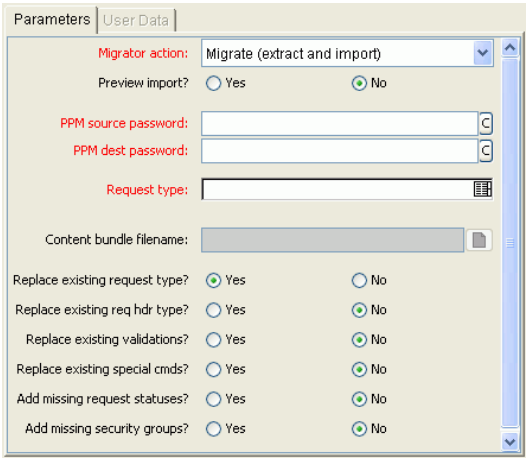
The behavior of controls related to the content bundle depends on the migrator action you select, as follows:

- If you select **Migrate (extract and import),** the migrator maintains its own internal scheme for naming and locating the temporary bundled XML data. This content bundle is extracted from the source, migrated to the destination, imported, and then cleaned up, all as part of the same execution step. The user cannot edit the content bundle information.
- If you select **Extract only,** you can specify the content bundle location and filename, or accept the default values. This lets you specify a location and naming convention that is easier to remember so that you can locate the extracted content bundle and use it as necessary (for example, check it into your version control system). By default, the migrator creates the bundle in the file system of the source PPM Server under the `<PPM_Home>/transfers` directory. The filename is based on the type of entity migrated, its package number, and its package line number.
- If you select **Import only,** you must specify the name and location of an existing content bundle file to import. You can select the file by browsing the file system of the destination PPM Server.

Import Flags

Use the import flags listed in the lower portion of the **Parameters** tab (shown in *Figure 9-4*) to control migrator behavior.

Figure 9-4. Import flags



The available import flags vary with object type.

Preview Import Option

If you set **Preview Import?** to **Yes,** the migrator does not actually import the migrated entity into the destination instance, but instead, simulates the migration and generates an execution log.

Import Behavior Controls

The following settings modify the specific import behavior for the entity to migrate.

- **Replace existing request type?** If the entity to migrate already exists in the target PPM Center instance, you can decide whether or not to replace it. The default selection is **Yes.**

  If the entity does not exist in the destination instance, it is created.

- **Replace existing req hdr type?** If the request type to be migrated references a request header type that already exists in the target PPM Center instance, you can decide whether or not to replace it. The default value is **No.**

- **Replace existing validations?** If the target entity references validations that already exist in the target PPM Center instance, you can decide whether or not to overwrite them. The default value is **No.**

  Regardless of the value, any validations that are missing from the destination instance are automatically created.

- **Replace existing special cmds?** If the validation to be migrated references PPM Center special commands (including parent and child special commands) that exist in the target PPM Center instance, you can decide whether or not to replace them. The default value is **No.**

- **Add missing request statuses?** If the request type to be migrated references request statuses that do not exist in the target PPM Center instance, you can decide whether or not to create them. The default value is **No.**

- **Add missing security groups?** If the entity to be migrated references security groups that are not included in the target instance, you can add those security groups. The default value is **No.**

  Only the list of associated access grants, but not associated users, is transferred.

Password Fields

If the **Migrator action** list displays **Migrate (extract and import),** then the **PPM source password** and **PPM dest password** fields (*Figure 9-5*) are enabled.

Figure 9-5. Password fields

Source Password Field

When the migrator contacts the source server, it uses the credentials of the current PPM Center user to authorize the entity extraction. This user must be part of a security group that contains the access grant "System Admin: Migrate HP PPM Objects." Confirm the user password for the source server in the **PPM source password** field.

Destination Password Field

When the migrator contacts the destination server, it uses the credentials of the current PPM Center user to authorize the entity import. This user must be part of a security group that has the "Sys Admin: Migrate HP PPM Objects" access grant. Confirm the user password for the destination server in the **PPM dest password** field.

Internationalization List

Typically, in an environment in which you are managing configuration across multiple PPM Servers, all of the PPM Center databases involved have the same localization settings. However, if you must migrate configuration entities between PPM Center databases that have different localization settings, you can change the localization-checking behavior of the migrator by changing the value of the **Internationalization** list.

By default, the **Internationalization** list is invisible to users on migrator object types. But the control is enabled and set to **Same language and character set.** To change this setting:

1. Log on to PPM Center.
2. From the menu bar, select **Administration > Open Workbench.**

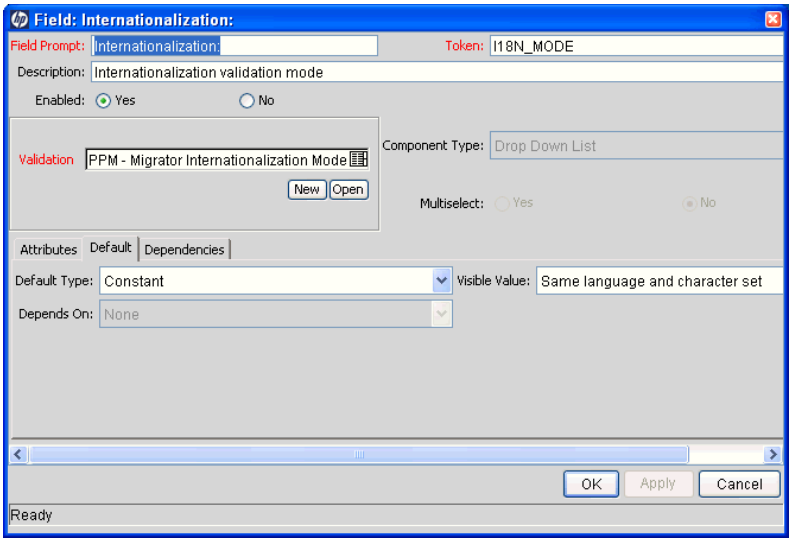
   The PPM Workbench opens.
3. From the shortcut bar, select **Deployment Mgmt > Object Types.**

   The Object Type Workbench window opens.
4. Click **List.**
5. In the **Object Name** column on the **Results** tab, double-click **PPM Request Type Migrator.**

   The Object Type: PPM Request Type Migrator window opens.
6. In the **Prompt** column on the **Fields** tab, double-click **Internationalization.**

   The Field: Internationalization window opens.

7. Click the **Default** tab.



8. From the **Visible Value** list, select one of the following:

   - **Same language and character set.** This is the default option for migrating entities between PPM Center instances running under the same language and character set configuration. It is the most conservative option; any difference in locale, language, or character set between the source and destination servers is flagged as an error and the migration fails.

   - **Different language or character set.** This option lets you override character set or language incompatibilities within the same localization. Use this option if you know that the language or character set settings are different across the source and destination servers, but you want to run the migration anyway and you do not anticipate the differences to cause problems with the entity data you want to migrate. For example, if the destination character set is a superset of the source character set, then you know that data extracted from the source will be valid in the destination.

- **Different localization.** This option lets you migrate content between instances belonging to different localizations (for example, English to German, or German to English). This is the least restrictive option for migrating configuration data across PPM Servers that have different locale settings. Selecting this value could potentially result in invalid data (unsupported characters, and so on) in the destination instance. Be sure to examine (and possibly update) the migrated entity data to ensure that it is valid in the destination.

9. Click **OK.**

Environment Considerations

When migrating entities, HP Deployment Management logs on to remote machines in the same way another user would (that is, using FTP, SCP, SSH, or Telnet). HP Deployment Management can log to a remote server using any existing operating system user name and password.

HP recommends that you generate a new user (for example, PPM Center) on every machine to which HP Deployment Management has access. A user you create for this purpose must have full access to the `<PPM_Home>` directory on the PPM Server, and read and write permissions on other required directories.

Environment Connection Protocol

The environment definition must include information about the communication protocol (for example, Telnet) to be used to connect to the server or client. For information about connection protocols that PPM Center supports, see the *System Requirements and Compatibility Matrix* and the *HP Deployment Management Configuration Guide*.

Environment Transfer Protocol

The environment definition must include information about the transfer protocol to be used to transfer files to or from machines specified in the environment definition. Choose the transfer protocol that best suits your

business and technology needs. Consider factors related to security and performance when selecting the transfer protocol. Work with the application administrator to determine which connection protocols are supported for the machines housing the deployment environments.

For information about transfer protocols, see the *HP Deployment Management Configuration Guide.*

Setting the SERVER_ENV_NAME Parameter

The PPM Center migrators depend on the `SERVER_ENV_NAME` server configuration parameter. This parameter specifies the name of an environment definition in the PPM Center system that describes the host server running that PPM Center instance.

When you installed PPM Center, the `KINTANA_SERVER` environment definition was automatically created on your system. This name is set as the default value of the `SERVER_ENV_NAME` server parameter. PPM Center often refers to this server parameter to find the environment definition that contains information about the computer(s) that host the PPM Server and database. For this reason, it is important that you keep this server parameter synchronized with the name of the corresponding environment definition, as follows:

```
SERVER_ENV_NAME=KINTANA_SERVER
```

Security Considerations

This section provides information about security considerations related to ownership and entity restrictions.

Migration and Ownership

Different groups of PPM Center users have ownership and control over different PPM Center entities. These groups are called ownership groups. Unless a global permission has been designated to all users for an entity, members of ownership groups are the only users who have the right to edit, delete, or copy that entity. The ownership groups must also have the proper access grant for the entity in order to complete those tasks.

Application administrators can assign multiple ownership groups to entities. The ownership groups will have sole control over the entity, providing greater security. Ownership groups are defined in the Security Groups window. Security groups become ownership groups when used in the ownership configuration.

Ownership applies to PPM Center entities during migrations in the following ways:

- If no ownership security is configured for the entity, any user who has permission to perform migrations can migrate it.
- If entity ownership is configured and the user migrating is not in the ownership group, the migration fails.
- If entity ownership is configured and the user migrating is in the ownership group, the migration succeeds.
- If entity ownership is configured and the user migrating is not in the ownership group but has the Ownership Override access grant, the migration succeeds.

These conditions apply to entity import, but not to entity export.

Migrations and Entity Restrictions

A report type might refer to security groups through entity restrictions. The Report Type migrator transfers references to security groups, but does not create any new security groups in the destination instance of PPM Center. If the referenced security group does not exist in the destination instance, the reference is discarded in transit. A message to that effect is displayed in the migration execution log.

If the source instance contains security groups that do not exist in the destination instance during migration, the entity restrictions for the migrated report type might be inaccurate. Therefore, after migration, manually verify report types that contain entity restrictions in the destination instance.

Entity Migrators

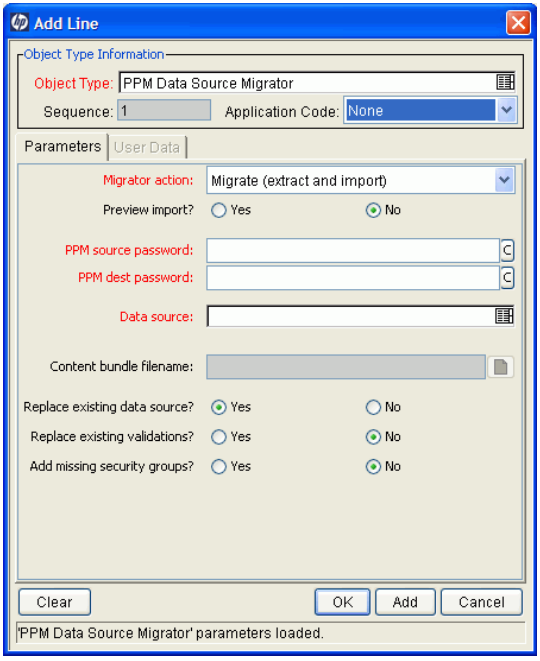
This section provides descriptions of PPM Center entity migrators.

Data Source Migrator

You can use the Data Source Migrator to move a data source that you created in the Data Source Workbench between the PPM Center instances. (Data sources provide data displayed in PPM Dashboard portlets.)

Figure 9-6 on page 239 shows the parameters for the Data Source migrator as they are displayed during package line creation.

Figure 9-6. Data Source Migrator

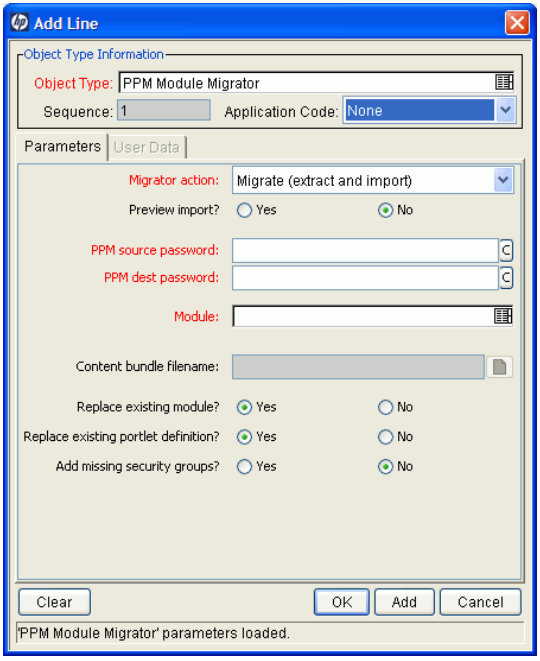


For information about the fields in this migrator, see *Defining Entity Migrators* on page 228. For information about how to create a portlet data source, see the *Creating Portlets and Modules* guide.

Module Migrator

In the PPM Center standard interface, a module is the set of pages that an administrator sets up for users to view and navigate in the PPM Dashboard. You can use the Module Migrator to move PPM Center modules from one PPM Center environment to another.

Figure 9-7. Module Migrator



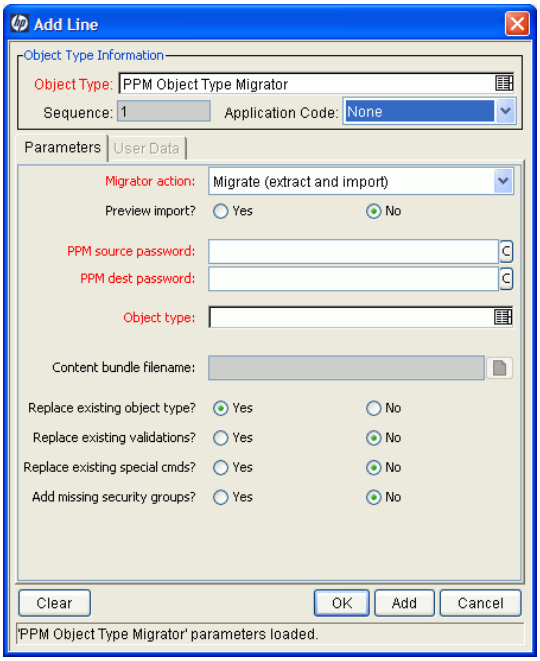
For information about the fields in this migrator, see *Defining Entity Migrators on page 228*. For information about how to create modules, see the *Creating Portlets and Modules* guide.

Object Type Migrator

The Object Type Migrator (*Figure 9-8* on page 241) contains the additional option **Replace existing special cmds?** If the validation to be migrated references PPM Center special commands (including parent and child special commands) that exist in the target PPM Center instance, you can decide whether or not to replace them. The default value is **No.**

Regardless of the migrator settings, special commands missing from the destination instance are created automatically.

Figure 9-8. Object Type Migrator



For information about most of the controls in this migrator window, see *Defining Entity Migrators* on page 228.

Configuration Considerations

The PPM Object Type Migrator also transfers the following information:

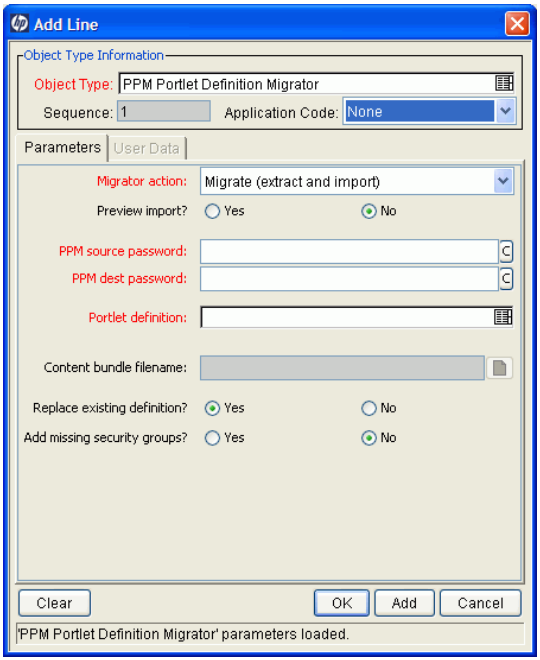
- Special commands referenced by command steps
- Validations referenced by fields
- Environments referenced by validations
- Special commands referenced by validations
- Special commands referenced by other special commands
- Ownership group information for the entity

The migrator transfers references to environments from validations, but does not create any new environments. If the referenced environment does not exist in the destination instance, the migration fails. If this happens, create the missing environment manually in the destination instance.

Portlet Definition Migrator

The Portlet Definition Migrator (*Figure 9-9*) contains all standard entity migrator object type fields. If you migrate a portlet definition to replace an existing enabled portlet definition the destination instance of PPM Center, the migrated changes are applied to all users who have added the same portlet to their PPM Dashboard pages.

Figure 9-9. Portlet Definition Migrator

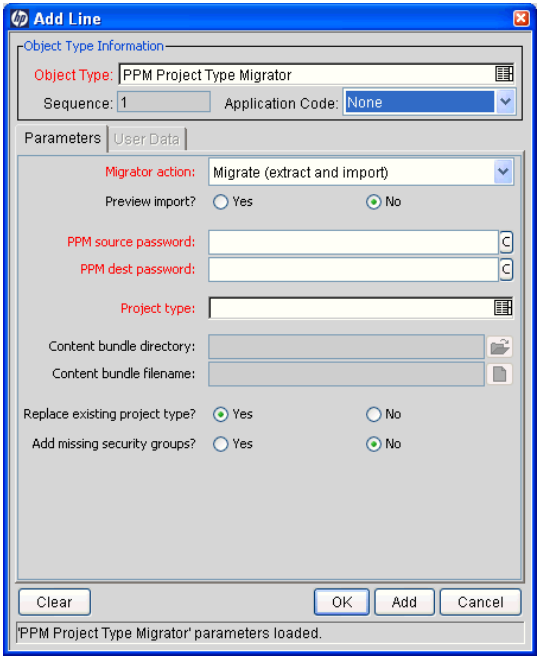


For information about the fields in this migrator, see *Defining Entity Migrators* on page 228.

Project Type Migrator

You can define project types in a development or testing instance of PPM Center, and then use the Project Type Migrator (*Figure 9-10*) to migrate them to production after testing.

Figure 9-10. Project Type Migrator



The Project Type Migrator migrates the following:

- Header information such as name and enabled flag
- All policies (including all attributes)
- References to request types for project, issue, and so on

If the migrator cannot locate these objects in the destination instance, then the references are dropped and a warning message is written into the migrator log file. The migrator report contains information about how each entity association was resolved (or lost).

Project types are connected to work plan templates, resource pools, project requests, and issue requests. None of these entities are migrated with project

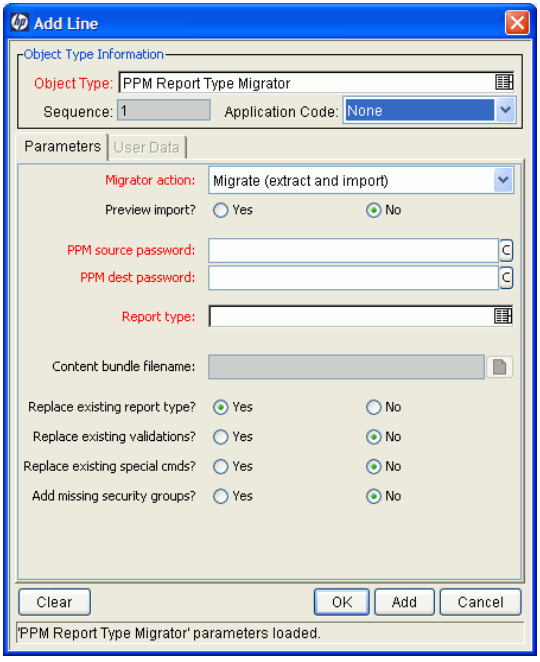
types. However, if these entities exist in the destination instance, the connection to them is maintained (the migrators identify entities by name). Because project types are useless without an associated project request, you must either migrate the associated request type first, so that the link to the project type is resolved when you migrate the project type is migrated, or edit the project type after you migrate it.

The Project Type Migrator does not transport secondary objects as dependencies.

Report Type Migrator

The Report Type Migrator (*Figure 9-11*) contains the additional option **Replace Existing special cmds?** If the validation to be migrated references PPM Center special commands (including parent and child special commands) that already exist in the target PPM Center instance, you can choose to replace them (or not). (The default value is **No.**) Regardless of their values, PPM Center automatically re-creates special commands that are missing from the destination instance.

Figure 9-11. Report Type Migrator



For information about most of the fields in this migrator, see *Defining Entity Migrators* on page 228.

Configuration Considerations

The Report Type Migrator also transfers the following information:

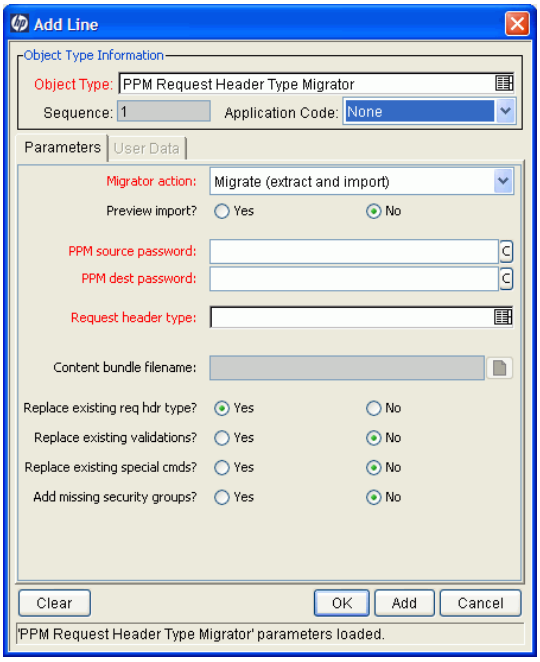
- Special commands referenced by command steps
- Validations referenced by fields
- Environments referenced by validations
- Special commands referenced by validations
- Special commands referenced by other special commands
- Ownership group information for the report type

The Report Type Migrator transfers references to environments from validations, but does not create an environment. If the referenced environment does not exist in the destination instance, the migration fails. If this occurs, you must create the missing environment manually in the destination instance.

Request Header Type Migrator

The Request Header Type Migrator (*Figure 9-12*) contains the additional option **Replace Existing special cmds?** If the validation to be migrated references PPM Center special commands that already exist in the target PPM Center instance, you can decide whether or not to replace them. This includes both parent and children special commands. (The default value is **No.**) Regardless of their values, PPM Center automatically re-creates special commands that are missing from the destination instance.

Figure 9-12. Request Header Type Migrator



For information about most of the fields in this migrator, see *Defining Entity Migrators* on page 228.

Configuration Considerations

The Request Header Type Migrator also transfers the following information:

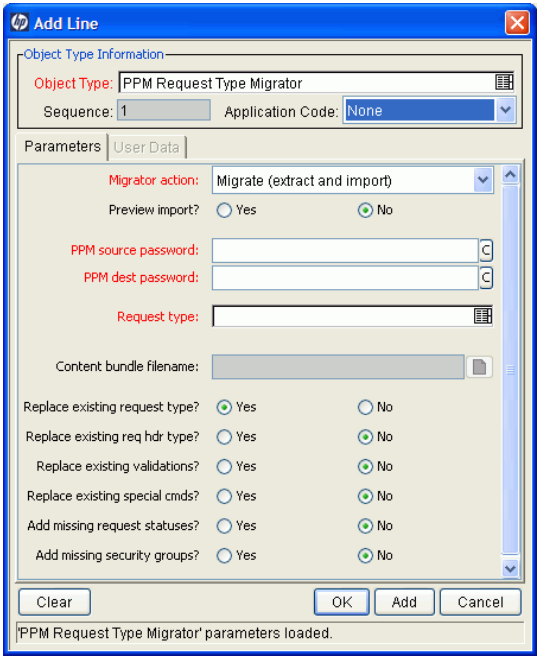
- Validations referenced by fields
- Environments referenced by validations
- Special commands referenced by validations
- Special commands referenced by other special commands
- Ownership group information for the request header type

The Request Header Type Migrator transfers references to environments from validations, but does not create an environment. If the referenced environment does not exist in the destination instance, the migration fails. In this case, you must create the missing environment manually in the destination instance.

Request Type Migrator

The Request Type Migrator (*Figure 9-13*) has additional import behavior options from which to choose.

Figure 9-13. Request Type Migrator



The additional import behavior options are as follows:

- **Replace existing req hdr type?** If the request type to be migrated references a request header type that already exists in the target PPM Center instance, you can decide whether or not to replace it. The default value is **No.**
- **Replace Existing special cmds?** If the validation to be migrated references PPM Center special commands that already exist in the target PPM Center instance, you can decide whether or not to replace them. This includes both parent and children special commands. The default value is **No.**

  Regardless of their values, PPM Center automatically re-creates special commands that are missing from the destination instance.

- **Add missing request statuses?** If the request type to be migrated references request statuses that do not exist in the target PPM Center instance, you can decide whether or not to create them. The default value is **No.**

  In the execution log, a message is displayed for each referenced request status that is not created.

If this option is set to **No,** and one of the missing request statuses is the initial status of the request type, the migration fails. In this case, you must create the request status for the initial status manually.

Configuration Considerations

The Request Type Migrator also transfers the following information:

- Request header types referenced by the request type
- Special commands referenced by command steps
- Validations referenced by fields of the request type or request header type
- Environments referenced by validations
- Special commands referenced by validations
- Special commands referenced by other special commands already referenced elsewhere
- Request statuses referenced by the request type
- Security groups referenced by the request type (on the **Access** tab)
- Workflows referenced by the request type
- Notifications referenced by the request type
- Ownership group information for the request type

The Request Type Migrator transfers references to environments from validations, but does not create an environment. If the referenced environment does not exist in the destination instance, the migration fails. In this case, you must create the missing environment manually in the destination instance.

Simple default rules, defined in the request type **Rules** tab, might reference users, workflows, or other objects. The Request Type Migrator transfers these references, but does not create a missing user or workflow. If the referenced user or workflow does not exist in the destination instance, the reference is discarded in transit, and a message to that effect appears in the migration's execution log. You must manually reconfirm advanced default rules after migration.

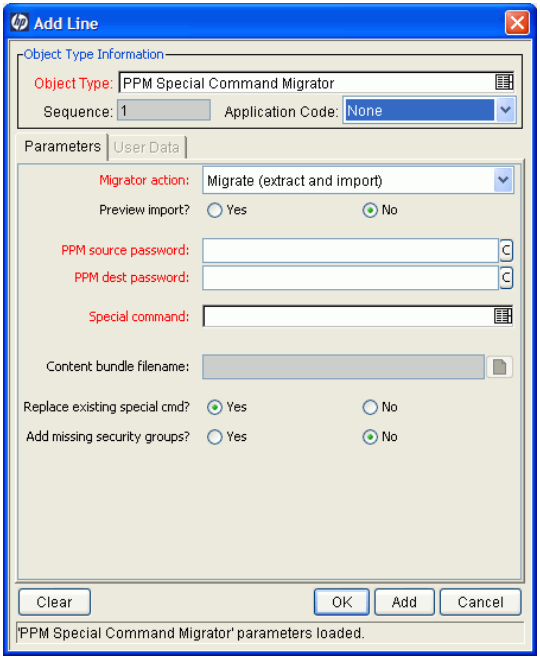
Circular references between request types and workflows could make it necessary to migrate either a request type or workflow twice:

- A new request type referring to a new workflow is migrated. Because the new workflow does not exist in the destination instance, not all references to that workflow are included in the new instance destination.
- The new workflow is migrated.
- The new request type is migrated again. This time, since the workflow it refers to exists, the references are included in the destination instance.

Special Command Migrator

If you migrate a workflow step, request type, or object type that contains special commands, the special commands are not migrated along with the entities. You must use the Special Command Migrator (*Figure 9-14*) to move the special commands between instances of PPM Center separately.

Figure 9-14. Special Command Migrator

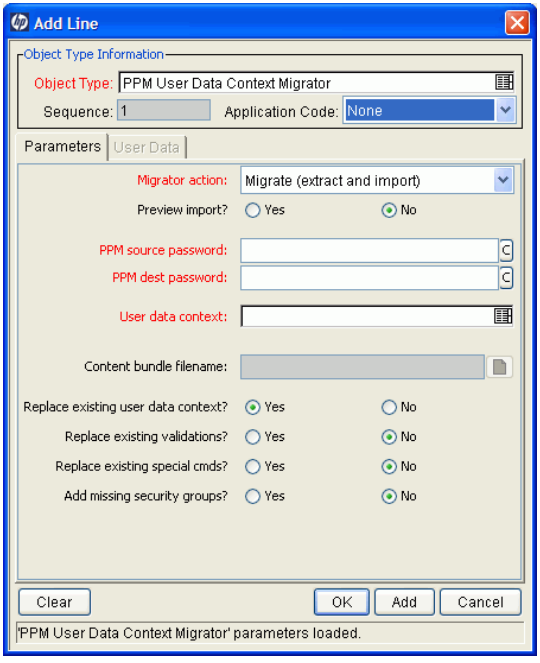


For information about the fields in this migrator, see *Defining Entity Migrators* on page 228.

User Data Context Migrator

The User Data Context Migrator (*Figure 9-15*) contains the additional option **Replace Existing special cmds?** If the validation to be migrated references PPM Center special commands that already exist in the target PPM Center instance, you can decide whether or not to replace them. This includes both parent and child special commands. (The default value is **No.**) Regardless of their values, PPM Center automatically re-creates special commands that are missing from the destination instance.

Figure 9-15. User Data Context Migrator

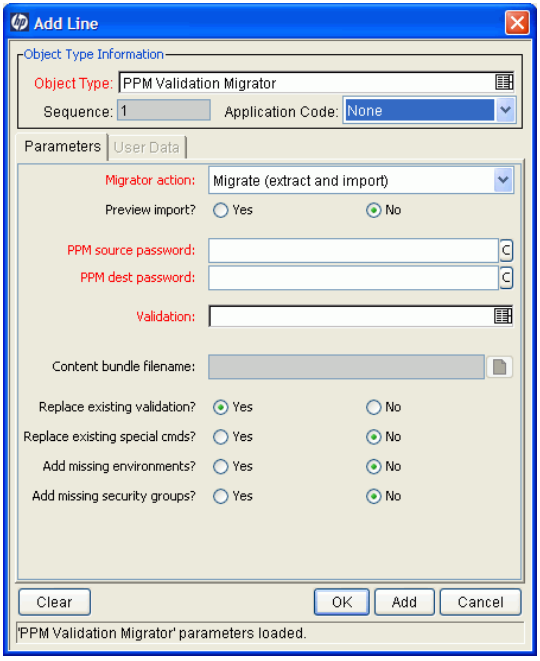


For information about most of the fields in the User Data Context Migrator, see *Defining Entity Migrators* on page 228.

Validation Migrator

The Validation Migrator is shown in *Figure 9-16*.

Figure 9-16. Validation Migrator



This migrator contains the following two additional import behavior options:

- **Replace existing special cmds?** If the validation to be migrated references PPM Center special commands that already exist in the target PPM Center instance, you can decide whether or not to replace them. This includes both special commands directly referenced by the validation, and also special commands referenced by these special commands. (The default value is **No.**) Regardless of their values, PPM Center automatically re-creates special commands that are missing from the destination instance.
- **Add missing environments?** If the validation to be migrated references environments or environment groups that do not exist in the target PPM Center instance, you can decide whether or not to create them (assuming that the option has been marked **Yes**). However, only the environment header information and user data are transferred. Application codes and

extension-specific environment tabs are not transferred. The default value is **No.**

Similarly, environment group application code information is not transferred. If an environment group already exists in the destination instance, it is not updated with environments that were added in the source instance. After migration is complete, if the migrator has created any environments, confirm and complete environment data manually.

For information about the controls in this migrator, see *Defining Entity Migrators* on page 228.

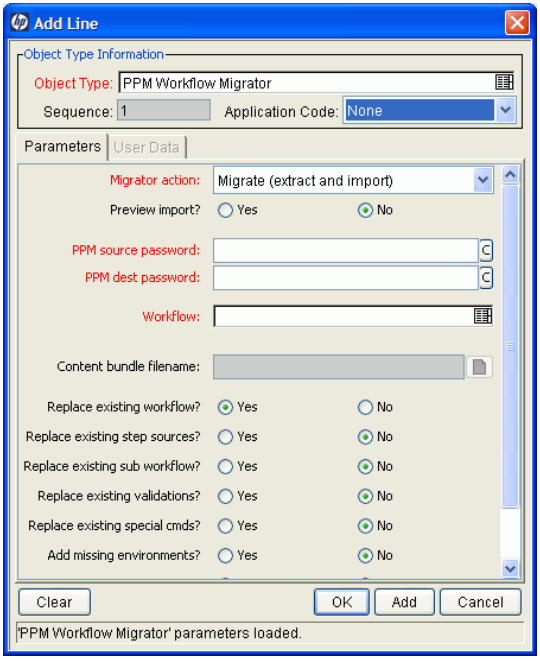
Configuration Considerations

Validation values can also carry context-sensitive user data. When migrating validation values that have such fields, you should manually set up the user data configuration in the destination instance before migration begins.

Workflow Migrator

The Workflow Migrator is shown in *Figure 9-17*.

Figure 9-17. Workflow Migrator



This migrator provides the following additional import behavior options:

- **Replace existing special cmds?** If the workflow to be migrated references PPM Center special commands that already exist in the target PPM Center instance, you can replace them. This includes special commands that the workflow references directly, as well as special commands that these special commands reference. Special commands in validations that the workflow references are also migrated.

  The default value is **No.** Regardless of the value, any special commands missing from the destination instance are created automatically.

- **Replace existing step sources?** If the workflow to be migrated references workflow decision and execution step sources that exist in the target PPM Center instance, you can choose to replace them or leave them in place. However, if workflows in the destination instance are using the existing

step sources, you cannot change certain options (such as **Workflow Scope, Validation,** and **Decision Type**), even if you set **Replace Existing Step Sources?** to **Yes.**

- **Add missing environments?** If the workflow to be migrated references environments or environment groups that do not exist in the target PPM Center instance, you can create the environments or environment groups. However, only the environment header information and user data are transferred. Application codes and extension-specific **Environment** tabs are not transferred. The default value is **No.**

  Similarly, environment group application code information is not transferred. If an environment group exists in the destination instance, it is not updated with environments added to the source instance. If the migrator has created environments, then after migration, make sure that you confirm and complete the environment data manually.

- **Add missing request statuses?** If the workflow to be migrated references request status values that do not exist in the target PPM Center instance, you can create the status values. The default value is **No.**

For information about controls in this migrator, see *Defining Entity Migrators* on page 228.

Configuration Considerations

The Workflow Migrator also transfers the following information:

- Subworkflows that the workflow steps reference
- Special commands that the command steps reference
- Workflow step sources that the workflow steps reference
- Validations that the parameters or workflow step sources reference
- Environments and environment groups that the workflow steps reference
- Environments that the environment groups referenced by workflow steps reference
- Environments that validations reference

- Special commands that validations reference
- Special commands that the workflow step sources reference
- Special commands referenced by other special commands referenced elsewhere
- Security groups that the workflow steps reference
- Request statuses that the workflow steps reference
- Notifications that the workflow steps reference
- Notification intervals that notifications reference
- Security groups that notifications reference
- Ownership group information for the workflow and workflow steps

If a notification in a workflow uses a notification interval that does not exist in the destination instance, the migrator creates this notification interval. The workflow migrator does not replace existing notification intervals in the destination instance.

The Workflow Migrator transfers entity restriction references to object types, but does not create an object type. If the referenced object type does not exist in the destination instance, the migrator discards the reference and records the event in its execution log.

The Workflow Migrator transfers references to request types, but does not create request types. If the referenced request type does not exist in the destination instance, the migrator discards the reference and records the event in its execution log.

If there are circular references between workflows and request types, you may have to migrate either a workflow or request type twice:

- A new request type referring to a new workflow is migrated. Because the new workflow does not exist in the destination instance, all references to that workflow are dropped in transit.
- The new workflow is migrated.
- The new request type is migrated again. This time, because the referenced workflow exists, the references are preserved.

Replacing an Existing Workflow

There are some restrictions on using the Workflow Migrator to make changes to a process that is already in use (by requests or package lines). These restrictions help to ensure that migration does not damage these existing requests or package lines.

Specifically, workflow migration cannot succeed unless the migrator logic finds a workflow step that corresponds to each step in the existing workflow. The following conditions are used to match workflow steps between instances:

- The step source (the particular decision, execution, or condition) of a workflow step is used to match workflow steps. If the step source is not identical, then two workflow steps do not match.
- If both the incoming and existing workflows assign a unique name to each workflow step, these workflow step names are used in combination with the step source to assess the match.
- If a workflow step name is repeated within either workflow, the step sequence is used instead, in combination with the step source, to assess the match.

The Workflow Migrator cannot handle a single change in which both the names of existing workflow steps and the step sequence of existing workflow steps have changed.

To change both the names and step sequences of a workflow:

- Change step names, but do not change any step sequences. Migrate the changed workflow.
- Change step sequences, but do not change any step names. Migrate the changed workflow a second time.

Because of this matching restriction, each open request is on the same process step following the migration as it was before the migration. The migration might have changed the name of this step, but it has not transitioned request workflows.

It is important to note that the migrator does not prevent the removal of outgoing transitions from workflow steps. Therefore, avoid "stranding" open requests at a workflow step that will be deprecated. When deprecating a process step, remove incoming transitions, but leave at least one outgoing transition from the step. This lets open requests move forward. The execution log for the migration contains a table that lists old and new workflow steps.

HP recommends that you use the **Preview import** mode first when you replace an existing workflow, and inspect this table of matched workflow steps before you run the workflow migration in non-preview mode.

Deprecating a Workflow

When the changes to a workflow are extensive, you can deprecate the existing workflow and bring the changes into the production instance as a new workflow. One advantage of implementing the changes as a new workflow is simplicity, since the new workflow is not required to contain all of the steps of the old workflow for backward compatibility.

To bring a new workflow into a production instance:

1. Rename the existing workflow and disable it in production.

   Disabling the workflow removes it from lists of workflow options when new requests are created. Requests that are in process continue to follow

the old workflow until they close, unless each is manually shifted to the new process and transitioned to an appropriate point in the process. Existing defaulting rules and other configurations also continue to refer to the old workflow, regardless of the name change.

2. Migrate the new version of the workflow into the production instance, under the original name.

   Because the production instance no longer contains a workflow by this name, the migrator treats it as a new workflow.

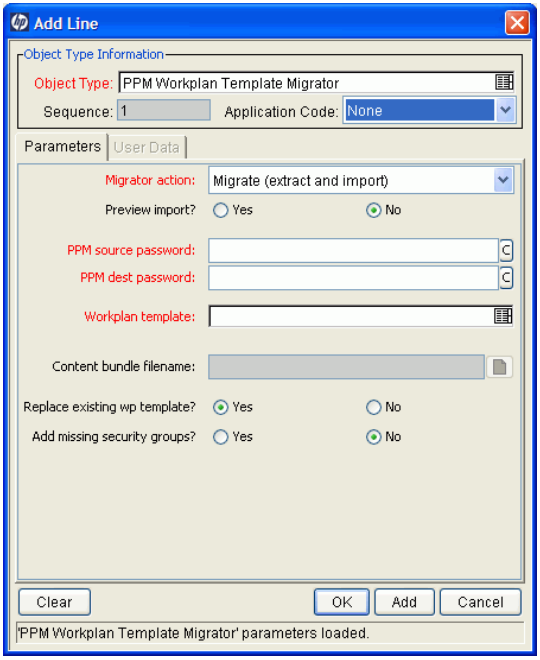
3. After the migration, you can update defaulting rules in request types to reference this new workflow.

   You can do this manually, or by migrating in versions of the request types that refer to the new workflow by its original name.

Work Plan Template Migrator

You can define work plan templates in a development or testing instance of HP Project Management, and then use the Work plan Template Migrator (*Figure 9-18*) to migrate them to production after testing is completed.

Figure 9-18. Work Plan Template Migrator



The Work Plan Template Migrator migrates the following:

- Header information such as work plan template name and list of owners (users)
- Work plan (hierarchy of tasks and task information)
- References to assigned resource groups or users (by reference only—security groups are not treated as dependent objects)

The Work Plan Template Migrator does not transport secondary objects (for example, validations) as dependencies.

10 Migrating Instances

Overview of Instance Migration

Each PPM Center instance consists of a file system and an Oracle database, which can exist on Windows or UNIX machines. You can migrate PPM Center using one of the following methods:

- Copy an entire PPM Center instance (server file system and database schemas) and move it to another location. If you are moving the copied instance to a different machine, you must have a new license key for it.
- Migrate the PPM Server to a different machine, but maintain the existing database schemas. Migrating the server requires a new license key.
- Migrate the database schemas, but maintain the existing PPM Server. Migrating only the database schema does not require a new license key.

Enterprise environments typically have multiple PPM Center instances (for example, development, test, and production). The following sections address the simplest multiple-instance configuration, which consists of a development instance (DEV) and a production instance (PROD). Each is set up on a different machine. You can extend the migration steps to support all of the instances used at your site.

Copying an Instance to Create a New Instance

To create additional PPM Center instances from an existing production (PROD) instance, clone the PROD instance.

To move from a single active instance to multiple instances:

1. Copy the PROD instance to DEV.

   This includes the file system, database, and license information.

2. Configure any changes to HP products in the DEV instance.

   This includes creating or modifying entities such as workflows, object types, request types, validations, security groups, and environments.

3. From the PROD instance, configure a package workflow to import the configuration data from the DEV instance.

4. Migrate data from the DEV instance into the PROD instance.

Running the Installation Script Twice to Create Two Instances

You can set up multiple instances as you first install and set up PPM Center. Configure one instance as the DEV instance, and the other as the PROD instance. This saves you from having to copy data from one instance into another later.

Migrating Document Management (Optional)

If your source machine has document management installed and integrated with PPM Center, see the *Document Management Guide and Reference* for information about how to migrate document management.

Preparing to Migrate

Before you can begin to migrate an entire instance to a different machine, you must obtain a new license key and stop the PPM Server, as described in the following sections.

Obtaining a New License Key

PPM Center is licensed based on the computer that hosts the PPM Server. If you plan to migrate the PPM Server to a different machine, you must obtain a new license key for the target machine. If you plan to migrate only the database schema, you do not need a new license key.

To obtain a new license key:

1. Gather the following information:
   - PPM Center version number
   - Machine IP address
   - Operating system (Windows or UNIX)
   - Server purpose (development, test, or production)
2. Go to the HP Software Support Web site (hp.com/go/hpsoftwaresupport).
3. In the right panel of the HP Customer Support page, click **Submit a License Key Request.**

   The License Request home page opens.
4. In the list of products, to the right of **PPM,** click **Get License.**
5. Provide the required information, and then click **Submit.**

Stopping the PPM Server

To ensure that you do not lose transactions, reports, or logs, stop the PPM Server before you migrate any part of a PPM Center instance. For information about how to stop the server, see *Starting and Stopping the PPM Server* on page 75.

Migrating the PPM Server

Before you migrate the PPM Server, make sure that the target machine meets the requirements described in the document *System Requirements and Compatibility Matrix*.

Migrating to a Windows Machine

To migrate the PPM Server to a Windows machine:

1. Obtain a new license key for the target server, as described in *Obtaining a New License Key* on page 265.
2. Stop the PPM Server.

   For information on how to stop the server, see *Starting and Stopping the PPM Server* on page 75.
3. Migrate the PPM Center file system:
   a. Make a compressed file of the entire `<PPM_Home>` directory.
   b. Copy the compressed file to the target machine, and then extract the file contents.
4. Migrate the PPM Center database schema.

   For information about how to migrate the database schema, see *Migrating the Database Schemas* on page 272.

5. Reconfigure the PPM Server in the target location, as follows:

   a. Run the `kConfig.sh` script, which is located in the `<PPM_Home>/bin` directory.

      The `kConfig.sh` script starts the server configuration utility, which then displays the values for each server parameter from the previous server configuration.

   b. Browse through all server configuration parameters, and make the following updates:

      - Update all parameters that refer to the DNS name or IP address of the old server to instead refer to the DNS name or IP address of the new server.

        - `BASE_URL` specifies the Web location (top directory name) of the PPM Server.

        - `RMI_URL` specifies the port on which the PPM Server listens to initiate RMI client/server communication. (This must be a unique port, distinct from the Web server, SQL*Net, and the HTTP or HTTPS ports.)

      - Update all parameters that reference a specific directory on the old server to instead reference the corresponding directory on the new server. These parameter include:

        - `ORACLE_HOME` specifies the home directory for the Oracle client tools on the PPM Server machine.

        - `BASE_PATH` specifies the full path to the directory where the PPM Server is installed.

        - `ATTACHMENT_DIRNAME` specifies the absolute pathname of the directory where attached documents are to be stored. This directory must give read/write access to Web browsers and, if the system includes an external Web server, exist outside the directory tree.

- SERVER_TYPE_CODE specifies the operating system on which the PPM Server is installed. Because you are placing the server on a computer running Windows, make sure you update the value to Windows.
- SERVER_NAME specifies the name of the PPM Server instance. If multiple PPM Servers are running on the same machine, this name must be unique for each server. If the server is running Windows, this name must match the name of the Windows service name.

c. To implement your changes, run the kUpdateHtml.sh script from the <*PPM_Home*>/bin directory.

6. Create a Windows service for the new PPM Center instance:
   - Run the kConfig.sh script from the <*PPM_Home*>/bin directory and:
     i. Select **Configure Windows services.**
     ii. Select **Change service parameters and refresh the services.**
     iii. Specify a value for the JAVA_HOME environment variable.
     iv. Click **Finish.**
7. Start the new PPM Server.

For information about how to start the server, see *Starting and Stopping the PPM Server* on page 75.

Migrating to a UNIX Machine

To migrate the PPM Server to a UNIX machine:

1. Obtain a new license key, as described in *Obtaining a New License Key* on page 265.
2. Stop the PPM Server.

   For information about how to stop the PPM Server, see *Starting and Stopping the PPM Server* on page 75.
3. Migrate the PPM Center file system as follows:
   a. On the PPM Server host machine, navigate to the parent of the <*PPM_Home*> directory.
   b. Using an archiving utility (such as Tar or Zip), create an archive file of the entire <*PPM_Home*> directory.

      Example:

      If the <*PPM_Home*> directory is named "PPM," run the command:

      ```
      $ tar cf mitg75.tar PPM
      ```
   c. Using FTP in binary mode, copy the archive file to the target machine. Put the archive file in the parent of the new <*PPM_Home*> directory.
   d. To extract the archive file, run the command:

      ```
      $ tar xf mitg75.tar
      ```

      This creates the new PPM Server directory structure. A directory named PPM is created automatically.
4. Migrate the PPM Center database schema.

   For information about how to migrate the database schema, see *Migrating the Database Schemas* on page 272.

5. Reconfigure the PPM Server in the target location:

   a. Run the `kConfig.sh` script, which is located in the `<PPM_Home>/bin` directory.

      The `kConfig.sh` script starts the server configuration utility, which then displays the values for each server parameter from the previous server configuration.

   b. Browse through all server configuration parameters, and make the following updates:

      - Update all parameters that refer to the DNS name or IP address of the old server to instead refer to the DNS name or IP address of the new server.
        - `BASE_URL` specifies the Web location (top directory name) of the PPM Server.
        - `RMI_URL` specifies the port on which the PPM Server listens to initiate RMI client/server communication. (This must be a unique port, distinct from the Web server, SQL*Net, and the HTTP or HTTPS ports.)
      - Update all parameters that reference a specific directory on the old server to instead reference the corresponding directory on the new server. These parameters include:
        - `ORACLE_HOME` specifies the home directory for the Oracle client tools on the PPM Server machine.
        - `BASE_PATH` specifies the full path to the directory where the PPM Server is installed.
        - `ATTACHMENT_DIRNAME` specifies the absolute pathname of the directory where attached documents are to be stored. This directory must give read/write access to Web browsers and, if the system includes an external Web server, exist outside the directory tree.

- `SERVER_TYPE_CODE` specifies the operating system on which the PPM Server is installed. Because you are placing the server on a computer running UNIX, make sure you update the value to `UNIX`.
- `SERVER_NAME` specifies the name of the PPM Server instance. If multiple PPM Servers are running on the same machine, this name must be unique for each server.

c. To implement your changes, run the `kUpdateHtml.sh` script from the `<PPM_Home>/bin` directory.

6. Place the new `license.conf` file into `<PPM_Home>/conf`.
7. Start the new PPM Server.

   For information on how to start the server, see *Starting and Stopping the PPM Server* on page 75.

Migrating the Database Schemas

This section provides the procedures used to migrate the PPM Center database schemas from one database to another.

Export and Import Tools

Using incompatible versions of export and import tools causes errors in instance migration. Make sure that the export and import tools you use are either the same version, or the export tool version is earlier than the import tool version.

If You Use the Extension for Oracle E-Business Suite

If you have HP Deployment Management Extension for Oracle E-Business Suite, you must consider the location of your Primary Object Migrator Host when migrating the PPM Center database schema, because HP Object Migrator might reside in the same database, or even the same schema, as PPM Center.

Migrating the schema does not require migrating the HP Object Migrator instance because the integration method in PPM Center can be refreshed to use the existing HP Object Migrator installation. If Object Migrator shares a database with PPM Center, and you intend to migrate it as well as PPM Center, the destination database must support Object Migrator. (For more information, see the *HP Object Migrator Guide.*)

Unless PPM Center and HP Object Migrator share the same schema, the migration of Object Migrator is completely separate from the migration of PPM Center, and should be completed before you migrate the PPM Center database. Contact HP Software Support Web site (hp.com/go/hpsoftwaresupport) for instructions on how to perform this migration.

If PPM Center and HP Object Migrator share the same schema and you want to migrate both, you must coordinate the migration activities. Contact HP Software Support Web site (hp.com/go/hpsoftwaresupport) for instructions.

Regardless of the configuration, refresh the integration definition after you migrate the PPM Center schemas.

To migrate the database schemas:

1. Stop the PPM Server.

   For information about how to stop the PPM Server, see *Starting and Stopping the PPM Server* on page 75.

2. Export the PPM Center database schema to a file by running the `exp` command as shown in the following example.

   ```
   $ORACLE_HOME/bin/exp USERID=system/<Password>@<DB>
   FILE=<Export_Filename> OWNER=<PPM_Username> LOG=c:/export_
   knta_750.log
   ```

   where

`<Password>`	represents the password for the system user on the Oracle database
`<DB>`	represents the database connect string
`<Export_Filename>`	represents the name of the file that is to contain the export. The filename must have the `dmp` extension (for example, `kntaExport.dmp`).
`<PPM_Username>`	represents the name of the PPM Center database schema to export.

3. Export the RML schema.

4. Create the new PPM Center database schema:

   a. Run the `CreateKintanaUser.sql` script (located in the `<PPM_Home>/install_750/mitg750/system` directory) from SQL*Plus as the SYSTEM user.

      Example:

      ```
      SQL> @CreateKintanaUser.sql PPM_User PPM_Password Data_
      Tablespace Index_Tablespace TEMP_Tablespace Clob_
      Tablespace
      ```

b. Run the `GrantSysPrivs.sql` script (located in the `mitg750/sys` directory) from SQL*PLUS as the SYS DBA user.

For more information, see *Preliminary Database Tasks* on page 368.

5. Create the new PPM Center RML database schema.

   To create a new, empty RML database schema in the target database, run the `CreateRMLUser.sql` script (located in the `mitg750/sys` directory) from SQL*PLUS as the SYSTEM user.

   Example

   ```
   SQL> @CreateRMLUser.sql Rml_User Rml_Password Rml_data_
   tablespace Rml_temp_tablespace
   ```

6. To import data from the export file that you created earlier into the new empty PPM Center database schema, run the `imp` command, as shown in the following example.

   ```
   $ ORACLE_HOME/bin/imp USERID=system/<Password>@<DB>
   FILE=<Export_Filename> IGNORE=Y TOUSER=<New_PPM_Username>
   FROMUSER=<PPM_Username> LOG=c:/import_knta_750.log
   ```

   where

<Password>	represents the password for the system user on the Oracle database
<DB>	represents the database connect string
<Export_Filename>	represents the name of the file that is to contain the export. The filename must have the `dmp` extension (for example, `kntaExport.dmp`).
<New_PPM_Username>	represents the name of the new PPM Center database schema
<PPM_Username>	represents the name of the PPM Center database schema that was previously exported.

7. Import the RML export file.
8. Create the RML-related packages in the RML schema:
   a. `cd <PPM_Home>/install_750/rml`
   b. `sqlplus <RML_Username>/<RML_Password>@<SID>@rml_driver.sql`
9. Grant privileges to the PPM Center RML database schema:

You can find the following scripts in the `<PPM_Home>/install_750/rml` directory.

- To set up the permissions between the two.

  ```
  sqlplus <PPM_Username>/<PPM_Password>@SID
  @RMLSetupInPPMSchema.sql <RML_Username>
  ```

- To create synonyms to PPM Center objects in the RML schema.

  ```
  sqlplus <RML_Username>/<RML_Password>@SID
  @RMLSetupInRMLSchema.sql <PPM_Username>
  ```

10. Configure the database schema to allow appropriate access to rebuild optimizer statistics.

If PPM Center and HP Object Migrator share the same database schema, the PPM Center database schema is referred to as the PPM Center account, and the HP Object Migrator schema is referred to as the HP Object Migrator account.

To provide the necessary grants and permissions to the PPM Center user, run the `GrantSysPrivs.sql` script as SYS DBA.

```
SQL> @GrantSysPrivs.sql <PPM_Username>
```

11. If the Extension for Oracle E-Business Suite is in use and HP Object Migrator resides in the same schema as PPM Center, complete the HP Object Migrator migration.

    For assistance, contact HP Software Support Web site (hp.com/go/hpsoftwaresupport).

12. If you are using the Extension for Oracle E-Business Suite, refresh the Primary Object Migrator Host definition.

To validate any invalid PPM Center database objects generated during link regeneration, run the `RecompileInvalid.sql` script, which is located in the `<PPM_Home>/install_750` directory. Run this script from SQL*Plus connected as the new PPM Center database schema account.

13. Reconfigure the PPM Server to connect to the new database schema:

    a. Start the configuration utility by running the `kConfig.sh` script located in the `<PPM_Home>/bin` directory.

    b. Update the server configuration parameters, which are described in *Server Configuration Parameters* on page 279.

If you edit the `server.conf` files manually, be sure to run the `kUpdateHTML.sh` script after you complete the edit.

14. Start the PPM Server (see *Starting and Stopping the PPM Server* on page 75).

Troubleshooting Instance Migrations

This section describes common problems that you might encounter as you migrate PPM Center instances.

PPM Server Does Not Start

If you cannot start the PPM Server, check the `serverLog.txt` file (located in the `<PPM_Home>/server/<PPM_Server_Name>/logs` directory) for error messages. If the `serverLog.txt` file contains no error messages, increase the server debug level to determine whether any additional helpful information is written to the log.

To increase the server debug level:

1. Open the `logging.conf` file (located in the `<PPM_Home>/conf` directory) in a text editor such as Notepad.
2. Set the value of the `SERVER_DEBUG_LEVEL` parameter to `HIGH`, and then save and close the `logging.conf` file.
3. Run the `kUpdateHtml.sh` script.
4. Rerun the `kStart.sh` script, and then recheck the `serverLog.txt` file to determine whether it contains any additional information.
5. Open the `logging.conf` file.
6. Restore the default value of the `SERVER_DEBUG_LEVEL` parameter.

   Restoring the default value ensures that the file system does fill up with unnecessary information recorded in the `serverLog.txt` file(s).

7. Run the `kUpdateHtml.sh` script.

Server Starts, but You Cannot Access Applications

If the Web browser accessing the PPM Center URL generates a “Not Found” or an “Access Denied” error, check the `server.conf` file and the external Web server (if one exists) to ensure that the PPM Server installation directory is specified correctly.

If the PPM Server has recently been upgraded and the URL has changed, make sure that any saved links to the previous PPM Center URL (for example, existing requests) are updated to point to the new URL.

A Server Configuration Parameters

Overview of Configuration Parameters

This appendix lists and describes the PPM Server configuration parameters located in three files in the <*PPM_Home*> directory:

- `server.conf`
- `logging.conf`
- `LdapAttribute.conf`

For more information about the PPM Server directory structure, see Appendix B, *Server Directory Structure and Server Tools,* on page 351.

Determining the Correct Parameter Settings

For most PPM Center installations, the default parameter values are optimal. Considerations detailed in the parameter descriptions can help you determine under what circumstances you might want to change the parameter settings.

Required Parameters

In the tables in this appendix, a single asterisk in the **Parameter** column indicates that the parameter is required to set up a PPM Server. Two asterisks in this column indicates that the parameter is required based on the condition of another parameter. For example, the `KINTANA_LDAP_ID` parameter is only required if the `AUTHENTICATION_MODE` parameter is set to `LDAP`.

In a server cluster configuration, required parameters must be set for the primary server. Secondary servers inherit the parameter values from the primary server. To override the inherited value, set the parameter to the value you want in the appropriate secondary server section of the `server.conf` file. For more information about setting up PPM Servers in a server cluster configuration, see *Configuring a Server Cluster* on page 131.

For information about how to specify your own parameters, see *Defining Custom and Special Parameters* on page 81.

Directory Path Names

Use forward slashes (/) to separate directory paths that you specify in the `server.conf` file, regardless of the operating system used. PPM Center automatically uses the appropriate path separators to communicate with Microsoft Windows. HP recommends that you not use backslashes (\) to separate directory paths in the `server.conf` file.

Server Configuration Parameters

The `server.conf` file contains the values of all of the server parameters applied when the server configuration utility (`kConfig.sh` script) was last run.

HP recommends that you *not* modify the `server.conf` file directly. Instead, use the `kconfig.sh` utility, which provides a graphical interface that you can use to change the server configuration parameter values.

To edit the `server.conf` file:

1. Stop the PPM Server.
2. Run the `kConfig.sh` script.

   After you finish specifying configuration parameter values, the `kConfig.sh` script automatically runs the `kUpdateHtml.sh` script to regenerate the `server.conf` file and apply your changes.

   For information about the `kUpdateHtml.sh` script, see *kUpdateHtml.sh* on page 362.

3. Restart the PPM Server.

   To view a list of the server configuration parameter values on an active PPM Server, run the Server Configuration report. For information on how to run the Server Configuration report, see *Running Server Reports from the Admin Tools Window* on page 178 and *Running Server Reports from the Command Line* on page 182.

Table A-1 provides descriptions of the configuration parameters in the `server.conf` file. The parameter names listed in the table are shortened versions of the actual names, all of which start with the string `com.kintana.core.server`. For example, the full name of the `CLIENT_TIMEOUT` parameter is `com.kintana.core.server.CLIENT_TIMEOUT`.

Table A-1. Server configuration parameters (page 1 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
ALLOW_SAVE_ REQUEST_DRAFT	If set to `true`, allows requests to be saved without automatically submitting them in the standard interface.	Default: `false` Valid values: `true, false`
APPLET_KEY_ CLEANUP_ INTERVAL	Frequency with which the *ENABLE_ APPLET_KEY_CLEANUP* thread runs. See also *DAYS_TO_KEEP_APPLET_ KEYS* on page 287.	Default: 21600 (seconds)
APPROVERS_ EVALUATIONS_ INTERVAL	While *ENABLE_APPROVERS_ EVALUATIONS* on page 291 is set to `true` (the default), a background service evaluates timesheet approvers at the interval specified by this parameter.	Default: 3600 seconds (1 hour)
*ATTACHMENT_ DIRNAME	Absolute pathname of the directory where attached documents are to be stored. This directory must: • Give read/write access to Web browsers • Be outside the directory tree if the system includes an external Web server In a server cluster, all servers must be able to access and share the specified directory.	Example `C:/ppm/eon/ attachments`
AUTHENTICATE_ REPORTS	If set to `true`, access to all reports requires user authentication. (A user must provide a PPM Center user login ID).	Default: `true` Valid values: `true, false`

Table A-1. Server configuration parameters (page 2 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
*AUTHENTICATION_MODE	User authentication method. To specify multiple modes, use a comma-delimited list of valid values.	Default: `PPM` Valid values: `PPM, LDAP, NTLM, SITEMINDER`
AUTO_COMPLETE_LONG_TYPE_MAX_ROWS	Determines the maximum number of rows in long auto-complete lists.	Default: `5000`
AUTO_COMPLETE_QUERY_TIMEOUT	Sets query timeouts on auto-complete lists to prevent excessive database CPU use.	Default: `30` (seconds)
AUTO_COMPLETE_SHORT_TYPE_MAX_ROWS	Determines the maximum number of rows to retrieve from the database for short type auto-completion lists.	Default: `500`
AUTOCOMPLETE_STATUS_REFRESH_RATE	Interval at which the command status is refreshed to provide a list of values in an auto-complete list.	Default: `5` (seconds)
BASE_CURRENCY_ID	Currency in which your organization maintains its accounting system.	Default: `97`
BASE_LOG_DIR	Points to the “logs” directory directly under the directory specified by the **BASE_PATH* parameter. In a server cluster, all servers must be able to access and share the specified directory.	Example `com.kintana.core.server.BASE_LOG_DIR=C:/PPM/eon/logs`
*BASE_PATH	Full path to the directory where the PPM Server is installed.	Default; The default value depends on the operating system platform. Example `C:/PPM/eon/`

Table A-1. Server configuration parameters (page 3 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
*BASE_URL	Web location (top directory name) of the PPM Server.	Example `http://www.mydomain.com:8080`
BUDGET_IN_THOUSAND_SHOW_DECIMAL	Used with the `BUDGET_IN_WHOLE_DOLLARS` parameter as follows: • If `BUDGET_IN_WHOLE_DOLLARS` is set to `true`, the `BUDGET_IN_THOUSAND_SHOW_DECIMAL` parameter is ignored and values are displayed as whole numbers. • If `BUDGET_IN_WHOLE_DOLLARS` is set to `false`, and `BUDGET_IN_THOUSAND_SHOW_DECIMAL` is set to `false`, values are displayed as 1000s without decimals. For example, the value 1234567 is displayed as 1235. • If `BUDGET_IN_THOUSAND_SHOW_DECIMAL` is set to `true`, values are displayed as 1000s with decimals. For example, the value 1234567 is displayed as 1234.567.	Default: `false` Valid values: `true, false`
BUDGET_IN_WHOLE_DOLLARS	Determines whether budget values are expressed in whole dollars.	Default: `false` Valid values: `true, false`
CCM_MACHINE_URL [a]	URL of the Change Control Management server and port number used for integration with PPM Center.	Valid value format: `http://<Host>:<Port>/ccm/`

Table A-1. Server configuration parameters (page 4 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
CLIENT_TIMEOUT	Determines the frequency (in minutes) with which the PPM Workbench interface sessions sends a message to the PPM Server that indicates the client is still active. Under normal operation, do not change this value.	Default: `5`
CLOSE_BROWSER_ON_APPLET_EXIT	Determines whether the client browser closes after the user quits the PPM Workbench.	Default: `false` Valid values: `true, false`
COMMANDS_CLEANUP_INTERVAL	Determines the frequency with which the *ENABLE_APPLET_KEY_CLEANUP* thread (page 244) runs. See also *DAYS_TO_KEEP_COMMANDS_ROWS* on page 287.	Default: `16200`
**CONC_LOG_TRANSFER_PROTOCOL Required if *ORACLE_APPS_ENABLED* = `true`	Transfer protocol used to transfer concurrent request logs and patching README files.	Default: `FTP` Valid values: FTP, SCP
**CONC_REQUEST_PASSWORD Required if *ORACLE_APPS_ENABLED* = true	Encrypted password of the concurrent request user.	Default: (none) Example `fnd`
**CONC_REQUEST_USER Required if *ORACLE_APPS_ENABLED* = true	Valid user on the Oracle system that can be used to retrieve concurrent request output files. Set the retrieval method (FTP or SCP). *See **CONC_LOG_TRANSFER_PROTOCOL* on page 285.	Example `applmgr`

Table A-1. Server configuration parameters (page 5 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
CONCURRENT_ REQUEST_WATCH_ DOG_INTERVAL	Determines the frequency with which the *TURN_ON_CONCURRENT_ REQUEST_WATCH_DOG* thread runs.	Default: `30`
COST_ CAPITALIZATION_ ENABLED	Determines whether cost capitalization is enabled.	Default: `false` Valid values: `true, false`
COST_RATE_RULE_ UPDATE_ INTERVAL_ MINUTES	This service updates the planned and actual costs of open projects when new cost rate rules are added or existing cost rate rules are modified.	Default: `60` (minutes)
COST_ROLLUP_ INTERVAL_ MINUTES	The Cost Rollup Service asynchronously recalculates and rolls up cost (project and program budget costs) asynchronously as part of a service. To set up the service, set the *ENABLE_COST_ROLLUP_SERVICE* parameter to `true` and use this parameter to specify the delay between consecutive runs of the service. The cost rollup service only recalculates project costs if changes have been made. In practice, the frequency with which the process runs has little effect on when a project is recosted. If a large number of active projects are updated throughout the day, it is very possible that the cost rollup service will take longer than the default 60 minutes to recalculate everything based on recent updates.	Default: `60` (minutes) Valid values: any positive integer

Table A-1. Server configuration parameters (page 6 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
COST_UPDATE_ SERVICE_ INTERVAL	The cost update service is used to update cost information with modified cost rate rules or currency exchange rates. This parameter determines the frequency with which the service is invoked.	Default: `3600` (seconds)
DASHBOARD_DB_ CONNECTION_ PERCENTAGE	Percentage of *MAX_DB_ CONNECTIONS* that the PPM Dashboard module can use for database connections.	Default: `25` Valid values: Integer between 0 and 100
DASHBOARD_ PAGE_AUTO_ REFRESH_ DISABLED	If set to `true`, indicates that IIS/ Apache is used. To avoid problems exporting PPM Dashboard pages as PDF files, you must set this parameter.	Default: `false`
DATE_ NOTIFICATION_ INTERVAL	Interval at which the PPM Server is to check to determine whether date-based notifications are pending, and to send them.	Default: `60` (minutes)
DAYS_TO_KEEP_ APPLET_KEYS	Determines the number of days applet keys are retained in the `KNTA_ APPLET_KEYS` table.	Default: `1`
DAYS_TO_KEEP_ COMMANDS_ROWS	Determines how many days records are kept in the prepared commands tables before they are cleaned up.	Default: `1`
DAYS_TO_KEEP_ INTERFACE_ROWS	Determines the number of days to keep records of all interfaces.	Default: `5`

Table A-1. Server configuration parameters (page 7 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
DAYS_TO_KEEP_ LOGON_ATTEMPT_ ROWS	Number of days to keep records of all logon attempts. **Note:** PPM Center keeps a record of the most recent logon attempt, regardless of when it occurred. So, for example, if the sole user only logs on once a month, PPM Center retains the record of the last logon, even if `DAYS_ TO_KEEP_LOGON_ATTEMPT_ROWS` is set to 14 days.	Default: `14`
**DB_ CONNECTION_ STRING (Required if RAC is used)	Oracle RAC (Real Application Clusters) service name.	Example `K92RAC`
DB_LOGIN_ TIMEOUT	Amount of time that the PPM Server is to continue to try to log on to the database (acquire the JDBC connections that make up the connection pool) before reporting that the database is unavailable.	Default: `30000` (milliseconds)
*DB_PASSWORD	Password for the database schema that contains the PPM Center tables.	Example `#!#<Password>#!#`
*DB_USERNAME	Name of the database schema that contains the PPM Center tables.	Example `knta`
DEBUG_MESSAGE_ CLEANUP_ INTERVAL	Specifies the run frequency for the *ENABLE_DEBUG_MESSAGE_ CLEANUP* thread.	Default: `21600`
DEFAULT_ COMMAND_ TIMEOUT	Determines the number of seconds the PPM Server tries to run commands before it times out.	Default: `90`

Table A-1. Server configuration parameters (page 8 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
DEFAULT_PAGE_SIZE	Default number of work plan lines that can be loaded into the Work Plan page for all new users. This setting indicates whether to use the fast setting or the slow setting (rather than indicating a specific size). In new installations, this defaults to the slow connection setting. HP recommends that the system administrator review this setting after installation. If your system has mostly LAN users (fast connections), set this to use the fast setting. If your system has mostly WAN/VPN users (slow connections) or mixed usage, set this to use the slower setting.	Default: `50`
DEFAULT_PAGE_SIZE_OPTION	Controls the initial type of page size (low, high, or custom) selected for the Edit My Profile page.	Default: `LOW_PAGE_SIZE` Valid values: `LOW_PAGE_SIZE, HIGH_PAGE_SIZE`, and `CUSTOM_PAGE_SIZE`
DEFAULT_REQUEST_SEARCH_ORDER_BY_ID	Affects the **Sort By** field on the Search Requests page. The default value is `true`, which sorts the search results based on Request ID. When set to `false`, search results are returned unsorted.	Default: `true` Valid values: `true, false`

Table A-1. Server configuration parameters (page 9 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
DEFAULT_TIME_SHEET_LINES_VIEW_MODE	Determines whether the time sheet items in HP Time Management are displayed grouped under appropriate headings, or in a flat list without headings. For detailed information about grouped and ungrouped display of time sheet items, see the *HP Time Management User's Guide*.	Default: `grouped` Valid values: `grouped, flat`
DEMAND_FIELDS_CACHE_SIZE	Specifies the size of the demand set fields cache in number of demand set.	Default: `10`
DEMAND_FIELDS_CACHE_TIMEOUT	Timeout for the demand set fields cache, expressed in seconds.	Default: `360000` (seconds)
DEPLOY_BASE_PATH	Specifies the deployment destination. **Note:** HP recommends that you leave the default value unless the PPM Server directory is renamed.	Default: server
DIST_ENGINE_MONITOR_SLEEP_TIME	Used in release distribution. Specifies the number of milliseconds the monitor waits between checking existing result listener. Use this parameter to adjust the amount of time the monitor sleeps between checks. **Note:** HP recommends that you not change this value. It does not affect performance.	Default: `5000` (milliseconds)
DOCUMENT_CLEANUP_SERVICE_DELAY	Determines the run frequency of a server thread that checks for documents no longer attached to a PPM Center entity, and removes them from the PPM Center file system. This parameter is associated with the parameter *ENABLE_DOCUMENT_CLEANUP_SERVICE* on page 293.	Default: `1440` (minutes)

Table A-1. Server configuration parameters (page 10 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
EMAIL_ NOTIFICATION_ CHECK_INTERVAL	Determines the frequency (in seconds) with which the PPM Server checks for pending email notifications.	Default: `20`
EMAIL_ NOTIFICATION_ SENDER	Email address of the default sender of email notifications. This sender receives any error messages associated with email notifications.	Example `mgr@ppm.com`
ENABLE_APPLET_ KEY_CLEANUP	Periodically removes old records from the database table `KNTA_APPLET_ KEYS`. (These are temporary, system-generated keys used for one-time access to the system—for example, if a user wants to open the PPM Workbench.) This parameter is associated with the frequency parameter *APPLET_KEY_ CLEANUP_INTERVAL*.	Default: `true` Valid values: `true, false`
ENABLE_ APPROVERS_ EVALUATIONS	If set to true (the default), an HP Time Management service periodically checks to determine whether the resource assigned to approve a timesheet has changed. The parameter *APPROVERS_ EVALUATIONS_INTERVAL* on page 282 determines the frequency of these checks.	Default: `true` Valid values: `true, false`

Table A-1. Server configuration parameters (page 11 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
ENABLE_ COMMANDS_ CLEANUP	If set to `true`, a service periodically removes old records from the `KNTA_ PREPARED_COMMANDS` and `KNTA_ PREPARED_COMMAND_STEPS` database tables. These tables contain temporary data used during command processing. This parameter is associated with the *COMMANDS_ CLEANUP_INTERVAL* frequency parameter and the *DAYS_TO_KEEP_ COMMANDS_ROWS* parameter.	Default: `true` Valid values: `true, false`
ENABLE_ CONCURRENT_ REQUEST_ UPDATES	This parameter is related to requests in HP Demand Management. When this is set to `true`, multiple users can change the same request simultaneously. Request data such as notes, new references and new table entries are always saved. Conflicting changes that cannot be saved are displayed to the user as differences.	Default: `true` Valid values: `true, false`
ENABLE_COST_ RATE_RULE_ UPDATE_SERVICE	This service updates the planned and actual costs of open projects when new cost rate rules are added or existing cost rate rules are modified.	Default: `true` Valid values: `true, false`
ENABLE_COST_ ROLLUP_SERVICE	PPM Center recalculates and rolls up cost (project and program budget costs) asynchronously as part of a service. To set up the service, set the this parameter to `true`, and then use the *COST_ROLLUP_INTERVAL_ MINUTES* parameter to specify the frequency with which the service performs its calculations.	Default: `true` Valid values: `true, false`

Table A-1. Server configuration parameters (page 12 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
ENABLE_COST_ UPDATE_SERVICE	If set to `true`, updates cost information with modified cost rate rules or currency exchange rates. The *COST_UPDATE_SERVICE_ INTERVAL* parameter setting determines how often the service is invoked.	Default: `false` Valid values: `true, false`
ENABLE_DB_ SESSION_ TRACKING	If set to `true`, enables a stack trace to be reported in the PPM Center DB Server Reports, which you can use to track the exact line of code used to request a database connection.	Default: `false` Valid values: `true, false`
ENABLE_DEBUG_ MESSAGE_ CLEANUP	Periodically removes old records from the `KNTA_DEBUG_MESSAGES` database table, which can collect a lot of temporary data. Use the *DEBUG_ MESSAGE_CLEANUP_INTERVAL* parameter to specify the run frequency for this thread. Use the **HOURS_TO_ KEEP_DEBUG_MESSAGE_ROWS* parameter to specify how long records stay in the debug table before they are cleaned up.	Default: `true` Valid values: `true, false`
ENABLE_ DIRECTORY_ CLEANUP	Determines whether the Directory Cleanup Service is enabled.	Default: `true` Valid values: `true, false`
ENABLE_ DOCUMENT_ CLEANUP_SERVICE	Enables a server thread that periodically checks for documents that are no longer attached to a PPM Center entity, and removes those it finds from the PPM Center file system. This parameter is associated with the parameter `DOCUMENT_CLEANUP_ SERVICE_DELAY`, which determines the frequency with which this thread runs.	Default: `false` Valid values: `true, false`

Table A-1. Server configuration parameters (page 13 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
ENABLE_ EXCEPTION_ ENGINE	If set to `true`, enables the exception engine, which runs a process to determine whether active projects are running on time. Set the exception engine interval with ***EXCEPTION_ENGINE_WAKE_UP_TIME* on page 302.	Default: `true` Valid values: `true, false`
ENABLE_ FINANCIAL_ METRICS_UPDATE_ SERVICE	Determines whether the financial metrics update service is enabled. This service calculates net present value (NPV) and return on investment (ROI) for HP Portfolio Management.	Default: `true` Valid values: `true, false`
ENABLE_FLS_ PENDING_DENORM	Managing field-level security is very computationally expensive, so whenever the security settings at the field level are updated, the PPM Server performs a number of calculations that allow live security checks in performance. The server performs these calculations asynchronously, by a separate server thread. This parameter enables the thread that performs the calculations. You can use the following associated parameters to specify the time at which this thread runs: • *FLS_PENDING_DENORM_WAKE_UP_TIME* • *FLS_PENDING_DENORM_DAY_OF_WEEK* • *FLS_PENDING_DENORM_WEEK_INTERVAL*	Default: `true` Valid values: `true, false`

Table A-1. Server configuration parameters (page 14 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
ENABLE_FX_RATE_ UPDATE_SERVICE	Recalculates cost after financial exchange (FX) rates change.	Default: `true` Valid values: `true, false`
ENABLE_ INTERFACE_ CLEANUP	Periodically removes old records from the database open interface tables. You can use the associated parameter *INTERFACE_CLEANUP_INTERVAL* to specify the run frequency for this thread, and the parameter *DAYS_TO_ KEEP_INTERFACE_ROWS* to specify how long to keep records in the interface tables.	Default: `true` Valid values: `true, false`
ENABLE_JDBC_ LOGGING	Determines whether to enable JDBC logging, which records SQL run against the database, the time required to run the SQL, and the time to retrieve the results. This information is recorded in `jdbc.System_ Name.log` in the server log directory. This parameter is useful in debugging system performance problems. You can set this parameter in the PPM Workbench interface without stopping the system (**Edit > Settings**).	Default: `false` Valid values: `true, false`

Table A-1. Server configuration parameters (page 15 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
ENABLE_LOGIN_ COOKIE	If set to `true`, the **Remember my logon** option is displayed on the logon page, and a cookie is placed on the client browser to maintain a record of the user logon information. **Remember my logon** sets a cookie on the local machine that lets a user log on to PPM Center later, without providing logon information. You can also view reports through notification links, and so on, without logging on. This cookie is removed only if the user clicks **Sign Out** (or clears cookies, or the cookie expires). If a user closes the browser window without signing off, the cookie is not cleared. To disable this function, change the parameter value to `false`.	Default: `true` Valid values: `true, false`
ENABLE_LOGON_ ATTEMPTS_ CLEANUP	Periodically removes old records from the `KNTA_LOGON_ATTEMPTS` database table, which contains records of all logon attempts. You can use the *LOGON_ATTEMPTS_ CLEANUP_INTERVAL* parameter to specify the run frequency of this thread. Use the *DAYS_TO_KEEP_ LOGON_ATTEMPT_ROWS* parameter to specify how long records stay in the logon table before they are removed.	Default: `true` Valid values: `true, false`
ENABLE_MAC_ SERVICE [a]	To enable the MAC service, set this value to `true`.	Default: `false` Valid values: `true, false`

Table A-1. Server configuration parameters (page 16 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
ENABLE_ OVERVIEW_PAGE_ BUILDER	This parameter is provided for backward compatibility if you have customized “overview pages.” If you do not have customized “overview pages,” leave the default value (`false`).	Default: `false` Valid values: `true, false`
ENABLE_PENDING_ ASSIGNMENTS_ CLEANUP	Periodically checks for duplicate rows in the `KNTA_PENDING_ ASSIGNMENTS` table. This parameter is related to the “work item breakdown” service. If a work item is updated more than once between runs of the work item breakdown service, the `KNTA_PENDING_ASSIGNMENTS` table contains duplicate rows. This thread removes the duplicates. Use the *PENDING_ASSIGNMENTS_ CLEANUP_INTERVAL* parameter to specify the run frequency for this thread.	Default: `true` Valid values: `true, false`
ENABLE_PENDING_ EV_UPDATES_ CLEANUP	If set to `true`, removes duplicate rows in the Pending EV Updates table. Use this parameter in conjunction with `PENDING_COST_EV_UPDATES_ SERVICE`.	Default: `true` Valid values: `true, false`
ENABLE_ PROGRAM_ SUMMARY_ CONDITION_ ENGINE	If set to `true`, enables the automatic update of program health indicators.	Default: `false` Valid values: `true, false`
ENABLE_PROJECT_ LAUNCH_FROM_ ACTION_MENU	If set to `true`, allows users with the required permission to open the PPM Workbench as a stand-alone application using Active X.	Default: `true` Valid values: `true, false`

Table A-1. Server configuration parameters (page 17 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
ENABLE_PROJECT_PV_UPDATE_SERVICE	If set to `true`, updates planned values for tasks. The interval at which the service runs is determined by the *PROJECT_PV_UPDATE_INTERVAL_MINUTES* parameter setting.	Default: `true` Valid values: `true, false`
ENABLE_QUALITY_CENTER_INTEGRATION [a]	If no XML mapping file has been generated and deployed to both PPM Center and Quality Center, set this value to `false`. If a mapping has been deployed, to enable the integration, set the value to `true`.	Default: `true` Valid values: `true, false`
ENABLE_QUALITY_CENTER_METRICS_SYNC [a]	Indicates whether or not to enable the service that synchronizes PPM Center with Quality Center. **Note:** Always leave this value set to `false` (the default).	Default: `false` Valid values: `true, false`
ENABLE_QUERY_BUILDER	If set to `true`, enables the advanced "query builder" capability for searching HP Demand Management requests.	Default: `true` Valid values: `true, false`
ENABLE_QUICKLIST_UPDATE	Controls the visibility of the **Update** button on the Quick List.	Default: `true` Valid values: `true, false`
ENABLE_REFERENCE_UPDATE_SERVICE	When set the `true`, enables the service that updates references between entities. See also *REFERENCE_UPDATE_INTERVAL*.	Default: `true` Valid values: `true, false`
ENABLE_RESOURCE_POOL_ROLLUP_SERVICE	If set to `true`, enables resource pool rollup (between child resource pool and parent resource pool).	Default: `true` Valid values: `true, false`

Table A-1. Server configuration parameters (page 18 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
ENABLE_RM_ NOTIFICATION_ SERVICE	Enables the resource pool and staffing profile notification service. The service must be enabled in order to send notifications to staffing profile managers, resource pool managers and resources. For more information, see the *HP Resource Management User's Guide.*	Default: `true` Valid values: `true, false`
ENABLE_SEC_ DETECTION	If set to `true`, enables detection mode in the security vulnerability filter. If the filter is in detection mode, all user inputs are matched with the regular expressions and possible attacks are logged as errors. If the `ENABLE_XSS_EXCEPTION` and `ENABLE_SQL_EXCEPTION` parameters are set to `true`, exceptions are thrown.	Default: `false`
ENABLE_SEC_ PROTECTION	If set to `true`, enables protection mode in the security vulnerability filter. If the filter is in protection mode, and the user input matches an attack regular expression, the HTML special characters <, >, ", and \ in user input are escaped to <, >, ", and &#39.	Default: `false`
ENABLE_SHARED_ LOCK_CLEANUP	If set to `true`, enables the shared lock cleanup service, which cleans up any entries left in the shared lock table after a server crash.	Default: `true` Valid values: `true, false`

Table A-1. Server configuration parameters (page 19 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
ENABLE_SQL_ TRACE	Determines whether performance statistics for all SQL statements run are placed into a trace file. The SQL trace facility generates the following statistics for each SQL statement: • Parse, run, and fetch counts • CPU and elapsed times • Physical reads and logical reads • Number of rows processed • Misses on the library cache • User name under which each parse occurred • Each commit and rollback This parameter corresponds to the **Enable DB Trace Mode** checkbox in the Server Settings dialog box.	Default: `false` Valid values: `true, false`
ENABLE_SQL_ EXCEPTION	If set to `true`, and cross-site scripting is detected based on the regular expression, a Security Validation Exception is thrown, and a corresponding error message is logged. As a result, the operation is abandoned. If set to `false`, an error message is logged, but the operation continues.	Default: `false` Valid values: `true, false`
ENABLE_ STATISTICS_ CALCULATION	Determines whether to automatically collect statistics for the cost-based optimizer. By default, statistics are rebuilt every Sunday at 1:00 a.m.	Default: `true` Valid values: `true, false`

Table A-1. Server configuration parameters (page 20 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
ENABLE_TASK_ ACTUAL_ROLLUP_ SERVICE	Enables a service that asynchronously rolls up actuals provided through HP Time Management or the My Tasks portlet.	Default: `true` Valid values: `true, false`
ENABLE_TIME_ SHEET_ NOTIFICATIONS_ SERVICE	If set to `true`, enables notification on time sheets.	Default: `false` Valid values: `true, false`
ENABLE_ TIMESTAMP_ LOGGING	If set to `true`, specifies that a timestamp is written into the log for each line of debugging text that corresponds to actions you have performed. The timestamp can help you locate information in the server log files about events that occurred at a specific time, or to determine how much time elapsed between specific logged statements. **Note:** Including the timestamp adds text to each logged statement, which bloats the log file and can make it more difficult to read.	Default: `true` Valid values: `true, false`
ENABLE_TM_ WORK_ITEM_MISC	If set to `true`, the **Allowed work item types** on the **Work Items** tab of a time sheet policy includes the **Miscellaneous Items** checkbox. If set to `false`, the checkbox is not displayed. For information about the **Work Items** tab, see *HP Time Management Configuration Guide.*	Default: `true` Valid values: `true, false`

Table A-1. Server configuration parameters (page 21 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
ENABLE_TM_ WORK_ITEM_ PACKAGES	If set to `true`, the **Allowed work item types** list on the **Work Items** tab of a time sheet policy includes the **Packages** checkbox. If set to `false`, the checkbox is not displayed. For information about the **Work Items** tab, see *HP Time Management Configuration Guide*.	Default: `true` Valid values: `true, false`
ENABLE_TM_ WORK_ITEM_ PROJECTS	If set to `true`, the **Allowed work item types** list on the **Work Items** tab of a time sheet policy includes the **Projects** checkbox. If set to `false`, the checkbox is not displayed. For information about the **Work Items** tab, see *HP Time Management Configuration Guide*.	Default: `true` Valid values: `true, false`
ENABLE_TM_ WORK_ITEM_ REQUESTS	If set to `true`, the **Allowed work item types** list on the **Work Items** tab of a time sheet policy includes the **Requests** checkbox. If set to `false`, the checkbox is not displayed. For information about the **Work Items** tab, see *HP Time Management Configuration Guide*.	Default: `true` Valid values: `true, false`
ENABLE_TM_ WORK_ITEM_ TASKS	If set to `true`, the **Allowed work item types** list on the **Work Items** tab of a time sheet policy includes the **Tasks** checkbox. If set to `false`, the checkbox is not displayed. For information about the **Work Items** tab, see *HP Time Management Configuration Guide*.	Default: `true` Valid values: `true, false`
ENABLE_UNICODE_ FOR_ TELNETCLIENT	If set to `true`, enables Unicode support in Telnet.	Default: (none) Valid values: `true, false`

Table A-1. Server configuration parameters (page 22 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
ENABLE_WEB_ ACCESS_LOGGING	If set to `true`, tells Tomcat (the Web server provided with JBoss) to log all http requests received. **Note:** If enabled on a busy system, Web access logging generates many log files.	Default: (none) Valid values: `true, false`
ENABLE_WEB_ SERVICES	To use the PPM Center Web services interface, set this to `true`.	Default: `false` Valid values: `true, false`
ENABLE_XSS_ EXCEPTION	If set to `true`, enables cross-site scripting detection exception.	Default: `false` Valid values: `true, false`
**EXCEPTION_ ENGINE_WAKE_ UP_TIME Required if *ENABLE_ EXCEPTION_ ENGINE* = true	Time at which the exception engine process runs.	Default: `1` (that is, 1:00 a.m.) Valid values: 1 through 24

Table A-1. Server configuration parameters (page 23 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values

EXCLUDED_ PARAM.n	Used to specify a list of excluded parameters. The “n” at the end is a number between 1 and the values specified for the `NUM_EXCLUDED_ PARAM` parameter.
	To specify parameters, use the format.
	`pageURI,parameterName`
	Example
	`com.kintana.core.web.NUM_ EXCLUDED_PARAM=2`
	`com.kintana.core.EXCLUDED _ PARAM.1=/itg/WEB-INF/jsp/ common/ dialogLayoutIF.jsp,message`
	`com.kintana.core.web.EXCLUDE D_PARAM.2=/dashboard/app/ portal/PageView.jsp,pageId`
	Note: No spaces are allowed, and the names are case-sensitive.
		Default: (none)

EXTERNAL_WEB_ PORT	If you are using an external Web server to serve PPM Center clients, you must configure this parameter as an available port that can communicate with the PPM Server. This port receives AJP (Apache JServ Protocol) requests from the external Web server. AJP is the standard protocol used for communication between a Web server and an application server. **Note:** If you are using an external Web server, you must still configure the standard PPM Center **HTTP_ PORT*. This port is used internally by PPM Center reports. There is no need to make it accessible to the network.	Valid value: Any available port number

Table A-1. Server configuration parameters (page 24 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
FAIL_EXECUTIONS_ON_STARTUP	If the PPM Server stops while command executions are running, those executions are interrupted and the parent entities (Package Lines, Releases, Requests, and so on) are assigned the status “in progress.” This parameter tells the server that, after it restarts, it must check for any entities that have “in progress” status and that have no executions running (that is, executions that were interrupted). The server sets the internal status of those entities to FAILED, with a visible status of “Failed (Interrupted).”	Default: `true` Valid values: `true, false`
FINANCIAL_METRICS_UPDATE_INTERVAL	Determines how often financial metrics are updated. Financial metrics calculates the net present value (NPV) and ROI.	Default: `1440` (minutes)
FLS_PENDING_DENORM_DAY_OF_WEEK	Determines the day of the week to run the fls_pending_denorm service. For information about this service, see *ENABLE_FLS_PENDING_DENORM* on page 294.	Default: `7` Valid values: An integer between 1 and 7 (inclusive), where 1 represents Sunday and 7 represents Saturday
FLS_PENDING_DENORM_WAKE_UP_TIME	Determines the time of day the fls pending denorm service is run. For information about this service, see *ENABLE_FLS_PENDING_DENORM* on page 294.	Default: `21` Valid values: Integer between 1 and 24, inclusive

Table A-1. Server configuration parameters (page 25 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
FLS_PENDING_ DENORM_WEEK_ INTERVAL	Determines the number of weeks between each fls_pending_denorm service run. For information about this service, see *ENABLE_FLS_PENDING_DENORM* on page 294.	Default: `4` Valid values: Integer between 1 and 4, inclusive
FULL_NAME_ FORMAT	Used to control the format in which the full names are provided for resources, contacts, and so on.	Default: `0` Valid values: 0, 1 0 denotes First Last. Example: John Smith. 1 denotes Last, First. Example: Smith, John
GRAPHICAL_WF_ ENABLE	If set to `true`, makes links to view graphical workflow available on submitted requests.	Default: `true` Valid values: `true, false`
GROUP_PRIVATE_ PUBLIC_PAGES	If set to `true`, after a user selects **Dashboard > Personalize Dashboard,** the PPM Dashboard displays two sections: **Private** and **Shared.** The **Private** section contains single pages and groups, the **Shared** section contains modules.	Default: `false` Valid values: `true, false`

Table A-1. Server configuration parameters (page 26 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
GZIP_ENCODING_ENABLED	Determines whether HTTP responses are compressed before they are sent to PPM Center HTML clients. If set to `true`, then textual HTTP responses are compressed using GZIP compression (if the requesting browser supports GZIP). By default, this is set to `true` to improve the responsiveness of the PPM Center standard (HTML) interface, because less overall data is carried across the Internet between the client and the PPM Server. If all PPM Center clients have fast network access to the PPM Server, then consider setting this parameter to `false` to reduce the overhead of compressing and decompressing responses.	Default: `true` Valid values: `true, false`
HIGH_PAGE_SIZE	Recommended number of work plan lines to load into the Work Plan page if the user is connected through a fast connection such as a LAN.	Default: `100`
*HOURS_TO_KEEP_DEBUG_MESSAGE_ROWS	Number of hours that rows in the `KNTA_DEBUG_MESSAGES` table are to be kept. For high-volume PPM Center installations, a large number of rows may be generated in this table. For such installations, decrease this value accordingly. See also *ENABLE_DEBUG_MESSAGE_CLEANUP* on page 292.	Default: `48`

Table A-1. Server configuration parameters (page 27 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
*HTTP_PORT	Port to use to communicate with the built-in HTTP server. If PPM Center is in stand-alone mode (that is, it is not integrated with an external Web server), then PPM Center clients must have access to the `HTTP_PORT`. If PPM Center is integrated with an external Web server, then client HTTP traffic is routed through the *EXTERNAL_WEB_PORT*. However, even in that case, the PPM Server still uses the **HTTP_PORT* internally to run reports. However, in this case, it is not necessary to make the **HTTP_PORT* externally accessible to PPM Center clients (and thus, the port need not be exposed outside of the PPM Server).	Default: `8080` Valid values: Unique port greater than 1024 and distinct from the Web server, SQL*Net, and RMI ports.
I18N_CARET_DIRECTION	Caret position on input fields (for example, text fields). If unspecified, same as *I18N_SECTION_DIRECTION*.	Default: `ltr` Valid values: `ltr, rtl` (left to right, right to left)
I18N_ENCODING	Character encoding to be used on all HTML pages in the PPM Center standard interface.	Default: `UTF-8`
I18N_LAYOUT DIRECTION	Default layout direction of HTML pages in the PPM Center standard interface.	Default: ltr Valid values: `ltr, rtl` (left to right, right to left)

Table A-1. Server configuration parameters (page 28 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
I18N_REPORT_ HTML_CHARSET	HTML character set used to generate PL/SQL reports. Must map to the character set specified in *I18N_REPORTS_ ENCODING*.	Default: `WE8ISO8859P15` Valid values: Any character set names that Oracle recognizes.
I18N_REPORTS_ ENCODING	Character encoding to use to generate reports in PPM Center. `IW8MSWIN1255` is recommended for Windows systems.	Default: `UTF-8` Valid values: Any encoding algorithm that Oracle can interpret.
I18N_SECTION_ DIRECTION	Layout direction of custom sections (for example, request detail sections). If unspecified, same as *I18N_ LAYOUT DIRECTION*.	Default: `ltr` Valid values: `ltr, rtl`
*INSTALLATION_ LOCALE	Language and country code of the PPM Center installation. The language code must match the PPM Center installation language.	Default: `en_US` Valid values: PPM Center installation language code
INTERFACE_ CLEANUP_ INTERVAL	Determines the frequency with which the *ENABLE_INTERFACE_ CLEANUP* thread runs.	Default: `11700`
JAVA_CLASSES_ LOC	Specifies the location of the JRE classes.	Example `C:/Java/ j2sdk1.5/jre/ lib/ classes.zip`

Table A-1. Server configuration parameters (page 29 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
JAVA_PLUGIN_PATH_IE	Specifies the Web location for downloading the cross-platform Java plug-in installer for Internet Explorer browsers.	Default: `http://java.sun.com/update/1.5.0/jinstall-1_5_0_11-windows-i586.cab`
JAVA_PLUGIN_XPI_PATH	Specifies the Web location for downloading the cross-platform Java plug-in installer for Firefox browsers. For information about the Java plug-in supported for the current PPM Center version, see the *System Requirements and Compatibility Matrix*.	Default: `java.com/en/download/windows_xpi.jsp`
JAVA_PLUGIN_VERSION	Version of the Sun Java plug-in used to start the PPM Workbench interface.	Default: `1.5.0_11`
JAVA_PLUGIN_XPI_PATH	Specifies the Web location for downloading the cross-platform Java plug-in installer for Firefox browsers.	Example `http://java.sun.com/update/1.5.0/j2re-1_5_0_11-windows-i586.xpi`
JDBC_DEBUGGING	Specifies the SQL_DEBUG property on the PPM Dashboard.	Default: `false` Valid values: `true, false`

Table A-1. Server configuration parameters (page 30 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
*JDBC_URL **Note:** For Oracle RAC (Real Application Clusters), this parameter must contain the host and port information for all databases to which the PPM Server will connect.	Locator for the database that contains the PPM Center database schema. Must be specified correctly for PPM Server to communicate with the database. Format: `jdbc:oracle.thin:@<Host_Name>:<Port>:<SID>` where • *<Host_Name>* is the DNS name or IP address of the system running the database • *<Port>* is the port used by SQL*Net to connect to the database. Refer to the database entry in the `tnsnames.ora` file • *<SID>* is the database system ID.	Default: `1521` Example `jdbc:oracle:thin:@DBhost.domain.com:1521:SID`
JVM_OPTIONS	This parameter is for HP internal use only. Do not alter its value unless directed to do so by HP-Mercury support for PPM Center.	Default: N/A
JSP_RECOMPILE_ENABLED	Determines whether changes to JSP files are picked up on a running server, thereby quickly making them visible. If set to `false`, JSP files are checked for changes only the first time they are accessed, with the result that changes are visible only after the server is restarted. If you expect JSP pages to be updated regularly, set to `true`. The PPM Server detects JSP changes without restarting.	Default: `false` on production systems, `true` on development systems Valid values: `true, false`

Table A-1. Server configuration parameters (page 31 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
**KINTANA_LDAP_ID Required if *AUTHENTICATION_MODE = LDAP	PPM Center account on the LDAP server. Used by the PPM Server to bind to the LDAP server.	Example `uid=admin, ou=dev`
**KINTANA_LDAP_PASSWORD Required if *AUTHENTICATION_MODE = LDAP	PPM Center password on the LDAP server. The PPM Server configuration utility automatically encrypts this password. To manually edit this value, surround the encrypted password with `#!#` delimiters.	Default: `#!##!#` Example `#!#<Password>#!#`
KINTANA_LOGON_FILENAME	Used in non-HTML notification, this parameter value is specified with the filename (to be appended to the URL), which points to the logon page. **Note:** HP recommends that you not reset this parameter.	Example `kintanaHome.html`
KINTANA_SERVER_DIRECTORY	Specifies the server directory location. You define this value if you are using a multiple-server (clustered) setup.	Default: `/server/kintana/`
KINTANA_SERVER_LIST	The server sets the (read-only) value of this parameter at runtime.	Example `aeon!rmi://ice:27099/KintanaServer`
*KINTANA_SERVER_NAME	Name of the PPM Server instance. If multiple PPM Servers are running on the same machine, this name must be unique for each server. If the server is running Windows, this name must match the name of the Windows service name.	Default: `kintana`

Table A-1. Server configuration parameters (page 32 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
*KINTANA_ SESSION_TIMEOUT	Time set to elapse before the PPM Server terminates a user session (in the PPM Workbench or standard interface) because of inactivity. A value of 0 denotes no timeout.	Default: `120` (minutes) Valid values: 10 through 720
LDAP_BASE_DN	Base distinguished name on the LDAP server. Each LDAP URL must specify a base distinguished name (DN), which is used in place of the LDAP_BASE_DN server configuration parameter.If the URLs provided for *LDAP_URL_FULL* do not have a DN value, PPM Center uses the value set for LDAP_BASE_DN.	Default: (none) Example `CN=Users,DC=PPMAD,DC=com`
LDAP_ENABLE_ DEREFERENCING	If set to `yes` (the default), then dereferencing is enabled. For more details about LDAP dereferencing, see “Dereferencing Aliases” on the Sun Developer Web site (java.sun.com/products/jndi/tutorial/ldap/misc/aliases.html).	Default: `yes` Valid values: `yes, no`
**LDAP_GROUP_ RECURSION_LIMIT Required if *AUTHENTICATION_MODE* = LDAP	Number of levels of subgroups to traverse when importing users from groups.	Default: `15`
**LDAP_SSL_PORT Required if *AUTHENTICATION_MODE* = LDAP	SSL port number on the LDAP server. If not specified, all transactions are carried over the port specified by the **LDAP_URL* parameter.	Default: `636`

Table A-1. Server configuration parameters (page 33 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
**LDAP_URL Required if *AUTHENTICATION_MODE = LDAP	Comma-delimited list of LDAP URLs, which the PPM Server queries in the order specified. If no port number is specified, the default port number 389 is used. **Note:** The LDAP_URL_FULL parameter supersedes the LDAP_URL parameter. That is, if a value is set for both in the server.conf file, LDAP_URL_FULL is used. If the URLs specified for LDAP_URL_FULL do not have a DN value, the value set for LDAP_BASE_DN is used.	Example ldap://ldap.theurl.com:389 Example ldap://10.100.102.199: 389
LDAP_URL_FULL	PPM Center uses this parameter to handle multiple domains during LDAP authentication. The values for the parameter include a space-separated (not comma-separated) list of full LDAP URLs. Each LDAP URL must specify a base DN. **Notes:** • To specify a space character inside a URL, use the URL encoding scheme, and replace the space with ”%20.” For example, if you have an organizational unit called ”My Org Unit,” then specify”My%20Org%20Unit” in the LDAP URL. • The LDAP_URL_FULL parameter supersedes the LDAP_URL parameter. That is, if a value is set for both in the server.conf file, LDAP_URL_FULL is used. If URLs specified for LDAP_URL_FULL do not have a DN value, the value set for LDAP_BASE_DN is used.	Example com.kintana.core.server.LDAP_URL_FULL=ldap://host.yourdomain.com/CN=Users,DC=yourdomain,DC=com ldap://host.yourdomain.com/OU=Users2,DC=yourdomain,DC=com

Table A-1. Server configuration parameters (page 34 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
LICENSE_KEY	License key required to use PPM Center core functionality.	Example `36ha5b993c1776kc6g03gjct5k7hv5c3`
LOCAL_IP	Name of the machine running the firewall. This parameter applies only to RMI traffic for the PPM Workbench. Before you set this parameter, register the external IP address on the external DNS server, and then specify the name of the machine running the firewall as the LOCAL_IP value. If you set this up correctly: • Client A running inside the firewall connects to the internal DNS server and the machine name resolves to an IP address. • Client B running outside the firewall connects to an external DNS server and the machine name resolves to a different IP address. Both clients can then connect, each to a different IP address.	Example `10.1.101.64`

Table A-1. Server configuration parameters (page 35 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
	Note: Setting the `LOCAL_IP` parameter resolves the following potential problems: • If set to the IP address of the machine running the firewall, clients inside the firewall can connect, but clients outside cannot, because they have no route to the host. • If set to the name of the machine running the firewall, clients inside the firewall can connect, but clients outside cannot, because they cannot resolve the hostname. • If set to an IP address that is different from the machine running the firewall, clients outside the firewall can connect, but clients inside the firewall cannot, because the address is not translated between a different IP address to the IP address on the machine running the firewall.	
LOGIN_COOKIE_MAX_AGE	Determines the maximum age (and thus the expiration) of cookies used to start a PPM Center session.	Default: `180`
LOGON_ATTEMPTS_CLEANUP_INTERVAL	Determines the run frequency of the *ENABLE_LOGON_ATTEMPTS_CLEANUP* thread.	Default: `18000`
LOGON_METHOD	Method used to log on to PPM Center.	Default: `USER_NAME`
LOGON_PAGE	URL for access to the logon page for PPM Center.	Default: `/web/knta/global/Logon.jsp`
*LOGON_TRIES_INTERVAL	Time interval during which logon attempts are monitored.	Default: `1` (minutes)
LOW_PAGE_SIZE	The recommended number of work plan lines to load into the Work Plan page if the user is connected through a slow connection such as a WAN.	Default: `50`

Table A-1. Server configuration parameters (page 36 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
MAC_LOG_ SEVERITY [a]	Specifies the logging level to use. When set to 0 (the default), only integration exceptions and a summary are logged. When set to 1, events other than errors related to processing changes are also logged.	Default: `0` Valid values: `0` and `1`
MAC_SERVICE_ INTERVAL[a]	Determines how frequently the MAC service runs.	Default: `900` (seconds)
MAINFRAME_JOB_ WATCH_DOG_ ENABLED	If you are using HP Deployment Management to integrate with a mainframe system, then you must enable this “watch dog” thread. WhenHP Deployment Management submits a job to the mainframe, this thread polls the mainframe system to determine what state the job is in, and when it is completed. This parameter is associated with the frequency parameter *MAINFRAME_JOB_ WATCH_DOG_INTERVAL*.	Default: `false` Valid values: `true, false`
MAINFRAME_JOB_ WATCH_DOG_ INTERVAL	Determines the frequency with which the *MAINFRAME_JOB_WATCH_ DOG_INTERVAL* thread runs.	Default: `30` (minutes)
MAM_MACHINE_ PASSWORD [a]	Specifies the encrypted Mercury Application Mapping user password.	Valid value: *<Mercury Application Mapping_ Password>*
MAM_MACHINE_ URL [a]	Specifies the URL of the Mercury Application Mapping server for integration with PPM Center.	Valid value: `http://<MAM_ Server>:8080/ webapp/`

Table A-1. Server configuration parameters (page 37 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
MAM_MACHINE_USER [a]	Specifies the Mercury Application Mapping user name.	Valid value: *<Mercury Application Mapping_Username>*
MAM_MACHINE_VERSION [a]	Specify `6.2` for either supported version (6.5 and 6.6) of Mercury Application Mapping.	Default value: `3.0`
MAX_DB_CONNECTION_IDLE_TIME	Amount of time that an unused database connection stays open before it is closed and removed from the pool.	Default: `60` (minutes)
MAX_DB_CONNECTION_LIFE_TIME	Amount of time that a database session is held open before it is closed and removed from the pool. Some Oracle cleanup operations that should be run periodically occur only at the end of database sessions. Therefore, do not keep database sessions open for the life of the PPM Server.	Default: `1440` (minutes)
MAX_DB_CONNECTIONS	Number of connections the PPM Server has to the database. Each user does not get his own connection. The server uses connection pooling, so it only opens a new database connection if no connections are available in the pool. After this number is reached, user sessions queue for the next available database connection. The PPM Server rarely requires more than 25 database connections.	Default: `60`

Table A-1. Server configuration parameters (page 38 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
*MAX_EXECUTION_MANAGERS	Maximum number of concurrent executions allowed to run on the server. If your system is heavily loaded, decreasing this may help reduce load, but may also delay execution of tasks. If your organization processes a high volume of packages, you may require more execution managers.	Default: 15
*MAX_LOGON_TRIES	Maximum number of logon attempts in the time interval specified by *LOGON_TRIES_INTERVAL.	Default: 0
MAX_PAGE_SIZE	Absolute maximum number of work plan lines that can be loaded into the Work Plan page. Use this parameter to prevent excessive load on the server from excessive queries, and to prevent users from getting themselves into low performance situations.	Default: 500
MAX_PPM_DB_CONNECTIONS	Determines the maximum number of connections that the Database Pool is to maintain. When this number is reached, subsequent requests for database connection must wait until a database becomes available.	Default: 45
*MAX_RELEASE_EXECUTION_MANAGERS	Number of command executions that can run in a release distribution simultaneously. Organizations processing a high volume of packages may require a larger number of release execution managers.	Default: 15 Valid values: Integer greater than 1

Table A-1. Server configuration parameters (page 39 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
MAX_STATEMENT_CACHE_SIZE	Maximum number of prepared statements cached per database connection. Part of the database connection pool settings.	Default: `50` Valid values: Integer greater than 0
*MAX_WORKER_THREADS	Worker threads are spawned by the scheduler to run scheduled tasks. This specifies the maximum number of scheduled tasks (for example, reports or request commands) that can be simultaneously active on the server. If the PPM Server is heavily loaded, specify a lower value to reduce the server workload. If there are many pending tasks, and additional capability is available on the server, set a higher value to improve performance.	Default: `10`
MSP_PROJECT_CUSTOM_FIELD	Microsoft Project includes a set of pre-defined text fields (Text1, Text2, Text3, and so on) that users can use to store whatever they want. By default, PPM Center uses the Text30 field at the project level in Microsoft Project to store information about the PPM Center project with which the Microsoft Project file is associated. If you already use the Text30 field in Microsoft Project, you can use this parameter to specify the Microsoft Project field for PPM Center to use. **Warning:** Do not change this parameter value once the Microsoft Project integration has been put into use.	Default: `Text30`

Table A-1. Server configuration parameters (page 40 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
MULTICAST_ CLUSTER_NAME	Unique name of a PPM Server cluster. Do not configure two clusters with the same name running on the same subnet.	Example `http://wwwserver.mydomain.com/ppm`
MULTICAST_DEBUG	Determines whether or not incoming and outgoing multicast messages are to be logged to the PPM Server log.	Default: `false` Valid values: `true, false`
MULTICAST_IP	Multicast IP address.	Default: `225.39.39.244` Valid values: `224.0.0.0` through `239.255.255.255`
MULTICAST_ LEASE_MILLIS	Determines the amount of time that must elapse after the PPM Server heartbeat stops, before the PPM Server is considered terminated.	Default: `60000` (milliseconds)
MULTICAST_PORT	Multicast IP port.	Default: `9000`
NOTIFICATIONS_ CLEANUP_ INTERVAL	Determines the frequency of notification cleanups. By default, the notifications cleanup service runs every 86400 seconds every day.	Default: `86400` (seconds)
NOTIFICATIONS_ CLEANUP_PERIOD	Determines the minimum age (in days) of notifications to be deleted at cleanup.	Default: `7` (days)
NUM_EXCLUDED_ PARAM	Indicates the number of excluded parameters.	Default: `0`

Table A-1. Server configuration parameters (page 41 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
OPTIMIZATION_ ITERATION_ MULTIPLIER	Number of algorithmic iterations that the optimization engine is to run. The more iterations, the more time is given to finding an optimal portfolio. Although the default is adequate in most instances, complex cases can benefit from more iterations. **Note:** This parameter also affects generation of the Efficient Frontier curve.	Default: `100` (iterations)
OPTIMIZER_ NUMBER_OF_ TIMESHIFTS	Maximum number of periods the optimizer can shift start dates forward. This does not affect manually-shifted HP Portfolio Management entities. If you allow a new start date for a project, the optimizer can start the project any time between the original start date and six months beyond that date.	Default: `6` (months)
ORACLE_APPS_ ENABLED	Determines whether PPM Center is to be integrated with Oracle Apps. You must set this parameter to `true` for installations using HP Deployment Management to integrate with Oracle Apps through HP Object Migrator or HP GL Migrator.	Default: `false` Valid values: `true, false`
ORACLE_APPS_ VERSION	Version of Oracle Apps used. For releases R11, R11i, and R12, specify R11.	Default: `R11` Valid values: R11
ORACLE_DB_ VERSION	The server sets this read-only parameter value during startup.	Example `10.2.0.3`

Table A-1. Server configuration parameters (page 42 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
*ORACLE_HOME	Full path to the Oracle home directory on the PPM Server. The Oracle_Home/network/admin directory must contain the correct TNS names (or a file containing the names such as `tnsnames.ora`) required to connect to the PPM Center database schema.	Example `d:/orant`
PACKAGE_LOG_DIR	In a server cluster, if you have overridden the default value for this parameter to refer to a different directory, then all servers in the cluster must be able to access and share the directory.	Default: Same default value as the *BASE_LOG_DIR* parameter
PAGE_PDF_EXPORT_DISABLED	To disable the Export to PDF feature, add this parameter to the `server.conf` file, and set its value to `true`.	Default: (none) Valid values: `true, false`
*PASSWORD_EXPIRATION_DAYS	Default expiration period of passwords for new users. A value of 0 indicates no expiration.	Default: `0` (days) Valid values: 0 through 366
*PASSWORD_REUSE_RESTRICTION_DAYS	The number of days to restrict the use of an old password after a new password is set. The value 0 indicates no restriction.	Default: `0` Valid values: 0 through 2192
PENDING_ASSIGNMENTS_CLEANUP_INTERVAL	Determines the frequency with which the *ENABLE_PENDING_ASSIGNMENTS_CLEANUP* thread runs.	Default: `14400`

Table A-1. Server configuration parameters (page 43 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
PENDING_COST_ EV_UPDATE_ SERVICE_DELAY	Number of seconds to wait after completion of the Pending Cost EV Update service before restarting the service.	Default: `30` Valid values: Number greater than 0
PENDING_COST_ EV_UPDATE_ SERVICE_ENABLED	Enables a service that asynchronously applies external updates to the Pending Cost EV Updates service when updates cannot be made immediately.	Default: `false` Valid values: `true, false`
PENDING_EV_ UPDATES_ CLEANUP_ INTERVAL	Specifies the interval at which to run pending earned value updates.	Default: `3600` (seconds)
PFM_PROJECTED_ TOTAL_ CALCULATION_ ENABLED	If set to `true` (the default), enables the project total calculation service, which calculates projected total value of budgets and benefits. The projected total is the sum of actual values in the past periods (month) and planned values in current and future periods (month).	Default: `true` Valid values: `true, false`
PFM_PROJECTED_ TOTAL_ CALCULATION_ INTERVAL	Determines the frequency with which the project total calculation service runs.	Default: `1440` (minutes)
PGA_AGGREGATE_ TARGET	Determines the maximum physical memory Oracle can use for working areas for all processes together. See also *WORKAREA_SIZE_POLICY* on page 339.	Maximum number of MB that can be dedicated to working Oracle processes.

Table A-1. Server configuration parameters (page 44 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
PM_CAN_ROLLUP_ACTUALS_ON_SAVE	If set to `true`, lets the user change the mode on HP Project Management's Enter Actuals page. The resulting options are either rollups calculated during save processing, or rollups are deferred (and rolled up using the associated service).	Default: `true` Valid values: `true, false`
PM_NUM_EDIT_ASGMTS	Specifies the maximum number of assignments that can be displayed for editing on HP Project Management's Enter Actuals page.	Default: `200`
PM_NUM_EDIT_TASKS	Specifies the maximum number of tasks that can be edited on HP Project Management's Quick Edit page.	Default: `200`
PORTFOLIO_MANAGEMENT_LICENSE_KEY	License key required to use HP Portfolio Management. This key is delivered in the `license.conf` file, which you can find in the `<`*PPM_Home*`>/conf` directory after PPM Center installation.	Default: (none) Example `9g54th33f7510 8l96d88fe7d16 390c52`

Table A-1. Server configuration parameters (page 45 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
PORTLET_EXEC_ TIMEOUT	Amount of time (in seconds) after which portlets time out. This parameter is used to limit long-running queries in portlets, which may be caused by adding portlets without filtering criteria. Used to avoid excessive database CPU processing when users end their sessions before processing has completed. **Note:** Increase the value of `PORTLET_EXEC_TIMEOUT` only as a last resort. It may (will) have system-wide performance impact. If you must increase the value, specify a value such as 30, and not a high value such as 200.	Default: `20` (seconds)
PORTLET_MAX_ ROWS_RETURNED	Determines the maximum number of rows to display in portlets.	Default: `200`
PROGRAM_ SUMMARY_ CONDITION_ INTERVAL	Interval between summary condition updates.	Default: `4000` (seconds)
PROJECT_PV_ UPDATE_ INTERVAL_ MINUTES	Interval at which the Project Planned Value Update Service runs. The service is enabled and disabled using the *ENABLE_PROJECT_PV_ UPDATE_SERVICE* parameter.	Default: `1440` (24 hours)
REFERENCE_ UPDATE_INTERVAL	Controls the interval for checking whether references between entities should be updated. See also *ENABLE_REFERENCE_ UPDATE_SERVICE*.	Default: `5` (minutes)

Table A-1. Server configuration parameters (page 46 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
REMOTE_ADMIN_ REQUIRE_AUTH	Determines whether user authentication is required for remote administration. If set to `true`, users running `kStop.sh` to shut down the PPM Server are required to supply a valid PPM Center user name and password. If set to `false`, any user with access to `kStop.sh` can shut down the server.	Default: `true` Valid values: `true, false`
REPORT_DIR	Default directory to which report output is written. If you require report output to be written to a location other than the default directory (outside of the PPM Server directory structure), use this parameter to specify an alternate directory here. Make sure that the PPM Server has access to the directory so that the report output HTML files can be written here.	Example `D:/<PPM_ Home>/750/ aeon/reports/`
REPORT_LOG_DIR	Directory in which the PPM Center report logs are stored. **Note:** In a server cluster, If you have overridden the default value for this parameters to refer to a different directory, then all servers in the cluster must be able to access and share the directory.	Same default value as the *BASE_LOG_DIR* parameter Example `D:/<PPM_ Home>/750/ aeon/logs/ reports/`
REPORTING_ STATUS_ REFRESH_RATE	Frequency with which report status is refreshed and displayed to the user.	Default: `5` (seconds)

Table A-1. Server configuration parameters (page 47 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
REQUEST_LOG_DIR	Points to the "logs" directory directly under the directory specified by the **BASE_PATH* parameter. Specifies the location for Request execution log outputs. **Note:** In a server cluster, If you have overridden the default value for this parameters to refer to a different directory, then all servers in the cluster must be able to access and share the directory.	Example `D:/PPM/750/aeon/logs/`
REQUEST_SEARCH_RESULTS_MAX_ROWS	Determines the maximum number of results returned by a search. The value is displayed as the default in the **Limit Rows Returned To** field.	Default: `1000`
REQUEST_TYPE_CACHE_TIMEOUT	Determines the stale check timeout for the cache that maintains mappings between parameters and tokens for Request Type and Request Header Type. **Note:** HP strongly recommends that you not change the value of this parameter.	Default: `3600` (seconds)
RESOURCE_FINDER_ROLE_WEIGHT	Used to calculate the suitability score for items returned on the Resource Finder results page.	Default: `25` Valid values: `0` through `100`
RESOURCE_FINDER_SEARCH_MAX_USERS	Determines the maximum number of resources that can be targeted in a user search. If the targeted number exceeds this value, the Resource Finder displays the message that the number of resources targeted is too large.	Default: `100`

Table A-1. Server configuration parameters (page 48 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
RESOURCE_ FINDER_SKILL_ WEIGHT	Used to calculate the suitability score for items returned on the resource finder results page.	Default: `25` Valid values: `0` through `100`
RESOURCE_POOL_ ROLLUP_INTERVAL	Controls how long the Resource Pool Rollup service waits before it wakes up and runs again (assuming that it is not currently running).	Default: `300` (seconds)
RESTRICT_ BYPASS_ EXECUTION_TO_ MANAGERS	Determines whether bypass execution of workflow steps in packages is restricted to managers. If set to `true`, only users with an access grant of Package Manager or Request Manager access can bypass executions. If set to `false`, all users eligible to act on executions can bypass them.	Default: `false` Valid values: `true, false`
RESTRICT_ BYPASS_REQ_ EXEC_TO_ MANAGERS	Setting this parameter to `true` restricts bypass execution to request managers. When set to `true`, only a user with the Manage Request access grant can bypass an execution step on a request	Default: `false` Valid values: `true, false`
RM_ALLOWED_ EFFORT_TYPES	Used to specify the allowed effort types for HP Resource Management staffing profile and other modules. You can specify a combination of up to three comma-delimited values. Examples • `fte, person_days, hours` • `fte, person_days` • `fte, hours` • `person_days, hours` The order does not matter.	Default: `fte, person_days` Valid values: `hours, fte, person_days`

Table A-1. Server configuration parameters (page 49 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
RM_DEFAULT_ EFFORT_TYPE	Used to determine the default effort type, in hours or full-time equivalents (fte) used to display staffing profiles and resource pool information.	Default: `fte` Valid values: `hours, fte, person_days`
RM_DEFAULT_ PERIOD_TYPE	Used to determine the default period type used to display staffing profiles and resource pool information.	Default: `month` Valid values: `quarter, month, week, year`
RM_MAX_ RESOURCE_IN_ POOL	Determines the maximum number of resources in a resource pool. If the number of resources exceeds this value, some features are unavailable on the Resource Pool overview page. The **View Resource Load** button is not available if the number of resources in that resource pool (or its hierarchy if the "Include children resource pools when calculating load for this resource pool" flag is selected) exceeds the value set for this parameter. The **View Forecasted Demand** and **Manage Pool Capacity** button are also unavailable if the number of resources in the resource pool exceeds the default. However, you can still use the Resource page Manage Participation feature to add or remove resources. Values greater than the default (250) may increase response times and memory footprint when the above operations are performed.	Default: `250`

Table A-1. Server configuration parameters (page 50 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
RM_NOTIFICATION_INTERVAL_MINUTES	Frequency, in minutes, with which resource pool and staffing profile notifications are sent. If set to 1, notifications are sent immediately. If set to a number greater than 1, notifications sent to the same recipient during that interval are grouped into a single email. For more information, see the *HP Resource Management User's Guide*.	Default: `10` (minutes) Valid values: Integers greater than or equal to 1
RM_OVERRIDE_ASSIGNMENT_CONTROLS	If set to `true`, this parameter turns off security during allocation of a resource to a staffing profile or during assignment of a resource to a work plan. A project manager can then directly assign any resource (in a resource pool) to the staffing profile or the work plan, or to both. The project manager can also use the resource finder to locate and assign resources in all resource pools.	Default: `false` Valid values: `true, false`
*RMI_URL	Port on which the PPM Server listens to initiate RMI client/server communication. Must be a unique port, distinct from the Web server, SQL*Net, and the HTTP or HTTPS ports. Format: `rmi://<Host_Name>:<Port>/KintanaServer`	Default: `1099` Valid values: Port numbers higher than 1024 Example `rmi://gold.ppm.com:1099/PPMServer`

Table A-1. Server configuration parameters (page 51 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
RMI_VALIDATE_ SERVER_ CERTIFICATE	Used if PPM Server is running in secure RMI mode. If set to `true`, the client PPM Workbench validates the server certificate against the Certificate Authorizer's to verify server identity. If set to `false`, the certificate is not validated.	Default: `false` Valid values: `true, false`
*RML_PASSWORD	Password of the Oracle schema name specified in *RML_USERNAME*.	Valid values: Encrypted password in the format `#!#<Password>#!#`
*RML_USERNAME	Oracle schema name for the meta layer schema. Must be the same as the database schema name used during installation.	Valid values: Any user name format that Oracle supports
*SCHEDULER_ INTERVAL	Number of seconds after which the scheduler checks for services to be run.	Default: `60`
SCPCLIENT_ TIMEOUT	Amount of time after which SCP clients must provide feedback after a file transfer has initiated, else a timeout occurs. Set to the maximum expected time for file transfer.	Default: `10000` (milliseconds)
SDI_LOG_ SEVERITY	Determines the level of detail included in Service Desk Integration (SDI) error logs. To log only errors, specify the value 0. To log both errors and information, specify the value 1.	Valid values: `0` and `1`

Table A-1. Server configuration parameters (page 52 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
SDI_SERVICE_ INTERVAL	Determines the frequency (in seconds) with which the SDI service is run.	Default: `900` (seconds)
SEARCH_TIMEOUT	Number of seconds after which searches time out. Used to limit long-running queries in searches, which may be caused by submitting a search without specifying selective data. Avoids taking up database CPU if a user ends a session before the search is completed.	Default: `60` (seconds)
SECURE_RMI	If set to `true`, RMI network traffic between PPM Workbench clients and the PPM Server is encrypted.	Default: `false` Valid values: `true, false`
SERVER_ENV_ NAME	Name of the PPM Center environment containing information PPM Server machine (for example, host name, user name, and password). Must be set before PPM Center entity migrators or commands involving secure copy can run.	Default: `KINTANA_ SERVER`
SERVER_MAX_ PERM_SIZE	For HP internal use only. Do not change its value unless directed to do so by HP-Mercury support for PPM Center.	Default: N/A
SERVER_MODE	Specifies the server mode to use in case you want exclusive access to a running server.	Default: `NORMAL` Valid values: `Normal, Restricted, Disabled`

Table A-1. Server configuration parameters (page 53 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
*SERVER_NAME	DNS name or IP address of the machine hosting the PPM Server.	Default: `kintana` Valid values: Any valid machine name
SERVER_TYPE_ CODE	Operating system on which the PPM Server is installed.	Valid values: `UNIX, WINDOWS`
SERVICE_ PROVIDER_ SECURITY_GROUP	For HP internal use only. Do not change its value unless directed to do so by HP-Mercury support for PPM Center.	Default: N/A
SERVICES_ ENABLED	If set to `false`, when the PPM Server is started or when a request is issued to start services, no services are started.	Default: `true` Valid values: `true, false`
SHOW_BASE_URL_ ON_NOTIFICATIONS	Determines whether the URL for the PPM Center logon window is displayed at the top of each email notification.	Default: `true` Valid values: `true, false`
SHOW_ PERSONALIZE_ FIRST	If set to `true`, **Personalize Dashboard** is the first PPM Dashboard menu item listed on the menu bar.	Default: `false` Valid values: `true, false`
SINGLE_SIGN_ON_ PLUGIN	In single sign-on configuration, this parameter is used to specify the SSO method. You must manually add this parameter to the `server.conf` file. For more information, see Chapter 6, *Implementing User Authentication,* on page 147	Example `com.kintana. sc.security. auth.Site MinderSingle SignOn`
SMTP_RFC_ COMPLIANCE	If set to `true`, formats PPM Center email notifications with line-feed <LF> and carriage-return <CR> characters appropriate for restrictive Global 9 security SMTP servers.	Default: `false` Valid values: `true, false`

Table A-1. Server configuration parameters (page 54 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
**SMTP_SERVER Required if notifications are used	Host name of the SMTP-compliant mail server that acts as the gateway for email notifications.	Example `mailserver.mydomain.com`
SMTP_WINDOWS_ADD_PERIOD	If set to `true` (default), appends PPM Center email notifications with '.' formatting (adds a period) appropriate for Windows SMTP servers. (The period is added only if a Windows SMTP server is detected.)	Default: `true` Valid values: `true, false`
SOCKS_PROXY_HOST	Host name of the SOCKS proxy server.	Host name of the SOCKS proxy server.
SOCKS_PROXY_PORT	Port on the SOCKS proxy host that accepts proxy connections.	Any available port on the SOCKS proxy host.
SQL_FILTER_REGEX	Regular expression for SQL injection detection.	Default: (.*)(((%27)|(\'))|(--))(.*)
*SQLPLUS	Name of the command-line SQL*Plus executable, which must be in the `<Oracle_Home>/bin` directory.	Default: `sqlplus.exe`
SQLPLUS_ESCAPE_CHARACTER	Specifies the SQL*Plus escape character.	Default: (none)
SQLPLUS_VERSION	Oracle SQL*Plus version installed on the machine that hosts the PPM Server. You must set this for some PPM Center reports that run from command-line SQL*Plus calls. If you encounter problems running PL/SQL-based reports in PPM Center, set this parameter.	Example `com.kintana.core.server.SQLPLUS_VERSION=10.1.0.2`

Table A-1. Server configuration parameters (page 55 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
**STATS_CALC_ DAY_OF_WEEK Required if *ENABLE_ STATISTICS_ CALCULATION* = true	Day of the week on which to calculate Oracle database statistics.	Default: `1` (designates Sunday) Valid values: 1 through 7
**STATS_CALC_ WAKE_UP_TIME Required if *ENABLE_ STATISTICS_ CALCULATION* = true	Hour of the day (using 24-hour clock) at which statistics are to be calculated.	Default: `1` (designates 1 a.m. or 01:00) Valid values: 0 (midnight) through 23 (11 p.m. or 23:00)
**STATS_CALC_ WEEK_INTERVAL Required if *ENABLE_ STATISTICS_ CALCULATION* = true	Frequency (in weeks) with which statistics are calculated.	Default: `1` (designates weekly calculation) Valid values: 1 through 52 Example 2 (designates every other week)
SYNC_EXEC_INIT_ WAIT_TIME	Amount of time after which the intermediate Request Working page opens.	Default: `4` (seconds)
SYNC_EXEC_MAX_ POLL_TRIES	Number of times to poll for completion of a request until a final message is returned to the user.	Default: `4`
SYNC_EXEC_POLL_ INTERVAL	Time interval (in minutes) at which to poll for completion of a request after the intermediate Request Working page opens.	Default: `15`

Table A-1. Server configuration parameters (page 56 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
TASK_ACTUAL_ ROLLUP_INTERVAL	Determines the delay between consecutive runs of the Task Actual Rollup Service, which asynchronously rolls up actuals provided through HP Time Management or the My Tasks portlet.	Default: `250` (minutes)
THREAD_POOL_ MAX_THREADS	Maximum number of packages to run simultaneously within a release distribution. If a large number of packages in a distribution are processing, increasing this value can improve performance.	Default: `10`
THREAD_POOL_ MIN_THREADS	Minimum number of packages to be run simultaneously within a release distribution. See also *THREAD_POOL_MAX_ THREADS* on page 335.	Default: `5`

Table A-1. Server configuration parameters (page 57 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
**TIME_ZONE Required if the PPM Server and the Oracle database are in different time zones	Used to set the time zone of the Oracle database. Leave the parameter blank if the PPM Server and the Oracle database host are in the same time zone. If they are in different time zones, set this to the time zone of the Oracle database host. Use a “standard” time zone setting, and not a daylight savings setting (such as EDT or PDT). You can use a fully-qualified time zone name (you are not restricted to three digits), such as “America/Los_Angeles” or “Australia/LHI.” For a list of fully-qualified names, run the Client Time Zone Report in the Admin Tools window of the PPM Workbench. For details on how to run the report, see *Running Server Reports from the Admin Tools Window* on page 178. If you do not a specify a value for this parameter, the value defaults to the time zone in which the PPM Server is running.	Default: Time zone in which the PPM Server is running Valid values: Any fully-qualified time zone designation such as “America/Los_Angeles” or “Australia/LHI.” Do not use daylight savings-modified time zones such as “EDT” or “PDT.”
TMG_DATE_NOTIFICATION_INTERVAL	Determines how often the system sends delinquent time sheet notifications (see *ENABLE_TIME_SHEET_NOTIFICATIONS_SERVICE* on page 300). If you keep the default (120 minutes), a delinquent timesheet notification goes out to the user every 2 hours until he submits that timesheet.	Default: `120` (minutes) Valid values: Any integer greater than 0.
TMG_FUTURE_PERIODS_TO_ALLOW	Specifies the number future periods for which users can specify time.	Default: `10`

Table A-1. Server configuration parameters (page 58 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
TMG_PAST_ PERIODS_TO_ ALLOW	Specifies the number of previous periods for which users can specify time.	Default: `10`
TRANSFER_PATH	Specifies the default temporary directory that PPM Center uses. The main purpose of this directory is to temporarily hold files as they are migrated from a source environment to a destination environment with HP Deployment Management. In a server cluster, all servers must be able to access and share the specified directory.	Example `D:/<`*`PPM_ Home`*`>/750/ ionia/ transfers/`
TURN_ON_ CONCURRENT_ REQUEST_WATCH_ DOG	If you are using HP Deployment Management to integrate with Oracle Apps (through HP Object Migrator or HP GL Migrator), then you must enable this “watch dog” thread. When HP Deployment Management submits a concurrent request (job) to Oracle Apps, this thread polls Oracle to determine what state the job is in, and when it has completed. This parameter is associated with the frequency parameter *CONCURRENT_REQUEST_ WATCH_DOG_INTERVAL*.	Default: `true` Valid values: `true, false`
TURN_ON_ NOTIFICATIONS	If set to `true`, turns on the notification service. You can use this parameter to turn off notifications for copies of production instances being used for testing, and turn them on again when the system goes to production.	Default: `true` Valid values: `true, false`

Table A-1. Server configuration parameters (page 59 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
TURN_ON_ SCHEDULER	If set to `true`, turns on the scheduler. To improve performance, turn off the scheduler in non-production instances.	Default: `true` Valid values: `true, false`
TURN_ON_WF_ TIMEOUT_REAPER	If set to `true`, turns on the timeout reaper, which scans all active workflow steps to verify that they have timed out according to the settings for the step. Use the ***WF_TIMEOUT_REAPER_ INTERVAL* parameter to set the frequency with which the service checks for information.	Default: `true` Valid values: `true, false`
USER_PASSWORD_ MAX_LENGTH	Maximum number of characters in user passwords.	Default: `16`
USER_PASSWORD_ MIN_DIGITS	Minimum number of digits in user passwords.	Default: `0`
USER_PASSWORD_ MIN_LENGTH	Minimum number of characters in a user password.	Default: `4`
USER_PASSWORD_ MIN_SPECIAL	Determines the minimum number of non-alphanumeric (special) characters that user passwords must contain.	Default: `0`
VALIDATION_ FIELDS	Used to specify fields that require validation. To specify multiple fields, use the "|" character as separator. Example `com.kintana.core.web. VALIDATION_FIELDS= REQUEST|HEADER|COOKIE.`	Default: `REQUEST` Valid values: `REQUEST`, `HEADER`, and `COOKIE` (Values are case-sensitive.)

Table A-1. Server configuration parameters (page 60 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
VALIDATION_LOG_DIR	In a server cluster, if you have overridden the default value for this parameters to refer to a different directory, then all servers in the cluster must be able to access and share the directory.	Same default value as the *BASE_LOG_DIR* parameter Example `D:/<PPM_Home>/750/aeon/logs/reports/`
VISUALIZATION_EXEC_TIMEOUT	Length of time (in seconds) that resource management visualizations can run before they time out.	Default: `180`
WF_SCHEDULED_TASK_INTERVAL	Frequency with which the PPM Server checks for pending scheduled tasks, and starts the tasks if worker threads are available.	Default: `60` (seconds)
WF_SCHEDULED_TASK_PRIORITY	Determines the priority of scheduled tasks. Because scheduled tasks run in the background, it may be useful to run them at a lower priority than the threads servicing user-oriented interactive tasks.	Default: `10`
**WF_TIMEOUT_REAPER_INTERVAL Required if *TURN_ON_WF_TIMEOUT_REAPER* = true	If *TURN_ON_WF_TIMEOUT_REAPER* is set to `true`, this parameter setting determines the frequency with which the service checks for information. Example If you set a timeout value of 86400 (seconds), which is 24 hours, on Monday at 10 a.m., then all active workflow steps would time out immediately at 10 a.m. on Tuesday.	Default: `900` (seconds)

Table A-1. Server configuration parameters (page 61 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
WORKAREA_SIZE_POLICY	Controls how the memory for SQL working areas is allocated for intensive operations as sort, group by, hash join, and so on. If this parameter is set to `AUTO` (the default), Oracle manages the allocation and de-allocation of the memory area for each process, and these need not be set separately or manually. Oracle calculates memory allocation based on the load and characteristic of the system. **Note:** HP strongly recommends setting `WORKAREA_SIZE_POLICY` to `AUTO`. This parameter must be set concurrently with *PGA_AGGREGATE_TARGET*.	Default: If you are using Oracle 10g, the default is `AUTO`. In Oracle 9i, the default is `AUTO` only if *PGA_AGGREGATE_TARGET* is set.
WORKBENCH_PLUGIN_VERSION	Specifies the Java plug-in version used to access the PPM Workbench interface. Use this parameter to configure PPM Center to use a specific version (other than the default version) of the Java plug-in to open the PPM Workbench.	Example `com.kintana.core.server.WORKBENCH_PLUGIN_VERSION=1.5.0_02`
WORK_ITEM_BREAKDOWN_SERVICE_ENABLED	Enables the Work Item Pending Assignment Service, which runs periodically to populate the KRSC_WORK_ITEM_ASSIGNMENTS table. This table is used for resource work load information. The service retrieves the actuals information from the request.	Default: `true` Valid values: `true, false`
WORK_ITEM_BREAKDOWN_SERVICE_DELAY	Determines the interval, in seconds, between runs of the Work Item Pending Assignment Service.	Default: `30` (seconds)

Table A-1. Server configuration parameters (page 62 of 62)

Parameter Name (*Required, **Required If)	Description, Usage	Default and Valid Values
WORK_ITEM_ UPDATE_SERVICE_ DELAY	Amount of time (in seconds) to wait after the work item update service has completed a session before restarting the service.	Default: `120` (seconds) Valid values: Integer greater than 0
WORK_ITEM_ UPDATE_SERVICE_ ENABLED	If set to `true` (default), enables the work item update service, which asynchronously propagates external updates to work items when updates cannot be made immediately.	Default: `true` Valid values: `true, false`
WS_UPDATE_ CLOSED_AND_ CANCELED_ REQUESTS	If set to `true`, lets Web services update closed and canceled requests.	Default: `false` Valid values: `true, false`
XSS_FILTER_ REGEX	Regular expression for cross-site scripting detection.	Default: `(.*)((((%3C)|<)((%2F)|/)(script)((%3E)|>))|javascript)(.*)`

a. For details about this parameter, see the *HP Managing Application Change Guide*.

b. For details about this parameter, see *HP Center Management for Quality Center Guide*.

Logging Parameters

Table A-2 lists the PPM Server configuration parameters located in the `logging.conf` file, and provides a description of each. The `logging.conf` file is located in the `<PPM_Home>/conf` directory.

Changes to `logging.conf` are picked up dynamically by the application (it takes about one minute) so there is no need to restart the application.

Table A-2. Logging parameters (page 1 of 4)

Parameter Name (*Required)	Description, Usage	Default, Valid Values, Example
CATCH_SYSTEM_ERR	Used to determine whether to redirect `System.err` to the server log.	Default: `true` Valid values: `true, false`
CATCH_SYSTEM_OUT	Used to determine whether to redirect `System.out` to the server log.	Default: `true` Valid values: `true, false`

Table A-2. Logging parameters (page 2 of 4)

Parameter Name (*Required)	Description, Usage	Default, Valid Values, Example
DEFAULT_SERVER_LOGGING_LEVEL	Default debug level of the PPM Server. Controls the verbosity of logs generated by the PPM Server. The values, which can also be set dynamically at runtime in the Workbench Server Settings window, map as follows: • `ERROR` maps to None in the Server Settings window • `INFO` maps to Normal • `DEBUG` maps to Max For more information about the Server Settings window, see *Setting Debugging and Tracing Parameters* on page 185.	Valid values: • `NONE` - No information, (including errors) is logged • `ERROR` - Only errors are logged • `INFO` - Errors and additional information is logged • `DEBUG` - Includes verbose debugging messages • `ALL` - Displays all log messages generated

Table A-2. Logging parameters (page 3 of 4)

Parameter Name (*Required)	Description, Usage	Default, Valid Values, Example
DEFAULT_USER_DEBUG_LEVEL	Specifies the default debug level of a user's client session. Controls the verbosity of users' logs on the client, application server, and database. Can be different for different client sessions, and can be changed in the standard interface as a user preference. The values, which can also be set in the Workbench Server Settings window dynamically at runtime, map as follows: • ERROR maps to None in the Server Settings window • INFO maps to Normal • DEBUG maps to Max For more information about the Server Settings window, see *Setting Debugging and Tracing Parameters* on page 185.	Valid values: • `NONE` - No information, (including errors) is logged • `ERROR` - Only errors are logged • `INFO` - Errors and additional information is logged • `DEBUG` - Includes verbose debugging messages • `ALL` - Displays all log messages generated
ENABLE_CONSOLE_LOGGING	Enables logging by the PPM Server to the console.	Default: `false` Valid values: `true, false`
ENABLE_WEB_ACCESS_LOGGING	Determines whether or not information sent to the internal PPM Center Web server (Tomcat) is logged.	Default: `false` Valid values: `true, false`
FILE_RECHECK_INTERVAL	Time interval (in seconds) at which the `logging.conf` file is checked for changes. The file keeps being checked as long as the PPM Server is running.	Default: `30`

Table A-2. Logging parameters (page 4 of 4)

Parameter Name (*Required)	Description, Usage	Default, Valid Values, Example
LOG_LAYOUT	Layout format of the log files.	Default: `TEXT` Valid values: `TEXT, XML`
MAX_BACKUP_INDEX	Limits the number of backup logs kept in the system.	Default `20`
ROTATE_LOG_SIZE	As the PPM Server logs information into the `serverLog.txt` file, the file can grow quite large. This parameter determines how large (in KB) it can grow before the server creates a new log file. When the `serverLog.txt` file reaches the size specified by this parameter, the PPM Server renames it (to `serverLog_<`*`Timestamp`*`>.txt`), and starts a new serverLog.txt file.	Default: `250`
SERVER_DEBUG_ LEVEL	Debug level of the PPM Server. Controls the verbosity of logs generated by independent server processes (for example, EmailNotificationAgent). Corresponds to the **Debug Leve**l list in the **Server** section of the Server Settings page.	Valid values: `NONE, LOW, HIGH`

LDAP Attribute Parameters

Table A-3 lists and provides descriptions of the PPM Server configuration parameters in the `LdapAttribute.conf` file, which is located in the `<PPM_Home>/conf` directory. Use the `LdapAttribute.conf` file to map the attributes of the LDAP server with the attributes used by the PPM Server.

The default mapping uses the standard LDAP attributes. All values are case-sensitive. Do not add spaces between tokens.

Do not map the `ORG_UNIT_NAME` and `PARENT_ORG_UNIT_NAME` parameters in `LdapAttribute.conf`. These attributes are specified in the `KRSC_ORG_UNITS_INT` table.

Table A-3. LDAP attribute parameters

Parameter Name (*Required)	Description, Usage	Default, Valid Values, Example
KNTA_USERS_INT	Target table for the import. Can be mapped to any LDAP attribute. Always map both `VISIBLE_USER_DATA` and `USER_DATA`. To disable default mapping, either comment out or delete the mapping line. Mappings: • USERNAME = sAMAccountName • FIRST_NAME = givenName • LAST_NAME = sn • EMAIL_ADDRESS = mail • PHONE_NUMBER = telephoneNumber • DEPARTMENT_MEANING = departmentNumber • LOCATION_MEANING = locality • MANAGER_USERNAME = manager • USER_DATA1 = mail • VISIBLE_USER_DATA1 = mail	Format: `ColumnName = LDAPAttribute`

LDAP_TIME_FORMAT	Attribute that keeps track of the time format that the LDAP server uses.	Format for Active Directory servers:
		`yyyyMMddHHmmss'.0Z'`
		Format for Sun Java System Active Server Pages LDAP server:
		`yyyyMMddHHmmss'Z'`

LDAP_USER_OBJECTCLASS	Object class attribute for a user on the LDAP server.	Default: `person`

B Server Directory Structure and Server Tools

Overview of Directory Structure

This appendix addresses the `mitg750` and <*PPM_Home*> directories and the scripts and tools they contain. The `mitg750` directory (the installation directory) contains two subdirectories that relate to the Oracle database schemas: `mitg750/sys` and `mitg750/system`.

The <*PPM_Home*> directory (the install directory for PPM Center) holds several subdirectories (`bin, docs, logs, reports,` and so on) that contain server- and system information, and administrative tools that perform tasks such as starting, stopping, and reporting on the PPM Server or system.

mitg750/system Directory

The `mitg750/system` directory contains the `CreateKintanaUser.sql` and `CreateRMLUser.sql` scripts.

The `CreateKintanaUser.sql` script variables are:

<PPM_Username>	represents the username of the new database schema.
<PPM_Password>	represents the password of the new database schema
<Data_Tablespace>	represents the tablespace used to store PPM Center tables
<Index_Tablespace>	represents the tablespace used to store PPM Center indexes
<Temp_Tablespace>	represents temporary tablespace
<Clob_Tablespace>	represents the tablespace used to store large data (CLOB).

The `CreateRMLUser.sql` script variables are:

<RML_Username>	represents the username for the new RML database schema.
<RML_Password>	represents the password for the new RML database schema
<RML_Data_Tablespace>	represents the tablespace used to store PPM Center database tables
<RML_Temp_Tablespace>	represents temporary tablespace.

<*PPM_Home*>/bin Directory

The `bin` subdirectory of <*PPM_Home*> contains all of the scripts required to configure and administer the server. This section provides descriptive information about these scripts.

kBuildStats.sh

The `kBuildStats.sh` script instructs Oracle to gather statistics about the PPM Center database schema. This information can be very important in improving the overall performance of PPM Center. For information about how to use this script, see *Using the dbms_stats Package to Collect Additional Statistics* on page 205.

kCancelStop.sh

If a command such as `kStop.sh-delay` is being used to stop the server, you can run `kCancelStop.sh` to cancel the stop request. Authentication may be required for this, which works in the same way as for `kStop.sh`. Use the `-user` user name flag.

kChangeNameDisplay.sh

The `kChangeNameDisplay.sh` script is used to change the display format of PPM Center users' names.

When you run the script, it asks you to specify the format to use to display a user's full name. You can specify one of the following:

- To use the format First Last (for example, John Smith), type **`0`**.
- To use the format Last, First (for example, Smith, John), type **`1`**.
- To use the format LastFirst (for example, SmithJohn), type **`2`**.

  The LastFirst format (option 2) is specifically for Korean language users.
- To cancel the operation, type **`a`**.

kConvertToLog4j.sh

The `kConvertToLog4j.sh` script converts the JDBC log, Web log, or server log to the log4j XML format. You can view logs in this format with a tool such as Chainsaw (a GUI-based log viewer available at the Web site logging.apache.org/log4j/docs/chainsaw.html).

Examples

To convert a Web log to the log4j XML format.

```
sh ./kConvertToLog4j.sh -webLog apacheLog.txt
```

To convert a JDBC log to the log4j XML format.

```
sh ./kConvertToLog4j.sh -jdbcLog jdbc.kintana.log
```

To convert a `serverLog.txt` file in text format to the log4j XML format.

```
sh ./kConvertToLog4j.sh -serverLog serverLog.txt
```

To convert a server log, JDBC log, and Web log, and then concatenate them in a result log.

```
sh ./kConvertToLog4j.sh -serverLog serverLog.txt -jdbcLog
jdbc.kintana.log -webLogiisLog.txt
```

For information about usage type.

```
sh ./kConvertToLog4j.sh -help
```

kConfig.sh

The `kConfig.sh` script launches the server configuration interface. Because `kConfig.sh` cannot update parameters in a cluster node (that is, anything that comes after an `@node`), HP recommends that, for a server cluster environment, you edit (or add) parameter values directly in the `server.conf` file using a text editor. After you do, be sure to run the `kUpdate.sh` script to implement your changes. For more information about how to set the server mode, see *Setting the Server Mode* on page 75.

kDeploy.sh

The `kDeploy.sh` script is a command-line tool used to install HP Deployment Management Extensions, PPM Center Best Practices, and PPM Center product service packs. This software is distributed as a deployment (a software bundle that contains files) in the following format.

`mitg-<Ver>-<ID>[.#'].jar`

where

`<Ver>`	represents the PPM Center version for which you can install the Extension, Best Practices, or service pack
`<ID>`	represents the unique identifier for service pack
(Optional) `.#'`	represents the revision number for the deployment.

Example

To install a product service pack SP1:

1. Ensure that the deployment JAR file is in the `<PPM_Home>` directory.

There is no need to extract anything. The `kdeploy.sh` script does that for you.

2. To apply the SP1 service pack, run the command:

```
sh ./kDeploy.sh -i SP1
```

Table B-1 displays the key command-line options for `kDeploy.sh`. To generate a list of options, run the command:

```
sh ./kDeploy.sh -h
```

Table B-1. Key command-line options for kDeploy.sh (page 1 of 2)

Option	Description
-i	Installs deployments. Example To install a PPM Center service pack (SP) 14, run the command: **`sh ./kDeploy.sh -i SP14`**

-l	Lists the deployments installed on an instance.
	Example
	`sh ./kDeploy.sh -l`
	results in
	`JAVA_HOME = /u1/java/j2sdk1_5`
	`java version "1.5"`
	`Java(TM) 2 Runtime Environment, Standard Edition (build 1.5-b02)`
	`Java HotSpot(TM) Client VM (build 1.5-b02, mixed mode)`

-D	Searches for bundles in a given directory. Example To search for a file in the `DIR` directory, run the command: **`sh ./kDeploy.sh -D DIR`**
-h	Provides help for `kDeploy.sh`. Lists all the command-line options.
-f	Reinstalls an existing deployment.
-k	Includes the PPM Center database schema password in the command. Automates command execution but may be a security risk.
-u	Includes the PPM Center user name in the command.
-p	Includes the password for the PPM Center user name in the command. Automates command execution but may be a security risk.

Table B-1. Key command-line options for kDeploy.sh (page 2 of 2)

Option	Description
-tidy	Cleans up unnecessary deployment files.
-skip -database	Specifies that database changes are not to be applied if they already exist.
–update–deploy	Extracts the new `kDeploy.sh`, if it exists.

kEncrypt.sh

In some cases you may need to generate encrypted strings in accordance with the encryption scheme of your PPM Server installation. To do this, you use the `kEncrypt.sh.` script.

Run the command:

```
sh ./kEncrypt.sh <String_To_Encrypt>
```

The `kEncrypt.sh` script run generates an encrypted string that starts and ends with the characters `#!#`, which the system uses to mark encrypted data. Copy only the text string between these markers.

kGenPeriods.sh

Use the `kGenPeriods.sh` script to generate the period information and populate the database tables that contain `knta_periods` and `knta_period_groups`. This script generates the monthly periods and period groups from the start year through the end year based on the start year and end year parameters.

The `kGenPeriods.sh` script does not regenerate periods that already exist between the specified years. It only creates periods between the minimum of the specified start year and the existing minimum period year—and the maximum of the existing maximum period year and the specified end year.

For detailed information on the syntax and optional parameters for the `kGenPeriods.sh` script, see the *HP Portfolio Management Configuration Guide.*

kGenTimeMgmtPeriods.sh

The `kGenTimeMgmtPeriods.sh` script is used in HP Time Management to populate the `KTMG_PERIODS` table with data. The script takes the number of periods to be populated and the start date from which the periods are to be populated.

Run the command:

```
sh ./kGenTimePeriods.sh <Num> <Start_Date>
```

where

`<Num>`	represents the number of time periods required
`<Start_Date>`	represents the date from which the periods are to be populated.

For a new installation, running this script is optional. Running `kGenTimePeriods.sh` with no arguments defaults the number of time periods to 24.

kHash.sh

The user name and password required to access the JMX console are encrypted to prevent unauthorized access to the information that the JMX console makes available. They are both stored as SHA-1 hash output in the `jmx-console-users.properties` file, which is located in the `<PPM_Home>/conf/props` directory.

You can run the `kHash.sh` script to output the hashed password required to access the JBoss JMX console, as follows:

```
sh ./kHash.sh -t <Password_Text>
```

kJSPCompiler.sh

The first time a user requests a page in the PPM Center standard interface, the server must compile the page. To eliminate this initial performance drag, run the `kJSPCompiler.sh` script to precompile all of the JSP pages before users request them. This gives first-time users faster access to the standard PPM Center interface.

kKeygen.sh

The `kKeygen.sh` script generates new security keys.

kMigratorExtract.sh

The script `kMigratorExtract.sh` is used in PPM Center entity migration.

kMigratorImport.sh

Use the `kMigratorImport.sh` script to migrate PPM Center entities. Make sure that you only type **`Y`** or **`N`** for the 17 flags listed.

Example

To import a file, run the command:

```
sh ./kMigratorImport.sh -username <Username> -password
<Password> -action import -filename <Full_File_Path> -i18n none
-refdata nochange -flags NNNNNNNNNNYYNNNNN
```

Be sure to place the full file path in single quotes.

kRunCacheManager.sh

Use the `kRunCacheManager.sh` script to clear your cache without having to restart the server. You can script this to run after your database changes have been committed.

kRunServerAdminReport.sh

You can use the `kRunServerAdminReport.sh` script to run diagnostic reports on the PPM Server. This utility provides a summary of current activity on the system and the number of database connections made.

You can also access this functionality through the PPM Workbench. To access and run these diagnostic reports from the PPM Workbench, on the shortcut bar, select **Sys Admin > Server Tools.**

The reports listed in the Admin Tools window are the same reports you can use the `kRunServerAdminReport.sh` script to run.

kStart.sh

The `kStart.sh` script is used only on UNIX systems to start the PPM Server as a background process. For more details about starting the server, see *Starting and Stopping the PPM Server* on page 75.

kStatus.sh

Run the `kStatus.sh` script to check the state of the PPM Server. This script returns the server status whether the server is running or not. If it is running, the script returns the current load value, which refers to the number of active user sessions.

kStop.sh

Use the `kStop.sh` script to stop the PPM Server. This script requires some arguments. You can use the `-now` flag to quickly stop the server, or use the `-delay <#minutes>` flag to stop it after a delay of a specified number of minutes.

If you are using the `-delay` option, you can use the `kCancelStop.sh` script to cancel the stop request.

Using the `-delay` option automatically issues a message to advise all connected PPM Center users that the server will stop after the specified delay. This script requires authentication if the server parameter `REMOTE_ADMIN_`

`REQUIRE_AUTH` is set to `true`. In this case, you must also specify the flag `-user <Username>`.

For more information on available flags, run `kStop.sh` without any options. For information about how to stop the server, see *Starting and Stopping the PPM Server* on page 75.

kSupport.sh

Use the `kSupport.sh` script to gather information useful to HP-Mercury support in diagnosing system problems, and create a Zip file with a timestamp in the `support/zipfiles` directory.

The `kSupport.sh` script gathers information from the following:

- Install logs
- Server logs (with the option for a date range)
- JDBC logs
- Deploy logs (for the installation of patches and HP Deployment Management Extensions)
- Configuration files
- Server reports
- Database information
- File system information

As it collects server logs or JDBC logs, the script concatenates all the files into one server `Log.txt` file.

You can run `kSupport.sh` in GUI, console, or silent mode. Silent mode automatically captures a default set of information without prompting for user input.

To run in GUI mode:

```
sh ./kSupport.sh
```

To run in console mode:

```
sh ./kSupport.sh -console
```

To run in silent mode:

```
sh ./kSupport.sh -silent -k <Password> -customer <Company_Name>
-sr <Service_Request_Number>
```

kUpdateHtml.sh

The `kUpdateHtml.sh` script is a key script used to update the PPM Server configuration. Run the `kUpdateHtml.sh` script any time a server configuration is updated in the `server.conf` file, regardless of whether you use the `kConfig.sh` script to change parameter values, or use a text editor to make the changes directly.

kWall.sh

Use the `kWall.sh` script to send a message to all users logged on to the PPM Workbench. When you run the script, it prompts you for your PPM Center user name and password, and for the message text.

setServerMode.sh

The `setServerMode.sh` script, located in the `<PPM_Home>/bin` directory, sets the server mode in case you want exclusive access to a running server.

The following are valid server mode values:

- **Normal.** In normal mode, all enabled users can log on, and all services are available, subject to restrictions set in `server.conf` parameters.
- **Restricted.** In restricted mode, the server lets users with Administrator access grant log on. The server cannot run scheduled executions, notifications, or the concurrent request manager while in this mode.

  Before you can install an HP Deployment Management Extension, you must set the server to restricted mode.
- **Disabled.** Disabled mode prevents server startup. A server enters disabled mode only after a PPM Center upgrade exits before the upgrade is completed.

To set the server mode using the `setServerMode.sh` script:

1. On the desktop, select **Start > Run.**

   The Run dialog box opens.
2. In the **Open** field, type:

   ```
   sh ./setServerMode.sh <Mode_Value>
   ```
3. Click **OK.**

For more information about server modes, see *Setting the Server Mode* on page 75.

<*PPM_Home*>/pdf Directory

The `pdf` subdirectory contains all documentation files for PPM Center (to view them, you need Adobe Reader).

You can also access product documentation:

- From **Product Information > Documentation** in either the PPM Center standard interface or the PPM Workbench interface
- The HP Software Product Manuals Web site (h20230.www2.hp.com/selfsolve/manuals)

<*PPM_Home*>/integration Subdirectory

The `integration` subdirectory contains information or examples for various common integrations between the PPM Server and external systems. For example, the <*PPM_Home*>`/integration/webserver` directory contains information about each external Web server that you can integrate with the PPM Server. Files used to perform the integration are located in these folders. For more information on using the folders and files in the `integration` subdirectory, see the relevant document that pertains to the integration involved.

<*PPM_Home*>/logs Directory

The server directory structure has two log directories. The <*PPM_Home*>`/logs` directory contains the `reports` subdirectory, which contains a log file for each PPM Server report that is run, and directories named `PKG_number` and `REQ_number`. These subdirectories contain execution logs for HP Deployment Management packages and HP Demand Management requests. The <*Number*> placeholder in the directory name corresponds to the ID of the package or request being run.

The other log directory, <*PPM_Home*>/server/<*PPM_Server_Name*>/log contains all PPM Server-generated logs. As the server runs, it generates logging messages and writes them to the serverLog.txt file. When this file reaches the size indicated by the ROTATE_LOG_SIZE server parameter, it is renamed to serverLog_timestamp.txt, and a new serverLog.txt is started.

The Java servlets used to serve the Web pages generate their own log files, named servletLog.txt. The amount of information in the server log files depends on the debugging level set in the server configuration. The server parameters SERVER_DEBUG_LEVEL and DEFAULT_USER_DEBUG_LEVEL control the debugging level. If a problem arises and you require more information in the logs, log on to the PPM Workbench as Administrator and reset the server debug level to Maximum debugging information (select **Edit > Debug Settings**).

<*PPM_Home*>/reports Directory

The reports subdirectory contains the HTML files for all reports that PPM Center clients have run.

<*PPM_Home*>/server Directory

The <*PPM_Home*>/server directory contains the deployed PPM Server. Typically, administrators are not required to make any changes in this directory. Server configurations are handled through the provided admin scripts in the <*PPM_Home*>/bin directory.

<*PPM_Home*>/sql Directory

The sql subdirectory contains source code for the built-in PPM Center reports and core PL/SQL packages. This is provided for convenience and for customization needs.

<*PPM_Home*>/transfers Directory

The `transfers` subdirectory serves as temporary storage for files transferred between the server and remote computers. For more information about how the transfers directory is used in entity migration, see *Basic Parameters* on page 230.

Other Directories

Other directories contain reference files, as indicated by their names. You are not likely to require access to these directories.

C Preinstallation Checklists

Preliminary Tasks

Before you can install PPM Center, you must perform a number of tasks on various system components to prepare for the installation. This appendix provides information to help ensure that your systems meet the technical requirements for installing PPM Center. It contains checklists for the preliminary tasks to perform on the application server (or servers), database server, client machines, and the network.

As you finish each task listed in the checklists, mark it as completed and make a note of the date and time you completed it. After you finish all of the required tasks, return this document to your HP Professional Services representative. The checklist will help your representative make the necessary preparations before installation and speed up the installation process. If you have questions or concerns, visit the HP Software Support Web site (hp.com/go/hpsoftwaresupport).

The tables in the following sections describe some system requirements. For a complete list of requirements, see the *System Requirements and Compatibility Matrix*.

Preliminary Database Tasks

Table C-1 lists the Oracle database-related tasks to perform before you install PPM Center.

Table C-1. Preinstall checklist for database tasks (page 1 of 2)

Done	Database Task	Information	Date and Time
	Identify the name and IP address of the database server.	The database server can reside on the same machine as the PPM Server, or on a different machine.	
	Install an Oracle database to house PPM Center solutions.	The database server can reside on the same machine as the PPM Server, or on a different machine.	

Table C-1. Preinstall checklist for database tasks (page 2 of 2)

Done	Database Task	Information	Date and Time
	Create the two required database schemas, and then set up access grants for them. For information about how to run the script to create the database schemas, see *Creating the Database Schemas* on page 57. For information about how to run the script that sets up the required access grants for the schemas, see *Key Decisions* on page 40. **Note:** Setting up the schemas before installation is optional. You can create the schemas and set up access grants during installation.	Set up the following grants for the schema: • `GRANT SELECT ON v_$parameter to <PPM_Schema>` • `GRANT SELECT ON v_$mystat to <PPM_Schema>` • `GRANT SELECT ON v_$process to <PPM_Schema>` • `GRANT SELECT ON v_$session to <PPM_Schema>` • `GRANT EXECUTE ON dbms_stats to <PPM_Schema>` To set up these grants before (or during) installation, run the `GrantSysPrivs.sql` script (located in the `mitg750/sys` directory). **Note:** HP recommends that you create these users during installation. If (and only if) your DBA does not provide you with the SYSTEM password for the database to use during installation, and does not type the password for you, then you can create the users ahead of time and use them during installation.	
	Set the Oracle database parameters to the values recommended for the system environment and optimum system performance.	For information about the recommended Oracle database parameter values, see *Configuring or Reconfiguring the Database* on page 93.	

Preliminary Application Server Tasks

Table C-2 lists the tasks to perform on every machine you plan to use as a PPM Server.

Table C-2. Preinstall checklist for PPM Server tasks (page 1 of 2)

Done	Application Server Task	Information	Date and Time
	Identify the operating system (UNIX or Windows) running on each machine on which you plan to install the PPM Server.		
	Identify the name and IP address of each application server.		
	Identify the installation directory.		
	For software installation, set aside the amount of disk space specified in the *System Requirements and Compatibility Matrix.*		
	Create a system (mitg) user for PPM Center installation and future system maintenance activities on this server. Create an email account for this system user.	Specify a user name that is consistent with your corporate naming standards.	
	PPM Center requires that you set `JAVA_HOME` in the system environment of the user account to be used to start the PPM Server. For information about how to verify that the `JAVA_HOME` environment variable is set or about how to set it, see *Verifying that the JAVA_HOME Environment Variable Is Set* on page 54.		

Table C-2. Preinstall checklist for PPM Server tasks (page 2 of 2)

Done	Application Server Task	Information	Date and Time
	After you install Oracle client on the server machine, set the `ORACLE_HOME` environment variable.		
	Install the Sun Java Development Kit (JDK) for your operating system.	The JDK version you install on the server depends on the operating system the server is running. For the exact version and operating system requirements, see the *System Requirements and Compatibility Matrix*. For information about how to install the JDK, see *Installing the Java Development Kit (JDK)* on page 53.	
	Each PPM Server requires the Oracle client library. After you install the Oracle database and client libraries, make sure that you can connect to that instance from the command line by running. `sqlplus <Username>/<Password>@<SID>`	PPM Center must be able to log in to the database instance in non-interactive mode. This step uncovers possible configuration issues with the database and client libraries.	

Table C-3 lists the tasks to perform on Windows server that is to interact with PPM Center application servers.

Table C-3. Preinstall checklist for Windows servers that interact with PPM Servers

Done	Task	Information	Date and Time
	Make sure that the mitg user has administrator-level access to the machine.		
	Make sure that the regional setting on the server is English (United States).		
	Make sure that FTP is installed and enabled, and that Bourne shell (bash) is installed.	Product support for Windows: • Van Dyke (VShell Server) • OpenSSH • Cygwin provides a complete UNIX-like environment. For information how to download and install Cygwin UNIX Emulator, go to cygwin.com. **Note:** HP recommends Van Dyke vShell.	
	If you plan to use PPM Center to perform deployments to other Windows machines in your environment, make sure that each Windows server with which PPM Center is to interact has the following: • UNIX Bourne shell emulator • FTP, SSH, SSH2, or Telnet server	Cygwin provides a complete UNIX-like environment. For information how to download and install Cygwin UNIX Emulator, go to cygwin.com.	

Preliminary Network Tasks

Use *Table C-4* to keep track of the network tasks you perform before you install or upgrade to PPM Center.

Table C-4. Preinstall checklist for network tasks (page 1 of 2)

Done	Network Task	Information	Date and Time
	If you plan to use PPM Center to perform deployments to other Windows machines in your environment, make sure that each Windows server that is to interact with PPM Center has the following: • UNIX Bourne shell emulator • FTP, SSH, SSH2, or Telnet server	HP-Mercury supports the following UNIX Bourne shell emulators: • Van Dyke (VShell Server) • OpenSSH (included in Cygwin) • Telnet server from Microsoft Windows Services for UNIX (SFU) (a supported remote command processor) **Note:** HP recommends Van Dyke vShell. Cygwin provides a complete UNIX-like environment. For information how to download and install Cygwin UNIX Emulator, go to cygwin.com.	

Table C-4. Preinstall checklist for network tasks (page 2 of 2)

Done	Network Task	Information	Date and Time
	Although PPM Server comes with its own HTTP server, you may want to use an industry-standard external Web server to serve PPM Center clients. If you plan to use HTTPS or a server cluster configuration, you must install and configure an external Web server.	PPM Center supports the following external Web servers: • Microsoft IIS • Microsoft Windows Server Sun Java System Web Server • Apache HTTP Server • IBM HTTP Server (IHS) For information on supported versions, see the*System Requirements and Compatibility Matrix.* PPM Server cluster uses an external Web server to load balance Web traffic across multiple application servers. For the most current configuration information, see the *System Requirements and Compatibility Matrix.*	

Preliminary Client Tasks

Use *Table C-5* to keep track of the tasks that you must perform on client machines to be used to access the PPM Dashboard and PPM Workbench.

Table C-5. Preinstall checklist for client machine tasks

Done	Client Task	Information	Date and Time
	Make sure that the client machine has a supported Web browser installed.	For information on which Web browsers are supported, see the *System Requirements and Compatibility Matrix.*	
	Make sure that the client machine has sufficient RAM for the part of PPM Center it must access on PPM Workbench.	Client machines that access the PPM Workbench must have at least 256 MB of RAM. Client machines that are not intended to access the PPM Workbench must have at least 128 MB of RAM. For client machines that access HP Project Management, HP recommends 512 MB of RAM.	
	Make sure that the client machine has sufficient disk space.	100 MB free disk space is required	
	Make sure that the client processor is adequate.	600 MHz is required	

As with most applications, greater memory and higher processor speeds result in higher application and user interface performance. However, in most cases, the minimum requirements shown in *Table C-5* provide adequate performance.

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