Using the PeopleSoft VirtualBox Images (PeopleSoft PeopleTools 8.54)

December 2015
Access to Oracle Support

Oracle customers have access to electronic support through My Oracle Support. For information, visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info or visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs if you are hearing impaired.
# Contents

**Preface**

<table>
<thead>
<tr>
<th>About this Documentation</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding this Documentation</td>
<td>9</td>
</tr>
<tr>
<td>Audience</td>
<td>9</td>
</tr>
<tr>
<td>Typographical Conventions</td>
<td>9</td>
</tr>
<tr>
<td>Products</td>
<td>11</td>
</tr>
<tr>
<td>Related Information</td>
<td>11</td>
</tr>
<tr>
<td>Comments and Suggestions</td>
<td>12</td>
</tr>
</tbody>
</table>

**Chapter 1**

**Prerequisites**

<table>
<thead>
<tr>
<th>Reviewing Hardware Requirements</th>
<th>13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reviewing Software Requirements</td>
<td>15</td>
</tr>
<tr>
<td>Reviewing Virtualization Platform Compatibility</td>
<td>15</td>
</tr>
</tbody>
</table>

**Chapter 2**

**Preparing to Deploy**

<table>
<thead>
<tr>
<th>Understanding Oracle VM VirtualBox and the PeopleSoft Deployment</th>
<th>17</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding Oracle VM VirtualBox</td>
<td>18</td>
</tr>
<tr>
<td>Completing the PeopleSoft Application-Specific Installation</td>
<td>19</td>
</tr>
<tr>
<td>Obtaining Oracle VM VirtualBox for PeopleSoft Appliances</td>
<td>19</td>
</tr>
</tbody>
</table>

**Chapter 3**

**Planning Security Administration**

<table>
<thead>
<tr>
<th>Understanding Security Administration for the PeopleSoft Virtual Machines</th>
<th>21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Considering Physical Security</td>
<td>22</td>
</tr>
<tr>
<td>Considering Host Operating System Security</td>
<td>23</td>
</tr>
<tr>
<td>Considering Network Security</td>
<td>23</td>
</tr>
<tr>
<td>Considering User Security</td>
<td>24</td>
</tr>
<tr>
<td>Considering the Virtual Machine Guest Operating System Security</td>
<td>26</td>
</tr>
<tr>
<td>Understanding the Virtual Machine Guest Operating System Security</td>
<td>26</td>
</tr>
<tr>
<td>Applying Operating System Patches and Updates</td>
<td>26</td>
</tr>
<tr>
<td>Checking for Critical Patch Updates</td>
<td>27</td>
</tr>
<tr>
<td>Disabling Unnecessary Services</td>
<td>27</td>
</tr>
</tbody>
</table>
Chapter 4
Deploying the PeopleSoft VirtualBox Appliances

Importing the PeopleSoft VirtualBox Appliance
Setting the Network Configuration for the Virtual Appliance
Understanding Network Configuration Settings
Setting a Host-Only Network Configuration
Using Alternative Network Configurations
Starting the PeopleSoft VirtualBox Appliance
Setting the Authentication Domain in the Web Profile
Using the PeopleSoft Installation
Reviewing the PeopleSoft Environment
Understanding Samba and File System Access
Reviewing the File System and Users
Accessing the Shared Drive Folders on the Virtual Appliance File System
Planning the Client Tools Installation
Installing and Starting Oracle Database Client Tools
Installing the PeopleTools Client Tools and Using Application Designer
Installing PeopleSoft Change Assistant
Managing PeopleTools Domains with PSADMIN
Changing the Access for PI_HOME
Using Oracle SES with the PeopleSoft VirtualBox Appliance
Compiling and Linking PeopleSoft COBOL Programs
Understanding COBOL Usage
Compiling COBOL
Compiling Additional Component COBOL with a PS_APP_HOME Setup
Linking COBOL
Running PeopleSoft COBOL Programs
Resolving Problems with the PeopleSoft Runtime Environment
Managing the Virtual Environment Lifecycle
Understanding Virtual Machine Management
Customizing and Cloning Virtual Appliances
Using the PeopleSoft Configuration Script
About this Documentation

This preface discusses:

- Understanding this Documentation
- Audience
- Typographical Conventions
- Products
- Related Information
- Comments and Suggestions

Understanding this Documentation

This documentation is designed to guide you through the deployment of the Oracle VM VirtualBox® appliances for Oracle's PeopleSoft applications. It is not a substitute for the documentation provided for Oracle VM VirtualBox®.

Audience

This documentation is intended for individuals responsible for deploying templates for Oracle's PeopleSoft applications with Oracle VM VirtualBox. The documentation does not include introductory information on virtualization technology or virtual machines. You should have a basic understanding of virtual machines. You should have a basic understanding of the PeopleSoft system.

Typographical Conventions

To help you locate and understand information easily, the following conventions are used in this documentation:

<table>
<thead>
<tr>
<th>Convention</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monospace</td>
<td>Indicates a PeopleCode program or other code, such as scripts that you run during the install. Monospace is also used for messages that you may receive during the install process.</td>
</tr>
<tr>
<td>Convention</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Italics</strong></td>
<td>Indicates field values, emphasis, and book-length publication titles. Italics is also used to refer to words as words or letters as letters, as in the following example: Enter the letter <em>O</em>. Italics are also used to indicate user-supplied information. For example, the term <em>domain</em> is used as a placeholder for the actual domain name in the user's environment. When two such placeholders are used together, they may be set apart with angle brackets. For example, the path <code>&lt;PS_CFG_HOME&gt;/apppserv/&lt;domain&gt;</code> includes two placeholders that require user-supplied information.</td>
</tr>
<tr>
<td><strong>Initial Caps</strong></td>
<td>Field names, commands, and processes are represented as they appear on the window, menu, or page.</td>
</tr>
<tr>
<td><strong>lower case</strong></td>
<td>File or directory names are represented in lower case, unless they appear otherwise on the interface.</td>
</tr>
<tr>
<td><strong>Menu, Page</strong></td>
<td>A comma (,) between menu and page references indicates that the page exists on the menu. For example, &quot;Select Use, Process Definitions&quot; indicates that you can select the Process Definitions page from the Use menu.</td>
</tr>
<tr>
<td><strong>Cross-references</strong></td>
<td>Cross-references that begin with <em>See</em> refer you to additional documentation that will help you implement the task at hand. We highly recommend that you reference this documentation. Cross-references under the heading <em>See Also</em> refer you to additional documentation that has more information regarding the subject.</td>
</tr>
<tr>
<td><code>⇒</code> (line-continuation arrow)</td>
<td>A line-continuation arrow inserted at the end of a line of code indicates that the line of code has been wrapped at the page margin. The code should be viewed or entered as a continuous line of code, without the line-continuation arrow.</td>
</tr>
<tr>
<td><code>“ “</code> (quotation marks)</td>
<td>Indicate chapter titles in cross-references and words that are used differently from their intended meaning.</td>
</tr>
<tr>
<td><strong>Note</strong>. Note text.</td>
<td>Text that begins with <em>Note</em>. indicates information that you should pay particular attention to as you work with your PeopleSoft system.</td>
</tr>
<tr>
<td><strong>Important! Important note text.</strong></td>
<td>A note that begins with <em>Important!</em> is crucial and includes information about what you need to do for the system to function properly.</td>
</tr>
</tbody>
</table>

Note: Note text.

Important! Important note text.
### Convention Description

**Warning!** Warning text.

A note that begins with *Warning!* contains critical configuration information or implementation considerations; for example, if there is a chance of losing or corrupting data. Pay close attention to warning messages.

### Products

This documentation may refer to these products and product families:

- Oracle® Database
- Oracle® Enterprise Manager
- Oracle® Linux
- Oracle® Tuxedo
- Oracle® VM
- Oracle VM VirtualBox®
- Oracle® WebLogic Server
- Oracle's PeopleSoft Application Designer
- Oracle's PeopleSoft Campus Solutions (CS)
- Oracle's PeopleSoft Customer Relationship Management (CRM)
- Oracle's PeopleSoft Enterprise Learning Management (ELM)
- Oracle's PeopleSoft Financial Management (FIN)
- Oracle's PeopleSoft Human Capital Management (HCM)
- Oracle's PeopleSoft PeopleTools
- Oracle's PeopleSoft Interaction Hub
- Oracle's PeopleSoft Process Scheduler
- Oracle's PeopleSoft Supply Chain Management (SCM)
- Oracle® Secure Enterprise Search


### Related Information

You can find several sources of reference information about PeopleSoft PeopleTools and your particular PeopleSoft application. You can access PeopleSoft documentation for the current release of PeopleSoft PeopleTools and PeopleSoft applications at the PeopleSoft Online Help Web site. You can also find installation guides and other information by searching for the product name and release number on My Oracle Support.

- PeopleSoft Online Help. This page includes links to the most recent documentation for PeopleSoft PeopleTools and PeopleSoft applications.
  
- PeopleTools: Getting Started with PeopleTools for your release. This documentation provides a high-level
introduction to PeopleTools technology and usage.


• PeopleTools: Change Assistant and Update Manager

• My Oracle Support. This support platform requires a user account to log in. Contact your PeopleSoft representative for information.
To locate documentation on My Oracle Support, search for the title and select PeopleSoft Enterprise to refine the search results.

• PeopleTools Installation for Oracle for the current release. This documentation provides instructions for installing PeopleSoft PeopleTools on an Oracle RDBMS (using the traditional method).
See My Oracle Support, (search for title).

• PeopleSoft Application Installation guides. Application-specific installation instructions are required in addition to the installation instructions for PeopleSoft PeopleTools.
See My Oracle Support, (search for title).

• User manual for Oracle VM VirtualBox. This is an extensive document that helps understand how to create and manage virtual machines using Oracle VM VirtualBox.

Comments and Suggestions

Your comments are important to us. We encourage you to tell us what you like, or what you would like changed about PeopleSoft documentation and other Oracle reference and training materials. Please send your suggestions to:
PSOFT-Infodev_US@oracle.com

While we cannot guarantee to answer every email message, we will pay careful attention to your comments and suggestions. We are always improving our product communications for you.
Chapter 1

Prerequisites

This chapter discusses:

• Reviewing Hardware Requirements
• Reviewing Software Requirements
• Reviewing Virtualization Platform Compatibility

Task 1-1: Reviewing Hardware Requirements

This section describes the hardware requirements for deploying Oracle VM VirtualBox PeopleSoft Appliances. Keep in mind that individual performance is expected to vary depending upon the specific hardware, CPU speed, disk type and speed, and disk fragmentation in your setup.

Note. This documentation uses "virtual appliance" or "image" to refer to the archive that is imported into the VirtualBox Manager. The term "virtual machine (VM)" is used in this documentation to refer to the environment that VirtualBox creates from the virtual appliance.

The requirements listed below apply to the machine used to host the Oracle VM VirtualBox appliances. Keep in mind that a PeopleSoft installation also requires a Microsoft Windows machine on which you install the PeopleTools client utilities. While it is possible to use the same machine as the VirtualBox appliance host and the PeopleSoft Microsoft Windows client, it is not required. To review the certification information for the PeopleSoft Microsoft Windows client, see My Oracle Support, Certifications.

Oracle strongly recommends that you dedicate a Microsoft Windows machine for the PeopleTools client used with the PeopleSoft Update Manager. This should be a machine that is not used for other PeopleSoft purposes. See "Deploying the PeopleSoft VirtualBox Appliances," Using the PeopleSoft Installation, for information on installing the PeopleTools client utilities.

• **Host computer:** You need a physical host computer to install VirtualBox and deploy the PeopleSoft Update Image (PI). This host computer can be located remotely and accessed by network-based desktop visualization methods such as RemotePC™ or Microsoft Remote Desktop Connection. However, because the PeopleSoft VirtualBox appliances are 64-bit, the VirtualBox instance that runs them cannot be run in another virtual machine. Also, VirtualBox cannot be used in a cloud or Amazon Machine Image (AMI) environment.

• **Host operating system:** The host operating system must be 64-bit Microsoft Windows that is supported by the PeopleSoft PeopleTools client utilities.

See My Oracle Support, Certifications.

See PeopleSoft PeopleTools Certifications, My Oracle Support, Doc ID 747587.1, for help searching PeopleSoft Certifications.

Note. While VirtualBox can be installed and run on other host OSs, the PeopleSoft VirtualBox appliances have been developed and tested using 64-bit Microsoft Windows operating systems.

- **CPU capabilities**: The processor must be a 64-bit processor with hardware virtualization capabilities. These features must be enabled in the BIOS before the machine is booted.

  The host computer on which the PeopleSoft VirtualBox appliances will run must have a 64-bit processor that can support hardware virtualization.

  PeopleSoft VirtualBox appliance relies on 64-bit Oracle Linux guest operating systems (OSs). VirtualBox does not support software virtualization for 64-bit OSs. So the host system should support hardware virtualization. Your host system must have 64-bit CPUs that support Intel™ Virtualization Technology (Intel VT, first released in 2005) or AMD Virtualization (AMD-V™) Technology (first released in 2006) hardware-virtualization features.

  Most newer CPUs from Intel and AMD contain the required virtualization extensions. These virtualization extensions are not normally enabled by default in a new machine. It is necessary to enter BIOS in your system and enable virtualization extensions before attempting to run any virtual machines. Consult the documentation provided with your computer for information on accessing the BIOS on your machine.

- **RAM (Memory)**: Each PeopleSoft VirtualBox appliance requires a minimum of 6 GB available RAM to run in addition to the requirements of the host OS and the applications previously running on it.

  Note that the memory used by the VirtualBox appliance will not be available to the host OS while the appliance is running. The available RAM refers to memory not used by other processes on the host OS.

  For information on memory requirements for Oracle Secure Enterprise Search, see the section on using Oracle SES later in this documentation.

  See "Deploying the PeopleSoft VirtualBox Appliances," Using Oracle SES with the PeopleSoft VirtualBox Appliance.

- **Disk space**: 150 GB free disk space is required to download the necessary files and initialize each virtual appliance.

  Note. The size will vary depending upon the specific virtual appliance. Access the information on the PeopleSoft Update Manager Home Page, My Oracle Support, Doc ID 1641843.2, for the requirements specific to the PeopleSoft VirtualBox appliance that you downloaded.

VirtualBox supports the ability to take snapshots of a running appliance, and use them to return to a previous state if your virtual appliance becomes corrupted in any way. You should plan for the space needed for snapshots when allocating storage for your virtual appliance.

See the information on snapshots in Oracle VM VirtualBox User Manual, "First Steps."

The disk space requirement includes:

- 25–35 GB for the downloaded zip files

  You may remove these files after you have successfully initialized your virtual machine.

- 25–35 GB for the virtual appliance archive (.OVA) after extraction.

  You may remove the .OVA file after you have successfully initialized your virtual machine. The downloaded virtual appliance archive is required only to set up the virtual machine.

- 60–80 GB for the virtual machine when initialized.

- **Network**: The default installation of the PeopleSoft VirtualBox appliance sets up a "host-only" network configuration.

  If you wish the VM to join the network you will need to make sure that you are able to configure the network
stack within the VM in such a way that it will be able to join the local area network (LAN) on which it will reside. This documentation includes brief information on alternative network configurations.
See Using Alternative Network Configurations.

**Task 1-2: Reviewing Software Requirements**

Here are the software requirements for deploying Oracle VM VirtualBox PeopleSoft Appliances:

- **Oracle VM VirtualBox**: Before deploying the Oracle VM VirtualBox PeopleSoft Appliances, you must install Oracle VM VirtualBox.
  
  See Understanding Oracle VM VirtualBox.
  
  Download the current version of VirtualBox from the Oracle VM VirtualBox web site.
  

- **Secure shell client**: You will need a secure shell (SSH) client, for example PuTTY, to log in to the virtual machine after initialization.

- **Web Browser**: You need a version certified for the current PeopleSoft PeopleTools release for end-users.
  
  See My Oracle Support, Certifications.

**Task 1-3: Reviewing Virtualization Platform Compatibility**

OVA compatibility across virtualization host products (VMWare, VirtualBox, OVM 3.1 and later, and so on) is a feature that these products support but something that we cannot internally test with each image. It is our belief that customers should feel free to load these images in any compatible host product and that the vendors are likely very good at maintaining the compatibility and therefore it is expected that it will work. We know of customers that are already running our images in VMWare and we expect that if there ever were a problem caused by the host software that it will manifest in easily identifiable ways (such as the virtual machine will not boot) and we expect that it would never result in a functional difference of behavior in the PeopleSoft Update Manager or other features of our applications. We will support the customer that uses an alternate virtualization platform, but if they report a problem that we suspect to be an issue with the host software, then we may ask them to replicate the issue using a VirtualBox host. This is similar to our support policy on virtualization in general, where we officially say that it is theoretically possible that a problem is due to virtualization software and we may ask a customer to replicate an issue in a non-virtual OS if we cannot replicate in the native non-virtual OS. Although we reserve for this possibility in our official support policies, in practice we are not aware of a time when we have needed to ask the customer to replicate in a non-virtual OS because in practice these virtualization products are very good at OS compatibility.

**Note.** There is a known compatibility issue with Oracle® Exalogic Elastic Cloud systems that prevents the importing of PeopleSoft VirtualBox appliances.
Chapter 2

Preparing to Deploy

This chapter discusses:

- Understanding Oracle VM VirtualBox and the PeopleSoft Deployment
- Understanding Oracle VM VirtualBox
- Completing the PeopleSoft Application-Specific Installation
- Obtaining Oracle VM VirtualBox for PeopleSoft Appliances

Understanding Oracle VM VirtualBox and the PeopleSoft Deployment

This documentation explains how to deploy the Oracle VM VirtualBox appliance for a PeopleSoft application. The PeopleSoft application is deployed as a single virtual machine (VM) in VirtualBox. Be sure to follow the instructions in this documentation in setting up your PeopleSoft virtual machine in order to avoid startup problems or usage issues. Do not change the delivered virtual machine settings, including the operating system and hardware virtualization settings, as changing these values can cause the virtual machine to not launch properly.

Note. Access the links on the PeopleSoft Update Manager Home Page, My Oracle Support Document 1641843.2, for version information.

The VirtualBox appliance for PeopleSoft applications includes the following features:

- PeopleSoft application (Campus Solutions 9.2, HCM 9.2, FSCM 9.2, ELM 9.2, or CRM 9.2, depending on the appliance chosen) demo database, built on Oracle RDBMS database software
  The PeopleSoft application database is a demo database with current patches applied.

Note. While the virtual appliances are built on an Oracle RDBMS platform, target environments used with PeopleSoft Update Manager can be any RDBMS platform supported for a PeopleSoft installation.

- PeopleSoft PeopleTools Install directory (this will be found in /opt/oracle/psft/pt/tools after deployment)
- PeopleSoft Client Installer
- PeopleSoft Pure Internet Architecture (PIA) built with Oracle WebLogic web server
- Application Server configured using a PeopleSoft small domain configuration
- Process Scheduler with a default UNIX configuration
- PeopleSoft Search Framework built with Oracle Secure Enterprise Search
- Oracle Tuxedo
- Oracle Linux operating system
- Samba Open Source software for file system access included
The section Using the PeopleSoft Installation later in this document details the components of a PeopleSoft environment deployed by the PeopleSoft VirtualBox Appliance, and gives information on how to work with the environment.

See "Deploying the PeopleSoft VirtualBox Appliances," Using the PeopleSoft Installation.

Before you carry out the procedures in this document to deploy the PeopleSoft VirtualBox appliance for use with a PeopleSoft application update, it is a good idea to review the various installation setups in the PeopleTools: Change Assistant and Update Manager product documentation. The way that you carry out these procedures will be impacted by your specific environment.

See PeopleTools: Change Assistant and Update Manager; "Setting Up the Client, Source, and Target Environments."

See Also

Understanding Oracle VM VirtualBox

"Prerequisites"

Obtaining Oracle VM VirtualBox for PeopleSoft Appliances

**Understanding Oracle VM VirtualBox**

Oracle VM VirtualBox is a virtualization product from Oracle that allows one or more guest operating systems (OSs) to be run on and in a single host OS. Oracle VM VirtualBox has the following advantages:

- A guest OS can run any number of applications completely in isolation from the host OS. VirtualBox virtualizes the physical resources of the host OS.
- Memory, CPU, network cards, and so on, are presented to the guest OS such that the guest is unaware that it is running in a virtualized environment.
- Most applications do not require any special modifications in order to run in a guest OS in VirtualBox.

Pre-configured guest OSs, also known as virtual appliances, can be downloaded from My Oracle Support. Virtual appliances can also be created manually on any machine on which VirtualBox is installed. This typically involves running the conventional installation program for the OS that you wish to run as your guest. Once you have created a virtual machine in this manner, it can be redistributed to any number of users.

VirtualBox is intended to host applications with only a very small number of users. VirtualBox is a machine-bound solution—it runs on a single host. Therefore, PeopleSoft VirtualBox appliances as delivered are intended for demonstration or evaluation purposes. They are not intended to be used for a large number of users or for remote access. A typical PeopleSoft application will be secured by the administrator before being made available to the user population. Furthermore, a PeopleSoft deployment typically makes considerations for scalability and fault tolerance. The PeopleSoft VirtualBox appliances, as delivered, have not been constructed to meet these requirements. If the decision is made to make the virtual appliance available to a larger user population, the administrator should take steps to implement the necessary security requirements.

See Oracle VM VirtualBox web site, https://www.virtualbox.org/.

Completing the PeopleSoft Application-Specific Installation

After you complete the installation tasks for the PeopleSoft VirtualBox appliance covered in this documentation, there may be additional installation and configuration steps that are specific to the PeopleSoft application you are installing. Be sure to obtain the installation documentation for your PeopleSoft application and complete any necessary tasks covered there. You can find the PeopleSoft application-specific installation guides by searching on My Oracle Support.

Task 2-1: Obtaining Oracle VM VirtualBox for PeopleSoft Appliances

Use this information to obtain and extract the VirtualBox appliances for a PeopleSoft application.

1. Go to the PeopleSoft Update Manager home page, My Oracle Support, Doc ID 1641843.2, to find the information on locating and downloading the image for your PeopleSoft application.

   This page includes links to PeopleSoft Update Manager documentation, as well as links to the individual images.

2. Download the virtual appliance files from My Oracle Support into a single directory.

   This can be any directory that has adequate available space. This directory location, referred to in this documentation as `APPLIANCE_TEMP_DIR`, will be accessed in the next chapter when importing the file into Oracle VM VirtualBox Manager.

   When you download, there will probably be multiple zip files. The multiple files are needed due to size limitations. You must extract parts for the virtual appliance from these individual zip files and recombine them into a single file before importing into Oracle VM VirtualBox Manager.

   The zip file names have the following format:

   `<APPLICATION_NAME>-<APPLICATION_RELEASE>-<IMAGE_TYPE>-<IMAGE_NUMBER>_OVA_<n>.zip`

   For example:

   HCM-920-UPD-009_OVA_1of11.zip
   HCM-920-UPD-009_OVA_2of11.zip
   ...
   HCM-920-UPD-009_OVA_11of11.zip

   The file names are comprised of the following parts:

   - `<APPLICATION_NAME>` is an abbreviation that represents the PeopleSoft application name, such as HCM for PeopleSoft Human Capital Management.
   - `<APPLICATION_RELEASE>` represents the PeopleSoft application release number, such as 9.20.
   - `<IMAGE_TYPE>`
   - `<IMAGE_NUMBER>`
   - `n` represents the total number of zip files.

3. Extract the contents of the first zip file using a standard zip tool.

   The first zip file you extract includes several relatively small files, such as a README, a text file with
checksum values, and two scripts.

- Use the MD-5 or SHA-1 checksum values to verify all of the downloaded zip files.
- The scripts (ova_gen.bat for Microsoft Windows operating systems, and ova_gen.sh for UNIX or Linux operating systems) are used in the next step to combine the individual parts into a single OVA file.

The ova_gen.bat script for Microsoft Windows requires the unzip.exe executable, which is not included in the downloaded files. To obtain the executable, go to http://www.info-zip.org/. After installing, verify that unzip.exe can be called from the command line.

4. Combine the individual files into a single file with a .ova extension.

Based on your operating system, run ova_gen.bat or ova_gen.sh, which you extracted from the first downloaded zip file, to extract the remaining files and generate the combined OVA file:

- On Microsoft Windows run the ova_gen.bat script.
  The script uses a `copy /b` command to combine the separate parts into a single OVA file.
  **Note.** You can also open the script with a text editor and copy the command from the script if you prefer to run it manually.

- On UNIX or Linux run the ova_gen.sh script.
  The script uses a `cat` command to combine the separate parts into a single OVA file.
  **Note.** You can also open the script with a text editor and copy the command from the script if you prefer to run it manually.

5. After you combine the individual files, you have a single file with a .ova extension such as:

   `<APPLICATION_NAME>-<APPLICATION_RELEASE>-<IMAGE_TYPE>-<IMAGE_NUMBER>.OVA`

Use the MD-5 or SHA-1 checksum file extracted from the first zip file to verify the checksum values of this OVA file.

This is the virtual appliance archive that can be imported into Oracle VM VirtualBox.

See "Deploying the PeopleSoft VirtualBox Appliances," Importing the PeopleSoft VirtualBox Appliance.
Chapter 3

Planning Security Administration

This chapter discusses:

- Understanding Security Administration for the PeopleSoft Virtual Machines
- Considering Physical Security
- Considering Host Operating System Security
- Considering Network Security
- Considering User Security
- Considering the Virtual Machine Guest Operating System Security
- Considering PeopleSoft Application Security and Client Access
- Summarizing Security Considerations

Understanding Security Administration for the PeopleSoft Virtual Machines

This chapter presents topics for you to consider when planning to secure your PeopleSoft virtual machine (VM). This chapter is not intended to replace or supersede any of the concepts covered in the PeopleSoft PeopleTools Security Red Papers or other sources of corporate infrastructure hardening.

The extent to which your VM must be secured is decided by the way in which it will be used and by whom. The more exposure the VM receives, the more secure it must be. The following table describes three scenarios and lists security considerations. Identify the scenario which best matches your use case:

<table>
<thead>
<tr>
<th>Environment</th>
<th>Description</th>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local (that is, a host-only network setup)</td>
<td>• Single user system&lt;br&gt;• Runs on laptop or desktop&lt;br&gt;• No network access required</td>
<td>• The VM does not need to be secured because it is only used by the same user that owns the host on which it runs.&lt;br&gt;• No additional steps required.</td>
</tr>
<tr>
<td>Environment</td>
<td>Description</td>
<td>Considerations</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Network, trusted users</td>
<td>- Small user population (fewer than 10 users)</td>
<td>- Network security is required to restrict access to the Guest OS via the LAN.</td>
</tr>
<tr>
<td></td>
<td>- User access can be restricted to a domain of trust that can be implemented as authorization group.</td>
<td>- The security setup uses existing network administration utilities to limit access to the virtual appliance.</td>
</tr>
<tr>
<td></td>
<td>- VM does not access external network.</td>
<td>- Security administration should prevent outbound connectivity from the virtual appliance.</td>
</tr>
<tr>
<td>Network, untrusted users</td>
<td>- The user population is not trusted or known.</td>
<td>- Implement the same security considerations as for the network, trusted users scenario.</td>
</tr>
<tr>
<td></td>
<td>- VM access cannot be restricted to small user group.</td>
<td>- The network security should follow that used for other machines on the network.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Disable unnecessary services such as Samba and tighten ports.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Implement PeopleSoft Application Security (PIA)</td>
</tr>
</tbody>
</table>

**See Also**

*PeopleTools: Security Administration*


**Considering Physical Security**

The virtual appliances are required to run as a guest VM on a physical machine. This physical machine may be any 64-bit machine with an AMD or Intel chip with virtualization extensions enabled. This is discussed in greater detail in the hardware requirements of this documentation. The virtual appliances can therefore be placed on a server grade machine or a machine as modest as a desktop or laptop that fits the hardware requirements. In most cases however, the physical machine on which the guest VM runs will be managed by the system administrator and will reside in the data center or a secured server room. This machine will need to be physically secured in the same way any other machine on your corporate network would be secured.

See "Prerequisites," Reviewing Hardware Requirements.
Considering Host Operating System Security

Virtual Machines run in "user space" on a virtualization platform. (User space is a system administrator term that should be understood by a security consultant). This means that processes within the virtual machine will not have access to host resources. Allowing the guest to access host resources would require additional steps to be taken by the administrator. Therefore the virtual machine can be thought of as a secure container. The steps required to allow the guest OS to see the host OS are not required by the PeopleSoft VMs and are therefore not documented here.

Virtual machines are created in the context of a logged in user on the VirtualBox manager desktop application. The user under whom the VM is created should be a normal non-administrator or non-root user. This is consistent with the least privilege security principle that is advocated for PeopleSoft installation homes and domain configurations.

See "Deploying the PeopleSoft VirtualBox Appliances," Importing the PeopleSoft VirtualBox Appliance.

The virtualization platform for which these virtual machines were built is Oracle VM VirtualBox. The steps regarding host security assume that the VM runs in a host-bound manner and in the context of a single user. Because the VM runs in the context of a specific user, other OS users do not have access to the virtual machine file system when logged on to the host OS. If possible, logon access to the host OS should be restricted to the user that will import, create and manage the lifecycle of the virtual machine.

With minor modifications, it is possible that these virtual machines would work on different virtualization platforms. These modifications are not documented here, nor does this ability suggest fitness to a given application, since Oracle tests and verifies correct functioning of these virtual machines only on the Oracle VM VirtualBox virtualization platform.

The steps for securing the host OS will naturally vary depending upon the virtualization platform. This results from the fact that some virtualization platforms are host-bound and others are enterprise multi-user solutions that have security models built into the virtualization management platform that contain different roles with varying authorization levels.

Considering Network Security

The VMs are delivered with the network adapter in "host-only" network configuration. This means that only users logged into the host OS can access resources within the guest OS. For example, logging into PIA can only be achieved from a browser running on the desktop of the host OS. Furthermore, the VM can only access resources within its own virtual machine. This means that steps need to be taken explicitly to make the VM accessible to and from the network.

It is understood that a host-only configuration is impractical for any real usage of the virtual machine. The delivery of the virtual appliance with a host-only adapter by default is a security precaution to prevent unexpected introduction of a new virtual host on the local area network (LAN) when switching on the virtual machine for the first time. By changing the network adapter settings in VirtualBox Manager you can make the VM available to users on the network.

See "Deploying the PeopleSoft VirtualBox Appliances," Setting the Network Configuration for the Virtual Appliance.

Note. When working with PeopleSoft Update Manager, we recommend that all components (source environment, target environment, and Change Assistant) reside on the same LAN.
VirtualBox supports up to four network adapters per virtual machine. There are a range of choices of network adapter type. When changing from the default host-only network adapter you will select the most appropriate choice for your network. Oracle tests the deployment of the virtual machine with the Bridged network adapter. This network adapter is tested with both static and dynamic IP addresses to allow remote clients to access the virtual machine and conduct pre-release testing of the virtual appliance.

See the Oracle VM VirtualBox User Manual for details about the various network configuration options for VirtualBox.

All network access to the virtual machine is achieved by proxy through the host's network adapter. This means that the host OS should be located on a network sub-domain or segment that restricts access both to and from the virtual machine. This is the same principle as restricting access to and from any machine within your network.

The OS of the VM that you are using is Oracle Linux. Oracle Linux contains the iptables firewall. The iptables utility is turned off by default in the delivered PeopleSoft virtual appliance. You may choose to enable the firewall in order to restrict access to the VM. This allows you to control which resources, ports, and so on, are available to users based on the host credentials from which they reach the VM. The steps required to enable the iptables firewall and limit network access to the VM are documented in the Oracle Linux security documentation.


### Considering User Security

A number of distinct and separate user accounts are used when interacting with the VM. These user accounts are as follows:

- **Host OS user account** — User that logs in to the host OS, imports the virtual appliance, and creates the virtual machine.
- **Network users** — Network users that access the virtual machine after it is started by using PIA, Application Designer, and so on.
- **Application user accounts** — User accounts contained in the PeopleSoft application database that are used to sign on to the PeopleSoft application.
- **Guest OS user accounts** — User accounts for signing on to the guest virtual machine. There are a number of default users in the virtual machine, as described in a later section.

**Note.** The virtual machine is designed to work with the delivered OS user accounts. If you change these guest OS user accounts, be aware that the virtual machine may not be usable.

See "Deploying the PeopleSoft VirtualBox Appliances," Reviewing the File System and Users.

- **Samba user accounts** — User accounts for accessing a limited part of the file system of the VM from outside the virtual machine.

Each of these accounts has different activities or roles that can be associated with them. This partitioning of roles with different authentication mechanisms provides scope for a more secure deployment of the VM similar to a typical environment management strategy used in your data center.

For example, it is possible to manage the environment such that the owner of the VM is unable to log in to the virtual machine. This allows the system and database administrators of the virtual machine to be divided into separate groups.
The following table lists sample administrators, their roles, and sample activities:

<table>
<thead>
<tr>
<th>Role</th>
<th>Sample Activities and Permissions</th>
</tr>
</thead>
</table>
| Network Administrator               | • Administers network addresses and names  
• (Sys Admin) Manages the host on which VMs run and creates the VM  
• After initial configuration, cannot log in to guest OS |
| System Administrator                | • Applies security to the guest OS and PeopleSoft runtime environment  
• Shuts down non-essential services and configures firewall  
• Cannot log in to host OS on which the VM runs |
| PeopleSoft Runtime Administrator    | • This is a non-root user on the guest OS.  
• Logs on to the VM to create and configure Application Server, Process Scheduler, or PIA domains  
• Controls the lifecycle of Application Server, Process Scheduler, or PIA domains by starting and stopping these components as needed |
| Database Administrator (DBA)        | • Manages the PeopleSoft application databases, availability and performance  
• Participates in creating new databases during upgrade |
| PeopleSoft Administrator            | Signs on to PeopleSoft application (PIA and Application Designer) and manages users, groups and authorization. |

Here is a possible scenario for the security administration provided by these four administrators:

1. The Network Administrator downloads the latest PeopleSoft virtual appliance to the physical machine on which the virtual machine will run.
2. The Network Administrator imports the PeopleSoft virtual appliance using VirtualBox Manager.
3. The Network Administrator creates a virtual machine from the imported virtual appliance.
4. The Network Administrator selects the network adapter for the virtual appliance.
5. The Network Administrator starts the VM.
   The startup procedure includes prompts for the VM network configuration information, default root password, and the connect ID and password. The network administrator provides this information to the System Administrator.
   See "Deploying the PeopleSoft VirtualBox Appliances," Starting the PeopleSoft VirtualBox Appliance.
6. The System Administrator logs in to the virtual machine using Secure Shell (SSH) as VM user root.
7. The System Administrator changes the root password and the passwords for each of user accounts in the virtual machine.
   See "Deploying the PeopleSoft VirtualBox Appliances," Using the PeopleSoft Installation.
8. The System Administrator applies security to the guest OS; for example:
   • Firewall configuration
• Disabling unnecessary services
• Installing Critical Patch Updates (CPUs)

9. The System Administrator copies the PeopleTools client installation program to a shared read-only file system location outside the VM for Application Designer users to access.

10. The System Administrator provides the DBA connectivity information for the PeopleSoft application and PeopleSoft database.

11. The DBA makes any necessary configuration or security changes to the RDBMS.

12. The System Administrator provides the credentials for non-root OS users to the PeopleSoft Runtime Administrator.

13. The PeopleSoft Runtime Administrator makes any necessary configuration or security changes to Application Server, Process Scheduler, or PIA domain.

14. The PeopleSoft Administrator makes any necessary configuration or security changes to the application through PIA or other PeopleTools utilities.

15. The PeopleSoft Administrator confirms operation of the application.

16. The PeopleSoft Administrator announces the availability of the VM to the broader end-user population.

17. The end users access the PeopleSoft application through the normal mechanisms of using PIA or Application Designer.

Considering the Virtual Machine Guest Operating System Security

This section discusses:

• Understanding the Virtual Machine Guest Operating System Security
• Applying Operating System Patches and Updates
• Checking for Critical Patch Updates
• Disabling Unnecessary Services

Understanding the Virtual Machine Guest Operating System Security

The OS of the virtual appliance is delivered with limited security. The PeopleSoft installation is secure in terms of file system permissions. The OS users that are used to administer the PeopleSoft system are consistent with published best practices. As noted elsewhere, those users are local to the virtual machine and must have their passwords immediately changed upon initial deployment.


Applying Operating System Patches and Updates

The virtual appliances that are downloaded from My Oracle Support contain the most recent versions of PeopleSoft PeopleTools and additional component (third-party) products (for example, Oracle Tuxedo) required by the PeopleSoft application. The operating system, Oracle Linux, is also reasonably current, but you may need to apply updates to ensure that it has all the required patches and fixes to function correctly and securely.
Your organization will have pre-existing guidelines and standards set forth for hardening the operating system prior to making any host accessible on your network. You may also make use of third party security scan and analysis tools. These tools are used to report any known vulnerabilities. This may include vulnerabilities identified since the release of the virtual appliance from Oracle. For this reason it is strongly recommended that you make use of a product of this nature to identify any hardening steps that you may need to take or recently published fixes (software package updates) to address these vulnerabilities and reduce your surface of attack. You should apply these same security guidelines for the guest OS of any virtual artifacts delivered by Oracle for PeopleSoft installations.

Fixes and updates for Oracle Linux are available from the Oracle Yum Public Repository (http://public-yum.oracle.com). These fixes can be accessed directly from your VM by configuring yum on your VM to connect directly to the repository. You will connect to the yum repository through a secure channel. If traffic to the public yum repository is required to flow through a corporate proxy, the yum process can be configured to honor those settings. An alternative to using the remote public repository is to create your own yum repository. The approach you take will derive from pre-existing security processes in place within your organization for patching operating systems.

Note. The Yum repository is not configured on the delivered virtual appliance.

See the information on Yum in the Oracle Linux documentation.


Checking for Critical Patch Updates

Critical Patch Updates (CPUs) are made available according to a published schedule. If CPUs have been released subsequent to the availability of the virtual appliance you may want to install these CPUs if your VM is available to an untrusted user population.


You can also search for critical patches in My Oracle Support, Patches & Updates.

See My Oracle Support Patches and Updates for PeopleSoft Products, My Oracle Support, Doc ID 1465172.1.

Disabling Unnecessary Services

At initialization the VM starts a number of services. These frequently run as background or daemon processes, and they may be owned by either root or regular users. These services are responsible for runtime management of the system. Some of these services may be deemed non-essential for the running of your VM.

You may wish to review the services that are running and decide from those running services which ones are non-essential and whether the essential ones are properly configured. For example, use this Linux command to review the running services:

```
service --status-all
```

Consult your organization security authorities to determine which services are either mandatory or prohibited.

Considering PeopleSoft Application Security and Client Access

This section discusses:
• Understanding PeopleSoft Application Security and Client Access
• Considering PeopleSoft Pure Internet Architecture Security
• Considering Security for Client Tools
• Considering SQL*Plus Security
• Considering Security for Samba and the VM File System
• Considering the VM Operating System and Secure Shell Access

Understanding PeopleSoft Application Security and Client Access

To effectively use the virtual machine you will need to make it available to users. In the most secure deployment the only user that needs to access the VM is the logged in user on the host OS. This is not expected to be sufficient in most cases and therefore access to the VM will need to be made available to the user population. The VM should be made only as accessible as it needs to be for the users to perform the required tasks. Each of the VM access channels is discussed below.

Considering PeopleSoft Pure Internet Architecture Security

By default, any user that can reach the VM over TCP/IP can access the PIA login page. The URL for accessing PIA is well-known and can be constructed if the hostname of the VM is known. Furthermore, the user accounts that are in the PeopleSoft database in your virtual appliance contain default passwords. There are no security certificates with the delivered VM and all traffic is HTTP by default. If needed, HTTPS must be configured after initial deployment if secure HTTP access is required. These default characteristics mean that access to the virtual appliance is quite open by default.

PIA access can be locked down in a number of ways. The following are examples of steps that can be taken:
• Configuring SSL and disabling HTTP access
• Changing the default PIA HTTP or HTTPS ports
• Disabling non-essential user accounts in the database to prevent unauthorized user login
• Changing default passwords for user accounts in the database
• Configuring the firewall to allow only clients within a specific sub-domain range to access the PIA host

Considering Security for Client Tools

Understanding Client Tools

PeopleSoft PeopleTools, including Application Designer (PSIDE) and PeopleSoft Change Assistant, are client tools that can run on only a Microsoft Windows machine, which can be the host OS or a remote workstation that has network access to the virtual machine. Alternatively the PeopleTools client installation can be placed on a shared (or mapped) drive that multiple users can access in read-execute mode. The installer for these Microsoft Windows-based client tools is contained within the virtual appliance and is exposed through a Samba share. See the section on Samba shares later in this documentation for more information about how to manage access to the shared folders. After the client installation has been copied from the virtual appliance it is no longer necessary to expose the VM file system to clients.

Considering Application Designer Security

Application Designer is not needed for feature demonstration or evaluation purposes; it is used for development or debugging purposes. The virtual appliance is delivered with the Workstation Listener (WSL) port disabled on the Application Server domain. The administrator can enable this port if Application Designer is needed.

See the information on Workstation Listener options in the *PeopleTools: System and Server Administration* product documentation.

Considering Change Assistant Security

Change Assistant works with the Environment Management Framework in performing PeopleSoft application updates (as well as upgrades). This function requires a variety of access at several points during the update process, including the following:

- The update process requires two-tier connection to both the source and target databases.
- In the case of PeopleSoft Update Manager updates, Change Assistant needs to connect to the virtual machine (PeopleSoft Update Image) database at the time of Change Package creation.
- When you apply a Change Package, in Initial Pass mode, you can choose to run either Source Steps Only, Target Steps Only, or both. The Source Steps Only option requires connectivity to the source database, and the Target Steps Only option requires connectivity to the target database.
  
  See *PeopleTools: Change Assistant and Update Manager*, "Applying Change Package."
- If you choose to use the Environment Management Hub for file deployment, Change Assistant must be able to connect to the Environment Management Hub that is running on the target database.
  
  See *PeopleTools: Change Assistant and Update Manager*.

Network access for Change Assistant would not be required only in the specific scenario in which both Change Assistant and the PeopleTools client tools are installed on the Microsoft Windows machine that is hosting the PeopleSoft virtual machine. In addition, the target database for the PeopleSoft Update Manager update would need to be installed on the same machine, as Change Assistant must upload information about the target from the Environment Management Hub.

In the more likely scenario in which Change Assistant is installed on a separate Microsoft Windows client machine and needs connectivity to the virtual machine's PeopleSoft database across the network, its security considerations depend upon that applied to the client machine. To a large extent this is no different from the way Change Assistant was used in previous releases with the Update Gateway. The administrator would follow organizational standards for security to ensure that Change Assistant can only access specific resources and can only be accessed by the minimal users that are required to do so.

Considering SQL*Plus Security

Oracle SQL*Plus is a client tool that allows direct access to the database tables. It can be used by a super-user to manipulate application data, and a database administrator can use it to manipulate the database itself. Obviously, this level of access should only be afforded to the most trusted users and DBAs.

The connectivity information for the PeopleSoft application database is available in the VM file system when it is started. This connectivity information is available in the form of a tnsnames.ora file that provides the service name and listening port for the database. This can be seen by any user that can access the shared folders of the VM through the Samba share. With this information it is necessary to supply the required credentials to connect to the database with SQL*Plus.
At minimum, access to the database should be disabled for user accounts that do not require direct database access. Passwords for legitimate users should be changed from the default values that are contained in the delivered virtual appliance. Most importantly the administrator must change the password for the SYSADM user immediately after VM startup. The DBA will be familiar with which parts of the PeopleSoft database tablespace must be secured including user accounts and passwords.

Network security can also be employed to turn off remote access in the database service. As noted earlier in this section, the firewall can be configured to only allow connections to the database service listener port from specific clients.

See Also


Considering Security for Samba and the VM File System

The Samba configuration allows users outside the guest OS to access the file system that is internal to the VM. Only a limited part of the file system is exposed, mostly for access to the client installation programs required for PeopleSoft application development and customization. Samba is not required for ongoing use of the virtual machine after initial setup. The client installation programs can be relocated. Unless continued access to the VM file system is required, the Samba service should be disabled. This will further prevent unauthorized users accessing the VM file system. Use this command to disable the Samba service:

```
chkconfig smb off
```

See "Deploying the PeopleSoft VirtualBox Appliances," Understanding Samba and File System Access. The security requirements at your organization may prevent you from mapping a drive on a Microsoft Windows machine to one of the Samba file system folders. If this is the case, you can copy the folder and its contents to a local directory on the Microsoft Windows machine.

Considering the VM Operating System and Secure Shell Access

Remote users (that is, users outside the host OS) can only sign on to the virtual machine using Secure Shell (SSH). All of the default users in the virtual machine must therefore have their passwords changed or invalidated immediately after initial startup.

SSH uses public-private key pairs to authenticate users and restrict access to the machine. The approaches provided in the virtual machine are the same as those used for conventional Linux systems.

See the documentation for your SSH client for more information.

Summarizing Security Considerations

This section includes samples of questions related to security considerations. Use these questions to help you decide the level of security to be applied to your virtual machine:

1. **Question:** Do you have the required hardware available to run the virtual machine?
   
   **Implication:** You may have to procure new hardware that is an exception to the current hardware in place.

2. **Question:** Does the hardware on which you will run the virtual machine require an exception to the existing organizational standards?
   
   **Implication:** You will have to work with your security and network administration team.
3. **Question:** Do you have organizational processes and standards in place for assessment or auditing of new hosts on the network?

   **Implication:** You will have to work with your security and network administration team to verify that the VM is permitted to join the corporate network.

4. **Question:** Will multiple users require access to the VM?

   **Implication:** If multiple users require access to the VM it will be necessary to apply network, host, VM and application security, as discussed earlier in this chapter.

5. **Question:** Will the VM be hosted in a LAN sub-domain that can only be accessed by the authorized domain users?

   **Implication:** If not, and if the unauthorized users have a network path to the VM, additional on-host security will need to be applied to prevent access to the VM.

6. **Question:** Will you retain the VM beyond the availability of a refresh on My Oracle Support?

   **Implication:** You must consider activities associated with ongoing maintenance of the VM such as OS and PeopleSoft application software patching, password expiration, and so on.
Chapter 4

Deploying the PeopleSoft VirtualBox Appliances

This chapter discusses:

- Importing the PeopleSoft VirtualBox Appliance
- Setting the Network Configuration for the Virtual Appliance
- Starting the PeopleSoft VirtualBox Appliance
- Setting the Authentication Domain in the Web Profile
- Using the PeopleSoft Installation
- Using Oracle SES with the PeopleSoft VirtualBox Appliance
- Compiling and Linking PeopleSoft COBOL Programs
- Resolving Problems with the PeopleSoft Runtime Environment
- Managing the Virtual Environment Lifecycle

Task 4-1: Importing the PeopleSoft VirtualBox Appliance

This section assumes that you have a running VirtualBox installation on your Microsoft Windows machine. See "Preparing to Deploy," Understanding Oracle VM VirtualBox.

You should have already downloaded and extracted the VirtualBox appliance from My Oracle Support, as described in the previous chapter, and saved the .OVA file in a directory referred to in this documentation as APPLIANCE_TEMP_DIR. The OVA is imported directly into VirtualBox at this point.

See "Preparing to Deploy," Obtaining Oracle VM VirtualBox for PeopleSoft Appliances.

Note. The OVA file names vary depending upon the PeopleSoft application, such as FSCM or PS, and other identifiers. The OVA file names in the examples in this documentation may not be the same as those you use.

To import the virtual appliance into VirtualBox:
1. Start VirtualBox.

The Oracle VM VirtualBox Manager appears. This example shows the Welcome page. If you start Oracle VM VirtualBox Manager with a previously-imported appliance, you see a page showing that appliance.
2. Select File, Import Appliance, as shown in this example.
3. Click Open Appliance and browse to `APPLIANCE_TEMP_DIR`. Select the OVA installation file and click Next. The appliance in this example is HCMDB-SES-854-01.ova.

Appliance to Import window
4. Review the configuration details for the virtual appliance.

The details for your appliance will be different from those shown in this example. The configuration details listed include appliance name, version, and the location of the Virtual Disk Images. To change the Virtual Disk Image location to a preferred file system location, double-click the entry. This may be necessary if the file system onto which you will place the disk images does not have sufficient free space.

Note. It is recommended that you do not decrease the values for CPU and RAM. The virtual appliance requires these minimum resources in order to run effectively and efficiently. If the host OS on which the virtual machine will run does not have adequate resources to direct to the virtual machine you will experience problems when using the virtual machine.

5. Select the option Reinitialize the MAC address of all network cards.
Important! This option is required for proper operation of the virtual network interface on the network, whether local or external.
6. Click Import.
   The import process takes a few minutes, as shown in this example of a progress indicator.

   ![Importing Appliance progress indicator](image)

   When the import is complete the imported appliance is shown with the status Powered Off. The steps in the next section begin with this window.

   ![Oracle VM VirtualBox Manager window after importing the PeopleSoft appliance](image)

7. Perform disk maintenance.
   To address possible performance issues caused by fragmentation occurring when writing the large virtual machine disk files, consider defragmenting the host operating system's hard drive at this point. Depending on the condition of the drive, this may take from a few minutes to a few hours.
Task 4-2: Setting the Network Configuration for the Virtual Appliance

This section discusses:

- Understanding Network Configuration Settings
- Setting a Host-Only Network Configuration
- Using Alternative Network Configurations

Understanding Network Configuration Settings

This section includes procedures for setting the network configuration for the VM. This section assumes that:

- You have imported the virtual appliance as described in the section Importing the PeopleSoft VirtualBox Appliance.
- You have fulfilled the host machine requirements discussed in the "Prerequisites" chapter.
- The virtual machine will be used in a machine-bound deployment.

This means that the virtual machine will only be used for single user or demonstration purposes and will be accessed only by users logged on to the host OS.

Oracle strongly recommends that the IP address of the host and the IP address of the guest be within the same subnet. Otherwise, customers will need to have their own networking experts verify that everything is set up properly, such that all virtual machines can see other machines as needed. Oracle Support will not assist customers directly with the actual network configuration of machines on different subnets.

Task 4-2-1: Setting a Host-Only Network Configuration

These instructions apply to the default host-only configuration. See the following sections for other configurations.

See Using Alternative Network Configurations.

This section assumes:

- The virtual machine does not need access to networked resources outside the host.
- Everything required of the runtime environment is contained within the virtual appliance.

To set the network configuration:

1. In the Oracle VM VirtualBox Manager, highlight the virtual appliance and click Settings in the menu bar.
2. On the Settings window, select Network in the left-hand frame.
3. Select *Host-only Adapter* from the Attached to drop-down list, as shown in this example.

![Settings window: Network page with Host-only Adapter selected](image)

**Note.** Setting the adapter to being Host-only means that the virtual machine will be unable to access the network outside the host on which it will run. The IP and hostname of the virtual machine will be known only within the host and virtual machine OS. During the time that the virtual machine is connected to the Host-only network consider performing any security configuration you need.

**Task 4-2-2: Using Alternative Network Configurations**

This section discusses:

- Understanding Alternative Network Configurations
- Allowing Your VM to Access the External Network
- Accessing VirtualBox and Your VM from Another Host
- Resetting the Network Stack of Your Virtual Appliance
- Using the Virtual Machine with VPN
- Using the Virtual Machine Hostname from the Host OS
Understanding Alternative Network Configurations

Oracle VM VirtualBox provides a rich set of network configuration options for your virtual machines (VMs). This will allow the virtual machine to function within your network in the same way as any other physical or virtual host. This topic is described in detail in the Oracle VM VirtualBox User Manual. Topics such as bridging, virtual LANs, dynamic and static IP address assignment are not described in this document. These concepts correlate to general network administrator activities and therefore are not discussed here.

Some of the scenarios with which you may wish to extend your virtual appliance are described here.

Allowing Your VM to Access the External Network

This is possible if your virtual machine has a network configuration that allows it to participate in the wider network. The default instructions in the previous section, Setting a Host-Only Network Configuration, permit the virtual machine to only run within the host machine. In order for the VM to operate in the wider network it is necessary to use one of the other network configuration options offered by VirtualBox. The most common choice is to use a bridged network adapter.

To use a bridged adapter rather than a host-only adapter, access the Network page in the Settings dialog box, as described in Setting a Host-Only Network Configuration, and select Bridged Adapter from the Attached to drop-down list, as shown in this example.

![Settings window: Network page with Bridged Adapter selected](image-url)
After you choose the Bridged Adapter option, you will select the correct adapter with which to connect to the
network. On a single user system such as a laptop this will typically correspond to the wireless network card. If
multiple adapters are listed you should consult the Microsoft Windows Control Panel to identify which network
adapter to use.

**Accessing VirtualBox and Your VM from Another Host**

VirtualBox is not intended for use as a server product, or for multi-user access. However, it is in fact possible to
access the virtual machine from outside the host on which it runs. In such a case the network configuration of the
virtual machine will need to be initialized with settings that are understood by the network in which it will run.
The virtual machine will be subject to any rules imposed upon conventional hosts residing on the network. This
means that a valid hostname, and IP address if using static IP, will be required.

To allow multiple users to access the VM, you must change the network adapter from Host-Only to Bridged
Adapter. The procedure that you follow depends upon where you are in the deployment process.

If you have just imported the VirtualBox appliance, carry out these steps:

1. In the Oracle VM Virtual Box Manager, highlight the virtual appliance and click Settings in the menu bar.
2. On the Settings window, select Network in the left-hand frame.
   The Network page includes four tabs in the right-hand frame, one for each of the network adapters.
3. On the Adapter 1 tab, select **Bridged Adapter** in the Attached to drop-down list.
4. Verify that the Name drop-down list is populated with the correct network adapter.
   This will typically be the wireless or wired network adapter that is on the host computer. This can be found,
   for example, by examining the network configuration in the Microsoft Windows Control Panel.
5. Click OK and start the VM.
   See Starting the PeopleSoft VirtualBox Appliance.

If you have already started the VM with the setting Host-Only Adapter, carry out these steps:

See Starting the PeopleSoft VirtualBox Appliance.

1. Open the VM console window and select the following command to stop the VM:
   ```
   Machine, ACPI Shutdown
   ```
2. In the Oracle VM Virtual Box Manager, highlight the virtual appliance and click Settings in the menu bar.
3. On the Settings window, select Network in the left-hand frame.
   The Network page includes four tabs in the right-hand frame, one for each of the network adapters.
4. On the Adapter 1 tab, select **Bridged Adapter** in the Attached to drop-down list.
5. Verify that the Name drop-down list is populated with the correct network adapter.
   This will typically be the wireless or wired network adapter that is on the host computer. This can be found,
   for example, by examining the network configuration in Microsoft Windows Control Panel.
6. Click OK and start the VM.
   See Starting the PeopleSoft VirtualBox Appliance.
7. Update the hosts file on the host Microsoft Windows machine to reflect the new IP address of the VM.
   See Using the Virtual Appliance Hostname from the Host OS.
Resetting the Network Stack of Your Virtual Appliance

If you made errors while initializing your virtual appliance and wish to reset it to the pre-initialization state, use the technique described in the section Resetting PeopleSoft Virtual Appliances. It is also applicable if you simply want to change the way that your virtual appliance works on the network.

See Resetting PeopleSoft Virtual Appliances.

Using the Virtual Machine with VPN

Your virtual machine may not work as expected if your host OS is connected to a private network using a Virtual Private Network (VPN). In particular, Application Designer, PuTTY or browser connections to PIA may fail. This is because communication to and from the virtual machine takes place through the VirtualBox Network Adapter. When a VPN connection is active, the host OS will route all network communication through the VPN network adapter. The reason that communications to and from the virtual machine will not work is that the VPN adapter does not recognize the private network that VirtualBox is using. Therefore communications from the browser, Application Designer and so forth, get stopped at the VPN adapter and do not get propagated to the virtual machine.

If you want to use VPN, you can investigate the following configurations. Set up the VPN on the host OS, and use NAT for the network adapter for the virtual machine. Alternatively, if you choose to set up the virtual machine with a bridged adapter, you need to locate a VPN client that is compatible with the Oracle Linux 5.8 server.

For more information on working with VPN, consult the VirtualBox documentation.


Using the Virtual Machine Hostname from the Host OS

If the hostname of your virtual machine is not known to the network on which your host OS is running, you will not be able to use it to access the virtual machine. Client connections such as those made by the browser to PIA will not be able to resolve the hostname.

To overcome this issue it is necessary to update the hosts file on the host OS. This file will be located in %SystemRoot%\System32\drivers\etc. The %SystemRoot% value by default maps to C:\Windows. The hosts file must be updated to contain a mapping from the virtual machine IP address to the hostname that it has been assigned. This will allow the network adapter on the host OS to route any network traffic directly to the virtual appliance.

Add an entry such as the following in order to use the virtual machine hostname rather than the IP address to establish connections:

192.168.1.103 hostname.example.com

Task 4-3: Starting the PeopleSoft VirtualBox Appliance

This section describes the initial startup of the virtual machine. This section assumes that you have imported the PeopleSoft VirtualBox appliance as described in the previous section. This section also assumes that you have chosen to use host-only networking.

As you use Oracle VM VirtualBox Manager, you may see messages concerning keyboard and mouse control. See the VirtualBox documentation for details about these messages.

See Oracle VM VirtualBox User Manual, "First Steps."
Note. If you plan to use a static IP address, you will need to provide a valid IP address, as well as addresses for
the Domain Name System (DNS) server, gateway, and netmask in this procedure. A static setup works best with
the Bridged Adapter network configuration. If you enter the values for a static networking setup in this procedure,
but you have chosen to use host-only networking when importing the virtual appliance, the system will not be
able to contact the DNS and validate the hostname.

See the information in Setting the Network Configuration for the Virtual Appliance to configure the Bridged
Adapter before beginning this procedure.

To start the virtual machine:
1. Open Oracle VM VirtualBox Manager, highlight your virtual appliance, and click Start (green arrow).
   This example shows the newly-imported appliance, HCMDB-SES-854-01, which is powered off.

   ![Oracle VM VirtualBox Manager window with imported PeopleSoft appliance](image)

   A command window appears displaying system initialization messages for the virtual machine, similar to those shown below:

   **Note.** A portion of the messages has been omitted for the sake of brevity.

   ```
   Starting crond: [ OK ]
   Starting SMB services: [ OK ]
   .
   .
   Starting sshd: [ OK ]
   ```

2. Specify a password for the root user at the following prompt.
   The password is not visible as you type. Take note of the value that you provide as it is essential for performing administrative operations on the virtual machine.

   Changing password for user root.
   New UNIX password:
Retype new UNIX password:

passwd: all authentication tokens updated successfully.

3. Choose whether to use dynamic IP configuration for this virtual machine at the following prompt.

Configuring network interface.
Network device: eth0
Hardware address: 00:11:22:33:AA:BB

Do you want to enable dynamic IP configuration (DHCP) (Y|n)? Y

These instructions assume that you are using Host-only networking, as discussed earlier in this document, and therefore you enter Y (yes). This will result in a dynamic IP address being assigned by the VirtualBox network adapter (this configuration is referred to as Dynamic Host Configuration Protocol, or DHCP).

4. (Optional) If you wish to assign a static IP address, enter n (no) to the prompt in the preceding step.

You must provide a valid IP address to ensure that the virtual host can join the network. You will also need the DNS server IP address, gateway, and netmask. If you do not satisfy these criteria, you see the following prompt:

The DNS server entered is not reachable. This is due to either the Virtual Machine's network is attached to a Host-only Adapter (applies to VM's running on VirtualBox) or some other network issue. It is not recommended to continue the installation with static IP configuration without basic network functionality. Some of components will not initialize properly.

Do you want to stop the initialization process to correct this condition? [Y|n]:

If you enter Y (yes), the system shows the following message, and shuts down.

Please refer to the Install document for further instructions regarding Network Adapter Configuration.

The Virtual Machine will be shutdown now.

If you enter n (no), the initialization continues.

Use the following information in understanding this prompt:

- If the entered static IP address and the DNS server IP address are valid, the DNS is reachable, and you selected Bridged Adapter when importing the virtual appliance, the system displays the DNS host name and prompts for confirmation.
- If the entered static IP address and the DNS server IP address are valid, but you selected the Host-only networking option when importing the virtual appliance, the system cannot reach the DNS to deduce the hostname and prompts the user to enter the hostname manually. This can be problematic. Rather than entering the hostname manually in the next step, shut down the virtual machine and start again at the beginning of this procedure.
- If either the static IP address or the DNS server IP address is invalid, the system cannot deduce the hostname and prompts the user to enter the hostname manually. This can be problematic. Rather than entering the hostname manually in the next step, shut down the virtual machine and start again at the beginning of this procedure.

5. Choose a hostname.

Use the following considerations in specifying the hostname:
• If you want the virtual machine to access an external network, you must use a legitimate hostname and fully qualified domain name for that network. See Using Alternative Network Configurations.

• If you do not need to access an external network, you can manually configure the hostname. In this case, specify a hostname that is comprised of any alphanumeric name of your choosing, plus a fully qualified domain name; that is, `<hostname>..<domainname>`. For example, hcm.example.com. This should not be a hostname that is currently in use on your network.

• If you do not enter a hostname, the default hostname localhost.<domainname> will be assigned.

6. Specify the hostname.

• If you chose to enable dynamic IP configuration (DHCP) in the earlier step, you see the following prompt:

```
Shutting down interface eth0: [ OK ]
Shutting down loopback interface: [ OK ]

Configuring network settings.
IP configuration: DHCP

Bringing up loopback interface: [ OK ]
Bringing up interface eth0: [ OK ]
Determining IP information for eth0... done.
```

Do you want to manually configure the hostname (y|N)? y

Enter hostname (e.g. host.domain.com): hostname.example.com

Network configuration changed successfully.
IP configuration: DHCP
IP address: 192.168.1.103
Netmask: 255.255.255.0
Gateway:
DNS Server:
Hostname: hostname.example.com

• (Optional) If you chose not to enable dynamic IP configuration (that is, you are using a static IP address), you see this prompt:

```
Shutting down interface eth0: [ OK ]
Shutting down loopback interface: [ OK ]

Configuring network settings.
IP configuration: Static IP address

Brining up loopback interface: [ OK ]
Bringing up interface eth0: [ OK ]
```

Enter hostname (e.g. host.domain.com): static_hostname.example.com

Network configuration changed successfully.
IP configuration: Static IP address
IP address: 192.168.1.103
Netmask: 255.255.255.0
Gateway: 10.147.68.1
DNS Server: 192.168.190.70
Hostname: static_hostname.example.com

7. If you want to change any of the values you supplied for the IP configuration and hostname in the previous steps, enter \text{n} (no) to the following prompt:

\text{Are you happy with your answers? [Y/n]: n}

The system repeats the prompts in the previous steps, beginning with \text{Configuring network interface}.

8. If you are satisfied with the values you supplied for the IP configuration and hostname in the previous steps, enter \text{y} when asked if you are happy with your answers, and continue with the next step.

9. If you want to change the database name, enter the new name at the following prompt:

\text{Enter the name of the database. Please ensure that the database name starts with a letter and includes only alphanumeric characters and is no more than 8 characters in length [default-dbname]?:}

The prompt displays the name of the database provided with the virtual appliance for \text{default-dbname}; for example, HCM92. If you do not want to change the database name, press \text{ENTER}, and the system uses the default name to set up the database.

If you enter a database name that does not fulfill the stated requirements, the system repeats the prompt until you supply a correct name.

10. Enter the Connect ID name and password at the following prompt:

\text{Enter the name of PeopleSoft Connect ID [people]:}
\text{Enter the PeopleSoft Connect ID password:}
\text{Re-Enter the PeopleSoft Connect ID password:}

The connect ID user name must be no greater than 8 characters. The connect ID password must be between 6-8 characters. If you enter values that do not match these criteria, the system prompts you to enter the correct values. If you are using this VM to apply PeopleSoft Update Manager-enabled maintenance, the connect ID and password must match the values on your target database.

\text{Note. If you do not see this prompt, the default value for the connect ID user is people, and that for the connect ID password is peop1e (with the letter "l" replaced by the number one "1").}

11. Review the status of the setup steps.

The system displays messages indicating the steps in the setup process. The success or failure of the step is indicated by [OK] or [FAILURE]. See the log file mentioned at the end of this section for information on failed steps. This example shows portions of the configuration messages:

- The creation of the database.

\text{Setting up PeopleSoft Database default-dbname on this VM}

- The creation and startup of the PeopleSoft Application Server and Process Scheduler domains.

\text{Setting up PeopleSoft Application Server on this VM}
\text{Setting up Decoupled Application Home: [ OK ]}
\text{Setting up Decoupled Cust Home: [ OK ]}
\text{Setting up Oracle TNS Names Entry: [ OK ]}
\text{Creating PeopleSoft Application Domain APPDOM: [ OK ]}
Starting PeopleSoft Process Scheduler Domain PRCSDOM: [ OK ]

- The installation and startup of PeopleSoft Pure Internet Architecture (PIA)
  Setting Up PeopleSoft Pure Internet Architecture on this VM

Starting PIA Domain peoplesoft: [ OK ]

- The configuration of PeopleBooks Help URL, Process Scheduler report nodes and Integration Broker:
  Configuring PeopleBooks Help URL: [ OK ]
  Configuring Process Scheduler Report Node: [ OK ]

Starting PeopleSoft Process Scheduler Domain PRCSDOM: [ OK ]

12. Answer y at the following prompt if you want to set up Oracle Secure Enterprise Search for the PeopleSoft Search Framework.

If you do not want to set up Oracle Secure Enterprise Search, enter n and the process continues at the next step.

Note: SES is not required for VirtualBox appliances (OVAs) used as PUM⇒ sources. SES consumes a significant amount of resources at the OS⇒ level and is only recommended for OVAs used as demo environments.

Do you wish to setup Secure Search Enterprise (SES) on this VM? [y|N]: y

Setting up Secure Enterprise Search (SES) on this VM

Configuring SES: [ OK ]

13. When you see a message indicating the completion of the initialization, the PeopleSoft runtime environment is available for use. For example:

The setup of the PeopleSoft Virtual Environment is completed. Please⇒ review the activity output in /var/log/oraclevm-template.log.

Review the /var/log/oraclevm-template.log file for information on the initialization process.
14. To confirm external shell access to the virtual machine, log in to the virtual machine from your host OS using Secure Shell (SSH) with a telnet client.

PuTTY is the SSH client used in the example below. In order to connect with SSH you will need the IP address of the virtual machine. The IP address can be identified using the Linux command `ifconfig`.

After the SSH client connects to the host, before you can access the virtual machine, you will need to supply the root user and the password that you provided earlier in this procedure.

**Note.** You can also log in to the VM on the console using one of the default accounts described in the task Using the PeopleSoft Installation.

This example shows the results of the Linux `ifconfig` command in the console and the PuTTY client dialog box:

![Connecting to the virtual appliance with PuTTY Client](image)

Establishing a connection to the virtual machine verifies its accessibility from the host OS. You may continue to verify that the individual logical tiers within the PeopleSoft environment are available by using utilities such as PeopleSoft PeopleTools PSADMIN and SQL*Plus. Before performing any administrative activities consult the section Reviewing the File System.

See the next section for instructions on signing in to the PeopleSoft application.

See Setting the Authentication Domain in the WebProfile.
See Also

Managing the Virtual Environment Lifecycle

**Task 4-4: Setting the Authentication Domain in the Web Profile**

In one of the steps in the previous section Starting the PeopleSoft VirtualBox Appliance, you chose whether to configure the virtual machine with dynamic IP configuration (DHCP) or a static IP address.

If you configured the virtual machine using the static networking option, the authentication domain is configured automatically, and you can skip this section. To access the sign-in window when you have configured the virtual machine with the static networking option, use the URL `http://hostname.example.com:8000/ps/signon.html`.

If you configured the virtual machine to use DHCP, use one of these options to sign in to the PeopleSoft application from a browser on the host OS:

- If you want to use a host name rather than an IP address in the URL that you use to access the PeopleSoft application, you must carry out the procedure in this section to set the authentication domain for PIA manually.

  See the information on setting up the PeopleSoft Pure Internet Architecture in the PeopleTools installation guide for Oracle.

In all cases, after accessing the PeopleSoft application sign-in window, enter the appropriate user name and password for the PeopleSoft application (for example, VP1/VP1, PS/PS, or PTDMO/PTDMO).

The user IDs and passwords used to sign in to the PeopleSoft application, VP1/VP1 and so on, are delivered with the virtual appliance.

For information on modifying the user ID passwords, see the information on working with passwords in the *PeopleTools: Security Administration* product documentation.

To set the authentication domain:

1. Sign in to the PeopleSoft application in a browser using the virtual machine IP address:
   

2. Select PeopleTools, Web Profile, Web Profile Configuration.
3. Click Search, and select **PROD** from the results list.
4. On the General tab, enter the authentication domain for your host.
   
   For example, if your virtual machine host name is hostname.example.com, enter `.example.com` in the Authentication Domain field.

5. Click Save and sign out.

6. On the Microsoft Windows machine hosting the virtual machine, open the `C:\Windows\System32\drivers\etc\hosts` file for editing.

7. On a new line enter the virtual machine IP address and the full host name with the authentication domain; for example:
   
   `192.168.1.103 hostname.example.com`

8. Save the file.
9. Shut down and restart the VM.
10. To sign in to the PeopleSoft application, use this URL:
   
   http://hostname.example.com:8000/ps/signon.html

11. On the sign-in window, enter the appropriate user name and password for the PeopleSoft application (for example, VP1/VP1, PS/PS, or PTDMO/PTDMO).

**Task 4-5: Using the PeopleSoft Installation**

This section discusses:

- Reviewing the PeopleSoft Environment
- Understanding Samba and File System Access
- Reviewing the File System and Users
- Accessing the Shared Drive Folders on the Virtual Appliance File System
- Planning the Client Tools Installation
- Installing and Starting Oracle Database Client Tools
- Installing the PeopleTools Client Tools and Using Application Designer
- Installing PeopleSoft Change Assistant
- Managing PeopleTools Domains with PSADMIN
- Changing the Access for PI_HOME

**Reviewing the PeopleSoft Environment**

After you complete the initialization of the virtual machine the PeopleSoft installation will be available. This section includes brief information to help you work with the PeopleSoft environment. For detailed definitions, and information on working with the components in a PeopleSoft installation, see the PeopleSoft documentation referenced earlier.

The specific components that comprise your environment, such as the database platform that your target database runs on, and the release/patch level of your database client, will impact the way you set up your installation. Remember to review PeopleTools: Change Assistant and Update Manager for information on configuring the PeopleSoft installation when carrying out a PeopleSoft application update before you carry out the procedures in this chapter.

See "About this Documentation," Related Information.

**Understanding Samba and File System Access**

The file system location in the virtual machine is made available using Samba. This makes files residing in the Oracle Linux OS on the virtual machine accessible on just the host Microsoft Windows machine when the network configuration is host-only, and both the host and your network when the network configuration is bridged.

*Note.* Samba is Open Source software under the GNU General Public licence that allows for interoperability between Linux/UNIX servers and Microsoft Windows-based clients.
By default Samba is set up to make some of the installation directories under the `/opt/oracle/psft/pt/` directory of the virtual machine available to the host as shared drives. The repository directory for Change Assistant is also made available. You can map to these shared drives from the host machine or other Microsoft Windows machines. A later section describes how to access the shared drives and map to them.

See Accessing the Shared Drive Folders on the Virtual Appliance File System.

The following table describes the local Oracle Linux directories on the virtual machine, and the shared drive folders that are made available:

<table>
<thead>
<tr>
<th>Local Oracle Linux Directory</th>
<th>Shared Drive Folder</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>/opt/oracle/psft/pt/tools-client/client-854</code></td>
<td>client-854</td>
<td>Client tools for PeopleSoft PeopleTools 8.54</td>
</tr>
<tr>
<td><code>/opt/oracle/psft/pt/oracle-client</code></td>
<td>oracle-12c-client-64bit</td>
<td>64-bit Oracle RDBMS client for Microsoft Windows (installation file) <strong>Note.</strong> The Oracle RDBMS client installation executable in this table refers to the 64-bit client that is required on Microsoft Windows operating systems for connectivity to the PeopleTools Client features. The 64-bit client is required for connectivity to PeopleTools 8.54. When configuring the Microsoft Windows client environment for applying updates with the PeopleSoft Update Manager, use the tnsnames.ora file in this directory for connectivity to the PI database.</td>
</tr>
<tr>
<td><code>/opt/oracle/psft/ptdb/oracle-client/windows</code></td>
<td>oracle-12c-client-32bit</td>
<td>32-bit Oracle RDBMS client for Microsoft Windows (installation file) <strong>Note.</strong> The Oracle RDBMS client installation executable in this table refers to the 32-bit client that is required on Microsoft Windows operating systems for connectivity to the PeopleTools Client features. The 32-bit client is required for connectivity to PeopleTools 8.53. The 32-bit database client is required only when the target database is on PeopleTools 8.53.</td>
</tr>
<tr>
<td><code>/opt/oracle/psft/ptdb/pi_home</code></td>
<td>pi_home</td>
<td>Change Assistant file repository</td>
</tr>
</tbody>
</table>
See *PeopleTools: Change Assistant and Update Manager*, "Configuring the Microsoft Windows Client Running Change Assistant" for more information on selecting the appropriate client installations for your environment.

As delivered, the Samba shared drive folders are configured as read only, which is sufficient for installing software to the Microsoft Windows client machine. This is sufficient for accessing installation programs such as the PeopleTools Client installation setup. You may modify the Samba configuration file in `/etc/samba/smb.conf` to change which content is accessed from outside the guest OS. See the samba man page in the virtual machine and the web site [www.samba.org](http://www.samba.org) for more information about configuration options for Samba.

### Reviewing the File System and Users

The PeopleSoft installation deployed by the PeopleSoft VirtualBox appliance sets up an environment comprised of several directories. This table lists the directories with the location, contents of the directory, and the owner:

<table>
<thead>
<tr>
<th>Directory</th>
<th>Location and Contents</th>
<th>Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS_HOME</td>
<td>The binary installation files are placed into a secure PS_HOME directory at <code>/opt/oracle/psft/pt/tools</code>.</td>
<td>This directory can only be written to by the PeopleSoft administrator, psadm1.</td>
</tr>
<tr>
<td>PS_CFG_HOME</td>
<td>The Application Server and Process Scheduler server configuration files are placed into PS_CFG_HOME. The PS_CFG_HOME path is <code>/home/psadm2/psft/pt/&lt;peopletools_version&gt;</code>.</td>
<td>This directory is owned by psadm2.</td>
</tr>
<tr>
<td>PS_APP_HOME</td>
<td>The application installation files are placed into a mounted directory at <code>/opt/oracle/psft/pt/apptools</code>.</td>
<td>This directory can only be written to by psadm3.</td>
</tr>
<tr>
<td>PS_CUST_HOME</td>
<td>The directory is created at <code>/opt/oracle/psft/ptdb/custhome</code>.</td>
<td>This directory is owned by psadm2.</td>
</tr>
<tr>
<td></td>
<td>For information on using PS_CUST_HOME, see the information on working with PS_CUST_HOME in the <em>PeopleTools: System and Server Administration</em> product documentation.</td>
<td></td>
</tr>
<tr>
<td>PI_HOME</td>
<td>This is the file repository that Change Assistant uses when you define a Change Package in PeopleSoft Update Manager. The location is <code>/opt/oracle/psft/ptdb/pi_home</code>.</td>
<td>This directory requires read access for Change Packages, and read and write access to apply PeopleSoft Release Patchsets (PRPs).</td>
</tr>
<tr>
<td></td>
<td><strong>Note.</strong> The directory contents will be accessed by Change Assistant. Manual changes are not recommended.</td>
<td>To apply PeopleSoft Release Patchsets (PRPs), use the instructions in the section Changing the Access for PI_HOME to change the access to read/write and disable guest login.</td>
</tr>
<tr>
<td>Directory</td>
<td>Location and Contents</td>
<td>Access</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------------------</td>
<td>--------</td>
</tr>
<tr>
<td>ORACLE_HOME (Oracle RDBMS software)</td>
<td>The Oracle RDBMS database server and client connectivity software, including the SQL*Plus program, is located in /u01/app/oracle/product/11.2.0.x/db_1. The Oracle RDBMS client installation for Linux is the 64-bit client used by PeopleSoft PeopleTools to connect from the PeopleSoft Application Server and Process Scheduler domains to the PeopleTools Database. <strong>Note.</strong> The database listener for the RDBMS hosting the PeopleSoft PeopleTools tables is 1522.</td>
<td>This directory is owned by user oracle.</td>
</tr>
<tr>
<td>ORACLE_HOME (SES)</td>
<td>This refers to the directory where the Database component (RDBMS server software) specific to Oracle SES software is installed. The default ORACLE_HOME directory is: /opt/oracle/psft/ses/db/product/11.2.0/se_sdb_1 <strong>Note.</strong> The database listener for the RDBMS hosting the SES tables is 1521.</td>
<td>This directory is owned by user sesadmin.</td>
</tr>
<tr>
<td>MW_HOME</td>
<td>This refers to the middleware home directory, where the middle tier components of Oracle SES software (that is, Oracle WebLogic Server, Oracle SES server, Oracle Fusion Middleware common files) are installed: /opt/oracle/psft/ses/midtier</td>
<td>This directory is owned by user sesadmin.</td>
</tr>
<tr>
<td>WLS_HOME</td>
<td>The SES ORACLE_HOME encapsulates its own installation of Oracle WebLogic. This is different from the version of Oracle WebLogic that is used by PeopleSoft PeopleTools. This refers to the directory where the Oracle WebLogic Server is installed. The default WLS_HOME directory is: /opt/oracle/psft/ses/midtier/wlserver.</td>
<td>This directory is owned by user sesadmin.</td>
</tr>
<tr>
<td>Directory</td>
<td>Location and Contents</td>
<td>Access</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>SES_DOMAIN_HOME</td>
<td>This refers to the directory where multiple instances of a WebLogic Server middle tier are created. The default SES_DOMAIN_HOME directory is: /opt/oracle/psft/ptdb/oradata/&lt;SID&gt;, where &lt;SID&gt; is the database name.</td>
<td>This directory is owned by user sesadmin.</td>
</tr>
<tr>
<td>SES_HOME</td>
<td>This refers to the directory where the Oracle SES server is installed. The SES_HOME directory is created under the MW_HOME directory. When Oracle SES 11.2.2.2 software is installed along with the WebLogic Server middle tier, the SES_HOME directory is: /opt/oracle/psft/ptdb/oradata/&lt;SID&gt;</td>
<td>This directory is owned by user sesadmin.</td>
</tr>
<tr>
<td>PeopleSoft database files (on Oracle RDBMS)</td>
<td>The database files and tables for the PeopleSoft application are located in the directory /opt/oracle/psft/ptdb/oradata/&lt;SID&gt;, where &lt;SID&gt; is the database name.</td>
<td>The owner of the database tables is oracle and its group is oinstall. Note. This is different from the users for the PeopleSoft installation and configuration.</td>
</tr>
<tr>
<td>Other directories</td>
<td>The rest of the environment, outside PS_HOME and PS_CFG_HOME. The file system ownership and permissions are similar to typical Oracle Linux installations.</td>
<td>These directories are owned by root.</td>
</tr>
</tbody>
</table>

The deployed configuration includes the default users and default passwords described in the following table.

**Important!** All default, non-root passwords are set to expire immediately. On the first login of one of the non-root users, the system will prompt you to provide new passwords. This applies to the passwords in the following table except SYSADM and root.

In the case of the passwords that expire immediately, such as those for psadm1 and so on, if you do not log in as the user specified in this table and change the password, the default password documented here remains in effect. For more information, see "Planning Security Administration," Considering User Security.

New passwords must include the following characteristics:

- At least 14 characters long
- At least one digit (0–9)
- At least one special character (for example, * or #)
- At least one lowercase letter (a–z)
- At least one uppercase letter (A–Z)
### User Name Default Password Role Definition

<table>
<thead>
<tr>
<th>User Name</th>
<th>Default Password</th>
<th>Role Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>psadm1</td>
<td>oradmin (the first character is the number zero)</td>
<td>The PeopleSoft installation administrator who owns PS_HOME. This user cannot write into PS_CFG_HOME.</td>
</tr>
<tr>
<td>psadm2</td>
<td>oradmin (the first character is the number zero)</td>
<td>The PeopleTools domain user who creates and configures the Application Server domain, Process Scheduler (batch server) domain, and the PIA. This user cannot write to PS_HOME, but has read-execute access.</td>
</tr>
<tr>
<td>psadm3</td>
<td>oradmin (the first character is the number zero)</td>
<td>The PeopleSoft installation administrator who owns PS_APP_HOME.</td>
</tr>
<tr>
<td>sesadmin</td>
<td>oradmin (the first character is the number zero)</td>
<td>The SES administrator user. This is the user who owns the SES directories.</td>
</tr>
<tr>
<td>searchsys</td>
<td>sesPassword1</td>
<td>The user name to log into the SES administration user interface.</td>
</tr>
<tr>
<td>SYSADM</td>
<td>SYSADM</td>
<td>The Oracle access ID and password. Use this to log in to the database in 2-tier mode.</td>
</tr>
<tr>
<td>oracle</td>
<td>oracle</td>
<td>The Oracle Database Server user name.</td>
</tr>
<tr>
<td>system</td>
<td>Passw0rd</td>
<td>The user name to log into the Oracle WebLogic console.</td>
</tr>
<tr>
<td>root</td>
<td></td>
<td>The root user for the virtual machine.</td>
</tr>
</tbody>
</table>

### See Also

*PeopleTools: System and Server Administration*, "Securing PS_HOME and PS_CFG_HOME"

*PeopleTools Installation for Oracle*, "Configuring Integration Between PeopleSoft PeopleTools and Oracle SES"

### Task 4-5-1: Accessing the Shared Drive Folders on the Virtual Appliance File System

Use these instructions to access the shared drive folders in the file system made available on the virtual machine. See Understanding Samba and File System Access.
From Windows Explorer access the virtual appliance file system from your Microsoft Windows host by selecting Start, Run, and entering the Microsoft Windows UNC path containing your virtual machine IP address, as shown in this example:

![Microsoft Windows Run dialog box with IP address](image)

This is the IP address used for your virtual machine in the section Starting the PeopleSoft VirtualBox Appliance. Windows Explorer opens a window displaying a file system location within the virtual machine with several share drives. Use the IP address used for your virtual machine to map to one of the shared drive folders. Use the format `\\<VM_IP_address>\<folder_name>;` for example, `\\192.168.1.103\client`. 
The following example shows the client-853, client-854, oracle-12c-client-32bit, oracle-12c-client-64bit, and pi_home share drives in a Windows Explorer window.

On Microsoft Windows 7 (64–bit) operating systems there are certain network security policy settings that may prevent you from accessing the Samba shared drives. If you find that you can see the shared drives in Windows Explorer but cannot access any of the files contained within them the following procedure describes a workaround which may be used to gain access. You should check with your network administrator before attempting to implement this workaround. An alternative to this workaround would be to use SFTP to copy the shared folder contents to local folders on your machine.

1. Select Start, Run, and enter regedit.exe to open the Microsoft Windows registry.
2. Locate this folder:
   
   HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\services\LanmanWorkstation\Parameters

3. For the subkey RequireSecuritySignature, change the value from 1 to 0.
4. Reboot the machine.

**Task 4-5-2: Planning the Client Tools Installation**

When setting up the Microsoft Windows client for applying updates, there are several possible configuration scenarios, which are dependant upon the PeopleTools release (8.53 or 8.54) and database platform (Oracle or non-Oracle) for the target environment. These scenarios and the recommended installation procedures are described in detail in the *PeopleTools: Change Assistant and Update Manager* product documentation.

See *PeopleTools: Change Assistant and Update Manager*, "Configuring the Microsoft Windows Client Running Change Assistant."

In general, you should follow this sequence to install the tools from the PI shared drives:

1. 32-bit database client (if not already installed)
2. 64-bit Oracle database client
3. PeopleTools 8.54 client tools
4. PeopleTools 8.53 client tools (if required)

**Task 4-5-3: Installing and Starting Oracle Database Client Tools**

The PeopleSoft installation deployed by the Oracle VM VirtualBox virtual appliance includes installation executables for Oracle Database Clients for Microsoft Windows. You can install the Oracle Database Client on the Microsoft Windows machine hosting your virtual appliance or another Microsoft Windows machine. The Oracle Database Client that you install is dependant upon the target environment that you are updating. Use the 32-bit Oracle Database Client for connectivity to PeopleTools 8.53, and the 64-bit Oracle Database Client for connectivity to PeopleTools 8.54. See the documentation for the PeopleSoft Update Manager for details on selecting the appropriate Oracle Database Client for your environment.

You can find the release/patch level for the Oracle Database Client on your PI home page. The link for your PI home page can be found on PeopleSoft Update Manager Home Page, My Oracle Support, Document 1641843.2.

For more information on installing the Oracle Database Client for use with the PeopleSoft Update Manager, see *PeopleTools: Change Assistant and Update Manager*, "Setting Up the Target, Source, and Client Environments."

To install the Oracle Database Client tools on a Microsoft Windows machine:

1. Access the virtual appliance file system from your Microsoft Windows host as described in the section Accessing the Shared Drive Folders on the Virtual Appliance File System.
2. Locate the shared drive folder for the client that you want to install:
   - For the 64-bit Oracle Database Client, locate oracle-12c-client-64bit.
   - For the 32-bit Oracle Database Client, locate oracle-12c-client-32bit.
3. Copy the Oracle Database Client installation program to a directory, referred to here as TEMP_DIR, and extract the contents.
   This will extract the installation program for the Oracle Database client.
4. Review the instructions for Install the Oracle Database Client Software in the installation documentation that accompanies the installation program.
   Access a link to the documentation by opening TEMP_DIR\client\welcome.html.
5. Start the installation program TEMP_DIR\client\setup.exe and follow the onscreen instructions to install the Oracle Database Client.
   Install to a directory on the Microsoft Windows client. This will be referred to as ORACLE_HOME for the
remainder of this section. During the installation, select Installation Type Administrator, and be sure to complete the configuration of the Net Configuration Assistant.

6. Locate the tnsnames.ora file in the oracle-client share directory.

The entries in the tnsnames.ora file provide the Oracle Database Client with database identification and connectivity information. The file in the oracle-client share directory is configured with the information for the virtual appliance.

7. Locate the tnsnames.ora file in the ORACLE_HOME installation directory.

The default location should be ORACLE_HOME\network\admin. The directory containing the tnsnames.ora file is referred to as TNS_ADMIN_DIR in this section.

Copy the contents of the tnsnames.ora file from the oracle-client share directory and paste it into the ORACLE_HOME\network\admin\tnsnames.ora file.

Note. If your configuration requires that you install both the 32-bit and 64-bit Oracle Database Clients, update the tnsnames.ora files in both the 32-bit and 64-bit ORACLE_HOME\network\admin folders with the same entry; that is, both files must include the connectivity information for the PI.

After the Oracle Database Client installation is complete, you should verify connectivity to the database by accessing it with PeopleSoft Application Designer, as described in the section Installing the PeopleSoft Client Tools and Using Application Designer.


See Also

Reviewing the File System and Users


Task 4-5-4: Installing the PeopleTools Client Tools and Using Application Designer

This section discusses:

- Understanding Application Designer and the Oracle VM VirtualBox Appliance
- Installing and Starting Application Designer

Understand Application Designer and the Oracle VM VirtualBox Appliance

The Microsoft Windows-based program Application Designer is an important tool that is used to perform a variety of administrative tasks in a PeopleSoft environment.

The PeopleSoft installation deployed by the Oracle VM VirtualBox virtual appliance includes the PeopleTools Client installer that packages Application Designer and other client tools (for example, Change Assistant, Configuration Manager, and the PeopleSoft Test Framework).

See Understanding Samba and File System Access.

Oracle strongly recommends that you dedicate a Microsoft Windows machine for the PeopleTools client for each PeopleSoft Update Image (PI). This should be a machine that is not used for other PeopleSoft purposes. You should install or upgrade the PeopleTools client tools each time the PeopleTools patch release increments as noted in the PI manifest.
Note. Oracle recommends that you install the PeopleTools client tools from the installation folders found on the latest PI in order to obtain the latest fixes. See your PI home page for release/patch information for the PeopleTools Client. The link for your PI home page can be found on PeopleSoft Update Manager Home Page, My Oracle Support, Doc ID 1641843.2.

See PeopleTools: Change Assistant and Update Manager, "Setting Up the Client, Source, and Target Environments."

See the PeopleTools installation guide for Oracle, "Preparing for Installation," Planning Your Initial Configuration.

Application Designer runs only on Microsoft Windows operating systems. You can install and run Application Designer on the host OS or another Microsoft Windows machine. The section Installing and Starting Application Designer describes how to use Application Designer to verify that you can connect directly to the database, that is, using two-tier mode.

For information on using Application Designer in three-tier mode (connection through the Application Server) and for more information on the PeopleTools client tools, see the PeopleSoft documentation.

See PeopleTools Installation for Oracle, "Setting Up the Install Workstation."


See PeopleTools: Change Assistant and Update Manager.

See PeopleTools: System and Server Administration, "Using PeopleSoft Configuration Manager."

See PeopleTools: PeopleSoft Test Framework.

Installing and Starting Application Designer

To install the PeopleTools Client tools and start Application Designer on a Microsoft Windows machine, use the following steps.


1. Access the virtual machine file system from your Microsoft Windows host as described in the section Accessing the Shared Drive Folders on the Virtual Appliance File System.

2. Locate the shared drive folder that contains the client that you want to install:
   - The PeopleTools 8.53 client in the client-853 shared drive folder
   - The PeopleTools 8.54 client in the client-854 shared drive folder

3. Run Client\Disk1\setup.bat to launch the Client installer.

   Specify the installation location for the PeopleSoft Client tools, referred to here as INSTALL_DIR. If you are installing the PeopleSoft Client tools when using a PeopleSoft Update Image as a source database for a PeopleSoft application update, select Oracle as the Database Platform and the Unicode option during this installation.

   For other possible installation configurations, see PeopleTools: Change Assistant and Update Manager, "Setting Up the Client, Source, and Target Environments."

Note. If you choose, you may also copy the client installer directory contents to another convenient directory, on the Microsoft Windows machine, and install from there.
4. Run `INSTALL_DIR\bin\client\winx86\pside.exe` to start Application Designer. The PeopleSoft Signon dialog box opens.

   [Image of PeopleSoft Signon dialog box]

   PeopleSoft Signon box for Application Designer in two-tier mode

   5. Select Oracle from the Connection Type drop-down list as shown in the example above.

   6. Enter the database name.

   7. Enter the User ID and Password for the PeopleSoft application (for example, PS/PS, VP1/VP1, or PTDMO/PTDMO).

   8. Click OK to start Application Designer.

   See *PeopleTools Installation for Oracle*, "Using the PeopleSoft Installer."

**Task 4-5-5: Installing PeopleSoft Change Assistant**

To install the PeopleSoft Change Assistant on a Microsoft Windows machine, use the following steps.

*Note.* Oracle recommends that you install Change Assistant from the installation folders found on the latest PeopleSoft Update Image (PI) in order to obtain the latest fixes. Install Change Assistant from the PeopleSoft PeopleTools 8.54 client installation (the client-854 shared drive folder).

See your PI home page for release/patch information. The link for your PI home page can be found on the PeopleSoft Update Manager Home Page, My Oracle Support, Doc ID 1641843.2.

1. Follow the instructions to install the PeopleTools client tools.
   
   See Installing the PeopleTools Client Tools and Using Application Designer.

2. Locate the `INSTALL_DIR\setup\PsCA` directory, and run `setup.exe` to launch the installer for PeopleSoft Change Assistant.
3. Follow the instructions in the PeopleTools installation guide for Oracle, "Installing Change Assistant" to complete the installation.
See PeopleTools Installation for Oracle, "Installing Change Assistant."

**Task 4-5-6: Managing PeopleTools Domains with PSADMIN**

Use the PSADMIN utility to manage any of the PIA, Application Server, or Process Scheduler domains. You must first sign in with the PeopleTools domain user psadm2, described in the section Reviewing the File System and Users. When you sign in as the PeopleTools domain user, the psconfig.sh script is automatically invoked through the user's profile. This is referred to as sourcing the psconfig.sh script. This ensures that all of the required environment variables are set prior to working with PSADMIN. You can perform all the usual administrative options for PIA, Application Server, and Process Scheduler domains using PSADMIN. You may reconfigure the existing domains, shut them down, restart them and create additional domains if necessary. The environment as delivered has however been sufficiently configured to perform many of the activities for which this virtual machine has been created.

**See Also**

PeopleTools: System and Server Administration, "Using the PSADMIN Utility"

**Task 4-5-7: Changing the Access for PI_HOME**

If you are applying PeopleSoft Release Patchsets (PRPs), use these instructions to enable user/password login, and to change the access level to read and write.

1. Using Secure Shell (SSH) log in to the virtual appliance as the root user.
2. Stop the Samba server by running the command `/etc/init.d/smb stop`.
3. In the command prompt window, run the command `smbpasswd -a psadm3`.
4. Enter the psadm3 user's UNIX password at this prompt:
   
   New SMB password:
   Retype new SMB password:

   **Note.** Upon successful completion, you should see the message "Added user psadm3."

5. Change directory to `/etc/samba` by running the command `cd /etc/samba`.
6. Back up the file `/etc/samba/smb.conf`; for example:
   
   `cp /etc/samba/smb.conf /etc/samba/smbconf.bkup`

7. Open the file `/etc/samba/smb.conf` file in an editor.
8. Go to the section `[pi_home]` and make the following changes:

   - Change from "writeable = no" to "writeable = yes".
   - Add the line "guest ok = no"
   - Add the line "valid users = psadm3"

9. Review the changes in these examples:

   Before:
   
   `[pi_home]`

   After:
   
   `[pi_home] writeable = yes guest ok = no valid users = psadm3`
path = /opt/oracle/psft/ptdb/pi_home
writeable = no
available = yes

After:
[pi_home]
path = /opt/oracle/psft/ptdb/pi_home
writeable = yes
available = yes
guest ok = no
valid users = psadm3

10. Save the file.
11. Restart the Samba server by running the command /etc/init.d/smb start.
12. After you complete these steps, in order to access the pi_home shared drive folder, you will be required to provide the user name, psadm3, and the password for that user, configured in the preceding steps.

Task 4-6: Using Oracle SES with the PeopleSoft VirtualBox Appliance

Oracle Secure Enterprise Search (SES) is the search engine on which the PeopleSoft Search Framework relies. The PeopleSoft VirtualBox appliance is delivered with Oracle SES installed and integrated with PeopleSoft PeopleTools. For additional information on using Oracle SES and the PeopleSoft Search Framework with your PeopleSoft application, see the references at the end of this section.

To use Oracle SES with the deployed VM, you may get better performance by increasing the memory you assign when importing the virtual appliance. Depending upon the PeopleSoft application, the memory required for Oracle SES crawling of the search index may be greater than the 6 GB recommended minimum for environments with Oracle SES. In that case, use these instructions to increase the memory manually.

To increase the memory:
1. Open Oracle VM VirtualBox Manager and select the VirtualBox appliance.
2. Click Settings.
3. Click System.
4. Increase the Base Memory from the default of 6 GB, for example to 8 GB.
5. Save.
6. Start the appliance.

See Starting the PeopleSoft VirtualBox Appliance.

Note. After the search indices have been set, you may lower the memory to 6 GB to enhance the performance of your PeopleSoft application. To lower the memory, shut down the virtual appliance and follow steps 1–3 above. Set the Base Memory to 6 GB, save, and restart the virtual appliance.

See Also

Installation guide for your PeopleSoft application, My Oracle Support

PeopleTools: PeopleSoft Search Technology
PeopleTools: Integration Broker Administration
PeopleTools Installation for Oracle, "Configuring Integration Between PeopleSoft PeopleTools and Oracle SES"
Oracle Secure Enterprise Search Installation and Upgrade Guide

Task 4-7: Compiling and Linking PeopleSoft COBOL Programs

This section discusses:

- Understanding COBOL Usage
- Compiling COBOL
- Compiling Additional Component COBOL with a PS_APP_HOME Setup
- Linking COBOL
- Running PeopleSoft COBOL Programs

Understanding COBOL Usage

To use COBOL with PeopleSoft Campus Solutions, see the information on obtaining, installing, compiling and running Micro Focus Server Express COBOL in the PeopleTools installation documentation. Note that you must use a properly licensed Micro Focus COBOL compiler, as discussed in the following references. Contact your Oracle sales representative to obtain a license for the Micro Focus compiler.

See Also

PeopleTools Installation for Oracle, "Installing and Compiling COBOL on UNIX"

PeopleSoft Enterprise Frequently Asked Questions About PeopleSoft and COBOL Compilers, My Oracle Support, Doc ID 747059.1

Task 4-7-1: Compiling COBOL

On Linux operating systems, you always need to compile your COBOL programs at installation time. This section assumes the psconfig.sh script has already been invoked when you signed in as a PeopleTools domain user. See Managing PeopleTools Domains with PSADMIN.

Before compiling, verify that the following environment variables are pointing to the correct location. For example:

PS_HOME
$ echo $PS_HOME
/opt/oracle/psft/pt/tools

PS_APP_HOME
$ echo $PS_APP_HOME
/opt/oracle/psft/pt/apptools

Run the shell script psebl.mak, found in PS_HOME/setup, to do the PeopleSoft COBOL compilation. To compile COBOL for PeopleSoft Campus Solutions, use the following command to compile only the PeopleSoft PeopleTools COBOL programs:
PeopleSoft PeopleTools compiled COBOL programs will be placed under the \textit{PS\_HOME}\textbackslash cblbin directory.
PeopleSoft application compiled COBOL programs will be placed under the \textit{PS\_APP\_HOME}\textbackslash cblbin directory.

\textbf{Task 4-7-2: Compiling Additional Component COBOL with a \textit{PS\_APP\_HOME} Setup}

This section discusses compiling additional component (that is, Institutional Need Analysis System, INAS) COBOL, along with the rest of the Campus Solutions 9.2 application COBOL, on Linux when \textit{PS\_APP\_HOME} is different from \textit{PS\_HOME}.

See the PeopleSoft Campus Solutions 9.2 product documentation for information on INAS.

This section assumes that you installed the PeopleSoft application software to a \textit{PS\_APP\_HOME} directory that is different from the \textit{PS\_HOME} directory where you installed PeopleSoft PeopleTools. It also assumes that there is no separate \textit{PS\_CUST\_HOME} directory with customized COBOL source files.

To compile:
1. Change to the \textit{PS\_APP\_HOME}/setup directory with the following command:
   \begin{verbatim}
   cd $PS\_APP\_HOME/setup
   \end{verbatim}
2. Use the following compile command to compile the entire set of PeopleSoft Campus Solutions 9.2 COBOL programs, including INAS:
   \begin{verbatim}
   ./pscblcs.mak PS\_APP\_HOME
   \end{verbatim}

PeopleSoft application compiled COBOL will be placed under the \textit{PS\_APP\_HOME}\textbackslash cblbin directory.

\textbf{Task 4-7-3: Linking COBOL}

To link PeopleSoft COBOL programs:
1. Change to the \textit{PS\_HOME}/setup directory:
   \begin{verbatim}
   cd $PS\_HOME/setup
   \end{verbatim}
2. For dynamic linking, run this command:
   \begin{verbatim}
   ./psrun.mak
   \end{verbatim}

The PSRUN.MAK script should return the Linux prompt when done. If the compile completes without errors, the files PSRUN and PSRUNRMT will now exist in the \textit{PS\_HOME}/bin directory. If you encounter errors, check \textit{PS\_HOME}/setup/psrun.err and \textit{PS\_HOME}/setup/psrunrmt.err.

\textbf{Task 4-7-4: Running PeopleSoft COBOL Programs}

You can run the COBOL programs after signing in to the Campus Solutions application in a browser, or from the command line. Details on configuring the application setup and data for running a requisite COBOL program in PIA can be found in appropriate PeopleSoft Campus Solutions documentation.

See "About this Documentation," Related Information.

To run COBOL programs from the command line:
1. Set the environment variables for \textit{PS\_HOME}, \textit{PS\_APP\_HOME}, \textit{PS\_SERVER\_CFG} and \textit{COBPATH} with the following commands:
PS_HOME= /opt/oracle/psft/pt/tools; export PS_HOME
PS_APP_HOME= /opt/oracle/psft/pt/apptools; export PS_APP_HOME
PS_SERVER_CFG=$PS_CFG_HOME/appserv/prcs/<domain>/psprcs.cfg; export PS_SERVER_CFG
COBPATH=$PS_APP_HOME/cblbin:$PS_HOME/cblbin; export COBPATH

Note. The PS_CFG_HOME path is /home/psadm2/psft/pt/<peopletools_version>.

2. Use this command to run the program:

PSRUN <COBOL_PROG> <dbtype>/<dbname>/<userid>/<userpasswd>/<runcontrol>⇒
/<process_instance>/<sqltrace>/<dbflags>

For example:

PSRUN GPPDPRUN ORACLE/CS92/PS/password/1/1/191/0

Task 4-8: Resolving Problems with the PeopleSoft Runtime Environment

Use the information in this section to guide you in resolving problems with your PeopleSoft virtual machine.

• You are unable to start the virtual machine.
  See "Prerequisites," Reviewing Hardware Requirements.
  • Check that hardware virtualization is supported and enabled in BIOS.
  • Verify that you are using the supported version of the host platform (64-bit Microsoft Windows).
  • Verify that you have sufficient physical resources on the host machine—RAM, CPU and disk space.
  • Check the system information in Oracle VM VirtualBox Manager for warnings about memory usage.
    Open Oracle VM VirtualBox Manager and select your virtual appliance. Select Settings, System. Check for warnings at the bottom of the System page.
  • Verify that you are using a supported version of Oracle VM VirtualBox.
    Access the links from the PeopleSoft Update Manager home page, My Oracle Support Document 1641843.2, for the supported version of Oracle VM VirtualBox for your PeopleSoft appliance.

• You are unable to connect to the VM from the host OS.
  Although the VM appears to successfully start, you are unable to connect to the virtual machine through PIA or other clients such as Application Designer or SQL*Plus. This is frequently because the virtual machine cannot be accessed from the host OS. Identify the IP address of the virtual machine using this Linux Bash shell command:
  ifconfig | more
  The output of this command is the IP address associated with the eth0 network adapter for the virtual machine.
  In a command prompt on the host OS or Microsoft Windows client machine, use the ping command to verify that you can access the IP address.
  See Setting the Network Configuration for the Virtual Appliance.

• You notice poor performance.
  • If you feel the virtual machine exhibits noticeably poor performance, you may need to increase the
Deploying the PeopleSoft VirtualBox Appliances

Chapter 4

Copyright © 2015, Oracle and/or its affiliates. All Rights Reserved.

memory, depending upon your environment. Use the Linux Bash shell command `free`. If the output of
this command shows significant use of the swap file system, try increasing the memory of the virtual
machine to improve performance.

- If your VM host machine OS is Microsoft Windows, a common issue is the fragmentation that naturally
occurs when files are stored on disk. This can be remedied by running a defragmenting utility, such as
comes with the Microsoft Windows OS, or provided by several external vendors. To improve speed of this
defragmenting, quiesce the processes running on the host OS, including stopping the PeopleSoft virtual
machines. The process will take from a few minutes to several hours depending on the condition of the
hard disk.

- Application Server and Process Scheduler fail to start.
The main reason that the Application Server or Process Scheduler domains fail to start is because they cannot
connect to the database. This can occur because the database or database listener is not started. You should
verify that the database is in fact started using the SQL*Plus utility before proceeding. If you are unable to
connect to the database you may need to start the database. This can be done with SQL*Plus.
The second most observed reason why these domains fail to start is because there are insufficient resources
available to support the hardware requirements of the virtual machine.

- You are unable to connect with SQL*Plus from the host OS:
Check the connectivity to the Oracle database. Try the following solutions:
  - Verify that the virtual machine is responsive using the ping command and the IP address before
    proceeding.
  - Verify that the tnsnames.ora file contains the correct host entries.
    See Installing and Starting Oracle Database Client Tools.

**Task 4-9: Managing the Virtual Environment Lifecycle**

This section discusses:

- Understanding Virtual Machine Management
- Customizing and Cloning Virtual Appliances
- Using the PeopleSoft Configuration Script
- Resetting PeopleSoft Virtual Appliances
- Using PeopleSoft Services
- Running Multiple Virtual Machines

**Understanding Virtual Machine Management**

After you create and initialize your PeopleSoft virtual machine environment, you may want to customize it and
save the customized environment as a template to share within your company. Keep in mind that the template will
be large and you should plan for the necessary storage.

In general, the steps to follow in creating a template from a customized environment are:

1. Set up the virtual machine.
2. Customize the environment.
   See Customizing and Cloning Virtual Appliances.
3. Take a snapshot of the working environment.
4. Edit the configuration plug-in script.
   See Using the PeopleSoft Configuration Script.

5. Issue commands to clean up and restart the virtual machine using the modified configuration script.
   See Resetting PeopleSoft Virtual Appliances.

6. Create clones and export the virtual machine to be used on other hosts.
   See the VirtualBox documentation for more information on handling VMs.
   See Oracle VM VirtualBox® User Manual, Oracle Technology Network,

**Task 4-9-1: Customizing and Cloning Virtual Appliances**

The virtual appliances delivered by Oracle for PeopleSoft installation can actually be used as a basis for a customized environment. For example, you may change some of the domain configuration settings and clone the virtual appliance using Oracle VM VirtualBox Manager. This snapshot can be cloned and used on other host OSs. This means that you don't need to repeat the same customization steps each time you initialize a virtual appliance. Instead it is possible to install software into a virtual appliance or add specific configuration preferences and then clone the virtual appliance.

There are a few things to keep in mind when cloning a virtual appliance. Before cloning a virtual appliance it is typically necessary to clean the network stack and remove host-specific configuration settings.

**Note.** This may not be necessary if the virtual appliance has been set up using host-only networking.

See Resetting PeopleSoft Virtual Appliances.

Before resetting the virtual appliance it is important to preserve the current state of the virtual appliance. This allows you to return to a last known good state. For this reason you should use the Snapshot capability of Oracle VM VirtualBox before making any significant changes to the virtual appliance. In fact, it is good practice to use snapshots as a way of versioning your virtual appliance.

When cloning a virtual appliance you may want to install software into the virtual appliance from which you will create clones. If you do so, you must make sure that the software that you have installed is virtualization safe. This means that the installation is not bound to the IP address or hostname through any configuration files, database entries, and so on. When you save a virtual appliance, the installed components must be host neutral, so that they will be able to run without any problems in new instances that have different hostnames or IP addresses.

If the software that you have installed requires licensing on a per host or per processor basis, you should ensure that you have the adequate number of licenses for your site. The terms surrounding licensing will vary from application to application.

When cloning a PeopleSoft virtual appliance you may wish to add customized first boot configuration steps. This means that you should edit the first boot configuration script, as described in the following section.

See Using the PeopleSoft Configuration Script.

**Task 4-9-2: Using the PeopleSoft Configuration Script**

To add configuration steps to the PeopleSoft virtual appliance, use the delivered configuration script, /opt/oracle/psft/vm/oraclevm-template-ext.sh. You can find this script in any PeopleSoft virtual appliance. If you wish to extend the virtual appliance, you can overwrite or add to this script.
The `oraclevm-template-ext.sh` script includes the four functions described in this table:

<table>
<thead>
<tr>
<th>Function Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>ovm_configure_pre</code></td>
<td>This function is run before the PeopleSoft PeopleTools configuration scripts. This function can perform any custom setup steps prior to the running of the PeopleSoft PeopleTools setup.</td>
</tr>
<tr>
<td><code>ovm_configure_post</code></td>
<td>This function is run after the PeopleSoft PeopleTools configuration scripts. This function can perform any custom steps required after the PeopleSoft PeopleTools setup has completed.</td>
</tr>
<tr>
<td><code>ovm_cleanup_pre</code></td>
<td>This function is run when a virtual machine is being cleaned up. This function is called before the PeopleSoft PeopleTools cleanup.</td>
</tr>
<tr>
<td><code>ovm_cleanup_post</code></td>
<td>This function is run when a virtual machine is being cleaned up. This function is called after the PeopleSoft PeopleTools cleanup.</td>
</tr>
</tbody>
</table>

When the virtual appliance is being initialized, the first boot configuration calls the four functions in the order presented in the table. The first boot configuration calls the function `ovm_configure_pre()` before any of the PeopleSoft PeopleTools setup functions begin, and `ovm_configure_post()` after the PeopleSoft PeopleTools setup functions have completed.

This script does not just play a role when initializing. When the virtual appliance is being cleaned, the PeopleSoft PeopleTools cleanup script calls the `ovm_cleanup_pre()` function before any of the PeopleSoft PeopleTools setup functions begin, and `ovm_cleanup_post()` function after the PeopleSoft PeopleTools setup functions have completed. As described in the above table these functions are located in `/opt/oracle/psft/vm/oraclevm-template-ext.sh`.

Any of these functions may be empty. These functions may call any of the functions in the PeopleSoft PeopleTools scripts. This allows them to manipulate and override the functions delivered in the PeopleSoft PeopleTools scripts.

After you have modified the `/opt/oracle/psft/vm/oraclevm-template-ext.sh` configuration script to include your preferred code, it is necessary to reset the virtual appliance to get it ready to be cloned, as described in the following section.

See Resetting PeopleSoft Virtual Machines

**Task 4-9-3: Resetting PeopleSoft Virtual Appliances**

It is possible to reset your virtual appliance such that the next time it is started it will appear as a clean, newly started virtual appliance.
This technique can be used if you have made changes to the virtual appliance such as installing new software and you wish to make a clone of the virtual appliance. It is also applicable if you simply want to change the way that your virtual appliance works on the network. If you reset the network stack of your virtual appliance, PeopleSoft components will stop functioning correctly. This is because Oracle WebLogic and Tuxedo, on which PeopleSoft relies, communicate through the network stack. The process of resetting the network stack therefore conducts an orderly shutdown and cleanup of these components. It removes the PIA, Application Server and Process Scheduler domains. This means that any changes that you have made to these configurations will be lost by following these instructions.

To reset a virtual appliance:

1. Invoke the following command to shut down and remove the PeopleSoft domains:
   
   ```
   /usr/sbin/oraclevm-template --cleanup
   ```

2. Invoke the following command to ensure that when the virtual appliance is restarted it will re-prompt for network configuration information:
   
   ```
   /usr/sbin/oraclevm-template --enable
   ```

3. Shut down the virtual appliance by selecting the option ACPI Shutdown in the virtual appliance console.

**Task 4-9-4: Using PeopleSoft Services**

After you initialize the PeopleSoft virtual machine, you can use the following Linux Bash shell commands to start and stop services for the database and mid-tier (Application Server, Process Scheduler, and PIA) components.

- To find the status of the PeopleSoft database, run the following command:
  
  ```
  service psft-db status
  ```

  - If the database (called `DBNAME` in this example) and the TNS Listener for the database, are running, you see the following message:
    
    ```
    PeopleSoft Database `DBNAME` is Up
    PeopleSoft Listener is Up
    ```

    **Note.** For more information on the TNS listener, see the *Oracle Database Net Services Administrator's Guide*, Oracle Database Documentation Library, http://www.oracle.com/pls/db112/homepage.

  - If the database and the PeopleSoft TNS Listener are not running, you see the following message:
    
    ```
    PeopleSoft Database `DBNAME` is Down
    PeopleSoft Listener is Down
    ```

  - To start the PeopleSoft database and PeopleSoft TNS listener, run the following command:
    
    ```
    service psft-db start
    ```

  - To stop the PeopleSoft database and PeopleSoft TNS listener, run the following command:
    
    ```
    service psft-db stop
    ```

  - To find the status of the mid-tier components, that is, the Application Server, Process Scheduler (batch server), and PIA, run the following command:
service psft-abw status

- If all the mid-tier components are running, you see the following message:
  
  Application Server Domain is Up
  Process Scheduler Domain is Up
  PIA Domain is Up

- If the mid-tier components are not running, you see the following message:
  
  Application Server Domain is Down
  Process Scheduler Domain is Down
  PIA Domain is Down

- To start the mid-tier components, run the following command:
  service psft-abw start

- To stop the mid-tier components, run the following command:
  service psft-abw stop

- To find the status of Oracle SES, run the following command:
  service ses status

**Task 4-9-5: Running Multiple Virtual Machines**

This documentation discusses the deployment of a single virtual appliance. You can however install and run multiple virtual machines. Keep the following points in mind when planning to deploy multiple VMs:

- Verify that the available disk space and memory is sufficient for the total number of VMs.

  For example, if you plan to deploy three VMs that each require 4 GB RAM and 40 GB disk space, you will need at least 12 GB RAM and 120 GB available disk space on the host machine.

  See "Prerequisites," Reviewing Hardware Requirements.

- Consult the VirtualBox documentation, as well as this documentation, for network configuration options.

  For information on networking options, see the section Setting the Network Configuration for the Virtual Appliance in this documentation. For details about networking configuration on VirtualBox, see the Oracle VM VirtualBox User Manual.

  If you plan to deploy more than one VM, and you intend to assign static IP addresses you should plan for multiple addresses. However, keep in mind that since each VM is a separate machine, the ports configured on each VM can be the same.

- You have a range of choices in setting up Change Assistant, the Oracle database client, and PeopleTools client tools discussed earlier in this chapter in the section Using the PeopleSoft Installation. As with any PeopleSoft installation, you will need to carry out specific steps depending upon your target environment's RDBMS platform.

  Details about using the VMs with PeopleSoft Update Manager, as well as information about setting up Change Assistant, the PeopleTools Client, and the Environment Management Framework in different configurations, can be found in the *PeopleTools: Change Assistant and Update Manager* product documentation.
Appendix A

Using the PeopleSoft VirtualBox Appliances in Oracle VM 3.1 and Later

This appendix discusses:

- Understanding the Support for VirtualBox Appliances in Oracle VM 3.1 and Later
- Prerequisites
- Importing the OVA File to Oracle VM
- Creating a Template from the OVA File
- Editing the Template in Oracle VM
- Creating a VM from the New Template
- Starting the VM in Oracle VM

Understanding the Support for VirtualBox Appliances in Oracle VM 3.1 and Later

The previous chapters of this document discuss deploying the PeopleSoft appliances using the VirtualBox virtualization product. This appendix describes the steps required to use the PeopleSoft VirtualBox appliances (OVA files) in Oracle VM 3.1 and later. Oracle VM is an enterprise-class server virtualization solution comprised of Oracle VM Server for x86, Oracle VM Server for SPARC, and Oracle VM Manager.

Note. This supplementary information may be used if you choose to use Oracle VM 3.1 or later to host the PeopleSoft VirtualBox appliances. Note that this information is untested and provided as a courtesy; the only certified host for the PeopleSoft VirtualBox appliances remains VirtualBox. For more information on our support policy, please refer to the section Reviewing Virtualization Platform Compatibility in the "Prerequisites" chapter earlier in this documentation.

Note. There is a known compatibility issue with Oracle® Exalogic Elastic Cloud systems that prevents the importing of PeopleSoft VirtualBox appliances.

Oracle VM has the advantage of being designed for enterprise-class deployment. However, in considering this type of deployment, keep in mind that when deploying the PeopleSoft VirtualBox appliance in Oracle VM, there are differences in the network security. For example, it is possible to deploy a PeopleSoft appliance on VirtualBox with a host-only configuration, and install PeopleSoft Change Assistant and other PeopleSoft PeopleTools client tools on the Microsoft Windows OS system on the same physical machine. This type of host-only security is not available with Oracle VM. By its very nature a virtual machine that is running on Oracle VM is only accessible over a virtual network. This has implications around security of the OS, users, network access, and so on.

The Oracle VM 3.x terminology uses the word "assembly" to refer to an archive that contains one or more virtual machine template. The PeopleSoft OVAs are seen as assemblies by Oracle VM.
Note. This process will not work in versions of Oracle VM before Oracle VM 3.1. While it may be possible to use the PeopleSoft VirtualBox appliances in earlier versions of Oracle VM, the functional experience would be very different.

Using a PeopleSoft VirtualBox appliance in Oracle VM includes the following high-level procedures:

1. Import the OVA file as an assembly.
2. Create a VM template from the OVA.
3. Configure the template.
4. Create a VM from the template.
5. Start the VM.

See Also


Prerequisites

This section assumes that you have obtained the zip files for the PeopleSoft VirtualBox appliance from My Oracle Support and combined them into a single OVA file as previously described.

Place the OVA file on an HTTP or FTP server from which Oracle VM Manager can import it.

Note. The OVA file names vary depending upon the PeopleSoft application, such as FSCM or PS, and other identifiers. The OVA file names in the examples in this documentation may not be the same as those you use.

See "Preparing to Deploy," Obtaining Oracle VM VirtualBox for PeopleSoft Appliances.

Task A-1: Importing the OVA File to Oracle VM

To import the OVA file into Oracle VM Manager:
1. Log in to Oracle VM Manager, as shown in this example.

![Oracle VM Manager Log in window](image)

2. Select the Repositories page.
3. Select the repository into which you want to import the OVA.
4. Highlight Assemblies in the repository tree, and click Import VM assembly (the green plus sign above the repository tree).

In this example, the PTOVMSHARE repository tree is expanded, and the Assemblies folder is highlighted.
5. In the Import VM Assembly dialog box, enter the following information:

- **Server**: Select the Oracle VM server from the drop-down list to use to import the file.
  - In the example, the server is srv222.
- **VM Assembly download location**: Enter the URL, including the file name, for the OVA file that you placed in the FTP or HTTP server.
  - This example shows an FTP server location. In the example, the location is ftp://testora:testora@xmpl.com/data1/ora/export/FSDMO-853-11.ova.
- Click OK to import the OVA file.

See *Oracle® VM User's Guide for Release 3.1.1, "Virtual Machine Resources."*

### Task A-2: Creating a Template from the OVA File

To create a virtual machine template from the OVA:

1. In Oracle VM Manager, select the Repositories page.
2. Select the repository that contains the imported OVA.
3. Highlight Assemblies in the repository tree, and Create VM Template (the green plus sign icon).
4. In the Create VM Template dialog box, enter the following information:
   - **Assembly Virtual Machines**: Specify the virtual machine in the assembly from which to create a template, which in this case is the imported OVA.
   - **VM Template Name**: Provide a name for the template.
   - **Description**: Provide an optional description.
5. Click OK to create the template.
   - The template is created in the same repository where the OVA file was located.
6. Highlight the template name in the management pane on the right, and select the Configuration page.

After importing and creating a template, you can verify that it is available in the repository by reviewing the information on the Configuration page, as seen in this example. The Configuration page includes information such as template name, number of processors, amount of memory, and domain type.
7. Review the information on the Networks page, as seen in this example. At this point, the Networks information indicates that there is no virtual network associated with the template. The virtual network is assigned in the following section, Editing the Template in Oracle VM.

Oracle VM Manager Repositories page with the Networks page for the imported template

Task A-3: Editing the Template in Oracle VM

You must make minor modifications to the default settings before you can create VMs. This section assumes that the template is open in Oracle VM Manager.

Note. This is similar to making changes in the Settings window of the Oracle VM VirtualBox Manager.

To edit the template:
1. In Oracle VM Manager, on the Repositories page, highlight the template and click the pencil icon to edit.
2. On the Edit VM Template_Name dialog box, select the Configuration page.
3. Change the Domain Type from Xen HVM, for hardware virtualized, to Xen PVM, for paravirtualized, as shown in this example.

4. Select the Networks page.
5. Select a network from the Available Ethernet Networks list, and move it to the Selected Ethernet Networks list.

This assigns a virtual network to the VM. In this example, the xenbr0 network is shown in the Selected Ethernet Networks list.

**Note.** You will need to do this before VMs created from the template will work. This step can in fact be deferred until the VM is being created but by doing it at this point, every VM you subsequently create from this template will work without modifying any settings.

6. Click OK to save the changes.
7. In the management pane of the Repositories page, select the Configuration page and verify that the Domain Type is Xen PVM.

Oracle VM Manager Repositories page with Configuration page for the edited template
8. In the management pane of the Repositories page, select the Networks page and verify that the Ethernet Network is the one that you specified, xenbr0 in this example.

![Oracle VM Manager Repositories page with Networks page for the edited template](image)

**Task A-4: Creating a VM from the New Template**

To create a VM from the template you created from the OVA:

1. In Oracle VM Manager, select the Servers and VMs page.
2. Click the Create VM icon.
3. On the Create Virtual Machine dialog box, select the Clone from an existing VM Template option, and specify the following parameters:

![Create Virtual Machine dialog box](image)

- **Repository**: Select the repository in which to create the virtual machine configuration files. In the example the repository is PTOVMSHARE.
- **VM Template**: Specify the template to use to create the virtual machines. In the example, the VM template is FSDMO-853-Template.
- **VM Name**: Enter a name for the template. In the example, the VM name is FSDMO_TEMPLATE.
- **Server Pool**: Specify the server pool in which to deploy the virtual machines. In the example, the server pool is OVM311B.

4. Click Finish to return to the Servers and VMs page.


### Task A-5: Starting the VM in Oracle VM

To start the VM you created in the previous section:

1. In Oracle VM Manager, on the Servers and VMs page, select the server in which the virtual machine resides in the Server Pools folder.
2. Select the virtual machine in the management pane on the right, and click the start icon (green triangle). Wait until you see the status "Running" as in this example for the VM FSDMO_TEMPLATE, before continuing.

3. Click the Launch Console icon (browser) to begin the initialization process. You see initialization messages for the virtual machine similar to the following:
   - Changing password for user root.
   - New UNIX password:
   - Retype new UNIX password:
   - passwd: all authentication tokens updated successfully.

   Use the instructions given earlier in this documentation to complete the initialization. See "Deploying the PeopleSoft VirtualBox Appliances," Starting the PeopleSoft VirtualBox Appliance.

4. After the initialization process is complete, verify that you can access the PeopleSoft application by logging in to PIA in a browser, accessing the shared folders with Samba, and so on. See "Deploying the PeopleSoft VirtualBox Appliances," Using the PeopleSoft Installation.