Oracle® Real User Experience Insight

Installation Guide

Release 4.5.2 for Linux x86-64

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Oracle Real User Experience Insight Installation Guide, Release 4.5.2 for Linux x86-64

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Preface

Oracle Real User Experience Insight (RUEI) provides you with powerful analysis of your network and business infrastructure. You can monitor the real-user experience, define Key Performance Indicators (KPIs) and Service Level Agreements (SLAs), and trigger alert notifications for incidents that violate them.

Audience

This document is intended for the following people:

- System administrators responsible for the installation of RUEI. This assumes a sound understanding of the Linux operating system.
- The person within your organization designated as the RUEI Administrator. This person is responsible for post-installation configuration, and system maintenance.

Some familiarity with network and Web technology is assumed. In particular, you should have a sound understanding of network topology, and a good operational knowledge of your organization's network and application environment.

This guide is organized as follows:

- Chapter 1, "Getting Started" introduces RUEI. In particular, how it monitors data traffic, the role of the Reporter and Collector modules, and the supported configurations.
- Chapter 2, "Installing RUEI" describes the procedure preparing the server system(s) for RUEI, and installing the RUEI software. This procedure is performed by a system administrator. The procedure for upgrading an existing RUEI 4.5.0 or 4.5.1 installation to release 4.5.2 is also explained.
- Chapter 3, "Configuring RUEI" describes the procedure for initially configured RUEI. This procedure is performed by the person within the organization who has been assigned the role of RUEI Administrator.
- Appendix A, "Troubleshooting" highlights the most common issues encountered when installing RUEI, and offers solutions to quickly locate and correct them. It should be reviewed before contacting Customer Service.
- Appendix B, "Installation Checklist" provides a checklist of actions that should be complete, and information gathered, before starting to install the RUEI software.
- Appendix C, "Third-Party Licenses" contains licensing information about certain third-party products included with RUEI.

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Related Documents

For more information, see the following documents in the Oracle Real User Experience Insight library:

- *Oracle Real User Experience Insight User's Guide*

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
italic	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
`monospace`	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

1

Getting Started

This chapter introduces the role of Oracle Real User Experience Insight (or RUEI for short), its architecture, attachment, and deployment options.

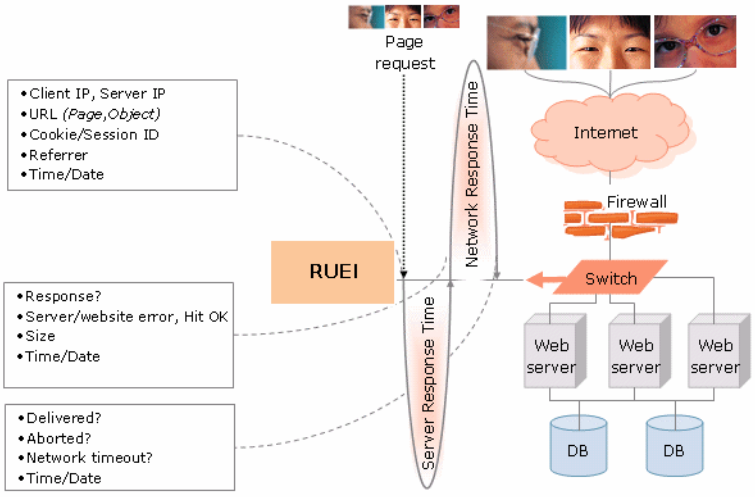
1.1 What is RUEI?

The usage of Web applications and services continues to grow. This includes not only the use of the Internet as a marketing channel, but also Extranet-based supply chain and back-office integration, and Intranet deployment of internal applications. Increasingly, it also includes the utilization of Web services which implement clearly defined business functions. RUEI is designed for measuring, analyzing, and improving the availability and performance of all of these deployment scenarios.

1.1.1 Data Collection

Typically, RUEI is installed before the Web servers, behind a firewall in the DMZ (as shown in Figure 1–1). The data collection method is based on Network Protocol Analysis (NPA) technology. This method is 100% non-intrusive. Hence, it does not place any load on a Web server, or require installing software agents that will impact performance. In addition, it does not require any change to the current application or infrastructure. When a new application release is deployed, or when an additional Web server is added, there is no or very little change required to RUEI's monitoring environment.

Figure 1–1 How RUEI Collects Data



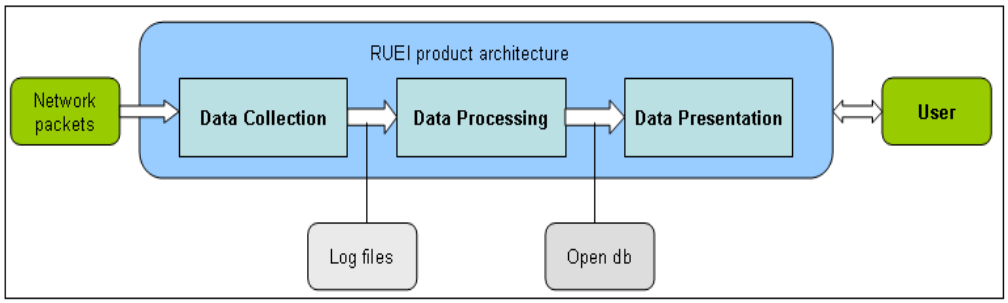
When an object is requested by a visitor, RUEI sees the request and measures the time the Web server requires to present the visitor with the requested object. At this point, RUEI knows who requested the page (the client IP), which object was requested, and from which server the object was requested (server IP).

When the Web server responds and sends the requested object to the visitor, RUEI sees that response. At this point, RUEI can see whether there is a response from the server, whether this response is correct, how much time the Web server required to generate the requested object, and the size of the object. In addition, RUEI can also see whether the object was completely received by the visitor, or if the visitor aborted the download (that is, proof of delivery). Hence, RUEI can determine the time taken for the object to traverse the Internet to the visitor, and calculate the Internet throughput between the visitor and the server (that is, the connection speed of the visitor).

1.1.2 Product Architecture

RUEI is based on a three-layer product architecture, as shown in Figure 1–2:

Figure 1–2 RUEI Product Architecture



The monitored data packets are processed by the following layers:

- **Data collection**

  This layer is responsible for acquiring raw data and delivering it to the Data processor. This data can be collected from multiple sources. The available attachment options are described later in this section.

- **Data processing**

  This layer converts the raw data into OLAP data sets. These comprise the multidimensional data structure that is viewable within the data browser.

- **Data presentation (reporter)**

  This layer is RUEI's analysis and reporting environment. This is a Web-based information portal that can be accessed from any selected browser. The interface between the data processing and data presentation layer is based on open db calls.

1.2 Security

To read HTTP(S) data streams, a proprietary software module reassembles TCP/IP packet streams. Because the data collectors do not have an assigned IP number, and the software using these data collectors does not have a functional IP stack, RUEI is not able to respond to incoming traffic received on the data collectors. This makes RUEI "invisible" to the monitored networks, and completely secure.

Note: Because of the non-intrusive way in which RUEI collects data, it is not possible for it to request retransmission in the event of an error on the measurement port.

Data collection can be configured to log encrypted data. To facilitate this, a copy of the Web server's private SSL keys needs to be set up in the data collector. In addition, RUEI can be configured to omit logging of sensitive data in the arguments of POST requests of forms or content; so called *data masking* (or blinding).

1.3 Connection Options

RUEI supports the use of both copy ports[1] and TAPs[2] for monitoring network traffic. Copy ports and TAPs are available for copper or fibre-based network infrastructures. While both devices allow non-intrusive monitoring of network traffic, there are differences between these two connection options. These are highlighted in the rest of this section.

1.3.1 Copy Ports

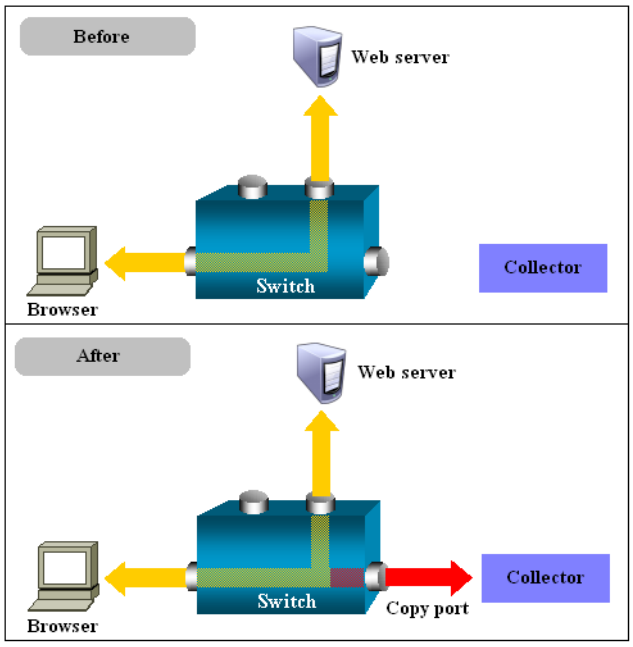
A copy port is a switch that starts to build up a Layer 2 forwarding table on the basis of the source MAC address of the different packets that the switch receives. After this forwarding table is built, the switch forward traffic that is destined for a MAC address directly to the corresponding port.

For example, after the Web server MAC in Figure 1–3 is learned, unicast traffic from the browser to the Web server is only forwarded to the Web server port. Therefore, the Collector does not see this traffic.

[1] Copy ports are also known as Switched Port Analyzer (SPAN) ports which is a feature of Cisco switches.

[2] Test Access Port (TAP) devices are provided by specialist vendors, such as NetOptics Inc.

Figure 1–3 Network Connection Using a Copy Port



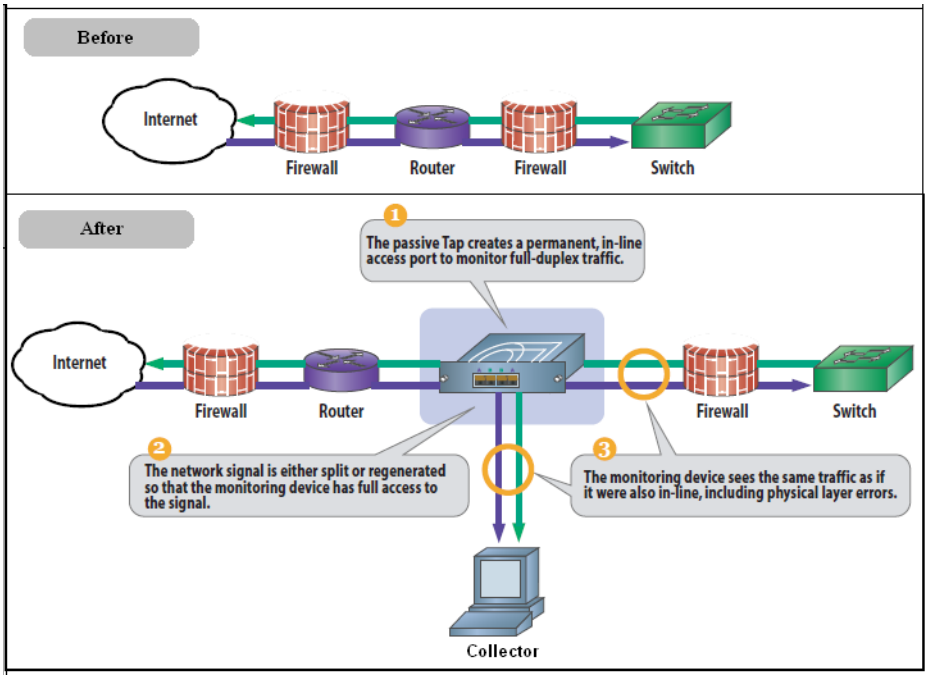
In the configuration shown in the lower part of Figure 1–3, the Collector is attached to a port that is configured to receive a copy of every packet that the browser sends. This port is called a copy port. Copy ports can copy traffic from any or all data ports to a single unused port and prevents bi-directional traffic on the port to protect against backflow or traffic into the network.

Be aware that activating a copy port on a switch can have a performance impact. Typically, copy ports support a wide range of configuration options, and for further information about these options you should consult your switch documentation or contact the vendor.

1.3.2 TAPs

TAPs can be placed between any two network devices (such as routers and firewalls). Any monitoring device connected to a TAP receives the same traffic as if it were in-line, including all errors. This is achieved through the TAP duplicating all traffic on the link, and forwarding it to the monitoring port(s). The example shown in Figure 1–4 illustrates a typical TAP deployment for one Collector.

Figure 1–4 Network Monitoring Using a TAP



Unlike copy ports, in the event of power failure, TAPs continue to allow data to flow between network devices. TAP devices are available for copper or fibre-based infrastructures. Generally, the use of TAPs is considered preferable since they can be easily deployed when and where required, but engineers do need to re-cable a network link.

Note: Broadly speaking, there are three types of TAPs: network, regeneration, and aggregation TAPs. RUEI supports the use of network and regeneration TAPs. The use of aggregation TAPs is *not* supported. However, the deployment of multiple Collectors, or the connection of multiple links directly to one Collector, is available for the aggregation of data from multiple streams. In addition, be aware that when capturing data with a network-tap device, the use of cascaded-tap configurations is not supported.

1.4 Installation and Deployment Options

A RUEI system can be configured in two different ways: as a Reporter, or as a Collector. Each installation option is reviewed in the following sections.

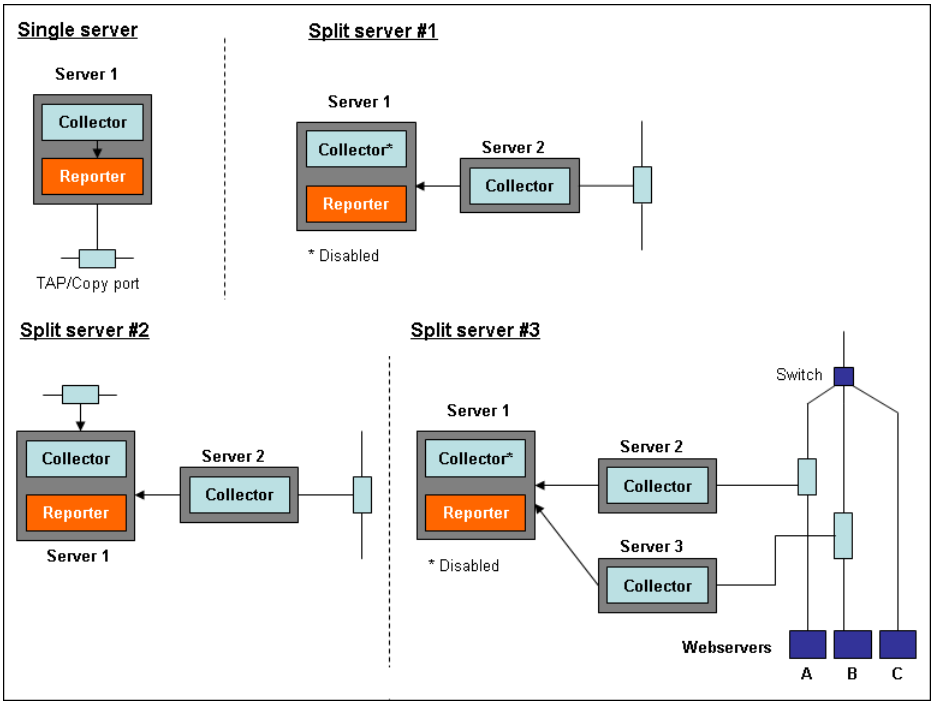
- **Reporter**

  This is the standard installation option, and is the simplest to install and configure. Here, the Reporter provides a browser-based interface to the collected data. Note that each Reporter installation also contains a local Collector instance. The Reporter can either be configured to just process information gathered by this local Collector (this is a single-server configuration similar to the one shown in Figure 1–5), or can (optionally) be configured to receive information from additional Collector installations.

- **Collector**

If a RUEI system is installed as a Collector, it submits the data it gathers to a Reporter system. Multiple Collectors can be attached to the same Reporter. Configuration #1 in Figure 1–5 is an example of a single Collector split-server configuration, while Configuration #2 is an example of a split-server configuration using two Collectors. Note that a direct network connection is required between the Collector(s) systems and the Reporter system.

Figure 1–5 Configuration Options



1.4.1 Scalability Options

The use of multiple Collectors may be considered when there is a need to monitor very high levels of data traffic. In addition, this deployment also provides the possibility of enhanced security. For example, by placing the Collector(s) outside the office network, while placing the Reporter system within the network.

Split-server configuration #1 in Figure 1–5 shows an example of a typical DMZ installation. The Collector is located in the DMZ, and the Reporter is within the server network environment. Note that the local Collector instance is disabled. Split-server configuration #2 shows an example of a deployment consisting of two Collectors. This could, for example, be used between two data centers (both monitoring the DMZ), where one data center acts as a failover for the other.

Split-server configuration #3 shows an example of a deployment in which both data lines are monitored in the same reporting environment. Note that this deployment assumes that the traffic on each line is mutually exclusive. It also shows an example of a deployment used for security reasons. While the traffic from Web servers A and B are monitored and reported, the traffic from Web server C is not. This is also the reason why the Collectors are not placed above the switch.

For security reasons, it is recommended that access. Similarly, you may want to locate the Reporter system inside the internal network to maximize its security. The Collector's data gathering ports should be in the DMZ.

1.5 Hardware Requirements

The required minimum system specifications for the selected configuration (as explained in Section 1.4) are described in the following sections.

Network Cards

It is recommended that you carefully consider the selection of network cards for your infrastructure. Depending on the connection option you selected in Section 1.3, "Connection Options", both copper and fibre-based network cards may be required. If necessary, consult both your network and systems management teams.

Note: For more information about required and recommended system specifications, please contact Customer Support.

1.5.1 Single-Server Requirements

Table 1–1 Single-Server System Requirements

Element	Requirements
CPU	64-bit Intel or ADM dual-CPU, dual-core processor (> 2 G Hz) or equivalent.
Memory	16 GB.
Disk space	Minimum 400 GB HDD free space.[1,2]
Network interfaces	When using a network-tap device[3], a minimum of three network interfaces is required: ■ Two interfaces for network traffic capturing. ■ One interface for network services.
GSM modem (optional)	Optional support for a GSM modem to send SMS messages. The modem needs to be either GSM07.05 or GSM07.07 compatible. It can be connected through a serial or USB port. If USB is used, RUEI uses the first available port (ttyUSB0). Alternative methods of sending SMS messages are available (http/e-mail).

1 The Reporter servers require high performance data storage. (Hardware) RAID-5, RAID-10, or equivalent storage configurations with high performance disks are strongly recommended.

2 This may be need to be increased if Enriched data exchange is enabled.

3 When capturing data with a network-tap device, the use of cascaded tap configurations is not supported.

1.5.2 Reporter Requirements

Table 1–2 Reporter System Requirements

Element	Requirements
CPU	64-bit Intel or ADM dual-CPU, dual-core processor (> 2 G Hz) or equivalent.
Memory	16 GB.
Disk space	Minimum 400 GB HDD free space[1,2].
Network interfaces	A minimum of 1 network interface is required.

Table 1–2 (Cont.) Reporter System Requirements

Element	Requirements
GSM modem (optional)	Optional support for a GSM modem to send SMS messages. The modem needs to be either GSM07.05 or GSM07.07 compatible. It can be connected through a serial or USB port. If USB is used, RUEI uses the first available port (ttyUSB0). Alternative methods of sending SMS messages are available (http/e-mail).

[1] The Reporter servers require high performance data storage. (Hardware) RAID-5, RAID-10, or equivalent storage configurations with high performance disks are strongly recommended.

[2] This may be need to be increased if Enriched data exchange is enabled.

1.5.3 Collector Requirements

The requirements for Collector systems are shown in Table 1–3:

Table 1–3 Collector System Requirements

Element	Requirement
CPU	64-bit Intel or AMD dual-core processor or equivalent.
Memory	8 GB.
Disk space	Minimum 200 GB HDD free space.
Network interfaces	When using a network-tap[1] device, a minimum of three network interfaces are required: ■ Two interfaces for network traffic capturing[2]. ■ One interface for communication with the Reporter system. When using a network-copy port, a minimum of two network interfaces are required: ■ One interface for network traffic capturing. ■ One interface for communication with the Reporter system.

[1] Capturing data with a network-tap device prevents the use of a cascaded taps configuration.

[2] For up and down stream traffic. Note that the use of taps that integrate up and down stream traffic on one line is not recommended.

Important: Please note that an Intel (or compatible) 64-bit platform is a *strict* requirement for both the hardware and the operating system in all deployment scenarios.

1.6 Software Requirements

The following GNU/Linux distributions are supported:

- Oracle Enterprise Linux 5.*x*
- RedHat Enterprise Linux 5.*x*

Encrypting Sensitive Data

If sensitive data needs to be encrypted using the `ecryptfs` utility, you will require Oracle Enterprise Linux 5.2. For more information, see Section 3.3.7, "Securing Sensitive Data".

1.7 Network Requirements

- All server system clocks should be synchronized via NTP using UDP port 123.
- Support DNS information requests over TCP and UDP port 53.
- Support reports and e-mail alerts using TCP port 25.
- Support SNMP traps on request from an SNMP Manager using UDP port 161/162.
- The RUEI user interface is accessible over HTTPS port 443.
- Each remote Collector system should be accessible by the Reporter system over port 22. It is recommended all other ports be blocked.

1.8 Client Requirements

The workstations that will access the RUEI user interface must have one of the following browsers installed:

- Mozilla Firefox 2.0.
- Internet Explorer 6 SP2.
- Internet Explorer 7.

Note that Javascript must be enabled. No other plug-ins are required.

In addition, the workstation should have a screen resolution of 1024 * 768 (or higher).

Important: Ensure that any pop-up blocker within the browser has been disabled.

AJAX Support

RUEI uses AJAX to enhance its user interaction. Internet Explorer relies on the MSXML control to facilitate AJAX. The AJAX dependencies can trigger a security warning when using strict security settings.

Internet Explorer 6 does not properly support transparent images in the PNG format. RUEI uses a well know fix (AlphaImageLoader) for this problem which relies on DirectX. If you are experiencing browser crashes with IE6, you may need to update your version of DirectX. The PNG fix can trigger a security warning when using strict security settings.

2

Installing RUEI

This chapter describes the procedure for preparing the server system(s) for RUEI, and installing the RUEI software. This is performed by a system administrator. Post-installation configuration of the RUEI system is described in Chapter 3.

> **Note:** Throughout this guide is is assumed that you are logged on as `root`, unless indicated otherwise.

Before you start

Before starting the installing procedure described in the following sections, ensure you have the following information to hand:

- The IP address of the RUEI system.
- The `root` password.

2.1 Overview

The process of preparing the server system, and installing the RUEI software, has the following phases:

1. Install the Linux operating system. This is described in Section 2.2, "Installing the Linux Operating System".
2. Install and configure the Oracle database. This is described in Section 2.3, "Installing and Configuring the Oracle Database".
3. Configure the Apache Web server. This is described in Section 2.4, "Installing the Apache Web Server and PHP".
4. Install the RUEI software. This is described in Section 2.5, "Installing the RUEI Software".

> **Important:** The installation procedure described in the following sections assumes that each system is dedicated to RUEI. Indeed, it is strongly recommended that RUEI is only installed on dedicated systems.

Obtaining the RUEI Software

The RUEI software is available from the Oracle E-Delivery Web site (`http://edelivery.oracle.com`). Select the following media pack criteria:

- Product pack: Oracle Enterprise Manager.

- Platform: Linux Intel (64-bit).

Select the required media pack from the displayed list and download.

Upgrading to Release 4.5.2

The procedure for upgrading an existing RUEI 4.5.0 or 4.5.1 installation to release 4.5.2 is fully explained in Section 2.6, "Upgrading from RUEI 4.5.x to 4.5.2". For information on upgrading to RUEI 4.5.2 from a release prior to 4.5.0, please contact Customer Support.

2.2 Installing the Linux Operating System

The procedure for installing Oracle Enterprise Linux 5.*x* is fully described in the product documentation. This section presents a summary of that procedure, and assumes a sound knowledge of Linux administration.

Although the installation procedure described in this section is based on Oracle Enterprise 5.*x*, the procedure for installing RedHat Enterprise Linux 5.*x* is virtually identical. For information on vendor-specific variations, consult the appropriate documentation.

Obtaining the Linux Operating System

The Oracle Enterprise Linux 5.*x* software is available from the Oracle E-Delivery Web site (`http://edelivery.oracle.com/linux`).

2.2.1 Download ISO Image and Burn CD

1. Download the appropriate ISO image. This should be Oracle or RedHat Enterprise Linux 5.*x* for the x86 64-bit architecture.
2. Unzip each of the files.
3. Burn the ISO files to CD. The operating system consists of six[1] CDs. Note that this requires the use of a CD-burning utility (such as UltraISO or Magic ISO Maker).

> **Note:** According to your corporate policy, the installation procedure may use a different procedure to that described in the following sections.

2.2.2 Run Installer

> **Note:** After installing Linux on the first node, repeat the Linux installation on the next required system(s).

1. Ensure that server system is able to boot from CD. Insert Oracle Enterprise Linux CD #1 into the first server, and power on.
2. When the Oracle Enterprise Linux boot screen appears, press **Enter** to start the installation process.

[1] This guide assumes an Oracle Enterprise Linux 5.2 installation (which has six CDs). Oracle Enterprise 5.0 and 5.1 has five CDs.

3. When asked to test the CD media, select **Skip**. After a short interval, the installer goes into GUI mode. (The media test is not necessary because the CD burning software would have informed you of any errors on the media).
4. At the Welcome to Oracle Enterprise Linux screen, click **Next**.
5. Select the appropriate options from the Language and Keyboard settings screens.
6. If the installer detects a previous version of Enterprise Linux, you are prompted to "Install Enterprise Linux" or "Upgrade an existing installation". Select "Install Enterprise Linux", and click **Next**.

Important: Oracle recommends that you install the Linux operating system with the default software packages (RPMs), and that you do not customize the RPMs during installation. This installation includes most required packages, and helps you limit manual checks of package dependencies.

2.2.3 Set up Disk Partitioning

1. When prompted, select the default **Remove Linux partitions on selected drives and create default layout** option, and check the option **Review and modify partitioning layout**. When prompted to confirm your selection, select **Yes**. Click **Next** to continue.

Note: A check box allows you to encrypt the entire system. If selected, for security reasons, a password is required during booting the system.

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2. When prompted to confirm the removal of all partitions, click **Yes**.
3. Review and modify (if necessary) the automatically selected disk partitions.

   For most automatic layouts, the installer assigns 100 MB for `/boot`, 2 GB for swap, and the remainder is assigned to the root (`/`) partition. The specified swap space is not enough for a working RUEI installation. See Table 2–1 and Table 2–2 for required disk space and swap space requirements.

   The installer creates a disk configuration using the Logical Volume Manager (LVM). For example, it will partition the first hard drive (`/dev/sda` in the described configuration) into two partitions: one for the `/boot` partition (`/dev/sda1`), and the remainder of the disk dedicated to a LVM named VolGroup00 (`/dev/sda2`). The LVM Volume Group (`VolGroup00`) is then partitioned into two LVM partitions: one for the root file system (`/`), and another for swap. If you have selected a non-standard layout, ensure that the system meets the required disk space specifications shown in Table 2–1. Ensure enough swap space is allocated for Oracle Enterprise Linux. Its required swap space is shown in Table 2–2.

Table 2–1 Required Disk Space Specifications

Partition	Minimum Required Disk Space (GB)
`/u01/app/`[1]	300
`/home/moniforce/`	100

[1] This is the example location of the database used throughout this guide.

Table 2–2 Required Swap Space

Available RAM	Swap Space Required
Up to 8192 MB	Equal to the size of RAM
More than 8192 MB	0.75 times the size of RAM

Important: The Reporter server requires high performance data storage. RAID-0 or RAID-5 (or equivalent) storage configurations with high performance disks are strongly recommended.

Note: The requirements shown in Table 2–1 and Table 2–2 can vary depending upon the composition and volume of monitored data. For more information, please contact Customer Support.

4. Accept the GRUB boot loader, as well as all default values, and click **Next**.

2.2.4 Network Configuration

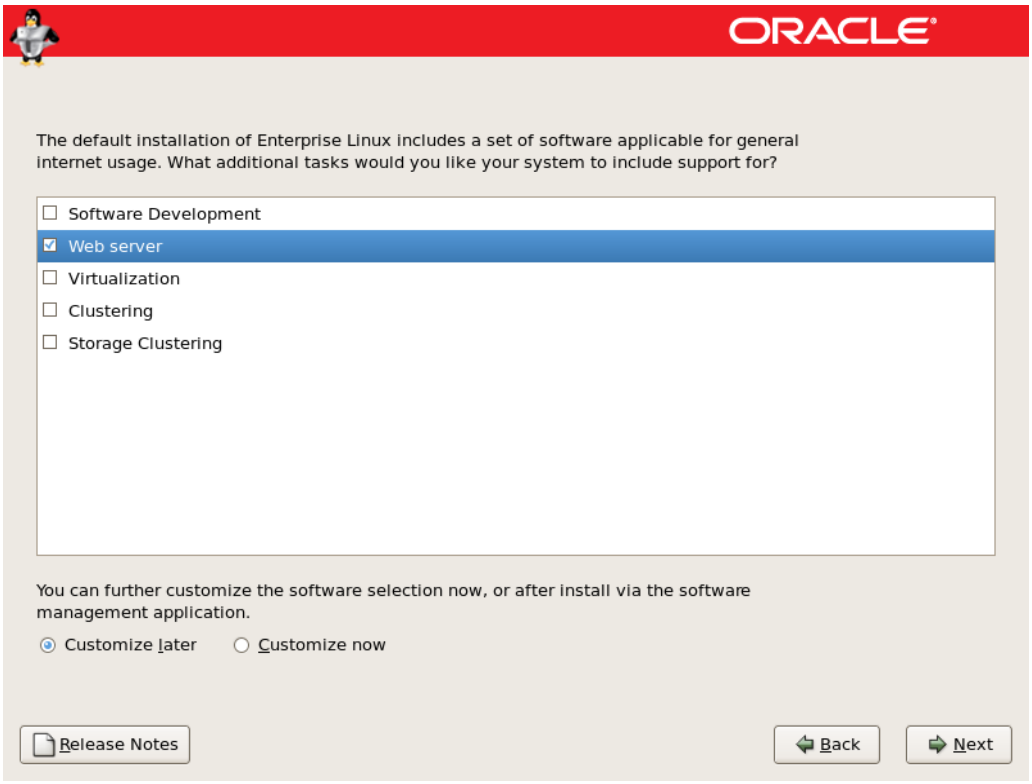
1. Ensure that a static IP address is assigned to the interface used to access the RUEI Web interface. In addition, the assigned IP address should be configured in the `/etc/hosts` file. If necessary, ensure that all Reporter and Collector systems are correctly defined in the DNS system.
2. Ensure that the network interface(s) used for network packet monitoring are administratively *up*, but *without* an IP address.

Important: Make the network interface *up* status permanent (after a reboot) by setting the ONBOOT parameter of the capturing interfaces to *yes* in the interface configuration files. The network interfaces configuration can be found in `/etc/sysconfig/networking/devices/ifcfg-eth`*`X`* (where *`X`* represents the necessary network interface). Alternatively, use the graphical utility **system-config-network** to set the appropriate interfaces to "activate device when computer starts".

2.2.5 Package Installation

1. Select the appropriate time zone for your environment, and click **Next**.
2. Specify a root password, and click **Next**.
3. At the additional tasks dialog box shown in Figure 2–1, check the **Web server** check box, leave the **Customize later** radio button checked, and click **Next**.

Figure 2–1 Additional Tasks Dialog Box



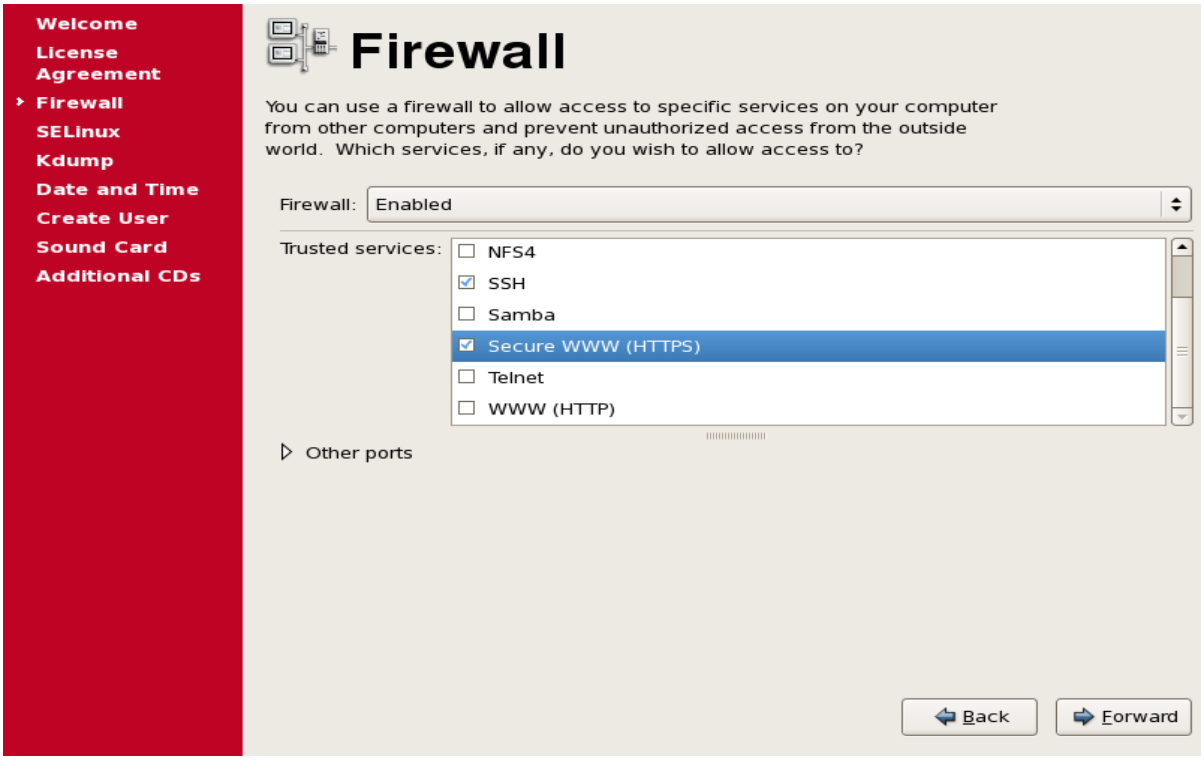
4. At the **About to install** screen, click **Continue** to start the installation.
5. Depending on the packages you have selected to install, you will be prompted to insert additional CDs. At the prompt screen, click **Next** to begin installation of Enterprise Linux.
6. Upon successful installation, remove the CD, and click **Reboot**.

> **Important:** It is *strongly* recommended that you use the settings described above, and do not perform a "minimal" installation of Oracle Enterprise Linux. This can lead to a wide range of problems, further described in Section A.8, "Missing Packages and Fonts Error Messages".

2.2.6 Post-Installation Wizard

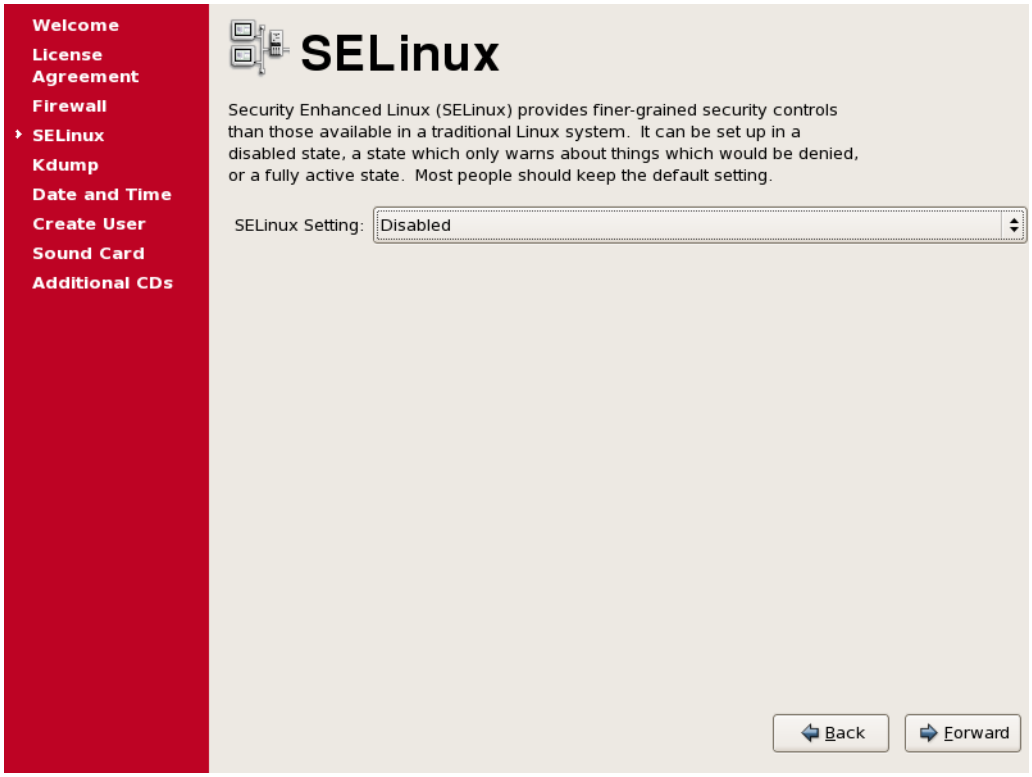
1. When the system boots for the first time, a post-installation wizard appears, and allows you to finalize the operating system configuration settings. Click **Forward**.
2. At the User license agreement screen, read the license terms. You cannot proceed until you have accepted the license terms. Then click **Forward**.
3. Use the screen shown in Figure 2–2 to allow only secure WWW (HTTPs) and SSH traffic. Be aware that, by default, SSH traffic is enabled, but secure WWW (HTTPS) traffic is not. Note that, when prompted with a warning about not setting the firewall, click **Yes**.

Figure 2–2 Firewall Configuration



4. Use the screen shown in Figure 2–3 to disable Security Enhanced Linux (SELinux). Click **Forward**. Note that you are prompted with a warning that changing the SELinux setting requires rebooting the system so that the entire system can be relabeled. Click **Yes**.

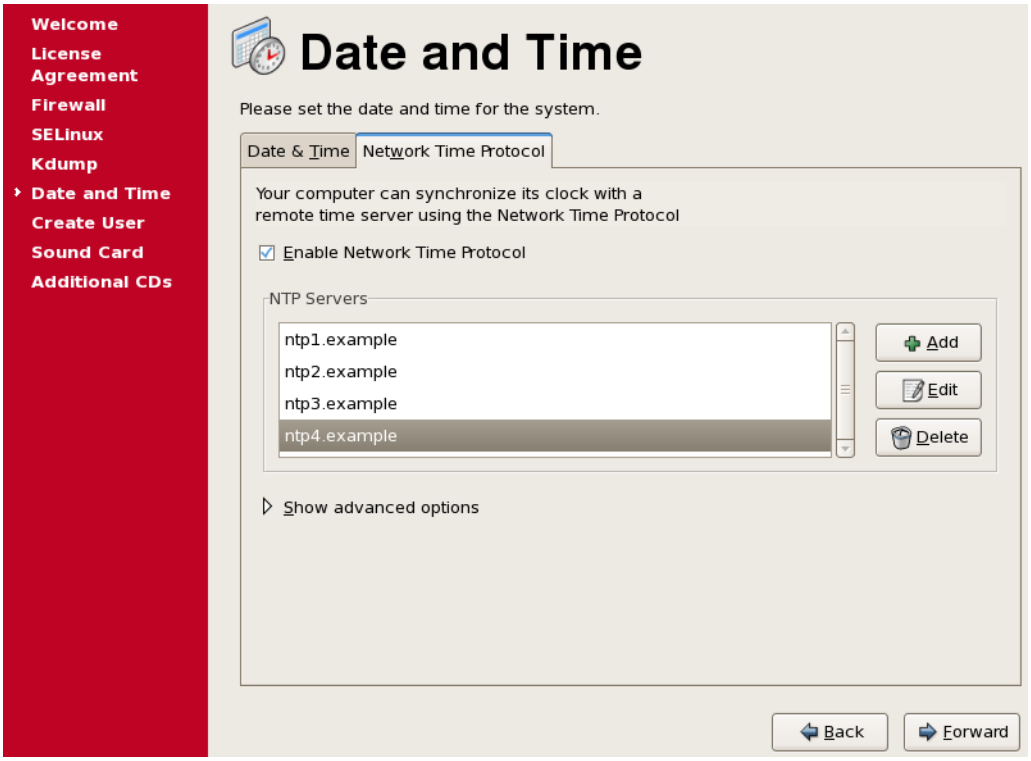
Figure 2–3 SELinux Configuration



Important: Security Enhanced Linux (SELinux) must be disabled for correct operation of RUEI.

5. Accept the default setting on the Kdump screen (disabled), and click **Forward**.
6. Adjust the date and time settings using the screen shown in Figure 2–4. The use of NTP is strongly recommended, and is required in a split-server deployment. Click **OK**.

Figure 2–4 Date and Time Settings



2.2.7 Create Additional Users and Reboot

1. Create any additional required (non-Oracle) operating system user accounts. Note that during the installation of the RUEI software, the `moniforce` user account is created. The creation of the `oracle` user is described in a later section. Do *not* create either user account at this point.
2. If prompted, confirm the detection of a sound card.
3. On the Additional CDs screen, click **Finish**.
4. Because the SELinux option has been changed (to disabled), you are prompted to reboot the system. Click **OK**.
5. After reboot, use the `root` user account, and the password you specified during installation to logon.

Text Mode Installation (Optional): When using the text mode installation, by default:

- Firewall: HTTPS (TCP 443) is blocked.
- Security: SE Linux is enabled.

Allow HTTPS traffic (TCP 443) and disable SElinux using the **system-config-securitylevel** utility.

Kickstart installation (tip): In addition to the base installation, two additional packages are required: `web-server` and `gnome-desktop`. You can include these package names in the %package section of your kickstart configuration file.

2.2.8 Verify NTP Daemon Operation

Because the NTP daemon is a critical component of RUEI, it is recommended that you verify that it is activated in at least run level 5 during boot. Use the following commands:

```
/sbin/chkconfig --list | grep ntp
ntpd     0:off   1:off   2:off   3:off   4:off   5:off   6:off
chkconfig ntpd on
/sbin/chkconfig --list | grep ntp
ntpd     0:off   1:off   2:on    3:on    4:on    5:on    6:off
/etc/init.d/ntpd start
Starting ntpd:                                     [  OK  ]
```

Note that if the NTP daemon is not already running, you can start it with the command

```
/etc/init.d/ntpd restart
```

The following sample output show when the NTP daemon is synchronized (indicated by an "*").

```
ntpq -pn
       remote           refid      st t when poll reach   delay   offset  jitter
  ==============================================================================
  *194.171.167.130 .PPS.          1 u 994 1024 377     6.429   0.041   0.093
  +80.85.129.25    130.235.20.3   3 u 725 1024 377     4.435   0.673   0.129
  +82.94.235.106   135.81.191.59 2 u 678 1024 377     1.709   1.774   0.020
   127.127.1.0     .LOCL.        10 l   8   64 377     0.000   0.000   0.001
```

2.3 Installing and Configuring the Oracle Database

This section describes the procedure for installing the Oracle database and its required components.

Download Oracle Database 11g Release 1 (11.1.0.6.0) Standard Edition, Standard Edition One, and Enterprise for Linux x86-64 Edition from the Oracle database home page (http://www.oracle.com/technology/software/products/database/index.html).

The procedure for installing the Oracle database is fully described in the product documentation. This section presents a summary of that procedure.

In addition, it is recommended that you download and review the information in the *Oracle Database 11g for Linux x86-64 Quick Installation Guide* (available at http://download.oracle.com/docs/cd/B28359_01/install.111/b32285/toc.htm).

Dependencies/Requirements

The following (or later versions of) Oracle Enterprise Linux 5.*x* and RedHat Enterprise Linux 5.*x* should be installed before installing the 11g database.

```
binutils-2.17.50.0.6
compat-libstdc++-33-3.2.3
compat-libstdc++-33-3.2.3 (32 bit)
elfutils-libelf-0.125
elfutils-libelf-devel-0.125
gcc-4.1.1
gcc-c++-4.1.1
glibc-2.5-12
glibc-2.5-12 (32 bit)
glibc-common-2.5
glibc-devel-2.5
glibc-devel-2.5-12 (32 bit)
libaio-0.3.106
libaio-0.3.106 (32 bit)
libaio-devel-0.3.106
libgcc-4.1.1
libgcc-4.1.1 (32 bit)
libstdc++-4.1.1
libstdc++-4.1.1 (32 bit)
libstdc++-devel 4.1.1
make-3.81
sysstat-7.0.0
```

Memory Usage

The Oracle database's maximum memory usage is set by the `MEMORY_TARGET` parameter. By default, this is set to 40% of the available server RAM. For example, in a system with 16 GB RAM, it is set to approximately 6.4 GB.

Note that if extra RAM is added to the server system to increase performance, it is not made available to the Oracle database until the `MEMORY_TARGET` parameter is manually increased.

Information about automatic memory management is available at http://download.oracle.com/docs/cd/B28359_01/server.111/b28310/memory003.htm#ADMIN11200.

2.3.1 Installing the Required Packages

1. Insert the Oracle or RedHat Enterprise Linux 5.*x* CD #1, and issue the following commands:

```
cd /media/cdrom/Server
rpm -Uhv kernel-headers-2.6.18-92.el5.x86_64.rpm
cd /
eject
```

2. Insert the Oracle or RedHat Enterprise Linux 5.*x* CD #2[2], and issue the following commands:

```
cd /media/cdrom/Server
rpm -Uhv elfutils-libelf-devel-0.125-3.el5.x86_64.rpm \
elfutils-libelf-devel-static-0.125-3.el5.x86_64.rpm
rpm -Uhv glibc-devel-2.5-* glibc-headers-2.5-24.x86_64.rpm
rpm -Uhv gcc-4.1.2-42.el5.x86_64.rpm gcc-c++-4.1.2-42.el5.x86_64.rpm \
libstdc++-devel-4.1.2-42.el5.x86_64.rpm libgomp-4.1.2-42.el5.x86_64.rpm
cd /
```

[2] The required CD assumes an Oracle Enterprise Linux 5.2 installation. For other versions, the required CD may differ.

3. Insert the Oracle or RedHat Enterprise Linux 5.*x* CD #3, and issue the following commands:

```
cd /media/cdrom/Server
rpm -Uhv libaio-devel-0.3.106-3.2.x86_64.rpm
cd /
eject
```

4. Insert the Oracle or RedHat Enterprise Linux 5.*x* CD #4[2], and issue the following commands:

```
cd /media/cdrom/Server
rpm -Uhv sysstat-7.0.2-1.el5.x86_64.rpm
cd /
eject
```

Required Components and Using a Yum Repository (Optional)

As an alternative to manual installation, you can use a Yum repository to install the required RPMs. This requires a working Yum repository. For information on Yum repositories, see http://linux.duke.edu/projects/yum/. Install the necessary Oracle packages using the following commands:

```
yum -y install gcc
yum -y install gcc-c++
yum -y install compat-libstdc++-33
yum -y install libstdc++-devel
yum -y install elfutils-libelf-devel
yum -y install glibc-devel
yum -y install libaio-devel
yum -y install sendmail-cf
yum -y install sysstat
```

Install the necessary RUEI packages using the following commands:

```
yum -y install perl-URI
yum -y install net-snmp
yum -y install sendmail-cf
yum -y install httpd
yum -y install php
yum -y install php-gd
yum -y install php-pear
yum -y install php-mbstring
yum -y install bitstream-vera-fonts
yum -y install librsvg2
yum -y install xorg-x11-xinit
```

2.3.2 Creating the Database User Accounts and Groups

1. Create two groups (`dba` and `oinstall`) with the following commands:

```
/usr/sbin/groupadd dba
/usr/sbin/groupadd oinstall
```

2. Create the `oracle` user, and specify `oinstall` as the primary group and `dba` as the secondary group, with the following command:

```
/usr/sbin/useradd -g oinstall -G dba oracle
```

3. Set the `oracle` user password with the following command:

```
passwd oracle
```

2.3.3 Configuring the Kernel Parameter Settings

1. Modify the `/etc/sysctl.conf` file to satisfy the Oracle installer's requirements by adding the following lines:

```
kernel.sem = 250 32000 100 128
net.ipv4.ip_local_port_range = 1024 65000
net.core.rmem_default = 4194304
net.core.rmem_max = 4194304
net.core.wmem_default = 262144
net.core.wmem_max = 262144
fs.file-max = 6553600
```

2. Make these changes effective immediately with the following command:

```
sysctl -p
```

2.3.4 Setting Shell Limits for the Oracle User

1. To improve the performance of the software, you must increase the shell limits for the `oracle` user. Add the following lines to the `/etc/security/limits.conf` file:

```
oracle soft nproc 2047
oracle hard nproc 16384
oracle soft nofile 1024
oracle hard nofile 65536
```

2. If not already present, add the following lines to the `/etc/pam.d/login` file:

```
session required /lib64/security/pam_limits.so
session required pam_limits.so
```

3. Depending on the `oracle` user's default shell, you need to make changes to it. For the Bourne, Bash, or Korn shell, add the following lines to the bottom of the `/etc/profile` file:

```
if [ $USER = "oracle" ]; then
    if [ $SHELL = "/bin/ksh" ]; then
        ulimit -p 16384
        ulimit -n 65536
    else
        ulimit -u 16384 -n 65536
    fi
fi
```

   For information about other shells, you should refer to the *Oracle Database 11g Release 1 for Linux x86-64 Quick Installation Guide* (at http://download.oracle.com/docs/cd/B28359_01/install.111/b32285/toc.htm).

2.3.5 Creating the Database Directory

Throughout this guide it is assumed that the directory `/u01/app` is the root of the Oracle installation. This is specified in the ORACLE_BASE environment variable.

1. Enter the following command to display information about all mounted file systems:

```
df -k
```

This command displays information about all the file systems mounted on the system, including:

- The physical device name
- The total amount, used amount, and available amount of disk space
- The mount point directory for that file system

2. Create the necessary subdirectories in the mount point directory that you identified and set the appropriate owner, group, and permissions for them using commands similar to the following:

```
mkdir -p /u01/app
chown -R oracle:oinstall /u01/app
chmod -R 775 /u01/app
```

2.3.6 Configuring the Oracle User's Environment

1. Logon to the system as the `oracle` user and add or edit the `umask` setting in the `~/.bash_profile` file to the following:

```
umask 022
```

2. Make the setting active for the current shell by issuing the following command:

```
. ./.bash_profile
```

3. Set the ORACLE_BASE environment variable to define the location of the root of the Oracle directory tree:

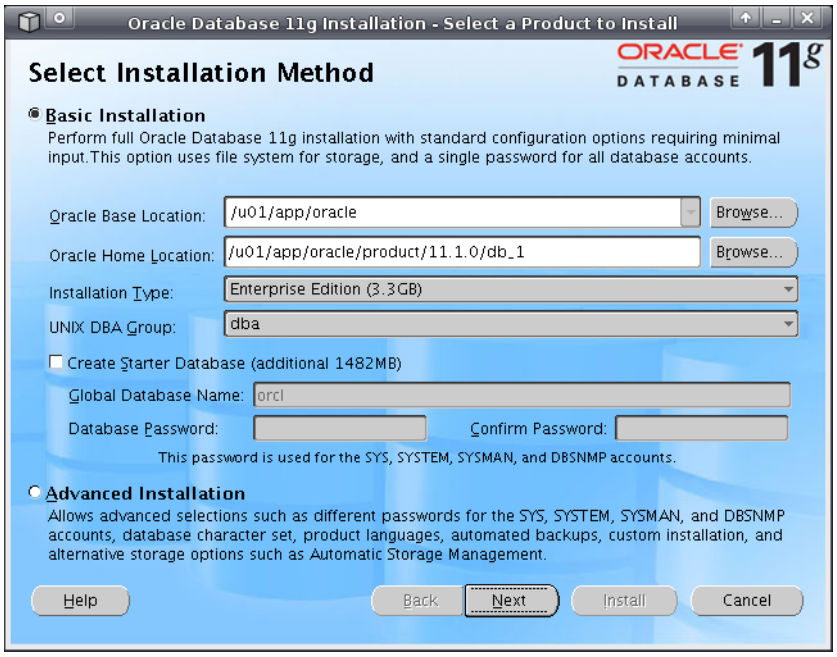
```
export ORACLE_BASE=/u01/app/oracle
```

4. Unzip the Oracle database installation zip file. This creates the directory `database`. Then, run the graphical installer (note this will not run under user `root`). Ensure that your X Window environment is properly set up. In addition, when logging on remotely with SSH, ensure X forwarding is enabled. Use the following commands:

```
cd <location of the zip file>
unzip linux_11gR1_database.zip
./database/runInstaller
```

5. Use the installation wizard, and specify the values shown in Figure 2–5.

Figure 2–5 Select Installation Method



Note that the **Create Starter Database** check box should be unchecked.

6. When ready, click **Next**. Specify the values shown in Figure 2–6. When ready, click **Next**.

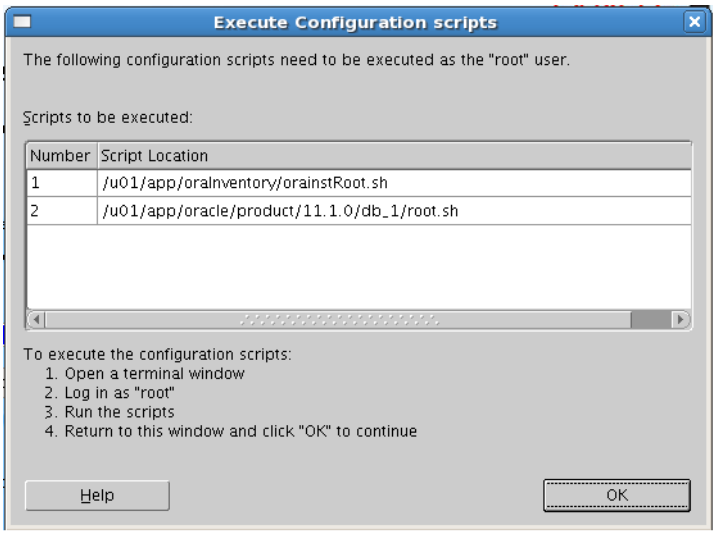
Figure 2–6 Specify Inventory Directory and Credentials

Important: Any warnings or errors reported during database installation (especially any missing prerequisties) must be resolved before proceeding. See Section 2.3.1, "Installing the Required Packages" and Appendix A, "Troubleshooting" for information about required components.

If all dependencies are met, you can click **Next**.

7. When installation is almost complete, you are prompted to run two scripts, `orainstRoot.sh` and `root.sh`, as `root`. This is shown in Figure 2–7.

Figure 2–7 Configuration Scripts



Run the two scripts indicated in Figure 2–7. They should be run in a terminal window as `root`. You will receive output similar to the following:

```
/u01/app/oraInventory/orainstRoot.sh
Changing permissions of /u01/app/oraInventory to 770.
Changing groupname of /u01/app/oraInventory to oinstall.
The execution of the script is complete

Finished product-specific root actions.
```

The second script generates the following output:

```
/u01/app/oraInventory/orainstRoot.sh
Changing permissions of /u01/app/oraInventory to 770.
Changing groupname of /u01/app/oraInventory to oinstall.
The execution of the script is complete

/u01/app/oracle/product/11.1.0/db_1/root.sh
Running Oracle 11g root.sh script...

The following environment variables are set as:
    ORACLE_OWNER= oracle
    ORACLE_HOME=  /u01/app/oracle/product/11.1.0/db_1

Enter the full pathname of the local bin directory: [/usr/local/bin]:
```

```
   Copying dbhome to /usr/local/bin ...
   Copying oraenv to /usr/local/bin ...
   Copying coraenv to /usr/local/bin ...

Creating /etc/oratab file...
Entries will be added to the /etc/oratab file as needed by
Database Configuration Assistant when a database is created
Finished running generic part of root.sh script.
Now product-specific root actions will be performed.
Finished product-specific root actions.
```

On completion of each script, return the dialog shown in Figure 2–7, and click **OK**. In the main installer screen, verify that the message "The installation of Oracle database 11g was successful" appears. Click **Exit**, and confirm by clicking **Yes**.

2.3.7 Creating an Oracle init Script File

1. Create an `/etc/init.d/oracledb` script file (as `root`) to start and stop the Oracle database. It should contain the following:

```
#!/bin/bash
#
# /etc/init.d/oracledb
#
# chkconfig: 2345 95 10
# description: Run-level Startup script for the Oracle Listener and
# Instances. It relies on the information in /etc/oratab

export ORACLE_BASE=/u01/app/oracle
export ORACLE_HOME=/u01/app/oracle/product/11.1.0/db_1
export ORACLE_OWNR=oracle
export PATH=$PATH:$ORACLE_HOME/bin

if [ ! -f $ORACLE_HOME/bin/dbstart -o ! -d $ORACLE_HOME ]
then
    echo "Oracle startup: cannot start"
    exit 1
fi

case "$1" in
    start)
        # Oracle listener and instance startup
        echo -n "Starting Oracle: "
        su $ORACLE_OWNR -c "$ORACLE_HOME/bin/lsnrctl start"
        su $ORACLE_OWNR -c "$ORACLE_HOME/bin/dbstart $ORACLE_HOME"
        touch /var/lock/oracle
        echo "OK"
        ;;
    stop)
        # Oracle listener and instance shutdown
        echo -n "Shutdown Oracle: "
        su $ORACLE_OWNR -c "$ORACLE_HOME/bin/lsnrctl stop"
        su $ORACLE_OWNR -c "$ORACLE_HOME/bin/dbshut $ORACLE_HOME"
        rm -f /var/lock/oracle
        echo "OK"
        ;;
    reload|restart)
        $0 stop
        $0 start
        ;;
```

```
    *)
        echo "Usage: `basename $0` start|stop|restart|reload"
        exit 1
esac
exit 0
```

A copy of this initialization script is available in the RUEI installation zip file (in `/root/RUEI/45`). Note that you will need to modify the settings for the ORACLE_BASE and ORACLE_HOME environment variables shown above if you selected a different installation directory for the Oracle database.

2. Make the script file executable and use it to start the Oracle database with the following commands:

```
chmod +x /etc/init.d/oracledb
/sbin/chkconfig --add oracledb
service oracledb start
```

2.4 Installing the Apache Web Server and PHP

This section describes the installation and configuration of the Apache Web server, and the components that use it.

2.4.1 PHP Configuration

1. Ensure that the Web server starts automatically by issuing the following command:

```
/sbin/chkconfig httpd on
```

2. Edit the `/etc/sysconfig/httpd` file to include the following lines:

```
export LD_LIBRARY_PATH=/usr/local/instantclient/lib
export TNS_ADMIN=/home/moniforce
```

3. Add or edit the following settings in the `/etc/php.ini` file:

```
session.gc_maxlifetime = 14400
memory_limit = 96M
upload_max_filesize = 128M
post_max_size = 128M
```

4. Explicitly set the required time zone in the [Date] section. For example:

```
[Date]
; Defines the default timezone used by the date functions
date.timezone = "Europe/Amsterdam"
```

Important: The time zone specified here determines the time displayed in the Reporter interface. Therefore, ensure that the time zone is set according to your local needs. The time zone specified here must to be the same as the time zone specified in the operating system. If the time zone was correctly set during Linux installation, you can obtain the time zone information from the `ZONE` variable in `/etc/sysconfig/clock`. A complete list of available time zones can be found at http://us3.php.net/manual/en/timezones.php.

2.4.2 Install the PHP mbstring Module

Insert CD #3 and mount it. For example, mount `/dev/hdc /mnt/cdrom`. Then issue the following commands:

```
cd /media/cdrom/Server
rpm -Uhv php-mbstring-5.1.6-*
```

2.4.3 Install the PHP GD Module (Optional, But Recommended)

1. The GD module is required for changing the company logo in the RUEI dashboard. Install the RPM from CD #3 using the following commands:

   ```
   cd /media/cdrom/Server
   rpm -Uhv php-gd-5.1.6-*
   ```

2.4.4 Install the PEAR Modules (Optional, But Recommended)

In order to install Microsoft Excel export support in RUEI, you will need to install the PEAR package manager.

1. Prepare the PEAR environment by setting the following environment variables:

   ```
   export ORACLE_HOME=/u01/app/oracle/product/11.1.0/db_1
   export PATH=$PATH:/u01/app/product/11.1.0/db_1/bin
   ```

2. Install the RPM from CD #4 using the following commands:

   ```
   cd /media/cdrom/Server
   rpm -Uhv php-pear-1.4.9-*.rpm
   ```

3. Download the PEAR::Spreadsheet_Excel_Writer package from `http://pear.php.net/package/Spreadsheet_Excel_Writer`, and the PEAR::OLE package from `http://pear.php.net/package/OLE`. Note that Spreadsheet Excel Writer version 0.9.1 and OLE version 0.6 are required.

4. Install the modules by issuing the following commands as the `root` user:

   ```
   pear install OLE-0.6.0.tgz
   install ok: channel://pear.php.net/OLE-0.6.0
   pear install Spreadsheet_Excel_Writer-0.9.1.tgz
   install ok: channel://pear.php.net/Spreadsheet_Excel_Writer-0.9.1
   ```

   Note that any warnings received during installation of the above modules can be safely ignored as long as the last report line reads "install OK".

5. Verify that the modules are installed correctly (directories `/usr/share/pear/Spreadsheet` and `/usr/share/pear/OLE` should be present).

2.4.5 Avoiding rsvg Warnings

RUEI uses rsvg for graph generation. In order to avoid warnings about a missing directory, create the empty `.gnome` directory using the following command:

```
mkdir -p /var/www/.gnome2
```

2.5 Installing the RUEI Software

Copy the downloaded RUEI zip file to `/root` directory on the server, and unzip it. Use the following commands:

```
cd /root
unzip package_name.zip
```

The following directories are created which contain the software needed to complete the RUEI installation:

- /root/RUEI/45
- /root/RUEI/ZendOptimizer
- /root/RUEI/IC
- /root/RUEI/PHP

2.5.1 Installing the Oracle Database Instant Client

1. Install the Oracle database Instant Client and SQLplus extension with the following commands as the root user:

   ```
   cd /root/RUEI/IC
   rpm -Uhv oracle-instantclient-basic-11.1.0.*.rpm
   rpm -Uhv oracle-instantclient-sqlplus-11.1.0.*.rpm
   ```

2. Create symlinks for the Oracle database Instant Client using the following commands:

   ```
   mkdir -p /usr/local/instantclient
   ln -sv /usr/lib/oracle/11.1.0.1/client64/lib /usr/local/instantclient
   ln -sv /usr/lib/oracle/11.1.0.1/client64/bin /usr/local/instantclient
   ```

2.5.2 Installing the php-oci8 Module

Install the php-oci8 module (this is part of the RUEI distribution set) using the following commands:

```
cd /root/RUEI/PHP
rpm -Uhv php-oci8-5.1.6-*
```

2.5.3 Installing the Zend Optimizer

Go to the directory containing the Zend Optimizer code, unpack the tar file, and run the Zend optimizer code installer. Read the user license agreement. You cannot proceed until you have accepted the license agreement. Accept all default settings, and allow the installer to restart the Apache Web server. Issue the following commands:

```
cd /root/RUEI/ZendOptimizer
tar zxvf ZendOptimizer-3.3.3-linux-glibc23-x86_64.tar.gz
cd ZendOptimizer-3.3.3-linux-glibc23-x86_64
./install
```

2.5.4 Installation of the RUEI Software

1. Add the following lines to the /home/oracle/.bash_profile for the environment variable for the RUEI installer:

   ```
   ORAENV_ASK=NO
   . oraenv
   ```

2. Run the prepare_uxinsight_db.sh script as root. It is located in the /root/RUEI/45 directory. You are prompted to set ORACLE_HOME. In this

guide, this is assumed to be /u01/app/oracle/product/11.1.0/db_1. Make the script executable and run it using the following commands:

```
chmod +x prepare_uxinsight_db.sh
./prepare_uxinsight_db.sh
```

Note: The prepare_uxinsight_db.sh script can be run with the --clean option to remove the current database and install a new one. Note that the ux-core RPM also needs to be re-installed with the --force option when this option has been used.

3. Password credentials for connecting to the database are stored in an Oracle wallet. The script will prompt you for the RUEI database user password and the password used to protect the wallet. Once the wallet password is stored in a secure location, the RUEI application can login to the database automatically. The default location of the wallet files are cwallet.sso and ewallet.p12 in the /home/moniforce directory.
4. Add the following lines to the /etc/profile file to make the Oracle database known to RUEI:

   ```
   ORACLE_SID=ux
   export ORACLE_SID
   ```

5. Go to the directory which holds the RUEI software, and install the RUEI RPM packages with the following commands:

   ```
   cd /root/RUEI/45
   rpm -Uhv ux-*
   ```

6. Restart the Apache Web server using the following command:

   ```
   service httpd restart
   ```

7. If installation of the above RPMs fail, change to the moniforce user and obtain an SQL*Plus prompt with the following commands:

   ```
   su - moniforce
   sqlplus /@uxinsight
   ```

   You should receive the SQL*Plus command line without being prompted for a password. This indicates that the Oracle wallet authentication was successful. Do not proceed further with the installation and configuration procedure until this step is successfully performed. If you encounter problems, please refer to Appendix A, "Troubleshooting".

8. Change to the moniforce user and set the RUEI Administration password to enable logging on to the RUEI interface with the following commands:

   ```
   su - moniforce
   set-admin-password
   ```

   You are prompted to enter and confirm the password.

Note: When defining the Administrator password, bear the following in mind:

- The password must have at least eight characters, and contain at least one non-alphanumeric character (such as $, @, &, and !).
- The password must be changed within seven days.
- The password is case sensitive.

9. If necessary, reset the database quota with the following commands:

```
su - moniforce
set-tablespace-quota
```

By default, the maximum size of the RUEI database (`ux`) is set is to 200 GB. If additional disk space is available, you can increase the maximum size limit. When this limit is reached, the oldest data is removed to make room for the most recent data.

2.5.5 Configuring the Network Interface

Make the monitoring network interface *up* status permanent (after a reboot) by setting the ONBOOT parameter of the capturing interfaces to *yes* in the interface configuration files. The network interfaces configuration can be found in `/etc/sysconfig/networking/devices/ifcfg-eth`*X* (where *X* represents the necessary network interface). Alternatively, use the graphical utility **system-config-network** to set the appropriate interfaces to "activate device when computer starts".

2.5.6 Mail (MTA) Configuration (Optional, Reporter Only)

RUEI assumes a working local MTA for sending PDF reports and E-mail alerts. By default, Enterprise Linux uses the Sendmail MTA. By default, Sendmail will deliver the E-mail directly to the destination MTA. If this behavior is not according to your needs or policies, sending mail via a SmartHost (relay) might be an alternative. To configure a SmartHost in Sendmail, do the following:

1. Install the `sendmail-cf` RPM package from CD #2 by mounting the CD. For example, `mount /dev/cdrom /media/cdrom`.
2. Issue the following commands:

```
cd /media/cdrom/Server
rpm -Uhv sendmail-cf-8.13.8-2.el5.x86_64.rpm
```

3. Find the line which contains the Smart Host setting in `/etc/mail/sendmail.mc`. Modify the SMART_HOST setting to your needs. For example:

```
define('SMART_HOST', 'my.example')dnl
```

4. Generate the new configuration into a new `sendmail.cf` by executing the following command:

```
make -C /etc/mail
```

5. Restart sendmail. For example:

```
/etc/init.d/sendmail restart
```

2.5.7 SNMP (Optional, Reporter Only)

1. For SNMP trap support, additional RPMs need to be installed from disk #2. Use the following command:

   ```
   rpm -Uhv lm_sensors-2.10.0-*
   ```

   From disk #4, use the following command:

   ```
   rpm -Uhv net-snmp-utils-5.3.1-* net-snmp-5.3.1-*
   ```

2. You can download the RUEI MIB definition file through the Reporter interface. This definition file can be added to the SNMP manager. The procedure for downloading the MIB file is described in the *Oracle Real User Experience Insight User Guide*.

2.5.8 Configuring Automatic Browser Redirection (optional)

To have the browser automatically redirected to the correct RUEI path, create the file `/var/www/html/index.html` with the following content:

```
<head>
<meta http-equiv="REFRESH" content="0;URL=/ruei/">
</head>
```

2.5.9 Configuring Reporter Communication (Split-Server Setup Only)

A password-less SSH connection must be setup between the Moniforce user from the Reporter system to each Collector system. Do the following:

1. Logon to the Reporter server as root. Issue the following commands:

   ```
   su - moniforce
   ssh-keygen -P ""
   ```

   Press **Enter** to accept the defaults.

2. Logon as `root` on each of the Collector systems. Issue the following commands:

   ```
   su - moniforce
   cd ~/.ssh
   ssh root@Reporter cat /home/moniforce/.ssh/id_rsa.pub >> authorized_keys
   ```

   (you will need to specify the Reporter system root password)

   ```
   chmod 600 authorized_keys
   ```

3. Check that it is now possible to execute a remote command (as `moniforce` user) on the Reporter system without using a password. For example:
   - Logon as root on the Reporter server.
   - Logon as moniforce user: `su - moniforce`.
   - Execute a remote pwd command: `ssh` ***Collector*** `pwd`.
   - Enter yes to the question "Are you sure you want to continue connecting (yes/no)?".
   - The command should return `/home/moniforce`.
4. The above steps must be performed for each Collector!

Note: If the connection between the Reporter and the Collector(s) has not been correctly configured, you will receive an authorization error when you try to register the remote Collector.

2.5.10 Verifying Successful Installation of RUEI

On completion of the Initial Setup Wizard (described in Section 3.1, "Performing Initial RUEI Configuration"), you can verify you installation by selecting **System** > **Maintenance** > **Environment check**. This is fully described in the *Oracle Real User Experience Insight User Guide*.

2.6 Upgrading from RUEI 4.5.*x* to 4.5.2

If you are upgrading an existing RUEI 4.5.0 or 4.5.1 installation to release 4.5.2, you should follow the procedure described in this section. Note that the upgrade procedure takes approximately 45 minutes. During that time, network traffic will continue to be monitored However, there is a short interruption during the installation of the RPM packages, and a temporary loss of current session-related information. In addition, a backlog in processing may occur.

Upgrading a Reporter System

Do the following:

1. Logon onto the Reporter system as `root`, unzip the RUEI software file, and change to the directory containing the application files using the following commands:

   ```
   unzip Vxxxx.zip
   cd RUEI/45
   ```

2. Stop all RUEI processing by logging onto the RUEI Reporter system using the following commands:

   ```
   su - moniforce
   project -stop wg
   exit
   ```

3. Run the `ruei-upgrade-4.5.x-4.5.2.sh` script as `root`. This script performs all prerequisite actions necessary for the upgrade. Use the following command:

   ```
   chmod +x ruei-upgrade-4.5.x-4.5.2.sh
   ./ruei-upgrade-4.5.x-4.5.2.sh
   ```

4. Install the RUEI RPM packages with the following command:

   ```
   rpm -Uhv ux-*
   ```

5. Turn on data processing by issuing the following commands:

   ```
   su - moniforce
   project -start wg
   ```

   At this point, processing of the backlog commences. The time required to do this depends on the system load, and the size of the backlog.

Note: After upgrading, you should use the Reporter interface to review the defined SSL keys, and reactivate any that have deactivated during the upgrade procedure. This only applies to SSL keys with an activation passphase. This is fully explained in the *Oracle Real User Experience Insight User Guide*.

Upgrading Collector-Only systems

Do the following:

1. Logon onto the Collector system as `root`, unzip the RUEI software file, and change to the directory containing the application files using the following commands:

   ```
   unzip Vxxxx.zip
   cd RUEI/45
   ```

2. Install the RUEI RPM packages with the following command:

   ```
   rpm -Uhv ux-*
   ```

3

Configuring RUEI

This chapter describes the procedure for initially configuring RUEI. This task is performed by the individual within your organization who has been assigned the role of RUEI **Administrator**. For more information about roles, see the *Oracle Real User Experience User Guide*.

In order to get RUEI up and running, you will need to have prepared the server systems for RUEI, and installed the RUEI software. This is described in Chapter 2, "Installing RUEI". After that, you are required to specify the installation type and mail setup (described in Section 3.1, "Performing Initial RUEI Configuration"), and then perform some post-installation configuration (described in Section 3.3, "Performing Post-Installation Configuration"). This is necessary in order to start reporting. It includes deciding how pages and users will be identified, and specifying the scope of monitoring in your network environment. Finally, you will need to define the system's initial users, as described in Section 3.3.6, "Authorizing Initial Users". Note that if you are installing a split-server configuration, you will need to configure each Collector system. This is described in Section 3.2, "Configuring a Collector System".

Caution: The configuration of RUEI should be discussed with someone with a detailed knowledge of your organization's network topology.

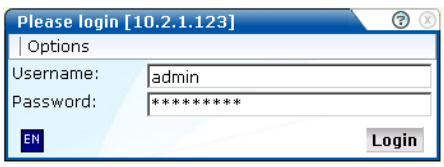
3.1 Performing Initial RUEI Configuration

In order for RUEI to start data monitoring and reporting, it must be configured with some information about your network infrastructure. Once completed, user traffic reporting is available. Note that this initial configuration can be changed later, as necessary. It is only intended to provide RUEI with sufficient information to start real-user monitoring and reporting.

To perform the initial RUEI configuration, do the following:

1. Start the Initial setup wizard by pointing your browser at `https://`***`Reporter`***`/ruei`. The dialog shown in Figure 3–1 appears:

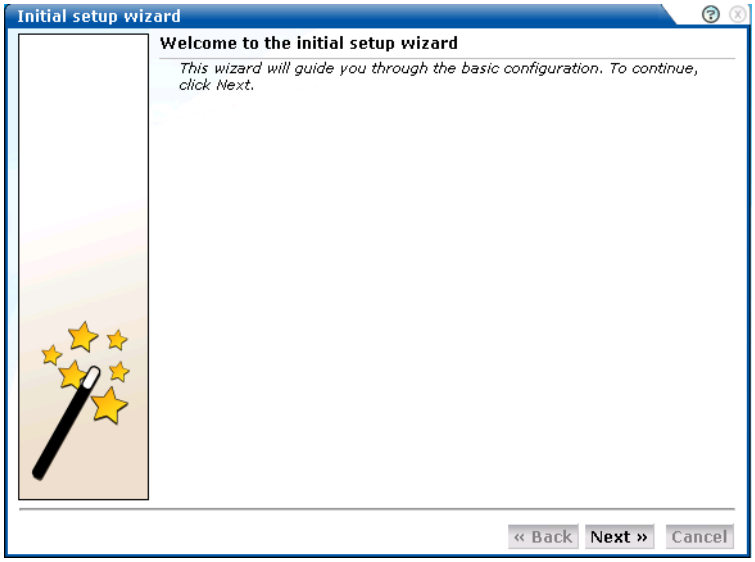
Figure 3–1 Logon Dialog Box.



Specify the `admin` user, and the RUEI Administration password defined with the `set-admin-password` script (defined in Section 2.5.4, "Installation of the RUEI Software"). When ready, click **Login**. The dialog shown in Figure 3–2 appears.

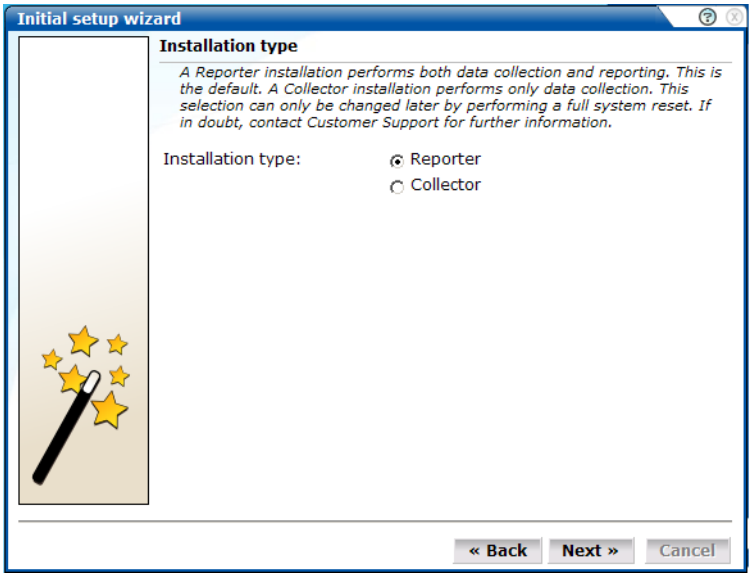
Note: The first time a user logs on, they receive a warning that the Web server was unable to verify the identify of the site's certificate. Depending on your security policies, you can either choose to accept this certificate permanently, temporarily for this session, or reject the certificate. Alternatively, you can purchase a certificate from a Certificate Authority (CA). You can also create an SSL certificate. For more information, visit `http://httpd.apache.org/docs/2.2/ssl/ssl_faq.html#realcert`.

Figure 3–2 Initial Setup Wizard Dialog



2. Click **Next** to proceed with configuration. The dialog shown in Figure 3–3 appears:

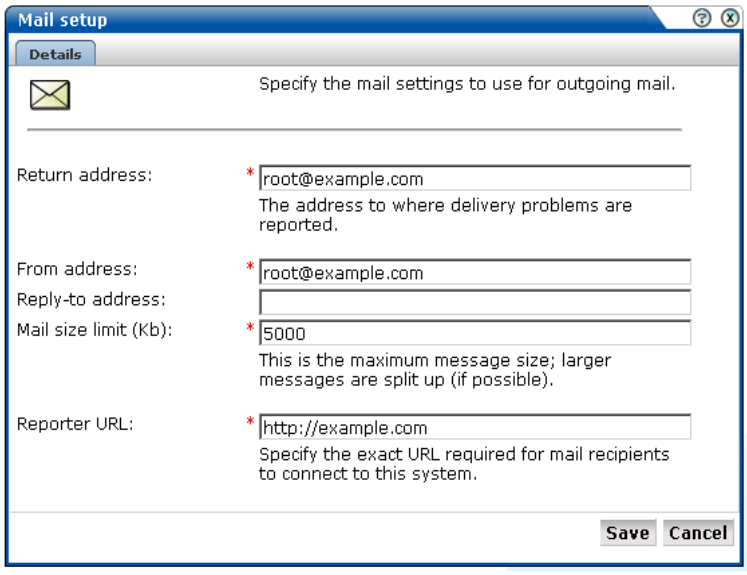
Figure 3–3 Installation Type Dialog



3. Use the radio buttons to select the required installation type. A Reporter system performs both data collection and reporting, and is the default configuration. A Collector configuration only performs data monitoring. After making your selection, click **Next**. The dialog shown in Figure 3–4 appears.

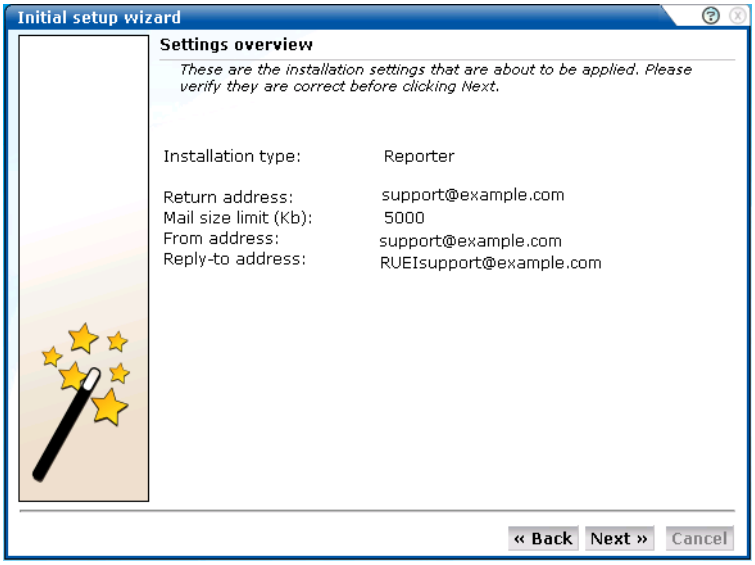
Important: Configuration of a RUEI system as a Collector (that is, as part of a split-server configuration) is only possible during this initial configuration phase; and this selection cannot be changed later. You should fully understand the implications of your selection before proceeding. Also, see Section 3.2, "Configuring a Collector System" for important information about registering the Collector with a Reporter system.

Figure 3–4 Mail Setup Dialog



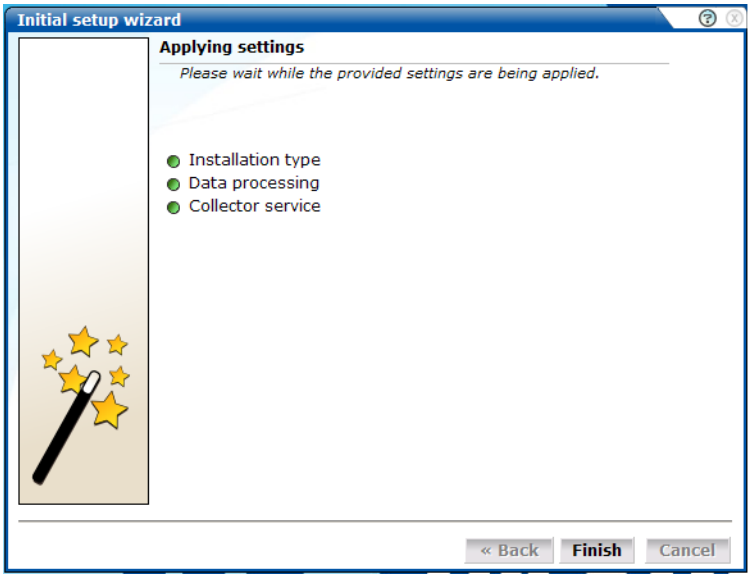
4. Specify the requested information. The e-mail information is used to configure RUEI's interface to your internal network, and will be used for reporting problems. When you have entered the required information, click **Next**. The dialog shown in Figure 3–5 appears.

Figure 3–5 Settings Overview Dialog



5. Check that the information specified in the settings overview is correct. You can use **Back** and **Next** to move between dialogs as necessary. When ready, click **Next**. The dialog shown in Figure 3–6 appears.

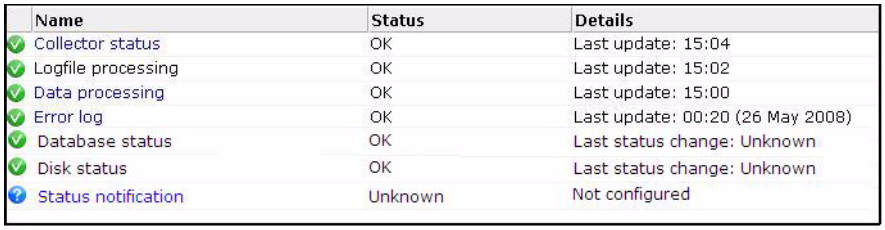
Figure 3–6 Applying Settings Dialog



6. This dialog indicates how far the system has got in applying your specified settings. Typically, this process takes a maximum of 15 minutes. When finished, click **Finish** to close the dialog.

7. Select **System**, and then **Status** to view the system's status. An example is shown in Figure 3–8.

Figure 3–7 Status Page



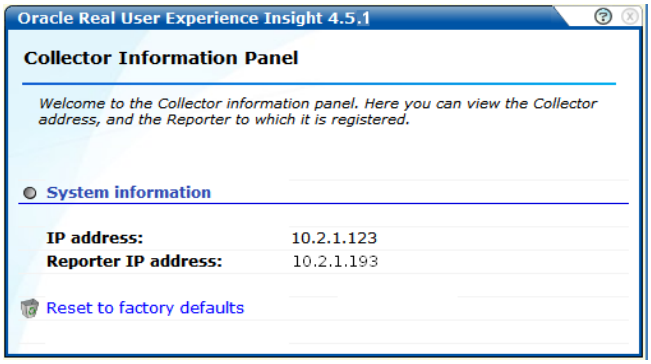
Name	Status	Details
Collector status	OK	Last update: 15:04
Logfile processing	OK	Last update: 15:02
Data processing	OK	Last update: 15:00
Error log	OK	Last update: 00:20 (26 May 2008)
Database status	OK	Last status change: Unknown
Disk status	OK	Last status change: Unknown
Status notification	Unknown	Not configured

Verify that all processes are operating properly.

3.2 Configuring a Collector System

If you selected a Collector configuration (Figure 3–3), the dialog shown in Figure 3–8 appears after logon:

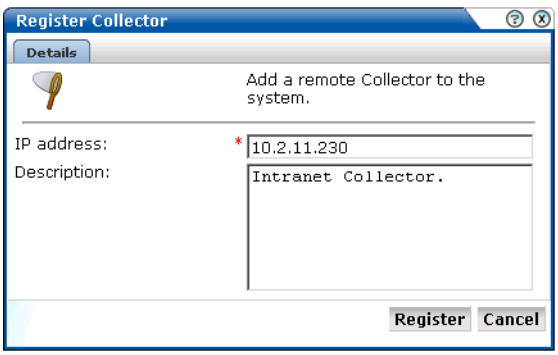
Figure 3–8 Collector Information Panel



To register a Collector to a Reporter system, do the following:

1. Within the Reporter system, select **System**, then **Maintenance**, and then **Network data collectors**. The Network data collectors window appears.
2. Select **Configuration**, and then **Register remote Collector**. The Register Collector dialog shown in Figure 3–9 appears.

Figure 3–9 Register Collector Dialog



3. Enter the IP address of the Collector. Optionally, you can also specify a brief description of the attached Collector. When ready, click **Register**. On return to the Network data collectors window, the new Collector should be listed.

3.2.1 Resetting a Collector System

As mentioned earlier, it is not possible to select a Collector type installation for a system, and later change it to a Reporter installation. The only way you can change its installation type is by resetting the Collector system with the **Reset to factory defaults** option described in the *Oracle Real User Experience Insight User Guide*. After that, the initial setup wizard would need to be re-run.

3.3 Performing Post-Installation Configuration

In order to start reporting, the RUEI needs certain information about the monitored network environment. It is important to understand that RUEI is designed to work within a wide range of network environments. Therefore, the configuration choices you make will affect the accuracy and usability of the reported data. It is strongly recommended that you carefully review the settings described in this section.

3.3.1 Specifying the Cookie Technology

Within RUEI, session information is based on cookies. Therefore, RUEI needs to know and understand the cookie technology (or technologies) your organization is using. The procedure to configure this is described in the *Oracle Real User Experience Insight User Guide*. The structure of supported cookie technologies is also explained in the *Oracle Real User Experience Insight User Guide*.

If cookie information is not available, user tracking is based on visitor IP address. This can lead to unreliable session information. For example, in the case of users behind a proxy server, all users coming from that network would be identified as the same user.

3.3.2 Adding/Uploading HTTP SSL Keys

Uploading SSL keys to the system is extremely important if most of your HTTP traffic is based on SSL sessions. Without the SSL keys being available to the system, the Collector will not be able to decrypt the SSL session traffic. In these circumstances, further configuration of cookies, user identification, and application pages would make little sense. Ensure that you upload and activate your HTTPS SSL keys as early on as possible in the configuration process. The management of SSL keys is fully described in the *Oracle Real User Experience Insight User Guide*.

3.3.3 Specifying How Users are Identified

Within RUEI, user identification is first based on the HTTP Authorization field. After that, it is derived from the supplied GET/POST argument within URLs. Therefore, if you are using arguments within URLs, the item within these used for user identification must be specified in order to provide reliable results. This is fully described in the *Oracle Real User Experience Insight User Guide*.

3.3.4 Naming Pages

Page identification within RUEI is based on applications. Essentially, an application is a collection of Web pages. This is because pages on a Web site are typically bound to a particular application. For each page that the system detects, it uses the available application definitions to assign a name to it. Note that information about any pages

that could not be identified using these definitions is discarded, and, therefore, not available through reports and the data browser. This is fully described in the *Oracle Real User Experience User Guide*.

3.3.5 Specifying the Scope of Monitoring

Within RUEI, you control the scope of traffic monitoring by specifying which TCP ports the SYSTEM should monitor. Obviously, no information is available for non-monitored ports. In addition, you can restrict monitoring to specific servers and subnets. This is fully described in the *Oracle Real User Experience Insight User Guide*.

3.3.6 Authorizing Initial Users

In order for users to start working with RUEI, you will need to authorize the required users. Only one user, the Administrator, is available after installation. The procedure to set the initial `admin` user password is described in Section 2.5.4, "Installation of the RUEI Software". All other required users must be created and assigned the necessary roles and access permissions through the Reporter GUI. In particular, it is recommended that you create a dedicated Security Officer account to finalize the security-related configuration. User roles, creation and management are fully described in the *Oracle Real User Experience Insight User Guide*.

Note that passwords are case sensitive, while user names are not. It is recommended that you do not include any diacritic characters, such as umlauts.

3.3.7 Securing Sensitive Data

Several directories on the Reporter system may hold sensitive data which was captured during monitoring. This is especially true if the Replay Viewer has been enabled. Enterprise Linux provides an encrypted file system to secure the data on disk. To do so, you need to install the `ecryptfs-utils` RPM. Then you need to load the `ecryptfs` kernel modules using the following command:

```
insmod /lib/modules/2.6.18-*.*.el5/kernel/fs/ecryptfs/ecryptfs.ko
```

To encrypt the Replay Viewer database, issue the following command as root:

```
mount -t ecryptfs /home/moniforce/appsensor/wg/REPLAY \
/home/moniforce/appsensor/wg/REPLAY
```

Other directories you might consider encrypting are `/home/moniforce/appsensor/sslkeys` (containing private keys) and `/home/moniforce/websensor/data` (containing log files).

More information about the use of the `ecryptfs` module is available at `http://ecryptfs.sourceforge.net/README`.

Note the `ecryptfs` facility is only available in Technology Preview since Oracle Linux 5.2.

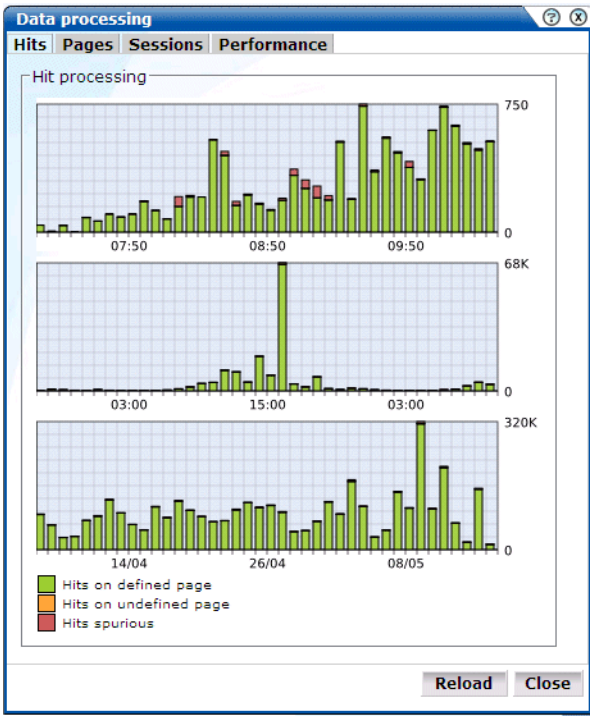
3.4 Verifying and Evaluating Your Configuration

To ensure the quality and quantity of data being collected and analyzed by your RUEI system, it is strongly advised that you verify the system's configuration using some core metrics. These are described in the following sections.

3.4.1 Viewing a Traffic Summary

You can open an overview of the monitored network traffic by selecting **System**, then **Status**, and then **Data processing**. This provides you with immediate information about hits, pages, and session processing, as well as the system load. An example is shown in Figure 3–10:

Figure 3–10 Data Processing Dialog



The precise number of percentage of identified sessions, pageviews, and hits relies heavily on your exact configuration. If you intend to measure all traffic, it is recommended that at least 80% of sessions, pageviews, and hits are reported as "identified". It is also recommended that you regularly review the reported numbers and percentages to ensure the quality and quantity of reported data.

Important: After initial configuration of cookies, user identification, and application page structure, the system will take at least 5 - 10 minutes before the **Sessions**/**Hits**/**Pageviews** tabs are updated with green bars. If, after 20 - 30 minutes after initial configuration, there is no green bars showing on any of the tabs, please review your initial RUEI configuration. If the bars do not indicate any activity at all, please review your system's network card configuration as outlined in Section 1.7, "Network Requirements".

3.4.2 Confirming Data Collection

At this point, RUEI should be collecting data from each of its associated Collectors. You can easily check the status of these Collectors by selecting **System**, then **Status**, and then **Collector status**. This opens the Network data collectors window. This is fully described in the *Oracle Real User Experience Insight User Guide*.

It is important to understand that the data being collected by Collector system(s) is offered to the RUEI data processing module for further analysis. If no data is collected, there is no means by which it can be processed.

A

Troubleshooting

This appendix highlights the most common problems encountered when installing RUEI, and offers solutions to locate and correct them. The information in this appendix should be reviewed before contacting Customer Support.

Support Web sites

Information on a wide variety of topics is available via the Oracle Web site (`http://www.oracle.com/enterprise_manager/user-experience-management.html`). It is recommended that you visit it regularly for support announcements.

In addition, detailed technical information is available via the Support Web site (`https://metalink.oracle.com`). This includes information about service pack availability, FAQs, training material, tips and tricks, and the latest version of the product documentation. A valid user name and password is required to access this Web site.

Contacting Customer Support

If you experience problems with the installation or configuration of the RUEI, you can contact Customer Support. However, before doing so, it is strongly recommended that you create a Helpdesk report file of your installation. To do so, select **System**, then **Configuration**, and then **Helpdesk report**. This file contains extended system information that is extremely useful to Customer Support when handling any issues that you report.

A.1 The prepare_uxinsight_db.sh Script Fails

If the `prepare_uxinsight_db.sh` script fails, this can be because the database listener has not been started correctly due to a failing DNS look up. To resolve this problem, do the following:

- Ensure the `/etc/hosts` file includes your host.
- Ensure entries in the `/etc/nsswitch.conf` file are specified in the required (sequence hosts: files DNS).

A.2 The Applying Settings Dialog Hangs

If the Applying settings dialog (Figure 3–6) hangs after performing the initial configuration (described in Section 3.1, "Performing Initial RUEI Configuration"), it is recommended that you do the following:

- Review the specified network settings and ensure that they are correct.

- Ensure that the time zone is explicitly set in your PHP installation. For more information, see Section 2.4.1, "PHP Configuration".

A.3 Starting Problems

If the system does not seem to start, or does not listen to the correct ports, do the following:

- Restart each Collector service. To do so, select **System**, then **Maintenance**, then **Network data collectors**, select each attached Collector, and select the **Restart** option from the menu. This is described in more detail in the *Oracle Real User Experience Insight User Guide*.
- Review your network filter definitions. This is described in the *Oracle Real User Experience Insight User Guide*. In particular, ensure that no usual network filters have been applied. This is particularly important in the case of VLANs.
- Ensure that RUEI is listening to the correct protocols and ports. This is described in the *Oracle Real User Experience Insight User Guide*.
- Verify that the Collector interfaces are *up*. This is described in the Section 2.2, "Installing the Linux Operating System".

Resources and Log Files

If during, or directly after running the Initial setup wizard (described in Section 3.1, "Performing Initial RUEI Configuration"), the system returns an error, there are the following resources and log files available to help you in debugging:

- `/home/moniforce/websensor/log/gui_debug.log`: a proprietary debug and log file that shows low-level system information. Although it contents may be difficult to read, you can find standard system error messages listed here.
- `/var/log/httpd/access_log` and `/error_log`: the Apache daemon access and error log files. If any part of the HTTP or PHP execution of the RUEI user interface is in error, it will show up in these log files. (Note that these are *not* the log files used by RUEI for HTTP data analysis).

Root-Cause Analysis

Before starting to address specific issues, it is important to understand the basic operation of data collection, data processing, and data reporting. Any root-cause analysis of RUEI problems should take the following:

- Verify data collection. Select **System**, then **Status**, and then **Collector status**. Select a Collector from the displayed list, and verify that the system interfaces are showing traffic activity on TCP, Ethernet, and HTTP level.
- In addition, verify that there are no problems with the SSL data decryption. It is normal that some errors occur (especially shortly after startup). But if SSL traffic is to be decrypted, the error rate can never be 100%.
- Verify data processing. Select **System**, then **Status**, then **Data processing**. A screen similar to the one shown in Figure 3–10 appears. It should indicate some activity.

A.4 Data Collection Problems

If the data collection service is not running, or will not start, do the following:

- Ensure the network cards used for data collection are running in promiscuous mode. This can be verified by issuing the command `ifconfig ethN` (where *N* is

the number of the network interface being used for data collection). It should return an output similar to the following:

```
ethn      Link encap:Ethernet  HWaddr 00:15:17:3E:26:AF
          UP BROADCAST RUNNING PROMISC MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 GiB)  TX bytes:0 (0.0 GiB)
          Memory:b9120000-b9140000
```

- If the network interface is not available, make sure the ONBOOT parameter is set to YES, as described in Section 2.2.4, "Network Configuration".
- If the network interface is not yet in promiscuous mode, set it by issuing the following command: `ifconfig ethN promisc` (where *N* is the number of the network interface being used for data collection).
- Verify there is *no* IP address assigned to the network interface being used for data collection. If there is a configured IP address, remove it.

> **Note:** Do not set to 0.0.0.0 or 127.0.0.1. Remove the configured IP address completely.

A.5 Data Processing Problems

If, for any reason, data processing does not start, try to restart it by selecting **System**, then **Maintenance**, and then **System Reset**. The System reset wizard appears. Select the **Restart system processing** option. Note that restarting system processing can take between 5 and 30 minutes.

In general, if no data is being processed, verify your system's configuration as described in Section 3.4, "Verifying and Evaluating Your Configuration". If you do not apply any configuration to the system, no data processing will take place.

If you are using an environment with multiple Collectors, ensure all Collectors are up and running normally. To do so, select **System**, then **Status**, and then **Collector status**. An failing Collector can become a block to further data processing of the system's data.

A.6 E-Mail Problems

Sending E-mails is RUEI functionality that is handled on a system level, together with your Mail Transfer Agent (MTA), such as Sendmail or Postfix. If problems occur when sending E-mails, do the following:

- If mail is sent correctly by RUEI to your MTA, the user interface will report "Message sent successfully" when you attempt to send a daily, weekly, or monthly report manually.
- If mail could not be sent correctly by RUEI to your MTA, verify that the MTA is up and running. Alternatively, analyze the mail settings by selecting **System**, then **Maintenance**, and **Mail configuration**.
- If the mail was sent successfully, but not delivered to the recipient, analyze the operation of your MTA to further identify the root cause of the mails that are not delivered.

Common issues with E-mail delivery often involve an incorrectly configured MTA, or an MTA that is not allowed to send E-mail within the Data Center or corporate network.

A.7 SSL Decryption Problems

In order to decrypt SSL traffic, the Collector needs to have the SSL key and certificate available. To enable SSL decryption, you should do the following:

- Upload the SSL key through the appropriate Collector.
- Enable the SSL key by entering the required decryption passphase (when applicable).
- Activate the SSL keys after successful upload.

The certificate needs to be uploaded to the Collector(s) by selecting **Configuration**, then **Security**, and then **SSL keys**. To check the status of the SSL decryption, select **System**, then **Status**, and then **Collector status**, and select the Collector for which you want SSL decryption analysis. Within the **SSL encryption** page, note the following:

- Decryption errors will occur if there is no SSL key uploaded.
- The percentage of successful decryption will be a low number shortly after uploading and activating the appropriate SSL keys.
- This percentage should rise in the first minutes and hours after uploading the SSL keys.

RUEI accepts PKCS#12 and PEM/DER encoding of SSL keys and certificates. Basically, this means both the certificate and key should be concatenated into one file. If you have separate key and certificate files, you can create a PKCS#12-compliant file by issuing the following command:

```
openssl pkcs12 -export -in certificate.cer -inkey key.key -out pkcs12file.p12
-passout pass:yourpassphrase
```

Where:

- *certicate.cer* is your CA root certificate file.
- *key.key* is the server's SSL key file.
- *pkcs12file.p12* is the output file name for the PKCS#12-encoded file.
- *yourpassphrase* is the passphrase you want to use to protect the file from unwanted decryption.

For example, consider the situation where the CA root certificate filename is `ca_mydomainroot.cer`, the server's SSL key is `appsrv12.key`, you want the output file to be called `uxssl.p12`, and want to protect this file with the passphrase `thisismysecretpassphrase`. The following command is required:

```
Openssl pkcs12 -export -in ca_mydomainroot.cer -inkey appsrv12.key -out uxssl.p12
-passout pass:thisismysecretpassphrase
```

A.8 Missing Packages and Fonts Error Messages

It is *strongly* recommended that you follow the installation procedure and settings described in Section 2.2.5, "Package Installation". In particular, you should not perform a "minimal" installation of Oracle Enterprise Linux. If you do so, it can lead to a wide

range of reported problems, depending on the components not included in the installation, but required by RUEI.

The most common of these are reported `fontconfig` error messages in the `/var/log/http/error_log` file. These can be fixed by installing the following fonts:

- urw-fonts-noarch v2.3
- ghostscript-fonts-noarch v5
- dejavu-lgc-fonts-noarch v2
- liberation-fonts v0.2
- bitmap-fonts v0.3
- bistream-vera-fonts-noarch v1.10

However, other possible error messages include reported missing packages (such as `librsvg2`).

When a Yum repository is available, all dependencies available on the Enterprise Linux 5.*x* CDs can be installed by issuing following command:

```
yum -y install gcc gcc-c++ compat-libstdc++-33 glibc-devel libstdc++-devel \
elfutils-libelf-devel glibc-devel libaio-devel sysstat perl-URI net-snmp \
sendmail-cf httpd php php-gd php-pear php-mbstring bitstream-vera-fonts librsvg2 \
xorg-x11-xinit
```

However, be aware that additional RPMs shipped with the `RUEI.zip` file still need to be installed according to the procedure described in Section 2.5, "Installing the RUEI Software".

A.9 ORA-xxxxx Errors

If you receive any Oracle database errors, do the following:

- Ensure that the `/etc/sysconfig/httpd` file contains the following lines:

  ```
  export LD_LIBRARY_PATH=/usr/local/instantclient/lib
  export TNS_ADMIN=/home/moniforce
  ```

  If you have to add these lines, restart the Apache Web server using the following command:

  ```
  service httpd restart
  ```

- Ensure the same host name is specified in the `/home/moniforce/tnsnames.ora`, `/etc/system/network`, and `/etc/hosts` files.

  Note if you make changes to any of these files, you may need to reboot the server.

A.10 Instant Client-Related Error Message

If during step 7 of Section 2.5.4, "Installation of the RUEI Software" you receive an error similar to the following

```
mklookup: error while loading shared libraries: libclntsh.so.11.1: cannot open
shared object file: No such file or directory
```

you should ensure that the symlinks for Oracle database Instant Client (described in Section 2.5.1, "Installing the Oracle Database Instant Client") have been correctly defined.

A.11 Removing Software

If the actions described in the previous sections do not resolve an encountered issue, it is recommended that you remove all RUEI RPMs using the following command:

```
rpm -e ux-*
```

In addition, it is recommended that you contact Customer Support for further assistance.

A.12 General (Non-Specific) Problems

If you are experiencing problems with the reporting module, or find its interface unstable, it is recommended that you do the following:

- Clear all content caching within your browser, and re-start your browser.
- Examine the error log. This is described in the *Oracle Real User Experience Insight User Guide*.
- Select **System**, then **Maintenance**, and then **Environment check** to verify the core components of the RUEI installation. This is described in more detail in the *Oracle Real User Experience Insight User Guide*.
- Select **System**, then **Status**, and verify correct operation of the core components by then selecting **Data Collection**, **Logfile processing**, and **Data processing**. If any of these components are in error, try to resolve them using the advice provided in this appendix.

B

Installation Checklist

This appendix provides a checklist of actions that should be complete, and information gathered, before starting to install the RUEI software. These include server and infrastructure readiness and configuration, as well as HTTPS encrypted traffic and alerting issues.

Server readiness	
Base hardware and operating system requirements.	
Intel/AMD 64-bit platform (minimum 2 dual-core CPUs). Network connectivity: ■ 10/100 MB NIC for office network connectivity. ■ 10/100/1000 MB NIC for data collection connectivity. Disk space: at least 400 GB (on high-performance RAID-5, RAID-10, or similar). Memory: at least 16 GB RAM for single server. OS: Oracle Enterprise Linux 64-bit or RedHat Enterprise Linux 64-bit 5.*x*.	

Infrastructure readiness	
Ensure easy placement and accessibility of the system.	
Prepare rackspace in the Data Center cabinet with power sockets. The server is accessible through remote ports: ■ Port 80 for HTTP traffic to the RUEI Web server. ■ Port 22 for remote management over SSH/SCP. Access to the Data Center on the appropriate day and time is arranged. Network preparation for TAP/copy port is done and cables available in cabinet. Server configuration completed (see below). Main topology with proxies, load balancers, routers, switches, and so on, is known. Main traffic flows throughout the infrastructure are known. VLAN topology, VLAD IDs, and IP addresses are known. The monitoring position for the RUEI server is located as close as possible to the firewall. The domains, applications, server farm(s), and/or VLANs to be monitored are identified.	

Server configuration

Complete the details below to for reference during server configuration.

Host name and domain name (optional).	
Data Center name.	
Placement date and time.	
Server IP, netmask, and default gateway.	
Server type (Collector/Reporter).	
NTP server IP and backup.	
DNS server IP and backup.	
Mail server and sender mail.	
Socket 0: collection port to TAP/switch name.	
Socket 1: collection port to TAP/switch name.	
Socket 2: rescue/maintenance interface.	<reserved>
Socket 3: Office network to switch name.	
Socket 4: collection port to TAP/switch name.	
Socket 5: collection port to TAP/switch name.	

Data collection configuration

Once in place, the server will start collecting data. Specify how much data is expected, and the technologies used.

HTTP traffic (in MB, pageviews, or hits per hour).
Limits on amount of traffic to be captured: ■ HTTP and HTTPS ports (if other than 80/443 HTTP/HTTPS). ■ VLAN traffic and VLAN IDs (optional).
Cookie technology.
Page-labelling technology.
Blind POST field names (such as passwd).
User identification in URL (if other than login).

HTTPS enablement

Specify the contact(s) for the required SSL keys to monitor encrypted traffic.

Name:	Name:
Function:	Function:
E-mail:	E-mail:
Phone/Mobile:	Phone/Mobile:
Keys (if not all):	Keys (if not all):

System health notifications

The system can trigger and send alerts for various components. Specify the users, notification methods, and details for each component.

Name:	Name:
Function:	Function:
E-mail:	E-mail:
Phone/Mobile:	Phone/Mobile:

Alerting via SNMP (optional)

SNMP management server.

SNMP community/version.

C

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