

Oracle® Exalogic Elastic Cloud

Exachk User's Guide

Release 12.1.0.2.4

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This document describes how to use Exachk, a tool to audit important configuration settings in an Exalogic machine.

Oracle Exalogic Elastic Cloud Exachk User's Guide, Release 12.1.0.2.4

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Primary Author: Ashish Thomas

Contributing Authors: Kumar Dhanagopal, Rekha Kamath

Contributors: Bob Caldwell, Andrego Halim, Denny Yim, Anoop Madhavan, Paul Wickstrom, Emma Liu

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Preface

This guide describes how to install and use Exachk, a health-check tool for the Oracle Exalogic Elastic Cloud machine.

This preface contains the following sections:

- [Audience](#)
- [Documentation Accessibility](#)
- [Conventions](#)

Audience

It is assumed that the readers of this document have the knowledge of the following:

- System administration concepts
- Hardware and networking concepts

Documentation Accessibility

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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.
<i>italic</i>	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.

Convention	Meaning
monospace	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

Introduction to Exachk for Exalogic

This chapter contains the following sections:

- [Purpose and Scope of Exachk](#)
- [Supported Platforms](#)
- [Known Issues](#)

1.1 Purpose and Scope of Exachk

Exachk is a health-check tool that is designed to audit important configuration settings in an Oracle Exalogic Elastic Cloud machine. Exachk examines the following components:

- Compute nodes
- Storage appliance
- InfiniBand fabric
- Ethernet network
- Exalogic Control vServers (relevant only in virtual configurations)
- Guest vServers (relevant only in virtual configurations)

Exachk audits the following configuration settings:

- Hardware and firmware
- Operating system kernel parameters
- Operating system packages

You must run Exachk for Exalogic in the following conditions:

- After deploying the machine
- Before and after patching or upgrading the infrastructure
- Before and after making any changes in the system configuration
- Before and after any planned maintenance activity

1.2 Supported Platforms

See the My Oracle Support document 1449226.1.

1.3 Known Issues

See the My Oracle Support document 1478378.1.

Installing and Upgrading Exachk for Exalogic

This chapter contains the following sections:

- [Prerequisites](#)
- [Installing Exachk](#)
- [Upgrading Exachk](#)

2.1 Prerequisites

This section describes the following prerequisites:

- [Section 2.1.1, "Prerequisites for Installing Exachk"](#)
- [Section 2.1.2, "Prerequisite for Viewing the Exachk HTML Report in a Web Browser"](#)

2.1.1 Prerequisites for Installing Exachk

Oracle recommends that you install Exachk on the pre-existing share `/export/common/general` on the ZFS storage appliance on the Exalogic machine. You can then run Exachk and access the Exachk-generated HTML reports from a compute node on which the `/export/common/general` share is mounted. For Exalogic machines in a virtual configuration, Oracle recommends that you mount the `/export/common/general` share on the vServer that hosts the Enterprise Controller component of the Exalogic Control stack, and run Exachk from that vServer.

To be able to install Exachk on the `/export/common/general` share, you must complete the following steps:

- [Enable NFS on the `/export/common/general` Share](#)
- [Mount the `/export/common/general` Share](#)

Enable NFS on the `/export/common/general` Share

Before installing Exachk on the pre-existing share `export/common/general`, ensure that the NFS share mode is enabled on the share.

1. In a web browser, enter the IP address or host name of the storage node as follows:

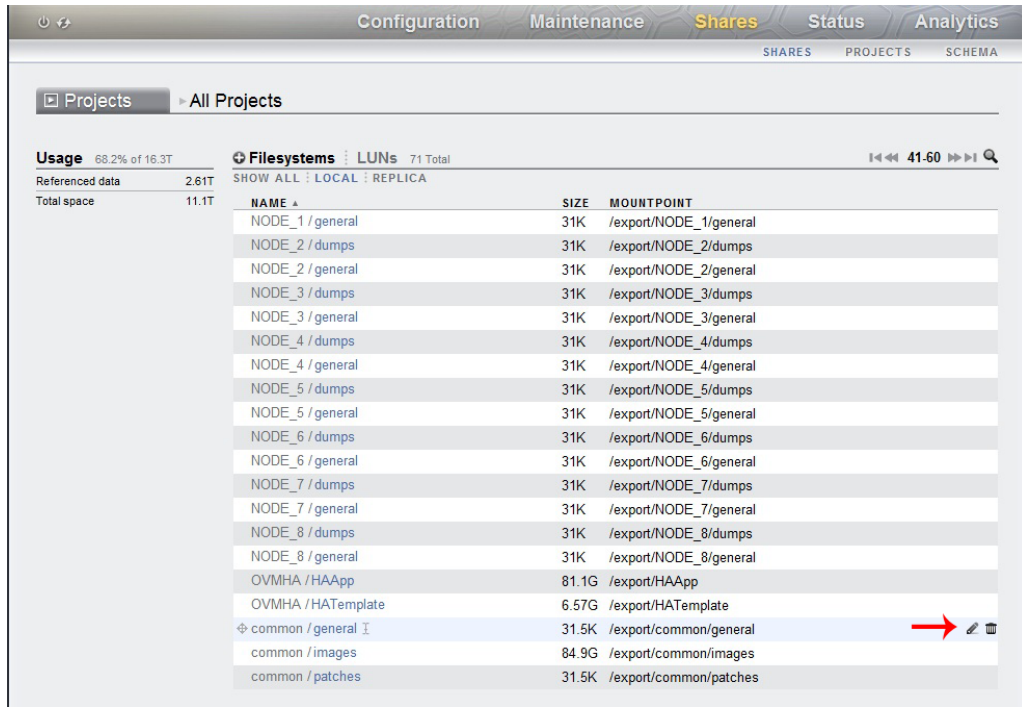
```
https://ipaddress:215
```

or

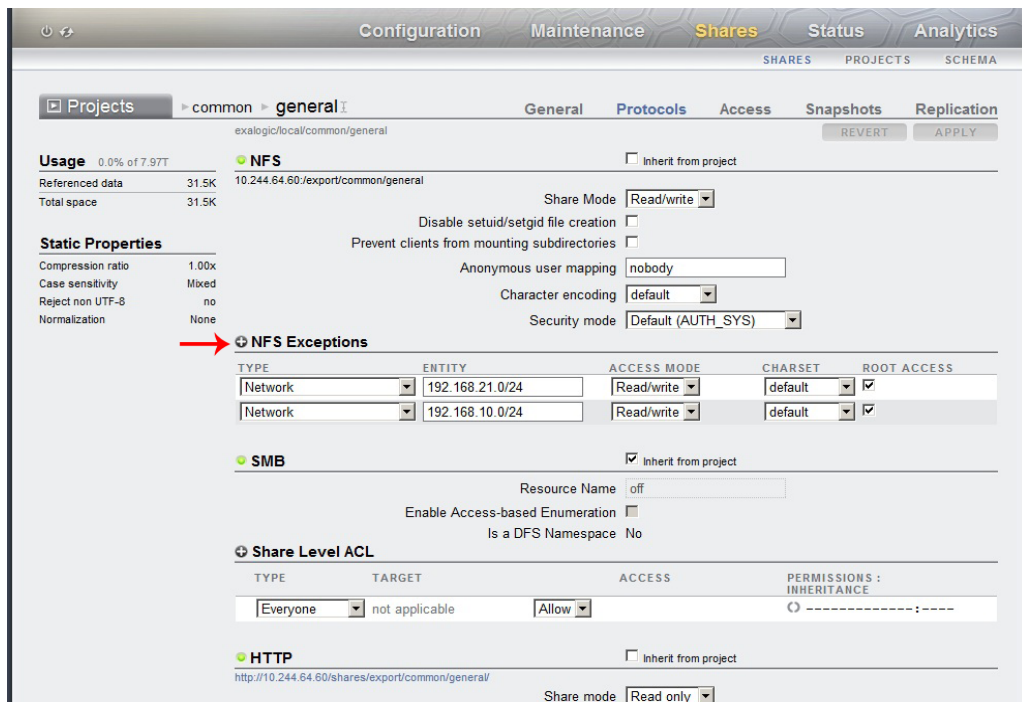
```
https://hostname:215
```

2. Log in as the `root` user.

3. Click **Shares** in the top navigation pane.
4. Place your cursor over the row corresponding to the share /export/common/general.
5. Click the **Edit entry** button (pencil icon) near the right edge of the row.



6. On the resulting page, select **Protocols** in the top navigation pane.
7. In the **NFS** section, deselect **Inherit from project**, and click the plus (+) button located next to **NFS Exceptions**.



8. Edit the following in the **NFS Exceptions** section:

Element	Action/ Description
TYPE	Select Network .
ENTITY	Enter the IP address of the host that will access the share. Example: 192.168.10.0/24
ACCESS MODE	Select Read/write
CHARSET	Keep the default setting.
ROOT ACCESS	Select the check box.

9. Click **APPLY**.

10. Log out.

Mount the `/export/common/general` Share

Note:

- In this section, compute node `e101cn01` is used as the example of the host on which the `/export/common/general` share is mounted.

For an Exalogic machine in a virtual configuration running EECS 2.0.6, mount the `export/common/general` Share on the vServer that hosts the Enterprise Controller component of the Exalogic Control stack. So substitute compute node `e101cn01` in this procedure with the host name or IP address of that vServer.

For an Exalogic machine running EECS 2.0.4 (virtual), if traffic from the `eth-admin` network cannot be routed to the `EoIB-external-mgmt` network, when you run `Exachk` from the Enterprise Controller vServer, health checks will not be performed for the switches and the storage appliance. On such racks, to perform health checks on the physical components, you must mount the `export/common/general` share on a compute node as well.

- Note that, in a virtual configuration, if you run `Exachk` from a compute node, `Exachk` will not perform health-checks for the Exalogic Control components.
-

1. Check whether the `/export/common/general` share is already mounted at the `/u01/common/general` directory on compute node `e101cn01`.

You can do this by logging in to `e101cn01` as the `root` user and running the following command:

```
# mount
```

If the `/export/common/general` share is already mounted on the compute node, the output of the `mount` command contains a line like the following:

```
192.168.10.97:/export/common/general on /u01/common/general ...
```

In this example, `192.168.10.97` is the IP address of the storage node, `e101sn01`.

- If you see the previous line in the output of the `mount` command, skip step 2.
 - If the output of `mount` command does not contain the previous line, perform step 2.
2. Mount the `/export/common/general` share at a directory on compute node `e101cn01`.
 - a. Create the directory `/u01/common/general` to serve as the mount point on `e101cn01`.

```
# mkdir -p /u01/common/general
```
 - b. Depending on the operating system running on the host on which you want to mount the `/export/common/general` share, complete the following steps:

Oracle Linux:

Edit the `/etc/fstab` file by using a text editor like `vi`, and add the following entry for the mount point that you just created:

```
e101sn01-priv:/export/common/general /u01/common/general nfs4  
rw,bg,hard,nointr,rsiz=131072,wsiz=131072,proto=tcp
```

Oracle Solaris:

Edit the `/etc/vfstab` file by using a text editor like `vi`, and add the following entry for the mount point that you just created:

```
e101sn01-priv:/export/common/general - /u01/common/general nfs - yes  
rw,bg,hard,nointr,rsiz=131072,wsiz=131072,proto=tcp
```
 - c. Save and close the file.
 - d. Mount the volumes by running the following command:

```
# mount -a
```

2.1.2 Prerequisite for Viewing the Exachk HTML Report in a Web Browser

Enable Access to the `/export/common/general` Share Through the HTTP/WebDAV Protocol

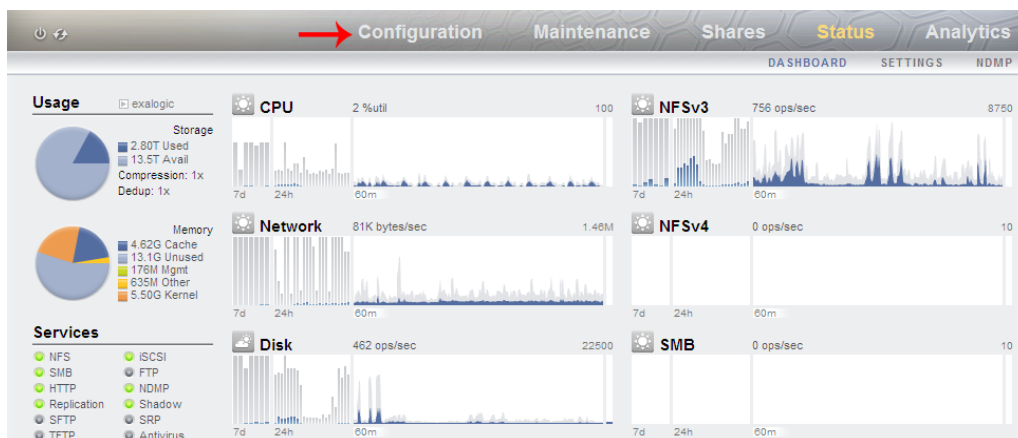
To enable access to a share through the HTTP/WebDAV protocol, complete the following steps:

1. In a web browser, enter the IP address or host name of the storage node as follows:

```
https://ipaddress:215
```

or

```
https://hostname:215
```
2. Log in as the `root` user.
3. Enable the HTTP service on the appliance, by doing the following:
 - a. Click **Configuration** in the top navigation pane.



b. Click HTTP under Data Services.

The screenshot shows the 'Services' configuration page in the Exalogic interface. The 'Data Services' section is expanded, and the 'HTTP' service is highlighted with a red arrow. The table below lists the status of various services:

Service	Status	Last Update	Refresh	Stop
NFS	Online	2012-6-28 01:48:46	↻	⏻
iSCSI	Online	2012-6-4 03:58:27	↻	⏻
SMB	Online	2012-6-28 02:29:23	↻	⏻
FTP	Disabled	2012-6-4 03:57:27	↻	⏻
HTTP	Online	2012-6-29 18:16:54	↻	⏻
NDMP	Online	2012-6-15 03:50:08	↻	⏻
Remote Replication	Online	2012-6-15 03:50:39	↻	⏻
Shadow Migration	Online	2012-6-15 03:50:38	↻	⏻
SFTP	Disabled	2012-6-4 03:57:27	↻	⏻
SRP	Disabled	2012-6-4 03:57:27	↻	⏻
TFTP	Disabled	2012-6-4 03:58:28	↻	⏻
Virus Scan	Disabled	2012-6-4 03:57:27	↻	⏻

The 'Directory Services' section is also visible, showing NIS, LDAP, Active Directory, and Identity Mapping.

c. Ensure that the **Require client login** check box is not selected.

The screenshot shows the configuration page for the 'HTTP' service. The 'Require client login' checkbox is unchecked, as indicated by a red arrow. The 'Protocols' dropdown is set to 'Both HTTP and HTTPS'. The 'HTTP port' is set to 80 and the 'HTTPS port' is set to 443.

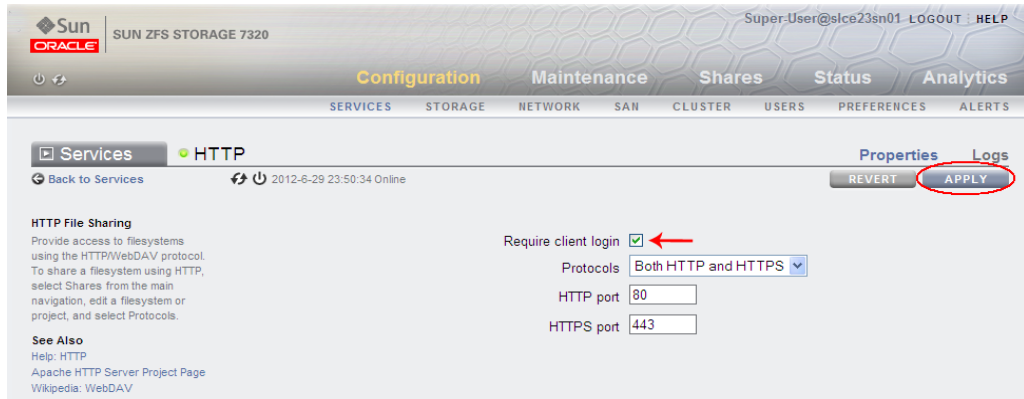
HTTP File Sharing
Provide access to filesystems using the HTTP/WebDAV protocol. To share a filesystem using HTTP, select Shares from the main navigation, edit a filesystem or project, and select Protocols.

See Also
Help: HTTP
Apache HTTP Server Project Page
Wikipedia: WebDAV

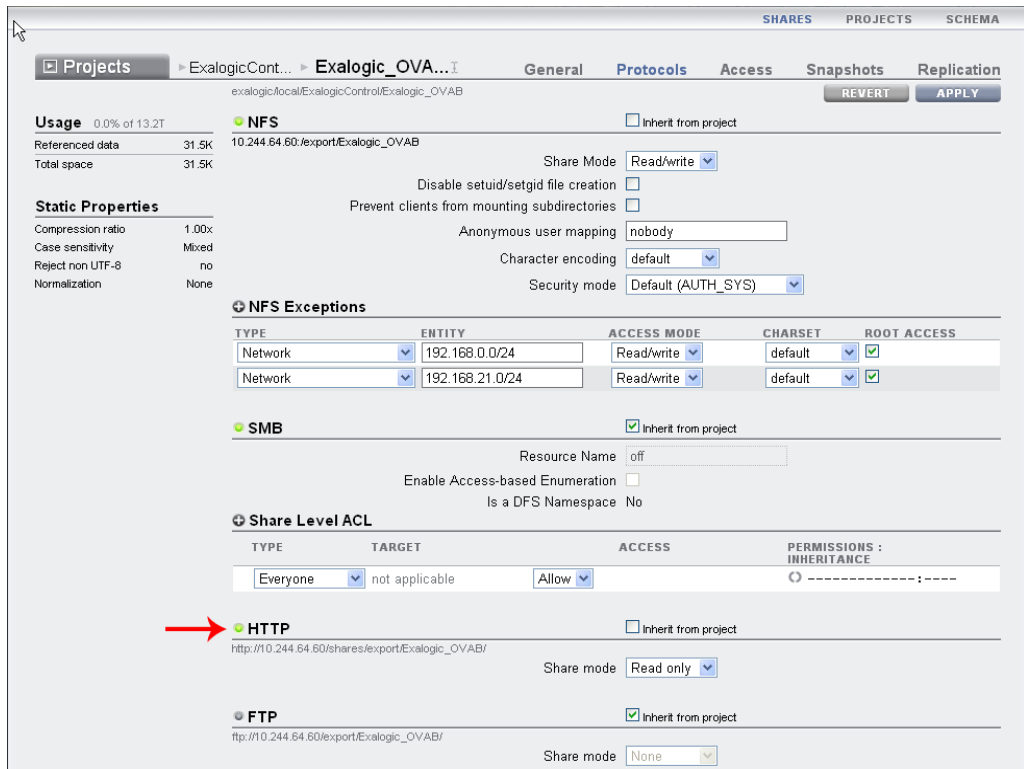
Require client login **Protocols** Both HTTP and HTTPS
HTTP port 80
HTTPS port 443

d. Click **APPLY**.

If the button is disabled, select and deselect the **Require client login** check box.



4. Enable read-only HTTP access to the `/export/common/general` share by doing the following:
 - a. Click **Shares** in the top navigation pane.
 - b. Place your cursor over the row corresponding to the `/export/common/general` share.
 - c. Click the **Edit entry** button (pencil icon) near the right edge of the row.
 - d. On the resulting page, click **Protocols** in the navigation pane.
 - e. Scroll down to the **HTTP** section.
 - f. Deselect the **Inherit from project** check box.
 - g. In the **Share mode** field, select **Read only**.



- h. Click **APPLY** located at the top right of the page.
5. Log out.

2.2 Installing Exachk

Install Exachk in the `/export/common/general` share by completing the following steps:

1. This step varies depending on whether you are installing Exachk on an Exalogic machine in a physical or virtual configuration:

- For Exalogic machines in a physical configuration:

- a. Ensure that `/export/common/ general` share is mounted on the compute node `e101cn01` as described in "[Mount the /export/common/general Share](#)".

- b. SSH to the compute node `e101cn01`.

- c. Create a subdirectory named `exachk` in `/u01/common/general/` to hold the Exachk binaries:

```
# mkdir /u01/common/general/exachk
```

- For Exalogic machines in a virtual configuration:

- a. Ensure that `/export/common/ general` share is mounted on the vServer that hosts the Enterprise Controller, as described in "[Mount the /export/common/general Share](#)".

Note: For an Exalogic machine running EECS 2.0.4 (virtual), if traffic from the `eth-admin` network cannot be routed to the `EoIB-external-mgmt` network, when you run Exachk from the Enterprise Controller vServer, health checks will not be performed for the switches and the storage appliance. On such racks, to perform health checks on the physical components, you must mount the `export/common/general` share on a compute node as well.

- b. SSH to the vServer.

- c. Create a subdirectory named `exachk` in `/u01/common/general/` to hold the Exachk binaries:

```
# mkdir /u01/common/general/exachk
```

Note: If the vServer is down or otherwise inaccessible, you can run Exachk from a compute node, but in this case, the health checks will not be performed for the Exalogic Control components.

2. Go to the `/u01/common/general/exachk` directory.
3. Download the `exachk_version_exalogic_bundle.zip` file from the link provided in the following My Oracle Support document.

<https://support.oracle.com/epmos/faces/DocumentDisplay?id=1449226.1>

4. Extract the contents of the `exachk_version_exalogic_bundle.zip` file.

```
# unzip exachk_version_exalogic_bundle.zip
```

The result is another zip file, `exachk.zip`.

5. Extract the contents of `exachk.zip`.

```
# unzip exachk.zip
```

The Exachk tool is now available at the following location on compute node el01cn01:

```
/u01/common/general/exachk/exachk
```

2.3 Upgrading Exachk

You can obtain the latest release of Exachk from the following My Oracle Support document:

<https://support.oracle.com/epmos/faces/DocumentDisplay?id=1449226.1>

To upgrade to the latest release of Exachk, complete the following steps:

1. Back up the directory containing the existing Exachk binaries by moving it to a new location.

For example, if the Exachk binaries are currently in the directory `/u01/common/general/exachk`, move them to a directory named, say, `exachk_05302012`, by running the following commands:

```
# cd /u01/common/general
# mv exachk exachk_05302012
```

In this example, the date when Exachk is upgraded (05302012) is used to uniquely identify the backup directory. Pick any unique naming format, like a combination of the backup date and the release number, and use it consistently.

2. Create the `exachk` directory afresh.

```
$ mkdir /u01/common/general/exachk
```

3. Install the new version of Exachk by following steps 2 onward in [Section 2.2](#).

Running Exachk for Exalogic: Basic Usage

This chapter contains the following sections:

- [Usage Recommendations](#)
- [Performing Health Checks for the Exalogic Infrastructure](#)
- [Performing Health Checks for Guest vServers](#)
- [About the Exachk Health-Check Process](#)

3.1 Usage Recommendations

For optimum performance of the Exachk tool, Oracle recommends that you complete the following steps:

- Exachk is a minimal impact tool, but Oracle recommends that you run Exachk when the load on the system is low. The runtime duration of Exachk depends on the number of nodes to be checked, CPU load, network latency, and so on.
- Do not run any scripts in the Exachk directory unless specifically documented.
- To avoid problems while running the tool from terminal sessions on a workstation or laptop, connect to the Exalogic machine and run Exachk by using VNC, so that if a network interruption occurs, Exachk continues to run.
- Run Exachk as the root user.

Whenever the tool requires root user privileges, it displays a message like the following:

```
7 of the included audit checks require root privileged data
collection.  If sudo is not configured or the root password is not
available, audit checks which require root privileged data collection
can be skipped.
```

1. Enter 1 if you will enter root password for each host when prompted (once for each node of the cluster)
2. Enter 2 if you have sudo configured for oracle user to execute /tmp/root_exachk.sh script
3. Enter 3 to skip the root privileged collections
4. Enter 4 to exit and work with the SA to configure sudo or arrange for root access and run tool later

Please indicate your selection from one of the above options:-

If you select 1, the tool prompts you to enter the root password for each node. Enter the root password once for each node.

If you select 2, and if you have `sudo` configured on your system, the tool performs the root privileged collection by using the `sudo` credentials.

If you select 3, the tool skips all of the root privileged collections and audit checks. Those checks must be performed manually.

3.2 Performing Health Checks for the Exalogic Infrastructure

This section describes how to use `Exachk` to perform health checks for the Exalogic infrastructure. This section contains the following topics:

- [Prerequisites for Performing Health Checks for the Exalogic Infrastructure](#)
- [Running Exachk for Physical Racks](#)
- [Running Exachk for Virtual Racks](#)
- [Running Exachk for Hybrid Racks](#)

3.2.1 Prerequisites for Performing Health Checks for the Exalogic Infrastructure

The term *infrastructure* is used here to indicate the compute nodes, switches, storage appliance, and, additionally, the Exalogic Control stack in the case of a machine in a virtual configuration.

Before running `Exachk` for the Exalogic infrastructure components, ensure that the following prerequisites are fulfilled:

- Ensure that `Exachk` has been installed as described in [Chapter 2](#).
- Before running `Exachk` for the first time, make a note of the short names of the storage nodes and switches: `e101sn01`, `e101sw-ib01`, and so on. `Exachk` will prompt you for these names at the start of the health-check process. This is a one-time prompt. `Exachk` stores the names you provide, and uses the stored names for subsequent runs.

3.2.2 Running Exachk for Physical Racks

To perform health checks for all the infrastructure components in an Exalogic machine in a physical (Linux or Solaris) configuration, complete the following steps:

1. SSH, as `root`, to the compute node on which you installed `Exachk`
2. Go to the directory in which you installed `Exachk`.

```
# cd /u01/common/general/exachk
```

3. Run the following command:

```
# ./exachk
```

When running `Exachk` for the first time, the tool detects the size of the Exalogic rack and prompts for the host name or IP address of the switch and storage node. For information about overriding the IP addresses and host names set during the first run, see [Section 4.4](#).

For more information about all the options that you can use with the `exachk` command, see [Section 4.2](#).

For information about the results of a health check performed by using `Exachk`, see [Chapter 5](#).

3.2.3 Running Exachk for Virtual Racks

To perform health checks for all the infrastructure components in an Exalogic machine in a virtual configuration, complete the following steps:

1. SSH, as root, to the vServer that hosts the Enterprise Controller.
2. Go to the directory in which you installed Exachk.

```
# cd /u01/common/general/exachk
```

3. Run the following command:

```
# ./exachk
```

Exachk automatically discovers the IP addresses or host names of all the components in the machine, and starts performing the health checks. For information about overriding the autodiscovered IP addresses and host names, see [Section 4.4](#).

For more information about all the options that you can use with the `exachk` command, see [Section 4.2](#).

For information about the results of a health check performed by using Exachk, see [Chapter 5](#).

Note: For an Exalogic machine running EECS 2.0.4 (virtual), if traffic from the eth-admin network cannot be routed to the EoIB-external-mgmt network, when you run Exachk from the Enterprise Controller vServer, health checks will *not* be performed for the switches and storage heads. On such racks, to perform health checks on all the components, complete the following steps:

1. Perform health checks for the Exalogic Control components:
 - a. SSH, as root, to the Enterprise Controller vServer.
 - b. Go to the directory in which you installed Exachk.

```
# cd /u01/common/general/exachk
```

- c. Run the following command:

```
# ./exachk -profile control_VM
```

Note that Exachk reports that all the checks on the compute nodes passed, but this command does not perform any health checks on the compute nodes, the storage appliance, and the switches.

2. Perform health checks for the physical components: compute nodes, storage appliance, and switches:

- a. SSH, as root, to the compute node on which you installed Exachk.

- b. Ensure that passwordless SSH to the Oracle VM Manager CLI shell is enabled, as described in "Verifying and Enabling Passwordless SSH to the Oracle VM Manager CLI" in [Section 4.2, "Exachk Command Options."](#)

- c. Go to the directory in which you installed Exachk.

```
# cd /u01/common/general/exachk
```

- c. Run the following command:

```
# ./exachk -profile el_extensive
```

3.2.4 Running Exachk for Hybrid Racks

To perform health checks for all the infrastructure components in an Exalogic machine in a hybrid configuration (that is, a machine on which half the nodes are running Oracle VM Server and the other half are on Oracle Linux), complete the following steps:

1. SSH, as root, to the vServer that hosts the Enterprise Controller component of the Exalogic Control stack.
2. Go to the directory in which you installed Exachk.

```
# cd /u01/common/general/exachk
```

3. Run the following command:

```
./exachk -hybrid -phy physical_node_1[,physical_node_2,...]
```

In this command, *physical_node_1*, *physical_node_2*, and so on are the eth-admin IP addresses of the compute nodes running Oracle Linux.

Note: The `-phy physical_node_1[,physical_node_2,...]` must be specified only the first time you run Exachk with the `-hybrid` option. Exachk stores the host names in the `exachk_exalogic.conf` file. For subsequent runs, you can run Exachk without specifying the `-phy` option. Exachk uses the host names stored in `exachk_exalogic.conf`.

For more information about all the options that you can use with the `exachk` command, see [Section 4.2](#).

For information about the results of a health check performed by using Exachk, see [Chapter 5](#).

3.3 Performing Health Checks for Guest vServers

This section describes how to use Exachk to perform health checks for guest vServers.

This section contains the following sections:

- [Section 3.3.1, "Prerequisites."](#)
- [Section 3.3.2, "Additional Prerequisites for STIG-hardened vServers."](#)
- [Section 3.3.3, "Running Exachk for vServers that are not STIG-hardened."](#)
- [Section 3.3.4, "Running Exachk for STIG-hardened vServers."](#)

3.3.1 Prerequisites

This section describes the prerequisites that must be completed before running Exachk for all guest vServers.

- Exachk must be installed as described in [Chapter 2](#).
- The IaaS CLI and API must be installed on the vServer that hosts the Enterprise Controller. Note that the IaaS CLI and API are pre-installed on the Enterprise Controller vServer in EECS 2.0.4.

To verify this prerequisite, check whether the `/opt/oracle/iaas/cli` and `/opt/oracle/iaas/api` directories exist on the vServer. If the directories exist, then the IaaS CLI and API are installed.

To install the IaaS CLI and API, complete the following steps:

1. Go to <https://edelivery.oracle.com>.
Sign in by using your Oracle account.
2. Read and accept the **Oracle Software Delivery Cloud Trial License Agreement** and the **Export Restrictions**.
Click **Continue**.
3. In the **Select a Product Pack** field, select **Oracle Fusion Middleware**.
In the **Platform** field, select **Linux x86-64**.
Click **Go**.
4. In the results displayed, select **Oracle Exalogic Elastic Cloud Software 11g Media Pack**, and click **Continue**.

5. Look for **Oracle Exalogic <version> IaaS Client for Exalogic Linux x86-64 (64 bit)**, and download the appropriate version—2.0.4.0.0, 2.0.6.0.0, or 2.0.6.0.1—depending on the EECS release installed on the Exalogic machine.
6. Unzip the downloaded file. It contains two RPMs.
7. Install both the RPMs by running the following command in the directory in which you unzipped the RPMs:

```
rpm -i *.rpm
```

3.3.2 Additional Prerequisites for STIG-hardened vServers

You can harden guest vServers using the STIGfix tool. The STIGfix tool is packaged as a part of the Exalogic Lifecycle Toolkit. You can download the toolkit installer and tar bundle from the My Oracle Support document ID 1586312.1. The My Oracle Support document also contains instructions for installing the toolkit.

To run Exachk on STIG-hardened vServers, you must perform the following prerequisites:

- Run Exachk on STIG-hardened vServers separately from other guest vServers.
- The vServer that hosts the Enterprise Controller and the STIG-hardened guest vServers should have the same user with sudo privileges. You can create these users by doing the following:

Create the account on the vServer hosting Enterprise Controller as follows:

1. Log in to the vServer hosting Enterprise Controller as the root user.
2. Run the following scripts to create the account ELAdmin:

```
# useradd -d /home/ELAdmin -s /bin/bash -m ELAdmin
# echo "ELAdmin:<password>" |chpasswd
# echo
"PATH=$PATH.:/usr/kerberos/sbin:/usr/kerberos/bin:/usr/local/sbin:/usr/local/bin:/sbin:/bin:/usr/sbin:/usr/bin:/root/bin" >>/home/ELAdmin/.bashrc
# usermod -a -G oinstall ELAdmin
```

Replace <password> with a password of your choice.

3. Run the visudo command.
4. Under ## Allows people in group wheel to run all commands, add the following line:

```
%ELAdmin ALL=(ALL) ALL
```

5. Under ## Same thing without a password, add the following line:

```
%ELAdmin ALL=(ALL) NOPASSWD: ALL
```

6. Save the file.

Create the ELAdmin account, which you created on the Enterprise Controller, on the guest vServer that is STIG-hardened as follows:

1. Log in to the vServer that is STIG-hardened.
2. Switch to the root user by running the following command:

```
su root
```

3. Run the following scripts to create the account ELAdmin:

```
# useradd -d /home/ELAdmin -s /bin/bash -m ELAdmin
# echo "ELAdmin:<password>" |chpasswd
# echo
"PATH=$PATH.:usr/kerberos/sbin:usr/kerberos/bin:usr/local/sbin:usr/local/bin:/sbin:/bin:/usr/sbin:/usr/bin:/root/bin" >>/home/ELAdmin/.bashrc
```

Replace <password> with a password of your choice.

4. Run the visudo command.
5. Under ## Allows people in group wheel to run all commands, add the following line:

```
%ELAdmin ALL=(ALL) ALL
```

6. Under ## Same thing without a password, add the following line:

```
%ELAdmin ALL=(ALL) NOPASSWD: ALL
```

7. Save the file.

3.3.3 Running Exachk for vServers that are not STIG-hardened

To perform health checks for all the guest vServers, which are not STIG-hardened, in a vDC on an Exalogic machine, complete the following steps:

1. SSH, as root, to the vServer that hosts the Enterprise Controller.
2. Go to the directory in which you installed Exachk.

```
# cd /u01/common/general/exachk
```

3. Discover the IP addresses of all the guest vServers, by running the following script:

```
# ./generate_guests_list.sh
```

Note: If the IaaS CLI and API are not installed on the vServer, the following error message is displayed:

```
IaaS API is not installed. Please consult with user guide for more information on IaaS API installation.
```

If this error occurs, install the IaaS CLI and API, as described in [Section 3.3.1, "Prerequisites"](#) and then perform this procedure from step 1.

4. When prompted, enter the root password.

Note: At times, particularly right after installing the IaaS CLI and API, when you enter the root password, the `generate_guests_list.sh` script may hang.

If this error occurs, complete the following steps:

1. Set the `IAAS_HOME` and `JAVA_HOME` environment variables, by running the following commands:

```
# export IAAS_HOME="/opt/oracle/iaas/cli"
# export JAVA_HOME="/usr/java/latest/"
```

2. Run the following command:

```
# /opt/oracle/iaas/cli/bin/akm-describe-accounts --base-url
https://localhost/ --user root
```

3. At the prompt to accept the trust certificate, enter `yes`.
 4. Run `generate_guests_list.sh` again.
-
-

The script generates a set of `.out` files, one for each Cloud User. The files are named `guest_vm_ip_user.out`, where `user` is a Cloud User. Each `.out` file contains the IP addresses of the guest vServers created by a Cloud User.

5. Run `Exachk` with the `-vmguest` option, and specify one or more `guest_vm_ip_user.out` files as arguments, depending on the users for which you want to perform health checks for guest vServers:

```
# ./exachk -vmguest guest_vm_ip_user-1.out[,guest_vm_ip_user-1.out,...]
```

For more information about all the options that you can use with the `exachk` command, see [Section 4.2](#).

For information about the results of a health check performed by using `Exachk`, see [Chapter 5](#).

3.3.4 Running Exachk for STIG-hardened vServers

Run `Exachk` for STIG-hardened vServers by doing the following:

1. Log in as `root` on the vServer that hosts the Enterprise Controller.
2. Switch to the `ELAdmin` user by running the following command:

```
su - ELAdmin
```

Note: When running `Exachk` on STIG-hardened vServers, Oracle recommends using only the `ELAdmin` user which you created in [Section 3.3.2, "Additional Prerequisites for STIG-hardened vServers."](#)

3. Create the `guest_vm_ip_user.out` manually. The `guest_vm_ip_user.out` has the following format:

```
ip_address_of_stig_hardened_guest_vserver1
ip_address_of_stig_hardened_guest_vserver2
ip_address_of_stig_hardened_guest_vserver3
```

4. Run `Exachk` with the `-vmguest` option, and specify one or more `guest_vm_ip_user.out` files as arguments, depending on the users for which you want to perform health checks for guest vServers:


```
# ./exachk -vmguest guest_vm_ip_user-1.out[,guest_vm_ip_user-1.out,...]
```

For more information about all the options that you can use with the `exachk` command, see [Section 4.2](#).

For information about the results of a health check performed by using `Exachk`, see [Chapter 5](#).

3.4 About the Exachk Health-Check Process

When `Exachk` starts, you will see the following sequence of events:

1. At the start of the health-check process, `Exachk` prompts you for the names of the storage nodes and switches. At the prompt, enter the names or IP addresses of the storage nodes and switches. This is a one time process. `Exachk` remembers these values, and uses them for the consequent health-checks. See [Figure 3-1](#).

Figure 3-1 Sample Message: `Exachk` Prompts for Names of Storage Nodes and Switches

```
[root@e101cn01 exachk_beta]# ./exachk
Could not find infiniband gateway switch names from env or configuration file.Please enter the first gateway infiniband switch name : e101sw-1b02
Could not find storage node names from env or configuration file.Please enter the first storage server : e101sn01

Checking ssh user equivalency settings on all nodes in cluster
Node e101cn02 is configured for ssh user equivalency for root user
Node e101cn03 is configured for ssh user equivalency for root user
Node e101cn04 is configured for ssh user equivalency for root user
Node e101cn05 is configured for ssh user equivalency for root user
Node e101cn06 is configured for ssh user equivalency for root user
```

Note: Enter the hostnames or IP addresses for the nodes, in the sequence in which they are arranged on the machine.

2. The health-check tool checks the SSH user-equivalency settings on all of the nodes in the cluster.

`Exachk` is a non-intrusive health-check tool. Therefore, it does not change anything in the environment. The tool verifies the SSH user equivalency settings, assuming that it is configured on all of the compute nodes on the system:

- If the tool determines that the user equivalence is not established on the nodes, it provides you an option to set the SSH user equivalency either temporarily or permanently.
- If you choose to set SSH user equivalence temporarily, `Exachk` does this for the duration of the health check, but after the completion of the health check, it returns the system to the state in which it found SSH user equivalence originally.

When `Exachk` prompts you, specify your preference, and enter the password for the nodes for which you are prompted. The default preference, 1, allows you to enter the `root` password once, for all of the nodes, on each host of the Exalogic machine. See [Figure 3-2](#).

Figure 3–2 Sample Message: Exachk Prompt for Setting SSH User Equivalence

```

Using cached file /root/exachk_beta/o_ibswitches.out for gateway infiniband switches list....

Using cached file /root/exachk_beta/o_storage.out for storage nodes list ....

Checking ssh user equivalency settings on all nodes in cluster
Node 0 is configured for ssh user equivalency for root user
Node 0 is configured for ssh user equivalency for root user

root user equivalence is not setup between 2 and STORAGE SERVER .

1. Enter 1 if you will enter root password for each STORAGE SERVER when prompted.
2. Enter 2 to exit and configure root user equivalence manually and re-run exachk.
3. Enter 3 to skip checking best practices on STORAGE SERVER.

Please indicate your selection from one of the above options[1-3][1]:- 1 ←
Is root password same on all STORAGE SERVER?[y/n][y]

```

On confirming the option and entering the credentials to proceed, Exachk creates a number of output files—log files and collection files—for collecting the data required for the health check. See [Figure 3–3](#).

Figure 3–3 Sample Collections: Exachk Data Collection

```

Preparing to run root privileged commands on INFINIBAND SWITCH el01sw-ib04.

root@el01sw-ib04's password:
Collecting - Environment Test
Collecting - Ethernet over infiniband data and control SL
Collecting - Free Memory
Collecting - Gateway Configuration
Collecting - Infiniband status
Collecting - List Link Up
Collecting - Localhost Configuration in /etc/hosts
Collecting - VNICS
Collecting - Version
Collecting - configvalid
Collecting - opensm

Preparing to run root privileged commands on INFINIBAND SWITCH el01sw-ib05 .

root@el01sw-ib05's password:
Collecting - Environment Test
Collecting - Ethernet over infiniband data and control SL
Collecting - Free Memory
Collecting - Gateway Configuration
Collecting - Infiniband status
Collecting - List Link Up
Collecting - Localhost Configuration in /etc/hosts
Collecting - VNICS
Collecting - Version
Collecting - configvalid
Collecting - opensm

```

- Exachk checks the status of the components of the Exalogic stack: compute nodes, storage nodes, and InfiniBand switches. Depending upon the status of each

component, the tool runs the appropriate collections and audit checks. See [Figure 3–4](#).

Figure 3–4 Sample Message: Collection and Audit Checks

```

=====
Node name - 0
=====
WARNING => NTP is not synchronized correctly.
INFO => One or more NFS Mount Points don't use the current recommended NFSv4.
WARNING => One or more NFS Mount Points uses incorrect rsize or wsize.
WARNING => Virtual Memory is not tuned to the recommended configuration.
WARNING => Ypbind is not configured correctly.
WARNING => DNS service is not configured correctly.
WARNING => IP Configuration for eth0 and bond0 are not configured correctly.
INFO => EoIB Setup is not set up.
INFO => Please verify BIOS Settings. See the Action / Repair section for instructions.
WARNING => Lock Daemon Configuration is not configured correctly.
=====
Node name - 0
=====
WARNING => NTP is not synchronized correctly.
INFO => One or more NFS Mount Points don't use the current recommended NFSv4.
WARNING => One or more NFS Mount Points uses incorrect rsize or wsize.
WARNING => Virtual Memory is not tuned to the recommended configuration.
WARNING => Ypbind is not configured correctly.
WARNING => DNS service is not configured correctly.

```

4. Exachk runs in the background, monitoring the progress of the command execution. If, for any reason, one of the commands times out, Exachk either skips or terminates that command, so that the process can continue. Exachk notes such cases in the log files. For information about command timeouts, see [Section 4.1.1](#).

If Exachk stops running for any reason, it cannot resume or restart automatically. You must start Exachk afresh. However, before running Exachk again, complete the following steps:

- Verify whether the previous Exachk process has been terminated, by running the following command:

```
# ps -ef | grep exachk
```

If the Exachk process is still running, terminate it by running the following command:

```
# kill pid
```

In this command *pid* is the process ID of the Exachk process that you want to terminate.

- Verify whether `/tmp/.exachk/`, the temporary directory generated by Exachk during the previous run, has been deleted. If the directory still exists, delete it.
5. When Exachk completes the health check, it produces an HTML report and a zip file.

For information about the output of Exachk, see [Chapter 5](#).

Running Exachk for Exalogic: Advanced Usage

This chapter contains the following sections:

- [Setting Environment Variables](#)
- [Exachk Command Options](#)
- [Running Exachk in Silent Mode](#)
- [Overriding Discovered Component Addresses](#)

4.1 Setting Environment Variables

This section describes the environment variables that you can set up for Exachk. This section contains following topics:

- [Setting Environment Variables for Runtime Command Timeouts](#)
- [Setting Environment Variables for Local Issues](#)

Note: To see the Exachk-related environment variables that are already configured on the system, run the following command:

```
export | grep RAT
```

4.1.1 Setting Environment Variables for Runtime Command Timeouts

To prevent the program from freezing, Exachk automatically terminates commands that exceed default timeouts. On a busy system, Exachk kills commands when the target of the check does not respond within the default timeout. Use the following environment variables to extend the default timeouts:

Note: If a command times out, analyze the cause of the timeout, and correct the parameters in the environment variables. Timeouts result in missing data, which limits the value of the tool. To avoid frequent timeouts, run the tool during times of least load on the system.

Table 4–1 Setting Environment Variables for Runtime Command Timeouts

Environment Variables	Default Timeout	Description	Example
RAT_TIMEOUT	90 seconds	If the default timeout for any non-root privileged individual command is not long enough, Exachk kills the other commands, which results in missing data.	Set the parameter by setting the environment variable in the script execution environment, as follows: export RAT_TIMEOUT=120
RAT_ROOT_TIMEOUT	300 seconds	The tool executes a set of root privileged data collections once for each node, including storage nodes and InfiniBand switches. If the default timeout for the set of root-privileged data collections is not long enough, Exachk kills the command running in the environment, which results in missing data for that node.	Set the parameter by setting this environment variable in the script execution environment, as follows: export RAT_ROOT_TIMEOUT=600
RAT_PASSWORDCHECK_TIMEOUT	10 seconds	During SSH login, if there is a delay in communication between the remote target and the DNS server, the login or password validation operation might timeout. This might result in failure of password validation, or other timeouts in the log.	Set the parameter by setting the environment variable, as follows: export RAT_PASSWORDCHECK_TIMEOUT=10

4.1.2 Setting Environment Variables for Local Issues

Exachk attempts to derive all the data it needs, from the environment in which it is executed. However, at times, the tool does not work as expected due to local system variations. In such cases, you can use local environment variables to override the default behavior of Exachk.

[Table 4–2](#) lists the environment variables for local issues, that you can set to address local issues:

Note: In a virtual configuration, when running Exachk from the vServer that hosts the Enterprise Controller component of the Exalogic Control stack, do not use the RAT_CELLS, RAT_SWITCHES, and RAT_CLUSTERNODES variables (as described in [Table 4–2](#)) to override the storage node, switches, and compute nodes for which Exachk should perform health checks. Instead, use the `exachk_exalogic.conf` file as described in [Section 4.4](#).

Table 4–2 Setting Environment Variables for Local Issues

Environment Variables	Description	Example
RAT_OS	Enables the utility to verify the platform information.	<p>For a 64 bit Oracle Enterprise Linux 5 machine, with x86 architecture, use the following command to set the RAT_OS variable:</p> <pre>export RAT_OS=LINUXX8664OELRHEL5</pre> <p>For a 64 bit Oracle Solaris 11 machine, with x86 architecture, use the following command to set the RAT_OS variable:</p> <pre>export RAT_OS=SOLARISX866411</pre>
RAT_SSHELL	Redirects Exachk to the default secure shell location.	<pre>export RAT_SSHELL="/usr/bin/ssh -q"</pre>
RAT_SCOPY	Redirects Exachk to the default secure copy (scp) location.	<pre>export RAT_SCOPY="/usr/bin/scp -q"</pre>
RAT_LOCALONLY	If set to 1, directs Exachk to perform health checks on only the compute node from which Exachk is run; that is, Exachk skips the checks for the storage nodes, the switches, and all the compute nodes other than one from which it is run.	<p>To direct Exachk to perform health checks on only the compute node from which Exachk is run, use the following command:</p> <pre>export RAT_LOCALONLY=1</pre>
RAT_CELLS	<p>Directs Exachk to run checks on one of the two storage nodes.</p> <p>If the names of the storage nodes are non-standard, edit the <code>o_storage.out</code> file that is located in the same directory where Exachk is installed, and specify the name of the storage node.</p>	<p>To direct Exachk to run checks on the second storage node, use the following command:</p> <pre>export RAT_CELLS="e101sn02"</pre>
RAT_SWITCHES	<p>Directs Exachk to run checks on sub-sets of the InfiniBand switches, in addition to the default checks on the InfiniBand switches.</p> <p>If the names of the switches are non-standard, edit the <code>o_ibswitches.out</code> file that is located in the same directory where Exachk is installed, and specify the names of the switches.</p>	<p>To direct Exact to run on the InfiniBand switch <code>e101sw-ib02</code> and its subsets, use the following command:</p> <pre>export RAT_IBSWITCHES="e101sw-ib02"</pre>

Table 4–2 (Cont.) Setting Environment Variables for Local Issues

Environment Variables	Description	Example
RAT_ CLUSTERNODES	Directs Exachk to run checks on specific nodes.	On a quarter rack, which has eight compute nodes, use the following command to list the compute nodes on which the health check needs to be performed: export RAT_ CLUSTERNODES="e101cn0 1 e101cn02 e101cn03 e101cn04 e101cn05 e101cn06 e101cn07 e101cn08"
RAT_ELRACTYPE	Indicates whether the machine is an eighth rack (0), quarter rack (1), half rack (2), or full rack (3).	To specify that the system is a full rack, use the following command: export RAT_ ELRACTYPE="3"

4.2 Exachk Command Options

You can run Exachk with the following command-line options:

Note: Only the options documented in the following table are applicable to Exalogic.

Option	Purpose and Syntax
-clusternodes	Perform checks on only the specified compute nodes and all the other components, and exclude the unspecified compute nodes. Syntax: ./exachk -clusternodes <i>cn_1[,cn_2,...]</i>
-diff	Compare two Exachk HTML reports and generate an HTML report showing the changes in the health of the Exalogic rack between Exachk runs. Syntax: # ./exachk -diff <i>report1 report2 [-outfile compared_report.html]</i> For more information, see Section 5.3 .
-exadiff	Compare two Exachk zip collections and generate an HTML report showing the differences in the versions of the infrastructure components (hardware, firmware, and software) between the two reports. The two Exachk reports can be for different Exalogic racks or at different points in time for the same rack, such as before and after upgrading the rack. Syntax: ./exachk -exadiff <i>exachk_collection_zip_1 exachk_collection_zip_2</i> For more information, see Section 5.5 .
-f	Perform checks on already collected data. Syntax: ./exachk -f <i>report_name</i>

Option	Purpose and Syntax
-vmguest	Perform checks for guest vServers as well. Syntax: <code>./exachk -vmguest <i>conf_file_1[,conf_file_2,...]</i></code> For more information, see Section 3.3 .
-hybrid	Perform checks on physical nodes (as well) in a hybrid rack Syntax: <code>./exachk -hybrid</code> For more information, see Section 3.2.4 .
-localonly	Perform checks for only the host on which Exachk is running. Syntax: <code>./exachk -localonly</code>
-nopass	Exclude passed checks from the HTML report. Syntax: <code>./exachk -nopass</code>
-o v	Display results for all checks, including those that passed. Syntax: <code>./exachk -o v</code>
-phy	Use this option along with -hybrid, to specify the physical nodes in a hybrid rack Syntax: <code>./exachk -hybrid -phy <i>node_1[,node_2,...]</i></code> For more information, see Section 3.2.4 .
-profile	Perform specific checks or checks for specific components. Syntax: <code>./exachk -profile <i>profile_name</i></code> For information about the profiles that you can specify, see "Supported Profiles for the -profile Option" after this table.
-s or -S	Run Exachk in silent mode. Syntax: <code>./exachk -s</code> For more information, see Section 4.3 .
-v	Display the version of the tool. Syntax: <code>./exachk -v</code>

Supported Profiles for the -profile Option

Profile	Description
control_VM	Run health checks for only the Exalogic Control components.

Profile	Description
e1_extensive	<p>In addition to the standard set of checks, run the following checks, which are useful for a freshly installed or upgraded machine:</p> <ul style="list-style-type: none"> ▪ Verify whether the BIOS on the compute nodes is configured correctly. ▪ Verify whether PCI 64-bit resource allocation setting on the compute nodes is disabled. ▪ In Oracle VM Manager, for each server pool name, verify whether VM Start Policy is set to Start on current server. <p>Note: Before running Exachk with the e1_extensive profile, verify whether passwordless SSH has been enabled for the CLI shell of Oracle VM Manager. For more information, see "Verifying and Enabling Passwordless SSH to the Oracle VM Manager CLI" after this table.</p>
switch	Run checks for the switches.
virtual_infra	Run checks for the Exalogic virtual infrastructure. This check is applicable to only Exalogic machines in a virtual configuration.
zfs	Run checks for the storage appliance.

Verifying and Enabling Passwordless SSH to the Oracle VM Manager CLI

Before running Exachk with the e1_extensive profile, you must verify whether passwordless SSH has been enabled for the CLI shell of Oracle VM Manager. To do this, try logging in via SSH to the Oracle VM Manager CLI shell, by running the following command on the host running the Oracle VM Manager vServer:

```
# ssh -l admin host_name_of_localhost -p 10000
```

host_name_of_localhost is the host name of the localhost.

If you can log in without having to enter a password (that is, the OVM> prompt is displayed), then passwordless SSH has been enabled.

If a password prompt is displayed, do the following:

1. Enter the password for the admin user (default: welcome1).
2. Log out from the OVM> shell, and try logging in again via SSH.

If the password prompt continues to be displayed, then passwordless SSH is not enabled. To enable passwordless SSH to the Oracle VM Manager CLI, complete the following steps:

1. SSH, as root, to the vServer that hosts the Oracle VM Manager.
2. Ensure that ssh-agent is running:

```
# eval `ssh-agent`
```

The output would be as shown in the following example:

```
Agent pid 18529
```

3. Generate a public/private key pair:

```
# ssh-keygen -t rsa -f ~/.ssh/admin
```

If ssh-agent is not running, the following error message will be displayed:

```
Could not open a connection to your authentication agent.
```

When prompted for a pass phrase, press Enter.

The keys are generated and stored in the `~/ .ssh/` directory: the `admin` file contains the private key and the `admin.pub` file contains the public key.

4. Add the private key to the authentication agent:

```
# ssh-add ~/.ssh/admin
Identity added: /home/user/.ssh/admin (/home/user/.ssh/admin)
```

5. Copy the public key to the `.ssh` directory in the `oracle` user's home directory:

```
# cp ~/.ssh/admin.pub /home/oracle/.ssh/
```

6. Append the file containing the public key (that is, `admin.pub`) to the `ovmcli_authorized_keys` file:

```
# cd /home/oracle/.ssh/
# cat admin.pub >> ovmcli_authorized_keys
```

7. SSH, as the `admin` user, to the Oracle VM Manager CLI:

```
# ssh -l admin localhost -p 10000
```

At the prompt to continue connecting, enter `yes`.

At the prompt for the password, enter the `admin` user's password.

The following shell is displayed:

```
OVM>
```

For subsequent logins, the newly established passwordless SSH channel is used.

4.3 Running Exachk in Silent Mode

You can run Exachk run in silent mode by using the `-s` or `-S` command-line options:

```
./exachk -s
```

```
./exachk -S
```

Note: When you run Exachk in silent mode, it does not perform health checks for storage nodes and InfiniBand switches.

Prerequisites

Ensure that the following prerequisites are met before running Exachk in silent mode:

1. Configure SSH user equivalence for the `root` user, from the compute node on which Exachk will be staged, to all the other compute nodes on which you would run the health-check tool.

To verify SSH user equivalence, log in by using the `oracle` software owner credentials, and run the SSH command, as shown in the following example:

```
$ ssh -o NumberOfPasswordPrompts=0 -o StrictHostKeyChecking=no -l oracle e101cn01 "echo \"oracle user equivalence is setup correctly\""
```

In this example, `oracle` is the `oracle` software owner, and `e101cn01` is the compute node hostname.

If the SSH user is not properly configured on the compute nodes, the following message is displayed:

```
Permission denied (publickey,gssapi-with-mic,password)
```

For more information about configuring passwordless login, see the "Upgrading Multiple Nodes Simultaneously" section in My Oracle Support document 1446396.1.

2. (required only for the `-s` option) Add the following line to the `sudoers` file on each compute node by using the `visudo` command:

```
oracle ALL=(root) NOPASSWD:/tmp/root_exachk.sh
```

4.4 Overriding Discovered Component Addresses

In a physical environment, the component IP addresses or host names are determined in the first run based on user input. In a virtual environment, Exachk has an in-built mechanism to automatically discover the IP addresses or host names of all the components. These features are designed to minimize the need for end-user input.

However, if the components were entered incorrectly during the first run or the autodiscovery mechanism fails to identify the components correctly, you can do the following to override the values:

- If you are running Exachk from a compute node, do the following:
 - To override the names of the I switches, edit (or create) the file `o_ibswitches.out` in the directory that contains the `exachk` binary. The file should contain a list of host names of the NM2-GW switches, each on a separate line.
 - To override the names of the storage components, edit (or create) the file `o_storage.out` in the directory that contains the `exachk` binary. The file should contain a list of host names of the storage heads, each on a separate line.
 - To override the names of the compute nodes, add the environment variable named `RAT_CLUSTERNODES`, and specify a list of the host names separated by a space, as the value of the variable.

```
Example: export RAT_CLUSTERNODES="e101cn01 e101cn02 e101cn03 e101cn04"
```

- If you are running Exachk from the vServer that hosts the Enterprise Controller component of the Exalogic Control stack, you must use a file named `exachk_exalogic.conf` to define the names of the components.

The Exachk bundle contains the following templates for `exachk_exalogic.conf` in the `templates` subdirectory:

- `exachk_exalogic.conf.tmpl_full`
- `exachk_exalogic.conf.tmpl_half`
- `exachk_exalogic.conf.tmpl_quarter`
- `exachk_exalogic.conf.tmpl_eight`

Copy the template that corresponds to the size of your Exalogic machine to the directory that contains the `exachk` binary, and rename the template file to `exachk_exalogic.conf`.

Modify `exachk_exalogic.conf` to match your IP address schema.

Note: Oracle recommends that you create a copy of the `exachk_exalogic.conf` file that Exachk generates the first time when the system is fully populated and functional, so that you can use the file later.

Using the Exachk Output

This chapter describes the output of Exachk and how you can read, interpret, and use the output.

This chapter contains the following sections:

- [Output of Exachk](#)
- [Reading and Interpreting the Exachk HTML Report](#)
- [Comparing Health-Check Results in Two Exachk HTML Reports](#)
- [Removing Checks from the Exachk HTML Report](#)
- [Comparing Component Versions in Two Exachk Collections](#)

5.1 Output of Exachk

After Exachk completes running, it generates the following output in the directory in which you installed Exachk:

- A subdirectory named according to the following convention:

exachk_compute-node_date_time

Example:

exachk_en01cn02_051412_140521

This subdirectory uses approximately 5 MB of space. Oracle recommends that you clean it regularly.

The following table summarizes the contents of this directory.

Subdirectory	Content
log	Exachk log files.
outfiles	A set of .out files, containing the environmental and configuration data that Exachk collected from the components on the Exalogic machine during the health check.
reports	An HTML report summarizing the findings that require attention and the checks that passed. For more information, see Section 5.2 . This directory also contains a set of .rep files, summarizing the health-check result for various components on the Exalogic machine.
upload	Raw data that Exachk collects for each node.

- A zip file containing the entire subdirectory, with the same name as that of the subdirectory (example: `exachk_en01cn02_051412_140521.zip`).

You can use this zip file while creating service requests with My Oracle Support for issues in the Exachk report that require assistance.

Note: Do not rename any of the Exachk output files and directories.

5.2 Reading and Interpreting the Exachk HTML Report

You can view the Exachk HTML report in a browser, by using an HTTP URL, as shown in the following example:

```
http://e101sn01/export/common/general/exachk/exachk_e101cn01_053112_101705/exachk_e101cn01_053112_101705.html
```

In this example, `e101sn01` is the name of the storage node, `e101cn01` is the name of the compute node on which the share is mounted, and `053112_101705` is the date-and-time stamp for the report.

For information about enabling access to a share through the HTTP/WebDAV protocol, see ["Enable Access to the /export/common/general Share Through the HTTP/WebDAV Protocol"](#).

The HTML report lists the most important exceptions, by component, first. The report contains the following sections.

- [Exalogic Rack Summary](#)
- [Findings Needing Attention](#)
- [Findings Passed](#)
- [System-Wide Firmware and Software Versions](#)
- [Skipped Nodes](#)

Note: The sections in the HTML report may vary, depending on the options selected while running Exachk. The appearance of the HTML report may vary depending upon the environment settings and browser preferences.

5.2.1 Exalogic Rack Summary

This section of the report summarizes the key environmental data that Exachk collected from the Exalogic machine, as shown in the following example:

Figure 5–1 Sample of Exalogic Rack Summary

Exalogic Rack summary	
OS Version	LINUX X86-64 OELRHEL 5 2.6.32-100.23.1.el5
Exalogic Version	1.0.0.2.0
System Identifier	Oracle Exalogic (none)
Number of nodes	34
Compute Nodes	<u>28</u>
Storage Servers	<u>2</u>
IB Switches	<u>4</u>
exachk Version	2.1.5(DEV)_20120509
Collection	exachk_scae01.cn02_051412_214442.zip
Collection Date	14-May-2012 21:46:52

To view details of the compute nodes, storage nodes, and InfiniBand switches, click on the numbers adjacent to the components listed.

5.2.2 Findings Needing Attention

This section lists the health checks that failed, resulted in an error, or resulted in a WARNING or INFO status.

For more information about each check, see My Oracle Support document 1463157.1.

[Table 5–1](#) describes status messages and the action that needs to be taken for each status message:

Table 5–1 Health-Check Status Message: Description and Action

Message Status	Description or Possible Impact	Action to be Taken
FAIL	Shows checks that did not pass due to issues.	Address the issue immediately.
WARNING	Shows checks that might cause performance or stability issues if not addressed.	Investigate the issue further.
ERROR	Shows errors in system components.	Take corrective measures, and restart Exachk.
INFO	Indicates information about the system.	Read the information displayed in these checks, and follow the instructions provided, if any.

For samples of the content in the Findings Needing Attention section, see [Figure 5–2](#), [Figure 5–3](#), and [Figure 5–4](#).

Figure 5–2 Sample of Findings Needing Attention

Findings Needing Attention

FAIL, WARNING, ERROR and INFO findings should be evaluated. INFO status is considered a significant finding and details for those should be reviewed in light of your environment.

Compute Node

Status	Type	Message	Status On	Details
FAIL	OS Check	Hardware and Firmware Profile are not configured correctly.	sae01cn19, sae01cn20, sae01cn27, sae01cn29	View
FAIL	OS Check	Software Profile is not configured correctly.	sae01cn14, sae01cn19, sae01cn20, sae01cn27, sae01cn29	View
WARNING	OS Check	Master SIM is not properly configured.	sae01cn19, sae01cn20, sae01cn27, sae01cn29	View
WARNING	OS Check	The image is not at a supported version.	sae01cn19, sae01cn23, sae01cn20, sae01cn27, sae01cn29	View
WARNING	OS Check	DNIS service is not configured correctly.	sae01cn11, sae01cn18, sae01cn19, sae01cn24, sae01cn20 ... more	View
WARNING	OS Check	ib_ipoib is not loaded.	sae01cn08, sae01cn19, sae01cn20, sae01cn27, sae01cn29	View
WARNING	OS Check	IB Card is not installed in the correct slot.	sae01cn08	View
WARNING	OS Check	ib_sdp is not loaded.	sae01cn08, sae01cn19, sae01cn20, sae01cn27, sae01cn29	View
WARNING	OS Check	POB is not in connected mode.	sae01cn08, sae01cn19, sae01cn20, sae01cn27, sae01cn29	View
WARNING	OS Check	Your kernel version is not at the supported version.	sae01cn08, sae01cn19, sae01cn23, sae01cn20, sae01cn27 ... more	View
WARNING	OS Check	Free Memory is not at sufficient level.	sae01cn08	View
WARNING	OS Check	Openibd doesn't start before Network Service(wrnl).	sae01cn08	View
WARNING	OS Check	Swap space is currently being used.	sae01cn08	View
WARNING	OS Check	Caine is disabled on Local SSD.	sae01cn01, sae01cn03, sae01cn04, sae01cn03, sae01cn07 ... more	View
WARNING	OS Check	TCP is not tuned to the recommended configuration.	sae01cn01, sae01cn03, sae01cn08, sae01cn21	View
WARNING	OS Check	Log Daemon Configuration is not configured correctly.	All Compute Nodes	View
WARNING	OS Check	IP Configuration for eth0 and bond0 are not configured correctly.	sae01cn02, sae01cn01, sae01cn08, sae01cn14, sae01cn10 ... more	View
WARNING	OS Check	Ypbind is not configured correctly.	sae01cn02, sae01cn01, sae01cn03, sae01cn04, sae01cn07 ... more	View
WARNING	OS Check	Virtual Memory is not tuned to the recommended configuration.	sae01cn02, sae01cn01, sae01cn03, sae01cn08, sae01cn09 ... more	View
WARNING	OS Check	One or more NFS Mount Points uses incorrect size or wsize.	sae01cn02, sae01cn09, sae01cn10, sae01cn13, sae01cn16 ... more	View
WARNING	OS Check	NTP is not synchronized correctly.	sae01cn02, sae01cn01, sae01cn03, sae01cn04, sae01cn03 ... more	View
INFO	OS Check	Please verify BIOS Settings. See the Action / Repair section for instructions.	All Compute Nodes	View
INFO	OS Check	EFI Setup is not set up.	All Compute Nodes	View
INFO	OS Check	One or more NFS Mount Points don't use the current recommended NFSv4.	All Compute Nodes	View

Storage Server

Status	Type	Message	Status On	Details
WARNING	Storage Server Check	Storage Node is not at a supported version.	All Storage Servers	View
WARNING	Storage Server Check	Datasets Check failed.	All Storage Servers	View

Infiniband Switch

Status	Type	Message	Status On	Details
WARNING	Switch Check	One or more links are down.	All Infiniband Switches	View
WARNING	Switch Check	One or more Environmental Status Test failed.	All Infiniband Switches	View
WARNING	Switch Check	One or more VNICs are not in UP state.	All Infiniband Switches	View
WARNING	Switch Check	Free Memory is not at sufficient level.	sae01sw-ib04, sae01sw-ib03	View

Figure 5–3 Part I - Sample of Detailed Report for Findings Needing Attention

Correct Slot Installation for IB Card

Success Factor	EXALOGIC AUDIT CHECKS
	Benefit / Impact: For the best performance on the PCI Express interface, the adapter card should be installed in a PCIe x8 slot.
	Risk
Recommendation	Installing the card in a slower slot will significantly limit bandwidth and performance.
	Action / Repair: Reinstall the card in a PCIe x8 slot, or replace the card if it is already in a PCIe x8.
Needs attention on	scae01cn08
Passed on	scae01cn02, scae01cn01, scae01cn03, scae01cn04, scae01cn05, scae01cn07, scae01cn09, scae01cn10, scae01cn11, scae01cn12, scae01cn13, scae01cn14, scae01cn15, scae01cn16, scae01cn17, scae01cn18, scae01cn19, scae01cn20, scae01cn21, scae01cn22, scae01cn23, scae01cn24, scae01cn25, scae01cn26, scae01cn27, scae01cn28, scae01cn29

Figure 5–4 Part II - Sample of Detailed Report of Findings Needing Attention

```

Status on scae01cn29: WARNING => ib_ipoib is not loaded.

DATA FROM SCAE01CN29 - DATABASE - IB_IPOIB MODULE

Module              Size  Used by
ocfs2                758716  1
jbd2                 61014  1 ocfs2
quota_tree           7649   1 ocfs2
ocfs2_dlmfs          19575  1
ocfs2_stack_o2cb     3888   1
ocfs2_dlm            226224  1 ocfs2_stack_o2cb
ocfs2_nodemanager    218304  12 ocfs2,ocfs2_dlmfs,ocfs2_stack_o2cb,ocfs2_dlm
ocfs2_stackglue      11707  3 ocfs2,ocfs2_dlmfs,ocfs2_stack_o2cb
configfs             29304  2 ocfs2_nodemanager
dm_nfs               5590   1
nfs                  299799  2
fscache              50862  1 nfs
nfs_acl              2589   1 nfs
auth_rpcgss          41579  1 nfs
gntdev               7543   0
...More
Top

```

The findings needing attention, are listed in separate subsections for compute nodes, storage nodes, and InfiniBand switches. [Table 5–2](#) describes the elements displayed in Findings Needing Attention of the Exachk output.

Table 5–2 Elements Displayed in Findings Needing Attention of the Exachk Output

Element	Description
Status	Displays the status of the health check on a specific component. See Table 5–1 for information about the health-check status message.
Type	Displays the type of health check that has been run on a specific component.
Message	Displays a brief description of the issue that has led to a specific status message.
Status On	Displays the nodes that need to be examined for specific issues.
Details	<p>Exachk assesses all of the items in the system, and calls attention to findings. These findings are displayed in details in the "Best Practices and Recommendations" section of the Exachk report.</p> <p>Click View to explore detailed information about each component. The detailed information is available in two parts. The first part provides an explanation of the following sections:</p> <ul style="list-style-type: none"> ■ Recommendation <ul style="list-style-type: none"> - Benefit or impact of a specific health check - Risk if corrective measures are not taken - Suggested action or repair ■ System components that need attention. ■ System components that passed the health checks. <p>Each of these sections may contain specific instructions, references to MOS notes, or directions to raise a service request with Oracle support. See Figure 5–3.</p> <p>The second part contains the raw data about each component. Click More to view all of the data provided in this section. See Figure 5–4.</p> <p>Click Top to go back to the main section of the Exachk output.</p>

5.2.3 Findings Passed

This section lists the health checks that passed, as shown in Figure 5–5, Figure 5–6, and Figure 5–7.

Figure 5–5 Sample of Findings Passed

Findings Passed				
Compute Node				
Status	Type	Message	Status On	Details
PASS	OS Check	NTP is synchronized correctly.	sca01cn18_sca01cn19_sca01cn24_sca01cn25_sca01cn27	more View
PASS	OS Check	Ypbind is configured correctly.	sca01cn01_sca01cn09_sca01cn10_sca01cn11_sca01cn13	more View
PASS	OS Check	IP Configuration for eth0 and bond0 are configured correctly.	sca01cn03_sca01cn04_sca01cn05_sca01cn07_sca01cn09	more View
PASS	OS Check	Virtual Memory is tuned to the recommended configuration.	sca01cn03_sca01cn04_sca01cn07_sca01cn11_sca01cn13	more View
PASS	OS Check	All NFS Mount Points uses the correct size and wsize.	sca01cn01_sca01cn03_sca01cn04_sca01cn05_sca01cn07	more View
PASS	OS Check	Master SM is properly configured.	sca01cn01_sca01cn01_sca01cn03_sca01cn04_sca01cn05	more View
PASS	OS Check	ib_ipoib module is loaded.	sca01cn02_sca01cn01_sca01cn03_sca01cn04_sca01cn05	more View
PASS	OS Check	IB Card is installed in the correct slot.	sca01cn01_sca01cn01_sca01cn03_sca01cn04_sca01cn05	more View
PASS	OS Check	ib_ipoib module is loaded.	sca01cn02_sca01cn01_sca01cn03_sca01cn04_sca01cn05	more View
PASS	OS Check	Cache is enabled on Local SSD.	sca01cn01_sca01cn18	View
PASS	OS Check	RoCE is in connected mode.	sca01cn02_sca01cn01_sca01cn03_sca01cn04_sca01cn05	more View
PASS	OS Check	MTU for all Ethernet Links are set to recommended values.	All Compute Nodes	View
PASS	OS Check	MTU for all InfiniBand Links are set to recommended values.	All Compute Nodes	View
PASS	OS Check	Your kernel version is at the supported version.	sca01cn01_sca01cn01_sca01cn03_sca01cn04_sca01cn05	more View
PASS	OS Check	DBS service is configured correctly.	sca01cn02_sca01cn01_sca01cn03_sca01cn04_sca01cn05	more View
PASS	OS Check	free Memory is at sufficient level.	sca01cn01_sca01cn01_sca01cn03_sca01cn04_sca01cn05	more View
PASS	OS Check	Openibd starts before Network Service(vmln).	sca01cn02_sca01cn01_sca01cn03_sca01cn04_sca01cn05	more View
PASS	OS Check	The image is at a supported version.	sca01cn01_sca01cn01_sca01cn03_sca01cn04_sca01cn05	more View
PASS	OS Check	Swap space is currently unused.	sca01cn02_sca01cn01_sca01cn03_sca01cn04_sca01cn05	more View
PASS	OS Check	All of the NFS Mount Points have the attribute caching enabled.	All Compute Nodes	View
PASS	OS Check	TCP is tuned to the recommended configuration.	sca01cn02_sca01cn03_sca01cn04_sca01cn07_sca01cn09	more View
PASS	OS Check	Software Profile is configured correctly.	sca01cn01_sca01cn01_sca01cn03_sca01cn04_sca01cn05	more View
PASS	OS Check	Hardware and Firmware Profile are configured correctly.	sca01cn02_sca01cn01_sca01cn03_sca01cn04_sca01cn05	more View

Storage Server				
Status	Type	Message	Status On	Details
PASS	Storage Server Check	Lock Daemon Configuration is configured correctly.	All Storage Servers	View
PASS	Storage Server Check	Space Utilization Check passed.	All Storage Servers	View
PASS	Storage Server Check	Snapshot Migrated Shares check passed.	All Storage Servers	View
PASS	Storage Server Check	Cluster Check passed.	All Storage Servers	View
PASS	Storage Server Check	Backup Checks passed.	All Storage Servers	View

Infiniband Switch				
Status	Type	Message	Status On	Details
PASS	Switch Check	Operam is running.	All Infiniband Switches	View
PASS	Switch Check	All Infiniband Stats Checks passed.	All Infiniband Switches	View
PASS	Switch Check	EoB Control BL is valid.	All Infiniband Switches	View
PASS	Switch Check	Content of /conf/config/wsid is valid.	All Infiniband Switches	View
PASS	Switch Check	Gateway is configured correctly.	All Infiniband Switches	View
PASS	Switch Check	The switch version is at the supported version.	All Infiniband Switches	View

Figure 5–6 Part I - Sample of Detailed Report of Findings Passed

IB Startup Sequence	
Success Factor	EXALOGIC AUDIT CHECKS
	Benefit / Impact: To avoid inconsistencies within the Exalogic Elastic Cloud, and for network services to work properly, openibd service must start before the network services.
Risk	If openibd doesn't start before network services, inconsistencies within the nodes can lead to problems and outages.
Recommendation	Action / Repair: Relink openibd with 005 and mlx4_vnic_confd with 006.
Links	<ul style="list-style-type: none"> Using Exalogic Configuration Utility
Needs attention on	scae01cn08
Passed on	scae01cn02, scae01cn01, scae01cn03, scae01cn04, scae01cn05, scae01cn07, scae01cn09, scae01cn10, scae01cn11, scae01cn12, scae01cn13, scae01cn14, scae01cn15, scae01cn16, scae01cn17, scae01cn18, scae01cn19, scae01cn20, scae01cn21, scae01cn22, scae01cn23, scae01cn24, scae01cn25, scae01cn26, scae01cn27, scae01cn28, scae01cn29

Figure 5–7 Part II - Sample of Detailed Report of Findings Passed

```

Status on scae01cn01: PASS => Openibd starts before Network Service(vnic).

DATA FROM SCAE01CN01 - DATABASE - IB STARTUP SEQUENCE

/etc/rc3.d/S05openibd
/etc/rc3.d/S27mlx4_vnic_confd

Status on scae01cn03: PASS => Openibd starts before Network Service(vnic).

DATA FROM SCAE01CN03 - DATABASE - IB STARTUP SEQUENCE

/etc/rc3.d/S05openibd
/etc/rc3.d/S06mlx4_vnic_confd

Status on scae01cn04: PASS => Openibd starts before Network Service(vnic).

DATA FROM SCAE01CN04 - DATABASE - IB STARTUP SEQUENCE

/etc/rc3.d/S05openibd
/etc/rc3.d/S06mlx4_vnic_confd

```

The structure of this section of the report is the same as that of the Findings Needing Attention section, as described in [Table 5–2](#).

5.2.4 System-Wide Firmware and Software Versions

This section lists the firmware and software versions of all the components for which the health check was performed.

5.2.5 Skipped Nodes

This section lists components for which Exachk did not perform any health check. Skipped components are those that, typically, Exachk cannot access.

The following table lists the typical situations when Exachk skips a component and the solution for each situation:

Situation	Solution
The IP address of the component is incorrect or the host name cannot be resolved.	Update <code>exachk_exalogic.conf</code> or the <code>o*.out</code> files, as appropriate, with the correct IP addresses, and run Exachk again. For more information, see Section 4.4 .
The component is not running.	Ping (or SSH to) the component. If the ping or SSH command fails, ensure that the component is started. Then, run Exachk again.
The network is congested and very slow, causing an SSH time-out.	Try increasing the value of the environment variable, <code>RAT_TIMEOUT</code> , and run Exachk again. For more information, see Section 4.1.1 .

Situation	Solution
The component is overloaded and low on memory, causing a password time-out.	Try increasing the value of the environment variable, <code>RAT_PASSWORDCHECK_TIMEOUT</code> , and run Exachk again. For more information, see Section 4.1.1 .

5.3 Comparing Health-Check Results in Two Exachk HTML Reports

You can use the `-diff` option of Exachk to compare two Exachk HTML reports. When you use this option, Exachk generates a comparison report in HTML format, highlighting the changes in the health of the Exalogic rack between Exachk runs. You can also use this feature to identify checks that have been introduced in a new version of Exachk.

To compare two Exachk reports, run the following command:

```
# ./exachk -diff report1 report2 [-outfile name_of_compared_report.html]
```

- `report1` and `report2` are the names of the reports being compared.
- `-outfile` is the full path and name of the file in which the comparison report must be saved.

By default, the comparison report is stored in a file named `exachk_report1_report2_diff.html`.

Example:

```
# ./exachk -diff exachk_ec1-vm_021213_040840 exachk_ec1-vm_021213_040912 -outfile compared_report.html
```

The comparison report provides the following information:

- A summary of the comparison
- Differences between the health-check results in the two HTML reports
- Checks that exist in only one of the two HTML reports
- Checks that are common to both HTML reports

For information about the columns in the tables of the comparison report, see [Table 5-2](#).

5.4 Removing Checks from the Exachk HTML Report

To remove checks from an HTML report, click **Remove finding from report** in the Table of Contents of the HTML report as shown in [Figure 5-8](#).

Figure 5–8 Table of Contents of the HTML Report

Table of Contents

- [Findings Needing Attention](#)
 - [On Compute Node](#)
 - [On Storage Server](#)
 - [On Infiniband Switch](#)
 - [System Wide](#)
- [Findings Passed](#)
 - [On Compute Node](#)
 - [On Storage Server](#)
 - [On Infiniband Switch](#)

[Remove finding from report](#) ←

The layout of the report changes as follows:

- The **Remove finding from report** option changes to **Hide Remove Buttons**.
- For each row in the Findings Needing Attention and Findings Passed tables, a button labeled **X** is displayed in the **Status** column.

To customize your report, you can complete the following steps:

- To revert to the original layout—that is, without the **X** buttons, click the **Hide Remove Buttons** link in the Table of Contents.
- To remove an item from the report, click **X**.
- To save the changes that you made in the report, save the HTML file using a new name.
- To clear any changes that you have made in the Exachk report, close the browser session.

Note: Removing findings from the HTML report does not change the original HTML file, unless you save the modified HTML file using the same name as that of the original.

5.5 Comparing Component Versions in Two Exachk Collections

You can use the `-exadiff` option of Exachk to compare two Exachk collections. When you use this option, Exachk generates a comparison report in HTML format, highlighting the differences in the versions of the infrastructure components (hardware, firmware, and software) between the two reports. The two Exachk reports can be for different Exalogic racks or at different points in time for the same rack, such as before and after upgrading the rack.

To compare two Exachk collections, complete the following steps:

1. Identify the two Exachk collections (zip files) that you want to compare.
2. If the collections do not already exist on the host (compute node or vServer) on which you are running Exachk, copy the collections to the host.
3. Run the following command:

```
./exachk -exadiff collection_1 collection_2
```

In this command, `collection_1` and `collection_2` are the full paths and names of the two collections that you want to compare. You can specify either the collection zip file or the directory in which the zip file has been extracted.

4. Wait for the command to finish executing.

After comparing the two collections, Exachk saves the results of the comparison in an HTML file named `rack_comparison_date_time.html` (example: `rack_comparison_131219_213435.html`).

You can view the HTML report in a browser, by using an HTTP URL, as shown in the following example:

Example:

```
http://e101sn01/export/common/general/exachk/rack_comparison_131219_213435.html
```

In this example, `e101sn01` is the name of the active storage node, `/common/general` is the share in which the Exachk reports are stored, and `131219_213435` is the date-and-time stamp for the report.

Note: For information about enabling access to the `/common/general` share through the HTTP protocol, see "[Enable Access to the /export/common/general Share Through the HTTP/WebDAV Protocol](#)".

Troubleshooting Exachk for Exalogic

This chapter contains the following sections:

- [Potential Problems](#)
- [Getting Support for Exachk](#)

6.1 Potential Problems

You might encounter the following problems when running Exachk:

- [Runtime Command Timeouts](#)
- [Issues With the Local Environment Settings](#)

6.1.1 Runtime Command Timeouts

During the health check process, if a particular compute node, storage node, or switch does not respond to the health-check command within a pre-defined duration, Exachk terminates that command. To prevent the program from freezing, Exachk automatically terminates commands that exceed the default timeouts. On a busy system, Exachk terminates commands when the target of the check does not respond within the default timeout.

For information about extending the timeout duration, see [Table 4-1](#).

Note: To avoid runtime command timeouts from occurring during health checks, ensure that you run the tool when there is least load on the system.

6.1.2 Issues With the Local Environment Settings

See [Section 4.1](#).

6.2 Getting Support for Exachk

For support on any problems that you might encounter while using Exachk, create a service request on the My Oracle Support website:

<http://support.oracle.com>

Note: You might see some errors in the `exachk_error.log` file. Most of these errors do not indicate any serious problem with Exachk or the system. To prevent these errors from appearing on the screen and cluttering the display, Exachk directs the errors to the `exachk_error.log` file. You usually need not report any of these errors to Oracle Support.
