Oracle Advanced Services Gateway Security Guide

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Contents

Preface

This document outlines the requirements for deploying Oracle Advanced Services Gateway (hereafter referred to as "the Gateway") into the customer environment to support the delivery of certain Oracle remote services (hereafter referred to as Oracle Services.) The Gateway is an important part of the Oracle delivery architecture for Oracle Services and its placement must be carefully considered in order for Oracle to deliver Oracle Services. This document outlines network configuration options when integrating the Gateway device within the customer environment. To help explain these options, this document assumes a "simple" customer-side network topology. However, these options can extend to more complex network topologies.

1

About the Gateway

The Gateway is a multi-purpose platform designed to facilitate a number of Oracle Services including Oracle Platinum Services, Support and Customer Success Services. The Gateway enables the simplification of network requirements and a single point of access for the provision and delivery of these services.

The Gateway platform is based on the Oracle Linux operating system and hosts a full set of Oracle software stacks, including Automated Service Request (ASR), Oracle Enterprise Manager, patch management (such as DNF services), and a suite of Java applications.

Together, these applications aggregate and route telemetry messages from the customer environment to the Oracle Support Services infrastructure. The Gateway provides remote access for Oracle engineers to access the customer network (with customer permission) and to carry out approved actions on customers' monitored systems.

General Requirements

There are a number of general requirements that are necessary for Oracle to deliver Oracle Services:

- A Gateway must be provisioned into the customer's environment.
- All monitored systems must be network accessible from the Gateway.
- The monitored systems must be dedicated to the customer. Oracle will not be able to deliver services for monitored systems which are not exclusively owned and controlled by the customer. Oracle recommends a dedicated, physical server. If you do not wish to purchase the certified server from Oracle, you can use a server or Virtual Machine (VM) that meets your particular requirements. See Installing the Gateway.
- Oracle must have access to certain ports and protocols (described below) in order to implement and deliver Oracle Services.
- The Gateway must be continuously accessible from the Oracle Support Platform using the secure protocols described below. However, the Gateway must not be directly exposed to the Internet.
- Customers must not attempt to gain access to the gateway outside approved, dedicated, restricted customer user accounts.
- Customers must not attempt to install other, third party, software onto the Gateway unless the software has been explicitly approved by Oracle. The Gateway should be viewed as an appliance that is installed into the customer network.
- Customers must not put a Transport Layer Security (TLS) break between the Gateway and the Internet.

In order to expedite the implementation process, the customer will be required to provide high level network topology which should include:

- IP numbering scheme
- Routing policy
- Locations of firewalls

- Locations of proxies (if applicable)
- Locations of monitored systems
- Proposed location of Gateway

Having this information enables Oracle to provide a recommendation regarding the Gateway placement.

Changes to the Security Guide Since the Last Release

This section outlines the principal changes made to *Oracle Advanced Services Gateway Security Guide* (this document) since the last release (E40643-66; January 2026).

- Updated to reflect the change in allowing customers to access the gateway using ssh and removing the information about accessing the web interface on the gateway.

2
Firewall Port Requirements

The specifics of the Oracle Services network requirement depends on the customer network topology relative to the Oracle Services Support centers, the Gateway, and the monitored systems. The customer networks must be configured to permit traffic flow as shown in the diagram below.

The firewall rules must be set up to allow traffic flow in two situations:

- Between the Gateway and Oracle Services Support centers. This is referred to as the *external connection*.

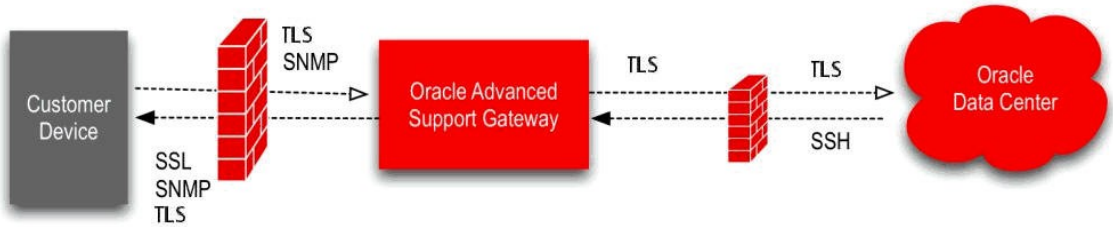
> **Note**
>
> A web proxy can be used to proxy the HTTPS traffic across the external connection. However, the Gateway does not support NTLM or Kerberos proxy authentication. Transport Layer Security (TLS) VPN traffic can be routed through an unauthenticated proxy server.

> **Caution**
>
> To defend against security attacks, you should never connect the Gateway interfaces or the Oracle ILOM Service Processor to a public network, such as the Internet. The Gateway should never be exposed directly to the Internet without the protection of a customer firewall or Access Control List (ACL.) You should keep the Oracle ILOM Service Processor management traffic on a separate management network and grant access only to system administrators. For further information, see the section on Securing the Physical Management Connection in the Oracle ILOM Security Guide.

- Between the Gateway and the customer's monitored devices, through a customer-controlled firewall or other security devices. This is referred to as the *internal connection*.

The diagram below depicts an example traffic flow between monitored systems and Oracle. (Detailed firewall rules and templates are provided to the customer during the implementation process.)

Figure 2-1 High Level Traffic Flow and Firewall Requirement



Downloading the Firewall Rules Document from My Oracle Support

Information about firewall rules is no longer published in *Oracle Advanced Services Gateway Security Guide* (this document). This information is now available in the form of a knowledge document on My Oracle Support (MOS) instead. To download this document, users are required to log on to MOS using their Oracle Account.

The firewall rules document from MOS provides essential information for customers on:

- All standard firewall port configurations necessary for the delivery of Oracle Services;
- All internal firewall rules for the customer network, Gateway hardware self-monitoring, Oracle Engineered Systems such as Exadata Database Machine (Exadata), Zero Data Loss Recovery Appliance (ZDLRA) and so on, as well as standalone hosts (both Oracle and third-party).

All Gateways must implement:

- Firewall rules between the Gateway and the customer network.
- Firewall rules for Gateway hardware self-monitoring.
- Firewall rules that apply for the systems to be monitored by the Gateway.

To download the document:

1. Click the following link: Firewall Rules for Oracle Advanced Services Gateway.
2. Enter your Oracle Account details.
3. Download and save the relevant PDF.

Use the firewall rules information to configure traffic flow as outlined in Firewall Port Requirements.

3
External Connection

Oracle utilizes a combination of a VPN solution and to secure communications between the Gateway, located within the customer's environment, and the Oracle Services Support center locations. The VPN is primarily used for tasks such as facilitating patching requirements from Oracle Services Support center locations to the Gateway and TLS is used for transporting the monitoring telemetry from the Gateway to the Oracle Services Support center locations.

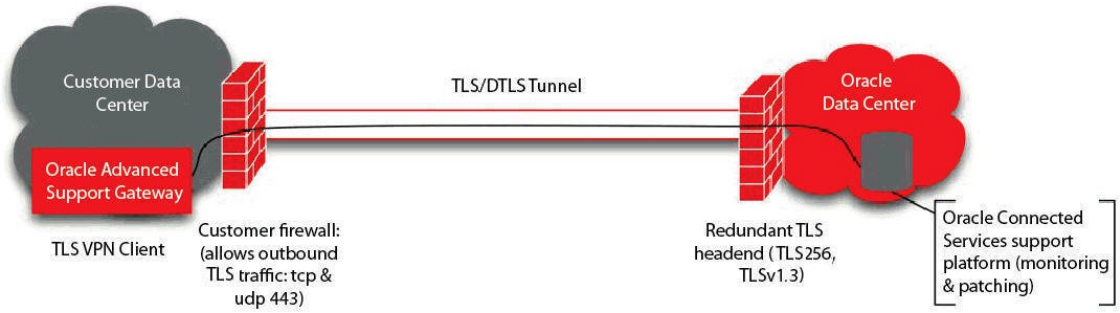
TLS VPN and the Gateway

The Gateway is configured with a software TLS-based VPN client. When the Gateway boots up, it opens an outbound connection to one of three Oracle Services Support centers,

establishing a TLS VPN tunnel. At that point, this connection is used for inbound connectivity between the Oracle Services Support center and the Gateway. No inbound firewall port openings are required, as the initial connection is outbound. The Gateway is assigned a unique ID and password and connects to one of the Oracle VPN concentrators. The TLS-based VPN has the following features:

- Connection based on TLS, AES256 symmetric encryption to ensure traffic integrity and confidentiality
- Continuous VPN connection availability through the use of active/passive VPN cluster servers at the Oracle Services Support centers. Any hardware or software issues on the active VPN server failover all connections to the backup VPN.
- Disaster recovery processes that use multiple clusters around the world. Any connection issue with one of the Oracle Services Support centers failover client connections to the other Oracle Services Support centers.

Figure 3-1 A TLS-Based VPN Client Connection from the Gateway to Oracle



> **Note**
>
> The TLS VPN is the standard method for establishing the connection with Oracle. Alternative connection methods are available on an exception, customer-by-customer basis that is summarized in Alternative External Connection Option. If you wish to explore these options further, please contact your Oracle Implementation Manager.

Alternative External Connection Option

Oracle offers an alternate method for establishing a connection using IPSec. The connection is terminated on the customer's existing VPN hardware. This option generally requires an

extended implementation cycle and is approved on an exception basis. If the customer chooses to use their existing VPN device (for example, firewall or VPN concentrator) as a termination point, the VPN overall requirements described above remain the same. The encryption domain requirements for this connection will create a more complex configuration.

The requirements include, but are not limited to:

- A public IP per Gateway connection supplied by the customer for use inside the VPN encryption domain;
- Access to one /26 subnet and multiple /32 addresses inside the encryption domain;
- Allowing the ports and protocols listed in the table specifying firewall rules between the Gateway and Oracle standalone hosts (see Downloading the Firewall Rules Document from My Oracle Support) to communicate across the VPN;
- Network Address Translation (NAT) can be used for the source address of the Gateway outbound to the Internet for external communication back to Oracle. For the Oracle Services Support Center Destinations to which the Gateway needs to communicate, NAT is not supported. These Oracle Service destinations must reside on their public IP addresses.

Controlling Remote Access

Oracle security policies require a VPN between Oracle and the customer so that Oracle can access the customer systems. The Gateway enables the customer to control the firewall settings to determine whether Oracle can perform an interactive log on to the Gateway. The Remote Access can be enabled though the OASG User Interface via the ssh session (see KB 871874).The default is to allow the connection indefinitely. Remote Access Control functionality is not available for all Oracle Connected Services. Please refer to your Oracle representative for further details.

Customer Access to the Gateway

If Oracle Hardware is used to host the Advanced Services Gateway (Gateway), Oracle will retain and maintain root access for the out of band management processor on the Gateway. Customer access to the Lights Out Management (LOM) section of the server is only permitted for emergency power operations. To obtain this access, a customer must submit a service request (SR) to obtain the required credentials for a specific period of time. The access will be restricted to only power operations and read only for the sensors.

4

Internal Connection

Placing the Gateway in a customer's DMZ that is not directly exposed to the Internet is the recommended internal connection option. By placing the Gateway in a DMZ behind an Internet firewall, the customer has control of traffic traversing their internal networks and also of inbound connections from the Internet.

5

Implementation Changes to a Customer System

This section outlines the changes made to a customer's system during the implementation of Oracle Gateway Enabled services, including Platinum Services and Customer Success Services. The Gateway runs Oracle Enterprise Manager Cloud Control and an Oracle Advanced Support Agent Controller to perform its monitoring. Oracle Enterprise Manager Cloud Control and Oracle Advanced Support Agent Controller requires agents to be installed on hosts, and then uses various plug-ins to monitor those devices that cannot be monitored directly. This section describes the monitoring method for a device and the configuration to be performed.

The Monitoring Matrix

This section provides a table of devices and shows how each device is monitored.

Device	Component	Monitoring Methods				
		Cloud Control Agent	Plug-in Target Type	SNMP Trap	ASR	Oracle Advanced Support Agent
Engineered System	Exadata Storage Cell	No	Oracle Exadata Storage Server	Yes	Yes	No
Engineered System	Cisco Switch	No	Systems Infrastructure Network Switch	Yes	Yes	No
Engineered System	InfiniBand Switch	No	Systems Infrastructure Network Switch	Yes	Yes	No
Engineered System	PDU	No	Systems Infrastructure PDU	Yes	No	No
Engineered System	OVS Compute Node	No	Systems Infrastructure Server Oracle Virtual Platform Oracle Server	Yes	Yes	Yes
Engineered System	ZFS Array Storage Heads	No	Oracle ZFS Appliance	No	Yes	No
Exadata	Database Node	Yes	Systems Infrastructure Server Host	Yes	Yes	Yes
Standalone Server (including other Engineered System nodes and VMs, for example: ODA, BDA, Exalytics)		Yes	Oracle Engineered System ILOM Server (if Oracle hardware) Systems Infrastructure Server Host	Yes		
Standalone ZFS Array Storage Heads		No	Oracle ZFS Storage Appliance	No		

Implementation Impact on the Environment

The following sections describe the changes that are made to various types of system during the implementation process:

All Systems With An Agent Deployed

The following changes are made to every system on which an agent is deployed:

- An entry is added to the /etc/hosts file for the Gateway.
- A new group is created on the operating system (OS) of the monitored server. The default group name is *orarom*.
- A new user is created on the ILOM of the monitored server (if applicable). The default username is *orarom*.
- A new user is added on the operating system (OS) (*orarom*) of the monitored server.

> **Note**
>
> The password for the *orarom* account is typically set to expire after 90 days. You can manage the password on OASP. If access is needed for troubleshooting and the account is expired, Oracle will reset the *orarom* password. For further information about password management, see How to update the Credentials in OASP portal (KB 389239).

- The new OS user is added to the group that owns the Oracle Inventory.
- A new user is added into the group that owns the database diag directories that are listed in the oratab file (required for monitoring databases and generating ADR packages).
- The Oracle Inventory directory is updated for group read/write permissions.
- The Database diag directories are updated for group read/write permissions.
- A directory (/opt/OracleHomes) is created for the agent information based on the information provided in the System Install flow or discussion with your implementation engineer.
- If permission to retain root privileges is given in the installation options during the Manage Systems request, the sudoers files are updated to allow the new OS user to execute commands as root.
- For Linux systems, the group of the /var/log/messages file is changed to the new group (*orarom*) if the group owner is root.
  - This allows the agent user to be part of a group that can read the file and the group read permission is granted. The agent user can then monitor the messages file. If the messages file is already owned by a different group, the new user is added to that group instead.
- For Linux systems, the /etc/security/limits.conf file is updated to add the required settings for the new user (*orarom*) to meet the agent requirements.
- Agents are pushed from the Gateway to the server using the new user. The storage requirement for the agent is initially around 5GB.
- Once the agents have been installed, the root.sh script for the agent is executed.

  - Root.sh creates or updates /etc/oragchomelist, creates /etc/init.d/gcstartup, creates /etc/init.d/lockgcstartup, and creates /etc/init.d/lockgcstartup.
- ILOMs are configured to send SNMP traps to the Gateway for all ILOM detected faults of level minor or above for ASR.

> **Note**
>
> For Exadata Nodes, the ILOM rules are configured on the operating system of the node using the Exadata CLIs (cellcli and dbmcli) rather than directly on the ILOM.

- Install or upgrade the Oracle Autonomous Health Framework (AHF) to a minimum version of 26.1.
  - The storage requirement for AHF is 2GB of space in /opt and a minimum of 6GB (with a recommendation of 10GB) on /u01.
- Configure Oracle Autonomous Health Framework (AHF) to auto-update from the Gateway when a new version is available.
- A monitoring sudoers profile is added to allow the monitoring of the system and a restart of the agents by the monitoring user:

```
/usr/sbin/dmidecode, /sbin/ethtool, /usr/bin/ipmitool, /usr/ sbin/
imageinfo, /usr/local/bin/imageinfo, /opt/oracle/bda/bin/
imageinfo, /usr/bin/systemctl stop oracle-oasgagent.service, /usr/ bin/
systemctl start oracle-oasgagent.service, /usr/bin/systemctl restart
oracle-oasgagent.service, /usr/bin/systemctl status oracle-
oasgagent.service, /sbin/service oasgagent start, /sbin/service oasgagent
stop, /sbin/service oasgagent restart, /sbin/service oasgagent status
```

Engineered Systems Storage Cells

An Engineered System storage cell has strict policies not to allow the creation of new users or the deployment of agents on the OS.

The changes that are made to these systems are performed in three stages:

- Create a user on the ILOM of the system to allow Oracle to access the ILOM and the console of the system during troubleshooting. The default username is *orarom*.
- Create a monitoring role and user in the Cell Management service to enable the monitoring of the cell via the rest api. The new role will grant list and diagpack privileges to the userUpdate the snmpsubscribers in the cell software to send the traps to the Gateway for ASR and the Enterprise Manager Agents. This removes any current subscribers that have a type of *ASR*.
- Update the notificationpolicy in the cell software to include "critical,warning,clear".
- Update the notificationmethod in the cell software to include snmp.

Engineered System Cisco Switches

The Cisco switch that is installed in the racks of an Engineered System is updated to send traps to the Gateway, and the SNMP server is enabled to send traps. A new snmp user is created and set with an access list. For the Cisco switches that support the Oracle ASR functionality, this is configured to send alerts to the Gateway.

> **Note**
>
> If the ASR Module is not installed on the Cisco switch it will not be configured and only SNMP traps will be configured.

Engineered System InfiniBand Switches

The InfiniBand switches that are installed in the racks of an Engineered System are updated to send traps to the Gateway and a set of SSH/SCP keys is created to allow password-less login from the monitoring agent to the ilom-operator on the switch.

The SSH/SCP keys for Exadata and SuperCluster systems are configured at discovery time. For the other systems, these are created manually by the installation engineer during the implementation prior to the target discoveries.

Engineered System PDU's

The PDU modules within the racks of an Engineered System are updated to send traps to the Gateway, and the PDU thresholds are set to generate alerts based on the values from Oracle Engineering teams.

Engineered Systems Compute Nodes (Physical Implementation) and Virtual Machines

A user (orarom) will be granted the following privileges in the sudoers file:

<user>

```
ALL= NOPASSWD: /usr/sbin/dmidecode, /sbin/ethtool, /usr/ bin/ipmitool, /usr/
sbin/imageinfo, /usr/local/bin/imageinfo, /opt/oracle/bda/ bin/
imageinfo, /usr/bin/systemctl stop oracle-oasgagent.service, /usr/bin/
systemctl start oracle-oasgagent.service, /usr/bin/systemctl restart oracle-
oasgagent.service, /usr/bin/systemctl status oracle-oasgagent.service, /sbin/
service oasgagent start, /sbin/service oasgagent stop, /sbin/service
oasgagent restart, /sbin/service oasgagent status
```

> **Note**
>
> The profile may be updated if the option for Oracle to retain sudo privilege is granted.

OVS Compute Nodes

- Install or upgrade the Oracle Autonomous Health Framework (AHF) to a minimum version of 26.1.
  - The storage requirement for AHF is 2GB of space in /opt and a minimum of 6GB (with a recommendation of 10GB) on /EXAVMIMAGES.
- Install *oasg-agent* software.
- Configure Oracle Autonomous Health Framework (AHF) to auto-update from the Gateway when a new version is available.
- Configure Oracle Autonomous Health Framework (AHF) to communicate to all KVM Nodes via socket for data collection.

The Oracle Virtual Server operating system that is used within an Engineered System that is running the virtualized stack has strict policies that do not allow the installation of Oracle Enterprise Manager (EM) agents on to the systems. These nodes will have the ILOMs

configured to send traps to the Gateway for ASR. A user (*orarom*) will be created on the OVS Server and granted the following privileges in the sudoers file:

<user>

```
ALL= NOPASSWD: /usr/sbin/xentop, /usr/sbin/dmidecode, /sbin/
ethtool, /usr/bin/xenstore-ls, /usr/bin/xenstore-read, /usr/bin/ xenstore-
list, /usr/sbin/xl, /usr/bin/ipmitool, /usr/sbin/xm, /usr/sbin/
imageinfo, /usr/local/bin/imageinfo, /opt/oracle/bda/bin/imageinfo, /usr/ bin/
systemctl stop oracle-oasgagent.service, /usr/bin/systemctl start oracle-
oasgagent.service, /usr/bin/systemctl restart oracle-oasgagent.service, /usr/
bin/systemctl status oracle-oasgagent.service, /sbin/service oasgagent
start, /sbin/service oasgagent stop, /sbin/service oasgagent restart, /sbin/
service oasgagent status
```

This list of commands is used by the Oracle Virtual Platform and Oracle Server target types to read information about the system, relay the information to EM, and manage the *oasg_agent*.

> **Note**
>
> The profile may be updated if the option for Oracle to retain sudo privilege is granted.

KVM Compute Nodes

- Install or upgrade the Oracle Autonomous Health Framework (AHF) to a minimum version of 26.1.
  - The storage requirement for AHF is 2GB of space in /opt and a minimum of 6GB (with a recommendation of 10GB) on /EXAVMIMAGES.
- Install *oasg-agent* software.
- Configure Oracle Autonomous Health Framework (AHF) to auto-update from the Gateway when a new version is available.
- Configure Oracle Autonomous Health Framework (AHF) to communicate to all KVM Nodes via socket for data collection.

The Oracle Linux 7 Server used within an Engineered System that is running the virtualized stack has strict policies that do not allow the installation of Oracle Enterprise Manager (EM) agents on to the systems. These nodes will have the ILOMs configured to send traps to the Gateway for ASR. A user (*orarom*) will be created on the KVM Server and granted the following privileges in the sudoers file:

<user>

```
ALL= NOPASSWD: /usr/bin/virsh list*, /usr/bin/virsh dominfo*, /usr/ bin/virsh
nodememstats*, /usr/bin/virsh domstats*, /usr/bin/virsh
capabilities, /usr/bin/virsh domblklist*, /usr/bin/virsh domiflist*, /usr/
bin/virsh domifstat*, /usr/bin/virsh vcpupin*, /bin/virsh cpu-stats*, /bin/
virsh domblkstat*, /bin/virsh dommemstat*, /bin/virsh nodeinfo, /sbin/dmsetup
info, /sbin/service --status-all, /usr/sbin/dmidecode, /sbin/ethtool, /usr/
bin/ipmitool, /usr/sbin/imageinfo, /usr/local/bin/imageinfo, /opt/oracle/
```

```
bda/bin/imageinfo, /opt/exadata_ovm/vm_maker, /usr/sbin/brctl, /sbin/fdisk -
l*, /bin/virsh domblkinfo*, /usr/bin/lvs*, /usr/bin/smartctl*, /usr/sbin/
ibnetdiscover, /usr/sbin/sminfo, /sbin/dmsetup info*, /bin/cat /etc/iscsi/
iscsid.conf, /usr/bin/systemctl stop oracle-oasgagent.service, /usr/bin/
systemctl start oracle-oasgagent.service, /usr/bin/systemctl restart oracle-
oasgagent.service, /usr/bin/systemctl status oracle-oasgagent.service, /sbin/
service oasgagent start, /sbin/service oasgagent stop, /sbin/service
oasgagent restart, /sbin/service oasgagent status
```

This list of commands is used by the Oracle Enterprise Manager (OEM) targets to read information about the system, relay the information to OEM, and manage the *oasg_agent*.

> **Note**
>
> The profile may be updated if the option for Oracle to retain sudo privilege is granted.

ZFS Storage Array Storage Heads

The ZFS arrays are appliances that cannot have agents installed on them. Consequently, they are monitored from another agent using a specific monitoring user. The changes that are carried out on both of the storage heads in a cluster are as follows:

- Execute the workflow “Configure for Oracle Enterprise Manager”. This always has the *recreateWorksheet* setting enabled. If the *oracle_agent* user and role are already created, then the *recreateUser* setting is not enabled. Otherwise it is enabled. If the user is set to be recreated, the password used is a strong, randomly generated, 16-character password.

  > **Note**
  >
  > The customer can change the password on the oracle_agent user without affecting the Oracle monitoring solution.

- Create a new user for the Oracle monitoring solution using the role *oracle_agent* created by the above workflow. The default username is *orarom*, but the name is customizable from the Service Implementation Worksheet (SIW).
- Enable *advanced_analytics* for the new user created above.

Utilization Impact Risk of OEM Cloud Control Agent on Monitored Systems

Oracle's implementation is designed to be a low risk deployment using scripts to ensure consistent deployments across all customer implementations. Furthermore, the implementation is validated for monitoring within Oracle test systems. Oracle makes no changes to customer applications or files outside of the steps described in the relevant sections on impacts on the environment above.

The table below outlines the utilization impact of Oracle Enterprise Manager Cloud Control Agent on Monitored Systems

Overhead Impact of the Oracle Tools in the Environment

Metric	OEM

CPU Utilization	The OEM Agent uses from 0.02% to 1% of CPU utilization. The agent may utilize more CPU cycles, depending on the number of processes or applications monitored.
Memory Utilization	The OEM Agent needs from 1GB to 2GB RAM to operate correctly. The actual memory utilization of the agent varies depending on the number of processes or applications monitored.
Disk Space Utilization	The OEM agent requires at least 2GB of free disk space for the installation files. After installation is complete, the installation files are removed. The installed OEM agent requires about 1GB of space initially. As the agent operates, disk space gradually increases up to 5GB. To apply patches to the agent, 5GB of space is required in /tmp to download and extract the installer before updating the agent binaries. Oracle Autonomous Health Framework (AHF) software requires 2GB of space in /opt and a minimum of 6GB (with a recommendation of 10GB) on /u01 to store the diagnostic bundles created by the software for configuration review and troubleshooting.

Backout Plan

If it is necessary for the installation to be rolled back, Oracle will:

- Shut down the agents that have been configured.
- Work with the customer to schedule a maintenance window to remove the agents and trap destinations for all the devices configured for monitoring.

6

Server Prerequisites for Monitoring Deployment

This section outlines the methods used to provide Oracle with the necessary server access for implementing monitoring on the Gateway.

Server Prerequisites for Monitoring Deployment

For services that are performed using Oracle Enterprise Manager (OEM), agents must be deployed to the systems. These systems must meet the prerequisites for an EM agent as described in the Package Requirements for Oracle Management Agent section of *Oracle Enterprise Manager Cloud Control Basic Installation Guide*.

Monitoring Access: An Overview

In general, there are three methods for providing Oracle with the necessary access for implementing monitoring:

- Provide root access to all systems.
- Provide a login user that can then use su to get to the root user.
- Provide access via *sudo (superuser do)*.
  - *sudo* is a program for operating systems such as Linux and Solaris that allows users to run programs as another user - normally as the system's superuser (root) - as specified in the /etc/sudoers file.
  - This section outlines the methods used to provide Oracle with the necessary access for implementing monitoring on the Gateway.

During activation of database services, the following users and accounts are used to monitor the database:

- For storage/cluster monitoring, the user *asmsnmp* is used;
- For database monitoring, the user *dbsnmp* is used;
- For standby database monitoring, the user *sys* is used.

> **Note**
>
> Passwords for all of the above users must be available during the activation of the Cluster and Database resources through the Databases section of OASP Portal. Refer to KB 543184.

User Privileges

Oracle requires that the user can execute the following commands using root privileges:

- <Service EM Base Directory>/agent_home/agent_*/root.sh
- /opt/oracle.cellos/compmon/exadata_mon_hw_asr.pl (*Exadata only)*
- /opt/oracle.cellos/imageinfo (*Exadata only*)
- /opt/oracle/dbserver/dbms/bin/dbmcli (*Exadata and ZDLRA only*)
- /opt/ipmitool/bin/ipmitool (*Solaris only*)
- /opt/ipmitool/sbin/ipmitool (*Solaris only*)
- /usr/bin/chmod
- /usr/bin/chown
- /usr/bin/chgrp
- /usr/bin/crontab (*Solaris only*)
- /usr/bin/cp
- /usr/bin/ex
- /usr/bin/ipmitool
- /usr/bin/grep
- /usr/bin/ls
- /usr/bin/mkdir
- /usr/bin/rmdir
- /usr/bin/passwd
- /usr/bin/systemctl
- /usr/bin/unzip
- /usr/bin/vim
- /usr/bin/virsh (Linux only)
- /usr/bin/xenstore-list
- /sbin/chkconfig
- /usr/sbin/dbmcli (*Exadata and ZDLRA only*)
- /usr/sbin/dmidecode (*Linux only*)
- /usr/sbin/groupadd
- /sbin/service
- /usr/sbin/useradd
- /usr/sbin/usermod
- /usr/sbin/xm
- /usr/bin/tfactl
- /usr/bin/ahfctl
- <ServiceEMBase>/install_ahf_no_cfg.sh
- /usr/bin/systemctl start oracle-oasgagent.service
- /usr/bin/systemctl stop oracle-oasgagent.service
- /usr/bin/systemctl restart oracle-oasgagent.service
- /usr/bin/systemctl status oracle-oasgagent.service

- /sbin/service oasgagent start
- /sbin/service oasgagent stop
- /sbin/service oasgagent restart
- /sbin/service oasgagent status

The user provided for the initial setup can be removed once the monitoring has been deployed and the agent user has been created. The agent user can be a user defined within a naming service and a home directory mounted from an NFS server. However, the agent installation directory must be unique to each server to be monitored. If the agent user is configured as part of a naming service, then the user must belong to the group that owns the Oracle inventory on all of the servers. The deployment scripts will verify and enforce group write permissions on any Oracle inventory directory that is discovered by using the /etc/oraInst.loc or the /var/ opt/ oracle/oraInst.loc files.

> **Note**
>
> The command paths are related to Solaris. For the Linux paths, please refer to the sudo settings for Linux.

sudo Profile

For Linux users, add the following entries to the sudoers file:

```
Cmnd_Alias ACSSINSTALL = /bin/chmod, /bin/chown, \
/bin/chgrp, /bin/cp, /bin/ex, /usr/bin/unzip, \
/bin/grep, /bin/ls, /bin/mkdir, /bin/rmdir, \
/usr/bin/passwd, /usr/sbin/groupadd, \
/usr/sbin/useradd, /usr/sbin/usermod, \
/usr/bin/ipmitool, /usr/bin/xenstore-list, \
/usr/sbin/dmidecode, \
/opt/exalytics/asr/bda_mon_hw_asr.pl, \
<ServiceEMBase>/agent_home/agent_<version>/root.sh,\
/opt/oracle.cellos/compmon/exadata_mon_hw_asr.pl, \
/opt/oracle.cellos/imageinfo, \
/opt/oracle/dbserver/dbms/bin/dbmcli, \
/usr/sbin/imageinfo, /usr/sbin/xm, \
/usr/bin/tfactl, /usr/bin/ahfctl, \
/usr/bin/exachk, \
/opt/oracle.ahf/exachk/exachk, \
/usr/local/bin/imageinfo, \
/usr/sbin/pca-admin, \
/usr/bin/virsh, \
/usr/bin/systemctl enable oracle-oasgagent.service, \
/usr/bin/systemctl start oracle-oasgagent.service, \
/usr/bin/systemctl stop oracle-oasgagent.service, \
/usr/bin/systemctl restart oracle-oasgagent.service, \
/usr/bin/systemctl status oracle-oasgagent.service, \
/sbin/chkconfig --add oasgagent, \
/sbin/chkconfig --on oasgagent, \
/sbin/chkconfig --off oasgagent, \
/sbin/service oasgagent start, \
/sbin/service oasgagent stop, \
/sbin/service oasgagent restart, \
```

/sbin/service oasgagent status, \
/sbin/service init.tfa start, \
/EXAVMIMAGES/install_ahf_no_cfg.sh, \
<ServiceEMBase>/install_ahf_no_cfg.sh, \
<ServiceEMBase>/agent_home/core/<version>/root.sh,\
<ServiceEMBase>/agent_home/agent_<version>/root.sh,\
/usr/bin/python3 /tmp/db_compliance_check.py, \
/usr/bin/python2 /tmp/db_compliance_check.py

<user> ALL=(ALL) ACSSINSTALL

The user must also have the sudo binary in their path to allow it to execute without a full path.

ILOM User Privileges

Oracle requires that the implementation user has the following privileges on an ILOM:

- *Admin*: To update the alert rules to send traps to the Gateway.
- *User Management*: To create the monitoring user.
- *Read-Only*: To view other ILOM properties, for example: host name, IP address, serial number, and so on.

For example:

set /SP/users/oracledeployer role=auo

7

Storage Prerequisites for Monitoring Deployment

This section outlines storage requirements for the monitoring deployment.

Monitoring Deployment: An Overview

The storage systems do not have the same privilege promotion capabilities as the servers do; each storage system has a different method of granting access privileges. There are 3 options to provide Oracle with the necessary access for implementing monitoring:

- Provide administrator access to the system.
- For some systems, create a user with the necessary privileges for Oracle to configure a new user for monitoring.
- Create the monitoring user per the system requirements.

For information on which options are available for the various storage systems, refer to the following sections.

Oracle ZFS Storage Appliances

The information in the following sections defines the properties for the users used in the deployment of monitoring and the standard monitoring users. Further privileges are required for patching the systems during a patch cycle.

Restricted User for Monitoring Deployment (AKSH Shell)

You can create a user with the following privileges to be used during the monitoring deployment:

Object	Permissions
worksheet .*.*	modify
stat.*	• read • create
user.*	• changePassword • changePreferences • changeProperties • changeRoles • create
workflow.* .*	read
role.*	• changeAuths • changeDescription • create

Monitoring User Requirements

You can create the monitoring user using the following high level steps:

- Execute the workflow outlined in the section “Configure for Oracle Enterprise Manager Monitoring”, ensuring to select creation of the worksheet.
- Create a new user for monitoring.
- Assign the *oracle_agent* role to this user.
- Set the preferences for the user to enable Advanced Analytics.
- Add the *stat.** create authorization to the *oracle_agent* role.

Restricted User for Monitoring Deployment User (ILOM)

You can create a user with the role of *u* to allow Oracle to create a new user for use with the monitoring.

Monitoring User Requirements (ILOM)

In order to provide monitoring and diagnostic collection on the ZFS ILOM, including initiating an NMI to the host, the monitoring user requires the permissions *cro*.

8

Using the Gateway User Interface

The Gateway user interface enables users to work on the following main functional areas:

- Remote access control
- Syslog forwarding
- System proxy
- Regional proxy
- ASR audit logs

Users can check the status of various system settings and make changes to these systems. These Gateway features can be accessed using the interface in two modes of functionality

- Interactive, *or*
- Non-interactive

Refer to KB 871874 for information on using the gateway user interface.

9

Audit Logging

The audit logging feature of the Gateway provides audit information for four different categories of system events. The four categories are:

- Outbound network connections: The Linux firewall service (iptables) triggers notifications for all outbound network traffic with the exception of traffic to Oracle managed hosts used for monitoring and management (for example, Oracle VPN end points, dts.oracle.com, support.oracle.com).
- Outbound login activity: The Linux auditing service (auditd) triggers notifications for all outbound login attempts initiated from the Gateway. This is done by monitoring usage of the SSH/SCP system binaries. The Gateway sends a message that SSH/SCP has been used, by which user, and when. The destination is not provided. auditd logs contain that information. auditd logs are not directly accessible by the customer on the Gateway.
- Inbound Gateway user login activity: The Linux auditing service (auditd) triggers notifications each time any of the system logs used for tracking logins is updated. This includes failed logins and successful login attempts. It also triggers a notification each time a user logs in from a remote system. These activities are monitored using auditd and forwarded to the customer's central logging system.
- Enterprise Manager activity: The Enterprise Manager application logs any activity performed within the application to any of the targets or their credentials. The activity in Enterprise Manager is then forwarded to the customer's central logging system.

All audit notifications are delivered using standard syslog protocol. A central logging system must be provided to accept and process these messages. Syslog forwarding is described in this document.

The format of most of these messages is based on auditd. They can be managed using various auditd and related utilities.

Sample Logging Messages

In the examples below, user mapping is enabled: uid=#(*username*) and gid=#(*groupname*). In the event that user mapping is disabled, all instances of uid=# and gid=# are replaced with uid=0 and gid=0.

Outbound Network Connectivity.

These messages are generated by firewalld and represent all outbound network traffic with the exception of traffic to known addresses used for Oracle monitoring.

The following example shows messages as they are seen on the system that receives the forwarded syslog messages.

Result from an SSH/SCP command:

Start ssh

2022-12-09T11:41:55.587734-05:00 HS

gatewaynode.example.com HE [kern.info] MS - 0:0:0:0:0:0:0:1 NA:

2022-12-09T17:20:26.946315+00:00 ct-

gateway-01 iptables: TCP_CONN_START IN= OUT=enp1s0 SRC=gw.gw.gw.gw DST=host.host.host.host LEN=60 TOS= 0x00 PREC=0x00 TTL=64 ID=55848 DF PROTO=TCP SPT=16890 DPT=22 WINDOW=64240 RES=0x00 SYN URGP=0 UID=1000(jdoe) GID=1001(jdoe) MARK=

0x1

End of ssh

2022-12-09T11:41:55.587734-05:00 HS

gatewaynode.example.com HE [kern.info] MS - 0:0:0:0:0:0:0:1 NA:

2022-12-09T17:20:36.450377+00:00 ct-

gateway-01 iptables: TCP_CONN_END IN= OUT=enp1s0 SRC=gw.gw.gw.gw DST=host.host.host.host LEN=40 TOS= 0x08 PREC=0x40 TTL=64 ID=55885 DF PROTO=TCP SPT=16890 DPT=22

WINDOW=501 RES=0x00 ACK FIN URGP=0 UID=1000(setup) GID=1001(setup) MARK=

0x1

Outbound Login Activity.

The following example shows a message as it is seen on the system that receives the forwarded syslog messages.

Result from an SSH/SCP command:

2022-12-09T11:41:55.587734-05:00 HS

gatewaynode.example.com HE [kern.info] MS - 0:0:0:0:0:0:0:1 NA:

2022-12-09T17:20:26.937571+00:00 ct-

gateway-01 gateway_audit: SYSCALL arch=c000003e syscall=59 success=yes exit=0 a0=55e05d4f03a0 a1= 55e05d4adfe0 a2=55e05d4c7cf0 a3=8 items=2 ppid=3957593 pid=3958481 auid=1000(jdoe) uid=1000(jdoe) gid= 1001(jdoe) euid=1000(jdoe) suid= 1000(jdoe) fsuid=1000(jdoe) egid= 1001(jdoe) sgid=1001(jdoe) fsgid= 1001(jdoe) tty=pts0 ses=63296 comm="ssh" exe="/usr/bin/ssh"

subj=unconfined_u:unconfined_r:unconfined

_t:s0-s0:c0.c1023 key="gateway_audit"

Inbound Gateway User Login Activity.

The following examples show messages as they are seen on the system that receives the forwarded syslog messages.

Example of SSH/SCP being invoked to the Gateway:

2022-12-09T11:41:33.209326-05:00 HS

gatewaynode.example.com HE [auth.notice] MS - 0:0:0:0:0:0:0:1 NA:

2022-12-09T17:20:04.735608+00:00 ct-

gateway-01 session: SYSCALL arch=c000003e syscall=257 success=yes exit=14 a0=ffffff9c a1=7fbb9f57f160 a2= 80002 a3=0 items=1 ppid=1245718() pid= 3957381(jdoe[priv]) auid=1000(jdoe) uid= 0(root) gid=0(root) euid=0(root) suid=0 (root) fsuid=0(root) egid=0(root)

sgid=0 (root) fsgid=0(root) tty=(none) ses=63296 comm="sshd" exe="/usr/sbin/sshd" subj=system_u:system_r:sshd_t:s0-s0:c0.c1023 key="SESSION"

Result from an su command on the Gateway:

Aug 1 21:42:49 Aug-01 17: 42:49 GMT-04:00 0:0:0:0:0:0:0:1

NA: sample-host audispd: node=sample-host type=SYSCALL msg=audit(1437567906.700:17840209): arch=c000003e syscall=2 success=yes exit=3 a0=7f691418c518 a1=2 a2=7f691418c760 a3=ffffffffffffffff0 items=1 ppid=22614 pid=25811 auid=54373 uid=54373 gid=501 euid=0 suid=0 fsuid=0 egid=501 sgid=501 fsgid=501 tty=pts4 ses=90594 comm="su" exe="/bin/su" subj=unconfined_u:unconfined_r:unconfined_t:s0-s0:c0.c1023 key="SESSION"

Enterprise Manager Activity.

Jul 8 14:10:34 mygatewy em_audit: OPERATION_NAME=LOGIN OPERATION_STATUS=SUCCESS INITIATOR_NAME=myuser UPSTREAM_COMP_TYPE=Browser OPERATION_MESSAGE=myuser Logged on successfully INITIATOR_SESSION_ID=4160ACF8F07C93F3D79AAA2EF0108AE9 INITIATOR_NW_ADDRESS=1.1.1.1 INITIATOR_HOST_NAME=1.1.1.1 Jul 8 14:12:34 mygateway em_audit: OPERATION_NAME=LOGOUT OPERATION_STATUS=SUCCESS INITIATOR_NAME=myuser UPSTREAM_COMP_TYPE=Browser OPERATION_MESSAGE=myuser Logged out successfully INITIATOR_SESSION_ID=4160ACF8F07C93F3D79AAA2EF0108AE9 INITIATOR_NW_ADDRESS=1.1.1.1 INITIATOR_HOST_NAME=1.1.1.1

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Managing ASR Audit Logs

This section describes how to manage Oracle Auto Service Request (ASR) audit logs for the Gateway.

About ASR Audit Logs

Oracle Auto Service Request (ASR) allows customers to restore system availability if a hardware fault occurs. ASR is a secure, expedited diagnostic process with automatic service request generation, priority service request handling, and automatic parts dispatch. You can maintain an ASR audit log that enables you to view, download, and search for audits.

Viewing ASR Audit Logs

To view the ASR Logs please refer to KB 871874 for information on using the gateway user interface in interactive and non-interactive mode.

11

Installing the Gateway

The Gateway can be installed in **one of the following ways**:

- Directly onto any server hardware that is supported by Oracle Linux 8.*x* and Oracle Unbreakable Enterprise Kernel (UEK) 5.4 (or later), *or*
- On Oracle Cloud Infrastructure (OCI) via the custom image, *or*
- On Oracle VM, *or*
- On a VM that supports installation of Oracle Linux 8.*x* and Oracle Unbreakable Enterprise Kernel (UEK) 5.4 (or later) via an ISO.

To review the Oracle Support position for Oracle products running on virtualized environments, see MOS Note KB 183395.

For more information about installing the Gateway, see Oracle Advanced Services Gateway Installation Guide.

12

Gateway Infrastructure Maintenance and Change Management Process

This section describes the Gateway infrastructure maintenance and change management process for Oracle Platinum Services Support and Customer Success Services.

Understanding Responsibilities

Customer Responsibilities

The Customer is responsible for:

- Notifying Oracle of issues with, or changes to, any of their connected services.
- Providing advance notice and any required information to Oracle Support about any upcoming scheduled maintenance tasks by creating a Change Management (CM) request which is processed automatically.
- Providing access to their connected systems as needed for the effective delivery of their services.

> **Note**
>
> In certain limited cases, Oracle enables the customer to control remote access by providing the capability to enable and disable Oracle's interactive inbound access (this feature is sometimes referred to as "Green Button" functionality). Customers with this functionality enabled or another form of restricted access must work with Oracle, when requested, to perform the required maintenance tasks on the Gateway.

> **Note**
>
> At a minimum the connection must be enabled at least once per month for security updates.

- Maintaining the list of users in My Oracle Support (MOS).
- Updating the passwords in Credential Management in OASP whenever passwords are changed on their systems (see KB 3061921).
- Monitoring SR updates and emails and taking action as necessary.

Oracle Responsibilities

Oracle is responsible for:

- Maintaining the infrastructure used for supporting the various services delivered via the Gateway and related tools.
- Processing and performing tasks based on customer requests and updates.

- Identifying security risks promptly; developing and deploying a solution to address these risks.

Generating a Change Management Request

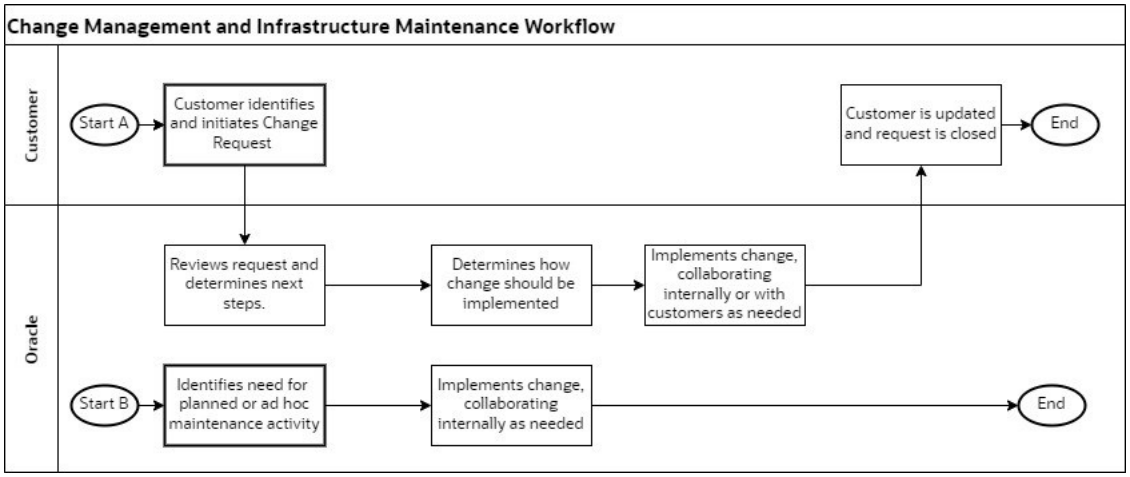
A Change Management (CM) request can be generated as follows:

- *Customer*: Creates a Service Request (SR) in My Oracle Support. Based on the type of request, the SR is routed to the relevant Oracle team.
- *Oracle*: Identifies the need for regular maintenance on the Gateway or a request to address newly identified security risks.

> **Tip**
>
> For instructions on generating a CM request, see KB 504181

Understanding the Change Management Workflow

Figure 12-1 High Level Gateway Change Management and Infrastructure Maintenance Workflow



Understanding Maintenance Activities

Activity Type	Activity Name	Activity Description	Frequency
Upgrade	OEM upgrade	Upgrade performed on Oracle Enterprise Manager (OEM) on the Gateway.	Every 24 months
Upgrade	Gateway application	Upgrade performed on the Gateway applications.	Every month

Upgrade	OS/kernel	Upgrade performed on the Gateway platform. Sometimes these are included in the Gateway application upgrade.	Every month
Upgrade	OEM agents	Upgrades performed on OEM agents installed on customer systems.	Every 3 months
Upgrade	Gateway agents (*oasg_agent*)	Upgrades performed on Gateway agents installed on customer systems.	Every month
Upgrade	Oracle Autonomous Health Framework (AHF) agent	Upgrades performed on AHF agents installed on customer systems.	Every month
Upgrade	Gateway ILOM	Upgrades performed on the ILOM version to the latest Oracle hardware version for the Gateway.	Every 6 months
Patching	Quarterly	Application of the latest quarterly patches.	Every 3 months
Patching	Security	Application of security patches at the express request of Oracle Global Information Security (GIS). This process may require 48 hours notice.	As required
Security	Password Change	Changes all Gateway passwords in accordance with Oracle security policies.	Every 90 days