

**Oracle[®] Advanced Support Gateway
Security Guide for Private Cloud at
Customer**

ORACLE[®]

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Contents

- Oracle Advanced Support Gateway Security Guide for Private Cloud at Customer** 11
 - About Oracle Advanced Support Gateway 11
 - General Requirements 11
 - Firewall Port Requirements 12
 - External Connection 13
 - TLS VPN and Oracle Advanced Support Gateway 13
 - Alternative External Connection Option 14
 - Firewall Rules: Ports and Protocols 15
 - Firewall Rules for External Traffic 15
 - Firewall Rules for External Traffic Through the Encrypted VPN Tunnel 17
 - Firewall Rules for Oracle Private Cloud at Customer Machine to the Customer Network 18
 - Oracle Advanced Support Gateway Audit Logging Feature 18
 - Enabling and Disabling Logging Messages 20

Oracle Advanced Support Gateway Security Guide for Private Cloud at Customer

This document outlines the requirements for deploying Oracle Advanced Support Gateway for Private Cloud at Customer infrastructure (hereafter PCC) within the customer environment to support the delivery of certain Oracle cloud services (hereafter referred to as Oracle cloud services.) The Oracle Advanced Support Gateway is an important part of the Oracle delivery platform for Oracle cloud services and its placement has been carefully considered in order for Oracle to deliver Oracle cloud services. This document outlines Oracle recommendations when integrating the Oracle Advanced Support 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.

About Oracle Advanced Support Gateway

Oracle Advanced Support Gateway is a multi-purpose platform designed to facilitate Oracle PCC. The Oracle Advanced Support Gateway enables the simplification of network requirements and a single point of access for the provision and delivery of these services.

The Oracle Advanced Support 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 (13c), patch management, and a suite of Java applications. Together, these applications aggregate and route telemetry messages from the PCC infrastructure to the Oracle Support Services infrastructure. The Oracle Advanced Support Gateway provides remote access for Oracle engineers to access via the customer network to carry out approved actions on customers' Oracle PCC infrastructure.

General Requirements

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

- An Oracle Advanced Support Gateway must be hosted within the customer environment along with PCC Infrastructure.
- Oracle Advanced Support Gateway will be directly connected to the PCC infrastructure via the PCC infrastructure management network.
- Oracle must have access to certain ports and protocols (described below) in order to implement and deliver Oracle cloud services.
- Oracle Advanced Support Gateway must be continuously accessible from the Oracle Support Platform using the secure protocols described below. However, Oracle Advanced Support Gateway must not be directly exposed to 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
- The placement of Oracle Advanced Support Gateway in same chassis/network as the PCC infrastructure.

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

Firewall Port Requirements

The specifics of the Oracle cloud services network requirement depend on the customer network topology relative to the Oracle Services Support centers, Oracle Advanced Support Gateway, and the monitored systems. The customer networks must be configured to permit traffic flow between Oracle Advanced Support 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, Oracle Advanced Support Gateway does not support NTLM or Kerberos proxy authentication. The Transport Layer Security (TLS) VPN traffic cannot be routed through a proxy server.



Caution - To defend against security attacks, you should never connect Oracle Advanced Support 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.)

Oracle Advanced Support Gateway comes with multiple network interfaces. Of these interfaces, two are utilized to support connectivity requirements. The first interface is used primarily for external connectivity while the second interface is connected directly to the PCC Infrastructure management network. This provides, in effect, the required isolation between the PCC infrastructure and the customer internal network.

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

FIGURE 1 High Level Traffic Flow and Firewall Requirement



External Connection

Oracle utilizes a combination of a VPN solution and TLS to secure communications between Oracle Advanced Support 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 Oracle Advanced Support Gateway and TLS is used for transporting the monitoring telemetry from Oracle Advanced Support Gateway to the Oracle Services Support center locations.

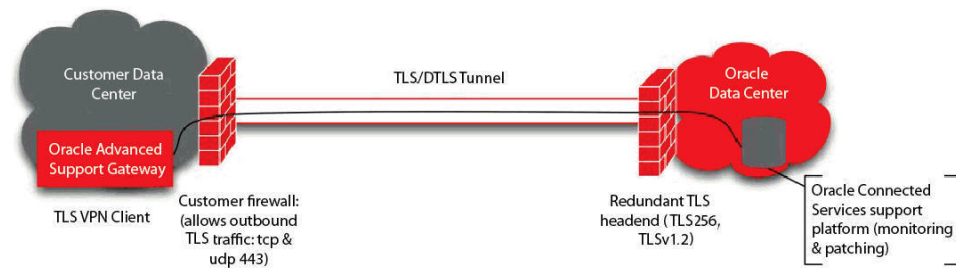
TLS VPN and Oracle Advanced Support Gateway

The Oracle Advanced Support 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 three Oracle VPN concentrators. The TLS-based VPN has the following features:

- Connection based on TLS 1.2, 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 2 A TLS-Based VPN Client Connection from Oracle Advanced Support 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” on page 14](#). 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 three /26 subnets and multiple /32 addresses inside the encryption domain;
- Network Address Translation (NAT) between the host and the Oracle resources over the tunnel is not supported (the Gateway must communicate directly to the public IP addresses inside the Oracle VPN.)

Firewall Rules: Ports and Protocols

This section provides information about the standard firewall port configurations necessary for the delivery of Oracle cloud services.

Note - The final port and firewall requirements depend on the specific PCC infrastructure being monitored by Oracle cloud services, the connectivity method chosen, and the actual customer network design.

The following sections outline firewall port configurations and provide information on monitoring requirements.

- [“Firewall Rules for External Traffic” on page 15](#)
- [“Firewall Rules for External Traffic Through the Encrypted VPN Tunnel” on page 17](#)
- [“Firewall Rules for Oracle Private Cloud at Customer Machine to the Customer Network” on page 18](#)

Firewall Rules for External Traffic

Note - The source for all these entries is Oracle Advanced Support Gateway. The rules in [Table 1, “Firewall Rules Between Oracle Advanced Support Gateway and the Oracle Services Support Center,” on page 16](#) apply to all of Oracle's Connected Services.

TABLE 1 Firewall Rules Between Oracle Advanced Support Gateway and the Oracle Services Support Center

Destination	Destination IP Address (es)	Application Protocol	Network Protocol/Port	Purpose
adc-ps-ssl-vpn.oracle-occn.com llg-ps-ssl-vpn.oracle-occn.com tokyo-ps-ssl-vpn.oracle-occn.com	198.17.210.28 141.143.215.68 140.83.95.28	TLS VPN	TCP/443 - TLS UDP/443 - DTLS (Datagram TLS)	To establish a TLS VPN connection* between Oracle and Oracle Advanced Support Gateway. *Cannot support communication through an internet proxy.
dts.oracle.com	192.206.43.1	HTTPS	TCP/443	To securely transport monitoring data to Oracle.
transport-adc.oracle.com	141.146.156.41	HTTPS	TCP/443	To securely transport monitoring and other data to Oracle.
ccr.oracle.com	141.146.54.49	HTTPS	TCP/443	To upload the customer's configuration data to Oracle's centralized configuration repository.
support.oracle.com	141.146.54.16	HTTPS	TCP/443	To download patches onto Oracle Advanced Support Gateway from My Oracle Support (MOS) via the Oracle Enterprise Manager (OEM) Cloud Control UI.
login.oracle.com Note - Each hostname currently resolves to multiple working IP addresses. Access to all addresses listed must be permitted as Oracle will switch from one to another in the near future.	209.17.4.8 156.151.58.18 141.146.8.119	HTTPS	TCP/443	To connect to Oracle's centralized authentication site.
updates.oracle.com	141.146.44.51	HTTPS	TCP/443	To provide patch downloads via Oracle Enterprise Manager (OEM).
ZFS Phone Home	129.157.65.13 129.157.65.14 141.146.1.169	ZFS Phone Home	TCP/443	ZFS fault monitoring is shipped direct to these Oracle systems. Used when Oracle Advanced Support Gateway hosts a proxy server for the ZFS Storage Heads.
oauth-e.oracle.com	■ 156.151.58.70 ■ 209.17.4.26 Note - 156.151.58.70 and 209.17.4.26 are multiple IP addresses	HTTPS	TCP/443	To provide support for Oracle centralized authentication for Oracle Enterprise Manager.

Destination	Destination IP Address (es)	Application Protocol	Network Protocol/Port	Purpose
	used to service oauth-e.oracle.com. DNS resolution may return a different IP address. Ensure access is granted for each IP directly.			

Firewall Rules for External Traffic Through the Encrypted VPN Tunnel

If you use the Oracle-provided TLS VPN solution, the following table is informational only, illustrating the traffic transmitted over the VPN in support of Oracle Advanced Support Gateway. If the alternative VPN solution is used, the following traffic must be allowed to communicate over the VPN.

TABLE 2 Firewall Rules between Oracle Advanced Support Gateway and the Oracle Data Center Using VPN Tunnel

Source	Destination	Network Protocol/Port	Purpose
Oracle Advanced Support Gateway	<ul style="list-style-type: none"> ■ 192.206.43.194/32 ■ 198.51.38.197/32 	Syslog (TCP/514)	Oracle Advanced Support Gateway Syslog
Oracle Advanced Support Gateway	198.51.38.194/32	HTTPS (TCP/8080,9898)	Oracle Advanced Support Gateway file integrity monitoring
198.51.38.193/32	Oracle Advanced Support Gateway	HTTPS (TCP/8080,9898)	Oracle Advanced Support Gateway file integrity monitoring
<ul style="list-style-type: none"> ■ 192.206.43.209/32 ■ 198.51.38.209/32 ■ 140.85.164.34/32 	Oracle Advanced Support Gateway	Security Scanner <ul style="list-style-type: none"> ■ TCP/UDP/1-65535 ■ ICMP (Types 8 & 0) 	Oracle Advanced Support Gateway availability and security scanning
<ul style="list-style-type: none"> ■ 198.51.37.1/32 ■ 193.188.5.1/32 ■ 140.83.88.1/32 ■ 140.83.88.129/32 ■ 140.83.89.1/32 ■ 141.146.155.40/32 ■ 141.146.155.41/32 ■ 192.206.43.208/32 ■ 198.51.38.208/32 	Oracle Advanced Support Gateway	<ul style="list-style-type: none"> ■ ICMP (Types 8 & 0) ■ SSH (TCP/22) ■ HTTPS (TCP/443, 7799,9702) ■ SGD (TCP/5307) 	Management traffic to remotely manage Oracle Advanced Support Gateway and also facilitate remote access
Oracle Advanced Support Gateway	<ul style="list-style-type: none"> ■ 192.206.43.196/32 	HTTPS (TCP/443)	REST services for Oracle Advanced Support Gateway

Source	Destination	Network Protocol/Port	Purpose
	<ul style="list-style-type: none"> ■ 198.51.38.198/32 		
Oracle Advanced Support Gateway	<ul style="list-style-type: none"> ■ 192.206.43.193/32 ■ 198.51.38.196/32 	LDAP (TCP/636)	Oracle Advanced Support Gateway authentication (LDAP)

Firewall Rules for Oracle Private Cloud at Customer Machine to the Customer Network

There are no firewall rules required between the Oracle Private Cloud at Customer and the customer network. Customers can add firewalls at their own discretion in accordance with local policies and procedures.

Oracle Advanced Support Gateway Audit Logging Feature

The Audit Logging Feature of Oracle Advanced Support Gateway provides audit information for three different categories of system events. The three 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 Oracle Advanced Support Gateway. This is done by monitoring usage of the `ssh` and `telnet` system binaries. Oracle Advanced Support Gateway sends a message that `ssh` or `telnet` 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 Oracle Advanced Support Gateway.
- **Inbound Oracle Advanced Support 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.

All audit notifications are delivered using standard syslog protocol. A central logging system must be provided to accept and process these messages.

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

The audit logging feature is disabled by default, and must be explicitly enabled through the Oracle Advanced Support Gateway command line interface (CLI). The details of how to configure this feature are explained in the following section:

Implement Log Forwarding: Oracle Setup Task:

1. Use `ssh` to connect to Oracle Advanced Support Gateway.
Use the customer administrator account configured at installation time or any other user with the customer administrator role.
2. At the first (CLI or CLISH) prompt, enter the password.
3. At the next prompt enter **configure terminal**.
4. At the next prompt enter **syslog**.
You are now in the syslog-specific section of the Oracle Advanced Support Gateway CLI where you can configure forwarding.

Available Commands:

Command	Description
<code>help</code>	To display a list of available commands.
<code>?</code>	To display a brief explanation of how to enter commands in the CLI.
<code>stat</code>	To display the current configuration. This produces a display similar to the following: <pre> ----- SyslogBroadcaster Configuration ----- Message Forward Status = enabled Host IP Address = 1.2.3.4 Host Port Number = 514 Host Time Zone = GMT firewall Message Forward = enabled ssh Message Forward = enabled session Message Forward = enabled UID/GUID MapICMP Type 0 and 8 = enabled ----- </pre>
<code>forward enable</code>	To enable syslog forwarding.
<code>forward disable</code>	To disable syslog forwarding.
<code>ip <ip address></code>	To enter the IP address of the remote syslog server (the one receiving the forwarded messages). You must enter a valid IP address, not a host name.
<code>port <port #></code>	To change the port used for forwarding syslog messages.
<code>timezone <value></code>	To set the time zone used in the forwarded syslog messages. Value must be -12 to +12 which is the offset from GMT.
<code>mapping enable</code>	To convert the uid and guid contained in each message to the corresponding Unix user and group name.

Command	Description
mapping disable	

Enabling and Disabling Logging Messages

The following paragraphs show the commands to enable and disable logging messages, and provide examples of the resulting 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.

Any combination of the following three categories can be enabled or disabled.

Outbound Network Connectivity:

To enable or disable this type of message forwarding:

- firewall enable
- firewall disable

These messages are generated by iptables 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 nslookup command:

```
Jul 31 15:10:01 Jul-31 15: 10:01 GMT+00:00 0:0:0:0:0:0:1 NA:
sample-host kernel: iptables: IN= OUT=eth0 SRC=nn.nn.nn.nn
DST=nn.nn.nn.nn LEN=59 TOS=0x00 PREC=0x00 TTL=64 ID=33101 DF
PROTO=UDP SPT=30849 DPT=53 LEN=39 UID=jsmith GID=admin
```

Result from an ssh command:

```
Jul 31 15:13:22 Jul-31 15: 13:22 GMT+00:00 0:0:0:0:0:0:1 NA:
sample-host kernel: iptables: IN= OUT=eth0 SRC=nn.nn.nn.nn
DST=nn.nn.nn.nn LEN=60 TOS=0x00 PREC=0x00 TTL=64 ID=46937 DF
PROTO=TCP SPT=54842 DPT=22 WINDOW=14600 RES=0x00 SYN URGP=0 UID=jsmith GID=admin
```

Outbound Login Activity:

To enable or disable this type of message forwarding:

- ssh enable
- ssh disable

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

Result from an ssh command:

```
Jul 31 15:22:15 Jul-31 15: 22:14 GMT+00:00 0:0:0:0:0:0:1 NA:
sample-host audispd: node=sample-host type=SYSCALL
msg=audit(1437567767.027:17839321): arch=c000003e syscall=59
success=yes exit=0 a0=124e030 a1=123d7f0 a2=1246d90 a3=10
items=2 ppid=22614 pid=25252 auid=54373 uid=jsmith gid=admin euid=54373
suid=54373 fsuid=54373 egid=501 sgid=501 fsgid=501 tty=pts4 ses=90594
comm="ssh" exe="/usr/bin/ssh"
subj=unconfined_u:unconfined_r:unconfined_t:s0-s0:c0.c1023
key="gateway_audit"
```

Oracle Advanced Support Gateway User Login Activity:

To enable or disable this type of message forwarding:

- session enable
- session disable

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

Example of ssh being invoked on Oracle Advanced Support Gateway:

```
Aug 1 21:37:02 Aug-01 17: 37:02 GMT-04:00 0:0:0:0:0:0:1
NA: sample-host audispd: node=sample-host type=SYSCALL
msg=audit(1375393022.626:187186): arch=c000003e syscall=59 success=yes
exit=0 a0=7fa860e69380 a1=7fa860e697e0 a2=7fa860e69ca0 a3=0 items=2
ppid=1428 pid=12967 auid=4294967295 uid=jsmith gid=admin euid=0 suid=0 fsuid=0
egid=0 sgid=0 fsgid=0 tty=(none) ses=4294967295 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 Oracle Advanced Support Gateway:

```
Aug 1 21:42:49 Aug-01 17: 42:49 GMT-04:00 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=ffffffffffffff0 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"