Oracle® Fabric Interconnect

Security Guide

ORACLE

VIRTUAL NETWORKING

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Contents

Oracle Fabric Interconnect and XgOS Security

Oracle Fabric Interconnect and XgOS employ network virtualization to enable flexible connections from servers to networks and storage. The Oracle Fabric Interconnect replaces the need for server network adapters with virtual network interface cards (vNICs) and virtual host bus adapters (vHBAs) that can be configured in real-time. Applications and OSs see these virtual resources exactly as they would their physical counterparts. The result is an architecture that is much faster, easier to manage, and far more cost-effective.

This guide is intended for experienced network administrators and provides both general guidelines and specific instructions to enhance security.

This guide does not provide security guidance for Oracle Fabric Manager or Oracle SDN Controller. For security information on these products, refer to:

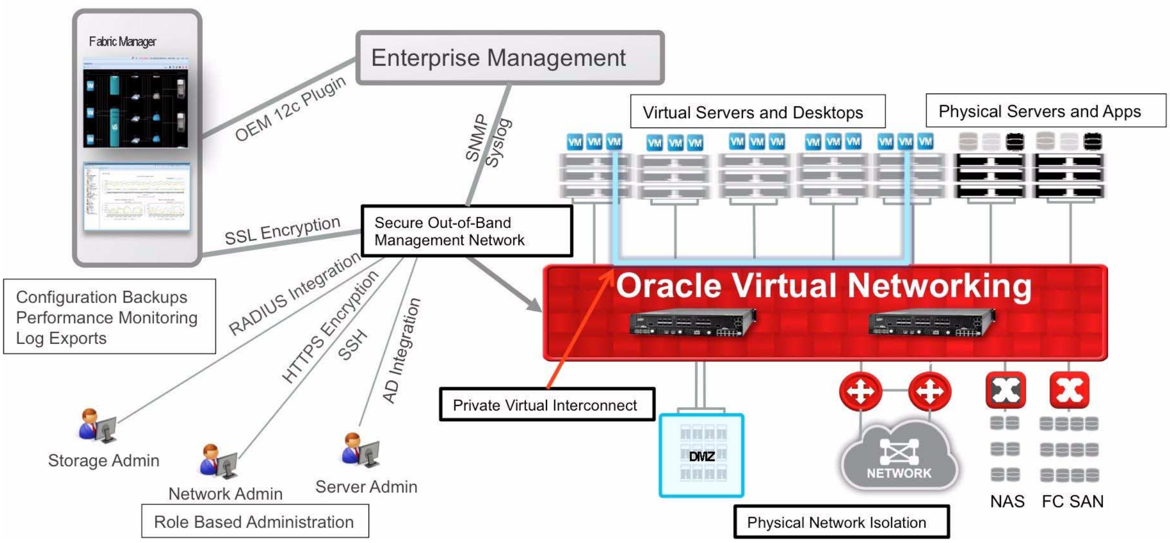
- *Oracle Fabric Manager Security Guide*
- *Oracle SDN Controller Security Guide*

System Overview

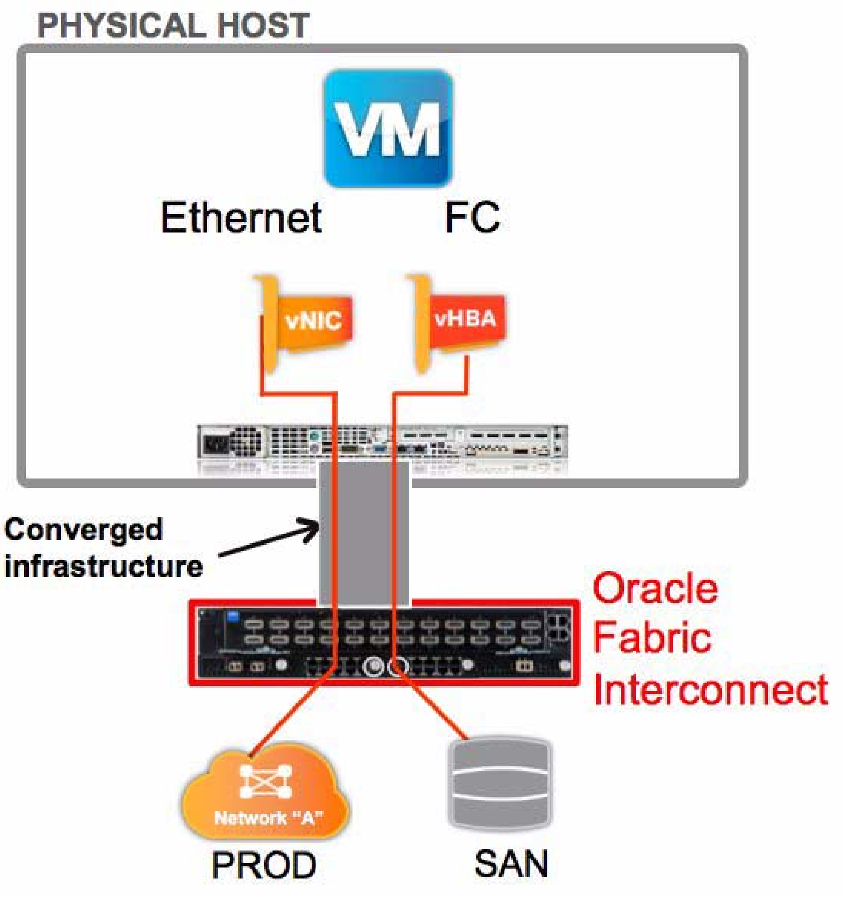
The Fabric Interconnect manages traffic from host servers to Ethernet or Fibre Channel interfaces using high-speed, low-latency InfiniBand network connections. The Fabric Interconnect uses XgOS and is available in 4U, 15-slot and 2U, 4-slot models. For security configurations, both Fabric Interconnects are considered identical.

- Oracle Fabric Interconnect F1-15
- Oracle Fabric Interconnect F1-4

The following is an overview of virtual networking with the Fabric Interconnects.



The following illustrates the relationship between the Fabric Interconnect and other components in the data center.



Security Principles

The following principles are fundamental to using the Fabric Interconnect securely.

1. **Keep up to date on the latest security and software update information**.

   Oracle continually improves its software and documentation. Check product and release notes often for updates at: `http://docs.oracle.com/cd/E38500_01/`

2. **Keep XgOS software and patches up to date**.

3. **Monitor system activity**.

   See “Monitor Log Files” on page 7 and refer to the *Oracle Fabric Manager Security Guide*.

4. **Ensure the hardware is in a locked environment.**

Security Guidelines

The following topics describe security guidelines for the Fabric Interconnect CLI.

Console Security

Access to the Fabric Interconnect command line interface is provided exclusively over encrypted Secure Shell connections. Telnet is not supported.

For example, connect to the Fabric Interconnect command line interface as user `admin`.

```
ssh -l admin ip-address
```

Additionally, a serial port interface is available to allow initial configuration of network parameters or maintenance access. Do not use the serial port interface unless required. Connect to the serial interface only through private management devices and with authorized personnel.

CLI User Accounts

The Identity Management System (IMS) service authenticates users and grants them suitable privileges according to assigned user roles when users access the Fabric Interconnect. The IMS service can be one of the following:

- Oracle XgOS local system, which is always present.
- Microsoft Active Directory (AD).
- Remote Authentication Dial In User Service (RADIUS).

Only the local XgOS identity management features are described in this guide. Refer to the CLI user’s guide for details on using Active Directory or RADIUS authentication services.

The system is delivered with two default management accounts. The password strength controls do not apply to these accounts. Enforce complex passwords for these accounts through policy.

- `root` – Allows complete administrative access to the underlying Linux based XgOS. This access is intended for Oracle certified personnel only. Changes to the XgOS configurations by the customer are not supported by Oracle.
- `admin` – Allows administrative access to the CLI management tools and security including the ability to create new user accounts.

To avoid the shared use of accounts and passwords, provide each Fabric Interconnect CLI user with a unique username and password and assign the proper role to match the user's tasks.

Available roles for the Fabric Interconnect CLI users include:

- Administrator – Allows configuration, editing, and management of all objects in Oracle's Fabric Directors (full administrative responsibilities).
- Network – Allows configuration, editing, and management of all objects related to vNIC configuration, Ethernet I/O cards and ports, network QoS parameters, ACLs, and server profiles.
- Operator – Allows read-only access including all show commands.
- Server – Allows all operations related to a server's physical connection, compute-resource configuration, and management.
- Storage – Allows vHBA configuration and management, Fibre Channel I/O module and ports, LUN masks, persistent mappings, and SAN QoS.

Note – Always assign users the least privileges required for their tasks.

Add a User and Assign Appropriate Privilege

Administrator privileges are required to add users.

- **Add a user and assign the storage management role, type.**

```
add user frank
set user frank -role=storage
```

Disable or Enable Root Login Over SSH

Administrator privileges are required to disable or enable root login over `ssh`.

- **Type either of these comands:**

```
set system root-ssh-login disable
set system root-ssh-login enable
```

CLI User Account Password Criteria

Fabric Interconnect local users are prompted for a password for authentication. Through XgOS you must set the password strength by specifying criteria with the `set system password-strength` command. The available criteria is as follows:

- `min-length` – Sets the minimum number of characters allowed for the password string.
- `min-lower-case` – Sets the minimum number of lowercase letters required for passwords.
- `min-number` – Sets the minimum number of numbers required for passwords.
- `min-special` – Sets the minimum number of special characters required for Fabric Interconnect passwords.
- `min-upper-case` – Sets the minimum number of uppercase letters required for Fabric Interconnect passwords.

Note – Configure user password strength criteria to adhere to your organizational security policy.

The criteria set with the `set system password-strength` command affects nondefault local user accounts only. This criteria does not affect login passwords for the following:

- Oracle Fabric Manager
- Windows Active Directory
- Any Identity Management System
- Default `root` or `admin` passwords

▼ Set High User Password Strength

In this example, the password for nondefault local user accounts must be at least 8 characters with at least 3 lower case, 2 numbers, 2 special characters, and 1 uppercase.

- Type:

```
set system password-strength -min-length=8 -min-lower-case=3 -min-
number=2 -min-special=2 -min-upper-case=1
```

Monitor Log Files

Log files are stored in the `/log` directory. A variety of subsystems have separate log file entries, including: `dmesg`, `apache`, `syslog`, `cli`, `xms`, and others.

Note – Monitor log files regularly and archive them to facilitate security reviews in case of a security breach.

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1. **Show CLI login activity.**

```
# more /log/cli.log
```

2. **Show daily boot messages.**

```
# more /log/dmesg
```

Access Control Lists

Access control lists (ACLs) classify packets. The classification result can be applied to quality-of-service (QoS) application flows (mark, police) or to network-access control (deny, allow). Strict ACL configurations are critical for enhancing security. Consider the following examples:

- **Prioritizing outbound traffic by marking fields in the IP header** – Enables upstream routers to handle this marked (set) traffic in a specific way.

  For example, any RTP VoIP traffic within a certain port range could have its IP TOS bit set to a value of 5. Any packet that satisfies these conditions will have its IP header field set by the I/O card.

- **Intentionally dropping packets during a denial-of-service (DoS) attack** – All traffic is blocked from specific IP or MAC addresses.

  For example, an ACL could block any traffic heading in an egress direction (server to network) with a specified IP or MAC address.

Refer to the *XgOS User's Guide* for instructions on how to create and enforce ACLs.

Network Access Controls

The Fabric Interconnect advertises the following ports:

- **Port 22 ssh** – CLI management.
- **Port 80 http** – Unencrypted Oracle Fabric Manager client access.
- **Port 443 https** – Encrypted Oracle Fabric Manager client access.
- **Port 161 SNMP** – SNMP monitoring.
- **Port 6522** – Enables Oracle Fabric Manager to discover the Fabric Interconnects.

SNMP Configuration

XgOS supports SNMPv1, v2, and v3. `get`, `getnext`, and `getbulk` operations are supported. `set` operations are not supported. Community strings are read only. The default `read-community` string is `public`.

Note – Change the default `read-community` string to prevent unauthorized monitoring of the systems.

Note – Always use SNMPv3 and use the correct authentication protocol.

▼ Change the SNMP Read Community String

- **Type:**

```
set snmp -read-community=string
```

ProWatch Remote Monitoring

Note – If you require high security, do not enable this feature. This feature is disabled by default.

The ProWatch feature automatically sends scheduled transmissions of the contents of log files and the output of the `show tech-support` command to Oracle Technical Support. This information enables Oracle Technical Support to proactively look for and diagnose potential problems without requiring you to collect data, package it, and transmit it to Oracle.

The information collected is from the `show tech-support` command and system logs only. No sensitive customer data is gathered and transmitted to Oracle. To ensure that private information is kept safe, the Oracle ProWatch feature provides ways to:

1. Send a copy of the information to an internal website for auditing purposes.
2. Remove private data, such as IP addresses, from the data.

Also, the data is transmitted encrypted so that it cannot be easily read.

ProWatch is disabled by default. If it is against your local policy to allow ProWatch to connect to Oracle, do not enable this feature.

Show the Current ProWatch Phone Home Status

- **Type:**

```
show system phone-home
```

Enable ProWatch Phone Home

Enabling Phone Home enables automatic data transmission.

- **Type:**

```
set system phone-home enable
```

▼ Disable Phone Home Automatic Transmission and Send Data Manually

With this feature, you decide when you want to send Phone Home data.

Note – The automatic and manual transmission commands are different. The manual transmission commands for Phone Home do not use the `set` command keyword.

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1. **Disable automatic Phone Home transmissions.**

```
set system phone-home disable
```

2. **Send Phone Home data manually.**

```
system phone-home
This will send quite a large amount of data to Xsigo Systems. It
requires that the I/O Director has access to the internet for an
HTTP transfer (perhaps through a proxy if necessary). Do you really
want to send the data (y/n)? y
```

Or, use the `-noconfirm` option to skip requiring `y/n` input.

```
system phone-home -noconfirm
```

▼ Disable or Enable Phone Home Feature to Remove Private IP Addresses

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Note – This feature is enabled by default.

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1. **To disable removing private IP addresses.**

```
set system phone-home -strip-private=false
```

2. **To enable removing private IP addresses.**

```
set system phone-home -strip-private=true
```

Or,

```
set system phone-home -strip-private=default
```

▼ Disable ProWatch Phone Home

- **Type:**

```
set system phone-home disable
```