ORACLE FABRIC INTERCONNECT

Transform your IT infrastructure with Oracle Fabric Interconnect, a hardware and software solution that streamlines server management. Instead of deploying multiple cards and cables to every server, you can connect servers with a single cable and then create virtual connectivity resources instantaneously with Oracle Fabric Interconnect. The result is up to 100 times faster server management, 70 percent fewer cables and cards, and 50 percent less capital cost than with conventional networking.

Flexibility and Cost Savings
Oracle Fabric Interconnect employs virtualization to enable you to flexibly connect servers to networks and storage. It eliminates the physical storage and networking cards found in every server and replaces them with virtual network interface cards (vNICs) and virtual host bus adapters (vHBAs) that can be deployed on the fly. Applications and operating systems see these virtual resources exactly as they would see their physical counterparts. The result is an architecture that is much easier to manage, far more cost-effective, and fully open.

Open Systems for Flexibility
Because Oracle Fabric Interconnect is built on open standards, you can use the servers, networking, and storage you prefer. Most alternative solutions employ proprietary gear that limits your options. With Oracle Fabric Interconnect, your options remain open.

Reliability, Simplicity, and Ease of Integration
With its open, standards-based architecture, Oracle Fabric Interconnect is nondisruptive and simple to integrate. Oracle Fabric Interconnect supports interoperability across x86 servers and blade systems. The system’s fully redundant, hot-swappable power and cooling, hot-swappable I/O modules, and passive midplane ensure superior reliability and serviceability.

InfiniBand Server Connectivity
Oracle Fabric Interconnect utilizes the latest InfiniBand networking technology to provide high-speed, low-latency converged connectivity to your servers. Quad data rate (QDR) InfiniBand Fabric provides the ultimate in performance, with data rates of 80 Gb/sec to each server in the fabric.
ORACLE VIRTUAL NETWORKING

Oracle Virtual Networking revolutionizes data center economics by creating an agile, highly efficient infrastructure built on your choice of hardware and software. This open architecture enables you to dynamically connect servers, networks, and storage. You create networks and connections entirely in software to enable secure, isolated services that support your business processes and priorities. With Oracle Virtual Networking, all traffic types, including Ethernet and Fibre Channel, traverse a converged infrastructure, resulting in a simpler, more efficient, wire-once environment with flexible connectivity.

Products in the Oracle Virtual Networking family include:
- Oracle Fabric Interconnects
- Oracle Fabric Manager
- Oracle Fabric Monitor
- Oracle SDN

Predictable User Experience

Get end-to-end performance control with Oracle Fabric Interconnect’s integrated quality-of-service (QoS) features. Both storage and network bandwidth can be controlled via fine-grained traffic policing, helping ensure that critical applications deliver the required performance.

Oracle Fabric Interconnect Elements

Oracle Fabric Interconnect includes the following elements:

Oracle Fabric Interconnect Chassis

Oracle Fabric Interconnect provides network and storage connectivity to all attached servers. Within the servers, vNICs and vHBAs appear as conventional Ethernet and Fibre Channel host adapters.

<table>
<thead>
<tr>
<th>Oracle Fabric Interconnect Chassis</th>
<th>Height</th>
<th>I/O Module Slots</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle Fabric Interconnect F1-4</td>
<td>2U</td>
<td>4</td>
</tr>
<tr>
<td>Oracle Fabric Interconnect F1-15</td>
<td>4U</td>
<td>15</td>
</tr>
</tbody>
</table>

Server Interconnect Options

Infiniband fabric is available to meet your specific application requirements.

<table>
<thead>
<tr>
<th>Server Interconnect Options</th>
<th>Link</th>
<th>Speed Gb/sec</th>
<th>Ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infiniband QDR</td>
<td>40</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

I/O Modules

Hot-swappable I/O modules provide storage and network connectivity. The I/O module options are:

- Oracle Fabric Interconnect Quad Port 10 Gb Ethernet Module
- Oracle Fabric Interconnect Ten Port 1 Gb Ethernet Module
- Oracle Fabric Interconnect Single Port 10 Gb Ethernet Module
- Oracle Fabric Interconnect Dual Port 8 Gb Fibre Channel Module
vNICs and vHBAs within each server appear to operating systems and hypervisors as physical host adapters.

Host Adapters
Oracle Fabric Interconnect connects to standard Ethernet and InfiniBand host adapters. For blade systems, compatible mezzanine cards and switch modules are available from most system makers.

Fabric Extenders
For enterprise scalability, Oracle’s line of InfiniBand switches provide additional server ports, enabling scalability to hundreds of servers within a single management environment.

Management Software
Oracle Fabric Interconnect is managed through either a command-line interface (CLI) or Oracle Fabric Manager, a centralized management environment that features an intuitive GUI. Multiple instances of Oracle Fabric Interconnects can be managed from a single instance of the Oracle Fabric Manager.

Figure 2. vNICs and vHBAs within each server appear to operating systems and hypervisors as physical host adapters.

Figure 3. Oracle Fabric Manager provides an intuitive user interface that consolidates connectivity management across all servers to a single console.
## Oracle Fabric Interconnect Specifications

### Chassis

| Oracle Fabric Interconnect F1-4     | • 2U height  
|                                      | • 4 I/O module slots  
| Oracle Fabric Interconnect F1-15    | • 4U height  
|                                      | • 15 I/O module slots  

### Server Interconnect Options

| InfiniBand fabric (40 Gb/sec) | • **Ports:** 20 nonblocking QDR InfiniBand server ports  
|                              | • **Interconnect:** Quad small-form-factor pluggable (QSFP+) copper (powered for fiber optic interfaces)  
|                              | • **Speed:** 40 Gbps per port full-duplex  

### Oracle Fabric Interconnect Dual Port 8 Gb Fibre Channel Module

| Physical ports                  | Two 8/4/2 Gb/sec autonegotiating SFP ports  
| Connectors                      | 2 SFP optical transceivers (850 nm)  
| Virtual interfaces              | Up to 128 vHBAs per I/O module (2 vHBAs reserved for internal card management)  
| Protocols                       | FC-AL, FCP (SCSI-FCP)  
| Logical unit number (LUN) masking | 256 LUNs per storage target per vHBA  
| World Wide Name (WWN)            | Each vHBA is assigned a unique WWN that can dynamically migrate with a specific virtual machine.  
| QoS                             | User-settable QoS features per vHBA include committed information rate (CIR) and peak information rate (PIR).  
| Storage area network (SAN) boot | vHBAs can be configured for SAN boot.  

### Oracle Fabric Interconnect Quad Port 10 Gb Ethernet Module

| Physical ports                  | 4 SFP+ ports  
| Virtual interfaces              | Up to 256 vNICs per module  
| Oversubscription                | 2:1 (4 ports)  
| QoS                             | User-settable QoS features per vNIC include CIR and PIR.  
| Preboot execution environment (PXE) | vNICs can be configured for PXE boot.  
| MAC addresses                   | • Each vNIC is assigned a unique MAC address.  
|                                  | • MAC addresses can dynamically migrate with specific virtual machines.  

Oracle Fabric Interconnect Specifications (continued)

**Oracle Fabric Interconnect Ten Port 1 Gb Ethernet Module**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical ports</td>
<td>10 Gigabit Ethernet (10GE) ports, RJ45 style</td>
</tr>
<tr>
<td>Virtual interfaces</td>
<td>Up to 160 vNICs per module</td>
</tr>
<tr>
<td>QoS</td>
<td>User-settable QoS features per vHBA include CIR and PIR</td>
</tr>
<tr>
<td>Port aggregation</td>
<td>Supports link aggregation groups for as many as 10 ports</td>
</tr>
<tr>
<td>Checksum offload</td>
<td>Supports IP header checksum offload</td>
</tr>
<tr>
<td>Jumbo frames</td>
<td>Supports jumbo frames for as many as 9,000 MTUs</td>
</tr>
<tr>
<td>VLAN</td>
<td>Supports 802.1Q VLANs, 4,096 per vNIC</td>
</tr>
<tr>
<td>PXE</td>
<td>vNICs can be configured for PXE boot.</td>
</tr>
<tr>
<td>MAC addresses</td>
<td>• Each vNIC is assigned a unique MAC address.</td>
</tr>
<tr>
<td></td>
<td>• MAC addresses can dynamically migrate with specific virtual machines.</td>
</tr>
</tbody>
</table>

**Oracle Fabric Interconnect Single Port 10 Gb Ethernet Module**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical ports</td>
<td>1 optical XFP or Cx4 XFP port</td>
</tr>
<tr>
<td>Virtual interfaces</td>
<td>Up to 128 vNICs per module</td>
</tr>
<tr>
<td>QoS</td>
<td>• User-settable QoS features per vNIC include CIR and PIR</td>
</tr>
<tr>
<td></td>
<td>• Supports 802.1p priority queuing/scheduling</td>
</tr>
<tr>
<td>Checksum offload</td>
<td>Supports IP header checksum offload</td>
</tr>
<tr>
<td>VLAN</td>
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**Management**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management interfaces</td>
<td>Java-based management GUI, command-line interface (CLI) through Secure Shell (SSH) and advanced API for integration with third-party software</td>
</tr>
<tr>
<td>Management module I/O</td>
<td>Ethernet management network, RS232 console, auxiliary ports, USB</td>
</tr>
<tr>
<td>Lights Out Management (LOM)</td>
<td>Supports IPMI based LOM</td>
</tr>
</tbody>
</table>

**Contact Us**

For more information about Oracle Fabric Interconnect, visit oracle.com or call +1.800.Oracle1 to speak to an Oracle representative.

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**Hardware and Software, Engineered to Work Together**

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**ORACLE DATA SHEET**