Intel® Omni-Path Director Class Switches

768 and 192 port director switches (100 Gbps per port)

Intel® Omni-Path Director Class Switches, an element of the Intel® Scalable System Framework, are part of an end-to-end product family for HPC fabrics that delivers high performance with breakthrough cost models. Intel® Omni-Path Architecture (Intel® OPA) builds on proven technologies from Intel® True Scale Architecture, the Cray Aries® interconnect, and open source software to provide an evolutionary on-ramp to revolutionary new fabric capabilities.

Higher Performance at Lower Cost

Intel® Omni-Path Director Class Switches deliver 100 Gbps port bandwidth with latency that stays low even at extreme scale. Based on new Intel 48-port switch silicon, these switches can lower fabric acquisition costs by as much as 50 percent, while simultaneously reducing space and power requirements. With these savings, you can potentially achieve higher total cluster performance within the same hardware budget to expand and accelerate your research.

Flexible Fabrics at Every Scale

Intel® Omni-Path Director Class Switches support HPC clusters of all sizes, from mid-level clusters to supercomputers with tens of thousands of servers. You can use these switches in combination with Intel® Omni-Path Edge Switches to build low-latency, multi-tier fabrics with an exceptional set of features for high-speed networking.

The Right Fabric for HPC

Key Benefits

Highly-integrated design reduces space, power, and cost
- 768 ports in 20U (+1U shelf)
- 192 ports in 7U

Optimized for high message rates and low end-to-end latency

Simple generational upgrades, with:
- Binary compatible applications
- FastFabric tools for easy installation
- All open source software

Key Features

Up to 19.2 Terabytes of aggregate bandwidth

Fully redundant subsystems
- Spine/management/power/cooling

Next-generation fabric innovations
- Packet Integrity Protection (PIP)
- Traffic Flow Optimization (TFO)
- Dynamic Lane Scaling (DLS)
- New 8K and 10K MTUs for improved storage efficiency
Modular Design
Intel® OPA leaf, spine, power, cooling, and management modules are common across chassis sizes, providing the flexibility needed to deploy and grow HPC environments efficiently and cost effectively.

High Availability
Intel® OPA switches provide integrated support for high availability with advanced features such as power, fabric, and management module redundancy, component-level diagnostics and alarming, and out-of-band management. Innovative features take fabric resilience and availability to new heights without sacrificing performance. Packet Integrity Protection (PIP), for example, provides high packet reliability with latency-free error checking and link-level recovery. Dynamic Lane Scaling (DLS) maintains 75 percent of link bandwidth if a physical lane fails, so HPC workloads can complete gracefully to keep research efforts on track.

SWITCH SPECIFICATIONS
- Based on Intel® Omni-Path Switch Silicon 100 Series 48 Port ASIC
- 100 Gbps per port bidirectional
- Virtual lanes: Configurable from one to eight VLs plus one management VL
- Configurable MTU size of 2 KB, 4 KB, 8 KB, or 10KB
- Maximum multicast table size: 8,192 entries
- Maximum unicast table size: 49,151 entries
- Supports QSFP28 Quad Small Form Factor Pluggable cabling
- Passive copper or active fiber cable

Management Features
- Management Module with optional redundancy
- Built-in Fabric Manager
- Subnet Management Agent (SMA)
- Performance Management Agent (PMA)
- Enables Command Line Interface and Chassis Management GUI through 10/100/1000 Base-T Ethernet
- Enables Serial Console through USB Serial Port
- Supports Embedded Subnet Manager (ESM) and Performance Manager (PM)
- Enables Network Time Protocol (NTP), SNMP/MIBs, and LDAP
- FastFabric Toolset
- Fabric Management GUI
<table>
<thead>
<tr>
<th>FEATURE</th>
<th>100SWD24</th>
<th>100SWD06</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 Gbs ports</td>
<td>32-up to 768</td>
<td>32-up to 192</td>
</tr>
<tr>
<td>Total System Bandwidth (bi-dir)</td>
<td>19.2 TB/s</td>
<td>4.8 TB/s</td>
</tr>
<tr>
<td>Dimensions (w x h x d)</td>
<td>17.6&quot; x 35.0&quot; x 29.5&quot;</td>
<td>17.6&quot; x 12.2&quot; x 29.5&quot;</td>
</tr>
<tr>
<td>Leaf Modules (Hot Swap)</td>
<td>1-24</td>
<td>1-6</td>
</tr>
<tr>
<td>Spine Modules (Hot Swap)</td>
<td>Up to 8</td>
<td>Up to 2</td>
</tr>
<tr>
<td>Fan Modules (Hot Swap)</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>Mgmt. Modules (Hot Swap)</td>
<td>1/2</td>
<td>1/2</td>
</tr>
<tr>
<td>Power Supplies (Hot Swap) Min / DC / AC</td>
<td>6/7/12</td>
<td>2/3/4</td>
</tr>
<tr>
<td>Power (Typ./Max)</td>
<td>6.8/8.9 KW (Copper) 9.5/11.6 KW (All Optical)</td>
<td>1.8/2.3 KW (Copper) 2.4/3 KW (All Optical)</td>
</tr>
<tr>
<td>Optical Power: Class 4 - 3 Watt Max</td>
<td>6.8/8.9 KW (Copper) 9.5/11.6 KW (All Optical)</td>
<td>1.8/2.3 KW (Copper) 2.4/3 KW (All Optical)</td>
</tr>
<tr>
<td>Weight - Fully Loaded</td>
<td>265kg</td>
<td>86kg</td>
</tr>
<tr>
<td>Status LEDs* (Ethernet/DC_On)</td>
<td>1/2</td>
<td>1/2</td>
</tr>
</tbody>
</table>

*Status LEDs - Ethernet Activity (Green), Ethernet Speed (Green/Orange) / DC_On (Green on push button)
Compliance

US/Canada
• FCC Part 15, Subpart B, Class A
• CAN ICES-3 (A)

Europe
• CISPR22
• CISPR32/EN55032
• EN55024
• EN61000-3-2
• EN61000-3-3

Japan
• VCCI, Class A

New Zealand/Australia
• AS/NZS CISPR 22, Class A

Korea
• RRA/KC (KN22, KN24), Class A

Taiwan
• BSMI (CNS 13438), Class A

Customs Union: Russia, Belarus and Kazakhstan
• GOST R IEC 60950-1
• GOST R 51318.22
• GOST 30805.24
• GOST R 51317.3.2 (Section 6, 7)
• GOST R 51317.3.3

Agency Approvals – Safety (Planned)

US/Canada
• TUV NRTL: UL 60950-1, CSA 22.1.No. 60950-1

Europe
• TUV SUD EN60950-1

International
• CB Scheme: IEC 60950-1

RoHS/REACH
• Complies with RoHS II Directive 2011/65/EU of the European Parliament
• Complies with REACH Regulation (EC) No 1907/2006

Acoustics
• Less than 7.0 Bels

Environmental Specifications

Temperature
• Operating: 0° to 40° C
• Storage: -40° to 70° C

Humidity
• Operating: 5% to 85% non-condensing
• Storage: 5% to 95% non-condensing

Altitude
• Operating: 0 – 10,000 feet (Temperature Derating 1C/175M above 900M)
• Storage: 0 – 40,000 feet

Shock
• Unpackaged: Half-sine, 2g 11ms 300 pulses total
• Packaged: 9" vertical and rotational drop

Vibration
• Unpackaged: 5-500 Hz, 2.2 g RMS random
• Packaged: 5-500 Hz, 1.09 g RMS random

Airflow - Front-to-back (Variable Speed Fans)
• 1100 CFM maximum at 40°C for 24 slot chassis
• 390 CFM maximum at 40°C for 6 slot chassis