

### Overview

#### Intel Omni-Path Director Switch Series

The Intel® Omni-Path Director Switches are based on the Intel® Omni-Path Architecture. The Intel® Omni-Path Architecture is designed for interconnecting the High Performance Computing (HPC) system resources, using a scalable, 100 Gbps, low-latency fabric. The Intel Omni-Path Director Switches effectively supports clusters with thousands of servers; larger fabrics are possible when the Director Switches are combined with the Intel® Omni-Path 1U Edge Switches.

The Intel Omni-Path Switch is ideal for customers who deploy high-performance computing (HPC) clusters based on HPE ProLiant XL and DL Servers using the Intel Omni-Path technology.



## Standard Features

### Key features

- Modular Director Class Switches
- Maximum of 768 ports, in 32-port increments, each providing 100 Gbps performance
- Scales up to 19.2 Terabytes per second (TB/s) aggregate bandwidth
- Optimized for message rate and latency
- Multiple Virtual Lanes (VLs) per physical port
- Supports virtual fabric partitioning
- System design supports full redundancy
- Integrated chassis management capabilities for installation, configuration, and ongoing monitoring

### Features and benefits

#### Switch Specifications

- Based on Intel® Omni-Path Switch Silicon 100 Series 48 Port ASIC
- 100 Gbps per port bidirectional
- Virtual lanes (VLs): 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: 8192 entries
- Maximum unicast table size: 49151 entries
- Supports QSFP28 passive copper and active optical cables

#### Chassis Management

- Modular Chassis Management Module
  - Q7 Intel® Atom™ processor-based board
  - Enables command line interface and chassis management GUI through 10/100/1000 Base-T Ethernet
  - Enables serial console through USB serial port
  - Chassis requires one Management Module, redundant module is optional
- Management Features
  - Chassis Management
  - Command Line Interface (CLI) through serial port or Out of Band (OOB) Ethernet
  - GUI through Out of Band Ethernet (via HTTP)
  - Protocol Enablement: Network Time Protocol (NTP), SNMP/MIBs, LDAP

#### Connectors and cabling

- The Line Board has QSFP28 ports
- Support passive copper and active optical cables

#### Warranty and support

- 3-year warranty, On Site, next business day response

## Configuration

### Intel Omni-Path Director Switch Series

#### Models

Intel® Omni-Path Architecture 192-port QSFP28/288-port Optical Director Switch Chassis	829912-B21
Intel® Omni-Path Architecture 768-port QSFP28/1152-port Optical Director Switch Chassis	829913-B21
Intel® Omni-Path Architecture Director Switch Fabric Board	829914-B21
Intel® Omni-Path Architecture 32-port QSFP28 Director Switch Line Board	829915-B21
Intel® Omni-Path Architecture Director Switch Management Module	829916-B21
Intel® Omni-Path Architecture Director Switch Power Supply Module	846041-B21

#### **Intel® Omni-Path Architecture 192-port QSFP28/288-port Optical Director Switch Chassis** 829912-B21

- 7U Chassis
- Up to Six (6) Line Boards, each with 32 QSFP28 ports
  - None included
- Up to Two (2) Fabric Boards
  - None included
- Up to Two (2) Management Modules
  - One (1) included
- Up to Four (4) Power Supplies
  - Three (3) included, N+1 redundant, hot swappable
  - Three (3) PDU Power Cords C20-C21 included
- Three (3) Fan Module included
  - N+1 redundant, hot swappable
- Rack rail kit included

#### **Intel® Omni-Path Architecture 768-port QSFP28/1152-port Optical Director Switch Chassis** 829913-B21

- 20U Chassis
- Up to twenty-four (24) Line Boards, each with 32 QSFP28 ports
  - None included
- Up to Eight (8) Fabric Boards
  - None included
- Up to Two (2) Management Modules
  - One (1) included
- Up to Twelve (12) Power Supplies
  - Seven (7) included, N+1 redundant, hot swappable
  - Seven (7) PDU Power Cords C20-C21 included
- Nine (9) Fan Module included
  - N+1 redundant, hot swappable
- Rack rail kit included

#### **Intel® Omni-Path Architecture Director Switch Fabric Board** 829914-B21

- Hot Swappable
- Two (2) Status LEDs (Green)
- Two (2) Attention LEDs (Amber)

#### **Intel® Omni-Path Architecture 32-port QSFP28 Director Switch Line Board** 829915-B21

- Hot Swappable
- Thirty-Two (32) 100Gbps QSFP28 ports
- Thirty-Two (32) Link Status LEDs (Green)
- Two (2) Board Status LEDs (Green)

## Configuration

- Two (2) Board Attention LEDs (Amber)

**NOTE:** See Related Options for supported cables

### Intel® Omni-Path Architecture Director Switch Management Module

829916-B21

- Hot Swappable
- One (1) Chassis Status LED (Green)
- One (1) Chassis Attention LED (Amber)
- One (1) Module Status LED (Green)
- One (1) Module Attention LED (Amber)
- One (1) Mechanical Release Latch (Green)
- One (1) Master LED – ON: Management Unit in Control

### Intel® Omni-Path Architecture Director Switch Power Supply Module

846041-B21

- Hot Swappable
- 180-240 VAC 50-60Hz (2500W rated)
- IEC320-C22 (mating connector IEC320-C21)
- One (1) AC Good LED (Green)
- One (1) DC Good LED/Alarm (Green/Amber/Red)

## Supported cables for Intel Omni-Path Switches

### Passive Copper cables

HPE 0.5m 100Gb QSFP28 Omni-Path Architecture Copper Cable	830024-B21
HPE 1m 100Gb QSFP28 Omni-Path Architecture Copper Cable	830024-B22
HPE 1.5m 100Gb QSFP28 Omni-Path Architecture Copper Cable	830024-B23
HPE 2m 100Gb QSFP28 Omni-Path Architecture Copper Cable	830024-B24
HPE 3m 100Gb QSFP28 Omni-Path Architecture Copper Cable	830024-B25

### Active Optical cables

HPE 3m 100Gb QSFP28 Omni-Path Architecture Optical Cable	830025-B21
HPE 5m 100Gb QSFP28 Omni-Path Architecture Optical Cable	830025-B22
HPE 7m 100Gb QSFP28 Omni-Path Architecture Optical Cable	830025-B23
HPE 10m 100Gb QSFP28 Omni-Path Architecture Optical Cable	830025-B24
HPE 12m 100Gb QSFP28 Omni-Path Architecture Optical Cable	830025-B25
HPE 15m 100Gb QSFP28 Omni-Path Architecture Optical Cable	830025-B26
HPE 20m 100Gb QSFP28 Omni-Path Architecture Optical Cable	830025-B27
HPE 30m 100Gb QSFP28 Omni-Path Architecture Optical Cable	830025-B28
HPE 3M 100Gb QSFP28 Omni-Path Optical Power Class 2 Cable	881204-B21
HPE 5M 100Gb QSFP28 Omni-Path Optical Power Class 2 Cable	881204-B22
HPE 7M 100Gb QSFP28 Omni-Path Optical Power Class 2 Cable	881204-B23
HPE 10M 100Gb QSFP28 Omni-Path Optical Power Class 2 Cable	881204-B24
HPE 12M 100Gb QSFP28 Omni-Path Optical Power Class 2 Cable	881204-B25
HPE 15M 100Gb QSFP28 Omni-Path Optical Power Class 2 Cable	881204-B26
HPE 20M 100Gb QSFP28 Omni-Path Optical Power Class 2 Cable	881204-B27
HPE 30M 100Gb QSFP28 Omni-Path Optical Power Class 2 Cable	881204-B28

## Services

### Services

Intel Omni-Path Switches should have the same attached support level as the Server and Enclosure.

#### **Protect your business beyond warranty with HPE Support Services**

HPE Technology Services delivers confidence, reduces risk and helps customers realize agility and stability. Connect to Hewlett Packard Enterprise to help prevent problems and solve issues faster. HPE Support Services enable you to choose the right service level, length of coverage and response time as you purchase your new server, giving you full entitlement to the support for need for your IT and business. Protect your product, beyond warranty.

Connect your devices: Unlock all of the benefits of your technology investment by connecting your products to Hewlett Packard Enterprise. Achieve up to 77%1 reduction in down time, near 100%2 diagnostic accuracy and a single consolidated view of your environment. By connecting, you will receive 24x7 monitoring, pre-failure alerts, automatic call logging, and automatic parts dispatch. HPE Proactive Care Service and HPE Datacenter Care Service customers will also benefit from proactive activities to help prevent issues and increase optimization. All of these benefits are already available to you with your server storage and networking products, securely connected to Hewlett Packard Enterprise support.

1.-IDC 2015

2.-HPE CSC reports 2014 – 2015

Learn more about getting connected at

**[www.hpe.com/services/getconnected](http://www.hpe.com/services/getconnected)**

#### **HPE Proactive Care\* with 24x7 coverage, three year Support Service**

HPE Proactive Care gives customers an enhanced call experience. When your products are connected to Hewlett Packard Enterprise, Proactive Care helps prevent problems and maintains IT stability by utilizing personalized proactive reports with recommendations and advice This Service combines three years proactive reporting and advice with our 24x7 coverage, four hour hardware response time when there is a problem. This service also includes collaborative software support for Independent Software Vendors (ISVs), (Red Hat, VMWare, Microsoft, etc.) running on your Hewlett Packard Enterprise servers.

**<http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-8855ENW.pdf>**

#### **HPE Foundation Care 24x7, three-year Support Service**

HPE Foundation Care 24x7 gives you access to Hewlett Packard Enterprise 24 hours a day, seven days a week for assistance on resolving issues. This service includes need based Hardware onsite response within four hours. In addition, collaborative software support is included in this service that provides troubleshooting assistance on industry leading software running on your HPE server. Simplify your support experience and make Hewlett Packard Enterprise your first call to help resolve hardware or software problems.

**<http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=4AA4-8876ENW&cc=us&lc=en>**

#### **HPE Foundation Care NBD, three-year Support Service**

HPE Foundation Care Next Business Day connects you to Hewlett Packard Enterprise during business hours for assistance on resolving issues – This service features need based next business day hardware onsite response and software call back within two hours. In addition, Collaborative software support and provides troubleshooting assistance on industry leading software running on your HPE server. Simplify your support experience and make Hewlett Packard Enterprise your first call to help resolve hardware or

## Configuration

software problems.

<http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=4AA4-8876ENW&cc=us&lc=en>

### Parts and Materials

Hewlett Packard Enterprise will provide HPE-supported replacement parts and materials necessary to maintain the covered hardware product in operating condition, including parts and materials for available and recommended engineering improvements.

Parts and components that have reached their maximum supported lifetime and/or the maximum usage limitations as set forth in the manufacturer's operating manual, product QuickSpecs, or the technical product data sheet will not be provided, repaired, or replaced as part of these services.

The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by Hewlett Packard Enterprise due to malfunction.

### Other related Services

#### HPE Server Hardware Installation

Provides for the basic hardware installation of Hewlett Packard Enterprise branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-9356EN.pdf>

#### HPE Factory Express for Servers and storage

HPE Factory Express offers configuration, customization, integration and deployment services for Hewlett Packard Enterprise servers and storage products. Customers can choose how their factory solutions are built, tested, integrated, shipped and deployed.

Factory Express offers service packages for simple configuration, racking, installation, complex configuration and design services as well as individual factory services, such as image loading, asset tagging, and custom packaging. Hewlett Packard Enterprise products supported through Factory Express include a wide array of servers and storage: HPE Integrity, HPE ProLiant, HPE Apollo, HPE ProLiant Server Blades, HPE BladeSystem, HPE 9000 servers as well as the MSAXxxx3PAR suite, XP, rackable tape libraries and configurable network switches.

HPE Technology Services Support Credits offer flexible services and technical skills to meet your changing IT demands. With a menu of service that is tailored to suit your needs, you get additional resources and specialist skills to help you maintain peak performance of your IT. Offered as annual credits, you can plan your budgets while proactively responding to your dynamic business.

#### HPE Datacenter Care service

HPE Datacenter Care helps improve IT stability and security, increase the value of IT, and enable agility and innovation. It is a structured framework of repeatable, tested, and globally available services "building blocks." You can deploy, operate, and evolve your datacenter wherever you are on your IT journey. With HPE Datacenter Care, you benefit from a personalized relationship with Hewlett Packard Enterprise via a single point of accountability for Hewlett Packard Enterprise and others' products. For more information, visit [www.hpe.com/services/datacentercare](http://www.hpe.com/services/datacentercare)

HPE Flexibly Capacity, a building block of HPE Datacenter Care is a pay per use model for on premise infrastructure, giving you the technology you want, the ability to manage capacity when you need it, with no upfront payment.

## Configuration

Flexible Capacity provides the needed room to grow your environment, but only pay for actual metered use. Technology transitions with refresh can be built in, and infrastructure and services are billed monthly, enabling you to align costs to business use.

## Technical Specifications

### Intel® Omni-Path Architecture 192-port QSFP28/288-port Optical Director Switch Chassis 829912-B21

<b>I/O ports and slots</b>	Two (2) Slots for Fabric Board Six (6) Slots for Line Board, each Line Board with 32 QSFP28 ports	
<b>Power supplies</b>	Two (2) minimum; Three (3) required for N+1 redundancy; Four (4) required for N+N redundancy.	
<b>Fan units</b>	3 fan units, N+1 redundant, hot swappable	
<b>Physical characteristics</b>	<b>Dimensions</b>	12.2 in (H) x 17.6 in (W) x 29.5 in (D) 30.7 cm (H) x 44.7 cm (W) x 74.9 cm (D)
	<b>Weight</b>	86.3 kg (fully configured) 190.1 lb (fully configured)
<b>Performance</b>	<b>Throughput</b>	4.8 TB/s capacity
	<b>Maximum multicast table size</b>	8192 entries
	<b>Maximum unicast table size</b>	49151 entries
<b>Colling (Max required)</b>	390 CFM at 40°C	
<b>Maximum power rating</b>	2.0 KW	

### Intel® Omni-Path Architecture 768-port QSFP28/1152-port Optical Director Switch Chassis 829913-B21

<b>I/O ports and slots</b>	Eight (8) Slots for Fabric Board Twenty-Four (24) Slots for Line Board, each Line Board with 32 QSFP28 ports	
<b>Power supplies</b>	Six (6) minimum; Seven (7) required for N+1 redundancy; Twelve (12) required for N+N redundancy.	
<b>Fan units</b>	9 fan units, N+1 redundant, hot-swappable.	
<b>Physical characteristics</b>	<b>Dimensions</b>	35.0 in (H) x 17.6 in (W) x 29.5 in (D) 88.9 cm (H) x 44.7 cm (W) x 74.9 cm (D)
	<b>Weight</b>	288 kg (fully configured) 635 lb (fully configured)
<b>Performance</b>	<b>Throughput</b>	19.2 TB/s capacity
	<b>Maximum multicast table size</b>	8192 entries
	<b>Maximum unicast table size</b>	49151 entries
<b>Colling (Max required)</b>	1100 CFM at 40°C	
<b>Maximum power rating</b>	7.8 KW	

### Intel® Omni-Path Architecture Director Switch Fabric Board 829914-B21

<b>Physical characteristics</b>	<b>Dimensions</b>	2.2 in (H) x 17.4 in (W) x 7.5 in (D) 5.6 cm (H) x 44.2 cm (W) x 19.1 cm (D)
	<b>Weight</b>	3.41 kg 7.5 lb
<b>Power</b>	<b>Typical</b>	203W DC 223W AC
	<b>Max</b>	262W DC 284W AC

### Intel® Omni-Path Architecture 32-port QSFP28 Director Switch Line Board 829915-B21

<b>I/O ports and slots</b>	32 QSFP28 ports	
<b>Physical characteristics</b>	<b>Dimensions</b>	2.2 in (H) x 6.9 in (W) x 12.3 in (D)

## Technical Specifications

		5.6 cm (H) x 17.5 cm (W) x 31.2 cm (D)
	<b>Weight</b>	3.86 kg 8.5 lb
<b>Power</b>	<b>Typical</b>	175W DC 190W AC
	<b>Max</b>	229W DC 249W AC

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### Intel® Omni-Path Architecture Director Switch Management Module

829916-B21

<b>Physical characteristics</b>	<b>Dimensions</b>	1.7 in (H) x 8.6 in (W) x 7.2 in (D) 4.3 cm (H) x 21.8 cm (W) x 18.3 cm (D)
	<b>Weight</b>	0.68 kg 1.5 lb
<b>Power</b>	<b>Typical</b>	23W DC 25W AC
	<b>Max</b>	25W DC 27W AC

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### Intel® Omni-Path Architecture Director Switch Power Supply Module

846041-B21

<b>Physical characteristics</b>	<b>Dimensions</b>	1.6 in (H) x 4.0 in (W) x 15.8 in (D) 4.1 cm (H) x 10.2 cm (W) x 40.1 cm (D)
	<b>Weight</b>	2.38 kg 5.3 lb
<b>Power Efficiency</b>		94% at 230V/50% load 91% efficiency at 230V/max load

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## Other Specifications

<b>Environment</b>	<b>Operating temperature</b>	0°C to 40°C (32°F to 104°F)
	<b>Non-Operating temperature</b>	-40°C to 70°C
	<b>Operating humidity</b>	10% to 85% non-condensing
	<b>STORAGE HUMIDITY</b>	5% to 95% non-condensing
	<b>Operating Altitude</b>	0 to 3048m (0 to 10,000 feet)
	<b>Storage Altitude</b>	0 to 12,192m (0 to 40,000 feet)
<b>Electrical characteristics</b>	<b>Acoustic</b>	Less than 7.0 Bels (70 dB)
	<b>Frequency</b>	50/60Hz
	<b>Voltage</b>	180- 240VAC
<b>Safety</b>	<b>US/Canada</b>	
	•	TUV NRTL: UL 60950-1, CSA 22.1.No. 60950-1
	<b>Europe</b>	
	•	TUV: EN60950-1
	<b>International</b>	
	•	CB Scheme: IEC 60950-1
	<b>Customs Union: Russian Federation, Belarus and Kazakhstan</b>	
	•	GOST R IEC 60950-1
	•	GOST R 51318.22

## Technical Specifications

- GOST 30805.24
- GOST R 51317.3.2 (Section 6, 7)
- GOST R 51317.3.3

### Emissions

#### US/Canada

- FCC Part 15, Subpart B, Class A
- CAN ICES-3 (A)/NMB-3(A)

#### Europe/International

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

#### Japan

- VCCI, Class A

#### Australia/New Zealand

- AS/NZS CISPR 22, Class A

#### Korea

- RRA/KC (KN32, KN35), Class A

#### Taiwan

- BSMI (CNS 13438), Class A

#### Customs Union: Russian Federation, Belarus and Kazakhstan

- TR CU 020/2011 "Electromagnetic compatibility of technical equipment"

### RoHS/REACH

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

### Fabric Management

The Intel® Omni-Path Fabric Suite Fabric Manager (FM) is required to be deployed as a host-based solution for a Director Class Switch. The host solution uses the Intel® Omni-Path Fabric stack running on a Linux Server to make use of the large memory resources and high speed processor technology of standard servers to access and manage the fabric.

## Summary of Changes

Date	Version History	Action	Description of Change
4-Dec-2017	From version 2 to 3	Updated	Add SKUs to the Related Options section
25-Sept-2017	From version 1 to 2	Updated	Updates throughout the QuickSpecs
6-June-2016	Version 1	Created	Create QuickSpecs for Intel Omni-Path Director Switches.



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