Data Sheet

Pluribus Freedom 9232-Q Switch

High-Performance Enterprise and Cloud Data Center Open Network Switch with Advanced Network Services for Leaf, Top of Rack and Mid-Range Spine Deployments with 32 40 Gigabit Ethernet QSFP+ Interfaces or 104 10 Gigabit Ethernet Interfaces

Highlights

- Compact 1 RU standards-based open network switch built on ONIE
- Optimized to support Netvisor OS advanced services
- Deployment-proven Broadcom Trident II switching ASIC
- Intel Rangeley CPU supports integrated network services
- Sustained performance and throughput for all configurations
- Large-scale VXLAN configurations supported in hardware
- Redundant power and fans to support high availability operations
- Minimal power consumption with up to 93% power efficiency, reduces operating costs
- Reversible airflow supports hot-aisle and cold-aisle placement
- Low heat dissipation minimizes cooling requirements

Product Overview

The Pluribus Freedom™ 9232-Q switch is a best-in-class, programmable open network switch that provides, standards-based networking to meet the stringent requirements of high-performance enterprise and cloud data centers. Built on the deployment-proven Broadcom StrataXGS® Trident II switching ASIC, the Pluribus Freedom 9232-Q switch is optimized to deliver the advanced networking and service capabilities of the Pluribus Netvisor® operating system. The Pluribus Freedom 9232-Q switch is Open Compute Project (OCP) compliant, and is built with the Open Network Install Environment (ONIE) to support any compatible network operating system for maximum flexibility and adaptability to meet future data center networking requirements.

The Pluribus Freedom 9232-Q switch delivers wire-speed layer 2 and layer 3 switching and routing with sustained packet forwarding performance of 1.28 Terabits per second (Tb/s) and 1.4 Billion packets per second (Bp/s) throughput with all network services enabled. The switch provides high-density, low latency 10G and 40G ports making it ideal for Leaf/ToR deployments or mid-range Spine aggregation. The Pluribus Freedom 9232-Q switch provides 32 QSFP+ ports that can support up to 32 40G interfaces or 104 10G interfaces in a single fixed form factor switch.

The platform is built for high availability environments with redundant and hot swappable power and fan units. The switch is highly power efficient, and offers air-flow flexibility to support hot or cold aisle deployments. The compact design of the Pluribus Freedom 9232-Q switch minimizes its deployment footprint, requires less power, and lowers cooling requirements, which reduce the cost of data center network operations.

System Highlights

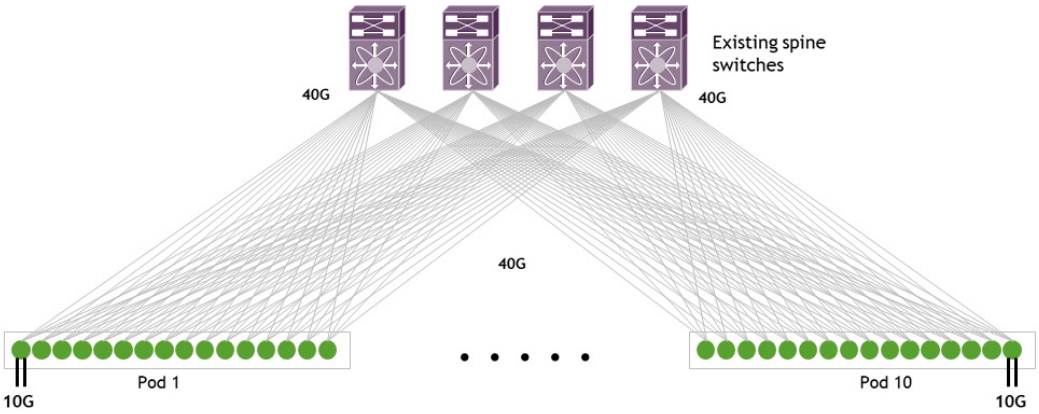
- Wire-speed Layer 2 and Layer 3 forwarding up to 1.28 Gb/s and 1.4 Bp/s
- 32 QSFP+ ports support either 1x 40G or 4x 10G (up to 104 ports)
- Broadcom Trident II switching ASIC
- VXLAN services supported in hardware at wire-speed
- 12 Mb shared packet buffer with SmartTable and SmartBuffer technologies enable high-scale data centers
- Intel Atom (Rangeley) C2538 quad-core 2.4 Ghz processor
- All ports on front; PSUs and fans accessible from rear
- Dual redundant, load-sharing, hot-swappable PSUs
- 370 Watt maximum power consumption with efficiency of up to 93%
- 4+1 redundant, hot-swappable fan modules
- Configurable hot/cold aisle with port-to-power and power-to-port airflow
- 1 RU compact form factor mountable in either a standard 19” or 21” rack

Meet Growing Data Center Capacity Requirements

The Pluribus Freedom 9232-Q switch is a high-capacity 40G and 10G switch that enables building high-scale ToR and mid-range Spine aggregation architectures. Its interface flexibility provides cost-effective horizontal capacity scale to support the server interface requirements for a broad range of next generation applications and highly virtualized servers.

This agility allows the efficient leverage of network infrastructure investments with the flexibility to quickly re-configure the network as capacity and speed requirements change, reducing the cost of sparing and lowering the total cost of operations.

Existing Data Center Deployment with Pluribus Freedom Series Switches Inserted in the Leaf Layer

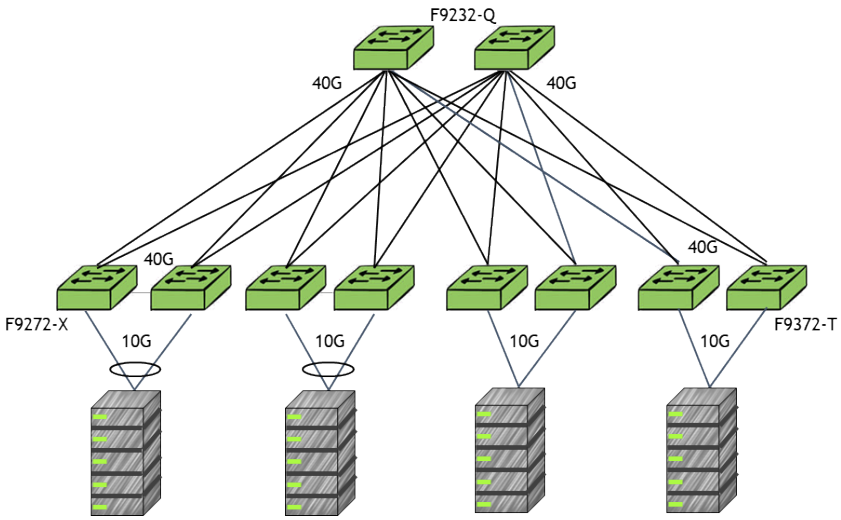


Pluribus Freedom 9000 Series switches with Netvisor OS inserted into the Leaf layer for an existing data center architecture with 10G at the Leaf and 40G uplinks to the Spine.

Deployment Examples

- Deploy Freedom 9232-Q as mid-range Spine to aggregate Freedom 9272-X and Freedom 9372-T switches or other third-party Leaf/ToR switches
- Deploy the Freedom 9232-Q as the Leaf/ToR switch with ultra-high density 10G to servers and 40G uplinks to a Freedom 9532-C
- Deploy the Freedom 9232-Q as the Leaf/ToR switch with ultra-high density 10G to servers and 40G uplinks to another Freedom 9232-Q acting as the Spine switch
- Deploy Freedom 9232-Q as Leaf/ToR switch into existing networks with ultra-high density 10G to servers and 40G uplinks to other vendor switches

40/10G Data Center Design with Pluribus Freedom 9000 Series Switches



Flexible, high density data center architecture with Pluribus Freedom series switches for 10G Leaf and 40G Spine uplinks.

Netvisor Operating System

Enabling simple, plug-and-play deployments, the Pluribus Freedom 9232-Q switch is delivered as an integrated, turn-key solution that is shipped pre-configured with the Pluribus Netvisor Operating System (ONVL) installed on the ONIE foundation.

The Pluribus Netvisor OS is a virtualized Network Operating System (NOS) that provides a best-in-class layer 2 and layer 3 networking foundation, advanced network services, VXLAN, distributed Adaptive Cloud Fabric™ intelligence and embedded network performance monitoring telemetry.

The Pluribus Netvisor software virtualizes the switch hardware, decoupling network resources from the underlying hardware to create multiple network containers on a single device. Each container can be dynamically allocated, and a single switch can instantiate multiple network containers. Each container has its own virtualized router and can support granular east/west and north/south network segmentation, strict multi-tenant services, security and policies, and the integration of virtualized network services and functions.

Pluribus Netvisor software is available as a perpetual or subscription license, and offers several software license-based feature options to meet different deployment requirements.

Netvisor OS Licensing Options

- **Netvisor Enterprise** — includes Layer 2 and Layer 3 switching and routing functionality with all standard networking protocols and high availability features
- **Netvisor Fabric** — adds VXLAN, Telemetry, Adaptive Cloud Fabric, Data Center Interconnect and security and segmentation capabilities

Optional licensed capabilities

- **vNET License** — supports multi-tenant and network/traffic segmentation requirements. Licensed one per fabric based upon number of segments required. vNet capabilities requires at least one Pluribus Freedom 9532-C switch to be a member of the Adaptive Cloud Fabric architecture or the deployment of Virtual Netvisor (vNV)
- **VirtualWire™ feature license** — additive license per switch and can co-exist with standard network interfaces

Warranty

The Pluribus Freedom 9232-Q switch is backed by a three-year limited hardware warranty. Multiple extended support options, including advanced replacement and 24x7 on-demand support services, are available. Contact Pluribus Networks or a Pluribus Networks authorized reseller for complete details.

Specifications

Pluribus Freedom 9232-Q Switch

Switching Engine

- Broadcom Trident II (BCM56850) ASIC

Onboard CPU / NFV Engine

- Intel Atom (Rangeley) C2538 quad-core 2.4 Ghz processor
- 8 GB SO-DIMM DDR3 RAM with ECC

Software

- Switch is loaded with Open Network Install Environment (ONIE) software installer
- Pluribus Netvisor OS - Open Netvisor Linux (ONVL) based upon license options ordered

Interface Ports

Network Interfaces

- 32 QSFP+ — each supporting 1x 40G or 4x 10G (up to 104 ports)

Management Ports

- 1x RJ45 serial console
- 1x RJ-45 100/1000BASE-T management
- 1x USB Type A Storage

Performance

- Wire speed L2 and L3 packet forwarding
- Switching capacity: 1.28 Tb/s
- Forwarding rate: 1.44 Bp/s
- Supports jumbo frames up to 9216 Bytes
- 12 MB pooled packet buffer
- Latency (RFC2544) 600ns

Hardware Capacity

- VXLAN supported in hardware
- SmartTable and SmartBuffer technologies
- 288K MAC addresses
- 16K IPv4 host routes
- 8K IPv6 host routes
- 16K IPv4 routes
- 8K IPv6 routes
- 4K IGMP/MLD Groups
- 4K VLAN IDs
- 1K VXLAN Tunnels
- 2K ACL TCAM

Operational

- 2x redundant, load-sharing, hot-swappable PSUs
- Input voltage: 90 to 264 VAC at 50-60 Hz
- Input Current: 10 Amps at 100/120 VAC, 5 Amps at 200/240 VAC
- PSU efficiency up to 93%
- 370 Watt maximum power, without pluggable optics
- Typical Power (Spine): 261 Watt with 32 x 40GBASE-SR4 and line rate traffic
- Typical Power (TOR): 227 Watt with 96 10G (24 x passive QSFP DAC) and 8 x 40GBASE-SR4 and line rate traffic
- Hot-swappable 4+1 redundant fan modules
- Supports both hot-aisle and cold-aisle placement with reversible airflow

Physical and Environmental

- 1RU, mountable in either 19” or 21” racks
- Dimension: (WxDxH) 43.84x51.5x4.35cm (17.26x20.28x1.71 in)
- Weight: 9.65 kg (21.27 lbs), with two PSU modules installed
- Storage Temperature: -40˚C to 70˚C (-40˚F to 158˚F)
- Operating Temperature: 0˚C to 40˚C (32˚F to 104˚F)
- Operating Humidity: 5% to 95% non-condensing
- Operating Altitude: 0 to 3,048 meters (0 to 10,000 Feet)

LEDs

- 40G QSFP+: status, activity
- Ethernet Management port: status, activity
- Console Port: status
- System: diagnostic, locator

Regulatory

EMI

- CE Mark
  - EN55022 Class A
  - EN55024
  - EN6100-3-2
  - EN6100-3-3

FCC Part 15 Subpart B Class A

VCCI Class A

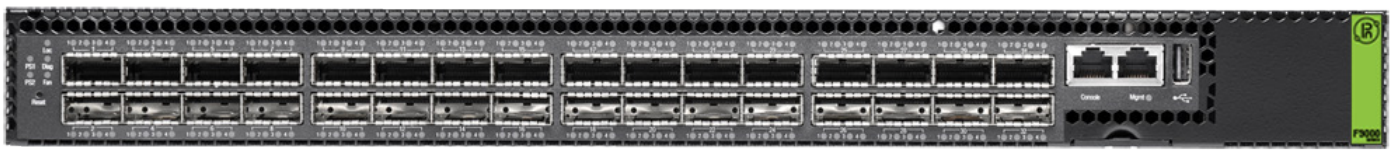
Safety

- CB
- UL/CUL

Environmental

- Temperature: IEC 68-2-14
- Vibration: IEC 68-2-36, IEC 68-2-6
- Shock: IEC 68-2-29
- Drop: ISTA 2A
- Acoustic Level: 62Db@ 27˚C

RoHS-6 compliant



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