

# Pluribus Freedom 9232-Q Switch

High-Performance 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® ONE Operating System (OS). 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 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 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 sparring and lowering the total cost of operations.

### 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

## Netvisor ONE 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 ONE OS installed on the Open Network Install Environment (ONIE) foundation.

Pluribus Netvisor ONE is a virtualized Network Operating System (NOS) that provides a best-in-class layer 2 and layer 3 networking foundation, and optionally licensed advanced network services such as VXLAN, the distributed Adaptive Cloud Fabric™ architecture and embedded network performance monitoring telemetry.

Netvisor ONE 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.

### Netvisor ONE 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, and security and segmentation capabilities
- **vNET License** — supports multi-tenant and network/traffic segmentation requirements. Licensed one per fabric based upon number of segments. vNET capabilities requires at least one Pluribus Freedom 9532-C or 9572-V switch to be a member of the Adaptive Cloud Fabric architecture or the deployment of Virtual Netvisor (vNV).
- **VirtualWire™ License** — additive license per switch and can co-exist with standard network interfaces

## Warranty

The Pluribus Freedom 9232-Q switch is backed by a 12-month 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
- 32 GB SSD SO-DIMM DDR3 RAM with ECC

### Software

- Switch is loaded with Open Network Install Environment (ONIE) software installer
- Pluribus Netvisor ONE OS - based upon 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

