

# Pluribus Freedom 9532L-C Switch

High-Performance Spine Switch Supporting Advanced Network Services and Network Function Virtualization Capabilities with 32 40/100 Gigabit Ethernet QSFP28 Interfaces or up to 128 10/25 Gigabit Ethernet Interfaces

## Highlights

- Compact 1RU standards-based open network switch built on ONIE
- Optimized to support Netvisor OS advanced services
- Deployment-proven Broadcom Tomahawk switching ASIC
- Intel Atom (Rangeley) C2538 quad-core 2.4 Ghz processor
- Low-latency and sustained performance predictability for all configurations
- Large-scale VXLAN configurations supported in hardware
- Architected for high-availability operations
- Minimal power consumption with up to 93% power efficiency, reducing operating costs
- Reversible airflow supports hot-aisle and cold-aisle placement
- Low heat dissipation minimizes cooling requirements



## Product Overview

The Pluribus Freedom™ 9532L-C switch is an advanced best-in-class, programmable open network platform that provides high-capacity, standards-based networking to stay ahead of evolving service demands driven by cloud and Internet of Things (IOT) requirements for enterprise and cloud data centers. Built on the deployment-proven Broadcom StrataXGS® Tomahawk switching ASIC, the Pluribus Freedom 9532L-C is optimized to deliver the comprehensive advanced services of the Pluribus Netvisor® ONE Operating System (OS). The Pluribus Freedom 9532L-C 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 platform delivers wire-speed Layer 2 and Layer 3 switching and routing with sustained packet forwarding performance of 3.2 terabits per second (Tb/s) and 4.7 billion packets per second (Bp/s) throughput, even when complex, process-intensive services are enabled. The switch provides 32 ultra-low latency QSFP28 FlexPorts that can support high-density 100, 40, 25 and 10 Gigabit Ethernet connections. The platform is highly power efficient, and is architected for high-availability environments with redundant and hot-swappable power and fan units. To meet diverse environmental requirements, the Pluribus Freedom 9532L-C switch offers airflow flexibility to support hot- or cold-aisle deployments.

The powerful next-generation switch can be deployed top-of-rack (ToR) or as a distributed spine, enabling scale-out architectures and eliminating the need for costly, oversized chassis switches in the data center. Its simplicity empowers network operators to build a highly flexible architecture that can scale capacity horizontally to optimize performance and enhance agility to support growing application traffic on a pay-as-you-grow basis. The compact design of the Pluribus Freedom 9532L-C switch dramatically reduces the deployment footprint and requires less power and lower cooling, which immediately reduces the cost of data center network operations.

## System Highlights

- Wire-speed, full-duplex across all ports, Layer 2 and Layer 3 forwarding up to 3.2 Tb/s and 4.7 Bp/s
- 32 QSFP28 FlexPorts, each supporting 1x 100/40G or 4x 25/10G ports
- Each port supports single-mode and multimode fibers (duplex or MPO/MTP) and copper transceivers or cables
- Broadcom Tomahawk switching ASIC
- 16 Mb shared packet buffer with SmartTable and SmartBuffer technologies enables high-scale data centers
- VXLAN services supported in hardware at wire speed
- Configurable pipeline latency enabling sub-400 ns port-to-port operation
- 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
- 310 watt typical power consumption, with efficiency of up to 93%
- 5+1 redundant, hot-swappable fan modules
- Configurable hot/cold aisle with port-to-power and power-to-port airflow
- 1RU compact form factor mountable in either a standard 19" or 21" rack

## Simplify the Data Center Architecture with a Single Device

The interface flexibility of the Pluribus Freedom 9532L-C switch allows a single device to be leveraged for all deployment points, such as the leaf and spine, in the data center architecture. Each of the 32 QSFP28 FlexPorts can be configured to support 100G, 40G, 25G or 10G interfaces for maximum agility. This flexibility optimizes data center network infrastructure investments through the standardization of fewer, simpler switching platforms that can be deployed everywhere. This dramatically simplifies deployment complexity, reduces the cost of spares and lowers the total cost of operations.

## Netvisor ONE Operating System

Enabling simple, plug-and-play deployments, the Pluribus Freedom 9532L-C switch is delivered as an integrated, turnkey solution that is shipped pre-configured with the Pluribus Netvisor ONE OS installed on the 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 require at least one Pluribus Freedom 9532L-C or 9572-V switch to be a member of the Adaptive Cloud Fabric architecture or Virtual Netvisor (vNV) to be deployed
- **VirtualWire™ License** — additive license per switch that can coexist with standard network interfaces

## Warranty

The Pluribus Freedom C9532L-C 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.

## Deployment Examples

- Deploy Freedom 9532L-C as common switch platform for leaf-and-spine (ToR) placements supporting all interface speed requirements
- Deploy Freedom 9532L-C as spine switch supporting 40G and 100G spine interconnects and leaf uplinks
- Deploy Freedom 9532L-C as leaf (ToR) switch supporting high-density 10G and 25G to servers with 40G or 100G uplinks to existing spine switches
- Deploy as a high-capacity spine switch supporting uplinks from other Freedom 9000 Series switches utilized as leaf devices

# Specifications

## Pluribus Freedom 9532L-C Switch

### Switching Engine

- Broadcom Tomahawk (BCM56960) ASIC

### Onboard CPU / NFV Engine

- Intel Atom (Rangeley) C2538 quad-core 2.4 Ghz processor
- 16 GB SD-DIMM DDR3 RAM
- 16 MB SPI Flash
- 32 GB M.2 SSD MLC

### Software

- Switch is loaded with ONIE software installer
- Pluribus Netvisor ONE OS – based upon options ordered

### Interface Ports

#### Network Interfacing

- 32x QSFP28 FlexPorts – Each FlexPort supports 1x 40/100G, or 4x 10/25G using splitter cables

#### 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: 3.2 Tb/s
- Forwarding rate: 4.7 Bp/s
- Supports jumbo frames up to 9216 bytes
- 16 MB pooled packet buffer
- Ultra-low-latency 450 ns with configurable pipeline latency enabling sub-400 ns port-to-port operation
- Supports high-performance storage/RDMA protocols including RoCE and RoCEv2

### Hardware Capacity

- VXLAN supported in hardware
- 104K MAC addresses
- 40K IPv4 host routes
- 20K IPv6 host routes
- 16K+ IPv4 routes
- VLAN IDs: 4K

### Operational

- Two redundant, load-sharing, hot-swappable PSUs
- Input voltage 90 to 240 VAC at 50-60 Hz
- PSU efficiency up to 93%
- 350W maximum power (without pluggable optics)
- 310W typical power (without pluggable optics)
- Hot-swappable 5+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: (W x D x H) 43.8 X 51.5 x 4.35 cm (17.3 x 20.3 x 1.7 in)
- Weight: 10 kg (23 lbs)
- Storage Temp: -40°C to 70°C (-40°F to 158°F)
- Operating Temp: 0°C to 45°C (32°F to 113°F)
- Operating Humidity: 5% to 95% non-condensing
- Operating Altitude: 0 to 3,048 meters (0 to 10,000 Feet)

### LEDs

- QSFP28 FlexPorts: status, activity, rate
- Ethernet Management port: status, activity
- Console Port: status
- System: diagnostic, locator, PSU and fan status

### 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: 62 Db @ 27°C

#### RoHS-6 compliant

