

# Pluribus Freedom E28Q-L Switch

High-Performance Spine Switch for Enterprise and Cloud Data Center with 28 QSFP+ Ports Supporting 28 40 Gigabit Ethernet or 8x 40 and 80x 10 Gigabit Ethernet Ports with Integrated CPU to Support Advanced Virtualized Network Services

## Highlights

- 2 RU standards-based high-performance Spine switch
- Pre-loaded with Netvisor (NVOS) software and optimized to support advanced Netvisor OS services
- Deployment-proven Broadcom Trident II switching ASIC
- Two Intel Xeon E5 CPUs with 12 cores supports advanced network services
- 480 GB integrated SSD storage
- Sustained performance and throughput for all configurations
- Large-scale VXLAN configurations supported in hardware
- Redundant power and fans support high availability operations
- Low heat dissipation minimizes cooling requirements



## Product Overview

The Pluribus Freedom E28Q-L delivers a unique combination of router, switch, compute, and storage capabilities to support converged network services and is optimized for deployment as a Spine switch and advanced network services node. With an advanced, high-performance architecture and robust wire-speed Layer-2 and Layer-3 networking, the Freedom E28Q-L supports specialized applications and leverages the advanced switching and Adaptive Cloud Fabric capabilities of the Netvisor OS. The Pluribus Freedom E28Q-L is ideal for multi-tenancy, network segmentation and service insertion applications.

## System Highlights

- Delivered pre-loaded with Pluribus Netvisor software (NVOS)
- Wire-speed Layer 2 and Layer 3 forwarding up to 2.24 Tb/s and 1.68 Bp/s
- Broadcom Trident II switching ASIC
- Integrated network processor provides 150 Mpps (100G) 64K queues, shaping and 2 Gb Packet buffer
- VXLAN services supported in hardware at wire-speed
- 12 Mb shared packet buffer with SmartTable and SmartBuffer technologies
- Two Xeon E5-2620 processors providing 12 cores
- 64 GB RAM memory
- 480 GB Internal SSD storage with expansion for up to 2 TB
- 4x 10G Network Interface Cards

## Netvisor Operating System

Enabling simple, plug-and-play deployments, the Pluribus Freedom E28Q-L switch is delivered as an integrated, turn-key solution that is shipped pre-configured with the Pluribus Netvisor Operating System (NVOS) Fabric Edition License. The Netvisor Fabric License includes Layer 2 and Layer 3 switching and routing functionality, all standard networking protocols, high availability features, VXLAN, Telemetry, Adaptive Cloud Fabric, Data Center Interconnect and security and segmentation capabilities.

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 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 switch capable of supporting vNet Manager to be a member of the Adaptive Cloud Fabric architecture or the deployment of Virtual Netvisor (vNV) in a virtual server
- **VirtualWire™ feature license** – additive license per switch and can co-exist with standard network interfaces

## Warranty

The Pluribus Freedom E28Q-L 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 E28Q-L Switch

### Switching Engine

- Broadcom Trident II ASIC

### Onboard CPU

- 2 Xeon E5-2620 (12 Cores)
- 64 GB RAM
- Internal Storage: 480 GB SSD
- Storage Expansion Slots: 2x 2.5" SATA SSDs
- CPU-To-Switch Bandwidth: 4x 10GE

### Software

- Pluribus Netvisor OS (NVOS) Fabric Edition and any options ordered

### Interface Ports

#### Network Interfaces

- 28x QSFP+ – each supporting 1x 40G or 8x 40G and 80x 10G
- 4x 10G Network Interface Cards

#### Management Ports

- 2x RJ45 10/100/1000 and IPMI console
- Console: Console, VGA
- 4x USB ports

### Performance

- Wire speed L2 and L3 packet forwarding
- Switching capacity: 2.24 Tb/s
- Forwarding rate: 1.68 Bp/s
- Supports jumbo frames up to 9216 Bytes
- 12 MB pooled packet buffer
- Latency 500ns

### Hardware Capacity

- VXLAN supported in hardware
- SmartTable and SmartBuffer technologies
- 288K MAC addresses
- 1.2M MAC Addresses SW
- 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 entries
- 256 RSTP Instances
- 16 MST Instances
- 32 Link Aggregation Group (LAG)
- 16 Member ports per LAG
- 64 Multi-chassis LAG (vLAG)
- 16 Member ports per vLAG
- 4,000 IGMP Groups
- 4,000 MLD Groups

### Hardware Capacity (Continued)

- 256 vNIC (SVI)
- 16-way ECMP
- 256 VRRP groups
- 128 BFD sessions
- 8 QoS Queues per port
- 1,000 VXLAN vTEP Tunnels
- Open TCP Connections by nVOS: 200,000
- 200,000 Total TCP Connections by nVOS: 200,000
- TCP Connection Track Rate: 30,000/sec
- Total vPorts in Fabric: 1,200,000
- Max vNET Virtualization: 32

### Operational

- 2 x 650W redundant hot-swappable power supplies
- Power Draw: 1,100 Watt (maximum)
- Power: Gold Power Supply Efficiency
- Airflow: Back-to-front
- Cooling Requirements: 4100 BTU/hr (maximum)
- Input voltage: 90 to 264 VAC at 50-60 Hz
- Input Current: 10 Amps at 100/120 VAC, 5 Amps at 200/240 VAC

### Physical and Environmental

- 2RU, mountable in either 19" or 21" racks
- Dimension: (WxDxH) 43 x 74.75 x 8.8cm (16.93 x 29.43 x 3.46in)
- Weight: 25 kg (55 lbs), with two PSU modules installed
- Operating Temperature: 0° to 40° C (32° to 104° F)
- Operating Altitude Range: 0 to 3,050 m (0 to 10,000 ft)
- Operating Relative Humidity: 10% to 85% non-condensing
- Storage Temperature: -40° to 70° C (-40° to 158° F)
- Storage Relative Humidity: 5% to 95% (noncondensing)

### Regulatory

#### EMC Emissions

- FCC 47CFR, Part 15 Class A (2009) USA Radiated Emissions
- EN 55022 Class A (2006) +A1 2007 European Radiated Emissions  
VCCI Class A (2007) Japanese Radiated Emissions
- BSMI CNS 13438 and NCC C6357 Taiwan Radiated Emissions  
AS/NZS CISPR22:2009

#### RoHS

- RoHS 5 compliant except for lead press-fit connectors

#### Safety

- CAN/CSA-C22.2 No. 60950-1 (2007) Information Technology Equipment- Safety UL 60950-1 (2nd Ed.) Information Technology Equipment - Safety
- EN 60950-1 (2005) Information Technology Equipment - Safety
- IEC 60950-1 (2005) Information Technology Equipment - Safety (all country deviations): CB Scheme report EN 60825-1 +A1+A2 (1994) Safety of Laser Products - Part 1: Equipment Classification