



# Dell Networking N4000 series

Dell Networking N4000 is a series of energy-efficient and cost-effective 10GbE switches designed for modernizing and scaling network infrastructure. N4000 switches utilize a comprehensive enterprise-class Layer 3 Advanced feature set, deliver consistent, simplified management and offer high-availability device and network design.

The N4000 switch series offers a power-efficient and resilient 10 Gigabit Ethernet (10GbE) switching solution with support for 40GbE uplinks for advanced Layer 3 distribution for offices and campus networks. The N4000 switch series has high-performance capabilities and wire-speed performance utilizing a non-blocking architecture to easily handle unexpected traffic loads. The N4000 series includes dual internal hot-swappable 80PLUS-certified power supplies for high availability and power efficiency. The switches offer simple management and scalability via flexible user port stacking at 10Gbps or 40Gbps. The high-availability stacking architecture allows management of up to 12 switches from a single IP address.

## Modernize campus network architectures

Modernize campus network architectures with a power-efficient and resilient 10/40GbE switching solution for environments requiring high throughput and availability at the aggregation or core. For greater interoperability in multivendor networks, N4000 series switches offer the latest open-standard protocols and include technology to interface with Cisco protocol RPVST+\* and devices using CDP.

Achieve high availability and full bandwidth utilization with Multi-chassis Link Aggregation (MLAG). N4000 series switches support MLAG to create active/active loop-free redundancy without spanning tree. Server rooms can deliver reliable server and storage connectivity with features to help save time and avoid configuration errors. These high density 24-port or 48-port 10GbE switches are ready for converged fabric requirements for SAN and LAN networks with loss-less operation for iSCSI environments with Data Center Bridging (DCB). N4000 supports VRF-lite, allowing it to be partitioned into multiple virtual routers with isolated control and data planes on the same physical switch. The N4000 series is also fully tested and validated to work with Dell EqualLogic™ PS-Series storage arrays.\*\*

## Leverage familiar tools and practices

All N-Series switches include Dell Networking OS 6 designed for easier deployment, greater interoperability and a lower learning curve for network administrators. One common command line interface (CLI) and GUI using a well-known command language gets skilled network administrators productive quickly. This allows network administrators to maintain consistent configurations by running one OS release across all N-Series products. With USB auto-configuration, network administrators can rapidly deploy mirrored configurations to numerous devices by simply inserting a USB key.

## Deploy with confidence at any scale

N4000 series switches help create performance assurance with a data rate up to 1.28Tbps (full duplex) and a forwarding rate up to 952Mpps. Scale easily with 10/40Gbps user port stacking supporting distances up to 100 meters. Switch stacks of up to 672 10GbE ports can be managed from a single screen using the highly-available stacking architecture for high-density aggregation with seamless redundant availability. N-Series switches help provide certainty with a lifetime warranty that covers software upgrades, hardware repair or replacement as well as optics and cables purchased with the switch. Details at [Dell.com/LifetimeWarranty](http://Dell.com/LifetimeWarranty)\*\*\*

\*Available starting with Dell Networking OS 6.1 release

\*\*Contact your Dell representative for a full list of validated storage arrays.

\*\*\*Select Networking products carry a Lifetime Limited Warranty with Basic Hardware Service (repair or replacement) for life. Repair or replacement does not include troubleshooting, configuration, or other advanced service provided by Dell ProSupport.

## Hardware, performance and efficiency

- Up to 32 10GbE ports (N4032 and N4032F) and up to 64 10GbE ports (N4064 and N4064F) using breakout cables.
- Converged network support for DCB with Priority Flow Control (802.1Qbb), ETS (802.1Qaz), DCBx, iSCSI TLV Support.
- Up to 672 10GbE ports in a 12-unit stack for high-density, high-availability aggregation and distribution in wiring closets/MDFs. Non-stop forwarding and fast failover in stack configurations.
- Hot swappable expansion module supporting dual-port QSFP+ (8x 10GbE), quad-port 10GBaseT and quad-port SFP+.
- Dual 80PLUS-certified efficient hot swappable power supplies and redundant variable speed fan operation helps decrease cooling and power costs.
- Energy-Efficient Ethernet and lower power PHYs reduce power to inactive ports and idle links, providing energy savings from the power cord to the port.
- Dell Fresh Air compliance for operation in environments up to 113°F (45°C) helps reduce cooling costs in temperature constrained deployments.

## Deploying, configuring and managing

- Tool-less ReadyRails™ significantly reduces rack installation time.
- USB auto-configuration rapidly deploys the switches without setting up complex TFTP configurations or sending technical staff to remote offices.
- Plug-and-Play configuration with Dell EqualLogic iSCSI storage arrays\*\* and one-command iSCSI setup alleviates multiple step configuration and potential configuration errors.
- Management via an intuitive and familiar CLI, embedded web server (GUI), SNMP-based management console application (including Dell OpenManage Network Manager), Telnet or serial connection.
- Private VLAN extensions and Private VLAN Edge support.
- AAA authorization, TACACS+ accounting and RADIUS support for comprehensive secure access support.
- Authentication tiering allows network administrators to tier port authentication methods such as 802.1x, MAC Authentication Bypass and Captive Portal in priority order so that a single port can provide flexible access and security.
- Achieve high availability and full bandwidth utilization with MLAG and support firmware upgrades without taking the network offline.
- Interfaces with RPVST+\* protocol for greater flexibility and interoperability in Cisco networks.
- Advanced Layer 3 IPv4 and IPv6 functionality.
- Flexible routing options with policy-based routing to route packets based on assigned criteria beyond destination address.
- Remote Switch Port Analyzer (RSPAN) monitors ports across a Layer 2 domain without costly dedicated network taps.
- OpenFlow 1.3 provides the ability to separate the control plane from the forwarding plane for more sophisticated traffic management.

# Specifications: Dell Networking N4000 series

## Dell SKU description

**N4032:** 24x 10GbE RJ45 auto-sensing (10Gb/1Gb/100Mb) fixed ports, 1x hot swap expansion module bay, 2x redundant 460W PSU included

**N4032F:** 24x 10GbE SFP+ auto-sensing (10Gb/1Gb) fixed ports, 1x hot swap expansion module bay, 2x redundant 460W PSU included

**N4064:** 48x 10GbE RJ45 auto-sensing (10Gb/1Gb/100Mb) fixed ports, 2x 40GbE QSFP+ fixed ports, 1x hot swap expansion module bay, 2x redundant 460W PSU included

**N4064F:** 48x 10GbE SFP+ auto-sensing (10Gb/1Gb) fixed ports, 2x 40GbE QSFP+ fixed ports, 1x hot swap expansion module bay, 2x redundant 460W PSU included

**Power cords**  
125V, 15A, 10 feet, NEMA 5-15/C13  
250V, 12A, 2 meters, C13/C14  
Country- and region-specific power cord options available

**Modules (optional)**  
4-port 10 Gigabit SFP+ hot swappable module  
4-port 10 Gigabit Base-T RJ-45 hot swappable module  
2-port 40 Gigabit QSFP+ hot swappable module

**Optics (optional)**  
Transceiver, SFP, 1000BASE-T  
Transceiver, SFP, 1000BASE-SX, 850nm wavelength, up to 550m reach  
Transceiver, SFP, 1000BASE-LX, 1310nm wavelength, up to 10km reach  
Transceiver, SFP+, 10GbE, LRM, 1310nm wavelength, up to 220m reach  
Transceiver, SFP+, 10GbE, SR, 850nm wavelength, up to 300m reach  
Transceiver, SFP+, 10GbE, LR, 1310nm wavelength, up to 10km reach  
Transceiver, QSFP+, 40GbE, SR4, 850nm wavelength, up to 150m reach  
Transceiver, QSFP+, 40GbE, ESR, 850nm wavelength, up to 300m reach  
Transceiver, QSFP+, 40GbE, LR4, 1310nm wavelength, up to 10km reach  
Transceiver, QSFP+, 40GbE, PSM4 with 1m, 5m or 15m pigtail to MPO

**Cables (optional)**  
Dell Networking cable, SFP+ to SFP+, 10GbE, copper twinax direct attach cable, 0.5m, 1m, 3m, 5m, 7m  
Dell Networking cable, QSFP+ to 4x SFP+, 40GbE to 4x10GbE, passive copper breakout cable, 0.5m, 1m, 3m, 5m, 7m  
Dell Networking cable, QSFP+ to QSFP+, 40GbE, passive copper direct attach cable, 0.5m, 1m, 3m, 5m, 7m  
OM3 MTP fiber cable, QSFP+ to QSFP+, 40GbE, requires QSFP+ optics, 1m, 3m, 5m, 7m, 10m, 25m, 50m, 75m, 100m  
Fiber breakout cable, QSFP+ to 4x SFP+, 40GbE MTP to 4x 10GbE LC, requires 1x QSFP+ and 4x SFP+ optics, 1m, 3m, 5m, 7m

## Physical

User port stacking up to 100m using 10Gb or 40Gb supporting up to 160Gbps on N4032 and 320Gbps on N4064 (full duplex)  
Rear out-of-band management port (10/100/1000BASE-T)  
USB (Type A) port for configuration via USB flash drive  
Auto-negotiation for speed and flow control  
Auto-MDI/MDIX, port mirroring  
Flow-based port mirroring  
Broadcast storm control  
Energy-Efficient Ethernet per port settings  
Redundant variable speed fans  
Air flow: I/O to power supply  
Dual redundant hot swappable power supplies included: 460W RJ45 console/management port with RS232 signaling (RJ-45 to female DB-9 connector cable included)  
Dual firmware images on-board

## Chassis

Size (LRU): 1.71 in x 17.08 in x 18.11 in (43.43 mm x 433.83 mm x 459.99 mm) (H x W x D)  
Approximate weight: 21.6lbs/9.83kg (N4032), 21.14lbs/9.59kg (N4032F), 24.07lbs/10.92kg (N4064), 23.28lbs/10.56kg (N4064F)  
ReadyRails rack mounting system, no tools required

## Environmental

Power supply efficiency: 80% or better in all operating modes  
Max. thermal output (BTU/hr): 823.44 (N4032), 603.86 (N4032F), 1353.53 (N4064), 754.82 (N4064F)  
Power consumption max (watts): 240 (N4032), 176 (N4032F), 395 (N4064), 220 (N4064F)  
Operating temperature: 32° to 113°F (0° to 45°C)  
Operating relative humidity: 90%  
Storage temperature: -4° to 158°F (-20° to 70°C)  
Storage relative humidity: 95%

## Performance

MAC addresses: 131,072  
Static routes: 1,024 (IPv4)/1,024 (IPv6)  
Dynamic routes: 8,160 (IPv4)/4,096 (IPv6)  
Switch fabric capacity: 640Gbps (N4032 and N4032F) (full duplex)  
1.28Tbps (N4064 and N4064F)  
Forwarding rate: 476Mpps (N4032 and N4032F)  
952Mpps (N4064 and N4064F)  
Link aggregation: 128 LAG groups, 144 dynamic ports per stack, 8 member ports per LAG  
Queues per port: 8  
Line-rate Layer 2 switching: All (non-blocking)  
Line-rate Layer 3 routing: All (non-blocking)  
Flash memory: 256MB

Packet buffer memory: 9MB  
CPU memory: 2GB  
OSPF routing interfaces: 8,160  
RIP routing interfaces: 512  
ECMP next hops per route: 4  
ECMP groups: 1,024  
VLAN routing interfaces: 128  
VLANs supported: 4,094  
Protocol-based VLANs: Supported  
Multicast forwarding entries: 512 (IPv4), 256 (IPv6)  
ARP entries: 6,144  
NDP entries: 1024  
Access control lists (ACL): Supported  
MAC and IP-based ACLs: Supported  
Time-controlled ACLs: Supported  
Max number of ACLs: 100  
Max ACL rules system-wide: 3,072  
Max rules per ACL: 1,023  
Max ACL rules per interface (IPv4): 2,047 (ingress), 1,023 (egress)  
Max ACL rules per interface (IPv6): 1,021 (ingress), 512 (egress)  
Max VLAN interfaces with ACLs applied: 24

## IEEE compliance

802.1AB LLDP  
Dell Voice VLAN  
Dell ISDP (inter-operates with devices running CDP)  
802.1D Bridging, Spanning Tree  
802.1p Ethernet Priority (User Provisioning and Mapping)  
Dell Adjustable WRR and Strict Queue Scheduling  
802.1Q VLAN Tagging, Double VLAN Tagging, GVRP  
802.1Qaz DCBx, Enhanced Transmission Selection (ETS)  
802.1Qbb Priority-based Flow Control (PFC)  
802.1S Multiple Spanning Tree (MSTP)  
802.1v Protocol-based VLANs  
802.1W Rapid Spanning Tree (RSTP)  
Dell RSTP-Per VLAN (compatible with Cisco's RPVST+)\*  
Dell Spanning tree optional features: STP root guard, BPDU guard, BPDU filtering  
802.1X Network Access Control, Auto VLAN  
802.2 Logical Link Control  
802.3 10BASE-T  
802.3ab Gigabit Ethernet (1000BASE-T)  
802.3ac Frame Extensions for VLAN Tagging  
802.3ad Link Aggregation with LACP  
802.3ae 10 Gigabit Ethernet (10GBASE-X)  
802.3AX LAG Load Balancing  
Dell Multi-Chassis LAG (MLAG)  
Dell Policy Based Forwarding  
802.3az Energy-Efficient Ethernet (EEE)  
802.3u Fast Ethernet (100BASE-TX) on management ports  
802.3x Flow Control  
802.3z Gigabit Ethernet (1000BASE-X)  
ANSI LLDP-MED (TIA-1057)  
Dell EqualLogic iSCSI Auto-configuration  
MTU 9,216 bytes

\*Available starting with Dell Networking OS 6.1 release

## RFC compliance and additional features

### General Internet protocols

General Internet protocols are supported. For a detailed list, please contact your Dell representative.

### General IPv4 protocols

General IPv4 protocols are supported. For a detailed list, please contact your Dell representative.

### General IPv6 protocols

General IPv6 protocols are supported. For a detailed list, please contact your Dell representative.

### Layer 3 functionality

1058	RIPv1	2453	RIPv2
1724	RIPv2 MIB Extension	2740	OSPFv3
1765	OSPF DB overflow	2787	VRRP MIB
1850	OSPF MIB	3101	NSSA
2082	RIP-2 MD5 Auth	3137	OSPF Stub Router Advert
2328	OSPFv2	3623	Graceful Restart
2338	VRRP	3768	VRRP
2370	Opaque LSA Option	4271	BGP
Dell	Policy Based Routing	5187	OSPFv3 Graceful Restart

### Multicast

1112	IGMPv1	3810	MLDv2
2236	IGMPv2	3973	PIM-DM
2365	Admin scoped IP Mcast	4541	IGMP v1/v2/v3 Snooping
2710	MLDv1		and Querier
2932	IPv4 MIB	4601	PIM-SM
2933	IGMP MIB	5060	PIM MIB
3376	IGMPv3	Dell	Static IP Multicast

Draft-ietf-pim-sm-bsr-05  
Draft-ietf-idmr-dvmrp-v3-10 DVMPRP  
Draft-ietf-magma-igmp-proxy-06.txt IGMP/MLD Proxying  
Draft-ietf-magma-igmpv3-and-routing-05.txt  
draft-ietf-idmr-dvmrp-mib-11  
draft-ietf-magma-mgmd-mib-05  
draft-ietf-pim-bsr-mib-06  
IEEE 802.1ag draft 8.1 - Connectivity Fault Management (CFM)  
IEEE 802.1p GMRP Dynamic L2 Multicast Registration

## Quality of service

2474	DiffServ Field	2697	srTCM
2475	DiffServ Architecture	4115	trTCM
2597	Assured Fwd PHB	Dell	L4 Trusted Mode (TCP/UDP)
Dell	Port Based QoS Services	Dell	Red/WRED
Dell	Flow Based QoS Services Mode (IPv4/IPv6)	Dell	Audio Video Bridging

## Network management and security

1155	SMIPv1	2856	Text Conv. For High Capacity Data Types
1157	SNMPv1		Interfaces MIB
1212	Concise MIB Definitions	2863	RADIUS
1213	MIB-II	2865	RADIUS Accounting
1215	SNMP Traps	2866	RADIUS Attributes for Tunnel Prot.
1286	Bridge MIB	2868	RADIUS Extensions
1442	SMIPv2	2869	Internet Standard Mgmt. Framework
1451	Manager-to-Manager MIB	3410	SNMP Management Framework
1492	TACACS+	3411	Message Processing and Dispatching
1493	Managed objects for Bridges MIB	3412	SNMP Applications
1573	Evolution of Interfaces	3414	User-based security model
1612	DNS Resolver MIB Extensions	3415	View-based control model
1643	Ethernet-like MIB	3416	SNMPv2
1757	RMON MIB	3417	Transport Mappings
1867	HTML/2.0 Forms with file upload extensions	3418	SNMP MIB
1901	Community-based SNMPv2	3577	RMON MIB
1907	SNMPv2 MIB	3580	802.1X with RADIUS
1908	Coexistence between SNMPv1/v2	3737	Registry of RMON MIB
2011	IP MIB	4086	Randomness Requirements
2012	TCP MIB	4113	UDP MIB
2013	UDP MIB	4251	SSHv2 Protocol
2068	HTTP/1.1	4252	SSHv2 Authentication
2096	IP Forwarding Table MIB	4253	SSHv2 Transport
2096	Interfaces Group using SMIv2	4254	SSHv2 Connection Protocol
2246	TLS v1	4419	SSHv2 Transport Layer Protocol
2271	SNMP Framework MIB	4521	LDAP Extensions
2295	Transport Content Negotiation	4716	SECSSH Public Key File Format
2296	Remote Variant Selection	6101	SSL
2346	AES Ciphersuites for TLS	6398	IP Router Alert
2576	Coexistence between SNMPv1/v2/v3	Dell	Enterprise MIB supporting routing features draft-ietf-hubmib-etherif-mib-v3-00.txt (Obsoletes RFC 2665)
2578	SMIPv2		
2579	Textual Conventions for SMIv2		
2580	Conformance Statements for SMIv2		
2613	RMON MIB	Dell	LAG MIB Support for sflow version 1.3 draft 5
2618	RADIUS Authentication MIB	Dell	802.1x Monitor Mode
2620	RADIUS Accounting MIB	Dell	Custom Login Banners
2665	Ethernet-like Interfaces MIB	Dell	Dynamic ARP Inspection
2666	Identification of Ethernet chipsets	Dell	IP Address Filtering
2674	Extended Bridge MIB	Dell	Tiered Authentication
2737	ENTITY MIB	Dell	RSPAN
2818	HTTP over TLS	Dell	Change of Authorization
2819	RMON MIB (groups 1, 2, 3, 9)	Beta	OpenFlow 1.0

## Regulatory, environment and other compliance

### Safety and emissions

Australia/New Zealand: ACMA RCA Class A  
Canada: ICES Class A; CUL  
China: CCC Class A; NAL  
Europe: CE Class A  
Japan: VCCI Class A  
USA: FCC Class A; NRTL UL  
Eurasia Customs Union: EAC  
Germany: GS mark  
Product meets EMC and safety standards in many countries inclusive of USA, Canada, EU, Japan, China.  
For more country-specific regulatory information, and approvals, please see your Dell representative.

### RoHS

Product meets RoHS compliance standards in many countries inclusive of USA, EU, China, and India. For more country-specific RoHS compliance information, please see your Dell representative.

### EU WEEE

EU Battery Directive

### REACH

Japan: JEL

### Certifications (available or coming soon)

Available with US Trade Agreements Act (TAA) compliance.  
N-Series products have the necessary features to support a PCI compliant network topology.

