



Dell Networking N2000 series

Dell Networking N2000 is a series of energy-efficient and cost-effective 1GbE switches designed for modernizing and scaling network infrastructure. N2000 switches utilize a comprehensive enterprise-class Layer 2+ feature set, deliver consistent, simplified management and offer high-availability device and network design.

The N2000 switch series offers a power-efficient Gigabit Ethernet (GbE) network-access switching solution with integrated 10GbE uplinks. The N2000 switch series has high-performance capabilities and wire-speed performance, utilizing a non-blocking architecture to easily handle unexpected traffic loads. The switches offer simple management and scalability via an 84Gbps (full-duplex) high-availability stacking architecture that allows management of up to 12 switches from a single IP address.

An integrated 80PLUS-certified power supply and features such as Energy-Efficient Ethernet and short cable detection provide energy efficiency to help decrease power and cooling costs.

Modernize campus network architectures

Modernize campus network architectures with a power-efficient and resilient 1/10GbE switching solution with Power over Ethernet Plus (PoE+). Select N2000 models offer 24 or 48 ports of PoE+ to deliver clean power to network devices such as wireless access points (APs), Voice-over-IP (VoIP) handsets, video conferencing systems and security cameras. For greater interoperability in multivendor networks, all N-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). All N-Series switches support MLAG to create active/active loop-free redundancy without spanning tree. The N2000 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 graphic user interface (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

N2000 series switches help create performance assurance with a data rate up to 220Gbps (full duplex) and a forwarding rate up to 164Mpps. Scale easily with built-in rear stacking ports. Switch stacks of up to 600 1GbE 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, and optics and cables purchased with the switch. Details at Dell.com/LifetimeWarranty.**

Hardware, performance and efficiency

- Up to 48 line-rate GbE RJ-45 ports and two integrated 10GbE SFP+ ports.
- Support for 24 ports of PoE+ in 1RU or up to 48 ports of PoE+ with an optional external power supply.
- Up to 600 1GbE ports in a 12-unit stack for high-density, high-availability in IDFs, MDFs and wiring closets.
- Non-stop forwarding and fast failover in stack configurations.
- 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

- USB auto-configuration rapidly deploys the switch without setting up complex TFTP configurations or sending technical staff to remote offices.
- 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 2+ IPv4 and IPv6 functionality including static routing and Routing Information Protocol support.
- Policy based forwarding provides access control for all packets that are bridged within a VLAN or that are routed into or out of a VLAN.
- Remote Switch Port Analyzer (RSPAN) monitors ports across a Layer 2 domain without costly dedicated network taps.

*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.

Specifications: Dell Networking N2000 series

Dell SKU description

N2024: 24x RJ45 10/100/1000 Mb auto-sensing ports, 2x SFP+ ports, 2x stacking ports, 1 integrated 100W PSU

N2024P: 24x RJ45 10/100/1000 Mb PoE+ (up to 30.8w) auto-sensing ports, 2x SFP+ ports, 2x stacking ports, 1 integrated 1000W PSU (requires C15 plug)

N2048: 48x RJ45 10/100/1000 Mb auto-sensing ports, 2x SFP+ ports, 2x stacking ports, 1 integrated 100W PSU

N2048P: 48x RJ45 10/100/1000 Mb PoE+ (up to 30.8w) auto-sensing ports, 2x SFP+ ports, 2x stacking ports, 1 integrated 1000W PSU (requires C15 plug)

Power cords

C13 to NEMA 5-15, 3M

C13 to C14, 2M

C15 to NEMA 5-15, 2M (C15 for POE N-Series only)

Power supplies (optional)

RPS720 external power supply for N2000 non-POE (720 watts): N2024 and N2048 (sold separately)

MPS1000 external power supply for N2000 PoE+ switches (1000 watts): N2024P and N2048P (sold separately)

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, 1000BASE-ZX, 1550nm wavelength, up to 80km 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, SFP+, 10GbE, ER, 1550nm wavelength, up to 40km reach

Cables (optional)

Stacking cable 0.25m, 1m and 3m

Dell Networking, cable, SFP+ to SFP+, 10GbE, copper twinax direct attach cable, 0.5m, 1m, 3m, 5m and 7m

Physical

2 rear stacking ports (21Gbps) supporting up to 84Gbps (full-duplex)

2 integrated front 10GbE SFP+ dedicated ports

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

Integrated power supply: 100W AC (N2024, N2048), 1,000W AC (N2024P, N2048P)

RJ45 console port with RS232 signaling (RJ-45 to female DB-9 connector cable included)

Dual firmware images on-board

Chassis

Size (RU): 1.7 in x 17.3 in x 10.1 in (43.5 mm x 440.0 mm x 257.0 mm) (H x W x D) (N2024 and N2048)

1.7 in x 17.3 in x 15.2 in (43.5 mm x 440.0 mm x 387.0 mm) (H x W x D) (N2024P and N2048P)

Approximate weight: 8.135lbs/3.69kg (N2024), 14.0435lbs/6.37kg (N2024P), 8.9287lbs/4.05kg (N2048), 14.9914lbs/6.8kg (N2048P)

Rack mounting kit with 2 mounting brackets, bolts and cage nuts

Environmental

Power supply efficiency: 80% or better in all operating modes

Max. thermal output (BTU/hr): 11744 (N2024), 3,113.33 (N2024P), 1677 (N2048), 6069.80 (N2048P)

Power consumption max (watts): 42.9 (N2024), 913 (N2024P), 53.9 (N2048), 1738 (N2048P)

Operating temperature: 32° to 113°F (0° to 45°C)

Operating humidity: 95%

Storage temperature: -40° to 149°F (-40° to 65°C)

Storage relative humidity: 85%

Performance

MAC addresses: 8K (16K theoretical*)

Static routes: 256 (IPv4)/128 (IPv6)

Dynamic routes: 256 (IPv4)

Switch fabric capacity: 172Gbps (N2024 and N2024P)

(full duplex) 220Gbps (N2048 and N2048P)

Forwarding rate: 128Mpps (N2024 and N2024P)

164Mpps (N2048 and N2048P)

Link aggregation: 128 LAG groups, 144 dynamic ports per stack, 8 member ports per LAG

Priority 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: 4MB

CPU memory: 1GB

RIP routing interfaces: 256

VLAN routing interfaces: 256

VLANs supported: 4,094

Protocol-based VLANs: Supported

ARP entries: 1,024

NDP entries: 400

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: 2,048

Max rules per ACL: 1,023

Max ACL rules per interface (IPv4): 1,024 (ingress), 512 (egress)

Max ACL rules per interface (IPv6): 512 (ingress), 256 (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

802.1S 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)

MTU 9,216 bytes

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 2082 RIP-2 MD5 Auth

1724 RIPv2 MIB Extension 2453 RIPv2

Multicast

2365 Admin scoped IP Mcast 4541 IGMP v1/v2/v3 Snooping and Querier

2932 IPv4 MIB

IEEE 802.1ag draft 8.1 – Connectivity Fault Management

Quality of service

2474 DiffServ Field 2697 srTCM

2475 DiffServ Architecture 4115 trTCM

2597 Assured Fwd PHB Dell L4 Trusted Mode

Dell Port Based QoS Services Mode (TCP/UDP)

Dell Flow Based QoS Services Mode (IPv4/IPv6)

Network management and security

1155 SMIv1 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 SMIv2 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 3415 View-based control model

1643 Ethernet-like MIB 3416 SNMPv2

1757 RMOM MIB 3417 Transport Mappings

1867 HTML/2.0 Forms with File Upload Extensions 3418 SNMP MIB

1901 Community-based SNMPv2 3577 RMOM MIB

1907 SNMPv2 MIB 3580 802.1X with RADIUS

1908 Coexistence Between SNMPv1/v2 3737 Registry of RMOM 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

2233 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 SECSH 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 2578 SMIv2 Dell Enterprise MIB supporting routing features draft-ietf-hubmib-etherif-mib-v3-00.txt (Obsoletes RFC 2665)

2579 Textual Conventions for SMIv2 2613 RMOM MIB Dell LAG MIB Support for 802.3ad Functionality sflow version 1.3 draft 5

2580 Conformance Statements for SMIv2 2618 RADIUS Authentication MIB Dell 802.1x Monitor Mode

2613 RMOM MIB Dell Custom Login Banners

2618 RADIUS Authentication MIB Dell Dynamic ARP Inspection

2620 RADIUS Accounting MIB Dell IP Address Filtering

2665 Ethernet-like Interfaces MIB Dell Tiered Authentication

2666 Identification of Ethernet Chipsets Dell RSPAN

2674 Extended Bridge MIB Dell Demo OpenFlow 1.0

2737 ENTITY MIB

2818 HTTP over TLS

2819 RMOM MIB (groups 1, 2, 3, 9)

Regulatory, environment and other compliance

Safety and emissions

Australia/New Zealand: ACMA RCM 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.

Energy

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.

*Available in 6.2 release under the capability to carve up the memory allocation.

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