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DELL EMC POWERSWITCH N2000 SERIES SWITCHES

Energy-efficient, cost-effective 1GbE switches for modernizing and scaling network infrastructure

The N2000 switch series offers a power-efficient Gigabit Ethernet (GbE) network-access switching solution with integrated 10GbE uplinks. With 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 eight* 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, N2000 switches offer the latest open-standard protocols and include technology to interface with Cisco protocol RPVST+ and devices using CDP.

Leverage familiar tools and practices

All N-Series switches include Dell EMC Networking OS6, 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. 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

N2200-ON series switches help create performance assurance with a data rate up to 220Gbps (full duplex) and a forwarding rate up to 256Mpps. Scale easily with built-in rear stacking ports. Switch stacks of up to 400* 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.**

* Up to 12 units running firmware pre-6.6.x.x. 6.6.x.x firmware reduces the maximum stack size of N2000 and N2128PX Series to 8 units.

**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 EMC ProSupport. For details, visit https://www.dell.com/en-us/work/shop/networkingwarranty/cp/networkingwarranty.

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.
- N2128PX-ON supports PoE 60W over its 4 2.5GbE ports, delivering up to 60W per port and bandwidth for Wave 2 wireless.
- Up to 600 1GbE ports in an 8-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 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.
- Layer 3 Standard IPv4 and IPv6 functionality including static routing, RIP, and OSPFv2 support.

Product	Description
N2000 Series	**N2024:** 24x RJ45 10/100/1000Mb auto-sensing ports, 2x SFP+ ports, 2x stacking ports, 1 integrated 100W PSU **N2024P:** 24x RJ45 10/100/1000Mb PoE+ (up to 30.8W) autosensing ports, 2x SFP+ ports, 2x stacking ports, 1 integrated 1000W PSU (requires C15 plug) **N2048:** 48x RJ45 10/100/1000Mb auto-sensing ports, 2x SFP+ ports, 2x stacking ports, 1 integrated 100W PSU **N2048P:** 48x RJ45 10/100/1000Mb PoE+ (up to 30.8W) autosensing ports, 2x SFP+ ports, 2x stacking ports, 1 integrated 1000W PSU (requires C15 plug) **N2128PX-ON:** 24x RJ45 10/100/1000Mb PoE+ (up to 30.8W) auto-sensing ports, 4x RJ45 10/100/1000/2500Mb PoE 60W 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, N2048P, N2128PX-ON (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 0.5m, 1m and 3m Dell Technologies Networking cable, SFP+ to SFP+, 10GbE, copper twinax direct attach cable, 0.5m, 1m, 3m, 5m and 7m

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Hardware specifications

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, N2128PX-ON)
RJ45 console port with RS232 signaling (RJ-45 to female DB-9 connector cable included)
Dual firmware images on-board
Switching engine model: Store and forward

Chassis
Size (1RU, H x W x D):
    N2024 and N2048: 1.7 in x 17.3 in x 10.1 in
    (43.5 mm x 440.0 mm x 257.0 mm)
    N2024P, N2048P, N2128PX-ON:
    1.7 in x 17.3 in x 15.2 in
    (43.5 mm x 440.0 mm x 387.0 mm)
Approximate weight:
    8.1351lbs/3.69kg (N2024),
    14.0435lbs/6.37kg (N2024P),
    8.9287lbs/4.05kg (N2048),
    14.9914lbs/6.8kg (N2048P),
    15.05lbs/6.8kg (N2128PX-ON)
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):
    117.44 (N2024), 3,113.33 (N2024P), 167.7 (N2048), 6069.80 (N2048P)
Power consumption max (watts):
    42.9 (N2024), 913 (N2024P), 53.9 (N2048), 1738 (N2048P), 1039.8 (N2128PX-ON)
Operating temperature: 32º to 113ºF (0º to 45ºC)
Operating humidity: 95%
Storage temperature:
    −40º to 149ºF (−40º to 65ºC)
Storage relative humidity: 85%

Performance
MAC addresses: 32K
Static routes: 256 (IPv4)/128 (IPv6)
Dynamic routes: 256 (IPv4)
Switch fabric capacity:
    172Gbps (N2024 and N2024P) (full duplex);
    192Gbps (N2128PXON); 220Gbps (N2048 and N2048P)
Forwarding rate:
    128 Mpps (86 Gbps) - N2024 and N2024P
    164 Mpps (110 Gbps) - N2048 and N2048P
    256 Mpps (172 Gbps) - N2128PX-ON
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 (512MB for N2128PX-ON)
Packet buffer memory: 4MB (5MB for N2128PXON)

CPU memory: 1GB (2GB for N2128PX-ON)
RIP routing interfaces: 256
VLAN routing interfaces: 256
VLANs supported: 4,094
Protocol-based VLANs: Supported
ARP entries: 4,096
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)
802.3at   PoE+ (N2024P and N2048P)
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 Technologies representative.

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

General IPv6 protocols
General IPv6 protocols are supported. For a detailed list, please contact your Dell Technologies 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
2932   IPv4 MIB Snooping and Querier
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(TCP/UDP) Services Mode
Dell UDLD
Dell Flow Based QoS Services Mode (IPv4/IPv6)

Network management and security
1155   SMIv1
1157   SNMPv1
1212   Concise MIB Definitions
1213   MIB-II
1215   SNMP Traps
1286   Bridge MIB
1442   SMIv2
1451   Manager-to-Manager MIB
1492   TACACS+
1493   Managed Objects for Bridges MIB
1573   Evolution of Interfaces
1612   DNS Resolver MIB Extensions
1643   Ethernet-like MIB
1757   RMON MIB
1867   HTML/2.0 Forms with File Upload Extensions
1901   Community-based SNMPv2
1907   SNMPv2 MIB
1908   Coexistence Between SNMPv1/v2
2011   IP MIB
2012   TCP MIB
2013   UDP MIB
2068   HTTP/1.1
2096   IP Forwarding Table MIB
2233   Interfaces Group using SMIv2
2246   TLS v1
2271   SNMP Framework MIB
2295   Transport Content Negotiation
2296   Remote Variant Selection
2576   Coexistence Between SNMPv1/v2/v3
2578   SMIv2
2579   Textual Conventions for SMIv2
2580   Conformance Statements for SMIv2
2613   RMON MIB
2618   RADIUS Authentication MIB
2620   RADIUS Accounting MIB
2665   Ethernet-like Interfaces MIB
2666   Identification of Ethernet Chipsets
2674   Extended Bridge MIB
2737   ENTITY MIB
2818   HTTP over TLS
2819   RMON MIB (groups 1, 2, 3, 9)
2856   Text Conv. For High Capacity Data Types
2863   Interfaces MIB
2865   RADIUS
2866   RADIUS Accounting
2868   RADIUS Attributes for Tunnel Prot.

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2869	RADIUS Extensions
3268	AES Ciphersuites for TLS
3410	Internet Standard Mgmt. Framework
3411	SNMP Management Framework
3412	Message Processing and Dispatching
3413	SNMP Applications
3414	User-based security model
3415	View-based control model
3416	SNMPv2
3417	Transport Mappings
3418	SNMP MIB
3577	RMON MIB
3580	802.1X with RADIUS
3737	Registry of RMOM MIB
4086	Randomness Requirements
4113	UDP MIB
4251	SSHv2 Protocol
4252	SSHv2 Authentication
4253	SSHv2 Transport
4254	SSHv2 Connection Protocol
4419	SSHv2 Transport Layer Protocol
4521	LDAP Extensions
4716	SECSH Public Key File Format
6101	SSL
6398	IP Router Alert

Dell Enterprise MIB supporting routing features
draft-ietfhubmib-etherifmib-v3-00.txt
(Obsoletes RFC 2665)
Dell LAG MIB Support for 802.3ad Functionality
Dell sflow version 1.3 draft 5
Dell 802.1x Monitor Mode
Dell Custom Login Banners
Dell Dynamic ARP Inspection
Dell IP Address Filtering
Dell Tiered Authentication
Dell RSPAN
Dell Change of Authorization
Dell OpenFlow 1.3
Dell Python Scripting
Dell Support Assist
HiveManager NG

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; FDA 21 CFR 1040.10 and 1040.11
Eurasia Customs Union: EAC
Germany: GS mark
Product meets Dell Technologiesand safety standards in many countries inclusive of USA, Canada, EU, Japan, China. For more country-specific regulatory information and approvals, please see your Dell Technologies 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 Technologies representative.
EU WEEE
EU Battery Directive
REACH

Energy

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.

Dell Technologies Services

Plan, deploy, manage and support your IT transformation with our top-rated services

Consulting

Dell Technologies Consulting Services provides industry professionals with a wide range of tools and the experience your need to design and execute plans to transform your business.

Deployment

Accelerate technology adoption with ProDeploy Enterprise Suite. Trust our experts to lead deployments through planning, configuration and complex integrations.

Management

Regain control of operations with flexible IT management options. Our Residency Services help you adopt and optimize new technologies and our Managed Services allow you to outsource portions of your environment to us.

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