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 twelve 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. 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 EMC 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. 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 256Mpps. 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.
- 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 a 12-unit stack for high-density, high-availability in IDF, MDF, 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.

*Contact your Dell EMC 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.
<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
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| **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 15-25, 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, 1510nm wavelength, up to 10km reach  
|                         | Transceiver, SFP+, 10Gbe, LRM, 1510nm wavelength, up to 220m reach  
|                         | Transceiver, SFP+, 10Gbe, LR, 1510nm wavelength, up to 10km reach  
|                         | Transceiver, SFP+, 10Gbe, ER, 1510nm wavelength, up to 40km reach  
|                         | Transceiver, SFP+, 10GbE, copper twinax direct attach cable, 0.5m, 1m, 3m, 5m and 7m                                                   |
| **Cables (optional)**   | Stacking cable 0.5m, 1m and 3m  
|                         | Dell Networking cable, SFP+ to SFP+, 10GbE, copper twinax direct attach cable                                                             |

**Technical 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
- 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: 8.355lbs/3.69kg (N2024), 14.043lbs/6.37kg (N2024P), 8.928lbs/4.05kg (N2048), 14.991lbs/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), 1,738 (N2048P), 1,039.8 (N2128PX-ON)
- 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: 32K
- Static routes: 256 (IPv4)/128 (IPv6)
- Dynamic routes: 256 (IPv4)
- Switch fabric capacity: 172Gbps (N2024 and N2024P) (full duplex); 192Gbps (N2128PX-ON); 220Gbps (N2048 and N2048P)
- Forwarding rate: 128Mpps (N2024 and N2024P); 164Mpps (N2048 and N2048P); 256Mpps (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 N2128PX-ON)
- 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
- NDIP entries: 400
- Access control lists (ACLs): 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 ACLs 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)
RFC compliance and additional features

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

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

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

Layer 3 functionality

1058 RIPv1 2082 RIPv-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 B – Connectivity Fault
Management

Quality of service

2474 DiffServ Field 2697 srTCM
2475 DiffServ Architecture 4115 tCRM
2597 Assured Fwd PHB Dell L4 Trusted Mode
Dell Port Based QoS (TCP/UDP)
Services Mode Dell UDDL
Dell Flow Based QoS Services Mode (IPv4/IPv6)

Network management and security

1155 SNMPv1 1573 Evolution of Interfaces
1157 SNMPv2 1612 DNS Resolver MIB Extensions
1212 Concise MIB 1643 Ethernet-like MIB
1213 Definitions 1757 RMON MIB
1215 MIB-II 1867 HTML/2.0 Forms with File Upload Extensions
1286 Bridge MIB 1901 Community-based SNMPv2
1442 SMV2 1907 SNMPv2 MIB
1451 Manager-to-Manager MIB 1901 TACACS+
1492 TACACS+ 1907 SNMPv2 MIB
1493 Managed Objects for Bridges MIB

1908 Coexistence Between SNMPv1/v2
2011 IP MIB
2012 TCP MIB
2013 UDP MIB
2068 HTTP/TLS
2096 IP Forwarding Table MIB
2233 Interfaces Group using SMv2
2246 TLS v1
2271 SNMP Framework MIB
2295 Transport Content Negotiation
2296 Remote Variant Selection
2346 AES Ciphersuites for TLS
2576 Coexistence Between SNMPv1/v2/v3
2578 SMv2
2579 Textual Conventions for SMv2
2580 Conformance Statements for SMv2
2613 RMON MIB
2618 RADIUS Authentication MIB
2620 RADIUS Accounting MIB
2665 Ethernet-like Interfaces MIB
2666 Identification of Ethernet Chassis
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
2865 Interfaces MIB
2865 RADIUS
2866 RADIUS Accounting
2868 RADIUS Attributes for Tunnel Prot.
2869 RADIUS Extensions
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 RMON MIB
4086 Randomness Requirements
4113 UDP MIB
4251 SSHv2 Protocol
4252 SSHv2 Authentication
4253 SSHv2 Transport
4264 SSHv2 Connection Protocol
4419 SSHv2 Transport Layer Protocol
4521 LDAP Extensions
4716 SECSH Public Key File Format
6101 SSL
6298 IP Router Alert
Dell Enterprise MIB supporting routing features draft-ietf- hubmib-etherif-mib-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

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