DELL EMC NETWORKING N4000 SERIES SWITCHES

Energy-efficient, cost-effective 10GbE switches for modernizing and scaling network infrastructure

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 environments 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. 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 10/40GbE 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.

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 help 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 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.

*Available starting with Dell Networking OS 6.1 release
**Contact your Dell EMC representative for a full list of validated storage arrays.
***Select Networking products carry a Limited Hardware 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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| **N4000 series** | 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+, 40GbE, 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, LHR, 1310nm wavelength, up to 10km reach  
Transceiver, QSFP+, 40GbE, PSV4 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, 20m, 30m, 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 |

### Technical specifications

| 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 | Approximate weight: 21.67lbs/9.83kg (N4032), 21.1lbs/9.59kg (N4032F), 24.07lbs/10.92kg (N4064), 23.2lbs/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: 8,960 (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 |
## Layer 3 functionality

<table>
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<tr>
<th>Layer 3 functionality</th>
<th>Protocol</th>
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<tr>
<td>1058 RIPv1</td>
<td>2453 RIPv2</td>
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<tr>
<td>1724 RIPv2 MB</td>
<td></td>
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<tr>
<td>Extension</td>
<td>2740 OSPFv3</td>
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<tr>
<td>1765 OSPF DB</td>
<td></td>
</tr>
<tr>
<td>overflow</td>
<td>2787 VRRP MIB</td>
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<tr>
<td>1850 OSPF MIB</td>
<td>3101 NSSA</td>
</tr>
<tr>
<td>2082 RIPv2 MB</td>
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</tr>
<tr>
<td>Auth</td>
<td>3137 OSPF Stub Router Advert</td>
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<tr>
<td>2328 OSPFv2 MIB</td>
<td>3623 Graceful Restart</td>
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<tr>
<td>2338 VRRP 3/68 VRRP</td>
<td></td>
</tr>
<tr>
<td>2370 Opaque LSA Option</td>
<td>4271 BGP</td>
</tr>
<tr>
<td>Dell Policy Based Routing</td>
<td>5187 OSPFv3 Graceful Restart</td>
</tr>
</tbody>
</table>

## Multicast

- 1112 IGMPv1 3810 MLdv2
- 2236 IGMPv2 3973 PIM-DM
- 2365 Admin scoped IP Mcast 4541 IGMP v1/v2/v3 Snooping
- 2710 MLdv1 and Guarantier
- 2932 IPv4 MIB 4601 PIM-SM
- 2933 IGMP MIB 5060 PIM-MIB
- 3376 IGMPv3 Dell Static IP Multicast
- Draft-ietf-pim-sm-brs-05
- Draft-ietf-idmr-dvmrp-05
- Draft-ietf-magma-igm-p-06.txt IGMP/MLD Proxying
- Draft-ietf-magma-igm-pv3-05.txt IGMP/MLD Proxying
- Draft-ietf-magma-igm-pv3-05.txt IGMP/MLD Proxying
- Draft-ietf-igm-pbr-mib-06 IEEE 802.1ag draft 8.1 - Connectivity Fault Management (CFM)
- IEEE 802.3p GMRP Dynamic L2 Multicast Registration

## Quality of service

- 2474 DiffServ Field 2697 atTCM
- 2475 DiffServ Architecture 4115 trTCM
- 2597 Assured Fwd PHB Dell L4 Trusted Mode
- Dell Port Based GoS Services (TCP/UDP)
- Dell Layered Red/WRED
- Dell Flow Based GoS Services Dell Audio Video

## Network management and security

- 1135 SNMPv1
- 1157 SNMPv1
- 1212 Concise MIB Definitions
- 1213 MIB-II
- 1215 SNMP Traps
- 1286 Bridge MIB
- 1442 SMv2
- 1451 Manager-to-Manager Mapping
- 1492 TACACS+
- 1493 Managed objects for Bridges MIBs
- 1573 Evolution of Interfaces
- 1612 DNS Resolver MIB Extensions
- 1643 Ethernet-like MIB
- 1767 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 SMv2
- 2246 TLS v1
- 2271 SNMP Framework MIB
- 2295 Transport Control 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 chipsets
- 2674 Extended Bridge MIB
- 2737 ENTITY MIB
- 2818 HTTP over TLS
- 2819 RMON MIB
- 2856 Text Conv. For High Capacity Data Types
- 2863 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

## 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.
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