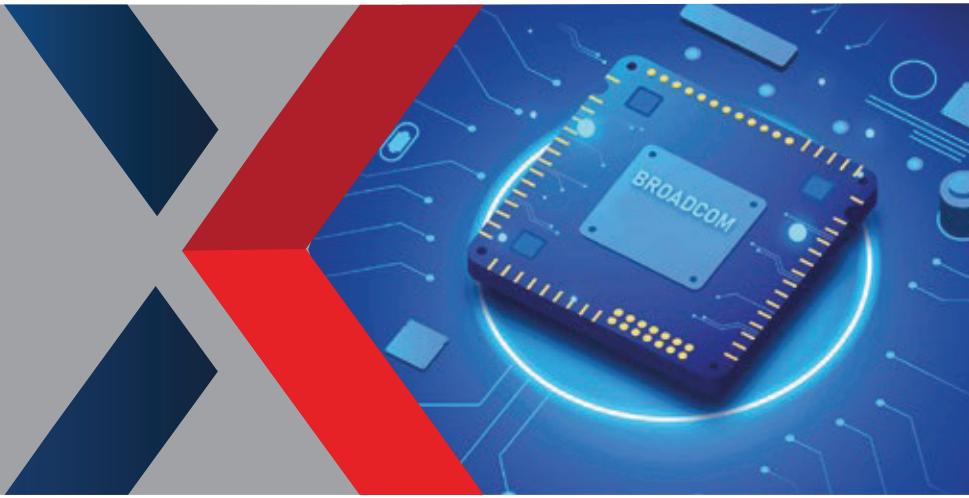


Next Generation Core Switches NX-8000 Series



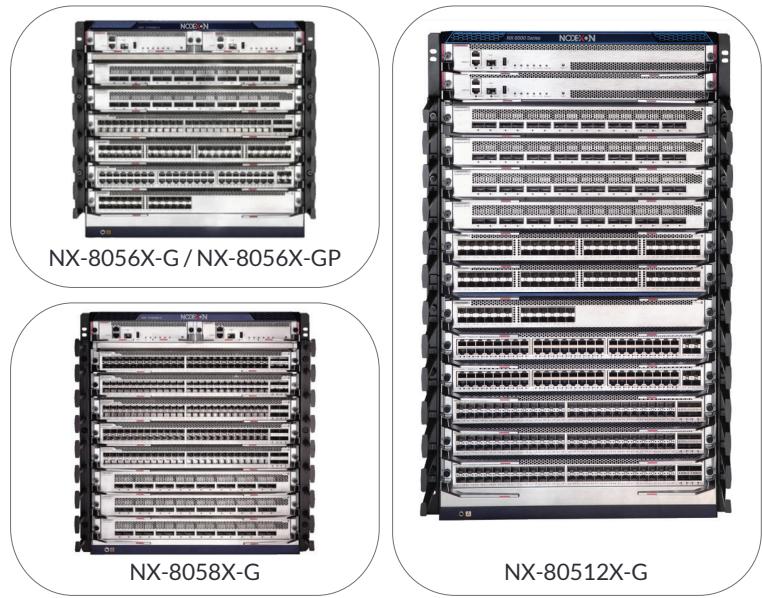
OVERVIEW

NODEXON NX-8000 series is a series of Ethernet core switches specifically designed for the core layer of cloud computing data centers and next-generation intelligent campuses. Running the NODEXON proprietary Comware 7 operating system, it offers a trusted and secure platform. With redundancy designs for the main components including the supervisor engine units (also called MPUs), switch fabric modules, fan trays, and power supplies, it delivers carrier-grade high reliability. It offers high-density GE/10GE/25GE/40GE/100GE and 400GE ports, supports mainstream technologies such as VXLAN, MDC, M-LAG and IRF 2, and integrates rich networking services including MPLS VPN, IPv6, integrated AC, and traffic analytics. It uses green designs from the hardware components to the chassis exterior and is fully compliant with the RoHS directive.

The NX-8000 series switch includes the NX-8056X-G, NX-8058X-G and NX-80512X-G models, with port density and performance to fit different deployment scales.

FEATURES HIGHLIGHTS

- Advanced System Architecture
- Distributed Multi-Engines
- Intelligent Resilient Framework 2 (IRF 2)
- Multitenant Device Context (MDC)
- Abundant Data Center Solutions
- Multi-chassis Link Aggregation Group (M-LAG) (Original DRNI)
- Comprehensive IPv6
- Media Access Control Security (MACsec)
- Green Designs



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PRODUCT FEATURES

Advanced System Architecture

The system architecture incorporates the following advanced designs:

- CLOS+ architecture and midplane-free design separate the forwarding plane and control plane completely and allows bandwidth scaling as business grows.
- Orthogonal interconnection of switching fabric modules and service modules eliminates cabling on the backplane and thus significantly reduces signal attenuation, with slot bandwidth up to 3.1Tbps on NX-8056X-G/NX-8056X-GP and 4.6Tbps on NX-8058X-G/NX-80512X-G.
- Compliant with 100G and 400G Ethernet standards, meeting the requirements of non-blocking campus networks today and in the future.
- High-density GE/10GE/25GE/40GE/100GE ports, meeting the requirements of applications today and in the future.
- 400G Ethernet ports, meeting inter-data center and inter-campus connection requirements.
- Thorough system optimization enables the device to forward traffic within 100 seconds after power on, greatly reducing service interruption time.
- New chassis dimension design enables the device to carry high-performance data forwarding within a small size, greatly improving cabinet space usage efficiency.
- Redundancy design for key components including MPUs, switch fabric modules, fan trays, power supplies, and power switches, maximizing the system availability and guarding the device against emergency and unexpected conditions.

Distributed Multi-Engines

The switch innovatively uses distributed control engines, detection engines, and maintenance engines to deliver powerful control capability and millisecond-level HA.

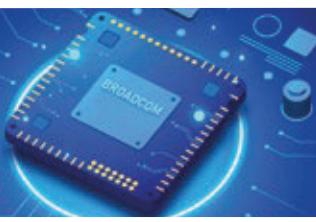
- **Distributed control engines:** Each service module is integrated with a strong control and processing system. It can efficiently process varieties of protocol packets and control packets, and provide refined control for protocol packets to safeguard against protocol packet attacks.
- **Distributed detection engines:** Each service module can use BFD and OAM to detect faults in milliseconds and interact with control plane protocols for fast failover and convergence to ensure service continuity.
- **Distributed maintenance engines:** The intelligent CPU system supports intelligent power management and online status monitoring of key components. It can power on and off modules in sequence, which reduces power impulse, electromagnetic radiation, and power consumption, and prolongs the device lifespan.

Intelligent Resilient Framework 2 (IRF 2)

NODEXON Intelligent Resilient Framework 2 (IRF 2) virtualizes multiple NX-8000 switches into one logical switch called an IRF fabric. IRF improves system performance and delivers the following benefits:

- **High availability:** The NODEXON proprietary routing hot backup technology ensures redundancy and backup of all information on the control and data planes and non-stop Layer 3 data forwarding in an IRF 2 fabric. It also eliminates single point of failure and ensures service continuity.
- **Redundancy and load balancing:** The distributed link aggregation technology supports load sharing and mutual backup among multiple uplinks, which enhances the network redundancy and improves link resources usage.
- **Simplified topology and easy management:** An IRF fabric appears as one node and is accessible at a single IP address on the network. This simplifies network device and topology managements, improves operating efficiency, and reduces maintenance cost.

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Multitenant Device Context (MDC)

MDC virtualizes one NX-8000 series into multiple logical switches, enabling multiple services to share one core switch. The 1:N virtualization maximizes switch utilization, reduces network TCO, and ensures secure isolation of services.

Multi-chassis Link Aggregation Group (M-LAG) (Original DRNI)

The NX-8000 series switch supports M-LAG, which enables links of multiple switches to aggregate into one to implement device-level link backup. M-LAG is applicable to servers dual-homed to a pair of access devices for node redundancy.

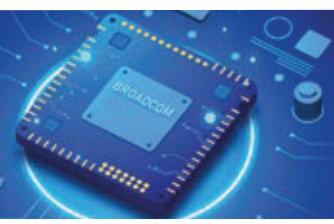
- **Streamlined topology:** M-LAG simplifies the network topology and spanning tree configuration by virtualizing two physical devices into one logical device.
- **Independent upgrading:** The DR member devices can be upgraded independently one by one to minimize the impact on traffic forwarding.
- **High availability:** The DR system uses a keepalive link to detect multi-active collision to ensure that only one member device forwards traffic after a DR system splits.

Abundant Data Center Solutions

The switch offers a wide range of solutions for data center virtualization and network convergence, including:

- **VXLAN:** A MAC-in-UDP technology that provides Layer 2 connectivity between distant network sites across an IP network. It also enables service isolation between different tenants.
- **Edge Virtual Bridging (EVB):** Uses the Virtual Ethernet Port Aggregator (VEPA) mode to switch traffic of VMs to a physical switch connected to the server for processing. This not only ensures traffic forwarding between VMs, but also enables VM traffic policing and access control policy deployment.
- **MP-BGP EVPN** (Multiprotocol Border Gateway Protocol Ethernet Virtual Private Network) uses standard based BGP protocol as the control plane for VXLAN overlay networks, providing BGP based VTEP auto peer discovery and end-host reachability information distribution. MP-BGP EVPN delivers many benefits, such as eliminating traffic flooding, reducing full mesh requirements between VTEPs via the introduction of BGP RR, achieving optimal flow-based end to end load sharing and more.

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Comprehensive IPv6

The switch offers comprehensive IPv6 features, including:

- **IPv6 routing:** IPv6 static routing, RIPng, OSPFv3, IS-ISv6, and BGP4+.
- **IPv4-to-IPv6 transition:** IPv6 manual tunnel, 6to4 tunnel, ISATAP tunnel, GRE tunnel, and IPv4-compatible automatic tunnel configuration.

Media Access Control Security (MACsec)

The switch supports hardware-level encryption technology MACsec (802.1AE), which is an industry-standard security technology that provides secure communication for all traffic on Ethernet links. Compared with traditional application-based software encryption technology, MACsec provides point-to-point security on Ethernet links between directly connected nodes and is capable of identifying and preventing most security threats.

Green Designs

The device uses green designs from hardware components to the chassis exterior

- Water-based paint without electroplating for the chassis exterior significantly reduces carbon emissions.
- Strict front-to-rear air flow reduces the airflow resistance and improves heat dissipation efficiency, allowing side-by-side deployment of cabinets.
- The fan trays provide area-based refined, intelligent speed adjustment and reduce the speed regulation response time to seconds, saving power consumption significantly.

Next Generation Core Switches

NX-8000 Series

HARDWARE SPECIFICATIONS

SPECIFICATIONS	NX-8056X-G/NX-8056X-GP	NX-8058X-G	NX-80512X-G
Switching capacity	43.2Tbps/76.8Tbps*	57.6Tbps/153.6Tbps*	86.4Tbps/230.4Tbps*
Forwarding capacity	19200Mpps	25600Mpps	68400Mpps
MPU slots	2	2	2
MPU Console Ports	1x RJ-45	1x RJ-45	1x RJ-45
MPU MGMT Ports	1x 10/100/1000M RJ-45 1x 1000M SFP	1x 10/100/1000M RJ-45 1x 1000M SFP	1x 10/100/1000M RJ-45 1x 1000M SFP
MPU USB Port	1		
LPU slots	6	8	12
Switching fabric module slots	4	6	6
Fan Trays	2	3	3
Power modules	4 (non- PoE)+8 (PoE)	6	8
Hardware architecture	Orthogonal CLOS		
Redundancy	Redundant MPUs, switching fabric modules, power modules, and fan trays		
Operating environment	Temperature: 0°C to 45°C (32°F to 113°F) Humidity: 5% to 95% (non-condensing)		
Input voltage	AC: 100V~240V DC: -48V~60V		
Maximum power consumption	3012W	4374W	6309W
MTBF(Year)	36.5	27.05	21
MTTR(Hour)	0.5	0.5	0.5
Dimension (H x W x D) mm	442×440×520 10U	530×440×640 12RU	796×440×640 18RU
Fully loaded weight	S10506X-G: < 85 kg/187.4 lb S10506X-G-PoE: < 95 kg/209lb	< 130 kg < 286.6 lb	< 180 kg < 396.8 lb
Switching capacity *: The value marked with * after (/) represents the capacity the chassis backplane is ready to support.			

Next Generation Core Switches NX-8000 Series

SOFTWARE SPECIFICATIONS

SPECIFICATIONS	NX-8000 Series
	<p>Port mirroring and traffic mirroring Mirroring, SPAN, RSPAN, ERSPAN with Max. 128 mirror groups Port aggregation, LACP, port isolation, and port mirroring 802.1d(STP)/802.1w(RSTP)/802.1s(MSTP)/PVST/PVST+ Up to 64 MSTP instances Up to 126 PVST/PVST+ instances STP Root Guard BPDU Guard, BPDU filter IEEE 802.3ad (dynamic link aggregation), static port aggregation, and multi-chassis link aggregation IEEE 802.1P (CoS priority) IEEE 802.1ad (QinQ), selective QinQ and Vlan mapping GVRP RRPP (Rapid Ring Protection Protocol) Jumbo frame (13312) SuperVLAN PVLAN Guest VLAN Voice VLAN MVRP(IEEE802.1ak) Broadcast/multicast/unknown unicast storm constrain Port-based, Protocol-based, Subnet-based and MAC-based VLAN Max. 720,896 MAC entries (SF cards)</p>
Routing	<p>Static routing, RIPv1/v2, OSPF, IS-IS, and BGP4 ARP proxy ARP snooping DHCP client, DHCP server, DHCP relay, DHCP snooping, DHCP option82 DHCPv6 client, DHCPv6 server, DHCPv6 relay, DHCPv6 snooping, DHCPv6 option82 Max. 16K DHCP-security users IPv4/IPv6 ECMP IPv4/IPv6 Policy-based routing IPv4/IPv6 Routing policy IPv4/IPv6 dual stack IPv6 static routing, RIPng, OSPFv3, IS-ISv6, and BGP4+ Pingv6, Telnetv6, FTPv6, TFTPv6, DNSv6, ICMPv6 IPv4-to-IPv6 transition technologies, such as IPv6 manual tunnel, 6to4 tunnel, ISATAP tunnel, GRE tunnel, IPv4-compatible IPv6 tunnel Max. 96,230 ARP entries (SF cards) Max. 81,350 ND entries (SF cards) Max. 780,288 IPv4 routing entries (SF cards) Max. 278,528 IPv6 routing entries (SF cards)</p>
Multicast	<p>PIM-DM, PIM-SM, PIM-SSM, MSDP, MBGP, and Any-RP IGMP V1/V2/V3, IGMP V1/V2/V3 Snooping IGMP Filter and IGMP Fast leave PIM snooping, IPv6 Pim-snooping Multicast VLAN PIM6-DM, PIM6-SM, PIM6-SSM MLD V1/V2, MLD V1/V2 Snooping Multicast policy and Multicast QoS Max. 8K L2 multicast entries Max. 8K L3 multicast entries (SF cards)</p>

Next Generation Core Switches NX-8000 Series

SOFTWARE SPECIFICATIONS

SPECIFICATIONS	NX-8000 Series
ACL/QoS	Standard and extended ACLs Ingress and Egress ACL VLAN ACL Global ACL Ingress/Egress CAR Diff-Serv QoS 802.1P/DSCP Priority marking and remarking 802.1p, TOS, DSCP, and EXP priority mapping Flexible queue scheduling algorithms including SP, WRR, SP+WRR, WFQ Traffic shaping Congestion avoidance, Tail-Drop and WRED Ingress/Egress counting COPP Max. 36MB Buffer (SF cards) Max. 26K IPv4 ACL (SF cards) Max. 8K IPv6 ACL (SF cards)
SDN/OPENFLOW	Support SDN solution (AD-Campus) OpenFlow 1.3 Multiple controllers (EQUAL, master/slave) Multiple tables flow Group table Meter
VXLAN	VXLAN L2 switching VXLAN L3 routing VXLAN VTEP L2 VxLAN gateway, L3 VxLAN gateway Distributed VxLAN gateway, Centralized VxLAN gateway IPv4/IPv6 VxLAN tunnel VXLAN OAM ping/tracert IS-IS+ENDP distributed control plane MP-BGP+EVPN distributed control plane, EVPN-DCI EVPN ES OpenFlow+Netconf centralized control plane
Programmability and automation	Ansible Auto DevOps by using Python, NETCONF, TCL, and Restful APIs for automated network programming
Lossless Ethernet	PFC (supported on SF card) ECN (supported on SF card) RoCEv2 (supported on SF card)
MPLS/VPLS	L3 MPLS VPN L2 VPN: VLL (Martini, Kompella) MCE MPLS OAM VPLS, VLL P/PE function LDP

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SOFTWARE SPECIFICATIONS

SPECIFICATIONS	NX-8000 Series
Multiservice Convergence	Integrated AC, Unified Wireless Access Controller, (LSEM1SUPAO, LSEM1SUPBO support integrated AC) AP Auto Registration Wireless User WPA2 + PSK Authentication Wireless User Portal Authentication
Security	Hierarchical user management and password protection EAD Port security Portal authentication MAC authentication IEEE 802.1x and IEEE 802.1x SERVER AAA/Radius TACACS+ HWTACACS (HW Terminal Access Controller Access Control System) (Same authentication processes and implementations with TACACS+) SSHv1.5/SSHv2 Basic and advanced ACLs for packet filtering OSPF, RIPv2, BGPv4 plain text and MD5 authentication IP address, VLAN ID, MAC address multiple binding combination MACsec uRPF HTTPS SSL PKI Secure boot TPM, Trust computing Active/standby data backup Micro-segmentation
System management	IMC network management system Loading and upgrading through XModem/FTP/TFTP SNMPv1/v2c/v3 SmartNMC sFlow, Netstream Telemetry INT, (INT is support on SF card) MOD (Mirror on drop) Packet capture gRPC Telemetry Stream, (Telemetry Stream is support on SF card) RMON and groups 1,2,3 and 9 NTP and PTP (1588v2) NQA, iNQA Fault alarm and automatic fault recovery System logs ZTP Ping, Tracert, VxLAN ping and VxLAN traceroute eMDI, (eMDI is support on SF card) Cloud management Device status monitoring mechanism, including the CPU engine, backplane, chips and other key components

Next Generation Core Switches NX-8000 Series

SOFTWARE SPECIFICATIONS

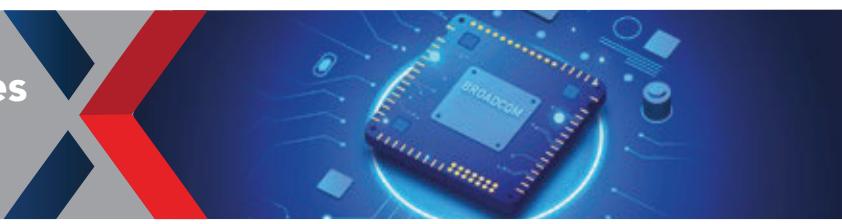
SPECIFICATIONS	NX-8000 Series
HA	Independent switching fabric modules 1+1 redundancy for key components such as MPUS and M+N redundancy for power modules N+1 redundancy for switching fabric modules Passive backplane Hot swapping for all components Real-time data backup on active/standby MPUs CPU protection IP source guard Loop detection Ethernet OAM VRRP, VRRPv3 Hot patching NSR/GR for OSPF/BGP/IS-IS/RSVP Port aggregation and multi-card link aggregation, LACP BFD for VRRP, BGP/BGPv4, IS-IS/IS-ISv6, PIM/PIM for IPV6, OSPF/OSPFv3, RSVP, static routing, with a failover detection time less than 50 milliseconds Hardware BFD Ethernet QAM (802.1ag and 802.3ah) RRPP/ERPS/EERN VCT Track Monitor Link Smart-Link IRF ISSU M-LAG S-MLAG MDC Loopback Detection
Green	IEEE (802.3az)
EMC	FCC Part 15 Subpart B CLASS A ICES-003 CLASS A VCCI CLASS A CISPR 32 CLASS A EN 55032 CLASS A AS/NZS CISPR32 CLASS A CISPR 24 EN 55024 EN 61000-3-2 EN 61000-3-3 ETSI EN 300 386
Safety	UL 60950-1 CAN/CSA C22.2 No 60950-1 IEC 60950-1 EN 60950-1 AS/NZS 60950-1 FDA 21 CFR Subchapter J GB 4943.1

Next Generation Core Switches NX-8000 Series

ORDERING INFORMATION

MODEL	Product Description
NX-8056X-G	NODEXON NX-8056X-G Ethernet Switch Chassis
NX-8056X-GP	NODEXON NX-8056X-GP Ethernet Switch Chassis, PoE
NX-8058X-G	NODEXON NX-8058X-G Ethernet Switch Chassis
NX-80512X-G	NODEXON NX-80512X-G Ethernet Switch Chassis
Power Supply Module	
NX-PS-1600B-12A-B	1600W AC Power Supply Module (Power Panel Side Exhaust Airflow)
NX-PS-2000-12D-B	2000W DC Power Supply Module (Power Panel Side Exhaust Airflow)
NX-PS-1600-56A-B	1600W/56V PoE Power Supply Module (Power Panel Side Exhaust Airflow)
FAN Tray Module	
NX-FN--80B-4-A	FanTray Module
NX-FN--80B-5-A	Fan Tray Module
NX-FN--80B-8-A	Fan Tray Module
Supervisor Engine	
NX-1SUPA0	NODEXON NX-8056X-G Supervisor Engine Unit,Type A
NX-3SUPA0	NODEXON NX-8056X-G Supervisor Engine Unit,Type A
NX-1SUPB0	NODEXON NX-80512X-G Supervisor Engine Unit,Type B
NX-3SUPB0	NODEXON NX-80512X-G Supervisor Engine Unit,Type B
Switch Fabric Unit	
NX-1SF06D0	NODEXON NX-8056X-GP Switch Fabric Module,Type D
NX-1SF08C0	NODEXON NX-8058X-G Switch Fabric Module,Type C
NX-1SF12B0	NODEXON NX-80512X-G Switch Fabric Module,Type B
NX-1SF06B0	NODEXON NX-8056X-GP Switch Fabric Module,Type B
Line Card	
NX-1GT48TSSD0	NODEXON NX-8056X-G 48-Port 10/100/1000BASE-T Interface(RJ45)+4-Port 10G Ethernet Optical Interface Module (SFP+,LC)(SD)
NX-1GV48TSSD0	NODEXON NX-8056X-G 48-Port 10/100/1000BASE-T Interface(RJ45)+4-Port 10G Ethernet Optical Interface Module (SFP+)(SD),PoE Plus

Next Generation Core Switches NX-8000 Series



ORDERING INFORMATION

MODEL	Product Description
NX-1GT24GP16TSSD0	NODEXON NX-8056X-G 24-Port 10/100/1000BASE-T Ethernet Copper Interface(RJ45)+16-Port 1000BASE Ethernet Optical Interface(SFP)+12-Port 10G Ethernet Optical Interface Module (SFP+)(SD)
NX-2TGS16GP32SD0	NODEXON NX-8056X-G 16-Port 10G Ethernet Optical Interface(SFP+) + 32-Port 1000BASE Ethernet Optical Interface Module (SFP)(SD)
NX-1TGS24SD0	NODEXON NX-8056X-G 24-Port 10G Ethernet Optical Interface Module (SFP+,LD)(SD)
NX-1TGS48SD0	NODEXON NX-8056X-G 48-Port 10G Ethernet Optical Interface Module (SFP+,LC)(SD)
NX-1TGS48QSSFO	NODEXON NX-8056X-G 48-Port 10G Ethernet Optical Interface(SFP+,LC)+4-Port 40G Ethernet Optical Interface Module (QSFP+)(SF)
NX-3TGS48QSSFO	NODEXON NX-8056X-G 48-Port 10G Ethernet Optical Interface(SFP+) + 4-Port 40G Ethernet Optical Interface Module (QSFP+)(SF)
NX-1TGT48SD0	NODEXON NX-8056X-G 48-Port Multigigabit Ethernet (10G/5G/2.5G/1G/100Mbps) Copper Interface Module (RJ45)(SD)
NX-1YGS48CQSF0	NODEXON NX-8056X-G 48-Port 10G Ethernet Optical Interface Module (SFP+)(SD)
NX-2TGS48SD0	NODEXON NX-8056X-G 48-Port 25G Ethernet Optical Interface (SFP28)+4-Port 100G Ethernet Optical Interface Module (QSFP28)(SF)
NX-3YGS48CQSF0	NODEXON NX-8056X-G 48-Port 25G Ethernet Optical Interface (SFP28) + 4-Port 100G Ethernet Optical Interface Module (QSFP28)(SF)
NX-1QGS16SF0	NODEXON NX-8056X-G 16-Port 40G Ethernet Optical Interface Module (QSFP+)(SF)
NX-3QGS16SF0	NODEXON NX-8056X-G 16-Port 40G Ethernet Optical Interface Module (QSFP+)(SF)
NX-1QGS36SF0	NODEXON NX-8056X-G 36-Port 40G Ethernet Optical Interface Module (QSFP+)(SF)
NX-3QGS36SF0	NODEXON NX-8056X-G 36-Port 40G Ethernet Optical Interface Module (QSFP+)(SF)
NX-1GT48TS24QSSD0	NODEXON NX-8056X-G 48-Port 10/100/1000BASE-T Ethernet Copper Interface(RJ45)+24-Port 10G Ethernet Optical Interface(SFP+)+2-Port 40G Ethernet Optical Interface Module (QSFP+)(SD)
NX-1CGQ16SF0	NODEXON NX-8056X-G 16-Port 100G Ethernet Optical Interface Module (QSFP28)(SF)
NX-3CGQ16SF0	NODEXON NX-8056X-G 16-Port 100G Ethernet Optical Interface Module (QSFP28)(SF)
NX-1CGQ36SF0	NODEXON NX-8056X-G 36-Port 100G Ethernet Optical Interface Module (QSFP28)(SF)
NX-1CDQ2SF0	NODEXON NX-8056X-G 36-Port 100G Ethernet Optical Interface Module (QSFP28)(SF)
NX-3CDQ2SF0	NODEXON NX-8056X-G 2-Port 400G Ethernet Optical Interface Module (QSFP-DD)(SF)