



Cisco Nexus 3600 Series NX-OS Verified Scalability Guide, Release 9.3(12)

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Introduction

This document describes the Cisco NX-OS configuration limits for the Cisco Nexus 3600 1U Top of Rack platforms, N3K-C3636C-R, and N3K-C36180YC-R.

The values provided in this guide should not be interpreted as theoretical system limits for Cisco Nexus 3600 platform hardware or Cisco NX-OS software. These limits refer to values that have been validated by Cisco. They can increase over time as more testing and validation is done.



Note All the limits are for the N3K-C36180YC-R TOR. The values specific to N3K-C3636C-R are indicated against the specific limit and the table.

Verified Scalability Limits (Unidimensional)

The tables in this section list the verified scalability limits for Cisco NX-OS Release 9.3(12). These limits are validated with a unidimensional configuration. The values provided in these tables focus on the scalability of one particular feature at a time.

Each number is the absolute maximum currently supported by this Cisco NX-OS release for the corresponding feature. If the hardware is capable of a higher scale, future software releases might increase this verified maximum limit. Results might differ from the values listed here when trying to achieve maximum scalability with multiple features enabled.

Table 1: Interfaces Verified Scalability Limits (Unidimensional)

| Feature | Verified Limit |
|--|--|
| DHCP servers/relay IPs per switch | 5 (IPv4) + 5 (IPv6) ¹ |
| MAC address - table limit per port | 2,000 - (Nexus 3636C-R and 36180YC-R switches) |
| MAC address - table system, VLAN limit | 2,000 - (Nexus 3636C-R and 36180YC-R switches) |
| Port channel member links | 32 |
| SVIs | 3967 |
| vPCs | 48 |

¹ This limit has not been tested

Table 2: Label Switching Verified Scalability Limits (Unidimensional)

| Feature | Verified Limit |
|---------------------------------------|----------------|
| LDP sessions | 200 |
| Forwarding Equivalence Classes (FECs) | 1,000 |
| Equal-cost multipaths (ECMPs) | 8 |

| Feature | Verified Limit |
|---------------------|----------------|
| FECs ECMPs | 4,000 |
| IAS option B labels | 450,000 |
| Layer 3 VPN routes | 100,000 |
| ECMPs | 2,000 |

Table 3: Layer 2 Switching Verified Scalability Limits (Unidimensional)

| Feature | Verified Limit |
|-----------------------------------|----------------|
| MAC addresses (default template) | 196,000 |
| MAC addresses (L2-scale template) | 384,000 |
| MST instances | 64 |
| MST virtual ports | 218,185 |
| RPVST virtual ports | 13,750 |
| VLANs | 3,967 |
| VLANs in RPVST mode | 250 |

Table 4: Layer 3 Multicast Verified Scalability Limits (Unidimensional)

| Feature | Verified Limit |
|---------------------------------------|--|
| IPv4 multicast routes | 32,000 (Layer 3) |
| Outgoing interfaces (OIFs) | 16 OIFs for 32K mroutes or 287 OIFs for 1000 mroutes |
| PIM neighbors | 500 |
| SVI | 50-60 |
| MVPN- unidimensional | |
| Multicast VRFs | 100 (N3K-C3636C-R and N3K-C36180YC-R) |
| Default MDT groups | 100 (N3K-C3636C-R and N3K-C36180YC-R) |
| MVPN Peers (PIM neighbors) per device | 100 (N3K-C3636C-R and N3K-C36180YC-R) |

Table 5: Security Verified Scalability Limits (Unidimensional)

| Feature | Verified Limit |
|--|---|
| IPv4 ingress access control entries (ACEs) | RACL-2000, PACL-1024 (without TCAM Carving) |
| IPv6 ingress access control entries (ACEs) | RACL-1000, PACL-1024 (without TCAM Carving) |

| Feature | Verified Limit |
|-------------|--|
| ACL | 12,000 (with TCAM Carving) |
| Egress ACLs | 20,000 (N3K-C3636C-R and N3K-C36180YC-R) |
| RACLs | 4,000 (N3K-C3636C-R and N3K-C36180YC-R) |
| System ACLs | 4,000 TCAM entries in internal TCAM and 64,000 TCAM entries in external TCAM (N3K-C3636C-R and N3K-C36180YC-R) |

Table 6: System Management Verified Scalability Limits (Unidimensional)

| Feature | Verified Limit |
|--|--|
| SPAN and ERSPAN | |
| Configurable SPAN or ERSPAN sessions | 32 |
| Active SPAN or ERSPAN sessions | 32 |
| Active localized SPAN or ERSPAN session per line card | 32 sessions across ports on single line card |
| Active localized SPAN or ERSPAN session (Rx and Tx, Rx, or Tx) | 32 sessions, 128 sources and 1 destination |
| Destination interfaces per SPAN session | 1 |
| Source VLANs per SPAN or ERSPAN | 6 |

Table 7: Layer 3 Unicast Routing Verified Scalability Limits (Unidimensional) - For Default system routing template

| Feature | Verified Limit |
|---------------------------|--|
| BFD sessions (echo mode) | 288 |
| | 100 MHBFD sessions (N3K-C3636C-R and N3K-C36180YC-R) |
| BGP neighbors | 256 |
| HSRP groups | 498 |
| IPv4 ARP | 75,000 |
| IPv4 host routes | 750,000 |
| IPv6 host routes | 62,000 |
| IPv6 ND | 32,000 |
| IPv4 unicast routes (LPM) | 192,000 |
| IPv6 unicast routes (LPM) | 62,000 |
| OSPFv2 neighbors | 1,000 |

| Feature | Verified Limit |
|---|----------------|
| OSPFv3 neighbors | 1,000 |
| OSPF/OSPFv3 LSA/LSDB size | 250,000 |
| OSPF/OSPFv3 areas | 15 |
| VRFs | 3,967 |
| VRRP | |
| VRRP groups per interface or I/O module | 15 |

Table 8: Layer 3 Unicast Routing Verified Scalability Limits (Unidimensional) - For Internet-peering system routing template

| Feature | Verified Limit |
|-------------------------------------|----------------|
| Routes (internet-peering mode) | 852000 |
| IPv4 routes (internet-peering mode) | 781000 |
| IPv6 routes (internet-peering mode) | 71000 |

Table 9: HSRP Verified Scalability Limits (Unidimensional)

| Feature | Verified Limit |
|---|---|
| Groups with default timers (3s/10s) and multiple group optimization. [There are 2 primary, one for IPv4 and the other for IPv6, and 7926 secondary] | 7,928 |
| Groups with aggressive timers (1s/3s) and multiple groups optimization. [There are 2 primary, one for IPv4 and the other for IPv6, and 7926 secondary] ² | 7,928 |
| Groups per interface or I/O module | Maximum 16 (Because 16 is the unique virtual MAC address limit) |

² If the user has Multi-protocol configuration, user should configure appropriate COPP policies so as to avoid any control plane traffic drops.

Table 10: VXLAN Verified Scalability Limits (Unidimensional)

| Feature | Verified Limit ³ |
|---------------------------------|-----------------------------|
| IGMP snooping over VXLAN | |
| VXLAN VLANs | 1,000 |
| VTEP peers | 256 |
| Underlay multicast groups | 128 |

| Feature | Verified Limit ³ |
|--|-----------------------------|
| VXLAN Flood and Learn | |
| Virtual network identifiers (VNIs) or VXLAN-mapped VLANs | Not applicable |
| Virtual network identifiers (VNIs) or VXLAN-mapped VLANs | Not applicable |
| Underlay multicast groups. | Not applicable |
| Overlay MAC addresses | Not applicable |
| Remote VXLAN tunnel endpoints (VTEPs) | Not applicable |
| Ingress replication peers | Not applicable |
| Ingress replication Layer 2 VNIs | Not applicable |
| MAC addresses for ingress replication | Not applicable |
| Port VLAN translations under an interface | Not applicable |
| Port VLAN translations in a switch | Not applicable |
| Static MAC addresses pointing to a remote VTEP | Not applicable |
| VXLAN VLAN logical port VP count | Not applicable |
| VXLAN VLANs per FEX port (host interface) | Not applicable |
| Layer 2 routed VNIs for vPC-centralized gateway | Not applicable |
| IGMP groups | Not applicable |
| VXLAN BGP eVPN | |
| Layer 2 VNIs | 2,000 |
| Xconnect VLANs | Not applicable |
| SVI with Distributed Anycast Gateway; Layer 2 VNI extended | 2,000 |
| Layer 3 VNIs / VRFs | 900 |
| Underlay multicast groups | 128 |
| VTEPs | 256 |
| MAC addresses | 90,000 |
| IPv4 host routes | 350,000 |
| IPv6 host routes | 48,000 |
| Overlay IPv4 LPM routes | 180,000 |
| Overlay IPv6 LPM routes | 48,000 |

| Feature | Verified Limit ³ |
|--|-----------------------------|
| VXLAN VLAN logical port VP count | Not applicable |
| VXLAN VLANs per FEX port (host interface) | Not applicable |
| IGMP groups | 8192 |
| VXLAN BGP eVPN Ingress Replication | |
| Layer 2 VNIs | Not applicable |
| Xconnect VLANs | Not applicable |
| SVI with Distributed Anycast Gateway; Layer 2 VNI extended | Not applicable |
| Layer 3 VNIs / VRFs | Not applicable |
| VTEPs | Not applicable |
| MAC addresses | Not applicable |
| IPv4 host routes | Not applicable |
| IPv6 host routes | Not applicable |
| Overlay IPv4 LPM routes | Not applicable |
| Overlay IPv6 LPM routes | Not applicable |
| VXLAN VLAN logical port VP count | Not applicable |
| VXLAN VLANs per FEX port (host interface) | Not applicable |
| IGMP groups | Not applicable |

³ For Cisco Nexus 3636C-R and Cisco Nexus 36180YC-R switches

Verified Scalability Limits (Multidimensional)

The tables in this section list the verified scalability limits for Cisco NX-OS Release 9.3(12). These limits are validated with a multidimensional configuration. The values provided in these tables focus on the scalability of one particular feature at a time.

Each number is the absolute maximum currently supported by this Cisco NX-OS release for the corresponding feature. If the hardware is capable of a higher scale, future software releases might increase this verified maximum limit. Results might differ from the values listed here when trying to achieve maximum scalability with multiple features enabled.



Attention

These numbers are not the maximum verified values if each feature is viewed in isolation. For these numbers, see the "Verified Scalability Limits" section.

Table 11: MSDC Profile Verified Scalability Limits (Multidimensional)

| Feature | Verified Limit |
|--------------------------------|-------------------------------------|
| Number of 100G ports | 6 36 (N3K-C3636C-R) |
| vPC port channels | 10 |
| ISIS IPv4 /32 unicast routes | 1,291 |
| ISIS IPv6 /128 unicast routes | 1,291 |
| Multicast IPv4 SSM | 10,000 |
| VRF IPv4/IPv6 | 100 |
| PIM neighbors | 100 |
| IGMP snooping database entries | 240 |
| VRRP v4 and v6 | 1,000 vlans |
| Multicast SSM | 10,000 |
| HSRP v4 and v6 | 1,000 vlans |
| SVI | 100 (N3K-C3636C-R) |
| Sub-interfaces | 100 (N3K-C3636C-R) |
| MAC | 1000 (N3K-C3636C-R) |
| BGP IPv4/IPv6 VLSM routes | 1000 (N3K-C3636C-R) |
| BGP IPv4/IPv6 Unicast routes | 10,000 (N3K-C3636C-R) |
| ECMP | 16-way Upstream (N3K-C3636C-R) |
| SPAN sessions | 1 local SPAN session (N3K-C3636C-R) |

Table 12: MPLS Verified Scalability Limits (Multidimensional)

| Feature | Verified Limit |
|------------------|-----------------------|
| MPLS Layer 3 VPN | 3,715 |
| VPE | 3,715 |
| PE nodes | Nil |
| PE routes | Nil |
| ACL (IPv4) | 1,100 |
| ACL (IPv6) | 440 |

| Feature | Verified Limit |
|----------------------------|--------------------------|
| HSRP and IPv6 VIP | 3,715 each for v4 and v6 |
| vPC uRPF | Nil |
| Strict uRPF | Yes |
| VRF | 3,715 |
| SVI | 3,715 |
| Layer 3 VPN routes IP ECMP | <500 |
| MPLS LSR ECMP | <500 |
| VPN IPv4 routes | 65,000 |
| VPN IPv6 routes | 25,000 |
| EBGP neighbors | Nil |

Table 13: Layer 2/Layer 3 TOR Boundary Verified Scalability Limits (Multidimensional)

| Feature | Verified Limit |
|-------------------------------|---|
| ECMP | 16-way (Upstream) |
| vPC port channels | 44 |
| OSPFv2 neighbors | 16 |
| OSPFv3 neighbors | 16 |
| OSPF IPv4 /32 unicast routes | 45,000 |
| OSPF IPv4 VLSM unicast routes | 1,000 |
| OSPF IPv6 /128 unicast routes | 25,000 |
| OSPF IPv6 VLSM unicast routes | 1,000 |
| BFD sessions | 230 100 MHBFD sessions (N3K-C3636C-R and N3K-C36180YC-R) |
| VLAN | 1,250 |
| SVI | 1,000 1250 (N3K-C3636C-R) |
| Sub-interfaces | 250 per interface and 500 across the system (N3K-C3636C-R) |
| VRRP IPv4 groups | 1,000 VRRS / 8 VRRPv3 |

| Feature | Verified Limit |
|---------------------------------|-------------------------|
| VRRP IPv6 groups | 1,000 VRRS / 8 VRRPv3 |
| PIM neighbors | 230 |
| IPv4 (*,G) multicast routes | 300 |
| IPv4 (S,G) multicast routes | 2,320 |
| IGMP snooping database entries | 6,300 |
| Sflow enabled interfaces | 63 45 (N3K-C3636C-R) |
| UDLD enabled interfaces | 65 48 (N3K-C3636C-R) |
| SPAN sessions | 1 local SPAN session |
| MVR VLANs | 250 |
| MVR receiver ports | 10 |
| MVR multicast groups | 1,000 |
| MAC | 20,000 (N3K-C3636C-R) |
| Q-in-Q tunnel ports | 26 |
| RSTP VLANs (tunneled over L2PT) | 3,960 |

Table 14: Layer 2/Layer 3 Spine Boundary (for N3K-C3636C-R) Verified Scalability Limits (Multidimensional)

| Feature | Verified Limit |
|-------------------------------|-------------------|
| Number of 100G ports | 36 |
| Number of 10G ports | 36 x 4 (Breakout) |
| ECMP | 16-way (Upstream) |
| vPC port channels | 40 |
| OSPFv2 neighbors | 100 |
| OSPFv3 neighbors | 100 |
| OSPF IPv4 /32 unicast routes | 45,000 |
| OSPF IPv4 VLSM unicast routes | 1,000 |
| OSPF IPv6 /128 unicast routes | 25,000 |
| OSPF IPv6 VLSM unicast routes | 1,000 |

| Feature | Verified Limit |
|--------------------------------|--|
| BFD sessions | 280 |
| | 100 MHBFD sessions (N3K-C3636C-R and N3K-C36180YC-R) |
| VLAN | 3,967 |
| SVI | 3,967 |
| Sub-interfaces | 250 per interface and 511 across system |
| VRRP IPv4 groups | 1,996 VRRS / 4 VRRPv3 |
| VRRP IPv6 groups | 1,996 VRRS / 4 VRRPv3 |
| HSRP IPv4 | 1,743 Secondary Groups / 7 Primary Groups |
| HSRP IPv6 | 1,743 Secondary Groups / 7 Primary Groups |
| PIM neighbors | 230 |
| IPv4 (*,G) multicast routes | 2,000 |
| IPv4 (S,G) multicast routes | 30,000 |
| IGMP snooping database entries | 6,300 |
| sFlow enabled interfaces | 45 |
| UDLD enabled interfaces | 48 |
| SPAN sessions | 1 local SPAN session |
| MAC | 50,000 |

Table 15: Segment Routing Verified Scalability Limits (Multidimensional)

| Feature | Verified Limit |
|------------------------|-----------------------|
| LACP | 26 |
| LACP members | 1 or 4 |
| eBGP IPv6 neighbors | 25 |
| eBGP IPv4 LU neighbors | 24 |
| IPv4 (LU) routes | 1,537 |
| IPv4 (LU) paths | 6,987 |
| IPv6 routes | 1,486 |
| IPv6 paths | 6,915 |

| Feature | Verified Limit |
|-----------------|----------------|
| SR ECMP (max) | 18 |
| MPLS HW entries | 6,868 |

Table 16: Segment Routing (for N3K-C3636C-R) Verified Scalability Limits (Multidimensional)

| Feature | Verified Limit |
|---------------------|----------------|
| VLAN | 100 |
| SVI | 100 |
| MAC entries | 10,000 |
| ARP entries | 70 |
| HSRPv4, HSRPv6 VIPs | 100, 100 |
| LACP | 3 |
| LACP members | 4 |
| eBGP IPv6 neighbors | 2 |
| eBGP IPv4 neighbors | 2 |
| IPv4 (LU) routes | 6,848 |
| IPv4 (LU) paths | 8,187 |
| IPv6 routes | 6,640 |
| IPv6 paths | 7,975 |
| SR ECMP | 2 |
| MPLS HW entries | 2,682 |

Table 17: VXLAN Profile Verified Scalability Limits (Multidimensional)

| Feature | Verified Limit |
|--------------------------------------|------------------|
| Number of ports | 16 |
| ECMP | 8-way (Upstream) |
| BGP neighbors | 2 |
| BGP EVPN Layer 2 VPN host routes | 60,000 |
| BGP IPv4 VLSM unicast routes or ospf | 10,000 |
| BGP IPv6 VLSM unicast routes or ospf | 2,000 |

| Feature | Verified Limit |
|---|-----------------------|
| BFD sessions | 10 |
| PIM neighbors | 10 |
| IPv4 (*,G) multicast routes (co-existing) | 4,000 |
| IPv4 (S,G) multicast routes (co-existing) | 2,000 |
| Layer 3 VNI | 100 |
| Layer 2 VNI | 400 |
| Local VTEP | 1 |
| Remote VTEPs | 205 |
| VLAN | 400 |
| SVI | 100 |
| MAC | 80,000 |
| vPC hosts | 1 |

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