



## **Cisco Nexus 3600 NX-OS Verified Scalability Guide, Release 9.2(4)**

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## Verified Scalability Limits

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.



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**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.

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### Introduction

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.

### Verified Scalability Limits (Unidimensional)

The tables in this section list the verified scalability limits for Cisco NX-OS Release 9.2(4). 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) <sup>1</sup>               |
| 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   |

<sup>1</sup> This limit has not been tested

**Table 2: Label Switching Verified Scalability Limits (Unidimensional)**

| Feature                | Verified Limit |
|------------------------|----------------|
| Number of LDP sessions | 60             |

| Feature                               | Verified Limit |
|---------------------------------------|----------------|
| Forwarding Equivalence Classes (FECs) | 1,000          |
| Equal-cost multipaths (ECMPs)         | 8              |
| 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       | 192,000        |
| 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  |
| IGMP snooping groups       | 8000   |

**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) |
| ACL  | 12000 (with TCAM Carving)                   |

**Table 6: System Management Verified Scalability Limits (Unidimensional)**

| <b>Feature</b>   | <b>Verified Limit</b>                        |
|--|--|
| <b>SPAN and ERSPAN</b>   |  |
| 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)**

| <b>Feature</b>                          | <b>Verified Limit</b> |
|---|-----------------------|
| BFD sessions (echo mode)                | 288                   |
| 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                 |
| OSPFv3 neighbors                        | 1,000                 |
| OSPF/OSPFv3 LSA/LSDB size               | 250,000               |
| OSPF/OSPFv3 areas                       | 15                    |
| VRFs                                    | 3,967                 |
| <b>VRRP</b>                             |                       |
| VRRP groups per interface or I/O module | 15                    |

**Table 8: 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] <sup>2</sup> | 7,928   |
| Groups per interface or I/O module  | Maximum 16 (Because 16 is the unique virtual MAC address limit) |

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

**Table 9: VXLAN Verified Scalability Limits (Unidimensional)**

| Feature  | Verified Limit <sup>3</sup> |
|--|-----------------------------|
| <b>IGMP snooping over VXLAN</b>                          |                             |
| VXLAN VLANs  | 1,000                       |
| VTEP peers   | 256                         |
| Underlay multicast groups                                | 128                         |
| <b>VXLAN Flood and Learn</b>                             |                             |
| 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              |

| <b>Feature</b>   | <b>Verified Limit</b> <sup>3</sup> |
|--|------------------------------------|
| VXLAN VLANs per FEX port (host interface)                  | Not applicable                     |
| Layer 2 routed VNIs for vPC-centralized gateway            | Not applicable                     |
| IGMP groups  | Not applicable                     |
| <b>VXLAN BGP eVPN</b>                                      |                                    |
| 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                             |
| VXLAN VLAN logical port VP count                           | Not applicable                     |
| VXLAN VLANs per FEX port (host interface)                  | Not applicable                     |
| IGMP groups  | 8192                               |
| <b>VXLAN BGP eVPN Ingress Replication</b>                  |                                    |
| 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                     |

| Feature                                   | Verified Limit <sup>3</sup> |
|---|-----------------------------|
| 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              |

<sup>3</sup> 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 9.2(4). 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 10: MSDC Profile Verified Scalability Limits (Multidimensional)**

| Feature                        | Verified Limit         |
|--------------------------------|------------------------|
| Number of 100G ports           | 6<br>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 IPv4 and IPv6             | 1,000 VLANs            |
| Multicast SSM                  | 10,000                 |
| HSRP IPv4 and IPv6             | 1,000 VLANs            |
| SVI                            | 100 (N3K-C3636C-R)     |

| Feature                      | Verified Limit                      |
|------------------------------|-------------------------------------|
| 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 11: 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                          |
| HSRP and IPv6 VIP          | 3.715 each for IPv4 and IPv6 |
| 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 12: Layer 2/Layer 3 TOR Boundary Verified Scalability Limits (Multidimensional)**

| Feature | Verified Limit    |
|---------|-------------------|
| ECMP    | 16-way (Upstream) |



| <b>Feature</b>                 | <b>Verified Limit</b>                                      |
|--------------------------------|--|
| 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  |
| VLAN                           | 1,250  |
| SVI                            | 1,000<br>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                                      |
| 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<br>45 (N3K-C3636C-R)                                    |
| UDLD enabled interfaces        | 65<br>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   |

| Feature                         | Verified Limit |
|---------------------------------|----------------|
| RSTP VLANs (tunneled over L2PT) | 3,960          |

**Table 13: 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                                     |
| BFD sessions                   | 280                                       |
| VLAN                           | 3,967                                     |
| SVI                            | 3,967                                     |
| Sub-interfaces                 | 250 per interface and 511 across system   |
| VRRP v4 groups                 | 1,996 VRRS / 4 VRRPv3                     |
| VRRP v6 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  |

| Feature       | Verified Limit       |
|---------------|----------------------|
| SPAN sessions | 1 local SPAN session |
| MAC           | 50,000               |

**Table 14: 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          |
| SR ECMP (max)          | 18             |
| MPLS HW entries        | 6,868          |

**Table 15: 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          |

| Feature         | Verified Limit |
|-----------------|----------------|
| IPv6 routes     | 6,640          |
| IPv6 paths      | 7,975          |
| SR ECMP         | 2              |
| MPLS HW entries | 2,682          |

**Table 16: VXLAN Profile Verified Scalability Limits (Multidimensional)**

| Feature                                   | Verified Limit   |
|---|------------------|
| 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            |
| 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 3VNI                                | 400              |
| Local VTEP                                | 1                |
| Remote VTEPs                              | 205              |
| VLAN                                      | 400              |
| SVI                                       | 100              |
| MAC                                       | 80,000           |
| vPC hosts                                 | 1                |

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