Cisco Nexus 3600 Series NX-OS Verified Scalability Guide, Release 9.3(9)

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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(9). 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
IGMP snooping groups	8000
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)

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

Feature	Verified Limit
OSPFv2 neighbors	1,000
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/0 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

Feature	Verified Limit [3]
Underlay multicast groups	128
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

Feature	Verified Limit [3]
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
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(9). 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 neihbors	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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