Versa Solution Scalability

This article describes the scaling of the Versa solution components, including Versa Analytics, Versa Controller, Versa Director, and Versa Operating System™ (VOS™) branch CPE devices.

The scalability numbers provided in this article are the system minimum requirements for the following Versa solution network reference platforms, which are very high-end platforms.

System	CPU	RAM	Storage	NICs
Versa Analytics	16 cores, Intel Xeon Skylake	16 GB	1 TB SSD	3 x 1/10 Gigabit Ethernet
Versa Controller	16 cores, Intel Xeon Skylake	16 GB	120 GB SSD	4 x 1/10 Gigabit Ethernet
Versa Director	16 cores, Intel Xeon Skylake	16 GB	200 GB SSD	2 x 1 Gigabit Ethernet
Versa Branch	8 cores, Intel Atom or Xeon	16 GB	64 GB SSD	3 x 1/10 Gigabit Ethernet

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Versa Analytics

Metric	Maximum Number Supported in Release 20.2.1
Number of analytics nodes per cluster	2 to 4
Number of search nodes per cluster	2
Number of log collectors/forwarders per cluster (optional for deployments of fewer than1000 nodes)	2 to 32
Rate of processing incoming logs	5000 per second
Maximum number of flow logs	Approximately 100 million per node. For further scaling, use the service. For more information, see Configure the Versa Advanc
Rate of processing REST API operations	1000 per minute
Number of tenants	500
Number of simultaneous connections from VOS devices	5000 (with a 14-node cluster consisting of 4 analytics, 2 search nodes; log forwarder nodes can handle up to 512 VOS connect

To manage more than 500 branch CPE devices, it is recommended that you add analytics nodes and dedicated log collector/forwarder nodes. For more information, see Hardware and Software Requirements for Headend.

For more information, see Versa Analytics Scaling Recommendations.

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Versa Controller

Metric	Maximum Number Supported for Releases 20.2.1 and Later
Number of tenants, including provider (parent) tenant	255
Number of IPsec tunnels	5000
Number of routing instances	1024
Number of BGP sessions	5000
Memory used per tunnel	IKE—250 KB IPsec—50 KB
Number of BGP routes reflected (handled)	No limit, based on memory (see next row)
Number of BGP routes per 1 GB RAM	500,000
Number of transport domains	63
Number of interfaces	16,000

Versa Director

Metric	Maximum Number Supported for Releases 20.2.1 and Later
Number of tenants managed	500 1024 (for Releases 21.2.1 and later)
Number of devices managed	2500 for a single headend
Number of simultaneous upgrades of VOS devices	50
Number of Netconf commands sent simultaneously	100
Number of operator user accounts	Tested up to 1000
Number of tenant user accounts	Tested up to 1000
Number of CPE devices onboarded simultaneously	50 per minute
Number of simultaneous logins (active)	100

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Metric	Maximum Number Supported for Releases 20.2.1 and Later
Number of simultaneous logins (passive)	200
Number of REST API calls	600 per 30-second window
Receive rate of notifications from VNFs	100 per second during a trap burst; otherwise, 20 per second

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VOS Branch CPE Devices

Metric	Maximum Number Supported for Releases 20.2.1 and Later
Number of tenants, including provider (parent) tenant	256
Number of WAN links per tenant	15
Number of IPsec tunnels	5000
Number of routing instances	1024
Number of BGP sessions	5000
Memory used per tunnel	IKE—250 KB IPsec—50 KB
Number of BGP routes reflected (handled)	No limit, based on memory (see next row)
Number of BGP routes per 1 GB RAM	500,000
Number of transport domains	63
Number of interfaces	1024
Number of Netconf commands handled	50 per second
Number of SNMP traps sent	256 per second
Number of Controller devices to which a VOS device can connect	8
Number of SLA probes configured	4096 (total across all tenants and all circuits) 16 per interface (circuit) 96 per tenant
Total bandwidth consumed by SLA probes (SLA probes per minute for 100 CPE devices on two access circuits)	8 Kbps
Zones per tenant	1024

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Maximum Number of VPNs

Each VPN core or organization can support a maximum of 1,024 VPNs.

Each SD-WAN branch (gateway) node can support a maximum 1,024 VPNs across multiple organizations.

Each tenant can have a maximum of 4,000 IPsec VPN profiles.

Each device can have a maximum of 7,500 IPsec VPN profiles.

The maximum number of simultaneous IPsec connections (branch to Controller node) is 7,500.

The maximum number of branch-to-branch connections is limited by the number of branches that can connect to the Controller node.

A single headend can support up to 2,500 devices across multiple topologies (such as full mesh, partial mesh, hub and spoke, and spoke-hub-hub-spoke) within a single VPN or multiple VPNs. For Releases 22.1.1 and later, up to 15 WAN interfaces per device are supported. For Releases 21.2 and earlier, up to 8 WAN interfaces per device are supported.

Maximum Number of Controller Nodes

One Director node can manage 32 different Controller nodes. The same tenant can use all 32 Controller nodes. That is, there can be a maximum of 32 Controller nodes per tenant.

Each VOS CPE device can connect to a maximum of 6 Controller nodes.

Maximum Number of Data Plane Tunnels

To forward in the data plane in a scenario with a full mesh of IPsec tunnels among VOS CPE devices, the following are some figures using different CPE types that show the total number of peers:

- Versa 120 platform and above
  - Intel C2758 8-core CPU, SOC–2.4 GHz
  - Tested up to 2500 sites
- Versa 110 platform
  - Intel C2758 4-core CPU, SOC–2.4 GHz
  - Tested up to 1200 sites
- Versa 100 platform
  - Intel C2358 2-core CPU, SOC–1.7 GHz
  - Tested up to 256 sites

Note that IKE control channels do not run between CPE devices, which is why in a Versa 100, with 2 core CPUs, each CPE can maintain tunnels with up to 255 remote neighbor CPE devices. This optimization in the Versa SD-WAN

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solution to provide a suitable at-scale architecture is because the Versa SD-WAN Controller node enables secure IPsec connectivity between branches without the overhead of maintaining a mesh of IKE-based connectivity between branches. This design allows the Versa software to avoid the key management and overhead associated with N^2 IKE/IPsec links and instead utilize the Controller node to distribute SA information, leveraging MP-BGP here for information distribution. The link between Versa SD-WAN branch devices and Versa SD-WAN Controller node is used to distribute inbound IPsec keys to other branch nodes to allow all branches to communicate using N+1 keys instead of N^2 keys.

Maximum Number of Policy Rules

For decryption, firewall, QoS and application QoS (App QoS), and SD-WAN policies, the total number of rules that the policies can have depends on the types of match criteria and the amount of memory that the VOS device has. The following table lists the maximum number of rules for average, non-exhaustive match criteria. Note that the values are the maximum number of all policy rules for all types of policies combined. These values apply to Releases 21.2.3 and later.

Memory	Maximum Number of Policy Rules
4 GB	500
8 GB	1,000
16 GB	4,000

Maximum Number of Sessions

For information on the maximum number of sessions that a VOS device supports, see Configure Service and Session Options.

Routing Scaling

The following table lists maximums for IP routing protocols and routing scaling information for Versa Cloud Services Gateway and white-box routers. Note that for the number of routes, the maximum numbers is for either IPv4 or IPv6.

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Description	CSG365, CSG750, Versa 110, Versa 210, VEP-1425	CSG770, CSG1300, Versa 120, Versa 220, Versa 520, Versa 813, VEP-1445, VEP-4600-910	CSG1500, Versa 1000, Versa 1800, VEP-V930	CSG5000
BGP peers	5,000	10,000	15,000	20,000
OSPF adjacencies	500	1,000	1,500	2,000
RIP sessions	Not tested	Not tested	Not tested	Not tested
BGP routes				
• IPv4	200,000 per VPN 200,000 unicast	500,000 per VPN 500,000 unicast	2,000,000 per VPN 2,000,000 unicast	8,000,000 per VPN 8,000,000 unicast
• IPv6	100,000 per VPN 100,000 unicast	250,000 per VPN 250,000 unicast	1,000,000 per VPN 1,000,000 unicast	4,000,000 per VPN 4,000,000 unicast
OSPF routes				
• IPv4	200,000 per VPN 200,000 unicast	500,000 per VPN 500,000 unicast	2,000,000 per VPN 2,000,000 unicast	8,000,000 per VPN 8,000,000 unicast
• IPv6	100,000 per VPN 100,000 unicast	250,000 per VPN 250,000 unicast	1,000,000 per VPN 1,000,000 unicast	4,000,000 per VPN 4,000,000 unicast
RIP routes				
• IPv4	200,000 per VPN 200,000 unicast	500,000 per VPN 500,000 unicast	2,000,000 per VPN 2,000,000 unicast	8,000,000 per VPN 8,000,000 unicast

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• IPv6	100,000 per VPN 100,000 unicast	250,000 per VPN 250,000 unicast	1,000,000 per VPN 1,000,000 unicast	4,000,000 per VPN 4,000,000 unicast
Total routes learned from all protocols				
• IPv4	200,000 per VPN 200,000 unicast	500,000 per VPN 500,000 unicast	2,000,000 per VPN 2,000,000 unicast	8,000,000 per VPN 8,000,000 unicast
• IPv6	100,000 per VPN 100,000 unicast	250,000 per VPN 250,000 unicast	1,000,000 per VPN 1,000,000 unicast	4,000,000 per VPN 4,000,000 unicast

Additional Information

Configure CoS
Configure HTTP/HTTPS Proxy
Configure SD-WAN Traffic Steering
Configure Service and Session Options
Configure Stateful Firewall
Configure the Versa Advanced Logging Service
Hardware and Software Requirements for Branch
Hardware and Software Requirements for Headend
Scalability and Performance
Versa Analytics Scaling Recommendations

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