Hardware and Software Requirements for Headend

For supported software information, click here.

This article describes the hardware and software required to install Versa Networks headend components.

CPU Requirements

Bare-Metal Platforms

For a bare-metal platform, you can deploy the headend components on either a Sandy Bridge CPU architecture or a Westmere CPU architecture:

Headend Component	Sandy Bridge CPU Requirements	Westmere CPU Requirements
Versa Director	• AES • AVX • PCLMULQDQ • SSE • SSE2 • SSE3 • SSE4.1 • SSE4.2	• Not supported
Versa Analytics	• AES • AVX • PCLMULQDQ • SSE • SSE2 • SSE3 • SSE4.1	• Not supported

Headend Component	Sandy Bridge CPU Requirements	Westmere CPU Requirements
	• SSE4.2	
Versa Operating System™ (VOS™) device	• AES • AVX • PCLMULQDQ • SSE • SSE2 • SSE3 • SSE4.1 • SSE4.2	• AES • PCLMULQDQ • SSE • SSE2 • SSE3 • SSE4.1 • SSE4.2 • RDRAND Requires a VOS software image with .wsm filename suffix

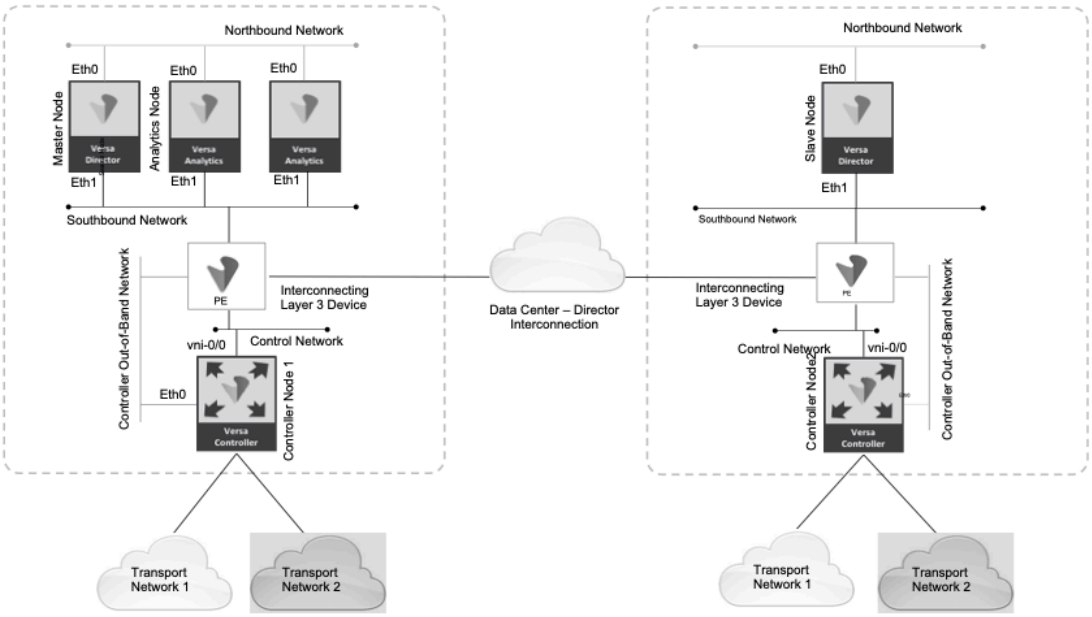
Virtual Machine Platforms

For a virtual machine (VM) deployment, you must allocate a dedicated CPU and memory (1:1 provisioning) to the headend components. Depending on the number of sockets present in the host, you might need to use CPU pinning. It is recommended that you turn off hyperthreading at the host level, by disabling hyperthreading in the host's BIOS. When hyperthreading is enabled, the number of available cores doubles. To verify the number of active cores, issue the **lscpu** command in the host's operating system.

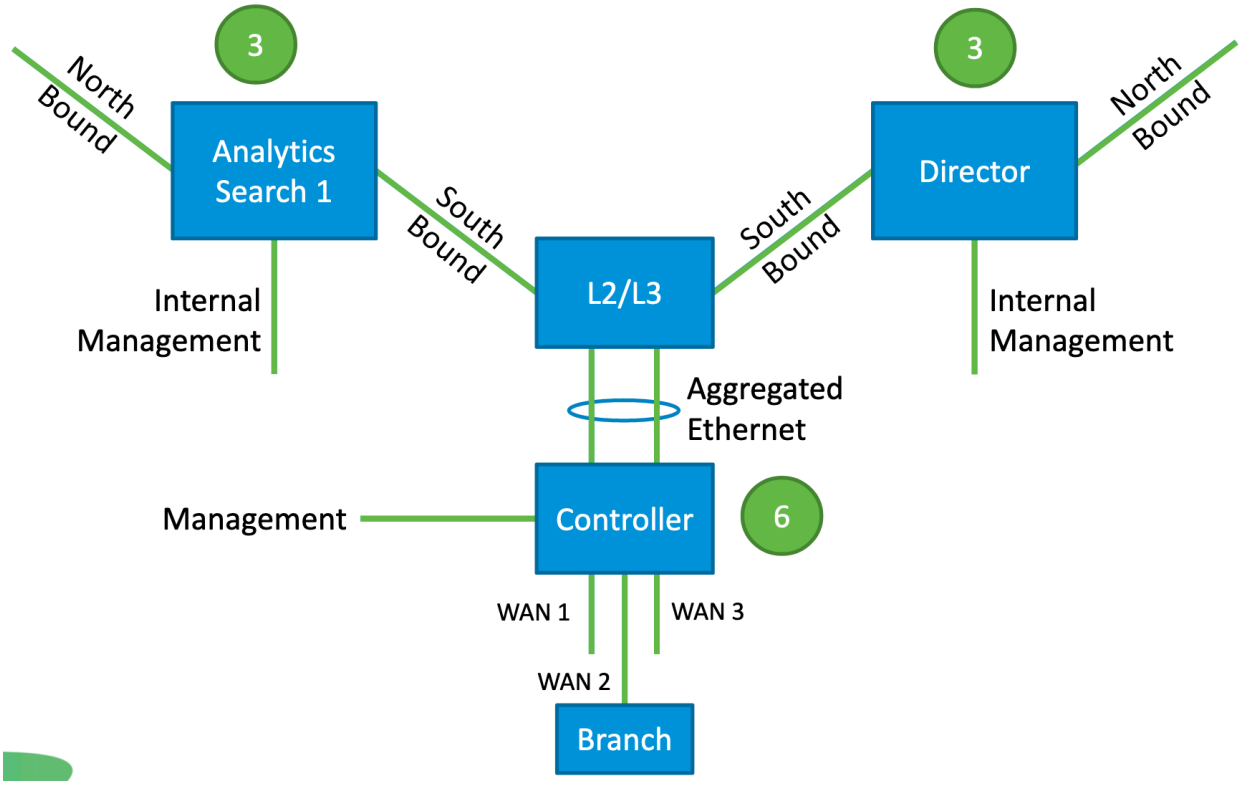
Hardware and VM Requirements

This section lists the bare-metal, AWS, and Azure requirements for headend components.

The following figure illustrates a representative headend topology.



The following figure illustrates the network interfaces required for each headend component.



Bare-Metal Hardware Requirements

Recommended Bare-Metal Hardware Requirements

The following table lists the recommended bare-metal hardware requirements for headend components for topologies up to 3500 CPE devices and up to 700 tenants.

Component	Up to 3,500 CPEs and 500 Tenants	Up to 2,500 CPEs and 500 Tenants	Up to 1000 CPEs and 200 Tenants	Up to 500 CPEs and 100 Tenants	Up to 250 CPEs and 50 Tenants
Analytics	At least 2 Analytics clusters (each cluster supports up to 2,500 CPEs) At least 2 clusters. For cluster resource requirements, see the 2,500 CPE column in the next column Use an Analytics aggregator for consolidated view across clusters	6 single-socket servers per cluster (cluster provides HA) Of the 6 servers: • 4 of type analytics, with at least 2048 GB, SSD recommended • 2 of type search, with at least 1024 GB, SSD recommended For each server: • 16 cores • 64 GB RAM • 3 network ports	4 single-socket servers per cluster (cluster provides HA) Of the 4 servers: • 2 of type analytics, with at least 1024 GB, SSD recommended • 2 of type search, with at least 1024 GB, SSD recommended For each server: • 16 cores • 64 GB RAM • 3 network ports	4 single-socket servers per cluster (cluster provides HA) Of the 4 servers: • 2 of type analytics, with at least 1024 GB, SSD recommended • 2 of type search, with at least 512 GB, SSD recommended For each server: • 16 cores • 64 GB RAM • 3 network ports	4 single-socket servers per cluster (cluster provides HA) Of the 4 servers: • 2 of type analytics, with at least 1024 GB, SSD recommended • 2 of type search, with at least 512 GB, SSD recommended For each server: • 16 cores • 32 GB RAM • 3 network ports
Concerto Arbiter	1 server: • 8 cores • 32 GB RAM • 512 GB, preferably SSD • 2 network ports	1 server: • 8 cores • 32 GB RAM • 512 GB, preferably SSD • 2 network ports	1 server: • 8 cores • 32 GB RAM • 512 GB, preferably SSD • 2 network ports	1 server: • 8 cores • 32 GB RAM • 512 GB, preferably SSD • 2 network ports	1 server: • 8 cores • 32 GB RAM • 512 GB, preferably SSD • 2 network ports
Concerto Cluster	2 worker servers for 3-node	2 worker servers for 3-node	2 worker servers for 3-node	2 worker servers for 3-node	2 worker servers for 3-node

	cluster: • 1 primary node • 1 secondary node • 1 arbiter node For each server: • 20 cores • 48 GB RAM • 512 GB, preferably SSD • 2 network ports	cluster: • 1 primary node • 1 secondary node • 1 arbiter node For each server: • 16 cores • 32 GB RAM • 512 GB, preferably SSD • 2 network ports	cluster: • 1 primary node • 1 secondary node • 1 arbiter node For each server: • 8 cores • 32 GB RAM • 512 GB, preferably SSD • 2 network ports	cluster: • 1 primary node • 1 secondary node • 1 arbiter node For each server: • 8 cores • 32 GB RAM • 512 GB, preferably SSD • 2 network ports	cluster: • 1 primary node • 1 secondary node • 1 arbiter node For each server: • 8 cores • 32 GB RAM • 512 GB, preferably SSD • 2 network ports
Controller	V930, V1000, V1800, CSG1500, or CSG2500 2 each for non-HA, 4 each for HA; HA is highly recommended. For Hub-Controller nodes, see below. Hub-controllers: Hub-Controllers should have a higher specification than the Controllers. Each Hub-	V930, V1000, V1800, CSG1500, or CSG2500 2 each for non-HA, 4 each for HA; HA is highly recommended. For Hub-Controller nodes, see below. Hub-controllers: Hub-Controllers should have a higher specification than the Controllers. Each Hub-	V930, V1000, V1800, CSG1500, or CSG2500 1 each for non-HA, 2 each for HA; HA is highly recommended. For Hub-Controller nodes, see below. Hub-controllers: Hub-Controllers should have a higher specification than the Controllers. Each Hub-	V930, V1000, V1800, CSG1500, or CSG2500 1 each for non-HA, 2 each for HA; HA is highly recommended.	V930, V1000, V1800, CSG1500, or CSG2500 1 each for non-HA, 2 each for HA; HA is highly recommended.

	Controller node must include 8 additional cores dedicated solely to the control plane, in addition to the cores used for the data plane.	Controller node must include 8 additional cores dedicated solely to the control plane, in addition to the cores used for the data plane.	Controller node must include 8 additional cores dedicated solely to the control plane, in addition to the cores used for the data plane.		
Director	1 single-socket server for non-HA, 2 single-socket servers for HA For each server: • 24 cores • 64 GB RAM • 200 GB, preferably SSD • 3 network ports	1 single-socket server for non-HA, 2 single-socket servers for HA For each server: • 24 cores • 64 GB RAM • 200 GB, preferably SSD • 3 network ports	1 single-socket server for non-HA, 2 single-socket servers for HA For each server: • 16 cores • 48 GB or 64 GB RAM • 200 GB, preferably SSD • 3 network ports	1 single-socket server for non-HA, 2 single-socket servers for HA For each server: • 16 cores • 48 GB or 64 GB RAM • 200 GB, preferably SSD • 3 network ports	1 single-socket server for non-HA, 2 single-socket servers for HA For each server: • 16 cores • 32 GB RAM • 200 GB, preferably SSD • 3 network ports
Log Collector/ Forwarder	8 single-socket servers per cluster per region For each server: • 4 cores • 8 GB RAM • 128 GB, preferably SSD • 2 network	8 single-socket servers per cluster per region For each server: • 4 cores • 8 GB RAM • 128 GB, preferably SSD • 2 network	4 single-socket servers per cluster per region For each server: • 4 cores • 8 GB RAM • 128 GB, preferably SSD • 2 network	2 single-socket servers per cluster per region For each server: • 4 cores • 8 GB RAM • 128 GB, preferably SSD • 2 network	2 single-socket servers per cluster per region For each server: • 4 cores • 8 GB RAM • 128 GB, preferably SSD • 2 network

	ports	ports	ports	ports	ports
Staging Controller (optional)	CSG355, CSG365, CSG750, or Versa 210	CSG355, CSG365, CSG750, or Versa 210	CSG355, CSG365, CSG750, or Versa 210	CSG355, CSG365, CSG750, or Versa 210	CSG355, CSG365, CSG750, or Versa 210
VOS underlay PE Router	CSG770 or Versa 220, 2 each	CSG770 or Versa 220, 2 each	CSG770 or Versa 220, 2 each	CSG770 or Versa 220, 2 each	CSG770 or Versa 220, 2 each

The following table lists the recommended bare-metal hardware requirements for headend components for topologies up to 20,000 CPE devices and up to 4,000 tenants.

Component	Up to 20,000 CPEs and 4,000 Tenants	Up to 10,000 CPEs and 2,000 Tenants	Up to 5,000 CPEs and 1,000 Tenants
Analytics	8 Analytics clusters (each cluster supports up to 2,500 CPEs) For cluster resource requirements, see the 2,500 CPE column in the previous table Use an Analytics aggregator for consolidated view across clusters	4 Analytics clusters (each cluster supports up to 2,500 CPEs) For cluster resource requirements, see the 2,500 CPE column in the previous table Use an Analytics aggregator for consolidated view across clusters	2 Analytics clusters (each cluster supports up to 2,500 CPEs) For cluster resource requirements, see the 2,500 CPE column in the previous table Use an Analytics aggregator for consolidated view across clusters
Analytics Aggregator Cluster	3 single-socket servers per cluster (cluster provides HA) For each server: • 16 cores • 64 GB RAM • 512 GB, SSD recommended • 2 network ports	3 single-socket servers per cluster (cluster provides HA) For each server: • 16 cores • 64 GB RAM • 512 GB, SSD recommended • 2 network ports	2 single-socket servers per cluster (cluster provides HA) For each server: • 16 cores • 64 GB RAM • 512 GB, SSD recommended • 2 network ports
Concerto Arbiter	1 server: • 24 cores • 64 GB RAM • 512 GB, preferably SSD • 2 network ports	1 server: • 16 cores • 32 GB RAM • 512 GB, preferably SSD • 2 network ports	1 server: • 16 cores • 32 GB RAM • 512 GB, preferably SSD • 2 network ports
Concerto Cluster	4 worker servers for 5-node cluster:	4 worker servers for 5-node cluster:	2 worker servers for 3-node cluster:

	• 2 primary nodes • 2 secondary nodes • 1 arbiter node For each server: • 24 cores • 64 GB RAM • 512 GB, preferably SSD • 2 network ports	• 2 primary nodes • 2 secondary nodes • 1 arbiter node For each server: • 24 cores • 64 GB RAM • 256 GB, preferably SSD • 2 network ports	• 1 primary node • 1 secondary node • 1 arbiter node For each server: • 24 cores • 48 GB RAM • 512 GB, preferably SSD • 2 network ports
Controller	V930, V1000, V1800, CSG1500, or CSG2500 16 each for non-HA, 32 each for HA; HA is highly recommended. For Hub-Controller nodes, see below. Hub-controllers: Hub-Controllers should have a higher specification than the Controllers. Each Hub-Controller node must include 8 additional cores dedicated solely to the control plane, in addition to the cores used for the data plane.	V930, V1000, V1800, CSG1500, or CSG2500 8 each for non-HA, 16 each for HA; HA is highly recommended. For Hub-Controller nodes, see below. Hub-controllers: Hub-Controllers should have a higher specification than the Controllers. Each Hub-Controller node must include 8 additional cores dedicated solely to the control plane, in addition to the cores used for the data plane.	V930, V1000, V1800, CSG1500, or CSG2500 4 each for non-HA, 8 each for HA; HA is highly recommended. For Hub-Controller nodes, see below. Hub-controllers: Hub-Controllers should have a higher specification than the Controllers. Each Hub-Controller node must include 8 additional cores dedicated solely to the control plane, in addition to the cores used for the data plane.
Director	8 single-socket servers for non-HA, 16 single-socket servers for HA; HA is highly recommended For each server: • 24 cores	4 single-socket servers for non-HA, 8 single-socket servers for HA; HA is highly recommended For each server: • 24 cores	2 single-socket servers for non-HA, 4 single-socket servers for HA; HA is highly recommended For each server: • 24 cores

	• 64 GB RAM • 512 GB, preferably SSD • 2 network ports	• 64 GB RAM • 512 GB, preferably SSD • 2 network ports	• 64 GB RAM • 512 GB, preferably SSD • 2 network ports
Log Collector/Forwarder	8 single-socket servers per cluster per region For each server: • 4 cores • 8 GB RAM • 128 GB, preferably SSD • 2 network ports	8 single-socket servers per cluster per region For each server: • 4 cores • 8 GB RAM • 128 GB, preferably SSD • 2 network ports	8 single-socket servers per cluster per region For each server: • 4 cores • 8 GB RAM • 128 GB, preferably SSD • 2 network ports
Staging Controller (optional)	CSG355, CSG365, CSG750, or Versa 210	CSG355, CSG365, CSG750, or Versa 210	CSG355, CSG365, CSG750, or Versa 210
VOS underlay PE Router	CSG770 or Versa 220, 2 each	CSG770 or Versa 220, 2 each	CSG770 or Versa 220, 2 each

Minimum Bare-Metal Hardware Requirements

The following table lists the minimum bare-metal hardware requirements for headend components. Note that for Analytics nodes, the table shows only the minimum storage recommendations. You may need to increase storage depending on logging rate, log retention, and other factors.

Use the minimum hardware resources only for lab or proof-of-concept (POC) environments. For production environments, use the hardware listed in Recommended Bare-Metal Hardware Requirements, above.

Component	Up to 2500 CPEs and 500 Tenants	Up to 1000 CPEs and 200 Tenants	Up to 500 CPEs and 100 Tenants	Up to 250 CPEs and 50 Tenants
Analytics	6 single-socket servers per cluster (cluster provides HA) Of the 6 servers: • 4 of type analytics, with at least 2048 GB, preferably SSD • 2 of type search, with at least 1024 GB, preferably SSD For each server: • 16 cores • 64 GB RAM • 2 network ports	4 single-socket servers per cluster (cluster provides HA) Of the 4 servers: • 2 of type analytics, with at least 1024 GB, preferably SSD • 2 of type search, with at least 1024 GB, preferably SSD For each server: • 16 cores • 64 GB RAM • 2 network ports	4 single-socket servers per cluster (cluster provides HA) Of the 4 servers: • 2 of type analytics, with at least 1024 GB, preferably SSD • 2 of type search, with at least 512 GB, preferably SSD For each server: • 8 cores • 16 GB RAM • 2 network ports	4 single-socket servers per cluster (cluster provides HA) Of the 4 servers: • 2 of type analytics, with at least 512 GB, preferably SSD • 2 of type search, with at least 256 GB, preferably SSD For each server: • 8 cores • 16 GB RAM • 2 network ports
Controller	V930, V1000, V1800, CSG1500, or CSG2500 2 each for non-HA, 4 each for HA; HA is highly recommended. For Hub-Controller nodes, see below. Hub-controllers: Hub-Controllers should have a higher specification than the Controllers. Each Hub-Controller	V930, V1000, V1800, CSG1500, or CSG2500 1 each for non-HA, 2 each for HA; HA is highly recommended. For Hub-Controller nodes, see below. Hub-controllers: Hub-Controllers should have a higher specification than the Controllers. Each Hub-Controller	CSG770, V810, or V910 1 each for non-HA, 2 each for HA; HA is highly recommended.	CSG770, V810, or V910 1 each for non-HA, 2 each for HA; HA is highly recommended.

	node must include 8 additional cores dedicated solely to the control plane, in addition to the cores used for the data plane.	node must include 8 additional cores dedicated solely to the control plane, in addition to the cores used for the data plane.		
Director	1 single-socket server, or 2 single-socket servers (for HA) For each server: • 16 cores • 32 GB RAM • 200 GB, preferably SSD • 2 network ports	1 single-socket server, or 2 single-socket servers (for HA) For each server: • 16 cores • 32 GB RAM • 200 GB, preferably SSD • 2 network ports	1 single-socket server, or 2 single-socket servers (for HA) For each server: • 8 cores • 16 GB RAM • 200 GB, preferably SSD • 2 network ports	1 single-socket server, or 2 single-socket servers (for HA) For each server: • 8 cores • 16 GB RAM • 200 GB, preferably SSD • 2 network ports
Log Collector/ Forwarder	8 single-socket servers per cluster per region For each server: • 4 cores • 8 GB RAM • 128 GB, preferably SSD • 2 network ports	4 single-socket servers per cluster per region For each server: • 4 cores • 8 GB RAM • 128 GB, preferably SSD • 2 network ports	2 single-socket servers per cluster per region For each server: • 4 cores • 8 GB RAM • 128 GB, preferably SSD • 2 network ports	2 single-socket servers per cluster per region For each server: • 4 cores • 8 GB RAM • 128 GB, preferably SSD • 2 network ports
Staging Controller (optional)	CSG355, CSG365, CSG750, or Versa 210	CSG355, CSG365, CSG750, or Versa 210	CSG355, CSG365, CSG750, or Versa 210	CSG355, CSG365, CSG750, or Versa 210
VOS underlay PE Router	CSG770 or Versa 220, 2 each	CSG770 or Versa 220, 2 each	CSG770 or Versa 220, 2 each	CSG770 or Versa 220, 2 each

General Notes about Bare-Metal Hardware Requirements

- Each Controller node can support a maximum of 255 tenants (organizations).
- The Versa 210 and Versa 220 devices are provided by Advantech, Dell, and Lanner. For more information, see Versa SD-WAN White-Box Appliances.
- After you start the Versa services, the Versa Director node reserves a fixed amount of memory for core processes such as Spring Boot and Tomcat, regardless of real-time utilization. This allocation can account for up to 70 percent of available memory. Because of this preallocation, RAM utilization does not increase linearly when you have a low to moderate number of managed devices.

AWS Requirements

The following table shows the minimum headend requirements for AWS virtual machine (VM) installations. Note that for Analytics nodes, the table shows only the minimum storage recommendations. You may need to increase storage depending on logging rate, log retention, and other factors.

To achieve interchassis HA, two EC2 instances are required for Director and Controller nodes. For Analytics, interchassis HA is achieved through clustering, which is accounted for in the recommended number of EC2 instances.

Component	Up to 2500 CPEs and 500 Tenants	Up to 1000 CPEs and 200 Tenants	Up to 500 CPEs and 100 Tenants	Up to 250 CPEs and 50 Tenants
Analytics	6 c5.4xlarge instances (cluster provides HA) 2 virtual NIC ports Of the 6 instances: – 4 of type analytics, with at least 2048 GB, preferably SSD – 2 of type search, with at least 1024 GB, preferably SSD	4 c5.4xlarge instances (cluster provides HA) 2 virtual NIC ports Of the 4 instances: – 2 of type analytics, with at least 1024 GB, preferably SSD – 2 of type search, with at least 1024 GB, preferably SSD	4 c5.2xlarge instances (cluster provides HA) 2 virtual NIC ports Of the 4 instances: – 2 of type analytics, with at least 1024 GB, preferably SSD – 2 of type search, with at least 512 GB, preferably SSD If HA for database is not required, 1 analytics and 1 search instance can be enabled, which still ensures HA for log data	4 c5.2xlarge instances (cluster provides HA) 2 virtual NIC ports Of the 4 instances: – 2 of type analytics, with at least 1024 GB, preferably SSD – 2 of type search, with at least 512 GB, preferably SSD If HA for database is not required, 1 analytics and 1 search instance can be enabled, which still ensures HA for log data

Component	Up to 2500 CPEs and 500 Tenants	Up to 1000 CPEs and 200 Tenants	Up to 500 CPEs and 100 Tenants	Up to 250 CPEs and 50 Tenants
Controller	2 c5.4xlarge instances, or 4 c5.4xlarge instances (for HA) 3 virtual NIC ports per instance 120 GB, preferably SSD 1 Controller pair supports up to 256 tenants; 2 pairs needed for 500 tenants. For Hub-Controller nodes, see below. Hub-controllers: Hub-Controllers should have a higher specification than the Controllers. Each Hub-Controller node must include 8 additional cores dedicated solely to the control plane, in addition to the cores used for the data plane.	1 c5.4xlarge instances, or 2 c5.4xlarge instances (for HA) 3 virtual NIC ports per instance 120 GB, preferably SSD For Hub-Controller nodes, see below. Hub-controllers: Hub-Controllers should have a higher specification than the Controllers. Each Hub-Controller node must include 8 additional cores dedicated solely to the control plane, in addition to the cores used for the data plane.	1 c5.2xlarge instances, or 2 c5.2xlarge instances (for HA) 3 virtual NIC ports per instance 120 GB, preferably SSD	1 c5.2xlarge instances, or 2 c5.2xlarge instances (for HA) 3 virtual NIC ports per instance 120 GB, preferably SSD
Director	1 c5.4xlarge instance, or 2 c5.4xlarge instances (for HA) 2 virtual NIC ports per instance	1 c5.4xlarge instance, or 2 c5.4xlarge instances (for HA) 2 virtual NIC ports per instance	1 c5.4xlarge instance, or 2 c5.4xlarge instances (for HA) 2 virtual NIC ports per instance	1 c5.4xlarge instance, or 2 c5.4xlarge instances (for HA) 2 virtual NIC ports per instance

Component	Up to 2500 CPEs and 500 Tenants	Up to 1000 CPEs and 200 Tenants	Up to 500 CPEs and 100 Tenants	Up to 250 CPEs and 50 Tenants
	200 GB, preferably SSD	200 GB, preferably SSD	200 GB, preferably SSD	200 GB, preferably SSD
Log Collector/ Forwarder	8 c5.xlarge instances per region 2 virtual NIC ports	4 c5.xlarge instances per region 2 virtual NIC ports	2 c5.xlarge instances per region 2 virtual NIC ports If regional log collectors are not required, external log collector/ forwarder is optional	2 c5.xlarge instances per region 2 virtual NIC ports If regional log collectors are not required, external log collector/ forwarder is optional
VOS Underlay PE Router To Connect to VPC	2 c5.xlarge instances	2 c5.xlarge instances	2 c5.xlarge instances	2 c5.xlarge instances

Azure Requirements

The following table shows the requirements for Azure VM installations. Note that for Analytics nodes, the table shows only the minimum storage recommendations. You may need to increase storage depending on logging rate, log retention, and other factors.

To achieve interchassis HA, two F-series VMs are required for Versa Director and Versa Controller. For Versa Analytics, interchassis HA is achieved through clustering, which is accounted for in the recommended number of VM instances.

Component	Up to 2500 CPEs and 500 Tenants	Up to 1000 CPEs and 200 Tenants	Up to 500 CPEs and 100 Tenants	Up to 250 CPEs and 50 Tenants
Analytics	6 standard_F16s_v2 VMs (cluster provides redundancy) 2 virtual NIC ports per instance Of the 6 instances: – 4 of type analytics, with at least 2048 GB, preferably SSD	4 standard_F16s_v2 VMs (cluster provides redundancy) 2 virtual NIC ports per instance Of the 4 instances: – 2 of type analytics, with at least 1024 GB, preferably SSD	4 standard_F8s_v2 VMs (cluster provides redundancy) 2 virtual NIC ports per instance Of the 4 instances: – 2 of type analytics, with at least 1024 GB, preferably SSD	4 standard_F8s_v2 VMs (cluster provides redundancy) 2 virtual NIC ports per instance Of the 4 instances: – 2 of type analytics, with at least 1024 GB, preferably SSD

Component	Up to 2500 CPEs and 500 Tenants	Up to 1000 CPEs and 200 Tenants	Up to 500 CPEs and 100 Tenants	Up to 250 CPEs and 50 Tenants
	– 2 of type search, with at least 1024 GB, preferably SSD	– 2 of type search, with at least 1024 GB, preferably SSD	– 2 of type search, with at least 512 GB, preferably SSD If HA for database is not required, 1 analytics and 1 search instance can be enabled, which still ensures HA for log data	– 2 of type search, with at least 512 GB, preferably SSD If HA for database is not required, 1 analytics and 1 search instance can be enabled, which still ensures HA for log data
Controller	2 standard_F16s_v2 VMs, or 4 standard_F16s_v2 VMs (for HA) 3 virtual NIC ports per instance 120 GB, preferably SSD. 1 Controller pair supports up to 256 tenants; 2 pairs needed for 500 tenants. For Hub-Controller nodes, see below. Hub-controllers: Hub-Controllers should have a higher specification than the Controllers. Each Hub-Controller node must include 8	1 standard_F16s_v2 VMs or 2 standard_F16s_v2 VMs (for HA) 3 virtual NIC ports per instance 120 GB, preferably SSD. For Hub-Controller nodes, see below. Hub-controllers: Hub-Controllers should have a higher specification than the Controllers. Each Hub-Controller node must include 8 additional cores dedicated solely to the control plane, in addition	1 standard_F8s_v2 VMs, or 2 standard_F8s_v2 VMs (for HA) 3 virtual NIC ports per instance 120 GB, preferably SSD.	1 standard_F8s_v2 VMs, or 2 standard_F8s_v2 VMs (for HA) 3 virtual NIC ports per instance 120 GB, preferably SSD.

Component	Up to 2500 CPEs and 500 Tenants	Up to 1000 CPEs and 200 Tenants	Up to 500 CPEs and 100 Tenants	Up to 250 CPEs and 50 Tenants
	additional cores dedicated solely to the control plane, in addition to the cores used for the data plane.	to the cores used for the data plane.		
Director	1 standard_F16s_v2 VMs, or 2 standard_F16s_v2 VMs (for HA) 2 virtual NIC ports per instance 200 GB, preferably SSD.	1 standard_F16s_v2 VMs, or 2 standard_F16s_v2 VMs (for HA) 2 virtual NIC ports per instance 200 GB, preferably SSD.	1 standard_F16s_v2 VMs, or 2 standard_F16s_v2 VMs (for HA) 2 virtual NIC ports per instance 200 GB, preferably SSD.	1 standard_F16s_v2 VMs, or 2 standard_F16s_v2 VMs (for HA) 2 virtual NIC ports per instance 200 GB, preferably SSD.
Log Collector/ Forwarder	8 standard_F4s VMs per region 2 virtual NIC ports	4 standard_F4s VMs per region 2 virtual NIC ports	2 standard_F4s VMs per region 2 virtual NIC ports If regional log collectors are not required, external log collector/ forwarder is optional	2 standard_F4s VMs per region 2 virtual NIC ports If regional log collectors are not required, external log collector/ forwarder is optional
VOS Underlay PE Router To Connect to vnet	2 standard_F2s_v2 VMs	2 standard_F2s_v2 VMs	2 standard_F2s_v2 VMs	2 standard_F2s_v2 VMs

Versa Concerto Hardware Requirements

For Releases 20.2.3 and later.

Versa Concerto supports both bare-metal and virtualized deployments. The following table lists the system requirements for an on-premises Concerto deployment for both bare metal and virtual environments.

	Up to 2,500 Branches	**Up to 5,000 Branches**	**Up to 10,000 Branches**	**Up to 20,000 Branches**
Number of tenants	500	1024	1024	1024
Deployment options	Bare metal or VM	Bare metal or VM	Bare metal or VM	Bare metal or VM
Processors	High-end x86 server class	High-end x86 server class	High-end x86 server class	High-end x86 server class
Worker nodes				1024
• Servers	2 worker servers for 3-node cluster: • 1 primary node • 1 secondary node • 1 arbiter node	2 worker servers for 3-node cluster: • 1 primary node • 1 secondary node • 1 arbiter node	4 worker servers for 5-node cluster: • 2 primary nodes • 2 secondary nodes • 1 arbiter node	4 worker servers for 5-node cluster: • 2 primary nodes • 2 secondary nodes • 1 arbiter node
• Cores	16	24	24	24
• Storage capacity	512 GB	512 GB	512 GB	512 GB
• DRAM	32 GB	48 GB	64 GB	64 GB
• Network ports per server	2	2	2	2
Arbiter node				
• Servers	1	1	1	1
• Cores	8	8	16	24

	Up to 2,500 Branches	Up to 5,000 Branches	Up to 10,000 Branches	Up to 20,000 Branches
• Storage Capacity	512 GB	512 GB	512 GB	512 GB
• DRAM	16 GB	16 GB	32 GB	64 GB
• Network ports per server	2	2	2	2
Azure	Worker nodes • 1xStandard_F16s_v2 Primary node • 1xStandard_F16s_v2 Secondary node Arbiter node • 1xStandard_F8s_v2	Worker nodes • 1xStandard_F32s_v2 Primary node • 1xStandard_F32s_v2 Secondary node Arbiter node • 1xStandard_F8s_v2	Worker nodes • 2xcStandard_F32s_v2 Primary node • 2xcStandard_F32s_v2 Secondary node Arbiter node • 1xStandard_F16s_v2	Worker nodes • 2xStandard_F32s_v2 Primary node • 2xStandard_F32s_v2 Secondary node Arbiter node • 1xStandard_F32s_v2
AWS	Worker nodes • 1xc5.4xlarge Primary node • 1xc5.4xlarge Secondary node Arbiter node • 1xc5.2xlarge	Worker nodes • 1xc5.9xlarge Primary node • 1xc5.9xlarge Secondary node Arbiter node • 1xc5.2xlarge	Worker nodes • 2xc5.9xlarge Primary node • 2xc5.9xlarge Secondary node Arbiter node • 1xc5.4xlarge	Worker nodes • 2xc5.9xlarge Primary node • 2xc5.9xlarge Secondary node Arbiter node • 1xc5.9xlarge

General Hardware and VM Requirements

It is strongly recommended that you use bare metal for the headend components.

The following are general requirements for bare-metal deployments:

- Servers must have Sandy Bridge or newer class of CPUs.
- Server hardware must support Ubuntu 18.04.
- For Director and Analytic nodes, it is recommended that you use servers that Versa Networks customers have already deployed in production networks. However, if you want to use any other servers, discuss this with your Versa Networks Sales Engineer. If you use any other servers, you may also need to qualify the hardware in your lab before placing it into production because of variabilities, including RAID, which may not be supported in the Ubuntu 18.04 used by the Versa software, and persistent NIC-ordering settings.
- The Director and Analytics nodes must support Ubuntu 18.04. Typical network interfaces that are supported are:
  - For 1-GB interfaces—i350-based and i210-based network adapters
  - For 10-GB interfaces—X710-based and 82599-based network adapters
- You must disable hyperthreading in the BIOS.
- The following are the minimum IOPS requirements for Director and VOS nodes; however, it is recommended that the disk have more IOPS:
  - Random 4K Reads—78k IOPS
  - Random 4K Writes—86k IOPS
- When more than 500 sites are connected to a Controller or Hub-Controller node, allocate eight CPUs for control plane processing by issuing the following CLI command and then rebooting the node:

  > Controller-CLI> **request system isolate-cpu enable num-control-cpu 8**

  Note: The above assumes the system has a minimum of 16 cores out of which 8 cores are reserved for the control plane.

For VM deployments, note the following:

- With the same resources as a bare-metal installation, the performance of VM headend components is about 25 percent less because of the virtualization.
- On the VM host, you must allocate a dedicated CPU and dedicated memory to the Versa headend VMs. This is called 1:1 provisioning.
- You must pin the CPU to the VM vCPU.
- You must disable hyperthreading on the VM host.
- The preferred NICs are SR-IOV NICs, which provide the best network I/O. A second choice is a VirtIO NIC driver. For VMWare, it is recommended that you use VMXNET3 on all interfaces.
- Openstack and KVM are supported. If you host the headend components on OpenStack, you must have a good understanding of the OpenStack infrastructure, and you must be able to troubleshoot hypervisor, underlay, and firewall issues.
- Ensure that the disk IO is optimized. The following are the minimum IOPS requirements for Director and VOS nodes; however, it is recommended that the disk have more IOPS:
  - Random 4K Reads—78k IOPS
  - Random 4K Writes—86k IOPS

The following table lists the VM software supported for VOS devices.

Software Type	Supported Software
Cloud Platforms	Amazon Machine Image (AMI) Google Cloud Platform Microsoft Azure VHD Oracle Cloud Infrastructure (OCI)
Hypervisors	KVM Ubuntu 18.04+ VMware vSphere 5.5, 6.0, 6.5, 6.6, 6.7, 7.0

For information about AWS, Azure, and Google cloud instances that have been qualified by Versa Networks and that you can use for headend and VOS devices, see Qualified AWS, Azure, and Google Cloud Instances.

Versa Messaging Service

For Releases 21.2.1 and later.

The following are the minimum hardware requirements to install the Versa messaging service (VMS) software on a bare-metal platform:

- 8 cores
- 16-GB RAM
- 250-GB solid state drive (SSD)

You can also deploy VMS on KVM and VMware virtual machines. When you install VMS on virtual machines, Versa Networks recommends the following for the VM deployment:

- Deploy the virtual machine using a SCSI controller.
- Disable hyperthreading.
- Ensure that CPU affinity and core pinning for the VMS is on a single socket.

Software Requirements

All headend components must run the same Versa software version. For example, if you are using Release 16.1 R2 S2.2, you must install this same software version on the Versa Director, Versa Analytics, and Versa Controller nodes.

Versa Concerto Release 10.1.1 is supported with Release 20.2.3 and later versions of the Versa DCA complex. Concerto is not supported with Release 21.1.1 of Versa DCA.

For information about the latest software release version, contact Versa Networks Customer Support.

Note: Versa Networks does not support the installation of any software packages other than what is contained in the software packages provided by Versa Networks. Installation of non-Versa Networks software packages would render

void any service agreement from Versa technical support.

Supported Software Information

Releases 20.2 and later support all content described in this article, except as noted.

- Releases 20.2.3 and later versions of the Versa DCA complex support Versa Concerto Release 10.1.1.
  Note: Release 21.1.1 of Versa DCA does not support Concerto Release 10.1.1.
- Releases 21.2.1 and later add support for Versa messaging service.

Additional Information

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Revision History

April 15, 2022—Update Concerto hardware requirements.
April 21, 2022—Update Controller requirements for 500 tenants for bare metal, AWS, and Azure.
May 31, 2023—Expand description of Analytics node requirements.
June 26,2023—Update AWS Director requirements for 500 CPEs and 100 tenants from C5.2xlarge to C5.4xlarge. Update Azure Director requirements for 500 CPEs and 100 tenants from 1 standard_F8s_v2 VMs, or 2 standard_F8s_v2 VMs (for HA) to 1 standard_F16s_v2 VMs, or 2 standard_F16s_v2 VMs (for HA).
August 23, 2023—Add bare-metal requirements for 5,000, 10,000, and 20,000 CPEs.
September 8, 2023—Add Controller and Director node information for 5,000, 10,000, and 20,000 CPEs.
November 1, 2023—Add list of VM software supported for VOS devices. Add CSG770 ;to minimum bare-metal requirements as a supported Controller for 250 and 500 CPEs.
July 15, 2024—Added separate instructions for control CPU allocation based on site connectivity thresholds for Controller and Hub-Controller nodes.