VMware vCloud Director® Configuration Maximums

vCloud Director 9.1 and 9.5

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This document supports the version of each product listed and supports
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Contents

VMware vCloud Director Management Maximums

This section covers maximums related to the entities managed directly by VMware vCloud Director®.

A description for each category of maximums listed in Table 1 is included here:

- VMware vCenter Server® systems

  vCloud Director is tested up to a certain number of vCenter Server instances. This is a recommended maximum validated as part of vCloud Director scale and performance testing. Exceeding this limit is acceptable but might result in performance degradation. The impact on performance and stability depends on many factors and varies from environment to environment. Extensive testing is recommended to make sure that system performance meets your standards.

- vCloud Director cells

  Number of vCloud Director cells deployed within a single vCloud Director instance. Increasing the number of cells generally improves performance, supported infrastructure scale, and concurrency characteristics, and might improve uptime.

- Users

  Total number of users managed by vCloud Director in all organizations.

- Organizations

  Total number of tenant organizations managed by vCloud Director.

- Users per organization

  Maximum number of users supported per organization.

- Org VDCs

  Maximum number of organization VDCs.

- VMs per vApp

  Virtual machines per vApp.

- vApps per organization

  Maximum number of vApps in an organization.

- vApps

  Total number of vApps managed by vCloud Director.

- Catalogs

  Total number of catalogs in all organizations.

- Media

  Total number of media files in all catalogs.

- Independent disks

  Independent disks are stand-alone virtual disks that can be created in organization VDCs. Administrators and users who have adequate rights can create, remove, and update independent disks, and attach them to or detach them from virtual machines using the API.

- Resource pools per provider VDC

  Number of top-level resource pools per provider VDC.

- External networks

  External networks connecting organization VDCs to physical networks. Backed by VMware vSphere® port group, VLAN, or distributed virtual switch (dvSwitch) objects.

- Routed networks

  Routed organization VDC or vApp networks connecting to an external network through an edge gateway.

- Isolated networks

  Isolated organization VDC or vApp network.

- Direct organization VDC networks

  Organization VDC networks connecting directly to an external network.

- Network pools

  Each provider VDC has a VXLAN network pool that has been automatically created. The system admin also has the option to create additional VLAN-backed network pools.

- VDC Groups

  Each VDC group encapsulates two or more Org VDCs in same organization in one vCloud Director site or a set of associated organizations in multiple vCloud Director sites. Stretched networks can be created across the group with distributed routing enabled for east-west traffic. The northbound interface of the edge gateways in the participating Org VDC form the egress points of the VDC group and they can be Active/Passive, Active/Active, one-armed, or private.

- Cross VDC Networks

  Org VDC networks stretched to all VDCs in the same VDC Group

Table 1. vCloud Director Management Maximums

Item	Maximum per vCloud Director	
	Release 9.1	**Release 9.5**
vCloud Director cells	(*see Note 1*)	(*see Note 1*)
Users	25,000	25,000
Organizations	10,000	10,000
Users per organization	5000	5000
Organization VDCs	10,000	10,000
Provider VDCs	100	100
Independent disks	1000 *(see Note 2)*	**10,000**
VMs per vApp	128	128
vApps	40,000	40,000

Item	Maximum per vCloud Director	
	Release 9.1	**Release 9.5**
vApps per organization	5000	5000
Catalogs	8000	8000
Media	1000	1000
Resource pools per provider VDC	64	64
External networks	1999 (SQL Server); 999 (Oracle); 2500 (PostgreSQL)	1999 (SQL Server); **Oracle unsupported;** **3000 (PostgreSQL)**
Routed networks (Org VDC and vApp)	Total of routed networks + isolated networks is limited by edge gateways in underlying VMware NSX® Manager™	Total of routed networks + isolated networks is limited by edge gateways in underlying NSX® Manager™
Isolated networks (Org VDC and vApp)		
Direct Org VDC networks	10,000	10,000
Directly connected networks backed by NSX-T	N/A	**1000 per vCloud Director**
Network pools	100	100
Cross VDC Networking		
VDC Groups per vCloud Director	N/A	100
Org VDCs per VDC Group	N/A	4
Universal Logical Routers	N/A	1 Universal Router per VDC Group
Cross-VDC networks per vCloud Director	N/A	1000 per vCloud Director
Cross-VDC networks per VDC group	N/A	100

Note 1

There is no fixed limit on the number of vCloud Director cells. Cells should be deployed to match the expected load from running VMs and managed vCenter Server instances ([# of vCenter Server instances] +1 cells). Note that each vCloud Director cell creates 75 connections to the database.

Note 2

Maximum number of independent disks supported in vCloud Director 9.1 is a soft limit. Depending on the environment configuration and workload profiles it is possible to have a significantly larger number of independent disks, up to 10,000. vCloud Director 9.5 was tested and certified up to 10,000 independent disks.

Infrastructure Maximums Associated with vCenter Server and NSX

vCenter Server instances and NSX Manager instances under vCloud Director impose scale limits on the underlying infrastructure and managed entities. The limits might vary for different versions of vSphere. Be sure to consult appropriate vSphere documentation (*vSphere Configuration Maximums*).

The overall vCloud Director powered system inherits the limits of the underlying vCenter Server instances and NSX Manager instances. In most cases, the limits can be related to the configuration maximums in the underlying vCenter Server instances. Some of the entities are co-managed by vCenter Server and vCloud Director and might also be subject to vCloud Director imposed limits. When vCenter Server and vCloud Director limits apply, both are noted in the table. The lower limit of the two is the actual limit in the given environment.

A description for each category of maximums listed in Table 2 is included here:

- Network latency from vCloud Director to vCenter Server instances and VMware ESXi™ hosts

  Recommended maximum round-trip network latency. Exceeding this limit might impact stability and responsiveness of the system. If you choose to exceed the limit, perform extensive testing to establish whether the performance impact is acceptable. The actual impact of latency on performance depends on a large number of factors and might vary significantly between environments.

- Hosts

  Total number of ESXi hosts that can be managed by vCloud Director. Primarily constrained by vCenter Server limits. vCloud Director can generally support the maximum number of hosts allowed by the underlying vCenter Server instances.

- Clusters

  Total number of ESXi clusters managed by vCloud Director.

- Datastores

  Total number of datastores under vCloud Director management. Constrained by the limits of the underlying vCenter Server instances. vCloud Director imposes its own overall maximum.

- Storage policies

  All storage policies exposed to vCloud Director by managed vCenter Server instances.

- Registered VMs

  VM managed in vCloud Director inventory.

- Powered-on VMs

  Powered-on VM managed by vCloud Director.

- Edge Gateways

  Edge gateways provided by NSX in managed vCenter Server instances.

Table 2. Infrastructure Maximums Associated with ESXi hosts, vCenter Server and NSX

Item	Maximum per vCloud Director	
	Release 9.1	**Release 9.5**
Round-trip network latency from vCloud Director to vCenter Server and ESXi hosts	150 ms	150 ms
vCenter Server systems	20 (*see Note 1*)	20 (*see Note 1*)
ESXi hosts backed by NSX-V	vSphere maximum	vSphere maximum
ESXi clusters	vSphere maximum	vSphere maximum
NSX-T Managers	N/A	**4 per vCloud Director**
ESXi hosts backed by NSX-T	N/A	**200 per vCloud Director**
Datastores	vSphere maximum vCloud Director max = 1024	vSphere maximum vCloud Director max = 1024
Storage policies	vSphere maximum; vCloud Director limit = 65	vSphere maximum; vCloud Director limit = 65
Registered VMs	vSphere maximum; vCloud Director limit = 40,000	vSphere maximum; vCloud Director limit = 40,000
Powered-on VMs	vSphere maximum; vCloud Director limit = 25,000	vSphere maximum; vCloud Director limit = 25,000
Edge gateways	2000 per vCloud Director	2000 per vCloud Director

Note 1

There is no inherent limit on the number of vCenter Server instances in vCloud Director. Larger number of vCenter Server instances will increase the load on vCloud Director services and will require a larger number of cells. VMware recommends running [# of vCenter Server instances] +1 cells for best performance.

Concurrency Maximums

This section covers the limits for concurrent API and UI operations and concurrent console sessions. These characteristics generally depend on the number of vCloud Director cells. Concurrency limits listed in the following table are recommended for best performance. Exceeding the limits is possible but will impact user experience and responsiveness of the system. The impact depends on many variables. Extensive testing is recommended to determine performance characteristics in your environment.

A description for each category of maximums listed in Table 3 is included here:

- Concurrent VM consoles

  Total number of concurrent VM console connections per vCloud Director. The recommended maximum is determined by many factors, including the number of vCloud Director cells.

- Concurrent user operations (invoked in UI or API)

  Total number of concurrent operations (tasks) being processed by vCloud Director. Includes API and UI initiated user operations. This limits scales nearly linearly with the number of cells.

Table 3. Concurrency Maximums

Item	Maximum per vCloud Director	
	Release 9.1	**Release 9.5**
Concurrent user tasks (invoked in UI or API)	256 per cell	256 per cell

Latency Maximums

This section covers the roundtrip latency tolerance for vCloud Director components.

Component	Component	Maximum Roundtrip Latency
vCloud Director Cell(s)	vCenter Server NSX Components ESXi Hosts	150ms[1]
vCloud Director Cell(s)	AMQP	Asynchronous[3]
Cross-vCenter NSX Environment	• All NSX Components • NSX Manager and NSX Controllers • NSX Manager and ESXi Hosts • NSX Manager and vCenter Server system • NSX Manager and NSX Manager in a cross-vCenter NSX Environment	150 ms[2]

NSX Controller Cluster	• NSX Controller Cluster storage subsystem • VMFS, NFS or vsanDatastore storage latencies for NSX Controller Cluster virtual appliance disks and files (vmdk, vmx, nvram, vmem, etc.)	Peak write latency 300 ms Mean write latency 100 ms
vRealize Operations[5]	• vRealize Operations Components • Data nodes • Remote Collectors • Agents • Components to Datastore latency	5 ms 200 ms 20 ms 10 ms
Management cluster storage metro cluster solution	Management cluster storage metro cluster solution	5-10 ms[4]

Notes:

[1] Recommended maximum round-trip network latency. Exceeding this limit might impact stability and responsiveness of the system. If you choose to exceed the limit, perform extensive testing to establish whether the performance impact is acceptable. The actual impact of latency on performance depends on a large number of factors and might vary significantly between environments.

[2] Must be on the same LAN segment.

[3] vCloud Director Cell(s) to AMQP message broker has no latency limits since the communication is asynchronous.

[4] Stretched storage can be used for disaster recovery protection of the management layer. In such a case, distance between sites is limited by the supported round-trip latency of the storage network (usually 5–10 ms). **Please refer to storage vendor's recommendations.**

[5] Refer to vROps Sizing Guidelines here: https://kb.vmware.com/s/article/54370