



What's New with VMware vCloud Director 8.0

Feature Overview

TECHNICAL WHITE PAPER

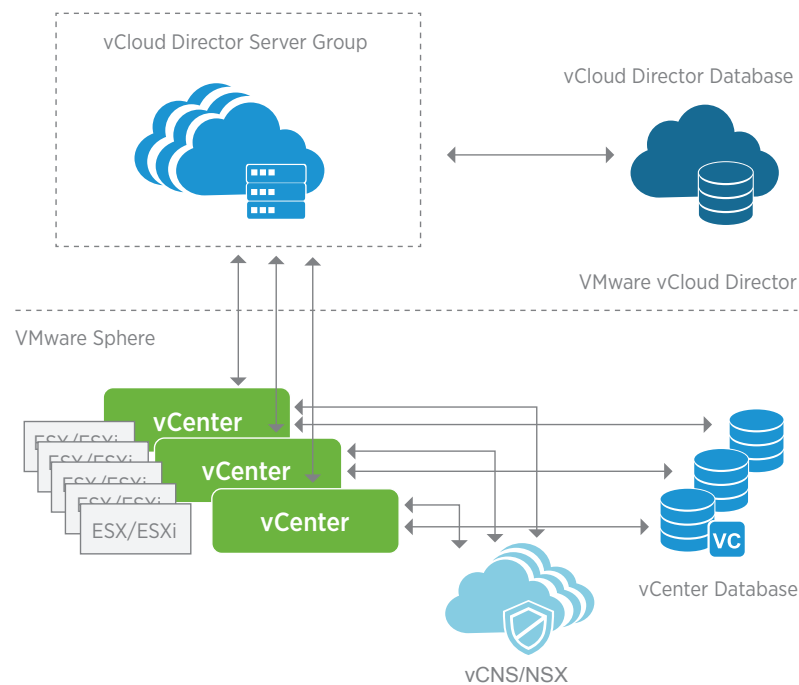
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What's New with VMware vCloud Director 8.0

VMware vCloud® Director (vCloud Director) enables service providers to orchestrate the provisioning of Virtual Data Centers, that are software-defined, modular and ready for consumption in a matter of minutes.

Version 8.0 of VMware vCloud Director adds features that leverage the server virtualization capabilities of VMware vSphere and the Software Defined Network (SDN) functionality from VMware NSX to offer service providers a powerful platform for delivering Infrastructure as a Service (IaaS) solutions.



vCloud Director Architecture

VMware vCloud Director 8.0 Features:

- **vSphere 6.0 and NSX 6.1.4 support:** version 6.0 of the vSphere server virtualization platform and version 6.1.4 of the NSX network virtualization platform are supported in backward compatibility mode.
- **Organizational virtual data center (vDC) templates:** system administrators can now develop organization-specific virtual data center templates with pre-set resource and delegation rules. Organizations deploy these templates to quickly create new virtual data centers on a self-service basis.
- **vApp enhancements:** system administrators can now reconfigure virtual machines within a vApp, as well as network connectivity and virtual machine capability during vApp instantiation.
- **OAuth support for identity sources:** OAuth2 tokens are now supported.
- **Tenant throttling:** prevents a few tenants from consuming a majority of the resources for a single instance of vCloud Director and ensures fairness of execution and scheduling among tenants.

Support for vSphere 6.0 and NSX 6.1.4

With server virtualization, a software abstraction layer (server hypervisor) reproduces the familiar attributes of an x86 physical server (e.g., CPU, RAM, Disk, NIC) in software, allowing them to be programmatically assembled in any combination to produce a unique virtual machine (VM) in a matter of seconds.

With network virtualization, the functional equivalent of physical network switches and routers reproduces the complete set of Layer 2 to Layer 7 networking services (e.g., switching, routing, access control, firewalling, QoS, and load balancing) in software. These Services also be programmatically assembled in any arbitrary combination to quickly produce a unique virtual network, with similar benefits.

Just as VMs are independent of the underlying x86 platform and allow IT to treat physical hosts as a pool of compute capacity, virtual networks are independent of the underlying IP network hardware and allow IT to treat the physical network as a pool of transport capacity that can be consumed and repurposed on demand.

VMware vCloud Director 8.0 adds support for VMware vSphere 6.0 up to virtual hardware version 10 and VMware NSX as the underlying virtualization platforms for server and network.

VMware vSphere 6.0 Support

VMware vSphere 6.0 offers optimized, scalable and resilient server hypervisor functionality. Each vSphere 6.0 Hypervisor instance can support as many as 480 logical CPUs, 12TB of RAM and 1,024 virtual machines. By leveraging the newest hardware advances, vSphere Hypervisor 6.0 enables virtualization of applications that were once thought to be nonvirtualizable.

With the addition of vSphere Hypervisor 6.0 as a supported platform, datacenters running vCloud Director 8.0 can optimize their cloud infrastructure platforms by managing more resources per vCenter Cluster along with the resource pools that are mapped to vCloud Director Org vDC's.

VMware NSX 6.1.4 Support

vCloud Director 8.0 leverages VMware NSX Manger to provide Edge gateway services to its tenants. An Edge gateway connects isolated, stub networks to shared (uplink) networks by providing common gateway services such as DHCP, VPN, NAT, dynamic routing, and load balancing. Edge gateway helps create virtual boundaries between various tenants and virtual data centers in vCloud Director.

Edge gateway helps manage and create virtual networks that can be assigned to various organizational vDCs in vCloud Director. These networks can be either:

- **Isolated:** where the virtual machines connected to an isolated network can only send/receive network traffic within the isolated network subnet. This kind of network is best suited for virtual machines that are part of a multi-tiered application, however they need not be exposed to external/routable networks.
- **Routed Networks:** a routed virtual network sits behind an edge gateway and will have private subnets. However, virtual machines connected to routed networks can send/receive external network traffic by utilizing Network Address Translation (NAT), and filter traffic by defining firewall rules. With routed virtual networks, applications can reside securely in private virtual networks and still interface externally by NAT mapping them to public Internet Protocol (IP) addresses allocated to an Edge gateway. This capability reduces the number of external IP addresses needed by service providers for making tenant applications publicly accessible.

Organizational Virtual Data Center Templates

VMware vCloud Director 8.0 introduces the concept of virtual data center templates, which provide a standard specification for new virtual data centers deployed by approved users within tenant organizations. Virtual data center templates are created by systems administrators with pre-defined characteristics tailored to the users of specific organizations, who can then deploy their own vDCs on a self-service, as-needed basis.

VDC templates free system admins from the responsibility of creating VDCs for tenants, while allowing them to retain control over the allocation of critical resources. VDC templates can be created with a variety of base configurations, and tenant organizations can be granted rights to use these templates to instantiate organization VDCs. Once instantiated, these VDCs can be modified in the same ways that have been the purview of organization administrators for the past several VCD releases, including adding and removing org VDC networks, configuring network services such as firewalls, load balancers, and VPNs. VDC created by instantiating a template are subject to the same limits imposed by the existing organization VDC quota.

Virtual Data Center templates are created using vCloud Director's Extensions API (the VDC template element was added to version 5.7 of the API schema). Below are examples of how a systems administrator can create vDC templates and how an organization administrator would consume the same. These examples have been executed using CuRL to work with vCloud Director's REST API.

After logging in to the vCloud Director REST API, the system administrator first needs to create a template by specifying the provider vDC the template will be using, along with the resource allocation and storage profile. Once the vDC template element has been created, the template can be granted to an organization and an organization administrator for on-demand consumption.

To reach the API URL needed to send the creation of a vDC template, the systems administrator would login to vCloud Director's REST API and list <vCloud Rest API base URL>/admin/extension, then get the URL to send a POST request for creating the vDC template. To send the POST request, he or she would create an XML construct to provide details such as the provider virtual data center's UUID, etc.

Then list the extension's URL to get the vDC template creation link:

```
Prathams-MacBook-Air:~$ prathams curl -i -k -H "Accept:application/*;version=5.8" -H "x-vcloud-authorization:607e2ac4c4084651a75f53aa9775f303" -u 'administrator@System:vmware1231' -X GET https://10.115.73.160/api/admin/extension
HTTP/1.1 200 OK
Date: Fri, 24 Jul 2015 09:57:59 GMT
X-VMWARE-VCLD-REQUEST-ID: 2589e753-1769-4345-b15b-17ec83b5b0f3
x-vcloud-authorization: 607e2ac4c4084651a75f53aa9775f303
X-VMWARE-VCLD-REQUEST-EXECUTION-TIME: 9
Content-Type: application/vnd.vmware.admin.vmwextension+xml;version=5.8
Vary: Accept-Encoding, User-Agent
Content-Length: 3445

<?xml version="1.0" encoding="UTF-8"?>
<vmext:VMExtension xmlns:vmext="http://www.vmware.com/vcloud/extension/v1.5" xmlns:vcloud="http://www.vmware.com/vcloud/v1.5" type="application/vnd.vmware.admin.vmwExtension+xml" xmlns: xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://www.vmware.com/vcloud/extension/v1.5 http://10.115.73.160/api/v1.5/schema/vmwextensions.xsd http://www.vmware.com/vcloud/v1.5 http://10.115.73.160/api/v1.5/schema/master.xsd">
  <vcloud:Link rel="down" href="https://10.115.73.160/api/admin/extension/providerVdcReferences" type="application/vnd.vmware.admin.vmwProviderVdcReferences+xml"/>
  <vcloud:Link rel="down" href="https://10.115.73.160/api/admin/extension/externalNetworkReferences" type="application/vnd.vmware.admin.vmwExternalNetworkReferences+xml"/>
  <vcloud:Link rel="down" href="https://10.115.73.160/api/admin/extension/networkPoolReferences" type="application/vnd.vmware.admin.vmwNetworkPoolReferences+xml"/>
  <vcloud:Link rel="down" href="https://10.115.73.160/api/admin/extension/vmServerReferences" type="application/vnd.vmware.admin.vmwVmServerReferences+xml"/>
  <vcloud:Link rel="down" href="https://10.115.73.160/api/admin/extension/hostReferences" type="application/vnd.vmware.admin.vmwHostReferences+xml"/>
  <vcloud:Link rel="down" href="https://10.115.73.160/api/admin/extension/settings" type="application/vnd.vmware.admin.systemSettings+xml"/>
  <vcloud:Link rel="add" href="https://10.115.73.160/api/admin/extension/providerVdc" type="application/vnd.vmware.admin.vmwProviderVdc+xml"/>
  <vcloud:Link rel="add" href="https://10.115.73.160/api/admin/extension/providerVdcParams" type="application/vnd.vmware.admin.createProviderVdcParams+xml"/>
  <vcloud:Link rel="add" href="https://10.115.73.160/api/admin/extension/externalNets" type="application/vnd.vmware.admin.vmwExternalNet+xml"/>
  <vcloud:Link rel="add" href="https://10.115.73.160/api/admin/extension/networkPools" type="application/vnd.vmware.admin.networkPool+xml"/>
  <vcloud:Link rel="add" href="https://10.115.73.160/api/admin/extension/action/registerVmServer" type="application/vnd.vmware.admin.registerVmServerParams+xml"/>
  <vcloud:Link rel="down" href="https://10.115.73.160/api/admin/extension/licensing/reports" type="application/vnd.vmware.admin.licensingReportList+xml"/>
  <vcloud:Link rel="down" href="https://10.115.73.160/api/admin/extension/datasources" type="application/vnd.vmware.admin.dataSourceList+xml"/>
  <vcloud:Link rel="down" href="https://10.115.73.160/api/admin/extension/strandedItemsQuery" type="application/vnd.vmware.vcloud.query.records+xml"/>
  <vcloud:Link rel="remove" href="https://10.115.73.160/api/admin/extension/strandedItems" type="application/vnd.vmware.vcloud.query.records+xml"/>
  <vcloud:Link rel="blockingTask" href="https://10.115.73.160/api/admin/extension/blockingTasks" type="application/vnd.vmware.admin.blockingTaskList+xml"/>
  <vcloud:Link rel="down" href="https://10.115.73.160/api/admin/extension/service" type="application/vnd.vmware.admin.extensionServices+xml"/>
  <vcloud:Link rel="down" href="https://10.115.73.160/api/admin/extension/vdcTemplateReferences" type="application/vnd.vmware.admin.vmwVdcTemplateReferences+xml"/>
  <vcloud:Link rel="add" href="https://10.115.73.160/api/admin/extension/vdcTemplates" type="application/vnd.vmware.admin.vmwVdcTemplate+xml"/>
</vmext:VMExtension>
```

Get the UUID for the provider vDC with which the vDC template will be associated:

```
Prathams-MacBook-Air:~$ prathams curl -i -k -H "Accept:application/*;version=5.8" -H "x-vcloud-authorization:607e2ac4c4084651a75f53aa9775f303" -u 'administrator@System:vmware1231' -X GET https://10.115.73.160/api/query?type=providerVdc&format=references
[1] 13837
Prathams-MacBook-Air:~$ prathams HTTP/1.1 200 OK
Date: Fri, 24 Jul 2015 10:18:27 GMT
X-VMWARE-VCLD-REQUEST-ID: 7fbb643e-8208-42f6-b71c-80cd3d2b5f9e
x-vcloud-authorization: 607e2ac4c4084651a75f53aa9775f303
X-VMWARE-VCLD-REQUEST-EXECUTION-TIME: 18
Content-Type: application/vnd.vmware.vcloud.query.records+xml;version=5.8
Vary: Accept-Encoding, User-Agent
Content-Length: 1733

<?xml version="1.0" encoding="UTF-8"?>
<QueryResultRecords xmlns="http://www.vmware.com/vcloud/v1.5" name="providerVdc" page="1" pageSize="25" total="1" href="https://10.115.73.160/api/query?type=providerVdc&page=1&pageSize=25&format=references" type="application/vnd.vmware.vcloud.query.records+xml" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://www.vmware.com/vcloud/v1.5 http://10.115.73.160/api/v1.5/schema/master.xsd">
  <Link rel="alternate" href="https://10.115.73.160/api/query?type=providerVdc&page=1&pageSize=25&format=idrecords" type="application/vnd.vmware.vcloud.query.records+xml"/>
  <Link rel="alternate" href="https://10.115.73.160/api/query?type=providerVdc&page=1&pageSize=25&format=idrecords" type="application/vnd.vmware.vcloud.query.records+xml"/>
  <vmw:ProviderVdcRecord cpuAllocationMhz="0" cpuLimitMhz="75451" cpusUsedMhz="64" isBusy="false" isDeleted="false" isEnabled="true" memoryAllocationMhz="0" memoryLimitMhz="375191" memoryUsedMhz="35771" name="vcan_provider" numberOfDatastores="1" numberOfStorageProfiles="1" numberOfVFs="1" status="READY" storageAllocationMhz="0" storageLimitMhz="619520" storageUsedMhz="173586" vcpuRatingMhz="1800" href="https://10.115.73.160/api/admin/providerVdc/2db23db4-9b16-4421-8948-2726ad6142d0" vName="VCM_Center" taskStatus="success" task="https://10.115.73.160/api/task/056e2528-ac52-4b4a-b213-875478ee6f8" taskDetails="{}" cpusOverheadMhz="64" v="https://10.115.73.160/api/admin/extension/vmServer/9805287b-69c7-4f32-9661-55267f688f11" numberOfResourcePools="1" memoryOverheadMhz="177" isVcEnabled="true" taskStatusName="cliCreateProviderVdc" storageOverheadMhz="784"/>
</QueryResultRecords>
```

Generate an XML parameters file for the vDC template by specifying details in it. Then send this file with the API request to generate the org vDC template:

```
<vmext:VMWVdcTemplate
  xmlns:vmext="http://www.vmware.com/vcloud/extension/v1.5"
  xmlns="http://www.vmware.com/vcloud/v1.5"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  name="example">
  <Description>Example AllocationVapp VDC Template with Gateway</Description>
  <vmext:TenantName>PayAsYouGoe</vmext:TenantName>
  <vmext:TenantDescription>PayAsYouGoVdcTemplate</vmext:TenantDescription>
  <vmext:ProviderVdcReference
    href="https://10.115.73.160/api/admin/providervdc/2db23db4-9b16-4421-8940-2726adf614da"
    name="vcap_provider1"
    type="application/vnd.vmware.admin.provider.vdc+xml"/>
  <vmext:VdcTemplateSpecification
    xsi:type="vmext:VMWAllocationVappVdcTemplateSpecificationType">
    <NicQuota>100</NicQuota>
    <VmQuota>50</VmQuota>
    <ProvisionedNetworkQuota>100</ProvisionedNetworkQuota>
  <StorageProfile name="*">
    <Enabled>true</Enabled>
    <Units>MB</Units>
    <Limit>2097152</Limit>
    <Default>true</Default>
  </StorageProfile>
  <vmext:ThinProvision>false</vmext:ThinProvision>
  <vmext:FastProvisioningEnabled>false</vmext:FastProvisioningEnabled>
  <CpuAllocationMhz>2048</CpuAllocationMhz>
  <CpuLimitMhzPerVcpu>1000</CpuLimitMhzPerVcpu>
  <MemoryAllocationMB>2048</MemoryAllocationMB>
  <CpuGuaranteedPercentage>1</CpuGuaranteedPercentage>
  <MemoryGuaranteedPercentage>1</MemoryGuaranteedPercentage>
  </vmext:VdcTemplateSpecification>
</vmext:VMWVdcTemplate>
```

Send an API POST request to generate the vDC template. In this example, '@vdctemplate' is the text file containing the XML request body as shown above:

```
Prathans-MacBook-Air:~$ curl -i -k -H "Accept:application/*;version=5.8" -H "x-vcloud-authorization:650583d1e34c485e00408f18f20ea281" -H "Content-Type:application/vnd.vmware.admin.vmwVdcTemplate+xml" -u 'administrator@system:vmware123!' -X POST https://10.115.73.160/api/admin/extension/vdcTemplates -d @vdctemplate
HTTP/1.1 200 Continue

HTTP/1.1 201 Created
Date: Fri, 24 Jul 2015 09:06:53 GMT
X-VMWARE-VCLD-REQUEST-ID: 84ce755f-fce9-4b70-badc-42babbf41f1c
X-vcloud-authorization: 650583d1e34c485e00408f18f20ea281
X-VMWARE-VCLD-REQUEST-EXECUTION-TIME: 20679
Location: https://10.115.73.160/api/admin/extension/vdcTemplate/ead80ce-2b70-4838-8695-0a0fa1c6f78
Content-Type: application/vnd.vmware.admin.vmwVdcTemplate+xml;version=5.8
Content-Length: 2930

<?xml version="1.0" encoding="UTF-8"?>
<vmext:VMWVdcTemplate xmlns:vmext="http://www.vmware.com/vcloud/extension/v1.5" xmlns:vcloud="http://www.vmware.com/vcloud/v1.5" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" name="example" id="urn:vcloud:vdcTemplate:ead80ce-2b70-4838-8695-0a0fa1c6f78" href="https://10.115.73.160/api/admin/extension/vdcTemplate/ead80ce-2b70-4838-8695-0a0fa1c6f78" xsi:schemaLocation="http://www.vmware.com/vcloud/extension/v1.5 http://10.115.73.160/api/v1.5/schema/vmextensions.xsd http://www.vmware.com/vcloud/v1.5 http://10.115.73.160/api/v1.5/schema/master.xsd">
  <vcloud:Link rel="edit" href="https://10.115.73.160/api/admin/extension/vdcTemplate/ead80ce-2b70-4838-8695-0a0fa1c6f78" type="application/vnd.vmware.admin.vmwVdcTemplate+xml"/>
  <vcloud:Link rel="remove" href="https://10.115.73.160/api/admin/extension/vdcTemplate/ead80ce-2b70-4838-8695-0a0fa1c6f78"/>
  <vcloud:Link rel="down" href="https://10.115.73.160/api/admin/extension/vdcTemplate/ead80ce-2b70-4838-8695-0a0fa1c6f78/controlAccess/" type="application/vnd.vmware.vcloud.controlAccess+xml"/>
  <vcloud:Link rel="controlAccess" href="https://10.115.73.160/api/admin/extension/vdcTemplate/ead80ce-2b70-4838-8695-0a0fa1c6f78/action/controlAccess" type="application/vnd.vmware.vcloud.controlAccess+xml"/>
  <vcloud:Link rel="alternate" href="https://10.115.73.160/api/vdcTemplate/ead80ce-2b70-4838-8695-0a0fa1c6f78" type="application/vnd.vmware.admin.vdcTemplate+xml"/>
  <vcloud:Description>Example AllocationVapp VDC Template with Gateway</vcloud:Description>
  <vmext:TenantName>PayAsYouGoe</vmext:TenantName>
  <vmext:TenantDescription>PayAsYouGoVdcTemplate</vmext:TenantDescription>
  <vmext:ProviderVdcReference href="https://10.115.73.160/api/admin/providervdc/2db23db4-9b16-4421-8940-2726adf614da"/>
  <vmext:VdcTemplateSpecification xsi:type="vmext:VMWAllocationVappVdcTemplateSpecificationType">
    <vcloud:NicQuota>100</vcloud:NicQuota>
    <vcloud:ProvisionedNetworkQuota>100</vcloud:ProvisionedNetworkQuota>
    <vcloud:StorageProfile name="*">
      <vcloud:Enabled>true</vcloud:Enabled>
      <vcloud:Units>MB</vcloud:Units>
      <vcloud:Limit>2097152</vcloud:Limit>
      <vcloud:Default>true</vcloud:Default>
    </vcloud:StorageProfile>
    <vmext:ThinProvision>false</vmext:ThinProvision>
    <vmext:FastProvisioningEnabled>false</vmext:FastProvisioningEnabled>
    <vcloud:CpuAllocationMhz>2048</vcloud:CpuAllocationMhz>
    <vcloud:CpuLimitMhzPerVcpu>1000</vcloud:CpuLimitMhzPerVcpu>
    <vcloud:MemoryAllocationMB>2048</vcloud:MemoryAllocationMB>
    <vcloud:CpuGuaranteedPercentage>1</vcloud:CpuGuaranteedPercentage>
    <vcloud:MemoryGuaranteedPercentage>1</vcloud:MemoryGuaranteedPercentage>
  </vmext:VdcTemplateSpecification>
```

Enhanced Virtual Appliance (vApp) Functionality

A Virtual Appliance (vApp) is a container/construct of multiple virtual machines that usually share common application components to make deployment of complex/multi-tiered applications more efficient and faster.

The vApp properties define the common characteristics of the virtual machines in it, such as network mappings, open virtualization format and sequence in which virtual machines start. vCloud Director stores these application templates in its catalogs in the form of virtual appliances. To deploy a virtual appliance, a user simply adds the vApp templates to its My Cloud.

vCloud Director 8.0 enhances the way vApps are instantiated and reconfigured to make the management of vApps and their virtual machines much more efficient.

Adding Network Services while Instantiating vApp

A virtual Appliance once instantiated from the Catalog inherits properties such as guest customization, sysprep and vApp network connectivity from the template. Earlier versions of the vCloud Director instantiate vApp template API call would not allow changes to any of these properties while deploying the vApp.

With vCloud Director 8.0, the *instantiate vApp* API call has added the attribute '*NetworkConfigSection*' to specify which networks to which the virtual machines of the vApp will be connected. *NetworkConfigSection* is an optional attribute; if it is not specified during the instantiate vApp call, the virtual machines of the vApp will be connected to the default network defined in the template.

This new feature helps reduce the number of templates stored in a catalog and the number of calls needed to reconfigure a vApp once it has been deployed from a common catalog template. It also helps service providers keep "golden" vApp templates that a tenant can leverage from the service provider's public catalog and deploy on the tenant's organizational networks.

Reconfiguring VMs from within vApp

The ability to add or remove virtual machines from virtual applications is critical for application maintenance, since a virtual machine that requires updates or maintenance can be safely removed from the cloud and added back to the vApp in cloud when ready.

Earlier versions of vCloud Director allowed a vApp that was added to a cloud to be edited only by adding or removing underlying virtual machines, which was accomplished by an '*Recompose vApp*' API call.

With vCloud Director 8.0, the *Recompose vApp* call allows you to not only add or remove virtual machines from a vApp, but it also allows for the reconfiguration of additional parameters such as attaching/detaching a VM from a vApp/organization network and changing the order in which the VMs in the vApp will startup or shutdown.

OAuth 2 support for identity sources

OAuth is an open standard protocol that enables applications to authenticate users with third-party identity source providers such as Google or Facebook. System accounts that are local to the application are mapped to users from the identity source, which helps delegate authorization of access to system functions without the need for generating local accounts. System roles can be assigned to users from the OAuth identity provider during import.

For vCloud Director 8.0, support for OAuth identity has been added along with SAML protocol for users of an organization virtual data centers. This will help service providers approve users from a wide variety of identity sources without generating long user lists. vCloud Director does not import any information from OAuth user accounts, but maps them to roles within the organization virtual data center.

Adding OAuth authentication to a virtual data center created with vCloud Director 8.0 can be accomplished in three easy steps:

1. Update the organization vDC with OAuth identity provider information, its public key and OAuth token
2. Import users from the OAuth identity store added in Step1 and specify a system role for the user
3. While sending the authentication to vCloud Director's API, send the bearer token in the login request instead of basic authentication

Tenant Throttling

A vCloud Director cell can host more than one tenant and schedule multiple operations initiated by each member of the tenant. The operations initiated by each tenant to vCloud Director will vary depending upon their needs. Some tenants may have a long set of continuous operations running and therefore utilize more resources than other tenants who may not be as active. Therefore, it is important to optimize scheduling of operations between tenants to ensure fairness in the execution of these requests.

vCloud Director 8.0 includes a new algorithm that ensures operations running or in queue from a "busy" tenant do not stop or slow down a request from a "sedentary" tenant. The tenant throttling feature gives system administrators control over the number of simultaneous resource-intensive operations any tenant can run. Resource-intensive operations beyond a specific limit are placed in a per-tenant queue. You can limit the depth of this queue to prevent an organization (or user) from continually adding tasks to it. "Throttling" operations in vCloud Director is accomplished through the tenant REST API calls, which are subject to four new parameters defined at the organization virtual data center level:

- OperationsPerOrg – maximum number of operations running per organization vDC
- OperationsPerUser – maximum number of operations running per user of the organization vDC
- QueuedOperationsPerOrg – maximum number of operations that can be queued per organization vDC
- QueuedOperationsPerUser – maximum number of operations that can be queued per user of the organization vDC

When a user makes a request that would cause the OperationsPerOrg limit to be exceeded, the requested operation is queued but remains ineligible to run until enough of the user's eligible requests have been run to allow an ineligible request to become eligible. When an organization member makes a request that would cause the QueuedOperationsPerOrg limit to be exceeded, the request fails and returns HTTP status 400. These attributes limit the number of operations that can be simultaneously executed or queued for execution by an organization or by an individual user within the organization. An attribute value of '0' indicates an unlimited number of operations are permitted. The operation limit specified for the organization should be higher than the total of operation limits defined for users. If the user limit is not set, the vCloud Director substitutes the organization limit.

A REST PUT request to the organization virtual data center's OperationLimitsSettings will change these options as shown in the following steps. Retrieve the current limits set on the orgvDC via REST GET request:

```
Prathams-MacBook-Air:~ pratham$ curl -i -k -H "Accept:application/*;version=5.0" -H "x-vcloud-authorization:7b8e65fe855341a6a032976d02602b06" -u 'administrator@System:vmware123!' -X GET https://10.115.73.160/api/admin/org/82480d7c-f3c8-47bb-89fb-a07776a25d05/settings/operationLimitsSettings
HTTP/1.1 200 OK
Date: Wed, 29 Jul 2015 10:37:28 GMT
X-VMWARE-VCLLOUD-REQUEST-ID: fcf86ed-e32e-46b3-07a2-cee85af565a3
x-vcloud-authorization: 7b8e65fe855341a6a032976d02602b06
X-VMWARE-VCLLOUD-REQUEST-EXECUTION-TIME: 15
Content-Type: application/vnd.vmware.admin.operationLimitsSettings+xml;version=5.0
Vary: Accept-Encoding, User-Agent
Content-Length: 971

<?xml version="1.0" encoding="UTF-8"?>
<OrgOperationLimitsSettings xmlns="http://www.vmware.com/vcloud/v1.5" href="https://10.115.73.160/api/admin/org/82480d7c-f3c8-47bb-89fb-a07776a25d05/settings/operationLimitsSettings" type="application/vnd
.vmware.admin.operationLimitsSettings+xml" xmlns:xs="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://www.vmware.com/vcloud/v1.5 http://10.115.73.160/api/v1.5/schema/master.xsd">
  <Link rel="up" href="https://10.115.73.160/api/admin/org/82480d7c-f3c8-47bb-89fb-a07776a25d05/settings" type="application/vnd.vmware.admin.orgSettings+xml"/>
  <Link rel="edit" href="https://10.115.73.160/api/admin/org/82480d7c-f3c8-47bb-89fb-a07776a25d05/settings/operationLimitsSettings" type="application/vnd.vmware.admin.operationLimitsSettings+xml"/>
  <ConsolesPerVmLimit>0</ConsolesPerVmLimit>
  <OperationsPerUser>0</OperationsPerUser>
  <OperationsPerOrg>0</OperationsPerOrg>
</OrgOperationLimitsSettings>
```

Frame a XML with the needed values:

```
Prathams-MacBook-Air:~ pratham$ more tenanttrottle
<vcloud:OrgOperationLimitsSettings
  xmlns:vcloud="http://www.vmware.com/vcloud/v1.5">
  <vcloud:ConsolesPerVmLimit>0</vcloud:ConsolesPerVmLimit>
  <vcloud:OperationsPerUser>2</vcloud:OperationsPerUser>
  <vcloud:OperationsPerOrg>3</vcloud:OperationsPerOrg>
  <vcloud:QueuedOperationsPerUser>2</vcloud:QueuedOperationsPerUser>
  <vcloud:QueuedOperationsPerOrg>3</vcloud:QueuedOperationsPerOrg>
</vcloud:OrgOperationLimitsSettings>
Prathams-MacBook-Air:~ pratham$
```

Update the OrgvDC via a REST PUT request:

```
Prathams-MacBook-Air:~ pratham$ curl -i -k -H "Accept:application/*;version=5.0" -H "x-vcloud-authorization:7b8e65fe855341a6a032976d02602b06" -H "Content-Type: application/vnd.vmware.admin.operationLimitsSettings+xml;version=5.0" -u 'administrator@System:vmware123!' -X PUT https://10.115.73.160/api/admin/org/82480d7c-f3c8-47bb-89fb-a07776a25d05/settings/operationLimitsSettings-d@tenanttrottle
HTTP/1.1 200 OK
Date: Wed, 29 Jul 2015 10:54:43 GMT
X-VMWARE-VCLLOUD-REQUEST-ID: 060d179e-664c-474c-a6b7-e74443780b6c
x-vcloud-authorization: 7b8e65fe855341a6a032976d02602b06
X-VMWARE-VCLLOUD-REQUEST-EXECUTION-TIME: 109
Content-Type: application/vnd.vmware.admin.operationLimitsSettings+xml;version=5.0
Content-Length: 971

<?xml version="1.0" encoding="UTF-8"?>
<OrgOperationLimitsSettings xmlns="http://www.vmware.com/vcloud/v1.5" href="https://10.115.73.160/api/admin/org/82480d7c-f3c8-47bb-89fb-a07776a25d05/settings/operationLimitsSettings" type="application/vnd
.vmware.admin.operationLimitsSettings+xml" xmlns:xs="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://www.vmware.com/vcloud/v1.5 http://10.115.73.160/api/v1.5/schema/master.xsd">
  <Link rel="up" href="https://10.115.73.160/api/admin/org/82480d7c-f3c8-47bb-89fb-a07776a25d05/settings" type="application/vnd.vmware.admin.orgSettings+xml"/>
  <Link rel="edit" href="https://10.115.73.160/api/admin/org/82480d7c-f3c8-47bb-89fb-a07776a25d05/settings/operationLimitsSettings" type="application/vnd.vmware.admin.operationLimitsSettings+xml"/>
  <ConsolesPerVmLimit>0</ConsolesPerVmLimit>
  <OperationsPerUser>2</OperationsPerUser>
  <OperationsPerOrg>3</OperationsPerOrg>
</OrgOperationLimitsSettings>
```

Summary

VMware vCloud Director 8.0 adds new features and functionality to enable service providers to more quickly deliver differentiated, enterprise-class cloud solutions. vCloud Director 8.0 is integrated with vSphere 6.0 and NSX 6.1.4 for a robust IaaS platform, it enables tenant users to deploy their own virtual data centers using organizational templates customized to their needs, and it optimizes tenant resource allocation with easily configured throttling limits.

Additional Resources

For more information about VMware vCloud Director, visit the product pages at:

<http://www.vmware.com/products/vcloud-director/overview.html>

You can access the documentation for vCloud Director at:

http://www.vmware.com/support/pubs/vcd_sp_pubs.html

For additional information or to purchase VMware vCloud Director, find out how you can join the VMware vCloud Air Service Provider Program at:

<https://www.vmware.com/partners/service-provider/>

About the Author

Boskey Savla is a Senior Technical Marketing Manager in the vCloud Air Network (vCAN) group at VMware. She works on developing resources for vCAN partners with VMware products, focusing on vCloud Director. She has more than 12 years of experience in systems and solution engineering and has worked with numerous VMware partners to certify and architect software-defined data center and hybrid cloud solutions.

