

Backup and Recovery Challenges with vCloud Director

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Overview

vCloud Director (vCD) is an integral part of the VMware vCloud Suite, which is a cornerstone of the VMware software-defined datacenter. vCloud Director introduces a virtualization model that requires a new approach to backup and recovery of workloads as well as configuration and metadata. This Veeam® technical brief will outline what challenges are present with vCD deployments and what should not be overlooked in a vCD data protection strategy.

What is vCloud Director?

Simply put, vCloud Director is a management tool that aggregates and abstracts infrastructure components like storage and networking. Conceptually, it creates a virtual datacenter for deploying applications, and the abstraction allows an Infrastructure-as-a-Service model (IaaS) to be offered to many organizations leveraging VMware technologies. These could be large or mid-size businesses with departmental groups that have the need to deploy their own virtualized applications without having to worry about the underlying infrastructure. vCloud Director supports virtual machines (VMs) by themselves or in collections as vApps.

vCloud Director brings a new level of management

There are a lot of features that make up a private cloud, and vCloud Director addresses these through management of the VMware software-defined datacenter. Capabilities such as resource pooling, resource prioritization, resource abstraction, multi-tenancy, self-service, workflow automation and automation are all significant features that can be managed by vCloud Director. Many environments have implemented VMware vSphere as the only virtualization component of their IT operation. While they have enjoyed the benefits it offers for abstraction and resource pooling, they have not realized the larger picture of the software-defined datacenter and its additional benefits.

Though these benefits indeed appeal to many IT environments, a number of details and components need to be in place to make them possible. For one, it is important to note that vCloud Director does not replace VMware vSphere, a datacenter mainstay for years. In fact, vCloud Director sits on top of vSphere to provide the critical capabilities of a private cloud. The figure below shows how vCloud Director presents virtualized infrastructures as a virtual datacenter:



Figure A

A number of concepts are introduced in this model. For one, it introduces the virtual datacenter (VDC) within vCloud Director. A VDC is used to differentiate resources from a group of compute and storage resources by a particular level of service. A VDC can be configured to deliver differentiated resources such as storage, host hardware, infrastructure availability and more. One example is to have a special-purpose VDC to address a business challenge, such as licensing. This can help an organization manage licensing costs by containing certain application licensing requirements within designated parts of the infrastructure. Additionally, features like vSphere High Availability (HA) and Distributed Resource Scheduler (DRS) can be provisioned as part of the definition of a VDC. This can be of significant interest to different stakeholders as they are deciding what their applications require. One example is to define a VDC with an availability based on vSphere HA for an underlying cluster that runs with N+1 or N+2 or higher. In this configuration, the VDC could let HA ensure availability of a VM or collection of VMs to accommodate individual ESXi host failure(s).

Here is a quick rundown of popular vCloud Director constructs:

- Organization - Organizations provide resources to a group of users and set policies that determine how users can consume those resources. It is recommended that an organization be created for each group of users that requires its own resources, policies, or both.
- Virtual datacenter - Virtual datacenters (VDCs) provide processor, memory, and storage resources to organizations. They are assigned to organizations by a system administrator. An organization can have multiple VDCs.
- vApp - A vApp consists of one or more VMs that communicate over a network and use resources and services in a vCD environment.
- vApp Template - A vApp template is a virtual machine image that is loaded with an operating system, applications, and data. These templates ensure that VMs are consistently configured across an entire organization.
- Published Catalog - Organizations use catalogs to store vApp templates and media files. The members of an organization can use catalog items as the building blocks for creating their own vApps.
- Lease – A runtime lease prevents inactive vApps from consuming compute resources. For example, if a user starts a vApp and goes on vacation without stopping it, the lease keeps the vApp from continuing to consume resources.

Each of these constructs introduces a specific configuration in the vCloud Director database. vCloud Director itself installs on Linux and can be a VM. It is administered through a web interface and has a backend database. In addition to its standard application programming interfaces (APIs) for communicating with the underlying vSphere about host- and communication-specific functions, VMware also has an API for these constructs. The VMware vCloud API is in place to query vCloud Director to discover and retrieve information about these constructs.

These constructs are leveraged to deploy services for departments with prescribed levels of performance. Frequently, VCD performance levels are set in terms like gold, silver or bronze, which also match the price and performance element associated with the underlying components. The figure below shows one way that two departments can leverage application catalogs and performance levels in a vCloud Director environment.



Figure B

vCloud Director business benefits

vCloud Director solves business challenges for organizations of many sizes. In particular, one doesn't have to be a hosting provider to use vCloud Director. In fact, there are a number of situations where vCloud Director is deployed in mid-size private organizations that deal with departmental infrastructure requests. A good example is organizations that historically have had to deal with "pockets" of infrastructure. How many times have we heard of a situation where a department sets up its own system, which then turned into two systems, which then became a VMware ESXi server and before long was its own datacenter? The departmental datacenter ends up assigning staff resources to administer equipment and address the business group's IT needs with various levels of support. In this example, vCloud Director can relieve the department of its IT burden so its people can go back to working with the applications and stakeholders instead of focusing on administering infrastructure.

Additionally, vCloud Director addresses self-service for virtualized infrastructures. There is a great opportunity to allow development teams to deploy their own VMs under a designated policy. This policy can include the removal of VMs, and also meter resource usage and enable cost reporting. These features and more address needs that organizations have today for deploying applications on a modern infrastructure platform.

What vCloud Director changes for data protection

It is pretty clear that there now is a new element of protection required when vCloud Director comes into play. And while it is also clear the vCloud Director constructs have their own configuration and impact on the entire infrastructure, the configuration of the individual virtual machine can't be ignored either. The right approach would be to identify what needs to be protected in a vCloud Director environment. Some considerations to a virtualized infrastructure with vCloud Director could include requirements for:

- Backing up the vCloud Director VM
- Querying the vCloud API for what objects are defined in Organizations, VDCs and more
- Backing up and restoring vCD-specific constructs, such as an entire vApp with its VMs and configuration data
- Backing up and restoring individual VMs with rich features (whole VM, guest file, application items) as they move around the infrastructure within the vCloud Director context

The reality is that protecting an individual VM is quite easy, and in fact, is a quite mature space. The vCloud Director system, as a whole, can easily be backed up as well. But what about the management framework and rules set up for all of the constructs within vCloud Director? How does a company protect itself if an entire vApp were to be deleted? There is a real opportunity to provide rich awareness for vCloud Director constructs in the data protection space.

How can Veeam help address data protection challenges with vCloud Director?

We've heard our customers and have announced that version 7 of Veeam Backup & Replication™ will provide enhanced vCloud Director support. This support will feature the ability to backup and restore an entire vApp for example. This is critical to ensure that configuration items such as permissions, resource assignments, locations and the individual VMs can be backed up and restored fully within the vCloud Director context. Stay tuned to Veeam.com for more information on Veeam Backup & Replication v7 and sign up for updates here: <http://go.veeam.com/v7>

About the Author



Rick Vanover is a Veeam Product Strategy Specialist with extensive virtualization expertise. In addition to being named a VMware vExpert, his certifications include VMware Certified Professional (VCP), Microsoft Certified Professional (MCP), Microsoft Certified IT Professional (MCITP) and Microsoft Certified Systems Administrator (MCSA). Rick is also an author, blogger and has worked in various levels of IT through his career.

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