Veeam Backup & Replication on IBM Cloud Solution Architecture

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Summary of Changes

This section records the history of significant changes to this document. Only the most significant changes are described here.

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Author</th>
<th>Description of Change</th>
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<tr>
<td>1.3</td>
<td>2019–06–25</td>
<td>Nazgol Sedghi</td>
<td>Veeam VSI specification change</td>
</tr>
<tr>
<td>1.2</td>
<td>2018–10–24</td>
<td>Nazgol Sedghi</td>
<td>Add information on public connectivity setup</td>
</tr>
<tr>
<td>1.1</td>
<td>2018–07–20</td>
<td>Scott Moonen</td>
<td>Add information on solution component backup</td>
</tr>
<tr>
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<td>2018–01–12</td>
<td>Jack Benney, Frank Chodacki, Daniel De Araujo, Bob Kellenberger, Simon Kofkin–Hansen, Scott Moonen</td>
<td>Initial Release</td>
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1 Introduction

1.1 About Veeam Backup & Replication

The purpose of this document is to define and describe the Veeam Backup & Replication architecture for the vCenter Server and VMware Cloud Foundation offerings deployed in the IBM Cloud. Specifically, it will detail the components of the solution and high-level configuration of each component in the design. This solution is considered to be an additional component and extension of both the vCenter Server solution offering and the VMware Cloud Foundation solution offering on IBM Cloud. As a result, this document will not cover the existing configuration of the foundation solutions on IBM Cloud. Therefore, it is highly recommended to review and understand the VMware on IBM Cloud solution architecture located on the IBM Architecture Center before reading this document.

![VMware Cloud Foundation on IBM Cloud](image)

Figure 1 VMware Cloud Foundation on IBM Cloud

1.2 Key Benefits

Enterprise VMware environments are designed with multiple levels of availability and recovery in mind, often including continuous availability and always addressing disaster recovery through replication and backup techniques. The Veeam Backup & Replication offering provides backup, recovery, and replication on IBM Cloud infrastructure, enabling the following functionality:

- Scheduled backup of both VMware vSphere and Microsoft Hyper-V workloads
- Fast, agentless image-based backups
- Recovery of entire VMs or individual files
• Item–level recovery and eDiscovery for Microsoft Exchange, SharePoint, and Active Directory
• Transaction–level restore of Oracle and Microsoft SQL Server databases
• Automatic testing and reporting of every backup and replica
• Monitoring and alerting to issues which could impact backup and application performance
2 Design

2.1 Overview

The Veeam Backup & Replication solution complements the IBM Cloud for VMware Solutions offerings by providing backup and replication services. With proper configuration and planning your administrators can use Veeam backup and restore capabilities as part of their plan to achieve high availability and disaster recovery goals for your VMware environment.

![Veeam on VMware Cloud Foundation High Level Components](image)

*Figure 2 Veeam on VMware Cloud Foundation High Level Components*
Figure 3 illustrates how Veeam interacts with other components of IBM Cloud for VMware Solutions.

**Figure 3 Veeam on VMware Cloud Foundation Architecture Diagram**

### 2.2 Veeam Deployment

#### 2.2.1 Scaling considerations

Considerations for sizing your Veeam backup storage repository are discussed below in section 2.2.3.2. There are also considerations for sizing your Veeam server deployment. You should familiarize yourself with Veeam’s recommendations and configuration guidance listed in Appendix B. For example, your backup job configuration can affect the performance of backup significantly.

As a rule of thumb, with the inclusion of Veeam Enterprise Manager, Veeam recommends a minimum server configuration of 8 CPU cores (physical or virtual) and 32GB of memory, and an average of 1 core and 5GB memory for every ten concurrent backup or restore jobs.

#### 2.2.1.1 Veeam server

Veeam Backup & Replication may be deployed either on an IBM Cloud public virtual system instance (VSI) or an IBM Cloud dedicated bare metal server. Greater network throughput is available with a bare metal server, so for any large-scale deployment the bare metal server is recommended.

IBM Cloud provides the infrastructure for running the Veeam virtual machine or bare metal server, as well as providing the Microsoft Windows Server and Veeam Backup & Replication licensing with a monthly recurring license.

Veeam is deployed with the following parameters:
### VSI configuration vs. Bare metal server configuration

<table>
<thead>
<tr>
<th>Component</th>
<th>VSI configuration</th>
<th>Bare metal server configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>8 vCPU</td>
<td>• Medium: Single Intel Xeon E5-2650 v4, 16 cores total&lt;br&gt;• Large: Dual Intel Xeon E5-2650 v4, 24 cores total</td>
</tr>
<tr>
<td>RAM</td>
<td>32GB</td>
<td>• Medium: 64GB&lt;br&gt;• Large: 128GB</td>
</tr>
<tr>
<td>Network</td>
<td>1 Gbps private uplink</td>
<td>2 × 10 Gbps private uplinks</td>
</tr>
<tr>
<td>Boot disk</td>
<td>100GB, SAN</td>
<td>2 × 1TB SATA, RAID–1</td>
</tr>
<tr>
<td>Operating System</td>
<td>Microsoft Windows Server 2016 Standard Edition</td>
<td></td>
</tr>
<tr>
<td>Location</td>
<td>Same data center and POD as vSphere hosts</td>
<td></td>
</tr>
<tr>
<td>Veeam license options</td>
<td>• 10 VMs&lt;br&gt;• 25 VMs&lt;br&gt;• 50 VMs&lt;br&gt;• 100 VMs&lt;br&gt;• 200 VMs</td>
<td></td>
</tr>
</tbody>
</table>

**Table 1 Veeam deployment summary**

When deployed using a bare metal server, this architecture specifies a 2U chassis configuration. This allows you to add up to 10 additional disks to the server at a future time if you wish to use local storage for backup jobs.

**2.2.1.2 Horizontal scaling**

This architecture specifies the deployment of a single Veeam server with an integrated *backup proxy* that performs the work of fetching virtual machine storage and performing deduplication, compression, and encryption.

As you increase the number of backup jobs beyond the point that your first server can support (taking into account CPU, memory, and network requirements), you should deploy an additional Windows server (whether VSI or bare metal) and connect it to your Veeam server as a backup proxy. Your Veeam server will install and configure the necessary components and services on the backup proxy.

**2.2.2 Network**

In this architecture, the Veeam public VSI or bare metal server is deployed with a private network interface and no public network interface. The network interface is attached to the same private VLAN hosting the management components of the VMware environment so that Veeam can connect directly to VMware ESXi and VMware vCenter Server. IBM Cloud automatically assigns an IP address for the VSI or bare metal server from the primary subnet for this VLAN.

Unless the Veeam service is installed in a vCenter Server instance with private network only, a new source IP address is configured on the Veeam server and set as the primary IP address to allow public connectivity to update Veeam licenses or to download Veeam update binary files. This IP address is on the same management VMware NSX Edge Services Gateway (ESG) subnet. The management NSX ESG of the Cloud Foundation or vCenter Server instance on IBM Cloud is then configured to allow outbound communications that originate from this new Veeam source IP address.
### Table 2 Veeam virtual machine network

<table>
<thead>
<tr>
<th>Network component</th>
<th>VSI configuration</th>
<th>Bare metal server configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface and speed</td>
<td>1 Gbps virtual interface</td>
<td>2 × 10 Gbps physical uplinks</td>
</tr>
<tr>
<td>VLAN</td>
<td>Private VLAN A</td>
<td></td>
</tr>
<tr>
<td>Subnet type</td>
<td>Primary</td>
<td></td>
</tr>
</tbody>
</table>

#### 2.2.3 Storage

**2.2.3.1 Devices**

The operating system, software, and configuration for the Veeam virtual machine are stored on a 100GB SAN disk in the IBM Cloud in the case of the virtual server instance (VSI), or on RAID–1 local storage in the case of the bare metal server.

Additionally, one or more IBM Cloud Endurance block storage volumes are attached to the Veeam system for storing virtual machine backups, with the configuration outlined below. Based on IBM and Veeam tests, this architecture recommends the performance level of 0.25 IOPS/GB.

<table>
<thead>
<tr>
<th>Storage attribute</th>
<th>Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume type</td>
<td>Endurance block storage</td>
</tr>
<tr>
<td>Performance options</td>
<td>• 0.25 IOPS/GB (recommended)</td>
</tr>
<tr>
<td></td>
<td>• 2 IOPS/GB</td>
</tr>
<tr>
<td></td>
<td>• 4 IOPS/GB</td>
</tr>
<tr>
<td>Size options</td>
<td>• 2,000 GB</td>
</tr>
<tr>
<td></td>
<td>• 4,000 GB</td>
</tr>
<tr>
<td></td>
<td>• 8,000 GB</td>
</tr>
<tr>
<td></td>
<td>• 12,000 GB</td>
</tr>
<tr>
<td>Snapshot space</td>
<td>0 GB</td>
</tr>
<tr>
<td>Connection</td>
<td>Windows iSCSI Initiator with Multipath I/O and CHAP authentication</td>
</tr>
<tr>
<td>Filesystem</td>
<td>ReFS</td>
</tr>
<tr>
<td>Block size</td>
<td>64 kB</td>
</tr>
<tr>
<td>Partition type</td>
<td>GPT</td>
</tr>
</tbody>
</table>

**Table 3 Veeam backup storage**

Figure 4 illustrates how the operating system boot disk and the backup repository disk are attached to the Veeam Windows VSI or to the Veeam Windows bare metal server.
2.2.3.2 Sizing considerations

Veeam provides a repository sizing guide (see Appendix B) to assist you in planning for storage capacity.

2.2.3.3 Backup repositories and storage expansion

You can order additional storage from IBM Cloud later and attach it to your Veeam virtual machine as your needs grow. To allow expansion of the backup repository to additional Endurance volumes, Veeam is configured with a scale–out backup repository that aggregates one or more disks. As illustrated in Figure 5, the Veeam backup job should be configured to write to the scale–out repository. The scale–out repository is configured to include one or more standard backup repositories, each of which can represent an Endurance volume, or an Object Storage bucket. The Object Storage repositories are part of the Capacity Tier that expands the scale-out backup repository capabilities.

Figure 5 Veeam backup repository configuration

To add additional storage to your Veeam backup server, you must order new IBM Cloud Endurance block storage volumes, attach them to your Veeam server, format and configure them as Veeam backup repositories, then add them to the Veeam scale–out repository.
2.2.4 Backup jobs

In order to satisfy your availability requirements, you can configure Veeam to backup both the management components of your instance as well as your own workload. For some components and solutions such as vCenter, NSX, F5 BIG-IP, and FortiGate-VM, a proper backup strategy may include file-based configuration export. In this case you should deploy a file backup server and plan to include this in your Veeam backup job for management components.

2.2.5 Windows updates

For the Veeam virtual machine, Windows updates are configured to be installed automatically but the time of reboot is left to the administrator’s discretion.

2.2.6 Veeam updates

Unless the Veeam service is installed on a vCenter Server instance with private network only, you can check for and download updates using the Veeam software itself. However, if the Veeam service is installed on a vCenter Server instance with private network only, because the Veeam virtual machine (VM) is configured with no public network access, you cannot check for or download updates using the Veeam software itself. Instead, you must download updates and product upgrades from the Veeam website and transfer them to the Veeam VM for installation.

2.2.7 Veeam license updates

IBM Cloud provisions Veeam using a license key that must be renewed annually. The date of renewal does not correspond to the date on which your Veeam instance is deployed. If the Veeam service is installed in a vCenter Server instance with private network only, you need to take note of the expiration date and contact IBM Cloud Support to assist you with updating the license key when the renewal is needed. Otherwise, you can manually update your Veeam License from the Veeam console. For more information, see the Veeam help center.
# Appendix A—License Requirements

This architecture requires licensing for several components. The licenses required are as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>License</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veeam virtual machine</td>
<td>Microsoft Windows Server 2016 Standard Edition</td>
<td>IBM Cloud</td>
</tr>
<tr>
<td>Veeam virtual machine</td>
<td>Veeam Backup &amp; Replication 9.5 Enterprise Plus</td>
<td>IBM Cloud</td>
</tr>
</tbody>
</table>

*Table 4 License requirements*
Appendix B—Reference

Additional information about IBM Cloud and Veeam Backup & Replication on IBM Cloud can be found at the following sites:

- IBM Cloud Architecture Center for Virtualization:  
  https://www.ibm.com/devops/method/content/architecture/virtualizationArchitecture/virtualizationRefArch
- Backing up solution components for VMware in IBM Cloud:  
  https://console.bluemix.net/docs/services/vmwaresolutions/archiref/solution/solution_backingup.html
- IBM Cloud and Veeam Configuration Guide:  
- IBM Cloud’s Veeam knowledge base:  
  https://knowledgelayer.softlayer.com/topic/veeam
- Veeam guidance on sizing backup server:  
  https://bp.veeam.expert/resource_planning/backup_server_sizing.html
- Veeam guidance on sizing storage repository:  
  https://bp.veeam.expert/resource_planning/repository_planning_sizing.html
- Veeam proxy server information:  
  https://bp.veeam.expert/resource_planning/proxy_server_and_transport_modes.html