Veeam Backup & Replication on IBM Cloud Solution Architecture

Date: 2020–05–01

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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.

Version	Date	Author	Description of Change
1.4	2020–05–01	Scott Moonen	Veeam VM
1.3	2019–06–25	Nazgol Sedghi	Veeam VSI specification change
1.2	2018–10–24	Nazgol Sedghi	Add information on public connectivity setup
1.1	2018–07–20	Scott Moonen	Add information on solution component backup
1.0	2018–01–12	Jack Benney Frank Chodacki Daniel De Araujo Bob Kellenberger Simon Kofkin–Hansen Scott Moonen	Initial Release

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 offering 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 the vCenter Server 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.

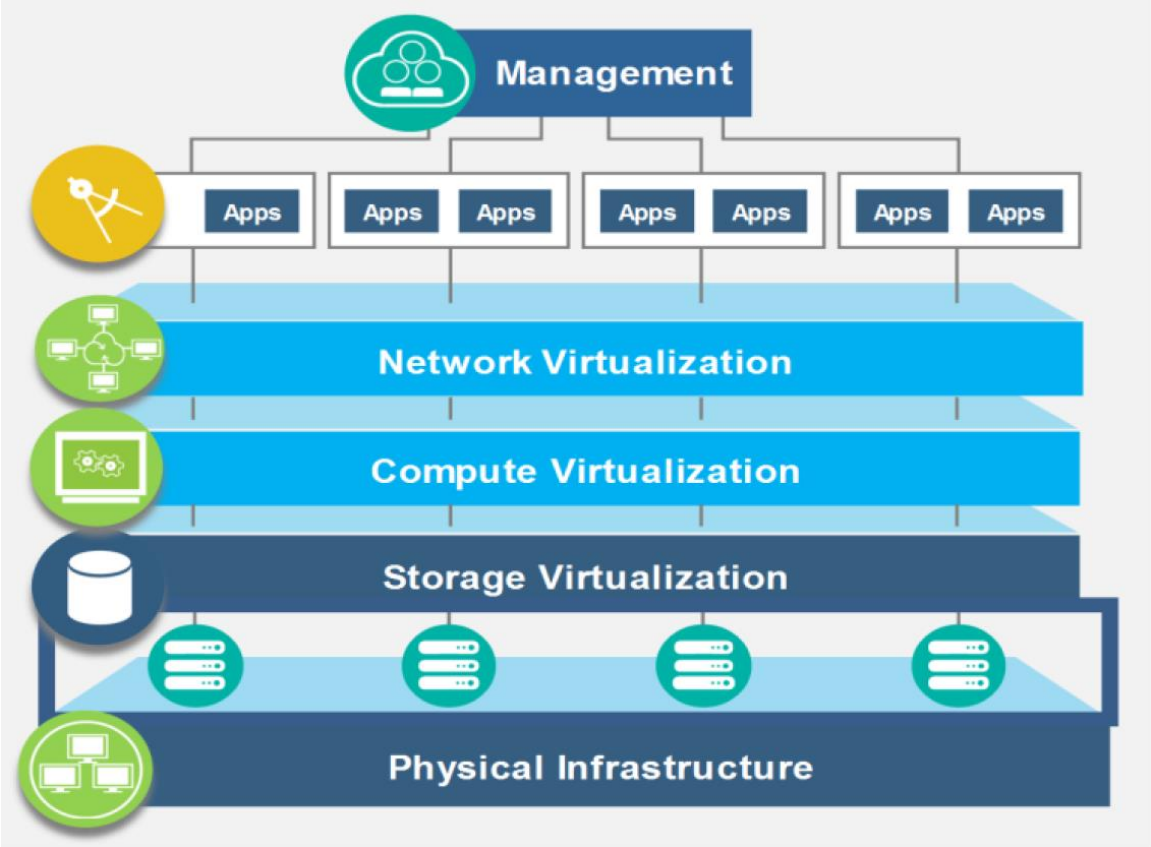

Figure 1 VMware vCenter Server on IBM Cloud

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.

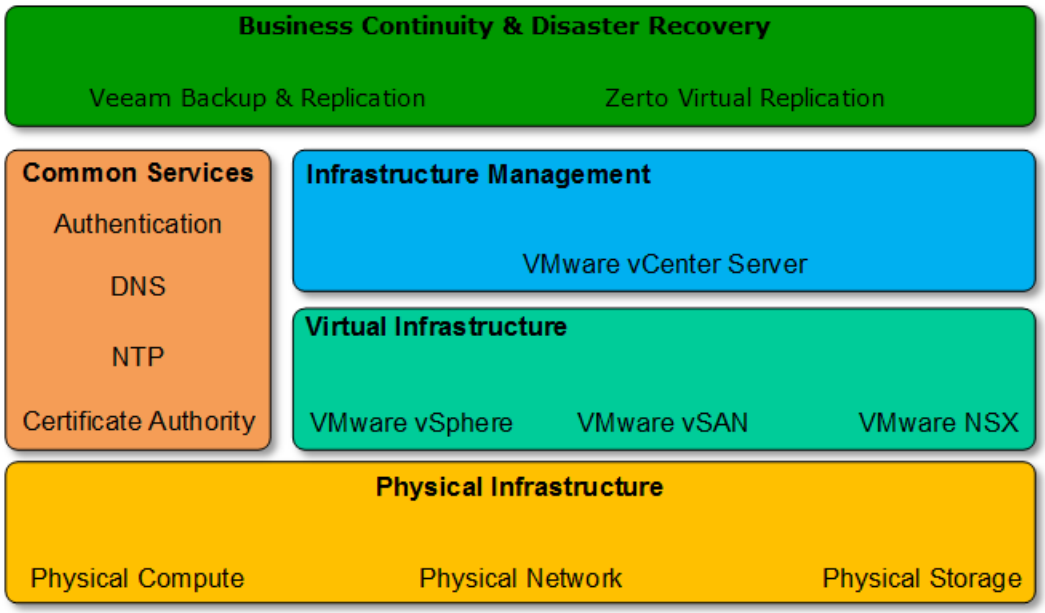

Figure 2 Veeam on VMware vCenter Server High Level Components

Figure 3 illustrates how Veeam interacts with other components of IBM Cloud for VMware Solutions.

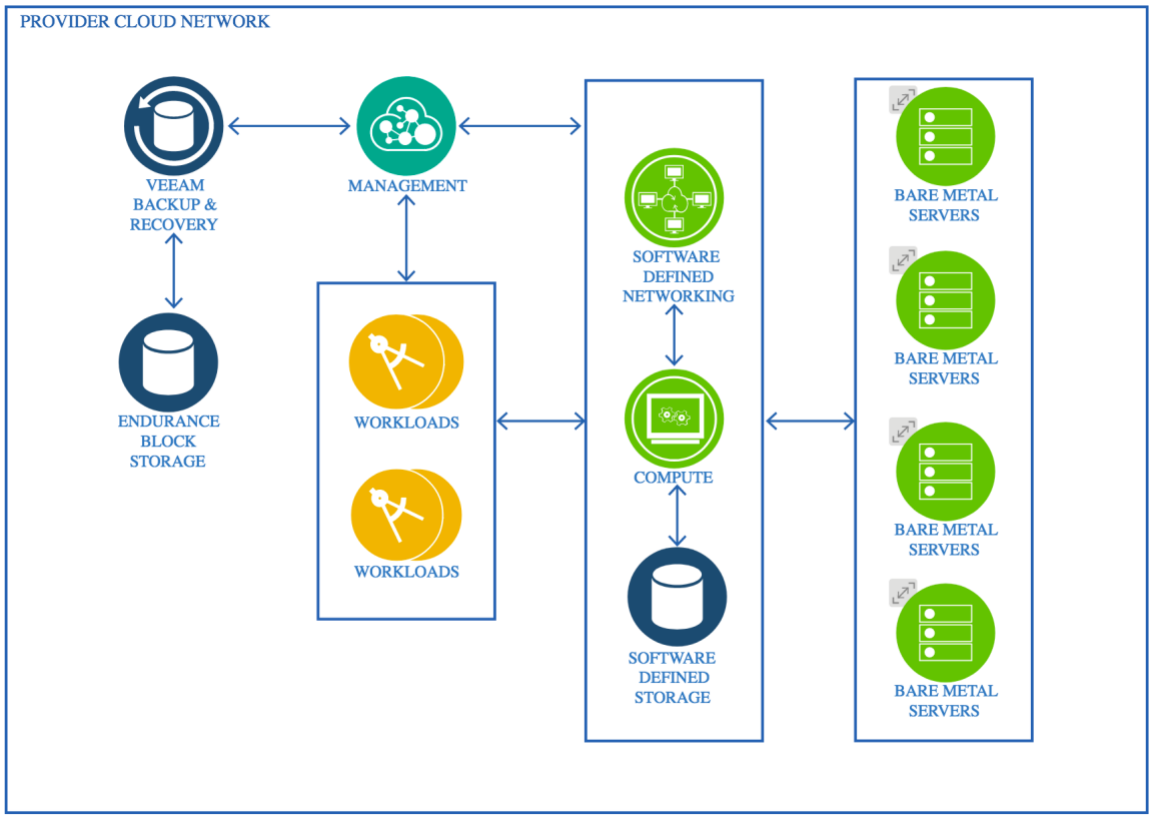

Figure 3 Veeam on VMware vCenter Server Architecture Diagram

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 as: (1) an IBM Cloud public virtual system instance (VSI), (2) a virtual machine (VM) running within your VMware vCenter Server environment, or (3) an IBM Cloud dedicated bare metal server. Greater network throughput is available with a virtual machine and with a bare metal server, so for any large–scale deployment the virtual machine or bare metal server are recommended.

IBM Cloud provides the infrastructure for running the Veeam VSI or bare metal server, while the Veeam VM runs within your own VMware vCenter Server instance. IBM Cloud provides a monthly recurring Microsoft Windows Server license for the VSI and bare metal server, but you must provide your own Windows license for the Veeam VM. In all cases the Veeam Backup & Replication license is available from IBM Cloud as a monthly recurring license.

Veeam is deployed with the following parameters:

Component	VSI configuration	VM configuration	Bare metal server configuration
CPU	8 vCPU		• Medium: Dual Intel Xeon Silver 4110, 16 cores • Large: Dual Intel Xeon Gold 5120, 24 cores
RAM	32GB		• Medium: 64GB • Large: 128GB
Network	1 Gbps private uplink	E100E adapter on management port group	2 × 10 Gbps private uplinks
Boot disk	100GB, SAN	100GB Endurance OR 100GB vSAN	2 × 1TB SATA, RAID–1
Operating System	Microsoft Windows Server 2016 Standard Edition OR Microsoft Windows Server 2019 Standard Edition		
Location	Same data center and POD as vSphere hosts		
Veeam license options	Increments of 10 VMs from 10 to 500		1 VM, 5, 10, 25, 50, 100, 200, OR 500 VMs

Table 1 Veeam deployment summary

When deployed using a bare metal server, this architecture specifies a 2U or 4U chassis configuration. The 2U chassis allows you to add up to 10 additional disks to the server for local backup storage, and the 4U chassis allows up to 34 additional disks.

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 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 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. When using a VSI or bare metal server, IBM Cloud automatically assigns an IP address from the primary subnet for this VLAN. When using a VM, IBM Cloud for VMware Solutions allocates an IP address from the VMware management portable subnet for your VMware instance.

Unless the Veeam service is installed in a vCenter Server instance with private network only, a portable 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 subnet. The management NSX edge of the vCenter Server instance on IBM Cloud is then configured to allow outbound communications that originate from this new Veeam source IP address.

Network component	VSI configuration	VM configuration	Bare metal server configuration
Interface and speed	1 Gbps virtual interface	Up to 10Gbps port group	2 × 10 Gbps physical uplinks
VLAN	Private VLAN A		
Subnet type	Primary	Portable	Primary

Table 2 Veeam virtual machine network

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), on the management NFS or vSAN datastore in the case of a VM, 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.

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

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.

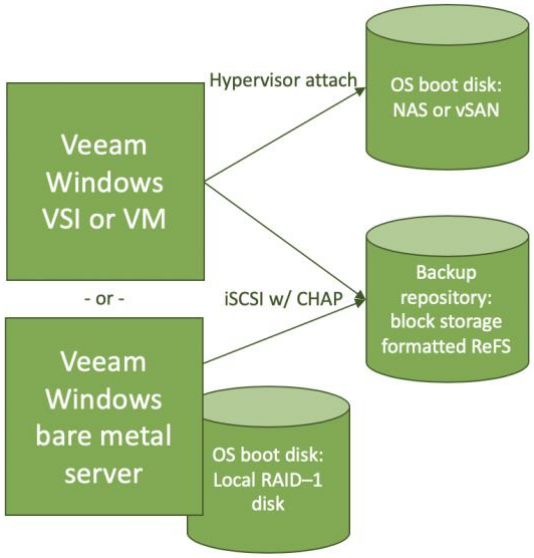

Figure 4 Veeam disk attachment

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 and to your Veeam proxies 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.

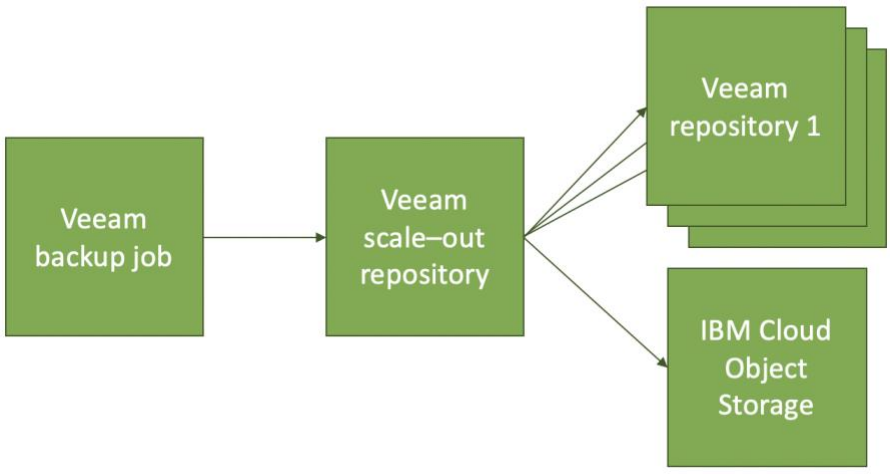

Figure 5 Veeam backup repository configuration

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:

Component	License	Source
Veeam virtual machine	Microsoft Windows Server 2016 Standard Edition OR Microsoft Windows Server 2019 Standard Edition	IBM Cloud OR Customer
Veeam virtual machine	Veeam Backup & Replication 10 Enterprise Plus	IBM Cloud

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/
- 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: https://www.veeam.com/wp-ibm-bluemix-configuration-guide.html
- Veeam guidance on sizing backup server: https://www.veeambp.com/backup_server_introduction/backup_server_sizing
- Veeam guidance on sizing storage repository: https://www.veeambp.com/repository_server/repository_planning/repository_planning_sizing
- Veeam proxy server information: https://www.veeambp.com/proxy_servers_intro/proxy_server_vmware-vsphere/transport_modes