

MFG229048

## **SkyVault: The Quantum of Collaboration**

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Autodesk Inc.

### **Learning Objectives**

- Learn the challenges involved in a hosted deployment
- Learn from a customer's experience with a hosted deployment
- Learn how to use Microsoft Azure to host Vault software
- Learn how to use Amazon Cloud to host Vault software

### **Description**

Are you investigating deploying your Vault Workgroup or Vault Professional Server software in a virtual cloud environment? Learn the tools necessary to spin up a hosted server instance to install the Vault Server software for your enterprise. Hear from an experienced customer about how they deployed their configuration in a hosted environment, and the lessons they learned along the way.

### **Speaker(s)**

Irvin is a Product Manager on the Autodesk Vault team based in Novi, Michigan. He has worked at Autodesk for eleven years starting in product support and as a user experience designer. Irvin is a Microsoft® Certified Professional and has been working in the information technology field for more than 26 years. He helps partners, consulting, and sales develop Vault deployment plans in enterprise environments and system requirements. You can find multiple classes Irvin has presented at Autodesk University, on a wide range of Vault topics. Irvin is a technology geek and loves sharing with the community on Twitter (@ihayesjr).

## Introductions

This class is a continuation of the following two classes I previously presented.

- [Every Silver Lining Has a Vault in the Cloud](#)
- [Cloudy with a Chance of Vault](#)

This class is intended to help those who are looking to deploy Vault Server in a cloud-hosted environment such as Amazon Web Services (AWS) and Microsoft Azure. The class will cover some examples of hosting configuration used as a guideline for deployment plans.

## Recommendations

- When planning your deployment, involve a representative who has experience in the hosting environment you are planning to use.
- Discuss and plan for security, backup and recovery strategy, latency and bandwidth, connection to your company network and deploying in specific regions.

## The Challenges

### System Requirements

As [Vault's system requirements](#) are based on physical hardware and not cloud-hosted environments, it is best to select a server type that meets or exceeds recommended Vault system requirements. The nice thing about the cloud is if you have architected the environment correctly, you can add more resources when needed.

## Licensing

Users who have purchased Vault Workgroup or Professional are allowed to virtualize the product under the following license types.

On November 9<sup>th</sup>, 2018 the licensing terms have been updated to reflect who are authorized to virtualize Autodesk software. The information is available online at <https://www.autodesk.com/terms>.

This information is also covered in the AU 2018 class: [SD227281 – Best Practices for Virtualizing Your Autodesk Software](#).

## Performance

Many factors play into having good performance with a Vault deployment in a hosted environment. Configuring the virtual images with a good amount of resources is important but so is having a good performing network, as high bandwidth and low latency maximizes the performance perceived by users. When file sizes or assemblies are large, a hosted deployment may require having the Autodesk Vault File Server (AVFS) installed close to the end users so that it does not delay their day to day work.

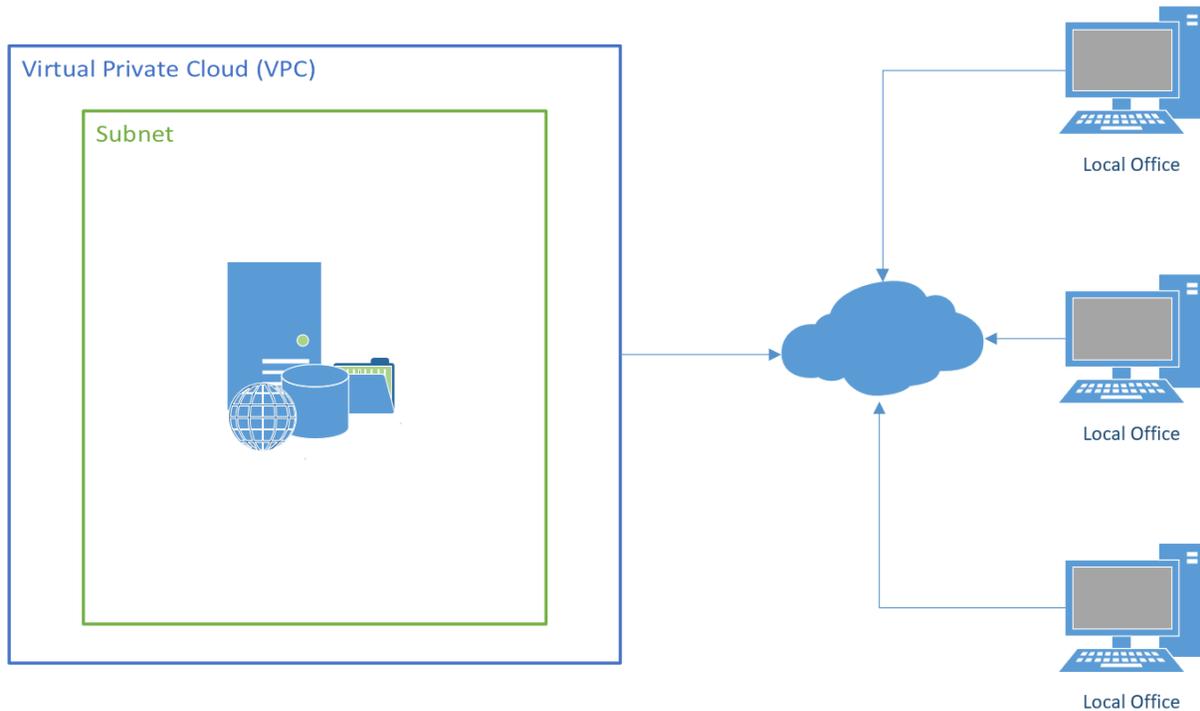
## Regions

Microsoft Azure and Amazon Web Services (AWS) provide deployments in multiple regions around the world. You need to pick the closest region which offers the best network performance to your users. Try a few different locations and never rely on a single test before you make your final decision which region to deploy in.

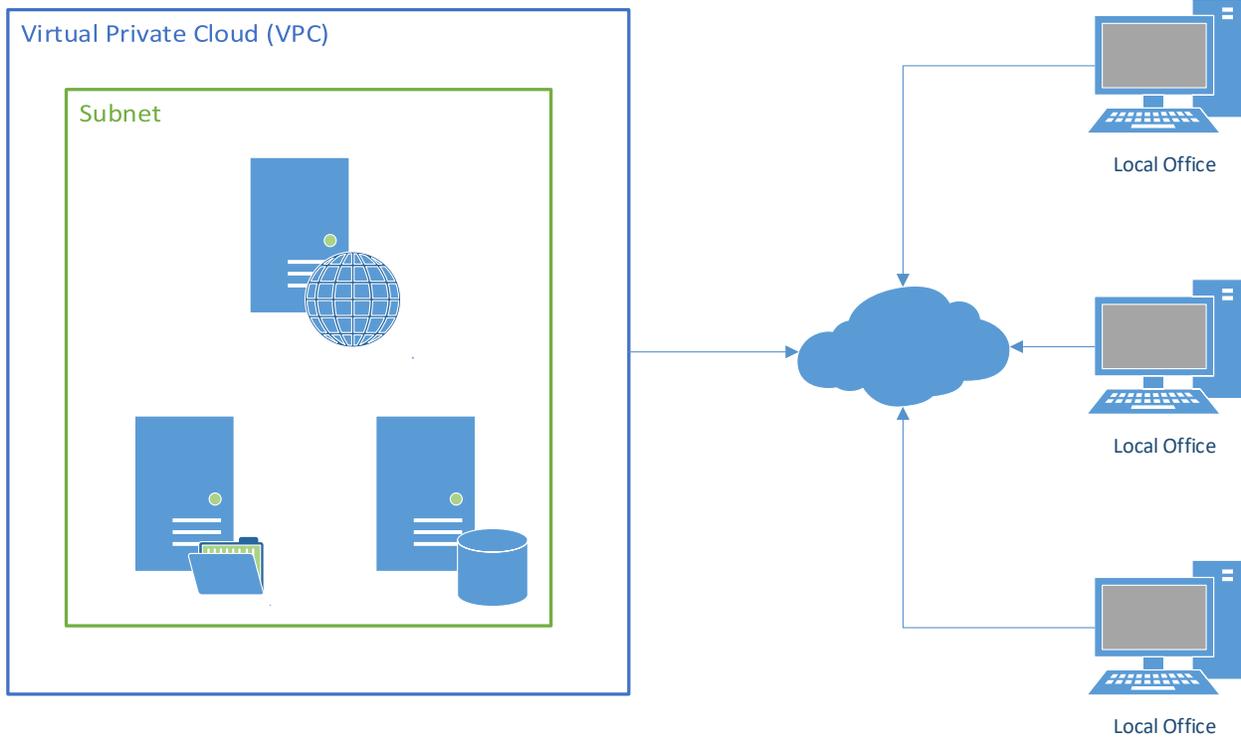
## Deployment Examples

### Single Site Deployment

A standard Vault installation has all of the Vault server components installed on the same virtual image. This configuration provides a simple and manageable Vault deployment.

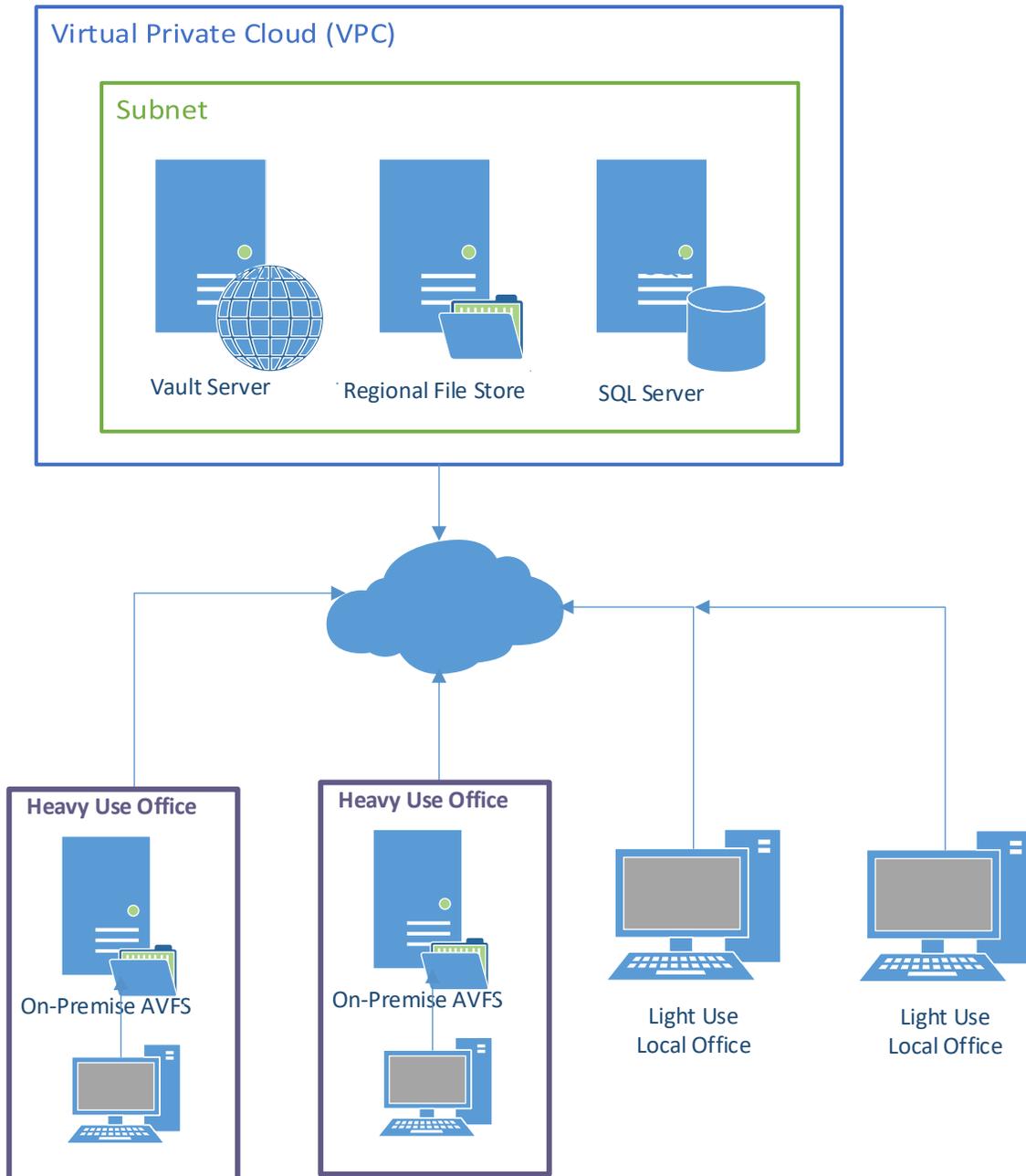


A distributed configuration is also possible for a single site deployment. This configuration separates the main components of Vault, the Vault Server, File Store, and SQL database onto different virtual machines which are sized based on the need of each component. Distributing the components on the separate machine can increase the performance overall for Vault.



## Multi-site Deployment

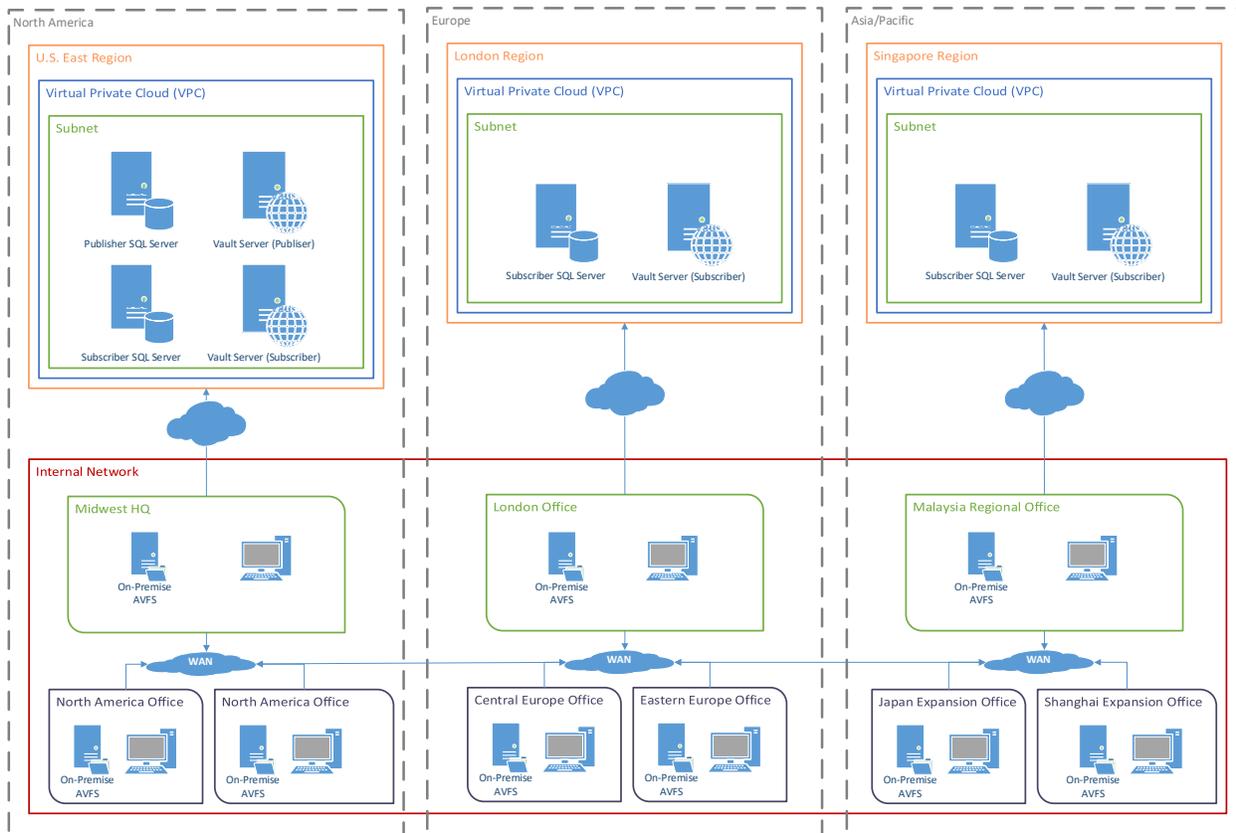
A multi-site deployment consists of deploying multiple Autodesk Vault File Servers local or on-premise close to the users, all connected to the main Vault Server hosted in the cloud environment.



## Global Deployment

Global deployments are more complicated, as you can imagine, and takes much planning to get it right. The image below illustrates what might be possible for large enterprise environments needing to deploy Vault in the full replication configuration. A significant amount of testing and configuration adjustments are needed for this configuration to perform at its highest.

Understanding the communication paths between servers in different regions is a key to a successful deployment.



## Microsoft Azure

### Microsoft Azure Services

Microsoft Azure offers many services in their hosted environment, but you only need a few with Autodesk Vault. These services include resource groups, virtual machines, storage, Active Directory, and virtual networks.



The resource group is a container that holds related resources for an Azure solution.



Virtual machines created from existing images where applications are installed.



Storage is used by the images as virtual hard drives. Inside of a storage account, create a file share to transfer files from on-premise to an Azure share.



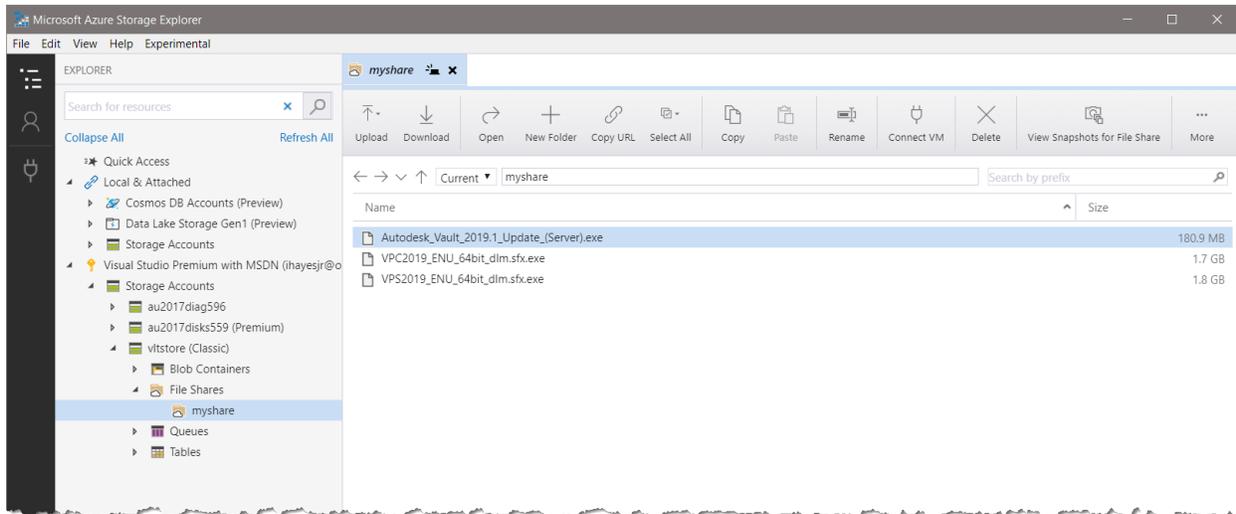
Virtual networks are created inside of Azure so that servers can communicate with each other and a company's local network.



Active Directory services can be used to connect to the corporate network.

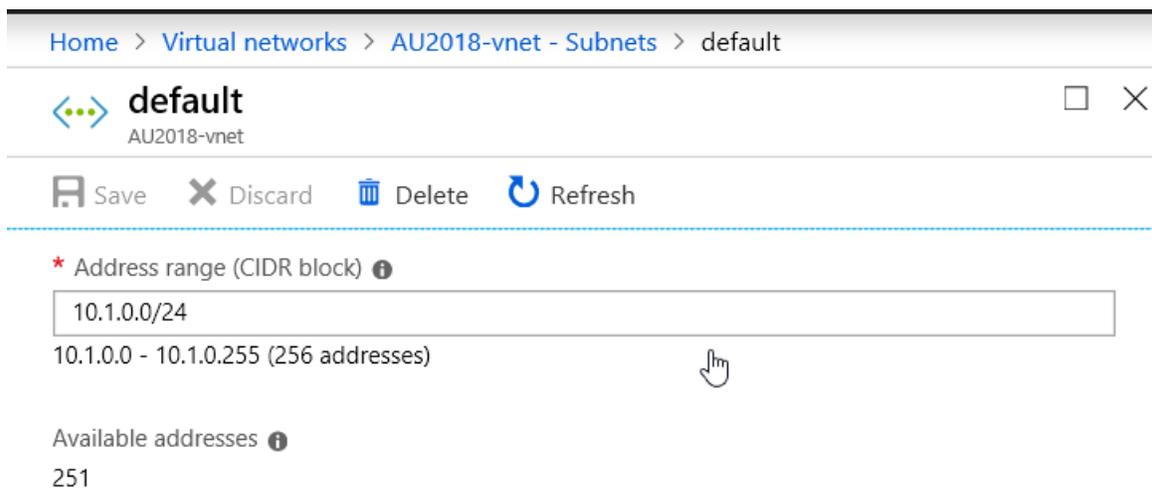
## Create a Storage Account

To get started, create a storage account with a file share so that you can upload the files necessary to install the Vault server in the virtual machine. I recommend downloading and configuring an application called Storage Explorer. This application allows you to connect easily to the Azure storage and upload files. If you have a current support subscription to Vault, you can download a self-extracting installation file for Vault server and upload this compressed file to the Azure storage account.



## Create a Virtual Network

A virtual network inside of Azure would allow multiple virtual machines to access each other within the same virtual network without using the public Internet addresses. Virtual networks also allow you to expand the vault components to different virtual machines in the same virtual network to scale to fit your business needs.



## Creating a Virtual Machine

When you create your virtual machine from the gallery, be sure to choose a virtual machine that is a Vault supported operating system (Vault System Requirements).

### 1. Select an image from the gallery

	SQL Server 2017 Standard on Windows Server 2016	Microsoft	Compute
	SQL Server 2016 SP2 Web on Windows Server 2016	Microsoft	Compute
	SQL Server 2017 Enterprise Windows Server 2016	Microsoft	Compute
	SQL Server 2017 Web on Windows Server 2016	Microsoft	Compute
	Windows Server 2016 Datacenter	Microsoft	Compute
	Windows Server 2016 Datacenter - Server Core	Microsoft	Compute
	Windows Server 2016 Datacenter - with Containers	Microsoft	Compute

2. Configure the virtual machine by creating a name, selecting a size at minimum A3, and setting the username and password.

[Home](#) > [Resource groups](#) > [AU-2018](#) > [Everything](#) > [Windows Server 2016 Datacenter](#) > Create a virtual machine

## Create a virtual machine

[Basics](#) [Disks](#) [Networking](#) [Management](#) [Guest config](#) [Tags](#) [Review + create](#)

Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization.  
Looking for classic VMs? [Create VM from Azure Marketplace](#)

### PROJECT DETAILS

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

\* Subscription 

\* Resource group    
[Create new](#)

### INSTANCE DETAILS

\* Virtual machine name 

\* Region 

Availability options 

\* Image    
[Browse all images and disks](#)

\* Size  **Standard D2s v3**  
2 vcpus, 8 GB memory  
[Change size](#)

### ADMINISTRATOR ACCOUNT

\* Username 

\* Password 

\* Confirm password 

### 3. Create Virtual Disks

Basics **Disks** Networking Management Guest config Tags Review + create

Azure VMs have one operating system disk and a temporary disk for short-term storage. You can attach additional data disks. The size of the VM determines the type of storage you can use and the number of data disks allowed. [Learn more](#)

**DISK OPTIONS**

\* OS disk type ?

**DATA DISKS**

You can add and configure additional data disks for your virtual machine or attach existing disks. This VM also comes with a temporary disk.

LUN	NAME	SIZE (GIB)	DISK TYPE	HOST CACHING
<input type="text" value="0"/>	Vault2019_DataDisk_0	500	Premium SSD	<input type="text" value="None"/> <span>?</span>

[Create and attach a new disk](#) [Attach an existing disk](#)

### 4. Configure the Networking settings

Basics **Disks** **Networking** Management Guest config Tags Review + create

Configure a new or existing virtual network for your VM as well as how your VM will be accessed on the virtual network. [Learn more](#)

**NETWORK INTERFACE**

When creating a virtual machine, a network interface will be created for you.

\* Virtual network ?  ?  
[Create new](#)

\* Subnet ?

Public IP ?  ?  
[Create new](#)

Network security group  Basic  Advanced

\* Public inbound ports ?  None  Allow selected ports

\* Select inbound ports  ?

These ports will be exposed to the internet. Use the Advanced controls to limit inbound traffic to known IP addresses. You can also update inbound traffic rules later.

Accelerated networking ?  On  Off

The selected VM size does not support accelerated networking.

### 5. Configure any of the remaining settings then review and create the image.

## Backup and Recovery

Azure offers a few backup solutions for its environment. You need to analyze the best backup method for your company and recovery process. Here are some options to consider:

- Use ADMS Server command line utility to backup to a folder on the virtual image. Use a PowerShell script to move that backup folder to a storage account for offline storage.
- Install the Azure Backup agent and use the Azure Recovery service to back up the folder where you stored the backups created by ADMS backup script.
- Use ADMS Server command line utility to backup to a remote virtual machine in the same virtual network.
- Back up the entire virtual machine in Azure.

## Things to Know

Here are some additional things to keep in mind when using Microsoft Azure to host the Vault server.

- If you use a gallery image with SQL, you have to install an SQL instance named AutodeskVault on that server for Vault to connect to and use. The SQL Server installation media is located in a folder on the C drive. Run Setup.exe from that location to add the AutodeskVault instance. Decide if you want to keep the default instance of SQL. If you remove the default instance of SQL, you should uninstall the SQL Server IaaS Agent Extension as well.

## Microsoft Azure Regions



## Amazon Web Services

Amazon Web Services also offers multiple services in their hosted environment. Just like Azure, we only need to use a few of the services provided for Autodesk Vault. These services include Amazon Elastic Compute Cloud (Amazon EC2)<sup>™</sup> which offers the virtual servers for deployment. Amazon Virtual Private Cloud (Amazon VPC)<sup>™</sup> which provides a logically isolated network in the cloud, and Amazon Simple Storage Service (Amazon S3)<sup>™</sup> which provides highly-scalable object storage that can be used for file transfer of our Vault backups.



Amazon Elastic Compute Cloud (EC2)



Amazon Virtual Private Cloud (VPC)



Amazon Simple Storage Services (S3)



Amazon Elastic Block Store (EBS)

### Creating an S3 Bucket

To get started, create an S3 bucket by logging into the S3 Management Console. Once the storage bucket is complete, you should check the permissions on the bucket to verify that you have the necessary permissions to upload files to the bucket.

▼ Permissions

Grantee: <input type="text"/>	<input checked="" type="checkbox"/> List	<input checked="" type="checkbox"/> Upload/Delete	<input checked="" type="checkbox"/> View Permissions	<input checked="" type="checkbox"/> Edit Permissions	x
Grantee: <input type="text"/>	<input checked="" type="checkbox"/> List	<input checked="" type="checkbox"/> Upload/Delete	<input checked="" type="checkbox"/> View Permissions	<input checked="" type="checkbox"/> Edit Permissions	x

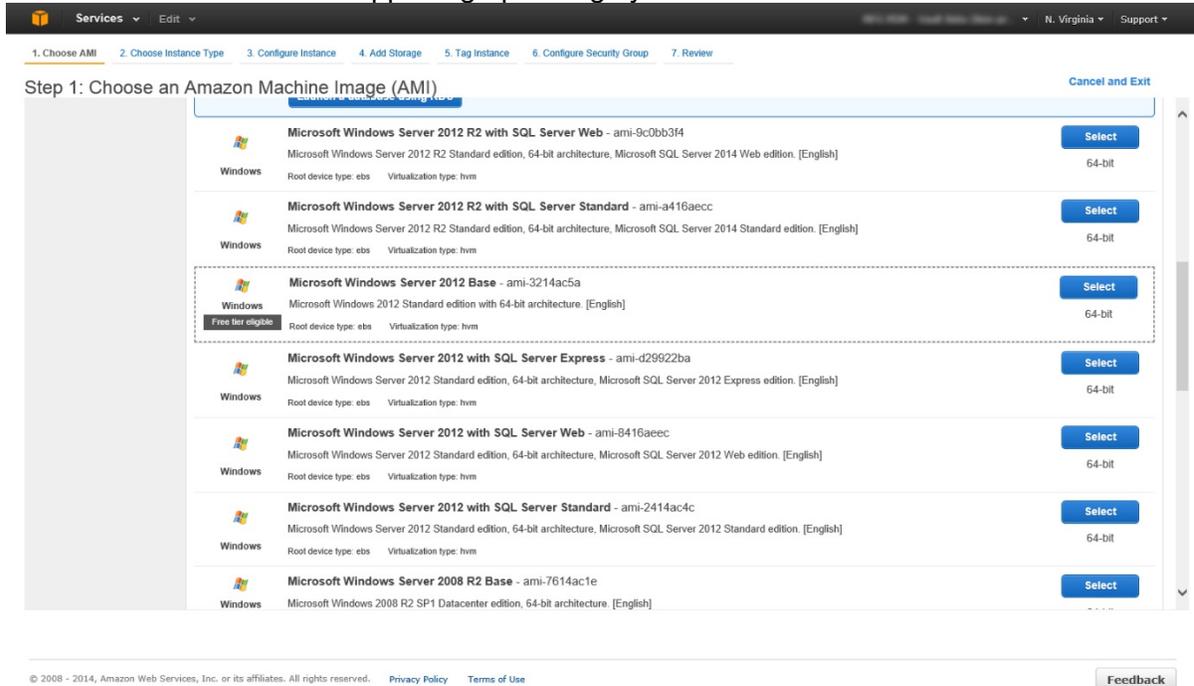
Select the bucket you have just created and click the Upload button at the top of the page. Upload the Vault Server installation self-extracting file you downloaded from the Autodesk Subscription Center.

## Creating a Virtual Private Cloud

The virtual private cloud (VPC) provides a logical internal cloud network inside of Amazon services. A VPC can have a public subnet for EC2 instances that need to be accessed from the public Internet. A VPC can also have a private subnet for EC2 instances that communicate with each other but not accessed from the Internet. Depending on when you have joined Amazon, your account should have a VPC already setup.

The VPC requires other components configured for it to work. You need to create Route Tables, Subnets, an Internet Gateway, DHCP Options, Security Groups, and Network ACLs. This documentation does not cover how these are set up.

1. Select the AMI that has a supporting operating system for the Vault Server.

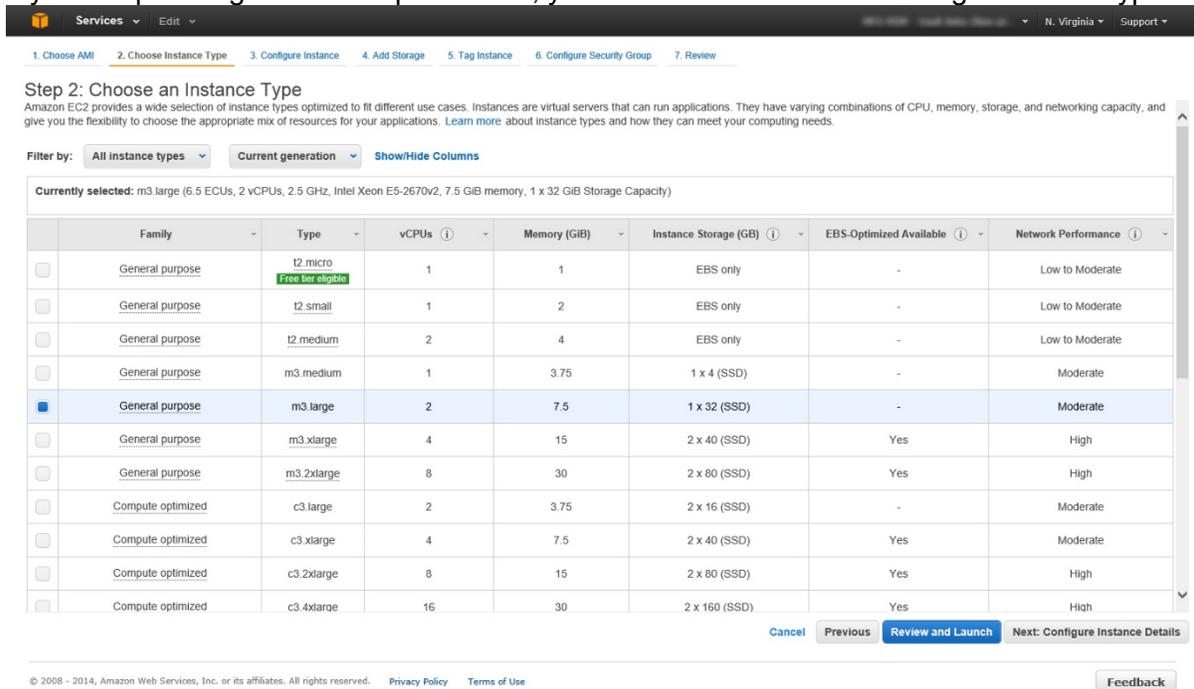


The screenshot shows the Amazon EC2 console interface for selecting an Amazon Machine Image (AMI). The breadcrumb trail at the top indicates the steps: 1. Choose AMI, 2. Choose Instance Type, 3. Configure Instance, 4. Add Storage, 5. Tag Instance, 6. Configure Security Group, 7. Review. The current step is 'Step 1: Choose an Amazon Machine Image (AMI)'. The page title is 'Choose an Amazon Machine Image (AMI)'. A 'Cancel and Exit' button is in the top right corner. The list of AMIs includes:

- Microsoft Windows Server 2012 R2 with SQL Server Web** - ami-9c0bb3f4 (64-bit)
- Microsoft Windows Server 2012 R2 with SQL Server Standard** - ami-a416aecc (64-bit)
- Microsoft Windows Server 2012 Base** - ami-3214ac5a (64-bit, Free tier eligible)
- Microsoft Windows Server 2012 with SQL Server Express** - ami-d29922ba (64-bit)
- Microsoft Windows Server 2012 with SQL Server Web** - ami-8416aecc (64-bit)
- Microsoft Windows Server 2012 with SQL Server Standard** - ami-2414ac4c (64-bit)
- Microsoft Windows Server 2008 R2 Base** - ami-7614ac1e (64-bit)

At the bottom of the console, there is a footer with copyright information: © 2008 - 2014, Amazon Web Services, Inc. or its affiliates. All rights reserved. Links for Privacy Policy and Terms of Use are provided. A Feedback button is also present in the bottom right corner.

- If you are planning to use it in production, you should start with the m3.large instance type.



**Step 2: Choose an Instance Type**  
Amazon EC2 provides a wide selection of instance types optimized to fit different use cases. Instances are virtual servers that can run applications. They have varying combinations of CPU, memory, storage, and networking capacity, and give you the flexibility to choose the appropriate mix of resources for your applications. [Learn more](#) about instance types and how they can meet your computing needs.

Filter by: **All instance types** | **Current generation** | [Show/Hide Columns](#)

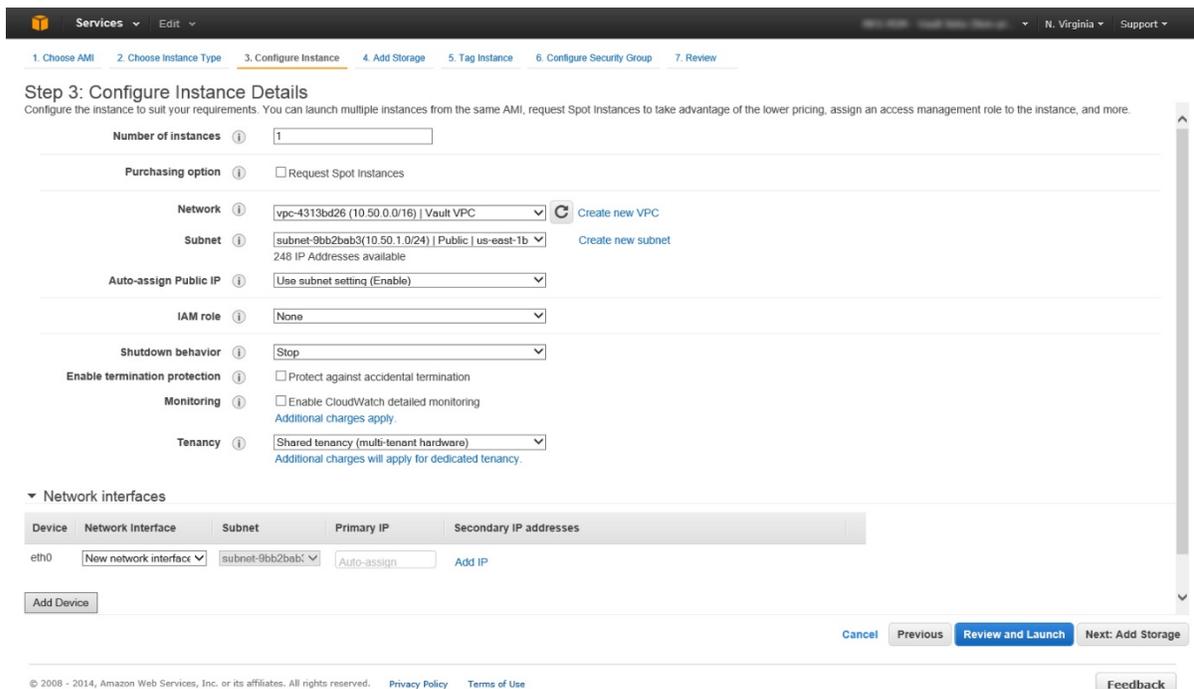
Currently selected: m3.large (6.5 ECUs, 2 vCPUs, 2.5 GHz, Intel Xeon E5-2670v2, 7.5 GiB memory, 1 x 32 GiB Storage Capacity)

	Family	Type	vCPUs	Memory (GiB)	Instance Storage (GiB)	EBS-Optimized Available	Network Performance
<input type="checkbox"/>	General purpose	t2.micro <small>Free tier eligible</small>	1	1	EBS only	-	Low to Moderate
<input type="checkbox"/>	General purpose	t2.small	1	2	EBS only	-	Low to Moderate
<input type="checkbox"/>	General purpose	t2.medium	2	4	EBS only	-	Low to Moderate
<input type="checkbox"/>	General purpose	m3.medium	1	3.75	1 x 4 (SSD)	-	Moderate
<input checked="" type="checkbox"/>	General purpose	m3.large	2	7.5	1 x 32 (SSD)	-	Moderate
<input type="checkbox"/>	General purpose	m3.xlarge	4	15	2 x 40 (SSD)	Yes	High
<input type="checkbox"/>	General purpose	m3.2xlarge	8	30	2 x 80 (SSD)	Yes	High
<input type="checkbox"/>	Compute optimized	c3.large	2	3.75	2 x 16 (SSD)	-	Moderate
<input type="checkbox"/>	Compute optimized	c3.xlarge	4	7.5	2 x 40 (SSD)	Yes	Moderate
<input type="checkbox"/>	Compute optimized	c3.2xlarge	8	15	2 x 80 (SSD)	Yes	High
<input type="checkbox"/>	Compute optimized	c3.4xlarge	16	30	2 x 160 (SSD)	Yes	High

Buttons: [Cancel](#) | [Previous](#) | [Review and Launch](#) | [Next: Configure Instance Details](#)

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- Make sure you are selecting the VPC that was created and place it into the public subnet.



**Step 3: Configure Instance Details**  
Configure the instance to suit your requirements. You can launch multiple instances from the same AMI, request Spot instances to take advantage of the lower pricing, assign an access management role to the instance, and more.

Number of instances:

Purchasing option:  Request Spot Instances

Network:  [Create new VPC](#)

Subnet:  [Create new subnet](#)  
248 IP Addresses available

Auto-assign Public IP:

IAM role:

Shutdown behavior:

Enable termination protection:  Protect against accidental termination

Monitoring:  Enable CloudWatch detailed monitoring  
[Additional charges apply.](#)

Tenancy:   
[Additional charges will apply for dedicated tenancy.](#)

**Network interfaces**

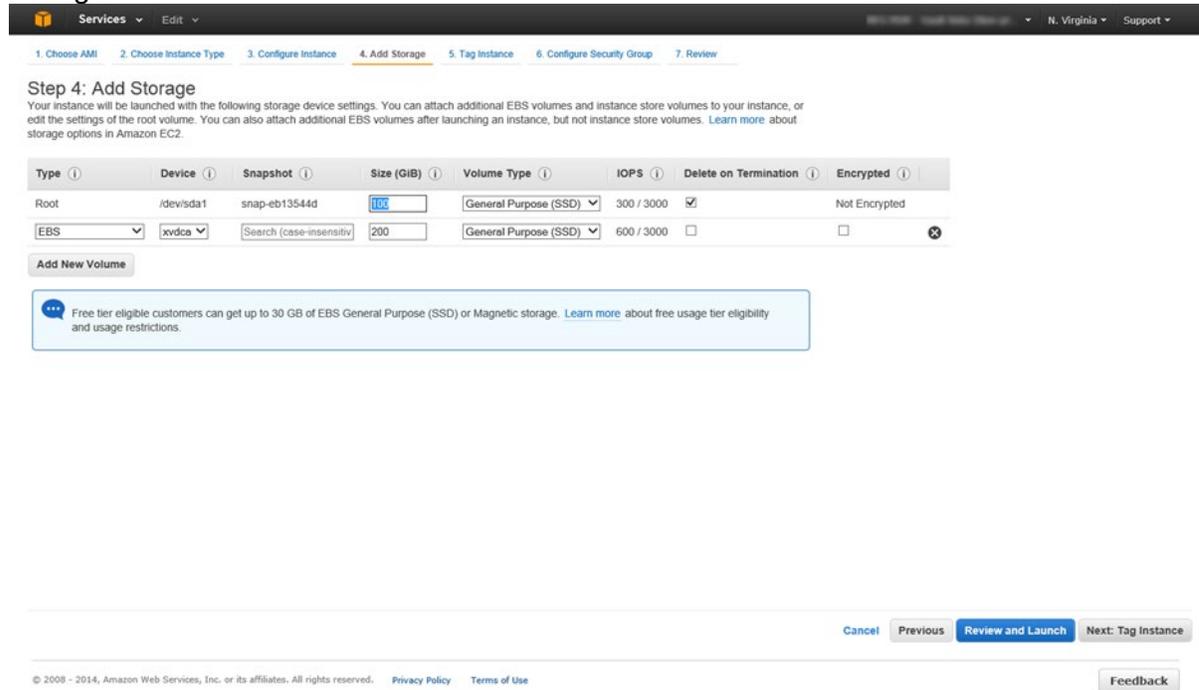
Device	Network interface	Subnet	Primary IP	Secondary IP addresses
eth0	<input type="text" value="New network interface"/>	<input type="text" value="subnet-9bb2bab3"/>	<input type="text" value="Auto-assign"/>	<a href="#">Add IP</a>

Buttons: [Cancel](#) | [Previous](#) | [Review and Launch](#) | [Next: Add Storage](#)

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- Increase the size of the instance and keep in mind the amount of data being uploaded. You can also add storage to the instance by clicking the Add New Volume button. You should

use an Elastic Block Storage (EBS) type when you add a new volume. The Instance Store type is temporary storage and if the instance is stopped or terminate anything stored in this storage volume is lost.



**Step 4: Add Storage**  
Your instance will be launched with the following storage device settings. You can attach additional EBS volumes and instance store volumes to your instance, or edit the settings of the root volume. You can also attach additional EBS volumes after launching an instance, but not instance store volumes. [Learn more](#) about storage options in Amazon EC2.

Type	Device	Snapshot	Size (GiB)	Volume Type	IOPS	Delete on Termination	Encrypted
Root	/dev/sda1	snap-eb13544d	100	General Purpose (SSD)	300 / 3000	<input checked="" type="checkbox"/>	Not Encrypted
EBS	xvdc*	Search (case-insensitiv	200	General Purpose (SSD)	600 / 3000	<input type="checkbox"/>	<input type="checkbox"/>

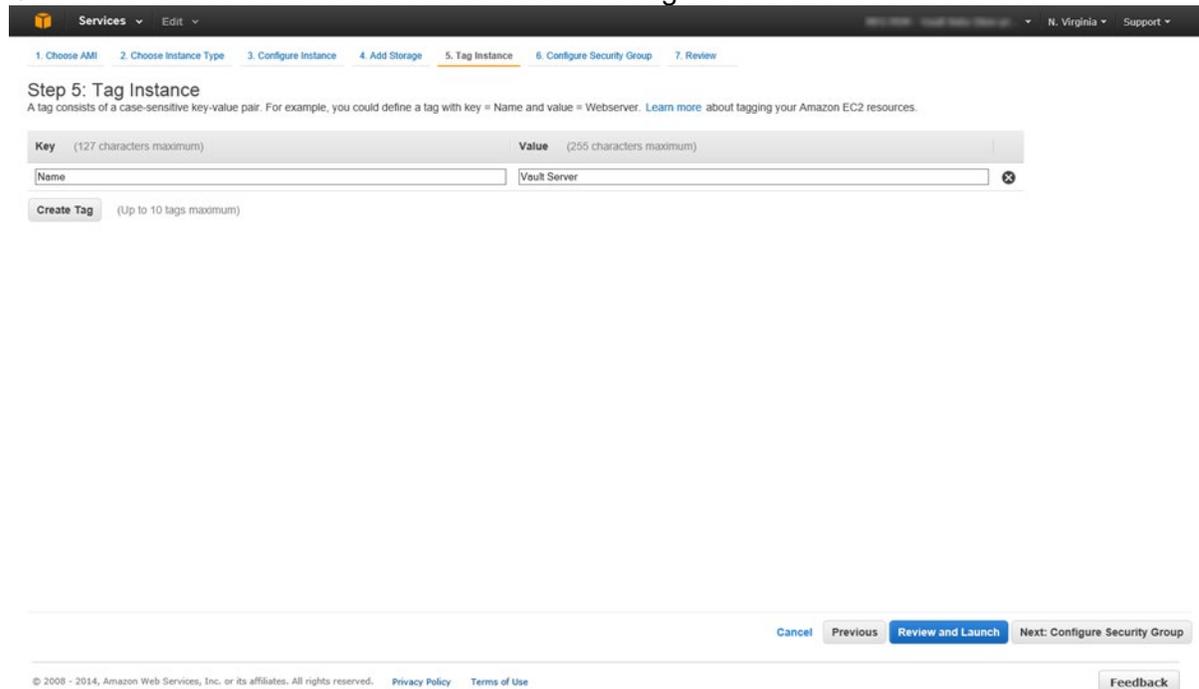
[Add New Volume](#)

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage. [Learn more](#) about free usage tier eligibility and usage restrictions.

Cancel Previous **Review and Launch** Next: Tag Instance

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5. Give the instance a name that can be used to recognize it in the list of instances.



**Step 5: Tag Instance**  
A tag consists of a case-sensitive key-value pair. For example, you could define a tag with key = Name and value = Webserver. [Learn more](#) about tagging your Amazon EC2 resources.

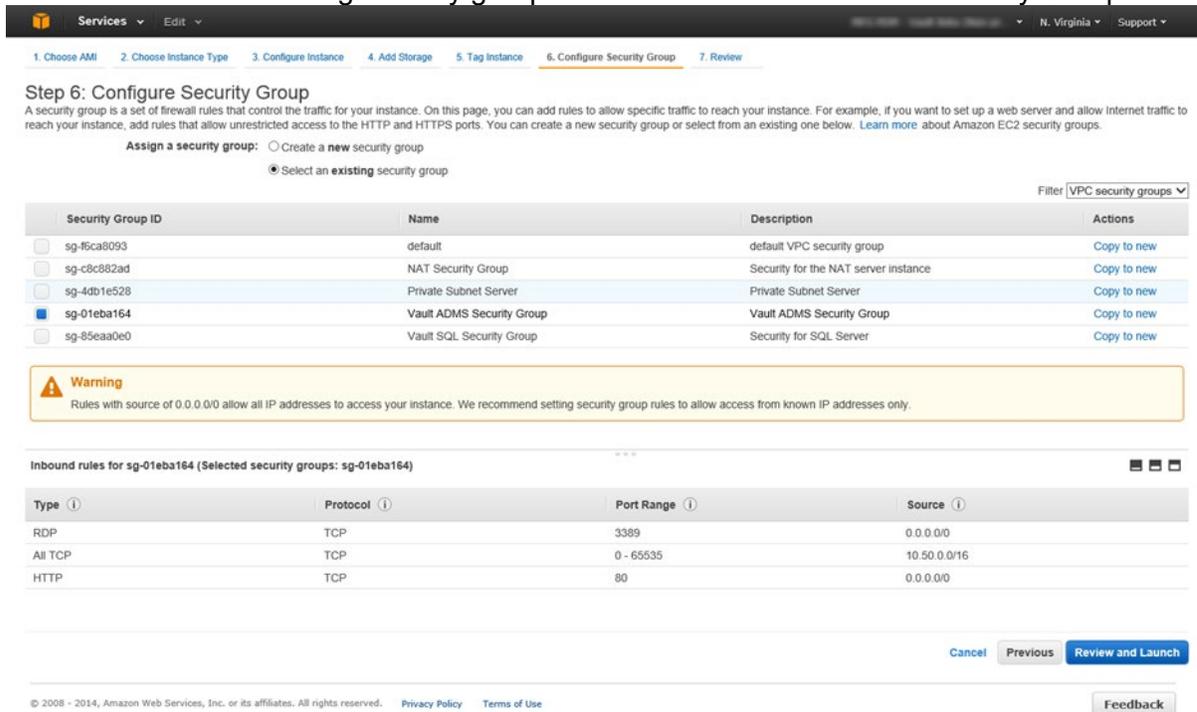
Key (127 characters maximum)	Value (255 characters maximum)
Name	Vault Server

[Create Tag](#) (Up to 10 tags maximum)

Cancel Previous **Review and Launch** Next: Configure Security Group

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6. Click the Select an existing security group and then select Vault ADMS Security Group.



**Step 6: Configure Security Group**  
 A security group is a set of firewall rules that control the traffic for your instance. On this page, you can add rules to allow specific traffic to reach your instance. For example, if you want to set up a web server and allow Internet traffic to reach your instance, add rules that allow unrestricted access to the HTTP and HTTPS ports. You can create a new security group or select from an existing one below. [Learn more](#) about Amazon EC2 security groups.

**Assign a security group:**  Create a new security group  
 Select an existing security group

Filter: VPC security groups

Security Group ID	Name	Description	Actions
<input type="checkbox"/> sg-f5ca8093	default	default VPC security group	<a href="#">Copy to new</a>
<input type="checkbox"/> sg-c8c882ad	NAT Security Group	Security for the NAT server instance	<a href="#">Copy to new</a>
<input type="checkbox"/> sg-4db1e528	Private Subnet Server	Private Subnet Server	<a href="#">Copy to new</a>
<input checked="" type="checkbox"/> sg-01eba164	Vault ADMS Security Group	Vault ADMS Security Group	<a href="#">Copy to new</a>
<input type="checkbox"/> sg-85eaa0e0	Vault SQL Security Group	Security for SQL Server	<a href="#">Copy to new</a>

**Warning**  
 Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.

Inbound rules for sg-01eba164 (Selected security groups: sg-01eba164)

Type	Protocol	Port Range	Source
RDP	TCP	3389	0.0.0.0
All TCP	TCP	0 - 65535	10.50.0.0/16
HTTP	TCP	80	0.0.0.0

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7. Review the configuration and launch the instance when you are ready.

## Amazon Regions

### Global Network of Regions and Edge Locations

The AWS Cloud spans 55 Availability Zones within 18 geographic Regions and 1 Local Region around the world, with announced plans for 12 more Availability Zones and four more Regions in Bahrain, Hong Kong SAR, Sweden, and a second AWS GovCloud Region in the US.



### Backup and Recovery

AWS offers a few backup solutions for its environment. You need to analyze the best backup method for your company and recovery process. Here are some options to consider:

- Use S3 buckets to store the backups created by the Vault Server command line utility. An example script could look like this: `"Aws s3 cp d:\backup\ s3://Vault_Backups --recursive"`
- Use Amazon Glacier to archive backups for longer periods.
- Use instance snapshots to backup an entire instance.
- Place the file store on an EBS volume which can be attached to another instance if the original instance fails.
- Place backups on an EBS volume and snapshot the volume.
- Use CloudWatch™ to monitor the instance for issues.

## Things to Know

Here are some additional things to keep in mind when using AWS to host the Vault server.

- If you use an image with SQL, you need to install a SQL instance named AutodeskVault on that server for Vault to connect to and use.

## Appendix

### Things to Keep in Mind

- Regions/Geography
- Billing/Per hour costs
- Security
- Disaster Recovery
- Best Practices for the host provider
- Distribute services between availability zones (AWS)
- Configuring Full Qualified Domain Name (FQDN)
- Private network connections to the on-premise site

### Useful Links

#### Microsoft Azure

- [What is Azure?](#)
- [Virtual Network Documentation](#)
- [Storage Account](#)
- [Storage Explorer](#)
- [Azure Backup Documentation](#)

#### Amazon Web Services(AWS)

- [Amazon Elastic Compute Cloud \(Amazon EC2\)](#)
- [Amazon S3](#)
- [Amazon Virtual Private Cloud \(Amazon VPC\)](#)
- [Regions and Endpoints](#)
- [Storage](#)