

VEEAM

Veeam Backup & Replication using AWS VTL Gateway Deployment Guide

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Introduction

The purpose of this document is to guide the user through the steps required to deploy an Amazon Web Services (AWS) storage gateway in VTL mode to leverage AWS storage for Veeam® backups. This guide should be used in conjunction with the AWS User's Guide which can be viewed or downloaded here: <https://aws.amazon.com/documentation/storage-gateway/>

It is assumed that the reader is generally familiar with Veeam Backup & Replication™ and AWS.

The challenge

Veeam with the AWS gateway in VTL mode offers a solution for anyone to connect their on-premises, Veeam Backup & Replication archives to AWS. For many customers and service providers, long-term retention of backups is a costly and time consuming process. Leveraging the AWS gateway to act as a VTL within Veeam allows users to send archival backups to AWS to save time and money.

The solution

Based on the many requests for additional storage space, methods or other solutions to add flexibility to the archival options available to the customers. Veeam has developed this configuration guide to help customers walk through the process of configuring, and using the AWS VTL Gateway.

Configuration steps

1. Install on-premises Veeam infrastructure (Veeam Availability Suite™ or Veeam Backup & Replication Enterprise *Plus* edition)
2. Planning of deployment
3. AWS configuration
 - Installation of appliance
 - Configuration of appliance
 - Activation of appliance
 - Creation of tapes
4. Veeam configuration of AWS Gateway
 - iSCSI configuration
 - Adding AWS Gateway to veer
 - Creating tape job
 - Retrieving of tapes

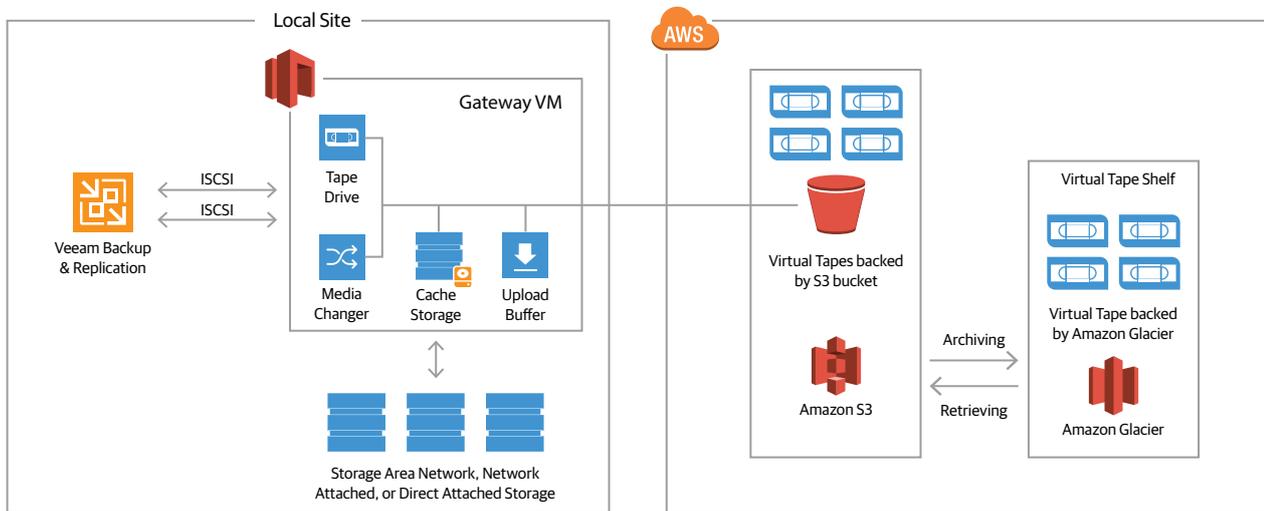
The entire configuration process can be completed in less than 60 minutes if the on-premises Veeam infrastructure is already in place.

Acknowledgements

A special thanks goes out to PhoenixNAP for providing me with the labs used for testing and documentation of this manual. My entire lab has been provided by them, and I appreciate the hard work and assistance that they have provided.

Planning

Proper planning is an important step for any successful implementation. Knowing the requirements and sizing recommendations prior to deployment will save a lot of time and potential issues down the road. AWS has a deployment guide to assist in the planning of the gateway appliance. When deploying a gateway in VTL mode, it will need two disks. One disk for an upload buffer and one disk for cache storage. It is imperative that these disks are sized appropriately for the amount of data that is going to be written to the gateway. Planning and sizing these disks correctly will reduce the chance of performance issues down the road.



The above diagram shows a sample design for deploying a AWS gateway in VTL mode.

When planning for deployment the first step will be to check the hardware and storage requirements needed to deploy. To deploy a VTL gateway you will need the following minimum resources:

- 4 vCPU
- 16GB of RAM
- 80GB of disk space for VM image and system disk

It is also important to note the port requirements needed to allow communication from the gateway through your firewall. AWS has a list of required ports at the following link:

<http://docs.aws.amazon.com/storagegateway/latest/userguide/Requirements.html>

In addition to the 80GB system disk, you will need to add two other disks to the gateway during deployment. These disks will be used for the buffer and cache mentioned above. The sizing of each disk is measured by a formula provided by Amazon. The drives have the following minimum and maximum sizing:

- Cache Disk - Minimum 150GB / Maximum 16TB
- Upload Buffer - Minimum 150GB / Maximum 2TB

It is important to note that these do not have to be single disks. You can add multiple disks to reach the maximum sizes.

To determine the sizing of the upload buffer you will need to use the following formula:

$$\left(\text{Application Throughput (MB/s)} - \text{Network Throughput to AWS (MB/s)} \times \text{Compression Factor} \right) \times \text{Duration of writes (s)} = \text{Upload Buffer (MB)}$$

- Application Throughput = The rate at which your applications write data to your gateway.
- Network Throughput to AWS = The rate at which your gateway can upload data to AWS (Maximum upload rate to AWS gateway is 120MB/s)
- Compression Factor = The amount of compression used by the gateway. 2 would be a safe number to use.
- Duration of Writes = The amount of time it takes to write data to the appliance. (For example: The amount of time it takes for the tape job would run)

While this formula looks complex, it is easy to calculate once you understand what each item is. AWS has an example listed on the following page : <http://docs.aws.amazon.com/storagegateway/latest/userguide/ManagingLocalStorage-common.html#CachedLocalDiskCacheSizing-common>

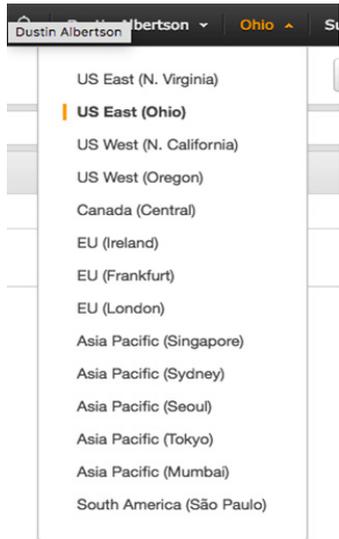
It is important to note that when you calculate the sizing for the upload buffer, if your calculations come out to less than 150GB, it is still recommended to use the minimum size of 150GB.

Once you have figured out the sizing needed for the upload buffer you can now figure out the sizing for the cache buffer. The cache buffer uses a formula of 1.1 times the size of the upload buffer. Now that you have figured out the disks sizing needs of the gateway appliance, we can now begin the installation.

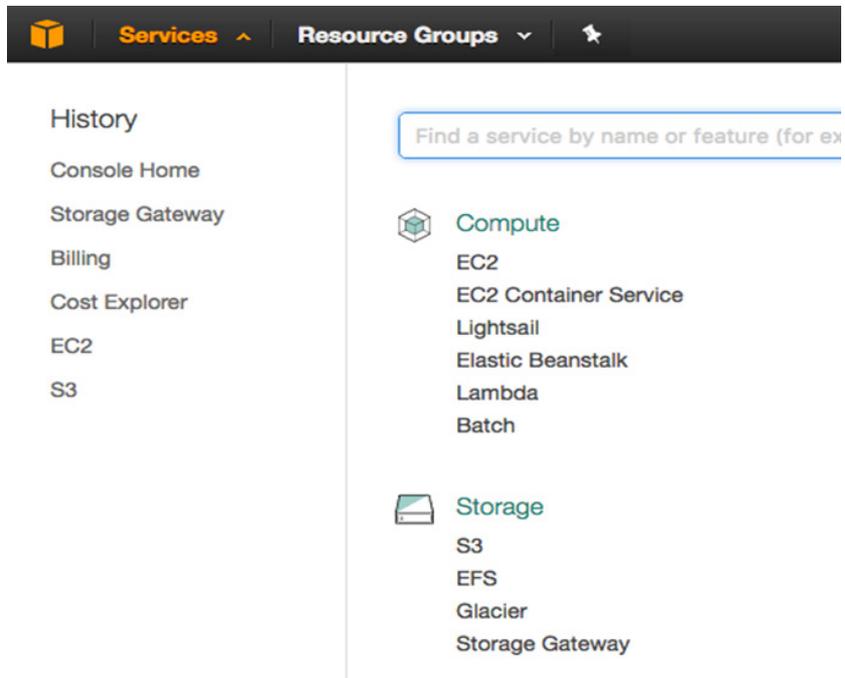
Installation

To begin the installation, you will need to open the AWS Management Console at <http://console.aws.amazon.com/storagegateway/home> and log in.

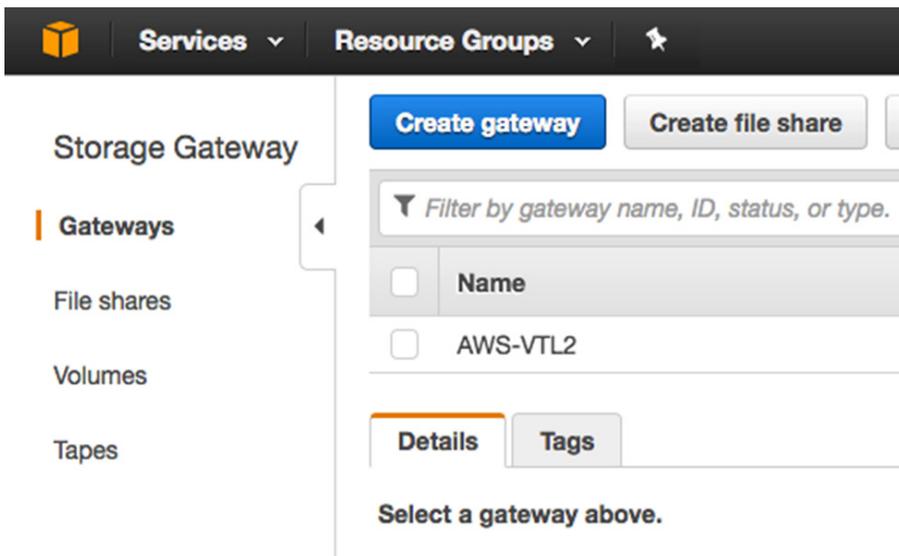
Next, select the AWS region you would like to create the gateway in.



Once logged in, you will need to select **Storage Gateways** from the services navigation pane.

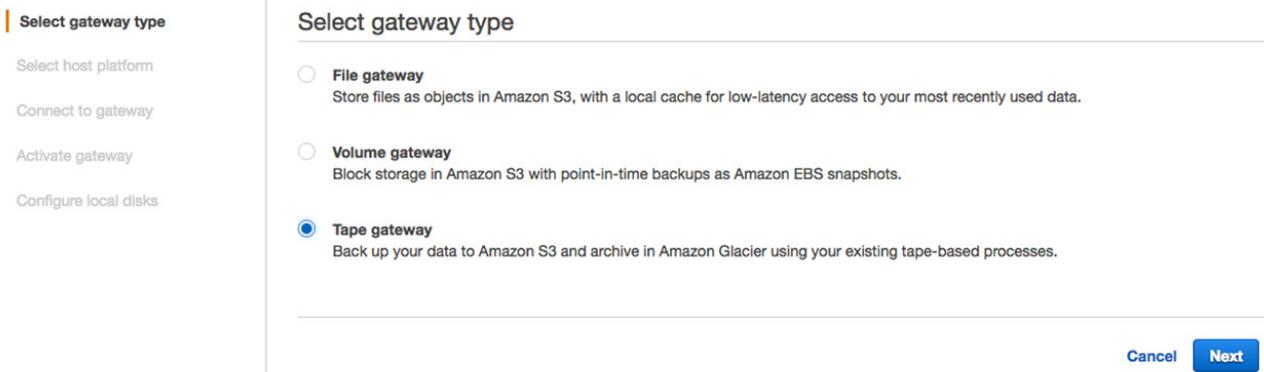


Now click on **Create gateway**



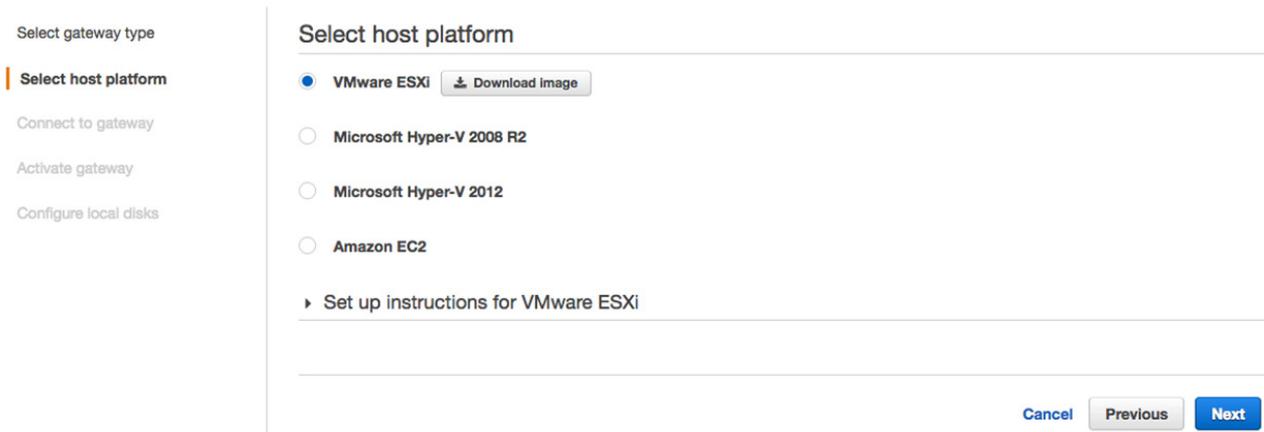
Select **Tape Gateway** from the Gateway install process, and click **Next**.

Create gateway



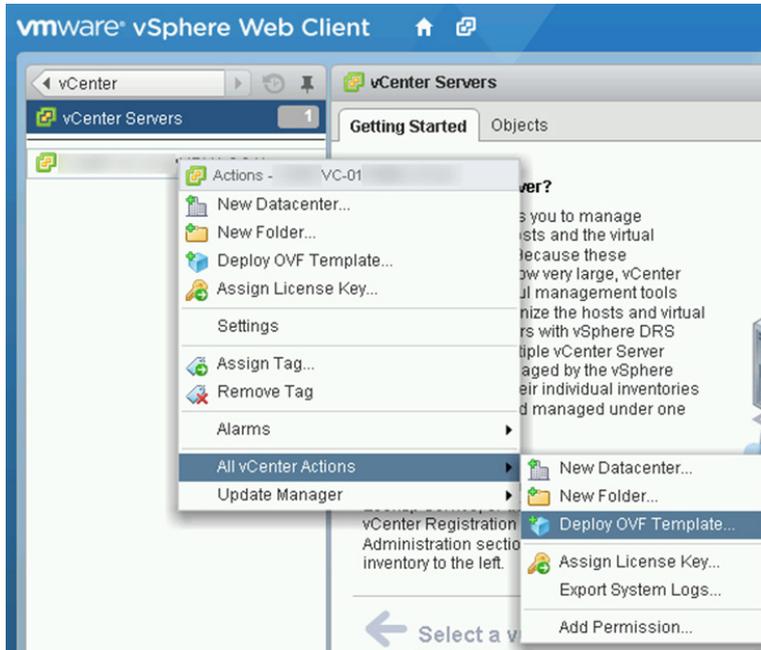
Choose the **Host platform** being used (for this install we focus on VMware). Once you click on the host type, you will click **download image** to download the OVA needed to deploy the local gateway appliance. **LEAVE THIS CONSOLE OPEN.**

Create gateway

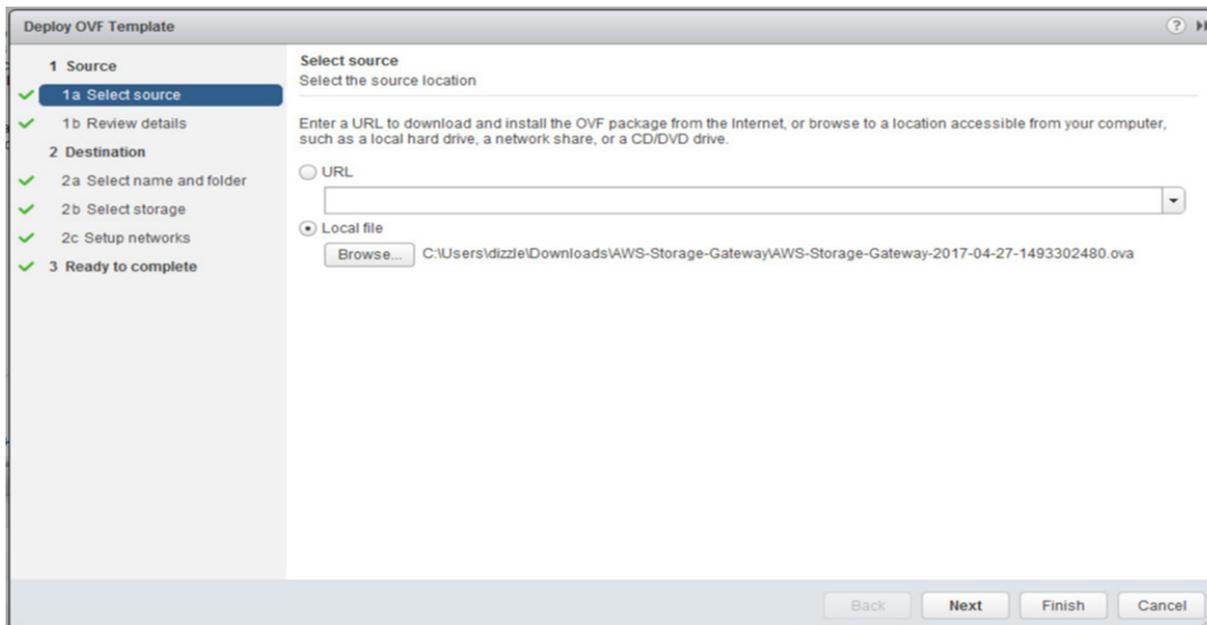


Appliance Installation

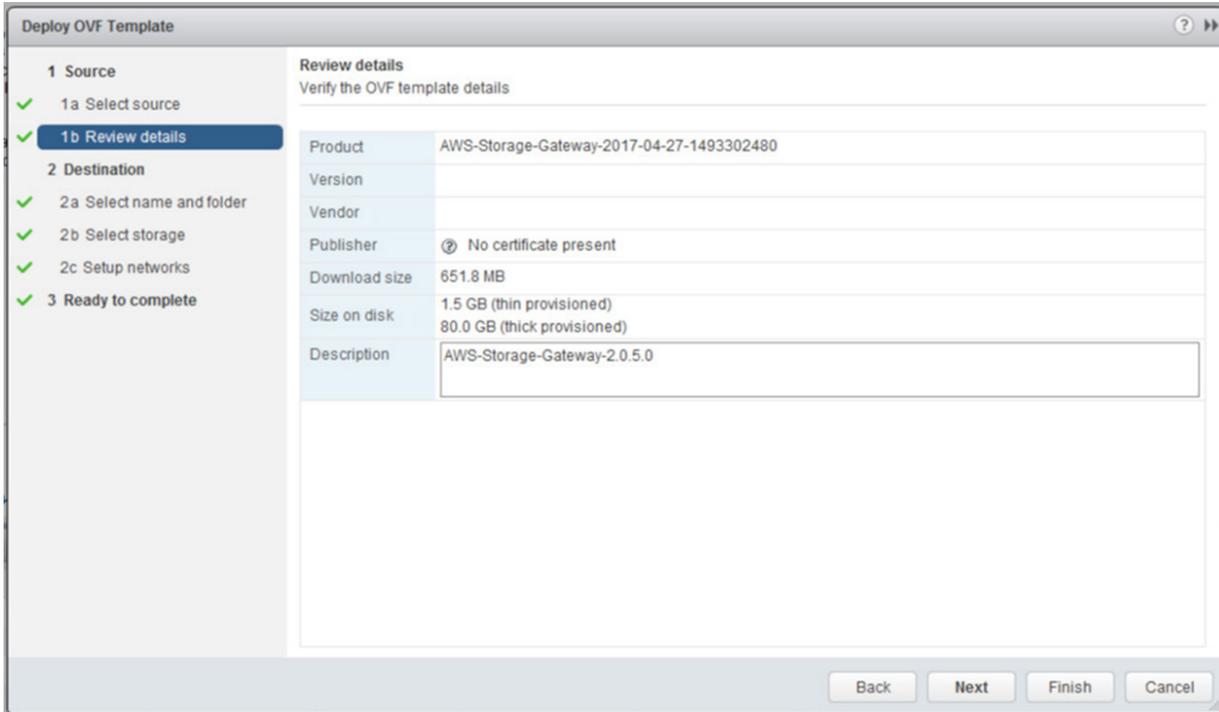
Now that the OVA has been downloaded, you will need to install the appliance into your virtual environment to complete the activation process. Open vCenter and select **Deploy OVF Template**.



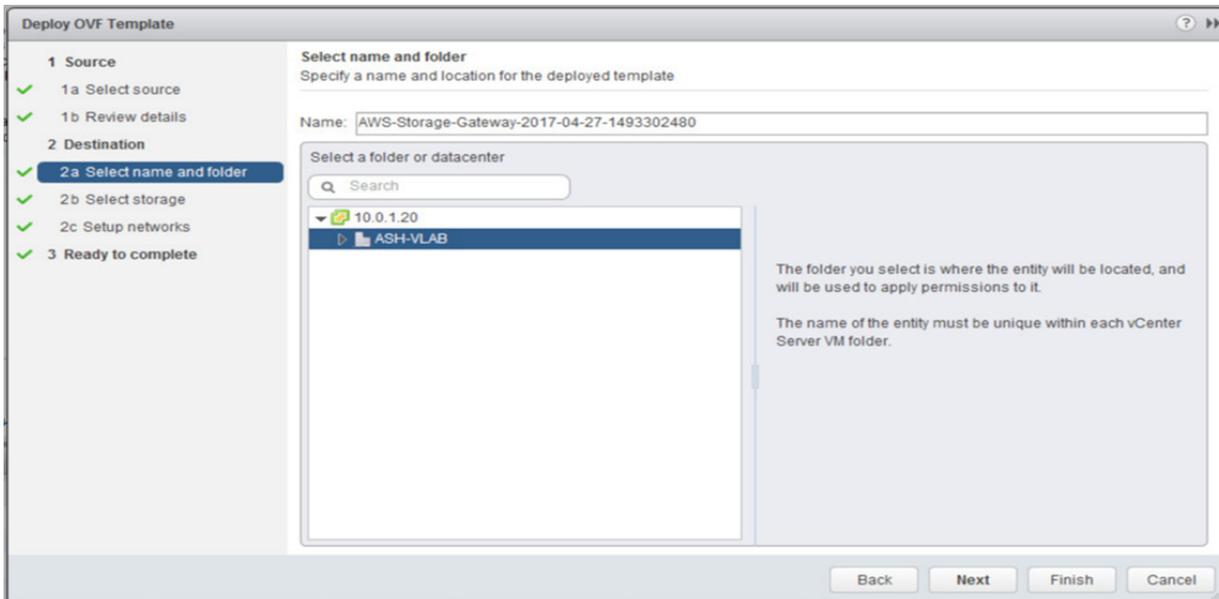
Click **local file** and click **browse** to select the downloaded image from AWS, then click **Next**.



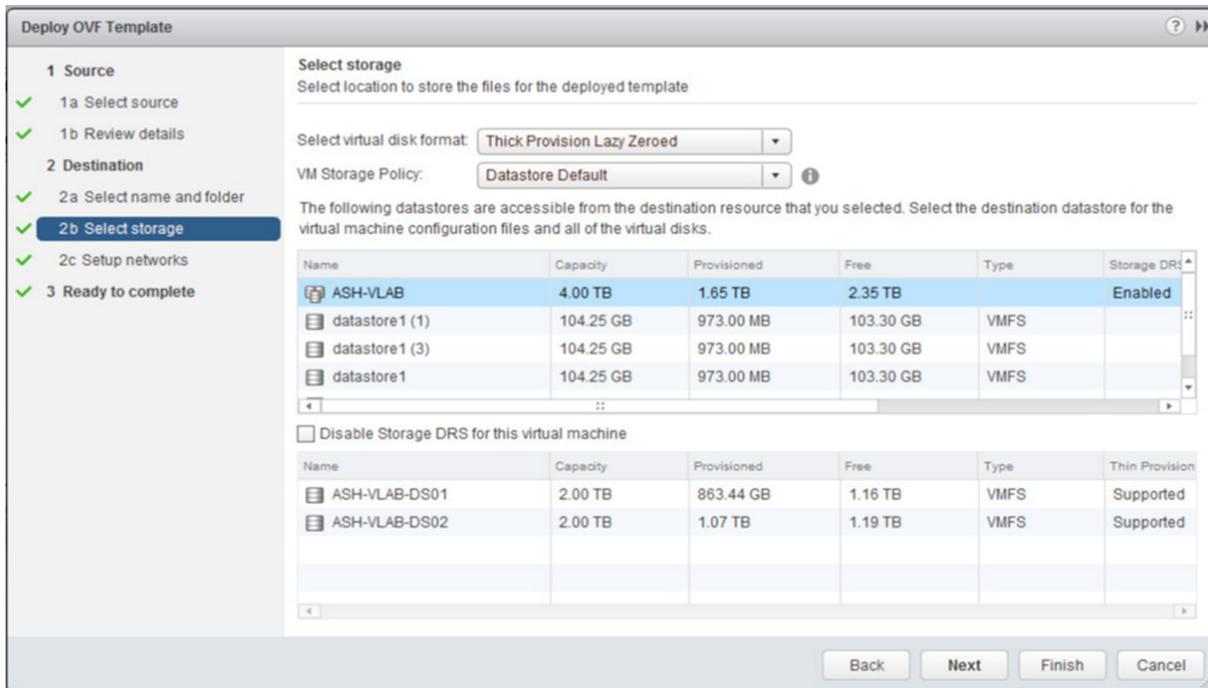
Review the details and click **Next**.



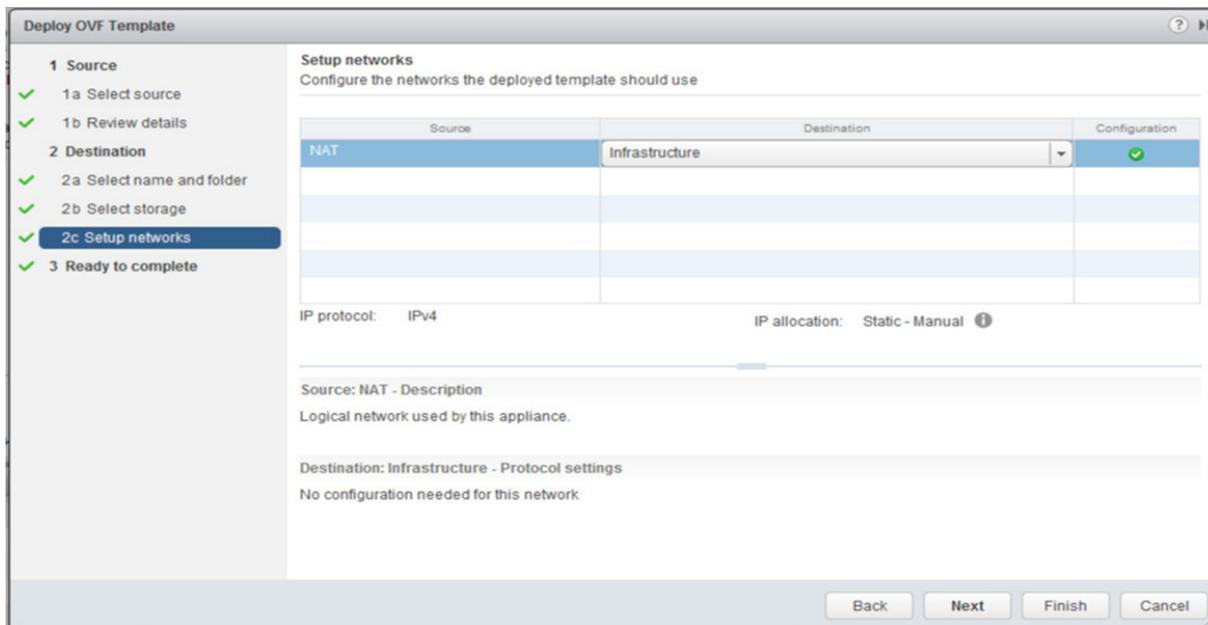
Now type the name that you would like the gateway to have, and select the location to install the appliance and click **Next**.



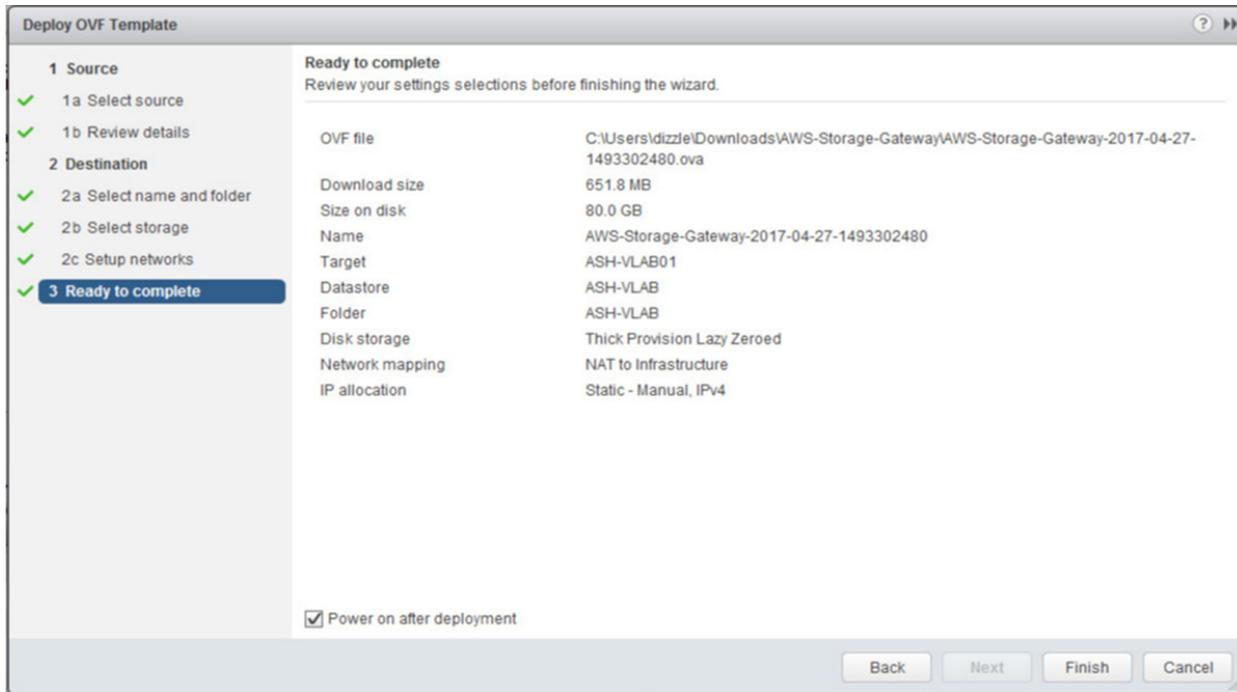
Select **Thick Provisioned** virtual disk format and the datastore that you want the appliance to reside on, and click **Next**.



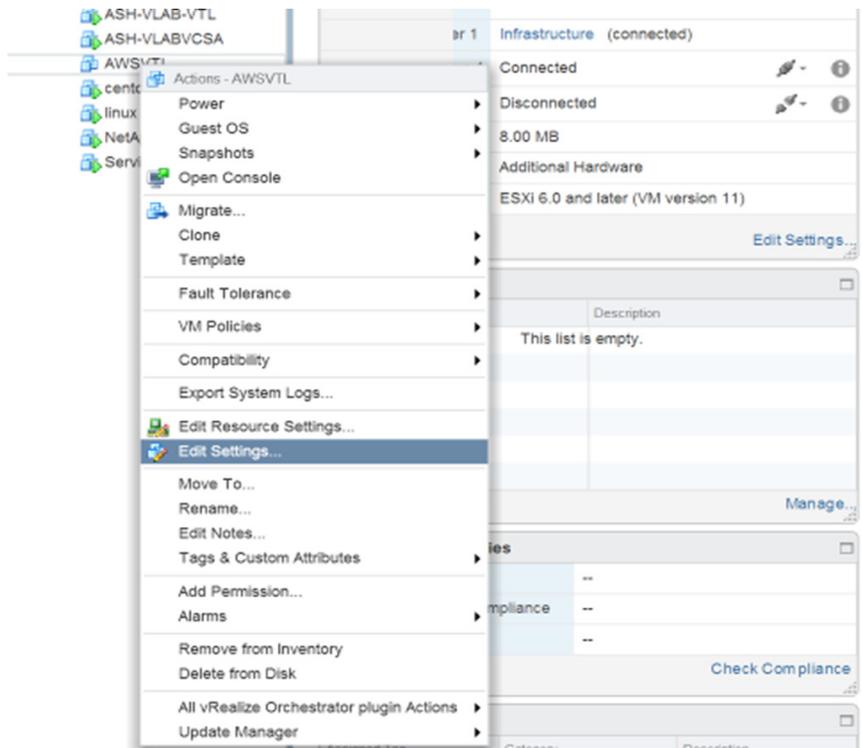
Select the correct network for the appliance and click **Next**.



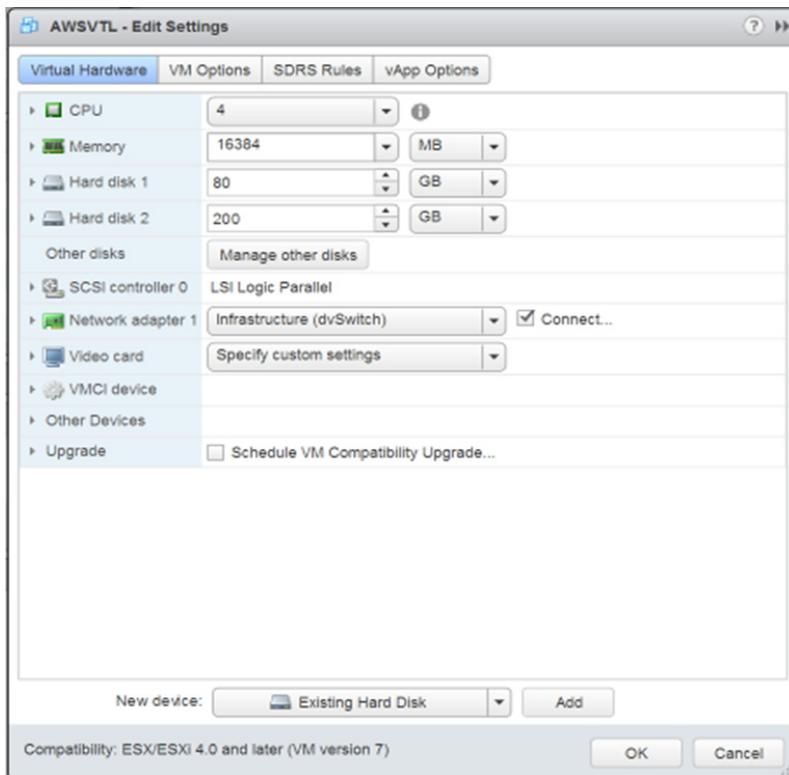
Review the install information to make sure everything is correct and make sure to un-check **Power on** after deployment if it is checked, then click **Finish** to deploy the appliance.



When the deployment is completed, you will need to edit the appliance and add the required disks for the upload and cache buffers. Right click on the appliance and choose edit settings.



Add the two hard drives with required sizing as determined during the planning stage and click **OK**.



Configuring appliance IP address

Power on the appliance that the drives have been added to now. To set a static IP to the appliance, you will need to open the local console to the appliance and log in. The default username is **sguser** and the password is **sgpassword**.

```
AWS Storage Gateway

Login to change your network configuration and other gateway settings.

For more information, please see:
https://docs.aws.amazon.com/console/storagegateway/LocalConsole

localhost login: sguser
Password: _
```

On the **Configuration main menu**, type option 2 to begin configuring a static IP address.

```
AWS Storage Gateway Configuration

#####
## Currently connected network adapters:
##
## eth0: 10.0.1.54
#####

1: SOCKS Proxy Configuration
2: Network Configuration
3: Test Network Connectivity
4: System Time Management
5: Gateway Console
6: View System Resource Check (0 Errors)

0: Stop AWS Storage Gateway

Press "x" to exit session

Enter command: _
```

Type option 3 to set a static IP address.

```
AWS Storage Gateway Network Configuration

1: Describe Adapter
2: Configure DHCP
3: Configure Static IP
4: Reset all to DHCP
5: Set Default Adapter
6: View DNS Configuration
7: View Routes

Press "x" to exit

Enter command: ^[_
```

Type the name of the adapter you want to configure. The default adapter is **eth0**.

```
AWS Storage Gateway Network Configuration

1: Describe Adapter
2: Configure DHCP
3: Configure Static IP
4: Reset all to DHCP
5: Set Default Adapter
6: View DNS Configuration
7: View Routes

Press "x" to exit

Enter command: 3

Available adapters: eth0
Enter Network Adapter: eth0_
```

Now type in the static IP address and hit **enter**.

```
AWS Storage Gateway Network Configuration

1: Describe Adapter
2: Configure DHCP
3: Configure Static IP
4: Reset all to DHCP
5: Set Default Adapter
6: View DNS Configuration
7: View Routes

Press "x" to exit

Enter command: 3

Available adapters: eth0
Enter Network Adapter: eth0

Enter IP Address: 10.0.1.54
Enter Network Mask: 255.255.255.0_
```

Type in subnet mask and hit **enter**.

```
AWS Storage Gateway Network Configuration

1: Describe Adapter
2: Configure DHCP
3: Configure Static IP
4: Reset all to DHCP
5: Set Default Adapter
6: View DNS Configuration
7: View Routes

Press "x" to exit

Enter command: 3

Available adapters: eth0
Enter Network Adapter: eth0

Enter IP Address: 10.0.1.54
Enter Network Mask: 255.255.255.0_
```

Type in the default gateway IP address and hit **enter**.

```
AWS Storage Gateway Network Configuration

1: Describe Adapter
2: Configure DHCP
3: Configure Static IP
4: Reset all to DHCP
5: Set Default Adapter
6: View DNS Configuration
7: View Routes

Press "x" to exit

Enter command: 3

Available adapters: eth0
Enter Network Adapter: eth0

Enter IP Address: 10.0.1.54
Enter Network Mask: 255.255.255.0
Enter Default Gateway: 10.0.1.1_
```

Type in the primary DNS IP and hit **enter**, then type the secondary IP address and hit **enter**.

```
AWS Storage Gateway Network Configuration

1: Describe Adapter
2: Configure DHCP
3: Configure Static IP
4: Reset all to DHCP
5: Set Default Adapter
6: View DNS Configuration
7: View Routes

Press "x" to exit

Enter command: 3

Available adapters: eth0
Enter Network Adapter: eth0

Enter IP Address: 10.0.1.54
Enter Network Mask: 255.255.255.0
Enter Default Gateway: 10.0.1.1
Enter Primary DNS: 10.0.1.21
Enter Secondary DNS: 8.8.8.8_
```

Now type Y to save and apply the configuration to the selected adapter.

```

AWS Storage Gateway Network Configuration

1: Describe Adapter
2: Configure DHCP
3: Configure Static IP
4: Reset all to DHCP
5: Set Default Adapter
6: View DNS Configuration
7: View Routes

Press "x" to exit

Enter command: 3

Available adapters: eth0
Enter Network Adapter: eth0

Enter IP Address: 10.0.1.54
Enter Network Mask: 255.255.255.0
Enter Default Gateway: 10.0.1.1
Enter Primary DNS: 10.0.1.21
Enter Secondary DNS: 8.8.8.8

Apply config [y/n]: Y_
    
```

Now that the appliance has been configured with a static IP, you can move forward with the activation process.

Activating gateway

With the IP set and the storage appliance powered up, you can now log back into the Amazon management console to complete the activation process. Open the AWS Management Console that we previously had opened and it should be on the **Connect to gateway** page. Put in the IP address you assigned to your gateway (internal IP) and click **Connect to gateway**.



Now select the time zone the gateway is in, along with the name you would like it to have. The default settings for the changer type and drive type are fine. Click on **Active gateway** to proceed.

Activate gateway

Selected gateway configuration: VTL gateway

Activation securely associates your gateway with your AWS account. [Learn more](#)

Storage and data transfer pricing applies when you start using your gateway. [Learn more](#)

AWS Region US West (Oregon)

Gateway time zone GMT Western Europe Time, Lond... ▼

Gateway name Gateway_VTL_Test

Backup application Other ▼

Medium changer type

- AWS-Gateway-VTL
- STK-L700

Tape drive type IBM-ULT3580-TD5

[Cancel](#) [Activate gateway](#)

On the **Configure local storage** page, you can select the disks that you previously added to the appliance. Be sure to designate the correct size disk for the **Upload buffer** and the **Cache**, and click **Save and continue**.

✔ Gateway is now active ✕

Configure local storage

Specify the local disks you've added to your VM for your gateway to use as its upload buffer and cache storage.

↻ ⓘ

Disk ID	Capacity	Allocation
xen-vbd-2080	150 MiB	Upload buffer ▼
xen-vbd-2064	200 MiB	Cache ▼

[Exit](#) [Save and continue](#)

Your gateway will now appear in the **AWS storage gateway** management page.

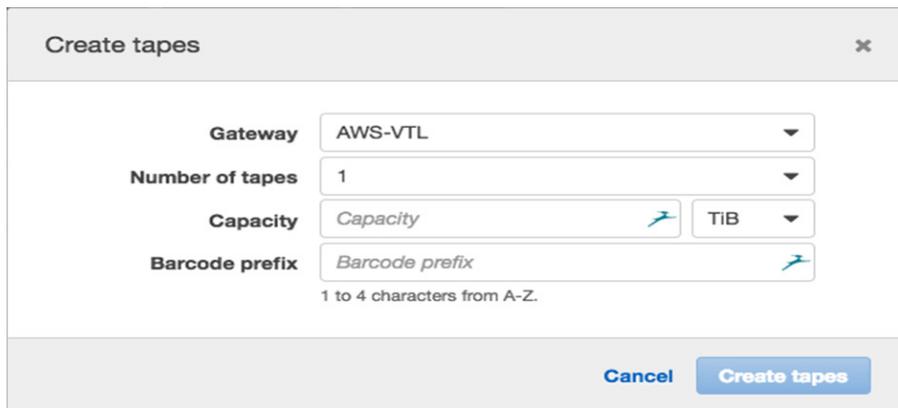
Creating tapes

The next step is to add tapes to the library so select your gateway by clicking the box next to its name, and then clicking on Create tapes at the top.



On the **Create tapes** page, you can select the number of tapes you would like to add and their capacity. Barcode prefix is an optional section that you can create your own prefix of one to four uppercase letters.

Note that the maximum number of tapes is 1,500, and the minimum size is 100GB with a maximum size of 2.5TB



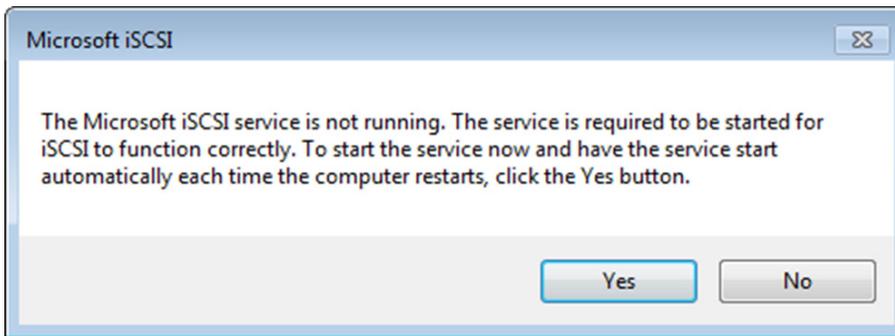
It is helpful to be aware of the size limitations of tapes in an AWS gateway. AWS has the following diagram located here: <http://docs.aws.amazon.com/storagegateway/latest/userguide/resource-gateway-limits.html#resource-tape-limits>

Description	Tape Gateway
Minimum size of a virtual tape	100 GiB
Maximum size of a virtual tape	2.5 TiB
Maximum number of virtual tapes for a virtual tape library (VTL)	1,500
Total size of all tapes in a virtual tape library (VTL)	1 PiB
Maximum number of virtual tapes in archive	No limit
Total size of all tapes in a archive	No limit

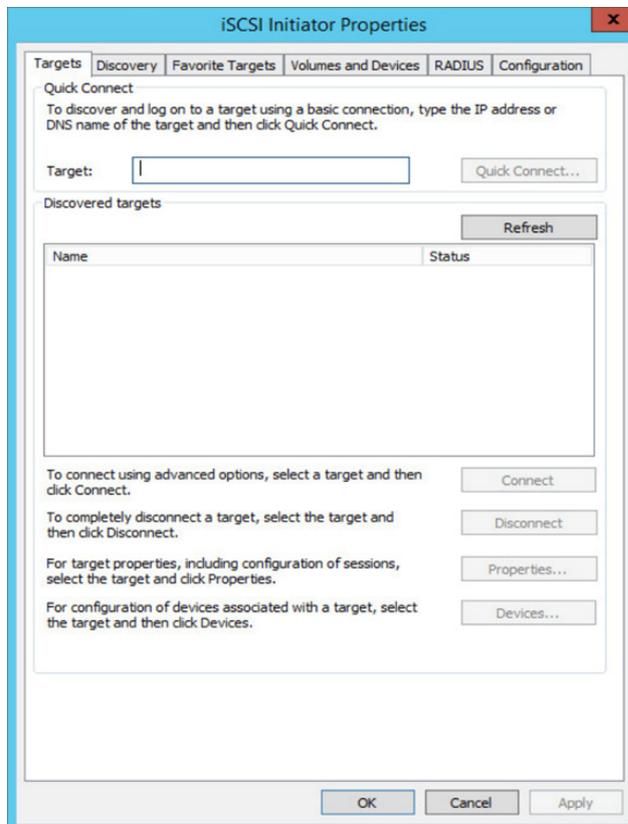
Veeam configuration for AWS gateway

Now that the appliance has been created, installed, configured and activated, it is time to attach the gateway to a Windows server to appear as a tape library. In this document, we will show you how to setup using a Windows server. If you would like to use a Linux server, you can find instructions at the following link: <http://docs.aws.amazon.com/storagegateway/latest/userguide/initiator-connection-common.html#ConfiguringiSCSIClientInitiatorRedHatClient>

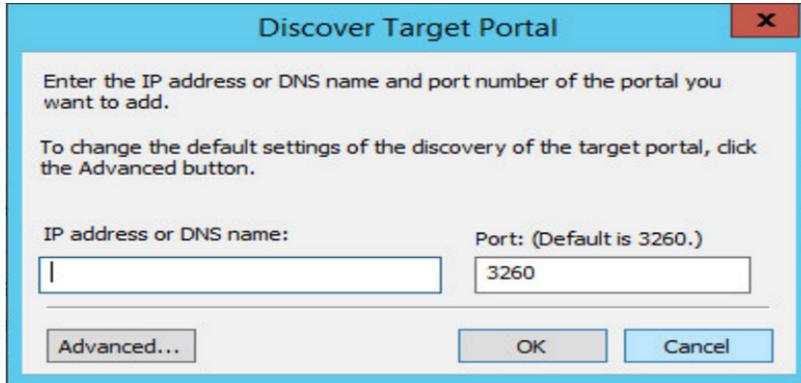
Now log into the Windows server that you would like to setup for use as the VTL. Click **Start** on your Windows client computer, type **iscsicpl.exe** in the **Search Programs and Files** box, locate the **iSCSI initiator program** and then run it. When the program starts, you will receive a warning that the service is not running, click **Yes** to start. (*Note: This is only if the iSCSI service is not running.*)



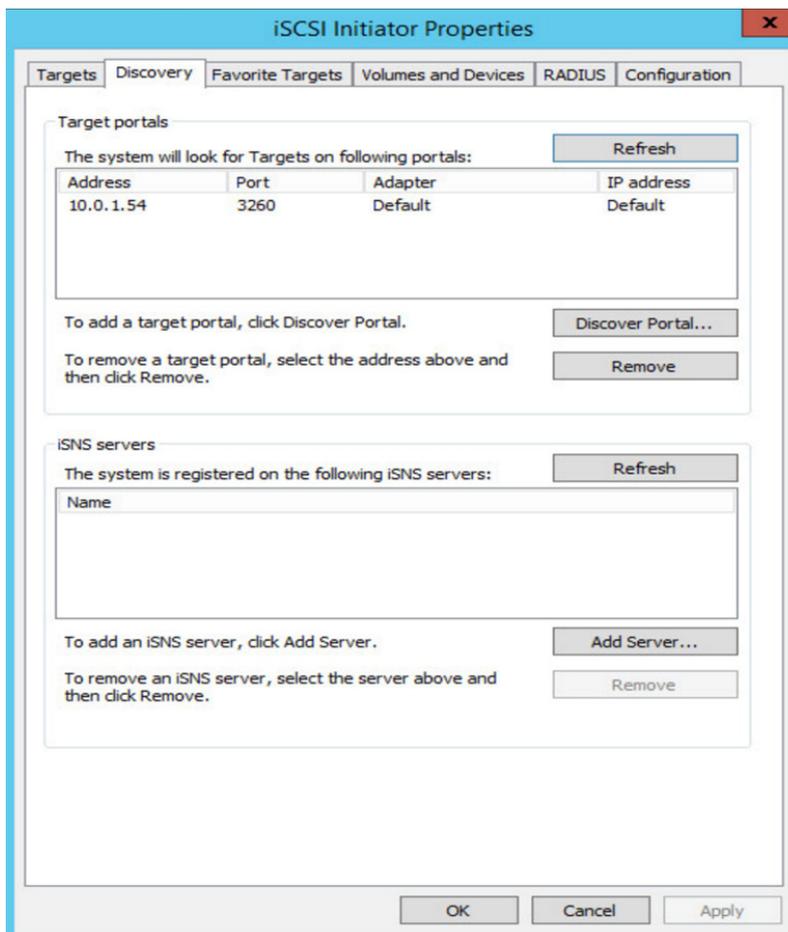
Once the iSCSI properties dialog box opens, click on the **Discovery** tab.



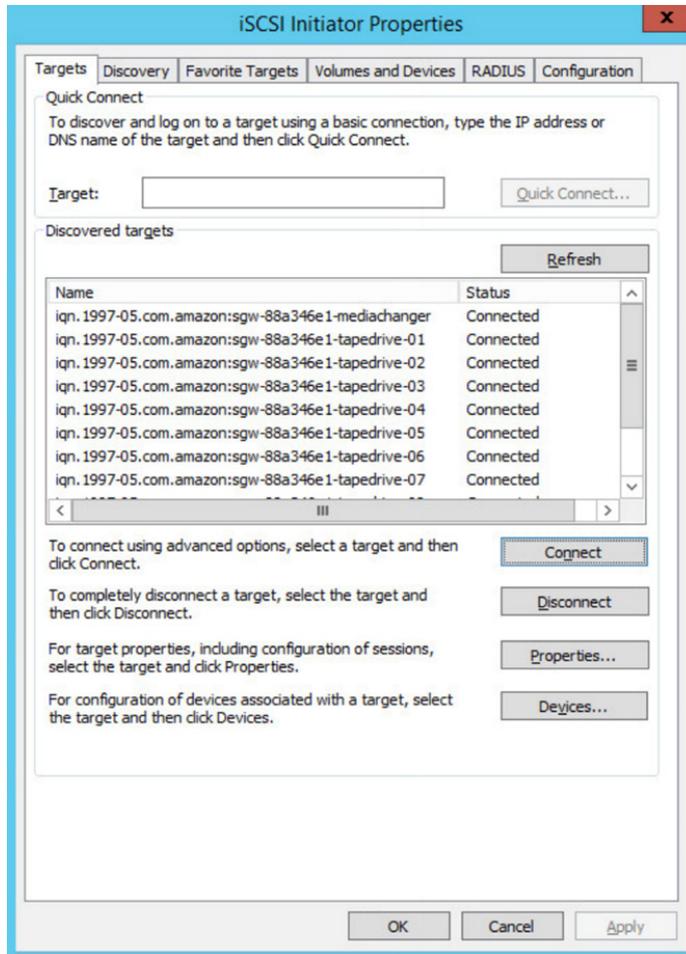
Once on the **Discovery** tab, then choose the **Discover Portal** button. Type the IP address that you previously set the AWS VTL gateway to and click **OK**.



You should now see the gateway appear in the **Target portals** box.

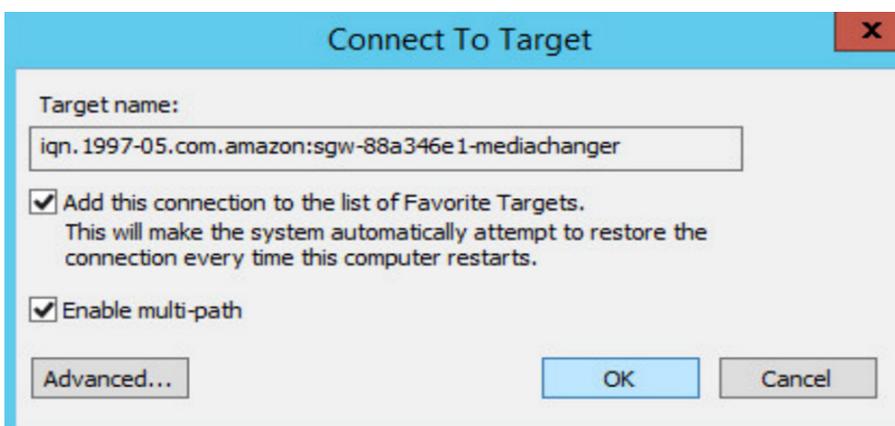


Choose the **Targets** tab, and then choose **Refresh**. All ten tape drives and the medium changer appear in the **Discovered targets** box. The status for the targets is **Inactive**.



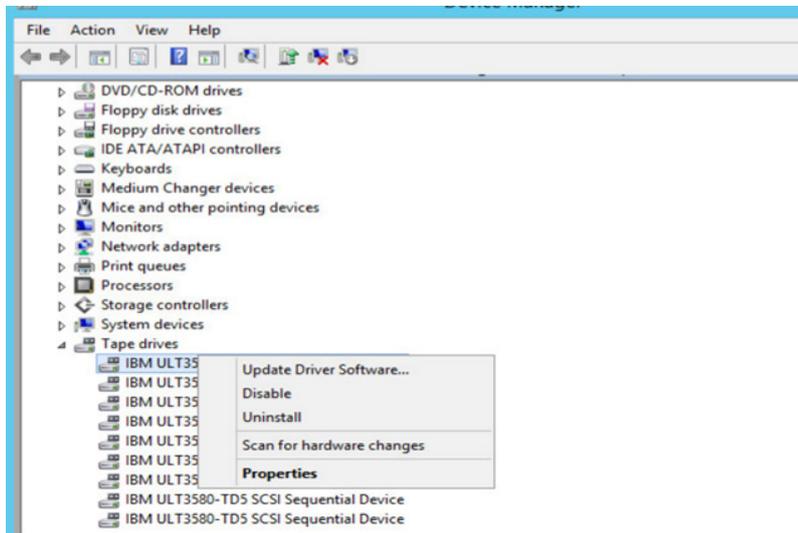
Select the first device and connect it. You connect all the devices one at a time.

Connect all of targets.

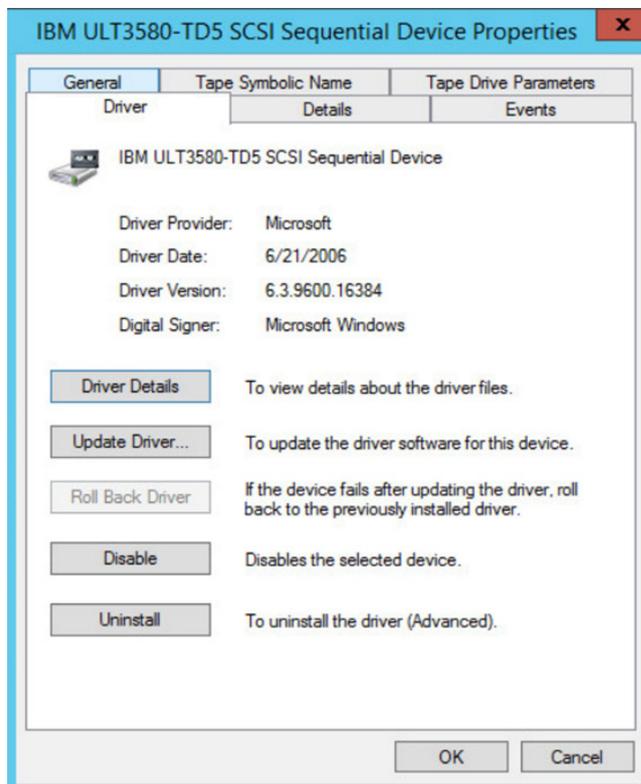


Once complete you will need to check the drivers on the tape drives in device manager. Open **Device Manager** and expand **Tape drives** and right click on the one of the drives and select **Properties**.

Note: It is important to check Media change devices for correct drivers installed as well. Veeam will work with unknown media changer types but it is important that none of the tape drives or media changer have no warning icons for driver issues.

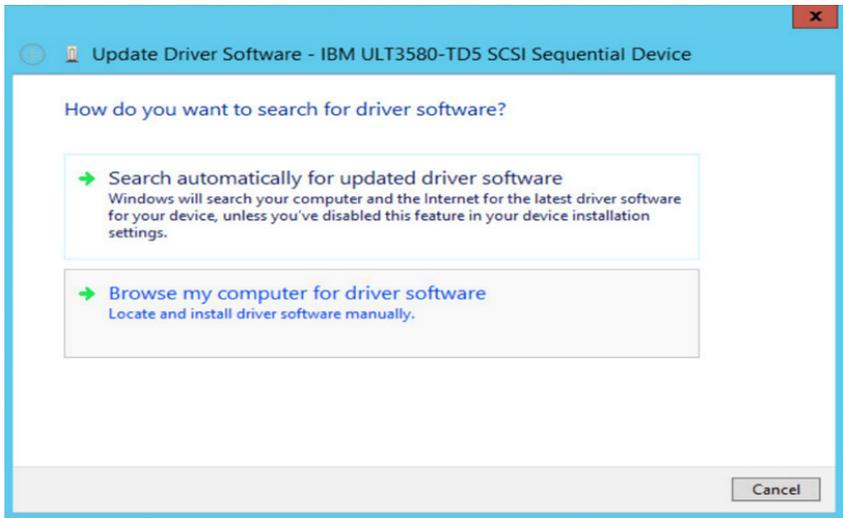


In the **Driver** tab of the **Device Properties** dialog box, verify that the **Driver Provider** is Microsoft.

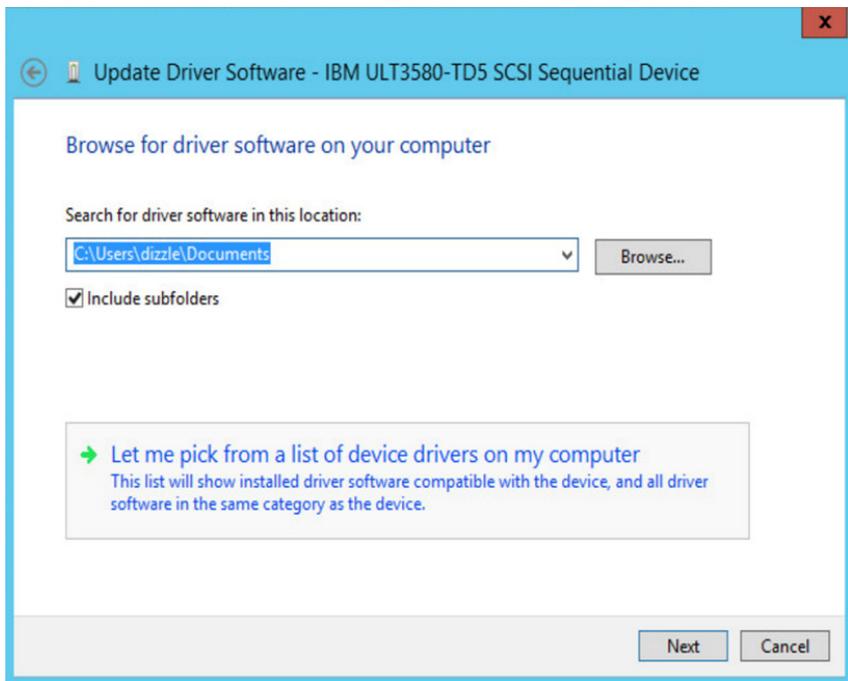


If the **Driver Provider** is not Microsoft, set the value as follows:

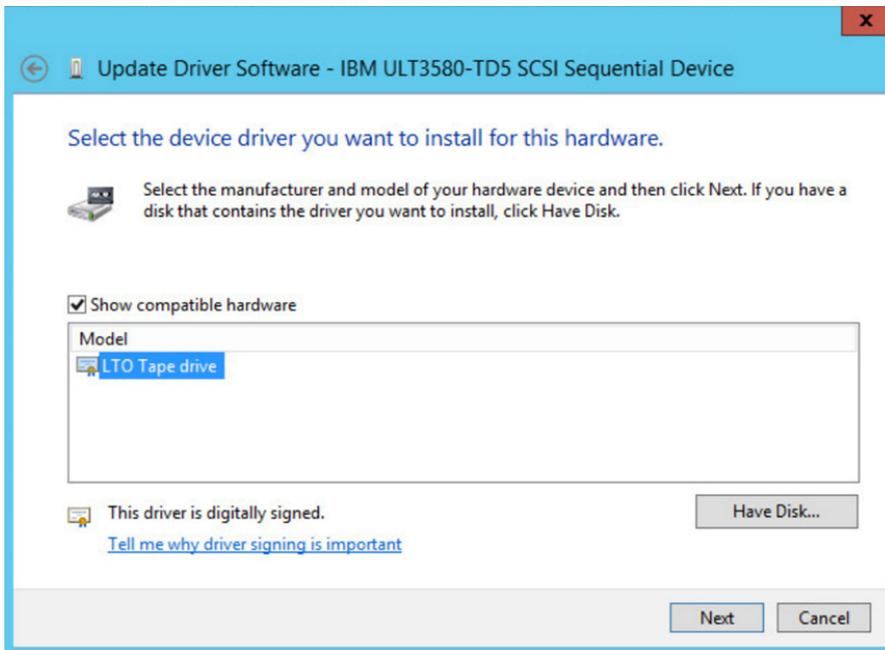
Choose **Update Driver**. In the **Update Driver Software** dialog box, choose **Browse my computer for driver software**.



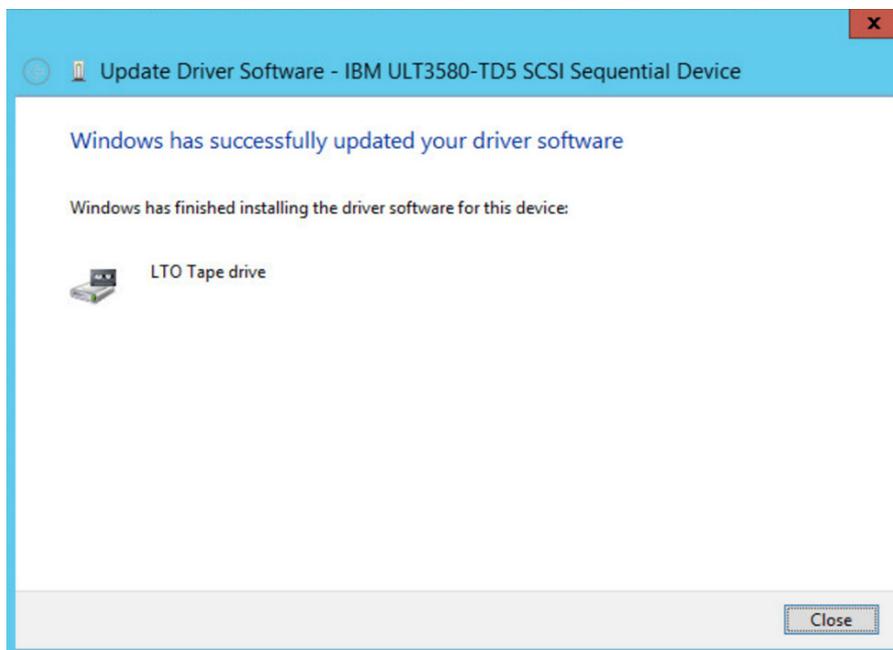
In the **Update Driver Software** dialog box, choose **Let me pick from a list of device drivers on my computer**.



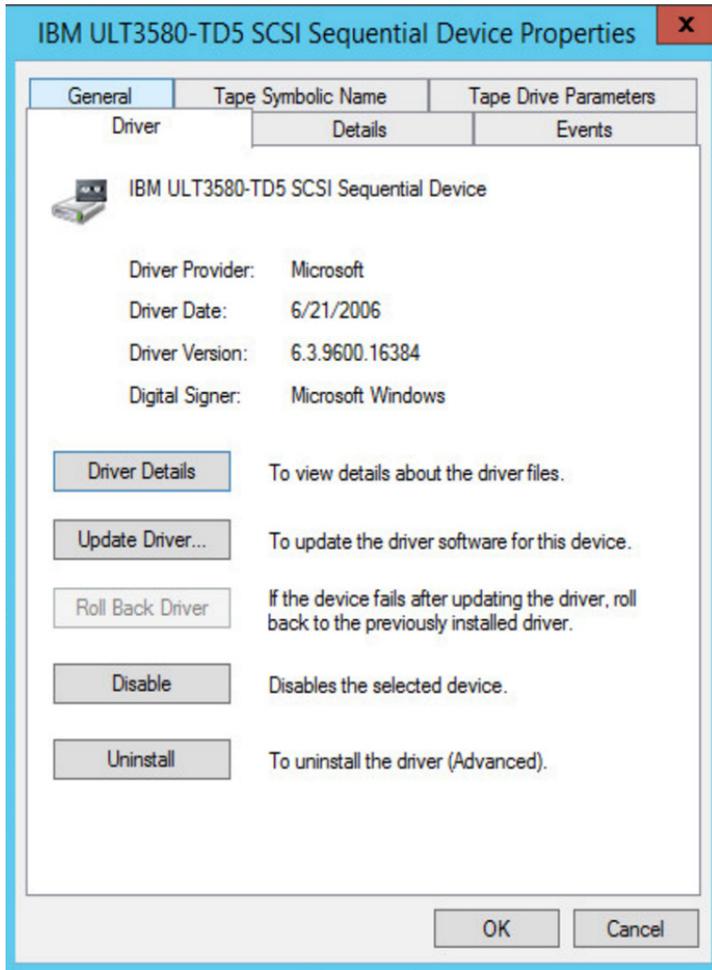
Select **LTO Tape drive** and choose **Next**.



Click **Close** on the completion dialog box.



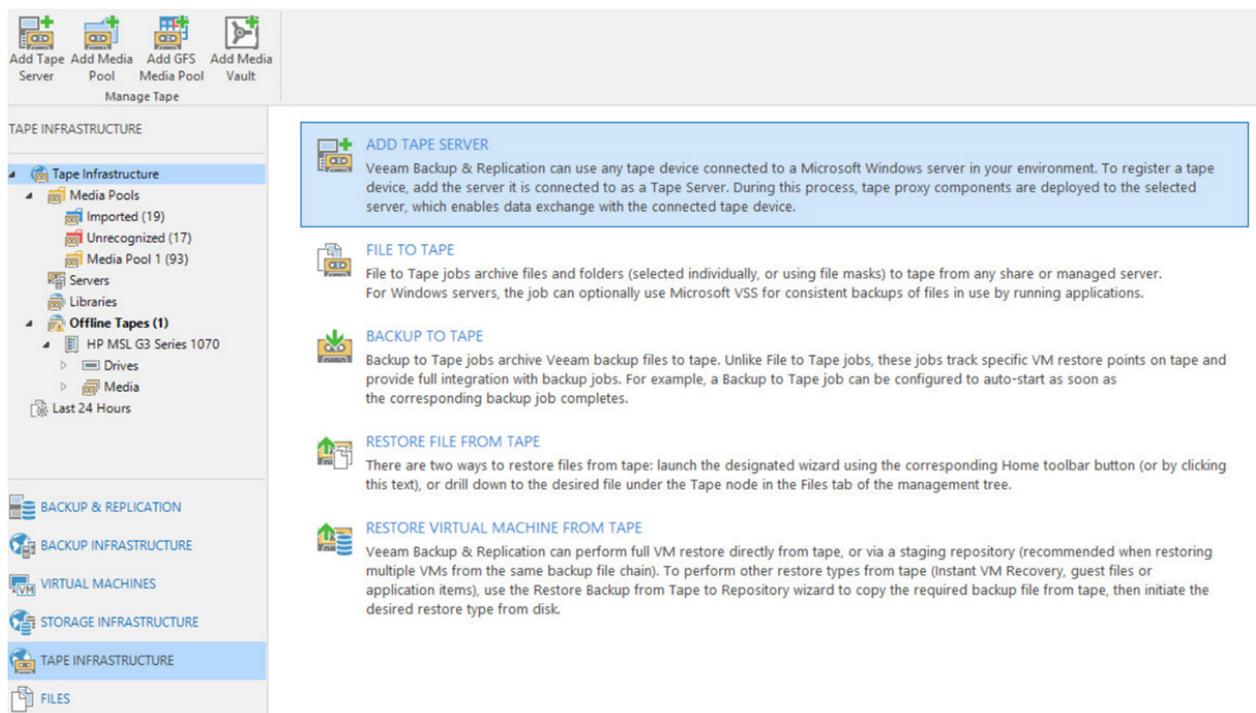
Verify that the **Driver Provider** value is now set to Microsoft. Complete these steps for all the tape drives.



You are now ready to configure Veeam to use the tape library.

Veeam configuration

Now that the AWS gateway has been installed, configured and mounted to a Windows server, it is time to add it to the Veeam server. Open the **Tape Infrastructure** view and click **Add Tape Server** on the ribbon.

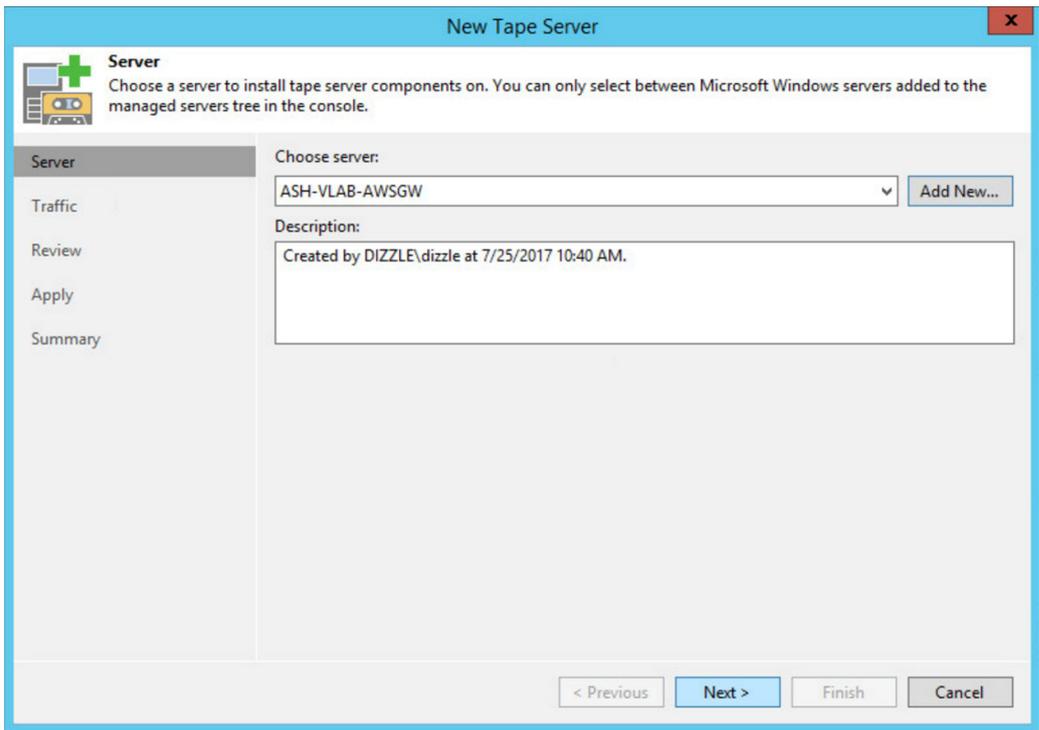


At the **Server** step of the wizard, select a physical or virtual server to which the tape devices are connected and that you want to add as the tape server.

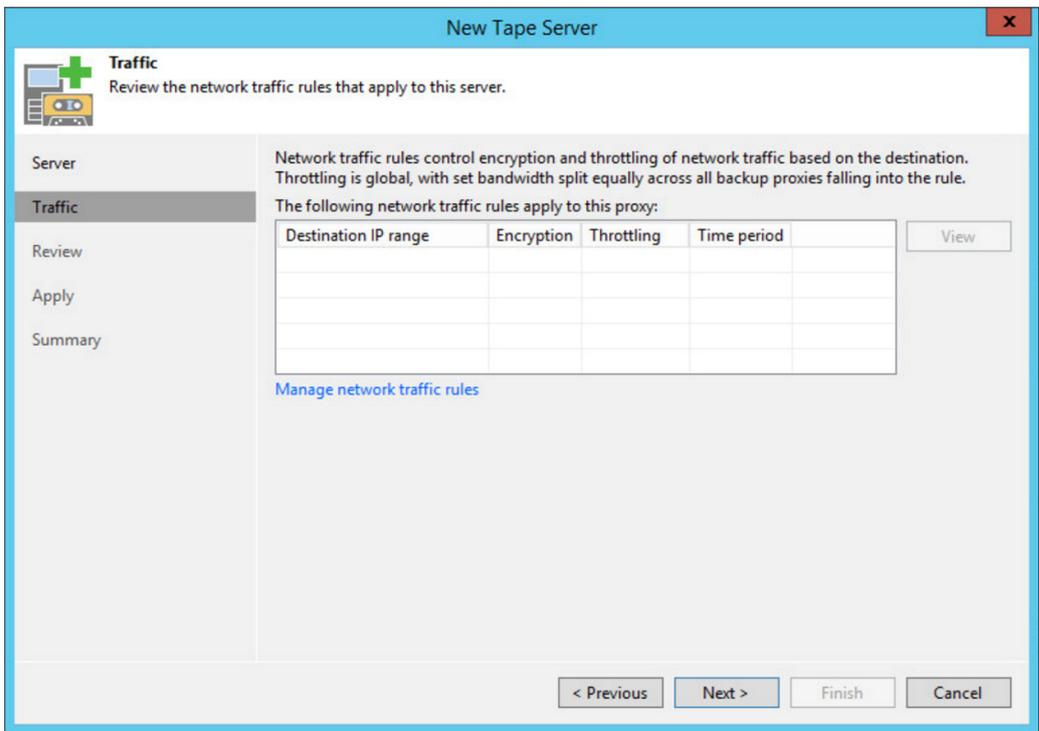
1. From the **Choose server** list, select the server that you want to add as the tape server. If the devices are connected to the Veeam backup server, choose **This server**. The tape server role will be assigned to your backup server.

If the devices are connected to a separated server, enter the server name or IP address. The tape server must run Microsoft Windows. If the server is not added to Veeam Backup & Replication yet, you can click **Add New** to open the **New Windows Server** wizard.

2. In the Description field, provide a description for future reference.



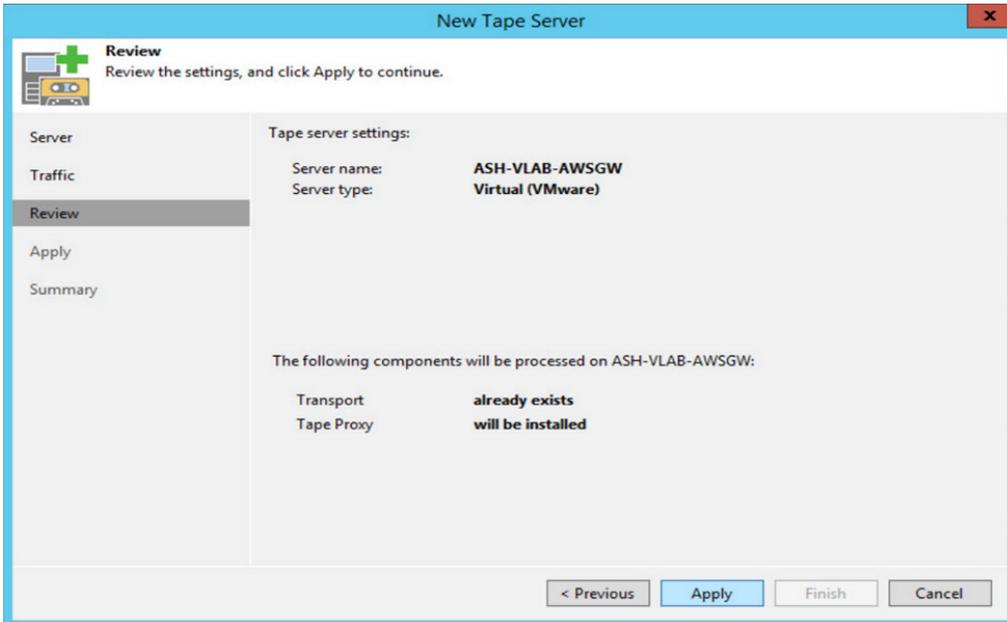
At the **Traffic** step of the wizard, configure throttling rules to limit the outbound traffic rate for the tape server. Throttling rules will help you manage bandwidth usage and minimize the impact of tape jobs on network performance. For more information, see https://helpcenter.veeam.com/docs/backup/vsphere/setting_network_traffic_throttling.html?ver=95



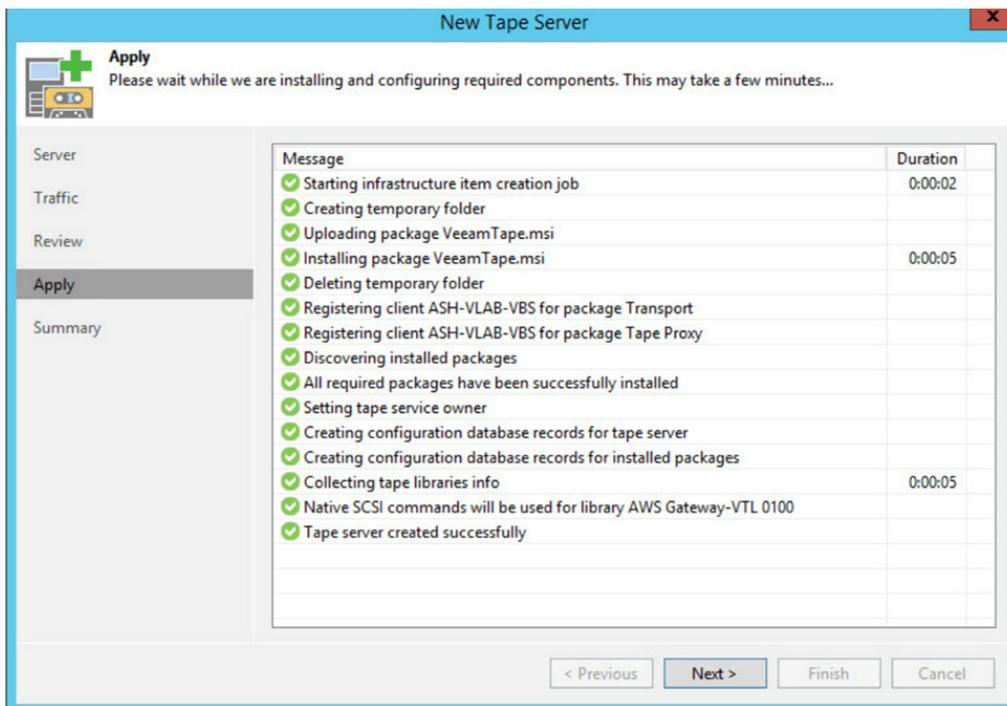
At the **Review** step of the wizard, Veeam Backup & Replication will display the list of components required for work of the tape server:

- Veeam transport
- Veeam tape service

If any are missing, Veeam Backup & Replication will automatically install them on the selected server. Click **Apply**.

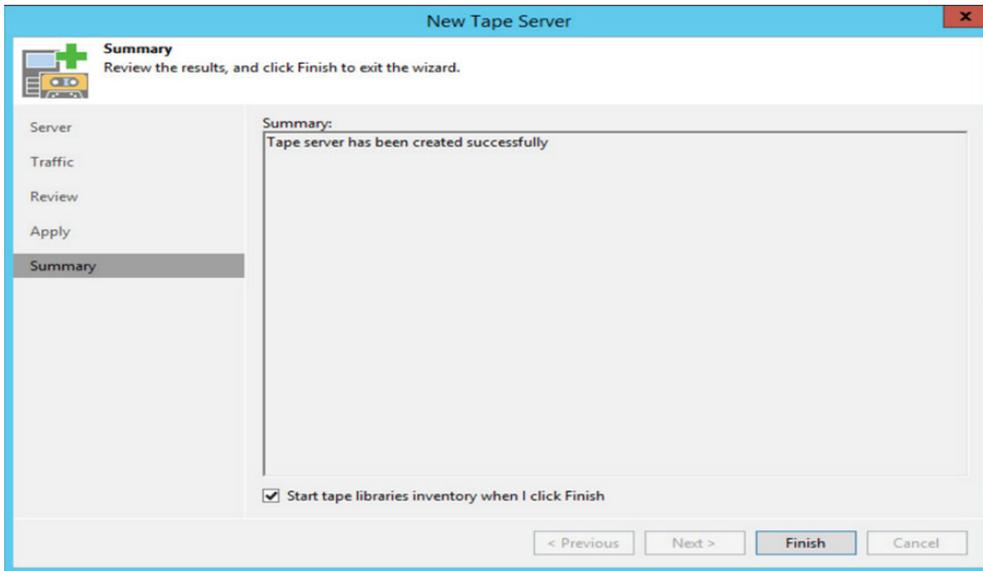


At the **Apply** step of the wizard, Veeam Backup & Replication will add the tape server to the backup infrastructure in the real-time mode. If Veeam Backup & Replication detects an unknown media changer, the message will appear in the **Message** area.

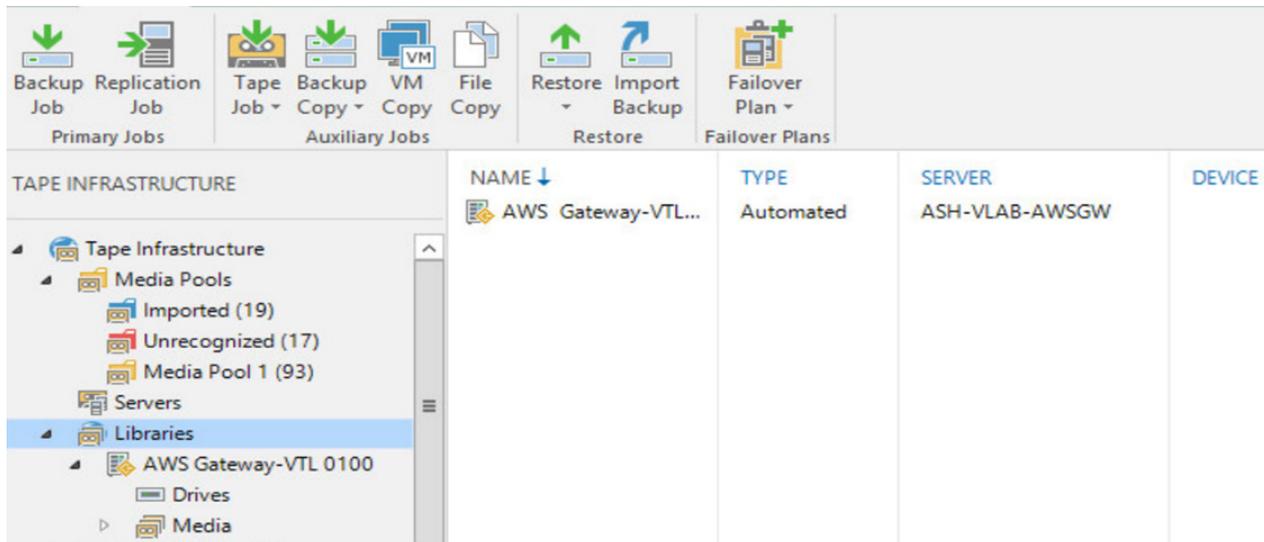


At the **Summary** step of the wizard, finalize the procedure of the tape server configuration. Review details of the added tape server. To inventory tape libraries connected to the tape server, select the **Start tape libraries inventory when I click Finish** check box.

Veeam Backup & Replication will start the inventory process when you finish working with the wizard.



Once complete, your AWS VTL gateway should now appear in the **Libraries** section of the Veeam console.



You have now installed and configured your AWS gateway within Veeam and you are ready to create media pools and tape jobs. Please review **Getting Started with Tapes** on the Veeam help site to complete the steps needed to setup a media pool to leverage all the tapes mounted.

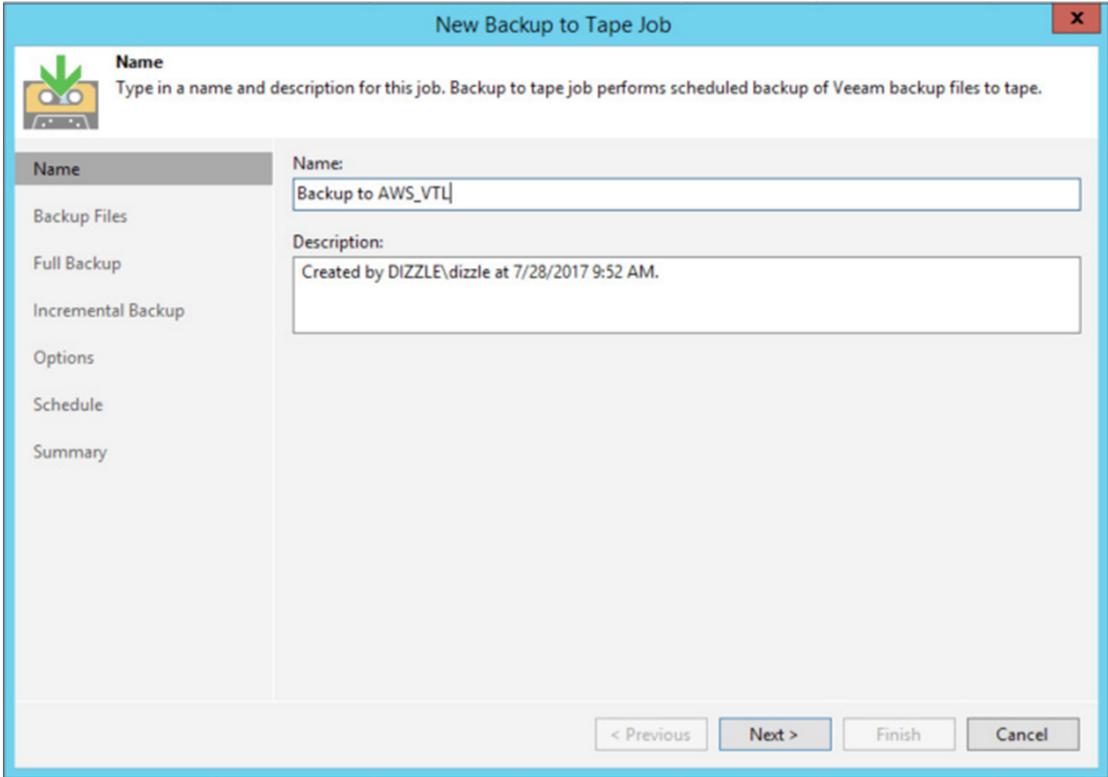
https://helpcenter.veeam.com/docs/backup/vsphere/getting_started_with_tapes.html?ver=95

Once you have completed the media pool and media vault creation, you are ready to create a tape job to send backups to AWS.

Creating tape jobs

In this section, we will create an example tape job to send backups to the AWS gateway and verify that the tape is then sent to AWS. To run the **New Backup to Tape Job** wizard, do either of the following: On the **Home** tab, click **Tape Job** and select **Backups**. At the **Name** step of the wizard, you should define basic settings for the created backup to tape job.

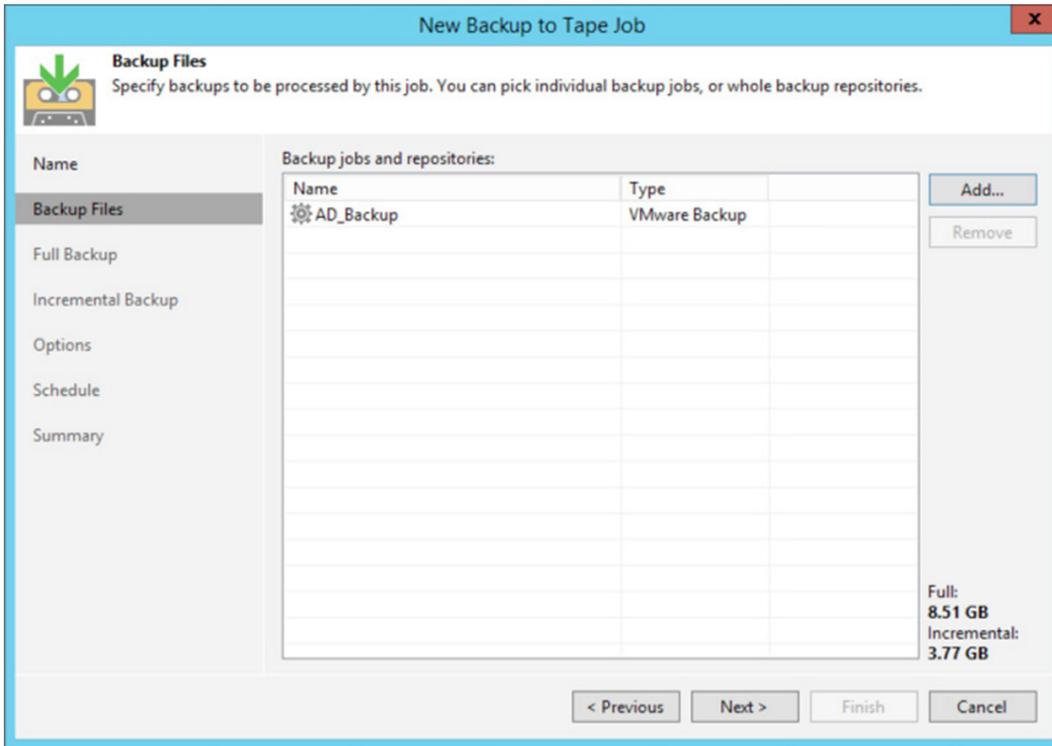
3. In the **Name** field, enter a name for the created job.
4. In the **Description** field, enter a description of the created job. (optional)



The screenshot shows the 'New Backup to Tape Job' wizard window. The title bar reads 'New Backup to Tape Job'. The main window has a blue header with a green arrow icon and the text 'Name' and 'Type in a name and description for this job. Backup to tape job performs scheduled backup of Veeam backup files to tape.' Below the header is a sidebar with a list of steps: 'Name', 'Backup Files', 'Full Backup', 'Incremental Backup', 'Options', 'Schedule', and 'Summary'. The 'Name' step is selected. The main area contains two text input fields: 'Name:' with the text 'Backup to AWS_VTL' and 'Description:' with the text 'Created by DIZZLE\dizzle at 7/28/2017 9:52 AM.' At the bottom of the window are four buttons: '< Previous', 'Next >', 'Finish', and 'Cancel'.

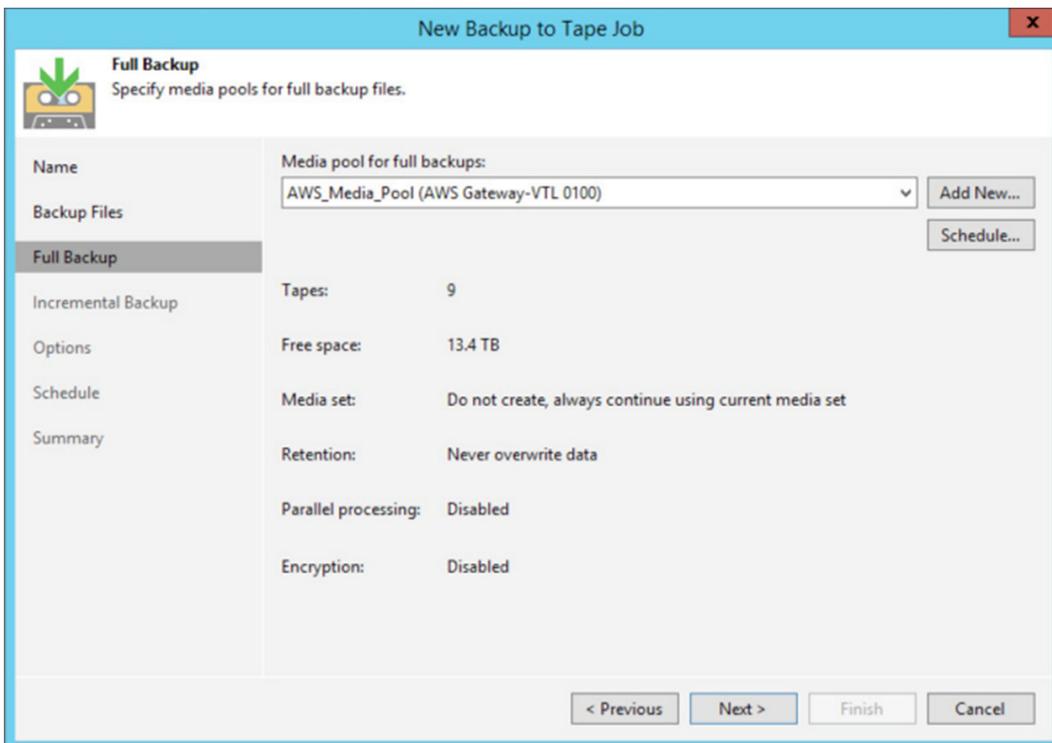
At the **Backup Files** step of the wizard, select backups that you want to write to tape with the created job. Click **Add** and select the necessary backups. You can choose backups from the following sources:

- Backup jobs: You can select backups from available backup or backup copy jobs. When a backup to tape job runs, Veeam Backup & Replication searches and archives restore points from the backups created by the selected backup jobs.
- Backup repositories: Using this option, you can select whole backup repositories. When a backup to tape job runs, Veeam Backup & Replication searches and archives restore points from all backups stored in the chosen backup repositories.

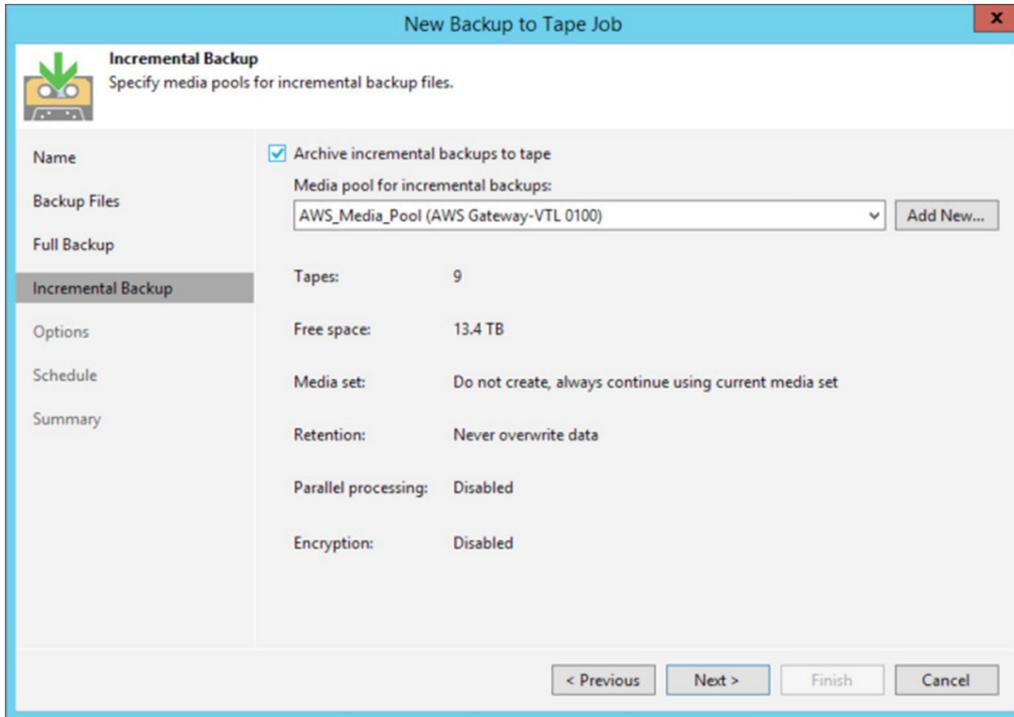


At the **Full Backup** step of the wizard, choose media pool for full backups and configure virtual full schedule for forever incremental backup chains.

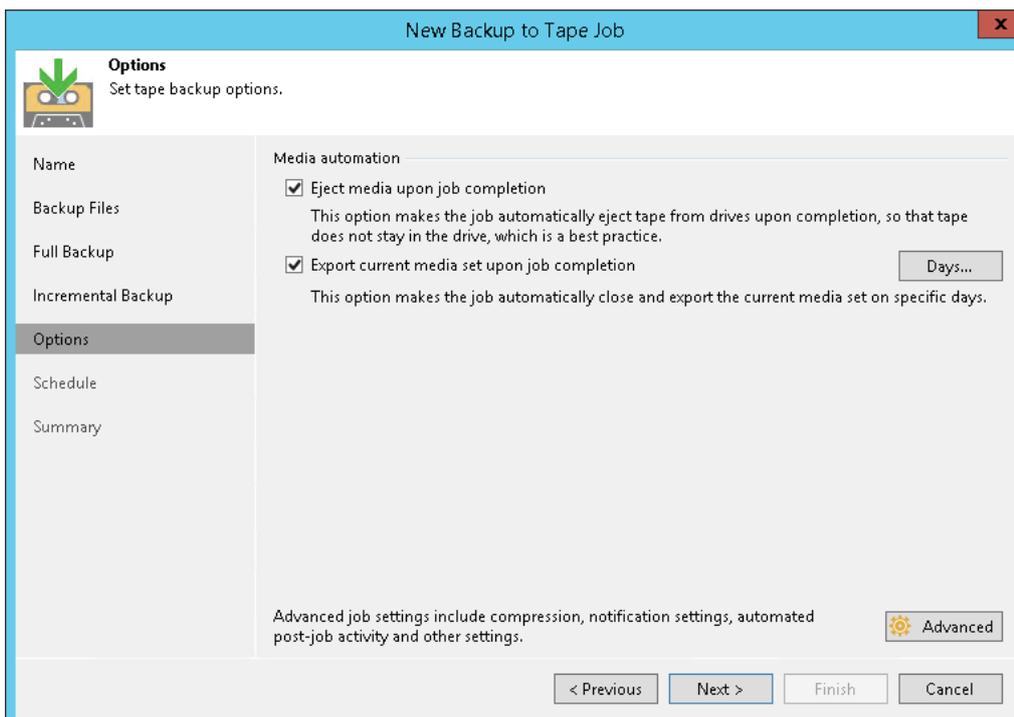
From the **Media pool for full backups** list, choose a media pool that will be used for archiving full backup files.



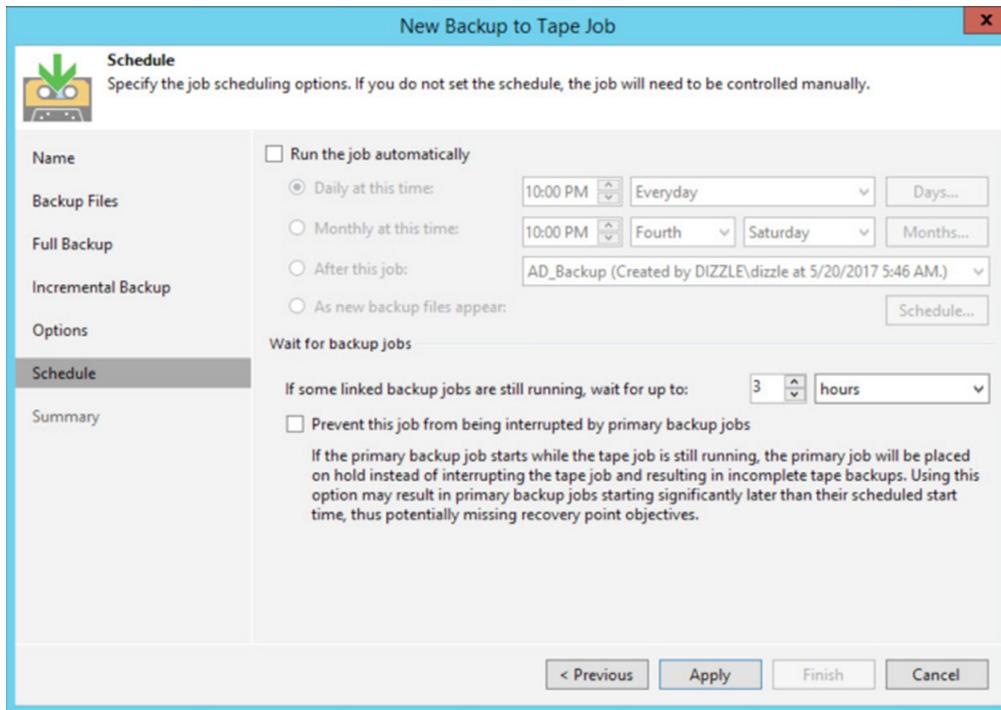
At the Incremental Backup step of the wizard, you can enable or disable incremental backups processing and choose media pool for incremental backups. If you want to back up incremental backups to tape, select the **Archive incremental backups to tape** check box. If this option is disabled, the backup to tape job will archive only VBK files and will skip VIB files from processing. From the **Media pool for incremental backups** list, choose a media pool that will be used for incremental backups.



At the Options setup of the wizard, specify archiving and media automation options. It is recommended to select the "Export current media set upon job completion" box for the job to be uploaded to AWS upon completion. It is also recommended to eject the media upon job completion as well.

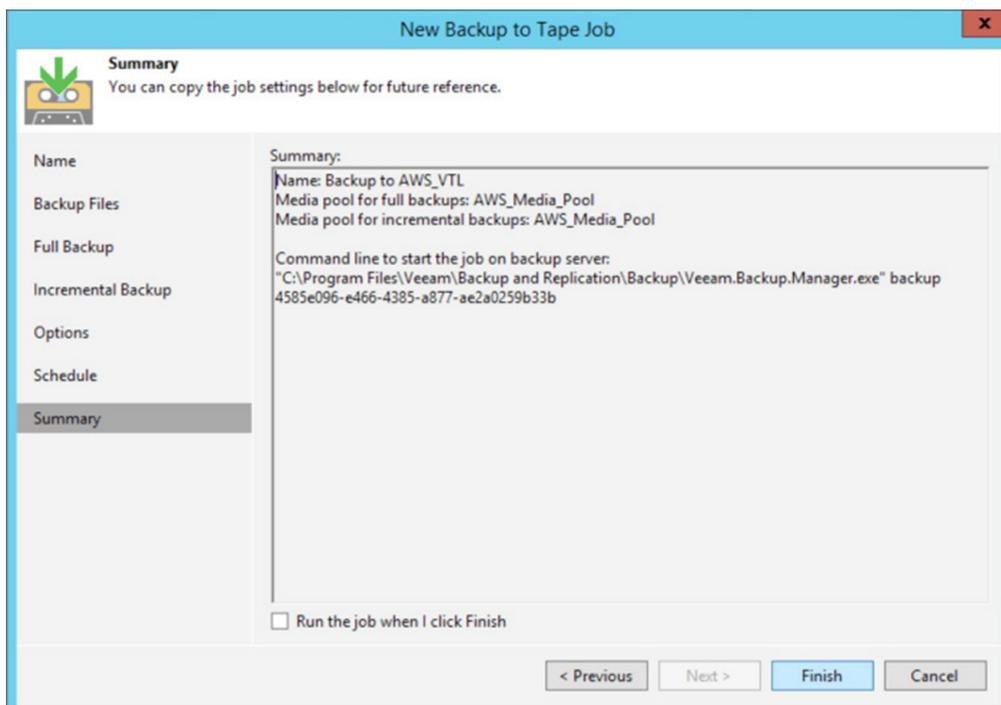


This step of the wizard is available if you selected a simple media pool at the **Full Backup** step of the wizard. To specify the job schedule, select the **Run the job automatically** check box. If this check box is not selected, the job is supposed to be started manually.



Note: Depending on what type of media pool you created will change what functions you see when performing a tape job setup. Educate yourself on the differences between a simple and GFS media pools at the following link: https://helpcenter.veeam.com/docs/backup/vsphere/tape_media_pools.html?ver=95

After you have specified schedule settings, click Create. Select the Run the job when I click Finish check box if you want to start archiving backups to tape job right after you complete working with the wizard. Click Finish to close the wizard.



Retrieving tape from AWS

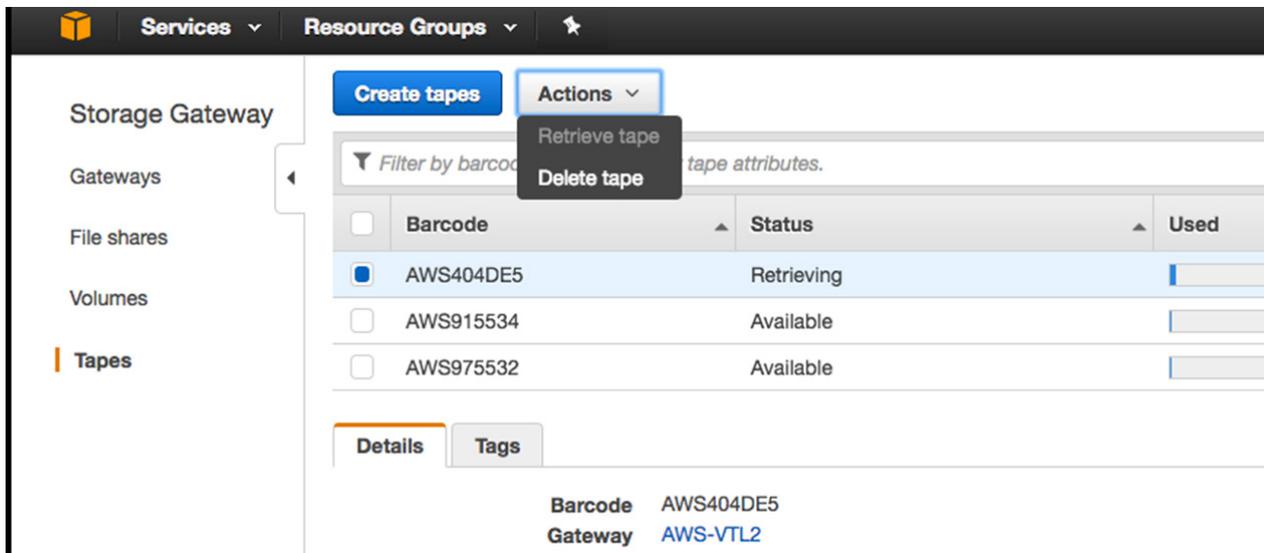
Now that your backups have been sent to tape and are located in AWS, we can walk through the process of retrieving that data.

Important: It takes up to three to five hours for the tape to be available in your tape gateway.

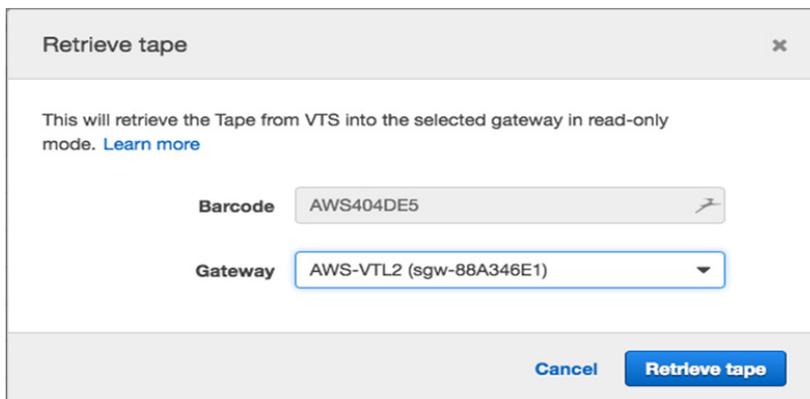
Note: There is a charge for retrieving tapes from archive. For detailed pricing information, see [AWS Storage Gateway Pricing](https://aws.amazon.com/storagegateway/pricing/) located here: <https://aws.amazon.com/storagegateway/pricing/>

Open the AWS Storage Gateway console at: <https://console.aws.amazon.com/storagegateway/home>

In the navigation pane, choose **Tapes**. You can search for all tapes that are archived to displays all virtual tapes that have been archived by all your gateways. Choose the virtual tape you want to retrieve, and choose **Retrieve Tape** from the **Actions** menu.



In the **Retrieve tape** dialog box, for **Barcode**, verify that the barcode identifies the virtual tape you want to retrieve. For **Gateway**, choose the gateway you want to retrieve the archived tape to, and then choose **Retrieve tape**.



Your tape will now be retrieved, during the process the status will show as **Retrieving**.

✔ **You have successfully initiated retrieval of the tape AWS404DE5.**
It may take 3-5 hours to retrieve the tape.

Create tapes
Actions ▾

⌵ Filter by barcode, status, or other tape attributes.

<input type="checkbox"/>	Barcode	Status	Used	Size
<input checked="" type="checkbox"/>	AWS404DE5	Retrieving	<div style="width: 4%; height: 10px; background-color: #0070c0;"></div> 4%	1.5 TiB
<input type="checkbox"/>	AWS4054E5	Available	<div style="width: 1%; height: 10px; background-color: #ccc;"></div> 1%	1.5 TiB

Upon completion of the retrieval process the tape will now show as **Retrieved**.

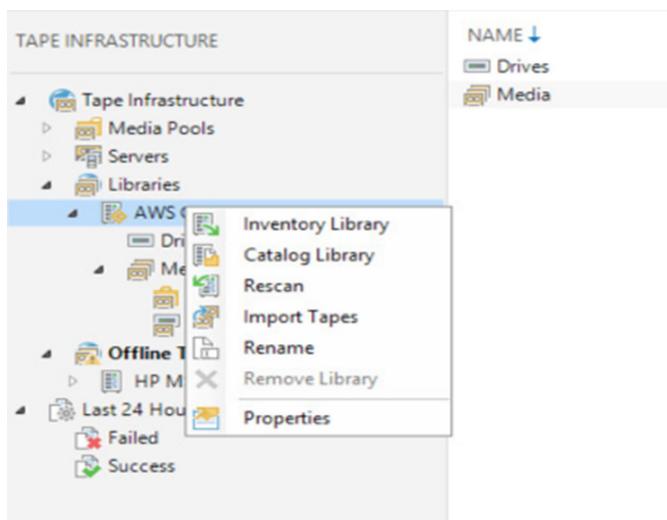
Services ▾
Resource Groups ▾
★

Create tapes
Actions ▾

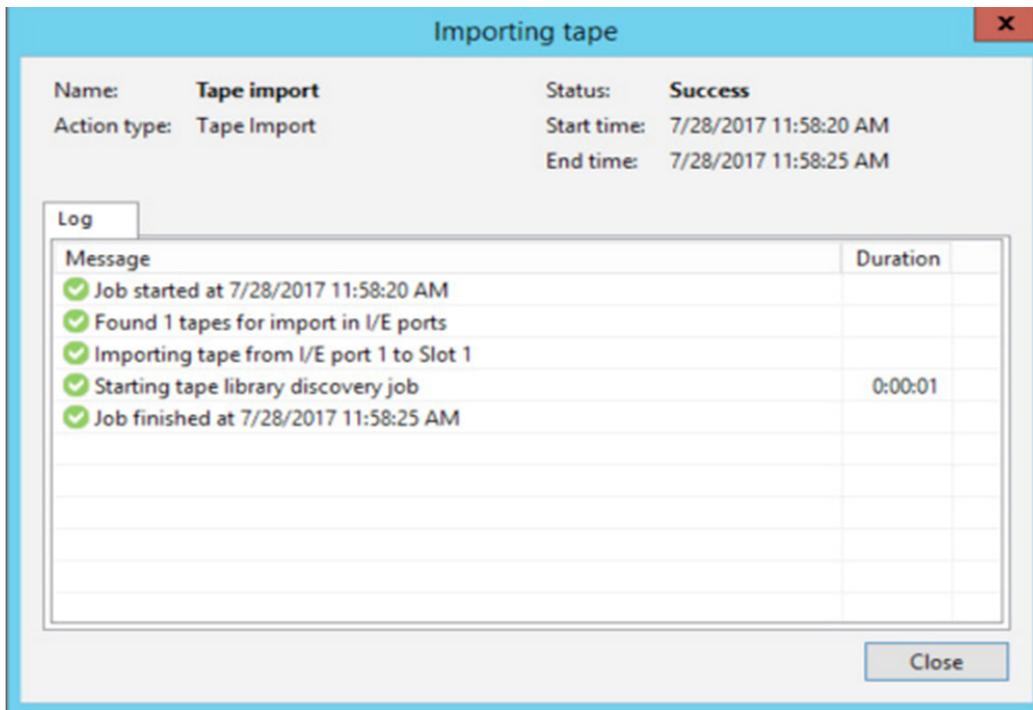
⌵ Filter by barcode, status, or other tape attributes.

<input type="checkbox"/>	Barcode	Status	Used	Size
<input type="checkbox"/>	AWS404DE5	Retrieved	<div style="width: 4%; height: 10px; background-color: #0070c0;"></div> 4%	1.5 TiB
<input type="checkbox"/>	AWS915534	Available	<div style="width: 0%; height: 10px; background-color: #ccc;"></div> 0%	1.5 TiB
<input type="checkbox"/>	AWS975532	Available	<div style="width: 0%; height: 10px; background-color: #ccc;"></div> 0%	1.5 TiB

Now that the tape has been retrieved and mounted to the gateway you will need to import the tape from the library to Veeam so that you can perform a restore of data. Within the Veeam console, right click on the **AWS gateway** in under the **Tape Infrastructure** tab and select **Import tapes**.



Once completed you can click **Close**.



Your tape will now be mounted to a drive and ready to perform a restore. (*Note: You may need to catalog the tape.*)

About the Author



Dustin Albertson (VCAP-CIA, VMCE, AWS-TP) is a Senior Cloud Solutions Architect for the Global Cloud Group at Veeam Software based in South Carolina, USA. Dustin is an active member of the virtualization and Service Provider communities. Dustin's career started in telecom before focusing on virtualization. His main areas of expertise are VMware and Networking, with a strong focus on Cloud Service Providers and Public Clouds. Follow Dustin on Twitter [@clouddizzle @veeam](#).

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A nighttime photograph of a city skyline, likely Chicago, with the Willis Tower prominently featured. The buildings are illuminated with lights, and the scene is reflected in a body of water in the foreground. The overall color palette is dark with highlights from the city lights.

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