StarWind Virtual Tape Library: Deploy Using Cloud Storage

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TECHNICAL PAPERS
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StarWind is a pioneer in virtualization and a company that participated in the development of this technology from its earliest days. Now the company is among the leading vendors of software and hardware hyper-converged solutions. The company’s core product is the years-proven StarWind Virtual SAN, which allows SMB and ROBO to benefit from cost-efficient hyperconverged IT infrastructure. Having earned a reputation of reliability, StarWind created a hardware product line and is actively tapping into hyperconverged and storage appliances market. In 2016, Gartner named StarWind “Cool Vendor for Compute Platforms” following the success and popularity of StarWind HyperConverged Appliance. StarWind partners with world-known companies: Microsoft, VMware, Veeam, Intel, Dell, Mellanox, Citrix, Western Digital, etc.

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Introduction To Starwind VTL

StarWind Virtual Tape Library (VTL) is a software solution that allows you to emulate physical Tape Libraries while storing data on the hard disk drives. The solution targets companies that want to completely quit using the physical Tape Library, as well as simplify and accelerate the process of data backup and recovery.

Installing Starwind VTL

1. Launch the downloaded setup file on the server where StarWind VTL has to be installed.
2. Read and accept the License Agreement.
3. Read carefully the information about new features and improvements. **Note:** the text in red indicates warnings for users who are updating existing software installations.
4. Click Browse to modify the installation path if necessary.
5. To install StarWind VTL service along with StarWind Virtual SAN service, enable the checkboxes as in the image below.

6. Specify the Start Menu folder.
7. Enable the checkbox to create a desktop icon.
8. Select the appropriate option to enter the license key.
9. Review the licensing information and click **Next** to apply the license key.
10. Verify the installation settings and click **Install** to continue or **Back** to make any changes.
11. Enable the appropriate checkbox to launch the StarWind Management Console right after the setup wizard is closed.
12. Click **Finish** to close the wizard.

### Configuring Virtual Tape Library

1. Launch the **StarWind Management Console** by double-clicking the StarWind tray icon.

   **NOTE:** If StarWind service and Management Console are installed on the same server, the Management Console will automatically add the local StarWind instance to the Console tree after the first launch. Then, the Management Console automatically connects to it using the default credentials. To add remote StarWind servers to the Console, use the **Add Server** button on the control panel.

2. StarWind Management Console will ask to specify the default storage pool on the server you are connecting to for the first time. Please, configure the default storage pool to use one of the volumes you have prepared as StarWind storage earlier. All the devices created through the **Add Device** wizard will be stored on that storage pool by default.

3. Press the **Yes** button to configure the storage pool. Should you require to change the storage pool destination, press **Choose path...** and point the browser to the necessary disk.
4. Select the StarWind server where the device needs to be created.
5. Press the **Add VTL Device** button on the toolbar.

6. Specify the Virtual Tape Library location in the appeared window and click **Next**.
7. Select the **Device Model** from a drop-down list. You can also fill all slots in the newly created Tape Library with empty tapes.
8. Provide **Target Alias** or choose the default one.
9. Press the **Create** button to start the creation process.
10. Once the device creation is completed, click **Close**.
11. Once the VTL device is created, the tapes can be added. To do this, select the VTL device and click the **Create Tape** button located in the **Tapes** section.
12. The **Create Tape** wizard will appear. Optionally, select the checkbox and specify the custom path where the tape files must be stored.

13. Specify the **Number of Tapes**, **Tape Type**, and other parameters and click the **Create** button.
14. The created tape appears in the first slot of the VTL device in the StarWind Management Console.
If required, create new tapes in the same way.

**Selecting The Cloud Storage Provider**

To further proceed with configuring StarWind VTL Cloud Replication, please select the cloud storage provider of your choice:

**Microsoft Azure**

**Getting Cloud Account Credentials in Microsoft Azure Cloud Storage**

1. From a browser, navigate to the [Azure portal](https://portal.azure.com) and sign in with your Azure account.
2. Create a Resource group in the Azure portal. It’s a container that collects related resources for an Azure solution, or those resources that ought to be managed as a group. Make sure you have selected the location with minimal network latency.
3. In the portal, click **New**. In the **Search the marketplace** field, type “Resource group”. Locate **Resource group** from the returned list and click it to open the **Resource group** window. Near the bottom of the **Resource group** window, click **Create**.
4. Navigate to Resource group and select it. In the top menu, select Add. In the Search the marketplace field, type “Virtual Network”. Locate Virtual Network from the returned list and click it to open the Virtual Network window. Use Resource Manager as a deployment model.
5. In the **Search the marketplace** field, type "**Storage account**". Locate "**Storage account - blob, file, table, queue**" from the returned list and click it to open the **Storage account** window.

6. Select the account type as **StorageV2** (general purpose v2).

7. Specify the performance tier: **Standard** or **Premium**. Select **Replication plan**.

8. Specify default Access tier: **Hot** or **Cool**. Click here for [more details](#).
The cost of your storage account depends on the usage and the options you choose below.

**Name**

stanwindv01

Deployment model

- Resource manager
  - Classic

Account kind

- StorageV2 (general purpose v2)

Location

- East US

Replication

- Read-access geo-redundant storage (RA-...

Performance

- Standard
  - Premium

Access tier (default)

- Cool
  - Hot

* Secure transfer required

- Disabled
  - Enabled

* Subscription

- Pay-As-You-Go

* Resource group

- Create new
  - Use existing

AzureRG

Virtual networks

Configure virtual networks

- Disabled
  - Enabled

Pin to dashboard

Create  Automation options
Creating Microsoft Azure Blob

1. Open a storage account. Navigate to **Blobs**.

2. Create a Blob.

3. Go back to the storage account. Open **Access Keys**.
4. Click copy key1 or key2 to get access.

**NOTE:** When generating a new access key, the old one will no longer work.

5. To proceed with configuring StarWind VTL Cloud Replication, please return to the **Configuring Cloud Replication** section.

**Amazon Web Services (Aws)**

**Getting Access Key ID and Secret Access Key in AWS**

1. To get the **Access key ID** and **Secret access key**, launch **AWS Management Console**.
2. Then click **Services -> Security, Identity & Compliance -> IAM**.
3. Click **Users**, select the existing User or create the new one.  
4. Make sure to assign necessary **Permissions** to the corresponding **User**.
5. In the User’s profile, click the **Security Credentials** and press the **Create access key** button.

6. Click **Show** in the **Secret access key** field.  
**NOTE:** Save the **Access key ID** and **Secret access key** as this information will be used during the configuration process.

**Creating Amazon S3 Bucket**

1. To create Amazon S3 bucket, select **Storage** and **S3**, and click the **Create Bucket** button.
3. Enter an appropriate **Bucket Name**, choose the **Region** in a drop-down menu and click **Create**.
4. The newly created bucket will appear in the list.

5. To proceed with configuring StarWind VTL Cloud Replication, please return to the Configuring Cloud Replication section.
Wasabi

Getting Account ID and Application Key in Wasabi Cloud Storage

1. Sing up to Wasabi using the following link: [https://wasabi.com/](https://wasabi.com/)
2. In the left-side menu of the Wasabi console, go to Access Keys and click on Create New Access Key.

3. Press **DOWNLOAD CSV** or **COPY KEYS TO CLIPBOARD** to save the values.
Create Key Successful

Download your key file now, which contains your new access key and secret access key. If you do not download the key file now, you will not be able to retrieve your secret access key again. When using the access keys for API access to the Wasabi service, the service endpoint address is s3.wasabisys.com.

NOTE: Make sure the keys are saved, as it is not possible to view the Secret Key once again after pressing the Close button.

Creating Wasabi Bucket

1. To create the Wasabi bucket, open the Buckets section and click the CREATE BUCKET button.
2. Specify the **Bucket Name** and click the **Create Bucket** button.

3. To proceed with configuring StarWind VTL Cloud Replication, please navigate to the **Configuring Cloud Replication** section.

**Backblaze B2 Cloud Storage**

**Getting Account ID and Application Key in Backblaze B2 Cloud Storage**
1. Sing up to Backblaze B2 Cloud Storage using the following link: [https://www.backblaze.com/b2/cloud-storage.html](https://www.backblaze.com/b2/cloud-storage.html)

2. To get the Account ID and Application Key, sing into Backblaze B2 Cloud Storage, open **Buckets** and click on the **Show Account ID and Application Key** link.

3. Click **Create Application Key** to get it.

   **NOTE:** When you create a new application key, the old one will no longer work.

### Creating Backblaze B2 Cloud Storage Bucket

1. To create the B2 Cloud Storage Bucket, open the **Buckets** section and click on the **Create a Bucket** button.
2. Specify a **Bucket Unique Name** and click on the **Create a Bucket** button.

![Create a Bucket](image)

**Create a Bucket**

All files must be in a bucket. There are no charges for creating a bucket. Only 100 buckets can be created per account. Each bucket name must be at least 6 characters long.

**Bucket Unique Name:** StarWindVTL

**Files in Bucket are:**
- Private
- Public

[Create a Bucket] [Cancel]
3. Once the bucket is created, click on the **Lifecycle Settings** button to specify the custom lifecycle rules.

   **B2 Cloud Storage Buckets**

   With Rackblaze B2 Cloud Storage you can store data in the Rackblaze Cloud. Any size, file type or number of files. New to B2 Cloud Storage? Check out the [B2 Starter Guide](#).

   Show Account ID and Application Key

   ![Create a Bucket](#)

   **StarWindVTL**

   - Created: January 12, 2018
   - Bucket ID: b7c754dc65ac9ed7bb670c571a
   - Type: Private
   - File Lifecycle: Keep all versions
   - Snapshots: 0
   - Current Files: 0
   - Current Size: 0 bytes

   ![Bucket Settings](#)
   ![Lifecycle Settings](#)
   ![CORS Rules](#)

4. In **Lifecycle Settings**, choose **Use custom lifecycle rules**, edit rules, and click **Update Bucket**.
5. To proceed with configuring StarWind VTL Cloud Replication, please navigate to the **Configuring Cloud Replication** section.

**Configuring Cloud Replication**

1. To enable the replication between StarWind and cloud storage, navigate to the **VTL device** and click **Cloud Replication**.
2. Choose the required cloud storage and click **Next**.
3. In the **Replication Settings**, specify Storage **Account Name**, **Account Key**, **Container Name** obtained and configured previously and press the **Next** button.
4. Specify **Tape File Retention Settings** and click **Apply**. Optionally, select **Create new empty tapes automatically** when the existing tape is exported for replication.
5. The automatic tape replication to the cloud storage is successfully configured according to the retention policy specified above. 
**IMPORTANT NOTE:** Retention settings should be configured according to your corporate RTO and RPO requirements.

**Mounting Vtl On The Backup Host**

To pass-through the VTL device to the server with the backup software provider, the corresponding VTL iSCSI target should be mounted first.  
1. Open **Microsoft iSCSI Initiator**, navigate to the **Discovery** tab, and press the **Discover Portal** button.
2. Enter the localhost address (127.0.0.1) and press the **Advanced** button.
3. Select **Microsoft iSCSI Initiator** from the **Local Adapter** drop-down list and press **OK**.
4. The newly added **Discovery Portal** will appear in the list.
5. Navigate to the **Targets** tab, find the iSCSI target which corresponds to the StarWind VTL device, and press the **Connect** button.
6. Leave the **Enable Multipath** checkbox empty and press the **Advanced** button.
7. Set **Local adapter as Microsoft iSCSI Initiator**, specify 127.0.0.1 / 3260 as Target portal IP and double-click the OK button to complete the target connection.
The VTL iSCSI target should be shown as **Connected** in the list.

**Installing tape library drivers**

It’s recommended to install the latest update driver from HP. The driver for **HP MSL8096** can be downloaded here: [HPE StoreEver Tape Drivers for Microsoft Windows](#). The current version that supports Windows Server 2016 is **4.2.0.0**. HP drivers must be installed on the host (localhost in this example) where StarWind VTL device is mounted via iSCSI.

1. Extract the downloaded driver and launch `cpqsetup.exe`.
2. Choose the **Select All** checkbox and click **Install**.
3. Once the drivers are installed, the Medium Changer devices is shown as Hewlett Packard MSL G3 Series library (x64 based).
The tape library is ready to be added to the server with the backup software provider.

**Backing Up Starwind Virtual Tapes**

Choose the required backup software provider to add StarWind Virtual Tape Library to:

**Microsoft System Center Data Protection Manager**

**Adding StarWind VTL Device to Microsoft SCDPM**

In case of any question regarding Microsoft SCDP deployment, please refer the following link:

1. DPM automatically detects tape devices that are attached to it and they are displayed in the Libraries workspace of the Management view. If the tape isn’t displayed, it can be detected manually with the Rescan button.

2. After the rescan, check that the details displayed in Device Manager and in the tape library are the same.

3. To add more tapes, select the tape library in the Libraries workspace of the Management view, and then click Add+.
4. The I/E port door named “Hewlett Packard MSL G3 Series library” will be open, and more tapes can be created using StarWind management console as described in the previous steps.

**IMPORTANT NOTE:** Do not press **OK** in case more tapes need to be created.

5. Once the tapes are created using StarWind management console, press **OK**. DPM will detect the newly added tapes as shown in the screenshot.
6. Prior to using the newly added tapes, **Identify** the “Unknown” tapes so they become “Free” and ready to be used.

Configuring protection group for DPM

1. Open DPM Management Console in the **Protection** workspace of the **Management** view, and then click **New+**

2. Select the required backup option (Servers / Clients).
3. Choose the data that needs to be protected.
4. In **Protection Group Wizard**, select the required protection option:

- Short-term protection (Disk / Tape)
- Long-term protection (Tape)
5. In **Protection Group Wizard**, specify the short-term goals:
6. Specify the required **Long-Term Goals**.
7. Specify the required **Library and Tape Details**.
8. Review the **Summary** and click **Create Group**.

9. To create a manual recovery point, navigate to the **Protection** workspace of the **Management** view, right-click on the protected item and select **Create recovery point**... Select **Short term tape protection** or **Long term tape protection**.
10. Open the **Libraries** workspace of the **Management** view, the protection group named “Tape Protection Group 01” is assigned to slot 5 and 6.

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**Restoring data from tape**

1. Make sure that the tape library is online and does not report any errors; this can be done by verifying the alerts in the **Monitoring** view of the DPM console or in the **Libraries** workspace of the **Management** view of the DPM console.

2. In the DPM console, go to **Recovery** and choose the data source to recover.

3. Mark the data source and choose the data and time for the restore. Right-click on the data source and choose **Recover**... to start the **Recovery** wizard.

4. In the **Review Recovery Selection** wizard, review the data source that is chosen for recovery and click on **Next** to continue.

5. In the **Select Recovery Type** wizard, choose one of the recovery options:
6. To recover data as a virtual machine, select **Recover as virtual machine to any host** option.

7. In the **Specify Destination** wizard, select the location to recover the virtual machine to.
8. In the **Specify Recovery Options** wizard, configure specific options for the recovery.

**NOTE:** Make sure to choose the library that hosts all the tapes that are needed for the recovery.
9. In the **Summary** step, verify the recovery settings, and click **Recover** to start the process of recovering the virtual machine to a different host.

**NOTE:** DPM uses a scratch before it sends the data to the selected data source. It is very important that the DPM `%systemdrive%` server has more than 10 GB of free disk space.

DPM supports item-level recovery (ILR), which allows performing a specific recovery of files, folders, volumes, and virtual hard disks from a host-level backup of Hyper-V virtual machines to a network share or a volume on a DPM protected server. However, ILR is not supported when restoring from tapes. Only an entire VM or a single virtual hard disk can be restored.

10. To restore files from the cloud storage, please navigate to the **Restoring tapes from the cloud storage** section.

**Veeam Backup & Replication**

Please refer to the following guide if having any questions about Veeam Backup &
Replication deployment:
https://www.veeam.com/documentation-guides-datasheets.html?ad=menu-resources

1. Open the Veeam Backup & Replication console. Open the **Tape Infrastructure** tab.

2. Open the **Add Tape Server** wizard. Choose the local server and press **Next**.
3. Complete the wizard, select **Start tape library inventory when I click Finish** and press the **Finish** button.

4. After Tape Inventory job is finished, the newly added tape library device will appear.
NOTE: You can also configure **Backups to Tape** Job. For more details, please refer to the following link: [https://helpcenter.veeam.com/docs/backup/vsphere/creating_backup_to_tape_jobs.html?ver=95](https://helpcenter.veeam.com/docs/backup/vsphere/creating_backup_to_tape_jobs.html?ver=95)

5. Navigate to the **Home** tab, press the **Backup Files** button, specify the job name and description in the appeared window, and press **Next**.
6. Choose files to be backed up and press **Next**.
7. Press **Add New** to add the new **Media Pool**.
8. The New Media Pool wizard will appear. Specify the name and description of the new Media Pool and click Next.
9. Add the existing tape(s) to the **Media Pool**, click **OK** and **Next** to select the tapes.
10. Specify the **Media Set** name, configure additional settings if necessary, and click **Next**.
11. Specify the preferred retention settings if necessary and press **Next**.
12. Specify the additional options if necessary and click the **Apply** button.
13. Review the **Summary** and press **Finish**.

14. Move back to the **New File to Tape Job** wizard and press **Next** to continue.
15. Configure the **Incremental Backup** schedule if necessary. Choose the same **Media Pool** or add the new **Media Pool** for the incremental backups.
Press **Next** to proceed.

16. In the **Options** tab, specify the additional settings and check the **Export current media set upon job completion** box to allow the automatic tape offload to cloud storage after backup job is completed. It is also recommended to **Eject media upon job completion**. Click **Apply**.
17. Review the summary, select the Run the job when I click Finish checkbox if the backup job needs to be run right away, and click Finish.

18. To check the Job progress, navigate to the Running tab in the side menu.

19. After the job is finished, the tape is automatically ejected, exported, and marked as Offline according to job settings configured above.

20. Since the tape was automatically exported upon job completion and StarWind VTL Replication policy was set to Replicate Immediately, the replication process to the cloud storage has started automatically. The progress can be checked in StarWind Management Console using the Offline Shelf overview.
NOTE: The tape can be kept in its tape library slot upon backup job completion and offloaded to the cloud storage later. For this purpose, use the disable Export current media set upon job completion and Eject media upon job completion options in File to Tape Job settings using Veeam Backup & Replication Console.

21. After the backup job is finished, in the Veeam B&R console, navigate to Tape Infrastructure ->Libraries -> Media -> Online and choose the tape to upload, right-click it, and press Export. The tape will be automatically offloaded to the cloud storage according to the specified Retention Settings of StarWind VTL.

22. When the tape is successfully uploaded to the cloud, the tape location status in Offline Shelf overview will be marked as Cloud.
23. If the local copy of the tape is not removed after replication, but already moved to Offline Shelf, it can be inserted back into the library by clicking the Insert button.

To restore files from the cloud storage, please navigate to the Restoring tapes from the cloud storage section.

Veritas Backup Exec™

Adding StarWind VTL Device to Veritas Backup Exec™

In case of any question regarding Veritas Backup Exec™ deployment, please refer the following link:

https://www.veritas.com/content/support/en_US/doc/59226269-99535599-0/v5989992-99535599

1. In Veritas Backup Exec™ console, click the Storage tab and Configure Storage.
2. In the opened window, select **Tape storage** and click **Next**.

3. Select **Run the Hot-swappable Device Wizard** and click **Next**.

4. Follow the steps suggested by **Hot-Swappable Device Wizard** and to complete it.
NOTE: If the tape device has not appeared in the Storage tab, initiate the restart.

5. Double-click Slots to scan, erase, inventory and catalog the tapes.

6. Choose the tape and perform the necessary operations.

7. Confirm the data erasure when requested.
8. The prepared tape should look like in the screenshot below.

![Screenshot of Veritas Backup Exec showing tape slots]

**Configuring Backup to Tape job in Veritas Backup Exec™**

In this part, the backup/restore process of the folder is shown as an example.

1. In the **Backups** group, click on the **Backup and Restore** tab. Click **Backup** and select **Back Up to Tape**.
2. Configure the **Backup** settings and click **OK**.

3. Once the job is configured, click the appropriate button to start it.
4. When the backup process starts, the progress is shown in the **Status** section. Double-click on the server to see the details.

5. To check the amount of the occupied storage space, navigate to the **Capacity** section.

**Restore data from Veritas Backup Exec™**

1. To restore data, click **Restore** in the **Backup and Restore** tab.
2. Select the type of data to restore.

3. Select the appropriate restore option.

4. Select files and folders to restore.
5. In the **Browse for Folder** window, specify the destination folder for the restored data and click **OK**. Then click **Next**.
6. Confirm the restore location and click **Next**.
7. Select the settings for file integrity, hierarchy, and security for the restored data.
8. Select options for restoring operating system features.
9. Specify additional tasks to perform before and/or after a restore.
10. Specify the restore job **Name**, **Storage**, and **Schedule**.

11. Double check the summary and complete the restore job by clicking **Finish**.

12. To check the job progress, navigate to the **Backup and Restore** tab.

13. To see the restoring details, double-click on the server.
14. The restored files can be found in the specified folder.

To restore files from the cloud storage, please navigate to the **Restoring tapes from the cloud storage** section.

**Restoring Tapes From Cloud Storage**

After the time specified in StarWind VTL **Retention Settings**, the local copy of the tape will be deleted, but the tape can be restored from the cloud. In this case, information
about the tape is located in the local database.

1. To restore the tape from the Cloud, open **StarWind Management Console** and choose the VTL device.
2. Click on the **Restore from Cloud**… option.

3. Identify the tape using its barcode. Click on the tape and press **Restore**.
4. The download progress can be checked in the Offline Shelf overview. When the download is completed, the tape location status in Offline Shelf overview will be marked as **Local** and **Cloud**.
# Contacts

<table>
<thead>
<tr>
<th>US Headquarters</th>
<th>EMEA and APAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-617-449-77 17</td>
<td>+44 203 769 18 57 (UK)</td>
</tr>
<tr>
<td>1-617-507-58 45</td>
<td>+34 629 03 07 17</td>
</tr>
<tr>
<td>1-866-790-26 46</td>
<td>(Spain and Portugal)</td>
</tr>
</tbody>
</table>

Customer Support Portal: [https://www.starwind.com/support](https://www.starwind.com/support)
Support Forum: [https://www.starwind.com/forums](https://www.starwind.com/forums)
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