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How Restoring Files from Tape Works

Before You Begin

Restoring Backup from Tape to Repository Works

Restoring Files from Tape
At Veeam Software we value the feedback from our customers. It is important not only to help you quickly with your technical issues, but it is our mission to listen to your input, and build products that incorporate your suggestions.

Customer Support
Should you have a technical concern, suggestion or question, please visit our Customer Center Portal at www.veeam.com/support.html to open a case, search our knowledge base, reference documentation, manage your license or obtain the latest product release.

Company Contacts
For the most up to date information about company contacts and offices location, please visit www.veeam.com/contacts.html.

Online Support
If you have any questions about Veeam Backup & Replication, you can use the following resources:

- Full documentation set: www.veeam.com/backup-replication-resources.html
- Community forum at forums.veeam.com
Veeam provides native tape support that is fully integrated into Veeam Backup & Replication. You can administrate all operations on tapes from your Veeam console.

Long-term archiving and compliance are listed as primary reasons for using tape. Tape appears to be one of the most widely used media for offsite backup. Using backup to tape, you can implement the ‘3-2-1’ backup approach (3 copies, 2 types of media, 1 offsite location) considered as a best practice for data protection and disaster recovery. Veeam Backup & Replication offers support for tape devices and allows you to archive your data to tape and restore it from tape whenever needed.

Storing data to tapes provides you with the same data managing options as disk repositories. In particular, you can store full and incremental backups, apply user-defined retention settings to the archived data, select restore points and so on. Compared to disk storage, tape archive requires more time to retrieve files for restore if the tapes are stored offsite.
Supported Devices and Configuration

Veeam Backup & Replication supports Linear Tape-Open tape libraries starting from 3 generation (LTO3) or later:

- Physical libraries and standalone drives, virtual tape libraries.
- Partitions of the physical or virtual tape libraries presented to the Veeam backup server.

**Note:** If you plan to run both Veeam Backup & Replication and 3rd party tape-recording software (for example, in your evaluation lab), consider that Veeam Backup & Replication by default will periodically lock the drive to perform rescan, preventing other software from recording.

Industry Format

Veeam Backup & Replication uses the MTF (Microsoft Tape Format) industry format to write data to tape.

**Note:** Veeam Backup & Replication does not support using WORM (Write Once Read Many) tapes.

Supported Connection Types

You can connect the tape device directly or remotely.

- Direct connection:
  - Fibre Channel (FC)
  - Serial Attached SCSI (SAS)
  - SCSI
- Remote connection:
  - iSCSI

Data Block Size

Drives use hardware dependent block sizes to read/write the tape data. Generally, the drives support a range of block sizes and report this range to Veeam Backup & Replication.

If you use a tape library with multiple drives or a number of standalone drives, Veeam Backup & Replication uses a unified block size to write data to tapes. Veeam Backup & Replication collects the block size ranges reported by each drive, compares them and detects a range of block sizes that can be supported by all drives. This range is additionally limited by storage controllers settings used in your infrastructure. From this range, Veeam Backup & Replication supports only values divisible by 1024. You can check the resulting range of block sizes supported by Veeam Backup & Replication for a particular drive in the **Drives** properties. For details, see [Working with Drives](#).

**Note:** If you connect the tape devices via HBA, Veeam Backup & Replication uses the block size configured for the HBA.

The block size is unified for:

- All drives in one library (if the drives support different block sizes)
- All standalone drives connected to one tape server.
To write data to tape, Veeam Backup & Replication uses the maximum available block size from the supported range. To read data from tape, Veeam Backup & Replication requires that the tape is written with the block size from the supported range (shown in the drive properties).

**Note:** Mind the block size range when working with the following tapes:
- Tapes with Veeam backups written by another tape library,
- Tapes with Veeam backups written on another tape server,
- Tapes written with other data transfer configuration settings,
- Tapes written on a 3rd party device.

You can restore from tapes written with block size that match the block size range set for the tape device.

**Unknown Medium Changers**

Veeam supports medium changers that have no Microsoft Windows drivers available. Make sure that such device is recognized as an unknown medium changer in the Microsoft Device Manager list.

It is recommended that you use tape devices with original equipment manufacturer (OEM) drivers.

**Limitations**

VMware does not support tape drives connected directly to ESX(i) 4.x and later. For more information, see [VMware vSphere Release Notes](http://kb.vmware.com/kb/1016407).

For more details and recommendations on configuring vendor-supported tape drives and media changers on ESX/ESXi, refer to VMware documentation at [http://kb.vmware.com/kb/1016407](http://kb.vmware.com/kb/1016407).
Tape Environment

To administrate tape backup and restore procedures, you must add the tape server to your Veeam Backup & Replication console. Adding the tape server to the backup infrastructure makes possible to transfer data between disk storages and the tape archive.

The tape backup and restore process involves the following components:

**Veeam Backup Server**

The Veeam backup server is the server running Veeam Backup & Replication. It is the core component in the backup infrastructure. The Veeam backup server tasks include the following operations:

- Recognizing all tape devices that are connected to it and is able to manage all drives, slots and tapes.
- Administering tape archiving: scheduling and triggering tape jobs and initiating restore tasks.
- Communicating with the Veeam backup database.

**Tape Device**

When connected to the Veeam backup server, tape devices provide reading and writing capabilities, while all administration is performed by the Veeam backup server. You can connect multiple tape devices.

**Tape Servers**

To connect to the tape devices, Veeam Backup & Replication uses tape servers.

The tape server is a backup infrastructure component transferring data between data source and tape device. The tape server runs Veeam Data Mover service that creates a communication point over which the data between the tape device and backup repositories or file servers is transferred.

The tape server deployment is fully automated: to create a tape server, you must assign the tape server role to a necessary server in the backup infrastructure. You can create a dedicated tape server or assign the tape server role to the Veeam backup server.
Veeam Backup Database

Veeam Backup & Replication catalogs information about all archived data and stores this information in the Veeam backup database.

The registered tapes stay in the database until you remove the information about them. You can always view details for each tape, for example, information about backups written to it, even if the tape is not inserted in the library.

The catalog lets quickly detect location of the required items on tape. The catalog correlates the archived files and their restore points to the names of the corresponding tapes, both online or offline, and the names of the media sets within which the data was written. When you start restore, Veeam Backup & Replication prompts for the tapes you need to bring online. As a result, you can restore data from tape much quicker when necessary.

Veeam Backup & Replication uses the following catalogs for storing the tape-related data:

- **Tape Catalog** stores information about files/folders archived to tape media with file to tape jobs, as well as backup files produced by backup to tape jobs. The content of the Tape Catalog can be examined in the **Files** view.

- **Backup Catalog** stores information about VMs whose backups are archived to tape media with backup to tape jobs. The content of the Backup Catalog can be examined under the **Backups > Tape** node in the **Backup & Replication** view.

Backup Repositories and File Servers

When retrieving data to back up, or restoring data to disk, Veeam Backup & Replication can connect to any machine that has been added as a managed server to the Veeam Backup & Replication console.

Storing devices include the following types:

- Windows server, including physical boxes
- Linux server, including physical boxes
- Deduplicating storage appliances (only for backup to tape jobs)
- NAS devices (by specifying the SMB path to the share).
Tape Devices Deployment

To connect tape devices to Veeam Backup & Replication, you need to deploy a tape server. Tape servers are network appliances that connect tape libraries to the Veeam backup server and manage traffic between tape devices and Veeam backup server. The connected tape devices are recognized by the Veeam Backup & Replication automatically.

Data Movers

With Veeam Backup & Replication, the data transfer during archiving and restore processes is enabled with Veeam Data Mover services. The Data Movers run on tape servers and other components of backup infrastructure. They receive tasks from the Veeam backup server and communicate to each other to transfer the data.

The Data Movers are light-weight services that take a few seconds to deploy. Deployment is fully automated: when you assign a tape server role to a server, Veeam Backup & Replication installs the necessary components on this server and starts the required services on it.
Connecting Tape Devices

To deploy a tape device, you must perform the following steps:

1. Choose a machine that will act as the tape server. You can choose between the following options:
   - Use the Veeam backup server as the tape server. This variant is sufficient for small environments with low traffic workloads.
   - Deploy a dedicated tape server. As a tape server, you can use any Microsoft Windows server, physical or virtual, accessible by Veeam Backup & Replication. A dedicated tape server is recommended for installations with intense data transferring. A dedicated tape server allows you to manage remote tape libraries.

2. Connect the tape device to the machine that will perform the role of the tape server. You can connect the tape device in two ways:
   - Directly over Fibre Channel (FC), Serial Attached SCSI (SAS), SCSI
   - Remotely with iSCSI (you can use Microsoft iSCSI initiator to establish the connection).

3. Install an appropriate device driver on the tape server.
   If multiple driver installation modes are supported for your storage device, make sure the driver is installed in the mode that allows for multiple open handles from a host to a drive to exist at the same time.
   For example, if installing a driver for IBM System Storage TS3100 Tape Library or TS3200 Tape Library, you should use the install_nonexclusive.exe installer as described in the product Readme.
   Please refer to your storage system manufacturer recommendations on choosing the appropriate setup option.

4. If the medium changer driver is not available, check that the tape device uses native SCSI commands.
   Open the Tape Infrastructure view, expand the Libraries node and select the needed library. Click Properties on the ribbon. You can also right-click the necessary library in the working area and select Properties. Select the Use native SCSI commands instead of Windows driver check box.
Important! Only media changers can use SCSI commands. Tape drives must use native OEM drivers.

5. Add the tape server to Veeam Backup & Replication. See Adding Tape Servers for details. Veeam Backup & Replication will automatically scan connected tape devices and display all discovered tape libraries and tape drives under the Libraries node in the Tape Infrastructure view. Afterward, the auto-discovery process will be performed periodically every 3 minutes.

You can connect a number of tape devices to each tape server. The connected tape devices will appear as list under the Libraries node in the Tape Infrastructure view.

Veeam Backup & Replication allows deploying a number of tape servers. However, if you have a number of Veeam backup servers, you cannot connect one tape server to several Veeam backup servers simultaneously.

Tip: If you have a number of Veeam backup servers, you can easily reconnect a tape server to another Veeam backup server without reconfiguring the tape device: Veeam backup server will recognize the library settings automatically. Note that when you reconnect the tape server, the tape jobs will not run with another Veeam backup server unless you copy the configuration.

Reconnecting Tape Devices to Another Tape Server

You can reconnect your tape devices to another tape server. For example, you can reconnect the tape devices from the Veeam backup server to a dedicated tape server. To do this, choose a tape server and perform steps for connecting tape devices above. When you add the new tape server to Veeam Backup & Replication, Veeam Backup & Replication will recognize the tape devices and all tape device settings.
Working with Tape Servers

When you have deployed a tape server and connected the tape device to it, you need to add the tape server to the Veeam backup server. To do so, you must assign the role of the tape server to a Windows server that is already added to the list of managed servers.
### Adding Tape Servers

To add a tape server, follow the next steps:

**Step 1. Launch the New Tape Server Wizard**

To launch the wizard, do one of the following:

- Open the **Tape Infrastructure** view and click **Add Tape Server** on the ribbon.
- Open the **Tape Infrastructure** view, right-click the **Tape Infrastructure** node and select **Add Tape Server**.

**Step 2. Choose a Server**

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.
Step 3. Configure Traffic Throttling Rules

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 Setting Network Traffic Throttling Rules section in Veeam Backup & Replication User Guide.

The list of throttling rules contains only those rules that are applicable to the tape server you are adding. The rule is applied to the tape server if its IP address falls under the source IP range of the rule. To view the rule settings, select it in the list and click the View button on the right.

You can also open global throttling settings and modify them directly from the wizard by clicking Manage network traffic throttling rules at the bottom of the window.

Step 4. Review Components

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 of them is missing, Veeam Backup & Replication will automatically install them on the selected server.
Step 5. Assess Results

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.
Step 6. Finish Working with the Wizard

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.

If you do not enable this option, you will have to inventory tape libraries manually. For more information, see **Inventorying Tapes**.
Removing Tape Servers

To remove a tape server:

1. Open the **Tape Infrastructure** view.
2. Select the **Servers** node in the inventory pane.
3. Select the tape server in the working area and click **Remove Tape Server** on the ribbon. You can also right-click the necessary tape server in the working area and select **Remove**.

When you remove a tape server, Veeam Backup & Replication unassigns the tape server role from it, so it is no longer used as a tape server. The actual server remains connected to Veeam Backup & Replication.

Limitations for Removing Tape Servers

You cannot remove a tape server if any of tape jobs is running at the moment. Before you remove the tape server, stop all tape jobs.
Updating Tape Servers

Every time you launch Veeam Backup & Replication, it automatically checks if the components installed on managed servers are up to date. You will be unable to work with tape libraries that are connected to the outdated servers.

If there is a later version of a component available (usually, if you have upgraded Veeam Backup & Replication), the Components Update window will be displayed, prompting you to update components on managed tape servers.

You can also open the Components Update window by doing one of the following:

- Open the main menu and select Upgrade from the main menu.
- Open the Tape Infrastructure view, select the Servers node and click Upgrade on the ribbon.
- Open the Tape Infrastructure view, right-click the necessary tape server in the working area and select Upgrade.

If components on all managed servers are up to date, the Upgrade item will be disabled.

The Components Update section lists tape servers that have outdated components deployed. To see the current and the latest available versions for deployed components, select a server in the list and click Details. Select check boxes next to servers for which you want to upgrade components and click Next.
Rescanning Tape Servers

In order to update the list of managed tape devices, Veeam Backup & Replication automatically rescans the tape servers every 3 minutes. You can perform manual rescan of a tape server, for example, if you want to implement the changes made to the tape infrastructure immediately.

To rescan a tape server:

1. Open the Tape Infrastructure view.
2. To rescan all tape servers, right-click the Servers node and select Rescan.
3. To rescan a particular tape server, select the Servers node in the inventory pane. Select the necessary server in the working area and click Rescan on the ribbon. You can also right-click the necessary server in working area and select Rescan.
Modifying Tape Servers

To edit settings of an added tape server:

1. Open the Tape Infrastructure view.
2. Select the Servers node in the inventory pane.
3. Select the necessary server in the working area and click Edit Tape Server on the ribbon. You can also right-click the necessary server in working area and select Properties.
4. Then edit the tape server settings as required.
Getting Started with Tapes

After you have connected tape devices, you need to complete the following steps:

1. Load tapes to the tape device (if not yet loaded) and run the importing procedure for them.
2. Create one or more simple media pool or GFS media pool that will be used as targets for tape jobs.
3. Configure one or more media vaults to conveniently organize offline tapes.
4. Configure and run backup to tape or file to tape jobs.
5. Restore VMs to infrastructure or to repository, or restore files from tape.
Working with Tape Libraries

All tape libraries managed by Veeam Backup & Replication are shown as a list of devices under the **Libraries** node in the **Tape Infrastructure** view. All connected devices are discovered automatically during the rescan procedure. When you add a new tape device to the tape server, it appears in your console after rescan.

To view properties of a tape library, open the **Tape Infrastructure** view, expand the **Libraries** node and select the needed library. Click **Properties** on the ribbon. You can also right-click the necessary library in the working area and select **Properties**.

Select the **Perform drive cleaning automatically** check box if you want Veeam Backup & Replication to manage the tape drives cleaning. For more information about automated drives cleaning, see Automated Drive Cleaning.

Select the **Use native SCSI commands instead of Windows driver** check box if your library is an unknown media changer. For more information about unknown media changers, see Supported Devices and Configuration.

![HP MSL G3 Series 5.30 Properties](image)
Rescanning Tape Libraries

You can rescan a selected tape library to update its network status.

To rescan a tape library:

1. Open the **Tape Infrastructure** view.
2. Select the **Libraries** node in the inventory pane. Select a necessary library in the working area and click **Rescan Library** on the ribbon. You can also right-click the necessary library in the working area and select **Rescan**.
Renaming Tape Libraries

The Veeam backup console shows the list of all tape devices as a list of libraries. By default, the connected libraries are shown with their production model names. For clearer visibility, you can rename them.

To rename a tape library:

1. Open the **Tape Infrastructure** view.
2. Select the **Libraries** node in the inventory pane. Select a necessary library in the working area and click **Rename Library** on the ribbon. You can also right-click the necessary library in the working area and select **Rename**.
Removing Tape Libraries

If you want to stop using a tape device, you can remove it from your Veeam backup console.

Mind the following limitations:

- Only the libraries in the offline status can be removed. To remove a tape library, you need to physically disconnect it from the tape server first. Otherwise, the tape library will be discovered during the next rescan and reappear in the Libraries list. Alternatively, you can remove the tape server to which the tape library is connected.
- You cannot remove the library that is used in a media pool. Remove the library from all media pools first.

To remove a tape library:

1. Disconnect the tape library or the tape server.
2. Open the Tape Infrastructure view.
3. Select the Libraries node in the inventory pane. Select a necessary library in the working area and click Remove Library on the ribbon. You can also right-click the necessary library in the working area and select Remove Library.
4. In the displayed dialog box, click OK to confirm deletion.

Tip:

If you remove the tape server, the tape devices remain connected to it. You can connect the tape server back to your console. In this case, Veeam Backup & Replication will recognize all tape devices that were previously added to it with tapes and media pools (in case they remain in the Veeam database).

You can also connect the tape server to another Veeam backup server. Veeam Backup & Replication will recognize the tape devices automatically, however you will need to create the media pools anew.
Importing Tapes

When you need to load free tapes, or if you need to restore data from tapes, you need to load these tapes into your tape device and import them. Importing is recognizing tapes that are loaded into your tape device.

When you load tapes into the mail slot, they are not visible in the Veeam backup console. To start using tapes, you need to introduce them to the Veeam Backup & Replication by running the importing procedure. The importing procedure conveys the tapes from the mail slot to the library working slots, scans them and sends information about them to Veeam backup database. After importing, Veeam Backup & Replication can use the tapes to read or write data.

Importing runs differently for tapes that are registered in the local Veeam backup database and those that are not. Choose an appropriate procedure for the following tapes:

- Importing empty tapes
- Importing tapes written on this backup server
- Importing tapes written on another Veeam server

Importing Empty Tapes

To import new tapes, follow the next steps:

1. Insert the tapes into the tape device.
2. Open the Tape Infrastructure view, expand the Libraries node and select the library to which you have loaded the tapes. Click Import Tapes on the ribbon. You can also right-click the necessary library in the working area and select Import Tapes.
3. The tapes will appear in the Unrecognized media pool.
4. Right-click the tapes and select Inventory tape.
5. The tapes will be moved to the Free media pool.

Tapes can be used to replenish simple or GFS media pools:

- Automatically, if the media pools are configured for automatic replenishment.
- Manually by moving tapes from the Free media pool to a selected media pools.

If you want to refill the free tape resources in your tape device, you can overwrite tapes containing outdated Veeam archives. For more information, see Importing Tapes Written on This Backup Server.

Tip: To understand which of the tapes can be overwritten, you can check their expiration date. In the Tape Infrastructure view, open the Media Pools node and select the media pool that you want to replenish. Check the Expires in field in the working area. You can sort the tapes by the expiration date and get the list of tapes that can be reused.

Importing Tapes Written on This Backup Server

If the tapes that you want to import were written on the same Veeam backup server, the Veeam backup database has information about them.

- When you import tapes written on a tape library with a barcode reader and information about these tapes is available in the Veeam Backup & Replication database, Veeam Backup & Replication immediately recognizes these tapes after importing. You will be able to view data written to these tapes and run restore procedures.
When you import tapes written on a tape library without a barcode reader, you need to additionally inventory these tapes to be able to work with them.

To import tapes without barcode labels:

1. Insert the tapes into the tape device.
2. Open the Tape Infrastructure view, expand the Libraries node and select the library to which you have loaded the tapes. Click Import Tapes on the ribbon. You can also right-click the necessary library in the working area and select Import Tapes.
3. The tapes will appear in the Unrecognized media pool.
4. Right-click the tapes you need and select Inventory Tape.
5. The tapes will be moved to the media pools in which they were originally written.

You can view the data written on these tapes and run restore procedures.

Note that if the tapes have expired, they will be overwritten by tape rotation scheme set for this media pool.

Importing Tapes Written on Another Veeam Server

Veeam Backup & Replication supports restoring data from tapes that were recorded on another Veeam backup server. To read data from such tapes, Veeam Backup & Replication must first scan the tapes and store the information about them to the Veeam backup database.

To import tapes, follow the next steps:

1. Insert the tapes into the tape device.
2. Open the Tape Infrastructure view, expand the Libraries node and select the library to which you have loaded the tapes. Click Import Tapes on the ribbon. You can also right-click the necessary library in the working area and select Import Tapes.
3. The tapes will appear in the Unrecognized media pool.
4. Right-click the tapes you want to import and select Catalog Tape.
5. The tapes will be moved to the Imported media pool. The Imported media pool will be created automatically. When the tapes are imported, you can view and restore data written to them.
**Inventorying Tapes**

When you load new tapes in your tape device for the first time, these tapes are presented to Veeam Backup & Replication as **Unrecognized**. To identify unrecognized tapes, you need to run tape inventory job against them.

Tape inventory job is a relatively fast process of reading metadata written on tape with the aim of detecting name of the media set and the sequence number for the tape. Tape inventory jobs helps Veeam Backup & Replication identify empty tapes and detect non-empty tapes belonging to specific media set.

You can perform tape inventory for a whole tape library or run the job against selected tapes only.

To start tape inventory for a whole tape library:

1. Open the **Tape Infrastructure** view.
2. Expand the **Libraries** node and select the library you want to inventory.
3. Click **Inventory Library** on the ribbon. Alternatively, you can right-click the tape library and select **Inventory Library** from the shortcut menu. Veeam Backup & Replication will perform inventory for all online tapes in the library.

To start tape inventory for selected tapes:

1. Open the **Tape Infrastructure** view.
2. Navigate to the list of tapes either under the **Media Pools** or under the **Libraries > LibraryName node > Media**.
3. Select the necessary tapes in the list and click **Inventory** on the ribbon. Alternatively, you can right-click the selected tapes and choose **Inventory Tape**.

The inventory log will display job session results. To access the inventory session details, you can open the **History** view and locate the necessary session under the **Jobs > Tape** node.
As a result of inventory, Veeam Backup & Replication places tapes in predefined pools:

- Empty tapes are moved to the **Free** pool. You can use these tapes for archiving backups and files.
- Tapes that contain data written on another Veeam backup server remain in the **Unrecognized** pool. Veeam Backup & Replication displays the detected media set name and sequence number for these tapes. If you want to restore data from a specific media set, you need to run the tape catalog job for all tapes in this media set.
Cataloging Tapes

Cataloging tapes is required for tapes that contain some data but are not registered in the Veeam database. For example, cataloging is required for tapes that were written on another Veeam backup server. After the cataloging procedure, you can restore data from the tapes.

When a catalog job is performed, Veeam Backup & Replication first performs tape inventory, reads the information about backup contents on tape from the on tape catalog information, scans tape contents and updates the database with details of new detected backup sets.

You can perform tape catalog job for a whole tape library or for selected tapes.

To catalog a whole tape library:

1. Open the Tape Infrastructure view.
2. Open the Tape Infrastructure view, expand the Libraries node and select the library you want to catalog. Click Catalog Library on the ribbon. Alternatively, you can right-click the tape library and select Catalog Library.

To catalog selected tapes:

1. Open the Tape Infrastructure view.
2. Navigate to the list of tapes either under the Media Pools or under the Libraries > LibraryName node > Media.
3. Select the necessary tapes in the list and click Catalog on the ribbon. Alternatively, you can right-click the selected tapes and choose Catalog Tape.

The catalog log will display job session results. To access the catalog session details, you can open the History view and locate the necessary session under the Jobs > Tape node.

<table>
<thead>
<tr>
<th>Name: Tape library cataloging</th>
<th>Status: Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action type: Tape Catalogization</td>
<td>Start time: 1/10/2017 4:05:23 AM</td>
</tr>
<tr>
<td></td>
<td>End time: 1/10/2017 4:05:33 AM</td>
</tr>
</tbody>
</table>

Log

- Processing started at 1/10/2017 4:05:23 AM
- Drive 1 (Server: shell.tech.local, Library: HP MSL G3 Series 3.00, Drive ID: Tape)
- Unloading tape 0014002P from Drive 1 (Server: shell.tech.local, Library: HP ...
- Loading tape 0014002R from Slot 10 to Drive 1 (Server: shell.tech.local, Lib...
- Performing inventory for tape in Drive 1 (Server: shell.tech.local, Library: H...
- Reading tape 0014002R catalog
- Moving tape 0014002R to media pool Imported
- Reading tape metadata
- Completed successfully at Tuesday, January 10, 2017 4:05:38 AM
Rescanning of tapes during the catalog job may take a lot of time. To speed up the catalogization process, you might do one of the following:

- First, run inventory job to identify tape media sets and decide which tapes should be included in catalogization process. Run the catalog job only against tapes in the necessary media set.
- If you work with a tape library, you can run the catalog job against the whole media set at once.
- If you work with a standalone drive, start catalogization from the last tape in the media set (as this tape usually stores on tape catalog information).

**System Requirements for Large Number of Files on Tape**

If the tape backup contains a large quantity of files, for example, more than 1 000 000 files in 1 000 folders, you must provide the following system resources:

- Backup server: 1.3 GB RAM per each 1 000 000 files
- Tape server: 800 MB RAM per each 1 000 000 files.
Automated Drive Cleaning

You can instruct Veeam Backup & Replication to automatically clean the tape library drives. Assigning the automated cleaning to Veeam Backup & Replication prevents possible overlapping of cleaning tasks and tape jobs. Such overlapping may cause tape jobs failures.

To instruct Veeam Backup & Replication to automatically clean the drives:

1. Open the Tape Infrastructure view.
2. Expand the Libraries node and select the needed library. Click Properties on the ribbon. You can also right-click the necessary library in the working area and select Properties.
3. In the Properties window, select the Perform drive cleaning automatically option.

How It Works

Veeam Backup & Replication cleans the drives at the beginning of backup to tape jobs or file to tape job run. The cleaning is not performed during other tape operations such as, for example, cataloging or export.

To clean the drives automatically, Veeam Backup & Replication performs the following actions:

1. The tape library alerts Veeam Backup & Replication on a drive that requires cleaning.
2. Veeam Backup & Replication waits for a tape job to start.
3. When the tape job locks necessary drives for writing data, Veeam Backup & Replication checks which of them requires cleaning.

Important!

If you enable the automated drive cleaning option in Veeam Backup & Replication, make sure that you disabled the drive cleaning tasks on your tape library device.
4. Veeam Backup & Replication ejects the tape from the drive, inserts a cleaning tape and performs the cleaning.
5. Veeam Backup & Replication ejects the cleaning tape and inserts the tape that was reserved for the tape job.
6. The tape job writes the data on tape.

The cleaning process usually takes several minutes.

The cleaning tapes are located in the Unrecognized media pool. The worn-out cleaning tapes are moved to the Retired media pool automatically.

If a tape job locks multiple drives simultaneously for parallel processing, and one or more drives require cleaning, all drives wait until the cleaning is finished. After cleaning, all drives start writing simultaneously.

The automated drive cleaning does not affect creation of media sets.

**Limitations for Automated Drive Cleaning**

You cannot enable the automated drive cleaning on standalone tape drives.

You cannot start the drive cleaning manually with Veeam Backup & Replication. The drive cleaning is fully automated.
Working with Drives

Drives of each connected library or standalone tape device are displayed in the Tape Infrastructure view under the Libraries > LibraryName node > Drives.

To view the drives properties, select Drives under the needed library. View the list and a short description of the drives in the working area. To view detailed information on a drive or to change its settings, click Properties on the ribbon. You can also right-click the necessary drive in the working area and select Properties.

To set block size for the drive manually, select a value from the Block size list in the drive properties.

Note: Veeam Backup & Replication uses uniform block size. Drive that is set manually to a particular block size may fail to read tape that was written with another block size. For more information on tape block size, see Supported Devices and Configuration.

To disable a drive, clear the Enabled option in the drive properties. To set the drive into working mode again, select the Enable option. You can disable a drive, for example, for maintenance. When you disable a drive, the library does not use this drive for read/write operations. If the library has multiple drives, other drives will be used for the read/write operations.
Working with Tapes

All tapes managed by Veeam Backup & Replication belong to one of media pools. Generally, the new tapes are in the Free media pool. Tapes that were written by tape jobs stay in the media pools that are targets to these tape jobs.

If you offload tapes from your tape device, their status changes to Offline, but they stay visible in the console.

Tape media in Veeam Backup & Replication are displayed in the Tape Infrastructure view, either under the Media Pools or under the Libraries > LibraryName node > Media > Online/Offline. You can work with both online and offline tapes:

- Tapes that are currently loaded to the tape device are available under the Online node.
- Tapes that have been unloaded from the tape device are shown under the Offline node.

All tapes are grouped to service or user-created media pools available under the Tape Infrastructure > Media Pools node. You can also view tapes under the Tape Infrastructure > Libraries > LibraryName node > Media.

Veeam Backup & Replication can use only online tapes for backup to tape and file to tape jobs. If you work with a standalone tape drive and all its tapes are offline, Veeam Backup & Replication will display a message informing you that you need to insert a tape into the drive. At the same time, Veeam Backup & Replication will hint what tape has been recently used for archiving.

You can insert any tape into the tape drive:

- If the tape you have inserted is registered in the Veeam backup database and the current media set can still be used, Veeam Backup & Replication will continue writing to this media set and append the new content to the content recently written on the tape.
- If the tape you have inserted is not registered in the Veeam backup database, it will be processed as follows:
  - A new empty tape will be placed to the Free media pool and used for writing data.
A tape containing any data written on another Veeam backup server or with another tape backup solution will be placed to the Unrecognized media pool. You need to perform catalogization for such tapes.
Viewing Tape Properties

You can view properties of each tape registered in Veeam database. The tapes may be online or offline. The Properties window shows location, capacity, name and other properties of the selected tape.

The capacity of the tape is identified by the tape device where the tape is located. You can also view the capacity of a tape in your tape device console (or in the Microsoft Windows Device Manager for tapes that are in drives).

The name of the tape is generated automatically during tape importing. If your tape device supports barcodes, Veeam Backup & Replication will use the barcodes to identify the tapes and display the barcode as the Name property of the tape. If a tape does not have a barcode, Veeam Backup & Replication will automatically create the tape name using the pattern 'Tape N'.

If necessary, you can change the name of a tape:

1. Open the Tape Infrastructure view.
2. Navigate to the list of tapes either under the Media Pools or under the Libraries > LibraryName node > Media > Online/Offline.
3. Select the tape you want to rename and click Properties on the ribbon. Alternatively, you can right-click the tape and choose Properties.
4. Change tape name and description as required.
5. Click OK to save changes.

Note: If you manage several tape libraries on the same Veeam backup server and use barcodes to identify tapes in these libraries, make sure that all barcodes are unique. If some tapes have identical barcodes, Veeam Backup & Replication may fail to manage them correctly.
0014002T Properties

General

Barcode: 0014002T
Library: HP MSL G3 Series (automated library)
Location: Slot 12
Media pool: Unrecognized
Capacity: 10.0 GB
Free: 10.0 GB
Block size: 262144

Description:
Imported from offsite backup server

[Buttons: OK, Cancel]
Viewing Data on Tapes

To view data contents that is currently stored on tape:

1. Open the **Tape Infrastructure** view.
2. Navigate to the list of tapes either under the **Media Pools** or under the **Libraries > LibraryName node > Media > Online**.
3. Select the necessary tape and click **Properties** on the ribbon. Alternatively, you can right-click the tape and choose **Properties**.
4. Open the **Files** tab.

![Image of tape file properties window]

- Shell.tech.local
  - Local Disk (C:)
    - Payroll_Reports
      - CustomerService
      - Marketing
    - Summary
      - Reports
        - Finance_summary.html
        - PayrollReport1.html
        - PayrollReport2.html
        - PayrollReport3.html
Removing Tapes from Catalog

If you do not want to store information about a tape and contents on this tape in Veeam Backup & Replication database, you can remove the tape from the catalog. Removing from catalog can be performed for offline tapes. For example, you can perform removal from catalog if a physical tape no longer exists, and the tape should no longer be displayed among media in the Veeam Backup & Replication console.

You can remove only tapes that are offline.

To remove one or more tapes from the catalog:

1. Open the **Tape Infrastructure** view.
2. Navigate to the list of tapes either under the **Media Pools** or under the **Libraries > LibraryName node > Media > Offline**.
3. Select offline tapes you want to remove from the catalog and click **Remove from Catalog** on the ribbon. Alternatively, you can right-click selected tapes and choose **Remove from Catalog** from the shortcut menu.
4. In the opened dialog box, click **Yes** to confirm removal.

**Important!** You cannot remove protected tapes from the catalog. To remove such tapes, you need to switch the protection **off** first.
Erasing Tapes

If you do not need the contents stored on tape, you can erase tapes. Veeam Backup & Replication supports two options for erasing data:

- **Short erase (fast)** — use this option to speed up the erase process. The short erase operation does not physically erase data written on the tape. It simply loads the tape to the drive and wipes the tape header. Note that short erase is not supported by some tape devices.

- **Long erase (slow)** – use this option to clear all data written to tape. The long erase operation loads the tape to the drive, rewinds the tape and physically erases all data written to the tape.

To erase tapes:

1. Open the **Tape Infrastructure** view.
2. Navigate to the list of tapes either under the **Media Pools** or under the **Libraries > LibraryName node > Media > Online**.
3. Select tapes you want to erase and click **Erase** on the ribbon. Choose the type of erase and click **OK**.
   Alternatively, you can right-click selected tapes and choose **Erase Tape**. Next, choose how the tape should be erased and click **OK**.

**Important!** You cannot erase protected tapes. To erase such tapes, you need to switch the protection off first.
Marking Tapes as Free

Instead of erasing tapes, you can mark tapes as free. During this operation, Veeam Backup & Replication deletes from backup and tape catalogs information about backup contents stored on tape. Data written to tape remains intact.

To mark tapes as free:

1. Open the **Tape Infrastructure** view.
2. Navigate to the list of tapes either under the **Media Pools** or under the **Libraries > LibraryName node > Media > Online**.
3. Select tapes you want to mark as free and click **Mark as Free** on the ribbon. Alternatively, you can right-click selected tapes and choose **Mark as Free** from the shortcut menu.
4. In the displayed dialog box, click **Yes**.

After a tape is marked as free, Veeam Backup & Replication removes from the catalog information about contents on this tape.

**Important!** You cannot mark protected tapes as free. To mark such tapes as free, you need to switch the protection off first.
Ejecting Tapes

Ejecting moves the tape that is currently in drive to a library slot. The tape stays in the library and is online. Ejecting prevents tapes, for example, from being occasionally overwritten.

You can select a tape to eject, or select a drive and eject the tape from it. Eject command is enabled only for tapes that are in drives or for drives with loaded tapes.

To eject a tape from a drive:

1. Open the Tape Infrastructure view.
2. Navigate to the list of tapes either under the Media Pools or under the Libraries > LibraryName node > Media > Online.
3. Select a tape located in drive that you want to eject and click Eject on the ribbon. Alternatively, you can right-click selected tape and choose Eject Tape.

To eject a tape from a drive:

1. Open the Tape Infrastructure view.
2. Navigate to the Libraries > LibraryName node > Drives.
3. Select a drive from where you want to eject the tape and click Eject Tape on the ribbon. Alternatively, you can right-click selected tape and choose Eject.

Tip: You can also instruct a tape job to eject tape from drive after the job completes. To do so, navigate to the Options step of backup to tape job or file to tape job and select the Eject media once the job finishes check box.
Exporting Tapes

If you want to take the tapes out of the tape device, you need to export them first. Exporting ejects the tapes from the slots in the tape device and moves them to the I/E slot (or Mail slot). When they are in the I/E slot, you can take them from the library and, for example, carry to a storing location.

Note: Export is available only for the devices that support corresponding operations and include I/E slot.

To export a tape:

1. Open the **Tape Infrastructure** view.
2. Navigate to the list of tapes either under the **Media Pools** or under the **Libraries > LibraryName node > Media > Online**.
3. Select a tape you want to export and click **Export** on the ribbon. Alternatively, you can right-click selected tape and choose **Export Tape** from the shortcut menu.
Tapes Availability and Write-Protection

Before archiving data to tape media, Veeam Backup & Replication detects available tapes in the target media pool. Unavailable tapes are filtered out and are not used for writing data. A tape may be unavailable for one of the following reasons:

- The tape cannot be used according to the retention policy set for the media pool.
- The tape is offline.
- The tape has the write-protect switch set.

If your tape is write-protected and you want to write data to this tape, you must eject the tape from the drive and drag the write protection switch off. After you insert the tape back to the drive, you must inventory the tape to mark it as writable in the Veeam Backup & Replication database.
Media Pools

Media pools are logical containers created in Veeam Backup & Replication to organize and administrate tapes. Veeam Backup & Replication works only with tapes that are placed to one of media pools. To introduce tapes to Veeam Backup & Replication, you need to run importing procedure against all new tapes you load to your tape devices. Importing registers tapes in the Veeam Backup database after which Veeam Backup & Replication places tapes to one of the media pools.

Veeam Backup & Replication has a number of service media pools that are used for automatic tape administration. For example, all new tapes are placed to the Free media pool. To write data to tapes, you need to manually create at least one simple media pool. To run GFS backups, you need to create a GFS media pool.

All Veeam media pools are global. They span tapes that belong to multiple libraries. In a global media pool, you can move tapes between the libraries without need to catalog them. For example, if you need to restore data from tapes, you can insert the tapes into any tape library in the pool.

Note: Mind the hardware encryption. If the tapes are encrypted by native hardware means of a tape library, you cannot read them at tape device with another encryption standard or with hardware encryption turned off.
**Tape Library Failover**

A simple or a GFS media pool can fail over to another tape library in certain cases. Failover is available in media pools that use multiple libraries. One tape library is always set as primary, and is generally used for processing data. The media pool can switch to the next library in the following cases:

- The tape library is offline.
- The tape library has no free tapes.
- The tape library has no free drives.

The libraries are failed over to by the user-defined order. On the next backup session, Veeam will try to switch back to the primary library. If it is still not available, the media pool fails over to the next library as defined.

*To configure the tape library failover rules, use the Manage Libraries option in the Media Pool wizard. See Step 3. Add Tapes to Media Pool of the New Media Pool wizard for details.*
**Media Sets**

Media set is a set of tapes used for continuously writing backup data. Media set is one of parameters in media pool configuration.

A new media set always starts with a free tape. Within one media set, the new data block is appended to a previous one on a tape. Veeam Backup & Replication stores information about all tapes that belong to each media set. You can view the list of names or barcodes of tapes that are associated with a particular media set.

Media sets are used to explicitly distinguish data recorded to particular sets of tapes. You can choose between the following configuration options:

- **Creating a new media set for each backup session.** In this case, Veeam Backup & Replication will produce a separate set of tapes for each tape backup session.

- **Starting a new media set for a certain period of time.** For example, each week. As a result, you will have a separate set of tapes containing all backups that have been written to tape during a week.

- **Always continuing one media set.** Use this option if you do not need to split your tape archives into separate sets of tapes.

When planning media sets configuration, you should balance between convenient viewing of data and efficiency of using the tapes. Media sets help create distinct packs of tapes, which will be convenient, for example, if you need to bring certain tapes from an offsite storage location to restore data. However, it may use the tapes ineffectively as the new media sets always require a new tape. This option is helpful when you have a lot of backups stored offsite.

Always continuing one media set option is most efficient in terms of tape capacity usage, for the new data would be written to the same tape until it is full. However, in this case the data will be split across tapes and you may require a larger number of tapes to get a particular backup set for restore. This option is usually used in environments where the tapes are not exported from libraries.

In some cases, Veeam forcibly starts a new media set, even if media pool settings do not instruct Veeam to do so. It happens when a job starts, but the tape that was planned for writing data cannot be used. In this situation, Veeam takes a new tape, and starts a new media set on it. For example, the situation may be as following:

1. The required tape is offline. If you bring such tape online before the tape job starts, it will be used as planned.
2. If the media pool is scheduled to export tapes. Exporting closes the current media set and starts a new one on the next job run.
3. The required tape is hardware or software protected.
4. In library failover on the following events: library is offline and all drives are busy. When a tape library is failed over on these events, Veeam Backup & Replication starts a new media set even if the global media pools are configured to always continue one media set.

Note that if a new media set is started, scheduled or forced, the previous media set cannot be resumed.
Backup Sets

When a tape job runs, it analyzes disk storage and spots files that match the tape job parameters. The tape job queues the files and writes them to tape. The set of files that are archived to tape within one tape job session is a backup set.

Depending on size and number of archived files, a backup set may require different amounts of tape space. For example, if the amount of data is large, it may take several tapes.
Service Media Pools

Service media pools sorts tapes and manage their free capacity for writing data. Service media pools are automatically created by Veeam Backup & Replication when needed. The following predefined media pools can be created:

- **Free** — a media pool containing empty tapes. You can use this media pool to replenish user-created pools with new tapes when needed.
- **Unrecognized** — a media pool containing tapes that were loaded to tape device. They need further identification by user that can be done by running the inventory or catalog job. This media pool also contain cleaning tapes.
- **Imported** — a media pool containing non-empty tapes. These include tapes identified by the tape catalog job.
- **Retired** — a media pool containing retired tapes that reached the maximal number of re-writes. This media pool may also contain tapes with some mechanical breakdown.

You cannot create, modify or delete service media pools.
Simple Media Pools

Simple media pools are target destinations for backup to tape and file to tape jobs. The simple media pools manage empty (or available for overwriting) tapes to allow the tape jobs write data. You can create as many simple media pools as you need. One media pool can be target for unlimited number of tape jobs. The GFS jobs require GFS media pools. For details, see GFS Media Pools.

For each simple media pool, you can configure rules. Such rules are further applied to every tape that belongs to this media pool.

You can apply the following rules:

- Configure tape replenishment: you can allocate some particular tapes or let the media pool take a free tape when required.
- Create media sets: media sets allow you to create sets of tapes with data for a particular time period.
- Set the data retention period: this setting lets you choose the period for which the data on tapes will be protected from overwriting.
- Enable parallel processing: you can allow the media pool to use multiple tape drives simultaneously for writing data to tape. With parallel processing enabled, the media pool can process simultaneously several tape jobs or split the data within one tape job across tape drives.
- Encrypt the data written to tapes.
- Export tapes to vault.

A tape allocated to a simple media pool will always be tied to its media pool. When you bring a tape with expired data online, Veeam Backup & Replication places it automatically to the media pool where the tape was written.

Creating Simple Media Pools

To create a simple media pool, use the New Media Pool wizard. This section will guide you through all steps of the wizard and provide explanation on available options.

Step 1. Launch the New Media Pool Wizard

To run the New Media Pool wizard, do either of the following:

- Open the Tape Infrastructure view and click Add Media Pool on the ribbon.
- Open the **Tape Infrastructure** view, right-click the **Media Pools** node and choose **Add Media Pool**.

**Tip:** You can also launch the **New Media Pool** wizard when configuring tape jobs (that is, directly from the New **Backup to Tape Job** wizard and New **File to Tape Job** wizard. For more details, see Creating Backup to Tape Jobs and Creating File to Tape Jobs.

### Step 2. Specify Media Pool Name

At the **Name** step of the wizard, define basic description for the new media pool.

1. In the **Name** field, enter a name for the created media pool.
2. In the **Description** field, enter a description of the new media pool. The default description contains information about the user who created the media pool, date and time when the media pool was created.

![New Media Pool Wizard](image)

### Step 3. Add Tapes to Media Pool

At the **Tapes** step of the wizard, you can configure global media pool settings and allocate tapes for the pool.

1. In the **Tape library** field, select the library from which the tapes will be allocated for the media pool. The list contains the tape libraries managed by this Veeam backup server. This field is disabled if multiple libraries are managed by this media pool.

2. To add multiple libraries to the media pool, click **Manage**. In the **Manage Libraries** window, click **Add** and select libraries that you want to add. Use **Up** and **Down** buttons to position the libraries in order they must fail over. The first library will be the primary. You can select any tape devices that are managed by this Veeam backup server even if they are connected to different tape servers.

   Select the events on which the media pool must fail over to the next library:
   - Library is offline.
No media available.
All tape drives are busy.

**Note:** To enable failover, ensure the following:
- Select at least one failover event.
- Add two or more tape libraries to failover list.

3. To allocate specific tapes from the library, click the **Add** in the **Tapes** field and select tapes that should be added to the media pool. Allocated tapes will be reserved for the created media pool; other media pools will not be able to use these tapes. The capacity and free space on the allocated tapes will be displayed in the bottom right corner.

4. To make the media pool replenishable, select the **Add tapes from Free media pool automatically when more tapes are required** check box.

With this option enabled, additional tapes will be allocated from the **Free** media pool when needed. That is, when a tape job uses all available tapes from this media pool, Veeam Backup & Replication will automatically add the required number of tapes from the **Free** media pool to let the job complete. If the option is disabled, the job will pause and prompt the backup administrator to add new tapes to the media pool.
Step 4. Specify Media Set Options

At the Media Set step of the wizard, specify rules for creating media sets. For details, see Media Sets.

In the media set name field, define the pattern according to which created media set(s) will be named. The default variables are %id% (the number of the media set) and %date% (the date of creation of the media set).

You can additionally use the following variables:

- %time% — the time of creation of the media set
- %day% — the day in month on which the media set is created
- %dayofweek% — the day of week on which the media set is created
- %month% — the month of creation of the media set (the month is shown as a name, for example, ‘January’)
- %year% — the year of creation of the media set
- %job% — the name of job for which the media set is created
- %monthnumeric% — the month of creation of the media set (the month is shown as a number, for example, ‘01’ for January).

In the Automatically create new media set section, specify conditions for creating new media sets on tapes allocated to the media pool. The following options are available:

- **Do not create, always continue using current media set.** If this option is selected, each subsequent backup session will write its backup set to the existing media set: it will append backup content to the content that was written to tape with a previous backup session. If, however, a backup set is started with a new tape, Veeam Backup & Replication will create a new media set for it.

- **Create new media set for every backup session.** If this option is selected, a new media set will be created for each new backup session. Each backup session will write its backup set starting with a new tape.
- **Daily at.** If this option is selected, you can specify day and time when new media sets should be created. For example, if at the end of the week you send weekly media sets to offsite storage, you can schedule creation of new media sets at the beginning of each week.

### Step 5. Specify Retention Settings

At the **Retention** step of the wizard, specify the retention settings for the tapes in this media pool. For details, see **Tape Data Retention**.

You can select one of the following options:

- **Do not protect data (cyclically overwrite tapes as required).** If this option is selected, tapes allocated to the pool will be overwritten, starting with the tape that stores the oldest archive.

- **Protect data for (time interval).** If this option is selected, data on tapes will be preserved for the specified period. When this period is over, tapes will be overwritten, starting with the tape that stores the oldest archive. This setting must accord with the retention policy specified for the backup chain that you plan to archive to tape. For details on disk retention, see **Data Retention**.

- **Never overwrite data.** If this option is selected, data on tapes will not be overwritten. If there is not enough tape capacity for the archiving job to complete, Veeam Backup & Replication will pause the job and prompt the backup administrator to add new tapes to the media pool.

**Note:** If at the previous step you selected the **Do not create, always continue using current media set** option, keep in mind that the retention period for such media sets starts after the first tape in the media set becomes full.

In the **Offline media tracking** section, you can set automatic moving tapes to a media vault when they are brought offline. To enable this option:

1. Select **Move all offline tapes from this media pool into the following media vault** check box.
2. From the **Vault** list, select the media vault where you want to automatically move the tapes.
If the vault is not added yet, click **Add New** to open the **New Media Vault** wizard.

### New Media Pool

**Retention**
- Specify the tape retention settings for this media pool.

<table>
<thead>
<tr>
<th>Name</th>
<th>Data retention policy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Do not protect data (logically overwrite tapes as required)</td>
</tr>
<tr>
<td></td>
<td>Protect data for 6 Months</td>
</tr>
<tr>
<td></td>
<td>Never overwrite data</td>
</tr>
</tbody>
</table>

#### Options
- Offline media backing
- Move all offline tapes from this media pool into the following media vault:
  - **Vault**: Atlanta Vault

#### Summary

<table>
<thead>
<tr>
<th>Options</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Step 6. Add Optional Media Pool Settings**

At the **Options** step of the wizard, you can enable parallel processing and encryption.

1. Select the **Enable parallel processing for tape jobs using this media pool** check box if you want to process multiple tape jobs simultaneously. Set the maximum number of drives that the media pool can use in parallel.

   If you want to use multiple drives simultaneously to process multiple primary backup chains within the tape jobs, select the **Enable parallel processing of backup chains within a single job** check box. For more information, see **Tape Parallel Processing**.

2. To enable encryption, select the **Use encryption** check box. This option allows you to encrypt the content of files or backups archived to tapes in the media pool.

   From the **Password** field, select a password you want to use to encrypt data written to tape. You can also click **Add** or use the **Manage passwords** link to add a password. For more information, see **Tape Jobs Encryption**.

   If the primary job produces encrypted backups, and you enable encryption in the properties of the media pool, the data on tape will be encrypted twice. To decrypt such tape backups, you will need to specify two passwords:
   - Password for the media pool
   - Password for the primary backup job
Step 7. Finish Working with the Wizard

Review the media pool settings and click **Finish** to complete the wizard.

A new media pool will be available under the **Tape Infrastructure > Media Pools** node in the **Tape Infrastructure** view.
GFS Media Pools

The GFS media pools are special media pools that store data to tape according to the GFS, or Grandfather-Father-Son rotation scheme. The GFS media pools are targets for GFS tape jobs. For details, see GFS Backup to Tape.

GFS media pool keeps four predefined media sets for storing the VM backups with a tiered retention policy scheme:

- Weekly
- Monthly
- Quarterly
- Yearly.

You can disable any media set or sets if you do not need them.

A GFS media pool can be target for unlimited number of GFS tape jobs.

Creating GFS Media Pools

To create a GFS media pool, use the New GFS Media Pool wizard. This section will guide you through all steps of the wizard and provide explanation on available options.

Step 1. Launch the New GFS Media Pool Wizard

To run the New GFS Media Pool wizard, do either of the following:

- Open the Tape Infrastructure view and click Add GFS Media Pool on the ribbon.
• Open the **Tape Infrastructure** view, right-click the **Media Pools** node and choose **Add GFS Media Pool**.

**Tip:** You can also launch the **New GFS Media Pool** wizard when configuring backup to tape jobs (that is, directly from the **New Backup to Tape Job** wizard. For details, see Creating **Backup to Tape Jobs**.

### Step 2. Specify Media Pool Name

At the **Name** step of the wizard, define basic description for the new GFS media pool.

1. In the **Name** field, enter a name for the created media pool.
2. In the **Description** field, enter a description of the new media pool. The default description contains information about the user who created the media pool, date and time when the media pool was created.

### Step 3. Add Tapes to Media Pool

At the **Tapes** step of the wizard, you can select tape libraries and allocate tapes for the pool.

In the **Tape library** field, select the library from which the tapes will be allocated for the media pool. The list contains the tape libraries managed by this Veeam backup server. This field is disabled if multiple libraries are managed by this media pool.

To add multiple libraries to the media pool, click **Manage**. In the **Manage Libraries** window, click **Add** and select libraries that you want to add to the media pool. Use **Up** and **Down** buttons to position the libraries in order they must fail over. The first library will be the primary. You can select any tape devices that are managed by this Veeam backup server even if they are connected to different tape servers.

Select the events on which the media pool must fail over to the next library:

- Library is offline.
- No media available.
- All tape drives are busy.

**Note:** To enable failover, ensure the following:
- Select at least one failover event.
- Add two or more tape libraries to failover list.

To allocate specific tapes from the library, click the **Add** in the **Tapes** field and select tapes that should be added to the media pool. Allocated tapes will be reserved for the created media pool; other media pools will not be able to use these tapes. The capacity and free space on the allocated tapes will be displayed in the bottom right corner.

To make the media pool replenishable, select the **Add tapes from Free media pool automatically when more tapes are required** check box.

With this option enabled, additional tapes will be allocated from the **Free** media pool when needed. That is, when a backup to tape or file to tape job uses all available tapes from this media pool, Veeam Backup & Replication will automatically add the required number of tapes from the **Free** media pool to let the job complete. If the option is disabled, the job will pause and prompt the backup administrator to add new tapes to the media pool.
Step 4. Specify Media Set Options

In the GFS media pool, a separate media set is created for each backup cycle: weekly, monthly, quarterly and yearly.

For each media set, you can set the data retention period. The retention period indicates for how long the data is protected from overwriting.

**Note:** If you want to disable any media set(s), set their retention period to 0 (zero). No backups will be stored to the media set with zero retention period.

Click **Advanced** to configure the advanced media set options.
Step 5. Specify Advanced Media Set Options

You can granularly configure rules for each media set.

At the **GFS Media Set** step of the wizard, click **Advanced**. Select the **Weekly** tab to configure the weekly media set.

1. If you want the **Weekly** media set to span a number of selected tapes, click **Add** and select tapes that should be added to the media set. You can select from tapes added to the media pool at the **Tapes** step of the wizard. The selected tapes will be displayed in the **Weekly media set** field.

   This option is useful if you want the media set to use some particular user-defined tapes. Otherwise, you can use the **Add tapes from media pool automatically** option.

2. In the **Media set suffix** field, define the pattern according to which the created media set will be named.

3. Select the **Add tapes from media pool automatically** check box to allow the media set to take a tape from the media pool when required.

4. Select **Append backup files to incomplete tapes** if you want to write the next backup set to the tape where the previous backup set was written. Otherwise, Veeam will use a new tape for each backup set.

5. You can set automatic moving tapes to a media vault when they are brought offline. To enable this option:
   - Select **Move all offline tapes from this media pool into the following media vault** check box.
   - From the list of vaults, select the media vault where you want to automatically move the tapes.
   - If the vault is not added yet, click **Add New** to open the **New Media Vault** wizard.
**Note:** Tapes written in this media set will always be used by this media set. Other media sets will not be able to use these tapes even after the data expires.

The monthly, quarterly and yearly backup cycles use the same settings as the weekly backup cycle.

**Step 6. Add Optional Media Pool Settings**

At the **Options** step of the wizard, you can enable encryption.

Select the **Use encryption** check box. This option allows you to encrypt the content of files or backups archived to tapes in the media pool.

From the **Password** field, select a password you want to use to encrypt backups or files archived to tape. You can also click **Add** or use the **Manage passwords** link to add a password. For more information, see **Tape Jobs Encryption**.

If the primary job produces encrypted backups, and you enable encryption in the properties of the media pool, the data on tape will be encrypted twice. To decrypt such tape backups, you will need to specify two passwords:

- Password for the GFS media pool
- Password for the primary job
Step 7. Finish Working with the Wizard

Review the media pool settings and click **Finish** to complete the wizard.

A new media pool will be available under the **Tape Infrastructure > Media Pools** node in the **Tape Infrastructure** view.

### Summary

Review the settings and click Finish to apply. You can copy these settings for the future reference.

<table>
<thead>
<tr>
<th>Name</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tapes</td>
<td>GFS media pool name: Web Serves GFS Backups</td>
</tr>
<tr>
<td></td>
<td>GFS media pool description: Created by PEARL Administrator at 1/11/2012 5:30:56 AM.</td>
</tr>
<tr>
<td></td>
<td>Tapes counts: 10</td>
</tr>
<tr>
<td></td>
<td>Capacity: 100.0 GB</td>
</tr>
<tr>
<td></td>
<td>Remaining: 100.0 GB</td>
</tr>
<tr>
<td>GFS Media Set</td>
<td>Weekly media set:--------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Retention: 4 weeks</td>
</tr>
<tr>
<td></td>
<td>Use the following media: 0017001L, 0017001W, 0017001X, 0017001Y, 0017002L, 0017002W, 0017002X, 0017002Y, 0017002Z, 0017002A, 0017002B</td>
</tr>
<tr>
<td></td>
<td>Tapes counts: 7</td>
</tr>
<tr>
<td></td>
<td>Capacity: 70.0 GB</td>
</tr>
<tr>
<td></td>
<td>Remaining: 70.0 GB</td>
</tr>
<tr>
<td></td>
<td>Append backup files to tapes</td>
</tr>
<tr>
<td></td>
<td>Monthly media set:-------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Retention: 12 months</td>
</tr>
<tr>
<td></td>
<td>Automatically add tapes</td>
</tr>
<tr>
<td></td>
<td>Do not append backup files to tapes</td>
</tr>
<tr>
<td></td>
<td>Quarterly media set:</td>
</tr>
</tbody>
</table>

- Previous  | Apply  | Finish  | Cancel |
Moving Tapes to Another Media Pool

Veeam Backup & Replication allows you to move tapes between media pools. You can move tapes between simple and GFS media pools, and from and to the Free media pool.

You cannot manually move tapes to Imported, Unrecognized or Retired media pools.

**Important!** When you move a tape to any media pool, Veeam Backup & Replication marks this tape as free.

To move tapes from one media pool to another:

1. Open the Tape Infrastructure view.
2. Navigate to the list of tapes either under the Media Pools or under the Libraries > LibraryName node > Media > Online.
3. Select tapes you want to move and click Move to on the ribbon. Choose the target media pool from the list.
   Alternatively, you can right-click selected tapes and choose Move to Media Pool. Next, choose the target media pool from the list.

**Note:** You cannot move tapes that are protected. To move such tapes, you need to switch the protection off first.
Modifying Media Pools

If necessary, you can modify settings of a media pool.

To modify media pool settings:

1. Open the Tape Infrastructure view.
2. Right-click the necessary media pool and choose Properties. Alternatively, select a media pool and click Edit Media Pool on the ribbon.
3. Go through the Edit Media Pool wizard to change the necessary settings.
4. Apply changes.

Limitations for Modifying Media Pools

You can modify only simple or GFS media pools; service media pools cannot be modified.
Removing Media Pools

If you no longer need a simple or a GFS media pool, you can remove it:

1. Open the **Tape Infrastructure** view.
2. Right-click the necessary media pool and choose **Remove Media Pool** from the shortcut menu. Alternatively, select a media pool and click **Remove Media Pool** on the ribbon.
3. In the displayed dialog box, click **OK** to confirm deletion.

When you remove a media pool, its tapes are moved to the **Imported** media pool. The data on the tapes is not erased. You can use the tapes in the **Imported** media pool for restore operations.

The **Imported** media pool does not have any retention settings. The tapes in the **Imported** media pool are never overwritten as they are not used by any jobs. The media set number and the media set expiration date are inherited and remain for user information. The data will remain on tapes until you choose to erase it manually.

If you do not need the data on tapes, you can move the imported tapes to the **Free** media pool or any other media pool. In this case, the tapes will be marked as free. For more information, see **Moving Tapes to Another Media Pool**.

**Limitations for Removing Media Pools**

- You can remove only simple or GFS media pools; service media pools cannot be removed.
- You cannot remove a media pool that is used in a backup to tape or file to tape job. To remove such media pool, you need to point corresponding jobs to other simple or GFS media pools.
**Media Vaults**

Media vaults are logical containers that help you to additionally organize offline tapes. When the tapes are recorded and moved offsite, you need to have easy ways to manage data on such tapes.

Media vaults visualize information about tapes. They store information about original location of tapes, such as library and media pool, data written to tapes and retention terms for it. Vaults are not limited to any original location of tapes: you can place tapes from different libraries and media pools to one media vault.

You can virtually move tapes to the vaults grouping them by any criteria. For example, if you have a number of offsite storages for physical tapes, you can create a media vault for each of them. When you transport the physical tapes to the offsite storage, you can accordingly move the offline tapes to a vault in your Veeam backup console mirroring the physical storage. This will allow you to have convenient representation of the list of tapes in each of your physical storages.

Tapes can be moved to a vault automatically if you instruct media pools to move tapes to a selected vault after the tapes go offline. You can also move the tapes from one media vault to another. Tapes will not be shown in their vault when you bring them online. The tapes that have been moved to a vault stay visible in their media pools and under the **Offline** node. When you remove a tape from the Veeam backup server, it is automatically deleted from the vault.

To start working with vaults, you need to create one or more of them. Vaults are virtual container, and do not require any physical resources.

**Note:** You can work with tape vaults if Veeam Backup & Replication Enterprise license or higher is installed on the Veeam backup server.
Creating Media Vaults

Created media vaults are shown under the **Vaults** node. If you have no vaults created, the **Vaults** node will not be shown.

To create a new media vault, use the **New Media Vault** wizard. This section will guide you through all steps of the wizard and provide explanation on available options.

To add a media vault, follow the next steps:

**Step 1. Launch the New Media Vault Wizard**

To run the **New Media Vault** wizard, do either of the following:

- Open the **Tape Infrastructure** view and select the **Tape Infrastructure** node. Click **Add Media Vault** on the ribbon.
- Open the **Tape Infrastructure** view, right-click the **Tape Infrastructure** node and choose **Add Media Vault**.

**Tip:** You can also launch the **New Media Vault** wizard when configuring media pools (that is, directly from the **New Media Pool** or **New GFS Media Pool** wizard. For more details, see *Creating Simple Media Pools* or *Creating GFS Media Pools*.

**Step 2. Specify Media Vault Name**

At the **Name** step of the wizard, you should define basic description for the new media vault.

1. In the **Name** field, enter a name for the created media vault.
2. In the **Description** field, enter a description of the new media vault. The default description contains information about the user who created the media pool, date and time when the media pool was created.
3. If you want to set overwrite protection to all tapes in this media vault, select the **Protect all tapes moved to this media vault automatically** check box. For more information, see *Tape Protection*.

---

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>tape1</td>
<td>A general description of the media vault</td>
<td><strong>Protect all tapes moved to this media vault automatically</strong> checked</td>
</tr>
<tr>
<td>tape2</td>
<td>A detailed description of the media vault</td>
<td><strong>Protect all tapes moved to this media vault automatically</strong> unchecked</td>
</tr>
<tr>
<td>tape3</td>
<td>A minimal description of the media vault</td>
<td><strong>Protect all tapes moved to this media vault automatically</strong> unchecked</td>
</tr>
<tr>
<td>tape4</td>
<td>A short description of the media vault</td>
<td><strong>Protect all tapes moved to this media vault automatically</strong> checked</td>
</tr>
<tr>
<td>tape5</td>
<td>A medium-length description of the media vault</td>
<td><strong>Protect all tapes moved to this media vault automatically</strong> checked</td>
</tr>
<tr>
<td>tape6</td>
<td>A long description of the media vault</td>
<td><strong>Protect all tapes moved to this media vault automatically</strong> unchecked</td>
</tr>
<tr>
<td>tape7</td>
<td>A very long description of the media vault</td>
<td><strong>Protect all tapes moved to this media vault automatically</strong> checked</td>
</tr>
<tr>
<td>tape8</td>
<td>A extremely long description of the media vault</td>
<td><strong>Protect all tapes moved to this media vault automatically</strong> checked</td>
</tr>
<tr>
<td>tape9</td>
<td>A multi-line description of the media vault</td>
<td><strong>Protect all tapes moved to this media vault automatically</strong> checked</td>
</tr>
<tr>
<td>tape10</td>
<td>A multi-line description of the media vault</td>
<td><strong>Protect all tapes moved to this media vault automatically</strong> checked</td>
</tr>
</tbody>
</table>
Step 3. Finish Working with the Wizard

Review the media vault settings and click **Finish** to complete the wizard.
Modifying Media Vaults

To modify media vault settings:

1. Open the Tape Infrastructure view.
2. Right-click the necessary media vault and choose Properties. Alternatively, select a media vault and click Edit Vault on the ribbon.
3. Go through the Edit Media Vault wizard to change the necessary settings.
4. Apply changes.
Removing Media Vaults

If you no longer need a media vault, you can remove it. Mind the following limitation:

- You cannot remove a media vault that contains tapes. To be able to remove such vault, first move tapes from this vault to other media vaults or remove them from the vault. When you remove a tape from the vault, you can see it in its media pool or under Media > Offline node.

- You cannot remove a media vault that has a reference to any media pool. To be able to remove such media vault, first edit settings of the corresponding media pool and remove a reference to this media vault.

To remove a media vault:

1. Open the Tape Infrastructure view.
2. Select a media vault and click Remove Vault on the ribbon. Alternatively, you can right-click the necessary media vault in the working area and choose Remove Vault.
3. In the displayed dialog box, click OK to confirm deletion.
Moving Tapes to Vault

Recorded tapes can be moved to a vault. In the vault, you can view tape information, including data written to tape and data retention settings.

If the tapes are placed to a vault, you can still view them under the Offline node or in the media pool. You can move the tapes manually or instruct the relevant media pool to place the tapes to a vault automatically.

In This Section

- Moving tapes to vault manually
- Automatic vaulting for simple media pools
- Automatic vaulting for GFS media pools

Moving Tapes to Vault Manually

You can move only tapes that contain data and that are offline. To move the tapes manually:

1. Open the Tape Infrastructure view and navigate to the list of tapes either under the Media Pools or under the Libraries > LibraryName node > Media > Offline.
2. In the working area, right-click the tapes you want to move and select Move to Vault. Choose the vault you need.

Automatic Vaulting for Simple Media Pools

To set the automatic placing of tapes to a vault, you need to configure the media pool where the target tapes are recorded. To configure a simple media pool:

1. Open the Tape Infrastructure view and select the Media Pools node.
2. Select the media pool you want to customize.
3. Click Edit Media Pool on the ribbon. Alternatively, you can right-click the media pool and select Properties.
4. Go to the Retention step of the Edit Media Pool wizard: in the Offline media tracking field, select Move all offline tapes from this media pool into the following media vault. Select the needed vault from the drop-down list.

Note that moving tapes to a vault automatically will not be available if you select Do not protect data (cyclically overwrite tapes as required) option as a data retention policy.
Tip: If you have not previously created a media vault, you can click the Add New button and create a new media vault without closing the job wizard. For more details, see Creating Media Vaults.

Automatic Vaulting for GFS Media Pools

Vaulting of GFS tapes is set for media sets individually. To change a media set configuration:

1. Open the Tape Infrastructure view and select the Media Pools node.
2. Select the GFS media pool you want to customize.
3. Click Edit Media Pool on the ribbon. Alternatively, you can right-click the media pool and select Properties.
4. Go to the GFS Media Set step of the Edit Media Pool wizard and click Advanced. Select a tab with the needed media set and select Move all offline tapes into the following media vault. Select the needed vault from the drop-down list.
Tip: If you have not previously created a media vault, you can click the Add New button and create a new media vault without closing the job wizard. For more details, see Creating Media Vaults.
Managing Tapes in Vault

When you have tapes placed to vaults, you can move them to another vault or remove from vault. When you remove tapes from a vault, they are still available in the Offline list or in their media pool.

To move tapes to another vault:

1. Open the Tape Infrastructure view and select the Vaults node. Select the vault where the needed tapes are stored.
2. In the working area, right-click the tapes you want to move and select Move to Vault. Select the target vault.

To remove tape from vault:

1. Open the Tape Infrastructure view and select the Vaults node. Select the vault you need.
2. In the working area, right-click the tapes you want to remove and select Remove from Vault.

The tapes are removed from vault automatically in the following situations:

- A tape comes online. It will re-appear in the vault when it goes offline if it was not erased or overwritten.
- A tape is removed from catalog.
- A tape is marked as free.
Tape Protection

Tape protection is a software option that prohibits overwriting, erasing or appending data to protected tape. You can protect individual tapes that, for example, contain particularly valuable data.

Tape protection overrides retention settings of the media pool. The retention of other tapes in the media pool is not modified. You can remove the protection at any time. The tape will return to the retention period set by the media pool. If the media pool retention expired during the time the tape was protected, the tape will be queued for overwriting.

You can set protection for any tape, online or offline, that contains data. If the offline tape is in a media vault, the media vault will update the Protected status for this tape automatically.

When the tapes are protected, the following operations are prohibited for them:

- Appending data to tapes
- Erasing tapes
- Marking tapes as free
- Removing tapes from catalog.

To perform these operations, you need to switch the protection off first.
Protecting Tapes

If you have a number of tapes for which you need to change the retention to 'never overwrite', you can protect them. Protection option sets lifelong retention period for the selected tapes overriding the retention settings of the media pool.

You can set protection for both online or offline tapes that contain data.

If the tapes are protected, they cannot be erased or marked as free by Veeam Backup & Replication or manually. To erase such tape, you need to switch the protection off first.

The protection can be switched off at any time. The retention settings will be changed to the value set for the media pool.

To enable protection:

1. Open the **Tape Infrastructure** view.
2. Navigate to the list of tapes either under the **Media Pools** or under the **Libraries > LibraryName node > Media > Online**.
3. Select tapes you want to protect and click **Protect** on the ribbon. Alternatively, you can right-click selected tapes and choose **Protect** from the shortcut menu.

**Important!** You cannot protect free tapes, that is, tapes that do not have any data written on them.
Tape Data Retention

Data retention period is a period of time when data written to tapes is protected from overwriting. Retention period is set by user for media pool and is applied to all tapes in this media pool. To set the retention policy, you can choose between the following options:

- Never overwrite data
- Define a particular time period to protect data
- Not to protect data at all.

During the retention period, Veeam Backup & Replication will not overwrite data on tape. If a tape contains several backup sets, it will expire when the backup set with the longest retention period expires.

You can change the retention at any time. When you change the retention policy, you can select if this modification works for tapes that will be written after you apply this change or also to tapes that are already recorded. In the latter case, the retention settings of the recorded tapes will change immediately and will be applied to tapes that are both online and offline.

Note: If you choose to set a shorter retention period and apply the retention settings to all tapes, some of your tapes may immediately become outdated. Such tapes will be queued for overwriting. Be careful when applying a new retention policy in order not to lose any data you need, or use the protection option. For more information, see Tape Protection.

Tape Retention and Disk Retention

For forward incremental and reverse incremental backup chains, you must always set the retention period for the tape archive not less than the retention period for backups on disk. The tape jobs analyze the existing tape archives and synchronize them with disk backups. If you have some restore points on disk and the tape archive misses them (for example, if the media pool retention allowed overwriting of these tapes), the tape job will re-write all missing restore points. For details, see Retention Policy section in Veeam Backup & Replication User Guide.

For example, there are 14 backup files on the backup repository that are kept for 14 days. The backup to tape job archives files once a week. The retention policy for the media pool is set to 7 days. In this case, Veeam Backup & Replication will first write 14 backup files from the backup repository to tape. After a 7-day interval, Veeam Backup & Replication will start recording the whole set of backup files from the backup repository to tape anew, overwriting backup files on tape with their copies from the backup repository.

When the primary job produces a forever forward incremental backup chain, you can set any retention period for the tape archive. To back up such chains, the virtual full mechanism is enabled automatically. Keep in mind that the virtual full backup must be always newer than the full backup on disk. Otherwise, the tape job will copy the full backup from disk and synthesize the virtual full within one backup set. For details, see Virtual Full Backup.

Managing Outdated Tapes

The tapes containing outdated data are handled in the following way:
If the expired tape is online, it will be overwritten next time a tape job requires a free tape. The expired tape can be used only by the same media pool unless you erase the tape manually or move it to another media pool. The tapes are rewritten by the FIFO method.

If the expired tape is offline, you can re-load it back to the library. Tapes that were written in particular media pool will be automatically placed to the same media pool unless you move the tape to another media pool or erase the tape manually.
Virtual Full Backup

Virtual full allows you to backup up forever forward incremental backup chains to tape. The forever forward incremental chain always keeps on disk one full backup followed by a fixed number of increments. The full backup is constantly rebuilt: as new increments appear, the older ones are injected into the full.

Unlike disk backups, tape archives are static: tape jobs cannot rebuild backups once they are written to tape. Also, the standard backup to tape scheme (archiving new restore points during each tape session) cannot be used: the tape archive would have one full backup and an endless chain of increments all of which would be required for restore. To adapt the forever forward incremental chains to tapes, Veeam Backup & Replication uses the virtual full.

The virtual full mechanism creates a periodic synthesized full backup on tape. The periodic fulls split the forever incremental backup chain into shorter series of files that can be effectively stored to tapes. Each series contains one synthesized full backup and a set of increments. Such series are convenient for restore: you will need to load to the tape device only those tapes that are part of one series.

The virtual full does not require additional repository disk space: it is synthesized directly on tape on the fly, when the tape job runs. To build such full backup, Veeam Backup & Replication uses backup files that are already stored on the backup repository.

The virtual full is enabled automatically if the primary job has no scheduled full backups. You can schedule the virtual full on a specific day (or days) of week. This day indicates the day for which you want to synthesize full backup of the source VMs.

The virtual full does not necessary need to be scheduled on the day when the tape job runs. When the tape job starts, it synthesizes the source VMs state as they were on the chosen day. For example, you can set Friday as the virtual full day, and schedule the tape job to run on Saturday. The tape job will not run on Friday. On Saturday, the tape job will copy blocks of data to reconstruct the state of the VMs as they were on Friday (or, if no backup is available for Friday, the closest day preceding Friday).

You can customize the virtual full schedule according to your needs, although you cannot disable the virtual full if you back up the forever forward incremental backup chain. Also, you cannot create more than one virtual full a day.
Note: The primary job configuration must not have scheduled synthetic or active full backups. If it does, the virtual full will be disabled even if configured in the tape job.
How Virtual Full Backup Works

When the tape job archives the forever incremental backup chain, it copies the full backup from disk only once. After that, it copies new increments and creates virtual fulls regularly, or, if archiving of increments is disabled, creates only virtual fulls.

To create a virtual full backup, Veeam Backup & Replication uses a small temporary file of the VSB (Veeam Synthetic Backup) format. The VSB file does not contain backup data; it contains pointers to data blocks inside files of the backup chain on disk that are required to build a full backup as for the needed day. Using these pointers, the tape job detects these blocks and writes them to tape.

To create a virtual full backup, the tape job performs the following operations:

1. On the day the tape job runs, it creates a VSB file and stores it on the backup repository, next to restore points in the backup chain.
2. According to the VSB file pointers, the tape job detects what backup chain and what data blocks on disk are required to synthesize a full backup, and writes these blocks to tape as a full backup file (.vbk).
3. At the end of the tape job session, the VSB file is removed from the backup repository.

For example:

- The primary backup job creates an increment every day.
- The tape job is scheduled on Saturday with a virtual full on Friday.

On Saturday, the tape job picks data blocks from the full backup on Tuesday and the subsequent increments up to Friday. Using these blocks, the tape job synthesizes a virtual full that represents the VM state as of Friday.
Note: If the primary backup chain contains a full backup that was created on the virtual full day (for example, an active full backup created manually), the tape job will copy it and will not create a virtual full.
Virtual Full Intervals

When the tape job needs to create a new virtual full, it analyzes the tape archive and detects the date of the last virtual full on tape. To create a new virtual full, the tape job needs restore points that were created in the following interval:

- The start of the interval is midnight after the last virtual full was created (the end of tape writing session).
- The end of the interval is midnight after the virtual full day.

To synthesize a new virtual full, the tape job needs at least one increment created in this interval. If there are many increments, the tape job builds a virtual full up to the most recent increment within the interval.

Missing Source Backups

The source chain may not contain an increment on the virtual full day. In this case, the tape job uses a backup that is closest to the virtual full day within the virtual full interval. For example, if the source backup closest to the virtual full day was on Tuesday, the tape job will synthesize a virtual full that represents the VM state as of Tuesday.

The source chain may have missing backups because of the following reasons:

- The primary job does not run on the virtual full day.
- The tape job has multiple primary jobs scheduled on different days. Some of the primary jobs do not create a backup on the virtual full day.
- The primary job fails to produce increments for a number of days, for example, because of a hardware breakdown, network inaccessibility or if the primary job was disabled by the user for some time.
- Some VMs in the primary job have corrupted backups. The tape job will use the last valid backups for these VMs and create the virtual full up to the latest valid restore point.

No Backups in the Virtual Full Interval

The primary job may not produce any backups after the previous full backup day. In this case, the tape job will not create a virtual full for this period.
The virtual full cannot be forced before it's scheduled day. For example, if you start the tape job manually off-schedule, it will not create the virtual full if the virtual full day is in future.
Tape Parallel Processing

If your tape library has multiple drives, you can use drives simultaneously for writing data to tape. This option is useful if you have a lot of tape jobs running at the same time or you have a lot of data that must be written to tape in a limited backup window.

Note: You cannot enable parallel processing for GFS media pools.

To process the tape data parallely, you can split the data across drives in 2 ways:

- Parallel processing for tape jobs
- Parallel processing for source chains of one (or more) tape jobs

Processing Tape Jobs Simultaneously

When you process tape jobs parallely, the media pool assigns a drive to each running tape job. The media pool can use the predefined maximum number of drives and process the equal number of tape jobs simultaneously. For example, if you set 3 drives as the maximum, you can process up to 3 tape jobs at the same time. If you have more jobs running at the same time, they are queued. When one of the jobs finishes and releases its drive, the first queued job takes the drive.

This option is available for backup to tape and file to tape jobs.

For example:

- You set the maximum number of drives to 3.
- 4 tape jobs start at the same time.

The tape jobs start, and jobs A, B and C occupy 3 drives to write data to tape. The Tape job D is queued and waits. When one of the jobs finishes and releases its drive, the Tape job D takes the drive and starts writing data.

Processing Backup Chains Simultaneously

When you select processing backup chains parallely, the media pool processes several primary jobs simultaneously. If the primary jobs produce per-VM backups, the media pool processes several per-VM backup chains simultaneously. For more information about per-VM backup files, see Per-VM Backup Files section in Veeam Backup & Replication User Guide.
This option is available for backup to tape jobs only.

For example:

- You set the maximum number of drives to 3.
- Tape job A has 4 primary jobs.

Tape job A starts, and occupies 3 drives to process 3 primary jobs. The fourth primary job is queued and waits. When one of the drives is released, the fourth primary job takes the drive and starts writing data.

If another tape job starts, it will be queued and wait until Tape job A finishes.

If a tape job has only 1 primary job, it is processed as 1 source.

For example:

- You set the maximum number of drives to 3.
- Tape job A has 1 primary job; Tape job B has 3 primary jobs. The tape jobs starts at the same time.

Tape job A occupies Drive 1. Tape job B occupies 2 other available drives and processes 2 primary jobs. Tape job A finishes and releases Drive 1, the third primary job from the Tape job B occupies Drive 1.
Note: If the media pool is configured to fail over to another library in case all tape drives are busy, only tape jobs can use drives of the next library. You cannot split source backup chains within one job across libraries. For more information about library failover, see Tape Library Failover.
Media Sets Created with Parallel Processing

With parallel processing, a separate media set is opened per each drive used.

**Note:** The media pool must have an available tape for each drive.

The media sets are opened according to media set options configured for the media pool:

- Parallel processing with Do not create, always continue using current media set option
- Parallel processing with Create new media set for every backup session option
- Parallel processing with Daily at option

You can edit the media pool settings at any time, and increase or reduce the maximum number of drives:

- If you reduce the number or drives, the media pool will use fewer drives for the next writing session. The media set(s) that become excessive will be closed.
- If you increase the number of drives, the media pool will open new media set(s) per each added drive. Further, the media pool will use these media sets according to rules described above.

**Tip:** When multiple media sets open simultaneously, they may have identical sequence number and time of creation. To distinguish between the media sets easily, use the %id% variable in the media set name. This variable is added to the media set name by default.

Parallel Processing with Do not Create, Always Continue Using Current Media Set Option

When the media pool is set to the **Do not create, always continue using current media set** option, a media set is opened per each drive during the first tape session. The next time a tape job starts, it chooses a tape that has most free space, and appends data to it.

For example, you set the maximum number of drives to 3. The tape jobs that are first to run start 3 media sets. The following tape sessions continue these 3 media sets appending data to them.

Parallel Processing with Create New Media Set for Every Backup Session Option
When the media pool is set to the **Create new media set for every backup session** option, a media set is opened per each drive for every writing session. When the jobs run the next time, they open a number of media sets anew.

Each media set uses a free tape. Note that this configuration is the most tape-consumptive.

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**Parallel Processing with Daily at Option**

When the media pool is set to **Daily at** option, a number of media sets (per each drive) is opened on the scheduled day. If tape jobs run twice or more before the scheduled day, they continue these media sets — in this case, the jobs use tapes that have most free space first.
Enabling Tape Parallel Processing

To enable the tape parallel processing, go to the Options step of the New Media Pool wizard. For details, see Step 6. Add Optional Media Pool Settings.
VM Backup to Tape

To back up data to tape, you need to create and run tape jobs. The backup to tape job is a dedicated job that archives to tape Veeam backups that were produced by Veeam backup jobs.

When a backup to tape job runs, it does not create new backups: it locates already existing backups and copies them from backup repository to tape. You need to set the source of the tape job: jobs and/or backup repositories.

Jobs as Source

The following jobs can be primary for tape jobs:

- VMware backup jobs
- Hyper-V backup jobs
- VMware backup copy jobs
- Hyper-V backup copy jobs
- Windows Agent backup jobs
- Linux Agent backup jobs
- Windows Agent backup copy jobs
- Linux Agent backup copy jobs.

When the tape job starts on its schedule, it picks the restore points that were produced by the primary jobs in period since the last tape job run. If you change the configuration of the primary jobs, the tape job is updated automatically: it adds new VMs to the list of VMs to archive or stops archiving VMs that were removed from primary jobs.

The primary jobs may use any backup method:

- Forever forward incremental backup method
  
  To back up the forever forward incremental chains to tape, the tape job uses the virtual full. The virtual full creates a synthetic full backup on tape regularly (for example, once a week) and splits the chain into short series of tapes which is more convenient for restore. For more information, see Virtual Full Backup.

  If the primary job is backup copy job, keep in mind that the last restore point of the backup copy job stays active until the next restore point is created. The tape job does not copy such active points, because they may be updated. For this reason, the backup chain on tape will be always one restore point shorter than on disk.

- Forward incremental backup method
  
  When the tape job backs up the forward incremental chain to tape, it creates a copy of the disk backup chain.

- Reverse incremental backup method
  
  The last backup in the reverse incremental backup chain is always the full backup. If the source backup chain is reverse incremental, the tape job will copy the full backup each time the tape job runs. The increments are skipped.

Backup Repositories as Source

When you add a repository as source to tape job, the tape job constantly scans the selected repository (or repositories) and writes the newly created backups to tape. The tape job monitors the selected repository in a background mode. You can set explicit backup windows for the tape job. In this case,
the tape job will start on the set time and archive all new restore points that were created in period since the last job run.

If you create or remove backup jobs that use this repository, or if you change the configuration of such backup jobs, you do not need to reconfigure the tape job that archives the repository.

**Mixed Jobs**

To one tape job, you can link an unlimited number of sources. You can mix primary jobs of different type: backup and backup copy, and of different platform (VMware, Hyper-V, Windows Agent or Linux Agent). You can add jobs and repositories as source to the same tape job.

| Important! | The tape job looks only for the Veeam backups that are produced by backup jobs running on your console. Other files will be skipped. |

Note that to back up files, you need to configure file to tape job. For more information, see File Backup to Tape.

**Linking Primary Jobs**

You can add primary jobs to tape jobs at any moment: when you create a tape job, or later. Adding primary jobs is not obligatory when you create a tape job: you can create an "empty" job and use it as a secondary destination target. When you link jobs, the tape job processes them in the same way as the jobs added with the Tape Job Wizard. For more information, see Linking Backup Jobs to Backup to Tape Jobs.
How VM Backup to Tape Works

When Veeam Backup & Replication executes a backup to tape job (started manually or on schedule), it performs the following operations:

1. The backup to tape job addresses the Backup Catalog in the Veeam Backup & Replication database to detect backups that match the job criteria.
2. The files are queued for archiving.
3. Veeam Backup & Replication connects to the Data Movers and starts the data transfer process.
4. The source Data Mover retrieves data from the backup repository and target Data Mover sends data to tape.
5. The tape job addresses the media pool that is set for this job as target. The media pool allots tapes for writing data according to the following configuration options:
   - Tapes consumption
   - Media sets
   - Tape retention.
6. While tape recording is performed, Veeam Backup service updates data in the Backup Catalog and Tape Catalog in Veeam Backup database. The Veeam Backup console displays refreshed information about backups archived to tape and shows job statistics.
Creating Backup to Tape Jobs

To archive backups to tape, you should create a backup to tape job using the New Backup To Tape Job wizard. This section will guide you through all steps of the wizard and provide explanation on available options.

With this wizard, you can create a backup to tape job or a GFS job.

To create a backup to tape job, follow the next steps:

Before You Begin

Before you configure a backup to tape job, complete the following prerequisites:

- You must have Veeam Backup & Replication Enterprise license or higher is installed on the Veeam backup server.
- You must check configuration of primary backup job(s). Tape jobs have the following requirements for the restore points to keep setting:
  - A primary job with forever forward incremental chain must keep not less then 3 restore points on disk.
  - A primary job with forward incremental chain must keep not less then 3 restore points on disk.
  - A primary backup copy job must keep not less then 4 restore points on disk.
  - A reverse incremental chain has no required minimum.
- You must configure one or more simple media pool with the necessary media set and retention settings.
- You must load tapes to the tape device and configure the target media pool so that it has access to them. If the media pool has no available tape, the tape job will wait for 72 hours and then terminate.

Mind the following limitations:

- The backup to tape job processes only VBK (full backups) and VIB files (forward incremental backups).
- If you back up to tape a reverse incremental chain, the tape job will always copy the full backup. Reverse incremental backups (VRB) are skipped from processing.
- Microsoft SQL Server log files (VLB) are skipped from processing.

Step 1. Launch the New Backup To Tape Job Wizard

To run the New Backup to Tape Job wizard, do either of the following:

- On the Home tab, click Tape Job and select Backups.
- Open the Backup & Replication view, right-click the Jobs node and select Tape Job > Backups to Tape.

Step 2. Specify Job Name and Description

At the Name step of the wizard, you should define basic settings for the created backup to tape job.

1. In the Name field, enter a name for the created job.
2. In the Description field, enter a description of the created job. The default description contains information about the user who created the job, date and time when the job was created.
Step 3. Choose Backups to Archive

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.

If you choose to archive data from backup repositories, the backup to tape job will process only the backups that were created with backup jobs configured on this Veeam backup server. Imported backups and configuration backups will be skipped from processing.

To learn more about sources to tape jobs, see **VM Backup to Tape**.

**Tip:** This step is optional. You can create a backup to tape job without source. You can add the source later, or you can link this job to a backup job. For more information, see **Linking Backup Jobs to Backup to Tape Jobs**.
The total size of full backups added to the backup to tape job is displayed in the **Full** field. The total size of incremental backups added to the backup to tape job is displayed in the **Incremental** field.

To remove a backup from the list, select it and click **Remove** on the right.

### Selecting Backup Chains to Archive

On the first run, the tape job can copy all restore points or only the latest backup chain. This option is useful if the source backup job or the source backup repository has several backup chains. The backup chain here means a full backup file plus a set of incremental backup files following it.

To select what backup files you want to archive:

1. Click **Add** and select **Backup jobs** or **Backup repositories**.
2. Select the necessary backup job or repository you want to add to the tape job.
3. Veeam Backup & Replication will display a warning informing about backup chain options. Click **Latest** to archive only the latest backup chain to tape. This option lets you have only the latest restore points written to tape and use less tape for data archiving. Click **All** to archive all available backup files.

This option selects what backup chain will be copied on the first run of the job. You can instruct the job to copy only the latest backup chain on every tape job run. This option is available in the advanced settings of the job. For more information, see **Advanced Settings**.
Step 4. Choose Media Pool for Full Backups

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

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

   You can select a simple media pool or a GFS media pool. Depending on the selected type, the job schedule will change to simple or GFS accordingly.

**Tip:** If you have not previously created a media pool with the required settings, you can click the **Add New** button and create a new media pool or a GFS media pool without closing the job wizard. For more details, see [Creating Simple Media Pools](#) or [Creating GFS Media Pools](#).
2. You can configure schedule for virtual full backup. This option is available only if you selected a simple media pool.

If the primary job produces a forever incremental backup chain or is a backup copy job, Veeam Backup & Replication will periodically create a virtual full backup. You can configure the full backup schedule at this step of the wizard. The virtual full cannot be switched off; however, it is disabled automatically if the primary job periodically creates active full or synthetic full backups.

The virtual full does not depend on the job settings for incremental backups. If you enable the virtual full for the job, it will be created in any case, no matter whether you enable or do not enable incremental backups. To more information, see Virtual Full Backup.

To configure the virtual full schedule, click Schedule and select the necessary scheduling options.
Step 5. Choose Media Pool for Incremental Backups

This step is available only if you selected a simple media pool as target for full backups.

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.

Veeam Backup & Replication allows you to choose different media pools for full backups and incremental backups. This can be required if you use different media set or retention settings for archiving full backups and increments.

Tip: If you have not previously created a media pool with the required settings, you can click the Add New button and create a new media pool without closing the job wizard. For more details, see Creating Simple Media Pools.
Step 6. Specify Archiving Options

At the Options step of the wizard, specify archiving and media automation options. The options are different for simple backup to tape jobs and GFS tape jobs:

- Options for Backup to Tape Job
- Options for GFS Tape Job

Options for Backup to Tape Job

This step of the wizard is available if you selected a simple media pool at the Full Backup step of the wizard.

1. Select the Eject media upon job completion check box if the tape should be automatically ejected from the tape drive after the job successfully finishes. The ejected tapes are placed into a free tape device slot. Note that if the job started and failed, the tape will remain in the drive.

   This option does not prevent the tape job from appending data to this tape. If not configured otherwise in media pool settings, this tape will be placed into a drive on the next tape job run.

2. Select the Export current media set upon job completion check box if you want to pull out the tapes with the current media set from the tape device, for example, to move to a storage location. The tape device will eject the tapes that belong to the current media set when the media set is closed.

   If you want to export tapes on specific days only (for example, every Saturday), click Days and schedule export on the necessary days.

   Note that with this option selected, a new media set is started after each export.

Click Advanced to configure the advanced job options.
Options for GFS Job

This step of the wizard is available if you selected a GFS media pool at the Full Backup step of the wizard.

1. Select the **Eject media upon job completion** check box if the tape should be automatically ejected from the tape drive and placed into a free tape device slot when the job finishes. This option does not prevent the tape job from appending data to this tape. If not configured otherwise in media pool settings, this tape will be placed into a drive on the next tape job run.

2. Select the **Export current media set upon job completion** check box if you want to pull out the tapes with the current media set from the tape device, for example, to move to a storage location. The tape device will eject the tapes that belong to the current media set.

   Click **Media sets** and select the media sets that you want to export.

Click **Advanced** to configure the advanced job options.
Step 7. Specify Advanced Job Settings

You can specify the following advanced settings for the backup to tape job:

- Notifications Settings
- Advanced Settings

Notifications Settings

At the **Notifications** tab, you can specify notification settings for the backup to tape job.

At the **Options** step of the wizard, click **Advanced**. Then select the **Notifications** tab.

Select the **Send email notifications to the following recipients** check box if you want to receive notifications about tape job status. In the field below, specify a recipient’s email address. You can enter several addresses separated by a semicolon.

**Important!**

To receive notifications about tape jobs status, you must enable general email notifications in Veeam Backup & Replication. For more information, see **Specifying Email Notification Settings** section in Veeam Backup & Replication User Guide.

You can choose between the following options:

- **Use global notification settings**: Veeam Backup & Replication will notify you according to global email notification settings specified for the Veeam backup server.

- **Use custom notification settings specified below**: you can specify notification settings for tape jobs.

  In the **Subject** field, specify a notification subject. You can use the following variables in the subject:
  
  - **%Time%**: the time when the tape job finished,
  - **%JobName%**: the name of the tape job,
%TapeCount%: the number of tapes used for the tape job session,
%JobResult%: the job result,
%VmCount%: the number of VMs in the job,
%Issues%: the number of VMs in the job processed with Warning or Failed status.

Select the occasions on which you want to receive email notifications:

- **Notify on success**: Veeam Backup & Replication will notify you if the tape job finishes successfully,
- **Notify on warning**: Veeam Backup & Replication will notify you if the tape job finishes with a warning,
- **Notify on error**: Veeam Backup & Replication will notify you if the tape job fails,
- **Notify when waiting for tape**: Veeam Backup & Replication will notify you if the tape job cannot start because there are no available tapes.
Tip: After you specify necessary settings for the tape job, you can save them as default settings. To do this, click **Save as Default** at the bottom left corner of the **Advanced Settings** window. When you create a new backup to tape job, Veeam Backup & Replication will automatically apply the default settings to the new job.

### Advanced Settings

At the **Advanced** tab, you can select what backups from the backup chain to copy, enable hardware compression or specify custom scripts that you want to run before and/or after the backup to tape job.

At the **Options** step of the wizard, click **Advanced**. Select the **Advanced** tab.

1. [Not available for GFS tape jobs] Select the **Process latest full backup chain only** check box if you want to copy only the last backup chain with each tape job run. The source backup chain consists of a full backup (active or synthetic) and subsequent increments. If you disable this option, the tape job will back up all restore points that are not on tape.
2. Disable the **Use hardware compression when available** check box.
3. Select the **Run the following script before the job** and/or **Run the following script after the job** check boxes and click **Browse** to choose executable file(s).

You can select to execute pre- and post-job actions after a number of job sessions or on specific week days.

- If you select the **Run every... backup session** option, specify the number of the job sessions after which the script(s) must be executed.
- If you select the **Run on selected days only** option, click **Days** and specify week days on which the script(s) must be executed.
After you specify necessary settings for the tape job, you can save them as default settings. To do this, click **Save as Default** at the bottom left corner of the **Advanced Settings** window. When you create a new backup to tape job, Veeam Backup & Replication will automatically apply the default settings to the new job.

### Step 8. Define the Job Schedule

At the **Schedule** step of the wizard, you can define a schedule for the job to run on a regular basis. The schedule settings are different for simple backup to tape jobs and GFS tape jobs:

- **Schedule for Backup to Tape Job**
- **Schedule for GFS Tape Job**

#### Schedule for Backup to Tape Job

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.
You can define the following scheduling settings for the job:

- You can choose to run the job at specific time on defined week days, monthly and with specific periodicity.
- You can schedule the backup to tape job when a corresponding backup job completes. To do so, select the After this job option and choose the preceding backup job from the list.

**Note:** The After this job function will only start the tape job if the primary is started automatically by schedule. If the primary job is started manually, jobs chained to it will not be started.

- You can schedule the tape job to periodically check the jobs that you have selected as primary for new backups and archive new backups to target media. To do so, select the As new backup files appear option. If this option is selected, the backup to tape job will constantly remain in the idle state, monitoring for new backups to appear. As soon as new backups are created, the job will start archiving these backup to tape.

  If necessary, you can define the time interval during which the backup to tape job must not archive data. These can be hours when backup repositories are busy with other tasks (backup jobs writing to repositories or backup copy jobs reading from repositories). To define prohibited time for the backup to tape job, click the Schedule button and define the time when the job is allowed and prohibited to run.

If you have scheduled the job to run at the specific time daily or monthly, consider configuring wait timeout value. Select the If some linked backup jobs are still running, wait for up to ... minutes check box and specify the new timeout. When a backup to tape job starts, Veeam Backup & Replication checks the status of the primary jobs. If a primary job is still writing data to the source repository, the backup to tape job will wait for the specified time interval.

If the timeout is disabled, the backup to tape job will terminate without waiting for the backup job to complete.

The timeout option is unavailable if you schedule the backup to tape job to run after a backup job or if you schedule the backup to tape job to start when new backups appear.

Sometimes, the primary job may start when the tape job is still running. This may cause a conflict if the primary job needs to perform the following operations:

- Merge of backup files
- Reverse incremental backup transformation
- Compact of full backup file.

By default, the primary job has priority. In this case, the tape job terminates with error and no data is written to tape. Select the Prevent this job from being interrupted by primary backup jobs option if you want to give the tape job a higher priority. If this option is selected, the tape job will not terminate and will finish writing the data. If the primary job needs to perform the listed above operations, it will wait for the tape job to finish. Note that in this case the primary job may finish with a significant delay.
Schedule for GFS Job

This step of the wizard is available if you selected a GFS media pool at the Full Backup step of the wizard.

Click Schedule to select days for each media set. The GFS job starts at 00:00 on the selected day.

Tip: After you specify necessary schedule settings, you can save them as default. To do this, click Save as Default at the bottom left corner of the Archival Schedule window. When you create a new GFS job, Veeam Backup & Replication will automatically apply default settings to the new job schedule.

Sometimes, the primary job may start when the tape job is still running. By default, the primary job has priority. In this case, the tape job terminates with error and no data is written to tape. Select the Prevent this job from being interrupted by primary backup jobs option if you want to give the tape job a higher priority. If this option is selected, the primary job will wait until the tape job finishes. Note that the primary job may start with a significant delay.
Step 9. Finish Working with the Wizard

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.
Linking Backup Jobs to Backup to Tape Jobs

Veeam Backup & Replication provides two options for linking backup jobs to backup to tape jobs:

- If you already have backup jobs configured, you can choose the necessary jobs in the **Backup to Tape Job Wizard**. For details, see Creating Backup to Tape Jobs.
- Alternatively, you can point a backup job to an existing backup to tape job using the **Backup Job** wizard.

To point a backup job to an existing backup to tape job, perform the following steps:

1. Open the backup job settings and navigate to the **Storage** step. Select the **Configure secondary destination for this job** check box.

2. At the **Secondary Target** step, click **Add** and choose a backup to tape job to which the backup job should be linked.
3. Save settings. Veeam Backup & Replication will automatically update backup files settings of the chosen backup to tape job.
GFS Backup to Tape

The GFS tape job creates yearly archive for the source VMs by the GFS scheme. The GFS archive includes one yearly backup and a number of weekly, monthly and quarterly backups.

The GFS job starts periodically and writes to tape a full backup. Depending on the schedule, the backup is stored as weekly, monthly, quarterly or yearly. To distinguish between these periods, the GFS media pool has 4 pre-defined media sets: weekly, monthly, quarterly and yearly. The job runs on days that are set in the job schedule for each period, for example:

- Every Sunday for the weekly backup
- Every 1st Sunday of each month for the monthly backup
- Every 1st Sunday of each quarter for the quarterly backup
- On 1st Sunday in January for the yearly backup.

For each media set, you can set the overwrite protection period. For example, the weekly backups must be stored for 4 weeks, and the first can be deleted after the job creates the monthly backup. The yearly backup must be stored for a year until it is replaced by the next yearly backup. You can set the retention that complies with your organization’s backup storage policy and meets your storage capacity.

If the schedule for backup periods overlap, only the backup for the media set with the longest retention will be archived. For example, if “the first Sunday of January” is the date for the monthly, the quarterly and the yearly backup, only the yearly backup will be stored, and the monthly and the quarterly backups will be skipped.

You can manually create a restore point for any backup period at any time with the Active full option. Veeam will copy or synthesize the most recent full backup possible for the selected period.
How GFS Backup to Tape Works

When Veeam Backup & Replication executes a GFS job, it performs the following operations:

1. At 00:00 of the day set in the GFS job schedule the GFS job starts and checks periodically if the primary job created a backup:
   - If the primary job creates a full backup, the GFS job copies it.
   - If the primary job creates an incremental backup, the GFS job synthesizes a virtual full backup.
   - If no backup appears in 24 hours, the GFS job looks for the most recent restore point available. If it is a full backup, the GFS job copies it. If it is an increment, the GFS job uses it to synthesize a virtual full backup.

2. The GFS job connects to the Data Movers and copies the data. The source Data Mover retrieves data from the backup repository and the target Data Mover sends data to tape.

3. The target GFS media pool allots tapes according to rules of the corresponding media set.

4. While tape recording is performed, Veeam Backup service updates data in the Backup Catalog and Tape Catalog in Veeam Backup database. The Veeam Backup console displays refreshed information about backups archived to tape and shows job statistics.

Note the following:

- The GFS job copies only new restore points. If the primary job did not create a new point after the last GFS job run, the GFS job will not copy anything to tape. For example, if you want weekly backups in the tape GFS archive, make sure that the primary job runs at least once a week.

- When you add a primary job to a GFS job, the GFS job does not copy existing restore points. The GFS job will copy only the restore point created on the day when the GFS job was linked to the primary job or new restore points created later.

- If the primary job creates more than one full backup in 24 hours, the tape job will copy only the first one.

- If the restore point is available but locked, the GFS job will wait for this restore point to become available for up to 7 days.

- If you stop the tape job manually, it will start again at 00:00 of the next scheduled day.

- If there is a technical problem, for example, the tape library is offline, or the backup server is down, the GFS job will not run. When the problem is fixed, the GFS job will archive two most recent missed full backups for each media set.

- If the GFS tape job was disabled manually for some period, it will skip all backups for this period after it is resumed.

- If the GFS job failed for some reason, it will try to restart every hour for 48 hours.
Creating GFS Tape Jobs

To create a GFS archive on tape, you need to create a GFS media pool and target a backup to tape job to it. Technically, a GFS tape job is a variant of backup to tape job. When you select a GFS media pool as target, the job schedule automatically changes to the GFS mode. For details, see Creating Backup to Tape Jobs.

As a source, you can use any backup job with any backup method: forever forward incremental, forward incremental or reversed incremental.

**Note:** Do not use backup copy jobs with the GFS retention to create a GFS tape archive. The tape job do not archive the GFS restore points from disk.
Viewing Backups on Tape

After the backup to tape job completes, you can view the created archive on tape:

1. Open the **Backup & Replication** view.
2. Expand the **Backups > Tape** node and locate the backup archive under the name of a corresponding job.
File Backup to Tape

File to tape job allows you to back up to tape any Microsoft Windows or Linux files.

To back up Veeam backup files, you can use backup to tape jobs that are specially intended for this and offer more possibilities. However, you can archive backups as files using file to tape job.

The file to tape job compares the source files to the files stored in tape archive and copies the changes to tape. You can create both full and incremental backups of files on tape.

Veeam Backup & Replication supports file backup from any server which has been added as a managed server to the Veeam Backup console (that is, Windows or Linux server, including physical boxes). You can also archive files residing on NAS devices.

When planning file to tape jobs, consider that the job performance depends more on the number of files to back up then on the amount of data. For example, writing a large number of small files with overall size of 10GB with one job will take more time than writing one 10GB file. If your job contain an extra large number of files (like millions of files) with one job, the job performance will be affected significantly. To improve performance, consider creating several file to tape jobs.

Note: If the file to tape job fails to complete in 3 weeks, it is terminated by timeout.
Before You Begin

Before you configure a file to tape job, complete the following prerequisites:

- You must configure one or more simple media pool with the necessary media set and retention settings.
- You must load tapes to the tape device and configure the target media pool so that it has access to them. If the media pool has no available tape, the tape job will wait for 72 hours and then terminate.

System Requirements for Large Number of Files in Job

If the file to tape job will process large quantities of files, for example, more than 1 000 000 files in 1 000 folders, you must provide the following system resources:

- Backup server: 1.5 GB RAM per each 1 000 000 files
- Tape server: 800 MB RAM per each 1 000 000 files.

You must provide these resources in addition to general system requirements. For more information, see System Requirements.

| Important! | Do not back up to tape large number of files (over 1 000 000 files in 1 000 folders) in one tape job if your Veeam backup server uses Microsoft SQL Server Express edition. Processing a large number of files will result in considerable performance penalty. |
How File Backup to Tape Works

When Veeam Backup & Replication executes a file to tape job (started manually or on schedule), it performs the following operations:

1. The file to tape job detects files that match the job criteria.
2. The files are queued for archiving. The following scenarios are used:
   - If it is a first job run or a scheduled full backup, all selected files are queued for archiving.
   - If it is an incremental backup run, Veeam Backup & Replication addresses the Tape Catalog in the Veeam Backup & Replication database to detect if any data has been modified since the latest backup. Detected changes are queued for archiving.
3. Veeam Backup & Replication connects to the Data Movers and starts the data transfer process.
4. The source Data Mover retrieves data from the source servers and target Data Mover sends data to tape.
5. The tape job addresses the media pool that is set for this job as target. The media pool allots tapes for writing data according to the following configuration options:
   - Tapes consumption
   - Media sets
   - Tape retention
6. While tape recording is performed, Veeam Backup service updates data in the Tape Catalog in Veeam Backup database. The Veeam Backup console displays refreshed information about files archived to tape and shows job statistics.
Creating File to Tape Jobs

To write files to tape, you should create a file to tape job using the New File To Tape Job wizard. This section will guide you through all steps of the wizard and provide explanation on available options.

To create a file to tape job, follow the next steps:

Step 1. Launch the New File To Tape Job Wizard

To run the New File to Tape Job wizard, do either of the following:

- On the Home tab, click Tape Job and select Files.
- Open the Backup & Replication view, right-click the Jobs node and select Tape Job > Files to Tape.

Alternatively, you can:

- Open the Files view, browse to the necessary files, select the files and choose Add to Tape Job > New job from the ribbon menu.
- Open the Files view, browse to the required files, right-click the necessary files and choose Add to Tape Job > New job.

Step 2. Specify Job Name and Description

At the Name step of the wizard, you should define basic settings for the created file to tape job.

1. In the Name field, enter a name for the created job.
2. In the Description field, enter a description of the created job. The default description contains information about the user who created the job, date and time when the job was created.
Step 3. Choose Files and Folders to Archive

At the **Files and Folders** step of the wizard, select files and folders that you want to back up.

From the **Server** list, choose a machine on which the necessary files or folders reside. Click **Add** and browse to the file or folder that you want to back up. The selected item will be added to the list. To remove a file or folder from the list, select it and click **Remove**.

To back up files from a CIFS shared folder, click **Add** and specify the folder path. After you click OK, you will be prompted to enter the shared folder credentials.

If you include a folder to the job, all of the folder contents will be archived. If necessary, you can choose only specific files from the included folder. To do so, select a folder in the list and click **Edit**. In the **File Masks** window, specify names of files in the folder that should be archived. You can use exact file names of create name masks (for example, *.evt or *.pdf). Separate file names and masks with semicolons.
Step 4. Choose Media Pool for Full Backup

At the **Full Backup** step of the wizard, choose a media pool that will be used for archiving full backups of the selected files and create a schedule for full file backups.

1. From the **Media pool for full backups** list, choose a media pool that will be used for full file backups.
2. To schedule periodic creation of full file backups, select the **Run the full backup automatically** check box and specify the schedule according to which the job will create full file backups. If this option is disabled, you will need to start the job manually to create full backups of files.

Tip: If you have not previously created a media pool with the required settings, you can click the **Add New** button and create a new media pool without closing the job wizard. For more details, see **Creating Simple Media Pools**.

---

Step 5. Specify Media Pool for Increments

At the **Incremental Backup** step of the wizard, choose a media pool that will be used for archiving incremental backups of the selected files and create a schedule for incremental file backups.

1. From the **Media pool for incremental backup** list, choose a media pool that will be used for incremental file backups.
2. To schedule periodic creation of incremental file backups, select the **Run incremental backup automatically** check box and specify the schedule according to which the job will create incremental file backups. If this option is disabled, you will need to start the job manually to create incremental backups of files.

Tip: If you have not previously created a media pool with the required settings, you can click the **Add New** button and create a new media pool without closing the job wizard. For more details, see **Creating Simple Media Pools**.
Step 6. Specify Archiving Options

At the **Options** step of the wizard, specify archiving and media automation options:

1. Select the **Use Microsoft volume shadow copy (VSS)** check box to enable backup of files with the help if Microsoft shadow volume copies. This option enables backup of files locked by application and provides file-level quiescence. This possibility can only be applied for files from servers running under Windows Server 2003 or later Windows-family OSs.

2. Select the **Eject media upon job completion** check box if the tape should be automatically ejected from the tape drive and placed into a slot when the job finishes.

3. Select the **Export current media set upon job completion** check box if you want to pull out the tapes with the current media set from the tape device, for example, to move to a storage location. The tape device will eject the tapes that belong to the current media set when the media set is closed.

   If you want to export tapes on specific days only (for example, every Saturday), click **Days** and schedule export on the necessary days.

   Note that with this option selected, a new media set is started after each export.
Step 7. Specify Advanced Job Settings

You can specify the following advanced settings for the file to tape job:

- Notifications Settings
- Advanced Settings

**Tip:** After you specify necessary settings for the file to tape job, you can save them as default settings. To do this, click **Save as Default** at the bottom left corner of the **Advanced Settings** window. When you create a new file to tape job, Veeam Backup & Replication will automatically apply default settings to the new job.

**Notifications Settings**

At the **Notifications** tab, you can specify notification settings for the file to tape job.

At the **Options** step of the wizard, click **Advanced**. Then select the **Notifications** tab.

Select the **Send email notifications to the following recipients** check box if you want to receive notifications about tape job status. In the field below, specify a recipient’s email address. You can enter several addresses separated by a semicolon.

**Important!** To receive notifications about tape jobs, you must enable general email notifications in Veeam Backup & Replication. For more information, see **Specifying Email Notification Settings** section in Veeam Backup & Replication User Guide.

You can choose between the following options:

- **Use global notification settings:** Veeam Backup & Replication will notify you according to global email notification settings specified for the Veeam backup server.
• **Use custom notification settings specified below:** you can specify notification settings for tape jobs.

In the **Subject** field, specify a notification subject. You can use the following variables in the subject:

- `%Time%`: the time when the tape job finished,
- `%JobName%`: the name of the tape job,
- `%TapeCount%`: the number of tapes used for the tape job session,
- `%JobResult%`: the job result,
- `%VmCount%`: the number of VMs in the job,
- `%Issues%`: the number of VMs in the job processed with Warning or Failed status.

Select the occasions on which you want to receive email notifications:

- **Notify on success:** Veeam Backup & Replication will notify you if the tape job finishes successfully,
- **Notify on warning:** Veeam Backup & Replication will notify you if the tape job finishes with a warning,
- **Notify on error:** Veeam Backup & Replication will notify you if the tape job fails,
- **Notify when waiting for tape:** Veeam Backup & Replication will notify you if the tape job cannot start because there are no available tapes.
Advanced Settings

At the **Advanced** tab, you can enable hardware compression or specify custom scripts that you want to run before and/or after the file to tape job.

At the **Options** step of the wizard, click **Advanced**. Select the **Advanced** tab.

1. Select the **Use hardware compression if available** check box if the tape drive should compress data before writing it to tape.

   ![Advanced Settings](image)

   **Important!** Enable the hardware compression only if your tape library provides support for hardware compression.

2. Select the **Run the following script before the job** and/or **Run the following script after the job** check boxes and click **Browse** to choose executable file(s). You can select to execute pre- and post-job actions after a number of job sessions or on specific week days.

   - If you select the **Run every... backup session** option, specify the number of the job sessions after which the script(s) must be executed.

   - If you select the **Run on selected days only** option, click **Days** and specify week days on which the script(s) must be executed.
Step 8. Finish Working with the Wizard

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 file to tape job right after you complete working with the wizard. Click **Finish** to close the wizard.
### Edit File to Tape Job [Payroll Reports to Tape (Q1-Q2)]

**Summary**

You can copy the job settings below for future reference.

<table>
<thead>
<tr>
<th>Name</th>
<th>Media pool for full backups: File Backup</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Media pool for incremental backups: File Backup</td>
</tr>
<tr>
<td><em>Command line to start the job on backup server</em></td>
<td><em>C:\Program Files\Veeam\Backup and Replication\Backup\Veeam\Backup\Manager.exe</em> backup eac0af9d-6e1a-40b8-8d8f-1e1d92e050b</td>
</tr>
</tbody>
</table>

- **Run the job when I click Finish**

---

### Options

- **Previous**
- **Next**
- **Finish**
- **Cancel**
Viewing Files on Tape

After the file to tape job completes, you can view the created archive on tape:

1. Open the Files view and press F5 to refresh it.
2. Expand the Tape node and locate the files archive. Veeam Backup & Replication preserves the source hierarchy of folders for archived files. You can use the created archive for file recovery.
VM Restore from Tape to Infrastructure

Restoring a VM from tape with Veeam Backup & Replication is a lot like restoring a VM from disk. For example, you can choose a desired restore point, select the target location or change the configuration of the restored VM.

To restore a VM from tape, you can choose between the following options: restore directly to infrastructure or restore through a staging repository. To choose the needed option, select Restore directly to the infrastructure or Restore through the staging repository at the Backup Repository step of the Full VM Restore wizard. See Step 4. Choose Backup Repository for details.

Restore Directly to Infrastructure

When you restore VMs from tape directly to the infrastructure, the restore process publishes the VMs to the virtual infrastructure copying the VM data directly from tape. This option is recommended if you want to restore one VM or a small number of VMs from a large backup that contains a lot of VMs. In this case, you do not need to provide a staging repository for a large amount of data most of which is not needed to you at the moment.

This option is slow if you restore many VMs. The VMs are restored one by one: this requires a lot of rewinding of tape as tapes do not provide random access to data.

Restore Through Staging Repository

When you restore VMs from tape through a staging repository, the restore process temporarily copies the whole restore point to a backup repository or a folder on disk. After that Veeam starts a regular VM restore.

This option is recommended if you want to restore a lot of VMs from a backup as the disk provides a much faster access to random data blocks than tape.
Before You Begin

For restoring VMs from tape, you must provide the following system resources:

- Tape server: 200 MB RAM for each restored VM disk.
How Restoring VM from Tape to Infrastructure Works

Restore Directly to Infrastructure

For each VM, Veeam starts a separate restore job. However, you can select multiple VMs to restore: in this case, Veeam will queue the restore jobs and run them one after the other.

For restoring a VM directly to the infrastructure, Veeam Backup & Replication performs the following steps:

1. The VM from tape restore job checks the Backup Catalog in the Veeam Backup & Replication database to discover the tapes containing the needed backup files. If the tapes are offline, Veeam Backup & Replication prompts the user to insert the required tapes.
   Veeam needs to load and read the selected tapes for 3 times.
2. Veeam loads the tapes for the 1st time.
3. Veeam reads metadata and caches it on the tape server. This requires approximately 100Mb of disk space per 1TB of tape data for the default data block size.
4. Using the cached data, Veeam builds a map of data blocks. The map contains referenced to the data blocks of the VM you restore: the VM configuration file and the VM disks data.
5. Veeam loads the tapes for the 2nd time.
6. Veeam restores the VM configuration:
   - To restore to original location, Veeam synchronizes the VM configuration file up to the backup state.
   - To restore to another location, Veeam copies the VM configuration file and registers the VM on the target host.
7. Veeam loads the tapes for the 3rd time.
8. Veeam restores the VM disks. Multiple disks are restored parallely. Veeam reads the tape consequently and, using the map of data blocks, copies the VM disks data.

Restore Through Staging Repository
For restoring through a staging repository, Veeam Backup & Replication performs the following steps:

1. Veeam starts 2 jobs at background:
   - Backup restore job: temporarily restores the backup to the repository.
   - VM restore job: restores the VM to the infrastructure.

   The jobs start simultaneously. The VM restore job starts and remains pending until the backup restore completes.

2. The backup restore job checks the Backup Catalog in the Veeam Backup & Replication database to discover the tapes containing the needed backup. If the tapes are offline, Veeam Backup & Replication prompts the user to insert the required tapes.

3. The backup restore job reads the tapes consequently and copies the backup to the selected staging repository or folder.

4. When the backup is copied, Veeam registers it temporarily as an imported backup.

5. The backup restore job finishes.

6. The VM restore job receives information about the backup restored successfully and launches a standard VM restore process. For details, see Full VM Recovery section in Veeam Backup & Replication User Guide.

7. When the VM is successfully restored, the VM restore process finishes.

8. Veeam deletes the backup from the staging repository and from disk.
Restoring VM from Tape to Infrastructure

To restore VMs from tape to virtual infrastructure, use the Full VM Restore wizard. This section will guide you through all steps of the wizard and provide explanation on available options.

If the tapes are online in your tape device, Veeam Backup & Replication will get the needed data automatically. If the tapes are offline, Veeam Backup & Replication will list the names of the required tapes.

To restore VMs from tape, follow the next steps:

Step 1. Launch the Full VM Restore Wizard

To run the Full VM Restore wizard, do one of the following:

- Open the Backup & Replication view, expand the Backups > Tape node. Choose and expand the tape backup you need. Select the necessary VMs in the tape backup and click Restore Entire VM on the ribbon.
- Open the Backup & Replication view, expand the Backups > Tape node. Choose and expand the tape backup you need. Right-click the necessary VMs in the tape backup and choose Restore entire VM.

Step 2. Choose Virtual Machines to Restore

At the Virtual Machines step of the wizard, review VMs that should be restored. To add one or more VMs to the list, click Add VM and select where to browse for the machines:

- From infrastructure — browse the virtual environment and select VMs to restore. If you choose a VM container, Veeam Backup & Replication will expand it to a plain VM list. To quickly find a VM, use the search field at the top of the list: enter the VM name or a part of it and click the search button on the right or press [ENTER]. Make sure that VMs you select from the virtual environment have been successfully archived to tape at least once.
- From backup — browse existing backups and select VMs under backup to tape jobs. To quickly find VMs, use the search field at the bottom of the Select Objects window: enter a VM name or a part of it and click the Start search button on the right or press [ENTER].

Note: You can add VMs only of the same virtualization platform.

To remove a VM, select it in the list and click Remove on the right.
Step 3. Select a Restore Point

By default, Veeam Backup & Replication will restore VMs to their latest state archived to tape. However, if you want to restore a VM to an earlier state, select a VM in the list and click "Point" on the right. In the Restore Points section, select a restore point that should be used for full VM recovery.

If you have chosen to restore multiple VMs, you can select a different restore point for every VM specifically.
Step 4. Choose Restore Source

At the **Restore Source** step of the wizard, choose the restore mode:

- **Select Restore directly from tape** if you want to restore VMs without a staging repository. In this case, the restore job will read data directly from tape. Note that restoring VMs directly to the infrastructure may be slow if you restore a lot of VMs simultaneously.

- **Select Restore through a staging repository** if you want to temporarily copy the tape backup to a repository or a folder first. The restore job will copy the backup to the selected destination and launch a standard restore VM from disk process.

From the **Backup repository** list, select the repository that should be used as a temporary storage (staging area) for VM backup before the VM is restored to the virtual infrastructure.

You can also select a target folder on any server connected to Veeam Backup & Replication. To do so, choose the **Select folder** option from the **Backup repository** list and choose the location to which backups should be restored before full VM recovery.

If you choose to restore files to a shared folder, make sure that the account under which Veeam Backup Service runs has write permissions to the target folder. If the account does not have sufficient permissions, Veeam Backup & Replication will prompt you to enter credentials for the account that can be used for writing to the target folder.
Step 5. Specify Restore Mode and Other Recovery Options

Go through the remaining steps of the Full VM Restore wizard. The procedure is identical to full VM recovery. For more details, see Performing Full VM Restore section in Veeam Backup & Replication User Guide.
Backup Restore from Tape to Repository

This option allows you to copy VM backups from tape to repository. This is helpful if you need some backups on disk for later use, or also for VM guest OS files restore. You can restore full backups or incremental backups to a repository or any location of your choice. The restored backup is registered in the Veeam Backup & Replication console as an imported disk backup so that you can use it for any restore from disk scenario later on. For one restore session at a time, you can choose one restore point available on tape.
How Restoring Backup from Tape to Repository Works

For restoring VM backups to a repository or a folder on disk, Veeam Backup & Replication performs the following steps:

1. Veeam checks the Backup Catalog in the Veeam Backup & Replication database to discover the tapes containing the needed backup. If the tapes are offline, Veeam Backup & Replication prompts the user to insert the required tapes.

2. The backup restore job reads the tapes consequently and copies the backup to the selected repository or folder.

3. When the backup is copied, Veeam registers it as an imported backup.
Restoring Backups from Tape to Repository

To restore backups from tape, use the **Restore Backup from Tape to Repository** wizard. This section will guide you through all steps of the wizard and provide explanation on available options.

If the tapes are online in your tape device, Veeam Backup & Replication will get the needed data automatically. If the tapes are offline, Veeam Backup & Replication will list the names of the required tapes.

To restore files from tape, follow the next steps:

**Step 1. Launch the Restore Backup from Tape to Repository Wizard**

To run the **Restore Backup from Tape to Repository** wizard, on the **Home** tab, click **Restore** and choose **Tape > Restore Backups**.

Alternatively, you can:

- Open the **Backup & Replication** view, expand the **Backups > Tape** node. Select the necessary VMs in backup and click **Restore backup to Repository** on the ribbon.
- Open the **Backup & Replication** view, expand the **Backups > Tape** node. Right-click the necessary VMs in backup and choose **Restore backup from tape to repository**.

**Step 2. Choose VMs to Restore**

At the **Source** step of the wizard, select one or more VMs for which backup files should be restored. If you have chosen VMs to restore from archives on tape, the list of objects to restore will be populated with selected VMs.

To add one or more VMs to the list, click **Add VM** and select where to browse for the machines:

- **From vSphere Infrastructure** — browse the virtual environment and select VMs to restore. If you choose a VM container, Veeam Backup & Replication will expand it to a plain VM list. To quickly find a VM, use the search field at the top of the list: enter the VM name or a part of it and click the search button on the right or press [ENTER]. Make sure that VMs you select from the virtual environment have been successfully archived to tape at least once.
- **From backups** — browse existing backups on tape and select VMs under backup to tape jobs. To quickly find VMs, use the search field at the bottom of the **Select Objects** window: enter a VM name or a part of it and click the **Start search** button on the right or press [ENTER].

To remove a VM, select it in the list and click **Remove** on the right.
Step 3. Select a Restore Point

By default, Veeam Backup & Replication will restore backup with the latest state of the archived VM. However, if you want to restore a backup for the VM to an earlier state, select a VM in the list and click **Point** on the right. In the **Restore Points** section, select a restore point that should be used to restore VM backup.

**Note:**

If you choose a full backup point in the list, Veeam Backup & Replication will restore only this full backup. If you choose an increment, Veeam Backup & Replication will restore a chain consisting of a full backup and forward increments, necessary to restore VMs to the required point-in-time.

If you have chosen to restore multiple VMs, you can select a different restore point for every VM specifically.
Step 4. Choose Backup Destination

At the **Destination** step of the wizard, select where the backup files for the selected VMs should be restored:

- To restore VM backup files to a repository, select the **Backup repository** option and choose the necessary repository from the list.
- To restore VM backup files to the Veeam backup server, shared folder or to any other machine connected to Veeam backup server, select the **Server** option. Choose the necessary server from the list and specify path to the target folder in the **Path to folder** field.

If you choose to restore files to a shared folder, make sure that the account under which Veeam Backup Service runs has write permissions to the target folder. If the account does not have sufficient permissions, Veeam Backup & Replication will prompt you to enter credentials for the account that can be used for writing to the target folder.
Step 5. Finish Working with the Wizard

Review the settings and click **Finish** to restore selected VM backups.
Viewing Restored Backups

After backups are restored from tape, they are displayed as imported backups in the **Backup & Replication** view > **Backups** > **Imported**. You can use the restored to disk backup for regular data recovery, including full VM recovery, recovery of VM files, guest OS files recovery and other.
File Restore from Tape

You can restore files and folders that were previously archived with file to tape jobs. Restoring capabilities allows you to restore files to their original location or another server, preserving ownership and access permissions. The file restore process allows you to restore files to any restore point available on tape.
Before You Begin

If the tape backup contains a large quantity of files, for example, more than 1,000,000 files in 1,000 folders, you must provide the following system resources for restore:

- Backup server: 2.6 GB RAM per each 1,000,000 files.
How Restoring Files from Tape Works

When Veeam Backup & Replication restores files archived to tape, it performs the following operations:

1. Veeam Backup & Replication checks the Tape Catalog in the Veeam Backup & Replication database to discover the tapes containing the needed restore point of the files. If the tapes are offline, Veeam Backup & Replication prompts the user to insert the required tapes.
2. Veeam Backup & Replication connects to the Data Mover service deployed on a tape server.
3. The Data Mover copies the relevant files from the tapes to a chosen target location, same or new one.
4. Veeam Backup & Replication updates the Tape Catalog in the Veeam Backup database.
Restoring Files from Tape

To restore files backed up to tape, use the Files from Tape Restore wizard. This section will guide you through all steps of the wizard and provide explanation on available options.

If the tapes are online in your tape device, Veeam Backup & Replication will get the needed data automatically. If the tapes are offline, Veeam Backup & Replication will list the names of the required tapes.

Note: The Files from Tape Restore wizard allows you to restore files and folders archived to tape. You cannot restore VM guest OS files using this wizard. To restore VM guest OS files, you can restore a backup from tape to the backup repository and perform VM guest OS files restore. For more information, see Restoring Backups from Tape.

To restore files from tape, follow the next steps:

Step 1. Launch the Files from Tape Wizard

To run the Files from Tape wizard, open the Home tab and click Restore on the ribbon. Choose Tape > Restore Files.

Alternatively, you can:

- Open the Files view, expand the Tape node and browse to the necessary files on tape. Select the files and click Restore Files from Tape on the ribbon.
- Open the Files view, expand the Tapes node and browse to the necessary files on tape. Select the files and choose Restore files from tape.

Step 2. Choose Files to Restore

At the Objects to Restore step, choose files and folders that you want to restore.

Click Add and browse to the file or folder that should be restored. The selected item will be added to the list. To quickly find file or folder, use the search field at the top of the list: enter an object name or a part of it and click the search button on the right or press [ENTER].

If you have chosen files to restore in the Files view, the list of objects to restore will be populated with selected files.

To remove a file or folder from the list, select it and click Remove.
By default, Veeam Backup & Replication will restore the latest version of files available on tape. If you want to restore files from another restore point, select the necessary file and click **Backup Set**. In the list of available backup sets, select the necessary archiving session and click **OK**.

**Note:** When you restore an entire folder from tape, Veeam Backup & Replication restores all files that have ever existed in the folder and been archived to tape. To restore files in the folder, Veeam Backup & Replication scans the selected backup set and backup sets that were created previously. If a file is not found in the selected backup set, Veeam Backup & Replication will restore the most recent version of the file from a backup set preceding the selected backup set.
Step 3. Specify Restore Destination

At the **Destination** step of the wizard, specify destination where the archived files will be restored. You can use one of the following options:

- **Original location.** Use this option to restore a file to the location where the original file resides (or resided). This type of restore is only possible if the original machine is connected to Veeam Backup & Replication and powered on.

- **This server.** Use this option if you want to restore the file to the Veeam backup server, shared folder or to any other machine connected to Veeam backup server. From the server list, choose a machine to which files should be restored and specify path to the target folder.

If you choose to restore files to a shared folder, make sure that the account under which Veeam Backup Service runs has write permissions to the target folder. If the account does not have sufficient permissions, Veeam Backup & Replication will prompt you to enter credentials for the account that can be used for writing to the target folder.

When restoring files to a location other than original, Veeam Backup & Replication preserves the folder hierarchy. To restore files to the specified target folder without keeping the folder structure, clear the **Preserve folder hierarchy** check box.
Step 4. Specify Restore Options

At the **Options** step of the wizard, specify overwrite options in case the file already exists in the target folder:

- **Leave the existing file.** Select this option if you do not want to overwrite the existing file with the restored one.

- **Overwrite the existing file if older than the backed up file.** Select this option if you want to overwrite the existing file only if it is older than the restored file.

- **Always overwrite the existing file.** Select this option if you want to overwrite the existing file with the restored file in all cases.

Select the **Restore file and folder security** check box if you want the restored files to keep their original ownership and security permissions. In the opposite case, Veeam Backup & Replication will change security settings: the user account under which the Veeam Backup Service runs will be set as the owner of the restored objects, while access permissions will be inherited from the target folder to which the objects are restored.
Step 5. Finish Working with the Wizard

Review the settings and click **Finish** to restore selected files and folders.