

QSAN XReplicator

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# 1 Introduction

## 1.1 What is QSAN® Xreplicator™?

QSAN Xreplicator is an integrated software suite that ensures the security of all of the information on your PC. It can back up your documents, photos, email, and selected partitions, and even the entire disk drive, including operating system, applications, settings, and all of your data.

Backups allow you to recover your computer system should a disaster occur, such as losing data, accidentally deleting critical files or folders, or suffering a complete hard disk crash.

### Key features:

- Disk-level backup (p. 18)
- File-level backup (p. 19)
- Rescue bootable media (p. 57)

### Getting started

Learn how to protect your computer with two simple steps: "Protecting your system (p. 7)".

## 1.2 System requirements and supported media

### 1.2.1 Minimum system requirements

QSAN Xreplicator requires the following hardware:

- Processor Pentium 1 GHz
- 1 GB RAM
- 1.5 GB of free space on a hard disk
- QSAN NAS to use as backup storage
- CD-RW/DVD-RW drive or USB flash drive for bootable media creation
- Screen resolution is 1024 x 768
- Mouse or other pointing device (recommended)

Additionally, you need to have administrator privileges to run QSAN Xreplicator.

### 1.2.2 Supported operating systems

QSAN Xreplicator has been tested on the following operating systems:

- Windows 7 SP1 (all editions)
- Windows 8 (all editions)
- Windows 8.1 (all editions)
- Windows 10 (all editions)
- Windows Home Server 2011

QSAN Xreplicator also lets you create a bootable CD-R/DVD-R that can back up and recover a disk/partition on a computer running any Intel- or AMD- based PC operating system, including Linux®. Note that the Intel-based Apple Macintosh is not supported.

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*Warning! Successful recovery is only guaranteed for the supported operating systems. Other operating systems may become unbootable after recovery.*

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## 1.2.3 Supported file systems

**QSAN Xreplicator for home users supports:**

- FAT16/32
- NTFS
- Ext2/Ext3/Ext4 \*
- ReiserFS \*
- Linux SWAP \*

\* The Ext2/Ext3/Ext4, ReiserFS, and Linux SWAP file systems are supported only for disk or partition backup/recovery operations. You cannot use QSAN Xreplicator for file-level operations with these file systems (file backup, recovery, search, as well as image mounting and file recovering from images). You also cannot perform backups to disks or partitions with these file systems.

If a file system is not supported or is corrupted, QSAN Xreplicator can copy data using a sector-by-sector approach.

## 1.3 Installing QSAN Xreplicator

### Installing and activating QSAN Xreplicator

**To install and activate QSAN Xreplicator:**

1. Run the setup file.
2. If you accept the terms of both documents, click **Install**.  
QSAN Xreplicator will be installed on your system partition (usually C:).
3. When the installation is complete, click **Start application**. The QSAN Xreplicator activation window opens.
4. On the **Sign in** tab, enter your QSAN account credentials, and then click **Sign in**.  
If you don't have an QSAN account, go to the **Create account** tab, fill out the registration form, and then click **Create account**.

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*Note: You can skip this step if you have a 64-character serial number.*

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5. Enter your serial number, and then click **Activate**.  
To activate QSAN Xreplicator with a 16-character serial number, you need an Internet connection. The full 64-character serial number will be obtained and activated automatically.

### Recovering from an QSAN Xreplicator error

If QSAN Xreplicator ceased running or produced errors, its files might be corrupted. To repair this problem, you first have to recover the program. To do this, run QSAN Xreplicator installer again. It will detect QSAN Xreplicator on your computer and will ask you if you want to repair or remove it.

## Removing QSAN Xreplicator

To remove QSAN Xreplicator components:

1. Open the list of installed programs and applications.
  - Select **Start -> Settings -> Control panel -> Add or remove programs.**
  - If you use Windows Vista, select **Start -> Control panel -> Programs and Features.**
  - If you use Windows 7, select **Start -> Control Panel -> Uninstall a program.**
  - If you use Windows 8 or Windows 10, click the Settings icon, then select **Control Panel -> Uninstall a program.**
2. Select the component to be removed.
3. Depending on your operating system, click **Remove** or **Uninstall**.
4. Follow the instructions on the screen.

You may have to reboot your computer afterwards to complete the task.

## 1.4 Activating QSAN Xreplicator

To use QSAN Xreplicator, you need to activate it via the Internet. Without activation the product works for 30 days. If you do not activate it during that period, all the program functions become unavailable except the recovery.

If your computer is connected to the Internet, the product will be activated automatically.

## 1.5 Technical Support

For any assistance with QSAN Xreplicator and product updates, please refer to official support resources of your QSAN NAS device manufacturer.

## 2 Getting started

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### 2.1 User interface language

Before you start, select a preferred language for the QSAN Xreplicator user interface. By default, the language is set in accordance with your Windows display language.

#### To change the user interface language:

1. Start QSAN Xreplicator.
2. In the **Settings** section, select a preferred language from the list.

### 2.2 Protecting your system

#### To protect your system:

1. Back up your computer (p. 7).
2. Create bootable media (p. 8).

It is recommended to test the rescue media as described in Making sure that your rescue media can be used when needed (p. 59).

#### 2.2.1 Step 1. Backing up your computer

##### When should I back up my computer?

Create a new backup version after every significant event in your system.

Examples of these events include:

- You bought a new computer.
- You reinstalled Windows on your computer.
- You configured all system settings (for example, time, date, language) and installed all necessary programs on your new computer.
- Important system update.

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*To ensure you save a healthy state of a disk, it is a good idea to scan it for viruses before backing it up. Please use antivirus software for this purpose. Note this operation often takes a significant amount of time.*

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## How do I create a backup of my computer?

You have two options to protect your system:

- **Entire PC backup (recommended)**

QSAN Xreplicator backs up all your internal hard drives in disk mode. The backup contains the operating system, installed programs, system settings, and all your personal data including your photos, music, and documents. Refer to Backing up all data on your PC (p. 9) for details.

- **System disk backup**

You can choose to back up your system partition or the entire system drive. Refer to Backing up disks and partitions (p. 18) for details.

We do not recommend using nonstop backup as a primary way to protect your system, because the main purpose of this technology is protection of frequently changed files. For the safety of your system, use any other schedule. See examples in Examples of custom schemes (p. 26). Refer to Using QSAN Nonstop Backup for more details about the Nonstop Backup feature.

### To back up your computer:

1. Start QSAN Xreplicator.

2. On the sidebar, click **Backup**.

If this is your first backup, you will see the backup configuration screen. If you already have some backups in the backup list, then first click **Add backup**, and then click **Create new backup**.

3. Click the **Backup source** icon, and then select **Entire PC**.

If you want to back up your system disk only, then click **Disks and partitions**, and then select your system partition (usually C:) and the System Reserved partition (if any).

4. Click the **Backup destination** icon, and then select your QSAN NAS device.

5. Click **Back up now**.

**Result:** A new backup box appears in the backup list. To create a new version of the backup in future, select the backup box from the list, and then click **Back up now**.

## How many backup versions do I need?

In most cases, you need 2-3 backup versions of your entire PC contents or your system disk, with a maximum of 4-6 (see above for information about when to create backups).

Remember, the first backup version (the full backup version) is the most important. It is the biggest one, because it contains all data stored on the disk. Further backup versions (the incremental and differential backup versions) may be organized in different schemes. These versions contain only data changes. That's why they are dependent on the full backup version and why the full backup version is so important.

By default, a disk backup is created by using the incremental scheme. This scheme is optimal, in most cases.

## 2.2.2 Step 2. Creating bootable rescue media

### What is bootable media?

Bootable media is a product, such as a CD-R/RW or a USB flash drive, from which you can run QSAN Xreplicator when Windows cannot start. You can make a media bootable by using QSAN Media Builder.

## How do I create bootable media?

1. Insert a CD-R/RW or plug in a USB flash drive.
2. Start QSAN Xreplicator.
3. On the sidebar, click **Tools**, and then click **Rescue Media Builder**.
4. On the first step, select **QSAN bootable rescue media**.
5. Select the device to use to create the bootable media.
6. Click **Proceed**.

## How do I use bootable media?

Use bootable media to recover your computer when Windows cannot start.

1. Connect the bootable media to your computer (insert the CD or plug in the USB drive).
2. Arrange the boot order in BIOS so that your rescue media device (CD or USB drive) is the first device to be booted.

Refer to Arranging boot order in BIOS (p. 50) for details.

3. Boot your computer from the rescue media and select **QSAN Xreplicator**.

**Result:** Once QSAN Xreplicator is loaded, you can use it to recover your computer.

Refer to QSAN Media Builder (p. 57) for details.

## 2.3 Backing up all data on your PC

### What is an Entire PC backup?

An Entire PC backup is the easiest way to back up the full contents of your computer. We recommend that you choose this option when you are not sure which data that you need to protect. If you want to back up your system partition only, refer to Backing up disks and partitions (p. 18) for details.

When you select Entire PC as a backup type, QSAN Xreplicator backs up all your internal hard drives in disk mode. The backup contains the operating system, installed programs, system settings, and all your personal data including your photos, music, and documents.

The recovery from an Entire PC backup is also simplified. You only need to choose the date to which you want to revert your data. QSAN Xreplicator recovers all data from the backup to the original location. Note that you cannot select specific disks or partitions to recover and you cannot change the default destination. If you need to avoid these limitations, we recommend that you back up your data with an ordinary disk-level backup method. Refer to Backing up disks and partitions (p. 18) for details.

You can also recover specific files and folders from an Entire PC backup. Refer to Backing up files and folders (p. 19) for details.

If an Entire PC backup contains dynamic disks, you recover your data in partition mode. This means that you can select partitions to recover and change recovery destination. Refer to About recovery of dynamic/GPT disks and volumes (p. 48) for details.

### How do I create an Entire PC backup?

#### To back up the entire contents of your computer:

1. Start QSAN Xreplicator.
2. On the sidebar, click **Backup**.

3. Click **Add backup**, and then click **Create new backup**.
4. Click the **Backup source** icon, and then select **Entire PC**.
5. Click the **Backup destination** icon, and then select a destination for the backup.
6. [optional step] Click **Options** to set the options for the backup, including Schedule (p. 21), Scheme (p. 23), and Password protection (p. 29). For more information see Backup options (p. 20).
7. Click **Back up now**.

## 2.4 Backing up your files

To protect files such as documents, photos, music files, and video files, there is no need to back up the entire partition containing the files. You can back up specific files and folders and save them to your QSAN NAS device.

### To back up files and folders:

1. Start QSAN Xreplicator.
2. On the sidebar, click **Backup**.
3. Click the **Backup source** icon, and then select **Files and folders**.
4. In the opened window, select the check boxes next to the files and folders that you want to back up, and then click **OK**.
5. Click the **Backup destination** icon, and then select your QSAN NAS.
6. Click **Back up now**.

Refer to Backing up files and folders (p. 19) for details.

## 2.5 Recovering your computer

Please be aware that recovery of a system disk is an important operation. Before you start, we recommend that you read the detailed descriptions in the following Help topics:

- Trying to determine the crash cause (p. 38)
- Preparing for recovery (p. 38)
- Recovering your system to the same disk (p. 39)

Let's consider two different cases:

1. Windows works incorrectly, but you can start QSAN Xreplicator.
2. Windows cannot start (for example, you turn on your computer and see something unusual on your screen).

### Case 1. How to recover computer if Windows works incorrectly?

1. Start QSAN Xreplicator.
2. On the sidebar, click **Backup**.
3. From the backup list, select the backup that contains your system disk.
4. Depending on the backup type, click **Recover PC** or **Recover disks**.
5. In the opened window, select the backup version (the data state from a specific date and time).
6. Select the system partition and the System Reserved partition (if any) to be recovered.
7. Click **Recover now**.

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*To complete the operation, QSAN Xreplicator must restart your system.*

## Case 2. How to recover computer if Windows cannot start?

1. Connect QSAN bootable media to your computer, and then run the special standalone version of QSAN Xreplicator.  
Refer to Step 2 Creating bootable rescue media (p. 8) and Arranging boot order in BIOS (p. 50) for details.
2. On the Welcome screen, select **My disks** below **Recover**.
3. Select the system disk backup to be used for recovery. Right-click the backup and choose **Recover**.  
When the backup is not displayed, click **Browse** and manually specify the path to the backup.
4. At the **Recovery method** step, select **Recover whole disks and partitions**.
5. Select the system partition (usually C) on the **What to recover** screen. Note that you may distinguish the system partition by the Pri, Act flags. Select the System Reserved partition (if any), as well.
6. You may leave all settings of the partitions without changes and click **Finish**.
7. Check the summary of operations, and then click **Proceed**.
8. When the operation finishes, exit the standalone version of QSAN Xreplicator, remove the rescue media (if any), and boot from the recovered system partition. After making sure that you have recovered Windows to the state you need, restore the original boot order.

## 2.6 Recovering your files and folders

You can recover files and folders both from file-level and disk-level backups.

### To recover files and folders:

1. Start QSAN Xreplicator.
2. On the sidebar, click **Backup**.
3. From the backup list, select the backup which contains the files or folders that you want to recover.
4. On the right panel, click **Recover files**.
5. Select the backup version (the data state from a specific date and time).
6. Select the files and folders that you want to recover, and then click **Next**.
7. Select a destination on your computer for the recovered files/folders. You can recover data to its original location or choose a new one, if necessary. To choose a new location, click the **Browse** button.
8. To start the recovery process, click the **Recover now** button.

## 3 Basic concepts

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### 3.1 Basic concepts

This section provides general information about basic concepts which could be useful for understanding how the program works.

#### Backup and recovery

**Backup** refers to the making copies of data so that these additional copies may be used to **recover** the original after a data loss event.

Backups are useful primarily for two purposes:

- To recover an operating system when it is corrupted or cannot start (called disaster recovery). Refer to Protecting your system (p. 7) for more details about protecting your computer from a disaster.
- To recover specific files and folders after they have been accidentally deleted or corrupted.

QSAN Xreplicator does both by creating disk (or partition) images and file-level backups respectively.

#### Backup versions

Backup versions are the file or files created during each backup operation. The number of versions created is equal to the number of times the backup is executed. So, a version represents a point in time to which the system or data can be restored.

Backup versions represent full, incremental and differential backups - see Full, incremental and differential backups (p. 14).

The backup versions are similar to file versions. The file versions concept is familiar to those who use a Windows Vista and Windows 7 feature called "Previous versions of files". This feature allows you to restore a file as it existed on a particular date and time. A backup version allows you to recover your data in a similar way.

#### Backup file format

QSAN Xreplicator usually saves backup data in the proprietary tib format using compression. The data from .tib file backups can be recovered only through QSAN Xreplicator, in Windows or in the recovery environment.

QSAN Nonstop Backup uses a special hidden storage for data and metadata. The backed up data is compressed and split into files of about 1 GB. These files also have a proprietary format and the data they contain can be recovered only with the help of QSAN Xreplicator.

## Backup validation

The backup validation feature allows you to confirm that your data can be recovered. The program adds checksum values to the data blocks being backed up. During backup validation, QSAN Xreplicator opens the backup file, recalculates the checksum values and compares those values with the stored ones. If all compared values match, the backup file is not corrupted.

## Scheduling

For your backups to be really helpful, they must be as "up-to-date" as possible. Schedule your backups to run automatically and on a regular basis.

## Deleting backups

When you want to delete backups and backup versions you no longer need, please do it by using the tools provided by QSAN Xreplicator. Refer to Deleting backups and backup versions (p. 36) for details.

QSAN Xreplicator stores information on the backups in a metadata information database. Therefore, deleting unneeded backup files in File Explorer will not delete information about these backups from the database. This will result in errors when the program tries to perform operations on the backups that no longer exist.

## 3.2 The difference between file backups and disk/partition images

When you back up files and folders, only the files and folder tree are compressed and stored.

Disk/partition backups are different from file and folder backups. QSAN Xreplicator stores an exact snapshot of the disk or partition. This procedure is called "creating a disk image", or "creating a disk backup" and the resulting backup is often called "a disk/partition image" or "a disk/partition backup".

A disk/partition backup contains all the data stored on the disk or partition:

1. Zero track of the hard disk with the master boot record (MBR) (applicable to MBR disk backups only).
2. One or more partitions, including:
  1. Boot code.
  2. File system meta data, including service files, file allocation table (FAT) and partition boot record.
  3. File system data, including operating system (system files, registry, drivers), user data and software applications.
3. System Reserved partition, if any.
4. EFI system partition, if any (applicable to GPT disk backups only).

By default QSAN Xreplicator stores only the hard disk sectors that contain data. Furthermore, QSAN Xreplicator does not back up pagefile.sys under Windows XP and later and hiberfil.sys (a file that keeps RAM contents when the computer goes into hibernation). This reduces image size and speeds up image creation and recovery.

You can change this default method by turning on the sector-by-sector mode. In this case QSAN Xreplicator copies all hard disk sectors, and not only those that contain data.

## 3.3 Full, incremental and differential backups

**Note:** Incremental and differential backups may be unavailable in the QSAN Xreplicator edition that you use.

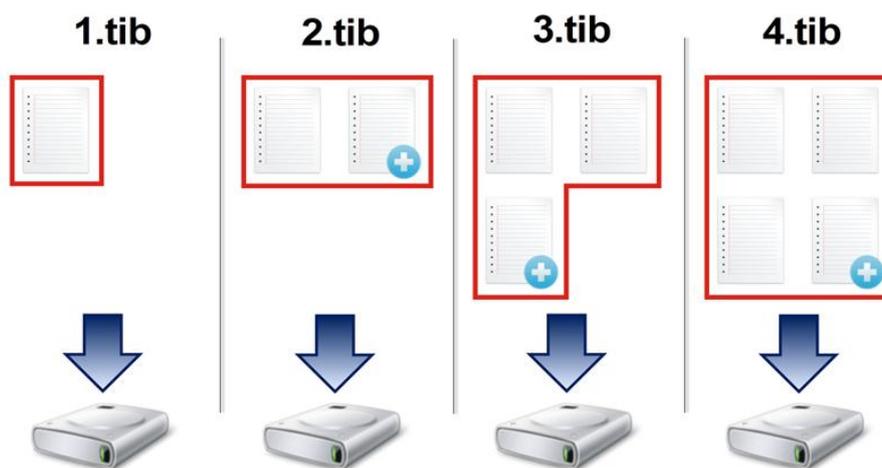
QSAN Xreplicator offers three backup methods:

### Full method

The result of a full method backup operation (also known as full backup version) contains all of the data at the moment of the backup creation.

**Example:** Every day, you write one page of your document and back it up using the full method. Xreplicator saves the entire document every time you run backup.

1.tib, 2.tib, 3.tib, 4.tib - full backup versions.



### Additional information

A full backup version forms a base for further incremental or differential backups. It can also be used as a standalone backup. A standalone full backup might be an optimal solution if you often roll back the system to its initial state or if you do not like to manage multiple backup versions.

### Incremental method

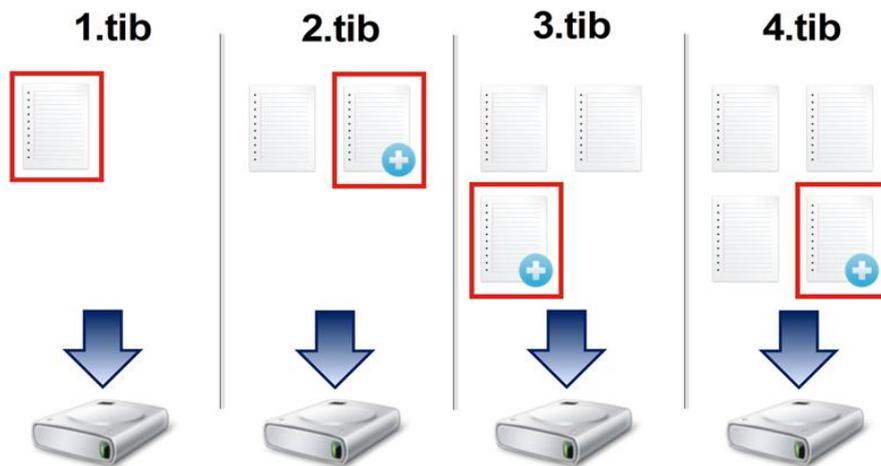
The result of an incremental method backup operation (also known as incremental backup version) contains only those files which have been changed since the LAST BACKUP.

**Example:** Every day, you write one page of your document and back it up using the incremental method. Xreplicator saves the new page every time you run backup.

**Note:** The first backup version you create always uses full method.

- 1.tib - full backup version.

- 2.tib, 3.tib, 4.tib - incremental backup versions.



### Additional information

Incremental method is the most useful when you need frequent backup versions and the ability to roll back to a specific point in time. As a rule, incremental backup versions are considerably smaller than full or differential versions.

On the other hand, incremental versions require more work for the program to provide recovery. In the example above, to recover the entire work from 4.tib file, Xreplicator reads data from all backup versions. Therefore, if you lose an incremental backup version or it becomes corrupted, all later incremental versions are unusable.

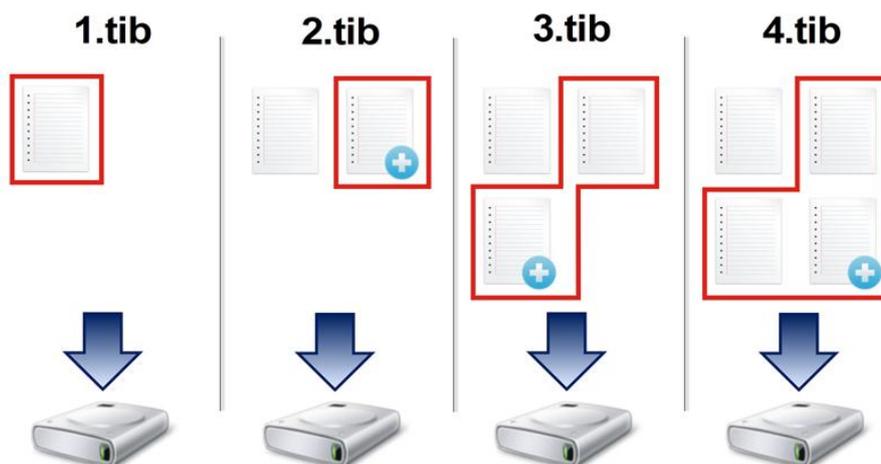
### Differential method

The result of a differential method backup operation (also known as differential backup version) contains only those files which have been changed since the LAST FULL BACKUP.

**Example:** Every day, you write one page of your document and back it up using the differential method. Xreplicator saves the entire document except the first page stored in the full backup version.

**Note:** The first backup version you create always uses full method.

- 1.tib - full backup version.
- 2.tib, 3.tib, 4.tib - differential backup versions.



## Additional information

Differential method is an intermediate between the first two approaches. It takes less time and space than "Full", but more than "Incremental". To recover data from a differential backup version, Xreplicator needs only the differential version and the last full version. Therefore, recovery from a differential version is simpler and more reliable than recovery from an incremental one.

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*An incremental or differential backup created after a disk is defragmented might be considerably larger than usual. This is because the defragmentation program changes file locations on the disk and the backups reflect these changes. Therefore, it is recommended that you re-create a full backup after disk defragmentation.*

---

To choose a desired backup method, you usually need to configure a custom backup scheme. For more information see Custom schemes (p. 25).

## 3.4 FAQ about backup and recovery

- **I have a 150GB system partition, but the occupied space on that partition is only 80GB. What will QSAN Xreplicator include in a backup?** - By default, QSAN Xreplicator copies only the hard disk sectors that contain data, so it will include only 80GB in a backup. You can also choose the sector-by-sector mode. Note that such a backup mode is required only in special cases. For more information see Image creation mode. While creating a sector-by-sector backup, the program copies both used and unused hard disk sectors and the backup file will usually be significantly larger.
- **Will my system disk backup include drivers, documents, pictures, etc.?** - Yes, such a backup will contain the drivers, as well as the contents of the My documents folder and its subfolders, if you kept the default location of the My documents folder. If you have just a single hard disk in your PC, such a backup will contain all of the operating system, applications and data.
- **What should I back up: a partition or the whole disk?** - In most cases, it is better to back up the whole disk. However, there may be some cases when a partition backup is advisable. For example, your notebook has a single hard disk with two partitions: system (disk letter C) and the data (disk letter D). The system partition stores your working documents in the My documents folder with subfolders. The data partition stores your videos, pictures, and music files. Such files are already compressed and backing them up using QSAN Xreplicator would not give you significant reduction of the backup file size. In this case, it may be better to use a local sync for the data partition files and a separate backup for the system partition. However, we also recommend creating at least one whole disk backup if your backup storage has enough space.
- **Does QSAN Xreplicator support RAID?** - QSAN Xreplicator supports hardware RAID arrays of all popular types. Support of software RAID configurations on dynamic disks is also provided. QSAN Bootable Rescue Media supports most of the popular hardware RAID controllers. If the standard QSAN rescue media does not "see" the RAID as a single volume, the media does not have the appropriate drivers.

## 3.5 Backup file naming

A backup file name has the following attributes:

- Backup name.
- Backup method (full, inc, diff: full, incremental, differential).
- Number of backup chain (in the form of b#).
- Number of backup version (in the form of s#).

- Number of volume (in the form of v#).  
For example this attribute changes when you split a backup into several files. Refer to Backup splitting (p. 30) for details.

Thus a backup name may look the following way:

1. **my\_documents\_full\_b1\_s1\_v1.tib**
2. **my\_documents\_full\_b2\_s1\_v1.tib**
3. **my\_documents\_inc\_b2\_s2\_v1.tib**
4. **my\_documents\_inc\_b2\_s3\_v1.tib**

If you are creating a new backup, and there is already a file with the same name, the program does not delete the old file, but adds to the new file the "-number" suffix, for example, **my\_documents\_inc\_b2\_s2\_v1-2.tib**.

## 3.6 Integration with Windows

During installation QSAN Xreplicator provides closer integration with Windows. Such merging allows you to get the most out of your computer.

QSAN Xreplicator integrates the following components:

- QSAN items on the Windows **Start** menu.
- QSAN Xreplicator button on the taskbar.
- Shortcut menu commands.

### Windows Start menu

The **Start** menu displays QSAN commands, tools and utilities. They give you access to QSAN Xreplicator functionality, without having to start the application.

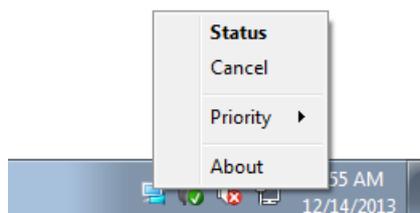
### QSAN Xreplicator button on the taskbar

The QSAN Xreplicator button on the Windows taskbar shows the progress and result of QSAN Xreplicator operations.



### Taskbar notification area icons

During most of the operations, special indicator icons appear in the Windows taskbar notification area. This icon doesn't depend on the main program window being open.



- To view a tooltip indicating the operation's progress or state, point to the icon.
- To view status, change priority or cancel a current operation, right-click the icon, and then click the corresponding command.

## 4 Backing up data

**Note:** Certain features and functionalities may be unavailable in the Xreplicator edition that you use.

QSAN Xreplicator includes a wealth of sophisticated backup capabilities that would please even an IT professional. They allow you to back up your disks (partitions) and files. You can choose a backup feature that suits you most or use them all. The sections below describe the backup features in more detail.

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### 4.1 Backing up disks and partitions

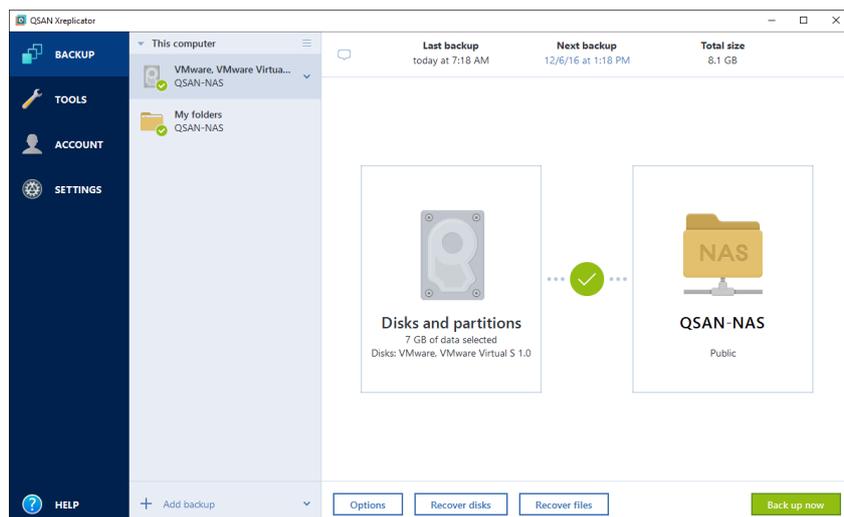
As opposed to file backups, disk and partition backups contain all the data stored on the disk or partition. This backup type is usually used to create an exact copy of a system partition of the whole system disk. Such backup allows you to recover your computer when Windows works incorrectly or cannot start.

#### To back up partitions or disks:

1. Start QSAN Xreplicator.
2. On the sidebar, click **Backup**.
3. Click **Add backup**, and then click **Create new backup**.
4. [Optional] To rename the backup, click the arrow next to the backup name, click **Rename**, and then enter a new name.
5. Click the **Backup source** icon, and then select **Disks and partitions**.
6. In the opened window, select the check boxes next to the partitions and disks that you want to back up, and then click **OK**.

To view hidden partitions, click **Full partition list**.

To back up dynamic disks you can use only the partition mode.



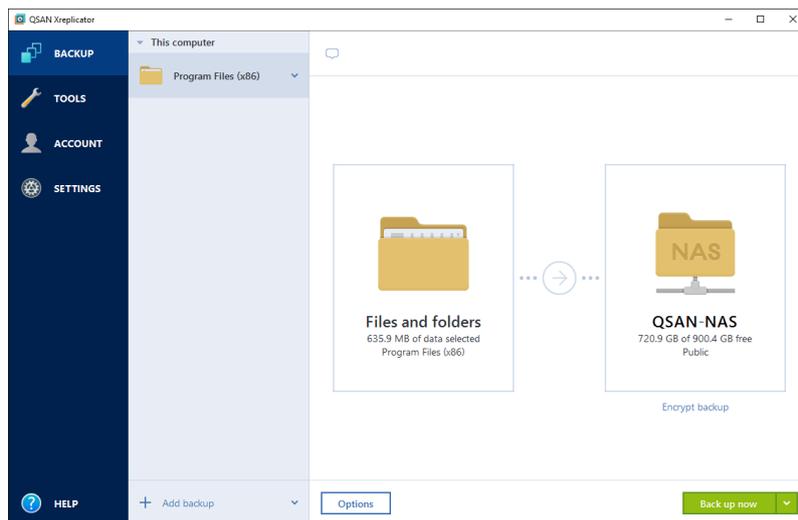
7. Click the **Backup destination** icon, and then select your QSAN NAS.
8. [optional step] Click **Options** to set the options for the backup, including Schedule (p. 21), Scheme (p. 23), and Password protection (p. 29). For more information see Backup options (p. 20).
9. Perform one of the following:
  - To run the backup immediately, click **Back up now**.
  - To run the backup later or on a schedule, click the arrow to the right of the **Back up now** button, and then click **Later**.

## 4.2 Backing up files and folders

To protect files such as documents, photos, music files, video files, there is no need to back up the entire partition containing the files. You can back up specific files and folders.

### To back up files and folders:

1. Start QSAN Xreplicator.
2. On the sidebar, click **Backup**.
3. Click **Add backup**, and then click **Create new backup**.
4. [Optional] To rename the backup, click the arrow next to the backup name, click **Rename**, and then enter a new name.
5. Click the **Backup source** icon, and then select **Files and folders**.
6. In the opened window, select the check boxes next to the files and folders that you want to back up, and then click **OK**.



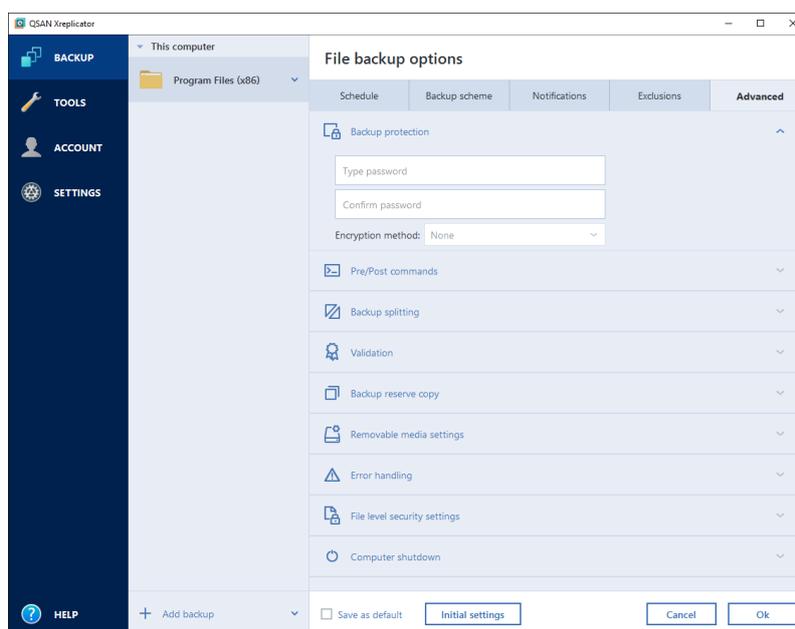
7. Click the **Backup destination** icon, and then select your QSAN NAS.
8. [optional step] Click **Options** to set the options for the backup, including Schedule (p. 21), Scheme (p. 23), and Password protection (p. 29). For more information see Backup options (p. 20).
9. Perform one of the following:
  - To run the backup immediately, click **Back up now**.
  - To run the backup later or on a schedule, click the down arrow to the right of the **Back up now** button, and then click **Later**.

## 4.3 Backup options

**Note:** Certain features and functionalities may be unavailable in the Xreplicator edition that you use.

In the **Disk Backup Options** and **File Backup Options** windows you can configure options for a disk/partition and file backup processes respectively. To open the options window, click the appropriate link.

After you have installed the application, all options are set to the initial values. You can change them for your current backup operation only or for all backups that will be created in future. Select the **Save the settings as default** check box to apply the modified settings to all further backup operations by default.



Note that options of each backup type are fully independent, and you should configure them separately.

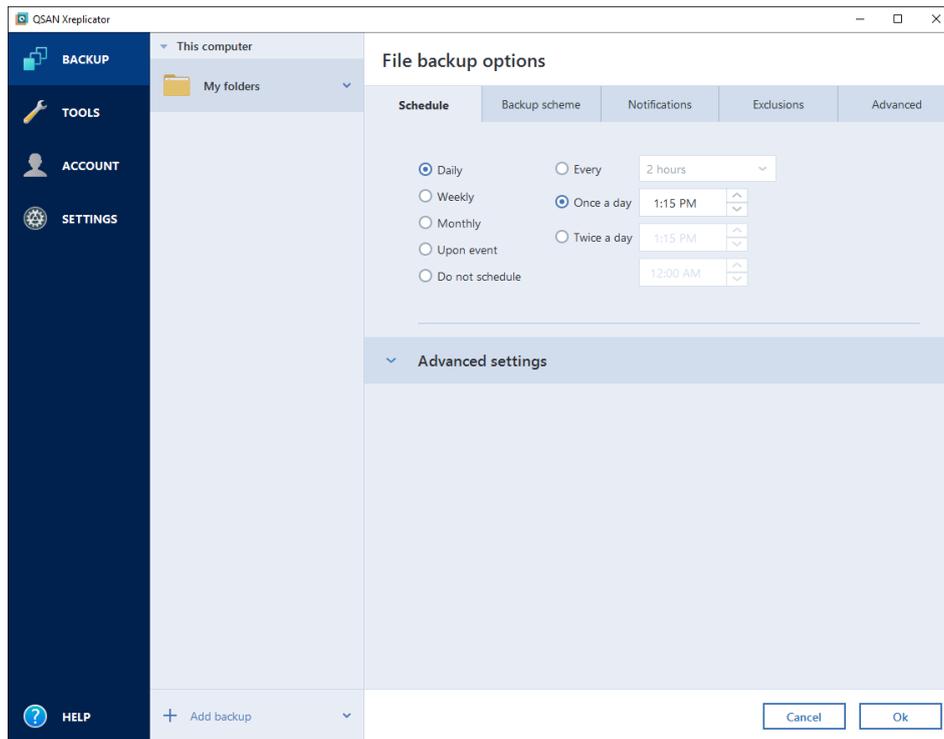
If you want to reset all the modified options to the values that were set after the product installation initially, click the **Reset to initial settings** button.

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## 4.3.1 Scheduling

The **Schedule** tab allows you to specify the backup and validation schedule settings.



You can choose and set up one of the following backup or validation frequencies:

- **Daily** (p. 22)—The operation will be executed once a day or more frequently.
- **Weekly** (p. 22)—The operation will be executed once a week or several times a week on the selected days.
- **Monthly** (p. 22)—The operation will be executed once a month or several times a month on the selected dates.
- **Upon event** (p. 23)—The operation will be executed upon an event.
- **Do not schedule**—The scheduler will be turned off for the current operation. In this case the backup or validation will run only when you click **Back up now** or **Validate** respectively in the main window.

### Advanced settings

Clicking **Advanced settings** allows you to specify the following additional settings for backup and validation:

- To postpone a scheduled operation until the next time the computer is not in use (a screen saver is displayed or computer is locked), select the **Run the backup only when the computer is idle** check box. If you schedule validation, the check box will change to **Run the validation only when the computer is idle**.
- If you want to wake up the sleeping/hibernating computer to perform the scheduled operation, select the **Wake up the sleeping/hibernating computer** check box.
- When a backup takes a long time, it may be interrupted if the computer goes into sleep or hibernation mode. To eliminate this situation, select the **Prevent the computer from going to sleep/hibernate** check box.

- If the computer is switched off when the scheduled time comes, the operation won't be performed. You can force the missed operation to run at the next system startup. To do so, select the **Run at the system startup with delay (in minutes)** check box.  
Additionally, you can set a time delay to start backup after the system startup. For example, to start backup 20 minutes after system startup, type *20* in the appropriate box.
- If you schedule a backup to a USB flash drive or validation of a backup that is located on a USB flash drive, one more check box appears: **Run when the current device is attached**. Selecting the check box will let you perform a missed operation when the USB flash drive is attached if it was disconnected at the scheduled time.

#### 4.3.1.1 Daily execution parameters

You can set up the following parameters for daily operation execution:

- **Start time or periodicity**
  - If you select **At**, set the operation's start time. Enter hours and minutes manually, or set the desired start time using the up and down buttons. You can specify several start times by clicking **Add**.
  - If you select **Every**, choose daily operation periodicity from the dropdown list (for example, every 2 hours).

Description of the **Advanced settings** see in Scheduling (p. 21).

#### 4.3.1.2 Weekly execution parameters

You can set up the following parameters for weekly operation execution:

- **Week days**  
Select the days on which to execute the operation by clicking on their names.
- **Start time**  
Set the operation's start time. Enter hours and minutes manually, or set the desired start time using the up and down buttons.

Description of the **Advanced settings** see in Scheduling (p. 21).

#### 4.3.1.3 Monthly execution parameters

You can set up the following parameters for monthly operation execution:

- **Periodicity or dates**
  - If you select **Every**, choose a numeral and the day of the week from the dropdown lists (example: First Monday - the operation will be performed on the first Monday of every month)
  - If you select **On**, choose the date(s) for operation execution (example: you may want the operation to be run on the 10th, 20th, and last day of the month)
- **Start time**  
Set the operation's start time. Enter hours and minutes manually, or set the desired start time using the up and down buttons.

Description of the **Advanced settings** see in Scheduling (p. 21).

### 4.3.1.4 Upon event execution parameters

You can set up the following parameters for the Upon event operation execution:

- **Event**
  - **User logon** – the operation will be executed each time the current user logs on to the OS.
  - **User logoff** – the operation will be executed each time the current user logs off the OS.
  - **System startup** – the operation will be executed at every OS startup.
  - **System shutdown or restart** – the operation will be executed at every computer shutdown or reboot.
- **Additional condition**
  - If you want to run an operation only at the first occurrence of the event on the current day, select the **Once a day only** check box.

Description of the **Advanced settings** see in Scheduling (p. 21).

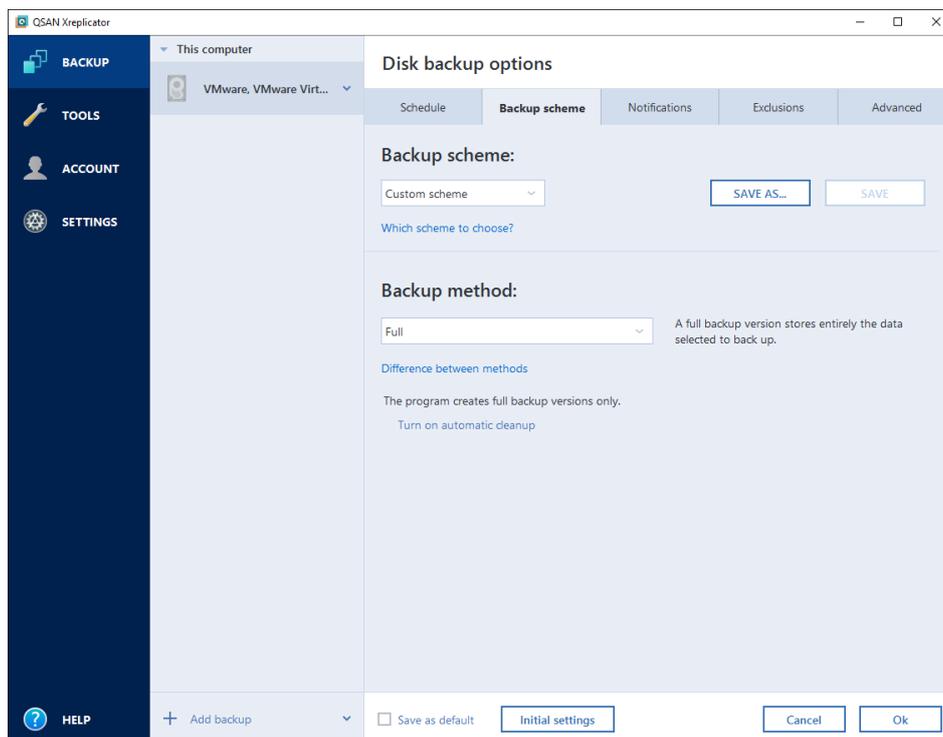
### 4.3.2 Backup schemes

Backup schemes along with the scheduler help you to set up your backup strategy. The schemes allow you to optimize backup storage space usage, improve data storage reliability, and automatically delete the obsolete backup versions.

For online backups, the backup scheme is preset and cannot be changed. After the initial full backup, only incremental versions are created.

The backup scheme defines the following parameters:

- Backup methods that will be used to create backup versions (full, differential or incremental)
- Sequence of the backup versions created using different methods
- Version cleanup rules



QSAN Xreplicator allows you to choose from the following backup schemes:

- **Single version** (p. 24) - select this scheme if you want to use the smallest backup storage.
- **Version chain** (p. 24) - this may be the optimal scheme in many cases.
- **Incremental** - select to create a full version after every five incremental versions. This is the default scheme.
- **Differential** - select to create only differential backups after an initial full backup.
- **Custom** (p. 25) - select to set up a backup scheme manually.

You can easily change the backup scheme for a pre-existing backup. This will not affect the integrity of the backup chains, so you will be able to recover your data from any previous backup version.

---

*You cannot change the backup scheme when backing up to optical media such as a DVD/BD. In this case, QSAN Xreplicator by default uses a custom scheme with only full backups. This is because the program cannot consolidate backups stored on optical media.*

---

### 4.3.2.1 Single version scheme

This backup scheme is the same for both disk backup and file backup types (except scheduler settings).

The program creates a full backup version and overwrites it every time according to the specified schedule or when you run the backup manually. In this process, the old version is deleted only after a new version is created.

Backup scheduler setting for disk backup: monthly.

Backup scheduler setting for file backup: daily.

Result: you have a single up-to-date full backup version.

Required storage space: minimal.

### 4.3.2.2 Version chain scheme

---

**Note:** This feature may be unavailable in the Xreplicator edition that you use.

---

At first the program creates the 1st full backup version. The version will be kept until you delete it manually. After that, according to the specified schedule (or when you run backup manually) the program creates: 1 full and 5 differential backup versions, then again 1 full and 5 differential backup versions and so on. The versions will be stored for 6 months. After the period the program analyzes if the oldest backup versions (except the 1st full version) may be deleted. It depends on the minimum number of versions (eight) and version chains consistency. The program deletes the oldest versions one by one after creating new versions with the same backup method (for example, the oldest differential version will be deleted after creation of the newest differential version). First of all the oldest differential versions will be deleted, then - the oldest full version.

Backup scheduler setting: monthly.

Result: you have monthly backup versions for the last 6 months plus the initial full backup version that may be kept for a longer period.

Required storage space: depends on the number of versions and their sizes.

### 4.3.2.3 Custom schemes

With QSAN Xreplicator you also can create your own backup schemes. Schemes can be based on the pre-defined backup schemes. You can make changes in a selected pre-defined scheme to suit your needs and then save the changed scheme as a new one.

---

*You cannot overwrite existing pre-defined backup schemes.*

---

So first of all select the backup methods in the appropriate box.

- Full (p. 14)

#### Automatic cleanup rules

To delete obsolete backup versions automatically, you can set one of the following cleanup rules:

- **Delete versions older than [defined period]** (available for full method only) - Select this option to limit the age of backup versions. All versions that are older than the specified period will be automatically deleted.
- **Store no more than [n] recent versions** (available for full method only) - Select this option to limit the maximum number of backup versions. When the number of versions exceeds the specified value, the oldest backup version will be automatically deleted.
- **Keep size of the backup no more than [defined size]** - Select this option to limit maximum size of the backup. After creating a new backup version, the program checks whether the total backup size exceeds the specified value. If it's true, the oldest backup version will be deleted.

#### The first backup version option

Often the first version of any backup is one of the most valuable versions. This is true because it stores the initial data state (for example, your system partition with recently installed Windows) or some other stable data state (for example, data after a successful virus check).

**Do not delete the first version of the backup** - Select this check box to keep the initial data state. The program will create two initial full backup versions. The first version will be excluded from the automatic cleanup, and will be stored until you delete it manually.

Note that when the check box is selected, the **Store no more than [n] recent versions** check box will change to **Store no more than 1+[n] recent versions**.

### Managing custom backup schemes

If you change anything in an existing backup scheme, you can save the changed scheme as a new one. In this case you need to specify a new name for that backup scheme.

- You can overwrite existing custom schemes.
- You cannot overwrite existing pre-defined backup schemes.
- In a scheme name, you can use any symbols allowed by OS for naming files. The maximum length of a backup scheme name is 255 symbols.
- You can create not more than 16 custom backup schemes.

After creating a custom backup scheme, you can use it as any other existing backup scheme while configuring a backup.

You can also use a custom backup scheme without saving it. In this case, it will be available only for the backup where it was created and you will be unable to use it for other backups.

If you do not need a custom backup scheme anymore, you can delete it. To delete the scheme, select it in the backup schemes list, click **Delete**, and then click **Delete scheme** in the confirmation window.

---

*The pre-defined backup schemes cannot be deleted.*

---

## Examples of custom schemes

### 1. Entire PC backup “Two full versions”

Case: You want to protect all data on your computer with two full versions and you want to update the backup once a month. Let’s see how you can do it by using a custom backup scheme.

1. Start configuring an entire PC backup. Refer to Backing up all data on your PC (p. 9) for details.
2. Make sure Entire PC is selected as the backup source.
3. Click **Options**, open the **Schedule** tab, click **Monthly**, and then specify a day of the month (for example, the 20-th). This will result in a backup version being created on a monthly basis, on the day you specify. Then, specify a start time for the backup operation.
4. Open the **Backup scheme** tab, and then choose **Custom scheme** instead of **Incremental scheme**.
5. In the **Backup method** box, select **Full** from the drop-down list.
6. To limit the number of versions, click **Store no more than [n] recent versions**, and type or select "2", and click **OK**.

In this case, the program will create a new full version every month, on the 20-th day. After creating the third version, the oldest version will be automatically deleted.

7. Check that all settings are correct and click **Back up now**. If you want your first backup to be run only at the time you specified in the Scheduler, click the down arrow to the right of the **Back up now** button and select **Later** in the drop-down list.

### 2. File backup “Daily incremental version + weekly full version”

Case: You have files and/or folders you work with every day. You need to save your daily work results and want to be able to recover data state to any date for the last three weeks. Let’s see how you can do this using a custom backup scheme.

1. Start configuring a file backup. Refer to Backing up files and folders for details.
2. Click **Options**, open the **Schedule** tab, click **Daily**, and then specify a start time for the backup operation. For example, if you finish your everyday work at 8 PM, specify this time or a little later (8.05 PM) as the start time.
3. Open the **Backup scheme** tab, and then choose **Custom scheme** instead of **Incremental scheme**.
4. In the **Backup method** box, select **Incremental** from the drop-down list.
5. Click **Create a full version after every [n] incremental versions**, and type or select "6".

In that case, the program will first create the initial full backup version (no matter how you set up a backup process, the first backup version will always be the full one), and then six incremental versions day by day. Then, it will create one full version and six incremental versions again and so on. So every new full version will be created in exactly a week's time.

6. To limit the storage time for the versions, click **Turn on automatic cleanup**.
7. Click **Delete version chains older than [n] days**, type or select "21", and click **OK**.
8. Check that all settings are correct and click **Back up now**. If you want your first backup to run only at the time you specified in the Scheduler, click the down arrow to the right of the **Back up now** button and select **Later** in the drop-down list.

### 3. Disk backup “Full version every 2 months + differential version twice a month”

Case: You need to back up your system partition twice a month and create a new full backup version every two months. In addition, you want to use no more than 100 GB of disk space to store the backup versions. Let’s see how you can do it using a custom backup scheme.

1. Start configuring a disk backup. Refer to Backing up disks and partitions (p. 18).
2. Select your system partition (usually C:) as the backup source.
3. Click **Options**, open the **Schedule** tab, click **Monthly**, and then specify, for example, the 1st and 15th days of the month. This will result in a backup version in about every two weeks. Then, specify a start time for the backup operation.
4. Open the **Backup scheme** tab, and then choose **Custom scheme** instead of **Incremental scheme**.
5. In the **Backup method** box, select **Differential** from the drop-down list.
6. Click **Create a full version after every [n] differential versions**, and type or select "3".  
In that case the program will first create the initial full backup version (no matter how you set up a backup process, the first backup version will always be the full one), and then three differential versions, each one in about two weeks. Then again a full version and three differential versions and so on. So every new full version will be created in two months.
7. To limit storage space for the versions, click **Turn on automatic cleanup**.
8. Click **Keep size of the backup no more than [defined size]**, type or select "100" "GB", and click **OK**.

---

*When the total backup size exceeds 100 GB, QSAN Xreplicator will clean up the existing backup versions to make the remaining versions satisfy the size limit. The program will delete the oldest backup chain consisting of a full backup version and three differential backup versions.*

---

9. Check that all settings are correct and click **Back up now**. If you want your first backup to be run only at the time you specified in the Scheduler, click the down arrow to the right of the **Back up now** button and select **Later** in the drop-down list.

### 4.3.3 Notifications for backup operation

Sometimes a backup or recovery procedure can last an hour or longer. QSAN Xreplicator can notify you when it is finished via email. The program can also duplicate messages issued during the operation or send you the full operation log after operation completion.

By default, all notifications are disabled.

#### Free disk space threshold

You may want to be notified when the free space on the backup storage becomes less than the specified threshold value. If after starting a backup QSAN Xreplicator finds out that the free space in the selected backup location is already less than the specified value, the program will not begin the actual backup process and will immediately inform you by displaying an appropriate message. The message offers you three choices - to ignore it and proceed with the backup, to browse for another location for the backup or to cancel the backup.

If the free space becomes less than the specified value while the backup is being run, the program will display the same message and you will have to make the same decisions.

#### To set the free disk space threshold:

- Select the **Show notification message on insufficient free disk space** check box
- In the **Size** box, type or select a threshold value and select a unit of measure

QSAN Xreplicator can monitor free space on the following storage devices:

- Local hard drives
- USB cards and drives
- Network shares (SMB/NFS)

---

*The message will not be displayed if the **Do not show messages and dialogs while processing (silent mode)** check box is selected in the **Error handling** settings.*

*This option cannot be enabled for FTP servers and CD/DVD drives.*

---

## Email notification

You can specify an email account that will be used to send you email notifications.

### To configure the email notifications:

1. Select the **Send e-mail notifications about the operation state** check box.
2. Configure email settings:
  - Enter the email address in the **To** field. You can enter several email addresses in a semicolon-delimited format.
  - Enter the outgoing mail server (SMTP) in the **Outgoing mail server (SMTP)** field.
  - Set the port of the outgoing mail server. By default the port is set to 25.
  - If required, select the **SMTP authentication** check box, and then enter the user name and password in the corresponding fields.
3. To check whether your settings are correct, click the **Send test message** button.

### If the test message sending fails, then perform the following:

1. Click **Show extended settings**.
2. Configure additional email settings:
  - Enter the e-mail sender address in the **From** field. If you are not sure what address to specify, then type any address you like in a standard format, for example *aaa@bbb.com*.
  - Change the message subject in the **Subject** field, if necessary.

To simplify monitoring a backup status, you can add the most important information to the subject of the email messages. You can type the following text labels:

    - **%BACKUP\_NAME%**—the backup name
    - **%COMPUTER\_NAME%**—name of the computer where the backup was started
    - **%OPERATION\_STATUS%**—result of the backup or other operation

For example, you can type: *Status of backup %BACKUP\_NAME%: %OPERATION\_STATUS% (%COMPUTER\_NAME%)*
  - Select the **Log on to incoming mail server** check box.
  - Enter the incoming mail server (POP3) in the **POP3 server** field.
  - Set the port of the incoming mail server. By default, the port is set to 110.
3. Click the **Send test message** button again.

### Additional notification settings:

- To send a notification concerning process completion, select the **Send notification upon operation's successful completion** check box.
- To send a notification concerning process failure, select the **Send notification upon operation failure** check box.

- To send a notification with operation messages, select the **Send notification when user interaction is required** check box.
- To send a notification with full log of operations, select the **Add full log to the notification** check box.

## 4.3.4 Backup protection

A backup file can be password-protected. By default, there is no password protection for backups.

---

*You cannot set or change the backup protection option for a pre-existing backup.*

---

### To protect a backup:

1. Enter the password for the backup into the corresponding field. We recommend that you use a password longer than seven symbols and containing both letters (in upper and lower cases preferably) and numbers to make it more difficult to guess.

---

*A password cannot be retrieved. Please memorize the password that you specify for a backup protection.*

---

2. To confirm the previously entered password, retype it into the corresponding field.
3. [optional step] To increase the security of your confidential data, you can encrypt the backup with strong industry-standard AES (Advanced Encryption Standard) cryptographic algorithm. AES is available with three key lengths – 128, 192 and 256 bits to balance performance and protection as desired.

The 128-bit encryption key is sufficient for most applications. The longer the key, the more secure your data. However, the 192 and 256-bit long keys significantly slow down the backup process.

If you want to use AES encryption, choose one of the following keys:

- **AES 128** - to use 128-bit encryption key
- **AES 192** - to use 192-bit encryption key
- **AES 256** - to use 256-bit encryption key

If you do not want to encrypt the backup and only want to protect a backup with a password, select **None**.

4. Having specified the backup settings, click **OK**.

### How to get access to a password-protected backup

QSAN Xreplicator asks for the password every time you try to modify the backup:

- Recover data from the backup
- Edit settings
- Delete
- Mount
- Move

To access the backup, you must specify the correct password.

## 4.3.5 Pre/Post commands for backup

You can specify commands (or even batch files) that will be automatically executed before and after the backup procedure.

For example, you may want to start/stop certain Windows processes, or check your data before starting backup.

#### To specify commands (batch files):

- Select a command to be executed before the backup process starts in the **Pre-command** field. To create a new command or select a new batch file, click the **Edit** button.
- Select a command to be executed after the backup process ends in the **Post-command** field. To create a new command or select a new batch file, click the **Edit** button.

Please do not try to execute interactive commands, i.e. commands that require user input (for example, "pause"). These are not supported.

### 4.3.5.1 Edit user command for backup

You can specify user commands to be executed before or after the backup procedure:

- In the **Command** field, type-in a command or select it from the list. Click ... to select a batch file.
- In the **Working directory** field, type-in a path for command execution or select it from the list of previously entered paths.
- In the **Arguments** field enter or select command execution arguments from the list.

Disabling the **Do not perform operations until the command's execution is complete** parameter (enabled for Pre commands by default), will permit the backup process to run concurrently with your command execution.

The **Abort the operation if the user command fails** (enabled by default) parameter will abort the operation if any errors occur in command execution.

You can test a command you entered by clicking the **Test command** button.

### 4.3.6 Backup splitting

---

*QSAN Xreplicator cannot split already existing backups. Backups can be split only when being created.*

---

Large backups can be split into several files that together make up the original backup. A backup can also be split for burning to removable media.

The default setting - **Automatic**. With this setting, QSAN Xreplicator will act as follows.

#### When backing up to a hard disk:

- If the selected disk has enough space and its file system allows the estimated file size, the program will create a single backup file.
- If the storage disk has enough space, but its file system does not allow the estimated file size, the program will automatically split the image into several files.
- If you do not have enough space to store the image on your hard disk, the program will warn you and wait for your decision as to how you plan to fix the problem. You can try to free some additional space and continue or select another disk.

#### When backing up to a CD-R/RW, DVD-R/RW, DVD+R/RW, BD-R/RE:

- QSAN Xreplicator will ask you to insert a new disk when the previous one is full.

Alternatively, you may select the desired file size from the drop-down list. The backup will then be split into multiple files of the specified size. This is useful when you store a backup to a hard disk in order to burn the backup to CD-R/RW, DVD-R/RW, DVD+R/RW or BD-R/RE later on.

---

*Creating images directly on CD-R/RW, DVD-R/RW, DVD+R/RW, BD-R/RE might take considerably more time than it would on a hard disk.*

---

## 4.3.7 Backup validation option

---

**Note:** Certain features and functionalities may be unavailable in the product edition that you use.

---

You can specify the additional validation setting: **Validate backup when it is created**.

When this option is enabled, the program will check the integrity of the recently created or supplemented backup version immediately after backup. When setting up a backup of critical data or a disk/partition backup, we strongly recommend that you enable this option in order to ensure that the backup can be used to recover the lost data.

### Regular validation

You can also schedule validation of your backups to ensure that they remain "healthy". By default regular validation is turned on with the following settings:

- Frequency: once a week
- Day: the date when the backup was started
- Time: the moment of backup start plus 15 minutes
- Advanced settings: the **Run the validation only when the computer is idle** check box is selected

You can change the default settings and specify your own schedule. For more information see Scheduling (p. 21).

## 4.3.8 Backup reserve copy

You can create reserve copies of your backups and save them on the file system or a network drive.

### To make a reserve copy:

- Select the **Create a reserve copy of my backups** check box
- Click **Set location...** and specify a location for the backup copies

All backup options (such as backup compression, backup splitting, etc.) will be inherited from the source backup.

---

*A reserve copy always contains all the data selected for backup, that is, when creating a reserve copy the program always makes a full backup of the source data.*

---

Also remember that you will pay for the enhanced convenience and increased security of your data by the time required for performing the backup because normal backup and reserve copying are performed one at a time and not simultaneously.

## 4.3.9 Removable media settings

When backing up to removable media, you can make this media bootable by writing additional components to it. Thus, you will not need a separate bootable disk.

---

*QSAN Xreplicator does not support creating bootable media if a flash drive is formatted in NTFS or exFAT. The drive must have a FAT16 or FAT32 file system.*

---

The following settings are available:

- **Place QSAN Xreplicator on media**  
**QSAN Xreplicator** - includes support of USB, PC Card (formerly PCMCIA) and SCSI interfaces along with the storage devices connected via them, and therefore is strongly recommended.
- **Place QSAN System Report on media**  
**QSAN System Report** - the component allows you to generate system report that is used for collecting information about your system in case of any program problem. Report generation will be available before you start QSAN Xreplicator from the bootable media. The generated system report can be saved to a USB flash drive.
- **Ask for first media while creating backups on removable media**  
You can choose whether to display the Insert First Media prompt when backing up to removable media. With the default setting, backing up to removable media may not be possible if the user is away, because the program will wait for someone to press OK in the prompt box. Therefore, you should disable the prompt when scheduling a backup to removable media. Then, if the removable media is available (for example, CD-R/RW inserted) the backup can run unattended.

If you have other QSAN products installed on your computer, the bootable versions of these programs' components will be offered as well.

### 4.3.10 Error handling

When the program encountered an error while performing backup, it stops the backup process and displays a message, waiting for a response on how to handle the error. If you set an error handling policy, the program will not stop the backup process, but will simply handle the error according to the set rules and continue working.

You can set the following error handling policy:

- **Do not show messages and dialogs while processing (silent mode)** - Enable this setting to ignore errors during backup operations. This is useful when you cannot control the backup process. You can view the detailed log of all operations after the backup process finishes.
- **Ignore bad sectors** - This option is available only for disk and partition backups. It lets you successfully complete a backup even if there are bad sectors on the hard disk.

We recommend that you select this check box when your hard drive is failing, for example:

- Hard drive is making clicking or grinding noises during operation.
- The S.M.A.R.T. system has detected hard drive issues and recommends that you back up the drive as soon as possible.

When you leave this check box cleared, the backup may fail because of possible bad sectors on the drive.

- **Repeat attempt if a backup fails** - This option allows you to automatically repeat a backup attempt if the backup fails for some reason. You can specify number of attempts and time interval between attempts. Note that if the error interrupting the backup persists, then the backup will not be created.

---

*This option is not available, when you back up your data to a USB flash drive or USB hard drive.*

---

### 4.3.11 Computer shutdown

If you know that the backup process you are configuring may take a long time, you may select the **Shut down the computer after the backup is complete** check box. In this case, you will not have to wait until the operation completion. The program will perform the backup and turn off your computer automatically.

This option is also useful when you schedule your backups. For example, you may want to perform backups every weekday in the evening to save all your work. Schedule the backup and select the check box. After that you may leave your computer when you finish your work knowing that the critical data will be backed up and the computer will be turned off.

### 4.3.12 Performance of backup operation

#### Compression level

You can choose the compression level for a backup:

- **None** - the data will be copied without any compression, which may significantly increase the backup file size.
- **Normal** - the recommended data compression level (set by default).
- **High** - higher backup file compression level, takes more time to create a backup.
- **Maximum** - maximum backup compression, but takes a long time to create a backup.

---

*The optimal data compression level depends on the type of files stored in the backup. For example, even maximum compression will not significantly reduce the backup size, if the backup contains essentially compressed files, like .jpg, .pdf or .mp3.*

---

*You cannot set or change the compression level for a pre-existing backup.*

---

#### Operation priority

Changing the priority of a backup or recovery process can make it run faster or slower (depending on whether you raise or lower the priority), but it can also adversely affect the performance of other running programs. The priority of any process running in a system, determines the amount of CPU usage and system resources allocated to that process. Decreasing the operation priority will free more resources for other CPU tasks. Increasing backup or recovery priority may speed up the process by taking resources from the other currently running processes. The effect will depend on total CPU usage and other factors.

You can set up the operation priority:

- **Low** (enabled by default) - the backup or recovery process will run slower, but the performance of other programs will be increased.
- **Normal** - the backup or recovery process will have the equal priority with other processes.
- **High** - the backup or recovery process will run faster, but the performance of other programs will be reduced. Be aware that selecting this option may result in 100% CPU usage by QSAN Xreplicator.

## 4.4 Operations with backups

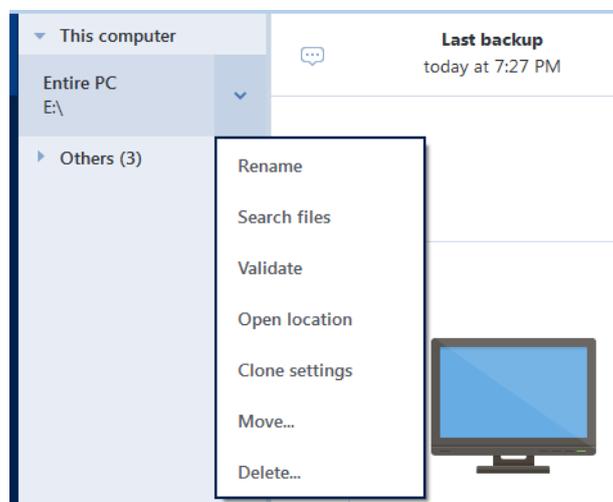
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## 4.4.1 Backup operations menu

The backup operations menu provides quick access to additional operations that can be performed with the selected backup.



The backup operations menu can contain the following items:

- **Rename** (not available for online backups) - allows you to set a new name for a backup in the list. The backup files will not be renamed.
- **Reconfigure** (for backups manually added to the backup list) - allows configuring the settings of a backup created by a previous QSAN Xreplicator version. This item may also appear for backups created on another computer and added to the backup list without importing their settings. Without backup settings, you cannot refresh the backup by clicking **Back up now**. Also, you cannot edit and clone the backup settings.
- **Reconfigure** (for online backups) - allows you to bind a selected online backup to the current computer. To do this, click this item and reconfigure settings of the backup. Note that only one online backup can be active on one computer.
- **Validate** - starts backup validation.
- **Open location** - opens the folder containing the backup files.
- **Clone settings** - Creates a new empty backup box with the settings of the initial backup and named **(1) [the initial backup name]**. Change the settings, save them, and then click **Back up now** on the cloned backup box.
- **Move** - click to move all the backup files to another location. The subsequent backup versions will be saved to the new location.  
If you change the backup destination by editing the backup settings, only new backup versions will be saved to the new location. The earlier backup versions will remain in the old location.
- **Delete** - depending on a backup type, this command completely deletes the backup from its location or allows you to choose whether you want to delete the backup completely or the backup box only. When you delete a backup box, the backup files remain in the location, and you will be able to add the backup to the list later. Note that when you delete a backup completely, the deletion cannot be undone.

## 4.4.2 Sorting backups in the list

By default, the backups are sorted by the date they were created, starting from the newest to oldest. To change the order, select the appropriate sorting type in the upper part of the backup list. You have the following options:

Command		Description
Sort by	<b>Name</b>	This command sorts all backups in alphabetical order. To reverse the order, select <b>Z → A</b> .
	<b>Date created</b>	This command sorts all backups from newest to oldest. To reverse the order, select <b>Oldest on top</b> .
	<b>Date updated</b>	This command sorts all backups by date of the last version. The newer the last backup version, the higher the backup will be placed in the list. To reverse the order, select <b>Least recent on top</b> .
	<b>Size</b>	This command sorts all backups by size, from biggest to smallest. To reverse the order, select <b>Smallest on top</b> .
	<b>Source type</b>	This command sorts all backups by the source type. The order is as follows: entire PC backups - disk backups - file backups - nonstop backup.

## 4.4.3 Validating backups

The validation procedure checks whether you will be able to recover data from a backup.

### Validating backups in Windows

**To validate an entire backup:**

1. Start QSAN Xreplicator, and then click **Backup** on the sidebar.
2. In the backup list, right-click the backup to validate, and then click **Validate**.

### Validating backups in a stand-alone version of QSAN Xreplicator (bootable media)

**To validate a specific backup version or an entire backup:**

1. On the **Recovery** tab, find the backup that contains the version that you want to validate. If the backup is not listed, click **Browse for backup**, and then specify the path to the backup. QSAN Xreplicator adds this backup to the list.
2. Right-click the backup or a specific version, and then click **Validate Archive**. This opens the **Validate Wizard**.
3. Click **Proceed**.

## 4.4.4 Adding an existing backup to the list

You may have QSAN Xreplicator backups created by a previous product version or copied from another computer. Every time you start QSAN Xreplicator, it scans your computer for such backups and adds them to the backup list automatically.

If you have backups that are not shown in the list, you can add them manually.

### To add backups manually:

1. In the **Backup** section, at the bottom of the backup list, click the arrow icon, and then click **Add existing backup**. The program opens a window where you can browse for backups on your computer.
2. Select a backup version (a .tib file), and then click **Add**.  
The entire backup will be added to the list.

## 4.4.5 Deleting backups and backup versions

When you want to delete backups and backup versions you no longer need, please do it by using the tools provided by QSAN Xreplicator.

QSAN Xreplicator stores information on the backups in a metadata information database. Therefore, deleting unneeded backup files in File Explorer will not delete information about these backups from the database. This will result in errors when the program tries to perform operations on the backups that no longer exist.

### To delete an entire backup:

In the **Backup** section, right-click a backup in the backup list, and then click **Delete**.

Depending on a backup type, this command completely deletes the backup from its location or allows you to choose whether you want to delete the backup completely or the backup box only. When you delete a backup box only, the backup files remain in the location, and you will be able to add the backup to the list later. Note that if you delete a backup completely, the deletion cannot be undone.

### To configure automatic cleanup rules for a backup:

1. Go to the **Backup** section.
2. Perform one of the following:
  - For a new backup, click **Add backup**, choose **Create new backup**, select backup source and destination, and then click **Options**.
  - For an existing backup, select the backup from the backup list, click **Operations**, choose **Edit settings**, and then click **Options**.
3. On the **Backup scheme** tab, select **Custom scheme**, select a backup method, and then click **Turn on automatic cleanup**.
4. Configure cleanup rules for the backup. Refer to Custom schemes (p. 25) for details.

### To delete a specific backup version:

1. Start your computer by using bootable media. Refer to Arranging boot order in BIOS (p. 50) for details.

2. In the Recovery section, click Refresh backups. This will update the backup list. If you cannot find the target backup in the list, or the backup is located on removable media, click Browse for backup, and provide the path to the backup.
3. Depending on type of the backup, go to the Disk backups or File backups tab.
4. Right-click the backup version that you want to delete, and then click Remove. The opened window displays the list of backup versions that will be deleted. See below why this list may contain more than one backup version.
5. To confirm the deletion, click Delete.

#### **Why does QSAN Xreplicator sometimes delete more than one backup version?**

When you delete a backup version, please remember that this version may have dependent versions. In this case the dependent versions will be deleted as well, because data recovery from such versions becomes impossible.

- **If you delete a full backup version** - the program will also delete all subsequent incremental and differential versions till the next full version.
- **If you delete an incremental backup version or a differential backup version** - the program will also delete all subsequent incremental versions till the next full or differential version.

See also Full, incremental and differential backups (p. 14).

## 5 Recovering data

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### 5.1 Recovering disks and partitions

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#### 5.1.1 Recovering your system after a crash

When your computer fails to boot, it is advisable to at first try to find the cause using the suggestions given in Trying to determine the crash cause (p. 38). If the crash is caused by corruption of the operating system, use a backup to recover your system. Make the preparations described in Preparing for recovery (p. 38) and then proceed with recovering your system.

##### 5.1.1.1 Trying to determine the crash cause

A system crash can be due to two basic factors:

- **Hardware failure**

In this scenario, it is better to let your service center handle the repairs. However, you may want to perform some routine tests. Check the cables, connectors, power of external devices, etc. Then, restart the computer. If there is a hardware problem, the Power-On Self Test (POST) will inform you about the failure.

If the POST does not reveal a hardware failure, enter BIOS and check whether it recognizes your system hard disk drive. To enter BIOS, press the required key combination (**Del**, **F1**, **Ctrl+Alt+Esc**, **Ctrl+Esc**, or some other, depending on your BIOS) during the POST sequence. Usually the message with the required key combination is displayed during the startup test. Pressing this combination takes you to the setup menu. Go to the hard disk autodetection utility which usually comes under "Standard CMOS Setup" or "Advanced CMOS setup". If the utility does not detect the system drive, it has failed and you need to replace the drive.

- **Operating system corruption (Windows cannot start up)**

If the POST correctly detects your system hard disk drive, then the cause of the crash is probably a virus, malware or corruption of a system file required for booting. In this case, recover the system using a backup of your system disk or system partition. Refer to Recovering your system (p. 39) for details.

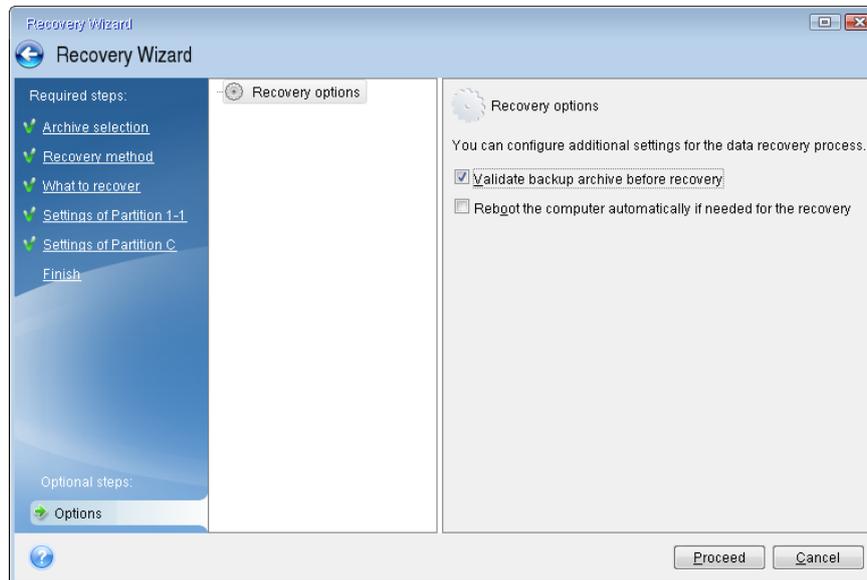
##### 5.1.1.2 Preparing for recovery

We recommend that you perform the following actions before recovery:

- Scan the computer for viruses if you suspect that the crash occurred due to a virus or malware attack.
- Under bootable media, try a test recovery to a spare hard drive, if you have one.
- Validate the image under bootable media. A backup that can be read during validation in Windows, **may not always be readable in a Linux environment.**

**Under bootable media, there are two ways to validate a backup:**

- To validate a backup manually, on the **Recovery** tab, right-click a backup and select **Validate Archive**.
- To validate a backup automatically before recovery, on the **Options** step of the **Recovery Wizard**, select the **Validate backup archive before recovery** check box.



- Assign unique names (labels) to all partitions on your hard drives. This will make finding the disk containing your backups easier.

When you use the QSAN Xreplicator rescue media, it creates disk drive letters that might differ from the way Windows identifies drives. For example, the D: disk identified in the standalone QSAN Xreplicator might correspond to the E: disk in Windows.

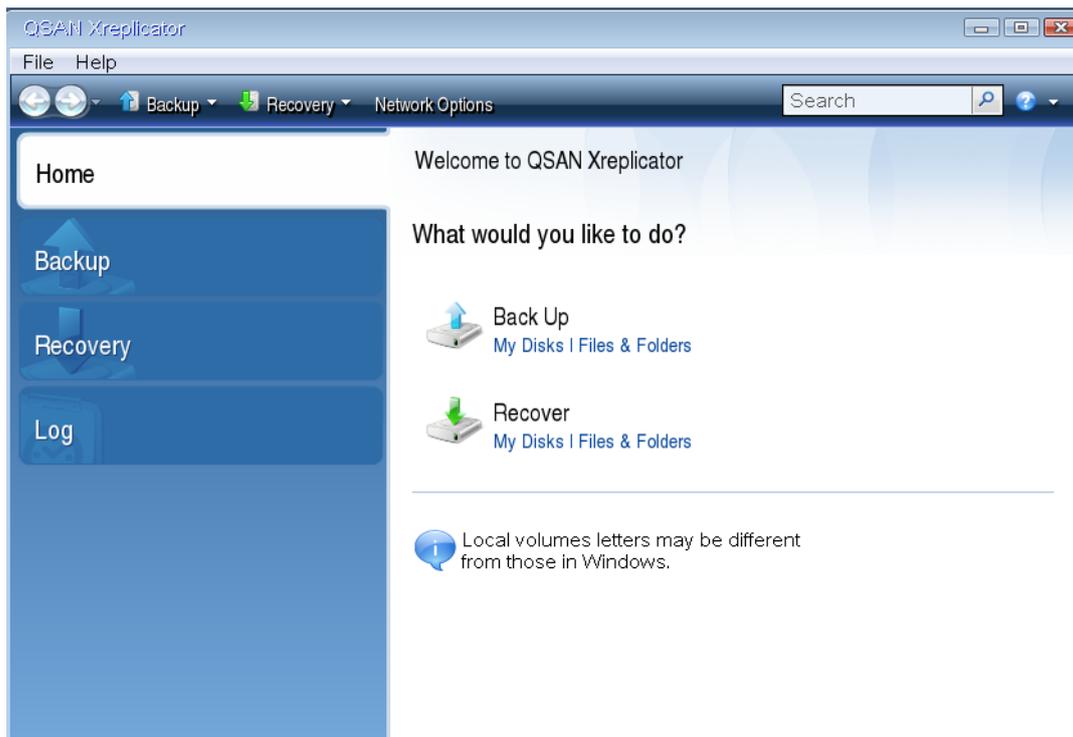
### 5.1.1.3 Recovering your system to the same disk

Before you start, we recommend that you complete the procedures described in Preparing for recovery (p. 38).

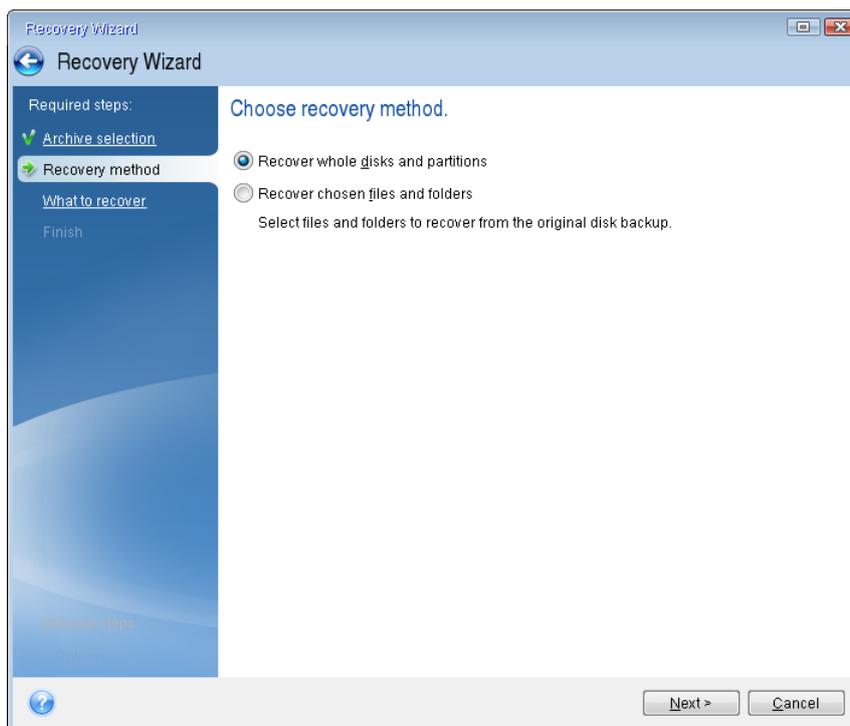
#### To recover your system:

1. Attach the external drive if it contains the backup to be used for recovery and make sure that the drive is powered on.
2. Arrange the boot order in BIOS so as to make your rescue media device (CD, DVD or USB stick) the first boot device. See Arranging boot order in BIOS (p. 50).
3. Boot from the rescue media and select **QSAN Xreplicator**.

4. On the **Home** screen, select **My disks** below **Recover**.

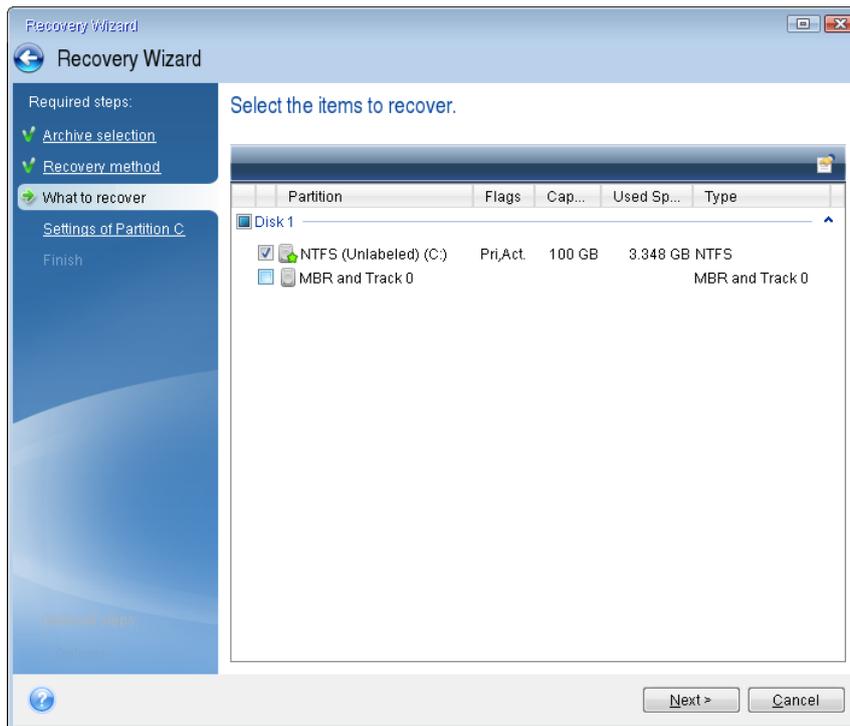


5. Select the system disk or partition backup to be used for recovery.  
When the backup is not displayed, click **Browse** and specify path to the backup manually.
6. Select **Recover whole disks and partitions** at the **Recovery method** step.

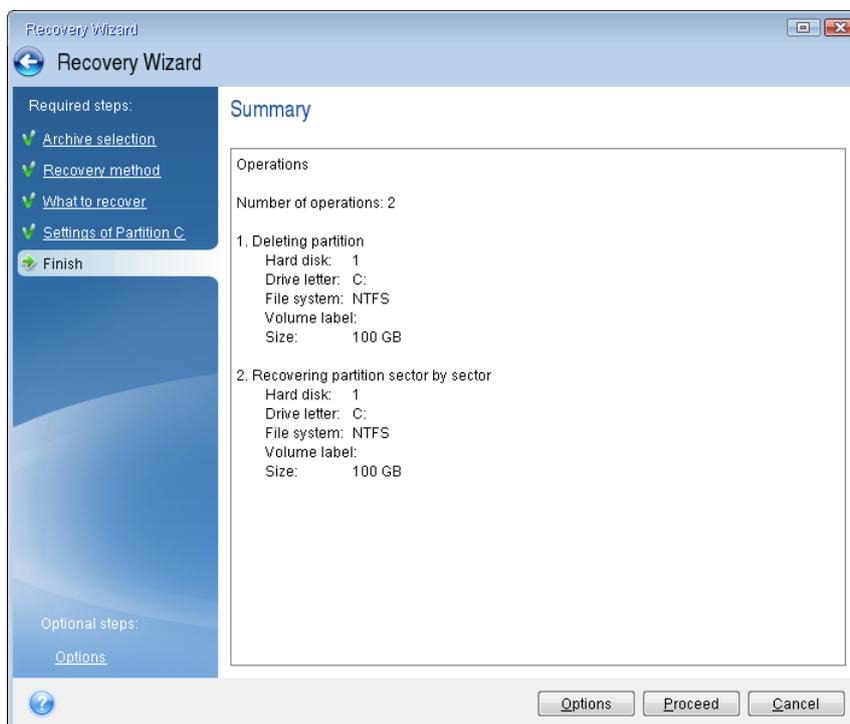


7. Select the system partition (usually C) on the **What to recover** screen. If the system partition has a different letter, select the partition using the **Flags** column. It must have the **Pri, Act** flags.

In case of Windows 7 the System Reserved partition will have the **Pri, Act** flags. You will need to select for recovery both the System Reserved partition and the System partition.



- At the "Settings of partition C" (or the letter of the system partition, if it is different) step check the default settings and click **Next** if they are correct. Otherwise, change the settings as required before clicking **Next**. Changing the settings will be needed when recovering to the new hard disk of a different capacity.
- Carefully read the summary of operations at the **Finish** step. If you have not resized the partition, the sizes in the **Deleting partition** and **Recovering partition** items must match. Having checked the summary click **Proceed**.



10. When the operation finishes, exit the standalone version of QSAN Xreplicator, remove the rescue media and boot from the recovered system partition. After making sure that you have recovered Windows to the state you need, restore the original boot order.

### 5.1.1.4 Recovering your system to a new disk under bootable media

Before you start, we recommend that you complete the preparations described in Preparing for recovery (p. 38). You do not need to format the new disk, as this will be done in the process of recovery.

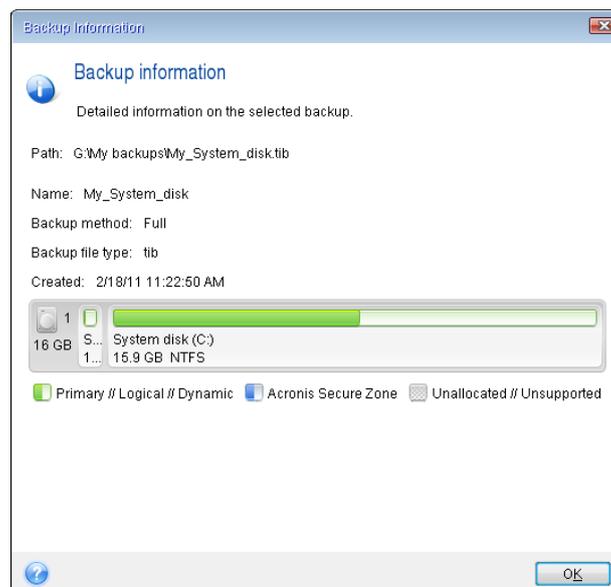
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*Warning! Your old and new hard drives must work in the same controller mode (for example, IDE or AHCI). Otherwise, your computer will not start from the new hard drive.*

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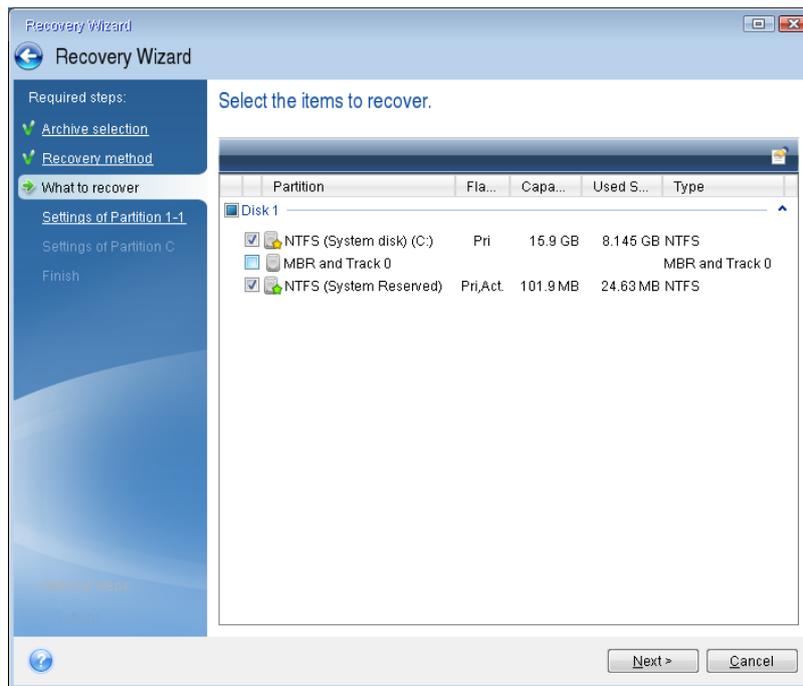
#### To recover your system to a new disk:

1. Install the new hard drive to the same position in the computer and use the same cable and connector that was used for the original drive. If this is not possible, install the new drive to where it will be used.
2. Attach the external drive if it contains the backup to be used for recovery and make sure that the drive is powered on.
3. Arrange the boot order in BIOS so as to make your rescue media device (CD, DVD or USB stick) the first boot device. See Arranging boot order in BIOS (p. 50).
4. Boot from the rescue media and select **QSAN Xreplicator**.
5. On the **Home** screen, select **My disks** below **Recover**.
6. Select the system disk or partition backup to be used for recovery. When the backup is not displayed, click **Browse** and specify path to the backup manually.
7. If you have a hidden partition (for example, the System Reserved partition or a partition created by the PC manufacturer), click **Details** on the wizard's toolbar. Please remember the location and size of the hidden partition, because these parameters need to be the same on your new disk.



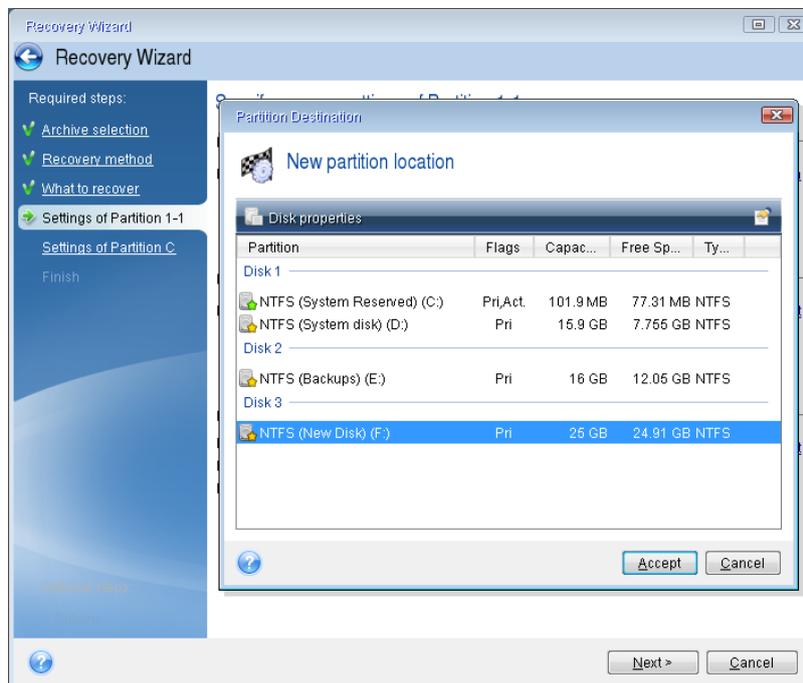
8. Select **Recover whole disks and partitions** at the **Recovery method** step.

9. On the **What to recover** step, select the boxes of the partitions to be recovered. Do not select the **MBR and Track 0** box.

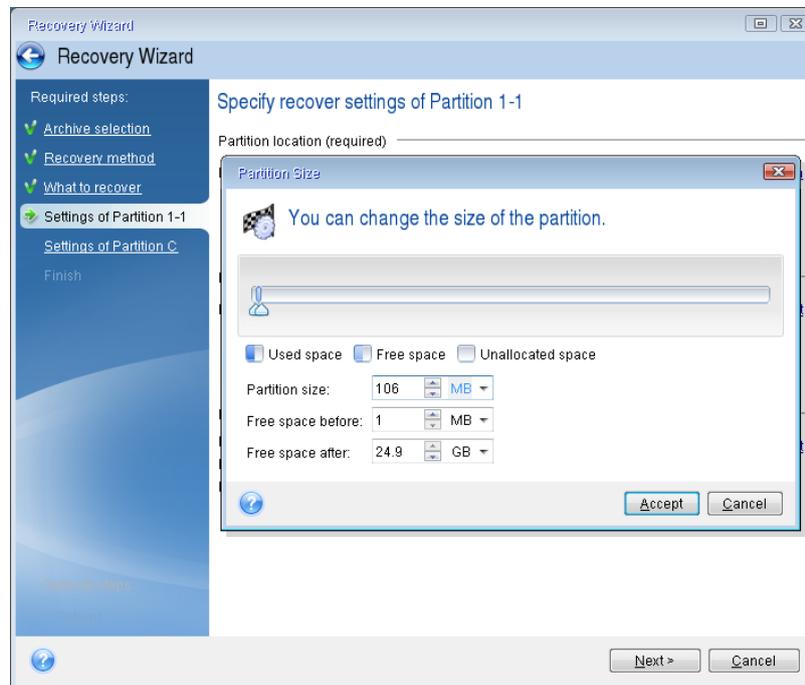


Selecting partitions leads to appearance of the relevant steps "Settings of partition ...". Note that these steps start with partitions which do not have an assigned disk letter (as usually is the case with hidden partitions). The partitions then take an ascending order of partition disk letters. This order cannot be changed. The order may differ from the physical order of the partitions on the hard disk.

10. On the Settings of the hidden partition step (usually named Settings of Partition 1-1), specify the following settings:
  - **Location.** Click **New location**, select your new disk by either its assigned name or capacity, and then click **Accept**.

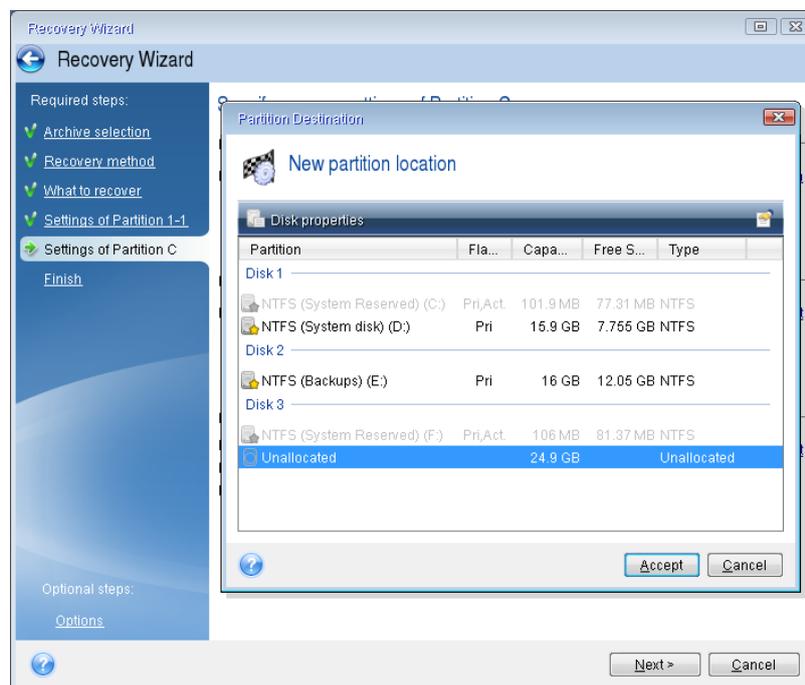


- **Type.** Check the partition type and change it, if necessary. Ensure that the System Reserved partition (if any) is primary and marked as active.
- **Size.** Click **Change default** in the Partition size area. By default the partition occupies the entire new disk. Enter the correct size in the Partition size field (you can see this value on the **What to recover** step). Then drag this partition to the same location that you saw in the Backup Information window, if necessary. Click **Accept**.



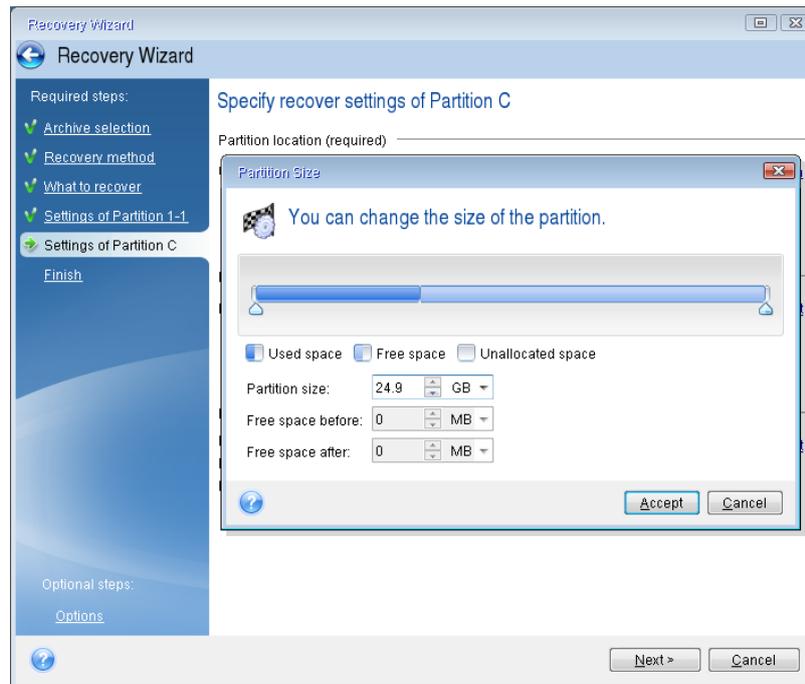
11. On the **Settings of Partition C** step, specify the settings for the second partition, which in this case is your system partition.

- Click **New location**, and then select unallocated space on the destination disk that will receive the partition.



- Change the partition type, if necessary. The system partition must be primary.

- Specify the partition size, which by default equals the original size. Usually there is no free space after the partition, so allocate all the unallocated space on the new disk to the second partition. Click **Accept**, and then click **Next**.



12. Carefully read the summary of operations to be performed and then click **Proceed**.

If your original disk contains a hidden partition created by the PC manufacturer, please proceed to MBR recovery. You need to recover the MBR because the PC manufacturer could change the generic Windows MBR or a sector on track 0 to provide access to the hidden partition.

- Select the same backup again. Right-click and select **Recover** in the shortcut menu. Choose **Recover whole disks and partitions** at the Recovery method step and then select the **MBR and Track 0** box.
- At the next step, select the destination disk as the target for MBR recovery. You can also recover the disk signature. Refer to *Selecting target disk for MBR recovery* (p. 45) for details.

Click **Next** and then **Proceed**. After MBR recovery is complete, exit the standalone version of QSAN Xreplicator.

### When the recovery is complete

Before you boot the computer, please disconnect the old drive (if any). If Windows "sees" both the new and old drive during the boot, this will result in problems booting Windows. If you upgrade the old drive to a larger capacity new one, disconnect the old drive before the first boot.

Remove the rescue media and boot the computer to Windows. It may report that new hardware (hard drive) is found and Windows needs to reboot. After making sure that the system operates normally, restore the original boot order.

### Selecting target disk for MBR recovery

In this window you should select a hard disk for recovering the Master Boot Record (MBR) along with track 0.

## Recover disk signature check box

If you have selected MBR recovery at the **Content selection** step, the **Recover disk signature** check box will be in the bottom left corner. Disk signature is a part of a hard disk MBR. It is used for uniquely identifying the disk media.

We recommend that you select the **Recover disk signature** check box due to the following reasons:

- QSAN Xreplicator creates scheduled tasks using the signature of the source hard disk. If you recover the same disk signature, you don't need to re-create or edit the tasks created previously.
- Some installed applications use a disk signature for licensing and other purposes.
- If you use Windows Restore Points, they will be lost when the disk signature is not recovered.
- Recovering a disk signature allows recovering VSS snapshots used by Windows Vista and Windows 7's "Previous Versions" feature.

We recommend that you clear the **Recover disk signature** check box when:

- You use an image backup not for disaster recovery but for cloning your Windows hard drive to another one.

In this case, QSAN Xreplicator generates a new disk signature for the recovered hard drive, even if you recover to the same drive.

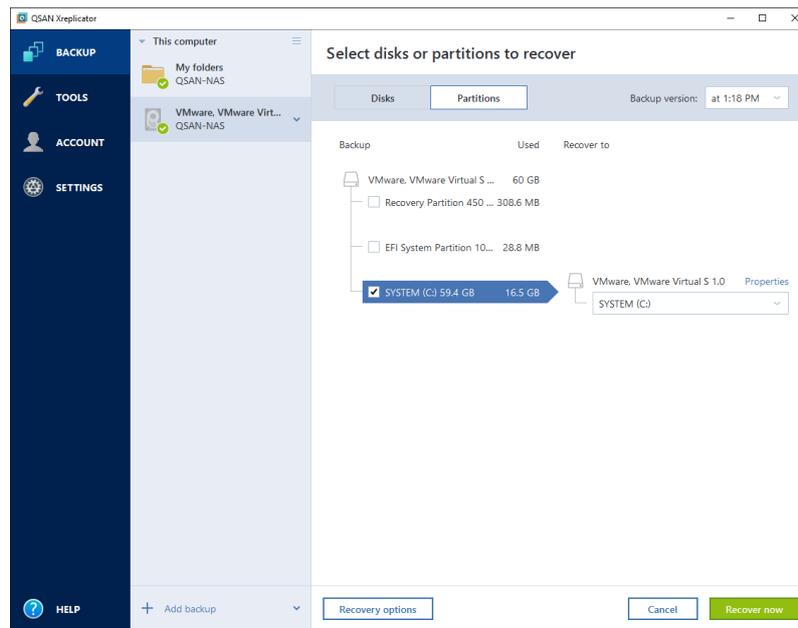
Having selected a hard disk drive and specified whether to recover the disk signature, click **Next** to continue.

## 5.1.2 Recovering partitions and disks

### To recover partitions or disks:

1. Start QSAN Xreplicator.
2. In the **Backup** section, select the backup which contains the partitions or disks you want to recover, and then click **Recover disks**.

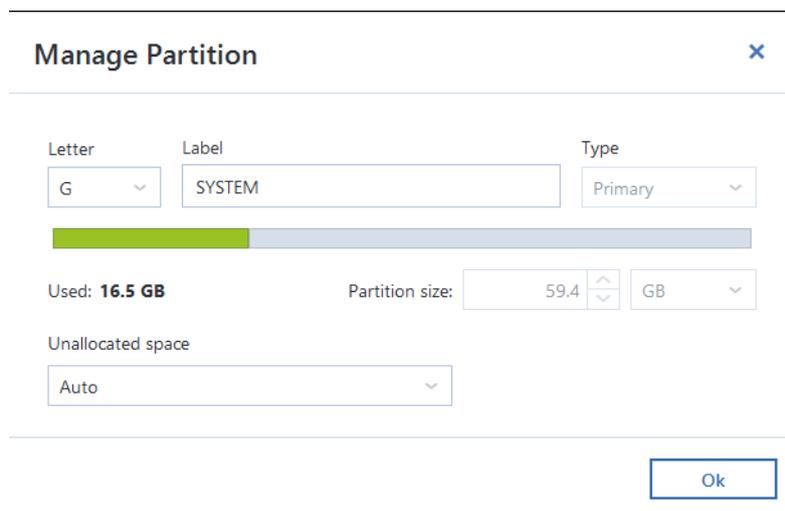
- In the **Backup version** list, select the backup version you want to recover by its backup date and time.



- Select the disks to recover.  
If you need to recover separate partitions, click **Recover specific partitions**, and then select the partitions to recover.
- In the recovery destination field below the partition name, select the destination partition. Unsuitable partitions are marked by red lettering. Note that all data on the destination partition will be lost because it is replaced by the recovered data and file system.  
*To recover to the original partition, at least 5 % of the partition space must be free. Otherwise, the **Recover now** button will be unavailable.*
- [optional step] To set up additional parameters for the disk recovery process, click **Options**.
- After you finish with your selections, click **Recover now** to start recovery.

### 5.1.2.1 Partition properties

When you recover partitions to a basic disk, you can change properties of these partitions. To open the **Partition Properties** window, click **Properties** next to the selected target partition.



You can change the following partition properties:

- **Letter**
- **Label**
- **Type**  
You can make the partition primary, primary active, or logical.
- **Size**  
You can resize the partition by dragging the right-side border with your mouse, on the horizontal bar on the screen. To assign the partition a specific size, enter the appropriate number into the **Partition size** field. You can also select the position of unallocated space—before or after the partition.

## 5.1.3 About recovery of dynamic/GPT disks and volumes

### Recovery of dynamic volumes

You can recover dynamic volumes to the following locations on the local hard drives:

- **Dynamic volume.**

---

*Manual resizing of dynamic volumes during recovery to dynamic disks is not supported. If you need to resize a dynamic volume during recovery, it should be recovered to a basic disk.*

---

  - **Original location (to the same dynamic volume).**  
The target volume type does not change.
  - **Another dynamic disk or volume.**  
The target volume type does not change. For example, when recovering a dynamic striped volume over a dynamic spanned volume the target volume remains spanned.
  - **Unallocated space of the dynamic group.**  
The recovered volume type will be the same as it was in the backup.
- **Basic volume or disk.**  
The target volume remains basic.
- **Bare-metal recovery.**  
When performing a so called "bare-metal recovery" of dynamic volumes to a new unformatted disk, the recovered volumes become basic. If you want the recovered volumes to remain dynamic, the target disks should be prepared as dynamic (partitioned and formatted). This can be done using third-party tools, for example, Windows Disk Management snap-in.

### Recovery of basic volumes and disks

- When recovering a basic volume to an unallocated space of the dynamic group, the recovered volume becomes dynamic.
- When recovering a basic disk to a dynamic disk of a dynamic group consisting of two disks, the recovered disk remains basic. The dynamic disk to which the recovery is performed becomes "missing" and a spanned/striped dynamic volume on the second disk becomes "failed".

### Partition style after recovery

The target disk's partition style depends on whether your computer supports UEFI and on whether your system is BIOS-booted or UEFI-booted. See the following table:

	<b>My system is BIOS-booted (Windows or QSAN Bootable Media)</b>	<b>My system is UEFI-booted (Windows or QSAN Bootable Media)</b>
<b>My source disk is MBR and my OS does not support UEFI</b>	The operation will not affect neither partition layout nor bootability of the disk: partition style will remain MBR, the destination disk will be bootable in BIOS.	After operation completion, the partition style will be converted to GPT style, but the operating system will fail booting from UEFI, since your operating system does not support it.
<b>My source disk is MBR and my OS supports UEFI</b>	The operation will not affect neither partition layout nor bootability of the disk: partition style will remain MBR, the destination disk will be bootable in BIOS.	The destination partition will be converted to GPT style that will make the destination disk bootable in UEFI. See Example of recovery to UEFI system (p. 49).
<b>My source disk is GPT and my OS supports UEFI</b>	After operation completion, the partition style will remain GPT, the system will fail booting on BIOS, because your operating system cannot support booting from GPT on BIOS.	After operation completion, the partition style will remain GPT, the operating system will be bootable on UEFI.

### Example of recovery procedure

See Example of recovery to a UEFI system (p. 49).

#### 5.1.3.1 Example of recovery to a UEFI system

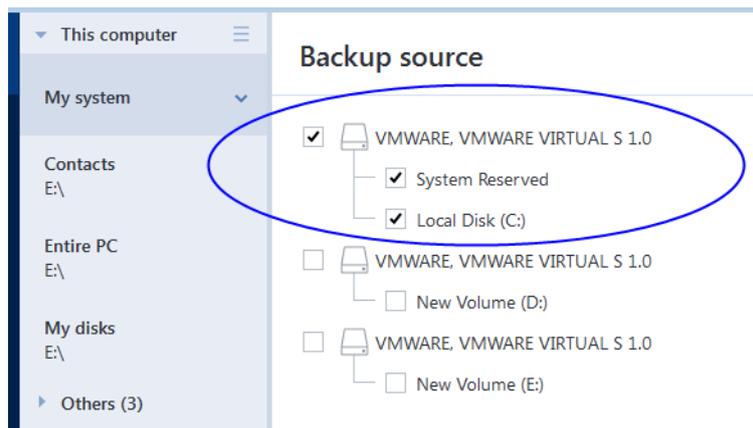
Here is an example for transferring a system with the following conditions:

- The source disk is MBR and the OS supports UEFI.
- The target system is UEFI-booted.
- Your old and new hard drives work in the same controller mode (for example, IDE or AHCI).

Before you start the procedure, please ensure that you have:

- **Bootable rescue media.**  
Refer to Creating bootable rescue media (p. 8) for details.
- **Backup of your system disk created in disk mode.**

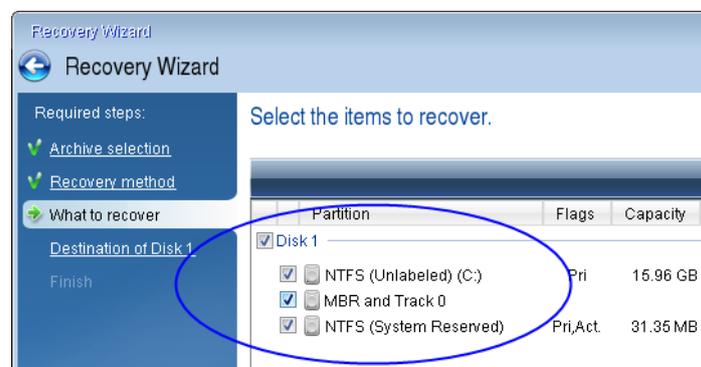
To create this backup, switch to disk mode, and then select the hard drive that contains your system partition. Refer to Backing up disks and partitions (p. 18) for details.



### To transfer your system from an MBR disk to a UEFI-booted computer:

1. Boot from the rescue media in UEFI mode and select QSAN Xreplicator.
2. Run the **Recovery wizard** and follow the instructions described in Recovering your system (p. 39).
3. On the **What to recover** step, select the check box next to the disk name to select the entire system disk.

In the example below, you need to select the **Disk 1** check box:



4. On the **Finish** step, click **Proceed**.

When the operation finishes, the destination disk is converted to GPT style so that it is bootable in UEFI.

After the recovery, please ensure that you boot your computer in UEFI mode. You may need to change the boot mode of your system disk in the user interface of the UEFI boot manager.

## 5.1.4 Arranging boot order in BIOS

To boot your computer from QSAN bootable rescue media, you need to arrange boot order in BIOS so the media is the first booting device.

### To boot from QSAN bootable media:

1. If you use a USB flash drive as a bootable media, plug it into the USB port.
2. Turn your computer on. During the Power-On Self Test (POST), you will see the key combination that you need to press in order to enter BIOS.

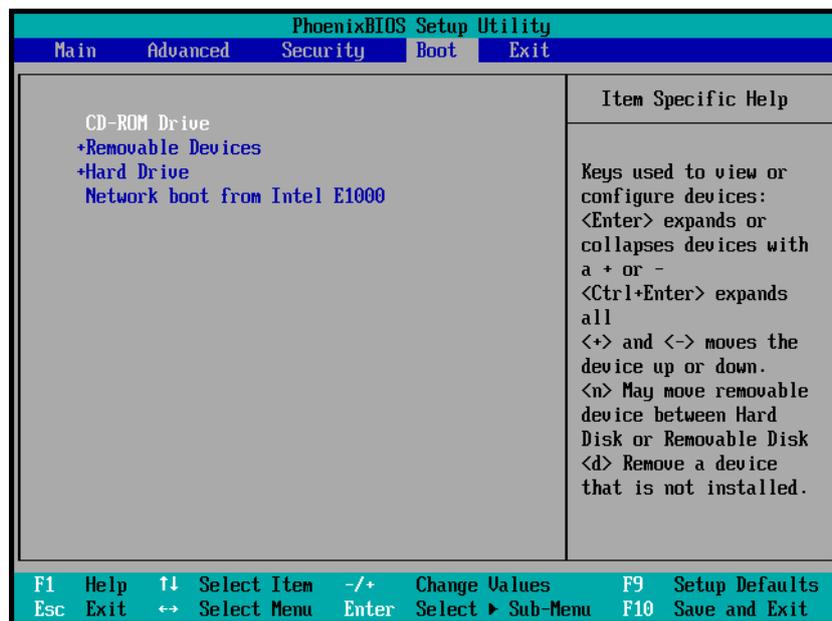
3. Press the key combination (such as, **Del**, **F1**, **Ctrl+Alt+Esc**, **Ctrl+Esc**). BIOS setup utility will open. Note that BIOS may differ in appearance, sets of items, names, etc.

---

*Some motherboards have a so called boot menu opened by pressing a certain key or key combination, for instance, **F12**. The boot menu allows selecting the boot device from a list of bootable devices without changing the BIOS setup.*

---

4. If you use a CD or DVD as a bootable media, insert it in the CD or DVD drive.
5. Make your rescue media (CD, DVD or USB drive) device the first booting device:
  1. Navigate to the Boot order setting by using the arrow keys on your keyboard.
  2. Place the pointer on the device of your bootable media and make it the first item in the list. You can usually use the Plus Sign and the Minus Sign keys to change the order.



6. Exit BIOS and save the changes that you made. The computer will boot from QSAN bootable media.

---

*If the computer fails to boot from the first device, it tries to boot from the second device in the list, and so on.*

---

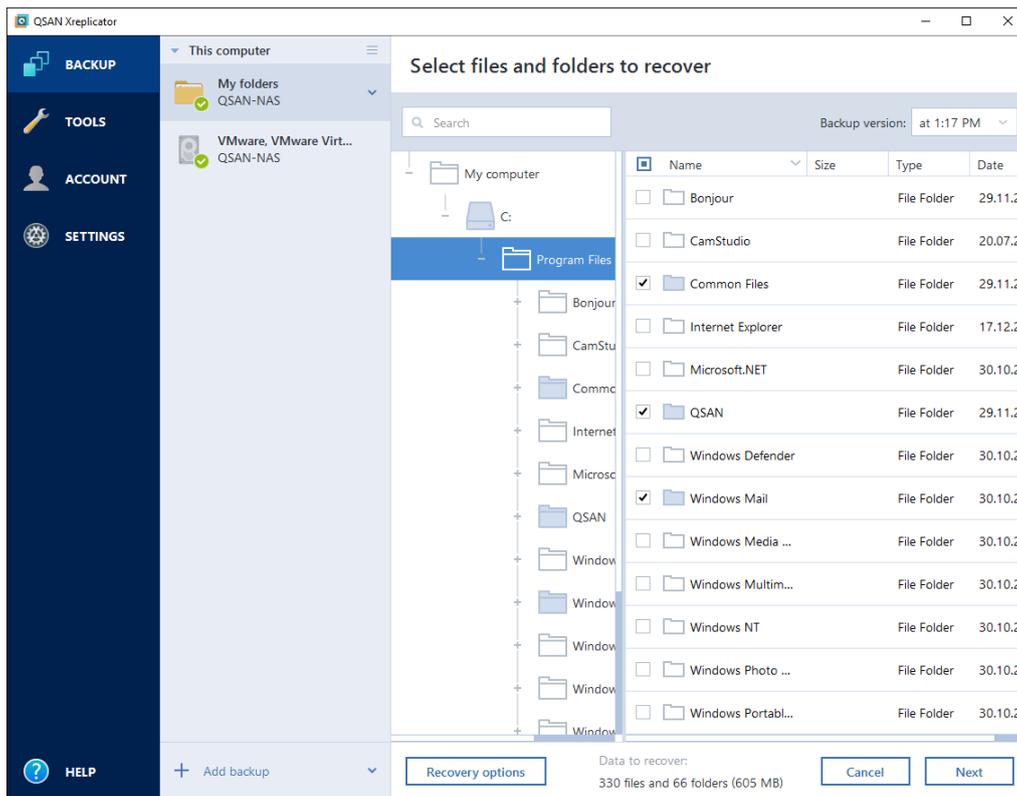
## 5.2 Recovering files and folders

You can recover files and folders both from file-level and disk-level backups.

### To recover files and folders:

1. Start QSAN Xreplicator.
2. On the sidebar, click **Backup**.
3. From the backup list, select the backup which contains the files or folders that you want to recover.
4. On the right panel, click **Recover files**.
5. Select backup version (data state on specific date and time).

6. Select the files and folders that you want to recover, and then click **Next**.



7. Select a destination on your computer to where you want to recover selected files/folders. You can recover data to its original location or choose a new one, if necessary. To choose a new location, click the **Browse** button.

When you choose a new location, the selected items will be recovered by default without recovering the original, absolute path. You may also wish to recover the items with their entire folder hierarchy. In this case select the **Keep the original folder structure** check box.

8. When needed, set the options for the recovery process (recovery process priority, file-level security settings, etc.). To set the options, click **Options**. The options you set here will be applied only to the current recovery operation.
9. To start the recovery process, click the **Recover now** button.  
You can stop the recovery by clicking **Cancel**. Please keep in mind that the aborted recovery may still cause changes in the destination folder.

## Recovering files in File Explorer

### To recover files and folders directly from File Explorer:

1. Double-click the corresponding .tib file, and then browse to the file or folder that you want to recover.
2. Copy the file or folder to a hard disk.

*Note: The copied files lose the "Compressed" and "Encrypted" attribute. If you need to keep these attributes, it is recommended to recover the backup.*

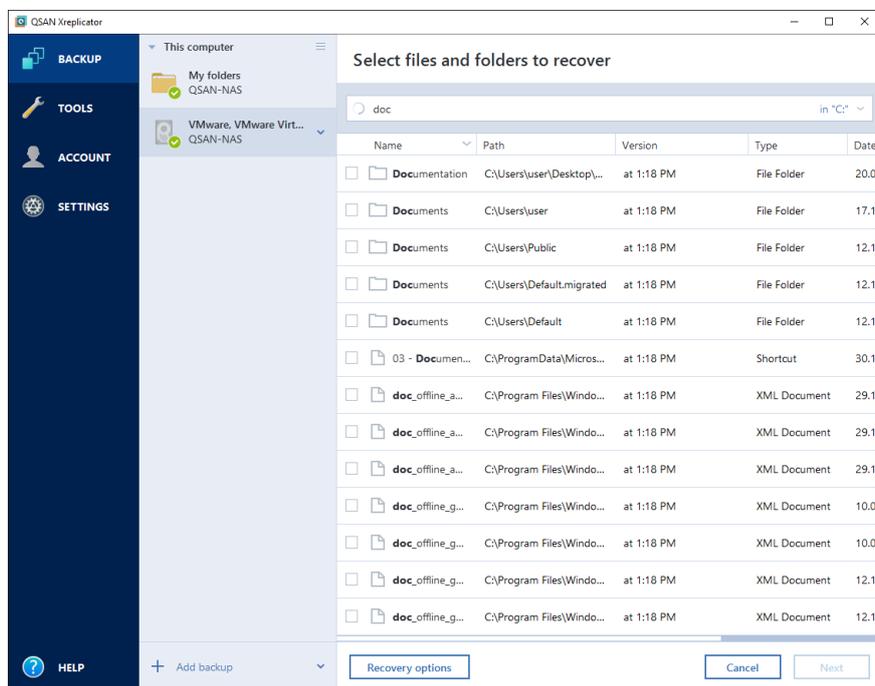
## 5.3 Searching backup content

While recovering data from local backups, you can search for specific files and folders stored in the selected backup.

### To search for files and folders:

1. Start recovering data as described in Recovering partitions and disks (p. 46) or Recovering files and folders (p. 51).
2. When selecting files and folders to recover, enter the file or folder name into the **Search** field. The program shows search results.

You can also use the common Windows wildcard characters: \* and ?. For example, to find all files with extension **.exe**, enter **\*.exe**. To find all .exe files with names consisting of five symbols and starting with “my”, enter **My????.exe**.



3. By default, QSAN Xreplicator searches the folder selected on the previous step. To include the entire backup in the search, click the down arrow, and then click **in entire backup**. To return to the previous step, delete the search text, and then click the cross icon.
4. After the search is complete, select the files that you want to recover, and then click **Next**.

*Note: Pay attention to the Version column. The files and folders that belong to different backup versions cannot be recovered at the same time.*

## 5.4 Recovery options

In the **Disk Recovery Options** and **File Recovery Options** windows you can configure options for a disk/partition and file recovery processes respectively. After you installed the application, all options are set to the initial values. You can change them for your current recovery operation only or for all further recovery operations as well. Select the **Save the settings as default** check box to apply the modified settings to all further recovery operations by default.

Note, that disk recovery options and file recovery options are fully independent, and you should configure them separately.

If you want to reset all the modified options to their initial values that were set after the product installation, click the **Reset to initial settings** button.

## In this section

Disk recovery mode .....	54
Pre/Post commands for recovery .....	54
Validation option.....	55
Computer restart .....	55
File recovery options.....	55
Overwrite file options .....	55
Performance of recovery operation .....	56
Notifications for recovery operation .....	56

### 5.4.1 Disk recovery mode

With this option you can select the disk recovery mode for image backups.

- **Recover sector-by-sector** - select this check box if you want to recover both used and unused sectors of disks or partitions. This option will be effective only when you choose to recover a sector-by-sector backup.

### 5.4.2 Pre/Post commands for recovery

You can specify commands (or even batch files) that will be automatically executed before and after the recovery procedure.

For example, you may want to start/stop certain Windows processes, or check your data for viruses before recovery.

To specify commands (batch files):

- Select a command to be executed before the recovery process starts in the **Pre-command** field. To create a new command or select a new batch file, click the **Edit** button.
- Select a command to be executed after the recovery process ends in the **Post-command** field. To create a new command or select a new batch file, click the **Edit** button.

Please do not try to execute interactive commands, i.e. commands that require user input (for example, "pause"). These are not supported.

#### 5.4.2.1 Edit user command for recovery

You can specify user commands to be executed before or after recovery:

- In the **Command** field type-in a command or select it from the list. Click ... to select a batch file.
- In the **Working directory** field type-in a path for command execution or select it from the list of previously entered paths.
- In the **Arguments** field enter or select command execution arguments from the list.

Disabling the **Do not perform operations until the command execution is complete** parameter (enabled by default), will permit the recovery process to run concurrently with your command execution.

The **Abort the operation if the user command fails** (enabled by default) parameter will abort the operation if any errors occur in command execution.

You can test the command you entered by clicking the **Test command** button.

### 5.4.3 Validation option

- **Validate backup before recovery**—Enable this option to check the backup integrity before recovery.
- **Check the file system after recovery**—Enable this option to check the file system integrity on the recovered partition.

---

*Only FAT16/32 and NTFS file systems can be checked.*

*The file system will not be checked if a reboot is required during recovery, for example, when recovering the system partition to its original place.*

---

### 5.4.4 Computer restart

If you want the computer to reboot automatically when it is required for recovery, select the **Restart the computer automatically if needed for the recovery** check box. This may be used when a partition locked by the operating system has to be recovered.

### 5.4.5 File recovery options

You can select the following file recovery options:

- **Recover files with their original security settings** - if the file security settings were preserved during backup (see File-level security settings for backup), you can choose whether to recover them or let the files inherit the security settings of the folder where they will be recovered to. This option is effective only when recovering files from file/folder backups.
- **Set current date and time for recovered files** - you can choose whether to recover the file date and time from the backup or assign the files the current date and time. By default the file date and time from the backup will be assigned.

### 5.4.6 Overwrite file options

Choose what to do if the program finds a file in the target folder with the same name as in the backup.

---

*This option is available only while restoring data from file-level backups.*

---

Selecting the **Overwrite existing files** check box will give the files from the backup unconditional priority over the files on the hard disk, though, by default, the more recent files and folders are protected against overwriting. If you want to overwrite those files and folders too, clear the appropriate check box.

If you do not need to overwrite some files:

- Select/clear the **Hidden files and folders** check box to enable/disable overwriting of all hidden files and folders.
- Select/clear the **System files and folders** check box to enable/disable overwriting of all system files and folders.
- Select/clear the **More recent files and folders** check box to enable/disable overwriting of new files and folders.
- Click **Add specific files and folders** to manage the list of custom files and folders that you do not want to overwrite.

- To disable overwriting of specific files, click the **Add...** button to create an exclusion criterion.
- While specifying the criteria, you can use the common Windows wildcard characters. For example, to preserve all files with extension **.exe**, you can add **\*.exe**. Adding **My???.exe** will preserve all **.exe** files with names consisting of five symbols and starting with “my”.

To delete a criterion, for example, added by mistake, click the Delete icon to the right of the criterion.

## 5.4.7 Performance of recovery operation

On the **Performance** tab you can configure the following settings:

### Operation priority

Changing the priority of a backup or recovery process can make it run faster or slower (depending on whether you raise or lower the priority), but it can also adversely affect the performance of other running programs. The priority of any process running in a system, determines the amount of CPU usage and system resources allocated to that process. Decreasing the operation priority will free more resources for other CPU tasks. Increasing backup or recovery priority may speed up the process by taking resources from the other currently running processes. The effect will depend on total CPU usage and other factors.

You can set up the operation priority:

- **Low** (enabled by default) - the backup or recovery process will run slower, but the performance of other programs will be increased.
- **Normal** - the backup or recovery process will have the equal priority with other processes.
- **High** - the backup or recovery process will run faster, but the performance of other programs will be reduced. Be aware that selecting this option may result in 100% CPU usage by QSAN Xreplicator.

## 5.4.8 Notifications for recovery operation

### Free disk space threshold

You may want to be notified when the free space on the backup storage becomes less than the specified threshold value. If after starting a backup QSAN Xreplicator finds out that the free space in the selected backup location is already less than the specified value, the program will not begin the actual backup process and will immediately inform you by displaying an appropriate message. The message offers you three choices - to ignore it and proceed with the backup, to browse for another location for the backup or to cancel the backup.

If the free space becomes less than the specified value while the backup is being run, the program will display the same message and you will have to make the same decisions.

#### To set the free disk space threshold:

- Select the **Show notification message on insufficient free disk space** check box
- In the **Size** box, type or select a threshold value and select a unit of measure

QSAN Xreplicator can monitor free space on the following storage devices:

- Local hard drives

- USB cards and drives
- Network shares (SMB/NFS)

---

*The message will not be displayed if the **Do not show messages and dialogs while processing (silent mode)** check box is selected in the **Error handling** settings.*

*This option cannot be enabled for FTP servers and CD/DVD drives.*

---

## 6 Creating bootable rescue media

You can run QSAN Xreplicator from a bootable media on a bare-metal system or a crashed computer that cannot boot. You can even back up disks on a non-Windows computer, copying all its data into the backup by imaging the disk in the sector-by-sector mode. To do so, you need bootable media that has a copy of the standalone QSAN Xreplicator version installed on it.

### How you can obtain bootable media:

- Use the installation CD of the boxed product.
- Make a media bootable with QSAN Media Builder (p. 57):
  - Blank CD
  - Blank DVD
  - USB flash drive

Note: The data it may contain will not be modified.

- Create an .iso image file to burn it afterwards onto a CD or DVD.

### 6.1 QSAN Media Builder

QSAN Media Builder allows you to make a USB flash drive or a blank CD/DVD bootable. In case Windows cannot start, use the bootable media to run a standalone version of QSAN Xreplicator and recover your computer.

#### Notes

- We recommend that you create a new bootable media after each QSAN Xreplicator update.
- If you use non-optical media, the media must have FAT16 or FAT32 file system.
- When booting from the Rescue Media, you cannot perform backups to disks or partitions with Ext2/Ext3/Ext4, ReiserFS, and Linux SWAP file systems.
- When booting from the rescue media and using a standalone version of QSAN Xreplicator you cannot recover files and folders encrypted with use of the encryption available in Windows XP and later operating systems. For more information, see File-level security settings for backup. On the other hand, backups encrypted using the QSAN Xreplicator encryption feature can be recovered.

#### 6.1.1 Creating bootable media

##### To create bootable media:

1. Plug in a USB flash drive, or insert a blank CD or DVD.
2. Start QSAN Xreplicator.

3. In the **Tools** section, click **Rescue Media Builder**.
4. Select a destination for the media:
  - **CD**
  - **DVD**
  - **USB flash drive**

If your drive has an unsupported file system, QSAN Xreplicator will suggest formatting it to FAT file system.

---

**Warning!** *Formatting permanently erases all data on a disk.*

---
  - **ISO image file**

You will need to specify the .iso file name and the destination folder.

When the .iso file is created, you can burn it onto a CD or DVD. For example, in Windows 7 and later, you can do this using a built-in burning tool. In File Explorer, double-click the created ISO image file, and then click **Burn**.
5. Click **Proceed**.

## 6.1.2 Bootable media startup parameters

Here, you can set bootable media startup parameters in order to configure rescue media boot options for better compatibility with different hardware. Several options are available (nousb, nomouse, noapic, etc.). These parameters are provided for advanced users. If you encounter any hardware compatibility problems while testing boot from the rescue media, it may be best to contact the product's support team.

### To add a startup parameter

- Enter a command into the **Parameters** field.
- Having specified the startup parameters, click **Next** to continue.

Additional parameters that can be applied prior to booting Linux kernel

### Description

The following parameters can be used to load Linux kernel in a special mode:

- **acpi=off**

Disables ACPI and may help with a particular hardware configuration.

- **noapic**

Disables APIC (Advanced Programmable Interrupt Controller) and may help with a particular hardware configuration.

- **nousb**

Disables loading of USB modules.

- **nousb2**

Disables USB 2.0 support. USB 1.1 devices still work with this option. This option allows using some USB drives in USB 1.1 mode, if they do not work in USB 2.0 mode.

- **quiet**

This parameter is enabled by default and the startup messages are not displayed. Deleting it will result in the startup messages being displayed as the Linux kernel is loaded and the command shell being offered prior to running the QSAN program.

- **nodma**

Disables DMA for all IDE disk drives. Prevents kernel from freezing on some hardware.

- **nofw**

Disables FireWire (IEEE1394) support.

- **nopcmcia**

Disables PCMCIA hardware detection.

- **nomouse**

Disables mouse support.

- **[module name]=off**

Disables the module (e.g. **sata\_sis=off**).

- **pci=bios**

Forces to use PCI BIOS, and not to access the hardware device directly. For instance, this parameter may be used if the machine has a non-standard PCI host bridge.

- **pci=nobios**

Disallows use of PCI BIOS; only direct hardware access methods are allowed. For instance, this parameter may be used if you experience crashes upon boot-up, probably caused by the BIOS.

- **pci=biosirq**

Uses PCI BIOS calls to get the interrupt routing table. These calls are known to be buggy on several machines and they hang the machine when used, but on other computers it is the only way to get the interrupt routing table. Try this option, if the kernel is unable to allocate IRQs or discover secondary PCI buses on your motherboard.

- **vga=ask**

Gets the list of the video modes available for your video card and allows selecting a video mode most suitable for the video card and monitor. Try this option, if the automatically selected video mode is unsuitable for your hardware.

## 6.2 Making sure that your rescue media can be used when needed

To maximize the chances of your computer's recovery, you must test that your computer can boot from the rescue media. In addition, you must check that the rescue media recognizes all your computer's devices, such as the hard drives, the mouse, the keyboard, and network adapter.

### To test the rescue media

---

*If you use external drives for storing your backups, you must attach the drives before booting from the rescue CD. Otherwise, the program might not detect them.*

---

1. Configure your computer to enable booting from the rescue media. Then, make your rescue media device (CD-ROM/DVD-ROM drive or USB stick) the first boot device. See Arranging boot order in BIOS.

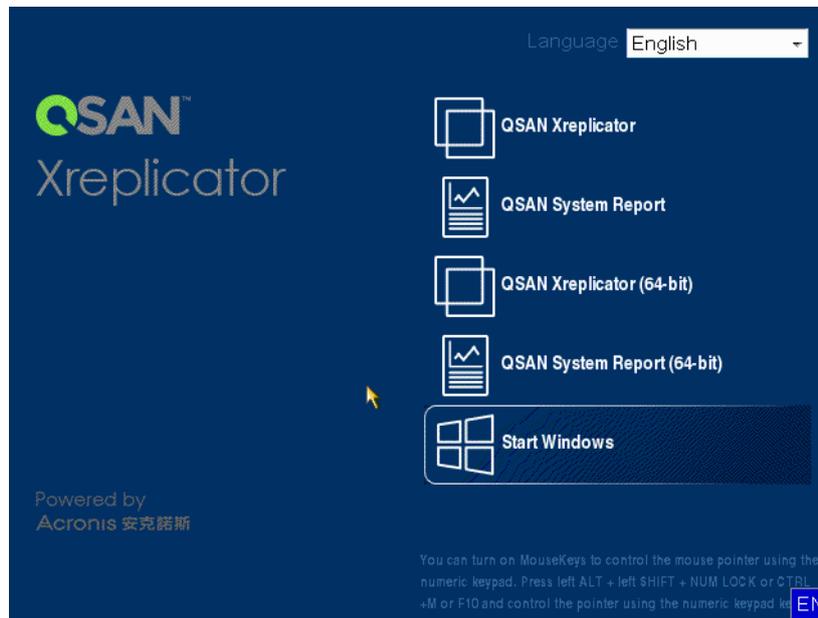
2. If you have a rescue CD, press any key to start booting from the CD, when you see the prompt "Press any key to boot from CD". If you do not press a key within five seconds, you will need to restart the computer.
3. After the boot menu appears, choose **QSAN Xrepliator**.

---

*If your wireless mouse does not work, try to replace it with a wired one. The same recommendation applies to the keyboard.*

*If you do not have a spare mouse or keyboard, contact QSAN Support. They will build a custom rescue CD that will have drivers for your models of the mouse and keyboard. Please be aware that finding the appropriate drivers and making the custom rescue CD may take some time. Furthermore, this may be impossible for some models.*

---



4. When the program starts, we recommend you try recovering some files from your backup. A test recovery allows you to make sure that your rescue CD can be used for recovery. In addition, you will check that the program detects all the hard drives you have in your system.

---

*If you have a spare hard drive, we strongly recommend that you try a test recovery of your system partition to this hard drive.*

---

## How to test recovery, as well as check the drives and network adapter

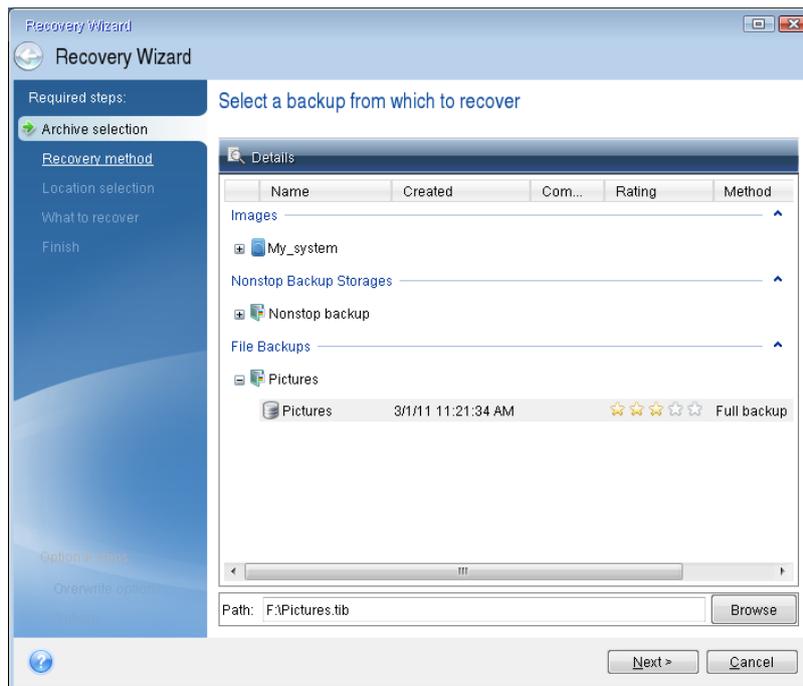
1. If you have file backups, start Recovery Wizard by clicking **Recovery -> File Recovery** on the toolbar.

---

*If you have only disk and partition backup, Recovery Wizard also starts and the recovery procedure is similar. In such a case, you need to select **Recover chosen files and folders** at the **Recovery Method** step.*

---

2. Select a backup at the **Archive location** step and then click **Next**.

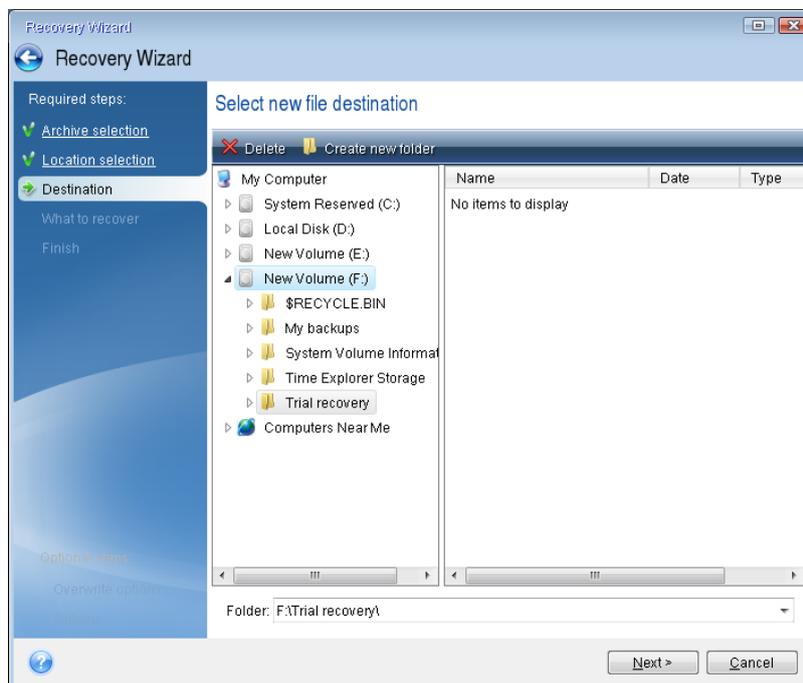


3. When recovering files with the rescue CD you are able to select only a new location for the files to be recovered. Therefore just click **Next** at the **Location selection** step.
4. After the **Destination** window opens, check that all your drives are shown under **My Computer**.

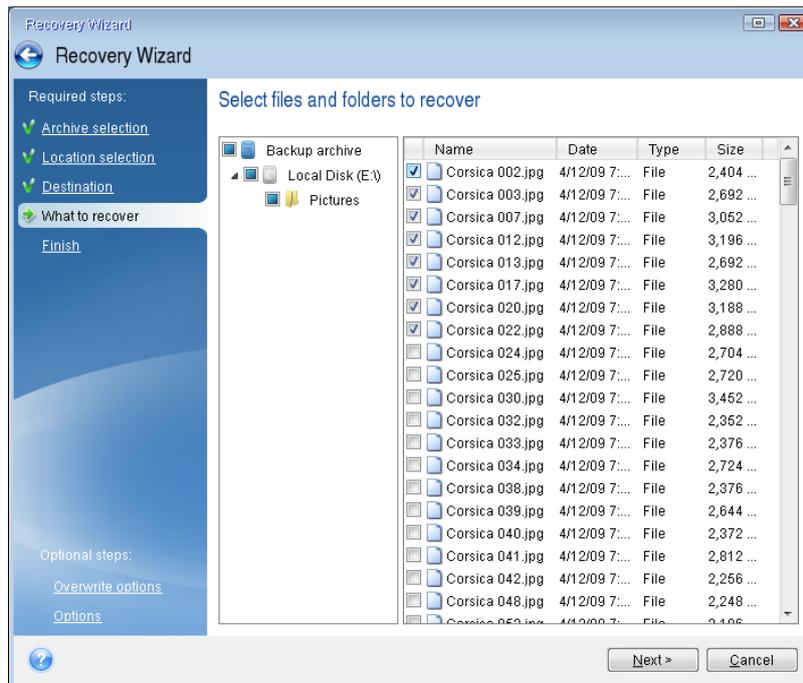
*If you store your backups on the network, you should also check that you can access the network.*

*If no computers are visible on the network, but the **Computers Near Me** icon is found under **My Computer**, specify network settings manually. To do this, open the window available at **Tools & Utilities** → **Options** → **Network adapters**.*

*If the **Computers Near Me** icon is not available under **My Computer**, there may be problems either with your network card or with the card driver provided with QSAN Xreplicator.*



5. Select the destination for the files and then click Next.
6. Select several files for recovery by selecting their check boxes and then click **Next**.



7. Click **Proceed** on the Summary window to start recovery.
8. After the recovery finishes, exit the standalone QSAN Xreplicator.

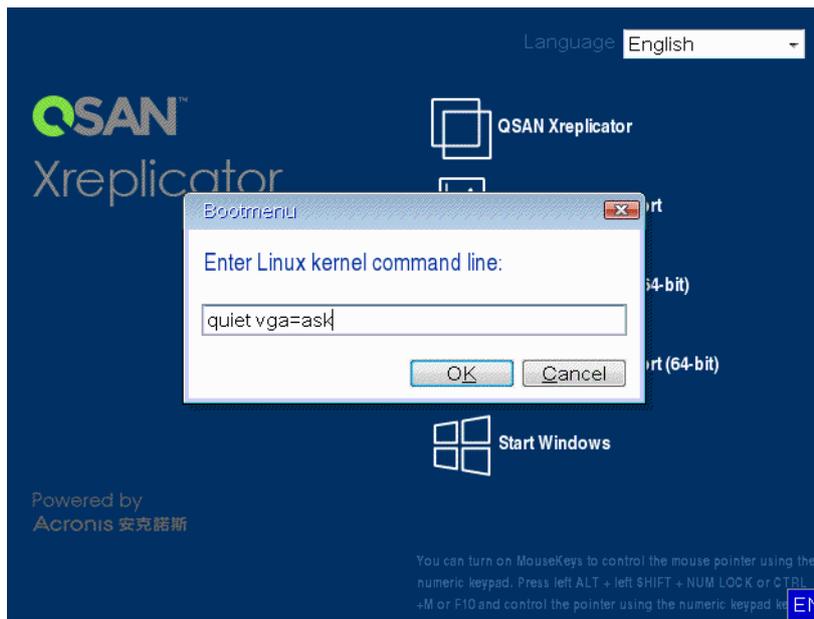
Now you can be reasonably sure that your rescue CD will help you when needed.

### 6.2.1 Selecting video mode when booting from the rescue media

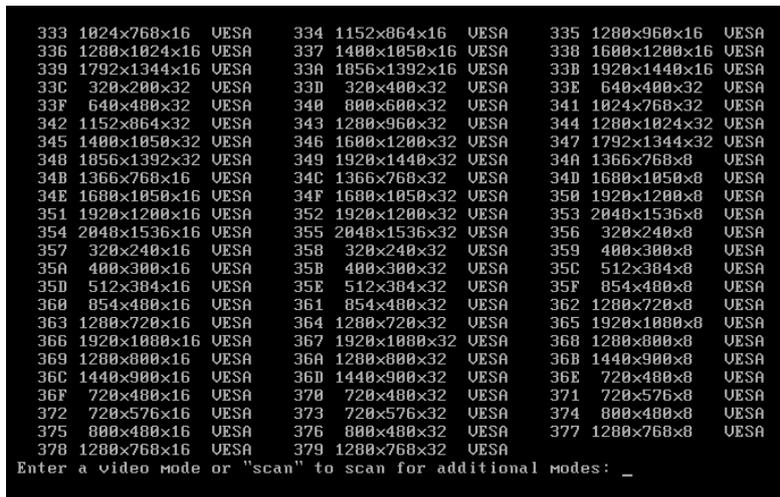
When booting from the rescue media the optimal video mode is selected automatically depending on the specifications of your video card and monitor. However, sometimes the program can select the wrong video mode, which is unsuitable for your hardware. In such case you can select a suitable video mode as follows:

1. Start booting from the rescue media. When the boot menu appears, hover the mouse over **QSAN Xreplicator** item and press the F11 key.

- When the command line appears, type "vga=ask" (without quotes) and click **OK**.



- Select **QSAN Xreplikator** in the boot menu to continue booting from the rescue media. To see the available video modes, press the Enter key when the appropriate message appears.
- Choose a video mode you think best suitable for your monitor and type its number in the command line. For instance, typing 338 selects video mode 1600x1200x16 (see the below figure).



- Wait until QSAN Xreplikator starts and make sure that the quality of the Welcome screen display on your monitor suits you.

To test another video mode, close QSAN Xreplikator and repeat the above procedure.

After you find the optimal video mode for your hardware, you can create a new bootable rescue media that will automatically select that video mode.

To do this, start QSAN Media Builder, select the required media components, and type the mode number with the "0x" prefix (0x338 in our instance) in the command line at the "Bootable media startup parameters" step, then create the media as usual.

## 7 QSAN System Report

When you contact the product's support team, they usually need information about your system in order to resolve your problem. Sometimes getting the information is an inconvenient process and may take a long time. The Generate system report tool simplifies the procedure. It generates a system report containing all the necessary technical information and allows you to save the information to file. When it's necessary, you can attach the created file to your problem description and send it to the product's support team. This will simplify and speed up the search for a solution.

**To generate a system report, perform one of the following:**

- On the main program window click the question mark symbol, and select **Generate system report**.
- On the Windows **Start** menu, click **All Programs -> QSAN -> Xreplicator -> Tools and Utilities -> QSAN System Report**.
- Press **CTRL+F7**. Note that you can use the key combination even when QSAN Xreplicator is performing any other operation.

**After the report is generated:**

- To save the generated system report to file, click **Save** and in the opened window specify a location for the created file.
- To exit to the main program window without saving the report, click **Cancel**.
- When you create your bootable rescue media, the **QSAN System Report** tool is automatically placed on the media as a separate component. This component allows you to generate a system report when your computer cannot boot. After you boot from the media, you can generate the report without running QSAN Xreplicator. Simply plug in a USB flash drive and click the **QSAN System Report** icon. The generated report is be saved on the USB flash drive.

**Creating a system report from the command line prompt**

1. Run Windows Command Processor (cmd.exe) as administrator.
2. Change the current directory to the QSAN Xreplicator installation folder. To do so, enter:

```
cd C:\Program Files (x86)\QSAN\Xreplicator
```

3. To create the system report file, enter:

```
SystemReport
```

File SystemReport.zip will be created in the current folder.

If you want to create the report file with a custom name, type the new name instead of <file name>:

```
SystemReport.exe /filename:<file name>
```

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## 8 Glossary of Terms

### B

#### Backup

1. The same as Backup operation (p. 66).
2. A set of backup versions created and managed by using backup settings. A backup can contain multiple backup versions created using full (p. 66) and incremental (p. 67) backup methods. Backup versions belonging to the same backup are usually stored in the same location.

#### Backup operation

An operation that creates a copy of the data that exists on a machine's hard disk for the purpose of recovering or reverting the data to a specified date and time.

#### Backup settings

A set of rules configured by a user when creating a new backup. The rules control the backup process. Later you can edit the backup settings to change or optimize the backup process.

#### Backup version

The result of a single backup operation (p. 66). Physically, it is a file or a set of files that contains a copy of the backed up data as of a specific date and time. Backup version files created by QSAN Xreplicator have a TIB extension. The TIB files resulting from consolidation of backup versions are also called backup versions.

#### Backup version chain

Sequence of minimum 2 backup versions (p. 66) that consist of the first full backup version and the subsequent one or more incremental versions. Backup version chain continues till the next full backup version (if any).

#### Bootable media

A physical media (CD, DVD, USB flash drive or other media supported by a machine BIOS as a boot device) that contains standalone version of QSAN Xreplicator.

Bootable media is most often used to:

- recover an operating system that cannot start
- access and back up the data that has survived in a corrupted system
- deploy an operating system on bare metal
- back up sector-by-sector a disk that has an unsupported file system

### D

#### Differential backup

---

**Note:** This feature may be unavailable in the Xreplicator edition that you use.

---

1. A backup method used for saving data changes that occurred since the last full backup version (p. 67) within a backup.
2. A backup process that creates a differential backup version (p. 66).

#### Differential backup version

---

**Note:** This feature may be unavailable in the Xreplicator edition that you use.

---

A differential backup version stores changes to the data against the latest full backup version (p. 67). You need access to the corresponding full backup version to recover the data from a differential backup version.

#### Disk backup (Image)

A backup (p. 66) that contains a sector-based copy of a disk or a partition in packaged form. Normally, only sectors that contain data are copied. QSAN Xreplicator provides an option to take a raw image, that is, copy all the disk sectors, which enables imaging of unsupported file systems.

## F

### Full backup

1. A backup method that is used to save all the data selected to back up.
2. A backup process that creates a full backup version (p. 67).

### Full backup version

A self-sufficient backup version (p. 66) containing all data chosen for backup. You do not need access to any other backup version to recover the data from a full backup version.

## I

### Image

The same as Disk backup (p. 66).

### Incremental backup

---

**Note:** This feature may be unavailable in the Xreplicator edition that you use.

---

1. A backup method used for saving data changes that occurred since the last backup version (p. 66) (of any type) within a backup.
2. A backup process that creates an incremental backup version (p. 67).

### Incremental backup version

---

**Note:** This feature may be unavailable in the Xreplicator edition that you use.

---

A backup version (p. 66) that stores changes to the data against the latest backup version. You need access to other backup versions from the same backup (p. 66) to restore data from an incremental backup version.

## R

### Recovery

Recovery is a process of returning of a corrupted data to a previous normal state from a backup (p. 66).

## V

### Validation

An operation that checks whether you will be able to recover data from a particular backup version (p. 66).

When you select for validation...

- a full backup version (p. 67) - the program validates the full backup version only.
- an incremental backup version (p. 67) - the program validates the initial full backup version, the selected incremental backup version, and the whole chain (if any) of backup versions to the selected incremental backup version.