

Other ways to protect data (in conjunction with backups)

In addition to performing regular backups of your database, there are other methods of safeguarding your system so that you are protected against potential data loss.

RAID (Redundant Array of Independent Disks)

RAID is a method of creating one or more pools of data storage space on several hard drives. RAID accomplishes this through either of two techniques: Disk Mirroring or Disk Striping. Both of these techniques create a copy of your primary hard drive on an external drive.

Disk Mirroring provides a way of protecting your data through redundancy. With this technique, a duplicate of your primary hard drive is created on another drive. The data on both drives is continuously updated.

Disk Striping is the process of dividing a body of data into blocks and spreading the data blocks across several partitions on several hard disks. Disk striping also provides data protection through redundancy. This process requires that you have at least three external drives dedicated for this purpose.

Refer to an IT professional for assistance in implementing one of these RAID techniques.

Uninterruptible Power Supply

An uninterruptible power supply (UPS) is a device that has a battery, power conditioning, and surge protection built into it. The UPS plugs into the wall outlet and the computer and monitor plug into the UPS, so that while the AC power from the wall powers the computer, it also charges the UPS battery. If the power goes out, the charged battery takes over and keeps the computer up and running long enough for you to perform an orderly shutdown, which can be important to bringing the server back up after an outage. If the users connected to the server also have UPSs, they will also have a chance to save their data before powering down. The amount of time the UPS can maintain power to the computer depends on the size of the battery inside the UPS and the amount of power drain placed on it.

In addition to battery backup, a UPS also provides power conditioning and surge protection. Power conditioning “cleans up” the power, removing noise caused by other devices. Surge protection keeps the computer from being affected by sags or spikes in the power flow. Alterations in power flow can occur during thunderstorms even if the power doesn’t go out, or when there is a drain on power resources, such as on a hot day when air conditioners are straining power stations.


Mirror application notes

Computer backup

protecting your system from unrecoverable loss of data

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 **IMPORTANT:** Canfield recommends you consult a qualified IT professional to assist you in developing a backup plan. An IT professional should install and configure the necessary equipment and software, and train the staff member designated to perform backups.

WHY do I need to back up my Mirror system?

Canfield Imaging System's Mirror software is a highly reliable program that will function predictably under ordinary circumstances. However, problems may occur as a result of power surges, disk failure, viruses or other damaging events that could render your database inaccessible or unusable. For this reason, it is essential that you regularly create backup copies of your data and images so that you can restore the database if you experience a problem.

After reviewing this summary of backup procedures and options, you should be able to develop a backup strategy to protect your system from unrecoverable loss of data.

Backup vs. archive It is important to note the difference between backing up your system and archiving files. A backup is essentially a snapshot of your hard drive at a particular time. The backups you create should contain only the files, data, and images you are currently working with in your practice. The purpose of the backup is to provide you with the capability to restore your system to its current working condition if necessary.

While backups must be done on a regular schedule to be useful, archiving files is an activity you should do whenever you have files on your hard drive that you are not currently using. These unused files should be removed from your hard drive (not just copied from it) and stored on media separately from your backup. Removing old files from your hard drive ensures you will have sufficient space on the drive for current files, and enables the computer to function at peak efficiency.

WHAT do I need to back up?

All information that you cannot readily re-create should be backed up. Obviously, this includes patient data and images you have input into the system. You may back up your data and images only, or you may choose to back up all files on your computer, including the Mirror program files. Each option has advantages and disadvantages.

Disadvantages:

- In order to restore all the files, you must have all of the incremental backups available.
- It may take longer to restore a specific file because you must search more than one backup set to find the latest version of a file.

Differential Backup A differential backup creates a backup of files that have changed since a full backup was performed. A differential backup typically saves only the files that are different or new since the last full backup, but this can vary in different backup programs. Together, a full backup and a differential backup include all the files on your computer, changed and unchanged.

A differential backup might be done as follows:

- Monday* Perform a full backup and save the file set.
- Tuesday* Perform a differential backup using the same file set. All files that have changed since the full backup are backed up in the differential backup.
- Wednesday* Perform a differential backup using the same file set. All the files that have changed since Monday's full backup are backed up.

Before initiating a differential backup strategy, consider the following:

Advantages:

- Differential backups require less disk, tape, or network drive space than incremental backups.
- Backup time is faster than for full or incremental backups.

Disadvantages:

- Restoring all your files may take considerably longer because you may have to restore both the last differential and full backup.
- Restoring an individual file may take longer because you have to locate the file on either the differential or full backup.

Automated backup software Refer to the documentation for your Server Operating System for instructions for using your system's automated backup program.

Storing backup media Canfield recommends that you maintain two copies of your backups: one to be stored on-site (preferably in a fire-proof container), and one to be stored at a secure off-site location. For both locations, ensure that only authorized personnel have access to the backup.

Testing your backup system The person responsible for backups should test the system periodically by backing up and restoring data to ensure data integrity. All testing should be done in a test environment to prevent the possibility of introducing problems into the system during testing.

Full Backup When you do a full backup, all files and folders on the drive are backed up. Before initiating a full backup strategy, consider the following:

Advantages:

- All files from the selected drives and folders are backed up to one set of tapes (or whichever media you have chosen).
- In the event you need to restore files, they are easily restored from the single backup set.

Disadvantages:

- A full backup is more time consuming than other backup options.
- Full backups require more tapes, disks, or network drive space.

Incremental Backup An incremental backup provides a backup of files that have changed or are new since the last incremental backup. Before you can successfully use incremental backups, you must do an initial full backup of the drives, folders, or files in question.

The first time you do an incremental backup (following a full backup), all files in the file set are backed up, just as in a full backup. If you use the same file set to perform an incremental backup later, only the files that have changed are backed up. If you use the same file set for a third backup, only the files that have changed since the second backup are backed up, and so on.

The Windows Backup utility (or whatever backup software you use) designates a file for backup in an incremental backup based on the filename, its last modified date, and the date of the last incremental backup, all of which are stored in the file set.

An incremental backup might be done as follows:

- Monday* Perform a full backup.
- Tuesday* Perform the first incremental backup of selected files and/or folders using a file set with the INCREMENTAL option enabled.
- Wednesday* Perform another backup with the backup file set you created Tuesday. Only files that have changed since Tuesday's backup are backed up.
- Thursday* Perform another backup with the backup file set you created Tuesday. Only files that have changed since Wednesday's incremental backup are backed up.

Before initiating an incremental backup strategy, consider the following:

Advantages:

- Backup time is faster than for full backups.
- Incremental backups require less disk, tape, or network drive space than a full backup.
- You can keep several versions of the same files on different backup sets.

Backing up your Mirror database only

The chief advantage of backing up only your database is the speed of the backup process. Also, a database-only backup requires fewer tapes, CDs, or whatever media you use than a full backup. If you need to re-create your system, you can restore your data and images from your backup, and re-install the Mirror program files from the installation disk. To back up your database and images, you must know the location of the data and image files.

To determine the location of Mirror image files, complete the following steps.

1. Open the Mirror application.
2. Go to the OPTIONS menu.
3. From the Mirror Database Options dialog, choose SET DATABASE OPTIONS.
4. Click on the DATABASE LIST tab.
5. Choose the appropriate database from the displayed list and click EDIT.
6. The Database Information dialog displays the directory path for the Mirror image files. Select this directory when backing up Mirror image files.

To determine the location of Mirror database files, complete the following steps.

1. From the desktop, click on the START icon. Select SEARCH and FOR FILES OR FOLDERS.
2. • If you have a SQL database, in the "Search for Files or Folders named" field, enter ***.*df** and click on SEARCH NOW.
 - If you have an Access database, in the "Search for Files and Folders named" field, enter ***.mdb** and click on SEARCH NOW.
3. In the "Look in" field, select LOCAL HARDDRIVES [C:] from the drop-down list.
4. Click on SEARCH NOW.
5. In the Search Results window, find the directory that contains the database files. Select this directory when backing up Mirror database files.

Backing up all files

A full backup offers the advantage of making it easy to re-create your system from a single source. However, if you choose to back up all files on your hard drive, the backup process will take longer and require more backup media than would be needed for a backup of your database only.

WHEN do I need to back up?

Regularly scheduled backups

Backing up your computer system should be part of your routine office procedures. Regularly scheduled backups ensure that you will be able to restore your most current data and images if there is a problem with your system. Establishing a backup schedule is discussed in detail in the section "How should I back up my Mirror system?" below.

Backups before major system events In addition to your scheduled backups, you should do a full backup prior to any event that could create a problem with your system so that you can restore the system to a usable state if necessary. These kinds of events include:

- installing new software
- upgrading software
- installing a Windows update
- installing a hardware upgrade
- moving your computer from one location to another

WHERE should I back up my Mirror system?

Computer files can be backed up to various types of media, including another hard drive, tape, CDs, or DVDs. When deciding on a type of backup media, you should consider how easy the backup and restore process is using that media, the data transfer speed and capacity of the media, and the amount of space you have for media storage. You may wish to maintain two sets of backups: one on-site, and one off-site at a secure location. You should take into account the amount of space available at each location.

Tape Because it is easy-to-use, tape is one of the most commonly used types of backup media. An IT professional can provide you with specifics regarding cartridge capacity, data compression, and rates of data transfer for tape drives.

Second Hard Drive Backups can be stored on another hard drive, which can be either internal (physically inside the computer terminal that houses your primary drive), or external.

A second internal hard drive can be set up to mirror any changes made to your original drive. In this way, a duplicate of your hard drive is maintained. The disadvantage of an internal hard drive is that it is subject to the same potential problems as your primary hard drive; for this reason you may not want to rely on an internal hard drive as your chief backup strategy.

An external drive is not connected to your system, and therefore not susceptible to potential problems, such as power surges, that affect your primary hard drive.

CDs/DVDs Backups can be created by copying data onto CD-ROMs or DVDs. However, because of the limited capacity of these devices, they are probably not practical as a backup medium for a Mirror database.

HOW should I back up my Mirror system?

Developing a backup plan When developing a backup plan, consider the following:

- Determine what should be backed up. You should back up your patient data and images. You may also wish to back up program files.
- Develop a schedule that includes the type of backup to be performed (Full, Incremental, or Differential), how often backups will be done, and at what time of day.
- Decide which type of media (tape, external hard drive, etc.) you will use for the backup, and how many backup copies you wish to maintain.
- Decide where you will store data once it is backed up. This plan should include both on-site and off-site storage. For both locations, ensure that only authorized personnel have access to the backup.
- Identify the person(s) who will perform the backups.
- Develop a schedule for testing your backup system regularly. The person responsible for backups should test the system periodically by backing up and restoring data to ensure data integrity. All testing should be done in a test environment to prevent the possibility of introducing problems into the system during testing.
- Create a backup log where you will record what was backed up, when the backup took place, who performed the backup, and what media was used.

Full, Incremental and Differential Backups There are three types of backup that can be implemented separately or in combination to ensure that you always have an up-to-date copy of your database. These backup types are Full, Incremental, and Differential. Each type of backup has advantages and disadvantages, which are discussed below.

With a full backup, all files and folders on the hard drive are backed up. An incremental backup provides a backup of files that have changed or are new since the last incremental backup. A differential backup creates a backup of files that have changed since a full backup was performed.

A good model for a backup schedule combines a full weekly backup with daily differential backups. With this schedule, backups can be performed quickly on a daily basis, and restoration of the database requires restoring the contents of only two tapes: the full backup overlain with the differential backup. Incremental backups could also be used for daily backup but are more difficult to restore because of the number of tapes required to keep a full incremental set.