Backup appliances usually include advanced features to help them pack as much backup data as possible into their disk storage. For example, most backup appliances use *de-duplication* to avoid storing identical data blocks twice. With de-duplication technology, a backup appliance can almost always shrink your data by a factor of at least 2:1, and often more like 3:1 or even 4:1 or more.

- **Cloud backup:** An increasingly popular option is to use a third-party service to back up your data to a remote location via the Internet. Cloud backup has the advantage of already being offsite.
- **Tape:** Magnetic tape, the oldest storage medium for backups, is still one of the most widely used types. One of the biggest advantages of tape backups is that tape cartridges are small and can thus be easily transported to an offsite location. (For more information about tape backup, see the section "Backing Up to Tape," coming up in just a bit.)

Establishing Two Key Backup Objectives

When determining how often to back up your data and what type of media to store your backups on, you should consider establishing two backup objectives:

- **Recovery point objective (RPO):** The point in time you want to be able to recover your data to. The RPO reflects the frequency of your backups: If you back up once per day, your RPO is one day.
- **Recovery time objective (RTO):** The amount of time it will take to recover your data in the event of a loss.

  In reality, it isn't possible to set a single RTO that applies to all types of losses, because the time required for recovery depends on the nature and extent of the data loss incident and which of your backup sets you'll be recovering from. If you're recovering from your primary backups, which reside on high-speed disk and are close to your primary storage, recovery will be relatively fast — measured in hours. On the other hand, if you're recovering from a cyberattack that corrupted your live data, your primary backup and your off-site backup, you'll have to recover your data from your offline backup, which is likely stored on much slower tape — possibly measured in days. And if you're recovering from a fire that destroyed your server room, you'll need to replace all your server equipment before you can start the recovery.

  For more information about planning for recovery from the wide variety of risks your data faces, refer to Chapter 23.