the Swiss-based company Veeam (`www.veeam.com`) has a powerful backup solution that is specifically designed for virtual environments. With Veeam, you can do full and incremental backups of VMs in a way that lets you recover either individual files or entire machines. One of the best features of Veeam is that you can run a virtual server directly from a backup image, without the need to first do a time-consuming restore. This can cut your recovery time from hours to minutes. And, while continuing to run the machine from the backup image, you can simultaneously restore the machine to its primary media. After the restore is completed, Veeam will automatically switch over to the restored copy of the machine.

Virtual-aware backup programs have a different set of backup types than file-based backups. For example, Veeam has five basic types of backup jobs:

- **Full backup:** A *full backup* is simply a copy of an entire VM. The VM along with all of its data are written to a single file. Naturally, a full backup can take a long time if the VM is large. Note that the first time you back up a VM using any of the Veeam backup methods, a full backup is produced to provide a starting point for the other types of backups.
- **Forward incremental backup:** Often called just an *incremental backup,* a *forward incremental backup* copies just those disk blocks in a VM that have changed since the last time the VM was backed up. Like a file-based incremental backup, a forward incremental backup creates a set of increment files that must be combined with the original full backup to restore a VM.
- **Reverse incremental backup:** A *reverse incremental backup* is similar to a forward incremental backup, but with a twist: Instead of creating a separate backup file that contains the changes since the last backup, the reverse incremental backup incorporates all changed data into the most recent full backup, and at the same time creates a separate file that holds the previous versions of all the data blocks that have changed. When reverse increments are used, the current version of the VM is always contained in the full backup file. To restore a previous version of a VM, the full backup is first restored. Then one or more of the reverse increment files are applied to the full backup to "walk back" the data until it reaches the desired restore point.
- **Synthesized full backup:** When forward incremental backups are used, the Veeam software can create a new full backup without actually transferring all the data from the source VM. Instead, it makes a copy of the most recent full backup; then it applies all the incremental backups that have been made since the most recent full backup. The result is called a *synthesized full backup* because it's identical to a regular full backup but it was made without actually copying any data from the source VM.