- **Reduced downtime:** Virtual environments typically have less downtime than nonvirtual environments. For example, suppose you need to upgrade the BIOS on one of your server computers. With physical servers, this type of upgrade will ordinarily require that you shut down the operating system that runs on the server, upgrade the BIOS, and then restart the server. During the upgrade, the server will be unavailable.

  In a virtual environment, you don't need to shut down the servers to upgrade the BIOS on the host computer that runs the server. Instead, all you do is move the servers that run on the host that needs the upgrade to another host. When the servers are moved (an operation that can be done without shutting them down), you can shut down the host and upgrade its BIOS. Then, after you restart the host, you can move the servers back to the host — again, without shutting down the servers.

- **Recoverability:** One of the biggest benefits of virtualization isn't the cost savings, but the ability to recover quickly from hardware failures. Suppose that your organization has ten servers, each running on separate hardware. If any one of those servers goes down due to a hardware failure — say, a bad motherboard — that server will remain down until you can fix the computer. On the other hand, if those ten servers are running as virtual machines on two different hosts, and one of the hosts fails, the virtual machines that were running on the failed host can be brought up on the other host in a matter of minutes.

  Granted, the servers will run less efficiently on a single host than they would have on two hosts, but the point is that they'll all be running after only a short downtime.

  In fact, with the most advanced hypervisors available, the transfer from a failing host to another host can be done automatically and instantaneously, so downtime is all but eliminated.

- **Disaster recovery:** Besides the benefit of recoverability when hardware failures occur, an even bigger benefit of virtualization comes into play in a true disaster-recovery situation. Suppose that your organization's server infrastructure consists of 20 separate servers. In the case of a devastating disaster, such as a fire in the server room that destroys all hardware, how long will it take you to get all 20 of those servers back up and running on new hardware? Quite possibly, the recovery time will be measured in weeks.

  By contrast, virtual machines are actually nothing more than files that can be backed up onto tape. As a result, in a disaster-recovery situation, all you have to do is rebuild a single host computer and reinstall the hypervisor software. Then you can restore the virtual-machine backups from tape, restart the virtual machines, and get back up and running in a matter of days instead of weeks.