



# Server virtualization — overview



## Server virtualization

Virtualization within the IT environment helps you make more efficient use of existing software and hardware resources. You can use popular virtualization software to create VMs (virtual machines) that share hardware resources while functioning as completely separate entities on a network.

There are several key benefits to using server consolidation and virtualization analysis solutions, including operational efficiency, better resource allocation, and enhanced security. You'll learn more about these and other business advantages of virtualization throughout this guide.

The sections of this guide include:

- » **Understand it**: Find out how virtualization technology can help you allocate resources more efficiently, meet business demands, and save money over the long term.
- » **Plan it**: Learn how to evaluate your current IT environment and determine which hardware and software are the best candidates for virtualization.
- » **Do it**: Pick up best practices for selecting solution components and deploying your virtualization solution.
- » **Use it**: Explore management tools and learn the essentials of securing complex virtualized environments.
- » **Buy it**: Shop for virtualization software, certified hardware, storage, and consulting services.
- » Next: [Understand it](#)



# Server virtualization — understand it



Server virtualization

A virtualized infrastructure can benefit companies and organizations of all sizes. Virtualization greatly simplifies a physical IT infrastructure to provide greater centralized management over your technology assets and better flexibility over the allocation of your computing resources. This enables your business to focus resources when and where they're needed most, without the limitations imposed by the traditional "one computer per box" model.

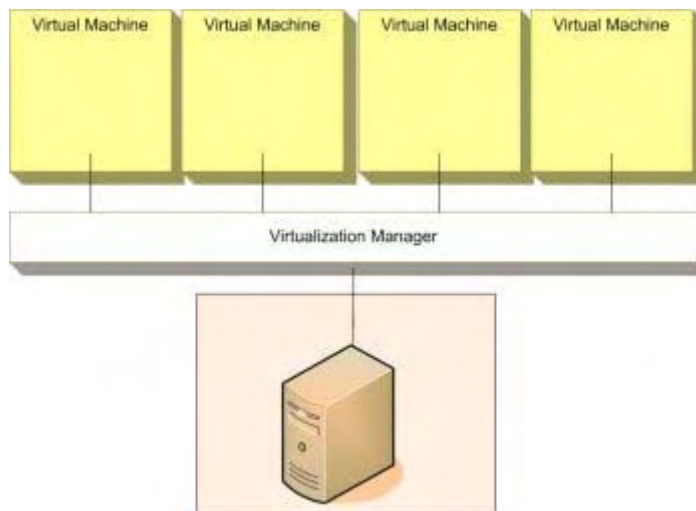
What does it all mean? In the computing realm, the term **virtualization** refers to presenting a single physical resource as many individual logical resources (such as platform virtualization), as well as making many physical resources appear to function as a singular logical unit (such as resource virtualization). A **virtualized environment** may include servers and storage units, network connectivity and appliances, virtualization software, management software, and user applications.

## What's a virtualized server?

Basically, a **virtual server**, or VM, is an instance of some operating system platform running on any given configuration of server hardware, centrally managed by a **virtual machine manager**, or **hypervisor**, and consolidated management tools.

**Note:** The software providing the virtualization is called the VMM (virtual machine monitor) or hypervisor. A hypervisor can run on bare hardware (native VM) or on top of an operating system (hosted VM).

A single instance may operate in isolation or share resources with several other instances of the same (or separate) server platforms.



VMware and Microsoft provide a few of the most popular virtualization software products, although open source solutions are also available.

## What are the primary benefits of using virtualization software?

Virtualization software enables you to create VMs that share hardware resources and transparently function as individual entities on the network. Consolidating servers as VMs on a small number of physical computers can save money on hardware costs and make centralized server management easier.

Server virtualization also makes backup and disaster recovery simpler and faster, providing for a high level of business continuity. In addition, virtual environments are ideal for testing new operating systems, service packs, applications, and configurations before rolling them out on a production network.

**Note:** Some companies even deploy virtualization of call centers or help desks, greatly reducing costs for those services.

- Next: Plan it



# Server virtualization — plan it



## Server virtualization

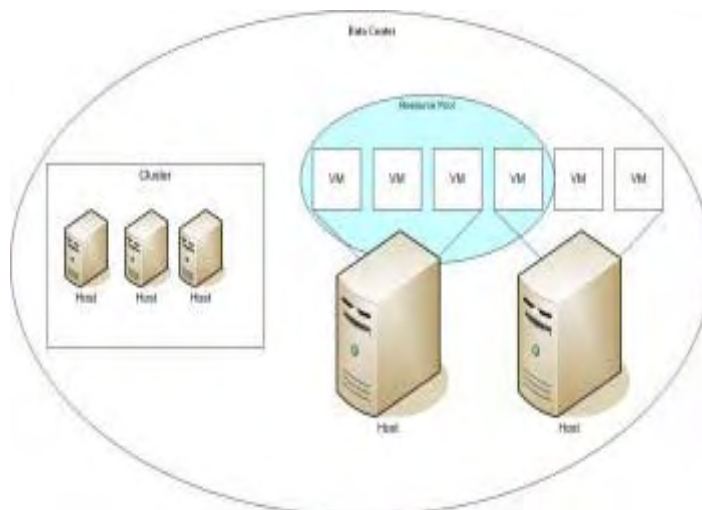
You should perform a formal assessment of your existing and planned resources and virtualization needs before acquiring a virtualization solution. Capacity planning determines how VMs will be distributed across physical computers for best performance and ease of management.

Your assessment should address the following questions:

- How many servers do you have?
- Which roles do they serve: application, database, web, and so on?
- How many servers do you need?
- How many users do you serve?
- Are you experiencing any issues with your current servers?
- Do you want to streamline any processes?
- Which server utilization trends do you observe?
- What percentage of your resources are underutilized and for how long, on average?
- Which usage patterns would you prefer to see?
- How much of your existing infrastructure can you virtualize?

## Resource evaluation

In a non-virtualized environment, business applications are run on specific server hardware that consume computing and power resources even if the applications are idle. However, server virtualization solutions increase resource utilization through pooling, sharing, and clustering on an as-needed basis. Server consolidation also reduces operational and ownership costs while providing more streamlined and centralized management.



During your evaluation, a key factor is determining the number of users who'll use your virtualization solution. This influences hardware processing speed and ability, which is significantly less demanding for 80 to 100 users versus 8,000 to 10,000 on the same system. Network traffic to and from your virtualized server site is also a crucial factor, especially over the long term. You need to ensure your solution is flexible and responsive to changing business needs and a potentially increasing user base.

## Component inventory

Prior to the availability of virtualization technologies, businesses usually had to operate separate servers

for incompatible platform-specific applications, which could double the amount of server hardware. With virtualization, a single moderately powered server can run multiple, non-heterogeneous operating systems simultaneously, supporting a variety of business applications.

Inventory your current IT infrastructure with the goal of reducing, reusing, and repurposing or retiring existing server platforms. Consider the following while completing your inventory.

- How can virtualization better economize resource utilization or business operations?
- How might I better arrange separate physical server roles into a virtual server?
- Which applications or processes create unnecessary doubling-up or are otherwise wasteful of resources?

**Tip:** To repurpose an existing server for virtualization, ensure it meets all requirements for the virtualization software you intend to use.

### Performance metrics

Performance data is another important element in the process of identifying the appropriate hardware for your virtualization solution. You need to gather performance metrics from your servers, storage systems, and networking gear over a period of at least 30 days. Monitor your applications and servers through normal business processes, and then determine the peaks and valleys of application use, and the types and quantity of resources these applications are using.

You can use your server operating system's built-in monitoring tools or enlist the help of a consultant, such as [HP Virtualization Assessment Services](#).

### Candidate identification

During the planning phase, you should determine which hardware and software to virtualize. Servers that make good candidates for virtualization generally are:

- Older servers (those with processors slower than 1 GHz [gigahertz]), to avoid upgrade costs.
- Infrequently used servers, to consolidate resources.
- Multiprocessor servers dedicated to single-processor applications, to optimize server resources.

**Tip:** Consider the environment in which your servers are used. For example, servers running in a production environment often have different requirements than those running in a development or test environment.

Most applications are candidates for virtualization because they use only a small percentage of available resources. The following are types of applications that you should consider virtualizing:

- Any application in a development or test environment
- Applications using a single processor
- Applications with low use rates

**Note:** Applications that exceed a single host server's available resources aren't good candidates for virtualization and should remain on a dedicated server.

Depending on the nature and complexity of your environment, you might need to hire an IT professional or consultant who can advise you and oversee the evaluation, selection, and deployment process for you. However, even if you decide to perform the work in-house, consider reviewing your evaluation results and preliminary virtualization software selection with resellers and experts. Spending \$200 to \$300 in consulting fees during the planning stage can potentially save many hours and thousands of dollars correcting otherwise avoidable miscalculations and mistakes.

- Next: [Do it](#)



# Server virtualization — do it



## Server virtualization

After you identify which servers and software to virtualize, it's time to select the physical components on which the virtualization software will run and the virtualization software itself. Then you can deploy and configure the virtualization software and migrate your server operating systems and applications to the VMs.

### Selection and deployment

If you need to purchase new server hardware, carefully compare vendors' server specifications to ensure you're purchasing the proper capacity based on your IT environment evaluation and inventory. Many small to medium-size environments find bladed servers offer maximum flexibility. A bladed server lets you quickly add or remove server blades from an enclosure, independent of storage and network connections.

Many popular virtualization software packages come in server and workstation versions. However, HP offers elemental and integrated virtualization solutions, which give you control over individual or entire components within your IT infrastructure:

- **Elemental virtualization:** Handles individual entities that include HP ProLiant servers operating VMware or Microsoft platforms, HP StorageWorks data-retention solutions, HP BladeSystem workstations, and infrastructure or virtualization services.
- **Integrated virtualization:** Encompasses a range of high-end capabilities from the HP VSE (Virtual Server Environment) to BladeSystem, HP Integrity NonStop servers, and StorageWorks virtualization systems, all with a centralized form of control.

A useful starting point for selecting virtualization software is at the [VMware from HP](#) website.

### Virtualization software deployment

Deployment begins by building new or repurposing old server hardware, assembling necessary component hardware, and then integrating networking and storage systems. When the hardware is ready, you install the virtualization software (agents and management tools), and then migrate existing applications into their virtual realms. Deployment is complete once you've established a functional virtualized server that's ready to reprioritize the resource utilization of your existing IT infrastructure.

**Note:** HP ProLiant Essentials Server Migration Pack, which is a part of HP ProLiant Essentials Virtualization Management Software, performs automatic migrations from physical server environments and mixed-platform VMs to HP ProLiant servers running VMware.

- Next: [Use it](#)



# Server virtualization — use it



## Server virtualization

Once the virtualized environment is established, you use management tools to control and monitor virtual servers. Using HP SIM (Systems Insight Manager) and the HP ProLiant Essentials Virtual Machine Management Pack, for example, you can monitor both virtual and physical servers simultaneously from a single, centralized interface. You may also easily transition existing VMs to other server platforms. In addition, HP Storage Virtualization System helps you pool and share your storage assets, simplifying resource management and increasing utilization.

Other management tools and their uses are described as follows:

- **HP Integrity ECA (Essentials Capacity Advisor):** Uses trending capabilities to simulate future usage patterns, which is helpful when planning upcoming consolidations.
- **HP Performance Agent:** Enables you to track workloads as they move through a server pool and plan consolidations from legacy servers.
- **HP Global Workload Manager:** Specifies workloads that may automatically access spare capacity while maintaining service levels for key business applications.
- **HP Global Instant Capacity:** Transfers usage rights from offline servers during planned and unplanned downtimes.

## Securing virtual environments

VMs are subject to some of the same vulnerabilities as physical machines, as well as some security issues peculiar to the virtualized environment. You enforce VM access using user and group permissions just as you do with physical servers. Depending on your environment, you might be able to integrate your VM access scheme into your existing directory or authentication services.

Be sure to address the following security issues in your virtualized infrastructure:

- Ensure all remote users authenticate when attempting to connect to a server.
- Check your server's security settings, which dictate security for network traffic to and from a host server.
- Because three or more TCP/IP (Transmission Control Protocol/Internet Protocol) ports may be used for access, configure the firewall to allow access to one or more of these ports.

By design, a VMM memory management scheme and virtual device firewalls a VM from accessing or acting on data belonging to other virtual machines. All processes, memory, storage, and networking are treated as individual and separate entities, even on the same physical set of resources.

- Next: [Buy it](#)



# Server virtualization — buy it



## Server virtualization

Look at various HP products for planning and creating a virtualized infrastructure.

### » HP Virtualization with VMware



- Use resources more efficiently and reduce costs.
- Consolidate servers and easily migrate applications.
- Product information about [HP Virtualization with VMware](#).

### » HP ProLiant servers for VMware



- HP ProLiant BL, DL, and ML servers deliver high-availability and unparalleled scalability.
- HP BladeSystem solutions consolidate and streamline your server infrastructure.
- HP Integrity NonStop servers are appropriate for high-availability services and fail-safe data integrity.
- Product information about [HP ProLiant servers for VMware](#).

### » HP StorageWorks storage virtualization



- HP StorageWorks includes an expedient migration path for VMs between various physical servers.
- Get storage resources that support a changing and growing environment.
- Product information about [HP StorageWorks storage virtualization](#).

### » Management solutions



- Discover your environment and identify servers with performance issues.
- Provide unified management of virtual machines and automate server migration.
- Product information about [Management solutions](#).

### » HP channel partners



- Let an HP channel partner assist you with planning, deployment, and operation of a virtualized environment.
- Get ongoing education and training for your administrative and support personnel, including online and onsite instructor-led training.
- Product information about [HP channel partners](#).

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