

Making the leap from physical to virtual (P2V migration)



Executive Summary

Converting physical servers to virtual machines can bring significant benefits to a business, such as savings on time, resources, complexity, and money. It can be tempting, therefore, to rush headlong into the conversion process: after all, the hypervisor tools are wizard-driven, making the actual physical to virtual (P2V) migrations straightforward.

But converting the machines is only one small step in a successful P2V migration. Planning and effort — both before and after the actual conversion — are required to ensure that a P2V conversion delivers the desired benefits.

6 steps

- Step 1** Define the business ROI
- Step 2** Determine the best candidates
- Step 3** Prioritize the migration candidates
- Step 4** Decide on the right tool
- Step 5** Do the appropriate clean up
- Step 6** Testing and go-live



1

Define the business ROI

IT professionals must determine the business return on investment (ROI) they are seeking through virtualization. For example, a company may want to:

- **Increase efficiency.** An individual server rarely runs at 100% capacity — more typically, it runs at 10% or less. Virtualization enables the server to leverage that unused 90% by consolidating multiple virtual machines onto one physical server. It is common to run 20 machines on a single physical blade.
- **Decrease cost.** Many companies are running out of space and power in their data centers. Virtualization maximizes space and power — and therefore minimizes cost — by lessening the number of physical machines necessary to run the business.
- **Streamline administration.** With fewer machines, administration becomes easier. For instance, an IT staff who used to have 60 servers may be able to virtualize those machines and house them on

3 physical servers. This means much less time to perform upgrades and maintenance. Additionally, it is easier to maintain a consistent or flat environment (i.e., to have one server model on site rather than multiple models from multiple years) with a minimal number of machines in use. Finally, disaster recovery (DR) becomes simpler because IT personnel do not need to worry about having the same hardware at the production and the DR site. Instead, the files (virtualized machines) become the most important consideration.

When defining the ROI of converting physical to virtual, it is important to be specific and to set up metrics at the outset that will help determine over time whether the ROI has been achieved. For instance, exactly what are the desired cost savings and how will the organization measure those savings in terms of space, power, administration, software, and hardware?



2

Determine the best candidates

IT professionals have to determine the best candidates for virtualization if they want to reap the business ROI they are aiming for. Not everything can or should be virtualized. The following attributes should be considered before proceeding with virtualization:

- **Random Access Memory (RAM).** If an application uses a huge amount of RAM, it is doubtful that it is a good candidate for virtualization. Such an application would use so much of the physical server's memory capacity that efficiency would be lost. As a general rule of thumb, anything using 32GB or more of RAM should not be virtualized.
- **Central Processing Unit (CPU).** CPU requirements should be treated the same as RAM. For example, if a physical machine is already running at 50–60% of CPU capacity, it is not worth the effort to virtualize: no efficiencies will be gained. Efficiency depends on how many CPU cores will be virtualized on a single physical machine, and the combined utilization of those cores.
- **Network.** Suppose a goal is set to have 20 virtualized machines on one server. IT personnel will need to examine the network capacity requirements of each machine to ensure that the combined requirements do not overwhelm the network capacity of the physical host server. They must also ensure that the appropriate virtual network interface controllers (NICs) are available on the host.
- **Disk Input/Output (I/O).** Of particular concern would be any machine with a very high throughput: such machines may not work well in a virtualized environment. IT professionals should examine input/output operations per second (IOPS) before deciding to virtualize: total IOPS over 1000 should be scrutinized to determine if they are a good fit for virtualization.



3

Prioritize the migration candidates

After determining the best candidates for virtualization, these candidates must be prioritized:

- The migration strategy should address low-risk, non-business critical workloads first, such as test and development environments. This enables organizations to master the P2V process without incurring the cost of any failures.
- Web servers are often good candidates for initial conversion, especially as many companies already have redundant web servers running. Such redundancy reduces risk, especially for the first P2V experiment.
- After the initial P2V conversions have been successfully completed, the organization should move on to low-use systems that host less critical applications.

- The next step is to move on to higher-use systems that are still not critical. Such candidates could include application-specific servers, or routing and virtual private networking servers.
- Lastly, migrate the servers that are running critical workloads. By this point, the process is familiar to all personnel and they are ready for any eventuality.

One further note: if the source machine is a domain controller, database server, email server, or any other service with frequently changing data, a cold conversion must be performed.



4

Decide on the right tool

IT professionals have many tools to choose from when performing a P2V migration. Each tool will virtualize machines and enable them to run on a certain platform, or hypervisor. It is the IT professional's responsibility to determine which hypervisor represents the preferred platform for their target virtual environment, for example:

- **VMware.** VMware offers desktop software that runs on Microsoft Windows, Linux, and Mac OS X. It also has "bare-metal" enterprise software hypervisors for servers that do not require an additional underlying operating system.
- **Red Stack.** Red Stack virtualizes machines for the Oracle platform.
- **Xen.** Xen is also a bare-metal hypervisor, and allows multiple computer operating systems to run on the same computer at the same time. It is supported by Citrix.

- **Hyper-V.** Formerly known as Windows Server Virtualization, Hyper-V enables platform virtualization on x86-64 systems.
- **PlateSpin.** PlateSpin Migrate is a physical/virtual conversion tool that delivers P2V migrations using block-based transfer protocols and Server Sync technology.

Using wizards, the selected tool takes the contents of the existing system's hard disk and creates a new server image that the associated hypervisor can use. The hardware that comprised the old system is then replaced with virtualized hardware, i.e., software, on the new system. The process does not affect the source server: nothing is removed; data is only copied.



5

Do the appropriate clean up

IT professionals need to perform clean up after converting physical computers to virtual machines. One of the most important parts of this clean-up is to remove the old hardware. While the hardware is no longer there in a “real” sense, the operating system still has configuration information which refers to it. Missing hardware is marked “hidden” in Windows, so in order to remove it, IT personnel need to do the following after the newly-virtualized server is up and running:

- Login as a local administrator.
- Run the command set **devmgr_show_nonpresent_devices=1**.
- Run the device manager and go to **VIEW › Show Hidden Devices**.
- Uninstall the hidden devices from the device manager.

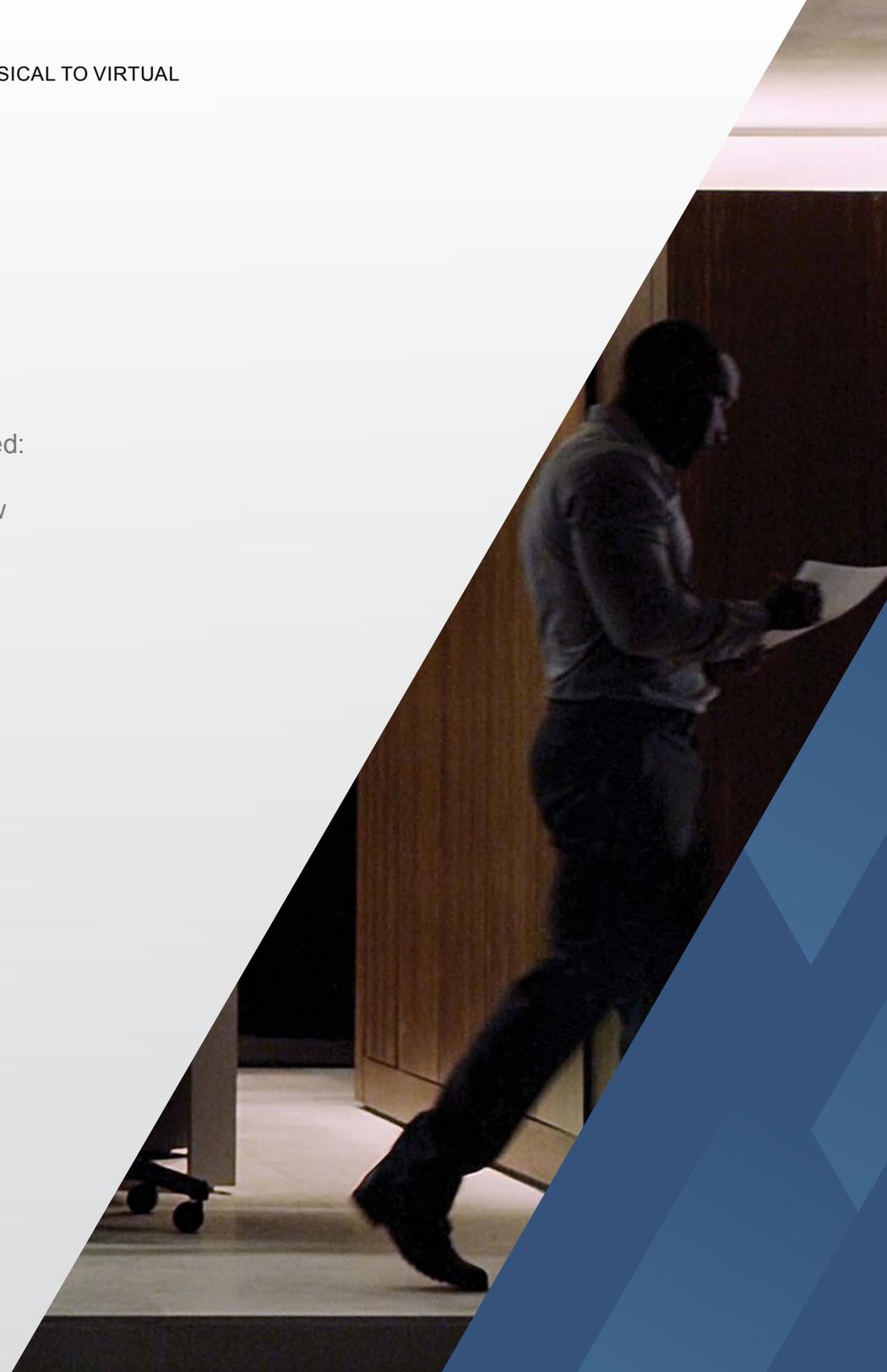


6

Testing and go-live

Once the P2V conversion is completed, it should be tested:

- Use a standard naming strategy to differentiate the new virtual service offering from the physical host that used to run the workload.
- In the case of a cold conversion, schedule a downtime in support of the migration.
- Prepare a testing plan for the new VM. First, run the virtual machine in a lab to ensure that it is stable. Only after its stability has been confirmed should the VM be plugged into the production environment.
- Prepare a go-live plan for the VM once it passes all tests. This go-live plan should include the decommissioning of the physical host.



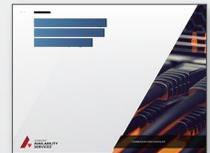
The focus is always on the business

At first glance, P2V conversions could seem like a purely technical matter. But both physical computers and virtual machines are tools to support the business — and as such, a P2V migration cannot take place apart from business considerations including strategy, analysis, evaluation, and execution. The above steps will ensure that every P2V conversion includes these considerations and remains focused on the business as a whole.

Additional reading



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[8 Factors to Consider in Cloud Computing Capacity Planning](#)

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