Destiny® and virtual machine (VM) technology— FAQ

Running Destiny in a virtual machine

Overview

Virtualization strategies are increasingly being used in IT networks. More sophisticated options are becoming available daily from sources such as VMware®, Citrix®, and Microsoft®. This content addresses the question of running Follett's Destiny® solution in a virtual machine.

What is virtualization?

Virtual machine (VM) software enables one or more guest operating systems (OS) to run in simulated servers, side-by-side on a host OS, all on one physical server. Conceptually, the guest OS and its applications are aware only of the guest environment. They are shielded from the host OS and physical machine. The VM software mediates between the guest OS and the physical resources (CPU, memory, disk, NIC, etc). You may have seen, for example, Windows XP running *in a window* on a host Linux server.

Typical goals of VM technology are to:

- isolate an application in its own more protective virtual machine
- provide a compatible OS to an application when hosted on a preferred OS
- pool server resources such as processors, memory, disk and network
- reduce IT infrastructure costs

A recent innovation is the *bare metal hypervisor* such as VMware ESX Server® or Microsoft Hyper-V®, available on Windows Server 2008 and Windows Server 2008 R2. Rather than a full-fledged OS, the host is a smaller, more efficient core called the hypervisor. The hypervisor owns the *bare metal* physical server resources. On top of the hypervisor run the main OS and any guest OS virtual machines. The guest VMs access physical resources transparently through the hypervisor, with less overhead than going through the main OS.

Another specialized innovation is *para-virtualization*, where the guest OS is aware it is in a VM and is able to utilize specific optimizations provided by the VM software layer.

Can I run Destiny on an OS hosting VMs such as Hyper-V?

No, Destiny should not be installed on the hosting OS. In a virtual environment, the hosting OS is best left free to manage the VMs. For example, Microsoft recommends NOT running applications on the main or host Hyper-V OS - only on the guest Virtual Machines. Destiny may be installed on a host Windows 2008 Server that is Hyper-V capable as the OS is usually shipped that way, but the Hyper-V role must NOT be enabled. If the Hyper-V role is enabled, Destiny should be installed only on a VM running from that server, not on the host OS. In this case, the normal policies below for running Destiny on a VM are in place.

Can I run Destiny in a virtual machine?

You may be considering whether running Destiny in a VM is an option for your environment. Destiny will, in general, run in a virtual machine.

However, Follett School Solutions, Inc. does not formally test and/or certify Destiny in a VM configuration. While FSC has not observed any functional incompatibilities when running Destiny in a non-QA-controlled VM environment, there are performance consequences. Please read the following section about performance considerations.

Destiny performance in a virtual machine

Because the VM software shields the guest OS from the physical hardware by a layer that emulates a physical server, applications running in the VM such as Destiny do not have direct access to the native hardware resources. Though functionally transparent to the application, the overhead of the emulation layer can cause a significant performance reduction. Also, competition with the host OS and other applications for hardware capability affects performance. For example, though the VM host may *allocate* the required memory to Destiny, in reality it may be swapped to disk while other processes use the memory.

Because of these factors, a virtual machine deployment will likely have a noticeable impact on Destiny's transaction performance. FSC has informally observed that the use of a VM can lead to a reduction in transaction capacity of 25-75%. When the virtual server can't provide the equivalent performance of a dedicated server, users will likely experience longer transaction times.

Optimizing for Destiny

Many technologies, hardware options and settings affect VM performance, including:

- The VM technology
- Settings for the virtual host server, VM, and guest OS
- Processor, hyper-threading, and memory allocation settings
- Physical disk subsystem configuration

The guideline must be to select and configure all aspects of the VM setup to provide Destiny the equivalent hardware performance required of a dedicated Destiny server. For example, adequate physical memory should be dedicated to the VM running Destiny.

Performance testing is completed on dedicated servers

FSC exhaustively tests Destiny on reference platforms of dedicated server hardware to ensure outstanding performance for our customers.

Because of the nearly limitless combinations of VM-related hardware and software configurations, it is not feasible for Follett School Solutions, Inc. to provide comprehensive VM-deployed performance tests that can be applied across unique customer environments. It is only possible to attain conclusive performance standards using reference configurations that eliminate the external VM-related factors that vary from customer to customer.

Destiny support when running in a VM

FSC Technical Support provides a *best effort* level of support to the Destiny application when it is running in a VM configuration. This does not include support of the VM configuration itself. Please refer to *Follett School Solutions Technical Support Policy Statement for VMware® Environments* for details of support in a virtual server environment.

Conclusion

Destiny can be run in a virtual machine environment. Some customers run Destiny in this manner today. However, Follett does not formally test Destiny in a virtual configuration. It is common to experience a reduced maximum throughput depending on the VM environment and load. Informal sampling indicates that deploying Destiny in a VM can reduce transaction throughput by 25-75% depending on overall VM configuration.

For information on Follett School Solution's technical support policy for VMware environment, see *Follett School Solution's Technical Support Policy Statement for Virtual Machine (VM) Environments*. Additional VMware vendor and product information is available at http://www.vmware.com/.

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