

Directions for VMware Ready Testing for Application Software

Introduction

To be awarded the VMware ready logo for your product requires a modest amount of engineering work, assuming that the pre-requisites are in place. For ISVs who do not have all the pre-requisites in advance, some additional preparation work will be required. At a high level, the steps can be broken into the following:

1. Download, install and configure the trial versions of VMware vSphere 4.0 and VMware vCenter Converter.
2. Design a virtual configuration of the application, which is generally very similar to the physical configuration of the application that is commonly tested.
3. Use the converter tool to convert existing physical machines running the application to the virtual configuration as designed.
4. Point an existing load driver mechanism to the virtualized configuration and run a modest load against it.
5. Collect VMware diagnostic information from the virtualized load test and submit the results to VMware.

After these steps, VMware will evaluate the results of the test and provide information on the success or failure, as well as some general feedback on the characteristics of the virtualized application. The ISV will need to provide an explicit support statement for the product, and if they have succeeded at the testing and have such a support statement, then they will be awarded the VMware Ready logo for use with that application. Note that the VMware Ready logo is awarded for a specific product only (i.e. not for all products a vendor may sell), so vendors who want the logo for multiple products must test each product individually.

Prerequisites

It is assumed the vendor has at least some basic skills and understanding of the VMware product line. More specifically, they will need to install vSphere 4.0 and converter, and follow basic guidelines for tuning and configuring virtual machines (VMs) and the ESX host. Vendors without such a basic skill set are encouraged to train one or more engineers, ideally with the **VMware vSphere: Install, Configure, Manage** class, available from <http://mylearn.vmware.com/>. Some basic level of support will be provided to assist vendors through the testing, but that may not be sufficient if they have not gotten this level of training or its equivalent.

It is also assumed that the vendor routinely runs the application in their own labs, and that they have some load test mechanism available for stress testing the application. Such a load test should accurately represent common production use of the application, should likely include a database of non-trivial volume, and should capture some performance metrics such as response time or throughput. The vendor should have an active environment running on physical hardware, with a deployment of the application that is typical in the customer base, and where the load driver can be applied if desired.

The vendor must have hardware available to run the physical testing, and additional servers to run the virtual testing on. The servers involved in the virtual testing should be on VMware's hardware compatibility matrix (available at <http://www.vmware.com/resources/compatibility/search.php>). In terms of server sizing for virtual tests, one server that is large enough to fit the entire virtualized configuration is ideal, but if it

needs to be spread across multiple such virtualized servers that is also a (slightly less convenient) option. External storage, such as a SAN device, is highly preferable for the virtualized configuration, and the networking configuration must exist such that the virtualized servers, the external storage (if in use), and the load driver configuration all can address each other across a LAN (ideally a private vLAN, but in this testing a public LAN is also acceptable). It is also assumed that the vendor has engineering resources to ensure the application is optimally tuned and functionally configured, as would be the case in a realistic production deployment of the application.

Step 1: Download and Install the Appropriate VMware Products

If not already available in your environment, download vSphere 4.0 and 60 day trial license from <https://www.vmware.com/tryvmware/index.php?p=vsphere&lp=1>. Next, download VMware vCenter Converter Standalone 4.0.1 from <https://www.vmware.com/tryvmware/?p=converter>. Install vSphere 4.0 on the select host servers. Note that vSphere is a “bare metal install”, so the server to be used should not have a running OS at the time of installation, or else the installer can be directed to overwrite the existing OS, in which case all data will be lost. Documentation on installation processes for vSphere is available at http://www.vmware.com/pdf/vsphere4/r40/vsp_40_esx_vc_installation_guide.pdf. It is recommended to use ESX, rather than ESXi, as ESXi has no console OS, and hence commands used below are more difficult to execute.

Install VMware vCenter Converter Standalone 4.0.1 on a separate physical machine or a VM running windows or Linux. Documentation on system requirement, installation and usage instructions are available at http://www.vmware.com/pdf/converter_standalone_guide401.pdf

Typical setup includes the server, agent and the client components installed on a windows workstation.

Once vSphere 4.0 is installed on the host or hosts that will be used for the testing, you can install the vSphere client on a client machine (typically running a version of the Windows operating system), and access the vSphere host as per the documentation http://www.vmware.com/pdf/vsphere4/r40/vsp_40_admin_guide.pdf http://www.vmware.com/pdf/vsphere4/r40/vsp_40_esx_server_config.pdf. Ensure that trial licenses are configured for vSphere.

Step 2: Design your Virtual Configuration

This step requires access to a physical deployment of the application that would be typical for a small to medium product user load. Understand exactly how many physical computers are included in this configuration, what their architectural function is (i.e. webserver, applications tier or database tier), and what is their size in terms of both memory and CPU requirements. Understand the storage requirements of the database that is used to load test this environment.

Typically, the virtual configuration is essentially unchanged from the physical one. So simply note down the configuration of each physical machine, and the storage requirements. If any one physical machine uses more than 8 physical cores, than that physical machine can not be directly virtualized, as vSphere’s largest virtual machine has 8 vCPUs. In this case, consider if the very large physical machine can be replaced with multiple 8 core systems, in a scale-out strategy. Also consider if the physical machine really uses more than 8 physical cores, or if it is allocated more than 8 cores but only uses a subset of the available resources. If you are planning to replace one large physical server with multiple virtual machines, note down the appropriate sizing of the virtual machines.

Once you have noted the requirements of all physical systems, add up these aggregate physical requirements and see how they compare to the servers you have identified for use as virtualized hosts. When doing this kind of testing, it is best to ensure that there are at least as many physical CPUs and memory in the virtual configurations as there were in the aggregate of the physical servers used. If all required CPU and memory resources fit within one physical server running vSphere, then that is the ideal case and will simplify data collection. If one host is not sufficient, then determine how many hosts are required to virtualize all the CPUs and memory used in the physical testing. Ensure that vSphere 4.0 is installed on all the required host machines.

Step 3: Convert your physical machines to virtual machines on vSphere 4.0

Use the VMware converter to create a virtual machine out of a physical machine and migrate the VM to run on the ESX host configured earlier. The user guide is available at http://www.vmware.com/pdf/converter_standalone_guide401.pdf. The converter does hot cloning to create a VM from powered-on physical machine so make sure to select the synchronization feature in the wizard to synchronize the destination VM with the source physical machine after cloning is complete. The time taken to clone the physical machines depends on the network bandwidth as the entire physical disk has to be re-imaged on the VM, so the cloning will be faster if there is higher network bandwidth between the source physical machine and the VM datastore. Note that an alternative to using converter to do a P2V migration is to create an empty VM and install the OS and required application software directly on the VM.

If the physical machines are connected to large databases there is a possibility of using the same LUN by adding that as a RDM (Raw device map) to the converted VM.

Step 4: Validate the Virtualized Configuration and Prepare to Run Load Against It

Once all physical machines have been converted to VMs and powered on, the application should work as it did on physical. Do an initial sanity check to login to the application and validate that it is functionally working. Ensure that IP addresses and host names are configured appropriately (as with physical hardware), such that you can now run load against the system, and such that they don't conflict with any other systems on the network.

Point your existing load driver mechanism to the newly virtualized configuration. This is typically done by altering the host name or IP addresses included in the load driver. Perform basic sanity checks, generally running first one and then multiple simulated users against the system. In the

case of batch oriented testcases, it may be possible to simulate load from a command line or UI, in which case an explicit load driver is not necessary. However, ensure that the database has non-trivial volume, as one would while running performance tests within product development.

Step 5: Run a Modest Load and Collect Diagnostic Data

The typical use case of virtualization is where a lightly loaded physical system is virtualized, and hence better overall utilization is achieved through running this and other workloads on the virtualized hosts. While virtualizing a highly loaded physical system is also useful, it generally is less common and may require more tuning, and hence is out of scope for this simple testing

process. So first identify a workload that can be run against the virtualized configuration that will result in CPU utilization numbers of between 5% and 40% for each virtual machine in the configuration. If some systems run at higher utilization that may be fine, but do not run a workload that pushes any one virtual machine close to 100% utilization, as that is an over utilized configuration and is likely to result in poor performance (as with a highly loaded physical configuration). Reduce user count of overall workload complexity until you have achieved these rough utilization goals. Ensure that the memory allocated is sufficient and you are not swapping on any of the virtual machines. Finally, monitor the utilization of the vSphere hosts, and ensure that they are not running at over 70% utilization of CPU, and are similarly not swapping memory. These load evaluations can be done via the UI in the vSphere client or vCenter, or using the diagnostic utility called ESXtop. More info on using ESXtop (the recommended utility) can be found at

http://pubs.vmware.com/vi3/resmgmt/wwhelp/wwhimpl/common/html/wwhelp.htm?context=resgmt&file=vc_esxtop.14.1.html. To collect testing results, you will be using a tool called “vm-support”, which is included in the vSphere product. Login into the console of the host or hosts you are running the test against as root. While running the load within the bounds discussed, perform the following steps:

First, ensure that there is enough available space to store the results of the test, which may be as large as 500M. You can do this by running “vdf /”

Next, run the following command, that will capture configuration information for the host and VMs, as well as load information for the specified duration and sample time.

➤ `vm-support -s -i 60 -d 1800`

In this case, we have suggested taking samples every 60 seconds (-i 60), and repeating that for 1800 seconds or 30 minutes. For a shorter test you can modify the sample size and duration accordingly to get roughly the same number of samples.

Once this command has completed, you will find a file with esx-DATE-TIME.PID.tgz name convention in the present working directory from where the command was triggered.

Directions to upload the file:

1. Go to <https://na6.salesforce.com/apex/page?name=tap.vmwareready.applicationsw> (you will need to login to Partner Central to be able to get to this page).
2. Click on “VMware ISV Product Listing” to go to that page and find the product you want to submit for VMware Ready logo approval. (If the product does not appear on the list, click on “Create New Product Listing” to create a new record.)
3. In the Status column, click on “Action Required”. This will take you to the VMware Ready Dashboard for your product
4. Click on “Need to Submit” under the Log File heading. A new page will open which allows you to upload up to five files if necessary.

Where multiple vSphere hosts have been used, a vm-support log will need to be collected concurrently on each host, and all such log files will be uploaded via the same mechanism.

Step 6: Receiving and Interpreting Feedback

After uploading the results file, you will get acknowledgement of its receipt from VMware at the email address associated with the logged in account. Within 5 business days, you will get an

email providing you feedback on your result set. Specifically, VMware will summarize the results, in terms of the average CPU and memory utilization, network activity and storage activity observed during the run. We will provide some characterization of the application based on that data, and provide a few high level best practices for virtualizing applications with those characteristics. Finally, we will specify if the testing was a success or not. Tests that were not successful are typically ones where the configuration was running out of some critical resource, and VMware will provide direction on what resource should be increased in order to perform another such test and collect a new data set. If the testing was successful, you will be instructed on the next steps to getting the VMware Ready logo. If it was unsuccessful, you will have to opportunity to rerun the tests and submit a new results file.