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VCAP-DCD Objective 1.2 – Gather and analyze application requirements

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Knowledge

- Identify the virtual hardware components and limitations.
- Identify key performance metrics.

Skills and Abilities

- Determine information needed in order to identify application dependencies.
- Given a set of applications within a physical environment, determine which applications are candidates for virtualization.
- Given the current physical design details of an environment, identify reusable components for the virtual environment.
- Given the current physical design details of an environment, identify potential application bottlenecks upon virtualization.
- Determine information needed in order to identify application dependencies.
- Given one or more application requirements, determine the impact of the requirements on the design.

Tools

- Best Practices Guide: Microsoft Exchange Solutions on VMware
- Exchange Getting Started Kit
- Microsoft Exchange Server 2007 Performance on VMware vSphere™ 4
- Best Practices Guide: Microsoft SQL Server and VMware Virtual Infrastructure
- Performance and Scalability of Microsoft SQL Server® on VMware vSphere 4
- VMware Cost-Per-Application Calculator
- Oracle® Databases on VMware vSphere™ 4
- Virtualizing Performance-Critical Database Applications in VMware® vSphere™

Although virtualization seems limitless there are some things that are still today limited. I would say it isn't that any particular application can't be virtualized

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today; it is just a matter of properly engineering the solution. For example, a few years ago a system that utilized a serial connection or USB would have been considered something that could not be virtualized, today though that is not the case with devices such as USB Anywhere and the capability of vSphere 4.1 to now pass through a limited set of USB devices.

It also may not be financially feasible to add a particularly large system to virtual infrastructure cluster. Remember you'll need to size your clusters to meet the demands of all your virtual machines and if you have only a few really heavy hitters maybe there is not a real need to virtualize. Sometimes though you may still choose to virtualize a box with a large footprint for the simple reason of providing it with the HA benefits that VMware has to offer.

And then there are the perceptual issues of applications that just cannot be virtualized. Many even today still cringe at the idea of virtualizing their 'tier-1' apps, but many case studies have shown that this concern is not warranted, especially if you consider the benefits again of VMware HA and DRS.

One set of applications that virtualization has just began to support in the main stream is real time applications such as Cisco's Call Manager, however the support is limited. You must use their hardware and configure it in a manner that meets their specs, for example using reservations and cpu affinity to guarantee cpu cycles. Voice and other real time applications can't afford to wait for resources so these configurations are certainly necessary.

When we think about virtualizing things like even vCenter itself, we certainly need to think about the applications and systems that that machine is dependent on. So in the case of vCenter we know we need SQL to be up and running and we need a functioning Windows Domain Controller. It is not just that we need those things, but that we need them to be there when vCenter is ready to come up, so we must consider things such as start order and the availability of those items. To me this is a huge consideration to virtualize those items as they will now be highly available in your virtual infrastructure. If there is hesitation you can still have physical clustered counterparts in the case of SQL or redundant physical domain controllers in the case of Windows Domain Controllers.

When we look at an existing physical environment and develop a virtual infrastructure, one thing I haven't always considered is the existing components of the physical infrastructure that may be reusable. Taking into consideration VMware's HCL and the 64 bit requirement for vSphere you may be left with hardware that is reusable. This hardware could be repurposed to be used as a development or management cluster. Management clusters are not something I have been a proponent of before, but have heard more of them recently and especially in the design workshop. The idea is to group together items like vCenter, AD, and other management virtual machines and separate them from your other virtual machines.

So from the application side of things we may see some bottlenecks and roadblocks to virtualization. It is possible that the application vendor today may still not support virtualization. Additionally as we mentioned there may be some USB/Serial licensing dongle constraints, or the application may use up such a large amount of resources that its relative proportion to the cluster would be so big that it would hinder the performance of other workloads.

There are also specific bottlenecks to consider for each application which can be limited by following best practices and recommendations from VMware, the application vendors, and storage vendors. I plan going into more detail on the below apps individually in the future, but for now here are some considerations for the following applications. Refer to the VMware recommended resource in the Tools section for more details and recommendations.

Oracle

- Use Large Memory Pages-again there are implications of making design decision like this. In the case of using large memory pages you must be aware that this will hinder the use of Transparent Page Sharing for the VMs memory.
- Use Oracle Automatic Storage Management
- Set Memory Reservations equal to size of Oracle SGA

Exchange

- RDMs can be used as a migration strategy from a physical to virtual world.
- Use the Microsoft Exchanges Servie Profile Analyzer to estimate workloads.

SQL

- Use Large Memory Pages

One application can have a huge impact on a virtual infrastructure if the solution is not properly sought out. As mentioned above for example, a workload that is much larger than the rest and not properly accounted for will detriment the rest of the workloads if the environment reaches capacity or if the hosts themselves are not powerful enough.

For more information on large memory pages I recommend checking out the following articles

- <http://www.vreference.com/?p=1065>
- <http://frankdenneman.nl/2011/01/re-impact-of-large-pages-on-consolidation-ratios/>
- <http://www.yellow-bricks.com/2011/01/26/re-large-pages-gabvirtualworld-frankdenneman-forbesguthrie/>
- <http://www.gabesvirtualworld.com/large-pages-transparent-page-sharing-and-how-they-influence-the-consolidation-ratio/>