

Understanding Server Hardware

Module 6: Servers in the Real World

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Introduction

- **How to justify the purchase of a new server**
 - Some successful tactics and negotiation strategies
- **Knowing what hardware tradeoffs to make**
 - How to maximize your hardware budget
- **Choosing hardware to minimize license costs**
 - Very important with socket-based or core-based licensing
- **Server consolidation**
 - Consolidating multiple existing servers onto fewer new servers
- **Hardware virtualization**
 - Running multiple server VMs on virtualization hosts

How to Justify the Purchase of a New Server

- **Make the technical and business case for a new server**
 - Gather performance metrics on your existing server(s)
 - What are the biggest performance and scalability bottlenecks?
 - What is the impact to the business of the old server?
 - Lost productivity, customer complaints, etc.
 - It may be more difficult to maintain an old server
 - How old are the existing servers?
 - Are they out of warranty from the hardware vendor?
 - Is the operating system out of mainstream support?
 - Research relevant application and component benchmark scores
 - Compare the existing server to the proposed new server
 - How much improvement is possible with the new server?
 - Are there any opportunities for server consolidation?

Knowing What Hardware Tradeoffs to Make

- **This depends on your workload type**
 - It also depends on where your biggest bottlenecks are
- **Common best practice is to favor the processors**
 - It is generally not economical to upgrade the processors later
 - You are likely to be stuck with your original processor(s)
- **Memory can usually be increased after the initial purchase**
 - Memory is inexpensive and prices are falling over time
 - Easier to get approval to buy more memory later if you need it
 - Memory can substitute for I/O capacity to a certain extent
- **Having empty processor slots affects total memory capacity**
 - Example:
 - One processor in a two socket server cuts memory capacity in half

Choosing Hardware to Minimize License Costs

- **It is becoming much more common to tie software licensing to hardware capabilities**
 - Examples:
 - Processor socket counts
 - Processor physical core counts
- **You need to be aware of this when you select the hardware**
 - Buying a 16-core AMD processor could be very expensive
 - Lower core count Intel processors usually have better performance
- **When selecting an Intel processor, pay attention to the details**
 - Frequency-optimized models can save a great deal of money
 - Intel Xeon E5-2643 (four-core, 3.3GHz base clock speed)
 - Intel Xeon E5-2690 (eight-core, 2.9GHz base clock speed)

Server Consolidation

- **Server consolidation is a good method to reduce server sprawl**
 - Workloads from multiple, older servers combined onto one server
- **Can reduce software licensing costs**
 - Only one OS license required
 - Possible savings on application licensing costs
- **Can reduce the overall required hardware maintenance**
 - Only one server to maintain with firmware and driver updates
- **Can reduce the overall required OS maintenance**
 - Only one server to patch
- **Can reduce operating costs**
 - Less electrical power usage
 - Less cooling capacity is required
 - Less server rack space is required

Hardware Virtualization

- **Hardware virtualization is becoming ever more popular**
 - Another method to reduce server sprawl
- **Doing physical to virtual (P2V) migrations is popular**
 - Good way to eliminate old, out of warranty hardware running legacy applications without having to reinstall and reconfigure
- **Hypervisors have less overhead than in the past**
 - Performance overhead is typically very low now
- **Latest Intel and AMD processors have much better hardware virtualization support**
 - This needs to be enabled in the BIOS
- **Very important that the host has enough resources**
 - CPU, memory, and I/O capacity

Resources

- **My blogs**

- Personal blog: <http://bit.ly/acoa15>
- SQLskills blog: <http://bit.ly/RA6wHZ>

- **AnandTech**

- <http://www.anandtech.com/>

- **Tom's Hardware**

- <http://www.tomshardware.com/>

- **StorageReview**

- <http://www.storagereview.com/>

- **CPU World**

- <http://www.cpu-world.com/>

Summary

- **Make the business case for new hardware**
 - Gather metrics and benchmarks
 - Executives are usually impressed by research and evidence
- **Know how to get the best performance for the least cost**
 - Know what components to spend money on for your workload
- **Be aware of software licensing costs as you choose hardware**
 - Bigger servers are usually slower than smaller servers
- **Look for opportunities for server consolidation**
 - Good way to reduce maintenance and operating costs
- **Look for virtualization opportunities**
 - Another way to reduce maintenance and operating costs
 - Lets you provision new VMs very quickly