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Running Informix in a Monster Virtual Machine

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Outline

- What is a VM
- Benefits of running Informix in a VM
- Problems with running Informix in a VM
- Benchmark and Testing
- Recommendations and Best Practices for Informix in a VM
- Poll – How many of you use VM?

What is a VM?

- Virtualization software allows a single host computer to create and run one or more virtual environments
- Virtualization software is most often used to emulate a complete computer system in order to allow a guest operating system to be run, for example allowing Linux to run as a guest on top of a PC that is natively running a Microsoft Windows operating system (or the inverse, running Windows as a guest on Linux).

What is a VM?

VM – Host Operating System

Guest OS

Guest OS

Guest OS

Guest OS

Guest OS

Guest OS

What is a Monster VM?

- Monster VM = more than 8 vCPUs and 256 GB RAM
- Focus of this presentation is VMware vSphere software for virtualization
- Other virtualization software

Benefits of a VM

- Partitioning
 - Run multiple operating systems on one physical machine
 - Divide system resources between virtual machines
- Isolation
 - Provide fault and security isolation at the hardware level
 - Preserve performance with advanced resource controls
- Encapsulation
 - Save the entire state of a virtual machine to files
 - Move and copy virtual machines as easily as moving and copying files
- Hardware Independence
 - Provision or migrate any virtual machine to any physical server

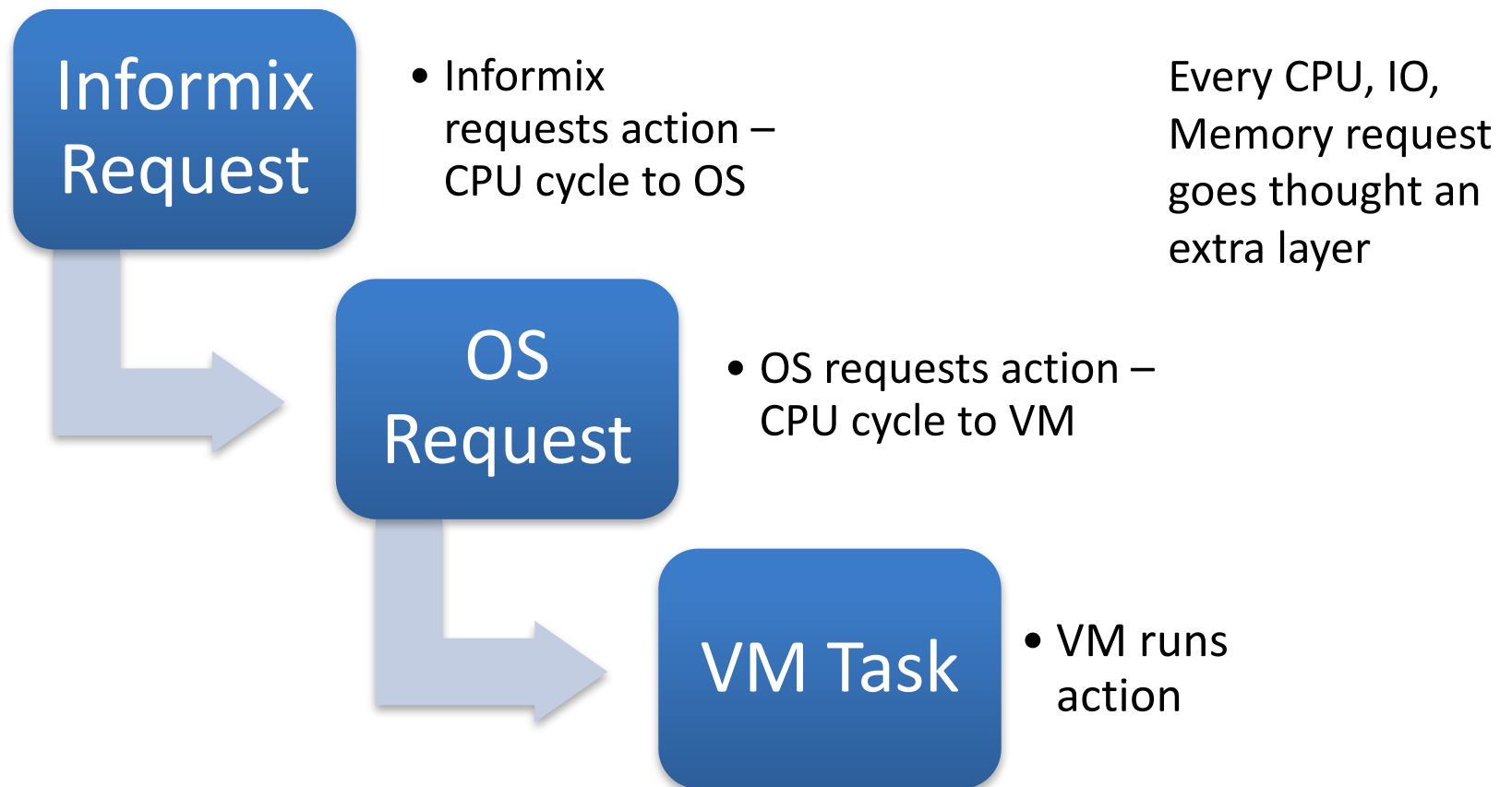
Benefits of running Informix in a VM

- Shared Resources
- Make use of ideal computer power
- Snapshots
- Flexible Management
- Flexible Allocation of Resources

Cost of Running a Database in a VM

- ESXi 6.0 Performance Relative to Native
 - “For example, with a 64-vCPU virtual machine running on a 72-pCPU ESXi host, throughput is 90% of native throughput on the same hardware platform.”
 - Source VMware white paper “Virtualizing Performance- Critical Database Applications in VMware vSphere 6.0”

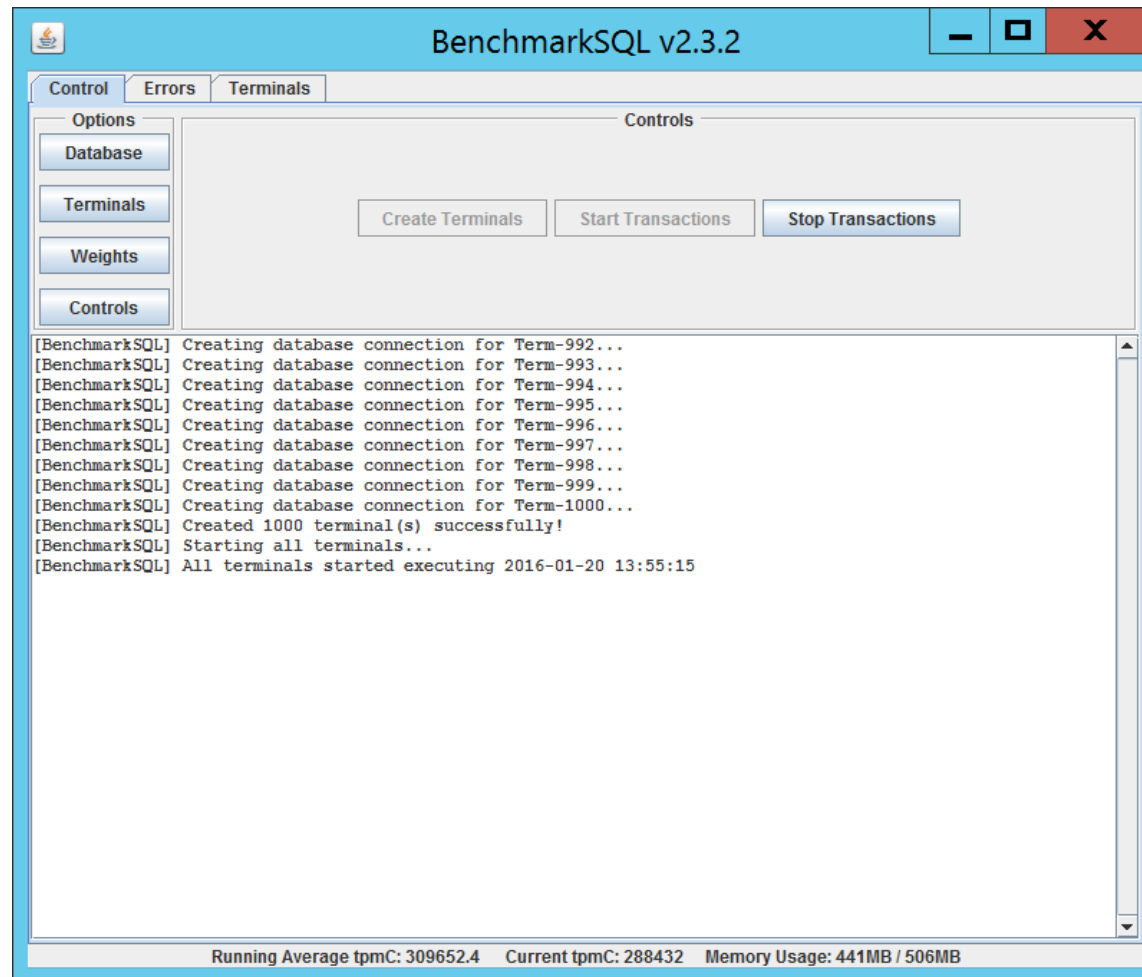
Costs of Running Informix in a VM



Problems of running Informix in a VM

- Overhead Costs- Memory and CPUs
- Disk performance
- Management and Monitoring
- Inconsistent results in benchmarks
- Snapshot corruption


Benchmark and Testing












Benchmark and Testing

- OLTP using Benchmark SQL
- Data Warehouse ETL Process
- Data Warehouse Reports
- The following Recommendations are based on our testing and benchmarks

Recommendations – Save 1 vCPU per Socket for VM (Used 92 of 96)

Hardware | Options | Resources | vServices | Virtual Machine Version: 11 


☐ Show All Devices Add... Remove

Hardware	Summary
 Memory	501760 MB
 CPUs	92
 Video card	Video card
 VMCI device	Deprecated
 SCSI controller 0	LSI Logic Parallel
 CD/DVD drive 1	[UCS SQL v02 - KIMHU...]
 CD/DVD drive 2	Client Device
 Hard disk 1	Virtual Disk
 Hard disk 2	Virtual Disk

Number of virtual sockets:

Number of cores per socket:

Total number of cores: 92

 Changing the number of virtual CPUs after the guest OS is installed might make your virtual machine unstable.

The virtual CPU configuration specified on this page might violate the license of the guest OS.

Recommendations – Disable Hot Swap Memory/CPU

vApp Options	Disabled
VMware Tools	Shut Down
Power Management	Standby
Advanced	
General	Normal
CPUID Mask	Expose Nx flag to ...
Memory/CPU Hotplug	Disabled/Disabled
Boot Options	Normal Boot
Fibre Channel NPIV	None
CPU/MMU Virtualization	Automatic
Swapfile Location	Use default settings
SDRS Rules	0 rules

The guest OS for which this VM is configured supports adding memory while the VM is powered on.

☒ Disable memory hot add for this virtual machine.

☐ Enable memory hot add for this virtual machine.

CPU Hot Plug

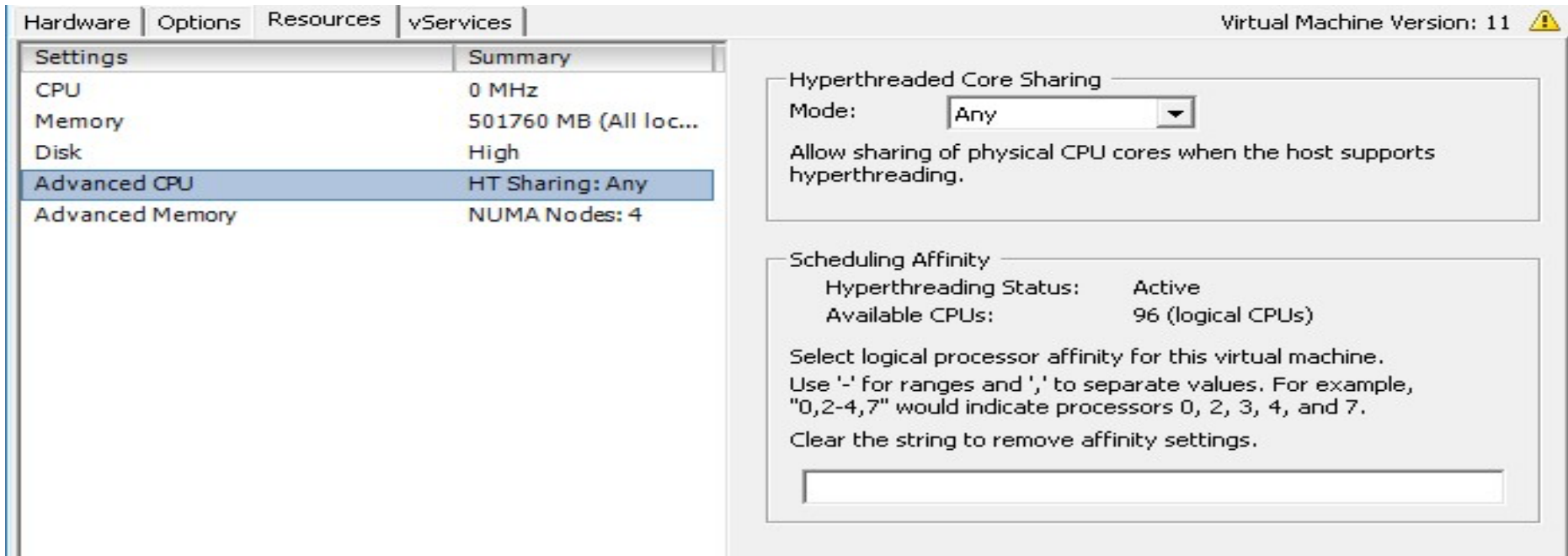
The guest OS for which this VM is configured supports adding virtual CPUs while the VM is powered on.

☒ Disable CPU hot plug for this virtual machine.

☐ Enable CPU hot add only for this virtual machine.

☐ Enable CPU hot add and remove for this virtual machine.

Recommendations – Turn on Hyperthreading ?



The screenshot shows the VMware Workstation interface with the 'vServices' tab selected. The left sidebar lists settings categories: Hardware, Options, Resources, and vServices. Under vServices, the 'Advanced CPU' option is selected, showing 'HT Sharing: Any'. The main panel displays the 'Hyperthreaded Core Sharing' settings. The 'Mode' is set to 'Any'. Below this, it states 'Allow sharing of physical CPU cores when the host supports hyperthreading.' The 'Scheduling Affinity' section shows 'Hyperthreading Status: Active' and 'Available CPUs: 96 (logical CPUs)'. It also includes instructions on how to use the affinity string field, such as '0,2-4,7' for processors 0, 2, 3, 4, and 7.

Virtual Machine Version: 11

Settings	Summary
CPU	0 MHz
Memory	501760 MB (All loc...
Disk	High
Advanced CPU	HT Sharing: Any
Advanced Memory	NUMA Nodes: 4

Hyperthreaded Core Sharing

Mode:

Allow sharing of physical CPU cores when the host supports hyperthreading.

Scheduling Affinity

Hyperthreading Status: Active

Available CPUs: 96 (logical CPUs)

Select logical processor affinity for this virtual machine.
Use '-' for ranges and ',' to separate values. For example,
"0,2-4,7" would indicate processors 0, 2, 3, 4, and 7.
Clear the string to remove affinity settings.

Recommendations – Save Memory for VM (Used 490 of 512)

Hardware | Options | Resources | vServices | Virtual Machine Version: 11

☐ Show All Devices Add... Remove

Hardware	Summary
Memory	501760 MB
CPUs	92
Video card	Video card
VMCI device	Deprecated
SCSI controller 0	LSI LogicParallel
CD/DVD drive 1	[UCS SQL v02 - KIMHU...]
CD/DVD drive 2	Client Device
Hard disk 1	Virtual Disk
Hard disk 2	Virtual Disk
Hard disk 3	Virtual Disk
Hard disk 4	Virtual Disk
Network adapter 2	Invalid backing


Memory Configuration

Memory Size: 490 GB

2 TB
1 TB
512 GB
256 GB
128 GB
64 GB
32 GB
16 GB
8 GB
4 GB
2 GB
1 GB
512 MB
256 MB
128 MB
64 MB
32 MB
16 MB
8 MB
4 MB

Maximum recommended for this guest OS: 4080 GB.
Maximum recommended for best performance: 524020 MB.
Default recommended for this guest OS: 1 GB.
Minimum recommended for this guest OS: 512 MB.

Recommendations – Turn NUMA on and align VM to NUMA Nodes

Hardware | Options | Resources | vServices | Virtual Machine Version: 11 

Settings	Summary
CPU	0 MHz
Memory	501760 MB (All loc...
Disk	High
Advanced CPU	HT Sharing: Any
Advanced Memory	NUMA Nodes: 4

NUMA Memory Affinity

Select NUMA node affinity for this virtual machine:

☐ No affinity

☒ Use memory from nodes:

☒ 0 ☒ 1 ☒ 2 ☒ 3

Recommendations and Best Practices

- Setup Direct Disk Access
- Enabled Hyper threading ?????(Maybe)
- Enabled NUMA Memory Affinity
- Disabled “Hot Swap” for CPU and RAM

Recommendations and Best Practices

- Informix External Backup Method for Snapshots
 - onmode -c block
 - Make Snapshot
 - onmode -c unblock



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Questions?

Send follow-up questions to
lester@advancedatatools.com

Next Webcast

Informix Best Practices

- **Informix Configuration, ONCONFIG part 2 by Lester Knutsen**
 - Thursday, May 18, 2017 at 2:00pm EST
- **Informix Connection Manager by Thomas Beebe**
 - Thursday, June 29, 2017 at 2:00pm EST
- **Informix Auditing by Mike Walker**
 - Thursday, July 27, 2017 at 2:00pm EST

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Thank You
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