Getting Even More Out of OpenEdge in a Virtualized Environment

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Agenda

- Virtualization
  - Definition & OE supportability
- Best practices
  - (v)Disk layout, network, etc. & performance data
- Snapshotting & backups
  - (v)Disk types, quiet points & 3rd party backup integration
- High Availability
  - DRS, Affinity rules, Replication

Virtualization

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Virtualization – What Is It? Well… Which One?

Storage virtualization

- Hitachi VSP

Server virtualization

- IBM, Oracle

Application virtualization

- XenApp, ThinApp

Network virtualization

- VLAN, NSX

Operating system virtualization

- VMware, Microsoft, Red Hat, Oracle
- Focus of this talk
- vSphere 5.5

Virtualization – Progress Support
Common Questions

Does Progress support Hyper-V replication?

Does Progress support VEEAM backup?

No – we don't.

The hypervisor vendor does.

So what *does* Progress support, then?

OpenEdge—on underlying OS running as VM on the hypervisor

Best Practices

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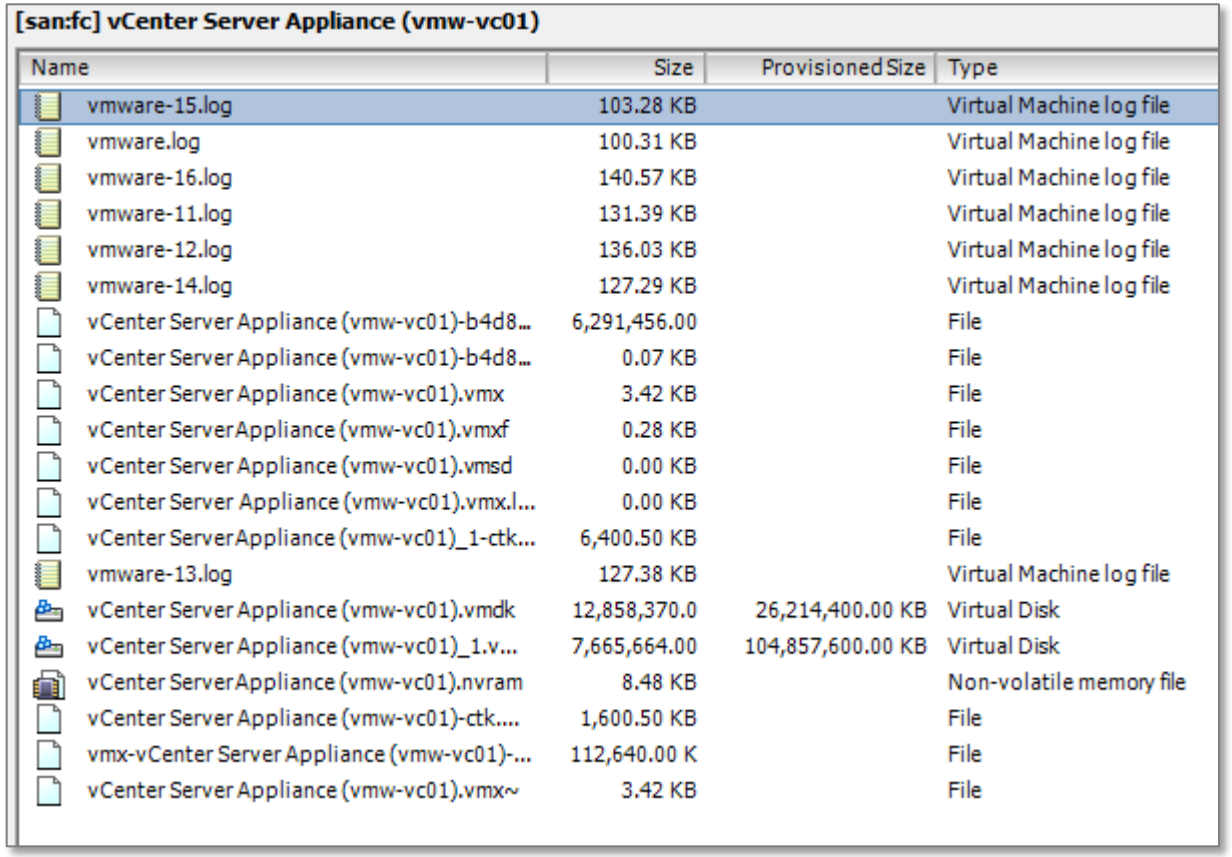
Best Practices – Virtual Machine

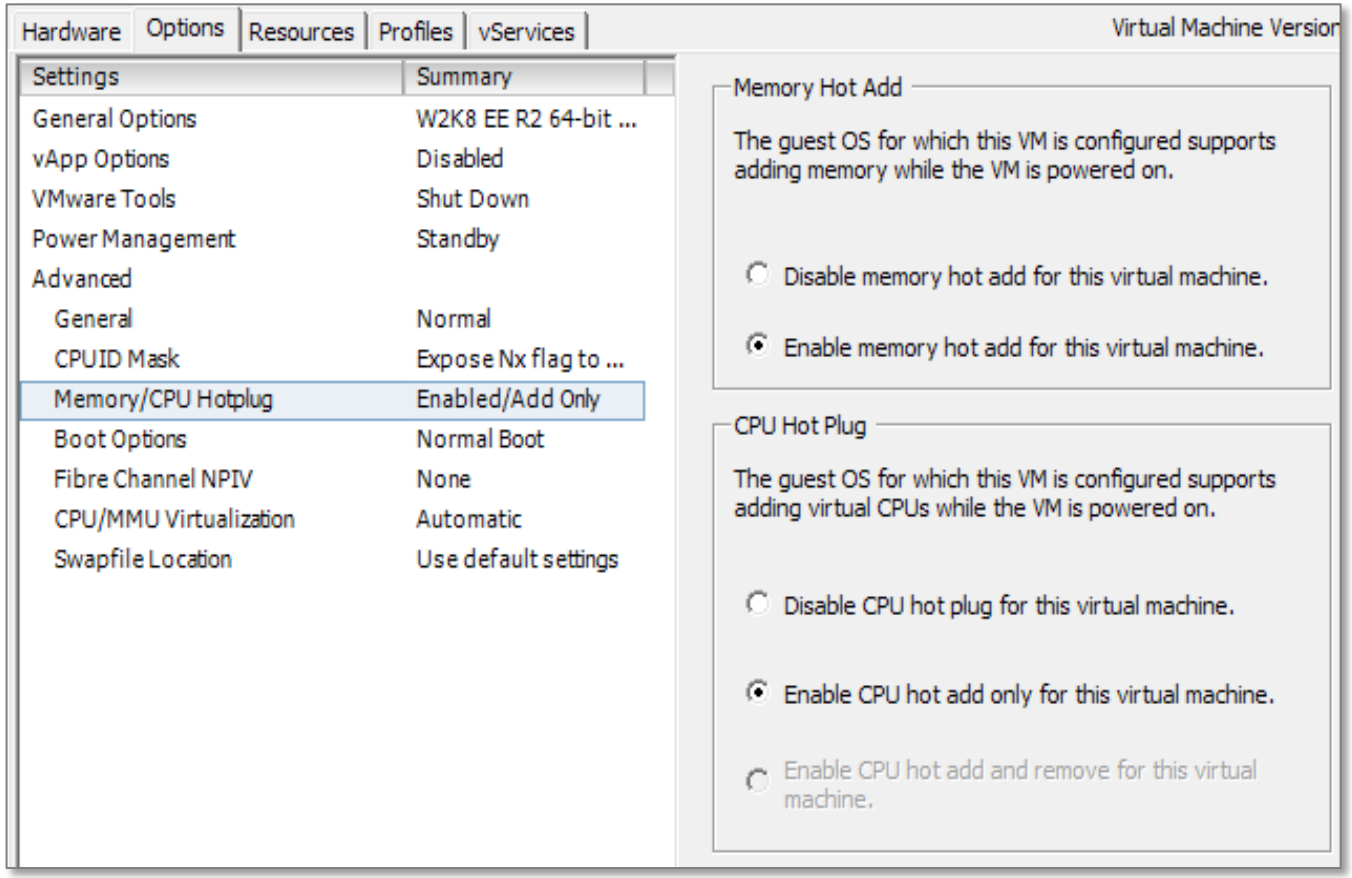
- **VM is a software computer**
  - Runs operating system and applications
  - In reality it is a set of files
    - virtual disk - .vmdk
    - configuration - .vmx
    - suspend file - .vmss
    - swap file - .vswp
    - .log, snapshot, BIOS settings ….



- **Configuration .vmx file**
  - Contains resource allocation
  - Possible to scale up or down after VM creation

Best Practices – Resource Allocation

- **Your VM is not the only one on the host**
  - Always scale up
- **4 key resources**
  - vCPU
  - vMemory
  - vDisk
  - vNIC
    - if you want to access the VM
- **Generic suggestion**
  - Use CPU/Memory “hotplug”
  - If supported by the host OS



Best Practices – vCPU Allocation

- **More vCPUs do not always equal better performance**

- **ALL assigned vCPUs have to be available for VM to run**
  - Not a consideration when playing alone
  - More VMs with quite a few vCPUs can have a negative effect
    - have to wait for a physical CPU/core time-slice
    - similarities w/ -spin
    - use CPU affinity for your production VM
    - better to have a host with more physical cores even less speedy

- **_progres, _mprosrv, prowin32**
  - Single threaded processes

Best Practices – vMemory Allocation

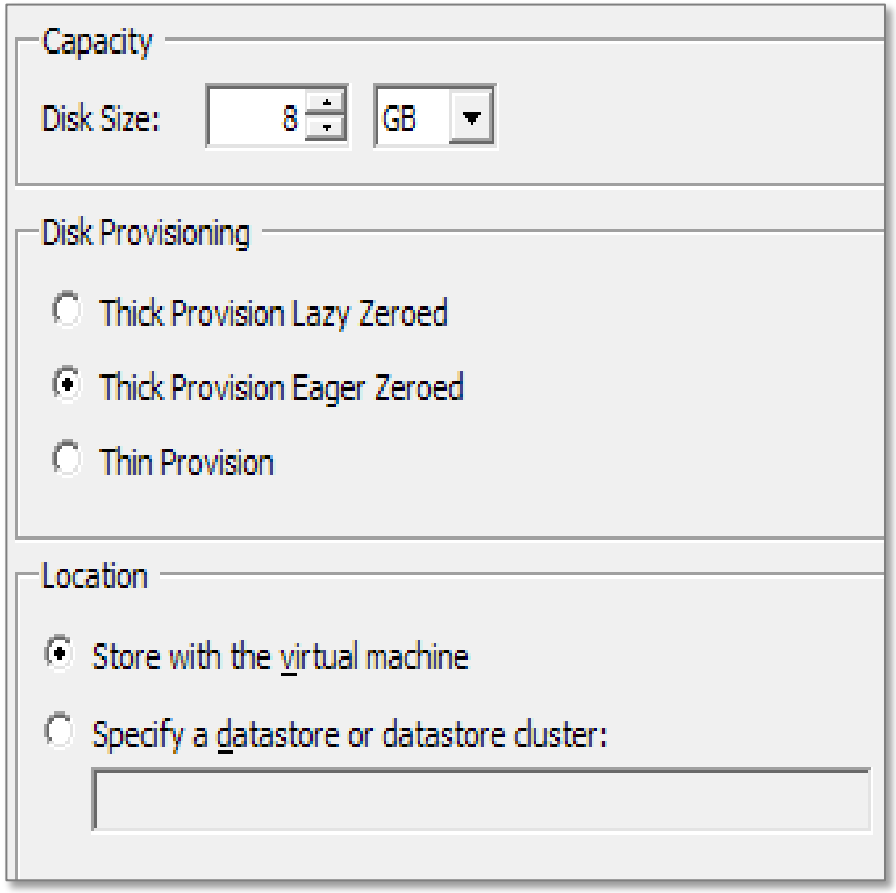
- **Generally more memory – better**
  - Means more for –B & -B2
    - Better buffer hits, better db performance
  - Do not go over memory allocated for the VM
    - Memory overcommitment

- **Memory ballooning**
  - Use with an extreme care
  - Host OS running low on memory asks hypervisor for more
    - inflating & deflating the balloon

- **Unnecessary memory allocation can lead to disk space issues**
  - .wsp size equals to memory

Best Practices – vDisk Allocation

- **2 key considerations**
  - How the disk is created
  - When the space is allocated
    - eventually where
- **2 types of disk provisioning**
  - Thin
  - Thick
    - Lazy zeroed
    - Eager zeroed



Best Practices – vDisk Provisioning Drill Down

Thick

- All space defined for vDisk files is allocated when VM gets created
- In OpenEdge DB world – fixed extent
- Lazy zeroed
  - entire vDisk NOT formatted upfront
- Eager zeroed
  - entire vDisk formatted out prior becoming available

Thin

- vDisk instantly available to the VM
- in OE DB world – variable extent
- space allocation on demand
  - “as the VM grows”

Best Practices – vNIC Configuration

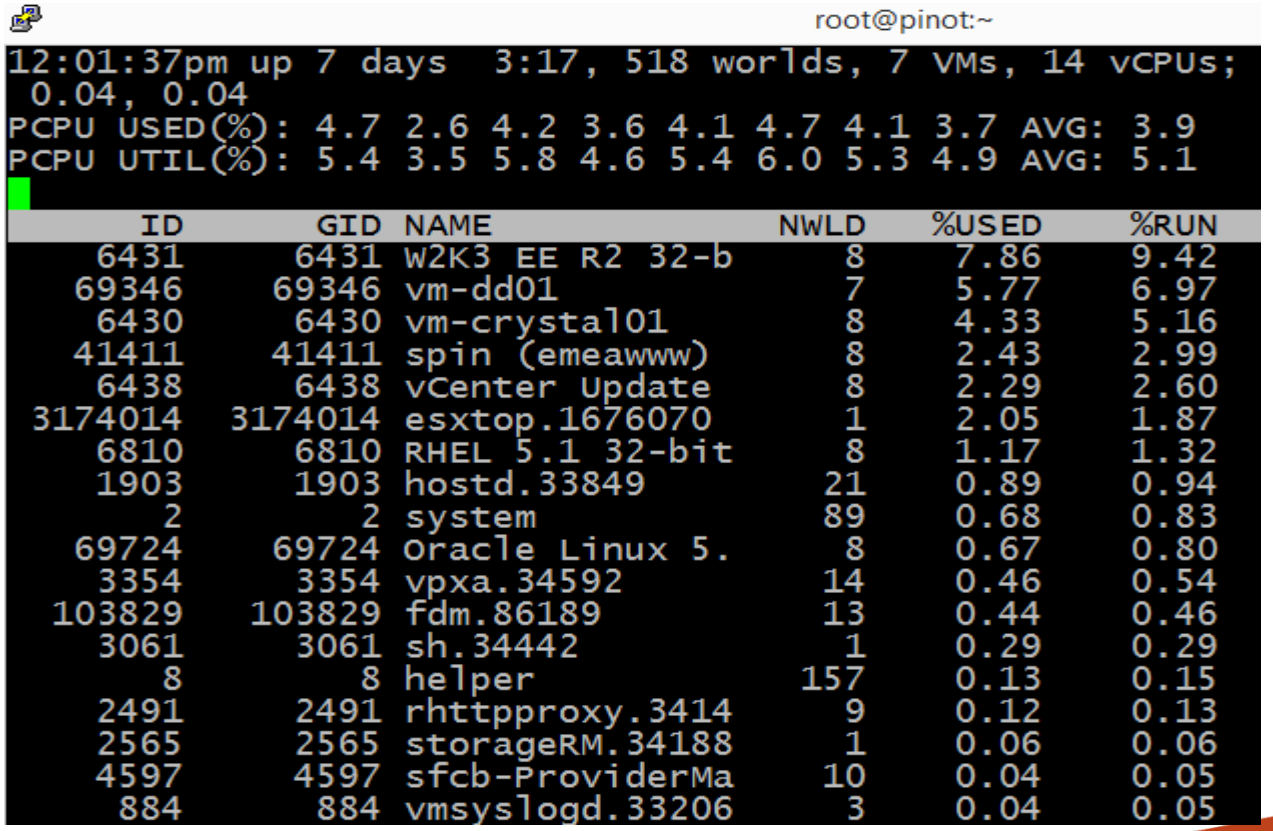
- **You want to access the VM, right ?**
- **Several network adapters available**
  - Whenever possible use vmxnet3
    - para-virtualized driver
    - better thru-put
    - less CPU intensive
- **VMDirectPath I/O “passthrough”**
  - In case of “network intensive” applications
    - has to be enabled on a device
    - 6 devices max.
    - limits HA

Best Practices – Other Performance Tips

- **Pay attention to an underlying disk setup behind vDisk**
  - Trust, but verify
  - NO thin provisioning for OE database
    - NO RAID5 either
- **Check physical host BIOS settings**
  - Make sure it is set to “Best performance”
    - or disable power management
- **Latency sensitive applications**
  - In OpenEdge world – intensive C/S; AppServer app
  - Check Latency-Sensitivity feature of vSphere 5.5
    - http://www.vmware.com/files/pdf/techpaper/latency-sensitive-perf-vsphere55.pdf

Best Practices – Performance Troubleshooting

- **On the top of the common “OE” troubleshooting**
  - “Sharing is caring”, but sometimes also a performance killer
  - OpenEdge can be slower due to other workload elsewhere
- **vSphere/ESX have their own tools**
  - esxtop
  - VisualESXtop
    - labs.vmware.com/flings/visualesxtop
  - vCenter data metric, charts, APIs
- **IPPerf**
  - To test network and its latency
  - sourceforge.net/projects/iperf/



Best Practices – Performance Troubleshooting (cont.)

- **SAN/NAS**
  - vSphere usually has plugins to gather SAN/NAS KPIs
  - Special tools from vendor

- **VMware performance troubleshooting useful links**
  - www.vmware.com/pdf/Perf_Best_Practices_vSphere5.5.pdf
  - pubs.vmware.com/vsphere-55/topic/com.vmware.ICbase/PDF/vsphere-esxi-vcenter-server-55-monitoring-performance-guide.pdf
  - kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKC&externalId=2001003
  - kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKC&externalId=1008205

Snapshots, (OpenEdge DB) Backup, Lies and Videotape

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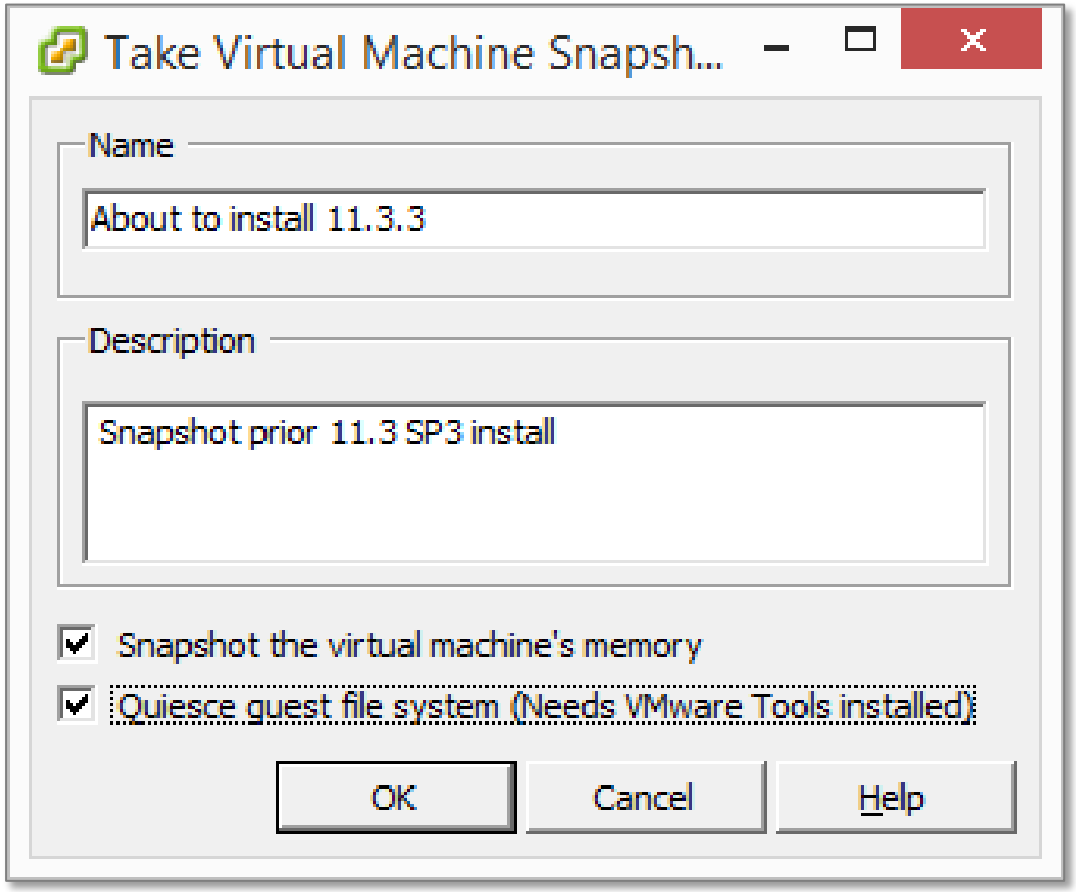
Snapshotting & (OpenEdge DB) Backup

- **Operation that preserves state of a VM at a given point in time**
  - It can be repeatedly returned to
  - Offline and online
- **Typical use case**
  - OS upgrade, OS patches
  - New application version
  - Service pack installation
- **Not meant for prolonged use**
  - Extra file maintenance
  - Performance degradation



Snapshotting & (OpenEdge DB) Backup (cont.)

- **Snapshot does NOT equal backup**
  - REPEAT: MESSAGE “It does NOT ….” . END.
- **Backup**
  - Process of creating a CONSISTENT copy of your data and MOVING it elsewhere
- **Snapshot**
  - State of VM at a certain time
  - Stored at the SAME location as VM
- **I have an OpenEdge database on VM**
  - What’s up with snapshots or a backup there?

Snapshotting & (OpenEdge DB) Backup (cont.)

- **OpenEdge database backup techniques**
  - probkup
    - no need for snapshot of DB vDisk
  - Mirror split
  - SAN/NAS volume copy
    - snap copy, SRDF
  - Replication
    - AI, OE Repl and/or VM
  - VM backup
    - Using 3rd party tools
      - Backup Exec, Legato, VEEAM, VDP …
        - snapshotting feature under the covers
      - Demo later

Snapshotting & (OpenEdge DB) Backup (cont.)

ONE DOES NOT SIMPLY JUST TAKE A VM SNAPSHOT

WITH AN OPENEDGE DATABASE RUNNING

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Snapshotting & (OpenEdge DB) Backup (cont.)

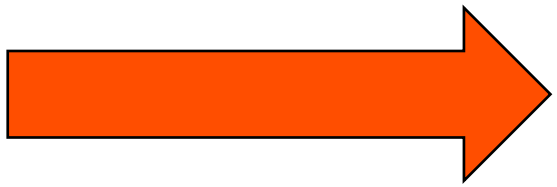
- **Unless**
  - Specific steps are undertaken
  - You (don't) care about your job
  - Like living on the (open) edge with errors 1124, 9450, 9445

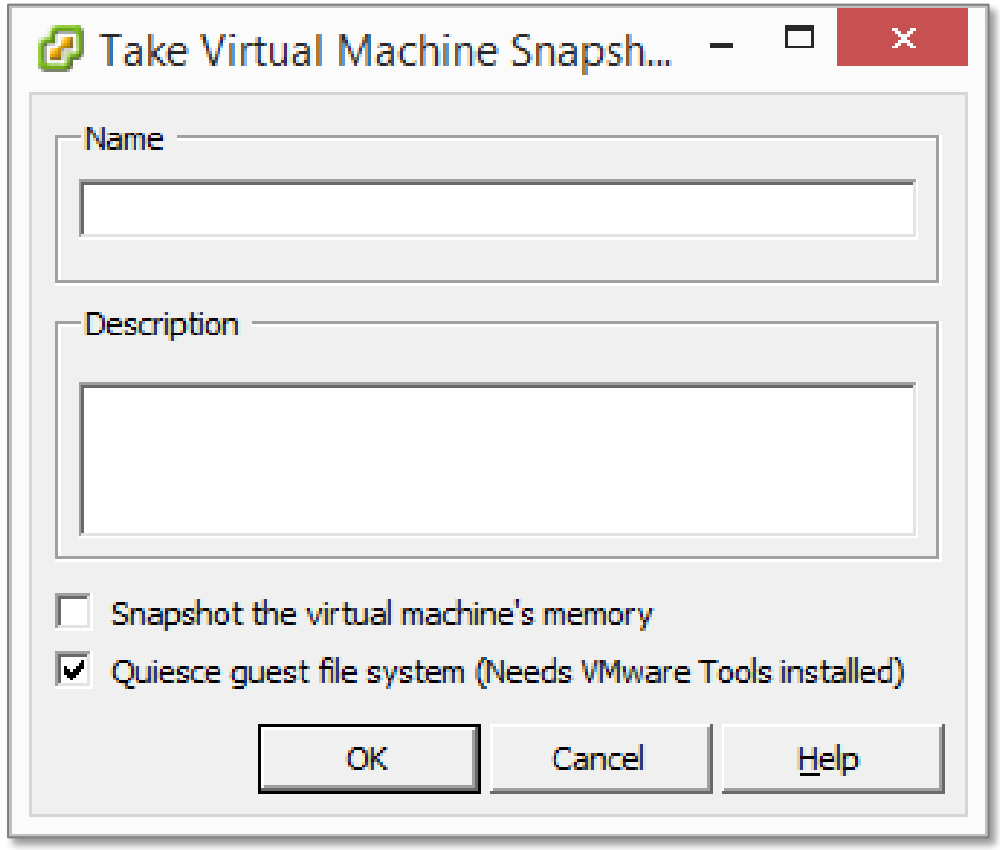
- **OpenEdge DB quiet point is required to be**
  - Enabled prior taking snapshot
    - DLC/bin/proquiet dbname -C enable
  - Disabled on snapshot completion
    - DLC/bin/proquiet dbname -C disable

- **Verify, verify and verify**
  - That quiet point has been enabled

Snapshotting & (OpenEdge DB) Backup (cont.)

- **VMware provides hooks**
  - Requires VMware Tools
- pre-freeze-script.(bat)
  - Quiet point ON
- post-thaw-script.(bat)
  - Quiet point OFF
- **Scripts ONLY fire with**
  - Unchecked





Snapshotting & (OpenEdge DB) Backup (cont.)

Now, hang on just a minute

- Without virtual machine's memory ?
  - what about reverting the snapshot ?
- And does not "quiet point" require an Enterprise DB license?

- **Off to 3rd party backup sw demos**
  - Taking a backup of VM with Backup Exec
  - Taking a backup of VM with VEEAM

High Availability

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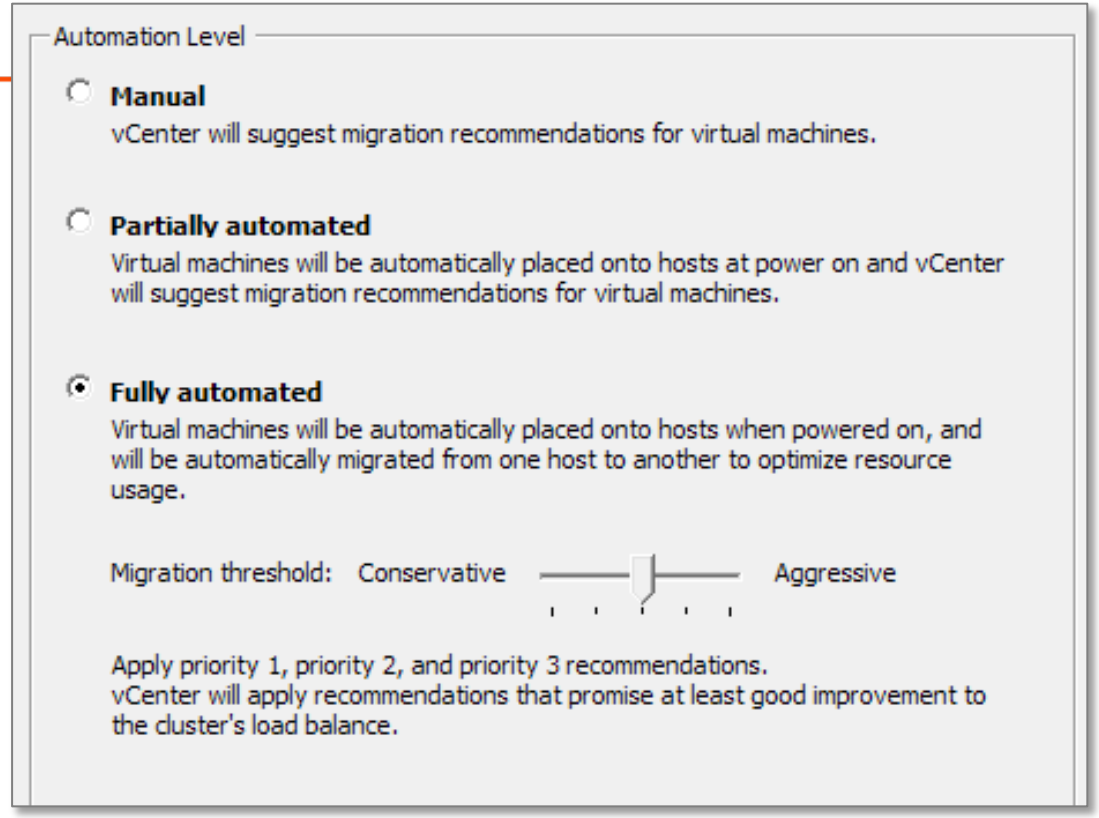
High Availability

- **vSphere has several HA & DR features capable of enhancing resilience and uptime of OpenEdge processes**
  - Distributed Resource Scheduler
  - (vSphere) Replication and Site Recovery Manager
  - vMotion, Storage vMotion, Fault tolerance
  - Cluster
    - read: cluster composed of ESXi servers
  - These are Virtual machine and NOT the application specific features

- **License check**
  - When deploying HA & DR solution built on VMware with OpenEdge db/app, make sure you are EULA compliant
  - If unsure, check with your Account Manager

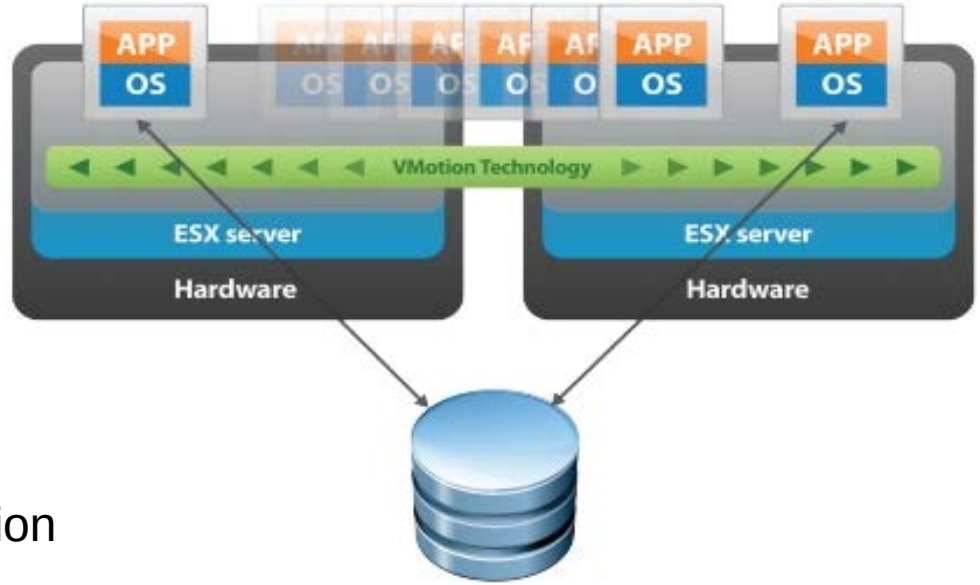
High Availability – DRS

- **Distributed resource scheduler**
  - Optimizes workload
    - based on CPU, memory & storage load of a host
    - live migration to a less utilized host
  - Resource prioritization per VM
  - Isolation based on business
    - resource pools
    - production, QA, development, testing, etc.
  - Affinity rules
    - where and how VMs can run
    - both Application server VM and database VM have to start
    - OE Replication source and replication target VMs always on different hosts
    - at least one failover cluster node have to be on a different host than the rest



High Availability - vMotion

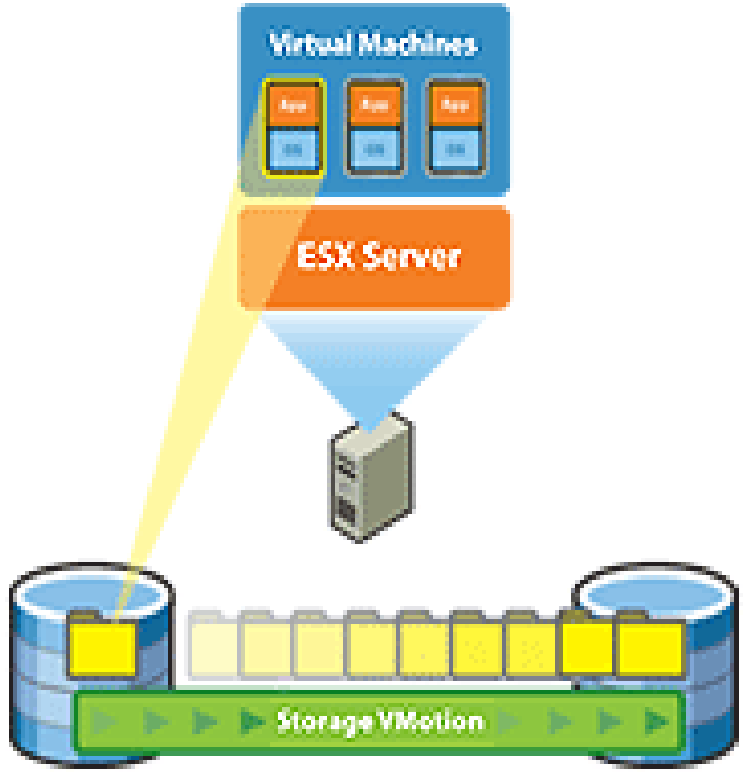
- **vMotion**
  - VM migration between 2 different hosts
  - Cold and live
    - offline & online



- **Live vMotion**
  - Way of offloading a VM from a busy host
    - while VM and its app keep running
  - Can be automated via DRS to balance server utilization
  - No business disruption
  - CANNOT prevent VM or ESX host failure
    - it will restart VM, but there will be a downtime

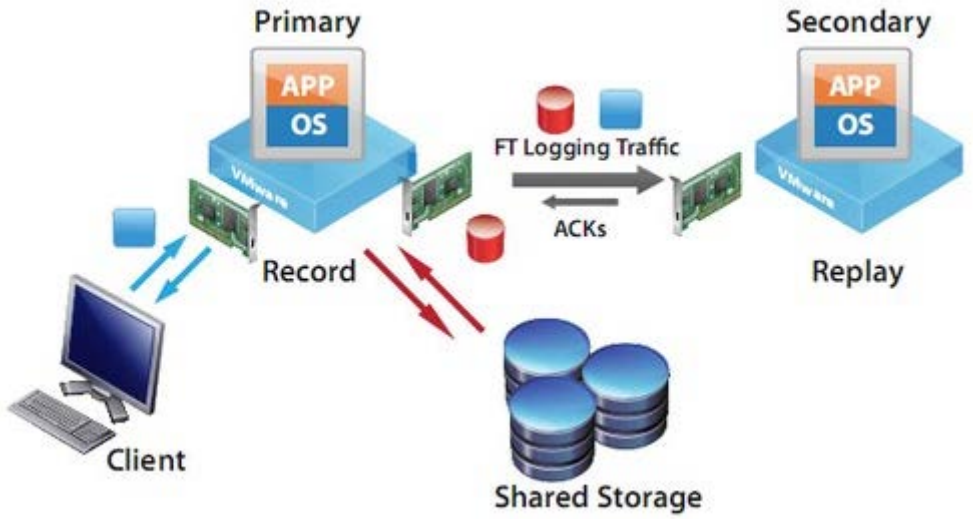
High Availability – Storage vMotion

- **Storage vMotion**
  - Enables live migration of virtual disks on the fly
  - Way of offloading an online VM from a busy disk subsystem
  - Performance considerations
    - introduces extra disk I/O



High Availability – Fault tolerance

- **Fault tolerance**
  - Protects against VM and/or ESX host failure
    - prevents un-planned downtime
  - Requires
    - 2 ESX hosts
    - dedicated & fast network
    - additional CPU & memory resources
  - Best suited for:
    - Application VM
    - JSE/Webserver VM
    - OEM/OEE VM



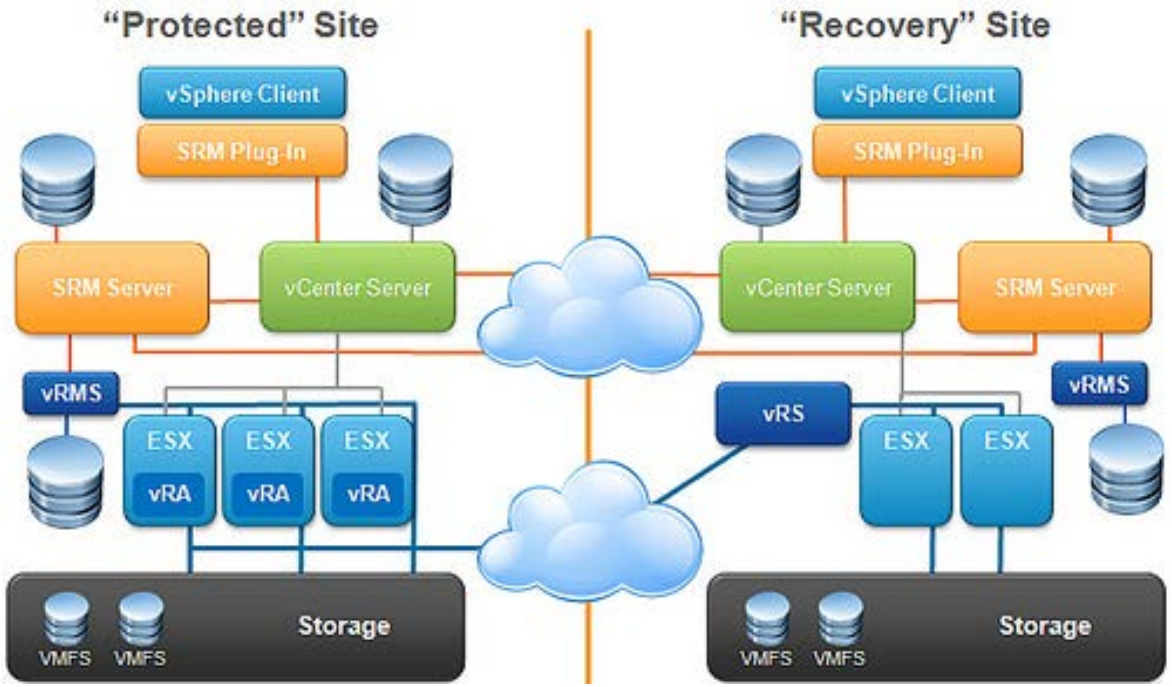
High Availability – Replication

- **vSphere replication**
  - Not “online”
  - Minimum RPO is 15 minutes
  - Achieved by using vDisk deltas
    - similar to after imaging
  - Use case: Application VM, JSE VM, OEM/OEE console VM

- **Storage replication**
  - Online
  - Disk level replication
  - Based on storage replication (SRDF) technology
  - Use case: Database VM

High Availability – Replication (cont.)

- **vSphere SRM**
  - SRM – Site Recovery Manager
  - Provides VM replication to a secondary site
  - Has tools for a failure testing
    - creates “private” network
  - Can replicate all vDisks or some
  - Requires
    - 2 vCenters
    - extra appliances



Summary

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Summary

Extends the life of legacy apps

Fast deployment of new servers

Excellent QA/testing capabilities

Provides HA & DR solution out of the box

VM isolation

- Not a “free lunch” universal solution
- Hypervisor still has and will have a performance overhead
- Sometimes real (physical) hardware is better
- YMMV, test!

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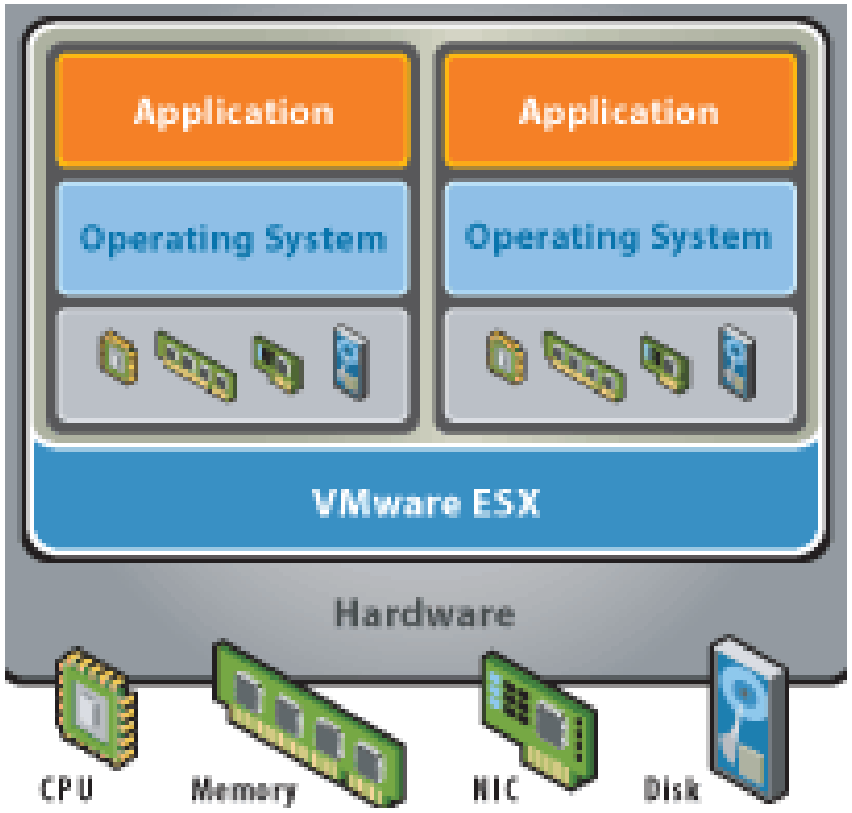
(Operating System) Virtualization

- **Way of running multiple OS on a (single) computer**
  - That includes applications
- **Each OS runs under its own Virtual Machine (VM)**
  - (Virtual) CPU, memory, disk allocation
- **Hypervisor**
  - Program that allows VMs to a share single hardware
  - Controls the host processor and resources
  - Ensures that VMs are isolated from each other



Virtualization – Benefits

- Central management of your VI
- Fast new deployment
- Support for legacy OS and applications
- Provides complete isolation
- Utilizes your hardware more effectively
- Reduces overall IT expenses
- … and so on

Virtualization – Vendors

- VMware
  - ESXi, vSphere, Workstation
- Microsoft
  - Hyper-V

x86

- RedHat
  - Xen, RHEV
- Oracle
  - Virtual Box, Solaris zones
- IBM
  - LPAR, WPAR

RISC

x86 virtualization