

Getting Even More Out of OpenEdge in a Virtualized Environment

Libor Laubacher
Principal Technical Support Engineer
Progress Software

llaubach@progress.com

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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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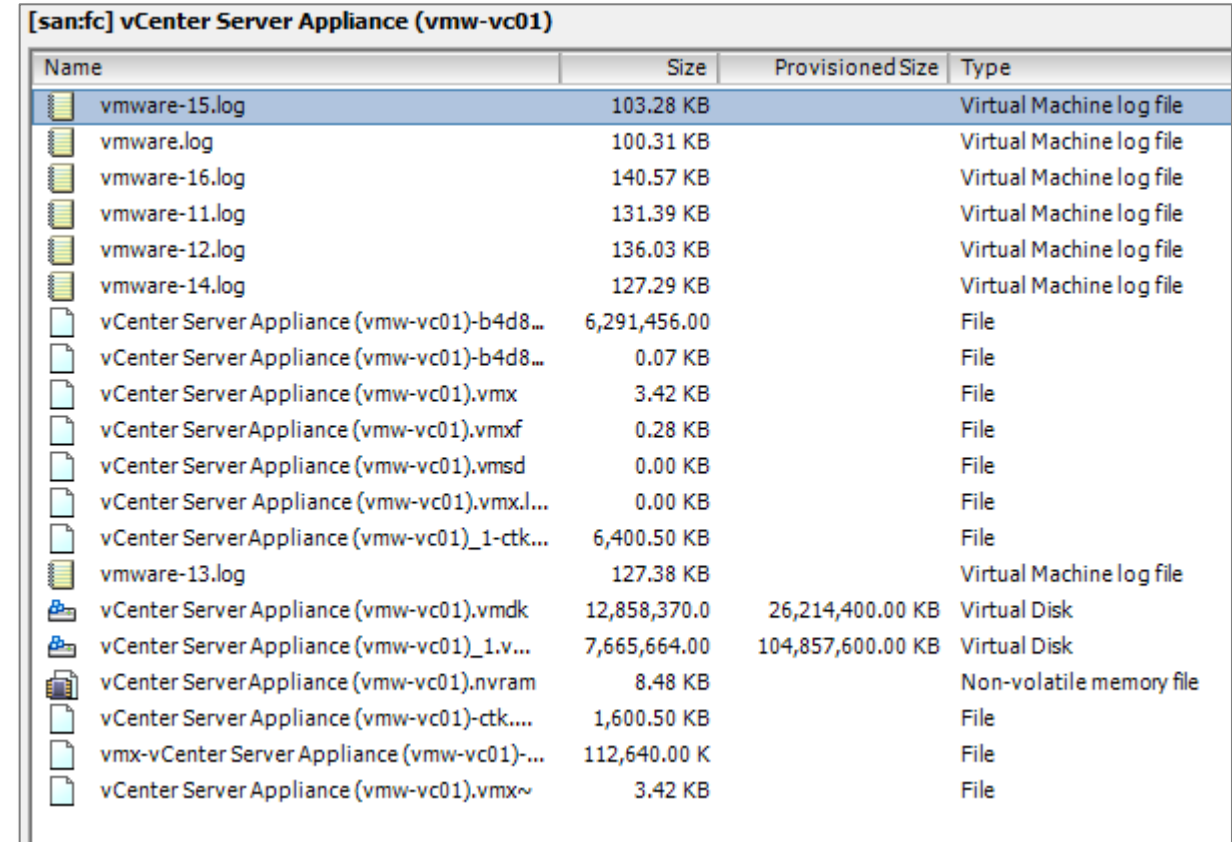
Best Practices – Virtual Machine

■ 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



Name	Size	Provisioned Size	Type
vmware-15.log	103.28 KB		Virtual Machine log file
vmware.log	100.31 KB		Virtual Machine log file
vmware-16.log	140.57 KB		Virtual Machine log file
vmware-11.log	131.39 KB		Virtual Machine log file
vmware-12.log	136.03 KB		Virtual Machine log file
vmware-14.log	127.29 KB		Virtual Machine log file
vCenter Server Appliance (vmw-vc01)-b4d8...	6,291,456.00		File
vCenter Server Appliance (vmw-vc01)-b4d8...	0.07 KB		File
vCenter Server Appliance (vmw-vc01).vmx	3.42 KB		File
vCenter ServerAppliance (vmw-vc01).vmxf	0.28 KB		File
vCenter Server Appliance (vmw-vc01).vmsd	0.00 KB		File
vCenter Server Appliance (vmw-vc01).vmx.l...	0.00 KB		File
vCenter ServerAppliance (vmw-vc01)_1-ctk...	6,400.50 KB		File
vmware-13.log	127.38 KB		Virtual Machine log file
vCenter Server Appliance (vmw-vc01).vmdk	12,858,370.0	26,214,400.00 KB	Virtual Disk
vCenter Server Appliance (vmw-vc01)_1.v...	7,665,664.00	104,857,600.00 KB	Virtual Disk
vCenter ServerAppliance (vmw-vc01).nvram	8.48 KB		Non-volatile memory file
vCenter Server Appliance (vmw-vc01)-ctk....	1,600.50 KB		File
vmx-vCenter Server Appliance (vmw-vc01)-...	112,640.00 K		File
vCenter Server Appliance (vmw-vc01).vmx~	3.42 KB		File

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

The screenshot shows the VMware vSphere VM settings interface. The 'Resources' tab is selected, and the 'Memory/CPU Hotplug' option is highlighted in the left-hand menu. The right-hand pane shows the configuration for 'Memory Hot Add' and 'CPU Hot Plug', both of which are set to 'Enable'.

Settings	Summary
General Options	W2K8 EE R2 64-bit ...
vApp Options	Disabled
VMware Tools	Shut Down
Power Management	Standby
Advanced	
General	Normal
CPUID Mask	Expose Nx flag to ...
Memory/CPU Hotplug	Enabled/Add Only
Boot Options	Normal Boot
Fibre Channel NPIV	None
CPU/MMU Virtualization	Automatic
Swapfile Location	Use default settings

Memory Hot Add

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.

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

The image shows a configuration dialog box for a vDisk. It is divided into three sections:

- Capacity:** The "Disk Size" is set to 8 GB.
- Disk Provisioning:** Three radio buttons are present: "Thick Provision Lazy Zeroed" (unselected), "Thick Provision Eager Zeroed" (selected), and "Thin Provision" (unselected).
- Location:** Two radio buttons are present: "Store with the virtual machine" (selected) and "Specify a datastore or datastore cluster:" (unselected). Below the second radio button is an empty text input field.

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/ipperf/

```
root@pinot:~
12:01:37pm up 7 days 3:17, 518 worlds, 7 VMs, 14 vCPUs;
0.04, 0.04
PCPU USED(%): 4.7 2.6 4.2 3.6 4.1 4.7 4.1 3.7 AVG: 3.9
PCPU UTIL(%): 5.4 3.5 5.8 4.6 5.4 6.0 5.3 4.9 AVG: 5.1
```

ID	GID	NAME	NWLD	%USED	%RUN
6431	6431	w2k3 ee R2 32-b	8	7.86	9.42
69346	69346	vm-dd01	7	5.77	6.97
6430	6430	vm-crystal01	8	4.33	5.16
41411	41411	spin (emeawww)	8	2.43	2.99
6438	6438	vCenter Update	8	2.29	2.60
3174014	3174014	esxtop.1676070	1	2.05	1.87
6810	6810	RHEL 5.1 32-bit	8	1.17	1.32
1903	1903	hostd.33849	21	0.89	0.94
2	2	system	89	0.68	0.83
69724	69724	Oracle Linux 5.	8	0.67	0.80
3354	3354	vpaxa.34592	14	0.46	0.54
103829	103829	fdm.86189	13	0.44	0.46
3061	3061	sh.34442	1	0.29	0.29
8	8	helper	157	0.13	0.15
2491	2491	rhttpproxy.3414	9	0.12	0.13
2565	2565	storageRM.34188	1	0.06	0.06
4597	4597	sfcB-ProviderMa	10	0.04	0.05
884	884	vmssyslogd.33206	3	0.04	0.05

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**

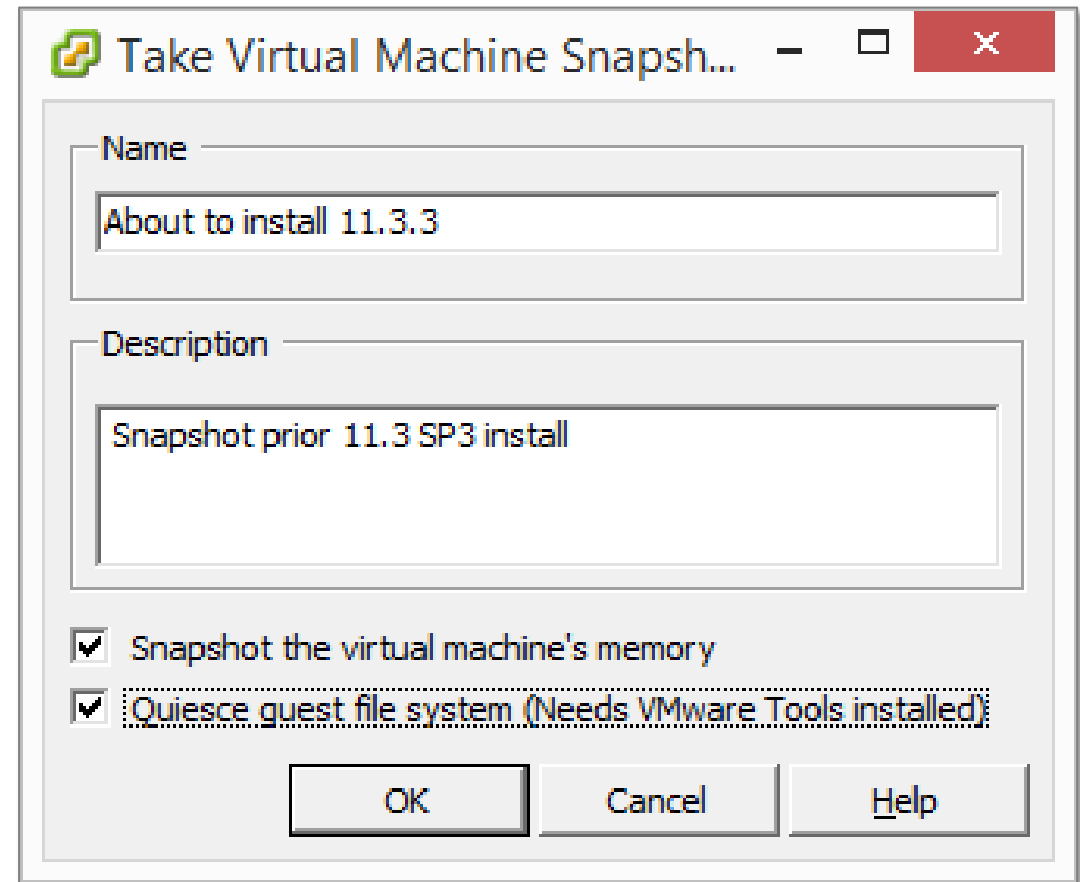
- It can be repeatedly returned to
- Offline and online

- **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

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)

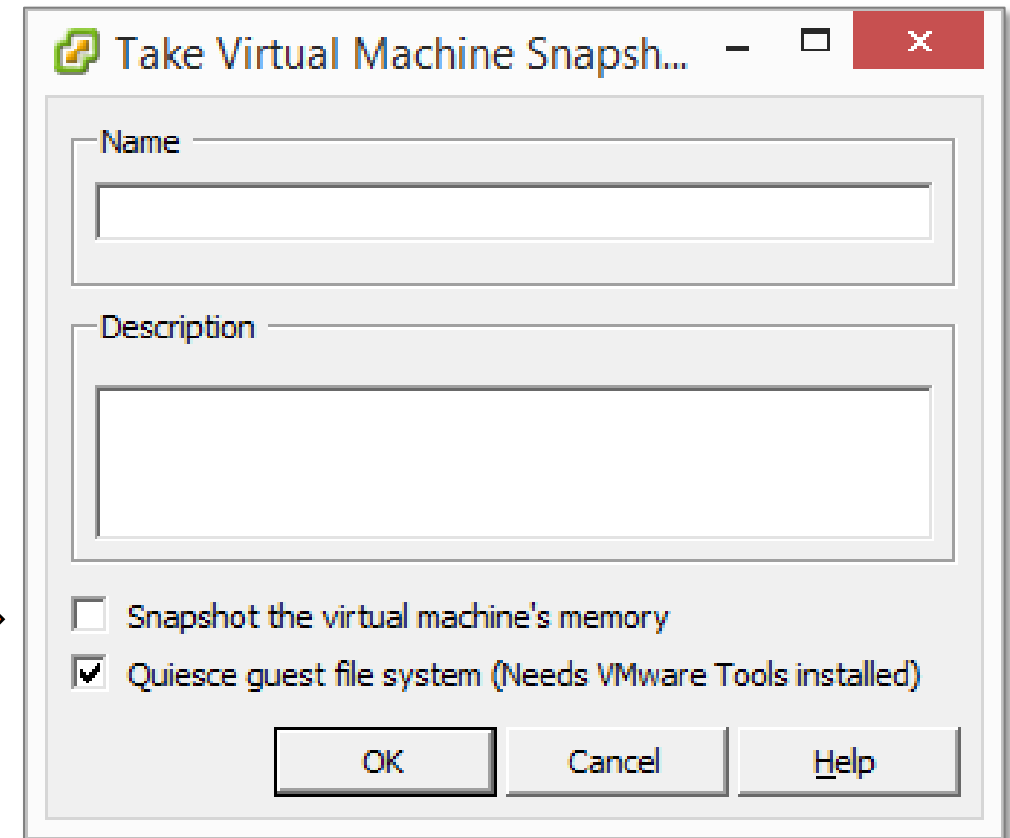
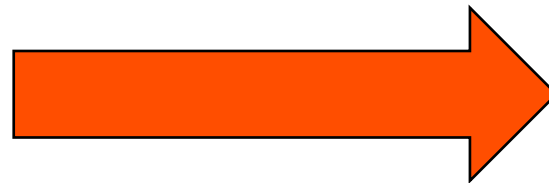
- Quiet point ON

- 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

Automation Level

- Manual**
vCenter will suggest migration recommendations for virtual machines.
- Partially automated**
Virtual machines will be automatically placed onto hosts at power on and vCenter will suggest migration recommendations for virtual machines.
- Fully automated**
Virtual machines will be automatically placed onto hosts when powered on, and will be automatically migrated from one host to another to optimize resource usage.

Migration threshold: Conservative  Aggressive

Apply priority 1, priority 2, and priority 3 recommendations.
vCenter will apply recommendations that promise at least good improvement to the cluster's load balance.

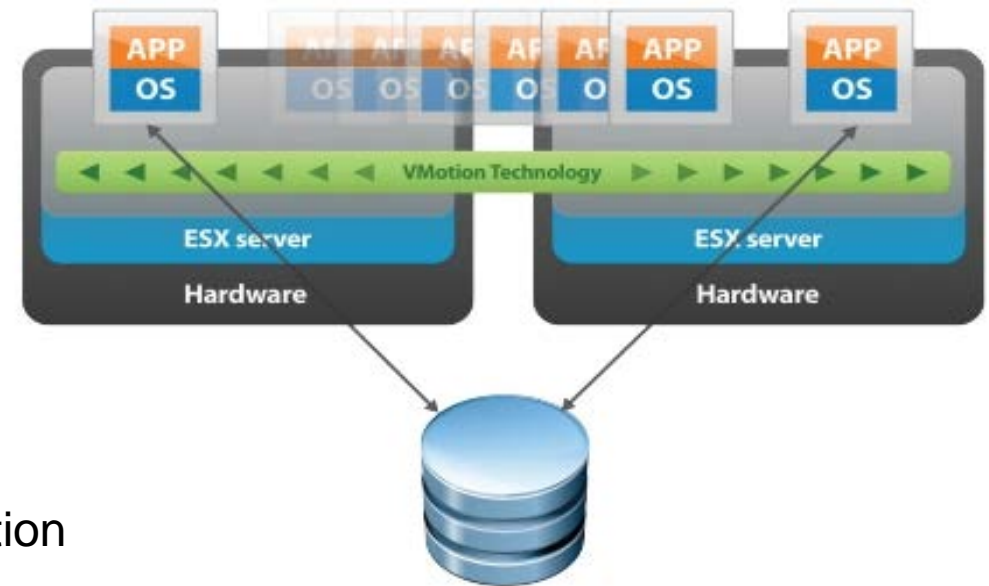
High Availability - vMotion

■ vMotion

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

■ Live vMotion

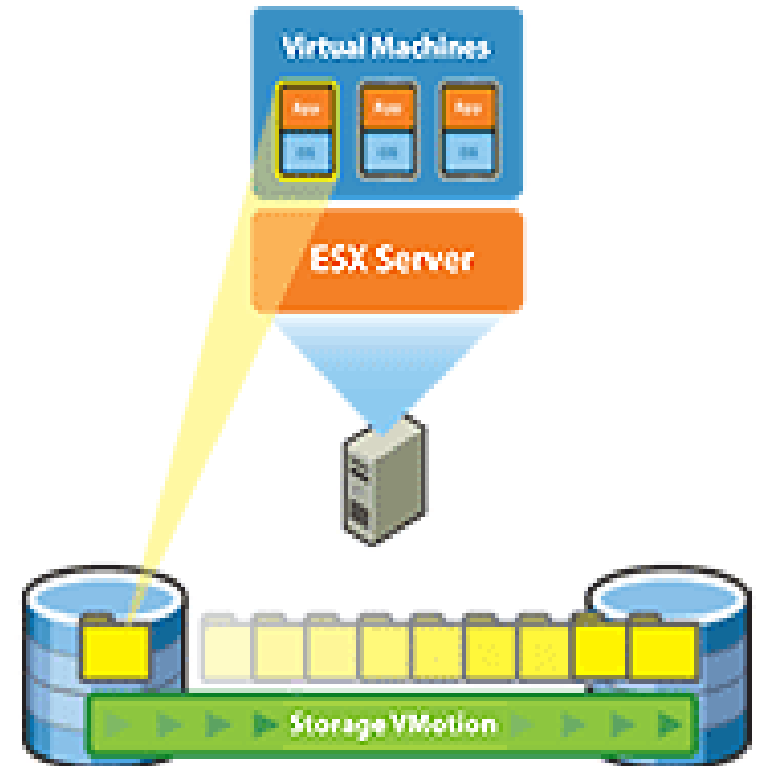
- Way of offloading a VM from a busy host
 - while VM and its app keep running
- Can be automated via DRS to balance server utilization
- No business disruption
- CANNOT prevent VM or ESX host failure
 - it will restart VM, but there will be a downtime



High Availability – Storage vMotion

■ Storage vMotion

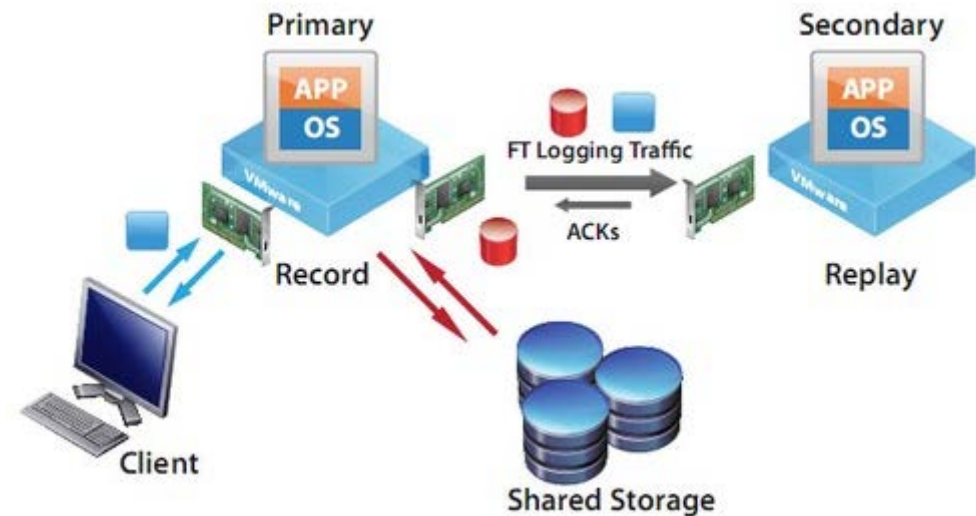
- Enables live migration of virtual disks on the fly
- Way of offloading an online VM from a busy disk subsystem
- Performance considerations
 - introduces extra disk I/O



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

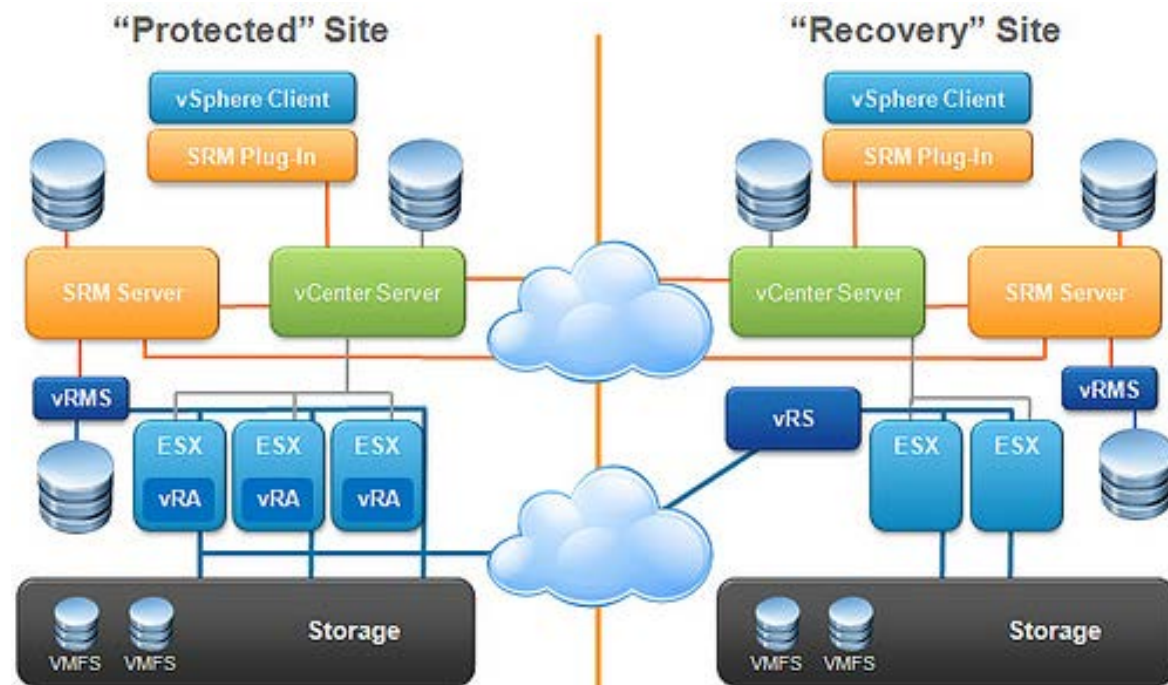
■ Storage replication

- 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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Visit the Resource Portal

- **Get session details & presentation downloads**
- **Complete a survey**
- **Access the latest Progress product literature**

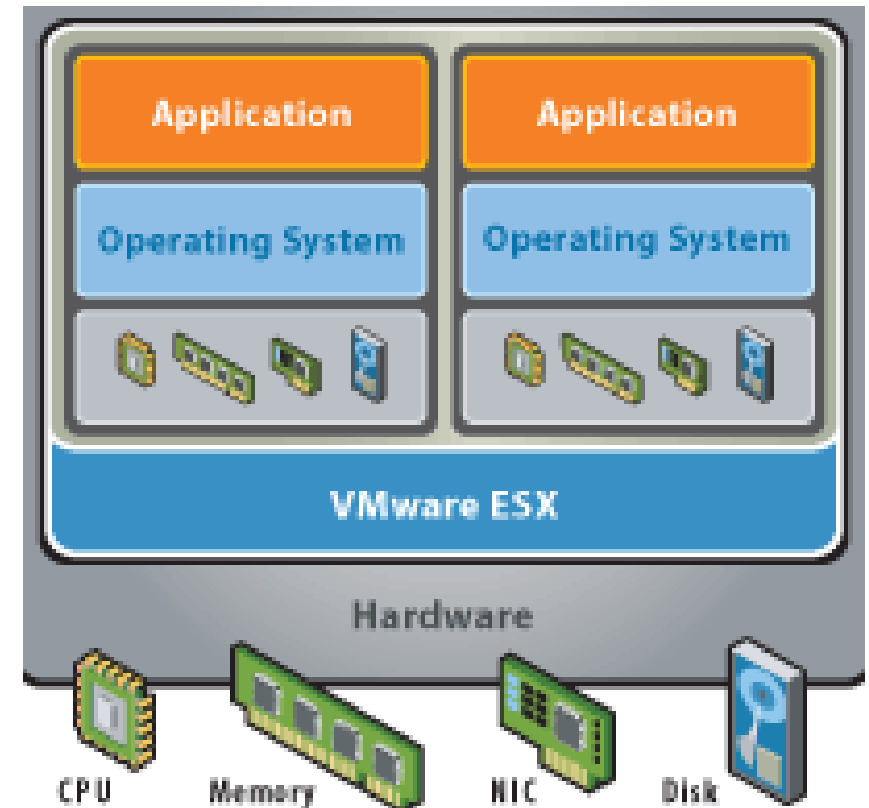
www.progress.com/exchange2014



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

x86

RISC



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