

# vSphere 6 (th) Big, Better, Should You Be Bovvered? ^

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# Hello

## Me:

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Chief Builder & Blogger  
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**vmware** vEXPERT

## You:

*sites?*  
*VMs?*  
*vSphere?*  
*Hyper-V?*  
*XenServer?*  
*nothing?*  
*cloud?*

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# vSphere Editions

**vSphere Hypervisor:** Free

**vSphere Essentials:** Kit | Plus Kit

**vSphere Remote Office Branch Office:** Standard | Advanced

**vSphere:** Standard | Enterprise | Enterprise Plus

**vSphere with Operations Management:** Standard | Enterprise | Enterprise Plus

**vCloud Suite:** Standard | Advanced | Enterprise



# Free ESXi

## vSphere Hypervisor

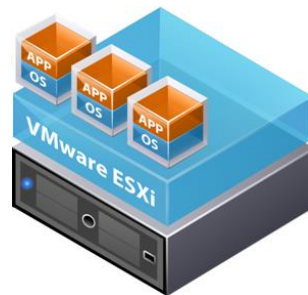
register to get license key  
per incident payed support  
cannot be added to vCenter

## Manage

vSphere Client (HW v8)  
VMware Workstation / Fusion

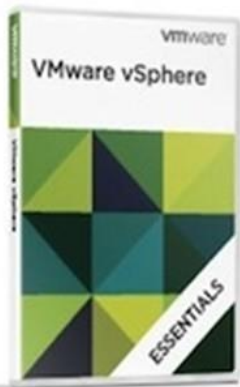
## Oomph...

2 physical CPUs  
unlimited cores per CPU  
unlimited physical memory  
8 x vCPUs per VM



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# vSphere Essentials



**3 x servers  
up to 2 CPUs each  
vCenter included**

**Essentials Kit:**      £2,385 (\$3,000)  
vSphere Hypervisor

**Essentials Plus Kit:**      £3,885 (\$4,500)  
vSphere Hypervisor

(+ vMotion, HA, Data Protection, vShield Endpoint, vSphere Replication)

# Remote Office Branch Office editions

**Standard:** £2,385 (\$3,000)

**Advanced:** £3,885 (\$4,500)

(+host profiles, auto deploy, distributed switch)

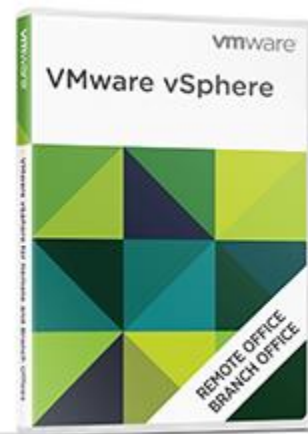
vCenter sold separately

**per VM licensing**

**available in packs of 25 virtual machines**

**1 pack per site**

replaces vSphere Essentials and Essentials Plus Kits for Retail and Branch Offices



# vSphere Editions

	Standard	Enterprise	Enterprise+
vMotion	vSwitch	vSwitch	vCenter/Distance
Storage vMotion	•	•	•
HA	•	•	•
Data Protection	•	•	•
Fault Tolerance	2 vCPU	2 vCPU	4 vCPU
vSphere Replication	•	•	•
Hot Add	•	•	•
Virtual Volumes	•	•	•
vShield Endpoint	•	•	•

# vSphere Editions

	Standard	Enterprise	Enterprise+
DRS + DPM		•	•
Reliable Memory		•	•
Big Data Extensions		•	•
Storage Array for Array Integration, Multi-pathing		•	•
Storage DRS			•
Storage & Network IO Control			•
SR-IOV Support			•
Flash based Read Cache			•

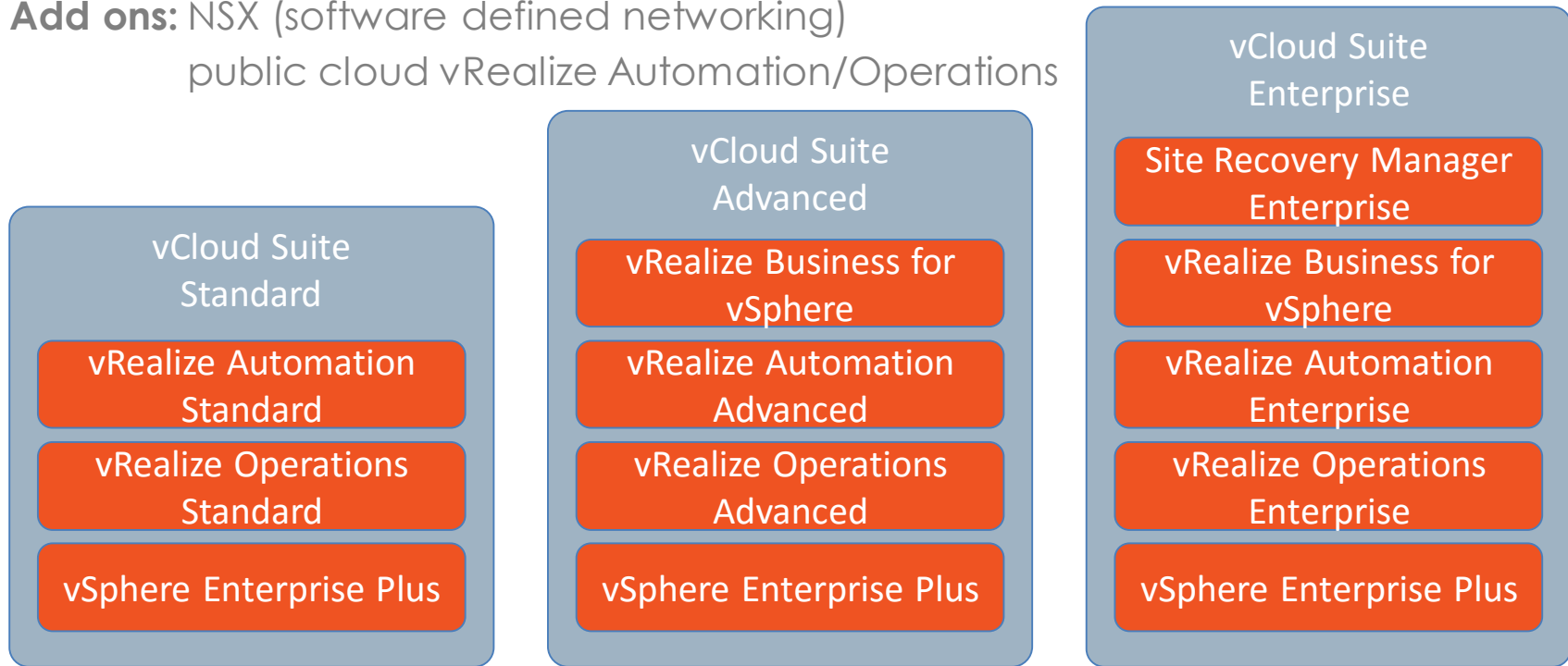


# vSphere Editions

	Standard	Enterprise	Enterprise+
Distributed Switch			•
Content Library			•
Auto Deploy			•
Host Profiles			•

# vCloud Suite

**Add ons:** NSX (software defined networking)  
public cloud vRealize Automation/Operations



# Bigger, Better, Faster, More!

	vSphere 5.5	vSphere 6	
Hosts per cluster	32	64	2x
VMs per cluster	4,000	8,000	2x
Logical CPUs per host	320	480	1.5x
RAM per host	4 TB	12 TB	3x
VMs per host	512	1,024	2x
Virtual CPUs per VM	64	128	2x
Virtual RAM per VM	1 TB	4 TB	4x

# vMotion everywhere

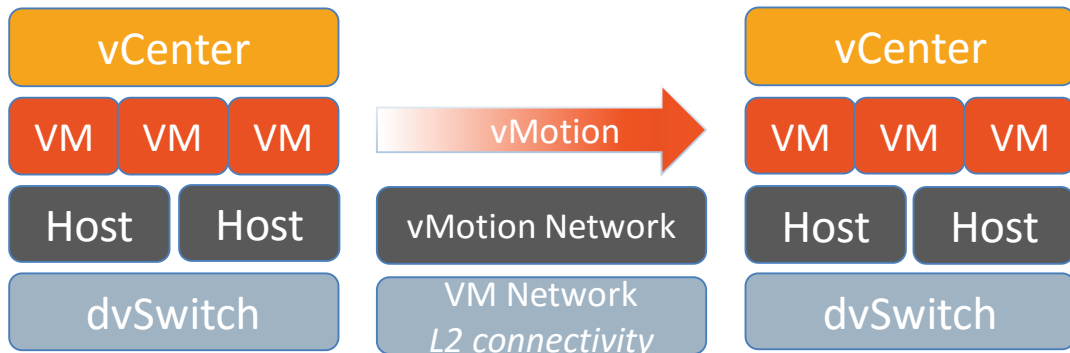
across vCenters

across distributed switches, from standard to distributed switches

VM keeps same IP, need L2

same SSO domain for UI, different SSO domain with API

VM UUID/events/tasks/rules/resources kept with move



# Long Distance vMotion

intra-continental distances (US) – up to 150ms RTTs

layer 2 for VM IPs

active/active storage replication needed

synchronous

asynchronous needs VVOLs

for?

avoiding disaster

multi-site load balancing

permanent migrations



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# SMP (multi-CPU) Fault Tolerance

up to 4 x vCPUs and 64GB RAM

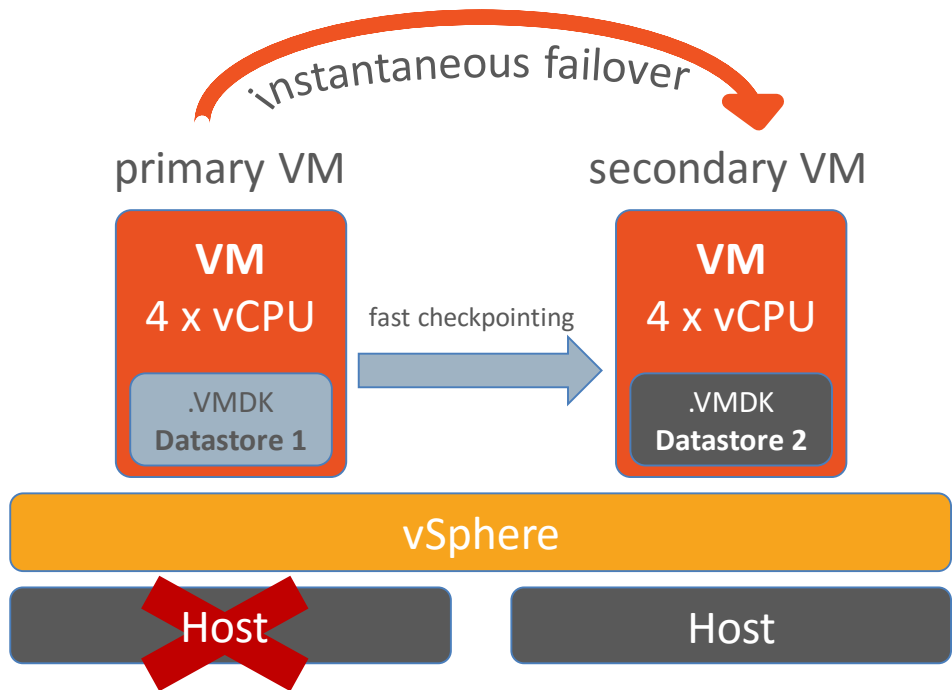
new fast check syncing  
any disk type  
separate storage

allow snapshots + backup  
needs 10GbE

not supported on:

storage DRS, VVOLs, VSAN, vCD, vSphere Replication

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# vSphere Data Protection

**agentless backup and recovery for VMs to disk**

file level restore

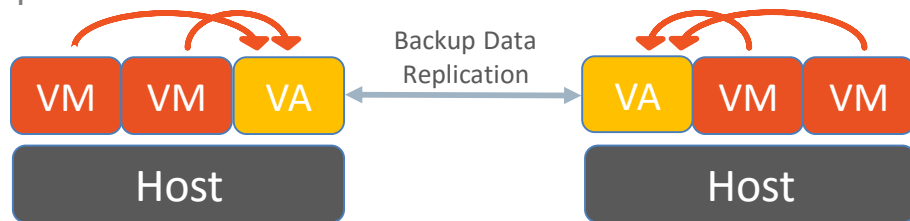
app level: SQL, Exchange, Sharepoint

up to 8TB of deduped backup per appliance

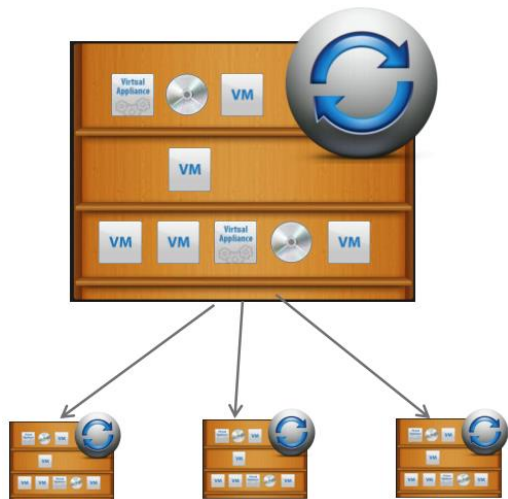
150-200 VMs per appliance

based on EMC Avamar

included in Essentials Plus and higher



# Content Library



## Central Replicated Content Store

templates, vApps, .ISO images, scripts  
publish and subscribe to replicate across VCenters  
sync between vCloud Director and vCenter

can't attach .ISOs directly  
templates stored as .OVFs, not VMs/.OVAs

publicly available, William Lam nested ESXi:

<http://www.virtuallyghetto.com/2015/04/subscribe-to-vghetto-nested-esxi-template-content-library-in-vsphere-6-0.html>



# Web Client

## Performance

**13x** improved login time

**4x** faster right click menu load

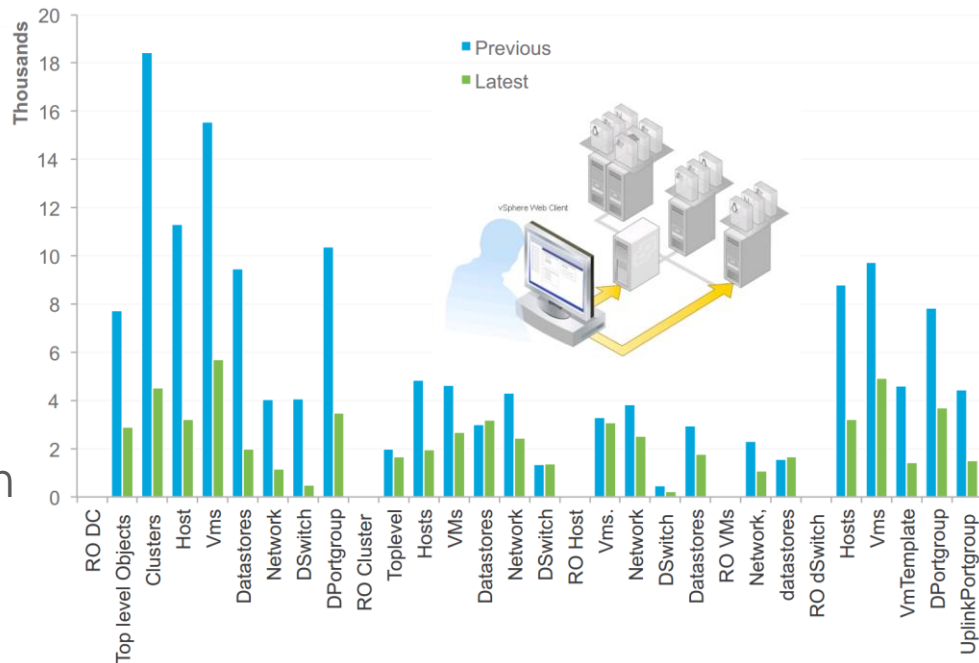
**50%** faster performance charts

## Usability

recent tasks back home at bottom

flattened right click menus

deep lateral linking



# NVIDIA GRID vGPU

super-duper 2D & 3D graphics for VDI

multiple VMs share single GPU

up to 8 users per physical GPU

native NVIDIA drivers

graphics passthrough without translation



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# VMware Software Defined Storage

## Current VM storage options:

VMDK on iSCSI

VMDK on FC

VMDK on NFS

in-guest connected

RDM

management everywhere

## The future:

abstracting and pooling

VM level data services:

encryption, replication, snapshots, backups,  
deduplication, disk type/speed/RAID, QoS,  
block size, caching, app stuff, etc... (future  
HIPAA/PCI/SOX)

policy based management

# VSAN 6 (2.0 )

software SAN  
baked into hypervisor

HDD + SSD  
all flash VSAN

Virsto snapshot and clone integration  
32 snapshots per VM

64 host cluster  
JBOD for blades



# Virtual Volumes

## per VM storage & operations

virtualises SAN/NAS arrays

uses native array capabilities  
array does heavy lifting

policy driven (like VSAN)

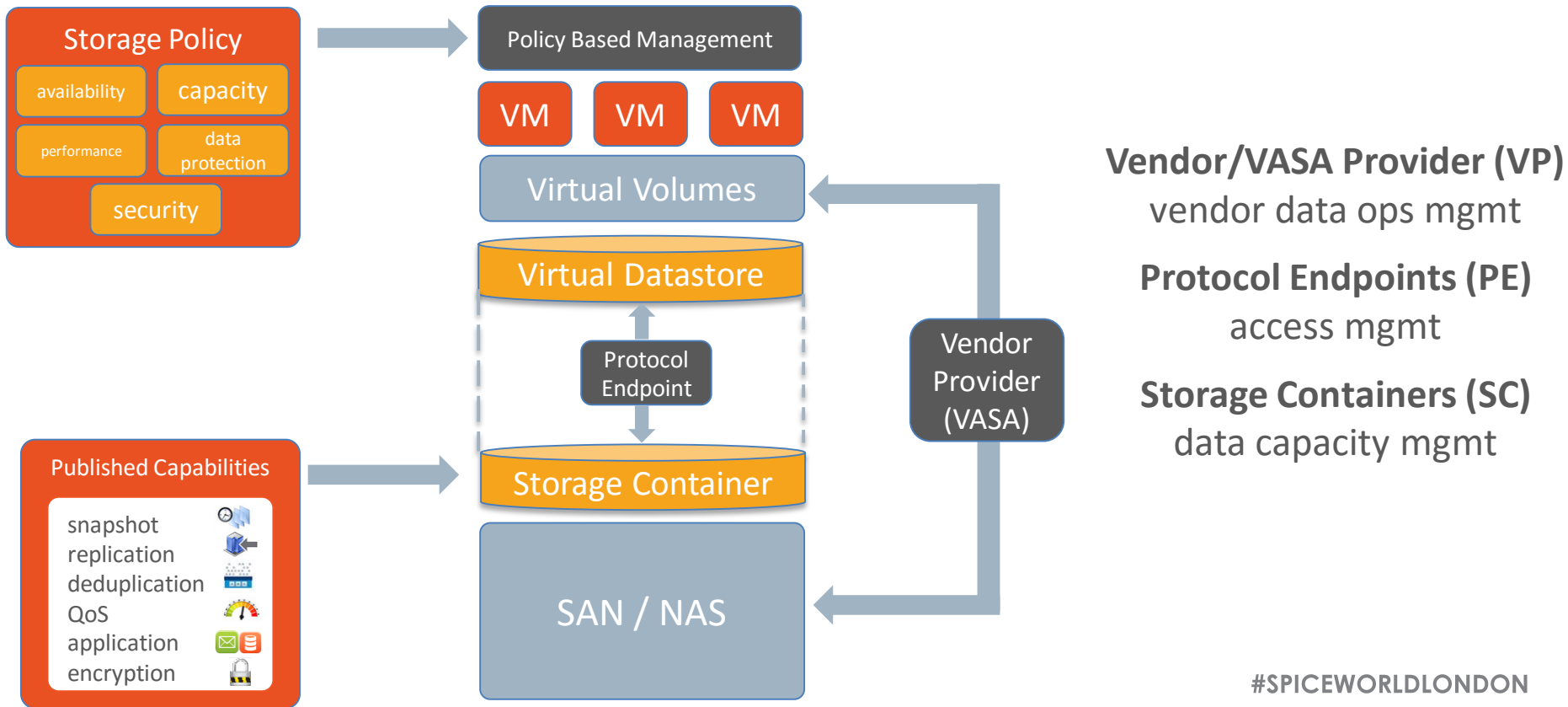
NFS/iSCSI/FT – who cares?



# Vendor Support



# Virtual Volumes: Show Me



# Whatsa VVOL?

## VM objects

stored natively on array

no filesystem

no VMDK/array formatting

no LUN management

## 5 types



Config-VVOL: Metadata



Data-VVOL: VMDKs



Mem-VVOL: Snapshots/Clones



Swap-VVOL: Swap files



Other-VVOL: storage vendor specific



# VVOLs no likey

<b>Site Recovery Manager</b>	vSphere API for I/O Filtering (VAIO)
vCloud Director/Air	<b>Array-based replication</b>
IPv6	Raw Device Mapping (RDM)
Storage DRS	<b>Microsoft Failover Clustering (MSCS)</b>
Fault Tolerance (FT)	Storage I/O Control
SMP-FT	vRealize Operations Manager
NFS version 4.1	vSphere Data Protection
NSX	vSphere Data Recovery



# vCenter & Platform Services Controller

## Platform Services Controller

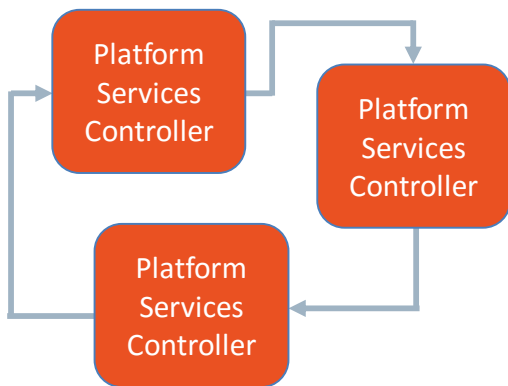
vCenter Single Sign-On

License Service

Lookup Service

VMware Directory Service

VMware Certificate Authority



## vCenter Services

### **(Management Node)**

vCenter Server

vSphere Web Client

vCenter Inventory Service

vSphere Auto Deploy

vSphere ESXi Dump Collector

vSphere Syslog Collector (Windows)

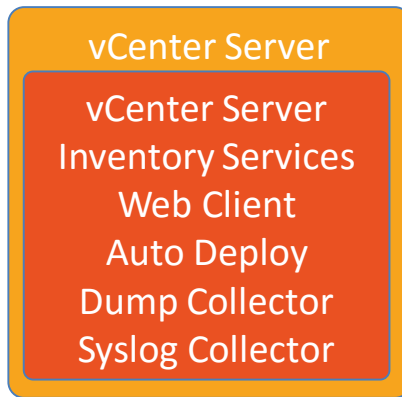
VMware Syslog Service (Appliance)

# vCenter components

## vCenter Server 5.1 or 5.5



## vCenter Server 6.0



# vCenter Server Appliance (VCSA)

VM appliance

linux, not windows

embedded Postgress DB

no external SQL support, only external = Oracle

VCSA install now .ISO + html, not .OVA

use VMCA for PSC?

vCenter to VCSA converter (SQL Only)

<http://www.virtuallyghetto.com/2015/03/long-awaited-fling-windows-vcenter-server-to-vcsa-converter-appliance-is-finally-here.html>



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# vCenter: Windows vs. Appliance



	Windows	Appliance
hosts per VC	1,000	✓
powered on VMs per VC	10,000	✓
hosts per cluster	64	✓
VMs per cluster	8,000	✓
Linked Mode	10	✓

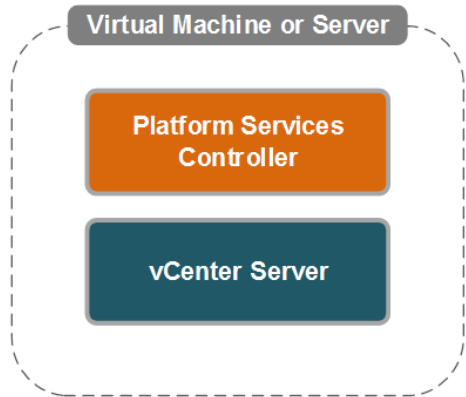
**Windows:** embedded Postgres | external SQL & Oracle DBs.  
**Appliance:** embedded Postgres | external Oracle DBs.

# Enhanced Linked Mode

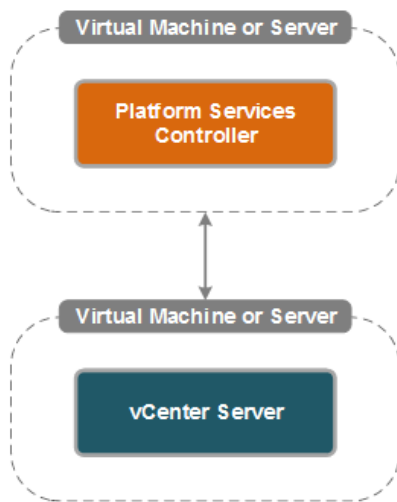
	vSphere 5.5	vSphere 6
Windows	Yes	Yes
Appliance	No	Yes
Single Inventory View/Search	Yes	Yes
Replication Technology	Microsoft ADAM	Native
Roles & Permissions	Yes	Yes
Licenses	Yes	Yes
Policies	No	Yes
Tags	No	Yes

# PSC Recommended Topologies

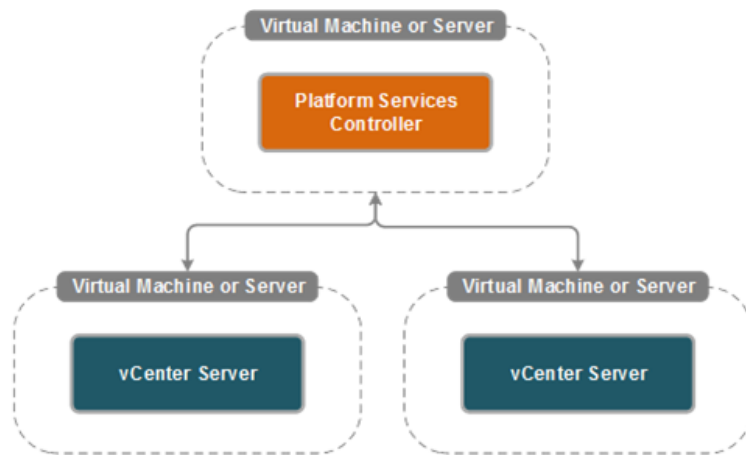
1



2



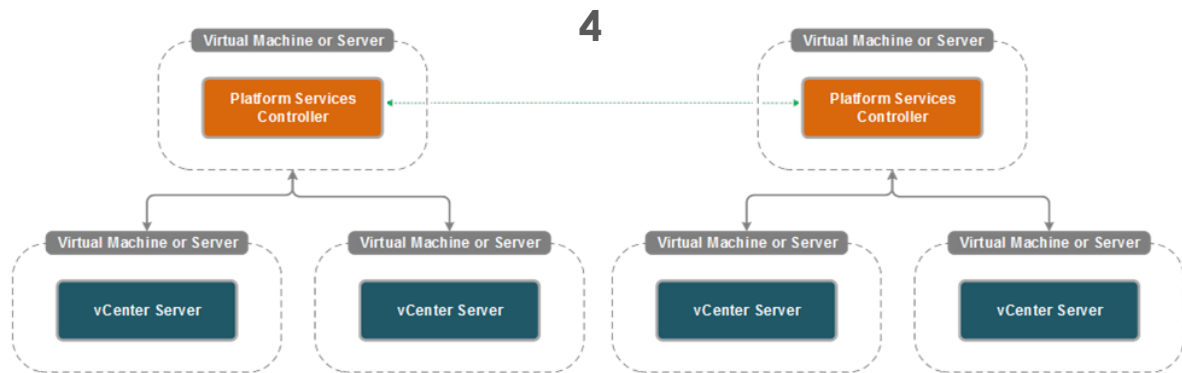
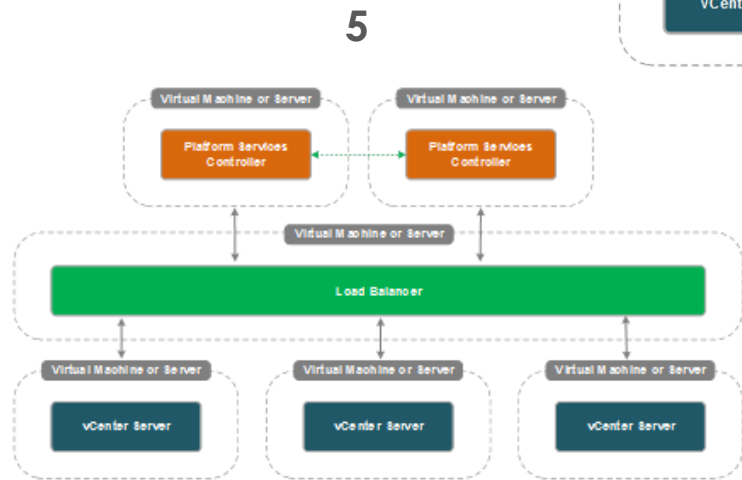
3



1 x SSO domain | 1 x SSO site | 1 x PSC | 1+ vCenters

# PSC Recommended Topologies

1 x SSO domain  
2+PSC = external  
multiple SSO sites

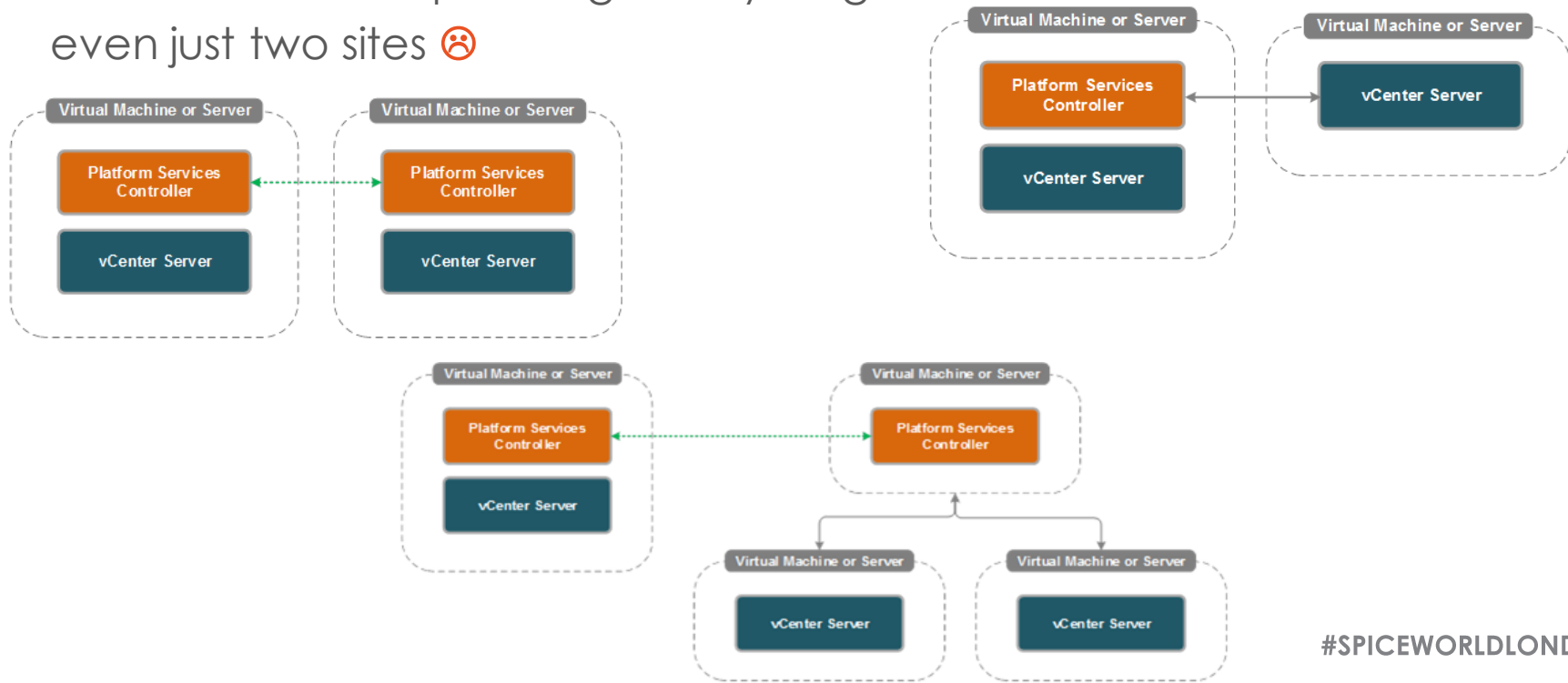


1 x SSO domain  
2+PSC = load balanced external  
1 x 3<sup>rd</sup> party load balancer



# PSC NOT Recommended Topologies

**NO** embedded replicating to anything  
even just two sites 🙄



# Playing with SSO & PSC

## repointing existing SSO

[http://kb.vmware.com/selfservice/microsites/search.do?language=en\\_US&cmd=displayKC&externalId=2033620](http://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKC&externalId=2033620)

## PSC FAQ

[http://kb.vmware.com/selfservice/microsites/search.do?language=en\\_US&cmd=displayKC&externalId=2113115](http://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKC&externalId=2113115)

## vCenter Architecture Changes

<http://blogs.vmware.com/consulting/2015/03/vsphere-datacenter-design-vcenter-architecture-changes-vsphere-6-0-part-1.html>

## List of recommended topologies for VMware vSphere 6.0.x

[http://kb.vmware.com/selfservice/microsites/search.do?language=en\\_US&cmd=displayKC&externalId=2108548](http://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKC&externalId=2108548)

# vCenter 6.0 Certificates

## **VMware Certificate Authority (VMCA)**

root or intermediary certificate authority  
signs own certs  
provisions to ESXi & vCenter

VMware Certificate  
Authority  
**VMCA**

## **VMware Endpoint Certificate Service (VECS)**

certificate and private key store  
vCenter certs all stored here  
ESXi host certificates stored locally, can be provisioned from the VMCA

VMware Endpoint  
Certificate Service  
**VECS**

**VMCA optional**, can use own CA

**VECS mandatory** for cert & key store

# vSphere 6+ Upgrade Steps

	vCenter SSO External	vRA	VCM	ITBM	vRAS	vCD	VCNS	NSX Manager	NSX Controllers	View Composer	View Connection Server	vCenter Server	vRO	VR	VUM	vROPS/ vCOPs	VDP	vCenter Hyperic	VIN	vCC	vRLI	BDE	SRM	ESXi	VMware Tools	vShield/ NSX Edge	vShield App/ NSX LFW	vShield Endpoint/ NSX Guest IDS	View Agent / Client
Seq.	1																												
		2	2	2																									
					3	3																							
							4	4																					
									5	5																			
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													8	8	8	8*	8	8	8		9	9	9	9					
																								10*					
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1. SSO External
2. vRA, VCM, ITBM
3. vRAS, vCD
4. VCNS, NSX Manager
5. NSX Controllers, View Composer
6. View Connection Server

7. **vCenter Server**
8. vRO, VR, VUM, vROPS, VDP, Hyperic, VIN
9. vCC, vRLI, BDE, SRM
10. ESXi
11. VMware Tools, vShield/NSX Edge
12. vShield App&Endpoint/NSX LFW/Guest IDS/View Agent&Client

# vCenter install/upgrade

for Web Client on vCenter, need Desktop Experience Feature+patched

4 Flash in IE with 2012/2012R2

turn off IE enhanced security mode

SQL Express migrated to PostgreSQL

point to PSC and enter SSO credentials

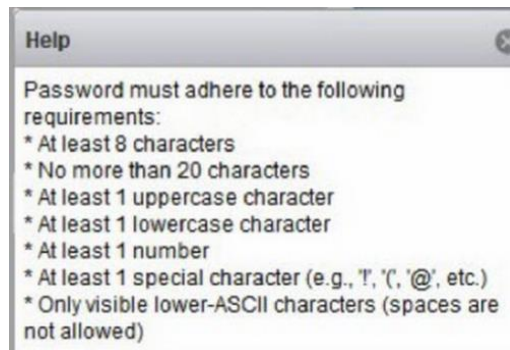
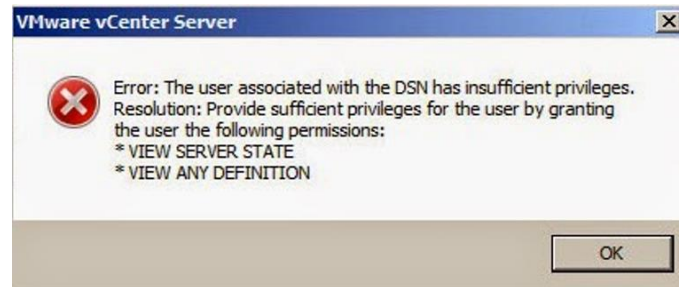
need short name support

at least 2 vCPUs (enforced)

at least 12GB of RAM (8GB enforced)

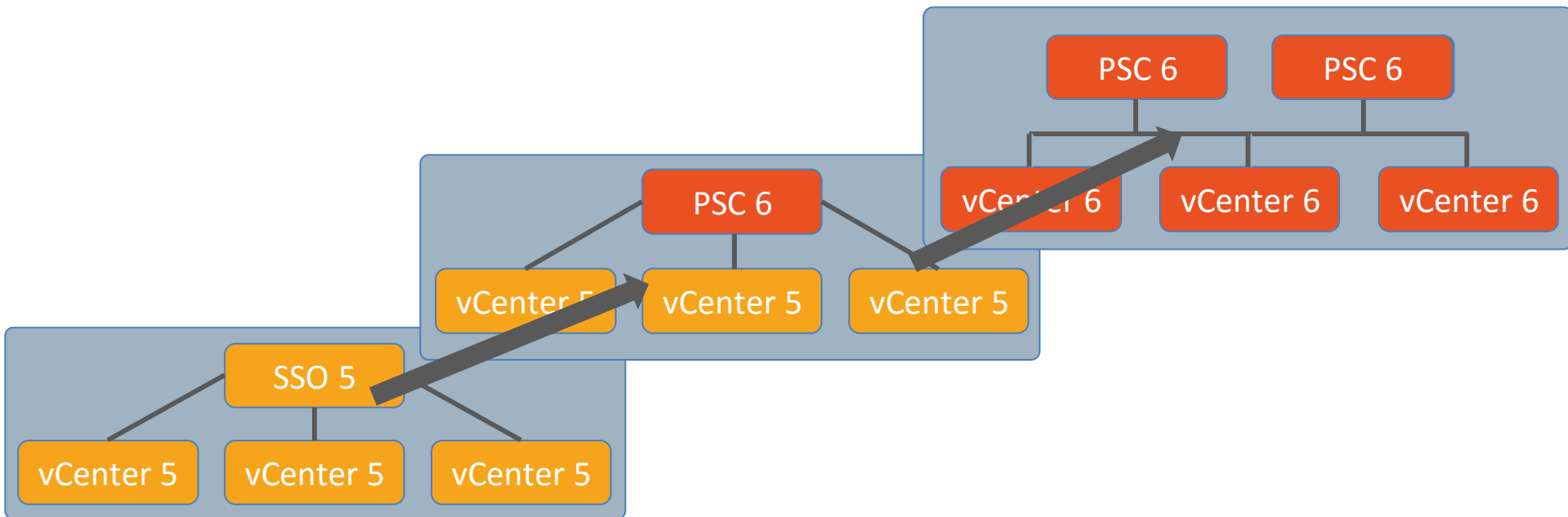
install now lists missing SQL permissions

TPS off by default



# Stepping Stones

## Mixed-Version Transitional Environments in vCenter Server for Windows Upgrades



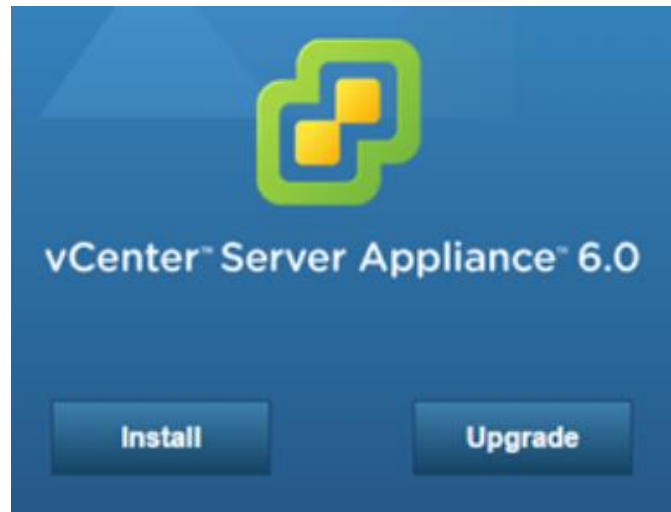
<http://pubs.vmware.com/vsphere-60/index.jsp#com.vmware.vsphere.upgrade.doc/GUID-FDF1D082-36EB-41EB-9D97-A48D33A1D843.html>

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# Upgrading vCenter Server Appliance (VCSA)

actually a migration (from 5.1 U3/5.5)

1. download and mount VCSA .ISO
2. install Client Integration Plugin
3. browse .ISO, run setup .html
4. select upgrade, disable DRS
5. point to an ESXi host
6. enter VCSA name, enable SSH
7. enter existing appliance & host details/credentials
8. choose to migrate perf and historical data
9. set datastore & temporary networking  
(IP changed to old server after migration)



# Update Manager

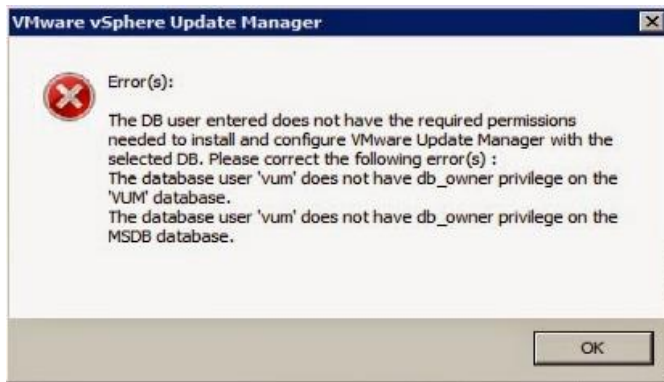
still mostly C# client

still 32-bit DSN

mount .ISO and next next...finish

reset service from local system to AD account

DB permissions check





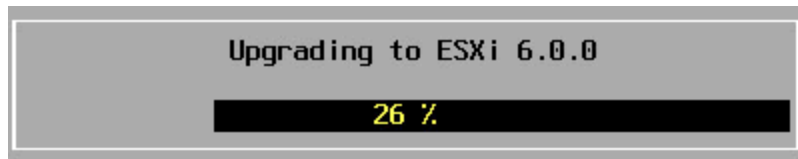
# Upgrade ESXi

check driver compatibility

blocked drivers in 6.0 (incl. consumer Nics)

<http://www.v-front.de/2015/03/vsphere-6-is-ga-ultimate-guide-to.html>

VMFS 3 deprecated



## VMware Update Manager (VUM)

VUM in fat client

import vendor/VMware image

create a baseline

attach to host/cluster

scan for upgrades

checks for incompatible VIBs

Remediate

## offline bundle

download vendor/VMware bundle

power down/migrate VMs

```
esxcli software profile update -d  
/vmfs/volumes/shared/VMware-ESXi-6.0.0-  
2494585-depot.zip -p ESXi-6.0.0-2494585-  
standard
```

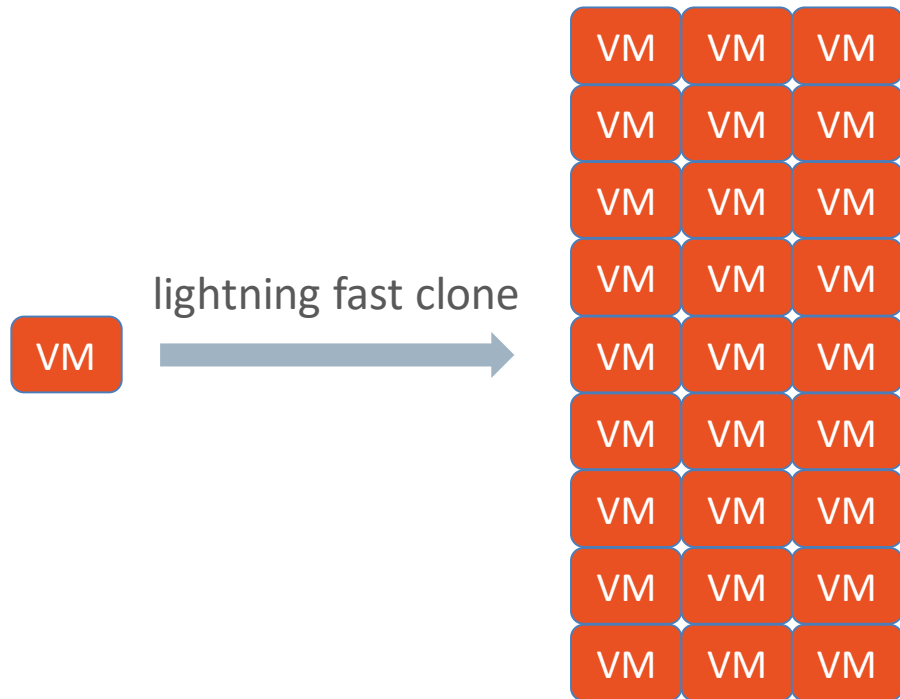
## installation .ISO

boot from .ISO

select Upgrade

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# Instant Clone (VM Fork)



## **rapidly clone a running VM**

under a second, 1000s in minutes  
parent VM quiesced and  
forked, child VM is born  
uses disk and memory of  
parent for reads  
networking to give it new MAC  
fudge AD join  
copy on write for deltas

## **Project Enzo**



# Any Questions?

all slides now available at [WoodITWork.com](http://WoodITWork.com)