

VMs

Maxims
Maximums (per VM): vCPUs = 32 RAM = 1TB (64GB - FT VMs) Virtual swap file (.vswp) = 1TB
SCSI adapters = 4 Devices per SCSI adapter = 1 IDE devices (Disk/CD) = 4 VMDK = 2TB-512B
vNICs = 10 USB devices = 20 (USB 3.0 = 1) Floppy drives = 2 Parallel ports = 3 Serial ports = 4
Remote consoles = 40 VMDirectPath devices = 4 VMDirectPath targets=60 Video RAM =128MB

Files:

.cfg	Earlier version of .vmx file	.std	Earlier version of .vmss file
.disk	Earlier version of .vmdk file	.vmem	VM's memory
.hlog	vMotion log file	.vmssd	Snapshot metadata
.lck-XXX	Locking file on NFS datastore	.vmnsn	Snapshot state file
.log	VM activity log	.vmss	Suspended state file
#.log	Old VM log	.vmt	Earlier version of VC template
.nvram	BIOS or EFI settings	.vmtm	Team data
.raw	Raw device e.g. tape device	.vmtx	VC template header
.rdm	RDM in Virtual Compatibility mode	.vmx	Primary configuration file
.rdmp	RDM in Physical Compatibility mode	.vmxf	Extra configuration file for VMs in a team
.REDO	Earlier version of -delta.vmdk file	.vswp	Swap file for overcommitted memory
.vmdk	Disk descriptor (also raw virtual disk for hosted products)		
-flat.vmdk	Raw pre-allocated virtual disk	-00000#.vmdk	Snapshot child disk
-ctk.vmdk	Changed Block Tracking file	-00000#-delta.vmdk	Snapshot differential file

Shell Commands
--help for esxcli namespaces & commands relative to location
List running VMs: `esxcli vm process list`
List registered VMs (& displays <vmid>): `vim-cmd /vmsvc/getallvms`
Show VM's power state: `vim-cmd /vmsvc/power.getstate <vmid>`
Power on VM: `vim-cmd /vmsvc/power.on <vmid>`
Power off VM: `vim-cmd /vmsvc/power.off <vmid>`
Register a VM: `vim-cmd /solo/register /vmfs/volumes/vmname/vmname.vmx`
Unregister a VM: `vim-cmd /vmsvc/unregister <vmid>`
Forcibly kill VM: `esxcli vm process kill --type <soft/hard/force> --world-id <id>`
Create/Delete/Modify VMDKs, RDMs, VMFS volumes & storage devices: `vmkfstools`

Power Off = hard off • Shut Down = soft with VMware tools • Reset = hard • Restart = soft

VM HW: Memory/CPU Hotplug - VMware Tools required. Multicore requires HW v8. BIOS based VM min 4MB RAM, EFI min 96MB. Mac OS X VMs must run on Apple HW. CPU or Memory (NUMA) affinity not available in DRS clusters.

HT sharing modes: • Any – vCPUs can share cores with other VMs • None – vCPUs have exclusive use when scheduled • Internal – can share core itself if VM has 2 vCPUs, not 2 vCPUs then same as None.

Disk types: • Thick Provision Lazy Zeroed - default, pre-allocates • Thick Provision Eager Zeroed - pre-allocates & zeros, better performance, slower creation • Thin Provision - allocates on-demand, monitor with "datastore usage" alarm. NFS datastore with HW acceleration supports all 3 types, without only support Thin.

RDM: Benefits User-Friendly Persistent Names, Dynamic Name Resolution, Distributed File Locking, File Permissions, File System Ops, SAN Snapshots, vMotion, SAN mgt agents & NPV. Limitations not for block devices, no partition mapping, needs whole LUN. Physical RDMs - no snapshots, clones, templates, only migrate the mapping file. Virtual RDMs - clones/templates copied into .vmdk file.
Snapshots: capture memory state, settings, disks. Can't snapshot physical RDMs or independent disks
Independent Disk Modes: no snapshots. Persistent changes immediate & permanent. Nonpersistent changes lost on power-off or reset.

Snapshot Manager: Delete commits snapshot to parent. Delete all commits all snapshots before You are here. Go to reverts to that snapshot. Revert to snapshot back to parent's snapshot You are here.

vMotion: To vMotion a suspended VM, new host must meet CPU compatibility requirements.
Storage vMotion: can transform thick > thin or thin > thick. Limitations: VMs cannot have snapshots, only persistent VMDKs or RDMs, requires license, ESX3.5 hosts need vMotion licensed/configured.

VMDirectPath I/O: allows guest OS to access physical PCI/PCIe devices, sets VM memory reservation to vRAM. Requires Intel VT-d or AMD IOMMU, VM HW v7 Restrictions no vMotion (okay on Cisco UCS with Cisco DVS)FT, HA, DRS (allowed in cluster), snapshots, hot add/remove, suspend, record/replay.
USB passthrough: Only 1 VM can connect to each device. Autoconnect uses physical port location.

Supported: DRS, vMotion. Not Supported: DPM, FT. Initial connection when powering on/unsuspending must be local (pre-vMotion), to reconnect VM must be back on USB connected host.

SCSI controllers: • BusLogic Parallel • LSI Logic SAS • LSI Logic Parallel • PVSCSI (IDE is ATAPI)

PVSCSI (Paravirtual SCSI): at least HW v7, high-performance storage adapter. Not recommended for DAS. Guests: Win 2003, 2008, RHEL5. Not supported: Record/Replay, FT, MSCS, RHEL5 boot disks

NPV (N-port ID virtualization): share FC HBA port as multiple virtual ports, each with unique IDs. VMs assigned 4 WWNs. Allows per-VM LUN access. Limitations: requires NPV enabled FC switch, only RDMs, Host HBA's WWNs also need access to LUN, NPV capable HBAs, no Storage vMotion, VM can't power on if WWNs in use, vMotion requires all RDM files on same datastore.

vNICs: • Flexible - 32-bit guests, vance without VMware Tools or vmxnet with VMware Tools • e1000 - Emulates E1000 NIC, default for 64-bit guests • vmxnet2 (Enhanced) - vmxnet with enhanced performance, requires VMware Tools • vmxnet3 - enhanced performance & networking features, requires VMware Tools & at least HW v7. WOL supported on vmxnet, vmxnet2 or vmxnet3.

MAC address can manually assign in vmx: ethernet<number>.addressType="static" & ethernet<number>.address=00:50:56:XX:YY:ZZ (XX only 00-03F)

TSO (TCP Segmentation Offload): enabled in VMkernel by default, must be enabled at VM level.

Needs enhanced vmxnet, might change the MAC. **Jumbo frames:** requires vmxnet2/3 or e1000.

OVF: templates imported from local file system or web server. OVF files are compressed. Client validates OVF file before importing. Can contain multiple VMs. OVA is single file version.

vApp: container containing one or more VMs, can power on & off, & be cloned. Metadata in VC's DB. **IP pool** - network configuration assigned to network used by vApp. vCenter provides IPs to its VMs.

Policies • Fixed – manual configuration • Transient – allocated from pool on vApp power on • DHCP

Links: Resolution Path – Troubleshooting VMs <http://communities.vmware.com/docs/DOC-15963>

Recreate missing virtual disk (VMDK) header/description file <http://kb.vmware.com/kb/1002511>

Consolidating snapshots in vSphere 5 <http://kb.vmware.com/kb/2003638>