

VMware ESX 2.1: Service Console Commands Guide

Document Version 1.3

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A Summary of Commands at the Service Console

This guide is by no means comprehensive or exhaustive. It is intended as quick reminder for the key commands issued at the service console with their most popular switches. Some processes such as writing a script and partitioning a drive are touched on, but due to the more complex nature of these tasks they are beyond the remit of this guide.

In the examples, I've chosen to put in **bold** the commands and required switches, and left un-bolded any text which could vary depending on your system so for example:

In most of my example any dsk file is called "instructor1.dsk", the label for the VMFS partition is "local" and the owner of the file is use called "lavericm"

So: `vmkfstools -i /vmimages/w2ksp4-sysprep.vmdk /vmfs/local/instructor1.dsk`

Becomes: **`vmkfstools -i /vmimages/w2ksp4-sysprep.vmdk /vmfs/local/instructor1.dsk`**

Version: From Version 1.3 this guide was based around ESX 2.5

Getting Help & Simple Service Console Commands

Get help on a command	man reboot or reboot --help	This works with both Linux & ESX commands. Q to quit Gives you short explanation
Clear Bash History	history -c	Bash has a history, not unlike doskey (except its in a file, not memory). Use this to clear your history of commands previously typed
Clear the screen	clear	Same as CLS in a cmd prompt
Switch to being root	su -	It is regarded as good practice to login with a VM Administrator account and then switch to being ROOT if required. The minus sign switches bash to ROOT and ROOT's environment. Without you would have the rights of root, but command might fail due to being in the incorrect path for the executable
Currently logged in user	whoami	I find it especially important to know who I am in all situations. Failure to know who you are can result in surprising results
Change the Date/Time	date -u 0701180504	The -u switch indicates the UTC format is being used. Numbers equate to mm/dd/hh/mm/yy
Display ESX Version Number	vmware -v	Should display information along this kind "VMware ESX Server 2.5.0 build-11343"

File & Folder Management

Purpose	Syntax Example/Sample	Notes
List files	ls -l	In PuTTY this colour codes the files, and directories and shows Type, Permissions, Group, User, Size (b) Date, and filename
List files with a pause	ls -l more	The is the pipe symbol commonly found where the \ is on a UK keyboard
List hidden files	ls -a l	Shows files that are hidden – files are made hidden if prefixed with a period, such as ./install
Full Path location	Pwd	Like what would see in a DOS command prompt
Return to the root	cd /	You have to put a space between d and /
Return one directory up	cd ..	Again, you need a space between cd and ..
Go to home directory	cd	CD on its own returns you to the home directory of the current users
Type the contents of a file	cat instructor1.vmx less instructor1.vmx	Same as the TYPE command in DOS Works better with longer files – use the keystroke [Q] to quit like man
Search for string inside a file	grep lavericm /etc/passwd	Here we are searching for a piece of text called lavericm in the file called passwd
Use a command together with grep	ls /etc -l grep vmware	Here we are listing all the files in /etc that contain the string vmware
Edit the contents of a file	nano -w /etc/fstab	-w disables word wrap and stops unwanted carriage returns Control+X, [ENTER] [ENTER] exits nano and saves a file
Create/Delete a directory	mkdir /vmimages/iso rmdir /vmimages/iso	Without file path, directory made relative to your path
Delete a file	rm filename	If your deleting lots of files rm -f *.txt will delete all the txt files but will NOT prompt you
Mount a CD at the Service Console	mount /dev/cdrom ls -l /mnt/cdrom	Root only!

Mount an ISO at the Service Console	mkdir /mnt/isocd mount -o loop -t iso9660 -r /vmimages/esx2.1.iso /mnt/isocd	Create directory for the mount point -o loop means mount the device as a block device -t iso9660 means its using the iso file system (as opposed to say Joliet) -r means to mount read-only
Copy a file	cp /vmimages/w2k3.iso /vmfs/local	Becareful with the use of wildcards if you try to copy every file with *.* as you would with DOS/Windows – this would misout files that DID NOT have extension. So w2k3.iso would be copied but w2k3 would not...
Securely copy a file from one ESX server to another	scp /vmimages/w2kadvsrv-sp4.iso root@esxinstructor2.education.vmw:/vmimages/	This uses secure copy. You will prompted with some security warnings on the first copy for the first time. You will have manually type the password of the remote machine
Renaming a file/folder	mv w2k3.iso cdw2k3.iso	Move because effectively, any rename is move procedure. As can be seen in the MUI
Find a file	find / -iname '*.conf'	Search here begins at the root / and is case-insensitive search by using -iname and '*.conf' would find every conf file – note ` ` are required – these are 'single quotes' not "double-quotes"
Find a file which contains a piece of text	find /usr/lib/vmware-mui -iname '*.html' -exec grep -il 'Download VMware Remote Console' {} \;	This invokes the find command with the exec switch which allows you to execute a program based on the find results. Here we are search every html file which exists in the MUI web directories. Executing a grep on each file searching for the words 'Download VMware Remote Console". The -i stops case-sensitivity, and -l causes the file name to printed to the service console session. The {} is a variable holder for the search string in single quotes. The \ and ; are "end of expression" and "end of command" marker
Find new files	find / -mount -mtime -1 -print	/ is the search point, -mount volumes mounted, -mtime is the duration and -print is the format for output to the screen
Find files of N size	Find / -mount -size +10240k	This would find files off / taking up more than 10MG
Compress a single file	gzip instructor1.dsk -best	Works best with single files such a DSK file Caution, automatically deletes original and adds a gz extension to the file name
Uncompress a single file	gunzip instructor1.dsk.gz	As above but in reverse!

Compress Multiple files

tar -czvf /backup/allfiles.tgz /vmimages

This would backup all the files in the vmimages directory to a backup folder (c - create, z - compress, v- verbosely listed files being tar'd, use a file)

Uncompress Multiple files	tar -xzvf /backup/allfiles.tgz /vmimages	This would restore all the files in the vmimages directory to a backup (x - Extract, z - uncompress, v- verbosely listed files being tar'd, use a file)folder
Change Ownership	chown lavericm:lavericm instructor1.dsk	Change the Owner of instructor1.dsk to be lavericm, also changes user group to be lavericm as well
Change Group Membership	chgrp lavericm instructor1.dsk	Change the Group rights to be the User Group, in this case lavericm
Make a disk template from a existing dsk file	vmkfstools -i /vmimages/w2ksp4-sysprep.vmdk /vmfs/local/instructor1.dsk	Can only be done by root. As your effectively creating a file, you will need to change ownership (not permissions) to allow a VM Admin rights. Notice how the source and destination are the "wrong" way round.

Make a new dsk from a template	vmkfstools -e /vmimages/w2ksp4-sysprep.vmdk /vmfs/local/instructor1.dsk	Can only be done by root. As your effectively creating a file, you will need to change ownership (not permissions) to allow a VM Admin rights. Notice how the source and destination are the "wrong" way round.
Create a dsk file	vmkfstools -c 2048m /vmfs/local/instructor-data01.dsk chown lavericm:lavericm /vmfs/local/instructor-data01.dsk	-c in lower case creates the dsk file - which can only be done by root at the service console chown is used to reset the ownership afterwards
Expand/Shrink a DSK file	vmkfstools -X 4096m /vmfs/local/instructor1.dsk	Warning, this can corrupt the file. Backup DSK first before attempting. You will need Partition Magic or Volume Manager to complete the process. X switch is case sensitive
Change Permissions	chmod 774 /home/lavericm -R <i>Here the user group would have the same rights to the VM as the Creator/Owner lavericm</i> chmod 754 /home/lavericm -R <i>Here the User Group would be able to see the VM in the MUI (vm-list) and be able to change its power status - they wouldn't be able to modify its hardware</i>	Change permissions on files using decimals to represent RWX. Used with the -R switch it sets these permission recursively. 774 is short for RWX for the user and group, and 4 for R for others. This is a popular permission set if you are following the "flagship user" concept/model that VMware recommends Although the Numbers are expressed in decimal - they are effectively binary where 1 is Execute, 2 is Write and 4 is R. They are represented not unlike jumper settings on the back of a SCSI device so 000 would mean NOTHING 0 001 would mean X 1 010 would mean W 2 011 would mean RX 3 100 would mean R 4 101 would mean RX 5 110 would mean RW 6 111 would mean RWX 7 111 would mean RWX 7
Create a DSK file	vmkfstools -c 2048m local:instructor-data01.dsk	Lowercase c to create a file. Here the disk file is being created on a VMFS partition labeled local

Increase/Decrease size of DSK	vmkfstools -X 6144m -force /vmfs/local/instructor1.dsk	Requires repartition tools like Partition Magic/Volume Manager WARNING: Backup disk BEFORE using this command. -force switch stops any warnings.
View the Partition Table of DSK file from Service Console	vmware-mount.pl -p /vmfs/local/instructor1.dsk	This is useful command as to view the data within the dsk file – we need to know the partition numbers, and file system. See below..
View contents of Partition within the disk file	vmware-mount.pl /vmfs/local/instructor1.dsk 1 -t ntfs -o ro /instructor1	1 indicates the first partition. -t indicates the file system is NTFS. -o allows us to specify options such as the ability to view the file in read-only mode. /instructor1 – is a mounting point created using mkdir /instructor1
Check integrity of a file	sum /vmfs/local/instructor1.dsk	Sum is less good than – md5sum. You need to compare copied file to known good original
As Above	md5sum /vmfs/local/instructor1.dsk	
Interrogating File format	head /vmfs/local/instructor1.dsk file - <i>or</i> od -c /vmfs/local/instructor1.dsk head	DSK and VMDK are just extensions. During import/export process vmkfstools -e or -i does not rename. Head and od examine the contents of the file a report true format DSK: standard input: x86 boot sector (Monolithic) VMDK: standard input: ASCII Text (COW) For old VMware products look for COW in the printed string
To create a ISO file from mounted CD at the Service Console	dd if=/dev/cdrom of=/vmimages/w2ksp4.iso bs=32k	Not recommended, as there is no check done on the integrity of the ISO file WinImage - http://www.winimage.com

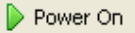
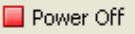

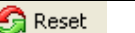
Physical Disk Management

Note: This is distinct from virtual disks – which are encapsulated files and covered in File & Folder Management

Purpose	Syntax Example/Sample	Notes
View Free Disk Space	vdf -h	H shows the disk space in MG and GB rather than B and KB
View Disk Space	df	Doesn't show VMFS space use vdf -h to do this
Rescan a SAN	vmkfstools -s vmhba1	You may need to adjust "Advanced Configuration" settings such as Disk.MaskLUNs, Disk.MaxLUN and Disk.SupportSparseLUN. Depending on your SAN configuration
Refresh information held by VM Kernel and Service Console	vmkpicdivy -refreshnames	No status information is printed to the screen
Queries VM host bus adapter displaying the disks/luns attached	vmkpicdivy -q vmhba_devs	Information appears like so for a SCSI adapters with two hard drives attached vmhba0:0:0 /dev/sda vmhba0:1:0 /dev/sdb
Format a partition with VMFS	vmkfstools -C vmfs vmhbaC:T:L:P	Partition type must be set as FB, not fdisk default which is 83 (Linux File System) C T L P – stands for controller, scsi target, lun number, partition such as vmhba0:1:0:5. It is UPPERCASE C – lowercase c is used to create a disk file
View Disk Information	cat /proc/vmware/scsi/vmhban cat /proc/vmware/scsi/vmhba0:1:0 cat /proc/scsi/scsi	View disks on a controller View disk the controller Used with older SCSI systems
Clearing the cache from Qlogic Card	echo scsi-qlascan > /proc/scsi/qla2n00/0	Where n is generation of card from Qlogic – such as qla2200 and qla2300. Qlogic cards cache information about the configuration of the SAN – and can cause failures to occur during re-scan
Discover WWN on a SAN HBA	cat /proc/scsi/qla2300/0	Look to the end of the file for something like: scsi-qla0-target-0=20000060163cad13. For Emulex cards it will be something like "lpfcdd" in the path, and something like this: lpfc0t00 DID 021500 WWPN 20:00:00:60:16:3c:ad:13 WWNN 20:00:00:60:16:3c:ad:13

Create a partition	fdisk /dev/sdb	Runs fdisk on the second scsi disk. P to print partition table N for a new partition, E for Extended, L for Logical, P for Primary W to write changes to partition table
Format a partition with EXT2	mke2fs /dev/sdb5	
Add the Journal system to an EXT2 partition	tune2fs -j /dev/sdb5 /data	Once this is done it is common to refer to this partition as EXT3 – setting the volume label to be /data. You can mount this manually with mount /data /data where the second /data is a folder which acts as the mounting point. The next stage is defining the partition in /etc/fstab so the partition is remounted on each boot up
Un-mount VMFS Partition	Umount /vmfs	
Re-mount all VMFS partition	mount -t vmfs vmfs /vmfs	-t sets the type of file system in this case VMFS. Last two are the volume label and the mount point

Simple BASH Scripts & Using vmtools-cmd

Purpose	Syntax Example/Sample	Notes
To create a script	nano -w scriptfilename.sh	Use nano text editor to create ASCII file Input commands as you would at the Service Console Save the file
To Run a script	sh scriptfilename.sh	SH to execute the script, assuming your in the same path as script. Convention is you save the file with a the SH extension so people know it s shell script
Return a list of Registered VM's and the path to there config file	vmware-cmd -l	Useful for use with ALL vmware-cmd commands which require the path to the VMX file to run successfuk
Un-register a VM	vmware-cmd -s unregister /home/lavericm/vmware/instructor1/instructor1.vmx	-s stands for set. You do need to refresh the MUI
 Power On	vmware-cmd /home/lavericm/instructor1/instructor1.vmx start trysoft	Trysoft is a power mode which tries a safe start/shutdown before a forced one. Others include soft and hard
 Power Off	vmware-cmd /home/lavericm/instructor1/instructor1.vmx stop trysoft	
 Suspend	vmware-cmd /home/lavericm/instructor1/instructor1.vmx suspend trysoft	To resume a VM, you just use the power on example
 Reset	vmware-cmd /home/lavericm/instructor1/instructor1.vmx reset trysoft	This equivalent of a soft reboot of machine
Find out the power state of a VM	vmware-cmd /home/lavericm/vmware/instructor1/instructor1.vmx getstate	Returns on, off, suspend, and stuck if waiting for input from a VM Administrator
Answer a stuck question	vmware-cmd /home/lavericm/vmware/instructor1/instructor1.vmx answer	Will offer options to a stuck scenario - depending on the cause
Discover if VM is alive or dead	vmware-cmd /home/lavericm/vmware/instructor1/instructor1.vmx getheartbeat	Needs to be run twice and numbers compared. If the heartbeat is the same, it is dead. If it increments it is alive

Commit a redo file	vmware-cmd /home/lavericm/instructor1/instructor1.vmx commit scsi0:0 0 0 1	Scsi0:0 is the first disk on the first scsi controller 0 0 1, control level, freeze and wait 0 0 1 commits the first redo (level) doesn't stop the VM from functioning (freeze) and vm continues operation once redo is being committed (wait) This method is slow, but the server is never offline 0 1 0 is quicker but server is offline while redo is applied
Find out settings in the VMX file	vmware-cmd /home/lavericm/vmware/instructor1/instructor1.vmx getconfig ide0:0.deviceType	Ide0:0 is in this case the CD Also has a command called setconfig Example below shows disconnecting from physical CD to an ISO
Disconnect a CD	vmware-cmd /home/lavericm/vmware/instructor1/instructor1.vmx disconnectdevice ide0:0	For this script/procedure to run smoothly you do need to disconnect before changing and reconnect afterwards.
Change to ISO	vmware-cmd /home/lavericm/vmware/instructor1/instructor1.vmx setconfig ide0:0.deviceType cdrom-image	
Specify ISO File	vmware-cmd /home/lavericm/vmware/instructor1/instructor1.vmx setconfig ide0:0.fileName /vmimages/w2k3ent.iso	
Connect CD	vmware-cmd /home/lavericm/vmware/instructor1/instructor1.vmx connectdevice ide0:0	
Connect with Remote Console to a VM, without user interaction	"C:\Program Files\VMware\VMware Remote Console\vmwareconsole" -h esxinstructor1.education.vmw -u lavericm -p vmware -c /home/lavericm/vmware/instructor1/instructor1.vmx	If you miss out -P vmware - the users password, the system will pause - wait for password input - and then proceed to connect to the VM -h for the esx host, -u for user, -p for the password, -c the VM to connect to... There is also a -P allows you to set the port number

Networking

Purpose	Syntax Example/Sample	Notes
List Services Running	service --status-all	Lists all the services running and not running
Restart a service	/etc/init.d/sshd restart <i>or</i> service sshd restart	The first part is the name of the service in this case the Secure Shell service. If you wish to restart the MUI you would use <code>/etc/init.d/httpd.vmware restart</code> . If you navigate to <code>/etc/init.d</code> you can see all the service names.
View information about Service Console NIC	cat /proc/net/PRO_LAN_Adapters/eth0.info	Eth0 is the default name given to the Service Console adapter. Usually, the first NIC on the PCI bus "PRO_LAN_Adapters" does change with vendor
View Virtual switches and devices mapped to them	cat /etc/vmware/netmap.conf	vmnetN for internal, vmnicN for external and bondN for NIC Teamed external switches
View PCI Location & Device Connected	cat /etc/vmware/devnames.conf	Shows only VM Kernel PCI devices not Service Console
View NIC Teamed Switches	cat /etc/vmware/hwconifg	
Changing Service Console NIC Speed & Duplex Settings	nano -w /etc/modules.conf options e1000 Speed=1000,1000 Duplex=1,1	Settings & Syntax vary with vendor modules.conf contains examples
Display IP/SM configuration of Service Console NIC	ip addr ifconfig	Short simple information More complicated info
Change Service Console IP/SM	nano -w /etc/sysconfig/network-scripts/ifcfg-eth0 ifdown eth0 ; ifup eth0	You can still use the Redhat command called netconfig if you prefer Edits text file Restarts the network better than "service network restart" and "/etc/init.d/network restart"
Change the	route del -net default	Deletes the current route

Service Consoles
DG

route add -net default gw 192.168.2.1
nano -w /etc/sysconfig/network

Encodes a new route
Edit the file where default gateway parameters are set

Change the ESX Servers Hostname	hostname esxinstructor1.education.vmw nano -w /etc/sysconfig/network nano -w /etc/hosts nano -w /usr/lib/vmware-mui/apache/conf/httpd.conf	Changes hostname for current uptime Edit the file where hostname is currently set Up date host file for name resolution – consider DNS updates on your DNS servers as well if required Edit the MUI's identity Recreate/Regenerate the Certificates for the Server. See the HOW TO document for the Perl Script to do this or the my Admin II Guide online
Change the Service Consoles DNS settings	nano -w /etc/resolv.conf	
Change the Remote Console port number	nano -w /etc/xinetd.d/vmware-authd nano -w /etc/vmware/config /etc/init.d/xinetd restart /etc/init.d/httpd.vmw restart esxinstructor1 1902 /home/lavericm/vmware/instructor1/instructor1.vmx	Change Port = 902 to desired number Change authd.client.port = "902" to desired number Restart xinetd Restart the web-service behind the MUI When using the Remote Console specify the port number
Connect to a Windows SMB Share	mkdir /sources nano -w /etc/fstab //instructor3/sources /sources smbfs ip=192.168.2.200,username=guest,password=guest,noauto 0 0 mount /sources	Create a mount point Edit the fstab file Enter path to Share, Format (SMB), Authentication – all one line Mount the Share resource to read data
Temporarily allow a VM to enter promiscuous mode	echo "PromiscuousAllowed yes" > /proc/vmware/net/vmnicN/config	Appears to be no way to make this permanent. Where VMnicN is the virtual network card
List current IP services run and IP Port numbers	lsof -i grep IPv4. *Listen	

Hardware Management

Note:

This covers the remaining hardware resources such as RAM and CPU. Some disk information is also viewable in the esxtop tool which is mentioned here

Purpose	Syntax Example/Sample	Notes
Change Start-up Profile	vmkpcidivy -i	Allow you change. Default OS to boot to in LILO, Allocation of RAM to Service Console, PCI usage
List drivers	vmkload_mod -list	VM Kernel only. Does not show drivers used by Service Console use lsmod to do this
List drivers used by Service Console	lsmod	Does not show drivers used by VM Kernel use vmkload_mod -list to do this
Performance Monitor	esxtop	F to add more fields - U, R, S, T will add in more memory counters S to change the refresh in seconds (minimum is 5secs) Show/Hide with C, M, P, D, N (Cpu, Memory, swaP, Disk, Network)
View CPU Times	cat /proc/vmware/sched/cpu-state-times	Lots of CPU time means system is busy
View Idle Time	cat /proc/vmware/sched/cpu-run-times	Little idleness means system is busy
View memory status of VM	cat /proc/vmware/vm/163/mem/status cat /proc/vmware/mem	Where 163 is World ID or VMID of the Virtual machine You can also use this - which shows memory available and memory used
View Free Memory	free -m	
Create a Service Console swapfile	dd if=/dev/zero of=/swapfile bs=1MG count=64	BS is block size of 1MG, therefore count of 64 makes a 64MG swap file. Zero of, makes sure the file occupies 64MG of disk space
Format and Activate Swapfile	mkswap /swapfile swapon /swapfile	First command formats the swap file And the second activates it
To retain swap after reboot	nano -w /etc/fstab /swapfile swap swap defaults 0 0	Edits the file system tab which mounts volumes at startup Activates swap, with the label of swap, files system of swap, with no checking of integrity

Software Management (RH Package Manager)

Purpose	Syntax Example/Sample	Notes
List packages installed	rpm -qa	Q means query... or display more information A means all
Filter same list looking for an application	rpm -qa grep lynx	
More detailed information about a package	rpm -qa lynx	
List files that make up a package	rpm -ql lynx	
De-install a package	rpm -e lynx	You may get errors looking for temporary files removed
Install/Upgrade Package	rpm -Uvh --nodeps lynx-2.8.4-18.1.i386.rpm	U stands for upgrade, v for verbose information during the installation, H show "hash marks" or status bar like information in the Service Console. --nodeps forces an install regardless of software dependency errors

User Management

Purpose	Syntax Example/Sample	Notes
Change the ROOTS password	passwd root	
List users connected to Service Console	W	Command also shows the last execute command
Create a user and set a password	useradd citrix-vmadmin	-P sets a password, the default is that the user gets a home directory, and that it creates a user group named after the user. If you wished to check for the existence of the user before you created them, you would use: grep lavericm /etc/passwd
Create a user, add them to an existing group, set their home directory	useradd lavericm -g citrix-vmadmin -d /home/sql-vmadmin	These two commands would be common if you wanted to first create a flagship user, and then add subsequent users to that flagship group
Create a group	groupadd finance	If you wished to check for the existence of that group before you create them you could use: grep finance /etc/group
Disable a users access	usermod -L lavericm passwd lavericm -d	-L locks the account by putting "!" in front of their password. The -U Unlocks their account in usermod. Alternatively, you can use passwd to quick change the password to something the user does not know. When you come set the user password - it will have to meet "complexity" requirements. These restrictions are NOT imposed in the MUI
Disable Service Console Shell	useradd lavericm -s /bin/false usermod -s /bin/false lavericm	When creating a user For an existing user Notice how the user argument comes last in usermod