Linux® Host Utilities 5.1 Quick Command Reference

Data ONTAP® commands	
Management commands	
fcp {start|stop} **iscsi {start|stop}**	Starts or stops the FC or iSCSI service on the storage system.
fcp config [*adapter* [**up|down**] [**partner** {*adapter*|**None**}|**-partner**] [**mediatype** {**ptp|auto|loop**}] [**speed** {**1|2|4|auto**}]]	Configures the FC target adapters on the storage system. Not all versions of Data ONTAP support 4-gigabyte speed. Enter **fcp config** with no arguments to display adapter information.
fcp show adapter [**-v**] [*adapter*]	Displays information about target adapters on the storage system.
fcp show cfmode	Displays the cfmode of a storage system in active/active configuration.
fcp show initiator [**-v**] [*adapter*]	Displays information about initiators connected to the storage system.
license [**add** *code*]	Displays or adds license codes on the storage system. Use to verify that both FC and iSCSI are licensed on the storage system.
iscsi config [*adapter* [**up|down**]]	Configures the iSCSI target adapter status as up or down. Omit **up** or **down** to display configurable information. Omit *adapter* to display all. **Note:** This command is used only in Data ONTAP 7.0.x.
iscsi nodename [*new_nodename*]	Displays or sets the iSCSI target node name.
iscsi alias [**-c |** *new_alias*]	Displays, sets, or clears an alias for the iSCSI target node name. **Note:** This command is not available in Data ONTAP 7.0.x and earlier.
iscsi show adapter [*adapter…*]	Displays target adapter information for specified logical adapters. **Note:** This command is used only in Data ONTAP 7.0.x.
iscsi initiator show	Displays information about initiators connected to the target.
ifconfig [**-a |** *interface*]	Displays or configures network parameters for the specified interface. Use **–a** to display all network interfaces.
Target status, performance, and troubleshooting commands	
{fcp | iscsi} status	Displays the status of the FC or iSCSI service on the storage system.
sysstat {-i|-f} [*interval***]**	Displays iSCSI (**-i**) or FC (**-f**) performance statistics. *interval* is integer reporting interval in seconds; default is 15 seconds.
fcp stats [**-z**] [*adapter*]	Displays statistics for the specified FC target adapter. Use **-z** to clear statistics.
fcp stats -i *interval* [**-c count**] [**-a**|*adapter*]	Displays FC performance statistics over a specified interval. *interval* is integer reporting interval in seconds. Specify *adapter*, or use **-a** to display statistics for all FC target adapters.
lun stats [**-z**] [**-o**] [**-a**|*lun_path*]	Displays block access statistics for the specified LUN. Use **-z** to clear statistics. Use **-o** for extended stats, **-a** to display stats for all LUNs. *(FC or iSCSI)*
lun config_check [**-S**] [**-s|-v**]	Performs several checks on the lun/igroup/fcp configuration of the storage system. Requires Data ONTAP 7.1 or later. *(FC specific)*
iscsi stats [**-z**]	Displays numbers of iSCSI PDUs and CDBs, and error statistics.
ifstat [**-z**] **-a |** *interface*	Displays device-level statistics for the specified network interface. Use **-z** to clear statistics. Use **-a** to display statistics for all interfaces. *(iSCSI specific)*
iSCSI software target management commands for Data ONTAP 7.0.x, 7.1.x, 7.2.x, and 7.3.x	
iswt interface show [**-a**|*interface …*]	Shows which network interfaces are enabled for iSCSI traffic.
iswt interface enable {**-a**|*interface***…**}	Enables the use of specified network interfaces by iSCSI traffic. Use **-a** to enable all. It is best not to enable gigabit Ethernet interfaces for iSCSI traffic.
iswt interface disable [**-f**] {**-a**|*interface***…**}	Disables the use of specified network interfaces for iSCSI traffic. Use **-a** to disable all. Use **-f** to force the termination of current sessions.

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iswt session show [**-v**] *adapter* [*session_num*]	Shows the status of one session, or for all connections associated with a specified logical adapter if no session number is specified. **Note:** This command is used only in Data ONTAP 7.0.x.
iscsi session show [**-v**] [*session_num*] **iscsi connection show** [**-v**] [*sess conn*]	Shows the status of one session or connection, or for all if no session number (and connection number for **connection show**) is specified. **Note:** This command is not available in Data ONTAP 7.0.x and earlier.
iscsi tpgroup create [**-f**] [**-t** *tpgtag*] *tpgroup_name* **[***interface* …**]**	Creates the user-defined target portal group. Needed for multi-connection sessions. All connections for a session must use interfaces in the same target portal group. **Note:** This command is not available in Data ONTAP 7.0.x and earlier.
iSCSI authentication (CHAP) management commands	
iscsi security add -i *initiator* **-s CHAP -p** *inpassword* **-n** *inname* [**-o** *outpassword* **-m** *outname*]	Defines the authentication method for specified initiator. For *initiator*, use node name in IQN format. Note that *inname* on a storage system is set to the outgoing user name on a host. Use **-o** and **-m** for bidirectional CHAP.
iscsi security default -s CHAP -p *inpassword* **-n** *inname* **[-o** *outpassword* **-m** *outname***]**	Sets the default authentication method, user names, and passwords for all initiators not specifically configured.
LUN and igroup management commands	
lun setup	Interactive LUN creation. Combines the `lun create`, `igroup create`, `igroup add`, and `lun map` command functions. *(FC or iSCSI)*
lun create -s *size* **-t linux** *lun_path*	Manual LUN creation. Enter *size* as integer bytes with one of the following suffixes: **m** (megabytes), **g** (gigabytes), or **t** (terabytes). *(FC specific)*
igroup create -f -t linux *initiator_group* [*WWPN…*]	Creates a new FC initiator group. Optionally, specify the initiator worldwide port names (*WWPN…*), or add them using the `igroup add` command.
igroup show [*initiator_group*]	Displays the initiator nodes in the specified initiator group. Omit *initiator_group* to see all igroups. *(FC or iSCSI)*
lun map *lun_path initiator_group* [*lun_id*]	Makes the specified LUN accessible to initiators in the specified igroup. Specify optional LUN ID, or take default of lowest available value. *(FC or iSCSI)*
lun show [**-v**|**-m**|**-c**] **[all|mapped|offline|online|unmapped|***lun_path***|-g** *initiator_group***]**	Displays general (**-v**), mapping (**-m**), or clone (**-c**) information about the specified set of LUNs. *(FC or iSCSI)*
lun online | offline *lun_path…*	Enables or disables block-protocol access to the specified LUNs. *(FC or iSCSI)*
lun destroy [**-f**] *lun_path…*	Destroys the specified LUNs and all their data. Use **-f** if LUN is in use. *(FC or iSCSI)*
vol options *vol_name* **nosnap on**	Turns off scheduled Snapshot copies for a volume containing LUNs. It is best to enable the use of space reservations. *(iSCSI specific)*
igroup create -i [**-t aix|hpux|default|linux|netware|solaris|vmware|windows**] *initiator_group* [*node…*]	Creates a new iSCSI initiator group. Optionally, specify the initiator node names (*node…*), or add them using the `igroup add` command.
igroup add *initiator_group node…*	Adds initiator nodes to the specified igroup. *(FC or iSCSI)*
lun move *lun_path to_lun_path*	Moves a LUN to a new path in the same volume. *(iSCSI specific)* **Note:** This command is used only in Data ONTAP 7.0.x.
General notes	
You can also use the FilerView® GUI for many of the above commands (**http://***stor_sys_ip_address***/na_admin**).	
The format of an iSCSI node name is **iqn.***yyyy***-***mm***.***reverse_domain_name***:***anything* and is automatically set on the storage system (target) and each host (initiator). It is best to use the host name for the *anything* portion of the initiator node name.	

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Red Hat® Enterprise Linux	
Host configuration files	
/etc/modprobe.conf	Contains HBA driver parameter settings. *(FC or iSCSI)*
/etc/fstab	Lists file systems on FC or iSCSI LUNs to mount.
/etc/multipath.conf	Lists local disks to exclude (blacklist) from multipathing and sets specific device parameters for NetApp® storage systems. *(FC or iSCSI)*
For Red Hat Enterprise Linux 5: **/etc/iscsi/initiatorname.iscsi** **For Red Hat Enterprise Linux 4:** **/etc/initiatorname.iscsi**	Contains the iSCSI node name of the initiator.
For Red Hat Enterprise Linux 5: **/etc/iscsi/iscsid.conf** **For Red Hat Enterprise Linux 4:** **/etc/iscsi.conf**	Lists most settings for the iSCSI initiator.
FC QLogic® HBA commands	
scli -i	Lists HBA attributes, including the WWPN.
scli -c	Lists all attributes for all available ports, including firmware and driver versions.
FC Emulex® HBA commands	
/usr/sbin/hbanyware/hbacmd ListHBAs	Lists HBA attributes, including the WWPN.
/usr/sbin/hbanyware/hbacmd HBAAttrib *wwpn*	Lists all attributes for the specified *wwpn*, including firmware and driver versions.
iSCSI QLogic® HBA commands	
iscli -i	Lists HBA attributes, including initiator names.
iscli -c	Lists all attributes for all available ports, including firmware and driver versions.
iSCSI service management commands	
/etc/init.d/iscsi start	Manually starts the iSCSI service on the Linux host.
chkconfig iscsi on	Configures the iSCSI service to start automatically.
Multipathing (dm-multipath) commands	
/etc/init.d/multipathd start	Manually starts the multipathing service on the Linux host. *(FC or iSCSI)*
chkconfig --add multipathd **chkconfig multipathd on**	Configures the multipathing service to start automatically. *(FC or iSCSI)*
multipath -ll	Displays the multipathing configuration. *(FC or iSCSI)*
multipath -v3	Creates the initial multipathing configuration. *(FC or iSCSI)*
multipath -f <device_map>	Removes an existing LUN from the multipathing configuration. *(FC or iSCSI)*
multipath -ll -v3 -d	Displays the multipathing configuration with extended verbosity. *(FC or iSCSI)*
Accessing LUNs on host	
sanlun lun show all	Lists available LUNs as seen by the sanlun script. *(FC or iSCSI)*
sanlun lun show -p	Provides multipath information, for both native dm-multipath and Veritas Storage Foundation™ dynamic multipathing solutions. *(FC or iSCSI)*
sanlun fcp show adapter -c	Generates `igroup create` commands that you can run on the storage system to create an initiator group for this host. *(FC specific)*
ls -lh /dev/mapper/	Lists multipath devices generated for LUNs when using dm-multipath. *(FC or iSCSI)*
fdisk *device*	Partitions the LUN. *device* is the /dev/sd*x* name for the LUN. *(FC or iSCSI)*
mkfs -V -t ext3 *device*	Creates an ext3 file system on the partition or multipath *device*. For dm-multipath, creates the file system on the /dev/mapper/ device. *(FC or iSCSI)*
e2label *device label*	Creates a persistent label for the file system. *device* is the partition, *label* is a unique string (maximum 16 characters). Not needed when using dm-multipath. *(FC or iSCSI)*

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mount -a	Mounts all file systems listed in /etc/fstab. *(FC or iSCSI)*
df -h	Lists all mounted file systems. *(FC or iSCSI)*
For Red Hat Enterprise Linux 5: **iscsiadm -m session** **iscsiadm -m session --sid=N --rescan** **iscsiadm -m session --rescan** **For Red Hat Enterprise Linux 4:** **/etc/init.d/iscsi reload**	Gets the list of all the current sessions. Rescans a specific session; makes new LUNs visible on the host. Rescans all the sessions. Makes new LUNs visible on the host; does not affect other LUNs. *(iSCSI specific)*
/etc/init.d/iscsi restart	Discovers new LUNs when reload fails; interrupts all iSCSI sessions. *(iSCSI specific)*
For Red Hat Enterprise Linux 5: **iscsiadm -m session --sid=0 -i** **For Red Hat Enterprise Linux 4:** **/sbin/iscsi-ls -l**	Lists available LUNs as seen by the Linux host. *(iSCSI specific)*
Troubleshooting	
sanlun lun show all	Verify that LUNs are visible to the host. *(FC or iSCSI)*
sanlun lun show –p	Verify the multipath information. *(FC or iSCSI)*
sanlun fcp show adapter -v all	Verify the host's WWPNs. *(FC specific)*
license (from storage system console)	Verify that FC is licensed on the storage system. *(FC or iSCSI)*
lsmod | grep qla **lsmod | grep lpfc**	Verify that the QLogic or Emulex driver is loaded on the host. *(FC specific)*
lsmod | grep dm	Verify that the dm-multipath driver is loaded on the host. *(FC or iSCSI)*
ping *storage_system_IP_address* (from host console) **ping** *host_IP_address* (from storage system console)	Verify basic network connectivity between the storage system and host. *(FC or iSCSI)*
ifconfig (from storage system console and host console)	Verify that network parameters are compatible on the host and storage system, especially duplex and jumbo frame (mtu) settings. *(FC or iSCSI)*
If using jumbo frames, verify that jumbo frames are configured on all switches between the host and storage system.	
If using CHAP, verify correct user names and passwords. The incoming values on the host are the outgoing values on the storage system. The incoming values on the storage system are the outgoing values on the host.	
Verifying the driver settings: For QLogic HBA driver: Check the values in /sys/module/qla2xxx or /sys/module/qla2xxx/parameters/. For Emulex HBA driver: Check the values in /sys/class/scsi_host/host<*adapter_number*>.	
Check the log file on the storage system (/etc/messages) for error messages.	
Search the NetApp Service and Support Knowledgebase at **https://now.netapp.com/eservice/SupportHome.jsp** for information about the problem.	
Before contacting NetApp Global Services with a problem, run the **/opt/netapp/santools/linux_info** and **/opt/netapp/santools/controller_info** scripts on the host to collect information to help diagnose the problem. Also run the appropriate script for your Fibre Channel switches.	
Resources	
http://now.netapp.com	All NetApp documentation and software downloads.
http://now.netapp.com/NOW/knowledge/docs/san/fcp_iscsi_config/fcp_support.shtml	Support matrix.

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SUSE® Linux Enterprise Server	
Host configuration files	
/etc/modprobe.conf.local	Contains HBA driver parameter settings. *(FC or iSCSI)*
/etc/fstab	Lists file systems on FC LUNs to mount.
/etc/multipath.conf	Lists local disks to exclude (blacklist) from multipathing. This file is not present in SUSE Linux Enterprise Server 10, by default. You need to create it. *(FC or iSCSI)*
For SUSE Linux Enterprise Server 10: **/etc/iscsi/initiatorname.iscsi** **For SUSE Linux Enterprise Server 9:** **/etc/initiatorname.iscsi**	Contains the iSCSI node name of the initiator.
For SUSE Linux Enterprise Server 10: **/etc/iscsi/iscsid.conf** **For versions prior to SUSE Linux Enterprise Server 9:** **/etc/iscsi.conf**	Lists most settings for the iSCSI initiator.
For SUSE Linux Enterprise Server 10: **/etc/fstab** **For SUSE Linux Enterprise Server 9:** **/etc/fstab.iscsi**	Lists file systems on the iSCSI LUNs to mount.
FC QLogic® HBA commands	
scli -i	Lists HBA attributes, including the WWPN.
scli -c	Lists all attributes for all available ports, including firmware and driver versions.
FC Emulex® HBA commands	
/usr/sbin/hbanyware/hbacmd ListHBAs	Lists HBA attributes, including the WWPN.
/usr/sbin/hbanyware/hbacmd HBAAttrib *wwpn*	Lists all attributes for the specified *wwpn*, including firmware and driver versions.
iSCSI service management commands	
For SUSE Linux Enterprise Server 10: **/etc/init.d/open-iscsi {start|stop}** **For SUSE Linux Enterprise Server 9:** **/etc/init.d/iscsi {start|stop}**	Manually start or stop the iSCSI service on the Linux host.
For SUSE Linux Enterprise Server 10: **chkconfig open-iscsi on** **For SUSE Linux Enterprise Server 9:** **chkconfig iscsi on**	Configures the iSCSI service to start automatically.
Multipathing (dm-multipath) commands	
/etc/init.d/boot.multipath start **/etc/init.d/multipathd start**	Manually start the multipathing service on the Linux host. *(FC or iSCSI)*
insserv boot.multipath multipathd	Configures the multipath service to start automatically. *(FC or iSCSI)*
multipath -ll	Displays the multipathing configuration. *(FC or iSCSI)*
multipath -v3	Adds new LUNs to the multipath configuration. *(FC or iSCSI)*
multipath -f <device_map>	Removes an existing LUN from the multipath configuration. *(FC or iSCSI)*
multipath -ll -v3 -d	Displays the multipathing configuration. *(FC or iSCSI)*

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Veritas Storage Foundation	
Multipathing commands	
vxdmpadm stat restored	Displays restore daemon statistics.
vxdmptune dmp_restore_interval 60	Sets the DMP restore interval to 60 seconds.
vxdmpadm getsubpaths ctlr=<c1>	Lists all the DMP paths under the controller <c1>.
vxdmpadm getsubpaths dmpnodename=<DMP_nodename>	Displays all the paths to a particular LUN. The DMP_nodename can be in the OS-native or enclosure-based naming format.
vxdmpadm settune <dmp_tunable>=<value>	Sets the value for a particular DMP tunable.
vxdmpadm gettune all	Displays the DMP tunable parameters.
sanlun lun show -p	Provides multipath information, for both native dm-multipath and Veritas Storage Foundation dynamic multipathing solutions.
vxdmpadm list dmpnode	Displays information about dmpnode such as LUN serial number, device attributes, and so on.
vxdmpadm list dmpnode dmpnodename=<dmp-device-name>	Displays information about a given dmpnode.
Accessing LUNs as Linux disk devices	
vxdisk list	Lists the LUNs available to the host.
vxdiskadm	Performs initialization, encapsulation, removal, replacement of disks, and changing the disk naming scheme, and so on.
vxdisksetup	Configures the disk for use by Veritas Volume Manager.
vxdg	Manages disk groups under Veritas Volume Manager.
vxassist	Manages volumes under Veritas Volume Manager.
vxprint	Lists the volumes and disk group information.
sanlun lun show all	Lists available LUNs as seen by the `sanlun` command.
sanlun fcp show adapter -c	Generates igroup and create commands that you can run on the storage system to create an initiator group for this host.
ls -l /dev/vx/dmp	Lists multipath devices generated for LUNs when using Veritas multipathing.
mkfs -V -t vxfs *volume*	Creates a vxfs file system on the Veritas volume. The path for the Veritas volume is /dev/vx/dsk.
mount -t vxfs *volume*	Mounts a Veritas volume.
mount -a	Mounts all file systems listed in /etc/fstab.
df	Lists all mounted file systems.
Troubleshooting	
sanlun lun show all	Verifies that LUNs are visible to the host.
sanlun lun show -p all	Verifies the multipath information.
sanlun fcp show adapter -v all	Verifies the host's HBA WWPNs.
license (from storage system console)	Verifies that FC is licensed on the storage system.
lsmod | grep qla **lsmod | grep lpfc**	Verifies that the QLogic or Emulex driver is loaded on the host.
lsmod| grep vxdmp	Verifies that the vxdmp module is loaded.
Check the log file on the storage system (/etc/messages) for error messages.	
Search the NetApp Service and Support Knowledgebase at **https://now.netapp.com/eservice/SupportHome.jsp** for information about the problem.	
Before contacting NetApp Global Services with a problem, run the **/opt/netapp/santools/linux_info** and **/opt/netapp/santools/controller_info** scripts on the host to collect information to help diagnose the problem. Also run the appropriate script for your Fibre Channel switches.	
Resources	
http://ftp.support.veritas.com/pub/support/products/VCS_for_WindowsNT/236522.pdf	Veritas Cluster Server command-line reference.
http://now.netapp.com	All NetApp documentation and software downloads.
http://now.netapp.com/NOW/knowledge/docs/san/fcp_iscsi_config/fcp_support.shtml	FC support matrix.

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