

Linux® Host Utilities 6.1 Quick Command Reference

Data ONTAP® operating in Cluster-Mode	
Service management commands	
system license show	Verifies the FCP and iSCSI licenses are installed on the cluster.
vserver iscsi create -vserver <i>name</i> -status-admin up	Enables iSCSI on the specified Vserver.
vserver fcp create -vserver <i>name</i> -status-admin up	Enables FC on the specified Vserver.
vserver {iscsi fcp} start -vserver <i>name</i>	Starts the FC or iSCSI service on the specified Vserver.
vserver {iscsi fcp} stop -vserver <i>name</i>	Stops the FC or iSCSI service on the specified Vserver.
Logical interface (LIF) management commands	
network interface create -vserver <i>name</i> -lif <i>lif_name</i> -role <i>data</i> -dataprotocol {iscsi fcp} -home-node <i>node</i> -home-port <i>port</i>	Creates a data LIF for either iSCSI or FC. You must create a data LIF in each Vserver on each node to enable failover.
network interface show	Verifies status of LIFs.
portset create -vserver <i>name</i> -portset <i>portset_name</i> -protocol mixed -port-name <i>lif_list</i>	Creates a port set that you can add to an igroup to limit which LIFs can be used to access LUNs mapped to that igroup.
iSCSI authentication (CHAP) management commands	
vserver iscsi security create -initiator <i>initiator</i> -auth-type CHAP -user-name <i>inname</i> -password <i>inpassword</i> [-outbound-user-name <i>outname</i> -outboundpassword <i>outpassword</i>]	Defines authentication method for the specified initiator. For <i>initiator</i> , use the host's iSCSI node name in iqn or eui format. Note that <i>inname</i> on storage system is set to outgoing user name on host.
vserver iscsi security show	Displays the current iSCSI authentication configuration.
Target status and troubleshooting commands	
vserver {fcp iscsi} show	Displays current status of the FC or iSCSI targets.
vserver iscsi connection show	Displays details of iSCSI connections.
vserver fcp initiator show	Displays details of FC initiators.
LUN and igroup management commands	
vserver setup	Interactive Vserver, volume, LUN, and igroup creation.
lun create -vserver <i>name</i> -volume <i>vol_name</i> -lun <i>lun_name</i> -size <i>size</i> -ostype <i>type</i> -space-reserve {enabled disabled}	Manual LUN creation. Enter <i>size</i> as an integer with one of the following suffixes: m (megabytes), g (gigabytes), or t (terabytes).
igroup create -vserver <i>name</i> -igroup <i>igroup_name</i> -protocol {fcp iscsi mixed} -ostype windows -initiator list [-portset <i>portset_name</i>]	Manual initiator group creation. Specify the initiator WWPNs or iSCSI node name. Use the optional port set to limit which initiator ports access LUNs mapped to this igroup.
lun map -vserver <i>name</i> -volume <i>vol_name</i> -lun <i>lun_name</i> -igroup <i>igroup_name</i> [-lun-id <i>integer</i>]	Makes the specified LUN accessible to initiators in the specified igroup. Specify optional LUN ID or take default of lowest available value.
lun igroup show [-vserver <i>name</i>] [-igroup <i>igroup_name</i>]	Displays the initiators in all igroups or in the specified initiator group or for the specified Vserver.
lun show [-instance] [<i>parameters</i>]	Lists LUNs. Use -instance to display more details. Add parameters to filter the list; run man lun show for available parameters.
lun modify -vserver <i>name</i> -volume <i>vol_name</i> -lun <i>lun_name</i> -state {online offline}	Enables or disables block-protocol access to the specified LUN.
lun delete -vserver <i>name</i> -volume <i>vol_name</i> -lun <i>lun_name</i>	Deletes the specified LUN and all its data.
General notes	
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). NetApp recommends that you use the host name for the <i>anything</i> portion of the initiator node name.	
Cluster-Mode SAN requires Data ONTAP 8.1 or later.	

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Data ONTAP operating in 7-Mode	
Management commands	
fc p {start stop}	Starts or stops the FC or iSCSI service on the storage system.
iscsi {start stop}	
fc p config [<i>adapter</i> [up down] [partner { <i>adapter</i> 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 fc p config with no arguments to display adapter information.
fc p show adapter [-v] [<i>adapter</i>]	Displays information about target adapters on the storage system.
fc p show cfmodes	Displays the cfmodes of a storage system in active/active configuration.
fc p show initiator [-v] [<i>adapter</i>]	Displays information about initiators connected to the storage system.
license [add <i>code</i>]	Displays or adds license codes on the storage system. Use to verify that both FC and iSCSI are licensed on the storage system.
iscsi nodename [<i>new_nodename</i>]	Displays or sets the iSCSI target node name.
iscsi initiator show	Displays information about initiators connected to the target.
ifconfig [-a <i>interface</i>]	Displays or configures network parameters for the specified interface. Use -a to display all network interfaces.
Target status, performance, and troubleshooting commands	
{ fc p iscsi } status	Displays the status of the FC or iSCSI service on the storage system.
sysstat {-i -f} [<i>interval</i>]	Displays iSCSI (-i) or FC (-f) performance statistics. <i>interval</i> is integer reporting interval in seconds; default is 15 seconds.
fc p stats [-z] [<i>adapter</i>]	Displays statistics for the specified FC target adapter. Use -z to clear statistics.
fc p stats -i <i>interval</i> [-c <i>count</i>] [-a <i>adapter</i>]	Displays FC performance statistics over a specified interval. <i>interval</i> is integer reporting interval in seconds. Specify <i>adapter</i> or use -a to display statistics for all FC target adapters.
lun stats [-z] [-o] [-a <i>lun_path</i>]	Displays block access statistics for the specified LUN. Use -z to clear statistics; -o for extended stats; -a to show stats for all LUNs.
lun config_check [-S] [-s -v]	(FC only) Performs checks on the lun/igroup/fcp configuration of the storage system. Requires Data ONTAP 7.1 or later.
iscsi stats [-z]	Displays numbers of iSCSI PDUs and CDBs, and error statistics.
ifstat [-z] -a <i>interface</i>	(iSCSI only) Displays device-level statistics for the specified network interface. Use -z to clear statistics. Use -a to display statistics for all interfaces.
iSCSI authentication (CHAP) management commands	
iscsi security add -i <i>initiator</i> -s CHAP -p <i>inpassword</i> -n <i>iname</i> [-o <i>outpassword</i> -m <i>outname</i>]	Defines the authentication method for specified initiator. For <i>initiator</i> , use node name in IQN format. Note that <i>iname</i> 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 <i>inpassword</i> -n <i>iname</i> [-o <i>outpassword</i> -m <i>outname</i>]	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 lun create, igroup create, igroup add, and lun map command functions.
lun create -s <i>size</i> -t linux <i>lun_path</i>	(FC only) Manual LUN creation. Enter <i>size</i> as integer bytes with one of the following suffixes: m (megabytes), g (gigabytes), or t (terabytes).
igroup create -f -t linux <i>initiator_group</i> [<i>WWPN...</i>]	Creates a new FC initiator group. Optionally, specify the initiator worldwide port names (<i>WWPN...</i>), or add them using the igroup add command.
igroup show [<i>initiator_group</i>]	Displays the initiator nodes in the specified initiator group. Omit <i>initiator_group</i> to see all igroups.
lun map <i>lun_path</i> <i>initiator_group</i> [<i>lun_id</i>]	Makes the specified LUN accessible to initiators in the specified igroup. The default is the lowest available value.
lun show [-v -m -c] [all mapped offline online unmapped <i>lun_path</i> -g <i>initiator_group</i>]	Displays general (-v), mapping (-m), or clone (-c) information about the specified set of LUNs.
lun online offline <i>lun_path...</i>	Enables or disables block-protocol access to the specified LUNs.
lun destroy [-f] <i>lun_path...</i>	Destroys the specified LUNs and all their data. Use -f if LUN is in use.
vol options <i>vol_name</i> nosnap on	(iSCSI only) Turns off scheduled Snapshot copies for a volume containing LUNs. Recommended: Enable space reservations.
igroup create -i [-t aix hpux default linux netware solaris vmware windows] <i>initiator_group</i> [<i>node...</i>]	Creates an iSCSI initiator group. Optionally, specify the initiator node names (<i>node...</i>) or add them using igroup add.
igroup add <i>initiator_group</i> <i>node...</i>	Adds initiator nodes to the specified igroup.

Red Hat® Enterprise Linux	
Host configuration files	
<code>/etc/modprobe.conf</code>	Contains HBA driver parameter settings.
<code>/etc/fstab</code>	Lists file systems on FC or iSCSI LUNs to mount.
<code>/etc/multipath.conf</code>	Lists local disks to exclude (blacklist) from multipathing and sets specific device parameters for NetApp® storage systems.
<i>For Red Hat Enterprise Linux 5 or later:</i> <code>/etc/iscsi/initiatorname.iscsi</code> <i>For Red Hat Enterprise Linux 4:</i> <code>/etc/initiatorname.iscsi</code>	Contains the iSCSI node name of the initiator.
<i>For Red Hat Enterprise Linux 5 or later:</i> <code>/etc/iscsi/iscsid.conf</code> <i>For Red Hat Enterprise Linux 4:</i> <code>/etc/iscsi.conf</code>	Lists most settings for the iSCSI initiator.
FC QLogic® HBA commands	
<code>qauccli -i</code>	Lists HBA attributes, including the WWPN.
<code>qauccli -c</code>	Lists all attributes for all available ports, including firmware and driver versions.
FC Emulex® HBA commands	
<code>/usr/sbin/ocmanager/hbacmd ListHBAs</code>	Lists HBA attributes, including the WWPN.
<code>/usr/sbin/ocmanager/hbacmd HBAAattrib <i>wwpn</i></code>	Lists all attributes for the specified <i>wwpn</i> , including firmware and driver versions.
iSCSI service management commands	
<code>/etc/init.d/iscsi start</code>	Manually starts the iSCSI service on the Linux host.
<code>chkconfig iscsi on</code>	Configures the iSCSI service to start automatically.
Multipathing (dm-multipath) commands	
<code>/etc/init.d/multipathd start</code>	Manually starts the multipathing service on the Linux host.
<code>chkconfig --add multipathd</code> <code>chkconfig multipathd on</code>	Configures the multipathing service to start automatically.
<code>multipath -ll</code>	Displays the multipathing configuration.
<code>multipath -v3</code>	Creates the initial multipathing configuration.
<code>multipath -f <i>device_map</i></code>	Removes an existing LUN from the multipathing configuration.
<code>multipath -ll -v3 -d</code>	Displays the multipathing configuration in verbose mode.
Accessing LUNs on host	
<code>sanlun fcp show adapter -v</code>	Displays HBA information.
<code>sanlun lun show all</code>	Lists available LUNs as seen by the sanlun script.
<code>sanlun lun show -p</code>	Provides multipath information for both DM-Multipath and Veritas Storage Foundation™ dynamic multipathing solutions.
<code>ls -lh /dev/mapper/</code>	Lists DM-Multipath devices generated for LUNs.
<code>fdisk <i>device</i></code>	Partitions the LUN. <i>device</i> is the <code>/dev/sdx</code> name for the LUN.
<code>mkfs -V -t ext3 <i>device</i></code>	Creates an ext3 file system on the partition or multipath <i>device</i> . For DM-Multipath, creates the file system on the <code>/dev/mapper/</code> device.
<code>e2label <i>device label</i></code>	Creates a persistent label for a file system. <i>device</i> is the partition; <i>label</i> is a unique string up to 16 characters. Not needed with DM-Multipath.
<code>mount -a</code>	Mounts all file systems listed in <code>/etc/fstab</code> .
<code>df -h</code>	Lists all mounted file systems.
<i>For Red Hat Enterprise Linux 5 or later:</i> <code>iscsiadm -m session</code> <code>iscsiadm -m session --sid=N --rescan</code> <code>iscsiadm -m session --rescan</code> <i>For Red Hat Enterprise Linux 4:</i> <code>/etc/init.d/iscsi reload</code> <code>/etc/init.d/iscsi restart</code>	(iSCSI only) 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.
<i>For Red Hat Enterprise Linux 5:</i> <code>iscsiadm -m session --sid=0 -i</code> <i>For Red Hat Enterprise Linux 4:</i> <code>/sbin/iscsi-ls -l</code>	(iSCSI only) Lists available LUNs as seen by the Linux host.

SUSE® Linux Enterprise Server	
Host configuration files	
<code>/etc/modprobe.conf.local</code>	Contains HBA driver parameter settings.
<code>/etc/fstab</code>	Lists file systems on FC or iSCSI LUNs to mount.
<code>/etc/multipath.conf</code>	Lists local disks to exclude (blacklist) from multipathing. You must create this file on SUSE Linux Enterprise Server 10; it is not present by default.
<code>/etc/iscsi/initiatorname.iscsi</code>	Contains the iSCSI node name of the initiator.
<code>/etc/iscsi/iscsid.conf</code>	Lists most settings for the iSCSI initiator.
FC QLogic HBA commands	
<code>qaucli -i</code>	Lists HBA attributes, including the WWPN.
<code>qaucli -c</code>	Lists all attributes for all available ports, including firmware and driver versions.
FC Emulex HBA commands	
<code>/usr/sbin/ocmanager/hbacmd ListHBAs</code>	Lists HBA attributes, including the WWPN.
<code>/usr/sbin/ocmanager/hbacmd HBAAattrib <i>wwpn</i></code>	Lists all attributes for the specified <i>wwpn</i> , including firmware and driver versions.
iSCSI service management commands	
<code>/etc/init.d/open-iscsi {start stop}</code>	Manually starts or stops the iSCSI service on the Linux host.
<code>chkconfig open-iscsi on</code>	Configures the iSCSI service to start automatically.
Multipathing (dm-multipath) commands	
<code>/etc/init.d/boot.multipath start</code> <code>/etc/init.d/multipathd start</code>	Manually starts the multipathing service on the Linux host.
<code>insserv boot.multipath multipathd</code>	Configures the multipath service to start automatically.
<code>multipath -ll</code>	Displays the multipathing configuration.
<code>multipath -v3</code>	Adds new LUNs to the multipath configuration.
<code>multipath -f <i>device_map</i></code>	Removes an existing LUN from the multipath configuration.
<code>multipath -ll -v3 -d</code>	Displays the multipathing configuration.
Accessing LUNs on host	
<code>sanlun fcp show adapter -v</code>	Displays HBA information.
<code>sanlun lun show all</code>	Lists available LUNs as seen by the sanlun script.
<code>sanlun lun show -p</code>	Provides multipath information for both native DM-Multipath and Veritas Storage Foundation dynamic multipathing solutions.
<code>iscsiadm -m session</code> <code>iscsiadm -m session --sid=<i>N</i> --rescan</code> <code>iscsiadm -m session --rescan</code>	(iSCSI only) 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.
<code>ls -lh /dev/mapper/</code>	Lists DM-Multipath devices generated for LUNs.
<code>fdisk <i>device</i></code>	Partitions the LUN. <i>device</i> is the <code>/dev/sdx</code> name for the LUN.
<code>mkfs -V -t ext3 <i>device</i></code>	Creates an ext3 file system on the partition or multipath <i>device</i> . For DM-Multipath, creates the file system on the <code>/dev/mapper/</code> device.
<code>mount -a</code>	Mounts all file systems listed in <code>/etc/fstab</code> .
<code>df -h</code>	Lists all mounted file systems.
<code>/etc/init.d/iscsi restart</code>	(iSCSI only) Discovers LUNs when reload fails. Interrupts all iSCSI sessions.
<i>For SUSE Linux Enterprise Server 10 SP2:</i> <code>iscsiadm --mode session --sid=<i>N</i> -P 3</code> <i>For SUSE Linux Enterprise Server 10 SP1:</i> <code>iscsiadm -m session --sid=0 -i</code>	(iSCSI only) Lists available LUNs as seen by the Linux host.
<code>iscsiadm -m session</code> <code>iscsiadm -m session --sid=<i>N</i> --rescan</code> <code>iscsiadm -m session --rescan</code>	(iSCSI only) Gets the list of all the current sessions. Rescans a specific session. Makes new LUNs visible on the host. Rescans all the sessions.

Veritas Storage Foundation	
Multipathing commands	
vxddmpadm stat restored	Displays restore daemon statistics.
vxddmptune dmp_restore_interval 60	Sets the DMP restore interval to 60 seconds.
vxddmpadm getsubpaths ctlr=c1	Lists all the DMP paths under the controller <c1>.
vxddmpadm 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.
vxddmpadm settune dmp_tunable=value	Sets the value for a particular DMP tunable.
vxddmpadm gettune all	Displays the DMP's tunable parameters.
sanlun lun show -p	Provides multipath information for both native DM-Multipath and Veritas Storage Foundation dynamic multipathing solutions.
vxddmpadm list dmpnode	Displays information about dmpnode, such as the LUN serial number, device attributes, and so on.
vxddmpadm 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.
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 information	
sanlun lun show all	Verify that LUNs are visible to the host.
sanlun lun show -p	Verify the multipath information.
sanlun fcp show adapter -v all	Verify the host's WWPNs.
license or system license show (from storage system console)	Verify that FC or iSCSI is licensed on the storage system.
lsmod grep qla lsmod grep lpfc	(FC only) Verify that the QLogic or Emulex driver is loaded on the host.
lsmod grep dm	Verify that the DM-Multipath driver is loaded on the host.
ping <i>storage_system_IP_address</i> (from host console) ping <i>host_IP_address</i> (from storage system console)	Verify basic network connectivity between the storage system and host.
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.
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<<i>adapter_number</i>>.	
Check the log file on the storage system (/etc/messages) for error messages.	
Search the NetApp Service and Support Knowledgebase at https://support.netapp.com/eservice/SupportHome.jsp for information about the problem.	
Resources	
http://support.netapp.com	All NetApp documentation and software downloads
http://support.netapp.com/NOW/products/interoperability	Interoperability matrix
http://www.redhat.com/	Red Hat Linux information
http://www.novell.com/home/	SUSE Linux information