

SAN Host Utilities 3.3.1 for iSCSI on SUSE® Linux® Enterprise Server commands
NetApp® iSCSI storage system commands for Data ONTAP® 7.0.x, 7.1.x, 7.2.x, and 7.3.x

iSCSI service management commands	
iscsi start stop	Starts or stops the iSCSI service.
iscsi config [<i>adapter</i> [up down]]	Configures the iSCSI target adapter up or down. Omit up or down to display configurable information. Omit <i>adapter</i> to display all.
Note: The iscsi config [<i>adapter</i> [up down]] command is used only in Data ONTAP® 7.0.x.	
iscsi nodename [<i>new_nodename</i>]	Displays or sets the iSCSI target node name.
iscsi alias [-c <i>new_alias</i>]	Displays, sets, or clears an alias for the iSCSI target node name.
iscsi initiator show	Displays information about initiators connected to the target.
Note: The iscsi alias [-c <i>new_alias</i>] and iscsi initiator show commands are used only in Data ONTAP 7.1.x, 7.2.x, and 7.3.x.	
iscsi show adapter [<i>adapter...</i>]	Displays target adapter information for specified logical adapters.
iscsi show initiator [<i>adapter...</i>]	Displays information about initiators connected to specified adapters.
Note: The iscsi show adapter [<i>adapter...</i>] and iscsi show initiator [<i>adapter...</i>] commands are used only in Data ONTAP 7.0.x.	
ifconfig [-a <i>interface</i>]	Displays or configures network parameters for the specified interface. Use -a to display all network interfaces.
iSCSI software target (iswt) management commands for Data ONTAP 7.0.x	
iswt interface show [-a <i>interface ...</i>]	Shows ISWT driver's use of network interfaces.
iswt interface enable { -a <i>interface...</i> }	Enables the use of specified network interfaces by iswt. Use -a to enable all. It is best not to enable e0 for the iSCSI traffic.
iswt interface disable [-f] { -a <i>interface...</i> }	Disables the use of specified network interfaces by iswt. Use -a to disable all. Use -f to force the termination of current sessions.
iswt session show [-v] <i>adapter</i> [<i>session_num</i>]	Shows the status of one session, or for all connections associated with a specified logical adapter if no session number is specified.
iSCSI software target and session management commands for Data ONTAP 7.1.x, 7.2.x, and 7.3.x	
iscsi interface show [-a <i>interface ...</i>]	Shows which network interfaces are enabled for the iSCSI traffic.
iscsi interface enable { -a <i>interface...</i> }	Enables the use of specified network interfaces for iSCSI traffic. Use -a to enable all. Only gigabit Ethernet interfaces are recommended for iSCSI.
iscsi interface disable [-f] { -a <i>interface...</i> }	Disables the use of specified network interfaces for the iSCSI traffic. Use -a to disable all. Use -f to force the termination of current sessions.
iscsi session show [-v] [<i>session_num</i>] iscsi connection show [-v] [<i>sess conn</i>]	Shows the status of one session or connection, or for all if no session number (and connection number for connection show) is specified.
iscsi tpgroup create [-f] [-t <i>tpgtag</i>] <i>tpgroup_name</i> [<i>interface ...</i>]	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.
iSCSI authentication (CHAP) management commands	
iscsi security add -i <i>initiator</i> -s CHAP -p <i>inpassword</i> -n <i>inname</i> [-o <i>outpassword</i> -m <i>outname</i>]	Defines the authentication method for a specified initiator. For <i>initiator</i> , use node name in iqn format. Note that <i>inname</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>inname</i> [-o <i>outpassword</i> -m <i>outname</i>]	Sets the default authentication method, user names, and passwords for all initiators not specifically configured.
iSCSI target status, performance, and troubleshooting commands	
iscsi status	Displays the current status of the iSCSI service.
iscsi stats [-z]	Displays numbers of iSCSI PDUs and CDBs, and error statistics.
ifstat [-z] -a <i>interface</i>	Displays device-level statistics for the specified network interface. Use -z to clear statistics. Use -a to display statistics for all interfaces.
sysstat -i [<i>interval</i>]	Displays iSCSI performance statistics. <i>interval</i> is integer reporting interval in seconds; the default is 15 seconds.

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lun stats [-z] [-o] [-a <i>lun_path</i>]	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.
LUN and igroup management commands	
vol options <i>vol_name</i> nosnap on	Turns off schedule Snapshots copies for a volume containing LUNs. It is best to enable the use of space reservations.
lun setup	Interactive LUN creation. Combines the lun create , igroup create , igroup add , and lun map command functions.
lun create -s <i>size</i> [-t aix hpux image netware linux solaris vld vmware windows] <i>lun_path</i>	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 -i [-t aix hpux default linux netware solaris vmware windows] <i>initiator_group</i> [<i>node...</i>]	Creates a new iSCSI initiator group. Optionally specify the initiator node names (<i>node...</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 initiator groups.
igroup add <i>initiator_group node...</i>	Adds initiator nodes to the specified igroup.
lun map <i>lun_path initiator_group</i> [<i>lun_id</i>]	Makes the specified LUN accessible to initiators in the specified igroup. Specify optional LUN ID, or take default of 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 move <i>lun_path to_lun_path</i>	Moves a LUN to a new path in the same volume.
Note: The lun move <i>lun_path to_lun_path</i> command is used only in Data ONTAP 7.0.x.	
lun destroy [-f] <i>lun_path...</i>	Destroys the specified LUNs and all their data. Use -f if LUN is in use.
General iSCSI notes	
The FilerView™ GUI can also be used for the above commands (http://stor_sys_ip_address/na_admin).	The iSCSI service on the storage system uses IP port 3260.
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 <i>anything</i> portion of the initiator node name.	
iSCSI host configuration files	
For SUSE Linux Enterprise Server 10 SP1: /etc/iscsi/initiatorname.iscsi	Contains the iSCSI node name of the initiator.
For SUSE Linux Enterprise Server 9: /etc/initiatorname.iscsi	
For SUSE Linux Enterprise Server 10 SP1: /etc/iscsi/iscsid.conf	Lists most settings for iSCSI initiator.
For version prior to SUSE Linux Enterprise Server 9: /etc/iscsi.conf	
For SUSE Linux Enterprise Server 10 SP1: /etc/fstab	Lists file systems on iSCSI LUNs to mount.
For SUSE Linux Enterprise Server 9: /etc/fstab.iscsi	
/etc/multipath.conf	Lists local disks to exclude (blacklist) from multipathing. This file is not present in SLES10 SP1, by default. You need to create it.
iSCSI service management commands	
For SUSE Linux Enterprise Server 10 SP1: /etc/init.d/open-iscsi {start stop}	To manually start the iSCSI service on the Linux host.
For SUSE Linux Enterprise Server 9: /etc/init.d/iscsi start	To manually start/stop the iSCSI service on the Linux host.
For SUSE Linux Enterprise Server 10 SP1: chkconfig open-iscsi For SUSE Linux Enterprise Server 9: chkconfig iscsi	To verify that the iSCSI service starts automatically.

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Multipathing (dm-multipath) commands	
<code>/etc/init.d/boot.multipath start</code> <code>/etc/init.d/multipathd start</code>	To manually start the multipathing service on the Linux host.
<code>insserv boot.multipath multipathd</code>	To configure the multipath service to start automatically.
<code>multipath -ll -v3 -d</code>	Displays the multipathing configuration.
<code>multipath -v2</code>	Adds new LUNs to the multipath configuration.
Accessing LUNs as Linux disk devices	
<u>For SUSE Linux Enterprise Server 10 SP1:</u> <code>iscsiadm -m session</code> <code>iscsiadm -m session --sid=N --rescan</code> <code>iscsiadm -m session --rescan</code>	To get the list of all the current sessions. To rescan a specific session; makes new LUNs visible on the host. To rescan all the sessions.
<u>For SUSE Linux Enterprise Server 9:</u> <code>/etc/init.d/iscsi reload</code>	Makes new LUNs visible on the host; does not affect other LUNs.
<code>/etc/init.d/iscsi restart</code>	Discovers and automatically mounts LUNs; interrupts all the iSCSI sessions.
<u>For SUSE Linux Enterprise Server 10 SP1:</u> <code>iscsiadm -m session --sid=0 -i</code>	Lists available LUNs as seen by the Linux host.
<u>For SUSE Linux Enterprise Server 9:</u> <code>/sbin/iscsi-ls -l</code>	
<code>/opt/netapp/santools/sanlun lun show all</code>	Lists available LUNs as seen by the sanlun script.
<code>ls -l</code>	List multipath devices generated for LUNs when using dm-multipath.
<code>/sbin/fdisk device</code>	Partition the LUN. <i>device</i> is the <code>/dev/sdx</code> name for the LUN. At least one partition is required, if not using dm-multipath.
<code>mkfs -V -t ext3 device</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/mpathx</code> device.
<u>For SUSE Linux Enterprise Server 10 SP1:</u> <code>mount -a</code>	Mounts unmounted file systems.
<u>For SUSE Linux Enterprise Server 9:</u> <code>iscsi-mountall</code>	
<code>df</code>	Lists all mounted file systems.
Troubleshooting	
<code>ping storage_system_IP_address</code> (from host console)	To verify basic network connectivity between the storage system and host.
<code>ping host_IP_address</code> (from storage system console)	
<code>license</code> (from storage system console)	To verify that iSCSI is licensed on the storage system.
<code>ifconfig</code> (from storage system console and host console)	To 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 outgoing values on the storage system are the incoming values on the host.	
Check the log file on the storage system (<code>/etc/messages</code>) for error messages.	
Before contacting NetApp Global Services with a problem, run the <code>/opt/netapp/santools/linux_info</code> and <code>/opt/netapp/santools/filer_info</code> scripts on the host to collect information to help diagnose the problem.	