IBM iSCSI client for Linux Installation and configuration instructions

Prerequisites

The minimum hardware and software requirements for the iSCSI client on the Linux operating system are:

- 100–Mbps or Gigabit Ethernet connection (Gigabit Ethernet is recommended.)
- Local boot disk
- SCSI support built into the kernel

The IBM iSCSI client has been tested with Red Hat Linux 6.2.1 (kernel version 2.2.19-6.2.1) running on Intel processors. Kernel versions earlier than 2.2.19 are known to produce severe problems.

RPMs to upgrade Red Hat Linux 6.2 to Red Hat Linux 6.2.1 and documentation for kernel upgrades can be found on the Web at the following sites, respectively:

http://www.redhat.com/support/errata/RHSA-2001-047.html
http://www.redhat.com/support/docs/howto/kernel-upgrade/kernel-upgrade.html

Note: You do not need SCSI-controller hardware. The iSCSI client works independently of the SCSI-controller hardware that you might already have installed in your machine.

An iSCSI disk is not bootable. You must have a local boot disk.

Packaging

The iSCSI client for Linux package is named **ibmiscsilinuxclient.***v.r.m***.tgz**, where *v.r.m* is the version, release, and modification number. This package contains the following items:

README	Installation instructions.
iscsiclient.conf	Sample configuration file.
iSCSI client source	Source files for module (if you need to build your own module) found in the driver directory.
iscsiclient.o	Module object for Red Hat Linux 6.2.1 (kernel 2.2.19–6.2.1) running on a non-SMP machine.
iscsiclientsmp.o	Module object for Red Hat Linux 6.2.1 (kernel 2.2.19–6.2.1) running on an SMP machine.
iscsi.sh	Script for starting, stopping, and restarting the iSCSI client.
iSCSI client tools	Objects for Red Hat Linux 6.2.1 found in the tools directory.

installtools.sh	Script for installing the iSCSI client tools.
uninstalltools.sh	Script for uninstalling the iSCSI client tools.

Installing and setting up the iSCSI client

The iSCSI client for Linux is delivered as a combination of source and binary.

Notes:

1. SCSI support must be built into your Linux kernel.
2. You must be the root user to install and set up the iSCSI client.

To install and set up the iSCSI client:

1. Download latest iSCSI client for Linux package.
2. Copy the package file to the directory where you want to install it.
3. Untar the package by typing **tar -xzvf ibmiscsilinuxclient.***v.r.m***.tgz**, where *v.r.m* is the version, release, and modification number, and pressing **Enter**.

   All files will be placed in a subdirectory named ibmiscsi-*v.r.m*, where *v.r.m* is the version, release, and modification number.
4. Copy the **iscsiclient.conf** file from the ibmiscsi-*v.r.m* directory to the /etc directory.
5. Configure the targets by editing the /etc/iscsiclient.conf file and adding targets using the following syntax. Each line defines a single target. You can specify a maximum of 16 targets.

   target=*host portNumber numberOfConnections* **Initiator:***userID,password*

   where:

host	The IP address of the target (for example, 111.222.333.444).
portNumber	The port number of the target. This value must be set to 47274.
numberOfConnections	The maximum number of open sockets to this target. This value must be set to 1.
userID	A login parameter that specifies the user ID of the iSCSI client. This ID is assigned to you by the system administrator.
password	A login parameter that specifies the password associated with your user ID. This password is also assigned to you by the system administrator.

   For example:

   ```
   target=192.45.31.14 47274 1 Initiator:Shuri_20,pwd
   ```
6. From the ibmiscsi-*v.r.m* directory, install the iSCSI client tools by typing **./installtools.sh** and pressing **Enter**.
7. Verify that you correctly configured the targets by typing **iscsi_check_config /etc/iscsiclient.conf** and pressing **Enter**.
8. Load the iSCSI client driver by typing **./iscsi.sh start** and pressing **Enter**.

9. Optionally, enable the iSCSI client to load automatically when the system reboots:

    a. Change to the ibmiscsi-*v.r.m* directory.

    b. Type **make install** and press **Enter**.

    c. Reboot the appliance

10. Verify that the iSCSI client driver loaded successfully:

    a. Verify that the iSCSI client driver is loaded by typing **lsmod** and pressing **Enter**.

    b. View the attached virtual logical units (VLUNs) by typing **cat /proc/scsi/scsi** and pressing **Enter**. A list of connected VLUNs on the target are displayed.

    c. Verify the size of the disk and the logical drive letter by typing **tail -100 /var/log/messages** and pressing **Enter**.

11. Create partitions on the disk by typing **fdisk /dev/sd***x*, where *x* is a unique letter of the logical drive you want to access (for example, fdisk /dev/sda), and pressing **Enter**.

12. Make an entire disk or a partition into a file system by typing **mkfs /dev/sd***yy*, where *yy* is the correct partition (for example, mkfs /dev/sda1), and pressing **Enter**.

13. Mount the file system by typing **mount** *disk file_system*, where *disk* is the iSCSI disk name and *file_system* is the file-system name (for example, mount /dev/sda1 /mnt), and pressing **Enter**.

Configuring the iSCSI client

Each iSCSI client maintains configuration information concerning the various targets it may access. In Linux, this configuration information is kept in a configuration file called /etc/iscsiclient.conf.

The targets are configured by editing the /etc/iscsiclient.conf file. Each line in the file defines a single target. You may specify a maximum of 16 targets. You can also add comments to the file by preceding it with a number sign (#).

Adding a target

To add a target to your iSCSI client:

1. Edit the /etc/iscsiclient.conf file using an ASCII editor.

2. Add a new line to the configuration file for each new target using the following syntax:

target=*host portNumber numberOfConnections* **Initiator:***userID,password*

where:

host	The IP address of the target (for example, 111.222.333.444).
portNumber	The port number of the target. This value must be set to 47274.
numberOfConnections	The maximum number of open sockets to this target. This value must be set to 1.

userID	A login parameter that specifies the user ID of the iSCSI client. This ID is assigned to you by the system administrator.
password	A login parameter that specifies the password associated with your user ID. This password is also assigned to you by the system administrator.

For example:

```
target=192.45.31.14 47274 1 Initiator:Shuri_20,pwd
```

3. Save and close the configuration file.
4. Unmount all iSCSI drives that are currently mounted.
5. Type **./iscsi.sh restart** and press **Enter** to establish the connection to the new target.
6. Remount the iSCSI drives.

Removing a target

Note: All disks associated with the target will not be available after removing the target.

To remove a target from your iSCSI client:
1. Unmount the file systems on the target you want to delete.
2. Edit the /etc/iscsiclient.conf file using an ASCII editor.
3. Delete or comment out one or more target configurations.
4. Save and close the configuration file.
5. Unmount all iSCSI drives that are currently mounted.
6. Type **./iscsi.sh restart** and press **Enter** to terminate the connection to the removed target.
7. Remount the iSCSI drives.

Verifying the target configuration

To verify the syntax of the configuration file, type the following command from a command line and press **Enter**:

iscsi_check_config /etc/iscsiclient.conf

Uninstalling the iSCSI client

To uninstall the iSCSI client:
1. Verify that all iSCSI disks are unmounted.
2. Unload the driver by typing **./iscsi.sh stop** and pressing **Enter**.
3. If you previously enabled the iSCSI client to load automatically when the system reboots, perform the following steps:
   a. Change to the driver directory.
   b. Type **make uninstall** and press **Enter**.
4. Uninstall the iSCSI client tools by typing **./uninstalltools.sh** and pressing **Enter**.
5. Delete the ibmiscsi-*v.r.m* directory structure where the iSCSI client code is stored.

Starting, stopping, and restarting the iSCSI client

Starting the iSCSI client

To configure the iSCSI client to start automatically when you reboot your machine:

1. Change to the driver directory.
2. Type **make install** and press **Enter**.

To manually start the iSCSI client if it is not configured to start automatically:

1. Change to the ibmiscsi-*v.r.m* directory.
2. Type **./iscsi.sh start** and press **Enter**.

Stopping the iSCSI client

To manually stop the iSCSI client:

1. Change to the ibmiscsi-*v.r.m* directory.
2. Unmount all iSCSI drives that are currently mounted.
3. Unload the driver by typing **./iscsi.sh stop** and pressing **Enter**.

Restarting the iSCSI client

To manually restart the iSCSI client:

1. Change to the ibmiscsi-*v.r.m* directory.
2. Unmount all iSCSI drives that are currently mounted.
3. Unload and load the driver by typing **./iscsi.sh restart** and pressing **Enter**.
4. Remount the iSCSI drives.

Recompiling the iSCSI client

The drivers supplied in the package were compiled for Red Hat Linux 6.2.1 (kernel 2.2.19-6.2.1). The iSCSI client has only been tested with kernel 2.2.19-6.2.1. Kernel versions earlier than 2.2.19 are known to produce severe problems. Kernel versions after 2.2.19 have not been tested.

Note: The iSCSI tools are supplied as binary only and have been compiled to run with Red Hat Linux 6.2.1 (kernel 2.2.19-6.2.1).

If you choose to recompile the iSCSI client code:

1. Change to the driver directory.
2. Type the following commands and press **Enter** after each:

   make clean
   make
3. Copy the new iscsiclient.o or iscsiclientsmp.o file to the ibmiscsi-*v.r.m* directory (for example, cp iscsiclient.o ..).

Troubleshooting

This section describes various error conditions that can occur while using the iSCSI client and its command-line tools.

Table 1. Troubleshooting symptoms and recommended actions

Symptom	Recommended actions
The device /dev/iscsi does not open.	1. Verify that you have root permission (su root). 2. Verify that the device exists by typing **ls -l /dev/iscsi** and pressing **Enter**. A list of devices is displayed. If you do not see the device in the list, create it by typing **mknod /dev/iscsi c 196 0** and pressing **Enter**. 3. Verify that the iSCSI client was loaded successfully by typing **lsmod** and pressing **Enter**.

Adding a target failed.	1. Verify your configuration by typing **iscsi_check_config /etc/iscsiclient.conf** and pressing **Enter**.
	2. Verify the network connection with the target by typing the following command and pressing **Enter**:
	ping *targetHostName*
	
	where *targetHostName* is the host name or IP address of the target.
	3. Verify that the target running and operating correctly using the Administrative Console by clicking **Storage ⟶ Virtualization** and verifying that the correct VLUNs are listed. If the VLUNs are not listed, view the debug messages from the Service and Recovery Console:
	  a. Connect to the target through the serial port.
	  b. Type **iscsi** and press Enter.
	  c. Type **dmesg** and press Enter.
	4. Verify that the IP address and log-in parameters for the target are properly specified in the /etc/iscsiclient.conf file.

Removing a target failed, and the message `Disks are used or busy` is displayed.	1. Verify that all disks associated with the target that you are attempting to remove are unmounted. 2. Verify that there are no applications (such as mkfs or fdisk) that are using the disks on the target .
Unresolved symbols are encountered.	1. Verify that the iSCSI client code matches the version of the Linux kernel source. If it does not, recompile the iSCSI client code for the correct version of Linux. 2. Verify that /usr/scr/linux points to the current Linux kernel source tree. 3. Verify that Linux has built-in SCSI support. 4. Verify that the VLUNs are configured properly in the target. 5. Verify that the VLUNs are assigned properly in your login.
The iSCSI client driver does not load or unload, and the message `Device or resource busy` is displayed.	1. Verify that the iSCSI client is loaded by typing **lsmod** and pressing **Enter**. 2. Verify that the /etc/iscsiclient.conf file exists. 3. Verify that all file systems using the disks are unmounted.
fdisk gives incorrect sizes for large disks (for example, larger than 500 GB).	Upgrade your util-linux code to version 2.10m or later. You can obtain the latest util-linux code from the Web at www.kernel.org.

Table 1. Troubleshooting symptoms and recommended actions (continued)

Symptom	Recommended actions
You receive a SCSI disk error or a SCSI disk I/O error.	The connection to the target has been lost. To reconnect to the target: 1. Unmount all iSCSI drives currently connected to the failed target (for example, **unmount /dev/sda1 /mnt**). 2. Type the following command and press **Enter**: **echo** ″**scsi remove-single-device** *host channel ID LUN*″ **> /proc/scsi/scsi** The variables *host, channel, ID, and LUN* can be determined by typing **cat /proc/scsi/scsi** and pressing **Enter**. 3. Determine and fix the connection problem (for example, reattach the cable or fix the network problem). 4. Type the following command and press **Enter**: **echo** ″**scsi add-single-device** *host channel ID LUN*″ **> /proc/scsi/scsi** The variables *host, channel, ID, and LUN* are the same as those used in step 2. 5. Run **fsck** on the lost disk (for example, **fsck /dev/sda1**). 6. Remount the drive (for example, **mount /dev/sda /mnt**).

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