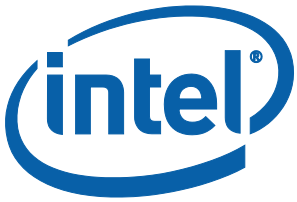

iSCSI Quick-Connect Guide for Red Hat Linux

A supplement for Network Administrators

The Intel® Networking Division

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Legal

Revisions

Date	Revision	Description
March 2013	1.0	Initial Release

Contents

1 Introduction and Intended Audience

As a supplement to the Red Hat Storage Administration Guide, this paper provides an introduction to iSCSI storage connectivity from a Red Hat Storage Server administrator's perspective and shows the basic connection from the Linux operating system to an iSCSI storage target.

As part of a series of iSCSI Quick Connect guides for multiple operating systems, our goal is to discuss the connection from a host perspective and review the requirements provided by and to storage and network administrators. Regrettably, switch and storage configuration are outside the scope of this paper.

The intended audience is experienced system administrators familiar with server, network, datacenter and SAN storage concepts and technologies.

2 iSCSI Basics

iSCSI has been in development since the early 2000s and Intel has been offering iSCSI solutions for over a decade. It is a flexible and powerful Storage Area Networking (SAN) protocol providing data availability, performance and ease of use. As a routable storage protocol, iSCSI imposes no inherent distance limitations and is scalable across LAN and WAN infrastructures.

The iSCSI Qualified Name (IQN) is typically shown as the literal IQN string plus date, reverse domain, and optional text such as the storage target name as shown in the example below. The IQN or iSCSI name is used in the assignment of the Logical Unit Number (LUN) on the external storage. In some applications, the IQN can be customized. Basic iSCSI configuration includes setup of the storage array by creating the LUN and initiator group then assigning the server's iSCSI IQN to that initiator group.

```
        Naming     String defined by
Type  Date    Auth       "example.com" naming authority
+--++-----+ +---------+ +----------------------------+
iqn.1998-01.com.microsoft:myservername-123abc0
```

3 Administrative Ownership

Basic iSCSI connectivity touches three technology disciplines; server, network, and storage. The server administrator provides the IQN to the storage administrator and sets up the host with an IP address provided by the network administrator. Besides IP assignment, the network administrator ensures the network is setup end-to-end. The storage administrator creates the LUN and host entity then assigns each to a storage group to create the LUN masking and provides the target IQN to the server administrator.

Server Administrator	a. Assign the host IP address provide by the network administrator b. Identify the host IQN c. Provide the IQN and IP address to storage administrator d. Set discovery IP address for host for basic storage connection e. Setup the host to connect to the storage target and LUN
Network Administrator	a. Assign host IP address to server administrator b. Ensure end-to-end connectivity of host and storage
Storage Administrator	a. Add host it "Host List" i. Assign IP address to host entity ii. Assign IQN to host entity b. Create a LUN c. Create a "Storage Group" i. Assign host entity to the Storage Group ii. Assign LUN to the Storage Group

Figure 1: Administrative Ownership Table

4 Setting up the Network

The network administrator owns IP address assignment, network switch port configuration, and end-to-end connectivity between the storage array and the server. iSCSI network speeds are typically 1 or 10 gigabit. The server administrator provides speed requirements to the network administrator and enables the iSCSI initiator.

5 Obtaining the IQN and IP Address in Red Hat Linux 6.2

This section shows how to obtain an IQN in the Red Hat Linux operating system.

Beginning with a command line interface (CLI), enter "`cat /etc/iscsi/initiatorname.iscsi`" at the prompt as shown in Figure 2.

```
[root@fmsnet02 ~]# cat /etc/iscsi/initiatorname.iscsi
InitiatorName=iqn.1994-05.com.redhat:4d652a497cc7
[root@fmsnet02 ~]#
```

Figure 2: Write performance on 12 node cluster

Next, enter ifconfig at the prompt to obtain the IP address as shown in Figure 3.

```
[root@fmsnet02 ~]# ifconfig
eth0      Link encap:Ethernet  HWaddr 00:15:17:FA:A9:08
          inet addr:10.19.253.212  Bcast:10.19.253.255  Mask:255.255.255.0
          inet6 addr: fe80::215:17ff:fefa:a908/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:9000  Metric:1
          RX packets:5158648 errors:0 dropped:0 overruns:0 frame:0
          TX packets:188463 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:447667586 (426.9 MiB)  TX bytes:110163567 (105.0 MiB)
          Memory:b2020000-b2040000

eth1      Link encap:Ethernet  HWaddr 00:1B:21:B3:46:28
          inet addr:192.168.25.2  Bcast:192.168.25.255  Mask:255.255.255.0
          inet6 addr: fe80::21b:21ff:feb3:4628/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:1977046 errors:0 dropped:0 overruns:0 frame:0
          TX packets:1928084 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:181868766 (173.4 MiB)  TX bytes:389053998 (371.0 MiB)
```

Figure 3: iSCSI Initiator Properties

The server administrator provides both the IQN and the IP address to the Storage Administrator. The storage administrator uses the IQN and IP address to assign a LUN to the host.

6 Operating System Setup for Red Hat Linux 6.2

This section shows the steps required on the server once the storage administrator has created the storage target. The storage administrator provides the Target IP address and IQN once the target has been created. All commands comply with the open-iscsi.org syntax.

Return to the command line interface and enter the command set "service iscsi restart" to ensure the iSCSI service is running as shown in Figure 4.

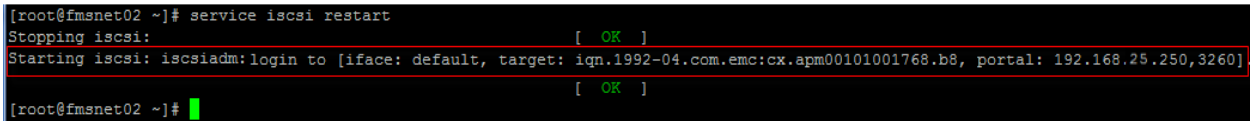

Figure 4

Next enter the command set "`iscsiadm --mode discoverydb --type sendtargets --portal 192.168.25.250 –discover`" to discover record targets on the given port 192.168.25.250 as shown in Figure 5.

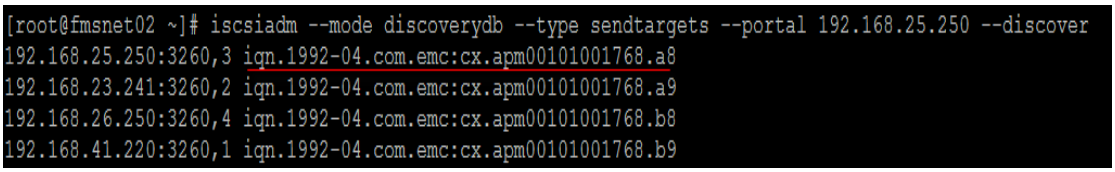

Figure 5

Use the IQN provided by the storage administrator to enter the command set "`iscsiadm --mode node --targetname iqn.1992-4.com.emc:cx.apm00101001768.a8 --portal 192.168.25.250 --login`" to login to the portal as shown in Figure 6.

Note that a login to the incorrect portal results in a failure.

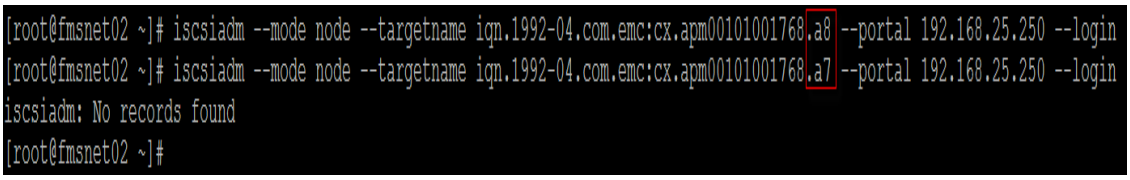

Figure 6

Verify the attached iSCSI LUNs and other related information for the iSCSI session by running the command "`iscsiadm -m session -P 3`" as shown in Figure 7. There are four session types; 0 (default), 1, 2, and 3. Session type 3 will show any attached SCSI devices plus the information from each of the other session types.

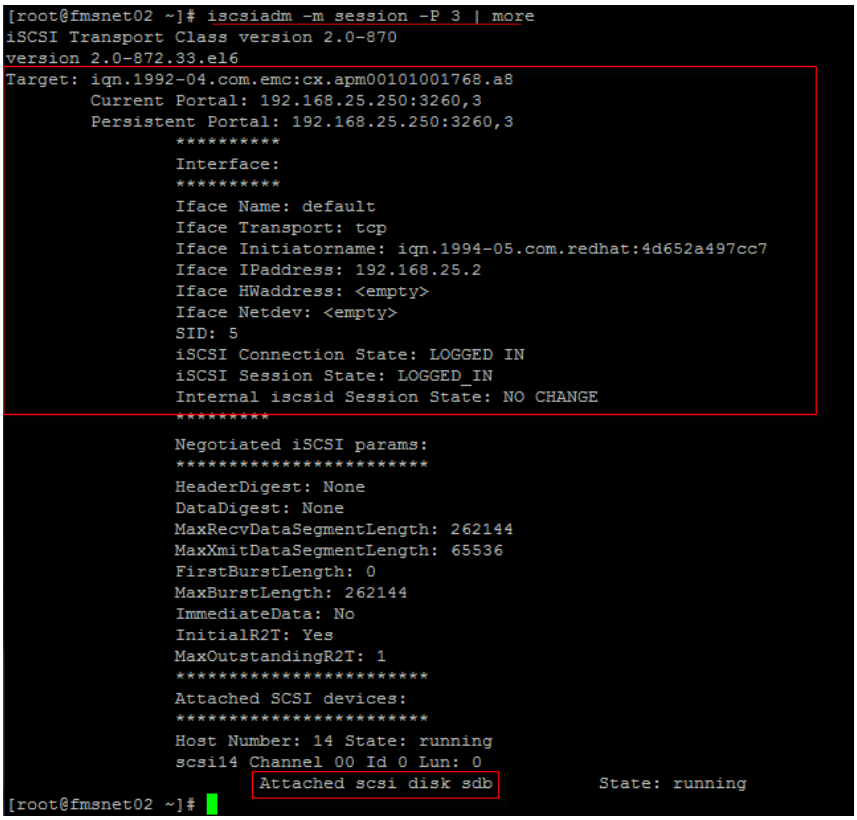

Figure 7

Use the fdisk command to create a primary partition on the attached SCSI device (sdb) found in the previous step using the command set "`fdisk /dev/sdb`" as shown below in Figure 8.

```
[root@fmsnet02 ~]# fdisk /dev/sdb

WARNING: DOS-compatible mode is deprecated. It's strongly recommended to
         switch off the mode (command 'c') and change display units to
         sectors (command 'u').

Command (m for help): x

Expert command (m for help): b
Partition number (1-4): 1
New beginning of data (1-10474379, default 63):
Using default value 63

Expert command (m for help): p

Disk /dev/sdb: 255 heads, 63 sectors, 652 cylinders

Nr AF  Hd Sec  Cyl  Hd Sec  Cyl     Start      Size ID
 1 00   1   1    0 254  63  651         63   10474317 83
 2 00   0   0    0   0   0    0          0          0 00
 3 00   0   0    0   0   0    0          0          0 00
 4 00   0   0    0   0   0    0          0          0 00

Expert command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.
Syncing disks.
[root@fmsnet02 ~]#
```

Figure 8

Make and mount the file system like any other new drive.

7 Summary

Intel's Server adapter line, in both 1 gigabit and 10 gigabit solutions, fully supports a wide range of storage capabilities. Customers appreciate the configuration ease of both Ethernet support and Windows iSCSI storage support in a single adapter.

For more command sets on Linux iSCSI go to http://www.open-iscsi.org/docs/README or see the Red Hat Enterprise Linux 6 Storage Administration Guide.

For more configuration information on Intel® Server Adapters, go to http://www.intel.com/support/network/sb/cs-009715.htm .