

## Connect a SUSE Linux host to OceanStor over an iSCSI network

On an IP SAN, the service network port on the application server functions as an initiator that sends iSCSI program requests from the application server to the storage system.

1. Launch the OceanStor ISM: <https://10.122.195.250>

Discover Device

Please enter the username and password, and then select the device type and discovery mode.

Authentication

Username: admin

Password: \*\*\*\*\* Admin@storage

Authentication Mode: Local Device

Device Type: Storage Unit

Discovery Modes

☒ Specify IP address (discover a device using its IP address)

IP Address: 10.122.195.250

☐ Specify IP Segment (discover devices using the IP segment)

From IP address:

To IP address:

☐ Local sub-network (discover devices within the subnet where the client is located)

OK Cancel Help

<input type="checkbox"/>	Device Type	Device Name	Device Status	IP Address	Location	Login User	User Level
<input type="checkbox"/>	S5500T	SN_210235G6GUZ0CB0000...	Normal	10.122.195.250	Santa Clara Yellow Zone Cage	admin	Super Administrator

2. Preparations Before Configuration

(1) HBA Identification on a host: before connecting a host to a storage system, make sure that the host HBAs are identified.

```
# lspci | grep Fibre
# cat /sys/class/scsi_host/host*/model*name
# cat /sys/class/fc_host/host*/port_name // View HBA WWN info
```

```

ptadm@fw0008859:~> /sbin/lspci | grep Fibre
02:00.2 Fibre Channel: Emulex Corporation OneConnect 10Gb FCoE Initiator (be3) (rev 03)
02:00.3 Fibre Channel: Emulex Corporation OneConnect 10Gb FCoE Initiator (be3) (rev 03)
03:00.2 Fibre Channel: Emulex Corporation OneConnect 10Gb FCoE Initiator (be3) (rev 03)
03:00.3 Fibre Channel: Emulex Corporation OneConnect 10Gb FCoE Initiator (be3) (rev 03)
ptadm@fw0008859:~> cat /sys/class/scsi_host/host*/model*name
OCe11100
OCe11100
OCe11100
OCe11100
ptadm@fw0008859:~> cat /sys/class/fc_host/host*/port_name
0x1000e0979600e194
0x1000e0979600e198
0x1000e0979600e160
0x1000e0979600e164
ptadm@fw0008859:~>

```

The output indicates that the host has identified four Fibre Channel host ports and that the HBA model is Emulex.

## (2) Check the connection

```

ptadm@fw0008859:~> ping 10.122.195.250
PING 10.122.195.250 (10.122.195.250) 56(84) bytes of data.
64 bytes from 10.122.195.250: icmp_seq=1 ttl=64 time=2.93 ms
64 bytes from 10.122.195.250: icmp_seq=2 ttl=64 time=0.525 ms
64 bytes from 10.122.195.250: icmp_seq=3 ttl=64 time=0.485 ms
64 bytes from 10.122.195.250: icmp_seq=4 ttl=64 time=0.489 ms
64 bytes from 10.122.195.250: icmp_seq=5 ttl=64 time=0.517 ms
64 bytes from 10.122.195.250: icmp_seq=6 ttl=64 time=0.555 ms
64 bytes from 10.122.195.250: icmp_seq=7 ttl=64 time=0.507 ms
64 bytes from 10.122.195.250: icmp_seq=8 ttl=64 time=0.525 ms
64 bytes from 10.122.195.250: icmp_seq=9 ttl=64 time=0.496 ms
^C
--- 10.122.195.250 ping statistics ---
9 packets transmitted, 9 received, 0% packet loss, time 7998ms
rtt min/avg/max/mdev = 0.485/0.781/2.931/0.760 ms
ptadm@fw0008859:~>

ptadm@fw0013550:~> ping 192.168.1.206
PING 192.168.1.206 (192.168.1.206) 56(84) bytes of data.
64 bytes from 192.168.1.206: icmp_seq=1 ttl=64 time=0.168 ms
64 bytes from 192.168.1.206: icmp_seq=2 ttl=64 time=0.131 ms
64 bytes from 192.168.1.206: icmp_seq=3 ttl=64 time=0.061 ms
^C
--- 192.168.1.206 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 1998ms
rtt min/avg/max/mdev = 0.061/0.120/0.168/0.044 ms
ptadm@fw0013550:~>

```

## 3. Establishing iSCSI Connections

SUSE Linux hosts and storage systems can be connected over an iSCSI switch-based network using Ethernet switches. IP addresses and iSCSI services need to be configured before you establish iSCSI connections. The procedure for establishing iSCSI connections is as follows:

- 1 •Confirm that required iSCSI software packages is installed on the host.
- 2 •Configure service IP addresses on the host and the storage system.
- 3 •Establish iSCSI connections
- 4 •Scan for LUNs on the host.

### 3.1 Check iSCSI on the Host

```
# rpm -qa |grep iscsi // check the iSCSI software installation
# chkconfig --list | grep iscsi
```

```
ptadm@fw0008859:~> rpm -qa | grep iscsi
open-iscsi-2.0.872-0.35.1
yast2-iscsi-server-2.17.10-0.7.3
yast2-iscsi-client-2.17.34-0.5.1
ptadm@fw0008859:~>
```

The output shows that iSCSI software is installed.

```
root@pterodb22883:/home/ptadm> chkconfig --list |grep iscsi
open-iscsi                0:off  1:off  2:off  3:on   4:off  5:on   6:off
root@pterodb22883:/home/ptadm>
```

If 3 and 5 are off, use `# inserv open-iscsi` command to update.

### 3.2 Configure service IP addresses for storage systems and hosts

(1) On storage systems (Already done):

The screenshot shows the OceanStor ISM web interface. On the left sidebar, the navigation tree includes 'All Devices(1)', 'Assistant', 'Settings', 'Device Info', 'Storage Unit', 'Enclosures', 'Controllers', 'Interface Mo', 'Ports', 'Disks', 'Storage Resources', and 'SAN Services'. The 'Ports' section is highlighted. The main panel displays 'iSCSI Host Ports' configuration. A dropdown menu for 'IP Address' is open, showing options: 'Modify IPv4 Address', 'Clear IPv4 Address', 'Modify IPv6 Address', 'Clear IPv6 Address', and 'iSCSI IP Information'. The table below lists the configured ports.

Items:8	Port ID	IPV4 Address/Subn...	IPV6 Address/Prefix
<input type="checkbox"/> A	P0	192.168.1.201 / 255.2...	--
<input type="checkbox"/> A	P1	192.168.1.201 / 255.2...	--
<input type="checkbox"/> A	P2	192.168.1.202 / 255.2...	--
<input checked="" type="checkbox"/> A	P3	192.168.1.203 / 255.2...	--
<input type="checkbox"/> B	P0	192.168.1.204 / 255.2...	--
<input type="checkbox"/> B	P1	192.168.1.205 / 255.2...	--
<input type="checkbox"/> B	P2	192.168.1.206 / 255.2...	--

### 3.3 Configure initiators

Initiators configured on a host are identified by the ISM

(1) On a host:

```
# sudo /etc/init.d/open-iscsi start // start the iSCSI service on a host
# sudo cat /etc/iscsi/initiatorname.iscsi // check the initiatorname on a host
```

```
fw0013550:/home/ptadm # service open-iscsi start
Loading iscsi modules:
Setting up iSCSI targets:
fw0013550:/home/ptadm # 
ptadm@fw0008859:~> sudo cat /etc/iscsi/initiatorname.iscsi
root's password:
##
## /etc/iscsi/iscsi.initiatorname
##
## Default iSCSI Initiatorname.
##
## DO NOT EDIT OR REMOVE THIS FILE!
## If you remove this file, the iSCSI daemon will not start.
## If you change the InitiatorName, existing access control lists
## may reject this initiator. The InitiatorName must be unique
## for each iSCSI initiator. Do NOT duplicate iSCSI InitiatorNames.
InitiatorName=iqn.1996-04.de.suse:01:671de66e4347
#InitiatorName=iqn.1996-04.de.suse:01:initiator118
ptadm@fw0008859:~>
```

(2) On a Storage System

The screenshot shows the OceanStor ISM web interface. On the left sidebar, the 'SAN Services' and 'Initiators' menu items are highlighted with red boxes. The main panel displays a table of iSCSI initiators. The 'Add to Host' button is also highlighted with a red box. Below the table, the 'Details' tab is selected, showing the configuration for the selected initiator.

Identifier	Alias	HBA Type	Host Name	Host Group Name	OS
abcde12345678901	FCInitiator001	FC	sle1112285a	Default Host Group	Linux
iqn.1994-05.com.redhat2933bca2...	ISCSIInitiator002	iSCSI	pt22883	Default Host Group	Linux
iqn.2014-04.mppdb.01:1a133c3e1...	ISCSIInitiator001	iSCSI	10.122.195.163	GROUP1	Linux
iqn.2015-02.com.example.01:828b...	ISCSIInitiator003	iSCSI	10.122.195.162	GROUP1	Linux
iqn.1994-05.com.redhatab36d9ce...	ISCSIInitiator004	iSCSI	sle1112285a	Default Host Group	Linux
iqn.2006-08.com.huawei.oceanstor...	ISCSIInitiator005	iSCSI	sle1112285a	Default Host Group	Linux
iqn.1994-05.com.redhat87a2c317...	ISCSIInitiator006	iSCSI	sle1112285a	Default Host Group	Linux

  

Details		CHAPs	
Identifier:	iqn.1994-05.com.redhat87a2c3178144	OS:	Linux
Alias:	ISCSIInitiator006	Status:	Link Down
HBA Type:	iSCSI	CHAPs:	0
Host Name:	sle1112285a	CHAP Status:	Disabled
Host Group Name:	Default Host Group	Enable ALUA:	No

### 3.4 Query the IP address of the target (iSCSI host port) and log in to the target

```
# iscsiadm -m discovery -t st -p 192.168.1.206 // Query the IP address of the target
```

```
# sudo cat /etc/iscsi/initiatorname.iscsi // Log in to the target
```

```
root@pterodb22883:/home/ptadm> iscsiadm -m discovery -t st -p 192.168.1.206
192.168.1.206:3260,13 iqn.2006-08.com.huawei:oceastor:21000022a10e349b::1020002:192.168.1.206
root@pterodb22883:/home/ptadm>
root@pterodb22883:/home/ptadm> iscsiadm -m node -p 192.168.1.206:3260 -l
Logging in to [iface: default, target: iqn.2006-08.com.huawei:oceastor:21000022a10e349b::1020002:192.168.1.206, portal: 192.168.1.206,3260]
```

### 3.5 Check for LUNs

#### (1) Scan for the LUNS on the host

```
# sudo rescan-scsi-bus.sh
```

```
fw0013550:/home/ptadm # rescan-scsi-bus.sh
Scanning SCSI subsystem for new devices
Scanning host 0 for SCSI target IDs 0 1 2 3 4 5 6 7, all LUNs
sg0 changed: device 0 0 0 0 ...
from:Enclosure : 00
to: Enclosure 2G SAS Model: Expander Rev: RevB
Type: Enclosure ANSI SCSI revision: 06

sg1 changed: device 0 2 0 0 ...
from:Direct-Access : 00
to: Direct-Access Model: LSI Rev: 4.27
Type: Direct-Access ANSI SCSI revision: 05

sg2 changed: device 0 2 1 0 ...
from:Direct-Access : 00
to: Direct-Access Model: LSI Rev: 4.27
Type: Direct-Access ANSI SCSI revision: 05

sg3 changed: device 0 2 2 0 ...
from:Direct-Access : 00
to: Direct-Access Model: LSI Rev: 4.27
Type: Direct-Access ANSI SCSI revision: 05

sg4 changed: device 0 2 3 0 ...
from:Direct-Access : 00
to: Direct-Access Model: LSI Rev: 4.27
Type: Direct-Access ANSI SCSI revision: 05

Scanning host 1 for SCSI target IDs 0 1 2 3 4 5 6 7, all LUNs
Scanning host 2 for SCSI target IDs 0 1 2 3 4 5 6 7, all LUNs
Scanning host 3 for SCSI target IDs 0 1 2 3 4 5 6 7, all LUNs
Scanning host 4 for SCSI target IDs 0 1 2 3 4 5 6 7, all LUNs
Scanning host 5 for SCSI target IDs 0 1 2 3 4 5 6 7, all LUNs
Scanning host 6 for SCSI target IDs 0 1 2 3 4 5 6 7, all LUNs
Scanning host 7 for SCSI target IDs 0 1 2 3 4 5 6 7, all LUNs
Scanning host 8 for SCSI target IDs 0 1 2 3 4 5 6 7, all LUNs
Scanning host 9 for SCSI target IDs 0 1 2 3 4 5 6 7, all LUNs
Scanning host 10 for SCSI target IDs 0 1 2 3 4 5 6 7, all LUNs
Scanning host 14 for SCSI target IDs 0 1 2 3 4 5 6 7, all LUNs
sg5 changed: device 14 0 0 0 ...
from:Direct-Access n: 00
to: Direct-Access I Model: S5500T Rev: 2105
Type: Direct-Access ANSI SCSI revision: 04

sg6 changed: device 14 0 0 1 ...
```

(2) Query LUN information on the host

```
# lsscsi
# fdisk -l
```

```
fw0013550:/home/ptadm # lsscsi
[0:0:0:0]    enclosu 12G SAS Expander      RevB  -
[0:2:0:0]    disk    LSI      LSI      4.27  /dev/sda
[0:2:1:0]    disk    LSI      LSI      4.27  /dev/sdb
[0:2:2:0]    disk    LSI      LSI      4.27  /dev/sdc
[0:2:3:0]    disk    LSI      LSI      4.27  /dev/sdd
[14:0:0:0]   disk    HUAWEI   S5500T   2105  /dev/sde
[14:0:0:1]   disk    HUAWEI   S5500T   2105  /dev/sdf
[14:0:0:2]   disk    HUAWEI   S5500T   2105  /dev/sdg
[14:0:0:3]   disk    HUAWEI   S5500T   2105  /dev/sdh
[14:0:0:4]   disk    HUAWEI   S5500T   2105  /dev/sdi
fw0013550:/home/ptadm #
```

```
fw0013550:/home/ptadm # fdisk -l
```

```
WARNING: GPT (GUID Partition Table) detected on '/dev/sdc'! The util fdisk doesn't
Parted.
```

```
Disk /dev/sdc: 4193.0 GB, 4192993280000 bytes
255 heads, 63 sectors/track, 509769 cylinders, total 8189440000 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00000000
```

Device	Boot	Start	End	Blocks	Id	System
/dev/sdc4		1	1		0+	ee GPT

```
Disk /dev/sda: 479.0 GB, 478998953984 bytes
255 heads, 63 sectors/track, 58234 cylinders, total 935544832 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x0009f54c
```

Device	Boot	Start	End	Blocks	Id	System
/dev/sda1		2048	10489855	5243904	82	Linux swap / Solaris
/dev/sda2	*	10489856	935544831	462527488	83	Linux

```
WARNING: GPT (GUID Partition Table) detected on '/dev/sdd'! The util fdisk doesn't
Parted.
```

```
Disk /dev/sdd: 4193.0 GB, 4192993280000 bytes
255 heads, 63 sectors/track, 509769 cylinders, total 8189440000 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00000000
```

Device	Boot	Start	End	Blocks	Id	System
/dev/sdd4		1	1		0+	ee GPT

```
WARNING: GPT (GUID Partition Table) detected on '/dev/sdb'! The util fdisk doesn't
Parted.
```

```
Disk /dev/sdb: 4193.0 GB, 4192993280000 bytes
255 heads, 63 sectors/track, 509769 cylinders, total 8189440000 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00000000
```

Device	Boot	Start	End	Blocks	Id	System
/dev/sdb4		1	1		0+	ee GPT

Disk /dev/sdb: 4193.0 GB, 4192993280000 bytes  
255 heads, 63 sectors/track, 509769 cylinders, total 8189440000 sectors  
Units = sectors of 1 \* 512 = 512 bytes  
Sector size (logical/physical): 512 bytes / 512 bytes  
I/O size (minimum/optimal): 512 bytes / 512 bytes  
Disk identifier: 0x00000000

Device	Boot	Start	End	Blocks	Id	System
/dev/sdb4		1	1	0+	ee	GPT

Disk /dev/sde: 5494.3 GB, 5494336913408 bytes  
255 heads, 63 sectors/track, 667981 cylinders, total 10731126784 sectors  
Units = sectors of 1 \* 512 = 512 bytes  
Sector size (logical/physical): 512 bytes / 512 bytes  
I/O size (minimum/optimal): 512 bytes / 512 bytes  
Disk identifier: 0x00000000

Disk /dev/sde doesn't contain a valid partition table

Disk /dev/sdf: 17998.1 GB, 17998060453888 bytes  
255 heads, 63 sectors/track, 2188139 cylinders, total 35152461824 sectors  
Units = sectors of 1 \* 512 = 512 bytes  
Sector size (logical/physical): 512 bytes / 512 bytes  
I/O size (minimum/optimal): 512 bytes / 512 bytes  
Disk identifier: 0x00000000

Disk /dev/sdf doesn't contain a valid partition table

Disk /dev/sdg: 3293.2 GB, 3293166174208 bytes  
255 heads, 63 sectors/track, 400371 cylinders, total 6431965184 sectors  
Units = sectors of 1 \* 512 = 512 bytes  
Sector size (logical/physical): 512 bytes / 512 bytes  
I/O size (minimum/optimal): 512 bytes / 512 bytes  
Disk identifier: 0x00000000

Disk /dev/sdg doesn't contain a valid partition table

Disk /dev/sdh: 19998.4 GB, 19998441472000 bytes  
255 heads, 63 sectors/track, 2431338 cylinders, total 39059456000 sectors  
Units = sectors of 1 \* 512 = 512 bytes  
Sector size (logical/physical): 512 bytes / 512 bytes  
I/O size (minimum/optimal): 512 bytes / 512 bytes  
Disk identifier: 0x00000000

Disk /dev/sdh doesn't contain a valid partition table

Disk /dev/sdi: 19998.4 GB, 19998441472000 bytes  
255 heads, 63 sectors/track, 2431338 cylinders, total 39059456000 sectors  
Units = sectors of 1 \* 512 = 512 bytes  
Sector size (logical/physical): 512 bytes / 512 bytes  
I/O size (minimum/optimal): 512 bytes / 512 bytes  
Disk identifier: 0x00000000



#### 4. Troubleshooting:

##### 4.1 The newly added LUNs cannot be identified on the host

- (1) Restart the open-iscsi service:

```
# /etc/init.d/open-iscsi restart
```

- (2) Re-log in to the iSCSI initiator:

```
# iscsiadm -m node -u
```

```
# iscsiadm -m node -l
```

#### 5. Acronyms and Abbreviations:

ISM	Integrated Storage Manager
SAN	Storage area network is a network which provides access to block level data storage
HBA	Host Bus Adaptor
LUN	Logical Unit Number
LV	Logical Volume
LVM	Logical Volume Manager
VG	Volume Group
iSCSI	Internet Small Computer Systems Interface
VLAN	hosts on an Ethernet network are divided into multiple logical groups. Each logical group is a VLAN