



CHAPTER 49

Configuring SANTap

The Storage Services Module (SSM) supports SANTap in Cisco MDS SAN-OS Release 2.0(2b) and later.

This chapter includes the following sections:

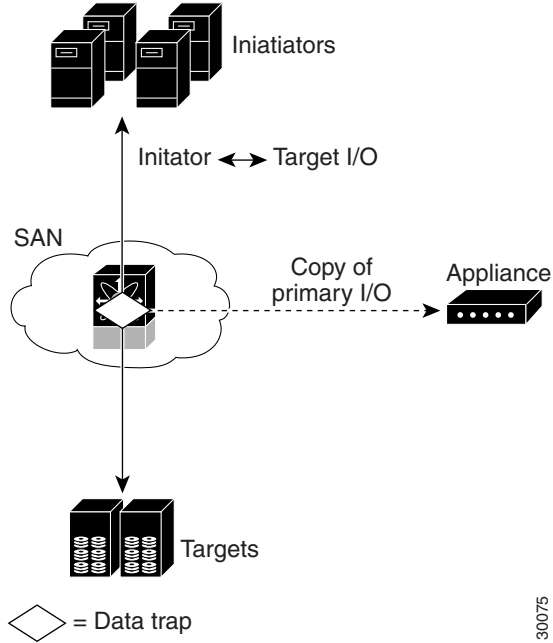
- [About SANTap, page 49-1](#)
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- [Displaying SANTap Information, page 49-5](#)
- [Removing Appliance-Generated Entities, page 49-8](#)
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About SANTap

The SANTap feature allows third-party data storage applications, such as long distance replication and continuous backup, to be integrated into the SAN. The protocol-based interface that is offered by SANTap allows easy and rapid integration of the data storage service application because it delivers a loose connection between the application and an SSM, which reduces the effort needed to integrate applications with the core services being offered by the SSM. See [Figure 49-1](#).

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Figure 49-1 Integrating Third-Party Storage Applications in a SAN



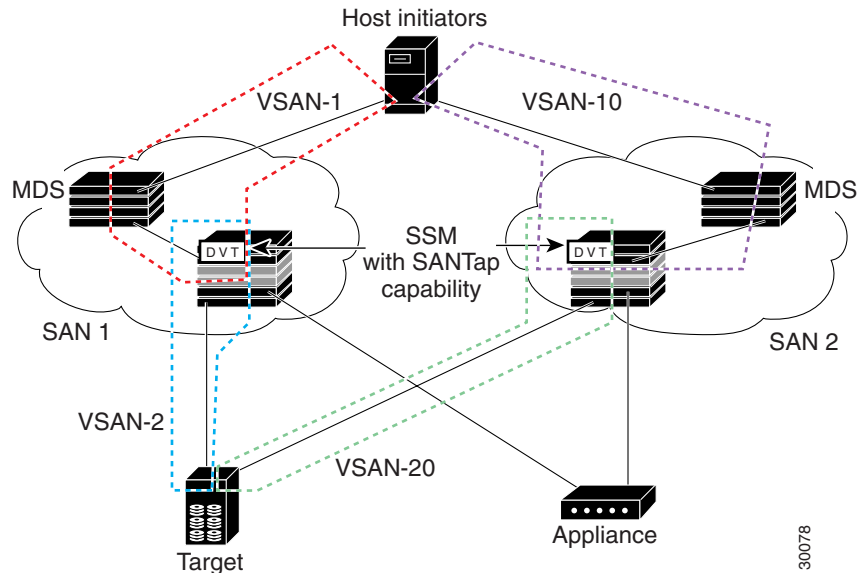
SANTap has a control path and a data path. The control path handles requests that create and manipulate replication sessions sent by an appliance. The control path is implemented using a SCSI-based protocol. An appliance sends requests to a Control Virtual Target (CVT), which the SANTap process creates and monitors. Responses are sent to the control LUN on the appliance. SANTap also allows LUN mapping to appliance virtual targets (AVTs). You can have a maximum of 512 target LUNs.

SANTap does not require reconfiguration of either the host or target when introducing SANTap-based applications. Also, neither the host initiator nor the target is required to be directly connected to an SSM. This is accomplished by assigning Cisco-specific WWNs to the virtual initiators (VIs) and Data Virtual Targets (DVTs). A host initiator or a target can be connected directly to an SSM. However, you must partition the SAN using VSANs.

You must configure the host initiator and the DVT in one VSAN and configure the VI and the target in another VSAN. See [Figure 49-2](#).

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Figure 49-2 SANTap Proxy Mode-2 Example



You can use SANTap to remove your appliance-based storage applications from the primary data path in your SAN. Removing these applications from the primary data path prevents them from compromising the security, availability, and performance of your SAN. SANTap copies the data at line speed and makes it available to other storage applications; these storage applications are prevented from affecting your SAN while maintaining the integrity of the data the storage applications need.

Dynamic LUN is a feature introduced in the Cisco SAN OS release 3.2(1). When one or more LUNs are removed or added on the backend target during the periodic scan, SANTap automatically uninstalls the deleted DVT LUNs and installs any additional LUNs. Uninstallation of the deleted DVT LUNs is done even if the total number of LUNs remains the same.

In previous releases, when the set of LUNs changed on the target, the original LUN list was displayed on the DVT. The new and changed LUNs were not reflected on the DVT. However, if the total number of LUNs increased, then the additional LUNs were installed and displayed on the host.

Prior to Cisco SAN OS release 3.2(1), a user had the following options for displaying the LUN list on DVT:

- Shut the host interface- Purge the DVT LUNs for the IT pair using CLI. All the LUNs for the existing IT pair were removed, and the correct set of LUNs was recreated when the host logs in.
- Reload the SSM- Works only if there are no sessions and AVT LUNs present.

64-Bit LUN Support- In Cisco SAN OS release 3.2(1) or later releases, SANTap supports 64-bit LUNs on the target.

The following CLI commands are used to obtain the mapping between the host-side LUN and the target-side LUN:

```
Switch# show santap module <num> dvtlun
Switch# show santap module <num> dvtlun brief
Module# show santap vttbl dvt <dvt_wwn> host <host_wwn>
```

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Configuring SANTap

This section includes the following topics:

- [Enabling SANTap, page 49-4](#)
- [Configuring DVTs, page 49-5](#)

Enabling SANTap

SANTap can be enabled on an entire SSM or it can be enabled on a group of four ports on an SSM.

Enabling SANTap on interfaces has the following restrictions:

- The fewest number of interfaces that you can enable is four. You can specify fc1 through fc4 but not fc1 through fc2.
- The first interface in the group must be 1, 5, 9, 13, 17, 21, 25, or 29. You can specify fc5 through fc8 but not fc7 through fc10.
- The groups of four interfaces do not need to be consecutive. You can specify fc1 through fc8 and fc17 through fc20.

To enable the SANTap feature, follow these steps:

	Command	Purpose
Step 1	switch# config t switch(config)#	Enters configuration mode.
Step 2	switch(config)# ssm enable feature santap module 4	Enables the SANTap application on the entire SSM.
	switch(config)# no ssm enable feature santap module 4	Disables the SANTap application on the entire SSM in slot 4.
	switch(config)# no ssm enable feature santap force module 4	Forces the switch to disable the SANTap application on the entire SSM in slot 4.
Step 3	switch(config)# ssm enable feature santap interface fc 4/1 - 4	Enables the SANTap application on ports 1 through 4 on the SSM. Note Interfaces must be specified in multiples of four beginning at ports 1, 5, 9, 13, 17, 21, 25, and 29.
	switch(config)# no ssm enable feature santap interface fc 4/1 - 4	Disables the SANTap application on ports 1 through 4 on the SSM in slot 4.
	switch(config)# no ssm enable feature santap force interface fc 4/1 - 4	Forces the switch to disable the SANTap application on ports 1 through 4 on the SSM in slot 4.
Step 4	switch(config)# santap module 4 appl-vsan 10	Enables SANTap on the SSM in slot 4 and on VSAN 10.
	switch(config)# no santap module 4 appl-vsan 10	Disables SANTap.



Note

You cannot simultaneously configure the intelligent services SANTap and NASB on a single SSM.

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Configuring DVTs

To configure a DVT, follow these steps:

	Command	Purpose
Step 1	switch# config t switch(config)#	Enters configuration mode.
Step 2	switch(config)# santap module 2 dvt target-pwwn 50:06:0e:80:03:81:32:36 target-vsan 9 dvt-name MYDVT dvt-vsan 12	Configures the pWWN, target VSAN (which contains the target and VI), DVT name, and DVT VSAN (which contains the host and the CVT).
	switch(config)# santap module 2 dvt target-pwwn 50:06:0e:80:03:81:32:36 target-vsan 9 dvt-name MYDVT dvt-vsan 12 dvt-port 1	Configures the pWWN, target VSAN, DVT name, DVT VSAN, and DVT port. The DVT port maps to one of the ports on the SSM. You can assign a port for explicit load balancing or not assign a port, which allows the SSM select the port and handle the load balancing (default).
	switch(config)# santap module 2 dvt target-pwwn 50:06:0e:80:03:81:32:36 target-vsan 9 dvt-name MYDVT dvt-vsan 12 lun-size-handling 1	Configures the pWWN, target VSAN, DVT name, DVT VSAN, and LUN size handling flag (enabled). Enabling the LUN size handling flag allows special LUN resize handling by the vendor. The default LUN size handling flag value is 0 (disabled).
	switch(config)# santap module 2 dvt target-pwwn 50:06:0e:80:03:81:32:36 target-vsan 9 dvt-name MYDVT dvt-vsan 12 io-timeout 20	Configures the pWWN, target VSAN, DVT name, DVT VSAN, and IO timeout value in seconds. The IO timeout determines the interval after which to time out I/Os on the target side. The range is 10 to 200 seconds and the default value is 10 seconds.
	switch(config)# no santap module 2 dvt target-pwwn 50:06:0e:80:03:81:32:36	Removes the DVT configuration.

In Cisco SAN OS release 3.2(1) or later releases, SANTap supports 32 host initiators per DVT.

Displaying SANTap Information

Use the **show santap module** command to display information about SANTap (see [Example 49-1](#) to [Example 49-8](#)).

Example 49-1 Displays SANTap CVT Information

```
switch# show santap module 2 cvt
```

```
CVT Information :
  cvt pwwn      = 23:4f:00:0d:ec:09:3c:02
  cvt nwwn      = 23:9d:00:0d:ec:09:3c:02
  cvt id        = 135895180
  cvt xmap_id   = 135895212
  cvt vsan      = 8
```

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```
cvtname =
```

Example 49-2 *Displays SANTap DVT Information*

```
switch# show santap module 2 dvt
```

```
DVT Information :
  dvt pwwn      = 50:06:0e:80:03:81:32:36
  dvt nwwn      = 50:06:0e:80:03:81:32:36
  dvt id        = 136773180
  dvt mode      = 3
  dvt vsan      = 12
  dvt if_index  = 0x1080000
  dvt fp_port   = 1
  dvt name      = MYDVT
  dvt tgt-vsan  = 9
  dvt io timeout      = 10 secs
  dvt lun size handling = 0
  dvt app iofail behaviour = 1
  dvt quiesce behavior = 1
  dvt tgt iofail behavior = 0
  dvt appio failover time = 50 secs
  dvt inq data behavior = 0
```

Example 49-3 *Displays SANTap DVT LUN Information*

```
switch# show santap module 2 dvtlun
```

```
DVT LUN Information :
  dvt pwwn      = 22:00:00:20:37:88:20:ef
  dvt lun       = 0x0
  xmap id       = 8
  dvt id        = 3
  dvt mode      = 0
  dvt vsan      = 3
  tgt pwwn      = 22:00:00:20:37:88:20:ef
  tgt lun       = 0x0
  tgt vsan      = 1
```

Example 49-4 *Displays SANTap Session Information*

```
switch# show santap module 2 session
```

```
Session Information :
  session id    = 1
  host pwwn     = 21:00:00:e0:8b:12:8b:7a
  dvt pwwn      = 50:06:0e:80:03:81:32:36
  dvt lun       = 0x0
  tgt pwwn      = 50:06:0e:80:03:81:32:36
  tgt lun       = 0x0
  adt pwwn      = 33:33:33:33:33:33:33:00
  adt lun       = 0x0
  aci pwwn      = 22:22:22:22:22:22:22:22
  cvt pwwn      = 23:4f:00:0d:ec:09:3c:02
  num ranges    = 0
  session state = 5
  redirect mode = 0
  mrl requested 1
  MRL : vsan 8 RegionSize 4806720, DiskPWWN 0x234f000dec093c02, DiskLun 0x 1,
  startLBA 1
```

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```
pwl requested 1
PWL : type 2, UpdatePol 2, RetirePolicy 4, pwl_start 1

iol requested 0
```

Example 49-5 Displays SANTap AVT Information

```
switch# show santap module 2 avt

AVT Information :
  avt pwwn      = 2a:4b:00:05:30:00:22:25
  avt nwwn      = 2a:60:00:05:30:00:22:25
  avt id        = 12
  avt vsan      = 4
  avt if_index  = 0x1080000
  hi pwwn      = 21:00:00:e0:8b:07:61:aa
  tgt pwwn      = 22:00:00:20:37:88:20:ef
  tgt vsan      = 1
```

Example 49-6 Displays SANTap AVT LUN Information

```
switch# show santap module 2 avtlun

AVT LUN Information :
  avt pwwn      = 2a:4b:00:05:30:00:22:25
  avt lun        = 0x0
  xmap id       = 16
  avt id        = 12
  tgt lun       = 0x0
```

Example 49-7 Displays SANTap Remote Virtual Terminal Information

```
switch# show santap module 2 rvt

RVT Information :
  rvt pwwn      = 2a:61:00:05:30:00:22:25
  rvt nwwn      = 2a:62:00:05:30:00:22:25
  rvt id        = 17
  rvt vsan      = 4
  rvt if_index  = 0x1080000
```

Example 49-8 Displays SANTap Remote Virtual Terminal LUN Information

```
switch# show santap module 2 rvtlun

RVT LUN Information :
  rvt pwwn      = 2a:61:00:05:30:00:22:25
  rvt lun        = 0x0
  xmap id       = 22
  rvt id        = 17
  app pwwn      = 22:00:00:20:37:39:b1:00
  app lun       = 0x0
  app vsan      = 1
```

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Removing Appliance-Generated Entities

An appliance might terminate its SANTap application without removing generated entities on the MDS switch. This section describes how to remove these entities using the CLI on the MDS switch.

This section includes the following topics:

- [Removing AVTs and AVT LUNs, page 49-8](#)
- [Removing SANTap Sessions, page 49-8](#)
- [Removing Initiator-Target-LUNs, page 49-8](#)

Removing AVTs and AVT LUNs

Occasionally the AVT and AVT LUN configuration remains after a SANTap application terminates. To remove AVTs and AVT LUNs, follow these steps:

	Command	Purpose
Step 1	switch# <code>show santap module 2 avt</code>	Displays the AVT pWWNs.
	switch# <code>show santap module 2 avtlun</code>	Displays the AVT pWWNs and LUNs
Step 2	switch# <code>clear santap module 2 avt 2a:4b:00:05:30:00:22:25 lun 0x0</code>	Removes a LUN from the AVT.
	switch# <code>clear santap module 2 avt 2a:4b:00:05:30:00:22:25</code>	Removes the AVT. Note You can remove the AVT only after all the LUNs are removed.

Removing SANTap Sessions

Occasionally a SANTap session continues after a SANTap application terminates. To remove a SANTap session, follow these steps:

	Command	Purpose
Step 1	switch# <code>show santap module 2 session</code>	Displays SANTap session information on the SSM in slot 2.
Step 2	switch# <code>clear santap module 2 session 1</code>	Removes SANTap session 1 on the SSM in slot 2.

Removing Initiator-Target-LUNs

The initiator-target-LUN (ITL) triplet identifies a LUN loaded on a DVT. Occasionally the ITL configuration remains after a SANTap application terminates. To remove all LUNs for an ITL triplet, follow these steps:

	Command	Purpose
Step 1	switch# <code>show santap module 2 dvtlun</code>	Displays the target and host pWWNs for the ITLs on the SSM in slot 2.
Step 2	switch# <code>clear santap module 2 itl target-pwwn 22:00:00:20:37:88:20:ef host-pwwn 22:00:00:20:37:88:20:ef</code>	Removes an IT L on the SSM in slot 2.

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Default Settings

Table 49-1 lists the default settings for SANTap parameters.

Table 49-1 Default SANTap Parameters

Parameters	Default
SANTap feature	Disabled.
DVT IO timeout	10 seconds.
DVT LUN size handling flag	0 (disabled).

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