Understand ISE SXP Update Logs along with Catalyst Debug Logs

Contents

Introduction

This document describes how to configure and understand the Security Group Exchange Protocol (SXP) connection between ISE and Catalyst 9300 Switch.

Background Information

SXP is the SGT (Security Group Tag) Exchange Protocol used by TrustSec to propagate IP to SGT mappings to TrustSec Devices.

SXP was developed to allow networks including third-party devices or legacy Cisco devices that do not support SGT inline tagging to have TrustSec capabilities.

SXP is a peering protocol; one device can act as a Speaker and the other as a Listener.

The SXP speaker is responsible for sending the IP-SGT bindings and the listener is responsible for collecting these bindings.

The SXP connection uses TCP port 64999 as the underlying transport protocol and MD5 for message integrity/authenticity.

Prerequisites

Requirements

Cisco recommends that you have knowledge of the SXP Protocol and Identity Services Engine (ISE) configuration.

Components Used

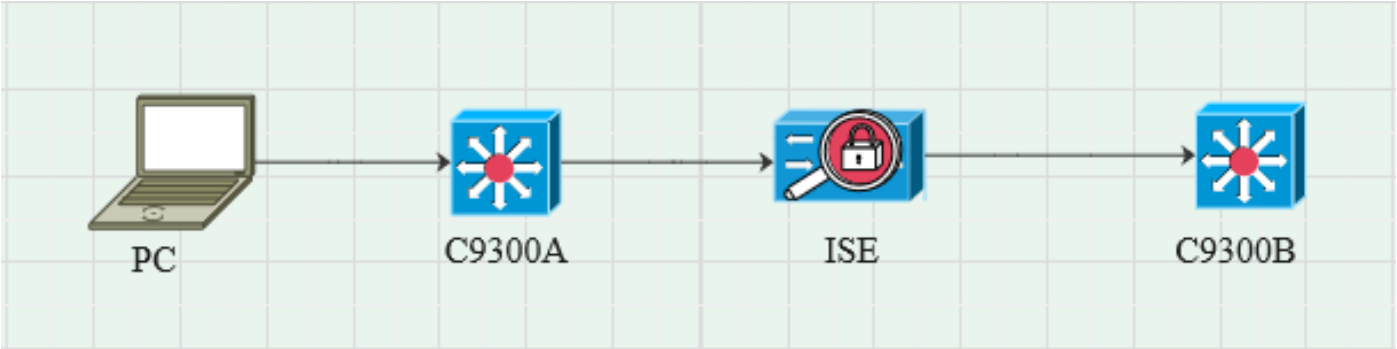
The information in this document is based on these software and hardware versions:

- Cisco Catalyst 9300 switch with software Cisco IOS® XE 17.6.5 and later
  Cisco ISE, Release 3.1 and later

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

Configuration

Network Diagram



Traffic Flow

PC authenticates with C9300A and ISE dynamically assigns SGT through Policy sets.
When the authentication has passed, bindings are created with an IP equal to the Framed-IP address RADIUS attribute and SGT as configured in the policy.
The bindings propogate in "All SXP bindings" under the default domain.
C9300B receives the SXP mapping information from ISE through SXP protocol.

Configure Switch

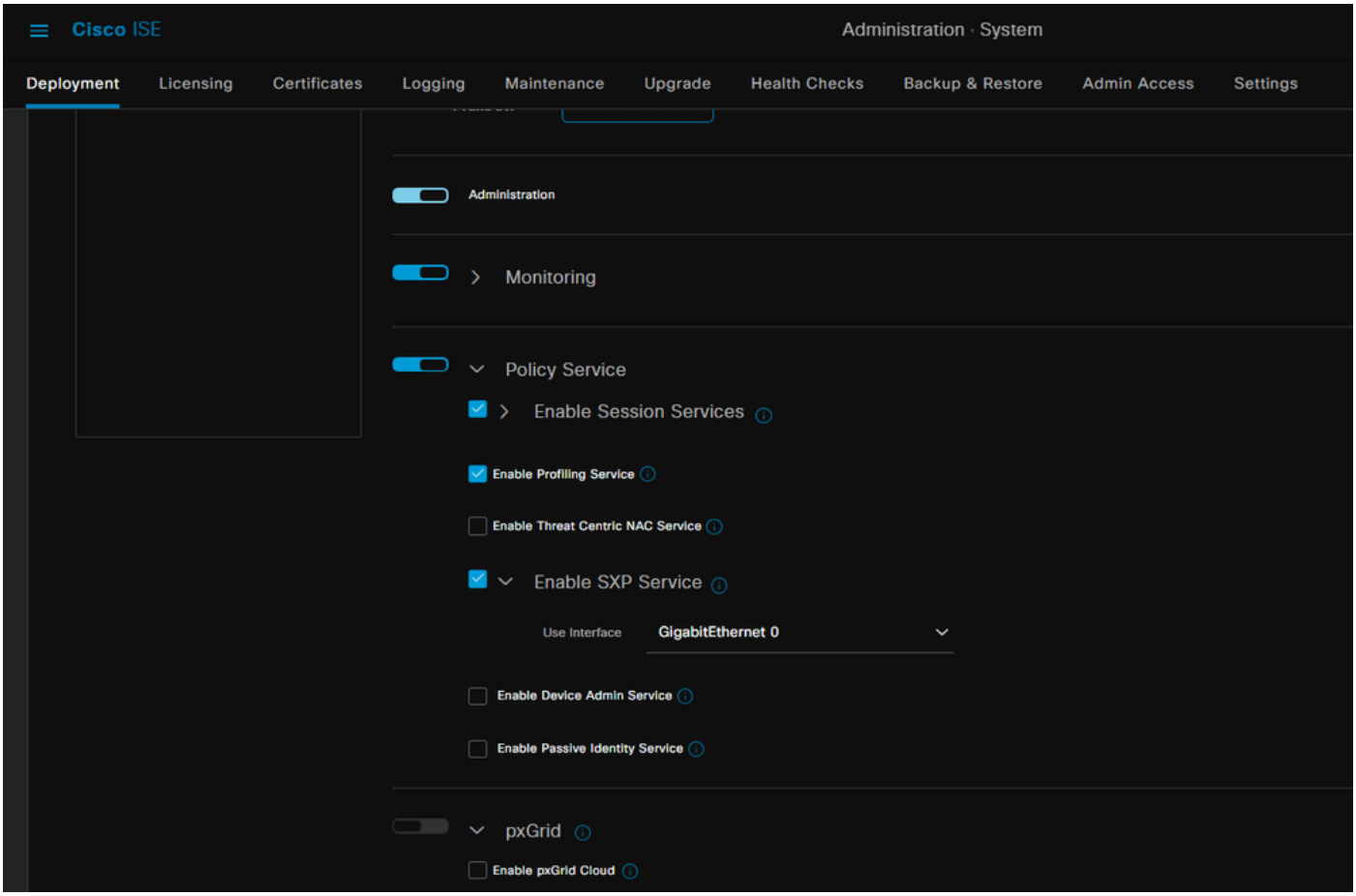
Configure the switch as an SXP listener to get the IP-SGT mappings from ISE.

```
cts sxp enable
cts sxp default password cisco
cts sxp default source-ip 10.127.213.27
cts sxp connection peer 10.127.197.53 password default mode peer speaker hold-time 0 0 vrf Mgmt-vrf
```

Configure ISE

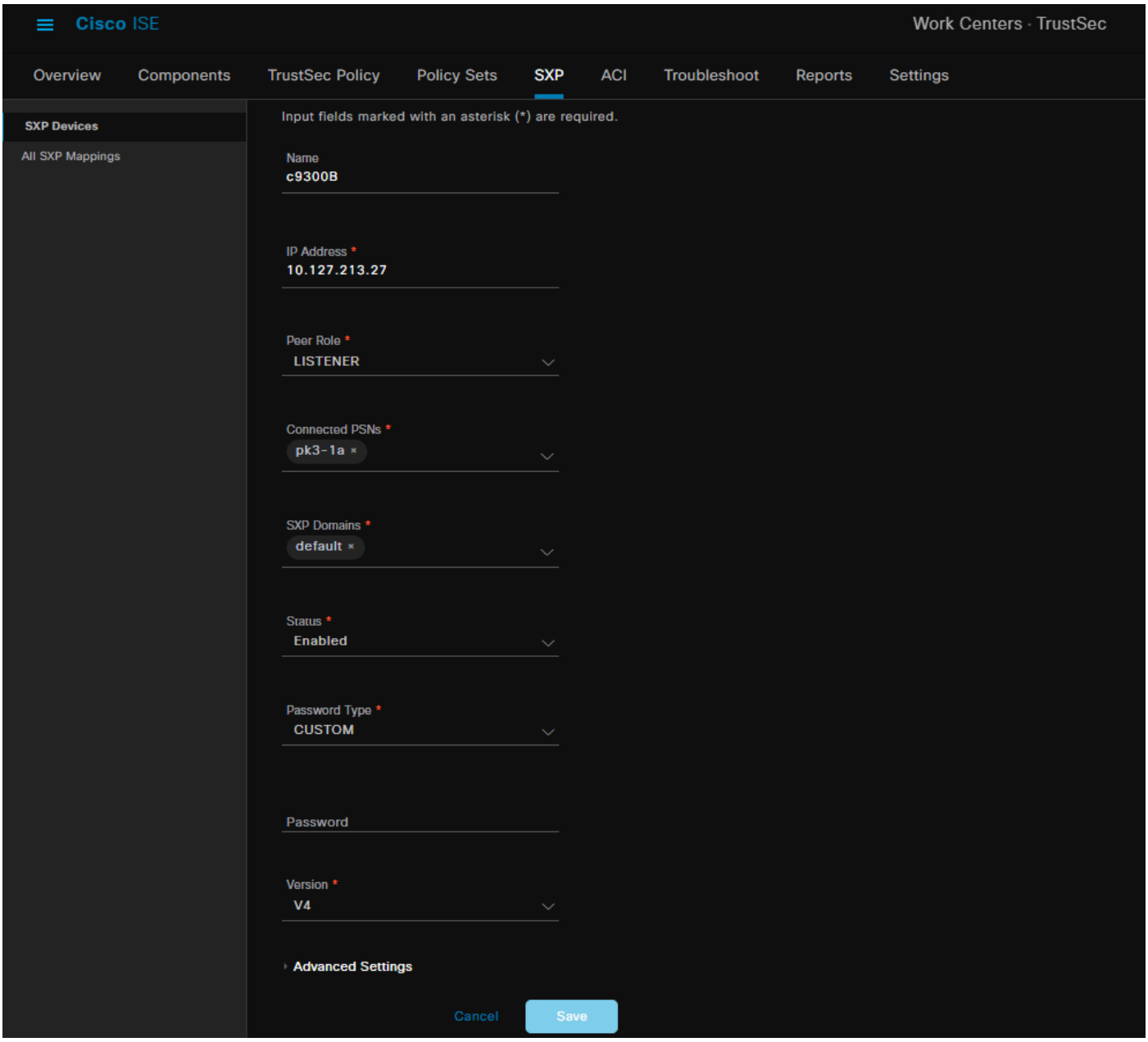
Step 1. Enable SXP service on ISE

Navigate to **Administration** > **System** > **Deployment** > **Edit** the node and under **Policy Service** select **Enable SXP Service.**



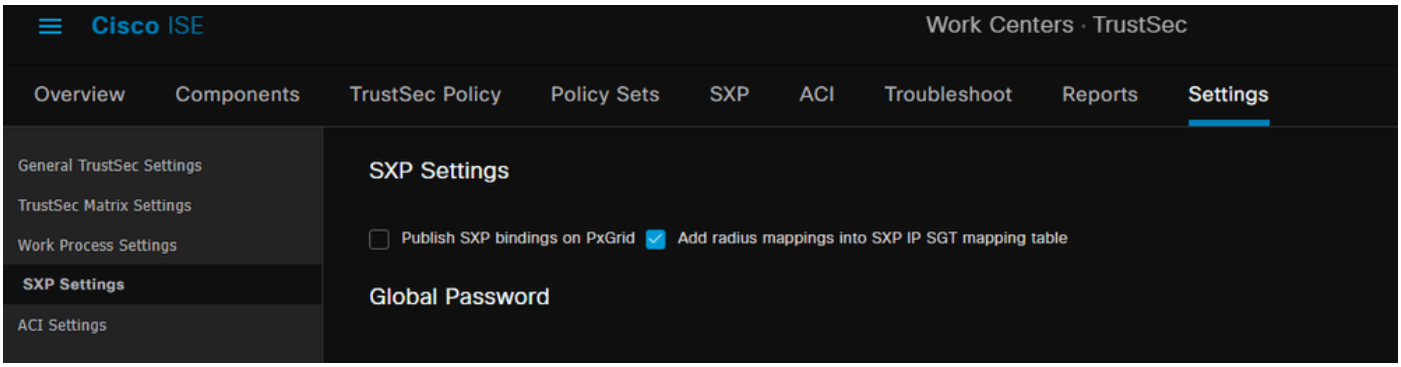
Step 2. Add SXP devices

In order to configure SXP listener and speaker for the corresponding switches, navigate to **Workcenters** > **Trustsec** > **SXP** > **SXP Devices**.
Add the switch with peer role as **Listener** and assign to default domain.



Step 3. SXP Settings

Ensure **Add radius mappings into SXP IP SGT mapping table** is checked, so that ISE learns dynamic IP-SGT mappings through Radius Authentications.



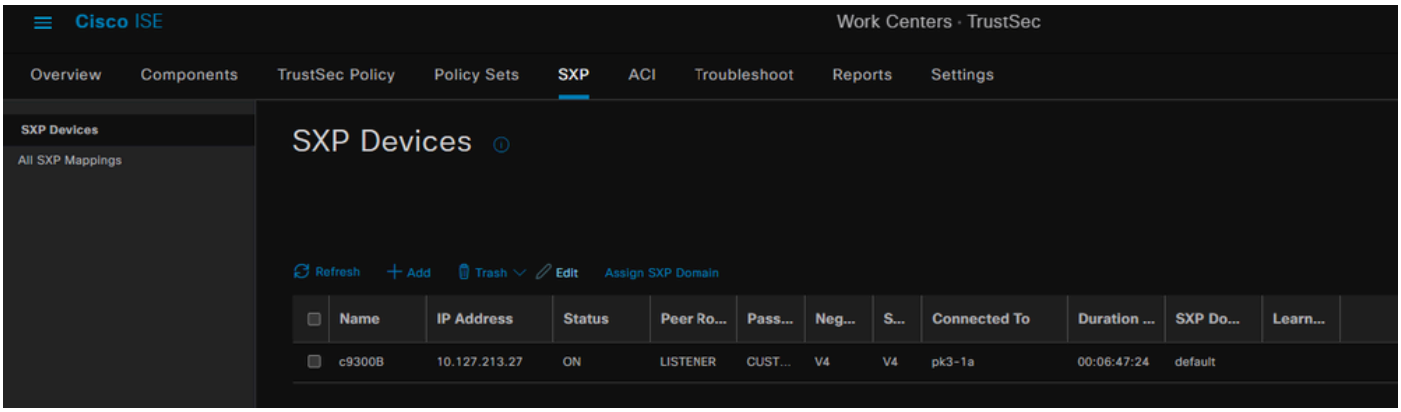
Verify

Step 1. SXP connection on Switch

```
C9300B#show cts sxp connections vrf Mgmt-vrf
SXP : Enabled
Highest Version Supported: 4
Default Password : Set
Default Key-Chain: Not Set
Default Key-Chain Name: Not Applicable
Default Source IP: 10.127.213.27
Connection retry open period: 120 secs
Reconcile period: 120 secs
Retry open timer is not running
Peer-Sequence traverse limit for export: Not Set
Peer-Sequence traverse limit for import: Not Set
----------------------------------------------
Peer IP : 10.127.197.53
Source IP : 10.127.213.27
Conn status : On
Conn version : 4
Conn capability : IPv4-IPv6-Subnet
Conn hold time : 120 seconds
Local mode : SXP Listener
Connection inst# : 1
TCP conn fd : 1
TCP conn password: default SXP password
Hold timer is running
Duration since last state change: 0:00:23:36 (dd:hr:mm:sec)


Total num of SXP Connections = 1

0x7F128DF555E0 VRF:Mgmt-vrf, fd: 1, peer ip: 10.127.197.53
cdbp:0x7F128DF555E0 Mgmt-vrf <10.127.197.53, 10.127.213.27> tableid:0x1
```

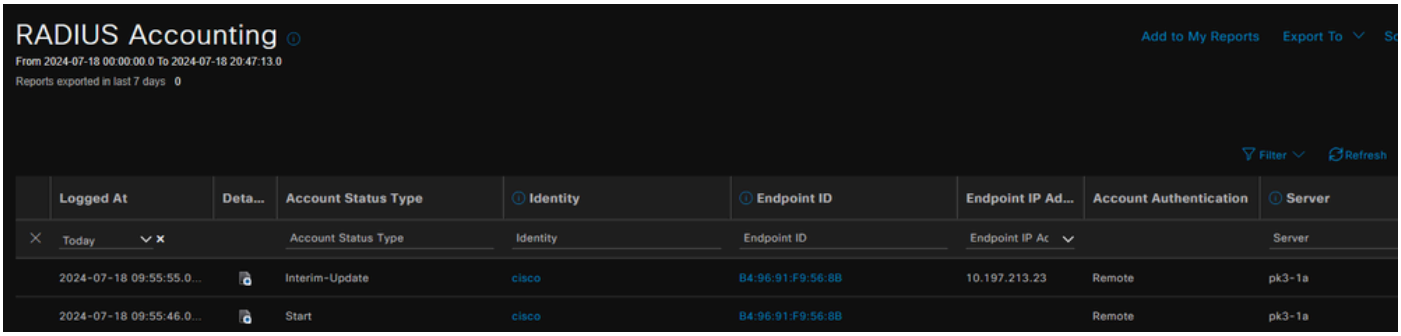
Step 2. ISE SXP verification

Verfiy the SXP status is **ON** for the Switch under **Workcenters** > **Trustsec** > **SXP** > **SXP Devices**.



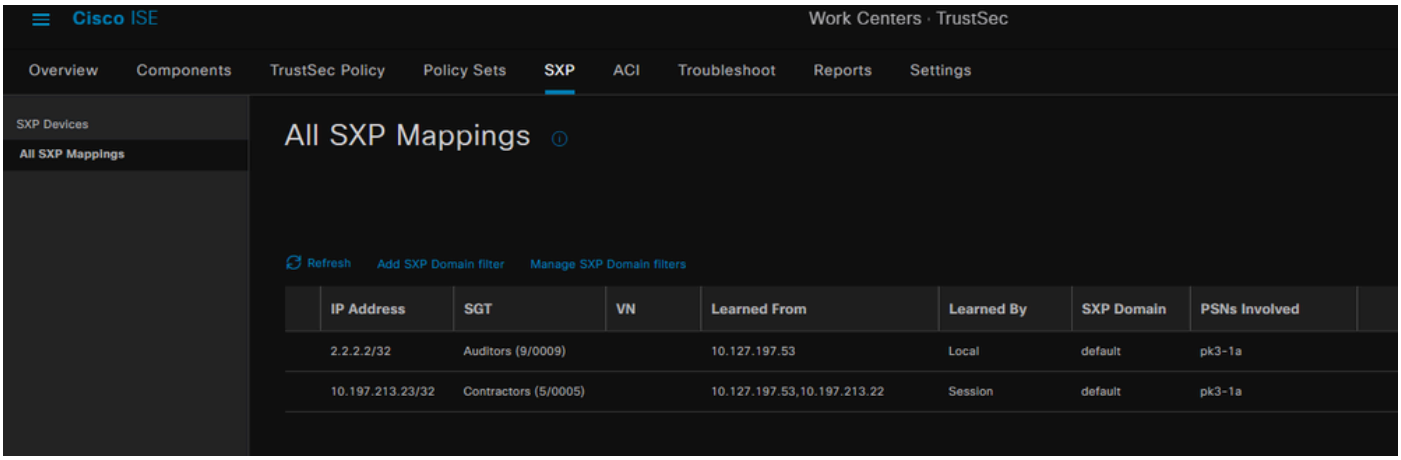
Step 3. Radius Accounting

Ensure ISE received the Framed-IP address RADIUS attribute from Radius Accounting Packet following successful authentication.

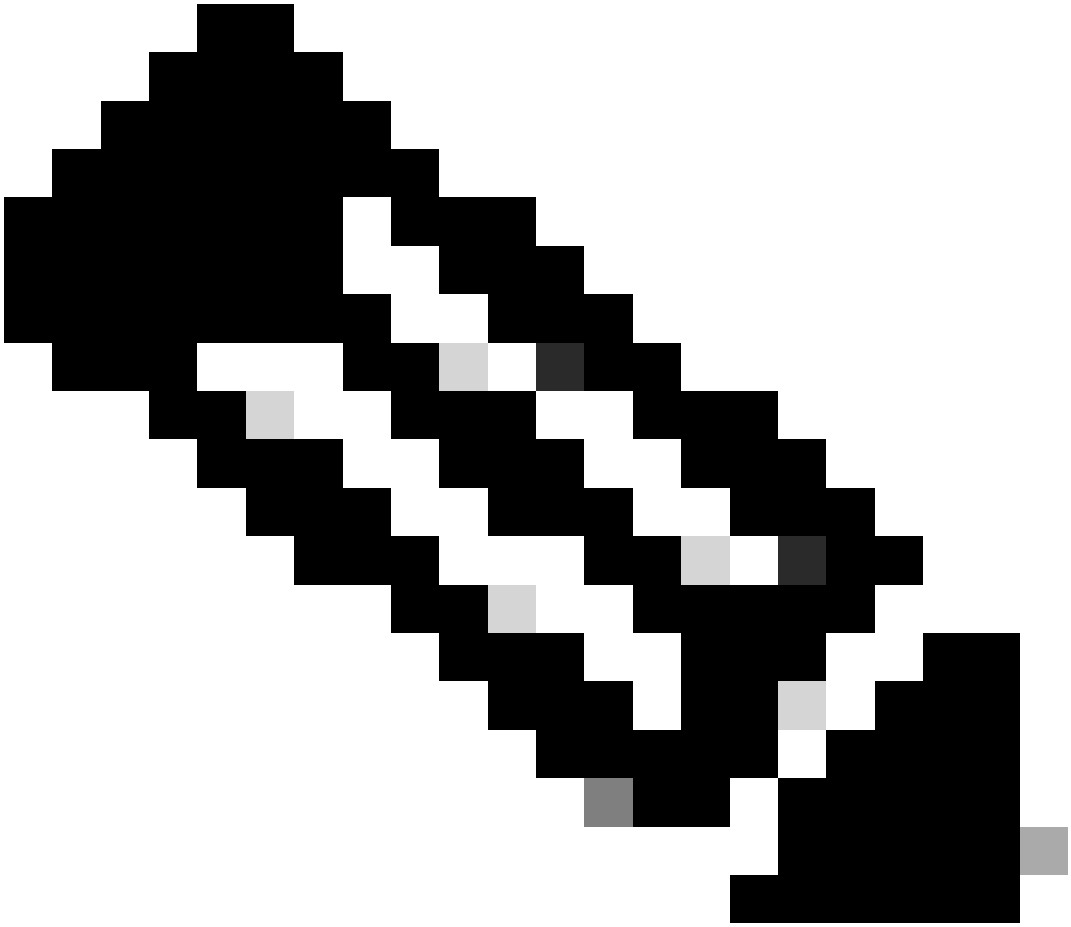


Step 4. ISE SXP Mappings

Navigate to **Workcenters > Trustsec > SXP > All SXP Mappings** to view the dynamically learned IP-SGT mappings from Radius session.



Learned By
Local - Statically assigned IP-SGT bindings on ISE.
Session - Dynamically learned IP-SGT bindings from Radius session.



Note: The ISE has the capability to receive IP-SGT bindings from another device. These bindings could be displayed as **Learned by SXP** under All SXP Mappings.

Step 5. SXP Mappings on Switch

The switch learned IP-SGT mappings from ISE through SXP protocol.

```
C9300B#show cts sxp sgt-map vrf Mgmt-vrf brief
SXP Node ID(generated):0x03030303(3.3.3.3)
IP-SGT Mappings as follows:
IPv4,SGT: <2.2.2.2 , 9>
IPv4,SGT: <10.197.213.23 , 5>
Total number of IP-SGT Mappings: 2
conn in the sxp_bnd_exp_conn_list (total:0):
C9300B#

C9300B#show cts role-based sgt-map vrf Mgmt-vrf all
Active IPv4-SGT Bindings Information
```

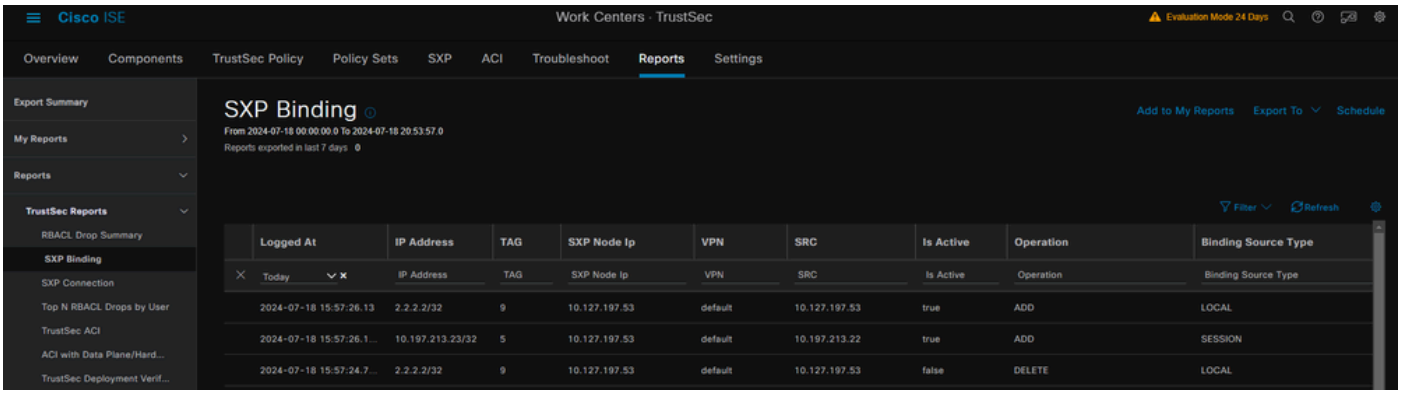
```
IP Address SGT Source
===========================================
2.2.2.2 9 SXP
10.197.213.23 5 SXP

IP-SGT Active Bindings Summary
===========================================
Total number of SXP bindings = 2
Total number of active bindings = 2
```

Troubleshoot

This section provides information you can use to troubleshoot your configuration.

ISE Report

ISE also allows to generate SXP binding and connection reports, as shown in this image.



Debugs on ISE

Collect the ISE support bundle with these atributes to be set at the debug level:

- sxp
- sgtbinding
- nsf
- nsf-session
- trustsec

When a user is authenticated from ISE server, ISE assigns an SGT in the access accept response packet. Once the user gets the IP address, the switch sends the Framed IP address in the Radius Accounting Packet.

show logging application localStore/iseLocalStore.log:

```
2024-07-18 09:55:55.051 +05:30 0000017592 3002 NOTICE Radius-Accounting: RADIUS Accounting watchdog update, ConfigVersionId=129, Device IP Address=10.197.213.22, UserName=cisco, NetworkDeviceName=pk, User-Name=cisco, NAS-IP-Address=10.197.213.22, NAS-Port=50124, Framed-IP-Address=10.197.213.23, Class=CACS:16D5C50A00000017C425E3C6:pk3-1a/510648097/25, Called-Station-ID=C4-B2-39-ED-AB-18, Calling-Station-ID=B4-96-91-F9-56-8B, Acct-Status-Type=Interim-Update, Acct-Delay-Time=0, Acct-Input-Octets=413, Acct-Output-Octets=0, Acct-
```

```
Session-Id=00000007, Acct-Authentic=Remote, Acct-Input-Packets=4, Acct-Output-Packets=0, Event-Timestamp=1721277745, NAS-Port-Type=Ethernet, NAS-Port-Id=TenGigabitEthernet1/0/24, cisco-av-pair=audit-session-id=16D5C50A00000017C425E3C6, cisco-av-pair=method=dot1x, cisco-av-pair=cts:security-group-tag=0005-00, AcsSessionID=pk3-1a/510648097/28, SelectedAccessService=Default Network Access, RequestLatency=6, Step=11004, Step=11017, Step=15049, Step=15008, Step=22085, Step=11005, NetworkDeviceGroups=IPSEC#Is IPSEC Device#No, NetworkDeviceGroups=Location#All Locations, NetworkDeviceGroups=Device Type#All Device Types, CPMSessionID=16D5C50A00000017C425E3C6, TotalAuthenLatency=6, ClientLatency=0, Network Device Profile=Cisco, Location=Location#All Locations, Device Type=Device Type#All Device Types, IPSEC=IPSEC#Is IPSEC Device#No,
```

show logging application ise-psc.log:

```
2024-07-18 09:55:55,054 DEBUG [SxpSessionNotifierThread][]
ise.sxp.sessionbinding.util.SxpBindingUtil -::::-
logging the session values received from PrrtCpmBridge :
Operation type ==>ADD, sessionId ==> 16D5C50A00000017C425E3C6, sessionState ==> ACCEPTED,
inputIp ==> 10.197.213.23, inputSgTag ==> 0005-00, nasIp ==> 10.197.213.22null, vn ==> null
```

The SXP node stores the IP + SGT mapping in its H2DB table and later PAN node gathers this IP SGT mapping and reflects in All SXP mappings in ISE GUI (Workcenters ->Trustsec -> SXP->All SXP Mappings).

show logging application sxp_appserver/sxp.log:

```
2024-07-18 10:01:01,312 INFO [sxpservice-http-96441] cisco.ise.sxp.rest.SxpGlueRestAPI:147 - SXP-PEERF Add Session Bindings batch-size: 1
2024-07-18 10:01:01,317 DEBUG [SxpNotificationSerializer-Thread]
cpm.sxp.engine.services.NotificationSerializerImpl:202 - processing task Task [add=true,
notification=RestSxpLocalBinding(tag=5, groupName=null, ipAddress=10.197.213.23/32,
nasIp=10.197.213.22, sessionId=16D5C50A00000017C425E3C6, peerSequence=null,
sxpBindingOpType=null, sessionExpiryTimeInMillis=0, apic=false, routable=true, vns=[])]

2024-07-18 10:01:01,344 DEBUG [SxpNotificationSerializer-Thread]
cisco.cpm.sxp.engine.SxpEngine:1543 - [VPN: 'default'] Adding new binding: MasterBindingIdentity
[ip=10.197.213.23/32, peerSequence=10.127.197.53,10.197.213.22, tag=5, isLocal=true,
sessionId=16D5C50A00000017C425E3C6, vn=DEFAULT_VN]
2024-07-18 10:01:01,344 DEBUG [SxpNotificationSerializer-Thread]
cisco.cpm.sxp.engine.SxpEngine:1581 - Adding 1 binding(s)
2024-07-18 10:01:01,344 DEBUG [SxpNotificationSerializer-Thread]
cisco.cpm.sxp.engine.MasterDbListener:251 - Submitting task to H2 Handler for adding bindings,
bindings count: 1
2024-07-18 10:01:01,344 DEBUG [H2_HANDLER] cisco.cpm.sxp.engine.MasterDbListener:256 -
MasterDbListener Processing onAdded - bindingsCount: 1
```

The SXP node updates the Peer Switch with the latest IP-SGT bindings.

```
2024-07-18 10:01:01,346 DEBUG [pool-7-thread-4] opendaylight.sxp.core.service.UpdateExportTask:93 -
SXP_PERF:SEND_UPDATE_BUFFER_SIZE=32
```

```
2024-07-18 10:01:01,346 DEBUG [pool-7-thread-4] opendaylight.sxp.core.service.UpdateExportTask:116
- SENT_UPDATE to [ISE:10.127.197.53][10.127.197.53:64999/10.127.213.27:31025][O|Sv4]
2024-07-18 10:01:01,346 DEBUG [pool-7-thread-4] opendaylight.sxp.core.service.UpdateExportTask:137
- SENT_UPDATE SUCCESSFUL to
[ISE:10.127.197.53][10.127.197.53:64999/10.127.213.27:31025][O|Sv4]
```

Debugs on Switch

Enable these debugs on the switch to troubleshoot SXP connections and updates.

debug cts sxp conn

debug cts sxp error

debug cts sxp mdb

debug cts sxp message

Swicth received the SGT-IP mappings from the SXP Speaker "ISE".

Check **Show logging** to view these logs:

```
Jul 18 04:23:04.324: CTS-SXP-MSG:sxp_recv_update_v4 <1> peer ip: 10.127.197.53
Jul 18 04:23:04.324: CTS-SXP-MDB:IMU Add binding:- <conn_index = 1> from peer 10.127.197.53
Jul 18 04:23:04.324: CTS-SXP-MDB:mdb_send_msg <IMU_ADD_IPSGT_DEVID>

Jul 18 04:23:04.324: CTS-SXP-INTNL:mdb_send_msg mdb_process_add_ipsgt_devid Start
Jul 18 04:23:04.324: CTS-SXP-MDB:sxp_mdb_inform_rbm tableid:0x1 sense:1 sgt:5 peer:10.127.197.53
Jul 18 04:23:04.324: CTS-SXP-MDB:SXP MDB: Entry added ip 10.197.213.23 sgt 0x0005
Jul 18 04:23:04.324: CTS-SXP-INTNL:mdb_send_msg mdb_process_add_ipsgt_devid Done
```

Related Information

ISE 3.1 Admin Guide Segmentation

Catalyst Configuration Guide Trustsec Overview