



## **Cisco BTS 10200 Softswitch SS7 SIGTRAN Guide, Release 7.0**

July 2010

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## Preface

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**Revised: July 2010, OL-23039-01**

This document describes the SIGTRAN solution for the Cisco BTS 10200 Softswitch. It is intended for use by service provider management, system administration, and engineering personnel who are responsible for designing, installing, provisioning, and maintaining networks that use the Cisco BTS 10200 Softswitch.

## Organization

This document is divided into the following chapters:

- **Chapter 1, “SS7 Basic Configurations”**—Signaling System 7 (SS7) is an out of band signaling system used in the public switched telephone network (PSTN) to control call setup and tear down calls, transport circuit and non-circuit related information, and support the Custom Local Calling Area Signaling Services (CLASS).
- **Chapter 2, “Provisioning Basic SS7 Configurations”**—Describes the provisioning process for the Cisco ITP, Mated Signal Transfer Point (STP)-Pair configurations, Cisco BTS 10200 Softswitch for Shared Point Code, SCTP provisioning, and NSO configuration.
- **Chapter 3, “Customer Profiles”**—Describes various configurations and combinations of the Cisco BTS 10200 Softswitch and the Cisco ITP that are built on top of the basic Shared Point Code and Mated STP-Pair configurations.
- **Chapter 4, “SS7 SIGTRAN Troubleshooting”**— Describes tools and procedures for troubleshooting SIGTRAN problems on the Cisco BTS 10200 Softswitch and Cisco ITP, for clearing Cisco BTS 10200 Softswitch alarms, and for troubleshooting network problems.

## Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What’s New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at

<http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>

Subscribe to the *What’s New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS Version 2.0.

## Document Change History

The following table lists the revision history for the *Cisco BTS 10200 Softswitch SS7 SIGTRAN Guide, Release 7.0*.

<b>Version Number</b>	<b>Issue Date</b>	<b>Status</b>	<b>Reason for Change</b>
OL-23039-01	July 2010	Initial	Initial document for Release 7.0.





# CHAPTER 1

## SS7 Basic Configurations

Revised: July 2010, OL-23039-01

### Overview

Signaling System 7 (SS7) is an out of band signaling system used in the public switched telephone network (PSTN) to:

- Control call setup and tear down calls
- Transport circuit and non-circuit related information
- Support the Custom Local Calling Area Signaling Services (CLASS)

Signaling Transport (SIGTRAN) is a group of IETF standards that describe the SS7 signaling functionality of hardware nodes that interconnect IP based networks to SS7 networks.

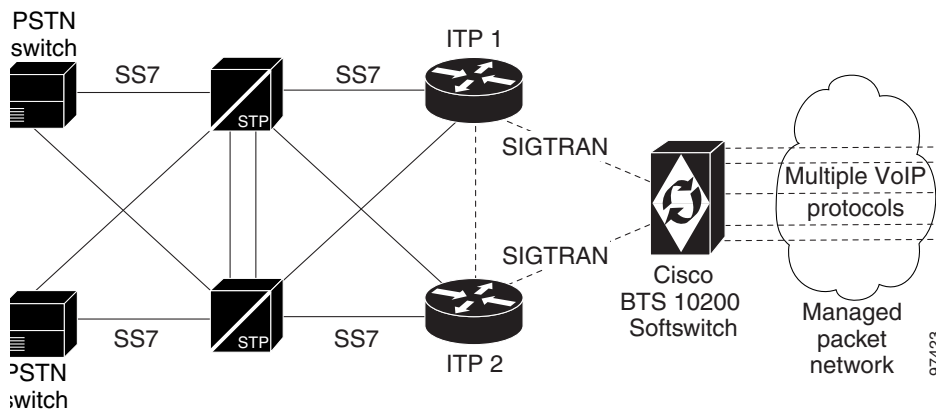
The Cisco BTS 10200 Softswitch communicates with SS7-based PSTN switches and service control points (SCPs) by using a SIGTRAN-based signaling gateway (SG), the Cisco IP Transfer Point (ITP). The SIGTRAN interface carries all SS7 messages encapsulated in IP packets.

For a description of SS7 architecture, see the following URL:

[http://www.cisco.com/univercd/cc/td/doc/product/tel\\_pswt/vco\\_prod/ss7\\_fund/index.htm](http://www.cisco.com/univercd/cc/td/doc/product/tel_pswt/vco_prod/ss7_fund/index.htm)

The relationship of the Cisco BTS 10200 to the SS7 network is shown in [Figure 1-1](#).

**Figure 1-1 Cisco BTS 10200 Softswitch Interface to SS7 Network**



# Cisco ITP Signaling Gateways

To interconnect with the Signaling System 7 (SS7) network, you must have Cisco IP Transfer Point (ITP). ITP transports SS7 traffic over traditional time-division multiplexing (TDM) networks or advanced SS7-over-IP (SS7oIP) networks. The following Cisco routers have ITP:

- 2600XM Series (2651XM)—Supports 2 or 4 SS7 links
- 7301—Supports up to 80 SS7 links
- 7500 Series Router (7507, 7513)—Supports from 32 to 256+ SS7 links
- 7600 Series Router—Supports up to 2772 SS7 links

When running ITP with BTS 10200, you may receive an "Unrecognized Parameter" error message. This appears because BTS 10200 supports an optical SCTP feature not supported by ITP. It does not affect calls or performance.

BTS 10200 and ITP both handle SS7 traffic using Sigtran protocols; they must be fully compatible with the Stream Control Transmission Protocol (SCTP) version.

## ITP Redundancy

All customer deployments of the SIGTRAN solution require ITP redundancy, and the following sections provide a brief overview of the ITP redundancy choices.

**Note**

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Throughout this document, the term Cisco BTS 10200 Softswitch (BTS) refers to a Cisco BTS Active/Standby mated pair.

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## Hardware Redundancy

If the Cisco ITP 7507 platform is chosen, redundancy can be accomplished in a single node by inserting redundant cards within the chassis. To failover with minimum call disruption, the 7507 should be configured to operate in ITP Non Stop Operation (NSO).

This document does not recognize the Cisco ITP 7507 platform as a fully redundant solution. However, it can be part of a fully redundant SG Mated Pair.

## Platform Redundancy

ITP redundancy can also be accomplished by connecting two ITP nodes together. This can be done in one of two ways. The ITPs can be connected as SG Mated Pairs or as an ITP-Group.

**Note**

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These two forms of redundancy cannot be combined.

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The ITP NSO feature ensures that an ITP running on a Cisco 7500 router continues to operate in the with no outages in the event of a Route/Switch Processor (RSP) failure. The NSO feature supports two Signaling Gateway Platforms (SGPs) per Signaling Gateway (SG) in a Signaling Gateway Group (SG-grp) for mated Signal Transfer Points (STPs) and also supports the Sigtran M3UA and Single User Account (SUA) Application Server Process (ASP) load-share traffic modes.

This feature also enhances the IP layer implementation on the Versatile Interface Processor (VIP) cards for handling complex routing to remote destinations using either static routes or a routing protocol. With this additional capability, the ITP provides VIP redundancy in addition to platform and RSP redundancy.

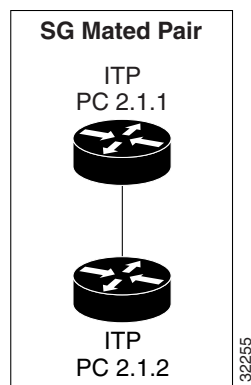
For additional information, refer to the [ITP NSO Configuration, page 1-9](#).

An SG Mated Pair is usually used to connect to the service provider's SS7 network via D-links. The ITP-Group is used when a customer wants a point code of the BTS to be shared with an SG point code. In this case, the connection to the service provider's SS7 network is via A, E, or F-links.

## SG Mated Pair

[Figure 1-2](#) illustrates an SG Mated Pair connection. Each identical ITP has its own point code and acts as an STP that connects to STPs in the SS7 network via D-links. Note that any ITP platform can be used for this form of redundancy.

**Figure 1-2** SG Mated Pair



In this configuration, an ITP is treated as a SG with a single SGP. Global title translation (GTT) can be supported by a capability point code, which is also known as an alias point code. A capability point code is shared by more than one system supporting the same GTT. Each signaling point with the same alias point code is capable of providing a predefined capability in the network.

From the BTS to the ITP, both load-sharing and redundancy standby mode are supported.

### Benefits

This section lists the benefits of this feature:

- Fully hardware redundant and IP network redundant solution
- Each ITP acts as an STP and has full STP functionality
- GTT can be supported on the ITP through the use of a capability point code
- Geographical separation between ITPs is supported

## Restrictions

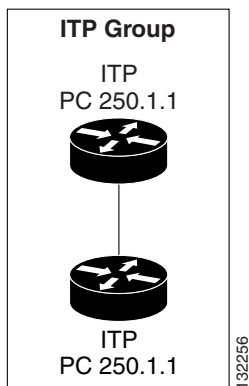
This section lists restrictions. These are conditions that might cause this feature to fail or work improperly.

- Each ITP requires a separate point code

## ITP-Group

In an ITP-group configuration, illustrated in [Figure 1-3](#), each ITP acts as a physical signaling gateway process. Two of these physical signaling gateway processes can be connected together to form one logical signaling gateway. In this configuration, both ITPs share the same point code value, which is also shared by a Cisco BTS 10200 Softswitch. Note that this form of redundancy is not available for the 7507, since it has internal hardware redundancy. It is available for the 2651, the 7200VXR series, and the 7300 series ITPs.

**Figure 1-3** ITP Group



## Benefits

This section lists the benefits of ITP group:

- Two ITPs share the same point code, so fewer point codes are needed.
- Identical ITPs for an SG.
- A fully hardware redundant and IP network redundant solution.

## Restrictions

This section lists restrictions. These are conditions that might cause this feature to fail or work improperly.

- GTT is not supported on the ITP.
- Only load sharing across the ITPs is supported. Prioritizing an ITP is not supported.
- The two ITPs must be collocated.
- There is no gain in SS7 link capacity when two ITPs are combined in this manner. The SS7 link capacity of an ITP group is only equal to the capacity of a single ITP.

**Note**

The 72XX series ITP can be used for greater link density.

## BTS and ITP Base Configurations

There are four basic BTS/ITP base configurations that form the basis of all customer offered profiles and are described in the following sections.

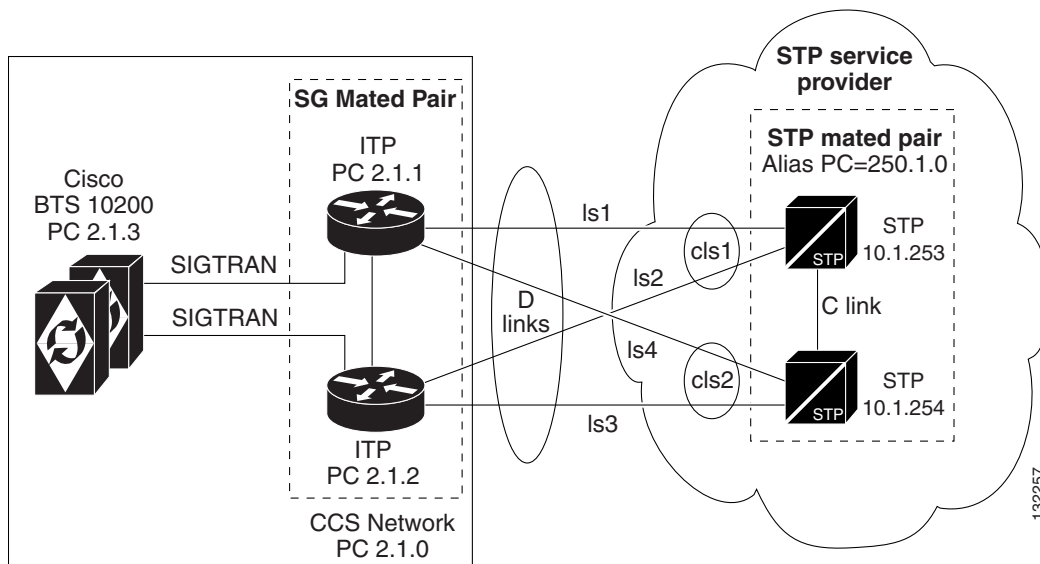
- [Mated STP-Pair Configuration, page 1-5](#)
- [Shared Point Code Configuration With A Links, page 1-6](#)
- [Shared Point Code Configuration Connecting With E-Links, page 1-8](#)
- [Shared Point Code Configuration Connecting With F-Links, page 1-8](#)

### Mated STP-Pair Configuration

A “D” (diagonal) link connects a secondary (local or regional) STP pair to a primary (inter network gateway) STP pair in a quad-link configuration. Their function is to carry signaling messages beyond their initial point of entry to the signaling network towards their destination.

In a Mated STP-Pair configuration, each ITP acts as an STP and has its own unique point code. The ITPs connect to the SS7 network using D-links, as illustrated in [Figure 1-4](#). An SG mated pair is utilized for the Mated STP-Pair configuration.

**Figure 1-4** Mated STP-Pair Configuration



In an SG mated pair, redundancy is supported between the ITPs. The ITPs can still operate and provide some services if a BTS were to become unavailable. In this case, an ITP would send a MTP3 Transfer Prohibit message (TFP) for the BTS point code and still act as a transfer point to other point codes in the SS7 network. Also, it can transfer messages to other BTS nodes in the case where there are multiple BTS nodes served by a single ITP pair.

The Mated STP-Pair configuration provides the following benefits:

- Multiple Origination Point Code (OPCs) are supported on the BTS with just two ITPs.
- Geographical separation is allowed between the ITPs.
- The ITP supports GTT by using capability point codes for redundancy.
- High volume SS7 traffic can be supported by load sharing the traffic between the SG mated pair.
- Unlike the Shared Point Code solution, there is no need to purchase additional connections to the SS7 network when more OPCs are added to the BTS.
- The SS7 network is able to distinguish between the status of the BTS and that of the ITP.
- All ITP platforms can be used as part of the Mated STP-Pair solution.

The Mated STP-Pair configuration has the following restrictions:

- Each ITP needs its own point code. This allows for greater scalability when multiple OPCs are needed on the Cisco BTS 10200 Softswitch.
- Service providers charge more for Mated STP-Pair connections when D-links are used, than when A-link connections are used, which is commonly part of the Shared Point Code solution.

## Shared Point Code Configuration With A Links

“A” (access) links connect a signaling endpoint (an SCP or signal switching point [SSP]) to an STP. Only messages originating from or destined to the signaling endpoint are transmitted on an A-link.

In this configuration, both ITPs and the Cisco BTS 10200 are viewed as a single point code from the service provider's SS7 network. This is possible since the same point code value is shared by both of the ITPs and is provisioned as an OPC value on the BTS. The ITP Group, consisting of two ITPs, acts as the SS7 proxy for the Cisco BTS 10200. The ITPs connect to the SS7 network using A-links, E-links, or F-links, as illustrated in [Figure 1-5](#).



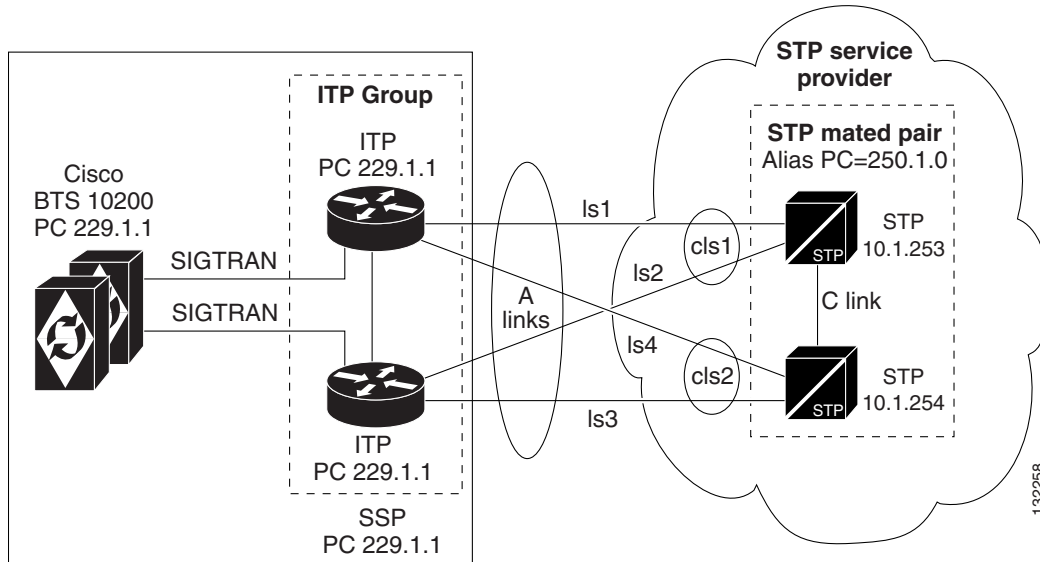
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**Note**

In the event that a Cisco BTS 10200 system becomes unavailable, the ITP will send a user part unavailable (UPU) to the SS7 network but cannot provide any other services.

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Figure 1-5 Shared Point Code Configuration using an ITP Group (Distributed MTP)



In an ITP group (the Distributed MTP feature) configuration, each ITP acts as a physical signaling gateway process. Two of these physical signaling gateway processes can be connected together to form one logical SG. In this configuration, both ITPs share the same point code value. Note that this form of redundancy is not available for the Cisco 7507 ITP, since it has internal hardware redundancy. It is available for the Cisco 2651 and Cisco 7300 series ITPs.

The Shared Point Code configuration provides the following benefits:

- There is less charge from the service provider for A-link connections, which are typically used for the Shared Point Code solution, than D-link connections, which are typically used for the Mated STP-Pair solution.
- The BTS and ITPs share the same point code value, thereby requiring fewer point codes in the network.
- There is full hardware redundancy support between ITPs.
- High volume SS7 traffic can be supported by a single point code.

This configuration has the following restrictions:

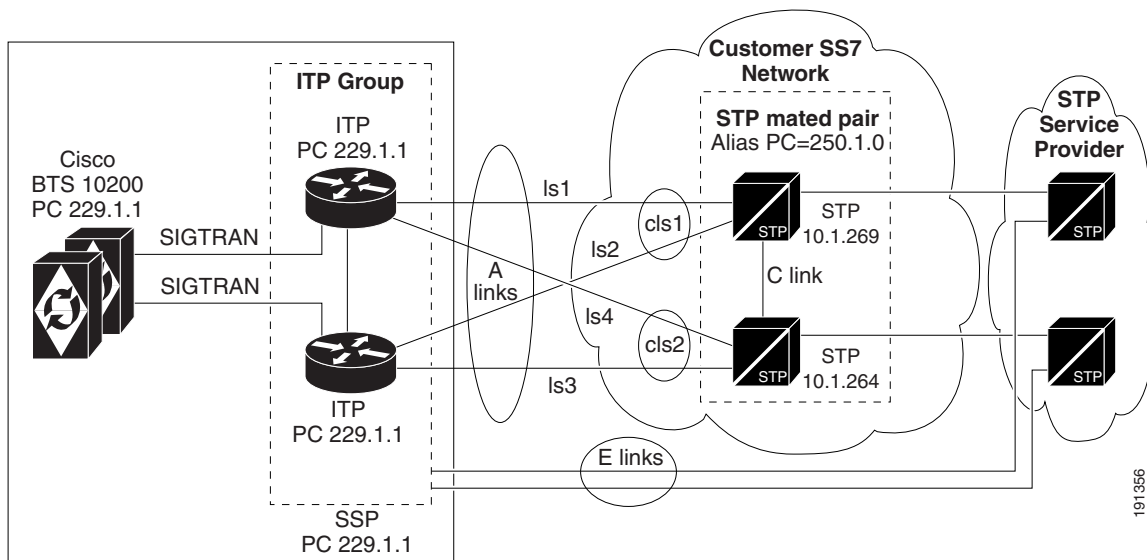
- GTT is not supported on the ITP and must be performed on the service provider's STP.
- Geographical separation of ITPs is not supported. ITPs must be collocated.
- Currently, a pair of ITPs is required for each OPC on the Cisco BTS 10200. In the Mated STP-Pair solution, only two ITPs are required, regardless of the number of OPCs on the Cisco BTS 10200.
- Approximately half of the SS7 traffic of each ITP goes across the inter-ITP connection. Therefore, the traffic between the ITPs is comparatively heavier than that of the Mated STP-Pair configuration. This extra processing requirement reduces the amount of processing power that is available for sending and receiving traffic on links that connect to the SS7 service provider, effectively reducing the amount of allowable links on each ITP platform in an ITP group by half. As a result, the two ITPs in an ITP group can only have a total number of SS7 links equal to that of one ITP that is not configured in an ITP group.

- If one ITP in the ITP group loses all IP communication, both ITPs will become isolated from each other. The ITP that has lost all IP communication will also not be able to communicate with the BTS. Its default behavior is to send a UPU to the network, which will stop all traffic towards the BTS, even though the other ITP is still functional.
- The Cisco 7507 is not available for ITP group mode. Only the Cisco 2651, Cisco 7206, and Cisco 7301 are supported.

## Shared Point Code Configuration Connecting With E-Links

An “E” (extended) link configuration is a variation of the Shared Point Code configuration, but it serves as a backup in case all A-link connections become unavailable. It has the basic provisioning setup, benefits, and limitations as the Shared Point Code with A-links configuration. [Figure 1-6](#) shows how the BTS and ITP can use E links to communicate with the service provider.

**Figure 1-6** Shared Point Configuration with E Links

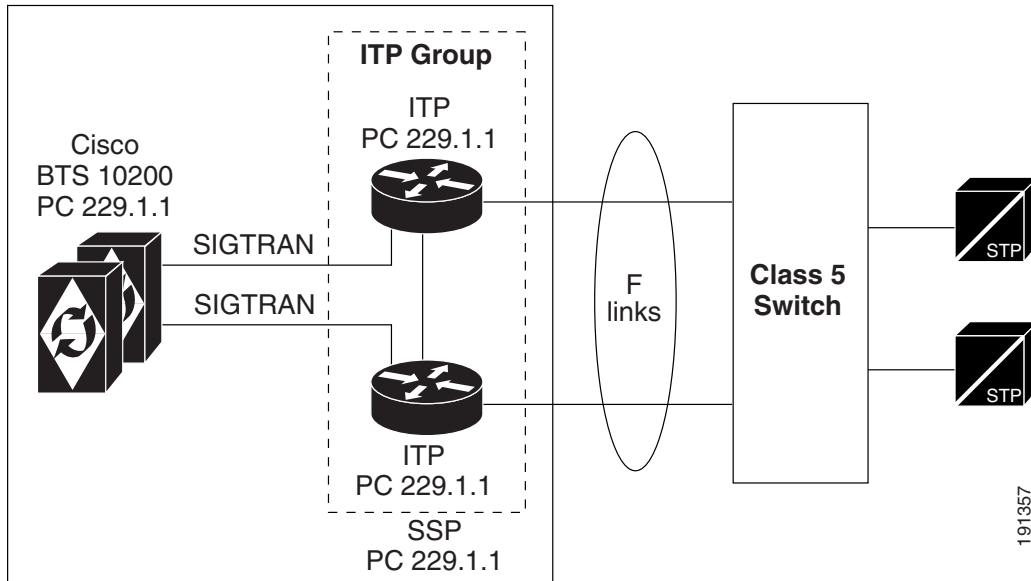


## Shared Point Code Configuration Connecting With F-Links

An “F” (fully associated) link configuration is a variation of the Shared Point Code solution that uses A-links, except that, instead of connecting to an STP via A-links, it connects to another signaling end point (SEP), an SSP or SCP, in the SS7 network via fully associated F-links. In this configuration, the BTS and ITP usually function as a private bank exchange (PBX). An F-link configuration has the basic setup and list of benefits and restrictions as the Shared Point Code with A-links configuration. [Figure 1-7](#) shows a typical F-link configuration.



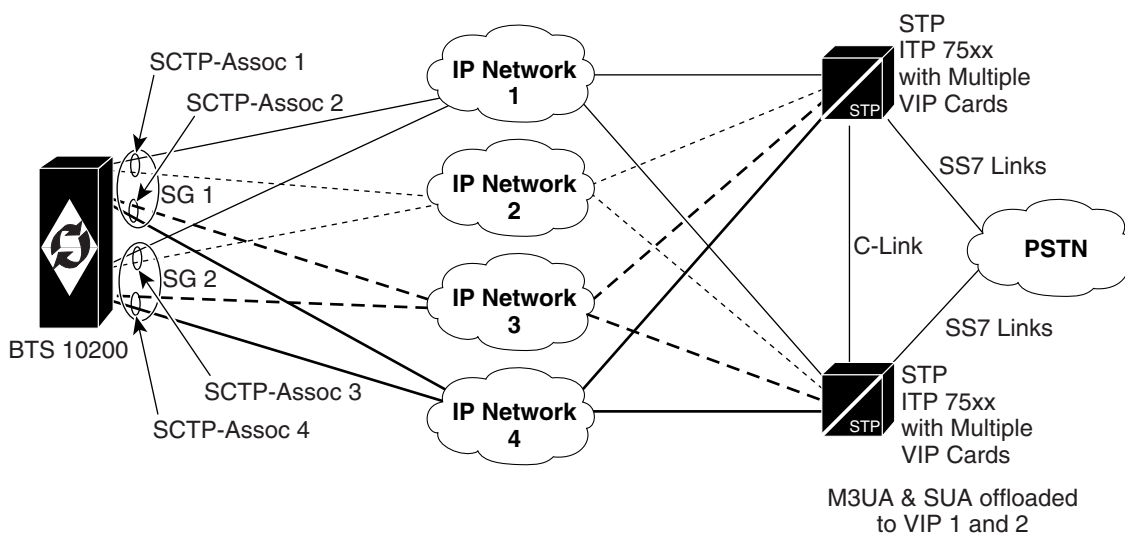
Figure 1-7 Shared Point Configuration with F-Links



## ITP NSO Configuration

Figure 1-8 illustrates a Cisco BTS 10200 setup with the NSO feature. The Cisco 7500 series ITP supports multiple VIPs, with each VIP acting as a SGP in the SIGTRAN data model, each able to terminate an SCTP association from a single Cisco BTS 10200 Softswitch platform Call Agent (CA), Advanced Intelligent Network (AIN) Feature Server (FSAIN), and POTS, Tandem, and Centrex Feature Server (FSPTC).

Figure 1-8 Multiple SCTP Associations from Single Cisco BTS 10200 Softswitch Platform



The Cisco BTS 10200 supports three profiles for connecting to an SS7 service provider network: D link, A link, and F link.

## NSO Configuration with D Links

The Cisco BTS 10200 Softswitch term for this profile is Mated STP. For the Cisco BTS 10200 Softswitch to support the Cisco 7500 series ITP NSO with VIP offload, the SG Group must be provisioned with the `sg-grp-mode` of Mated STP and the SGs in that group must have the `internal-redundancy-mode` set to SSO-NSO.

The D-link profile with NSO mode has the following characteristics:

- Redundancy is supported between the ITPs. NSO mode with VIP off-loading provides another layer of redundancy with dual VIP cards with LAN Port Adapters (PAs) on each Cisco 7500 series ITP.
- Two SCTP associations can terminate on two different VIP cards within a single ITP for a total of four associations in a Mated STP SG Group.
- Allows two SGPs per SG and a total of four SGPs per SG-Group.
- SCTP multi-home capability can be configured utilizing two LAN PAs on each VIP card.
- SIGTRAN traffic is load-balanced over the multiple associations.

The D-link profile with NSO mode has the following limitations:

- NSO mode operation is only supported on Cisco 7500 series ITP.
- NSO mode operation cannot be used with the ITP Group feature (Distributed MTP3).

## NSO Configuration with A and F Links

The Cisco BTS 10200 term for these profiles is ITP group, which is the Distributed MTP configuration on an ITP. For the Cisco BTS 10200 Softswitch to support Distributed MTP on ITPs, the SG Group must be provisioned with parameter `sg-grp-mode=itp-group` with only one SG in that group whose parameter `internal-redundancy-mode=none`. The A-link and F-link profiles are identical because the Cisco BTS 10200 and the SG share the same point code.



## CHAPTER 2

# Provisioning Basic SS7 Configurations

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Revised: July 2010, OL-23039-01

This chapter describes the provisioning process for the Cisco ITP, Mated Signal Transfer Point (STP)-Pair configurations, Cisco BTS 10200 Softswitch for Shared Point Code, SCTP provisioning, and NSO configuration and contains the following sections:

- [ITP AS and ASP Configuration Example](#)
- [Mated STP-Pair Configuration Example](#)
- [Shared Point Code Configuration Example](#)
- [SCTP Provisioning](#)
- [NSO Configuration Examples](#)

Each of the configuration examples include Cisco BTS 10200 example provisioning that is related to the associated profile. For a complete description of provisioning SS7 related objects on the Cisco BTS 10200, please refer to the following URL:

[http://www.cisco.com/univercd/cc/td/doc/product/voice/bts10200/bts4\\_1/provgd/41\\_ss7.htm](http://www.cisco.com/univercd/cc/td/doc/product/voice/bts10200/bts4_1/provgd/41_ss7.htm)

The DSCP is now configured in the ca-config table. For information about the SCTP-DSCP token, refer to the *Cisco BTS 10200 Softswitch CLI Database*.

## ITP AS and ASP Configuration Example

The IETF SIGTRAN standard defines how a signaling gateway, such as the Cisco ITP, routes traffic from the Signaling System 7 (SS7) service provider towards a SIGTRAN enabled IP endpoint, such as the Cisco BTS 10200 Softswitch. This section provides a basic example and diagram for configuring an application server (AS) and application server process (ASP) on the ITP. Please refer to [Figure 2-3 on page 2-31](#) when reading this example.

The following components are configured in this example:

- Routing Key—A set of SS7 parameters, such as Destination Point Code (DPC), Origination Point Code (OPC), SI, Carrier Identification Code (CIC) range, and Subsystem Number (SSN), that uniquely define the range of signaling traffic to be handled by a particular AS.
- Routing Context—A value that uniquely defines a routing key.

- Application Server (AS)—A logical entity serving a specific routing key. An example of an application server is a switch element handling all call processing for a unique range of SS7 network trunks, identified by an SS7 SI, DPC, OPC, Subsystem, and CIC-range. The AS will contain two application server processes, one of which is actively processing traffic. Note that there is a one-to-one relationship between an AS and a routing key.
- Application Server Process (ASP)—An active or standby process instance of an application server (in the BTS, it is either the active or standby BTS signaling gateway adapter or Transaction Capabilities Application Part [TCAP] signaling adapter software process). An ASP is defined by its Stream Control Transmission Protocol [SCTP] endpoint information (two IP addresses and port) and may be configured to process signaling traffic within more than one application server.

## Cisco ITP Configuration

The following ASP configuration defines the primary side TCAP Signaling Adapter (TSA) process on FSAIN. TB44-PRIAIN is the variable name of the ASP, 12205 is the remote (Cisco BTS 10200) port number, 14001 is the local (Cisco ITP) port number, and SUA defines the Layer 3 SIGTRAN protocol that is utilized to transfer information to the ASP. In this definition, there are also the two IP addresses of the Cisco BTS 10200 Softswitch that the TSA process on FSAIN uses for SUA communication.

The following example defines the local port defined for M3UA traffic on ITP:

```
cs7 m3ua 2905
  local-ip 10.89.225.200
  local-ip 10.89.226.200
```

The following defines the local port defined for SUA traffic on ITP:

```
cs7 sua 14001
  local-ip 10.89.225.200
  local-ip 10.89.226.200

cs7 asp TB44-PRIAIN 12205 14001 sua
  remote-ip 10.89.225.234
  remote-ip 10.89.226.234
```

The following configuration defines information for the secondary side TSA process on FSAIN:

```
cs7 asp TB44-SECAIN 12205 14001 sua
  remote-ip 10.89.225.235
  remote-ip 10.89.226.235
```

The following configuration defines an ASP that uses M3UA to transfer information to the ASP. This configuration is for the primary side SGA process:

```
cs7 asp TB44-PRIISUP 11146 2905 m3ua
  remote-ip 10.89.225.234
  remote-ip 10.89.226.234
```

The following configuration is for the secondary side SGA process:

```
cs7 asp TB44-SECISUP 11146 2905 m3ua
  remote-ip 10.89.225.235
  remote-ip 10.89.226.235
```

The AS configuration defines the routing key, which defines a filter for the traffic that will be sent towards the associated ASPs. The filter is based on parameters within incoming messages from the SS7 network, such as DPC, OPC, CIC range, service indicator, and SSN:

The following line of the AS configuration defines an AS name of TB44-ISUP and also says that the AS is defined for M3UA:

```
cs7 as TB44-ISUP m3ua
```

The following line defines the routing key. It is identified by a routing context value of 1. It also includes a DPC value of 2.1.3 (which is the BTS OPC). The next parameter in the routing key is the service indicator, SI ISUP. This means that when a Layer 4 SS7 message (such as an ISUP message) is received from the SS7 network, if the DPC in the MTP3 header is 2.1.3 and the SI indicates ISUP, it will be processed by this AS.

```
routing-key 1 2.1.3 si isup
```

The following lines of the AS configuration defines the two associated ASPs. These represent the active and standby BTS processes, one of which will actually do the processing:

```
asp TB44-PRIISUP
asp TB44-SECISUP
```

The following line of the AS configuration indicates that override mode is being used for this AS. Either ASP TB44-PRIISUP or ASP TB44-SECISUP will process the traffic (as opposed to a load-share mode, which is not supported):

```
traffic-mode override
```

The following AS definition is for processing AIN traffic. Instead of defining M3UA as the SIGTRAN protocol, which is used to communicate with this AS, SUA is the defined protocol. In addition to the DPC and SI definitions in the routing key definition, an SSN value of 248 is also used to further refine the filter.

```
cs7 as TB44-AIN sua
routing-key 2 2.1.3 si sccp ssn 248
asp TB44-SECAIN
asp TB44-PRIAIN
traffic-mode override
```

## Overlapping AS Configurations

The following AS configuration example is similar to the one in the previous subsection but has more information in the routing key definition.

In the following AS configuration, the routing key has a routing context value of 10. The routing key defined DPC value is 2.1.3. The routing key also defines an OPC value of 3.50.3. This OPC has a mask value of 255.255.255, which means all bits of the OPC will be considered when routing. It defines an SI of ISUP and a CIC range of 1 to 23. Therefore, this AS will route messages towards ASP PRI\_ISUP\_BTS2 or SEC\_ISUP\_BTS2, if the message has the following criteria: the DPC is 2.1.3, the OPC is 3.50.3, the service indicator is ISUP, and the CIC range is between 1 and 23.

```
cs7 as ISUP_BTS1 m3ua
routing-key 10 2.1.3 opc 3.50.3 255.255.255 si isup cic 1 23
asp PRI_ISUP_BTS2
asp SEC_ISUP_BTS2
traffic-mode override
```

This AS (ISUP\_BTS1) and the AS of the previous section (TB44-ISUP) both route ISUP messages from the SS7 network that have DPC values of 2.1.3. The ITP routes towards the ASP that matches best when the DPC in the incoming ISUP message is 2.1.3. ISUP\_BTS1 requires that four parameters from the incoming SS7 message match its routing key. TB44-ISUP only requires that two parameters match. If all four parameters of routing-key 10 match, then ISUP\_BTS1 will be chosen. If only three parameters of routing-key 10 match, then routing key 1 is a better match, and TB44-ISUP will be chosen to process the message.

## GTT Configuration

When an ITP pair is connected to a service provider's network using a Mated STP-Pair configuration, the ITP pair can be used as an STP pair. In this case, GTT can be performed on the ITP. The GTT table needs to be populated for remote subsystems and preserved as part of the start-up configuration. For additional information on populating the ITP GTT table.

Extra steps are needed to save it in the flash and have the startup procedure load it from the flash. The following is an example procedure:

- 
- Step 1** On ITP1, add the GTT entry in the global config mode:
- ```
cs7 gtt selector acar_sel
gta 469255 pcssn 1.1.30 pcssn ssn 251
gta 469256 pcssn 1.1.31 pcssn ssn 251
```
- Step 2** On ITP1, save the GTT table in the privileged enable mode:
- ```
cs7 save gtt-table flash:gttdata.txt
```
- Step 3** On ITP1, save the configuration:
- ```
copy run start
```
- Step 4** Swap the flash card between ITP1 and ITP2.
- Step 5** On ITP2, load the GTT table in the global config mode:
- ```
cs7 gtt load flash:gttdata.txt
```
- Step 6** Swap the flash card between ITP1 and ITP2.
- Step 7** On ITP2, save the GTT table in the privileged enable mode:
- ```
cs7 save gtt-table flash:gttdata.txt
```
- Step 8** On ITP2, save the configuration:
- ```
copy run start
```
- 

## Mated STP-Pair Configuration Example

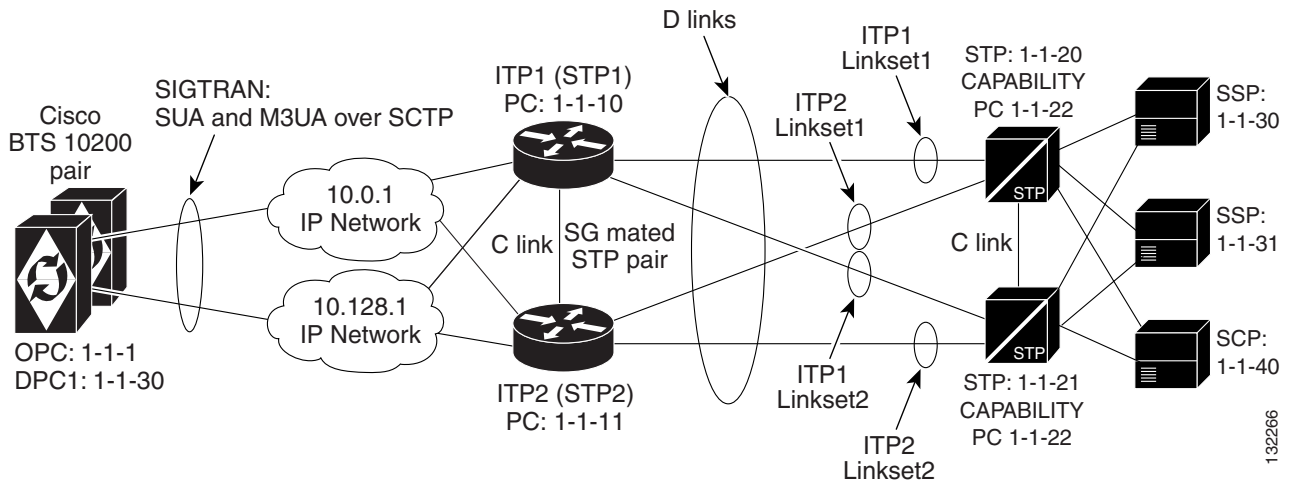
A Mated STP-Pair configuration is used to access the SS7 service provider network STP, usually using SS7 D-links, although A-links can also be used to connect to an SEP in the network. With a Mated STP-Pair configuration, ITPs support GTT, and geographical separation is available.

This section provides an example and diagram for a basic Mated STP-Pair configuration. Please refer to [Figure 2-1](#) when reading this example.

**Note**

The ITP configuration may vary slightly depending on the ITP platform.

**Figure 2-1** Mated STP-Pair Configuration



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## Cisco ITP Configuration

### ITP1 Configuration

ITP1 is the first ITP in the sg-pair (each ITP in the sg-pair functions as an STP).

```

Current configuration : 3470 bytes
!
version 12.2
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname ITP1
!
boot-start-marker
boot system flash c2600-itp-mz.topsail_s_nightly_040915
boot-end-marker
!
redundancy inter-device
!
enable secret 5 $1$XCoU$j0Y2wFRoks2pocHalgHhi0
enable password cisco
!
memory-size iomem 20
ip subnet-zero
!
ip domain-name cisco.com
ip name-server 10.0.0.6

```



For the Mated STP-Pair configuration (SG Mated Pair), the local point code value is 1.1.10, which is different than the BTS OPC and the other ITP (ITP1) that makes up the SG Mated Pair.

```

cs7 variant ANSI
cs7 point-code 1.1.10
!
controller E1 0/0
    framing NO-CRC4
    channel-group 0 timeslots 1
!
controller E1 0/1
    framing NO-CRC4
    channel-group 0 timeslots 1
!
controller E1 0/2
    shutdown
!
controller E1 0/3
    shutdown
!
interface Serial0/0:0
    description connect to link 0 of STP 1-1-20
    no ip address
    encapsulation mtp2
    no clns route-cache
!
interface Serial0/1:0
    description connect to link 0 of STP 1-1-21
    no ip address
    encapsulation mtp2
    no clns route-cache

interface FastEthernet0/0
    ip address 10.0.1.54 255.255.0.0
    speed auto
    half-duplex
    no clns route-cache
!
interface FastEthernet0/1
    ip address 10.128.1.239 255.255.0.0
    speed auto
    half-duplex
    no clns route-cache

```

In the Mated STP-Pair configuration, instead of defining a cs7 group, as is done in the Shared Point Code configuration, a "local-peer" and "mated-sg" are defined. Here, we define the local-peer, which is the local definition for the C-link connection between the two ITPs that make up the redundant STP pair.

```

cs7 local-peer 7000
    local-ip 10.0.1.54
    local-ip 10.128.1.239

```

**Linkset definitions**—The number after 'link' represents SLC.

```

cs7 linkset lset1chn 1.1.20
    link 0 Serial0/0:0
!
cs7 linkset lset2chn 1.1.21
    link 0 Serial0/1:0

```

**C-link linkset definition**—Here the point code value and IP information for the mated-sg is defined. The local IP information is defined in the local-peer definition above.

```
cs7 linkset c-link 1.1.11
  link 0 sctp 10.0.1.55 10.128.1.240 7000 7000
```

### SS7 Route Definitions

In the following entries, note the following:

- All of the routes towards all DPCs are configured with equal priority when using lset1chn or lset2chn.
- There are lower priority routes towards each destination across the c-link.
- Routing towards the capability PC of the adjacent STPs is treated as if the capability PC is a DPC beyond the STP.

```
cs7 route-table system
  update route 1.1.30 255.255.255 linkset lset1chn priority 1
  update route 1.1.30 255.255.255 linkset lset2chn priority 1
  update route 1.1.31 255.255.255 linkset lset1chn priority 1
  update route 1.1.31 255.255.255 linkset lset2chn priority 1
  update route 1.1.40 255.255.255 linkset lset2chn priority 1
  update route 1.1.40 255.255.255 linkset lset1chn priority 1
```

### Lower priority C-link routes

```
update route 1.1.30 255.255.255 linkset c-link priority 2
update route 1.1.31 255.255.255 linkset c-link priority 2
update route 1.1.40 255.255.255 linkset c-link priority 2
```

### Routing to capability point codes of adjacent STPs

```
update route 1.1.22 255.255.255 linkset lset1chn priority 1
update route 1.1.22 255.255.255 linkset lset2chn priority 1
```

With the mated-sg (Mated STP-Pair configuration), you must also define a connection between the ITPs to pass SIGTRAN specific state information and other data. This is done by defining the local IP information in the "cs7 sgmp" configuration and the peer IP information in the "cs7 mated-sg" configuration.

```
cs7 sgmp 9101
  local-ip 10.0.1.54
  local-ip 10.128.1.239
!
cs7 mated-sg ITP2 9101
  remote-ip 10.0.1.55
  remote-ip 10.128.1.240
```

### The M3UA definition that declares local IP addresses and port number

```
cs7 m3ua 2905
  local-ip 10.0.1.54
  local-ip 10.128.1.239
  keepalive 2000
```

Here, as with all configurations, there are a minimum of two ASPs defined for each AS, one for the primary BTS node and one for the Secondary. In reality, there will be at least one for each user part on the Cisco BTS 10200, so if you have a TCAP service going over SUA and ISUP traffic, you will have a

total of at least four ASPs: primary ISUP, secondary ISUP, primary TCAP service, and secondary TCAP service. 2905 is the local port value. The remote IP addresses are the BTS IP addresses. They are also obtained through the fully-qualified domain name (FQDN) that is an SGA command line argument.

```
cs7 asp PriCaIsupAsp 11146 2905 m3ua
  remote-ip 10.0.1.5
  remote-ip 10.128.1.2
!
cs7 asp SecCaIsupAsp 11146 2905 m3ua
  remote-ip 10.0.1.6
  remote-ip 10.128.1.3
```

The routing key is a very simple one. It has a routing context of 1 defined, the DPC (BTS OPC) of 1.1.1 defined, and a service indicator of ISUP defined. This means that all traffic coming from the SS7 service provider network that has a DPC of 1.1.1 and a service indicator of ISUP will be sent to either PrimaryBtsIsupAsp or SecondaryBtsIsupAsp (depending on which one is active). The traffic mode is always set to override (not loadshare), as with the current implementation, only the override application server traffic mode is supported. In the case of override-traffic mode, the reception of ASP active messages at the SGP causes the redirection of all traffic for the AS to the ASP that sent the ASP active message.

### The SUA definition that declares local IP addresses and port number

```
cs7 sua 14001
  local-ip 10.0.1.54
  local-ip 10.128.1.239
  keepalive 2000
```

Here we are defining an ASP that will process AIN related traffic.

```
cs7 asp PrimFsAinAsp 12205 14001 sua
  remote-ip 10.0.1.5
  remote-ip 10.128.1.2
!
cs7 asp SecFsAinAsp 12205 14001 sua
  remote-ip 10.0.1.6
  remote-ip 10.128.1.3
!
cs7 asp PriFsPtcAsp 12235 14001 sua
  remote-ip 10.0.1.5
  remote-ip 10.128.1.2
!
cs7 asp SecFsPtcAsp 12235 14001 sua
  remote-ip 10.0.1.6
  remote-ip 10.128.1.3
```

The following AS is defined for LNP related message flows. The routing context value is 4, the DPC (BTS OPC) is 1.1.1, the service indicator is SCCP and the subsystem number is 247. This means that any message received from the SS7 service provider that has a DPC of 1.1.1, a service indicator of SCCP and an SSN of 247 will be sent to either PrimaryBtsAinAsp or SecondaryBtsAinAsp (depending on which one is active).

```
cs7 as FsAinLnpAs sua
  routing-key 4402 1.1.1 si sccp ssn 247
  asp PriFsAinAsp
  asp SecFsAinAsp
  traffic-mode override
!
cs7 as FsAin800TAs sua
```

```

routing-key 4404 1.1.1 si sccp ssn 254
asp PriFsAinAsp
asp SecFsAinAsp
traffic-mode override
!
cs7 as FsAin800AAs sua
routing-key 4403 1.1.1 si sccp ssn 248
asp PriFsAinAsp
asp SecFsAinAsp
traffic-mode override
!
cs7 as FsPtcCnamAs sua
routing-key 4404 1.1.1 si sccp ssn 232
asp PriFsPtcAsp
asp SecFsPtcAsp
traffic-mode override
!
cs7 as FsPtcAcarAs sua
routing-key 4405 1.1.1 si sccp ssn 251
asp PriFsPtcAsp
asp SecFsPtcAsp
traffic-mode override
!
cs7 gtt load flash:gttdata.txt
!

```

## ITP2 Configuration

ITP2 is the second ITP in the sg-pair (each ITP in the sg-pair functions as an STP).

```

Current configuration : 4054 bytes
!
version 12.2
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname ITP2
!
boot-start-marker
boot system flash 2600/c2600-itp-mz.topsail_s_nightly_040915
boot-end-marker
!
redundancy inter-device
!
enable secret 5 $1$B6u2$gI4fFgj0Qo5XppDSWJdfI.
enable password cisco
!
!
memory-size iomem 10
ip subnet-zero
!
ip domain-name cisco.com
ip name-server 10.0.0.6
!
cs7 variant ANSI

```

For the Mated STP-Pair configuration (SG Mated Pair) configuration, the local point code value is 1.1.11, which is different than the BTS OPC and the other ITP (ITP1) that makes up the SG Mated Pair.

```

cs7 point-code 1.1.11
!
controller E1 0/0
  framing NO-CRC4
  channel-group 0 timeslots 1
!
controller E1 0/1
  framing NO-CRC4
  channel-group 0 timeslots 1
!
controller E1 0/2
  shutdown
!
controller E1 0/3
  shutdown
!
interface FastEthernet0/0
  ip address 10.0.1.55 255.255.0.0
  speed auto
  half-duplex
  no clns route-cache
!
interface FastEthernet0/1
  ip address 10.128.1.240 255.255.0.0
  speed auto
  half-duplex
  no clns route-cache
!
interface Serial0/0:0
  description connect to link 1 of STP 1-1-20
  no ip address
  encapsulation mtp2
  no clns route-cache

interface Serial0/1:0
  description connect to link 1 of STP 1-1-21
  no ip address
  encapsulation mtp2
  no clns route-cache

```

### local-peer definition

```

cs7 local-peer 7000
  local-ip 10.0.1.55
  local-ip 10.128.1.240

```

**Linkset definitions**—The number after 'link' represents SLC.

```

cs7 linkset lset1chn 1.1.20
  link 1 Serial0/0:0
!
cs7 linkset lset2chn 1.1.21
  link 1 Serial0/1:0

```

### C-link linkset definition

```

cs7 linkset c-link 1.1.10
  link 0 sctp 10.0.1.54 10.128.1.239 7000 7000
!
cs7 route-table system
  update route 1.1.30 255.255.255 linkset lset1chn priority 1

```

```

update route 1.1.30 255.255.255 linkset lset2chn priority 1
update route 1.1.31 255.255.255 linkset lset1chn priority 1
update route 1.1.31 255.255.255 linkset lset2chn priority 1
update route 1.1.40 255.255.255 linkset lset2chn priority 1
update route 1.1.40 255.255.255 linkset lset1chn priority 1

```

### C-link routes

```

update route 1.1.30 255.255.255 linkset c-link priority 2
update route 1.1.31 255.255.255 linkset c-link priority 2
update route 1.1.40 255.255.255 linkset c-link priority 2

```

### Routing to capability point codes of adjacent STPs

```

update route 1.1.22 255.255.255 linkset lset1chn priority 1
update route 1.1.22 255.255.255 linkset lset2chn priority 1

```

```

!
cs7 sgmp 9101
  local-ip 10.0.1.55
  local-ip 10.128.1.240
!
cs7 mated-sg ITP1 9101
  remote-ip 10.0.1.54
  remote-ip 10.128.1.239
cs7 m3ua 2905
  local-ip 10.0.1.55
  local-ip 10.128.1.240
!
cs7 asp PriCaIsupAsp 11146 2905 m3ua
  remote-ip 10.0.1.5
  remote-ip 10.128.1.2
!
cs7 asp SecCaIsupAsp 11146 2905 m3ua
  remote-ip 10.0.1.6
  remote-ip 10.128.1.3
!
cs7 as CaIsupAs m3ua
  routing-key 1 1.1.1 si isup
  asp PriCaIsupAsp
  asp SecCaIsupAsp
  traffic-mode override
!
cs7 sua 14001
  local-ip 10.0.1.55
  local-ip 10.128.1.240
  keepalive 2000
!
cs7 asp PriFsAinAsp 12205 14001 sua
  remote-ip 10.0.1.5
  remote-ip 10.128.1.2
!
cs7 asp SecFsAinAsp 12205 14001 sua
  remote-ip 10.0.1.6
  remote-ip 10.128.1.3
!
cs7 asp PriFsPtcAsp 12235 14001 sua
  remote-ip 10.0.1.5
  remote-ip 10.128.1.2
!
cs7 asp SecFsPtcAsp 12235 14001 sua
  remote-ip 10.0.1.6

```

```

remote-ip 10.128.1.3
!
cs7 as FsAinLnpAs sua
  routing-key 4402 1.1.1 si sccp ssn 247
  asp PriFsAinAsp
  asp SecFsAinAsp
  traffic-mode override
!
cs7 as FsAin800TAs sua
  routing-key 4401 1.1.1 si sccp ssn 254
  asp PriFsAinAsp
  asp SecFsAinAsp
  traffic-mode override
!
cs7 as FsAin800AAs sua
  routing-key 4403 1.1.1 si sccp ssn 248
  asp PriFsAinAsp
  asp SecFsAinAsp
  traffic-mode override
!
cs7 as FsPtcCnamAs sua
  routing-key 4404 1.1.1 si sccp ssn 232
  asp PriFsPtcAsp
  asp SecFsPtcAsp
  traffic-mode override
!
cs7 as FsPtcAcarAs sua
  routing-key 4405 1.1.1 si sccp ssn 251
  asp PriFsPtcAsp
  asp SecFsPtcAsp
  traffic-mode override
!
cs7 gtt load flash:gttdata.txt
!

```

## Cisco BTS 10200 Provisioning for a Mated STP-Pair Configuration

The local IP addresses and port are determined by command line arguments that are passed to the SGA process and TSA processes when they start up. An example SGA command line is:

```

Args=-t 1 -h crit-aSYS11CA.ipclab.cisco.com -p 11146 -mdldir ../mdl -mdltracedir
../mdltrace -mdltestmode 0 -mdlloadmdo 0 -mdltriggertimer 200 -mdlgarbagetimer 5146
-resetcics 1 -fcmtimer 900 -fcmparalleljobs 4

```

In this list of arguments, the `-h` argument, `crit-aSYS11CA.ipclab.cisco.com`, is a fully qualified domain name (FQDN) that resolves to two local IP addresses. In most cases, the FQDN can be viewed in the `/etc/hosts` file. To determine the IP addresses to which the FQDN resolves, type `nslookup <FQDN>`.

The following example configures the Cisco BTS 10200 in the Mated STP-Pair Configuration.

### CA Configuration

```

add ca-config type=MGCP-INIT-TERMS;value=160;datatype=integer;
add ca-config type=MGCP-INIT-DURATION;value=5;datatype=integer;
add ca-config type=MGCP-ICMP-PING-RETRANSMIT-DURATION;value=5;datatype=integer;
add ca-config type=MGCP-ICMP-PING-RETRY-COUNT;value=5;datatype=integer;
add ca-config type=MGCP-MAX-UNREACH-COUNT;value=5;datatype=integer;
add ca-config type=MGCP-MAX-FAULT-COUNT;value=5;datatype=integer;
add ca-config type=MGCP-ADM-RESP-TIME;value=300;datatype=integer;
add ca-config type=MGCP-SIG-TOS-LOWDELAY;value=Y;datatype=boolean;
add ca-config type=MGCP-SIG-TOS-PRECEDENCE;value=1;datatype=integer;

```

```
add ca-config type=MGCP-SIG-TOS-RELIABILITY;value=Y;datatype=boolean;
add ca-config type=MGCP-SIG-TOS-THROUGHPUT;value=Y;datatype=boolean;
```

## CA & FS

```
add call-agent id=CA146; tsap-addr-sidea=hrn11ca; mgw-monitoring-enabled=N;
add feature-server id=FSAIN205; tsap-addr-sidea=hrn11ca:11205; type=AIN;
add feature-server id=FSPTC235; tsap-addr-sidea=hrn11ca:11235; type=PTC;
```

## SIGTRAN components

```
add user-part-variant id=ANSISS7_GR317;
```

For the Mated STP-Pair configuration, there are two SGs defined for redundancy. They are essentially mated STPs. This is different than the A, F, or E link configurations, which derive redundancy at the SGP level.

```
add sg id=sg1; description=Signaling gateway 1;
add sg id=sg2; description=Signaling gateway 2;
```

In the Mated STP-Pair configuration, the SG-GRP has two SGs defined in the SG-GRP. The A,F, and E link configurations must only have one SG defined in an SG-GRP.

```
add sg-grp id=sg-grp1; sg1-id=sg1; sg2-id=sg2 description=SG group 1;
```

In the Mated STP-Pair configuration, there is only one SGP per SG. Note that the two SGPs defined here have a one-to-one correspondence to the SGs that were defined above. This is in contrast to the A,F, and E link configurations, which must have two SGPs per SG.

```
add sgp id=sg1-sgp1 ; sg-id=sg1; description=SG process 1 for sg1;
add sgp id=sg2-sgp1 ; sg-id=sg2; description=SG process 1 for sg2;

add opc id=opc1; point-code=1-1-1; description=OPC; point-code-type=ANSI_CHINA;
add dpc id=dpc1; point-code=1-1-30; description=DPC 1; point-code-type=ANSI_CHINA;
add dpc id=dpc2; point-code=1-1-31; description=DPC 2; point-code-type=ANSI_CHINA;
```

## ISUP routing keys

```
add routing-key id=rk1; opc-id=opc1; sg-grp-id=sg-grp1; si=ISUP; rc=1; platform-id=CA146;

add call-ctrl-route id=dpc1-routel; dpc-id=dpc1; routing-key-id=rk1; si=isup;
user-part-variant-id= ANSISS7_GR317
add call-ctrl-route id=dpc2-routel; dpc-id=dpc2; routing-key-id=rk1; si=isup;
user-part-variant-id= ANSISS7_GR317;

add sctp-assoc-profile id=sctp-prof;
```

**SCTP associations**—The chosen id name in this statement reflects the fact that this is the SCTP association for SGP1 of SG1.

```
add sctp-assoc id=sg1-sgp1-sctp; sgp-id=sg1-sgp1; sctp-assoc-profile-id=sctp-prof;
platform-id=CA146; remote-port=2905; remote-tsap-addr1=10.0.1.54;
remote-tsap-addr2=10.128.1.239; ip-tos-precedence=ROUTINE;

add sctp-assoc id=sg2-sgp1-sctp; sgp-id=sg2-sgp1; sctp-assoc-profile-id=sctp-prof;
platform-id=CA146; remote-port=2905; remote-tsap-addr1=10.0.1.55;
remote-tsap-addr2=10.128.1.240; dip-tos-precedence=ROUTINE;
```



## Dial plan profile

```
add digman-profile id=pretrans;
add digman id=pretrans; rule=1; match-string=^*; replace-string=&; match-noa=any;
replace-noa=VSC;
add digman id=pretrans; rule=2; match-string=#; replace-string=&; match-noa=any;
replace-noa=VSC;
add digman-profile id=ani_20;
add digman id=ani_20; rule=1; match-string=^20; replace-string=none;
add dial-plan-profile id=dp-1; nanp-dial-plan=Y; description=NA dial plan profile;
dnis-digman-id=pretrans; ani-digman-id=ani_20;
```

## SS7 TG

```
add ss7-ansi-tg-profile ID=ansi-tg-prof;
add trunk-grp ID=1; call_agent_id=CA146; tg_type=SS7; direction=BOTH;
tg_profile_id=ansi-tg-prof; call-ctrl-route-id=dpc1-routel; dial-plan-id=dp-1;
description=TG to DPC 1; MGCP_PKG_TYPE=T;
add trunk-grp ID=2; call_agent_id=CA146; tg_type=SS7; direction=BOTH;
tg_profile_id=ansi-tg-prof; call-ctrl-route-id=dpc2-routel; dial-plan-id=dp-1;
description=TG to DPC 2; MGCP_PKG_TYPE=T;
```

## MGW

```
add mgw-profile id=as5300-prof; vendor=Cisco; mgcp-hairpin-supp=n; MGCP_RSIPSTAR_SUPP=N;
MGCP_TERM_INIT_LEVEL=0; RBK_ON_CONN_SUPP=N; MGCP_VERSION=MGCP_1_0; mgcp-max2-retries=3;
fax-t38-camode-supp=Y; mgcp-keepalive-interval=60; mgcp-keepalive-retries=10;
mgcp-t-tran=400; mgcp-max1-retries=2; mgcp-t-longtran=5; mgcp-default-pkg=NONE;
MGCP_3WAY_HSHAKE_SUPP=N; mgw_type=AS5300; PC_MPTIME_SUPP=N;

MGCP_VERSION=MGCP_1_0; PC_MPTIME_SUPP=N;
add mgw id=va-5350-23; tsap-addr=va-5350-23.hrndvtest.cisco.com; call-agent-id=CA146;
mgw-profile-id=as5300-prof; type=TGW;
```

## SS7 terminations and trunks

```
add termination prefix=S3/DS1-4/; port-start=1; port-end=31; type=trunk;
mgw-id=va-5350-23;
add termination prefix=S3/DS1-5/; port-start=1; port-end=31; type=trunk;
mgw-id=va-5350-23;
add trunk cic-start=1; cic-end=31; tgn-id=1; mgw-id=va-5350-23;
termination-prefix=S3/DS1-4/; termination-port-start=1; termination-port-end=31;
add trunk cic-start=1; cic-end=31; tgn-id=2; mgw-id=va-5350-23;
termination-prefix=S3/DS1-5/; termination-port-start=1; termination-port-end=31;
```

## SS7 routes, route guides and destinations

```
add route id=dpc1-route; tg_selection=RR; tgn1_id=1;
add route id=dpc2-route; tg_selection=RR; tgn1_id=2;
add route-guide id=dpc1-rg; policy-type=ROUTE; policy-id=dpc1-route;
add route-guide id=dpc2-rg; policy-type=ROUTE; policy-id=dpc2-route;
add destination dest-id=dpc1-dest; call-type=LOCAL; route-type=ROUTE;
route-guide-id=dpc1-rg;
add destination dest-id=dpc2-dest; call-type=LOCAL; route-type=ROUTE;
route-guide-id=dpc2-rg;
```

**TCAP/SUA provisioning for FSAIN, FSPTC**

```
add sctp-assoc id=sg1-sgpl-sctp-ain; sgp-id=sg1-sgpl; sctp-assoc-profile-id=sctp-prof;
platform-id=FSAIN205; remote-port=14001; remote-tsap-addr1=10.0.1.54;
remote-tsap-addr2=10.128.1.239; ip-tos-precedence=ROUTINE;
```

```
add sctp-assoc id=sg2-sgpl-sctp-ain; sgp-id=sg2-sgpl; sctp-assoc-profile-id=sctp-prof;
platform-id=FSAIN205; remote-port=14001; remote-tsap-addr1=10.0.1.55;
remote-tsap-addr2=10.128.1.240; ip-tos-precedence=ROUTINE;
```

```
add sctp-assoc id=sg1-sgpl-sctp-ptc; sgp-id=sg1-sgpl; sctp-assoc-profile-id=sctp-prof;
platform-id=FSPTC235; remote-port=14001; remote-tsap-addr1=10.0.1.54;
remote-tsap-addr2=10.128.1.239; ip-tos-precedence=ROUTINE;
```

```
add sctp-assoc id=sg2-sgpl-sctp-ptc; sgp-id=sg2-sgpl; sctp-assoc-profile-id=sctp-prof;
platform-id=FSPTC235; remote-port=14001; remote-tsap-addr1=10.0.1.55;
remote-tsap-addr2=10.128.1.240; ip-tos-precedence=ROUTINE;
```

```
add sccp-nw id=1; NET_IND=NATIONAL; SUB_SVC=NATIONAL; HOP_COUNT=3;
```

```
add subsystem-profile id=SS_LNP; platform-id=FSAIN205; description=LNP subsystem;
add subsystem-profile id=SS_800A; platform-id=FSAIN205; description=AIN 800 subsystem;
add subsystem-profile id=SS_800T; platform-id=FSAIN205; description=IN1 800 subsystem;
add subsystem-profile id=SS_CNAM; platform-id=FSAIN205; description=CNAM subsystem;
add subsystem-profile id=SS_ACAR; platform-id=FSPTC235; description=ACAR subsystem;
```

```
add subsystem id=SS_LNP; opc-id=opc1; local-ssn=247; remote-ssn=247; sccp-nw-id=1;
SCCP_VERSION=ANS92; TCAP_VERSION=ANS92; APPLICATION_VERSION=AIN01;
add subsystem id=SS_800A; opc-id=opc1; local-ssn=248; remote-ssn=248; sccp-nw-id=1;
SCCP_VERSION=ANS92; TCAP_VERSION=ANS92; APPLICATION_VERSION=AIN01;
add subsystem id=SS_CNAM; opc-id=opc1; local-ssn=232; remote-ssn=232; sccp-nw-id=1;
SCCP_VERSION=ANS92; TCAP_VERSION=ANS92; APPLICATION_VERSION=IN1;
add subsystem id=SS_800T; opc-id=opc1; local-ssn=254; remote-ssn=254; sccp-nw-id=1;
SCCP_VERSION=ANS92; TCAP_VERSION=ANS92; APPLICATION_VERSION=IN1;
add subsystem id=SS_ACAR; opc-id=opc1; local-ssn=251; remote-ssn=251; sccp-nw-id=1;
SCCP_VERSION=ANS92; TCAP_VERSION=ANS92; APPLICATION_VERSION=IN1;
```

```
add routing-key id=rk_lnp; opc-id=opc1; sg-grp-id=sg_grp1; si=SCCP; rc=4402;
PLATFORM_ID=FSAIN205; ssn-id=SS_LNP;
add routing-key id=rk_800a; opc-id=opc1; sg-grp-id=sg_grp1; si=SCCP; rc=4403;
PLATFORM_ID=FSAIN205; ssn-id=SS_800A;
add routing-key id=rk_cnam; opc-id=opc1; sg-grp-id=sg_grp1; si=SCCP; rc=4404;
PLATFORM_ID=FSAIN205; ssn-id=SS_CNAM;
add routing-key id=rk_800t; opc-id=opc1; sg-grp-id=sg_grp1; si=SCCP; rc=4401;
PLATFORM_ID=FSAIN205; ssn-id=SS_800T;
add routing-key id=rk_acar; opc-id=opc1; sg-grp-id=sg_grp1; si=SCCP; rc=4405;
PLATFORM_ID=FSPTC235; ssn-id=SS_ACAR;
```

**Provisioned DPC is the STP capability point code**

```
add dpc id=stp_cap_pc; point-code=1-1-22; point-code-type=ANSI_CHINA;
description=Capability Point Code of STPs
```

```
add feature fname=LNP; feature-server-id=FSAIN205; description=Local number portability;
tdp1=COLLECTED_INFORMATION; tid1=LNP_TRIGGER; ttype1=R;
```

```
add ported-office-code digit-string=301-612; in-call-agent=n;
```

```
add CA-Config type=DEFAULT-LNP-SLHR-ID; datatype=string; value=slhr_lnp;
```

```
add slhr-profile id=slhr_800t; description=Service Logic Host Routing Table for IN1 800
Service;
```

```

add slhr-profile id=slhr_lnp; description=Service Logic Host Routing Table for AIN LNP
Service;
add slhr-profile id=slhr_800a; description=Service Logic Host Routing Table for AIN 800
Service;
add slhr-profile id=slhr_cnam; description=Service Logic Host Routing Table for IN1 CNAM
Service;
add slhr-profile id=slhr_acar; description=Service Logic Host Routing Table for ACAR
Service;

add slhr id=slhr_800t; opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_800T; gtt-req=Y; tt=254;
GTT_ADDR_TYPE=CDPN; GTT_ADDR=3;
add slhr id=slhr_lnp; opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_LNP; gtt-req=Y; tt=11;
GTT_ADDR_TYPE=CDPN; GTT_ADDR=3;
add slhr id=slhr_800a; opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_800A; gtt-req=Y; tt=8;
GTT_ADDR_TYPE=CDPN; GTT_ADDR=3;
add slhr id=slhr_cnam; opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_CNAM; gtt-req=Y; tt=5;
GTT_ADDR_TYPE=CLGN; GTT_ADDR=3;
add slhr id=slhr_acar; opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_ACAR; gtt-req=Y; tt=251;
GTT_ADDR_TYPE=CDPN; GTT_ADDR=10;

add sccp-route opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_800T; rk-id=rk_800t;
add sccp-route opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_800A; rk-id=rk_800a;
add sccp-route opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_LNP; rk-id=rk_lnp;
add sccp-route opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_CNAM; rk-id=rk_cnam;
add sccp-route opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_ACAR; rk-id=rk_acar;

add sccp-route SSN_ID=SS_ACAR; OPC_ID=opc1; DPC_ID=dpc1; RK_ID=rk_acar
add sccp-route SSN_ID=SS_ACAR; OPC_ID=opc1; DPC_ID=dpc2; RK_ID=rk_acar

add pop ID=50901; STATE=tx; COUNTRY=US; TIMEZONE=CDT; LOCAL_7D_DIALING=Y; ITP=N;
ZERO_MINUS=LEC; BLOCK_EAWOPIC=Y; CNAM_OPTION=EXT_LIDB; PIC2_REQD=N; MY_LRN=4692559999;
TREAT_IMS_ANONYMOUS=N; OPC_ID=opc1; ZERO_PLUS_LOCAL=N

```

### Control network entities in-service for ANSI SS7

```

control trunk-grp id=1; mode=forced; target-state=ins;
control trunk-grp id=2; mode=forced; target-state=ins;
equip trunk-termination tgn-id=1; cic=all;
equip trunk-termination tgn-id=2; cic=all;
control trunk-termination tgn-id=1; cic=all; target-state=INS; mode=FORCED;
control trunk-termination tgn-id=2; cic=all; target-state=INS; mode=FORCED;
control sctp-assoc id=sg1-sgpl-sctp; mode=forced; target-state=INS;
control sctp-assoc id=sg2-sgpl-sctp; mode=forced; target-state=INS;
control sctp-assoc id=sg1-sgpl-sctp-ain; mode=forced; target-state=INS;
control sctp-assoc id=sg2-sgpl-sctp-ain; mode=forced; target-state=INS;
control sctp-assoc id=sg1-sgpl-sctp-ptc; mode=forced; target-state=INS;
control sctp-assoc id=sg2-sgpl-sctp-ptc; mode=forced; target-state=INS;
control subsystem id=SS_800T; opc-id=opc; target-state=UIS; mode=FORCED;
control subsystem id=SS_LNP; opc-id=opc; target-state=UIS; mode=FORCED;
control subsystem id=SS_800A; opc-id=opc; target-state=UIS; mode=FORCED;
control subsystem id=SS_CNAM; opc-id=opc; target-state=UIS; mode=FORCED;
control subsystem id=SS_ACAR; opc-id=opc; target-state=UIS; mode=FORCED;

```

### Status commands

```

# status trunk-grp id=1;
# status trunk-grp id=2;
# status trunk-termination tgn-id=1; cic=all;
# status trunk-termination tgn-id=2; cic=all;
# status sctp-assoc id=sg1-sgpl-sctp;
# status sctp-assoc id=sg2-sgpl-sctp;
# status sctp-assoc id=sg1-sgpl-sctp-ain;
# status sctp-assoc id=sg2-sgpl-sctp-ain;

```

```
# status sctp-assoc id=sg1-sgpl-sctp-ptc;
# status sctp-assoc id=sg2-sgpl-sctp-ptc;
# status subsystem id=SS_800T; opc-id=opc;
# status subsystem id=SS_LNP; opc-id=opc;
# status subsystem id=SS_800A; opc-id=opc;
# status subsystem id=SS_CNAM; opc-id=opc;
# status subsystem id=SS_ACAR; opc-id=opc;
```

## Shared Point Code Configuration Example

A basic Shared Point Code configuration is used when a customer wants an OPC of the BTS to be shared with a point code of the ITP. This usually occurs when the customer wants to access the SS7 service provider network using A-links. It provides a low cost yet fully hardware and network redundant solution. Cost reduction is accomplished by minimizing the number of point codes that are connected to the SS7 service provider network and by connecting via A-links rather than D-links, which require more setup and maintenance.

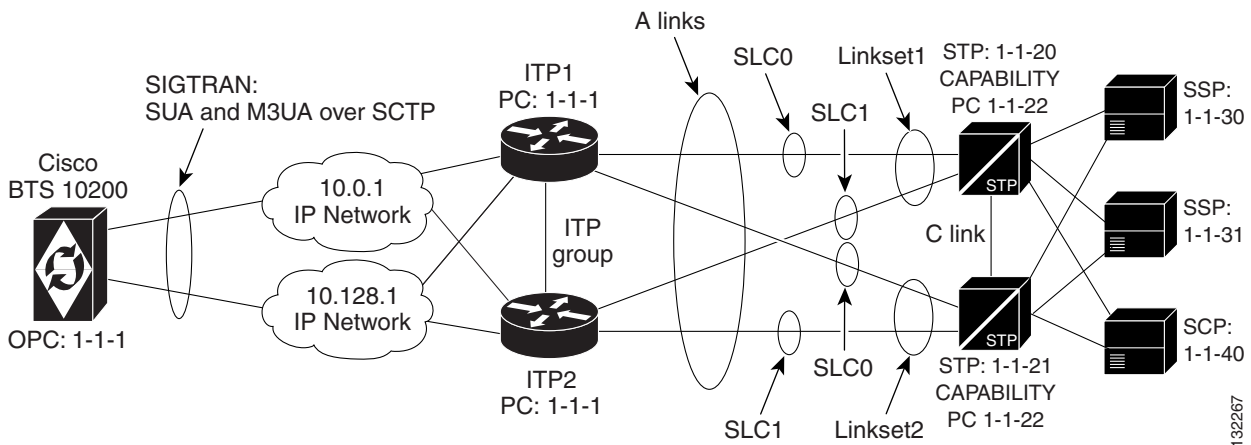
This section provides an example and diagram for the basic Shared Point Code configuration. Please refer to [Figure 2-2](#) when reading this example.



**Note**

The ITP configuration may vary slightly, depending on the ITP platform.

**Figure 2-2** Shared Point Code Configuration



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## ITP Configuration

This section contains a configuration example for the basic Shared Point Code profile. For additional ITP configuration information, please refer to the *Cisco IP Transfer Point (ITP) Configuration Guide*



**Note**

When debugging the ITP, the version of the ITP should be noted so the associated ITP manual can be consulted.

## ITP1 Configuration

This is the first ITP in the ITP group (the first SGP in the SG).

```

!
Current configuration : 3470 bytes
!
version 12.2
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname ITP1
!
boot-start-marker
boot system flash c2600-itp-mz.topsail_s_nightly_040915
boot-end-marker
!
redundancy inter-device
!
enable secret 5 $1$XCoU$j0Y2wFRoks2pocHa1gHhi0
enable password cisco

```

For the Shared Point Code configuration, ipc zone is provisioned to support the link between two ITPs in the ITP-group.

```

ipc zone default
association 1
no shutdown
protocol sctp
local-port 9001
local-ip 10.0.1.54
local-ip 10.128.1.239
remote-port 9000
remote-ip 10.0.1.55
remote-ip 10.128.1.240
!
memory-size iomem 20
ip subnet-zero
!
ip domain-name cisco.com
ip name-server 10.0.0.6
!

```

For the Shared Point Code (ITP-group/Distributed MTP) configuration, the local point code value is 1.1.1, which is the same as the BTS OPC.

```

cs7 variant ANSI
cs7 point-code 1.1.1
!
controller E1 0/0
framing NO-CRC4
channel-group 0 timeslots 1
!
controller E1 0/1
framing NO-CRC4
channel-group 0 timeslots 1
!
controller E1 0/2
shutdown
!
controller E1 0/3

```

```

shutdown
!
interface FastEthernet0/0
 ip address 10.0.1.54 255.255.0.0
 speed auto
 half-duplex
 no clns route-cache
!
interface Serial0/0:0
 description connect to link 0 of STP 1-1-20
 no ip address
 encapsulation mtp2
 no clns route-cache
!
interface FastEthernet0/1
 ip address 10.128.1.239 255.255.0.0
 speed auto
 half-duplex
 no clns route-cache
!
interface Serial0/1:0
 description connect to link 0 of STP 1-1-21
 no ip address
 encapsulation mtp2
 no clns route-cache
!

```

Unlike the Mated STP-Pair configuration, which defines a local-peer and mated-sg for redundancy, for the Distributed MTP3 feature Shared Point Code configuration, you define a cs7 group. This enables both ITPs in the ITP-group (or SGPs in the SG) to communicate with each other. In this configuration, you define the IP addresses and port values for both sides of the connection.

```

cs7 group grp-ITP1 9004
 local-ip 10.0.1.54
 local-ip 10.128.1.239
 peer grp-ITP2 9003
  remote-ip 10.0.1.55
  remote-ip 10.128.1.240

```

When the linksets are defined, for redundancy, each linkset has links from each ITP in the ITP-group (or SGP in the SG).

```

cs7 linkset lset1chn 1.1.20
 link 0 grp-ITP1 Serial0/0:0
 link 1 grp-ITP2 Serial0/0:0

cs7 linkset lset2chn 1.1.21
 link 0 grp-ITP1 Serial0/1:0
 link 1 grp-ITP2 Serial0/1:0

```

Unlike the Mated STP-Pair configuration, there are no low priority routes defined to the DPCs. This is because, in the ITP-group setup, the STPs view the combination of the two ITPs is as a single entity. The two SGPs form one SG. Therefore, there is no lower priority routes that travel across a C-link between the two ITPs like there is in the Mated STP-Pair configuration.

```

cs7 route-table system
 update route 1.1.30 255.255.255 linkset lset1chn priority 1
 update route 1.1.31 255.255.255 linkset lset2chn priority 1
 update route 1.1.30 255.255.255 linkset lset2chn priority 1
 update route 1.1.31 255.255.255 linkset lset1chn priority 1

```

```
update route 1.1.40 255.255.255 linkset lset2chn priority 1
update route 1.1.40 255.255.255 linkset lset1chn priority 1
```

### Routing to capability point codes of adjacent STPs

```
update route 1.1.22 255.255.255 linkset lset1chn priority 1
update route 1.1.22 255.255.255 linkset lset2chn priority 1
```

### The M3UA definition that declares local IP addresses and port

```
cs7 m3ua 2905
local-ip 10.0.1.54
local-ip 10.128.1.239
keepalive 2000
```

Here, as with all configurations, there are a minimum of two ASPs defined for each AS (one for the primary BTS node and one for the secondary BTS node). In reality, there will be at least one for each "user part" on the BTS 10200. If you have a TCAP service going over SUA and ISUP traffic, you will have a total of at least four ASPs: primary ISUP, secondary ISUP, primary TCAP service, secondary TCAP service. 2905 is the local port value. The remote IP addresses are the BTS IP addresses. They are also obtained through the FQDN that is an SGA command line argument.

```
cs7 asp PriCaIsupAsp 11146 2905 m3ua
remote-ip 10.0.1.5
remote-ip 10.128.1.2
!
cs7 asp SecCaIsupAsp 11146 2905 m3ua
remote-ip 10.0.1.6
remote-ip 10.128.1.3
!
```

The routing key is a very simple one. It has a routing context of 1 defined, the DPC (BTS OPC) of 1.1.1 defined, and a service indicator of ISUP defined. This means that all traffic coming from the SS7 service provider network that has a DPC of 1.1.1 and a service indicator of ISUP will be sent to either PrimaryBtsIsupAsp or SecondaryBtsIsupAsp (depending on which one is active). The traffic mode is always set to override (not loadshare), as with the current implementation, only the override application server traffic mode is supported. In the case of override-traffic mode, the reception of ASP active messages at the SGP causes the redirection of all traffic for the AS to the ASP that sent the ASP active message.

This is the SUA definition that declares local IP addresses and port numbers.

```
cs7 sua 14001
local-ip 10.0.1.54
local-ip 10.128.1.239
keepalive 2000
```

Here we are defining an ASP that will process AIN related traffic. 14001 is the local port number.

```
cs7 asp PriFSainAsp 12205 14001 sua
remote-ip 10.0.1.5
remote-ip 10.128.1.2
!
cs7 asp SecFSainAsp 12205 14001 sua
remote-ip 10.0.1.6
remote-ip 10.128.1.3
```

The following AS is defined for local number portability (LNP) related message flows. The routing context value is 4, the DPC (BTS OPC) is 1.1.1, the service indicator is SCCP and the subsystem number is 247. This means that any message received from the SS7 service provider that has a DPC of 1.1.1, a service indicator of SCCP and an SSN of 247 will be sent to either PriFsAinAsp or SecFsAinAsp (depending on which one is active).

```
cs7 as FsAinLnpAs sua
  routing-key 4402 1.1.1 si sccp ssn 247
  asp PriFsAinAsp
  asp SecFsAinAsp
  traffic-mode override
```

```
cs7 as FsAin800TAs sua
  routing-key 4401 1.1.1 si sccp ssn 254
  asp PriFsAinAsp
  asp SecFsAinAsp
  traffic-mode override
```

```
cs7 as FsAin800AAs sua
  routing-key 4403 1.1.1 si sccp ssn 248
  asp PriFsAinAsp
  asp SecFsAinAsp
  traffic-mode override
```

Here we are defining an ASPs that will process FSPTC related traffic. 14001 is the local port number.

```
cs7 asp PriFsPtcAsp 12235 14001 sua
  remote-ip 10.0.1.5
  remote-ip 10.128.1.2
  !
cs7 asp SecFsPtcAsp 12235 14001 sua
  remote-ip 10.0.1.6
  remote-ip 10.128.1.3
  !
cs7 as FsPtcCnamAs sua
  routing-key 4404 1.1.1 si sccp ssn 232
  asp PriFsPtcAsp
  asp SecFsPtcAsp
  traffic-mode override

cs7 as FsPtcAcarAs sua
  routing-key 4405 1.1.1 si sccp ssn 251
  asp PriFsPtcAsp
  asp SecFsPtcAsp
  traffic-mode override

!
```

## ITP2 Configuration

This is the second ITP in the ITP-Group (the second SGP in the SG). Please refer to the comments in the ITP1 Configuration section. The configuration in this section is similar to the ITP1 section, except for the ITP Group definition.

```
!
Current configuration : 4054 bytes
!
version 12.2
service timestamps debug datetime msec
service timestamps log datetime msec
```



```
no service password-encryption
!
hostname ITP2
!
boot-start-marker
boot system flash 2600/c2600-itp-mz.topsail_s_nightly_040915
boot-end-marker
!
redundancy inter-device
!
enable secret 5 $1$B6u2$gI4fFgjOQo5XppDSWJDfI.
enable password cisco
!
ipc zone default
  association 1
    no shutdown
    protocol sctp
      local-port 9000
      local-ip 10.0.1.55
      local-ip 10.128.1.240
      remote-port 9001
      remote-ip 10.0.1.54
      remote-ip 10.128.1.239
    !
  memory-size iomem 10
  ip subnet-zero
  !
  ip domain-name cisco.com
  ip name-server 10.0.0.6
  !
  cs7 variant ANSI
  cs7 point-code 1.1.1
  !
  controller E1 0/0
    framing NO-CRC4
    channel-group 0 timeslots 1
  !
  controller E1 0/1
    framing NO-CRC4
    channel-group 0 timeslots 1
  !
  controller E1 0/2
    shutdown
  !
  controller E1 0/3
    shutdown
  !
  interface FastEthernet0/0
    ip address 10.0.1.55 255.255.0.0
    speed auto
    half-duplex
    no clns route-cache
  !
  interface Serial10/0:0
    description connect to link 1 of STP 1-1-20
    no ip address
    encapsulation mtp2
    no clns route-cache
  !
  interface FastEthernet0/1
    ip address 10.128.1.240 255.255.0.0
    speed auto
    half-duplex
    no clns route-cache
```

```

!
interface Serial0/1:0
  description connect to link 1 of STP 1-1-21
  no ip address
  encapsulation mtp2
  no clns route-cache
!
cs7 group grp-ITP2 9003
  local-ip 10.0.1.55
  local-ip 10.128.1.240
  peer grp-ITP1 9004
    remote-ip 10.0.1.54
    remote-ip 10.128.1.239
!
cs7 linkset lset1chn 1.1.20
  link 0 grp-ITP1 Serial0/0:0
  link 1 grp-ITP2 Serial0/0:0
!
cs7 linkset lset2chn 1.1.21
  link 0 grp-ITP1 Serial0/1:0
  link 1 grp-ITP2 Serial0/1:0
!
cs7 route-table system
  update route 1.1.30 255.255.255 linkset lset1chn priority 1
  update route 1.1.31 255.255.255 linkset lset2chn priority 1
  update route 1.1.30 255.255.255 linkset lset2chn priority 1
  update route 1.1.31 255.255.255 linkset lset1chn priority 1
  update route 1.1.40 255.255.255 linkset lset2chn priority 1
  update route 1.1.40 255.255.255 linkset lset1chn priority 1

```

### Routing to capability point codes of adjacent STPs

```

  update route 1.1.22 255.255.255 linkset lset1chn priority 1
  update route 1.1.22 255.255.255 linkset lset2chn priority 1
!
cs7 m3ua 2905
  local-ip 10.0.1.55
  local-ip 10.128.1.240
!
cs7 asp PriCaIsupAsp 11146 2905 m3ua
  remote-ip 10.0.1.5
  remote-ip 10.128.1.2
!
cs7 asp SecCaIsupAsp 11146 2905 m3ua
  remote-ip 10.0.1.6
  remote-ip 10.128.1.3
!
cs7 as CaIsupAs m3ua
  routing-key 2 1.1.1 si isup
  asp PriCaIsupAsp
  asp SecCaIsupAsp
  traffic-mode override
!
cs7 sua 14001
  local-ip 10.0.1.54
  local-ip 10.128.1.239
  keepalive 2000
!
cs7 asp PriFsAinAsp 12205 14001 sua
  remote-ip 10.0.1.5
  remote-ip 10.128.1.2
!

```

```

cs7 asp SecFsAinAsp 12205 14001 sua
  remote-ip 10.0.1.6
  remote-ip 10.128.1.3
!
cs7 as FsAinLnpAs sua
  routing-key 4402 1.1.1 si sccp ssn 247
  asp PriFsAinAsp
  asp SecFsAinAsp
  traffic-mode override

cs7 as FsAin800TAs sua
  routing-key 4401 1.1.1 si sccp ssn 254
  asp PriFsAinAsp
  asp SecFsAinAsp
  traffic-mode override

cs7 as FsAin800AAs sua
  routing-key 4403 1.1.1 si sccp ssn 248
  asp PriFsAinAsp
  asp SecFsAinAsp
  traffic-mode override

cs7 asp PriFsPtcAsp 12235 14001 sua
  remote-ip 10.0.1.5
  remote-ip 10.128.1.2
!
cs7 asp SecFsPtcAsp 12235 14001 sua
  remote-ip 10.0.1.6
  remote-ip 10.128.1.3
!
cs7 as FsPtcCnamAs sua
  routing-key 4404 1.1.1 si sccp ssn 232
  asp PriFsPtcAsp
  asp SecFsPtcAsp
  traffic-mode override

cs7 as FsPtcAcarAs sua
  routing-key 4405 1.1.1 si sccp ssn 251
  asp PriFsPtcAsp
  asp SecFsPtcAsp
  traffic-mode override

```

## Cisco BTS 10200 Softswitch Provisioning for the Shared Point Code Configuration

The following example provisions the BTS 10200 for a basic Shared Point Code configuration:

### CA configuration

```

add ca-config type=MGCP-INIT-TERMS;value=160;datatype=integer;
add ca-config type=MGCP-INIT-DURATION;value=5;datatype=integer;
add ca-config type=MGCP-ICMP-PING-RETRANSMIT-DURATION;value=5;datatype=integer;
add ca-config type=MGCP-ICMP-PING-RETRY-COUNT;value=5;datatype=integer;
add ca-config type=MGCP-MAX-UNREACH-COUNT;value=5;datatype=integer;
add ca-config type=MGCP-MAX-FAULT-COUNT;value=5;datatype=integer;
add ca-config type=MGCP-ADM-RESP-TIME;value=300;datatype=integer;
add ca-config type=MGCP-SIG-TOS-LOWDELAY;value=Y;datatype=boolean;
add ca-config type=MGCP-SIG-TOS-PRECEDENCE;value=1;datatype=integer;

```

```
add ca-config type=MGCP-SIG-TOS-RELIABILITY;value=Y;datatype=boolean;
add ca-config type=MGCP-SIG-TOS-THROUGHPUT;value=Y;datatype=boolean;
```

### CA & FS configuration

```
add call-agent id=CA146; tsap-addr-sidea=hrn11ca; mgw-monitoring-enabled=N;
add feature-server id=FSAIN205; tsap-addr-sidea=hrn11ca:11205; type=AIN;
add feature-server id=FSPTC235; tsap-addr-sidea=hrn11ca:11235; type=PTC;
```

### SIGTRAN components

```
add user-part-variant id=ANSISS7_GR317;
```

Unlike the Mated STP-Pair solution that requires two SG definitions for each SG-grp, Shared Point Code (Basic Distributed MTP3) solution requires that only one SG be associated with the SG-grp. This is because redundancy in the Shared Point Code solution is at the SGP level (not the SG level).

```
add sg id=sg1; description=Signaling gateway 1;
add sg-grp id=sg-grp1; sg1-id=sg1; description=SG group 1;
```

There are two SGP definitions per SG. This is in contrast to the Mated STP-Pair solution that only allows one SGP per SG. It is at the SGP level that the Shared Point Code/Distributed MTP3 solution provides hardware and IP network redundancy.

```
add sgp id=sg1-sgp1 ; sg-id=sg1; description=SG process 1 for sg1;
add sgp id=sg1-sgp2 ; sg-id=sg1; description=SG process 2 for sg1;

add opc id=opc1; point-code=1-1-1; description=OPC; point-code-type=ANSI_CHINA;
add dpc id=dpc1; point-code=1-1-30; description=DPC 1; point-code-type=ANSI_CHINA;
add dpc id=dpc2; point-code=1-1-31; description=DPC 2; point-code-type=ANSI_CHINA;
```

### ISUP routing keys

```
add routing-key id=rk1; opc-id=opc1; sg-grp-id=sg-grp1; si=ISUP; rc=1; platform-id=CA146;

add call-ctrl-route id=dpc1-route1; dpc-id=dpc1; routing-key-id=rk1; si=isup;
user-part-variant-id= ANSISS7_GR317
add call-ctrl-route id=dpc2-route1; dpc-id=dpc2; routing-key-id=rk1; si=isup;
user-part-variant-id= ANSISS7_GR317;
```

### SCTP configuration for M3UA (ISUP)

```
add sctp-assoc-profile id=sctp-prof;
```

The id used in the add sctp-assoc statement reflects the fact that this is the SCTP association for SGP1 of SG1.

```
add sctp-assoc id=sg1-sgp1-sctp; sgp-id=sg1-sgp1; sctp-assoc-profile-id=sctp-prof;
platform-id=CA146; remote-port=2905; remote-tsap-addr1=10.0.1.54;
remote-tsap-addr2=10.128.1.239; ip-tos-precedence=ROUTINE;

add sctp-assoc id=sg1-sgp2-sctp; sgp-id=sg1-sgp2; sctp-assoc-profile-id=sctp-prof;
platform-id=CA146; remote-port=2905; remote-tsap-addr1=10.0.1.55;
remote-tsap-addr2=10.128.1.240; ip-tos-precedence=ROUTINE;
```

## Dial plan profile with digit manipulation

```
add digman-profile id=pretrans;
add digman id=pretrans; rule=1; match-string=^*; replace-string=&; match-noa=any;
replace-noa=VSC;
add digman id=pretrans; rule=2; match-string=^#; replace-string=&; match-noa=any;
replace-noa=VSC;
add digman-profile id=ani_20;
add digman id=ani_20; rule=1; match-string=^20; replace-string=none;
add dial-plan-profile id=dp-1; nanp-dial-plan=Y; description=NA dial plan profile;
dnis-digman-id=pretrans; ani-digman-id=ani_20;
```

## SS7 trunk group configuration

```
add ss7-ansi-tg-profile ID=ansi-tg-prof;
add trunk-grp ID=1; call_agent_id=CA146; tg_type=SS7; direction=BOTH;
tg_profile_id=ansi-tg-prof; call-ctrl-route-id=dpc1-routel; dial-plan-id=dp-1;
description=TG to DPC 1; MGCP_PKG_TYPE=T;
add trunk-grp ID=2; call_agent_id=CA146; tg_type=SS7; direction=BOTH;
tg_profile_id=ansi-tg-prof; call-ctrl-route-id=dpc2-routel; dial-plan-id=dp-1;
description=TG to DPC 2; MGCP_PKG_TYPE=T;
```

## MGW configuration

```
add mgw-profile id=as5300-prof; vendor=Cisco; mgcp-hairpin-supp=n; MGCP_RSIPSTAR_SUPP=N;
MGCP_TERM_INIT_LEVEL=0; RBK_ON_CONN_SUPP=N; MGCP_VERSION=MGCP_1_0; mgcp-max2-retries=3;
fax-t38-camode-supp=Y; mgcp-keepalive-interval=60; mgcp-keepalive-retries=10;
mgcp-t-tran=400; mgcp-max1-retries=2; mgcp-t-longtran=5; mgcp-default-pkg=NONE;
MGCP_3WAY_HSHAKE_SUPP=N; mgw_type=AS5300; PC_MPTIME_SUPP=N;
MGCP_VERSION=MGCP_1_0; PC_MPTIME_SUPP=N;
add mgw id=va-5350-23; tsap-addr=va-5350-23.hrndevtest.cisco.com; call-agent-id=CA146;
mgw-profile-id=as5300-prof; type=MGW;
```

## SS7 terminations and trunks

```
add termination prefix=S3/DS1-4/; port-start=1; port-end=31; type=trunk;
mgw-id=va-5350-23;
add termination prefix=S3/DS1-5/; port-start=1; port-end=31; type=trunk;
mgw-id=va-5350-23;
add trunk cic-start=1; cic-end=31; tgn-id=1; mgw-id=va-5350-23;
termination-prefix=S3/DS1-4/; termination-port-start=1; termination-port-end=31;
add trunk cic-start=1; cic-end=31; tgn-id=2; mgw-id=va-5350-23;
termination-prefix=S3/DS1-5/; termination-port-start=1; termination-port-end=31;
```

## SS7 routes, route guides and destinations

```
add route id=dpc1-route; tg_selection=RR; tgn1_id=1;
add route id=dpc2-route; tg_selection=RR; tgn1_id=2;
add route-guide id=dpc1-rg; policy-type=ROUTE; policy-id=dpc1-route;
add route-guide id=dpc2-rg; policy-type=ROUTE; policy-id=dpc2-route;
add destination dest-id=dpc1-dest; call-type=LOCAL; route-type=ROUTE;
route-guide-id=dpc1-rg;
add destination dest-id=dpc2-dest; call-type=LOCAL; route-type=ROUTE;
route-guide-id=dpc2-rg;
```

**TCAP/SUA provisioning for FSAIN, FSPTC**

```
add sctp-assoc id=sg1-sgp1-sctp-ain; sgp-id=sg1-sgp1; sctp-assoc-profile-id=sctp-prof;
platform-id=FSAIN205; remote-port=14001; remote-tsap-addr1=10.0.1.54;
remote-tsap-addr2=10.128.1.239; ip-tos-precedence=ROUTINE;
```

```
add sctp-assoc id=sg1-sgp2-sctp-ain; sgp-id=sg2-sgp1; sctp-assoc-profile-id=sctp-prof;
platform-id=FSAIN205; remote-port=14001; remote-tsap-addr1=10.0.1.55;
remote-tsap-addr2=10.128.1.240; ip-tos-precedence=ROUTINE;
```

```
add sctp-assoc id=sg1-sgp1-sctp-ptc; sgp-id=sg1-sgp1; sctp-assoc-profile-id=sctp-prof;
platform-id=FSPTC235; remote-port=14001; remote-tsap-addr1=10.0.1.54;
remote-tsap-addr2=10.128.1.239; ip-tos-precedence=ROUTINE;
```

```
add sctp-assoc id=sg1-sgp2-sctp-ptc; sgp-id=sg2-sgp1; sctp-assoc-profile-id=sctp-prof;
platform-id=FSPTC235; remote-port=14001; remote-tsap-addr1=10.0.1.55;
remote-tsap-addr2=10.128.1.240; ip-tos-precedence=ROUTINE;
add sccp-nw id=1;NET_IND=NATIONAL;SUB_SVC=NATIONAL;HOP_COUNT=3;
```

```
add subsystem-profile id=SS_LNP; platform-id=FSAIN205; description=LNP subsystem;
add subsystem-profile id=SS_800A; platform-id=FSAIN205; description=AIN 800 subsystem;
add subsystem-profile id=SS_800T; platform-id=FSAIN205; description=IN1 800 subsystem;
add subsystem-profile id=SS_CNAM; platform-id=FSAIN205; description=CNAM subsystem;
add subsystem-profile id=SS_ACAR; platform-id=FSPTC235; description=ACAR subsystem;
```

```
add subsystem id=SS_LNP; opc-id=opc1; local-ssn=247; remote-ssn=247; sccp-nw-id=1;
SCCP_VERSION=ANS92; TCAP_VERSION=ANS92; APPLICATION_VERSION=AIN01;
add subsystem id=SS_800A; opc-id=opc1; local-ssn=248; remote-ssn=248; sccp-nw-id=1;
SCCP_VERSION=ANS92; TCAP_VERSION=ANS92; APPLICATION_VERSION=AIN01;
add subsystem id=SS_CNAM; opc-id=opc1; local-ssn=232; remote-ssn=232; sccp-nw-id=1;
SCCP_VERSION=ANS92; TCAP_VERSION=ANS92; APPLICATION_VERSION=IN1;
add subsystem id=SS_800T; opc-id=opc1; local-ssn=254; remote-ssn=254; sccp-nw-id=1;
SCCP_VERSION=ANS92; TCAP_VERSION=ANS92; APPLICATION_VERSION=IN1;
add subsystem id=SS_ACAR; opc-id=opc1; local-ssn=251; remote-ssn=251; sccp-nw-id=1;
SCCP_VERSION=ANS92; TCAP_VERSION=ANS92; APPLICATION_VERSION=IN1;
```

```
add routing-key id=rk_lnp; opc-id=opc1; sg-grp-id=sg_grp1; si=SCCP; rc=4402;
PLATFORM_ID=FSAIN205; ssn-id=SS_LNP;
add routing-key id=rk_800a; opc-id=opc1; sg-grp-id=sg_grp1; si=SCCP; rc=4403;
PLATFORM_ID=FSAIN205; ssn-id=SS_800A;
add routing-key id=rk_cnam; opc-id=opc1; sg-grp-id=sg_grp1; si=SCCP; rc=4404;
PLATFORM_ID=FSAIN205; ssn-id=SS_CNAM;
add routing-key id=rk_800t; opc-id=opc1; sg-grp-id=sg_grp1; si=SCCP; rc=4401;
PLATFORM_ID=FSAIN205; ssn-id=SS_800T;
add routing-key id=rk_acar; opc-id=opc1; sg-grp-id=sg_grp1; si=SCCP; rc=4405;
PLATFORM_ID=FSPTC235; ssn-id=SS_ACAR;
```

**Provisioned DPC is the STP capability point code (alias point code)**

```
add dpc id=stp_cap_pc; point-code=1-1-22; point-code-type=ANSI_CHINA;
description=Capability Point Code of STPs
```

```
add feature fname=LNP; feature-server-id=FSAIN205; description=Local number portability;
tdp1=COLLECTED_INFORMATION; tid1=LNP_TRIGGER; ttype1=R;
```

```
add ported-office-code digit-string=301-612; in-call-agent=n;
```

```
add CA-Config type=DEFAULT-LNP-SLHR-ID; datatype=string; value=slhr_lnp;
```

```
add slhr-profile id=slhr_800t; description=Service Logic Host Routing Table for IN1 800
Service;
```

```

add slhr-profile id=slhr_lnp; description=Service Logic Host Routing Table for AIN LNP
Service;
add slhr-profile id=slhr_800a; description=Service Logic Host Routing Table for AIN 800
Service;
add slhr-profile id=slhr_cnam; description=Service Logic Host Routing Table for IN1 CNAM
Service;
add slhr-profile id=slhr_acar; description=Service Logic Host Routing Table for ACAR
Service;
add slhr id=slhr_800t; opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_800T; gtt-req=Y; tt=254;
GTT_ADDR_TYPE=CDPN; GTT_ADDR=3;
add slhr id=slhr_lnp; opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_LNP; gtt-req=Y; tt=11;
GTT_ADDR_TYPE=CDPN; GTT_ADDR=3;
add slhr id=slhr_800a; opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_800A; gtt-req=Y; tt=8;
GTT_ADDR_TYPE=CDPN; GTT_ADDR=3;
add slhr id=slhr_cnam; opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_CNAM; gtt-req=Y; tt=5;
GTT_ADDR_TYPE=CLGN; GTT_ADDR=3;
add slhr id=slhr_acar; opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_ACAR; gtt-req=Y; tt=251;
GTT_ADDR_TYPE=CDPN; GTT_ADDR=10;
add sccp-route opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_800T; rk-id=rk_800t;
add sccp-route opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_800A; rk-id=rk_800a;
add sccp-route opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_LNP; rk-id=rk_lnp;
add sccp-route opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_CNAM; rk-id=rk_cnam;
add sccp-route opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_ACAR; rk-id=rk_acar;

add sccp-route SSN_ID=SS_ACAR; OPC_ID=opc1; DPC_ID=dpc1; RK_ID=rk_acar
add sccp-route SSN_ID=SS_ACAR; OPC_ID=opc1; DPC_ID=dpc2; RK_ID=rk_acar

```

```

add pop ID=50901; STATE=tx; COUNTRY=US; TIMEZONE=CDT; LOCAL_7D_DIALING=Y; ITP=N;
ZERO_MINUS=LEC; BLOCK_EAWOPIC=Y; CNAM_OPTION=EXT_LIDB; PIC2_REQD=N; MY_LRN=4692559999;
TREAT_IMS_ANONYMOUS=N; OPC_ID=opc1; ZERO_PLUS_LOCAL=N

```

### Control network entities in-service for ANSI SS7

```

control trunk-grp id=1; mode=forced; target-state=ins;
control trunk-grp id=2; mode=forced; target-state=ins;
equip trunk-termination tgn-id=1; cic=all;
equip trunk-termination tgn-id=2; cic=all;
control trunk-termination tgn-id=1; cic=all; target-state=INS; mode=FORCED;
control trunk-termination tgn-id=2; cic=all; target-state=INS; mode=FORCED;
control sctp-assoc id=sg1-sgp1-sctp; mode=forced; target-state=INS;
control sctp-assoc id=sg1-sgp2-sctp; mode=forced; target-state=INS;
control sctp-assoc id=sg1-sgp1-sctp-ain; mode=forced; target-state=INS;
control sctp-assoc id=sg1-sgp2-sctp-ain; mode=forced; target-state=INS;
control sctp-assoc id=sg1-sgp1-sctp-ptc; mode=forced; target-state=INS;
control sctp-assoc id=sg1-sgp2-sctp-ptc; mode=forced; target-state=INS;
control subsystem id=SS_800T; opc-id=opc; target-state=UIS; mode=FORCED;
control subsystem id=SS_LNP; opc-id=opc; target-state=UIS; mode=FORCED;
control subsystem id=SS_800A; opc-id=opc; target-state=UIS; mode=FORCED;
control subsystem id=SS_CNAM; opc-id=opc; target-state=UIS; mode=FORCED;
control subsystem id=SS_ACAR; opc-id=opc; target-state=UIS; mode=FORCED;

```

### Status commands

```

status trunk-grp id=1;
status trunk-grp id=2;
status trunk-termination tgn-id=1; cic=all;
status trunk-termination tgn-id=2; cic=all;
status sctp-assoc id=sg1-sgp1-sctp;
status sctp-assoc id=sg1-sgp2-sctp;
status sctp-assoc id=sg1-sgp1-sctp;
status sctp-assoc id=sg1-sgp2-sctp;

```

```

status sctp-assoc id=sg1-sgp1-sctp-ain;
status sctp-assoc id=sg1-sgp2-sctp-ain;
status sctp-assoc id=sg1-sgp1-sctp-ptc;
status sctp-assoc id=sg1-sgp2-sctp-ptc;
status subsystem id=SS_800T; opc-id=opc;
status subsystem id=SS_LNP; opc-id=opc;
status subsystem id=SS_800A; opc-id=opc;
status subsystem id=SS_CNAM; opc-id=opc;
status subsystem id=SS_ACAR; opc-id=opc;

```

## SCTP Provisioning

The following sections explain the SCTP provisioning:

### Provisioning SCTP Associations M3UA Layer

The SIGTRAN M3UA layer transmits ISDN user part (ISUP) messages between the Cisco BTS 10200 Softswitch and the ITP. This is accomplished by provisioning the Cisco BTS 10200 Softswitch with a platform-id of CAXXX, usually CA146, and with a remote IP port number for M3UA, generally 2905. You can configure another port number, as long as the port number is also configured on the ITP when the M3UA service is defined. The local port number that the BTS uses for M3UA communication is usually 11146, which was chosen as part of the BTS port naming convention.

### Provisioning SCTP Associations SUA Layer for LNP and 800 Services

The SIGTRAN SSCP User Adaptation (SUA) layer is utilized to handle Local Number Portability (LNP) and 800 services between the BTS feature server (FSAIN) and the ITP. This is accomplished by provisioning the BTS FSAIN with a platform-id of FSXXX, usually FSAIN205, and with the remote IP port number 14001. You can configure another port number, as long as the port number is also configured on the ITP when the SUA service is defined. The local port number that the BTS uses for FSAIN communication is usually 12205, which was chosen as part of the BTS port naming convention.

### Provisioning SCTP Association SUA Layer for ACAR and CNAM Services

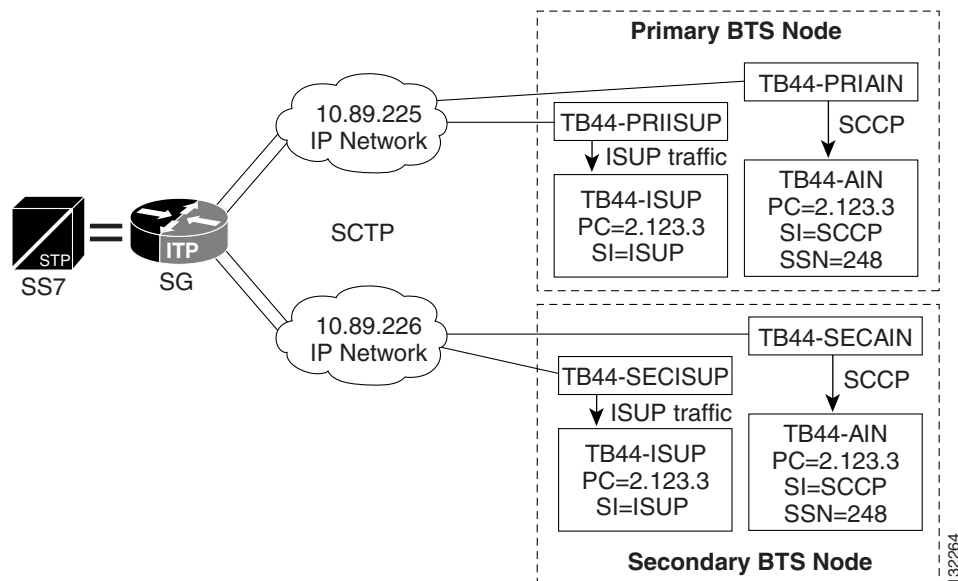
The SIGTRAN SUA layer is also utilized to handle automatic callback and automatic recall (ACAR) and calling name delivery (CNAM) services between the BTS feature server (FSPTC) and the ITP. This is accomplished by provisioning the BTS FSPTC with a platform-id of FSPTCXXX (usually FSPTC235) and with remote IP port number 14001. You can configure another port number as long as the port number is also configured on the ITP when the SUA service is defined. The local port number that the BTS uses for FSPTC communication is usually 12235, which was chosen as part of the BTS port naming convention.



## Configuring SCTP Parameters

The SCTP timers on the BTS and the ITP side need to be aligned properly for failure detection. Parameters such as rto-min, rto-max, and max-path-retrans should be the same on both sides of the SCTP association. If they are not the same, each side will have its own retransmit interval and will determine there is a network failure at different times. The bundle-timeout should be tuned when a guaranteed round-trip time is needed.

Figure 2-3 Configuring an AS and ASP on the ITP



## NSO Configuration Examples

The following section gives the NSO configuration examples:

### D-Link for ISUP with ASP Load Sharing Configuration

The following steps explain how to configure the D-Link for ISUP with ASP load sharing:

**Step 1** Add the Signaling Gateways with internal redundancy mode set to SSO-NSO.

```
add sg id=sgw100; internal_redundancy_mode=SSO-NSO; description=SS7 Signaling Gateway ANSI testing; priority=1;
```

```
add sg id=sgw110; internal_redundancy_mode=SSO-NSO; description=SS7 Signaling Gateway ANSI testing; priority=1;
```

**Step 2** Add the Signaling Gateway Group for STP (Mated STP) mode.

```
add sg-grp id=sg-grp100; sg1-id=sgw100; sg2-id=sgw110; sg-grp-mode=Mated_STP; description=SG Group for ANSI testing;
```

**Step 3** Add two Signaling Gateway Process (SGP) for each Signaling Gateway.

```
add sgp id=sgw100-sgp1; sg-id=sgw100; description=SGP on ITP va-7507-3;
add sgp id=sgw100-sgp2; sg-id=sgw100; description=SGP on ITP va-7507-3;
add sgp id=sgw110-sgp1; sg-id=sgw110; description=SGP on ITP va-7507-6;
add sgp id=sgw110-sgp2; sg-id=sgw110; description=SGP on ITP va-7507-6;
```

**Step 4** Add the OPC and ISUP DPCs.

```
add opc id=opc1; point-code=250-250-3; point-code-type=ANSI_CHINA; description= Network
Point Code 1;

add dpc id=hollyville; point-code=250-248-4; point-code-type=ANSI_CHINA; description=ANSI
SS7 network DPC;

add dpc id=havenville; point-code=250-248-6; point-code-type=ANSI_CHINA; description=ANSI
SS7 network DPC;
```

**Step 5** Add the SCTP association profile.

```
add sctp-assoc-profile id=sctp_pf100;
```

**Step 6** Add the SCTP associations to each Signaling Gateway.

```
add sctp-assoc id=CA-assoc1; sgp-id=sgw100-sgp1; sctp-assoc-profile-id=sctp_pf100;
platform-id=CA146; remote-port=2905; REMOTE_TSAP_ADDR1=10.0.1.230;

add sctp-assoc id=CA-assoc2; sgp-id=sgw100-sgp2; sctp-assoc-profile-id=sctp_pf100;
platform-id=CA146; remote-port=2907; REMOTE_TSAP_ADDR1=10.128.7.8;
add sctp-assoc id=CA-assoc3; sgp-id=sgw110-sgp1; sctp-assoc-profile-id=sctp_pf100;
platform-id=CA146; remote-port=2905; remote-tsap-addr1=10.0.5.216;

add sctp-assoc id=CA-assoc4; sgp-id=sgw110-sgp2; sctp-assoc-profile-id=sctp_pf100;
platform-id=CA146; remote-port=2907; remote-tsap-addr1=10.128.2.7;
```

**Step 7** Add the ISUP routing key.

```
add routing-key id=NewMatedSG-rk; opc-id=opc1; sg-grp-id=sg-grp100; si=ISUP;
platform-id=CA146; rc=60; description=Dual processor Signaling Gateway;
```

**Step 8** Add call control routes for each ISUP DPC.

```
add call-ctrl-route id=holly-ccr; routing-key-id=NewMatedSG-rk; dpc-id=hollyville;
user-part-variant-id=ANSISS7_GR317; si=ISUP; description=Call Control Route for ANSI ISUP
DPC;

add call-ctrl-route id=haven-ccr; routing-key-id=NewMatedSG-rk; dpc-id=havenville;
user-part-variant-id=ANSISS7_GR317; si=ISUP; description=Call Control Route for ANSI ISUP
DPC;
```

**Step 9** Add the SS7 trunk group, trunks and routing to the SS7 network destination and dial plan, and equip the trunk group terminations according to your network setup, if you have not already done so.

**Step 10** Control CA SCTP-assoc INS.

```
control sctp-assoc id=CA-assoc1; mode=forced; target-state=ins;
```

```
control sctp-assoc id=CA-assoc2;mode=forced;target-state=ins;
control sctp-assoc id=CA-assoc3;mode=forced;target-state=ins;
```

## D-Link for TCAP with ASP Load Sharing Configuration

The following steps explain how to configure the D-Link for TCAP with ASP load sharing:

**Step 1** Add the Signaling Gateways with internal redundancy mode set to SSO-NSO.

```
add sg id=sgw100; internal_redundancy_mode=SSO-NSO;description=SS7 Signaling Gateway ANSI
testing;priority=1;

add sg id=sgw110; internal_redundancy_mode=SSO-NSO;description=SS7 Signaling Gateway ANSI
testing;priority=1;
```

**Step 2** Add the Signaling Gateway Group for STP (Mated STP) mode.

```
add sg-grp id=sg-grp100; sg1-id=sgw100;sg2-id=sgw110; sg-grp-mode=Mated_STP;description=SG
Group for ANSI testing;
```

**Step 3** Add 2 Signaling Gateway Process (SGPs) for each Signaling Gateway.

```
add sgp id=sgw100-sgp1; sg-id=sgw100; description=SGP on ITP va-7507-3;

add sgp id=sgw100-sgp2; sg-id=sgw100; description=SGP on ITP va-7507-3;

add sgp id=sgw110-sgp1; sg-id=sgw110; description=SGP on ITP va-7507-6;

add sgp id=sgw110-sgp2; sg-id=sgw110; description=SGP on ITP va-7507-6;
```

**Step 4** Add OPC and TCAP DPCs.

```
add opc id=opc1; point-code=250-250-3; point-code-type=ANSI_CHINA;description= Network
Point Code 1;
add dpc id=cap_dpc1;point-code=1-101-0;point-code-type=ANSI_CHINA;description=Capability
Point Code for remote STP with GTT;

add dpc id=office2; point-code=250-250-3; description= Destination point code for IMT;
```

**Step 5** Add the FSAIN and FSPTC feature server SCTP associations for LNP, 800, CNAM, and AC/AR services.

```
add sctp-assoc id=FSAIN-assoc1; sgp-id=sgw100-sgp1;
sctp_assoc-profile-id=sctp_pf100;platform-id=FSAIN205;
remote-port=14001;REMOTE_TSAP_ADDR1=10.0.1.230;

add sctp-assoc id=FSAIN-assoc2; sgp-id=sgw100-sgp2; sctp_assoc-profile-id=sctp_pf100;
platform-id=FSAIN205; remote-port=14002; REMOTE_TSAP_ADDR1=10.128.7.8;

add sctp-assoc id=FSAIN-assoc3; sgp-id=sgw100-sgp1;
sctp_assoc-profile-id=sctp_pf100;platform-id=FSPTC235; remote-port=14001;
REMOTE_TSAP_ADDR1=10.0.1.230;

add sctp-assoc id=FSAIN-assoc4; sgp-id=sgw100-sgp2; sctp_assoc-profile-id=sctp_pf100;
platform-id=FSPTC235; remote-port=14002; REMOTE_TSAP_ADDR1=10.128.7.8;

add sctp-assoc id=FSPTC-assoc1; sgp-id=sgw110-sgp1; sctp_assoc-profile-id=sctp_pf100;
platform-id=FSAIN205; remote-port=14001; REMOTE_TSAP_ADDR1=10.0.5.216;
```

```
add sctp-assoc id=FSPTC-assoc2; sgp-id=sgw110-sgp2; sctp-assoc-profile-id=sctp_pf100;
platform-id=FSAIN205; remote-port=14002; REMOTE_TSAP_ADDR1=10.128.2.7;
```

```
add sctp-assoc id=FSPTC-assoc3; sgp-id=sgw110-sgp1; sctp-assoc-profile-id=sctp_pf100;
platform-id=FSPTC235; remote-port=14001; REMOTE_TSAP_ADDR1=10.0.5.216;
```

```
add sctp-assoc id=FSPTC-assoc4; sgp-id=sgw110-sgp2; sctp-assoc-profile-id=sctp_pf100;
platform-id=FSPTC235; remote-port=14002; REMOTE_TSAP_ADDR1=10.128.2.7;
```

**Step 6** Add the LNP, CNAM, and 800 features.

```
add feature fname=LNP; feature-server-id=FSAIN205; description=Local number portability;
tdp1=COLLECTED_INFORMATION; tid1=LNP_TRIGGER; ttype1=R;
```

```
add feature fname=8XX; tdp1=COLLECTED_INFORMATION; tid1=SPECIFIC_DIGIT_STRING; ttype1=R;
description=Toll Free Number; feature_server_id=FSAIN205;
```

```
add feature fname=CNAM; tdp1=FACILITY_SELECTED_AND_AVAILABLE;
tid1=TERMINATION_RESOURCE_AVAILABLE; ttype1=R; description=Calling Name;
feature_server_id=FSPTC235;
```

```
add feature fname=AC; fname1=AC_ACT; fname2=AC_DEACT; feature_server_id=FSPTC235;
```

```
add feature fname=AR; fname1=AR_ACT; fname2=AR_DEACT; feature_server_id=FSPTC235;
```

**Step 7** Add the SCCP network for TCAP services.

```
add sccp-nw id=6; net-ind=NATIONAL; sub-svc=NATIONAL; hop-count=3;
```

**Step 8** Add the SSN profile.

```
add subsystem-grp id=SSN_LNP1; platform-id=FSAIN205; tcap-version=ANS92;
description=SS grp profile for LNP svc;
```

```
add subsystem-grp id=SSN_AIN_800_1; platform-id=FSAIN205; tcap-version=ANS92;
description=SSN grp profile for 800 svc;
```

```
add subsystem-grp id=SSN_CNAM1; platform-id=FSPTC235; tcap-version=ANS92; description=SSN
grp profile for CNAM svc;
```

```
add subsystem-grp id=SSN_ACAR1; platform-id=FSPTC235; tcap-version=ANS92; description=SSN
grp profile for AC/AR svc;
```

**Step 9** Add a subsystem.

```
add subsystem id=SSN_LNP1; opc-id=opc1; local-ssn=247; remote-ssn=247;
sccp-nw-id=6; sccp-version=ANS92; application-version=AIN01;
```

```
add subsystem id=SSN_AIN_800_1; opc-id=opc1; local-ssn=248; remote-ssn=248; sccp-nw-id=6;
sccp-version=ANS92; application-version=AIN01;
```

```
add subsystem id=SSN_CNAM1; opc-id=opc1; local-ssn=232; remote-ssn=232; sccp-nw-id=6;
sccp-version=ANS92; application-version=IN1;
```

```
add subsystem id=SSN_ACAR1; opc-id=opc1; local-ssn=251; remote-ssn=251; sccp-nw-id=6;
sccp-version=ANS92; APPLICATION_VERSION=IN1;
```

**Step 10** Add a routing key for FSPTC and FSAIN.

```
add routing-key id=NewMatedSG-rk1; opc-id=opc1; sg-grp-id=sg-grp100; si=sccp;
subsystem-grp-id=SSN_LNP1; platform-id=FSAIN205; rc=161; description=Routing Key for SUA
User Adaptation layer;
```

```
add routing-key id=NewMatedSG-rk2; opc-id=opc1; sg-grp-id=sg-grp100; si=sccp;
subsystem-grp-id=SSN_AIN_800_1; platform-id=FSAIN205; rc=162; description=Routing Key for
SUA User Adaptation layer in FSAIN205;
```

```
add routing-key id=NewMatedSG-rk3; opc-id=opc1; sg-grp-id=sg-grp100; si=sccp;
subsystem-grp-id=SSN_CNAM1; platform-id=FSPTC235; rc=163; description=Routing Key for SUA
User Adaptation layer in FSPTC235;
```

```
add routing-key id=NewMatedSG-rk4; opc-id=opc1; sg-grp-id=sg-grp100; si=sccp;
subsystem-grp-id=SSN_ACR1; platform-id=FSPTC235; rc=164; description=Routing Key for SUA
User Adaptation layer in FSPTC235;
```

**Step 11** Add SCCP routes for LNP, CNAM, 800, and ACR.

```
add sccp-route opc-id=opc1; dpc-id=cap_dpc1; rk-id=NewMatedSG-rk1;
subsystem-grp-id=SSN_LNP1; description=SCCP route for FSAIN LNP service;
```

```
add sccp-route opc-id=opc1; dpc-id=cap_dpc1; rk-id=NewMatedSG-rk2;
subsystem-grp-id=SSN_AIN_800_1; description=SCCP route for 800 service in FSAIN;
```

```
add sccp-route opc-id=opc1; dpc-id=cap_dpc1; rk-id=NewMatedSG-rk3;
subsystem-grp-id=SSN_CNAM1; description=SCCP route for FSPTC CNAM service;
```

```
add sccp-route opc-id=opc1; dpc-id=office2; rk-id=NewMatedSG-rk4;
subsystem-grp-id=SSN_ACAR1; description=SCCP route for FSPTC ACAR service;
```

```
add call-ctrl-route id=office2-ccr; routing-key-id=NewMatedSG-rk; dpc-id=office2;
user-part-variant-id=ANSISS7_GR317; si=ISUP; description=Call Control Route for Office2
destination;
```

**Step 12** Add an SS7 trunk group for AC/AR service, the Call Agent configuration for TCAP services, the SLHR profile, and the SLHR, and configure the 800 dialing and ported office codes for your network setup.

**Step 13** Control FSAIN SCTP association into service.

```
control sctp-assoc id=FSAIN-assoc1; mode=forced; target-state=ins;
```

```
control sctp-assoc id=FSAIN-assoc2; mode=forced; target-state=ins;
```

```
control sctp-assoc id=FSAIN-assoc3; mode=forced; target-state=ins;
```

```
control sctp-assoc id=FSAIN-assoc4; mode=forced; target-state=ins;
```

**Step 14** Control the FSPTC SCTP association into service.

```
control sctp-assoc id=FSPTC-assoc1; mode=forced; target-state=ins;
```

```
control sctp-assoc id=FSPTC-assoc2; mode=forced; target-state=ins;
```

```
control sctp-assoc id=FSPTC-assoc3; mode=forced; target-state=ins;
```

```
control sctp-assoc id=FSPTC-assoc4; mode=forced; target-state=ins;
```





# CHAPTER 3

## Customer Profiles

---

Revised: July 2010, OL-23039-01

This chapter describes various configurations and combinations of the Cisco BTS 10200 Softswitch and the Cisco ITP that are built on top of the basic Shared Point Code and Mated STP-Pair configurations documented in [Chapter 1, “SS7 Basic Configurations,”](#) to form the following customer profiles:

- [Multiple Cisco BTS 10200 Softswitch Nodes per ITP](#)
- [Multiple OPCs on the Cisco BTS 10200 Softswitch](#)
- [Multiple Cisco BTS 10200 Softswitch Nodes Sharing the Same OPC](#)
- [Geographically Separated Mated STP Pair with SG Priority Routing](#)

### Multiple Cisco BTS 10200 Softswitch Nodes per ITP

This profile, illustrated in [Figure 3-1](#), is recommended for a customer who is setting up an all-IP telephony network based on Cisco BTS 10200 softswitches and has a long-term plan for network expansion. Each BTS has only one Origination Point Code (OPC), and this profile is appropriate when there is a requirement for high capacity traffic to each OPC.

A pair of high capacity Cisco 73XX or 7507 series ITP nodes are required to provide the necessary throughput. The topology between ITPs and Signal Transfer Point (STPs) forms a typical Signaling System 7 (SS7) STP quad. Global title translation (GTT) is supported on the Cisco ITP.



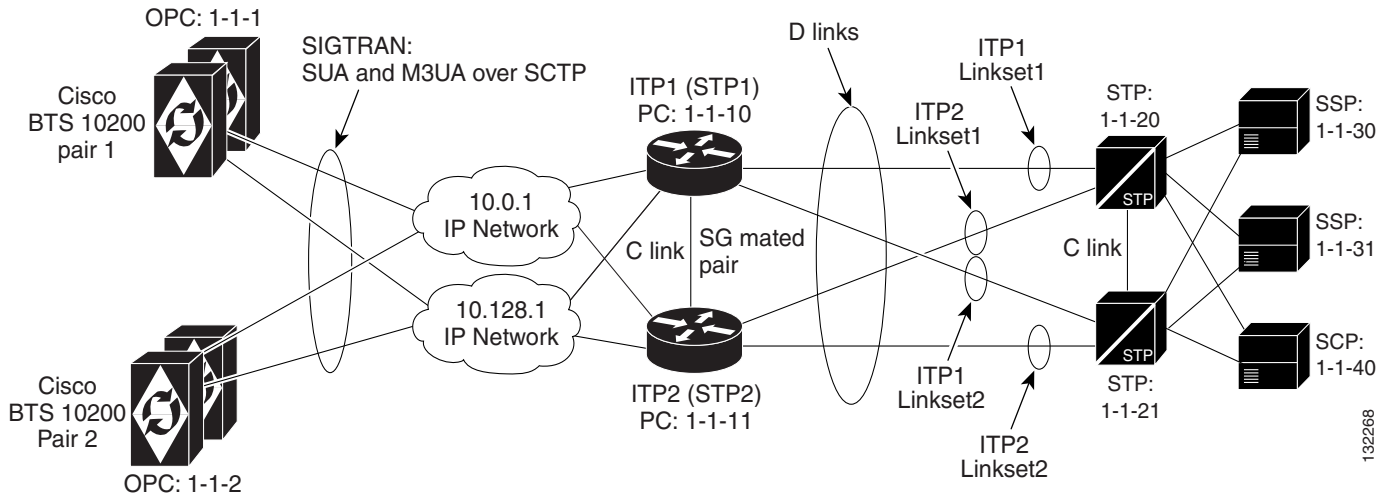
**Note**

---

This profile is only available when connecting to the SS7 network via D-links. Therefore, a mated STP pair must be used.

---

Figure 3-1 Multiple Cisco BTS 10200 Softswitches per ITP



## Cisco ITP Configuration Example

The Cisco ITP configuration information for this customer profile is similar to the basic Mated STP-Pair configuration described in [Chapter 2, “Provisioning Basic SS7 Configurations.”](#)<sup>1</sup> However, in this profile, extra Application Server Process (ASP) configuration information is necessary to communicate with the second Cisco BTS 10200. There is also extra information in the application server (AS) configuration section for routing to each of the BTS nodes based on Destination Point Code (DPC) (BTS OPC value).

The following example provisions ASP and AS configuration elements for ITP1:

**ITP1 Configuration** — It is important to note that ITP2 will have the same ASP and AS configuration information that is shown below for ITP1.

The ASP configuration for BTS1 Active and Standby Nodes— For ISDN user part (ISUP) - M3UA

```
cs7 asp PRI_ISUP_BTS1 11146 2905 m3ua
  remote-ip 10.0.1.5
  remote-ip 10.128.1.2

cs7 asp SEC_ISUP_BTS1 11146 2905 m3ua
  remote-ip 10.0.1.6
  remote-ip 10.128.1.3
```

### Transaction Capability Application Part (TCAP)/AIN - SUA

```
cs7 asp PRI_AIN_BTS1 12205 14001 sua
  remote-ip 10.0.1.5
  remote-ip 10.128.1.2
!
cs7 asp SEC_AIN_BTS1 12205 14001 sua
  remote-ip 10.0.1.6
  remote-ip 10.128.1.3
```



**TCAP/PTC - SUA**

```

cs7 asp PRI_PTC_BTS1 12235 14001 sua
remote-ip 10.0.1.5
remote-ip 10.128.1.2
!
cs7 asp SEC_PTC_BTS1 12235 14001 sua
remote-ip 10.0.1.6
remote-ip 10.128.1.3

```

**AS configuration for BTS1**—The routing context entries are as follows:

```

routing context = 1, DPC(BTS OPC)=1.1.1 service indicator=ISUP

```

```

cs7 as ISUP_BTS1 m3ua
routing-key 1 1.1.1 si isup
asp PRI_ISUP_BTS1
asp SEC_ISUP_BTS1
traffic-mode override

cs7 as LNP_BTS1 sua
routing-key 4402 1.1.1 si sccp ssn 247
asp PRI_AIN_BTS1
asp SEC_AIN_BTS1
traffic-mode override

cs7 as 800T_BTS1 sua
routing-key 4401 1.1.1 si sccp ssn 254
asp PRI_AIN_BTS1
asp SEC_AIN_BTS1
traffic-mode override
!
cs7 as 800A_BTS1 sua
routing-key 4403 1.1.1 si sccp ssn 248
asp PRI_AIN_BTS1
asp SEC_AIN_BTS1
traffic-mode override
!
cs7 as CNAM_BTS1 sua
routing-key 4404 1.1.1 si sccp ssn 232
asp PRI_PTC_BTS1
asp SEC_PTC_BTS1
traffic-mode override
!
cs7 as ACAR_BTS1 sua
routing-key 4405 1.1.1 si sccp ssn 251
asp PRI_PTC_BTS1
asp SEC_PTC_BTS1
traffic-mode override

```

**ASP configuration for BTS2 active and standby modes**—ISUP - M3UA

```

cs7 asp PRI_ISUP_BTS2 11146 2905 m3ua
remote-ip 10.0.1.7
remote-ip 10.128.1.4
cs7 asp SEC_ISUP_BTS2 11146 2905 m3ua
remote-ip 10.0.1.8
remote-ip 10.128.1.5

```

**Transaction Capabilities Application Part (TCAP)/AIN - SUA**

```

cs7 asp PRI_AIN_BTS2 12205 14001 sua
  remote-ip 10.0.1.7
  remote-ip 10.128.1.4
!
cs7 asp SEC_AIN_BTS2 12205 14001 sua
  remote-ip 10.0.1.8
  remote-ip 10.128.1.5

```

**TCAP/PTC - SUA**

```

cs7 asp PRI_PTC_BTS2 12235 14001 sua
  remote-ip 10.0.1.5
  remote-ip 10.128.1.4
!
cs7 asp SEC_PTC_BTS2 12235 14001 sua
  remote-ip 10.0.1.6
  remote-ip 10.128.1.5

```

**AS configuration for BTS2**—The DPC value changes to 1.1.2 for sending messages to BTS2

```

cs7 as ISUP_BTS2 m3ua
  routing-key 2 1.1.2 si isup
  asp PRI_ISUP_BTS2
  asp SEC_ISUP_BTS2
  traffic-mode override

cs7 as LNP_BTS2 sua
  routing-key 4502 1.1.1 si sccp ssn 247
  asp PRI_AIN_BTS2
  asp SEC_AIN_BTS2
  traffic-mode override

cs7 as 800T_BTS2 sua
  routing-key 4501 1.1.1 si sccp ssn 254
  asp PRI_AIN_BTS2
  asp SEC_AIN_BTS2
  traffic-mode override
!
cs7 as 800A_BTS2 sua
  routing-key 4503 1.1.1 si sccp ssn 248
  asp PRI_AIN_BTS2
  asp SEC_AIN_BTS2
  traffic-mode override
!
cs7 as CNAM_BTS2 sua
  routing-key 4504 1.1.1 si sccp ssn 232
  asp PRI_PTC_BTS2
  asp SEC_PTC_BTS2
  traffic-mode override
!
cs7 as ACAR_BTS2 sua
  routing-key 4505 1.1.1 si sccp ssn 251
  asp PRI_PTC_BTS2
  asp SEC_PTC_BTS2
  traffic-mode override

```

## Cisco BTS 10200 Softswitch Configuration Example

Provisioning the Cisco BTS 10200 for this profile is essentially the same as the basic Mated STP-Pair profile given in [Chapter 1, “SS7 Basic Configurations.”](#)<sup>1</sup> However, the following provisioning script is necessary for the secondary BTS:

### CA Configuration

```
add ca-config type=MGCP-INIT-TERMS;value=160;datatype=integer;
add ca-config type=MGCP-INIT-DURATION;value=5;datatype=integer;
add ca-config type=MGCP-ICMP-PING-RETRANSMIT-DURATION;value=5;datatype=integer;
add ca-config type=MGCP-ICMP-PING-RETRY-COUNT;value=5;datatype=integer;
add ca-config type=MGCP-MAX-UNREACH-COUNT;value=5;datatype=integer;
add ca-config type=MGCP-MAX-FAULT-COUNT;value=5;datatype=integer;
add ca-config type=MGCP-ADM-RESP-TIME;value=300;datatype=integer;
add ca-config type=MGCP-SIG-TOS-LOWDELAY;value=Y;datatype=boolean;
add ca-config type=MGCP-SIG-TOS-PRECEDENCE;value=1;datatype=integer;
add ca-config type=MGCP-SIG-TOS-RELIABILITY;value=Y;datatype=boolean;
add ca-config type=MGCP-SIG-TOS-THROUGHPUT;value=Y;datatype=boolean;
```

**CA & FS**—The CA147 and FSAIN206 ids are different than on BTS1.

```
add call-agent id=CA147; tsap-addr-sidea=hrn11ca; mgw-monitoring-enabled=N;
add feature-server id=FSAIN206; tsap-addr-sidea=hrn11ca:11205; type=AIN;
```

### SIGTRAN components

```
add user-part-variant id=ANSISS7_GR317;

add sg id=sg1; description=Signaling gateway 1;
add sg id=sg2; description=Signaling gateway 2;

add sg-grp id=sg-grp1; sg1-id=sg1; sg2-id=sg2 description=SG group 1;

add sgp id=sg1-sgp1 ; sg-id=sg1; description=SG process 1 for sg1;
add sgp id=sg2-sgp1 ; sg-id=sg2; description=SG process 1 for sg2;
```

### OPC value for BTS2 is 1-1-2

```
add opc id=opc1; point-code=1-1-2; description=OPC; point-code-type=ANSI_CHINA;
add dpc id=dpc1; point-code=1-1-30; description=DPC 1; point-code-type=ANSI_CHINA;
add dpc id=dpc2; point-code=1-1-31; description=DPC 2; point-code-type=ANSI_CHINA;
```

**ISUP routing keys**—A unique rc value was needed when defining the routing-key. It must match the rc value that is defined in the associated AS/routing-key definition in the ITPs. This routing key has a different OPC value than defined for BTS1.

```
add routing-key id=rk1; opc-id=opc1; sg-grp-id=sg-grp1; si=ISUP; rc=2; platform-id=CA147;

add call-ctrl-route id=dpc1-route1; dpc-id=dpc1; routing-key-id=rk1; si=isup;
user-part-variant-id= ANSISS7_GR317
add call-ctrl-route id=dpc2-route1; dpc-id=dpc2; routing-key-id=rk1; si=isup;
user-part-variant-id= ANSISS7_GR317;
add sctp-assoc-profile id=sctp-prof;
```

## SCTP associations

```
add sctp-assoc id=sg1-sgpl-sctp; sgp-id=sg1-sgpl; sctp-assoc-profile-id=sctp-prof;
platform-id=CA147; remote-port=2905; remote-tsap-addr1=10.0.1.54;
remote-tsap-addr2=10.128.1.239; ip-tos-precedence=ROUTINE;
```

```
add sctp-assoc id=sg2-sgpl-sctp; sgp-id=sg2-sgpl; sctp-assoc-profile-id=sctp-prof;
platform-id=CA147; remote-port=2905; remote-tsap-addr1=10.0.1.55;
remote-tsap-addr2=10.128.1.240; ip-tos-precedence=ROUTINE;
```

## Dial plan profile

```
add digman-profile id=pretrans;
add digman id=pretrans; rule=1; match-string=^*; replace-string=&; match-noa=any;
replace-noa=VSC;
add digman id=pretrans; rule=2; match-string=^#; replace-string=&; match-noa=any;
replace-noa=VSC;
add digman-profile id=ani_20;
add digman id=ani_20; rule=1; match-string=^20; replace-string=none;
add dial-plan-profile id=dp-1; nanp-dial-plan=Y; description=NA dial plan profile;
dnis-digman-id=pretrans; ani-digman-id=ani_20;
```

## SS7 TG

```
add ss7-ansi-tg-profile ID=ansi-tg-prof;
add trunk-grp ID=1; call_agent_id=CA147; tg_type=SS7; direction=BOTH;
tg_profile_id=ansi-tg-prof; call-ctrl-route-id=dpc1-route1; dial-plan-id=dp-1;
description=TG to DPC 1; MGCP_PKG_TYPE=T;
add trunk-grp ID=2; call_agent_id=CA147; tg_type=SS7; direction=BOTH;
tg_profile_id=ansi-tg-prof; call-ctrl-route-id=dpc2-route1; dial-plan-id=dp-1;
description=TG to DPC 2; MGCP_PKG_TYPE=T;
```

## MGW

```
add mgw-profile id=as5300-prof; vendor=Cisco; mgcp-hairpin-supp=n; MGCP_RSIPSTAR_SUPP=N;
MGCP_TERM_INIT_LEVEL=0; RBK_ON_CONN_SUPP=N; MGCP_VERSION=MGCP_1_0; mgcp-max2-retries=3;
fax-t38-camode-supp=Y; mgcp-keepalive-interval=60; mgcp-keepalive-retries=10;
mgcp-t-tran=400; mgcp-max1-retries=2; mgcp-t-longtran=5; mgcp-default-pkg=NONE;
MGCP_3WAY_HSHAKE_SUPP=N; mgw_type=AS5300; PC_MPTIME_SUPP=N;
MGCP_VERSION=MGCP_1_0; PC_MPTIME_SUPP=N;
add mgw id=va-5350-23; tsap-addr=va-5350-23.hrndevtest.cisco.com; call-agent-id=CA147;
mgw-profile-id=as5300-prof; type=MGW;
```

## SS7 terminations and trunks

```
add termination prefix=S3/DS1-4/; port-start=1; port-end=31; type=trunk;
mgw-id=va-5350-23;
add termination prefix=S3/DS1-5/; port-start=1; port-end=31; type=trunk;
mgw-id=va-5350-23;
add trunk cic-start=1; cic-end=31; tgn-id=1; mgw-id=va-5350-23;
termination-prefix=S3/DS1-4/; termination-port-start=1; termination-port-end=31;
add trunk cic-start=1; cic-end=31; tgn-id=2; mgw-id=va-5350-23;
termination-prefix=S3/DS1-5/; termination-port-start=1; termination-port-end=31;
```

## SS7 routes, route guides and destinations

```
add route id=dpc1-route; tg_selection=RR; tgn1_id=1;
add route id=dpc2-route; tg_selection=RR; tgn1_id=2;
add route-guide id=dpc1-rg; policy-type=ROUTE; policy-id=dpc1-route;
add route-guide id=dpc2-rg; policy-type=ROUTE; policy-id=dpc2-route;
add destination dest-id=dpc1-dest; call-type=LOCAL; route-type=ROUTE;
route-guide-id=dpc1-rg;
add destination dest-id=dpc2-dest; call-type=LOCAL; route-type=ROUTE;
route-guide-id=dpc2-rg;
```

## TCAP/SUA provisioning for LNP

```
add sctp-assoc id=sg1-sgp1-sctp-ain; sgp-id=sg1-sgp1; sctp-assoc-profile-id=sctp-prof;
platform-id=FSAIN205; remote-port=14001; remote-tsap-addr1=10.0.1.54;
remote-tsap-addr2=10.128.1.239; ip-tos-precedence=ROUTINE;
```

```
add sctp-assoc id=sg2-sgp1-sctp-ain; sgp-id=sg2-sgp1; sctp-assoc-profile-id=sctp-prof;
platform-id=FSAIN205; remote-port=14001; remote-tsap-addr1=10.0.1.55;
remote-tsap-addr2=10.128.1.240; ip-tos-precedence=ROUTINE;
```

```
add sctp-assoc id=sg1-sgp1-sctp-ptc; sgp-id=sg1-sgp1; sctp-assoc-profile-id=sctp-prof;
platform-id=FSPTC235; remote-port=14001; remote-tsap-addr1=10.0.1.54;
remote-tsap-addr2=10.128.1.239; ip-tos-precedence=ROUTINE;
```

```
add sctp-assoc id=sg2-sgp1-sctp-ptc; sgp-id=sg2-sgp1; sctp-assoc-profile-id=sctp-prof;
platform-id=FSPTC235; remote-port=14001; remote-tsap-addr1=10.0.1.55;
remote-tsap-addr2=10.128.1.240; ip-tos-precedence=ROUTINE;
```

```
add sccp-nw id=1;NET_IND=NATIONAL;SUB_SVC=NATIONAL;HOP_COUNT=3;
```

```
add subsystem-profile id=SS_LNP; platform-id=FSAIN205; description=LNP subsystem;
add subsystem-profile id=SS_800A; platform-id=FSAIN205; description=AIN 800 subsystem;
add subsystem-profile id=SS_800T; platform-id=FSAIN205; description=IN1 800 subsystem;
add subsystem-profile id=SS_CNAM; platform-id=FSAIN205; description=CNAM subsystem;
add subsystem-profile id=SS_ACAR; platform-id=FSPTC235; description=ACAR subsystem;
```

```
add subsystem id=SS_LNP; opc-id=opc1; local-ssn=247; remote-ssn=247; sccp-nw-id=1;
SCCP_VERSION=ANS92; TCAP_VERSION=ANS92; APPLICATION_VERSION=AIN01;
add subsystem id=SS_800A; opc-id=opc1; local-ssn=248; remote-ssn=248; sccp-nw-id=1;
SCCP_VERSION=ANS92; TCAP_VERSION=ANS92; APPLICATION_VERSION=AIN01;
add subsystem id=SS_CNAM; opc-id=opc1; local-ssn=232; remote-ssn=232; sccp-nw-id=1;
SCCP_VERSION=ANS92; TCAP_VERSION=ANS92; APPLICATION_VERSION=IN1;
add subsystem id=SS_800T; opc-id=opc1; local-ssn=254; remote-ssn=254; sccp-nw-id=1;
SCCP_VERSION=ANS92; TCAP_VERSION=ANS92; APPLICATION_VERSION=IN1;
add subsystem id=SS_ACAR; opc-id=opc1; local-ssn=251; remote-ssn=251; sccp-nw-id=1;
SCCP_VERSION=ANS92; TCAP_VERSION=ANS92; APPLICATION_VERSION=IN1;
```

## This routing key differs from the one on BTS1

```
add routing-key id=rk_lnp; opc-id=opc1; sg-grp-id=sg_grp1; si=SCCP; rc=4502;
PLATFORM_ID=FSAIN205; ssn-id=SS_LNP;
add routing-key id=rk_800a; opc-id=opc1; sg-grp-id=sg_grp1; si=SCCP; rc=4503;
PLATFORM_ID=FSAIN205; ssn-id=SS_800A;
add routing-key id=rk_cnam; opc-id=opc1; sg-grp-id=sg_grp1; si=SCCP; rc=4504;
PLATFORM_ID=FSAIN205; ssn-id=SS_CNAM;
add routing-key id=rk_800t; opc-id=opc1; sg-grp-id=sg_grp1; si=SCCP; rc=4501;
PLATFORM_ID=FSAIN205; ssn-id=SS_800T;
add routing-key id=rk_acar; opc-id=opc1; sg-grp-id=sg_grp1; si=SCCP; rc=4505;
PLATFORM_ID=FSPTC235; ssn-id=SS_ACAR;
```

### Provisioned DPC is the STP capability point code

```

add dpc id=stp_cap_pc; point-code=1-1-22; point-code-type=ANSI_CHINA;
description=Capability Point Code of STPs

add feature fname=LNP; feature-server-id=FSAIN206; description=Local number portability;
tdp1=COLLECTED_INFORMATION; tid1=LNP_TRIGGER; ttype1=R;

add ported-office-code digit-string=301-612; in-call-agent=n;

add CA-Config type=DEFAULT-LNP-SLHR-ID; datatype=string; value=slhr_lnp;

add slhr-profile id=slhr_lnp;

add slhr id=slhr_lnp; gtt-req=Y; tt=11; GTT_ADDR_TYPE=CDPN; GTT_ADDR=3; opc-id=opc1;
dpc-id=stp_cap_pc; ssn_id=SSN_LNP1;

add sccp-route opc-id=opc1; dpc-id=stp_cap_pc; rk-id=itp-grp-rk2; ssn-id=SSN_LNP1;
description=LNP for opc1;

add pop ID=50901; STATE=tx; COUNTRY=US; TIMEZONE=CDT; LOCAL_7D_DIALING=Y; ITP=N;
ZERO_MINUS=LEC; BLOCK_EAWOPIC=Y; CNAM_OPTION=EXT_LIDB; PIC2_REQD=N; MY_LRN=4692559999;
TREAT_IMS_ANONYMOUS=N; OPC_ID=opc1; ZERO_PLUS_LOCAL=N

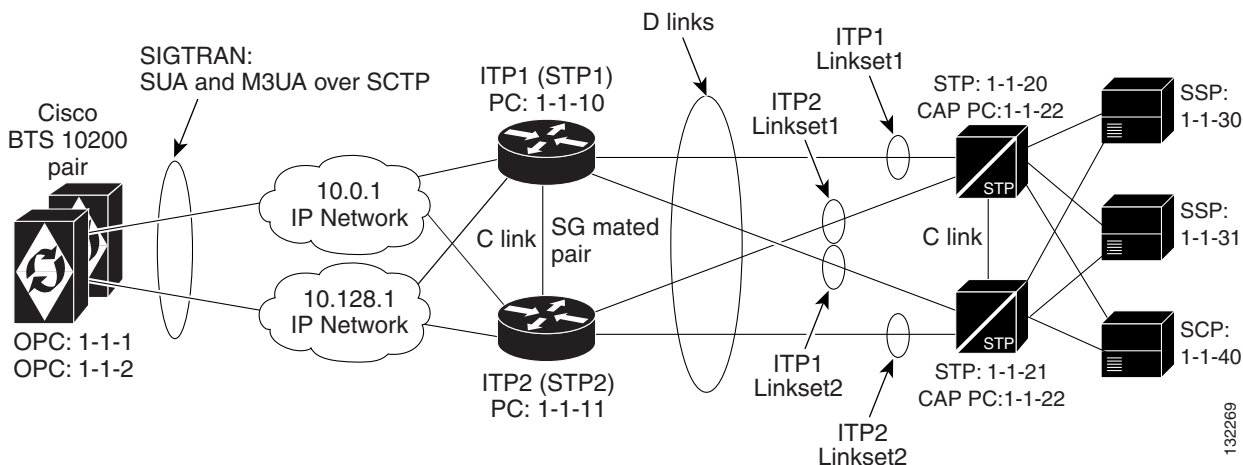
```

## Multiple OPCs on the Cisco BTS 10200 Softswitch

This customer profile, illustrated in [Figure 3-2](#), is based on the Mated STP-Pair profile. It is recommended for the customer who wants to emulate multiple legacy SS7 switches with one high-capacity Cisco BTS 10200 Softswitch.

A similar A-link profile can also be implemented. However, the A-link profile requires a separate ITP-Group for each OPC on the Cisco BTS 10200 Softswitch.

**Figure 3-2** Multiple OPCs on the Cisco BTS 10200 Softswitch



The Cisco BTS 10200 Softswitch also supports up to 30 OPCs when the SIGTRAN signaling gateway supports Single User Account (SUA) and MTP3 User Adaptation Layer (M3UA) in a D-link configuration.

## Configuration Requirements for Supporting 30 OPCs

The user must complete the following tasks to configure the Cisco BTS 10200 Softswitch to support 30 OPCs:

The following tasks include examples of CLI commands that illustrate how to configure the feature. Most of these tables have additional tokens that are not included in the examples.

- Subsystem\_grp Table:

```
add subsystem_grp id=CNAM; platform_id=FSPTC235; tcap_version=ANS-92;
```

- Subsystem Table:

```
add subsystem id=CNAM; opc-id=opc_tx; local-ssn=232; remote-ssn=232; sccp-nw-id=1;
SCCP_VERSION=ANS92; application-version=IN1;
```

```
add subsystem id=CNAM; opc-id=opc_nc; local-ssn=232; remote-ssn=232; sccp-nw-id=1;
SCCP_VERSION=ANS92; application-version=IN1;
```

- SLHR Table:

```
add slhr id=slhr_cnam; opc-id=opc_tx; dpc-id=stp1; subsystem-grp-id=CNAM; gtt-req=Y; tt=5;
GTT_ADDR_TYPE=CLGN; GTT_ADDR=3;
```

- SCCP\_Route Table

```
add sccp-route opc-id=opc_tx; dpc-id=stp1; subsystem-grp-id=CNAM; rk-id=rk_cnam_tx;
```

- Routing\_Key Table

```
add routing-key id=rk_cnam_tx; opc-id=opc_tx; sg-grp-id=sg_grp; si=SCCP; rc=204;
PLATFORM_ID=FSPTC325; subsystem-grp-id=CNAM;
```

- Controlling the Subsystem Group In or Out of Service

The Subsystem Group table has a status associated with it. The operator can control a subsystem group in or out of service. Controlling the subsystem group out of service has the same affect as controlling all the subsystems in the subsystem group out of service. Controlling the subsystem group in service puts all subsystems in the group in service.

The following CLI command controls both subsystem/OPC combinations out of service:

```
control subsystem_grp id=CNAM; mode=forced; target_state=UOS;
```

```
SUBSYSTEM GRP ID -> CNAM
INITIAL STATE -> User in service
RESULT STATE -> User out of service
REQUEST STATE -> User out of service
FAIL REASON -> ADM found no failure
REASON -> ADM executed successfully
RESULT -> ADM configure result in success
Reply : Success: CLI change successful
```



### Note

For a complete list of all CLI tables and tokens, refer to the *Cisco BTS 10200 Softswitch CLI Database*.

## Alternate Base Profiles

Although this profile is based on the Mated STP-Pair configuration, a similar Shared Point Code configuration can be implemented. However, it requires a separate ITP Group for each OPC on the Cisco BTS 10200.

## ITP Configuration

The ITP configuration for this profile is essentially identical to the one for the Mated STP-Pair configuration documented in [Chapter 1, “SS7 Basic Configurations.”](#)<sup>1</sup> However, there is an extra AS configuration for the added OPC on BTS1. This additional AS configuration information is shown here:

```

cs7 as BtsIsupAs2 m3ua
  routing-key 2 1.1.2 si isup
  asp PrimaryBtsIsupAsp
  asp SecondaryBtsIsupAsp
  traffic-mode override

cs7 as LNP2_BTS1 sua
  routing-key 4412 1.1.2 si sccp ssn 247
  asp PRI_AIN_BTS1
  asp SEC_AIN_BTS1
  traffic-mode override

cs7 as 800T2_BTS1 sua
  routing-key 4411 1.1.2 si sccp ssn 254
  asp PRI_AIN_BTS1
  asp SEC_AIN_BTS1
  traffic-mode override

cs7 as 800A2_BTS1 sua
  routing-key 4413 1.1.2 si sccp ssn 248
  asp PRI_AIN_BTS1
  asp SEC_AIN_BTS1
  traffic-mode override

cs7 as CNAM2_BTS1 sua
  routing-key 4414 1.1.2 si sccp ssn 232
  asp PRI_PTC_BTS1
  asp SEC_PTC_BTS1
  traffic-mode override

cs7 as ACAR2_BTS1 sua
  routing-key 4415 1.1.2 si sccp ssn 251
  asp PRI_PTC_BTS1
  asp SEC_PTC_BTS1
  traffic-mode override

```

## Cisco BTS 10200 Softswitch Configuration Example

The Cisco BTS 10200 provisioning information is the same as the basic Mated STP-Pair configuration given in [Chapter 1, “SS7 Basic Configurations,”](#) with additional objects based on the provisioning of a second OPC, OPC 1.1.2. The BTS configuration is shown here.

### CA configuration

```

add ca-config type=MGCP-INIT-TERMS;value=160;datatype=integer;
add ca-config type=MGCP-INIT-DURATION;value=5;datatype=integer;
add ca-config type=MGCP-ICMP-PING-RETRANSMIT-DURATION;value=5;datatype=integer;
add ca-config type=MGCP-ICMP-PING-RETRY-COUNT;value=5;datatype=integer;
add ca-config type=MGCP-MAX-UNREACH-COUNT;value=5;datatype=integer;
add ca-config type=MGCP-MAX-FAULT-COUNT;value=5;datatype=integer;
add ca-config type=MGCP-ADM-RESP-TIME;value=300;datatype=integer;

```



```

add ca-config type=MGCP-SIG-TOS-LOWDELAY;value=Y;datatype=boolean;
add ca-config type=MGCP-SIG-TOS-PRECEDENCE;value=1;datatype=integer;
add ca-config type=MGCP-SIG-TOS-RELIABILITY;value=Y;datatype=boolean;
add ca-config type=MGCP-SIG-TOS-THROUGHPUT;value=Y;datatype=boolean;

```

## CA & FS

```

add call-agent id=CA146; tsap-addr-sidea=hrn11ca; mgw-monitoring-enabled=N;
add feature-server id=FSAIN205; tsap-addr-sidea=hrn11ca:11205; type=AIN;

```

## SIGTRAN and SS7 components

```

add user-part-variant id=ANSISS7_GR317;
add sg id=sg1; description=Signaling gateway 1;
add sg id=sg2; description=Signaling gateway 2;

add sg-grp id=sg-grp1; sg1-id=sg1; sg2-id=sg2 description=SG group 1;

add sgp id=sg1-sgp1 ; sg-id=sg1; description=SG process 1 for sg1;
add sgp id=sg2-sgp1 ; sg-id=sg2; description=SG process 1 for sg2;

add opc id=opc1; point-code=1-1-1; description=OPC1; point-code-type=ANSI_CHINA;

```

## Second OPC

```

add opc id=opc2; point-code=1-1-2; description=OPC2; point-code-type=ANSI_CHINA;

add dpc id=dpc1; point-code=1-1-30; description=DPC 1; point-code-type=ANSI_CHINA;
add dpc id=dpc2; point-code=1-1-31; description=DPC 2; point-code-type=ANSI_CHINA;

```

## ISUP routing keys

```

add routing-key id=rk1; opc-id=opc1; sg-grp-id=sg-grp1; si=ISUP; rc=1; platform-id=CA146;

```

## The new ISUP routing key is added for OPC2

```

add routing-key id=rk2; opc-id=opc2; sg-grp-id=sg-grp1; si=ISUP; rc=2; platform-id=CA146;

add call-ctrl-route id=dpc1-route1; dpc-id=dpc1; routing-key-id=rk1; si=isup;
user-part-variant-id= ANSISS7_GR317

add call-ctrl-route id=dpc2-route1; dpc-id=dpc2; routing-key-id=rk1; si=isup;
user-part-variant-id= ANSISS7_GR317;

```

## Two new routes are added for OPC2

```

add call-ctrl-route id=dpc1-route2; dpc-id=dpc1; routing-key-id=rk2; si=isup;
user-part-variant-id= ANSISS7_GR317
add call-ctrl-route id=dpc2-route2; dpc-id=dpc2; routing-key-id=rk2; si=isup;
user-part-variant-id= ANSISS7_GR317;

add sctp-assoc-profile id=sctp-prof;

```

## SCTP associations

```

add sctp-assoc id=sg1-sgp1-sctp; sgp-id=sg1-sgp1; sctp-assoc-profile-id=sctp-prof;
platform-id=CA146; remote-port=2905; remote-tsap-addr1=10.0.1.54;
remote-tsap-addr2=10.128.1.239; ip-tos-precedence=ROUTINE;

```

```
add sctp-assoc id=sg2-sgpl-sctp; sgp-id=sg2-sgp1; sctp-assoc-profile-id=sctp-prof;
platform-id=CA146; remote-port=2905; remote-tsap-addr1=10.0.1.55;
remote-tsap-addr2=10.128.1.240; ip-tos-precedence=ROUTINE;
```

### Dial plan profile

```
add digman-profile id=pretrans;
add digman id=pretrans; rule=1; match-string=^*; replace-string=&; match-noa=any;
replace-noa=VSC;
add digman id=pretrans; rule=2; match-string=^#; replace-string=&; match-noa=any;
replace-noa=VSC;
add digman-profile id=ani_20;
add digman id=ani_20; rule=1; match-string=^20; replace-string=none;
add dial-plan-profile id=dp-1; nanp-dial-plan=Y; description=NA dial plan profile;
dnis-digman-id=pretrans; ani-digman-id=ani_20;
```

### SS7 TG

```
add ss7-ansi-tg-profile ID=ansi-tg-prof;
add trunk-grp ID=1; call_agent_id=CA146; tg_type=SS7; direction=BOTH;
tg_profile_id=ansi-tg-prof; call-ctrl-route-id=dpc1-route1; dial-plan-id=dp-1;
description=TG to DPC 1; MGCP_PKG_TYPE=T;
add trunk-grp ID=2; call_agent_id=CA146; tg_type=SS7; direction=BOTH;
tg_profile_id=ansi-tg-prof; call-ctrl-route-id=dpc2-route1; dial-plan-id=dp-1;
description=TG to DPC 2; MGCP_PKG_TYPE=T;
```

### Two new trunk groups are added for OPC2

```
add trunk-grp ID=3; call_agent_id=CA146; tg_type=SS7; direction=BOTH;
tg_profile_id=ansi-tg-prof; call-ctrl-route-id=dpc1-route2; dial-plan-id=dp-1;
description=TG2 to DPC 1; MGCP_PKG_TYPE=T;
add trunk-grp ID=4; call_agent_id=CA146; tg_type=SS7; direction=BOTH;
tg_profile_id=ansi-tg-prof; call-ctrl-route-id=dpc2-route2; dial-plan-id=dp-1;
description=TG2 to DPC 2; MGCP_PKG_TYPE=T;
```

### MGW

```
add mgw-profile id=as5300-prof; vendor=Cisco; mgcp-hairpin-supp=n; MGCP_RSIPSTAR_SUPP=N;
MGCP_TERM_INIT_LEVEL=0; RBK_ON_CONN_SUPP=N; MGCP_VERSION=MGCP_1_0; mgcp-max2-retries=3;
fax-t38-camode-supp=Y; mgcp-keepalive-interval=60; mgcp-keepalive-retries=10;
mgcp-t-tran=400; mgcp-max1-retries=2; mgcp-t-longtran=5; mgcp-default-pkg=NONE;
MGCP_3WAY_HSHAKE_SUPP=N; mgw_type=AS5300; PC_MPTIME_SUPP=N;
MGCP_VERSION=MGCP_1_0; PC_MPTIME_SUPP=N;
add mgw id=va-5350-23; tsap-addr=va-5350-23.hrndevtest.cisco.com; call-agent-id=CA146;
mgw-profile-id=as5300-prof; type=TGW;
```

### SS7 terminations and trunks

```
add termination prefix=S3/DS1-4/; port-start=1; port-end=31; type=trunk;
mgw-id=va-5350-23;

add termination prefix=S3/DS1-5/; port-start=1; port-end=31; type=trunk;
mgw-id=va-5350-23;

add trunk cic-start=1; cic-end=31; tgn-id=1; mgw-id=va-5350-23;
termination-prefix=S3/DS1-4/; termination-port-start=1; termination-port-end=31;

add trunk cic-start=1; cic-end=31; tgn-id=2; mgw-id=va-5350-23;
termination-prefix=S3/DS1-5/; termination-port-start=1; termination-port-end=31;
```

### New termination and trunk information for OPC2

```
add termination prefix=S3/DS1-6/; port-start=1; port-end=31; type=trunk;
mgw-id=va-5350-23;

add termination prefix=S3/DS1-7/; port-start=1; port-end=31; type=trunk;
mgw-id=va-5350-23;

add trunk cic-start=1; cic-end=31; tgn-id=3; mgw-id=va-5350-23;
termination-prefix=S3/DS1-6/; termination-port-start=1; termination-port-end=31;

add trunk cic-start=1; cic-end=31; tgn-id=4; mgw-id=va-5350-23;
termination-prefix=S3/DS1-7/; termination-port-start=1; termination-port-end=31;
```

### SS7 routes, route guides and destinations

```
add route id=dpc1-route; tg_selection=RR; tgn1_id=1;
add route id=dpc2-route; tg_selection=RR; tgn1_id=2;
add route-guide id=dpc1-rg; policy-type=ROUTE; policy-id=dpc1-route;
add route-guide id=dpc2-rg; policy-type=ROUTE; policy-id=dpc2-route;
add destination dest-id=dpc1-dest; call-type=LOCAL; route-type=ROUTE;
route-guide-id=dpc1-rg;
add destination dest-id=dpc2-dest; call-type=LOCAL; route-type=ROUTE;
route-guide-id=dpc2-rg;
```

### New route, route guide and destination information for OPC2

```
add route id=dpc1-route2; tg_selection=RR; tgn1_id=3;
add route id=dpc2-route2; tg_selection=RR; tgn1_id=4;
add route-guide id=dpc1-rg2; policy-type=ROUTE; policy-id=dpc1-route2;
add route-guide id=dpc2-rg2; policy-type=ROUTE; policy-id=dpc2-route2;
add destination dest-id=dpc1-dest2; call-type=LOCAL; route-type=ROUTE;
route-guide-id=dpc1-rg2;
add destination dest-id=dpc2-dest2; call-type=LOCAL; route-type=ROUTE;
route-guide-id=dpc2-rg2;
```

### TCAP/SUA Provisioning for LNP

```
add sctp-assoc id=sg1-sgp1-sctp-ain; sgp-id=sg1-sgp1; sctp-assoc-profile-id=sctp-prof;
platform-id=FSAIN205; remote-port=14001; remote-tsap-addr1=10.0.1.54;
remote-tsap-addr2=10.128.1.239; ip-tos-precedence=ROUTINE;

add sctp-assoc id=sg2-sgp1-sctp-ain; sgp-id=sg2-sgp1; sctp-assoc-profile-id=sctp-prof;
platform-id=FSAIN205; remote-port=14001; remote-tsap-addr1=10.0.1.55;
remote-tsap-addr2=10.128.1.240; ip-tos-precedence=ROUTINE;

add sctp-assoc id=sg1-sgp1-sctp-ptc; sgp-id=sg1-sgp1; sctp-assoc-profile-id=sctp-prof;
platform-id=FSPTC235; remote-port=14001; remote-tsap-addr1=10.0.1.54;
remote-tsap-addr2=10.128.1.239; ip-tos-precedence=ROUTINE;

add sctp-assoc id=sg2-sgp1-sctp-ptc; sgp-id=sg2-sgp1; sctp-assoc-profile-id=sctp-prof;
platform-id=FSPTC235; remote-port=14001; remote-tsap-addr1=10.0.1.55;
remote-tsap-addr2=10.128.1.240; ip-tos-precedence=ROUTINE;

add sccp-nw id=1;NET_IND=NATIONAL;SUB_SVC=NATIONAL;HOP_COUNT=3;

add subsystem-profile id=SS_LNP; platform-id=FSAIN205; description=LNP subsystem;
add subsystem-profile id=SS_800A; platform-id=FSAIN205; description=AIN 800 subsystem;
add subsystem-profile id=SS_800T; platform-id=FSAIN205; description=IN1 800 subsystem;
add subsystem-profile id=SS_CNAM; platform-id=FSAIN205; description=CNAM subsystem;
add subsystem-profile id=SS_ACAR; platform-id=FSPTC235; description=ACAR subsystem;
```

```

add subsystem id=SS_LNP; opc-id=opc1; local-ssn=247; remote-ssn=247; sccp-nw-id=1;
SCCP_VERSION=ANS92; TCAP_VERSION=ANS92; APPLICATION_VERSION=AIN01;
add subsystem id=SS_800A; opc-id=opc1; local-ssn=248; remote-ssn=248; sccp-nw-id=1;
SCCP_VERSION=ANS92; TCAP_VERSION=ANS92; APPLICATION_VERSION=AIN01;
add subsystem id=SS_CNAM; opc-id=opc1; local-ssn=232; remote-ssn=232; sccp-nw-id=1;
SCCP_VERSION=ANS92; TCAP_VERSION=ANS92; APPLICATION_VERSION=IN1;
add subsystem id=SS_800T; opc-id=opc1; local-ssn=254; remote-ssn=254; sccp-nw-id=1;
SCCP_VERSION=ANS92; TCAP_VERSION=ANS92; APPLICATION_VERSION=IN1;
add subsystem id=SS_ACAR; opc-id=opc1; local-ssn=251; remote-ssn=251; sccp-nw-id=1;
SCCP_VERSION=ANS92; TCAP_VERSION=ANS92; APPLICATION_VERSION=IN1;

```

### New subsystem ID for OPC2

```

add subsystem id=SS_LNP; opc-id=opc2; local-ssn=247; remote-ssn=247; sccp-nw-id=1;
SCCP_VERSION=ANS92; TCAP_VERSION=ANS92; APPLICATION_VERSION=AIN01;
add subsystem id=SS_800A; opc-id=opc2; local-ssn=248; remote-ssn=248; sccp-nw-id=1;
SCCP_VERSION=ANS92; TCAP_VERSION=ANS92; APPLICATION_VERSION=AIN01;
add subsystem id=SS_CNAM; opc-id=opc2; local-ssn=232; remote-ssn=232; sccp-nw-id=1;
SCCP_VERSION=ANS92; TCAP_VERSION=ANS92; APPLICATION_VERSION=IN1;
add subsystem id=SS_800T; opc-id=opc2; local-ssn=254; remote-ssn=254; sccp-nw-id=1;
SCCP_VERSION=ANS92; TCAP_VERSION=ANS92; APPLICATION_VERSION=IN1;
add subsystem id=SS_ACAR; opc-id=opc2; local-ssn=251; remote-ssn=251; sccp-nw-id=1;
SCCP_VERSION=ANS92; TCAP_VERSION=ANS92; APPLICATION_VERSION=IN1;

```

```

add routing-key id=rk_lnp; opc-id=opc1; sg-grp-id=sg_grp1; si=SCCP; rc=4402;
PLATFORM_ID=FSAIN205; ssn-id=SS_LNP;
add routing-key id=rk_800a; opc-id=opc1; sg-grp-id=sg_grp1; si=SCCP; rc=4403;
PLATFORM_ID=FSAIN205; ssn-id=SS_800A;
add routing-key id=rk_cnam; opc-id=opc1; sg-grp-id=sg_grp1; si=SCCP; rc=4404;
PLATFORM_ID=FSAIN205; ssn-id=SS_CNAM;
add routing-key id=rk_800t; opc-id=opc1; sg-grp-id=sg_grp1; si=SCCP; rc=4401;
PLATFORM_ID=FSAIN205; ssn-id=SS_800T;
add routing-key id=rk_acar; opc-id=opc1; sg-grp-id=sg_grp1; si=SCCP; rc=4405;
PLATFORM_ID=FSPTC235; ssn-id=SS_ACAR;

```

### New routing-key for OPC2

```

add routing-key id=rk_lnp2; opc-id=opc2; sg-grp-id=sg_grp1; si=SCCP; rc=4412;
PLATFORM_ID=FSAIN205; ssn-id=SS_LNP;
add routing-key id=rk_800a2; opc-id=opc2; sg-grp-id=sg_grp1; si=SCCP; rc=4413;
PLATFORM_ID=FSAIN205; ssn-id=SS_800A;
add routing-key id=rk_cnam2; opc-id=opc2; sg-grp-id=sg_grp1; si=SCCP; rc=4414;
PLATFORM_ID=FSAIN205; ssn-id=SS_CNAM;
add routing-key id=rk_800t2; opc-id=opc2; sg-grp-id=sg_grp1; si=SCCP; rc=4411;
PLATFORM_ID=FSAIN205; ssn-id=SS_800T;
add routing-key id=rk_acar2; opc-id=opc2; sg-grp-id=sg_grp1; si=SCCP; rc=4415;
PLATFORM_ID=FSPTC235; ssn-id=SS_ACAR;

```

### Provisioned DPC is the STP capability point code

```

add dpc id=stp_cap_pc; point-code=1-1-22; point-code-type=ANSI_CHINA;
description=Capability Point Code of STPs

add feature fname=LNP; feature-server-id=FSAIN205; description=Local number portability;
tdp1=COLLECTED_INFORMATION; tid1=LNP_TRIGGER; ttype1=R;

add ported-office-code digit-string=301-612; in-call-agent=n;

add CA-Config type=DEFAULT-LNP-SLHR-ID; datatype=string; value=slhr_lnp;

add slhr-profile id=slhr_800t; description=Service Logic Host Routing Table for IN1 800
Service;

```

```

add slhr-profile id=slhr_lnp; description=Service Logic Host Routing Table for AIN LNP
Service;
add slhr-profile id=slhr_800a; description=Service Logic Host Routing Table for AIN 800
Service;
add slhr-profile id=slhr_cnam; description=Service Logic Host Routing Table for IN1 CNAM
Service;
add slhr-profile id=slhr_acar; description=Service Logic Host Routing Table for ACAR
Service;

add slhr id=slhr_800t; opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_800T; gtt-req=Y; tt=254;
GTT_ADDR_TYPE=CDPN; GTT_ADDR=3;
add slhr id=slhr_lnp; opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_LNP; gtt-req=Y; tt=11;
GTT_ADDR_TYPE=CDPN; GTT_ADDR=3;
add slhr id=slhr_800a; opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_800A; gtt-req=Y; tt=8;
GTT_ADDR_TYPE=CDPN; GTT_ADDR=3;
add slhr id=slhr_cnam; opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_CNAM; gtt-req=Y; tt=5;
GTT_ADDR_TYPE=CLGN; GTT_ADDR=3;
add slhr id=slhr_acar; opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_ACAR; gtt-req=Y; tt=251;
GTT_ADDR_TYPE=CDPN; GTT_ADDR=10;

```

### New slhr for OPC2

```

add slhr id=slhr_800t; opc-id=opc2; dpc-id=stp_cap_pc; ssn-id=SS_800T; gtt-req=Y; tt=254;
GTT_ADDR_TYPE=CDPN; GTT_ADDR=3;
add slhr id=slhr_lnp; opc-id=opc2; dpc-id=stp_cap_pc; ssn-id=SS_LNP; gtt-req=Y; tt=11;
GTT_ADDR_TYPE=CDPN; GTT_ADDR=3;
add slhr id=slhr_800a; opc-id=opc2; dpc-id=stp_cap_pc; ssn-id=SS_800A; gtt-req=Y; tt=8;
GTT_ADDR_TYPE=CDPN; GTT_ADDR=3;
add slhr id=slhr_cnam; opc-id=opc2; dpc-id=stp_cap_pc; ssn-id=SS_CNAM; gtt-req=Y; tt=5;
GTT_ADDR_TYPE=CLGN; GTT_ADDR=3;
add slhr id=slhr_acar; opc-id=opc2; dpc-id=stp_cap_pc; ssn-id=SS_ACAR; gtt-req=Y; tt=251;
GTT_ADDR_TYPE=CDPN; GTT_ADDR=10;

```

```

add sccp-route opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_800T; rk-id=rk_800t;
add sccp-route opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_800A; rk-id=rk_800a;
add sccp-route opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_LNP; rk-id=rk_lnp;
add sccp-route opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_CNAM; rk-id=rk_cnam;
add sccp-route opc-id=opc1; dpc-id=stp_cap_pc; ssn-id=SS_ACAR; rk-id=rk_acar;

```

```

add sccp-route SSN_ID=SS_ACAR; OPC_ID=opc1; DPC_ID=dpc1; RK_ID=rk_acar
add sccp-route SSN_ID=SS_ACAR; OPC_ID=opc1; DPC_ID=dpc2; RK_ID=rk_acar

```

### New sccp-route for OPC2

```

add sccp-route opc-id=opc2; dpc-id=stp_cap_pc; ssn-id=SS_800T; rk-id=rk_800t2;
add sccp-route opc-id=opc2; dpc-id=stp_cap_pc; ssn-id=SS_800A; rk-id=rk_800a2;
add sccp-route opc-id=opc2; dpc-id=stp_cap_pc; ssn-id=SS_LNP; rk-id=rk_lnp2;
add sccp-route opc-id=opc2; dpc-id=stp_cap_pc; ssn-id=SS_CNAM; rk-id=rk_cnam2;
add sccp-route opc-id=opc2; dpc-id=stp_cap_pc; ssn-id=SS_ACAR; rk-id=rk_acar2;

```

```

add sccp-route SSN_ID=SS_ACAR; OPC_ID=opc2; DPC_ID=dpc1; RK_ID=rk_acar2
add sccp-route SSN_ID=SS_ACAR; OPC_ID=opc2; DPC_ID=dpc2; RK_ID=rk_acar2
_PLUS_LOCAL=N

```

### New pop for OPC2

```

add pop ID=50902; STATE=tx; COUNTRY=US; TIMEZONE=CDT; LOCAL_7D_DIALING=Y; ITP=N;
ZERO_MINUS=LEC; BLOCK_EAWOPIC=Y; CNAM_OPTION=EXT_LIDB; PIC2_REQD=N; MY_LRN=4692559991;
TREAT_IMS_ANONYMOUS=N; OPC_ID=opc2; ZERO_PLUS_LOCAL=N

```

# Multiple Cisco BTS 10200 Softswitch Nodes Sharing the Same OPC

This profile, illustrated in [Figure 3-3](#), is used when a customer wants to share a single OPC among multiple BTS nodes. When this feature is utilized, traffic is divided in one of two ways:

1. Traffic can be split between the BTS nodes based on a per call control route basis. In this case, the BTS nodes will not be provisioned with the same DPC. This means that only one of the BTS nodes will send traffic to and receive traffic from the associated DPC in the service provider network.
2. Traffic can also be split on a per call control route/Carrier Identification Code (CIC) range basis. In this case, the same DPC (and call control route) can be provisioned for multiple BTS nodes, but the associated trunk group will be provisioned with a CIC range that differs on each BTS node.

This customer profile is subject to the following limitations:

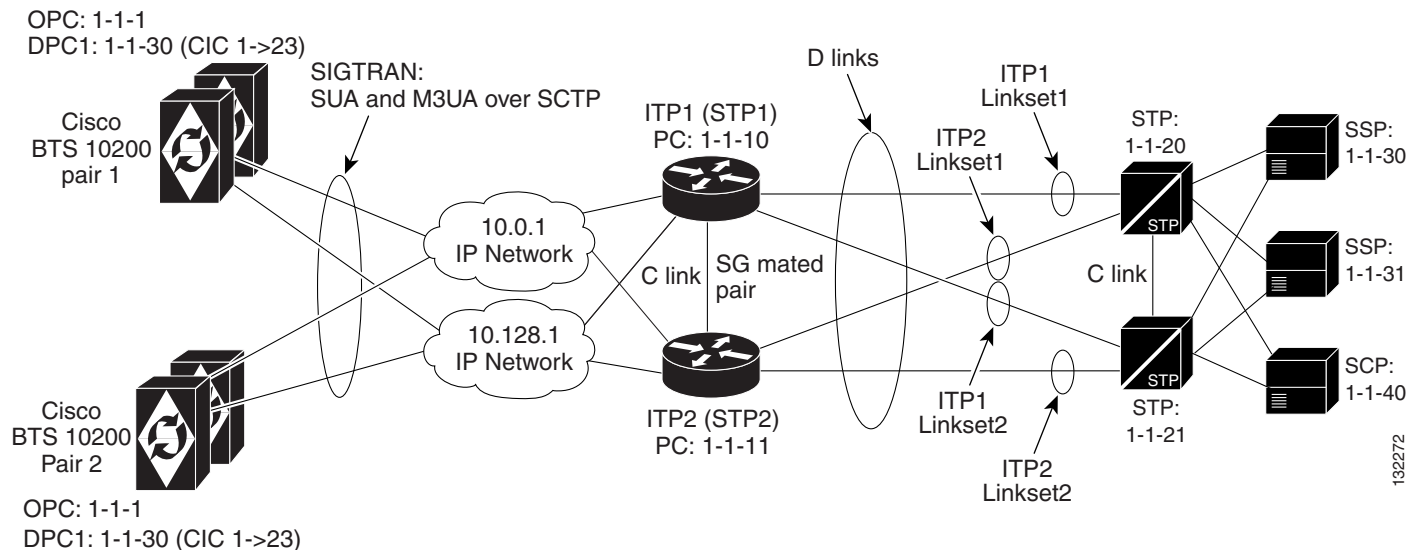
- Multiple Cisco BTS 10200 nodes sharing a single point code is only valid for ISUP. If TCAP queries are needed, a separate TCAP OPC will be needed for each Cisco BTS 10200.
- If a provisioned DPC on one BTS is also provisioned on any other BTS, then load must be divided between the BTS nodes based on CIC range.
- When provisioning call control routes on the BTS, you cannot provision two different call control routes that have the same routing key and DPC information.



## Note

This customer profile is valid for Mated STP Pair and Shared Point Code topologies. For the Shared Point Code topologies that connect via A, F, and E-links, the point code of the ITP Group is shared by the BTS.

**Figure 3-3 Multiple BTS Nodes Sharing the Same Point Code**



## Cisco ITP Configuration Example

This example shows an AS and ASP configuration and is only for M3UA. For a default Mated STP-Pair configuration, which includes SUA, refer to [Chapter 1, “SS7 Basic Configurations.”](#)<sup>1</sup>

For additional ITP configuration information, refer to the *Cisco ITP Configuration Guide*


**Note**

When debugging the ITP, the version of the ITP should be noted so the associated ITP manual can be consulted.

This configuration information is similar to a basic Mated STP-Pair configuration, except that in this example there will be extra ASP configuration information for communicating to the second (CA)(BTS2). Also, there is extra information in the AS configuration section for routing to each of the Cisco BTS 10200 nodes, based on CIC range. Shown below are the ASP and AS configuration elements for ITP1.


**Note**

ITP2 will have the same ASP and AS configuration information that is shown below for ITP1.

### ASP configuration for BTS1

```
cs7 asp PRI_ISUP_BTS1 11146 2905 m3ua
  remote-ip 10.0.1.5
  remote-ip 10.128.1.2
cs7 asp SEC_ISUP_BTS1 11146 2905 m3ua
  remote-ip 10.0.1.6
  remote-ip 10.128.1.3
```

### ASP configuration for BTS2

```
cs7 asp PRI_ISUP_BTS2 11146 2905 m3ua
  remote-ip 10.0.1.7
  remote-ip 10.128.1.4

cs7 asp SEC_ISUP_BTS2 11146 2905 m3ua
  remote-ip 10.0.1.8
  remote-ip 10.128.1.5
```

### AS configuration for BTS1—The routing context entries are as follows:

```
routing context = 1, DPC(BTS OPC)=1.1.1, opc=1.1.30, mask is 255.255.255,
service indicator=ISUP, CIC range=1->23
```

```
cs7 as ISUP_BTS1 m3ua
  routing-key 1 1.1.1 opc 1.1.30 255.255.255 si isup cic 1 23
  asp PRI_ISUP_BTS1
  asp SEC_ISUP_BTS1
  traffic-mode override
```

### AS configuration for BTS2—The CIC range changes to 24->46 for sending messages to BTS2

```
cs7 as ISUP_BTS1 m3ua
  routing-key 2 1.1.1 opc 1.1.30 255.255.255 si isup cic 24 46
  asp PRI_ISUP_BTS2
  asp SEC_ISUP_BTS2
  traffic-mode override
```

Note that additional AS configurations will be needed for other DPCs (such as 1-1-31).

# Cisco BTS 10200 Softswitch Provisioning Example

## BTS1 Provisioning

The following example documents BTS1 provisioning for routing key/CIC based routing. It is important to note that, unlike the ITP, the BTS does not configure CIC ranges within the routing key. Instead, the CIC ranges on the BTS are provisioned as part of the trunk object.

```
add opc id=opc1; point-code=1-1-1; point-code-type=ANSI_CHINA;
add dpc id=dpc1; point-code=1-1-30; point-code-type=ANSI_CHINA;
add dpc id=dpc2; point-code=1-1-31; point-code-type=ANSI_CHINA;
add sg id=sg1; priority=1;
add sg id=sg2; priority=1;
add sg-grp id=sg-grp1; sg1-id=sg1; sg2-id=sg2;
add sgp id=sg1-sgp1; sg-id=sg1;
add sgp id=sg2-sgp2; sg-id=sg2;
add sctp-assoc-profile id=sctp-prof1;

add sctp-assoc id=sg1-sgp1-sctp; sgp-id=sgp1; sctp-assoc-profile-id=sctp-prof1;
platform-id=CA146; remote-port=2905; remote-tsap-addr1=10.89.225.235;
remote-tsap-addr2=10.89.226.235; dip-tos-precedence=ROUTINE;

add sctp-assoc id=sg2-sgp2-sctp; sgp-id=sgp2; sctp-assoc-profile-id=sctp-prof1;
platform-id=CA146; remote-port=2905; remote-tsap-addr1=10.89.225.236;
remote-tsap-addr2=10.89.226.236; ip-tos-precedence=ROUTINE;

add user-part-variant id=ANSISS7_GR317;
```

### The RC VALUE IN BTS CONFIG MATCHES RC VALUE IN ITP CONFIG

```
add routing-key id=rk1; opc-id=opc1; sg-grp-id=sg-grp1; si=ISUP; rc=1; platform-id=CA146;

add call-ctrl-route id=dpc1-route; dpc-id=dpc1; routing-key-id=rk1; si=ISUP;
user-part-variant-id=ANSISS7_GR317;
add call-ctrl-route id=dpc2-route; dpc-id=dpc2; routing-key-id=rk2; si=ISUP;
user-part-variant-id=ANSISS7_GR317;
add mgw-profile id=as5300-prof; mgw-type=AS5300; mgcp-version=MGCP_1_0;
add mgw id=as5300-1; mgw-profile-id=as5300-prof; call-agent-id=CA146;
tsap-addr=as5300-1.cisco.com; type=MGW;
add termination prefix=S1/DS1-0/; port-start=1; port-end=23 or 31; type=trunk;
mgw-id=as5300-1;

add ss7-ansi-tg-profile id=ss7-prof1;
add trunk-grp id=1; call-agent-id=CA146; tg-type=SS7; tg-profile=ss7-prof1;
call-ctrl-route-id=dpc1-route;
```

The CIC range in the BTS trunk matches the one in the ITP as rkey configuration. Also the CIC range is not defined in the routing-key for the BTS. It is defined as part of the trunk object. It is however possible to define the DPC in this routing key, but it is not necessary and was not done here.

```
add trunk cic-start=1; cic-end=23; type=trunk; mgw-id=as5300-1;
termination-prefix=S1/DS1-0/; tgn-id=1; termination-port-start=1; termination-port-end=23;

add route id=dpc1-route; tg-selection=RR; tgn1-id=1;

add route-guide id=dpc1-rg; policy-type=ROUTE; policy-id=dpc1-route;

add destination id=dpc1-dest; route-type=ROUTE; route-guide-id=dpc1-rg;
```



## BTS2 Provisioning

The following example documents BTS2 provisioning for routing key/CIC based routing.

```
add opc id=opc1; point-code=3-10-3; point-code-type=ANSI_CHINA;
add dpc id=dpc1; point-code=3-50-3; point-code-type=ANSI_CHINA;
add dpc id=dpc2; point-code=3-51-3; point-code-type=ANSI_CHINA;
add sg id=sg1; priority=1;
add sg id=sg2; priority=1;
add sg-grp id=sg-grp1; sg1-id=sg1; sg2-id=sg2;
add sgp id=sgp1; sg-id=sg1;
add sgp id=sgp2; sg-id=sg2;
add sctp-assoc-profile id=sctp-prof1;

add sctp-assoc id=ca-sgp1-sctp; sgp-id=sgp1; sctp-assoc-profile-id=sctp-prof1;
platform-id=CA147; remote-port=2905; remote-tsap-addr1=10.89.225.235;
remote-tsap-addr2=10.89.226.235; ip-tos-precedence=ROUTINE;

add sctp-assoc id=ca-sgp2-sctp; sgp-id=sgp2; sctp-assoc-profile-id=sctp-prof1;
platform-id=CA147; remote-port=2905; remote-tsap-addr1=10.89.225.236;
remote-tsap-addr2=10.89.226.236; ip-tos-precedence=ROUTINE;

add user-part-variant id=ANSISS7_GR317;
```

The RC value in the BTS configuration matches the RC value in the ITP configuration. Also the CIC range is not defined in the routing key for the BTS. It is defined as part of the trunk object. It is, however, possible to define the DPC in this routing key, but it is not necessary and was not done here.

```
add routing-key id=rk3; opc-id=opc1; sg-grp-id=sg-grp1; si=ISUP; rc=2; platform-id=CA146;

add call-ctrl-route id=dpc1-route; dpc-id=dpc1; routing-key-id=rk3; si=ISUP;
user-part-variant-id=ANSISS7_GR317;
add call-ctrl-route id=dpc2-route; dpc-id=dpc2; routing-key-id=rk4; si=ISUP;
user-part-variant-id=ANSISS7_GR317;
add mgw-profile id=as5300-prof; mgw-type=AS5300; mgcp-version=MGCP_1_0;
add mgw id=as5300-1; mgw-profile-id=as5300-prof; call-agent-id=CA146;
tsap-addr=as5300-1.cisco.com; type=MGW;
add termination prefix=S1/DS1-0/; port-start=1; port-end=23 ; type=trunk; mgw-id=as5300-2;
add ss7-ansi-tg-profile id=ss7-prof1;

add trunk-grp id=1; call-agent-id=CA147; tg-type=SS7; tg-profile=ss7-prof1;
call-ctrl-route-id=dpc1-route;
```

The CIC range in the BTS trunk matches the one in the ITP AS routing key configuration.

```
add trunk cic-start=24; cic-end=46; type=trunk; mgw-id=as5300-2;
termination-prefix=S1/DS1-0/; tgn-id=1; termination-port-start=1; termination-port-end=23;

add route id=dpc1-route; tg-selection=RR; tgn1-id=1;
add route-guide id=dpc1-rg; policy-type=ROUTE; policy-id=dpc1-route;
add destination id=dpc1-dest; route-type=ROUTE; route-guide-id=dpc1-rg;
```



## Cisco ITP Configuration Example

The ITP configuration in this example is similar to the one in the [ITP1 Configuration, page 2-6](#), with the following exceptions:

- In [Figure 3-4](#), only one STP is shown as a route towards each SSP.
- The routes through STP1 and STP2 lead towards different endpoints.

The following is the configuration example for the cs7 linksets and routes:

**SS7 Linkset definitions**—The number after 'link' represents SLC.

```
cs7 linkset lset1chn 1.1.20
 link 0 Serial0/0:0
!
cs7 linkset lset2chn 2.1.20
 link 0 Serial0/1:0
```

**SS7 Route definitions**

```
cs7 route-table system
 update route 1.1.30 255.255.255 linkset lset1chn priority 1
 update route 1.1.31 255.255.255 linkset lset1chn priority 1
 update route 2.1.30 255.255.255 linkset lset2chn priority 1
 update route 2.1.31 255.255.255 linkset lset2chn priority 1
```

## Cisco BTS 10200 Softswitch Provisioning Example

In this BTS provisioning script, each BTS assigns one of the SGs of the SG-Group as a priority 1 SG route while the other BTS assigns it as a priority 2 SG route. In the BTS1 provisioning script, SG1 has a priority of 1 while SG2 has a priority of 2. In the BTS2 provisioning script, SG2 has a priority of 1 while SG1 has a priority of 2.

The following is a provisioning example for configuring SG priorities.

### BTS1 Provisioning

SG configuration for BTS1. The priority is provisioned opposite of what will be done on BTS2 (as shown in the following subsection).

```
add sg id=sg1; description=Signaling gateway 1 of SG GRP 1; priority 1
add sg id=sg2; description=Signaling gateway 2 of SG GRP 1; priority 2
```

**SG-GRP configuration for BTS1**

```
add sg-grp id=sg-grp1; sg1-id=sg1; sg2-id=sg2 description=SG group 1;
```

## BTS2 Provisioning

**SG configuration for BTS2**—The priority is provisioned opposite of what it is for BTS1.

```
add sg id=sg1; description=Signaling gateway 1 of SG GRP 1; priority 2
add sg id=sg2; description=Signaling gateway 2 of SG GRP 1; priority 1
```

### **SG-GRP configuration for BTS2**

```
add sg-grp id=sg-grp1; sg1-id=sg1; sg2-id=sg2 description=SG group 1;
```



## CHAPTER 4

# SS7 SIGTRAN Troubleshooting

---

Revised: July 2010, OL-23039-01

This chapter describes tools and procedures for troubleshooting SIGTRAN problems on the Cisco BTS 10200 Softswitch and Cisco ITP, for clearing Cisco BTS 10200 Softswitch alarms, and for troubleshooting network problems. When an alarm is raised on the Cisco BTS 10200, a series of steps may be required to determine the source of the problem and may include viewing other alarms, invoking command line interface (CLI) status and control commands, viewing the Cisco BTS 10200 logs, and invoking ITP control and status requests.

This chapter contains the following sections:

- [Cisco ITP Troubleshooting Procedures](#)
- [Cisco BTS 10200 Softswitch Troubleshooting Procedures](#)
- [Troubleshooting Cisco BTS 10200 Softswitch Alarms](#)
- [Debugging Network Problems for TCAP/SCCP Applications](#)
- [Troubleshooting With the Query Command](#)

## Cisco ITP Troubleshooting Procedures

The following procedures are useful for troubleshooting problems on the Cisco ITP.

### ITP System Messages

The Cisco ITP displays system messages when you are logged in to the console port. Some of these messages are similar to alarms. Analyzing ITP system messages is outside the scope of this document. For details concerning ITP system messages, please see the *ITP Operations Manual*.



**Note**

---

When debugging the ITP, note the version of the ITP so the associated *ITP Operations Manual* can be consulted.

---

## Logging On to the ITP

Some of the troubleshooting sections in this chapter require the user to log on to the ITP. Access the ITP through the associated console server or through direct access with a console cable. You need the username and password to access the ITP.

Troubleshooting the ITP will require you to be in ITP enable mode. To get into enable mode, after logging in to the ITP, type **enable**. You will be prompted for the enable password.

## Viewing the ITP Configuration

To view the ITP configuration, log in to the ITP and get into enable mode. Enter the command **show run**. The configuration will be displayed. Continue to hit the enter key until you have viewed the entire configuration, or type **q** to stop viewing the configuration.

## ITP Status Commands

The following ITP commands are helpful for displaying the status of ITP resources:

- **show cs7 as**—Retrieves the AS status.
- **show cs7 asp**—Retrieves the ASP status.
- **show cs7 linkset**—Retrieves the SS7 linkset status.
- **show cs7 route**—Retrieves the SS7 route status.
- **show cs7 group state**—Retrieves the SG-Group status.

## Controlling ITP Resources

Change the administrative state of an ITP resource as follows:

- 
- Step 1** Log on to the ITP, and get into configure mode.
  - Step 2** Type the first configuration line of the resource that you want to control.
  - Step 3** Type **shut** to take the resource out of service, or type **no-shut** to place the resource back in service.
- 

The following example takes a linkset out of service:

```
va-2651-33# conf t
```

Enter configuration commands, one per line

```
va-2651-33(config)# cs7 linkset lset1 1.1.20
```

```
va-2651-33(config-cs7-ls)# shut
```

```
*May 19 12:32:13.827: %CS7MTP3-5-ACTDEACTLINKSET: Linkset lset1 deactivation is in progress
```

```
*May 19 12:32:13.827: %CS7MTP3-5-LINKUPDOWN: Link 0 in linkset lset1 is down
```

To put the linkset back in service, type the following command:

```
va-2651-33(config-cs7-ls)# no shut
*May 19 12:33:47.704: %CS7MTP3-5-ACTDEACTLINKSET: Linkset lset1 activation is in progress
*May 19 12:33:47.704: %CS7MTP3-5-ACTDEACTLINK: Link 0 linkset lset1 activation is in progress
```

## Cisco BTS 10200 Softswitch Troubleshooting Procedures

The following procedures are useful for troubleshooting problems on the Cisco BTS 10200 Softswitch:

- [Using Cisco BTS 10200 Softswitch CLI Commands](#)
- [Viewing Cisco BTS 10200 Softswitch Logs](#)

### Using Cisco BTS 10200 Softswitch CLI Commands

In the following sections, examples of BTS CLI commands are used to aid in resolving BTS alarms. The following CLI commands are helpful to display and clear alarms.

To display all the currently active alarms, enter the following command at a CLI prompt:

```
show alarm
```

To display all alarms of a specific type, enter:

```
show alarm type=<alarm type>
```

To clear an alarm, enter the following command:

```
clear alarm id=<alarm id>
```

For a detailed description of the CLI commands that are used, see the *Cisco BTS 10200 Softswitch CLI Database*.

### Viewing Cisco BTS 10200 Softswitch Logs

Viewing Cisco BTS 10200 logs is helpful when debugging M3UA related objects on the Cisco BTS 10200. Specific string patterns are printed out by the M3UA Interface Module and are useful to determine what is occurring in the log. These strings are formatted as follows:

```
MIM <functional area> <network object>
```

Functional areas include:

- CFG
- STATUS
- PDU
- STATISTICS
- CTRL
- PLATFORM

Network objects include:

- SCTP

- SGP
- SG
- DPC
- OPC
- ROUTING-KEY
- CALL-CONTROL-ROUTE

Search or grep the following example strings when searching the Cisco BTS 10200 logs:

- MIM CFG SCTP—Display how the Stream Control Transmission Protocol (SCTP) has been configured at startup.
- MIM PDU—Trace the incoming messages at the Multipurpose Internet Mail (MIM) layer.
- MIM STATUS DPC—Display how the Destination Point Code (DPC) status has changed in the system.
- MIM STATUS SCTP—Display how the SCTP status has changed in the system.
- MIM PLATFORM—Determine if a platform state change has been issued to the Signaling Gateway Adapter (SGA)/MIM module.
- MIM CTRL SCTP—Determine if an SCTP association has been administratively taken out of service or put back in service.

## Troubleshooting Cisco BTS 10200 Softswitch Alarms

When an alarm is raised on the BTS, you must determine whether the issue is in the IP network, on the ITP, or in the public switched telephone network (PSTN). Subsequent sections provide troubleshooting steps for the following BTS Signaling System 7 (SS7) and SIGTRAN related alarms raised on the BTS. Click on the alarm name to display troubleshooting information for that alarm at both the MTP3-User Adaptation Layer (M3UA) and Single User Account (SUA) layers.

**Table 4-1** Cisco BTS 10200 Softswitch SS7 and SIGTRAN Alarms

Alarm Type	Alarm Name	Alarm Severity
SIGNALING(23)	<a href="#">DPC Unavailable</a>	MAJOR
SIGNALING(116)	<a href="#">DPC User Part Unavailable</a>	MAJOR
SIGNALING(24)	<a href="#">DPC Congested</a>	MINOR
SIGNALING(110)	<a href="#">Signaling Gateway Group Is Out of Service</a>	CRITICAL
SIGNALING(113)	<a href="#">Signaling Gateway Failure</a>	MAJOR
SIGNALING(114)	<a href="#">Signaling Gateway Process Is Out of Service</a>	MAJOR
SIGNALING(109)	<a href="#">SCTP Association Failure</a>	MAJOR
SIGNALING(111)	<a href="#">SCTP Association Degraded</a>	MINOR
SIGNALING(112)	<a href="#">SCTP Association Configuration Error</a>	MINOR
SIGNALING(122)	<a href="#">M3UA Cannot Go Active</a>	MAJOR
SIGNALING(121)	<a href="#">M3UA Cannot Go Standby</a>	MAJOR



Alarm Type	Alarm Name	Alarm Severity
SIGNALING(127)	<a href="#">TCAP Binding Failure</a>	MAJOR
SIGNALING(124)	<a href="#">Remote Subsystem Is Out Of Service</a>	MINOR

## DPC Unavailable

This alarm indicates that the BTS is unable to communicate with the specified DPC in the SS7 network. Determine if the issue is a communication problem between the BTS and the ITP or if it is related to communication problems between the ITP and the DPC by following these steps:

- 
- Step 1** Use the BTS CLI **show alarm** command to determine if there is an active Signaling Gateway Group Out of Service alarm. This will occur if communication has been lost to both of the SGs in the SG-Group. If so, proceed to the [“Signaling Gateway Group Is Out of Service”](#) section on page 4-7. Otherwise, proceed to Step 2.
- Step 2** Determine if there is an M3UA Cannot Go Active alarm. This occurs if, at the time of startup or failover, the BTS is not able to communicate with any of the SGs. If this is the case, proceed to the [“M3UA Cannot Go Active”](#) section on page 4-11. Otherwise, proceed to Step 3.
- Step 3** If you arrive at this step, there is probably communication between the BTS and ITP at the M3UA and SUA layers, and a communication problem exists between the ITP and the unavailable DPC. To confirm this, log on to each ITP, get into enable mode, and enter **show cs7 route**. The output of this command tells you if the associated DPC is accessible or not from the ITP point of view and will look similar to the following:

```
va-2651-82# show cs7 route
```

Destination	Prio	Linkset Name	Route
229.123.2/24	INACC	1 lset1chn	UNAVAIL

This output indicates that DPC 229.123.2 is unavailable from the ITP point of view.

- Step 4** Determine if the problem is at the link level or at a higher level outage in the DPC by typing **show cs7 linkset**. If the ITP shows that the DPC is AVAIL, there is a configuration mismatch between the ITP and BTS.
- Step 5** Check whether the DPC has been removed from the BTS database. At the BTS CLI prompt, enter **show call-ctrl-route** or **show sccp-route** and see if the DPC is in any of the routes. If not, the alarm was raised before the associated routes were deleted. If this is the case, manually clear the alarm.
- Step 6** If you still cannot determine the cause of the problem, contact the Cisco Technical Assistance Centre(TAC).
- 

## DPC User Part Unavailable

This alarm indicates that a Layer 4 user part, such as ISDN user part (ISUP), is unavailable at the DPC in the SS7 network. Contact your SS7 service provider for help in resolving this problem.

## DPC Congested

This alarm indicates that the DPC in the SS7 network is congested, that is, is in a state where it has received more traffic than it can handle. This should be a temporary state. If the type of network is National, which is generally the case in the United States, there will also be a level of congestion associated with the alarm.

The ITP should continually communicate with the DPC in the SS7 network to determine if congestion has abated. If this alarm does not clear or keeps reappearing after clearing, contact your SS7 service provider to determine why the DPC is congested.

## Signaling Gateway Group Is Out of Service

This alarm indicates that after communication to the SG group was established, it was lost. This indicates that communication to the associated SGs is down, which also indicates that communication to all SGPs is down. See the [“Signaling Gateway Failure” section on page 4-7](#) to determine why the associated SGs are down.

## Signaling Gateway Failure

This alarm indicates that communication at the M3UA or SUA layer to an SG has failed. M3UA communications at all SGPs that make up the SG are unavailable. See the [“Signaling Gateway Process Is Out of Service” section on page 4-7](#) to determine why the associated SGPs are down.

## Signaling Gateway Process Is Out of Service

This alarm indicates that communication at the M3UA or SUA layer to an SGP has failed. In the majority of cases, there will also be a related SCTP Association Failure alarm. If this is the case, proceed to the [“SCTP Association Failure” section on page 4-7](#). Otherwise, the problem is at the M3UA layer. Call the Cisco TAC for assistance.

## SCTP Association Failure

This alarm indicates that the BTS is unable to communicate with an SGP at the SCTP level.

If the application for which SCTP is providing transport is ISUP, please refer to [Debugging SCTP Problems for ISUP Applications, page 4-7](#).

If the application for which SCTP is providing transport is TCAP/SCCP, please refer to [Debugging SCTP Problems for TCAP/SCCP Applications, page 4-11](#).

## Debugging SCTP Problems for ISUP Applications

Use the following steps to determine the source of the problem at the M3UA layer:

---

**Step 1** Determine if the administrative state of the SCTP is correct.

- a. Type the following command at the BTS CLI prompt:

```
status sctp-assoc id=<sctp-assoc-name>
```

If the response displays ADMIN STATE ->ADMIN\_OOS, the SCTP association has been taken administratively out of service and needs to be put back in service.

- b. Enter the following command to put the SCTP association in service:

```
control sctp-assoc id=<sctp-assoc-name>; mode=forced; target-state=INS;
```

- c. If the administrative state is ADMIN\_INS, determine if the association has been taken out of service on the ITP. Log on to the ITP. If you are unable to log on to the ITP, proceed to Step 2.
- d. If you are able to log on to the ITP, check the state of the associated ASP by entering the following command:

```
show cs7 asp
```

The following is an example of the output:

ASP Name	AS Name	State	Type	Rmt Port	Remote IP Addr	SCTP
hrn11asp	hrn11bts	shutdown	M3UA	11146	10.0.5.13	

- e. If the state of the ASP indicates shutdown, someone has administratively taken the association out of service. Refer to the *Cisco ITP User's Guide*, to put the ASP (SCTP association) back in service:


**Note**

When debugging the ITP, note the version of the ITP so the associated *ITP Operations Manual* can be consulted.

- f. If the state is down proceed to Step 2.
- g. If the state of the ASP is inactive, the ASP is probably on the standby BTS. If the ASP on the active BTS is inactive, proceed to Step 7.

**Step 2** Determine if the problem is an IP address or port configuration mismatch between the ITP and the BTS.

- a. Determine the BTS configured values for the BTS IP addresses and port. Look for the DNS name and port number that are configured for the SGA process in /opt/OptiCall/CA146/bin/platform.cfg. Go to the specified directory and enter:

```
cat platform.cfg | grep mdl
```

The output will look similar to the following:

```
Args=-t 1 -h mgcp-HRN11CA.hrndevtest.cisco.com -p 11146 -mdlmdir ../mdl -mdltracedir
../mdltrace -mdltestmode 0 -mdlloadmdo 0 -mdltriggertimer 200 -mdlgarbagetimer 5146
-resetcics 1 -fcmtimer 900 -fcmparalleljobs 4
```

- The local IP port number is shown directly after the -p option.
- The local IP addresses that are used by the BTS are derived from the DNS name, which is given directly after the -h option. At the BTS UNIX prompt, enter:

```
NSlookup <DNS name>
```

The output will look similar to the following:

```
Server: hrnbtsjs-1.cisco.com
Address: 10.82.70.199
Name: mgcp-HRN11CA.hrndevtest.cisco.com
Addresses: 10.0.5.136, 10.128.1.147
```

The BTS configured local IP addresses are given in the Addresses line.

b. Determine the ITP configured values of the ITP BTS IP addresses and port.

- Log on to the ITP and get into enable mode.
- Enter the following command:

**show run**

- Press **Enter** until the ASP configurations are displayed. A section similar to the following will appear, which shows you the ITP configured values for the BTS IP addresses of the SCTP association:

```
cs7 asp hrn11asp 11146 2905 m3ua
remote-ip 10.0.5.136
remote-ip 10.128.1.147
```

The number after the ASP name "hrn11asp" is the port number that the ITP has configured for the BTS side of the SCTP association. The two remote-ip addresses are the addresses that the ITP has configured for the BTS side of the SCTP association. Make sure all of these values match the values found in Step 2a.

c. Determine the BTS configured values for the ITP IP addresses and port.

On the BTS EMS CLI console, type the following:

```
CLI> show sctp-assoc id=<SCTP assoc id>
```

An example of the output will show the IP addresses and port as follows:

```
REMOTE_PORT=2905
REMOTE_TSAP_ADDR1=10.0.1.54
REMOTE_TSAP_ADDR2=10.128.1.239
```

d. Determine the ITP configured values of the ITP BTS IP addresses and port.

- Log on to the ITP and get into enable mode.
- Enter **show run**.
- Press **Enter** until the M3UA (or SUA) configuration is displayed. In our example, we are considering the SCTP association connection between the Cisco BTS 10200 Softswitch and the ITP, so we will look at the ITP M3UA configuration. An example of this is as follows:

```
cs7 m3ua 2905
local-ip 10.0.1.54
local-ip 10.128.1.239
```

- Make sure that the IP addresses and port number are the same values as found in step 2c.

**Step 3** Determine if all Ethernet connections on the BTS have been disconnected or if communication has been lost to the IP router. In the platform log, look for the following ERROR message:

```
"All the IP interfaces are faulty!!"
```

If this message is found, the Ethernet connections of the BTS have been pulled or cut. If this message is not found, proceed to Step 4.



**Note**

Platform log is the log file found under /opt/optical/CA146/bin/logs. It is not a single log file.

**Step 4** Determine if the problem is an IP routing issue.

- a. Determine what has been provisioned in the BTS for the destination IP interfaces of the SCTP association by typing the following command:

```
show sctp-association id=<sctp-association-id>
```

Information similar to the following will appear and display the destination IP addresses:

```
REMOTE_TSAP_ADDR1=10.0.1.54
REMOTE_TSAP_ADDR2=10.128.1.239
```

- b. Ping each of the destination IP addresses. If one of the addresses does not respond to the ping, there is an IP routing problem that has disabled SCTP communication. Contact the Cisco TAC for assistance. If the ping commands are successful, proceed to Step 5.

**Step 5** Determine if the BTS is reachable from the ITP.

- a. Log on to the ITP and get into enable mode.

- b. Find the BTS SCTP association endpoint IP addresses by typing the following command:

```
show run
```

- c. Press **Enter** until the ASP configuration is displayed. A section similar to the following will appear the BTS IP addresses of the SCTP association:

```
cs7 asp hrn11asp 11146 2905 m3ua
remote-ip 10.0.5.136
remote-ip 10.128.1.147
```

- d. From the ITP prompt, ping each of the IP addresses. If you do not receive a response to the ping command for at least one of the BTS IP endpoint addresses, there is an IP routing problem that is causing the SCTP association to be down. Contact the Cisco TAC for assistance. Otherwise, proceed to Step 6.

**Step 6** Bounce the SCTP association (take it administratively out of service and then put it in service).

- a. At the BTS CLI prompt, enter the following commands:

```
control sctp-assoc id=<sctp-assoc-name>; mode=forced; target-state=OOS;
control sctp-assoc id=<sctp-assoc-name>; mode=forced; target-state=INS;
```

- b. Check if the SCTP association has come back in service by entering the following:

```
status sctp-assoc id=<sctp-assoc-name>;
```

The output will either show OPER STATE -> SCTP-ASSOC out of service or OPER STATE -> SCTP-ASSOC in service.

If the OPER STATE still shows that the SCTP association is out-of-service, proceed to Step 7.

**Step 7** Bounce the SCTP association from the ITP side by performing the following steps:

- a. Log on to the ITP and get into enable mode.
- b. Get into configure mode by typing configure terminal.
- c. Type the following commands to bounce the SCTP association back in service:

```
va-2651-82(config)# cs7 asp hrn11asp
va-2651-82(config-cs7-asp)# shut
va-2651-82(config-cs7-asp)# no shut
va-2651-82(config-cs7-asp)# end
```

- d. Determine if the SCTP association has come back in service by typing the following BTS CLI command:

```
status sctp-assoc id=<sctp-assoc-name>;
```

The output will display either OPER STATE -> SCTP-ASSOC out of service or OPER STATE -> SCTP-ASSOC in service.

If the OPER STATE still shows that the SCTP association is out-of-service, there is probably an SCTP communication issue that must be debugged at the SCTP protocol level. Contact the Cisco TAC for assistance.

---

## Debugging SCTP Problems for TCAP/SCCP Applications

Refer to [Debugging Network Problems for TCAP/SCCP Applications](#), page 4-12 to determine the source of the problem at the SUA layer.

## SCTP Association Degraded

This alarm indicates that one of the two sides of the multi-homed SCTP connection is down. Communication still exists if the other side of the multi-homed connection is up. Refer to the [“SCTP Association Failure”](#) section on page 4-7, or contact the Cisco TAC for assistance in resolving this issue.

## SCTP Association Configuration Error

This alarm indicates that there is a provisioning error keeping the BTS from properly configuring the SCTP association. Perform the following steps to resolve the problem:

- 
- Step 1** If the associated application is ISUP, look at the platform.log for error messages containing the string “MIM CFG.”
  - Step 2** Perform [Step 2](#) of the [“Debugging SCTP Problems for ISUP Applications”](#) section on page 4-7 to verify that your IP addresses and ports are properly configured on the BTS.
  - Step 3** Contact the Cisco TAC for assistance in resolving this issue.
- 

## M3UA Cannot Go Active

This alarm is raised at initial startup or during failover by the BTS node that is trying to go into platform Active mode. It occurs when this BTS node is unable to communicate properly with any SGs to tell them that all active call traffic should be routing towards the BTS. See the [“Signaling Gateway Process Is Out of Service”](#) section on page 4-7 to determine why the BTS is unable to communicate with any of the ITPs at the M3UA layer. Refer to the [“Verify the SCTP Association Status”](#) section on page 4-12 to determine why the BTS is unable to communicate with any of the ITPs at the SUA layer.

## M3UA Cannot Go Standby

This alarm is raised at initial startup or during failover by the BTS node that is trying to go into platform Standby mode. See the “[Signaling Gateway Process Is Out of Service](#)” section on page 4-7 to determine why the BTS is unable to communicate with any of the SGs at the M3UA layer. See the “[Verify the SCTP Association Status](#)” section on page 4-12 to determine why the BTS is unable to communicate with any of the ITPs at the SUA layer.

## TCAP Binding Failure

This alarm is raised when the TCAP layer does not have enough service access point (SAP) to bind for the subsystem. Currently only 16 subsystems are allowed on the same platform. Check the Subsystem table to see if you have more than 16 subsystems on the same platform, FS for POTS/Tandem/Centrex (FSPTC) or AIN Feature Server (FSAIN).

## Remote Subsystem Is Out Of Service

This alarm indicates the remote subsystem is out of service. Contact your service control point (SCP) service provider for assistance.

# Debugging Network Problems for TCAP/SCCP Applications

Network failure issues can be caused by several problems. This section describes the procedures to locate the cause of the problem. These procedures describe an iterative process that must be performed in order. When a problem is found and resolved, perform the procedure again from the beginning.

This section describes how to perform the following procedures:

1. [Verify the SCTP Association Status, page 4-12](#)
2. [Verify the Configuration, page 4-13](#)
3. [Verify the IP Routing, page 4-15](#)
4. [Verify if the ASP is Used by Any AS, page 4-15](#)
5. [Verify the ITP T1 Card Provisioning, page 4-16](#)
6. [Verify the ITP MTP2 Serial Interface, page 4-16](#)
7. [Verify the ITP-STP Linkset Status, page 4-17](#)
8. [Verify the Cisco ITP Route, page 4-17](#)

## Verify the SCTP Association Status

- Step 1** Determine if the administrative state and the operational state of the SCTP association on the BTS Element Management System (EMS) are in service. If the SCTP association is not in service, bring it in service and repeat this step. The following is an example of a healthy SCTP association:

```
CLI> status sctp-assoc id=<id>

SCTP ASSOC ID -> sctp_assoc3
ADMIN STATE -> ADMIN_INS
```



```
OPER STATE -> SCTP-ASSOC in service
REASON -> ADM executed successfully
RESULT -> ADM configure result in success
```

Reply : Success:

- Step 2** Determine if the ASP is in service on the Cisco ITP by entering **show cs7 asp name <asp-name>**. The ASP name corresponds to the SCTP association name provisioned on the BTS. Information similar to the following is displayed:

```
c2651-48# show cs7 asp name <asp name>
Effect Primary
ASP Name      AS Name      State      Type  Rmt Port Remote IP Addr  SCTP
-----
TB2-PRI-AIN   TB02-LNP-NC  active     SUA   12520   10.89.225.209   323
TB2-PRI-AIN   TB02-SUALNP  shutdown   SUA   12520   10.89.225.209   323
TB2-PRI-AIN   TB02-800A-NC active     SUA   12520   10.89.225.209   323
TB2-PRI-AIN   TB02-800T-NC active     SUA   12520   10.89.225.209   323
TB2-PRI-AIN   TB02-SUA800A active     SUA   12520   10.89.225.209   323
TB2-PRI-AIN   TB02-SUA800T active     SUA   12520   10.89.225.209   323
```

- If the status is **shutdown**, enter the following commands on the ITP and check the status again:
 

```
config terminal
cs7 asp <asp name>
no shut
```
- If the status of the ASP is **inactive**, the ASP is probably on the standby BTS.
- If the ASP on the active BTS is inactive, enter the following commands on the ITP and check the status again:
 

```
config terminal
cs7 asp <asp-name>
no shut
```
- If the ASP is now active, proceed to the [“Verify if the ASP is Used by Any AS” section on page 4-15](#). Otherwise, continue to the next section.

## Verify the Configuration

- Step 1** Determine if the problem is an IP address or port configuration mismatch between the ITP and the BTS. Enter the command **show sctp-assoc id=<sctp-assoc-name>** on the BTS EMS
- Step 2** Enter the command **show cs7 sua** on the ITP.
- Step 3** Verify that the remote TSAP address and the remote port of the SCTP association on the BTS is the same as the local IP address and the local port used by the ITP SUA. If the SCTP association is multi-homed, all of the IP addresses should be verified. The following example displays properly matched configurations:

```
CLI> show sctp-assoc id=sctp_assoc3

ID=sctp_assoc3
SGP_ID=itp_2651_1
SCTP_ASSOC_PROFILE_ID=sctp_prof
REMOTE_PORT=14001
REMOTE_TSAP_ADDR1=10.89.232.48
PLATFORM_ID=FSAIN520
IP_TOS_PRECEDENCE=FLASH
```

```

LOCAL_RCVWIN=64000
MAX_INIT_RETRANS=5
MAX_INIT_RTO=1000
STATUS=INS
ULP=XUA

```

Reply : Success: Entry 1 of 1 returned.

```

c2651-48# show cs7 sua
Sigtran SUA draft version: 14

```

```

SUA Local port: 14001          State: active          SCTP instance handle: 2
Local ip address:              10.89.232.48
Number of active SUA peers:    8
Max number of inbound streams allowed: 17
Local receive window:         64000
Max init retransmissions:      8
Max init timeout:              1000 ms
Unordered priority:            equal
SCTP defaults for new associations
  Transmit queue depth: 1000          Cumulative sack timeout: 200 ms
  Assoc retransmissions: 10          Path retransmissions: 4
  Minimum RTO: 1000 ms             Maximum RTO: 1000 ms
  Bundle status: on                 Bundle timeout: 400 ms
  Keep alive status: true           Keep alive timeout: 10000 ms

```

**Step 4** If there is no mismatch, proceed to Step 5. Otherwise, perform the following procedure:

- a. Correct the mismatch.
- b. Bounce the SCTP association on the BTS.
- c. Repeat the [“Verify the SCTP Association Status”](#) section on page 4-12.

**Step 5** Verify that the SCTP port on the BTS and the remote port of the ASP on the ITP are the same.

- a. On the BTS, open the platform.cfg file and locate the section for TSA on FSAIN/FSPTC, as illustrated in the following example:

```

[ProcessParameters]
ProcName=TSA
#----- Process priority (valid values = -60 to 60)
-----#
Priority=24
#----- Max thread priority (valid values = -60 to 60)
-----#
MaxDynamicThreadPriority=18
#-----Resource limits = (max descriptors) / (max heap size bytes) / (max stack size
bytes)-----#
ResourceLimits=0 / 524288000 / 0
ExecName=tsa.FSAIN520
ExecPath=./
Args=-numthread 1 -tsadns crit-aSYS02AIN.ipclab.cisco.com -sctpport 12520 -stackcfg
tri_stack.cfg -multithread 0 -sgw_option SUA
ProcessGroup=0
ReportsDisableLevel=0
DebugReportsDisableLevel=0
NewConsole=0
Enable=1
ThreadHealthMonitoring=yes
SwitchOverIfMaxRestartExceededInDuplex=yes
EndPlatformIfMaxRestartExceededWhenMateFaulty=yes
#----- Restart rate = n / m (where n = Max restarts , m - interval in hours)
-----#
RestartRate=0 / 1

```

- b. On the ITP, enter the command **show run | begin <asp-name>**. Information similar to the following is displayed:

```
c2651-48# show run | begin TB2-PRI-AIN

cs7 asp TB2-PRI-AIN 12520 14001 sua
  remote-ip 10.89.225.209
  remote-ip 10.89.226.209
!
```

- c. If the SCTP port on the BTS and the remote port of the ASP on the ITP are the same, proceed to Step 6.
- d. If the SCTP port on the BTS and the remote port of the ASP on the ITP are not the same, perform the following procedure:
- Correct the problem on the ITP.
  - Bounce the SCTP association on the BTS.
  - Repeat the [“Verify the SCTP Association Status” section on page 4-12](#).

**Step 6** Verify that the tsadns resolves to exactly the same remote-ip as the ASP on the ITP. If not, perform the following procedures as necessary:

- a. Correct it in the /etc/hosts file and on the DNS server, if necessary.
  - b. Correct it on the ITP if the IP addresses on the ITP are incorrect.
  - c. Bounce the SCTP association on the BTS.
  - d. Repeat the [“Verify the SCTP Association Status” section on page 4-12](#).
- 

## Verify the IP Routing

- Step 1** Ping the ITP addresses discovered in the [“Verify the Configuration” section on page 4-13](#) from the BTS in order to see if traffic is routed as planned.
  - Step 2** Ping the BTS addresses discovered in the [“Verify the Configuration” section on page 4-13](#) from the ITP to see if traffic is routed as planned.
  - Step 3** If routing is not as expected, correct the routing setup.
  - Step 4** Repeat the [“Verify the SCTP Association Status” section on page 4-12](#).
- 

## Verify if the ASP is Used by Any AS

If the ASP is not used by any AS in the ITP, the SCTP association will be taken down by the ITP. Make sure the AS using the ASP is provisioned before bringing up the SCTP association corresponding to the same ASP. If the ASP is used by any AS, continue to the next section. Otherwise, correct it and continue.

## Verify the ITP T1 Card Provisioning

Enter the command **show controller t1** <slot/[bay/]port> on the ITP. Verify if T1 is up. If not, check if the framing, line code, and the clock source are provisioned as planned. The following example displays a healthy card status:

```
c2651-48# show controllers t1 0/0

T1 0/0 is up.
  Applique type is Channelized T1
  Cablelength is short 133
  No alarms detected.
  alarm-trigger is not set
  Version info Firmware: 20010805, FPGA: 15
  Framing is ESF, Line Code is B8ZS, Clock Source is Line.
  Data in current interval (477 seconds elapsed):
    0 Line Code Violations, 0 Path Code Violations
    0 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins
    0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs, 0 Unavail Secs
.....
```

## Verify the ITP MTP2 Serial Interface

To resolve problems with the ITP MTP2 serial interface, perform the following steps:

- Step 1** To display the state of the ITP MTP2 serial interface, enter the command **show int serial** <number> on the ITP. Information similar to the following will be displayed:

```
c2651-48# show int serial 0/0:0

Serial0/0:0 is up, line protocol is up
  Hardware is PowerQUICC Serial
  Description: link_to_mgts_lic_10
  MTU 1500 bytes, BW 56 Kbit, DLY 20000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation SS7 MTP2, loopback not set
  Keepalive not set
  Last input 33w5d, output 00:00:31, output hang never
  Last clearing of "show interface" counters 33w5d
  Queueing strategy: fifo
  Output queue 0/40, 0 drops; input queue 0/75, 23 drops
  30 second input rate 0 bits/sec, 0 packets/sec
  30 second output rate 0 bits/sec, 0 packets/sec
    1912000 packets input, 9866017 bytes, 0 no buffer
    Received 0 broadcasts, 0 runts, 17 giants, 0 throttles
    3356 input errors, 128 CRC, 2641 frame, 0 overrun, 0 ignored, 587 abort
    1163961 packets output, 13234709 bytes, 0 underruns
    0 output errors, 0 collisions, 55 interface resets
    0 output buffer failures, 0 output buffers swapped out
    31 carrier transitions
  Timeslot(s) Used:1, SCC: 0, Transmitter delay is 0 flags
```

- Step 2** If the interface is up and the line protocol is up, continue to the next section. If there is a problem, determine where the problem exists, as follows:
- If the interface is down, shut down the interface manually.
  - If the line protocol is down, the problem exists in cabling or in the MTP2 layer.
  - If both the interface and the line protocol are down, there is a hardware failure or the interface is manually shutdown.

**Step 3** After correcting the problem, continue to the next section.

---

## Verify the ITP-STP Linkset Status

To resolve problems with the ITP-STP linkset status, perform the following steps:

**Step 1** Verify whether the link-set is available on the ITP by entering the following command:

```
show cs7 linkset <ls-name>
```

Information similar to the following is displayed:

```
c2651-48# show cs7 linkset

lsn=ls_to_mgts_lic_10  apc=1.101.0      state=avail  avail/links=1/1
  SLC  Interface          Service  PeerState    Inhib
   00  Serial0/0:0        avail    -----     -
```

**Step 2** If the status is not available and at least one of the serial interfaces is available, the problem could be the point code type or point code value mismatch with the remote peer.

**Step 3** If the checking is successful, continue to the next section. Otherwise, correct the problem and continue.

---

## Verify the Cisco ITP Route

To resolve problems with the Cisco ITP route, perform the following steps:

**Step 1** Verify if there is a route to the destination point code provisioned in the BTS by entering the following command:

```
show cs7 route
```

Information similar to the following is displayed:

```
c2651-48# show cs7 route

Dynamic Routes 0 of 500

Routing table = system Destinations = 6 Routes = 6
Destination          Prio Linkset Name      Route
-----
1.8.1/24             INACC  1  ls_to_mgts_lic_10  UNAVAIL
1.12.1/24            acces  5  ls_to_mgts_lic_10  avail
1.101.0/24           acces  1  ls_to_mgts_lic_10  avail
7.44.120/24          acces  1  ls_to_inet12_pod_1  avail
7.44.121/24          acces  1  ls_to_inet12_pod_1  avail
7.212.112/24         acces  1  ls_to_inet12_pod_1  avail

Routing table = XUA

Destination          Type
-----
7.2.1/24             acces  AS
7.2.3/24             acces  AS
7.44.1/24            acces  AS
7.44.3/24            acces  AS
```

**Step 2** If the linkset is available and the route is UNAVAIL, the problem could be in the service provider's SS7 network. Contact the service provider to coordinate troubleshooting.

After successfully passing this step, the network failure should not happen. If it still happens, the supporting team or the developer should be contacted.

---

## Troubleshooting With the Query Command

The Query Verification Tool (QVT) enables a user to generate TCAP queries to external databases through the CLI interface. For information about the QVT, see the following URL:

[http://www.cisco.com/univercd/cc/td/doc/product/voice/bts10200/bts4\\_4/featmods/qvttvt.htm#wp1168709](http://www.cisco.com/univercd/cc/td/doc/product/voice/bts10200/bts4_4/featmods/qvttvt.htm#wp1168709)

## Table Configuration Problems

The CLI query command with the table-info option displays the tables used for routing the external SS7 queries on the BTS. The query command can identify the following problems:

- Missing CA-CONFIG table
- Missing SLHR-PROFILE table
- Missing SLHR table
- Missing DPC table
- Missing OPC table
- Missing SUBSYSTEM-PROFILE table
- Missing SUBSYSTEM table
- Missing SCCP-NW table
- Missing SCCP-ROUTE table
- Missing ROUTING-KEY table
- Missing SG-GRP table
- Missing SG table
- Missing SGP table
- Missing SCTP-ASSOC table

To resolve a table error, add the appropriate entry to the table specified in the command response.

## Network Related Problems

The CLI query command can provide information about network related problems. This section describes problems identified by the query command and the solutions to them.

## No Translation for an Address of Such Nature

Layer: SCCP

Version: ITU88, ITU92, ITU96, ANSI88, ANSI92

Location: STP

Cause: The GTT entry is not provisioned correctly in the STP.

Solution: Correct the GTT entry in the STP.

## No Translation for this Specific Address

Layer: SCCP

Version: ITU88, ITU92, ITU96, ANSI88, ANSI92

Location: STP

Cause: The GTT entry is not provisioned correctly in the STP.

Solution: Correct the GTT entry in the STP.

## Subsystem Congestion

Layer: SCCP Subsystem (TCAP)

Version: ITU88, ITU92, ITU96, ANSI88, ANSI92

Location: SCP

Cause: The SCP subsystem is congested.

Solution: Ask the SCP service provider to solve the congestion problem.

## Subsystem Failure

Layer: SCCP Subsystem (TCAP)

Version: ITU88, ITU92, ITU96, ANSI88, ANSI92

Location: SCP

Cause: The SCP is down or the subsystem of the SCP is down.

Solution: Verify that the SCP point code is correct.

## Unequipped User

Layer: SCCP Subsystem (TCAP)

Version: ITU88, ITU92, ITU96, ANSI88, ANSI92

Location: SCP

Cause: The SCCP user is not equipped.

Solution: Verify that the SCP point code is correct.

## Network Failure

Layer: MTP3/MTP2/MTP1 or SCTP

Version: ITU88, ITU92, ITU96, ANSI88, ANSI92 for MTP3/2/1, IETF RFC 2960 for SCTP

Location: Local, STP, or SCP

Cause: The BTS-ITP sctp-association is down or the SS7 link, linkset, or route is down.

Solution: See the “[Debugging Network Problems for TCAP/SCCP Applications](#)” section on page 4-12 section for assistance in solving this problem.

## Network Congestion

Layer: SCCP

Version: ITU88, ITU92, ITU96, ANSI88, ANSI92

Location: Local, STP, or SCP

Cause: The SCTP layer or the SS7 network is congested.

Solution: The service provider of the SS7 network needs to either provide higher capacity or re-engineer the traffic. SCTP layer congestion normally indicates insufficient CPU power. Hardware needs to be upgraded or more BTSs need to be added to offload traffic.

## Unqualified

Layer: SCCP

Version: ITU88, ITU92, ITU96, ANSI88, ANSI92

Location: STP or SCP

Cause: Unknown.

Solution: Contact the support team or developer for assistance.

## Error In Message Transport

Layer: SCCP

Version: ITU92

Location: STP

Cause: There was a failure in message transportation.

Solution: Contact the support team or the developer.

## Destination Cannot Perform Reassembly

Layer: SCCP

Version: ITU88, ITU92, ITU96, ANSI88, ANSI92

Location: SCP

Cause: The peer side is not capable of reassembling extended unit data service (XUDTS) packets.

Solution: The ITP does not support segmentation and reassembly. Contact the Cisco TAC for assistance.



## SCCP Failure

Layer: SCCP

Version: ITU88, ITU92, ITU96, ANSI88, ANSI92

Location: Local, STP, or SCP

Cause: The Signal Connection Control Part (SCCP) layer failed or the local TCAP Signaling Adapter (TSA) could not find the appropriate entry in the Subsystem table or the SCCP-nw table.

Solution: Add or properly populate the Subsystem and SCCP-nw tables. If it still does not work, restart the platform providing the service (FSAIN or FSPTC).

## Hop Counter Violation

Layer: SCCP

Version: ITU96, ANSI92

Location: STP

Cause: The maximum hop count is exceeded during the message routing.

Solution: Make sure the hop count value provisioned in the SCCP-NW table is not too small. Verify that the SS7 network provider does not have any route-loops.

## Segmentation Not Supported

Layer: SCCP

Version: ITU96

Location: SCP

Cause: The peer side is not capable of reassembling XUDTS packets.

Solution: The ITP does not support segmentation and reassembly. Contact the Cisco TAC for assistance.

## Segmentation Failure

Layer: SCCP

Version: ITU96

Location: STP

Cause: The segmentation failed.

Solution: The ITP does not support segmentation and reassembly. Contact the Cisco TAC for assistance.

## QVT Timeout

Layer: Local

Cause: The SCP failed to respond or the TSA is out of service.

Solution: If the SCP failed, contact the service provider to solve the problem. If the TSA is out of service, perform a manual failover.

## CLI Timeout

Layer: Local

Cause: The EMS and CA.FSAIN/FSPTC connections are down or the SCA on the CA/FSAIN/FSPTC is out of service.

Solution: If the SCA is down, restart the SCA or restart the platform where the SCA resides. If the EMS and CA/FSAIN/FSPTC connections are down, verify whether the IP routing is correct and the OptiCall Messaging System (OMS) hub is in service.



## GLOSSARY

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---

### A

- ACAR** Automatic Callback and Automatic Recall
- AIN** Advanced Intelligent Network
- AS** Application Server; an M3UA term that describes software that processes M3UA messages. The SGA.
- ASP** Application Server Process; defines the IP interfaces to which the SG sends M3UA traffic.

---

### B

- BTS Shared Point Code Configuration** A configuration in which a Cisco BTS 10200 Softswitch OPC and the SG with which it connects share the same SS7 point code (OPC) value. In this configuration, the SG connects directly to an STP via SS7 A-links, F-links, or E-links.
- BTS Mated STP Pair Configuration** A configuration in which the Cisco BTS 10200 Softswitch and the SG with which it connects do not share the same SS7 point code (OPC) value. In this configuration, the SGs operate as STPs.

---

### C

- CA** Call Agent.
- Cisco BTS 10200 Softswitch** Cisco BTS 10200 Softswitch Active/Standby mated pair.
- CNAM** Calling name delivery.

---

### D

- DAVA** M3UA Destination Available message.
- Distributed MTP3** An M3UA term describing a signaling network topology in which two or more physical SGP nodes operate as a single SG node, thereby providing hardware redundancy.
- DUNA** M3UA Destination Unavailable message.
- DUPU** M3UA Destination User Part Unavailable message.

---

**E**

**EMS** Element Management System.

---

**F**

**FS** BTS Feature Server

**FSAIN** BTS Feature Server for AIN services such as LNP and 800 services.

**FSPTC** BTS Feature Server for POTS and Centrex services such as ACAR and CNAM.

---

**G**

**GTT** Global Title Translation.

---

**I**

**ITP** Cisco IP Transfer Point. This is the SGP that is used in combination with the Cisco BTS 10200 Softswitch to form the SIGTRAN signaling solution.

---

**M**

**M3UA** MTP3 User Adaptation Layer.

**MIM** M3UA Interface Module

**MTP3** Message Transfer Part Level 3.

---

**N**

**NMS** Network Management System.

**NSO** Non-Stop Operation.

---

**R**

- Routing Context** A value that uniquely identifies a routing key.
- Routing Key** A set of SS7 parameters, such as DPC, OPC, SI, CIC-range, and SSN, that uniquely define the range of signaling traffic to be handled by a particular AS.

---

**S**

- SCON** M3UA Signaling Congestion message.
- SCCP** Signaling Connection Control Part.
- SCTP** Stream Control Transmission Protocol. IETF standard for reliable transport over IP. Used instead of TCP/UDP/RUDP.
- SEP** Signaling End Point.
- SG Group** A Cisco BTS term that describes the pairing of SGs to form redundancy for the Cisco BTS 10200 Softswitch D-link solution. An equivalent ITP term that describes this pairing is SG Mated Pair.
- SG Mated Pair** An ITP term that describes the pairing of SGs to form redundancy for the Cisco BTS 10200 Softswitch D-link solution. An equivalent Cisco BTS term that describes this pairing is SG Group.
- Signaling Gateway** A logical gateway that interconnects IP signaling over SIGTRAN to SS7 network signaling over SS7 (T1/E1) links. It can be made up of one or more signaling gateway processes. The solution described in this document allows a maximum of two SGPs (ITPs) to be combined to form a single SG.
- Signaling Gateway Process** A physical gateway that interconnects IP signaling over SIGTRAN to SS7 network signaling over SS7 (T1/E1) links. One or more SGPs can be combined to form a single SG. The solution described in this document allows a maximum of two SGPs (ITPs) to be combined to form a single SG.
- SIGTRAN** A group of IETF standards that describe the SS7 signaling functionality of hardware nodes that interconnect IP based networks to SS7 networks.
- SGA** Signaling Gateway Adapter. A process on the Cisco BTS 10200 Softswitch that processes ISUP related calls.
- SGP** Signaling Gateway Process.
- STP** Signaling Transfer Point.
- SUA** SCCP User Adaptation Layer.

---

**T**

- TCAP** Transaction Capability Application Part
- TFA** MTP3 Transfer Allowed message.

- TFC** MTP3 Transfer Control message. MTP3 message for congestion indications.
- TFP** MTP3 Transfer Prohibit message.
- TSA** TCAP Service Adapter. A process on the Cisco BTS 10200 Softswitch that processes TCAP related calls.



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