

# Configuring SS7 Signaling Network, M3 IETF

## OPERATING INSTRUCTION

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# Contents

<b>1</b>	<b>Overview</b>	<b>1</b>
1.1	Description	1
1.2	Prerequisites	2
<b>2</b>	<b>Procedure</b>	<b>3</b>
2.1	Configuring M3UA in the ASP/IPSP Node	3
2.2	Configuring MTPL3 in the ASP/IPSP Node	14
2.3	Configuring the SGP/STP Node	18
2.4	Configuring Distributed Endpoint Support in M3UA Node	27
<b>3</b>	<b>Communication M3-IETF with M3</b>	<b>29</b>
	<b>Glossary</b>	<b>31</b>
	<b>Reference List</b>	<b>33</b>





# 1 Overview

## 1.1 Description

This operating instruction describes, using examples, how to configure the IETF compliant SS7 stack layer MTP-L3 and M3UA (in short M3 IETF). M3 IETF obsoletes M3. If M3 or SCCP needs to be configured, see description in Configuring SS7 Signaling Network, SCCP, M3.

**Note:** It is recommended that the example configurations in this document are created in the Signaling Manager tool while reading this document, otherwise it might be difficult to follow the steps in the text.

The example in Section 2.1 on page 3 shows how to configure an ASP/IPSP node for M3UA. The ASP view and the IPSP view in Figure 1 are configured. The SGP view is remote in this case. The configured node handles both IPSP to IPSP communication as well as ASP to SGP communication. There are two AS:es that are served by the same IPSP, and one AS that is served by an ASP. The example continues in Section 2.2 on page 14 where it is shown how to configure the MTP-L3 part in the ASP/IPSP node.

The example in Section 2.3 on page 18 shows how to configure an SGP/STP node. The SGP view in Figure 1 and the STP MTP-L3 part are configured. The ASP and IPSP views are remote in this case. The SGP-view is configured to relay between the IP network and the SS7 network. The SG communicates with a Remote AS and the MTP Layer 3 handles the SS7 communication.

**Note:**

- For information how to configure Front Ends see documents listed in Section 1.2.3 on page 2. The example ASP/IPSP configuration uses one SCTP Front End with two SCTP End Points.

The example SGP configuration requires one SCTP Front End and one Narrowband Front End (Message Transfer Part - Layer 2).

- The point codes (PC) and IP addresses in this document are examples only, which must be replaced in a real world configuration.
- The configuration in Figure 1 is a simplified configuration example that lacks redundancy. In a real world configuration redundant associations should be configured to avoid loss of traffic during software upgrade or similar. To configure redundant associations one more SCTP FE need to be configured in a similar way as shown in the example. The Remote sides need to support the redundant associations in the second FE by having one more Remote IPSP per Remote AS. There should be one more SG that provides alternative routes to the SS7SEP:s (301 and 302 in the example). There should be one more Remote SGP per SG.

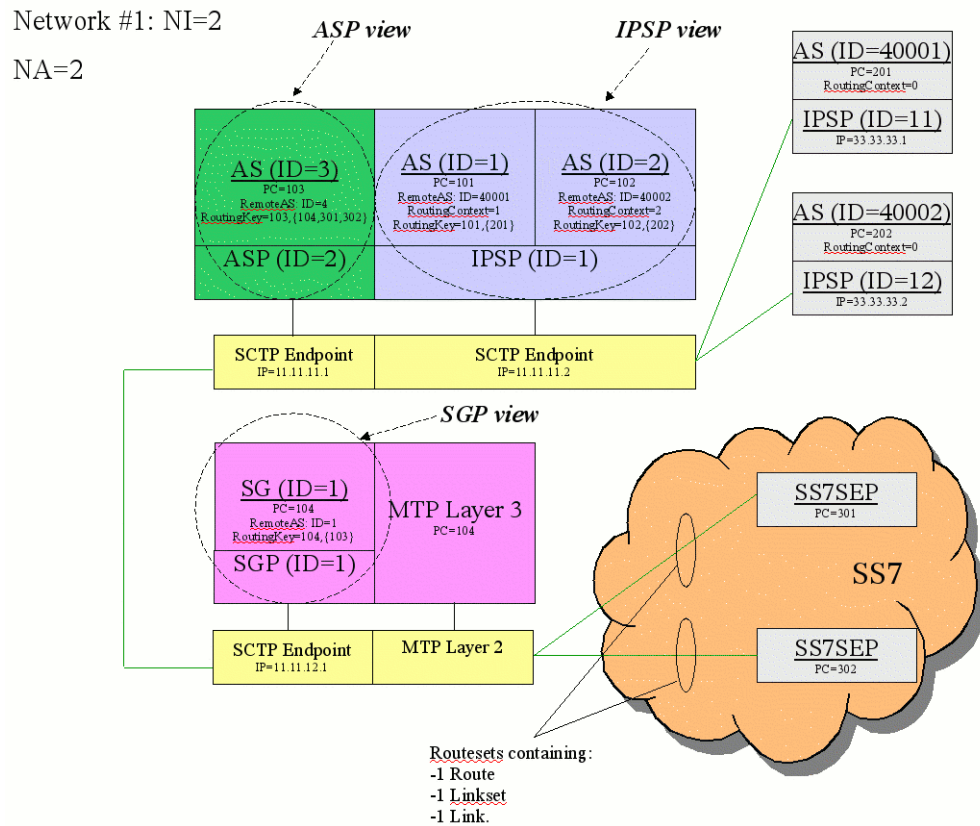


Figure 1 Network Configuration Example

## 1.2 Prerequisites

### 1.2.1 Documents

For configuration property information, see the SCTP, MTP-L2 IF ISR and M3 IETF Information Models. For configuration of SCCP, see the SCCP related parts in document Configuring SS7 Signaling Network, SCCP, M3.

### 1.2.2 Tools

Signaling Manager.

### 1.2.3 Conditions

Configuration of FE:s has been performed, according to Configuring SS7, MTP-L2 IF ISR - NB, HSL.

Configuration of FE:s has been performed, according to Configuring SS7, SCTP.



## 2 Procedure

**Note:** To view all elements and properties you may need to turn on the **Expert Mode** under the **Tools** menu, but it is recommended to have it turned off. It will be stated in text if the **Expert Mode** is needed to follow the steps in the example.

### 2.1 Configuring M3UA in the ASP/IPSP Node

#### 2.1.1 Create Local and Remote SignPoints

For the ASP/IPSP node the following point codes (PC:s) from Figure 1 shall be created:

- Local PC:s are those related to ASP (103) and IPSP (101 and 102).
  - The Remote PC:s are those related to the Remote SGP (104), Remote IPSP:s (201 and 202) and the SS7SEP:s (301 and 302).
1. Expand **Signaling System**.
  2. Select **Sign Networks** and press the **Insert** key on your keyboard. An instance of a Signaling Network, named **Network #1** will be added. The number after # is the **Network ID** property taken from the Sign Network instance.
  3. Expand **Network #1** to view the default configured parts that are mandatory for a Signaling Network.
  4. Set the properties in the table below in Signaling Network and Local and Remote Signaling Points:

Table 1 Local Signaling Point related Properties

Property Location	Property Name	Comments
Network #1	Network Indicator	In the Example select <b>NI2</b> . Otherwise the possible values are:  <b>NI0</b> : International network <b>NI1</b> : Spare (International use only) <b>NI2</b> : National network <b>NI3</b> : Reserved for national use



Table 1 Local Signaling Point related Properties

Property Location	Property Name	Comments
Local SPC: [undef]	Local SPC	In the Example set the value to: 101.  The name of the <b>Local SPC: [undef]</b> in the navigation pane will be updated with the set value, for instance <b>Local SPC: 101</b> , if the set value is <b>101</b>
Remote SPC: [undef]	Remote SPC	In the Example set the value to: 201.  The name of the <b>Remote SPC: [undef]</b> in the navigation pane will be updated with the set value, for instance <b>Remote SPC: 201</b> , if the set value is <b>201</b>

5. Create two additional Local Signaling Points by selecting **Local Sign Points** and press the **Insert** key twice. Set the Local SignPoint values, to be used by the Local AS:es, to 102 and 103.
6. Create four additional Remote Signaling Points by selecting **Remote Sign Points** and press the **Insert** key four times. Set the Remote SignPoint values, to be used by the Remote AS:es and SS7 nodes, to 202, 104, 301 and 302.

**Note:** To remove **Local Sign Points** or **Remote Sign Points** select it and press either Remove popup menu option or **Delete** key. The location of these elements in the element tree is described in the above paragraphs.

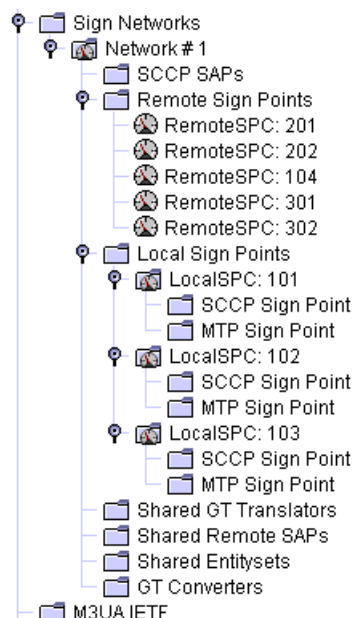


Figure 2 Local and Remote SignPoints from the ASP/IPSP node point of view.





## 2.1.2 Create Local SPs

When configuring the ASP and IPSP views in Figure 1 the SGP view will be remote, which means that the following LocalSP:s shall be created:

- Local SP with ID=1. Type IPSP
  - Local SP with ID=2. Type ASP
1. Select **M3UA IETF** (located one level under SignalingSystem) and press the **Insert** key. An instance of M3UA, holding all global M3UA configuration properties, is created named **M3UA**.
  2. Expand **M3UA** to view the default created Local SP.
  3. Select **LocalSP#1...** The Local SP can be of ASP, IPSP or SGP type. Set the property SP Type to IPSP.
  4. Assign the SCTP End Point to use. Press the ... button to the right of property **Sctp End Point** and choose the EndPoint that has IP-address 11.11.11.2, called **FE 0: IP Address Table#2**.

**Note:** The SCTP End Point creation is not described in this document. See document listed in Section 1.2.3 on page 2.

5. Select **Local SPs** and press the **Insert** key. A new instance **LocalSP#2...** is created.
6. Select **LocalSP#2...** and set SP Type to ASP and assign the SctpEndPoint that has IP-address 11.11.11.1, called **FE 0: IP Address Table#1**.

**Note:** The SCTP Endpoint represents the local SCTP Endpoint to use. It is optional to configure both SCTP Endpoints on the same or separate Front Ends.

**Note:** To remove **LocalSP#1...** select it and press either Remove popup menu option or **Delete** key. The location of **LocalSP#1...** in the element tree is described in the above paragraphs.

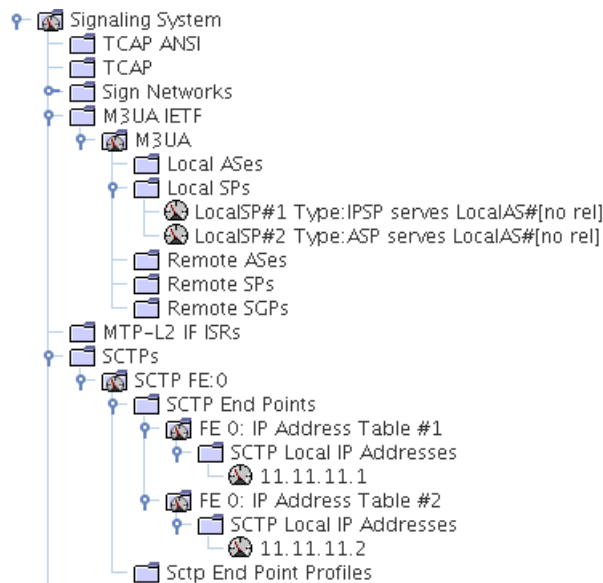


Figure 3 Local SPs of type IPSP and ASP created.

### 2.1.3

#### Create Local AS:es

The three Local AS:es in the ASP and IPSP views in Figure 1 shall be created (see also Figure 4 for the goal of this section):

- AS with ID=1 that is served by IPSP. RoutingContext=1, RoutingKey is 101,{201}
  - AS with ID=2 that is served by IPSP. RoutingContext=2, RoutingKey is 102,{202}
  - AS with ID=3 that is served by ASP. RoutingContext is not used, RoutingKey is 103,{104,301,302}
1. Select **Local ASes** and press the **Insert** key. An instance of a Local AS, named **LocalAS#1 LocalSPC:[no rel]** is added. The number after # is the **ID** property taken from this Local AS. The ID is generated automatically but can be changed if desired.
  2. Expand **LocalAS#1...** to view the default created Local AS along with the required parts of a Local AS. These parts are a RoutingKey, a Grouping and a Destination SPC.
  3. In **LocalAS#1...** assign the Local Sign Point that this Local AS shall serve. In this example Local AS with ID=1 shall serve Local Signaling Point 101. Assign by pressing the button next to the reference-property Local Sign Point and select **LocalSPC: 101** from the list.
  4. Create the second AS that shall be served by the same IPSP, which is similar to the steps 1-3 above. The second Local AS will automatically get ID=2



- and therefore be named **LocalAS#2....** Set the reference-property Local Sign Point to refer to **LocalSPC: 102**.
5. Create the AS that shall be served by the ASP, which is similar to step 1-3. Local AS will automatically get ID=3 and be named **LocalAS#3....** For reference-property Local Sign Point choose **LocalSPC: 103**.
  6. Select **RK#1 NA:[undef]** located under **LocalAS#1 LocalSPC:101**. Set the Network Appearance for this network. In this example the Network Appearance shall be set to 1.
  7. Repeat step 6 for **RK#2 NA:[undef]** located under **LocalAS#2 LocalSPC:102**. NA shall be the same as in **RK#1...**, since they are in the same network.
  8. Repeat step 6 for **RK#3 NA:[undef]** located under **LocalAS#3 LocalSPC:103**. NA shall be the same as in **RK#1...**, since they are in the same network.
  9. Select **RemoteSPC:[undef]** located under **RK#1 NA:1** and assign the Remote Sign Point that shall be known by this Local AS. In this example **RemoteSPC: 201** is the destination for **LocalAS#1 LocalSPC:101**.
  10. Repeat step 9 for **RemoteSPC:[undef]** located under **RK#2 NA:1**. In this example **RemoteSPC: 202** is the destination for **LocalAS#2 LocalSPC:102**.
  11. Repeat step 9 for **RemoteSPC:[undef]** located under **RK#3 NA:1**. Assign **RemoteSPC:104** from the list of RemoteSignPoints.
  12. In this example **LocalAS#3 LocalSPC:103** has two more destinations: SPC 301 and 302. Select the already existing destination **RemoteSPC:104...** and press the **Insert** key twice. Two additional Destination SPCs are added, but they use the wrong SPC 104. Correct the SPCs by assigning the **RemoteSPC:301** in the first and **RemoteSPC:302** in the second.
  13. Because the same IPSP serves two LocalAS:es, RoutingContext must be defined for **LocalAS#1 LocalSPC:101** and **LocalAS#2 LocalSPC:102**. Select the group-element **Routing Contexts** located directly under **LocalAS#1 LocalSPC:101** and press the **Insert** key. An instance of a Routing Key, named **RC:[undef]** is added. Set the Routing Context property to 1 in this example.
  14. Repeat step 13 for **LocalAS#2 LocalSPC:102**, but set Routing Context property to 2 instead.

**Note:**

- A Routing Context is not needed for **LocalAS#3 LocalSPC:103** because only one AS is served by the same ASP.
- To remove an instance of a Local AS **LocalAS#...** select it and press either Remove popup menu option or **Delete** key. The location of **LocalAS#...** in the element tree is described in the above paragraphs.

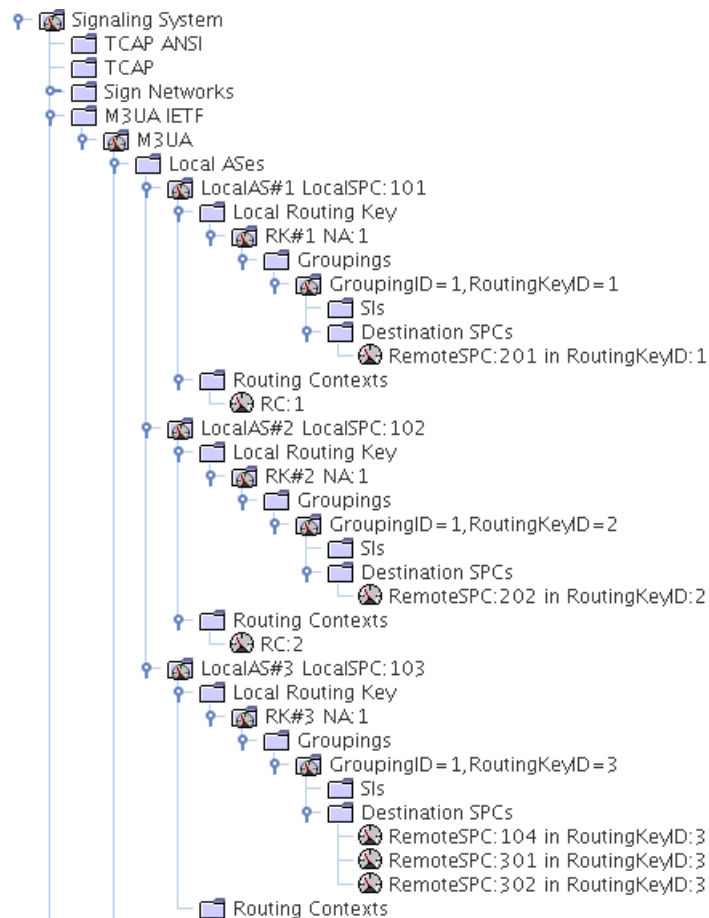


Figure 4 LocalAS#1, LocalAS#2 and LocalAS#3 is created along with RoutingKeys and Groupings.

## 2.1.4

### Create Remote AS:es

The two Remote AS:es with PC=201 and 202 in Figure 1 shall be created. The property Routing Context (RC) in each Remote AS can be set to zero, which means not used, since there is only one Remote AS per Remote IPSP in the example:

- Remote AS with ID=40001, RC=0 and served by Remote IPSP with ID=11.
- Remote AS with ID=40002, RC=0 and served by Remote IPSP with ID=12.

1. Select **Remote ASes** and press the **Insert** key. An instance of a Remote AS, named **RemoteAS#40001 RC:[undef]** is added. The number after # is the **ID** property for this Remote AS. This ID is generated automatically but can be changed if desired.
2. Select **RemoteAS#40001 RC:[undef]** and set the property **Routing Context** to zero.
3. Repeat step 1-2 for **RemoteAS#40002 RC:[undef]**.



**Note:** To remove an instance of a Remote AS **RemoteAS#...** select it and press either Remove popup menu option or **Delete** key. The location of **RemoteAS#...** in the element tree is described in the above paragraphs.

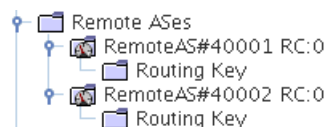


Figure 5 Remote AS:es created.

## 2.1.5 Create Remote SPs

Two Remote SP:s of type IPSP, that are remote to the IPSP view in Figure 1, shall be created:

- Remote SP with ID=11 and IP-Address 33.33.33.1
- Remote SP with ID=12 and IP-Address 33.33.33.2

**Note:** The Remote SGP process adjacent to the ASP is not created in this section, it is created in Section 2.1.6 on page 11.

1. Select **Remote SPs** and press the **Insert** key. An instance of a Remote SP, named **RemoteSP#1 Type:[undef] serves RemoteAS#[no rel]** is added.
2. Update the property **Remote SP ID** to 11, since the **Remote SP** cannot use the same ID as the **Remote SGP** in Figure 1.
3. Expand **RemoteSP#11 Type:[undef] serves RemoteAS#[no rel]** to view the default created Remote SP along with an IP-address.
4. Set the properties shown in the following table to specify the Remote SP.

Table 2 Remote SP and Remote SP IP Address related Properties

Property Location	Property Name	Comments
RemoteSP#11...	SP Type	In the Example select <b>IPSP</b> . Otherwise the possible values are:  <b>ASP</b>  <b>IPSP</b>
RemoteSP#11...	Exchange Model	In the Example select <b>Double Exchange Mode</b> in order to setup a communication in both directions. Otherwise the possible values are:  <b>Single Exchange Mode</b>  <b>Double Exchange Mode</b>



Table 2 Remote SP and Remote SP IP Address related Properties

Property Location	Property Name	Comments
RemoteSP#11...	SCTP Type	In the Example select <b>Server</b> for the Remote IPSP, which means that the local side acts as client towards the remote side. Otherwise the possible values for the Remote IPSP are:  <b>Client</b>  <b>Server</b>  <b>Client/Peer</b>
[undef] (located under the Remote SP IP Address group-element)	Address	In the Example set the value to 33.33.33.1.  The name of the [undef] in the navigation pane will be updated with the set value, for instance <b>33.33.33.1</b> , if the set value is <b>33.33.33.1</b>
RemoteSP#11...	Primary Local Ip Address	Defines primary local ip address for SCTP association
RemoteSP#11...	Primary Remote Ip Address	Defines primary remote ip address for SCTP association

- Repeat step 1- 4 to create the second Remote SP, but set its Remote SP ID to 12 instead of 11. Set the same SP Type, SCTP Type and Exchange Model. The IP address shall be set to 33.33.33.2.

**Note:** A tip when creating a copy of a parts of the configuration is to Select the “root” instance to be copied, here the **RemoteSP#11...**, and press the insert button. The sub-tree is copied and inserted, the only thing here to be changed is the IP Address.

**Note:** To remove an instance of Remote SP **RemoteSP#...** select it and press either Remove popup menu option or **Delete** key. The location of **RemoteSP#...** in the element tree is described in the above paragraphs.

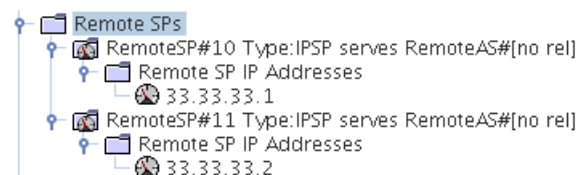


Figure 6 Two Remote SPs along with the Remote IP Addresses.



## 2.1.6 Create Remote SGP

One Remote SGP, the SGP with remote point code 104 in Figure 1, shall be created with ID=1, IP-Address set to 11.11.12.1 and serve an SG with ID=1:

1. Select **Remote SGPs** and press the **Insert** key. An instance of a Remote SGP, named **RemoteSGP#1...** is added.
2. Expand **RemoteSGP#1...** to view the default created Remote SGP along with an IP-address.
3. Set the properties shown in the following table to configure the Remote SGP.

**Note:** To remove an instance of a Remote SGP **RemoteSGP#...** select it and press either Remove popup menu option or **Delete** key. The location of **RemoteSGP#...** in the element tree is described in the above paragraphs.

Table 3 Remote SGP and Remote SGP IP Address related Properties

Property Location	Property Name	Comments
RemoteSGP#1...	Remote SG ID	In the Example set the value to 1.
RemoteSGP#1...	SCTP Type	In the Example select <b>Server</b> for the Remote SGP, which means that the local side acts as client towards the remote side. Otherwise the possible values for the Remote SGP are:  <b>Client</b>  <b>Server</b>  <b>Client/Peer</b>
[undef] (located under the Remote SGP IP Address)	Address	In the Example set the value to 11.11.12.1.  The name of the [undef] in the navigation pane will be updated with the set value, for instance <b>11.11.12.1</b> , if the set value is <b>11.11.12.1</b>
RemoteSGP#1...	Primary Local Ip Address	Defines primary local ip address for SCTP association
RemoteSGP#1...	Primary Remote Ip Address	Defines primaryremotel ip address for SCTP association

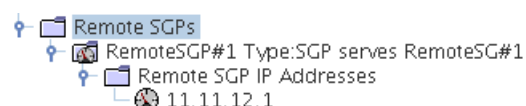


Figure 7 Remote SGP

### 2.1.7 Setting Remote SPs in its context

In the PC:s 201 and 202 in Figure 1 there are two Remote SPs of type IPSP that each shall serve a Remote AS, which is indicated by creating a reference from the Remote SP to the Remote AS:

- Remote SP with ID=11 (type IPSP) shall serve Remote AS with ID=40001.
  - Remote SP with ID=12 (type IPSP) shall serve Remote AS with ID=40002.
1. Select **RemoteSP#11 Type:IPSP serves RemoteAS#[no rel]** that has the Remote IP Address 33.33.33.1.
  2. Assign the reference-property Remote AS to the **RemoteAS#40001 RC:0**.
  3. Assign the reference-property Routing Context to the **RC:1** that belongs to a Local AS and was previously defined when creating the LocalAS.
  4. Repeat steps 1-3 for **RemoteSP#12...** that has the Remote IP Address 33.33.33.2, but instead assign **RemoteAS#40002 RC:0** and Routing Context **RC:2**.

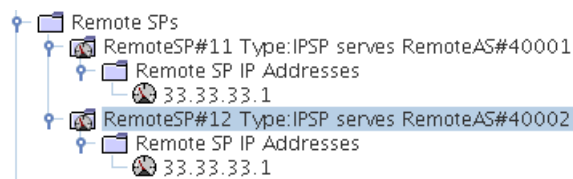


Figure 8 Remote SPs serving Remote AS

### 2.1.8 Setting Local SPs in its Context

In the ASP and IPSP views in Figure 1 there is one Local SP of type IPSP and one Local SP of type ASP that shall serve Local AS:es. References shall therefore be created from the Local SP:s to the Local AS:es:

- Local SP with ID=1 (type IPSP) shall serve Local AS with ID=1 and Local AS with ID=2. Its remote SPs are Remote SP (type IPSP) with ID=11 and ID=12.
  - Local SP with ID=2 (type ASP) shall serve Local AS with ID=3. Its remote SGP is Remote SGP with ID=1.
1. Select **LocalSP#1 Type:IPSP serves LocalAS#[no rel]**.
  2. Assign the reference-property Local AS to **LocalAS#1 LocalSPC=101** and **LocalAS#2 LocalSPC=102** from the list of Local AS:es.
- Note:** To select multiple elements from the list: hold down the **Ctrl** key on the keyboard while using the mouse.
3. Assign the reference-property Remote SP to **RemoteSP#11...** and **RemoteSP#12....**





4. Select **LocalSP#2 Type:ASP serves LocalAS#[no rel]**.
5. Assign the reference-property Local AS to **LocalAS#3 LocalSPC=103**.
6. Assign the reference-property Remote SGP to **RemoteSGP#1....**



Figure 9 Local SPs

### 2.1.9 Setting Local ASes in its Context

When setting up an IPSP communication it must be configured which Remote AS element that the Local AS shall be associated with. This end-to-end communication is configured as a reference from the Local AS to its Remote AS. In the example in Figure 1 the following associations shall be created (the references are not shown in the figure):

- Local AS at PC=101 to Remote AS at PC=201.
  - Local AS at PC=102 to Remote AS at PC=202.
1. Select **LocalAS#1 LocalSPC=101**.
  2. Assign the reference-property RemoteASes to **RemoteAS#40001 RC:0**.
  3. Repeat steps 1-2 for **LocalAS#2 LocalSPC=102**, which shall have a reference to **RemoteAS#40002 RC:0**.

### 2.1.10 Verifying the ASP/IPSP Configuration

In order to validate you select **Validate** from the **Edit** menu. The result will be displayed in the Results tab in the Information pane.

If the configuration is not valid the incorrect properties will be listed in different lines. By Selecting a line, Signaling Manger will prompt to the location to edit the property with proper values to make the configuration valid.

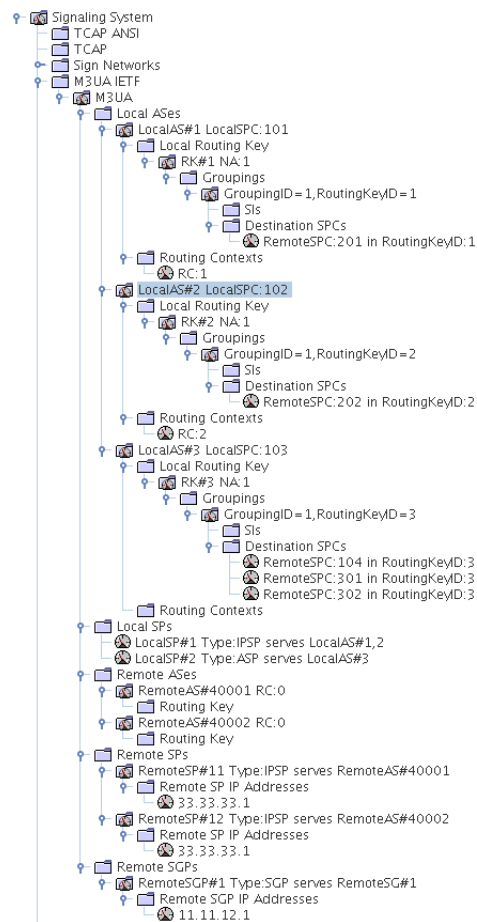


Figure 10 Complete M3 IETF configuration for the ASP/IPSP node.

## 2.2 Configuring MTPL3 in the ASP/IPSP Node

### 2.2.1 Overview

This section describes, using an example, how to add an MTPL3 configuration to the M3UA ASP/IPSP configuration made in Section 2.1 on page 3. Both IP via M3UA/SCTP and SS7 via MTPL3/MTPL2 will be configured between the ASP and an SGP/STP in Figure 11. As shown in Figure 11 the ASP at PC 103 will get an MTP Layer 3 and also an MTP Layer 2 FE, compared to the ASP configuration shown in Figure 1.

ASPs with both IP and SS7 is the first step when migrating between SS7 and IP in runtime. In later steps either SS7 or IP is removed. In the following example the ASP at PC 103 will use SS7 as first priority to the STP at PC 104. The result of the below steps in Signaling Manager GUI is shown in Figure 12.



**Note:** This is a simplified configuration example that lacks redundancy. In a real world configuration there should be redundant associations and redundant LS (Link Sets) to avoid loss of traffic during software upgrade or similar. How to configure redundant associations was briefly described in Section 1.1 on page 1. To configure redundant LS one more MTP-L2 FE need to be configured in a similar way as shown in this example. There should also be one more SGP/STP that provides routes to the PC 301 and PC 302, so that the LS can be split between the two MTP-L2 FEs and the two SGP/STPs.

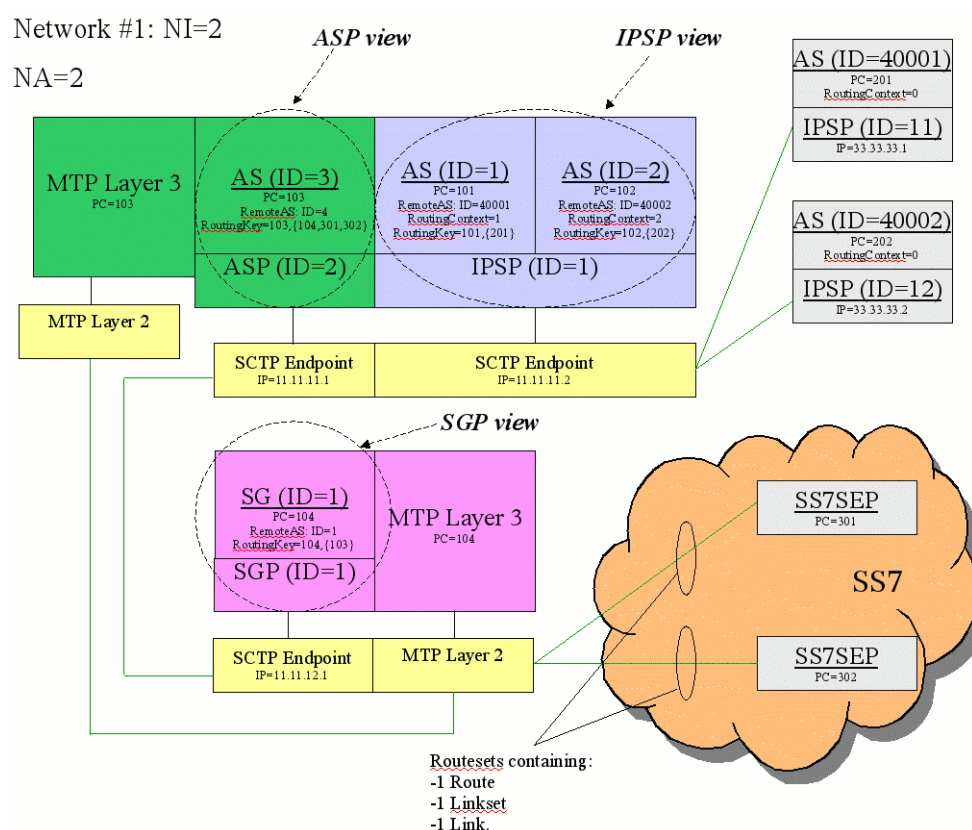


Figure 11 Network configuration example with both IP and SS7 from an ASP

## 2.2.2

### Create MTP-L2 FE

First an MTP-L2 FE configuration need to be added to the example configuration made in earlier sections. In Figure 11 the MTP Layer 2 under the MTP Layer 3 with PC=103 shall be added:

1. Select the group-element **MTP-L2 IF ISRs** and add an **MTP-L2 IF ISR FE:1**. This is made in a similar way to the procedure in document: Configuring SS7, MTP-L2 IF ISR - NB, HSL.

**Note:** To remove **MTP-L2 IF ISRs** select it and press either Remove popup menu option or **Delete** key.



### 2.2.3 Create MTP-L3 Linkset

Add an MTP-L3 Linkset in the MTP Layer 3 with PC=103 in Figure 11:

- Adjacent SPC for the Linkset will be PC=104 in MTP Layer 3 of the SGP/STP node.
- Four links from **MTP-L2 IF ISR FE: 1** will be used for the Linkset.
- 1. Expand **Sign Networks**, then under **LocalSPC: 103** select **MTP Sign Point** and press the **Insert** key to create an element **MTPL3**.
- 2. Select **MTPL3** and set property Node Behaviour to **SS7 End-Point**.
- 3. Expand **MTPL3**, select **Sign Linksets** and press the **Insert** key to create the element **LS # 1...**
- 4. Select the **LS # 1...** and set the reference-property Adjacent SPC to **RemoteSPC: 104**.
- 5. Expand **LS # 1...**, select element under **Sign Links** and set reference-property L2 Link to **FE 1: ISR Link PCMA:1**.
- 6. To add three more links, press the **Insert** button three times while the previous link is selected. The SLC and L2 Link are both automatically increased to the next available value.

**Note:** To remove **LS # 1...** select it and press either Remove popup menu option or **Delete** key. The location of **LS # 1...** in the element tree is described in the above paragraphs. Configuration with added elements is shown in Figure 12.

### 2.2.4 Create MTP-L3 Routesets

Add MTP-L3 Routesets in the MTP Layer 3 with PC=103 in Figure 11:

- The first Routeset leads to the adjacent SGP/STP node with PC=104.
- The second Routeset leads to the SS7 node with PC=301.
- The third Routeset leads to the SS7 node with PC=302.
- 1. Under **MTPL3** select the element under **Sign Routesets** and set the reference-property Remote Sign Point to **RemoteSPC: 104**.
- 2. Select the element under **Sign Routes** and set the reference-property Carrier to **LS # 1 --> Adjacent RemoteSPC:104**.
- 3. Create Routesets for SPCs 301 and 302 by selecting **RS: 104 in LocalSPC 103** and pressing the **Insert** key two times to create two new Routesets. In the two new Routesets change reference-property Carrier to **RemoteSPC: 301** in the first and **RemoteSPC: 302** in the second.



**Note:** To remove the instance **RS:...** of **Sign Routsets** select it and press either Remove popup option or **Delete** key. The location of **Sign Routsets** in the element tree is described in the above paragraphs. Configuration with added elements is shown in Figure 12.

## 2.2.5

### Setting SS7 Priority for Destination SPCs

In the Local AS with ID=3 and PC=103 in Figure 11, set SS7 priority instead of IP between the ASP and the SGP/STP for the Destination SPCs:

- Adjacent PC 104 will use have Priority set to **Use SS7**.
  - PC 301 and PC 302 will also have Priority set to **Use SS7**.
1. Turn on **Expert Mode** under the **Tools** menu.
  2. Under **M3UA IETF** expand **LocalAS#3 LocalSPC:103**.
  3. Under the group-element **Destination SPCs** select the **RemoteSPC:104 in RoutingKeyID: 3** and set the Priority property to **Use SS7**, as shown in Figure 12.
  4. Set the Priority for the other two **Destination SPCs** 301 and 302 to the value **Use SS7** in the same way as in step 3.



Figure 12 Setting Priority to SS7 instead of IP.

## 2.2.6

### Verifying the ASP/IPSP Configuration with SS7

In order to validate you select **Validate** from the **Edit** menu. The result will be displayed in the Results tab in the Information pane.

## 2.3

### Configuring the SGP/STP Node

This chapter is a step-by-step instruction how to configure a SGP/STP node. In the following example the SGP view in Figure 1 is the local part and the ASP view is the remote part. The SGP/STP configuration is therefore completely separated from the configuration created in Section 2.1 on page 3.

**Note:** To follow the SGP/STP example in this section make sure to start with a new blank configuration.



### 2.3.1 Create Local and Remote SignPoints

How to create Local and Remote SignPoints is similar to how it was done in Section 2.1.1 on page 3.

Create the same Signaling Network but replace the values of Local and Remote SPC:s.

Table 4 Local and Remote SignPoints for the SGP/STP node.

Local SPC	104, Local Signaling Point of this SGP/STP node.
Remote SPC:s	301 and 302, Remote SPCs that shall be reached via SS7.

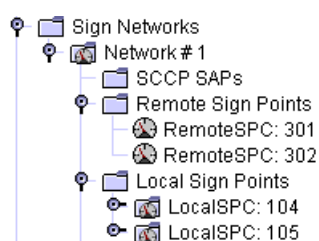


Figure 13 Signaling Network, Local and Remote SignPoints.

### 2.3.2 Configuring the IP Part of the SGP/STP Node

#### 2.3.2.1 Create Local SP

The Local SP of type SGP with ID=1 in the SGP view in Figure 1 shall be created:

1. Expand **Signaling System** and the underlying structure to view the configuration.
2. Select **M3UA IETF** and press the **Insert** key. An instance of M3UA, holding all global M3UA configuration properties, is created named **M3UA**.
3. Expand **M3UA** to view the default created Local SP.
4. Select **Type:[undef] serves LocalAS#[no rel]**. Because the Local SP can be of ASP, IPSP and SGP type the property SP Type shall be set to SGP.
5. Select the SCTP End Point to use. Choose the SCTP EndPoint that has IP-address 11.11.11.2 (for example called **FE 0: IP Address Table#X**).

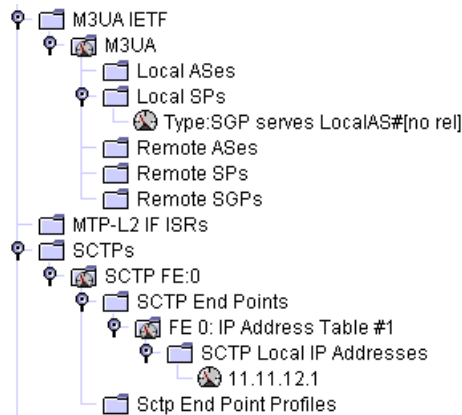


Figure 14 Local SP and its SCTP EndPoint.

### 2.3.2.2 Create Remote SP

One Remote SP of type ASP shall be created with ID=1.

1. Select **Remote SP** and press the **Insert** key. An instance of a Remote SP, named **Type:[undef] ASP\_Identifier=0 serves RemoteAS#[no rel]** is added.
2. Expand **Type:[undef] ASP\_Identifier=0 serves RemoteAS#[no rel]** to view the default created Remote SP along with an IP-address.
3. Set the properties shown in the following table to configure the Remote SP.

Table 5 Remote SP and Remote SP IP Address related Properties

Property Location	Property Name	Comments
Type:[undef] ASP_Identifier=0 serves RemoteAS#[no rel]	SP Type	In the Example select <b>ASP</b> . Otherwise the possible values are:  <b>ASP</b>  <b>IPSP</b>
Type:[undef] ASP_Identifier=0 serves RemoteAS#[no rel]	SCTP Type	In the Example select <b>Client</b> . Otherwise the possible values are:  <b>Client</b>  <b>Server</b>  <b>Client/Peer</b>
[undef]	Address	In the Example set the value to 11.11.11.1.  The name of the [undef] in the navigation pane will be updated with the set value, for instance <b>11.11.11.1</b> , if the set value is <b>11.11.11.1</b>





Figure 15 Remote ASP.

### 2.3.2.3

#### Create the Remote AS

The Remote AS with ID=3 and PC=103 in Figure 1 shall be created:

1. Select **Remote AS** and press the **Insert** key. An instance of a Remote AS, named **RemoteAS#1 RC:[undef]** is added. The number after # is the **ID** property taken from this Remote AS. This ID is generated automatically but can be changed if desired.
2. Select the **RemoteAS#1...** and change its ID to 3 to match the network in Figure 1.
3. Expand **RemoteAS#3 RC:[undef]** to view the default Remote AS.
4. Select **RemoteAS#3 RC:[undef]** and set the RoutingContext for this AS. RoutingContext is not used here and shall therefore be set to 0.
5. Configure the Signaling Network that the Remote AS belongs to by assigning **Network#1** from the list of Signaling Networks.
6. Select **Routing Key** and press the **Insert** key.
7. Select **RK#1 NA:[undef]** located under **RemoteAS#3 RC:0** and set the Network Appearance for this network. In this example this shall be set to 1.
8. Expand **RK#1 NA:1**.
9. Select **DestinationSPC:[undef]** located under **RK#1 NA:1** and set the destination SignPoint that shall be reached from this SGP/STP. In this example set Destination SPC to 103. This SPC value is the SPC of the Remote AS.
10. Select **SPC:[undef]** located under **DestinationSPC:103**.

This is one of the originating SPC values that shall reach this Remote AS. The combination of Originating SPCs and Destination SPC is used by the SGP/STP in order to determine where a message from a certain Originating SPC in the SS7 network shall be redirected.

11. Set the Originating SPC value to 301.
12. Select **Originating SPCs** and press the **Insert** key. A new instance of a Originating SPC is created. Set Originating SPC in this instance to 302.

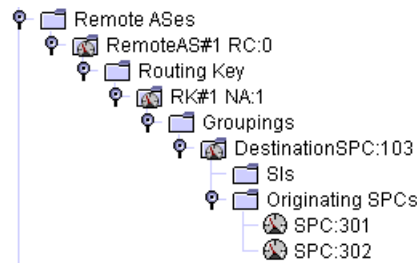


Figure 16 Remote AS

#### 2.3.2.4 Setting Local SGP in its Context

There is one Local SGP with ID=1. Its remote SP are Remote SP (type ASP) with ID=1.

1. Select **Type:SGP serves LocalAS#[no rel]**. Because an SGP does not use an AS the Local AS shall not be assigned.
2. Assign Remote SP **Type:ASP ASP\_Identifier=0 serves RemoteAS#[no rel]** from the list of Remote SPs.

#### 2.3.2.5 Setting Remote SP in its Context

There is one Remote SP with ID=1 (type ASP). This Remote ASP shall serve the Remote AS with ID=1.

1. Select **Type:ASP ASP\_Identifier=0 serves RemoteAS#[no rel]**.
2. Assign Remote AS **RemoteAS#3 RC:0** from the list of Remote AS:es.
3. RoutingContext is not used for this AS and shall not be set here.

#### 2.3.2.6 Setting the Default Relay Point

If a message without NA property arrives, addressed to a SS7 destination, it shall be relayed do a default LocalSignPoint in the Mtpl3 configuration. The default location is specified by detting the Default Relay Point reference in the M3UA instance.

1. Select **M3UA**.
2. Set the Default Relay Point by selecting **LocalSPC:104** from the list.

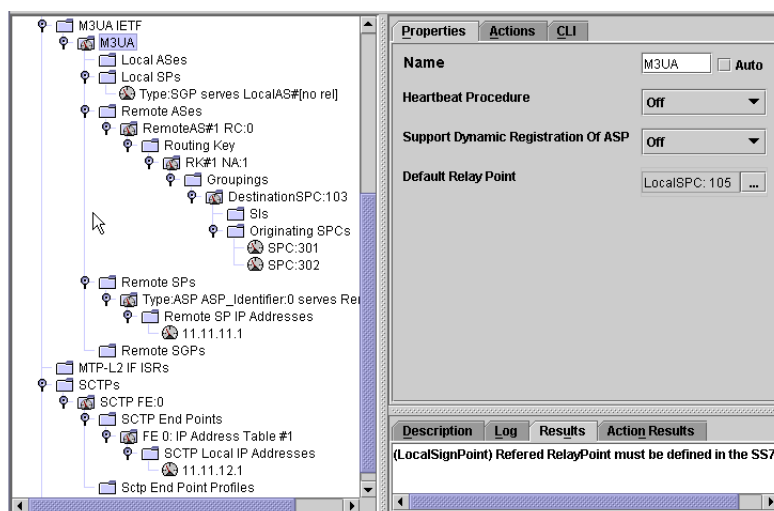


Figure 17 Complete IP part of the SGP/STP node

## 2.3.3 Configuring the MTPL3 Part of the SGP/STP Node

### 2.3.3.1 Create the MtpSignPoint

1. Select and expand **LocalSPC:104** under **Network#1**.
2. Select **MtpSignPoint** and press the **Insert** key. An instance of a MtpSignPoint, named **MTPL3** is added.
3. Set the NodeBehaviour property in MTPL3. This shall be set to **SS7 STP** in this example because the node will only act as transfer point.
4. Select and expand the **MTPL3** instance to view the default created parts.

### 2.3.3.2 Create Sign Linksets

1. Select **Sign Linksets** located under **MTPL3** and press the **Insert** key. An instance of a SignLinkset named **LS # 1 --> Adjacent RemoteSPC: [no rel]** is added.

**Note:** As visible in the name of the added **LS # 1 --> Adjacent RemoteSPC: [no rel]** the Adjacent RemoteSPC relation is not set by default.

2. Select the added Linkset instance, **LS # 1 --> Adjacent RemoteSPC: [no rel]**, and assign the **Adjacent SPC** reference. Set the first Linkset towards Remote SPC 301.
3. Repeat step 1-2 and assign SPC 302 as **Adjacent SPC**.

### 2.3.3.3 Create Sign Links of a Linkset

The first Link called **[no rel]SLC: 0** was already added by default when each Linkset was added.



**Note:** As it is visible in the name of the added **[no rel]SLC: 0**, the **L2Link** relation which is a reference to a physical timeslot of a trunk on an MTP-L2 IF ISR, is not set initially. When this reference is set the name of the link will be updated, for instance as **FE 0: ISR Link PCMA:0, SLC: 0**

1. Select **[no rel]SLC: 0** located under **LS # 1 --> Adjacent RemoteSPC: 301** and assign the **L2Link** reference.

**Note:** The **L2Link** is created in the MTP Layer 2 configuration under **MTP-L2 IF ISR** in Signaling Manager. This is not described in this OPI. See document listen in Section 1.2.3 on page 2.

2. Select **[no rel]SLC: 0** located under **LS # 2--> Adjacent RemoteSPC: 302** and assign the **L2Link** reference.

**Note:**

- The **M3–Link Normal Activation** action must be performed when links are added during the reconfiguration mode, in order to activate the added links.
- To add more links under the same linkset , press the **Insert** button while the previous link is selected. The SLC and L2Link are both automatically increased to the next available value, but may need to be updated.

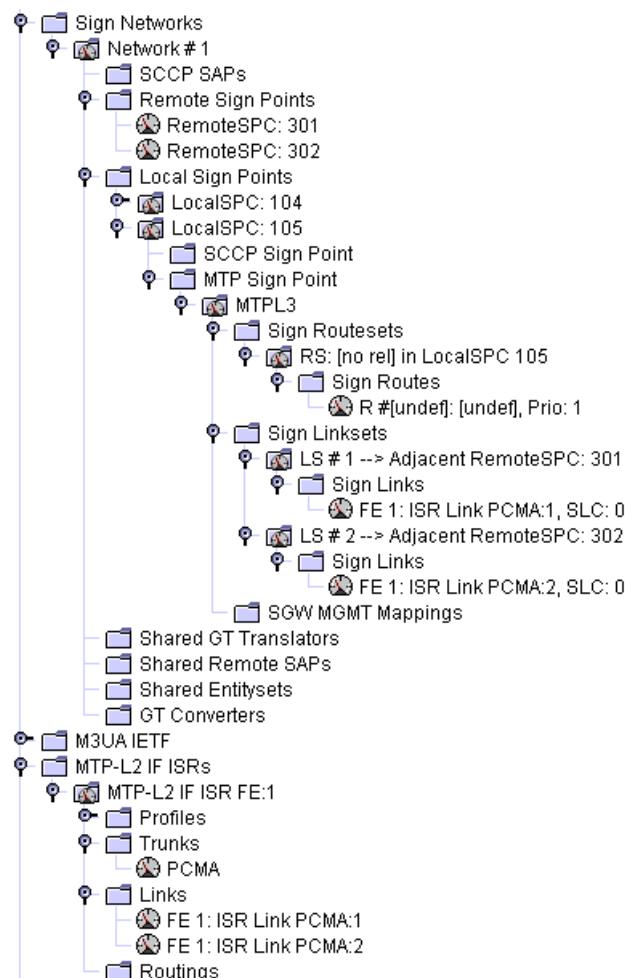


Figure 18 Signaling Linksets and links

#### 2.3.3.4

#### Create Sign Routesets

A Routeset is already added by default when the **MTPL3** is added called **RS: [no rel] in LocalSPC 104** in this example.

**Note:** As is visible in the name of the added **RS: [no rel] in LocalSPC 104**, the **Remote Sign Point** relation is not set by default. When this reference is set the name of the Routeset will be updated, here **RS: 301 in LocalSPC 104**.

1. Select the added Routeset, **RS: [no rel] in LocalSPC 104**, and assign the **Remote Sign Point** reference. Select RemoteSignPoint 301 for the first Routeset
2. Select **Sign Routesets** located under **MTPL3** and press the **Insert** key. An instance of a SignRouteset named **RS: [no rel] in LocalSPC 104** is added.
3. Select the added Routeset, **RS: [no rel] in LocalSPC 104**, and assign the **Remote Sign Point** reference. Select RemoteSignPoint 302 for the second Routeset

### 2.3.3.5 Create Sign Routes of a Routeset

The first Route, called **R #1: [undef], Prio: 1** is already added for the added Routesets by default.

**Note:** Visible in the name of the added **R #1: [undef], Prio: 1** is the **Carrier** relation which is a reference to a **Sign Linkset** instance. When the reference is set, the name of the route will be updated, for instance as **Route #1,LS # 1 to RS 301, Prio: 1**

1. Select **R #[undef]: [undef], Prio: 1** located under **RS:301 in LocalSPC 104** and assign the **Carrier** reference. Select **LS # 1 --> Adjacent RemoteSPC: 301** from the list of Linksets.
2. Select **R #[undef]: [undef], Prio: 1** located under **RS:302 in LocalSPC 104** and assign the **Carrier** reference. Select **LS # 2--> Adjacent RemoteSPC: 302** from the list of Linksets.

**Note:** Adjust the **Route Priority** unless loadsharing is desired.

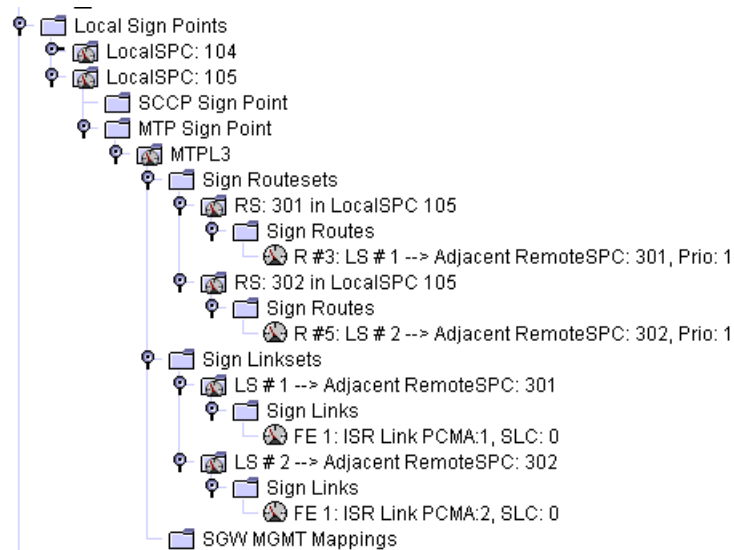


Figure 19 Signaling Routesets and Routes

### 2.3.4 Verifying SGP/STP Configuration

In order to validate, select **Validate** from the **Edit** menu. The result will be displayed in the Results tab of the Information pane.

If the configuration is not valid the incorrect properties will be listed in different lines. When a line is selected, Signaling Manger will prompt to the location to edit the property with the proper values to make the configuration valid.

If you have performed the steps in the Example configuration there might be some properties that are invalid because they do not have any default value. In



that case you can set a value according to the description of the property. Repeat until the configuration is valid.

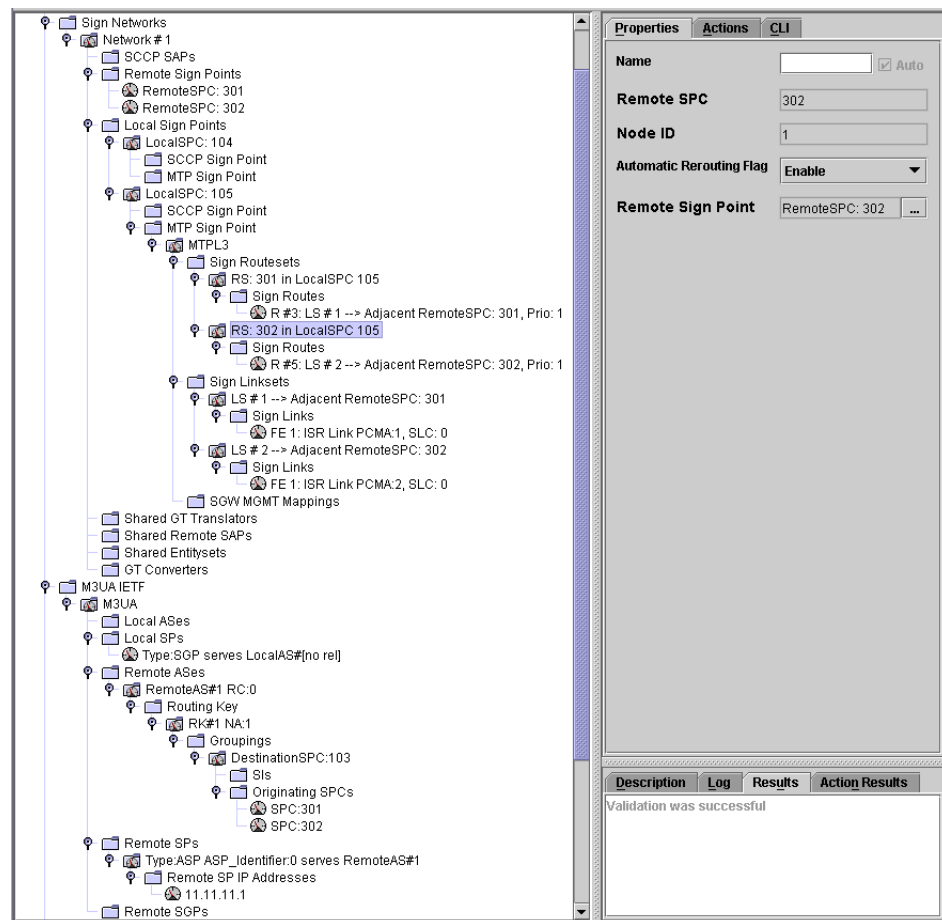


Figure 20 Complete configuration for the SGP/STP node.

## 2.4 Configuring Distributed Endpoint Support in M3UA Node

This section describes how to activate DEP Support in M3UA Node. DEP Support feature allows to initialize one EndPoint for different FrontEnds. Associations of this EndPoint are distributed among the available FrontEnds, which was configured this IP address.

To activate DEP Support you can open M3UA Property and set Distribution End Point Support property to On.

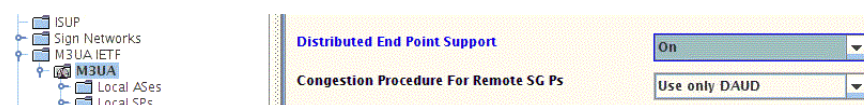


Figure 21 Distributed End Point Support property.



In Signaling Manager, when DEP Support feature is activated, EndPoints with the same IP address and port may be configured for each FrontEnd independently.

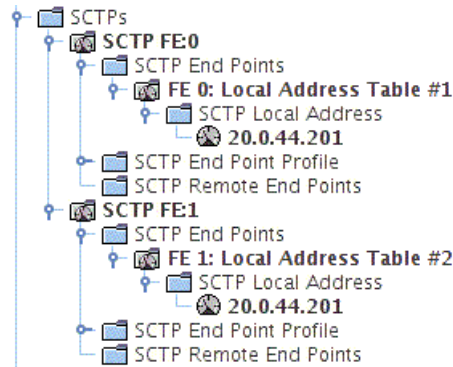


Figure 22 The same EndPoint for different FrontEnds.

In that case to include the possibility of representation one of the DEPs EndPoint should have reference from M3UA.

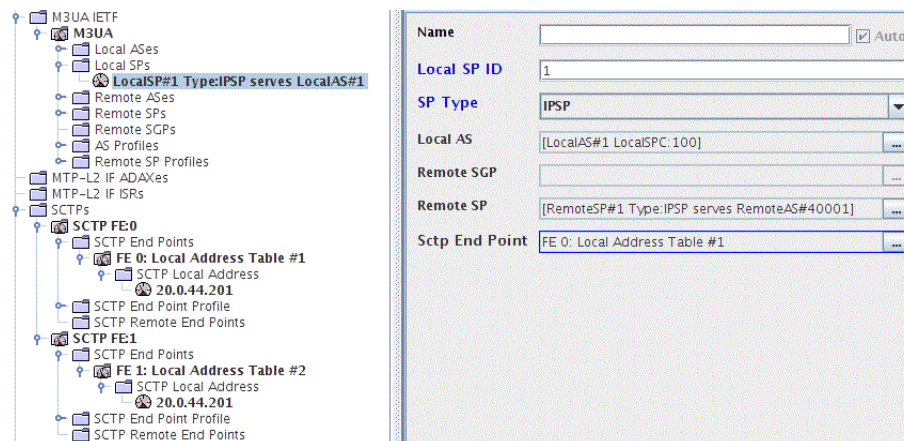


Figure 23 Reference from M3UA to Sctp End Point.

When DEP Support feature is activated, it is also possible to configure EndPoint for one FrontEnd.

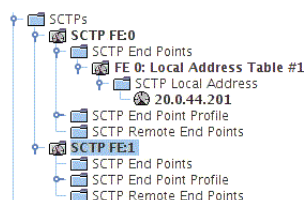


Figure 24 One EndPoint for one FrontEnd.





### 3 Communication M3-IETF with M3

**Note:** To view all elements and properties you need to turn on the **Expert Mode** under the **Tools** menu. You can find the below mentioned items in the following places of Signaling Manager UI: M3UA node of M3UA IETF, RemoteSP node of M3UA IETF

In particular, the following issues must be taken into account when communicating M3-IETF with E-Sigtran (M3)

It is assumed that **M3UA IETF/M3UA** element is already created.

1. **Support Dynamic Registration of ASP** is recommended to be set to **Off** (for M3IETF). Available options are **Off /On/Identification Only**.  
  
**Identification Only** option is available only if M3 is configured with ASP Identifier not equal to 0. ASP identifier is empty in M3UA configuration by default and equal to 0 in M3-IETF.
2. **Notify Behaviour** must be set to **Off**. Otherwise, the M3-IETF will wait for Notify message from M3 to establish associations.
3. **DUPU Handling** is recommended to be set to **Off**. If it is set to **On**, M3-IETF will not activate AS until all users (SI) in the RK are bound.
4. **Network Appearance** of any **LocalAS** or **RemoteAS** elements must be set to 0, and it is empty in M3UA configuration.
5. **ASP Identifier** of any **RemoteSP** element is recommended to be set to 0 (for M3IETF).
6. **Sctp Type** and **ASP Messaging** of any **RemoteSP** element must be set to **Client/Peer**. If so, M3-IETF will allow both incoming and outgoing SCTP and M3UA connections.

Otherwise, following variants are possible:

- **Sctp Type** must be set to **Client** and **ASP Messaging** must be set to **Client**, if remote M3 is configured with Association Behaviour Mask set to 0.
- **Sctp Type** must be set to **Client** and **ASP Messaging** must be set to **Server**, if remote M3 is configured with Association Behaviour Mask set to 1.
- **Sctp Type** must be set to **Server** and **ASP Messaging** must be set to **Server**, if remote M3 is configured with Association Behaviour Mask set to 2.
- **Sctp Type** must be set to **Server** and **ASP Messaging** must be set to **Client**, if remote M3 is configured with Association Behaviour Mask set to 3.



7. **Routing Context** of any **LocalAS** or **RemoteAS** elements must be set to **0**, and is empty in M3UA configuration.
8. **Exchange Model** of any **RemoteSP** element must be set to **Single Exchange Mode**.



# Glossary

**SCCP**

Signaling Connection Control Part

**IETF**

Internet Engineering Task Force

**MTP-L2**

Message Transfer Part - Layer 2

**M3**

MTP Layer 3

**M3-IETF**

SS7 MTPL3 & M3UA-IETF

**M3UA**

MTPL3 User Adaptation layer

**MTP**

Message Transfer Part

**SS7**

Signaling System Number 7

**FE**

Front End

**DEP**

Distributed End Point





## Reference List

- [1] Configuring SS7 Signaling Network, SCCP, M3, 3/1543-CNA 403 0874 Uen/
- [2] Configuring SS7, MTP-L2 IF ISR - NB, HSL, 2/1543-CNA 403 0874/
- [3] Configuring SS7, SCTP, 1/1543-CNA 403 0874/
- [4] Geographical Network Redundancy User Guide, 1/1553-CAA 901 1448/