

SGSN9810 Iu Interface Data Configuration

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References

- 3GPP TS 25.413 UTRAN Iu interface RANAP signalling
- 3GPP TS 23.110 Iu interface Services and Functions
- HUAWEI SGSN9810 Serving GPRS Support Node V800R009
 - **Configuration Guide**



Contents

1. **Basic Concept**
2. Iu Over ATM
3. Iu Over IP

Iu Interface Protocol Stack

Iu Control Plane				Iu User Plane		
RANAP	UICP	RANAP	UICP	GTP-U		UGFU
SCCP		SCCP		UDP		
MTP3B		M3UA		IP		
SAAL		SCTP		AAL5	L2	
ATM/PHY	UGFU/ UPIU	IP/L2/ L1	UGFU/ UPIU	ATM/ PHY	L1	UPIU

Iu Interface Protocol

- **RANAP**
- The radio access network application protocol (RANAP) implements the following functions:
 - Encapsulating and carrying upper-layer signaling
 - Handling signaling between the SGSN and the UTRAN
 - Managing GTP connections on the Iu interface

Iu Interface Protocol

- **Broadband MTP**
- The broadband MTP provides broadband signaling transmission service through the ATM network. It consists of the following two parts:
 - Message transfer part (Broadband) (MTP3B)
 - Signaling ATM adaptation layer (SAAL)

Iu Interface Protocol

- **SIGTRAN**
- The SIGTRAN protocol stack is classified into two categories based on functions: adaptation and transmission.
 - SS7 adaptation protocols:
 - M3UA: MTP3 User Adaptation
 - Universal signaling transmission protocols:
 - SCTP: Stream Control Transmission Protocol

Iu Interface Protocol

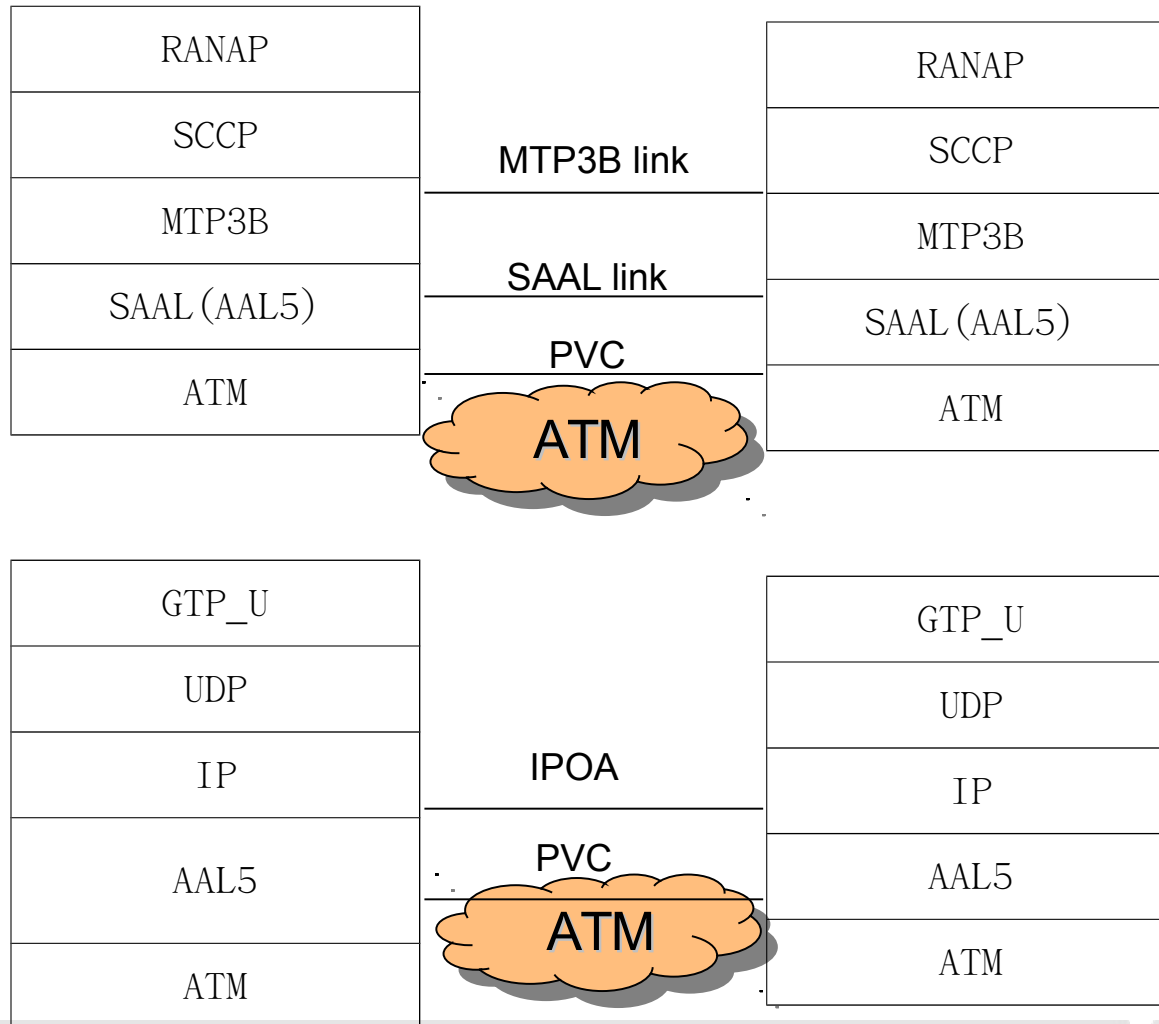
- The user plane protocol consists of the following parts:
 - GTP user plane (GTP-U): transmits signaling or user data through tunnels.
 - User datagram protocol (UDP): provides connectionless datagram service.
 - Internet protocol (IP): includes IPv4 and IPv6.
 - ATM adaptation layer 5 (AAL5): supports point-to-point transmission and point-to multipoint transmission and provides reliable and unreliable service.



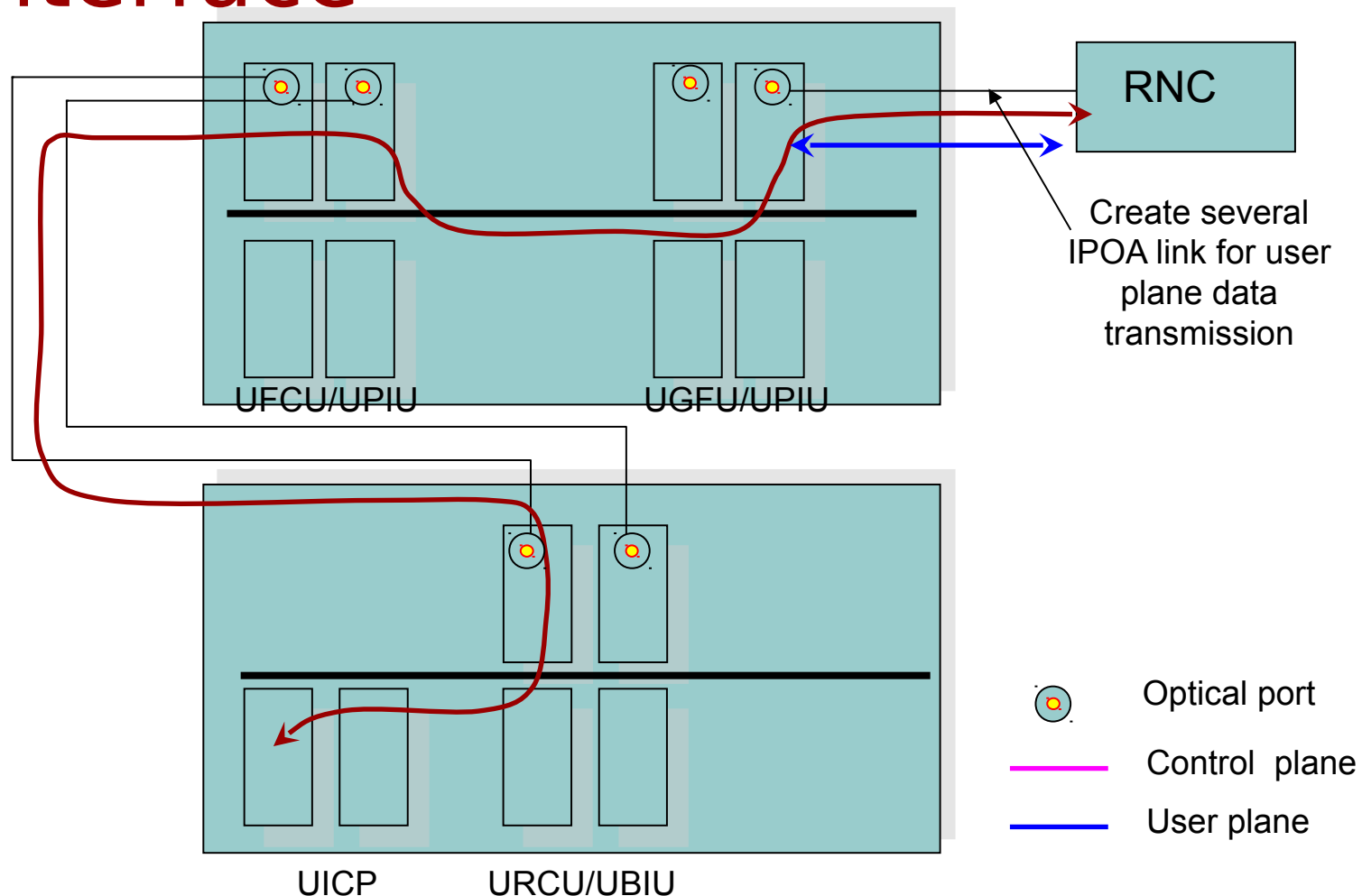
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Iu over ATM



Internal Structure of Iu Interface



Network Data

- Board

information

Board	Subrack	Slot	Front/back k	Pinch board
UICP	0	0/1(A/S)	Front	
UGFU	3	12/13(A/S)	Front	
UPIU	3	12/13	Back	UAIC/UAI C

- Optical port of lu

interface

Board	Active port	Standby port
UPIU	3/12/0	3/13/0

Network Data

- PVC traffic parameter

	Service Categories	Peak Cell Rate
User Plane	UBR	100000
Control Plane	CBR	3708

- User plane

	SGSN	RNC
user plane IP address	217.164.95.6 5	100.1.1.1
IPOA address	10.110.0.1/24	10.110.0.2/2 4
VPI/VC	1/200	

Network Data

- Control plane

Item	Value
PLMN ID	46007
RNC ID	1234
SGSN OPC	A00
RNC DPC	401
VPI/VCI of MTP3B link1	1/100
VPI/VCI of MTP3B link2	1/101
SLC of MTP3B link1	0
SLC of MTP3B link2	1

Configuration Steps

Step	Action	Command
Add the related boards and ports		
1	Add the UICP	ADD BRD
2	Add UGFU and UPIU	ADD BRD
3	Configure the UPIU port	SET UPIU_PORT
Set the signaling attribute		
4	Set the signaling attribute of SGSN	SET SIGATTR

Configuration Steps

Step	Action	Command
Configure the MTP3B		
5	Add the MTP3B destination signaling points	ADD MTP3BOPC
6	Add the MTP3B destination signaling points.	ADD MTP3BDPC
7	Add the MTP3B signaling link sets.	ADD MTP3BLKS
8	Add the MTP3B signaling routes.	ADD MTP3BRT
9	Add the traffic parameters.	ADD TRAFFIC
10	Add the MTP3B signaling links.	ADD MTP3BLNK
11	Set the MTP3B timers.	SET MTP3BTMR
(Optional)		



Configuration Steps

Step	Action	Command
Configure the SCCP		
12	Add the SCCP origination signaling points.	ADD SCCPOPC
13	Add the SCCP destination signaling points.	ADD SCCPDPC
14	Add the SCCP subsystems.	ADD SCCPSSN
Configure the RNCs		
15	Configure the RNCs.	ADD RNC
16	Add the 3G paging tables.	ADD 3GPAGING

Configuration Steps

Step	Action	Command
Configure the user plane		
17	Add the interface IP of UPIU	ADD IFIP
18	Add the traffic parameters.	ADD TRAFFIC
19	Add IPoA links to the RNC.	ADD IPOA
20	Add routes to the RNC user plane.	ADD IPRT
21	Configure the mapping between the RNC and the UGFU.	ADD RNCUGFULNK

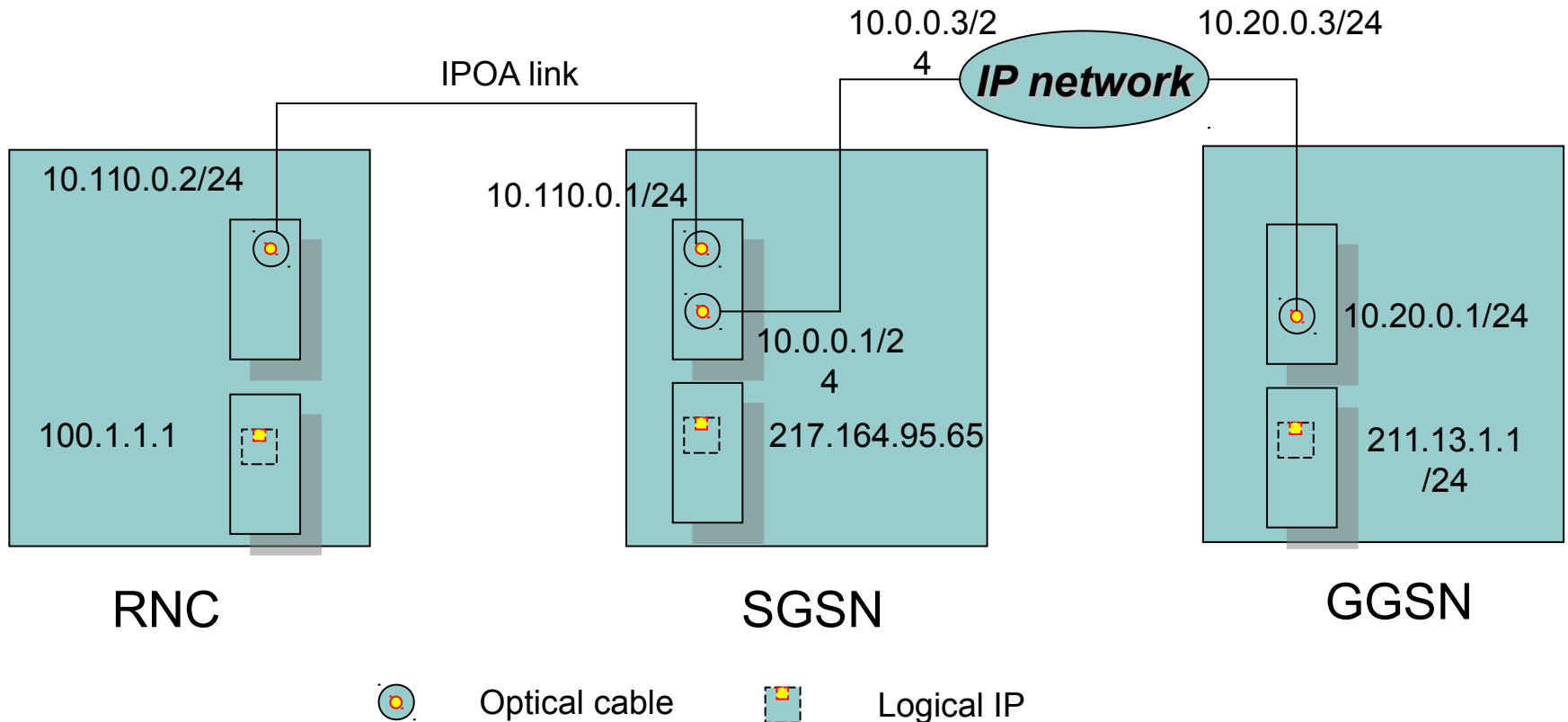
Step1: Add UICP Board

- ADD BRD:
 - ADD BRD: SRN=0, SN=0, BP=IO, BT=UICP, RS=ACTIVE, PSRN=0, PSN=1, SPEC=B;

Step2: Add UGFU/UPIU

- ADD BRD:
 - In this command, the IP address of lu user plane will be configured.
 - ADD BRD: SRN=3, SN=12, BP=IO, BT=UGFU, RS=ACTIVE, **IP1="217.164.95.65"**, PSRN=3, PSN=13, **PM CUT=UAIC**, **PM CDT=UEFC**;

IP Address Planning- One IP Address for Iu and Gn Interface



Step 3: Configure the UPIU Port

- SET UPIU_PORT:
 - SET UPIU_PORT: MSRN=3, MSN=12, MPN=0, SSN=13, SPN=0, **PT=ATM, SCRAM=ENABLE, FM=SDH;**

Step 4: Configure Signaling Attribute for lu

- SET SIGATTR
 - SET SIGATTR: IF=INVALID, IRF=INVALID, **NF=LABEL24, NRF=LABEL14, SS7T=ITUT_SS7;**
- These attributes define characteristics of signaling supported by the local signaling network.

Step 5: Define the Signaling Point of SGSN

- ADD MTP3BOPC
 - ADD MTP3BOPC: OPX=0, **NI=NATB**, **OPC="A00"**,
OPN="SGSN9810 Iu interface";

Step 6: Define the Signaling Point of RNC

- ADD MTP3BDPC
 - ADD MTP3BDPC: DPX=0, OPX=0, **DPC="401"**,
SLSSM=B0000, STPF=DISABLE, **ADJF=TRUE**,
DPN="RNC Iu Interface";

Step 7: Define the Link Set

- ADD MTP3BLKS
 - ADD MTP3BLKS: LSX=0, DPX=0, **SLSM=B0000**;
- There is only one link set between each originating signaling point and adjacent destination signaling point.

Step 8: Define the MTP3B Route

- ADD MTP3BRT
 - ADD MTP3BRT: RTX=0, DPX=0, LSX=0;
- If the SGSN and RNC are direct connected, there is only one route from SGSN to RNC.
- If the SGSN and RNC are not direct connected, there may be several routes from SGSN to RNC. But only 16 routes can be configured for each MTP3B destination signaling point of RNC.

Step 9: Define Traffic Information of SAAL link

- ADD TRAFFIC:
 - ADD TRAFFIC: **IDX=30, SC=CBR, PCR=3708;**
 - The system provides 14 groups of parameters by default. The MTP3B link uses the tenth group of parameters by default.

Index No.	Service Type	Peak Cell Rate (PCR) (cells/s)	Supportable Cell Rate (cells/s)	Max. Cell Burst Size (cells/s)	Cell Delay Variation Tolerance (us)
10	Real-time variable rate	2415	1207	150	300000

- If MTP3BLNK chose default traffic IDX, then this command is no need to executed.

ATM Traffic Classes

Class	Subclass	Description	Suggested layer	Example
Guaranteed	CBR	Constant bit rate	AAL1	Voice
	rt-VBR	Real-time variable bit rate	AAL2	Video conference
	nrt-VBR	Non-real-time variable bit rate	AAL2	Video streaming
Best effort	ABR	Available bit rate	AAL5	Web browsing
	GFR	Guaranteed frame rate	AAL5	Any IP traffic
	UBR	Unspecified bit rate	AAL5	File transfer

Step 10: Configure MTP3B Links

- ADD MTP3BLNK
 - ADD MTP3BLNK: LNK=1, BT=UGFU, IFSRN=3, IFSN=12, IFPORT=0, **PVPI=1, PVCI=100**, SRN=0, SN=0, LSX=0, **SLC=0, STRAFI=30**;
 - ADD MTP3BLNK: LNK=2, BT=UGFU, IFSRN=3, IFSN=12, IFPORT=0, **PVPI=1, PVCI=101**, SRN=0, SN=1, LSX=0, **SLC=1, STRAFI=30**;

Step 11: Set Timer of Lu Protocol

- SET MTP3BTMR
 - Default value is suggested
 - in this case chose default value, the command needn't to be configured.

Step 12: Configure SCCP OPC

- ADD SCCPOPC
 - ADD SCCPOPC: OPX=1, **NI=NATB**, **OPC="a00"**,
SPN=IUONLY;

Step 13: Configure SCCP DPC

- ADD SCCPDPC
 - ADD SCCPDPC: DPX=1, OPX=1, **DPC="401"**,
LDP=nouse, DPN="RNC";

Step 14: Configure SCCP SSN

- Add sub-system for RNC
 - ADD SCCPSSN: SSNX=1, **SSN=SCMG**, NI=NATB, **DPC="401"**, **OPC="A00"**, SSNNAME="scmg";
 - ADD SCCPSSN: SSNX=2, **SSN=RANAP**, NI=NATB, **DPC="401"**, **OPC="A00"**, SSNNAME="RANAP";
- Add sub-system for SGSN
 - ADD SCCPSSN: SSNX=3, **SSN=SCMG**, NI=NATB, **DPC="A00"**, **OPC="A00"**, SSNNAME="scmg";
 - ADD SCCPSSN: SSNX=4, **SSN=RANAP**, NI=NATB, **DPC="A00"**, **OPC="A00"**, SSNNAME="SGSN";

Step 15: Configure RNC Information

- ADD RNC
 - ADD RNC: RNCX=1, **RNCMCC="460"**,
RNCMNC="07", **RNCID=1234**, **NI=NATB**,
SPC="401";

Step 16: Configure 3G Paging Table

- ADD 3GPAGING
 - ADD 3GPAGING: **LAI="460071234", RAC="01", RNCINDEX=1;**
- During the paging procedure, the SGSN paging the UE in the scope of RAI. So the SGSN will use this 3G paging information to find the corresponding RNC, and forward the paging message to the RNC.

Step 17: Configure the UPIU Port IP

- ADD IFIP
 - ADD IFIP: SRN=3, SN=12, PN=0, IPT=PRI,
IP="10.110.0.1", MSK="255.255.255.0",
DESC="interface to RNC1";

Step 18: Traffic Information of IPOA

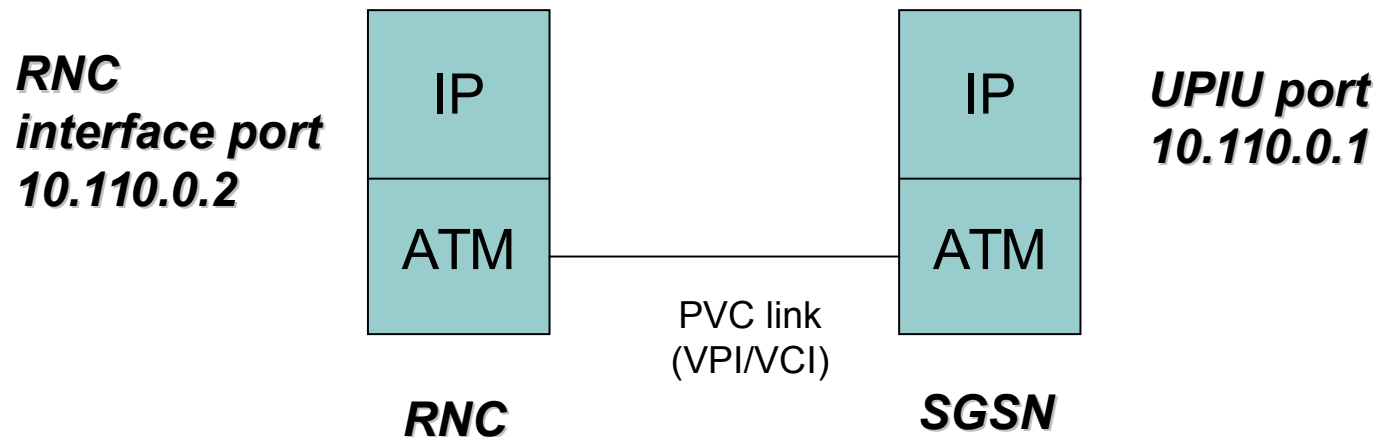
- ADD TRAFFIC

- ADD TRAFFIC: **IDX=31, SC=UBR, PCR=100000;**
- The system provides 14 groups of parameters by default. The IPoA link uses the fourth group of parameters by default.
- If chose default traffic IDX, then this command

Index No.	Service Type	Peak Cell Rate (PCR) (cells/s)	Supportable Cell Rate (cells/s)	Max. Cell Burst Size (cells/s)	Cell Delay Variation Tolerance (us)
4	Unknown bit rate	353207	-	-	500000

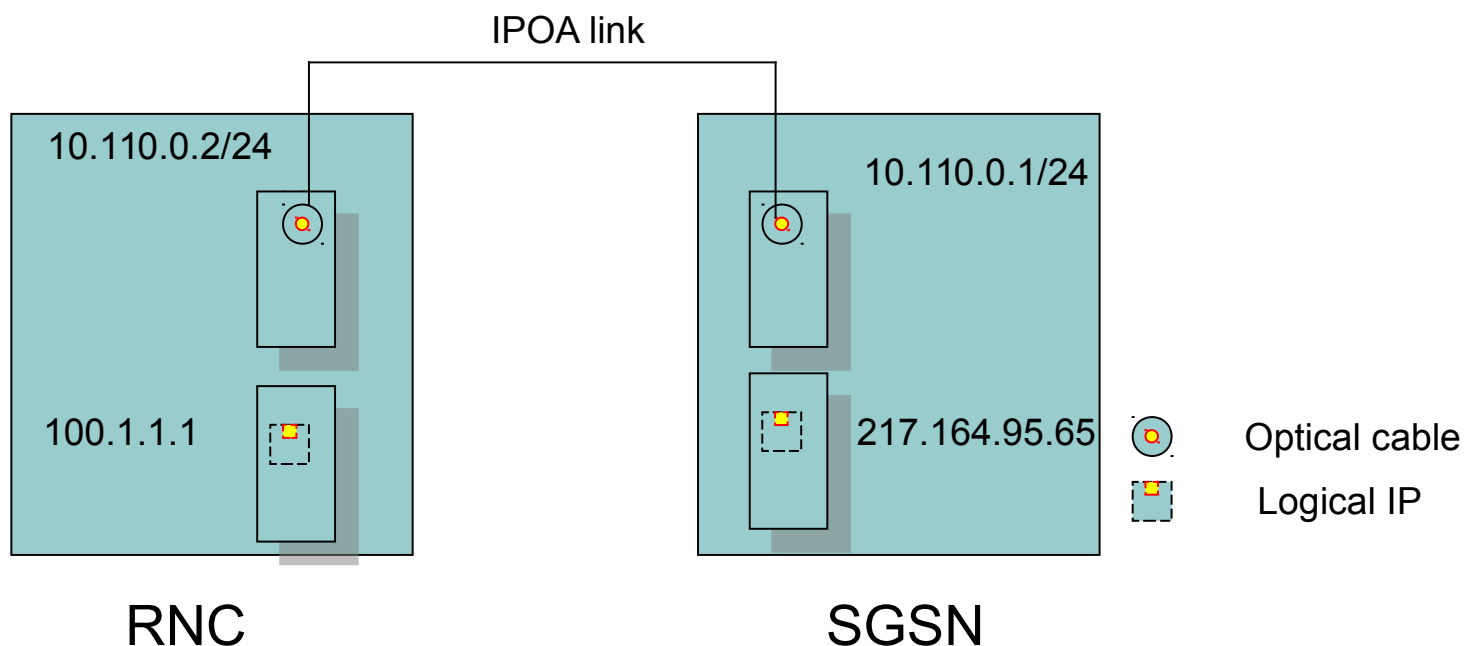
Step 19: Configure IPOA Link

- ADD IPOA
 - ADD IPOA: SRN=3, SN=12, PN=0, **VPI=1, VCI=200**, **TP=STATIC_MAP, IP="10.110.0.2"**, TRAF=31, QOS=0;



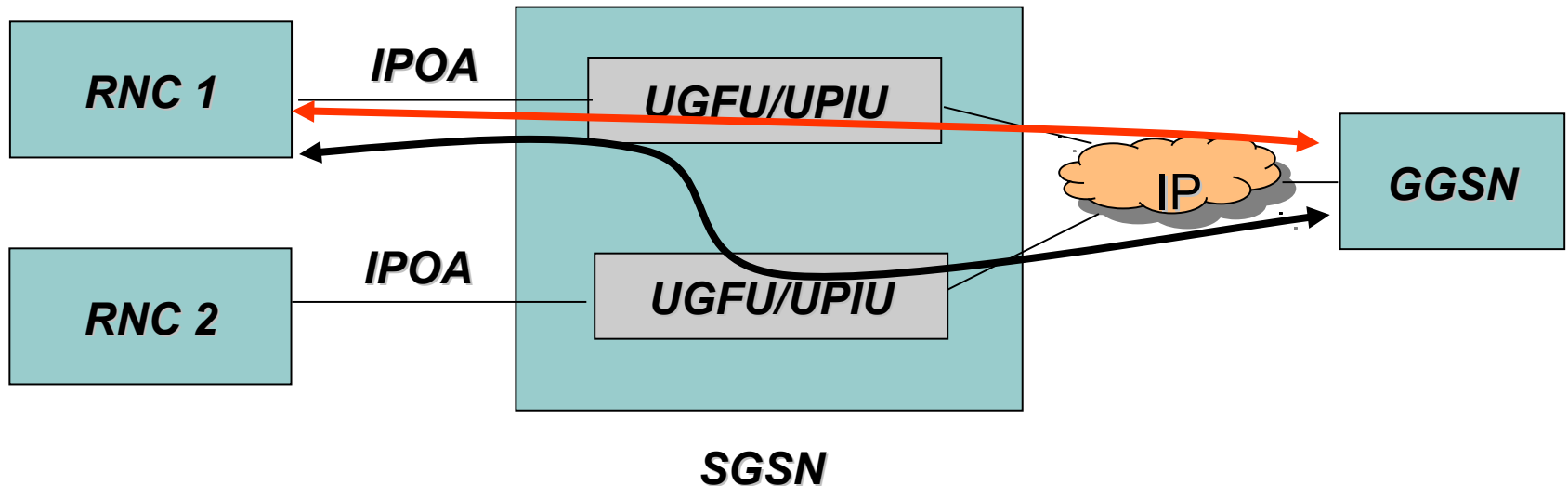
Step 20: Configure IP Route

- ADD IPRT
 - ADD IPRT: **IP="100.1.1.1", MSK="255.255.255.0", GATE="10.110.0.2", PRE=60;**



Step 21: Bind the RNC with the UGFU

- ADD RNCUGFULNK:
 - ADD RNCUGFULNK: SRN=3, SN=12, RNCX=1;



Iu over ATM Interface Status Check

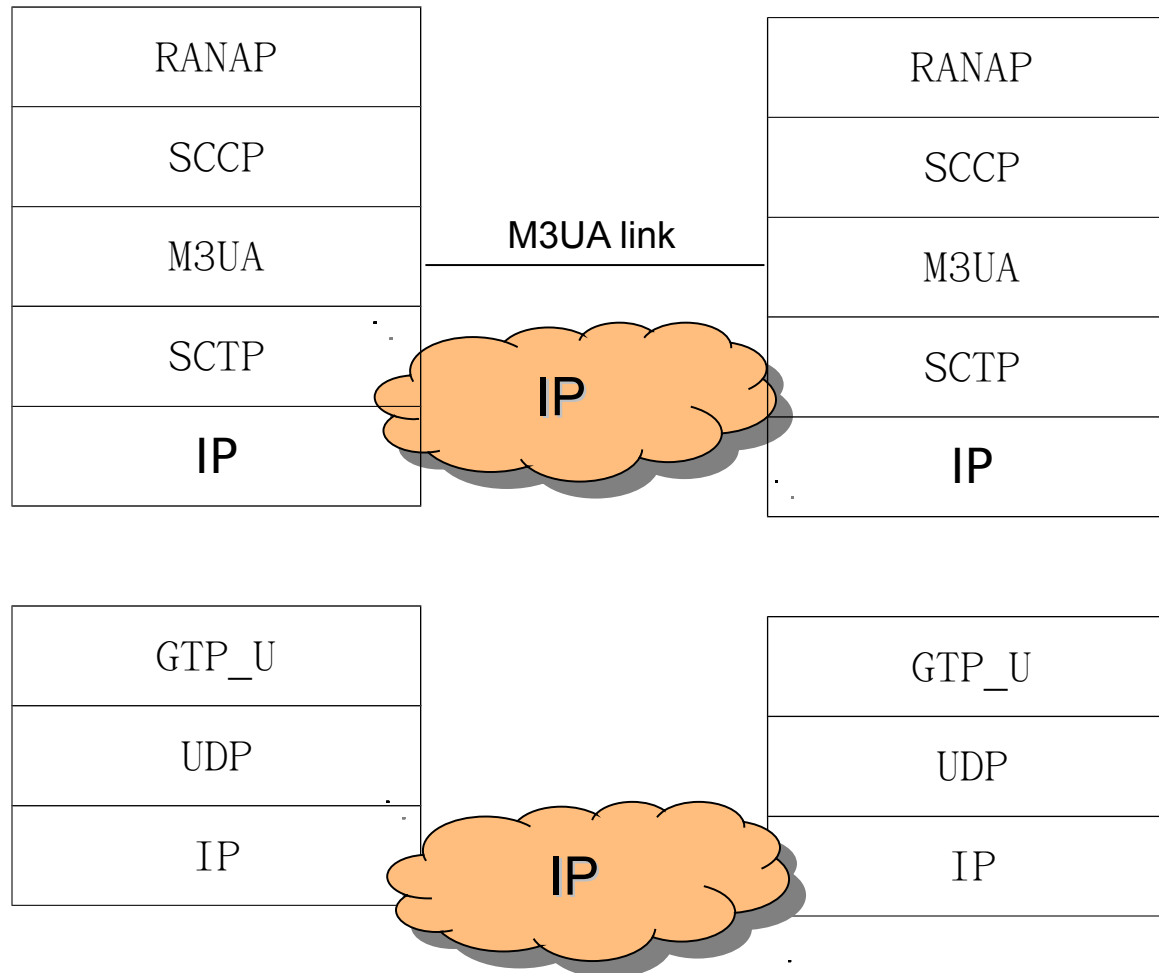
- Step 1: Checking the Status of the ATM Port
 - DSP UPIU_PORT_STAT
- Step 2: check the control plane of Iu interface
 - DSP MTP3BDPC: DPX=0;
 - DSP MTP3BRT: RTX=0;
 - DSP MTP3BLNK: SRT=ALL;
 - DSP SCCPDPC: DPX=1;
 - DSP SCCPSSN: SSNX=2, NI=NATB, DPC="401", SSN=RANAP;
- Step 3: check the user plane of Iu interface
 - TST GTPURNCGSN: SRN=3, SN=12, ITP=IPV4, PIP4="100.1.1.1";



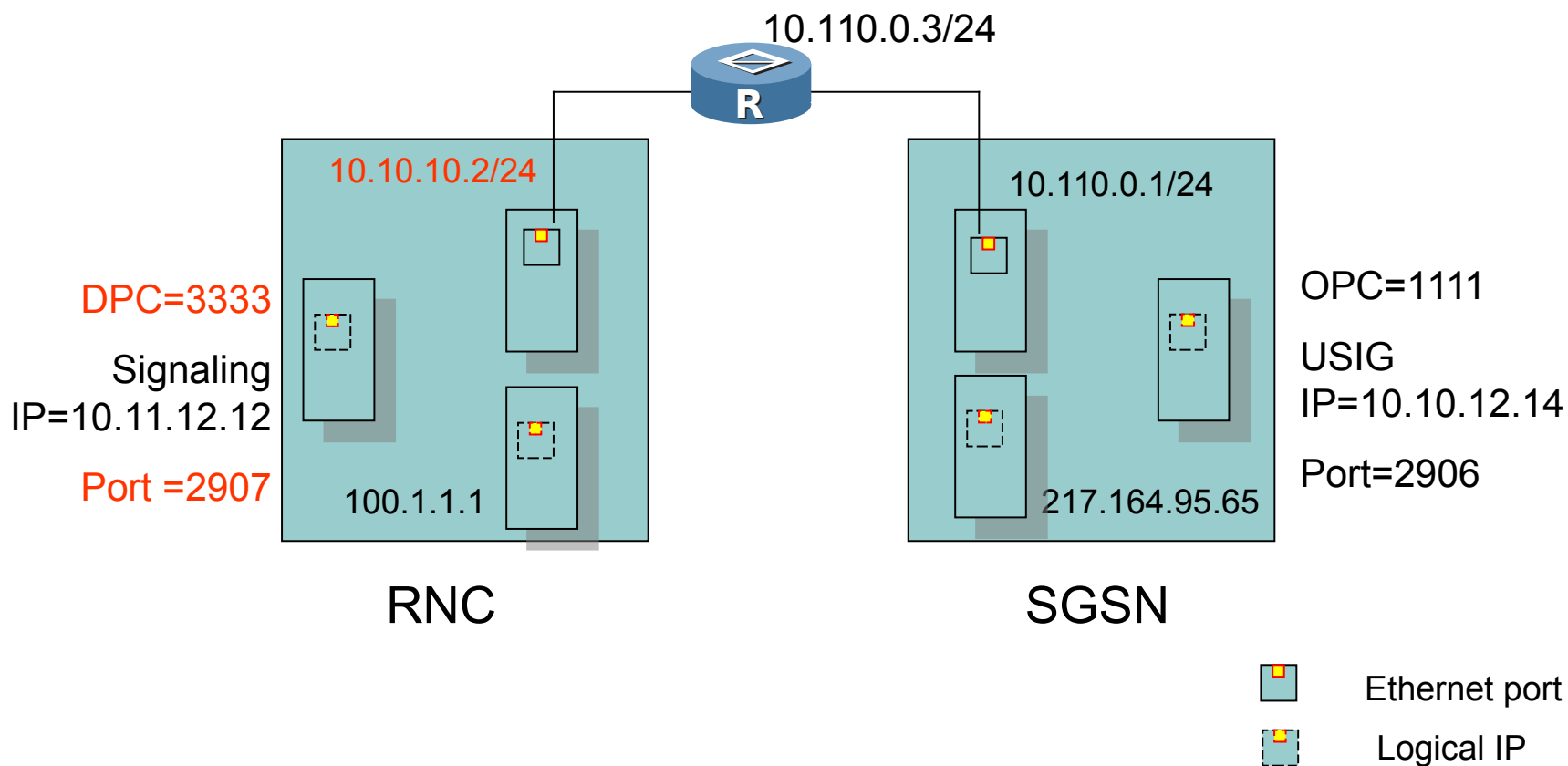
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3. **Iu Over IP**

Iu over IP



Networking



Configuration Steps

Step	Action	Command
Configure the hardware		
1	Configure UICP/USIG/UGFU/UPIU board, and UPIU port and IP	ADD BRD ADD BINDUGFU SET UPIU_PORT ADD IFIP
Configure the M3UA		
2 (optional)	Add the IP address of the USIG.	ADD BRDIP
3	Add the M3UA local entity	ADD M3LE
4	Add the M3UA destination entity.	ADD M3DE
5	Add the M3UA signaling link sets.	ADD M3LKS
6	Add the M3UA signaling routes.	ADD M3RT
7	Add the M3UA signaling links.	ADD M3LNK
8	Add the IP route to the destination entity.	ADD IPRT

Configuration Steps

Step	Action	Command
Configure the SCCP		
9	Add the SCCP OPC.	ADD SCCPOPC
10	Add the SCCP DPC.	ADD SCCPDPC
11	Add the SCCP subsystems.	ADD SCCPSSN
Configure the RNC		
12	Add the RNC.	ADD RNC
13	Add the 3G paging tables.	ADD 3GPAGING
Configure the user plane		
14 (optional)	Configure the UPIU port of user plane	SET UPIU_PORT ADD IFIP
15	Add route	ADD IPRT

Step 1: Configure the Hardware

- ADD BRD
 - Add UICP/USIG/UGFU/UPIU boards. The IP address of USIG can be used in Gr and Lu interface control plane.
- ADD BINDUGFU
 - Set the binding relationship of USIG and UGFU.
- SET UPIU_PORT
 - Set the work mode of UPIU port.
- ADD IFIP
 - Configure the UPIU port IP address.
 - Lu interface control plane and user plane can share the same UPIU port, or use different port separately.

Step 2: Configure the IP Address of lu

- ADD BRDIP
 - ADD BRDIP: SRN=0, SN=14, IPT=IPV4,
IPV4="10.10.12.14";

Step 3/4: Configure the M3LE/M3DE

- ADD M3LE
 - ADD M3LE: LEX=0, **NI=NATB**, **OPC="1111"**,
LET=IPSP;

- ADD M3DE
 - ADD M3DE: DEX=0, LEX=0, **DPC="3333"**,
SLSSM=B0000, **DET=IPSP**, **ADJF=TRUE**,
PVER=RFC3332, DEN="rnc";

Step 5/6 : Configure the Link Set and Route

- ADD M3LKS
 - ADD M3LKS: LSX=0, ADX=0, **SLSM=B0000**,
WM=IPSP, LSN="LINKSET1";

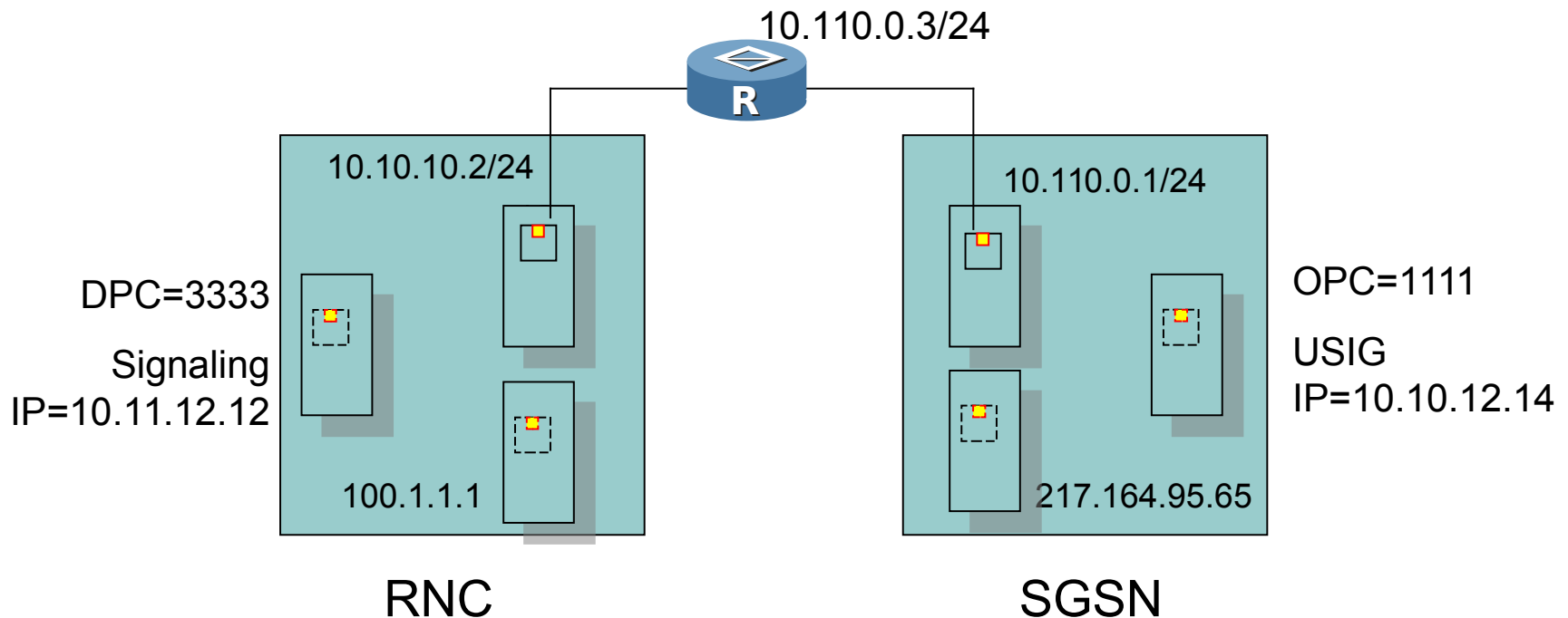
- ADD M3RT
 - ADD M3RT: RTX=0, DEX=0, LSX=0, PRI=0, RTN="TO rnc";

Step 7: Configure M3UA Link

- ADD M3LNK
 - ADD M3LNK: **SRN=0, SN=14**, LNK=0, IPT=IPv4,
LOCIPV41="10.10.12.14", **LOCPORT=2906**,
PEERIPV41="10.11.12.12", **PEERPORT=2907**,
CS=C, LSX=0, LKN="link1";
 - **SRN=0, SN=14** is the location of USIG

Step 8: Configure the IP Route of Control Plane

- ADD IPRT
 - ADD IPRT: **IP="10.11.12.12",**
MSK="255.255.255.0", GATE="10.110.0.3";



Step 9/10: Configure SCCP OPC/DPC

- ADD SCCPOPC
 - ADD SCCPOPC: OPX=1, **NI=NATB**, **OPC="1111"**,
SPN=IUONLY;

- ADD SCCPDPC
 - ADD SCCPDPC: DPX=1, OPX=1, **DPC="3333"**,
LDP=nouse, DPN="RNC";

Step 11: Configure SCCP SSN

- Add sub-system for RNC
 - ADD SCCPSSN: SSNX=1, **SSN=SCMG**, NI=NATB, **DPC="3333"**, **OPC="1111"**, SSNNAME="scmg";
 - ADD SCCPSSN: SSNX=2, **SSN=RANAP**, NI=NATB, **DPC="3333"**, **OPC="1111"**, SSNNAME="RANAP";
- Add sub-system for SGSN
 - ADD SCCPSSN: SSNX=3, **SSN=SCMG**, NI=NATB, **DPC="1111"**, **OPC="1111"**, SSNNAME="scmg";
 - ADD SCCPSSN: SSNX=4, **SSN=RANAP**, NI=NATB, **DPC="1111"**, **OPC="1111"**, SSNNAME="SGSN";

Step 12: Configure RNC Information

- ADD RNC
 - ADD RNC: RNCX=1, **RNCMCC="460"**,
RNCMNC="07", **RNCID=1234**, **NI=NATB**,
SPC="3333";

Step 13: Configure 3G Paging Table

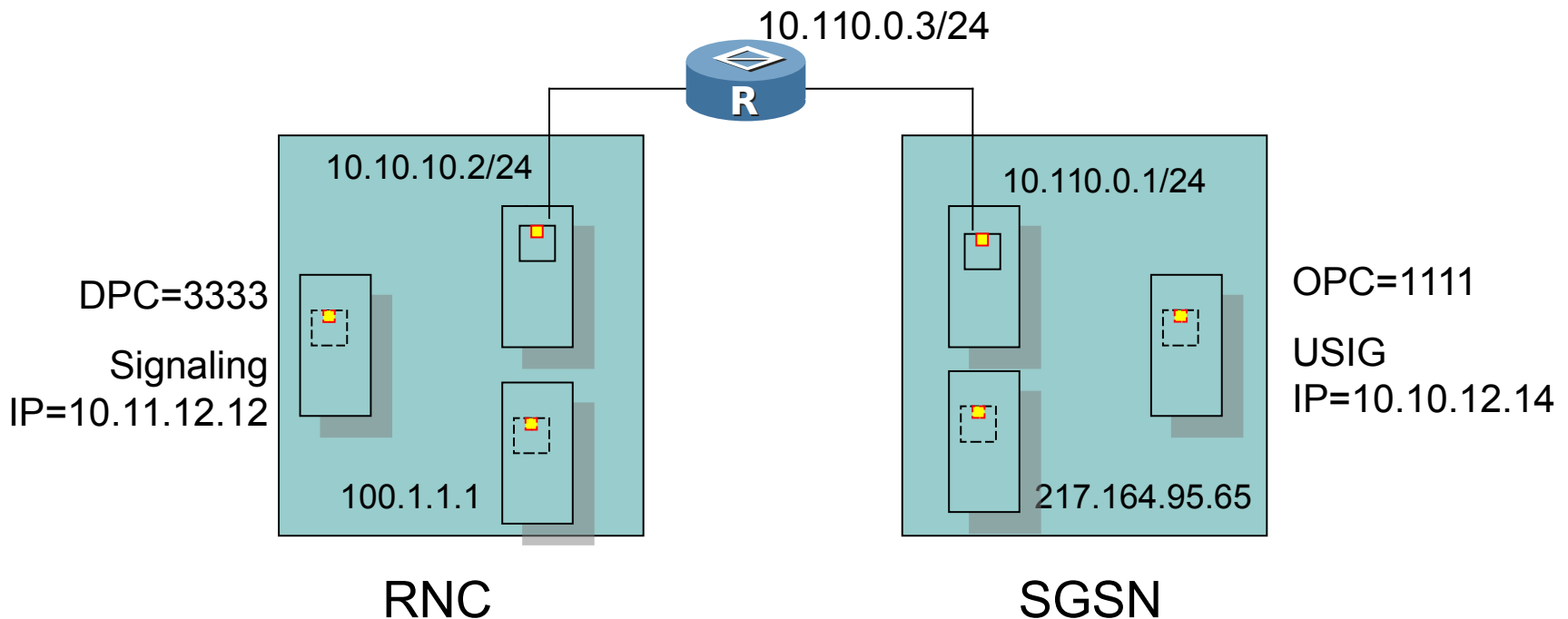
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 - ADD 3GPAGING: **LAI="460071234", RAC="01", RNCINDEX=1;**
- During the paging procedure, the SGSN paging the UE in the scope of RAI. So the SGSN will use this 3G paging information to find the corresponding RNC, and forward the paging message to the RNC.

Step 14: Configure the UPIU Port of User Plane

- If the user plane and control plane of lu interface use different UPIU port, we need to configure the user plane UPIU port.
 - SET UPIU_PORT
 - ADD IFIP
- In our case, we don't need to configure the user plane UPIU port.

Step 15: Configure the Route of User Plane

- ADD IPRT
 - ADD IPRT: **IP="100.1.1.1", MSK="255.255.255.0", GATE="10.110.0.3";**



Iu over IP Interface Status Checking

- Checking the Status of the Ethernet Port
 - DSP UPIU_PORT_STAT
(This command is both used for Control plane and user plane)

- Checking the Status of the Route
 - PING IP
(This command is both used for Control plane and user plane)

Iu over IP Interface Status Checking

- check the control plane of Iu interface
 - DSP M3DE: DEX=1 ;
 - DSP M3RT: RTX=1;
 - DSP M3LNK: SRT=LINK, SRN=0, SN=13, LNK=0;
 - DSP SCCPDPC: DPX=1;
 - DSP SCCPSSN: SSNX=2, NI=NATB, DPC="3333", SSN=RANAP;
- check the user plane of Iu interface
 - TST GTPURNCGSN: SRN=3, SN=12, ITP=IPV4, PIP4="100.1.1.1";

Thank you

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