

G.P.R.S.

G.P.R.S.

1. INTRODUCTION
2. ARCHITECTURE
3. FUNCTION OF DIFFERENT GPRS ELEMENTS
4. MOBILITY MANAGEMENT
5. SECURITY
6. SESSION MANAGEMENT
7. RADIO INTERFACE

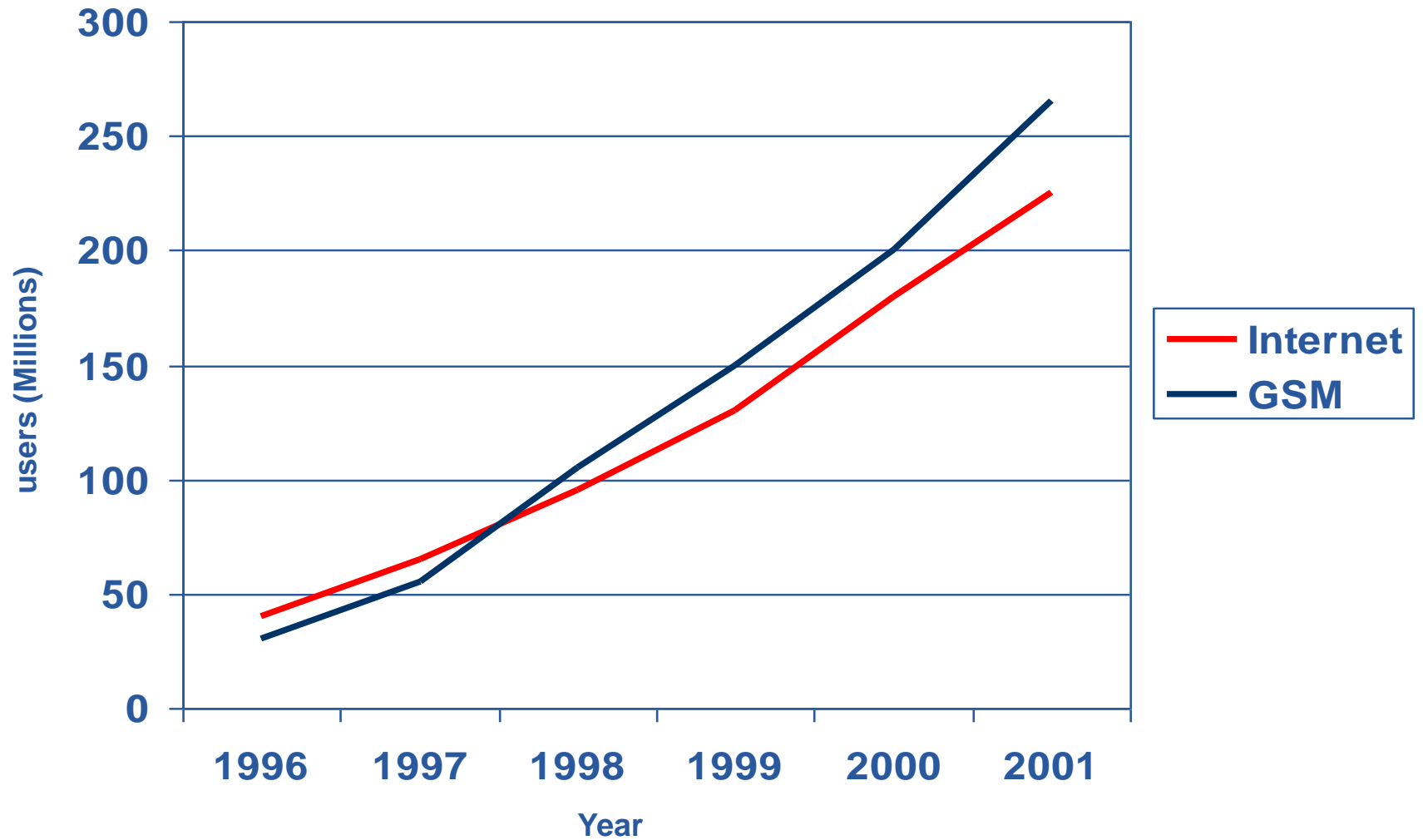
G.P.R.S.

- 8. MS-SGSN INTERFACE
- 9. BSS-SGSN (Gb) INTERFACE
- 10. SGSN-GGSN (Gn) INTERFACE
- 11. GGSN-PDN (Gi) INTERFACE

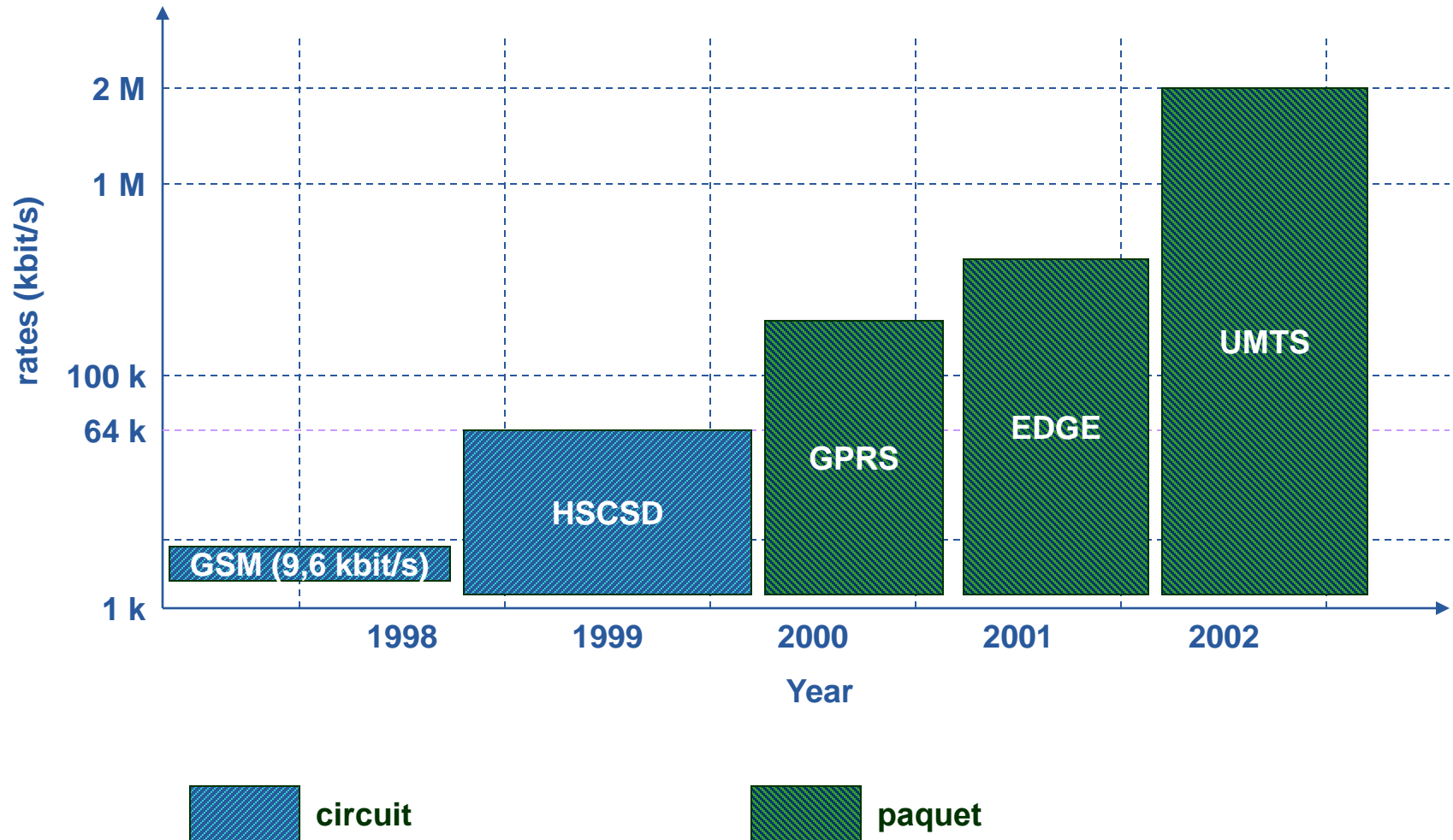
1. INTRODUCTION

- **PLMN and INTERNET**
- **The other networks**
- **Data services with circuit switch**
- **GPRS**
- **Services and GPRS applications**
- **QoS**
- **GPRS Handsets**

Internet and PLMN

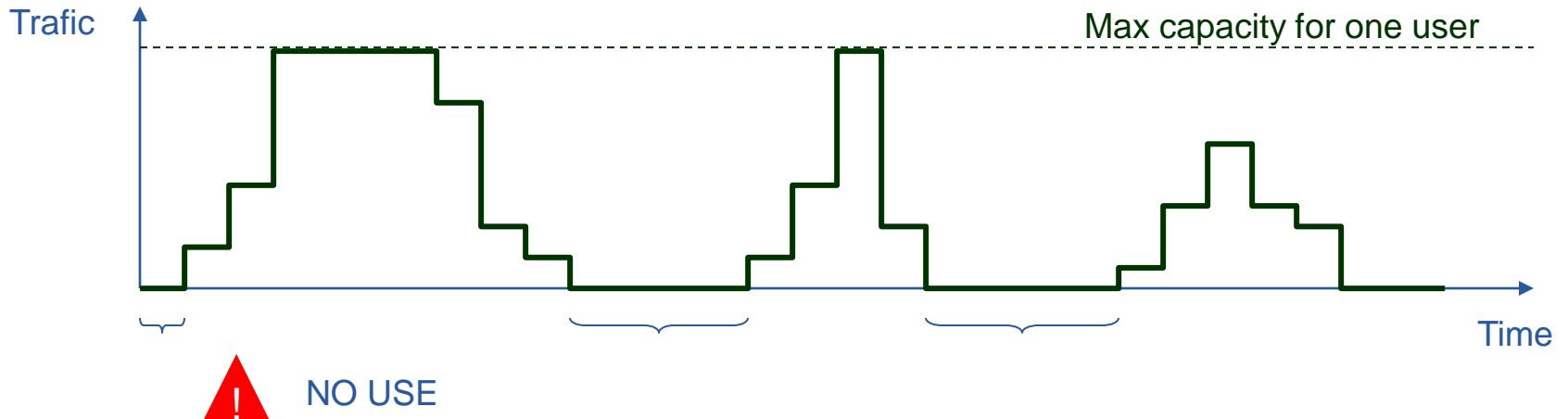


Network solutions

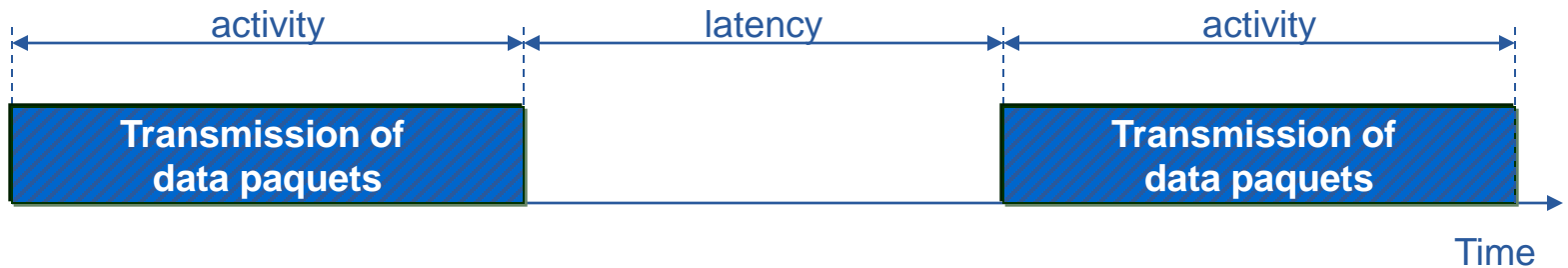


Circuit switch and data transfert

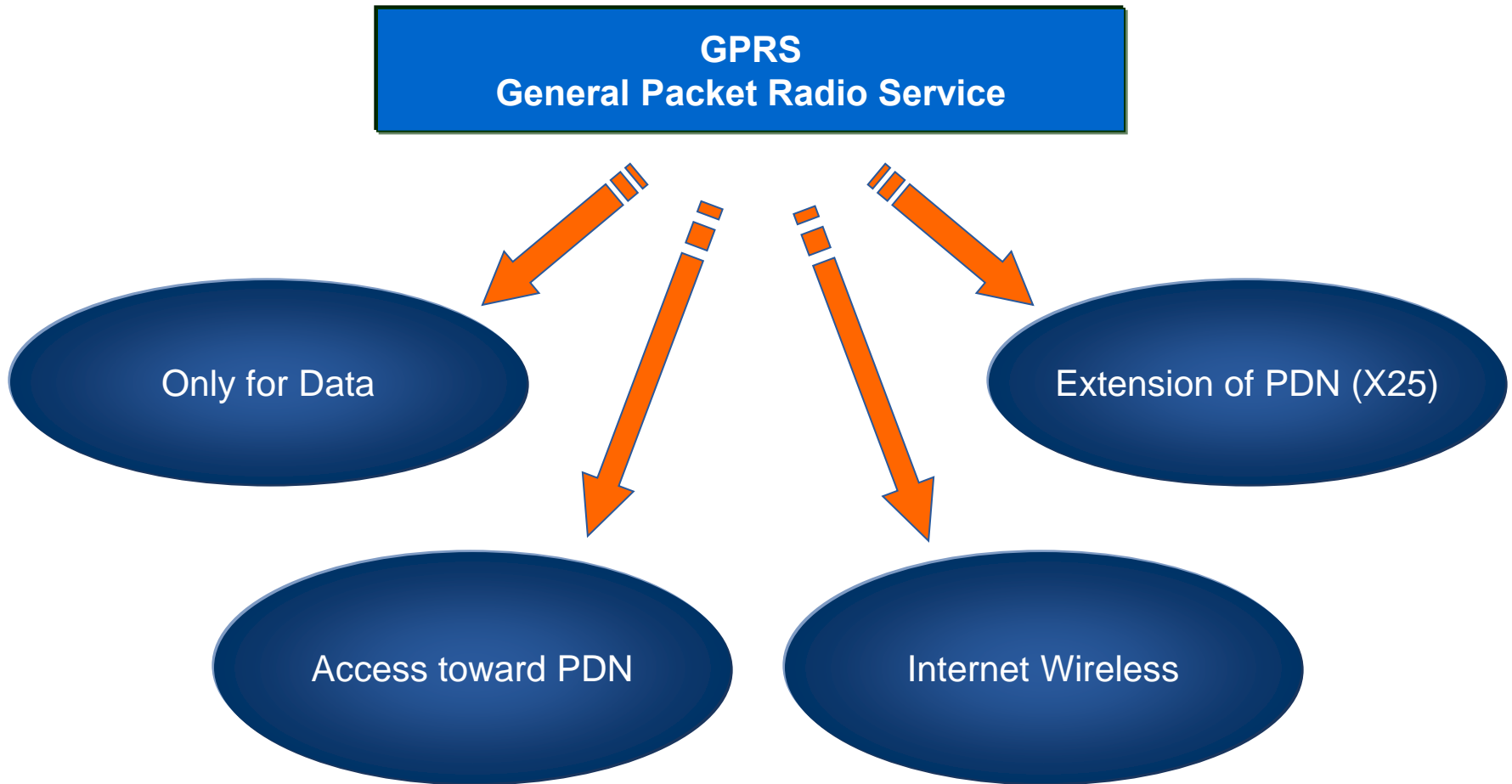
Use of ressource in circuit mode



The Internet traffic



What is GPRS ?



Operators wanted

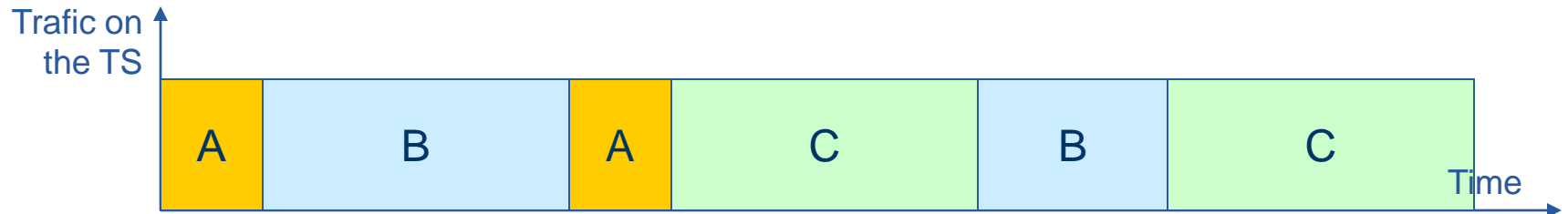
- Maximale use of radio ressources
- Simple access to PDN
- New subscribers

Subscribers wanted

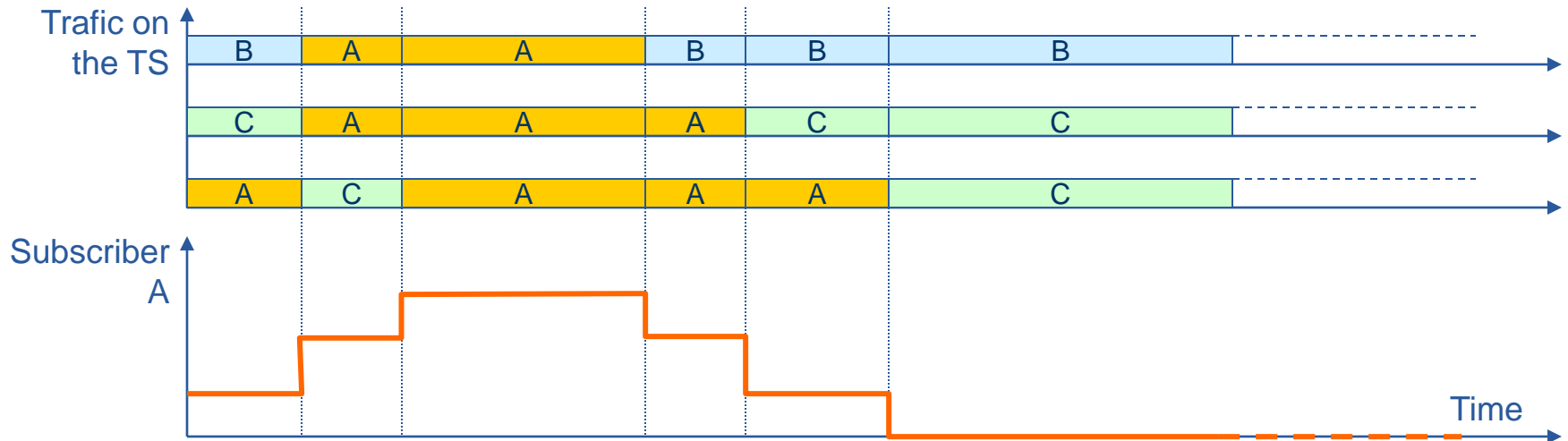
- Best Prices
- More Rates
- easy to use

GPRS: How it works ?

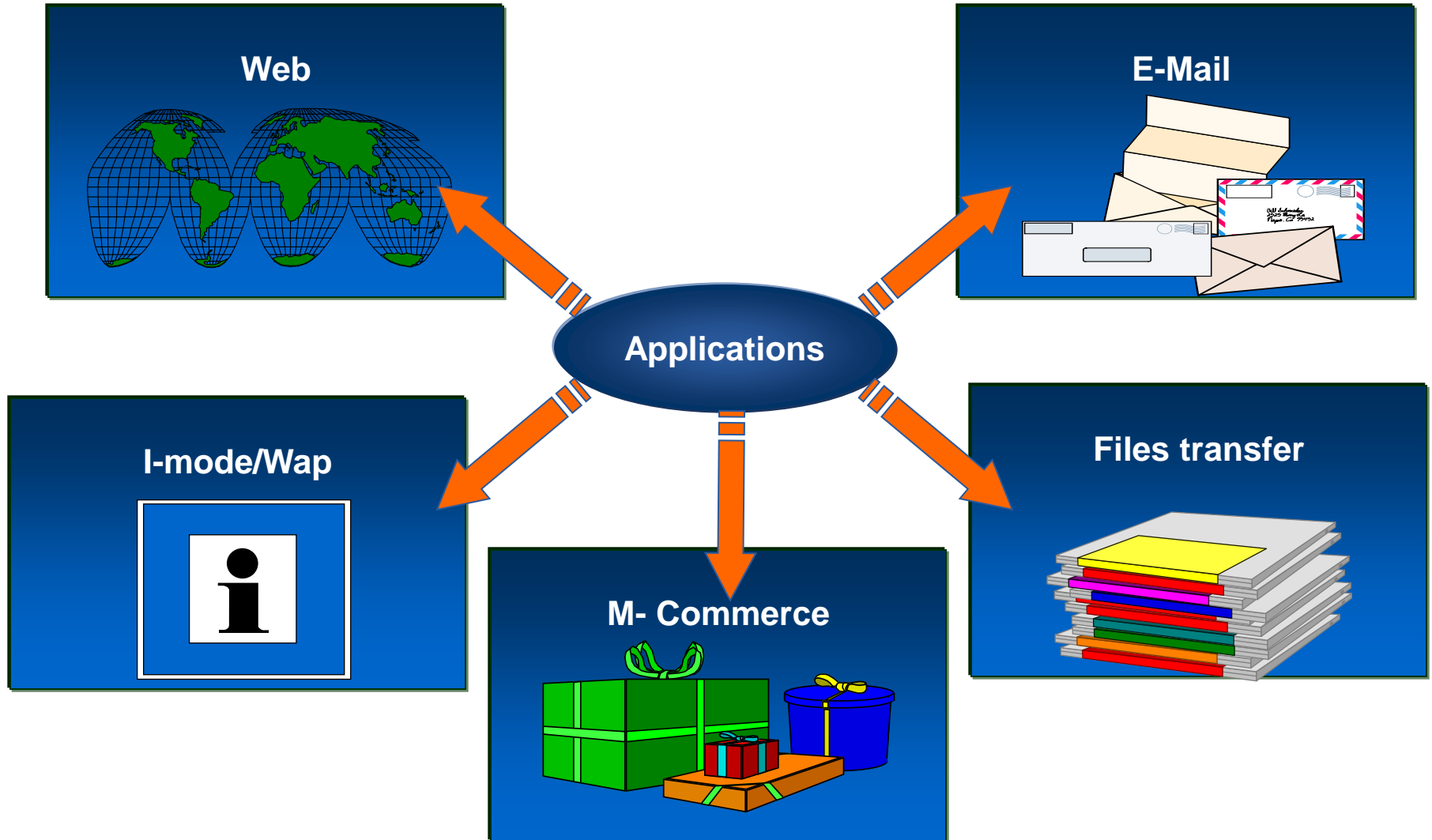
Ressource sharing



High Rates



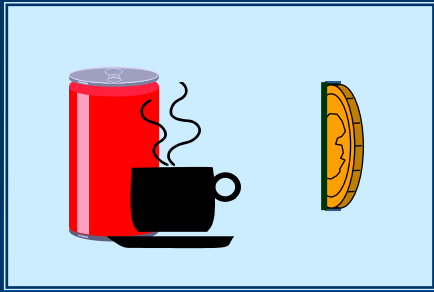
GPRS Applications (1/2)



GPRS Applications (2/2)

Applications

Telemetry



Machines



Taxis

Firms



MMS



Hello!!
How do you do?
I'am going to cinema
tomorrow. Will you
come?



QoS

QoS

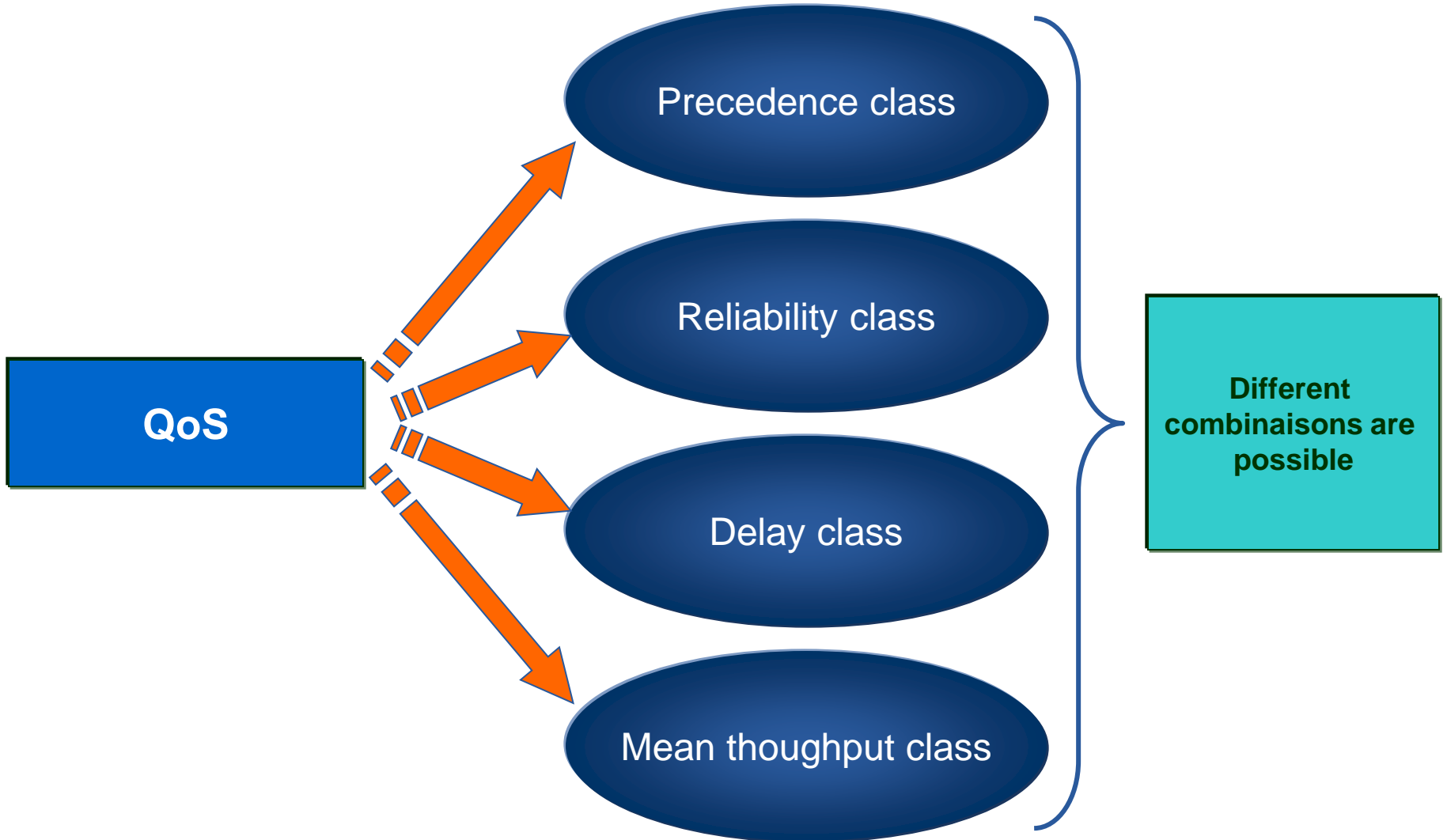
Precedence class

Reliability class

Delay class

Mean throughput class

**Different
combinations are
possible**



Types of mobile station

- **Type A** - Mobile station attached to the GSM and GPRS
 - Data and voice simultaneous
 - 2 radio channels are necessary.
- **Type B** - Mobile station attached to the GSM and GPRS
 - complex
 - If there is a call, the GPRS connexion is on "Busy or held".
 - Voice and paquet not at the same time.
- **Type C** - Mobile station attached to the GSM or GPRS
 - Manual switch.
 - Easy implementation.



Example: 3+1

Multislot Class = Down-link Time Slot
+
Up-link Time Slot

DL
BTS



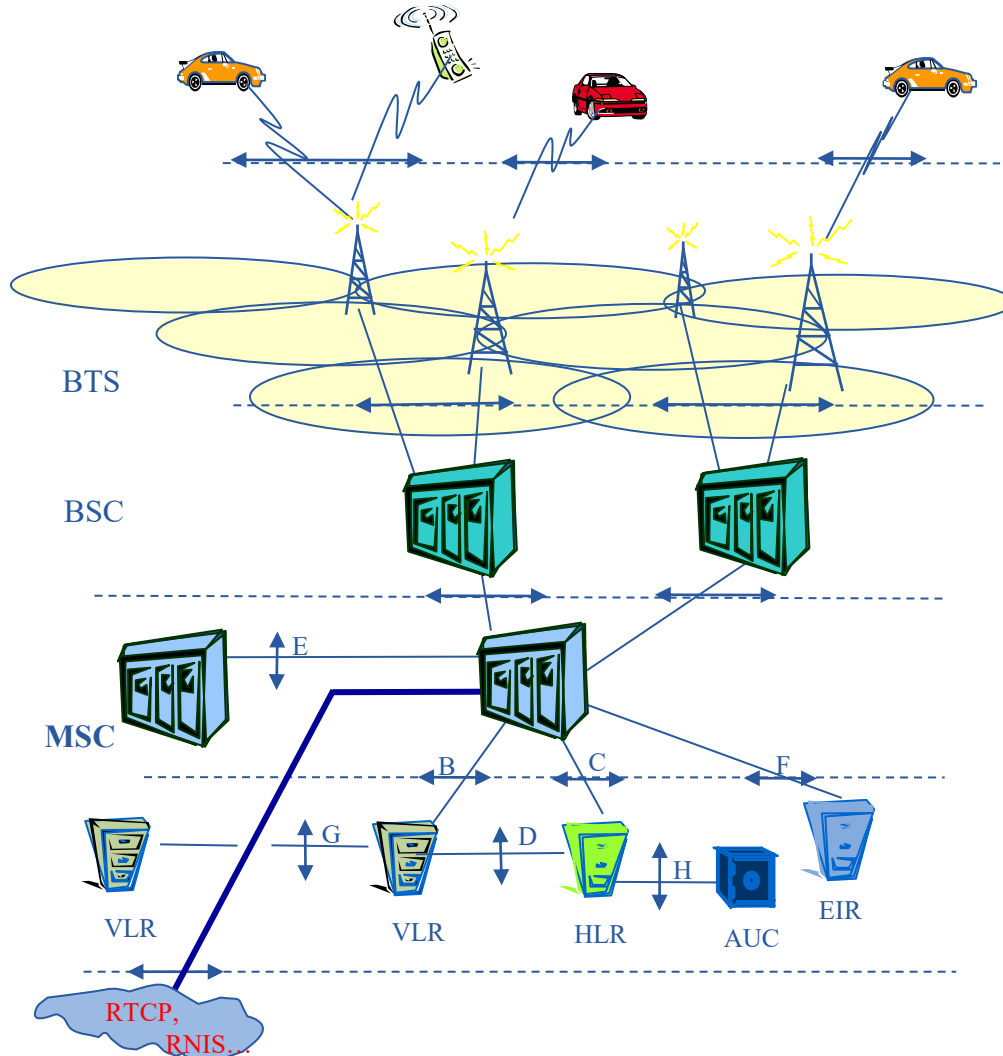
UL
BTS



2. GPRS ARCHITECTURE

- **GSM architecture**
- **Access interfaces to GPRS network**
- **Logical architecture**
- **Transport and signaling plane**

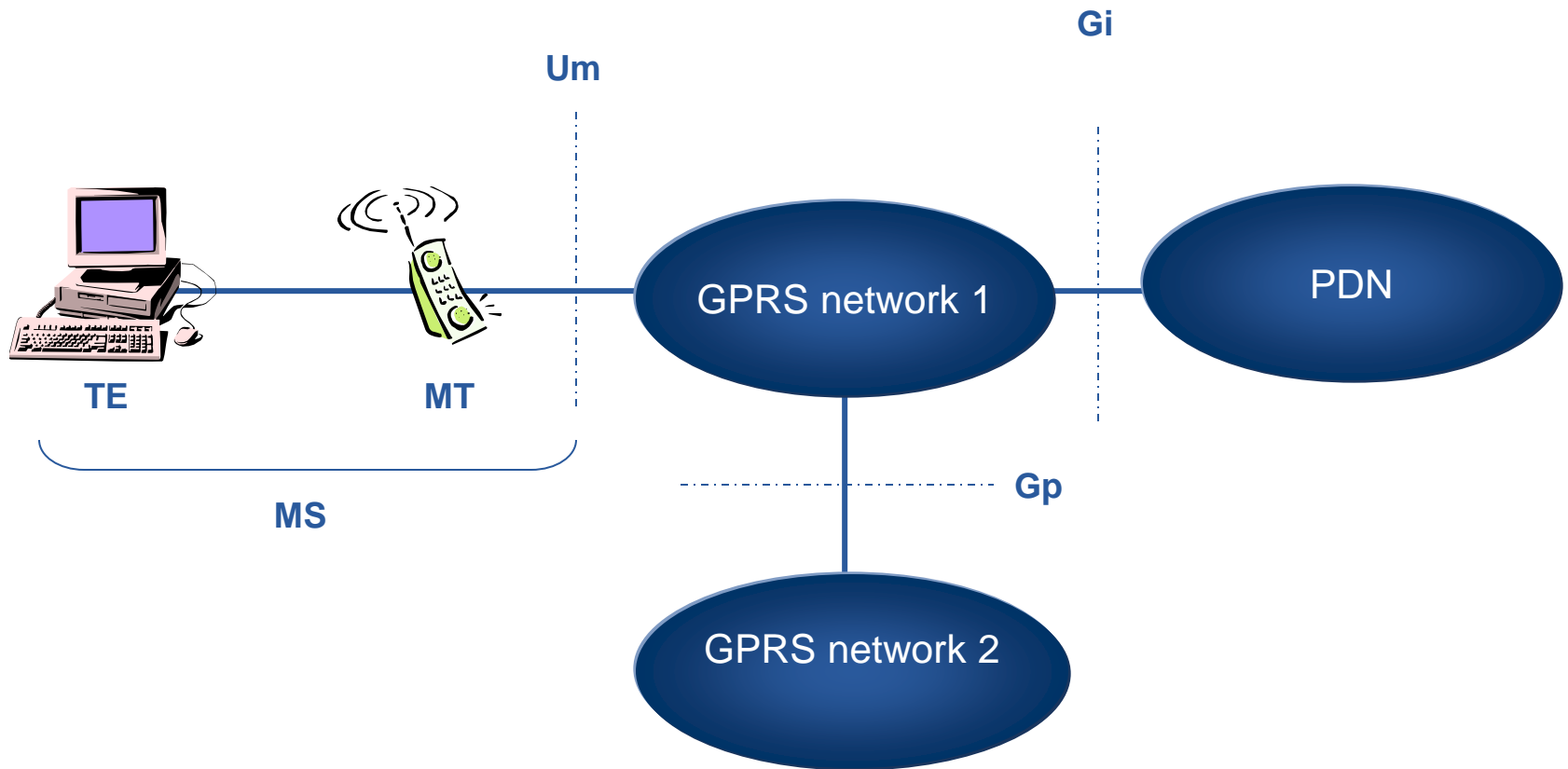
Remember GSM architecture !!!



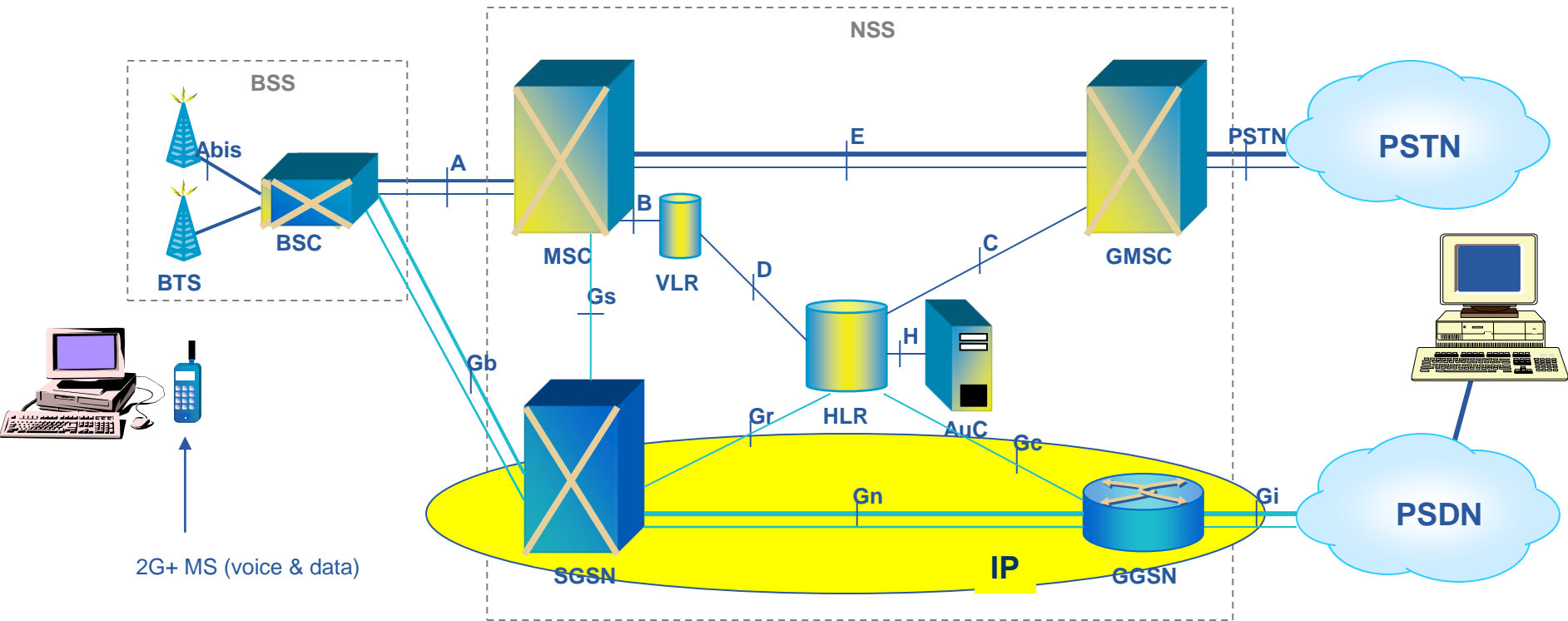
INTERFACES ET PROTOCOLES GSM

		<u>Interfaces</u>	<u>Protocoles</u>
Um	Radio	Spécifique GSM	LAPDm
Abis	BTS-BSC	(type RNIS)	LAPD
A	BSC-MSC	(base SS7)	SS7 + BSSAP
{ B C D E F G H }	MSC-VLR MSC-HLR HLR-VLR MSC-MSC MSC-EIR VLR-VLR HLR-AuC	(base SS7)	SS7 + MAP
{ RTCP RNIS }	MSC-RTCP MSC-RNIS	(base SS7)	SS7 + TUP (SSUT) Ou ISUP (SSUR)

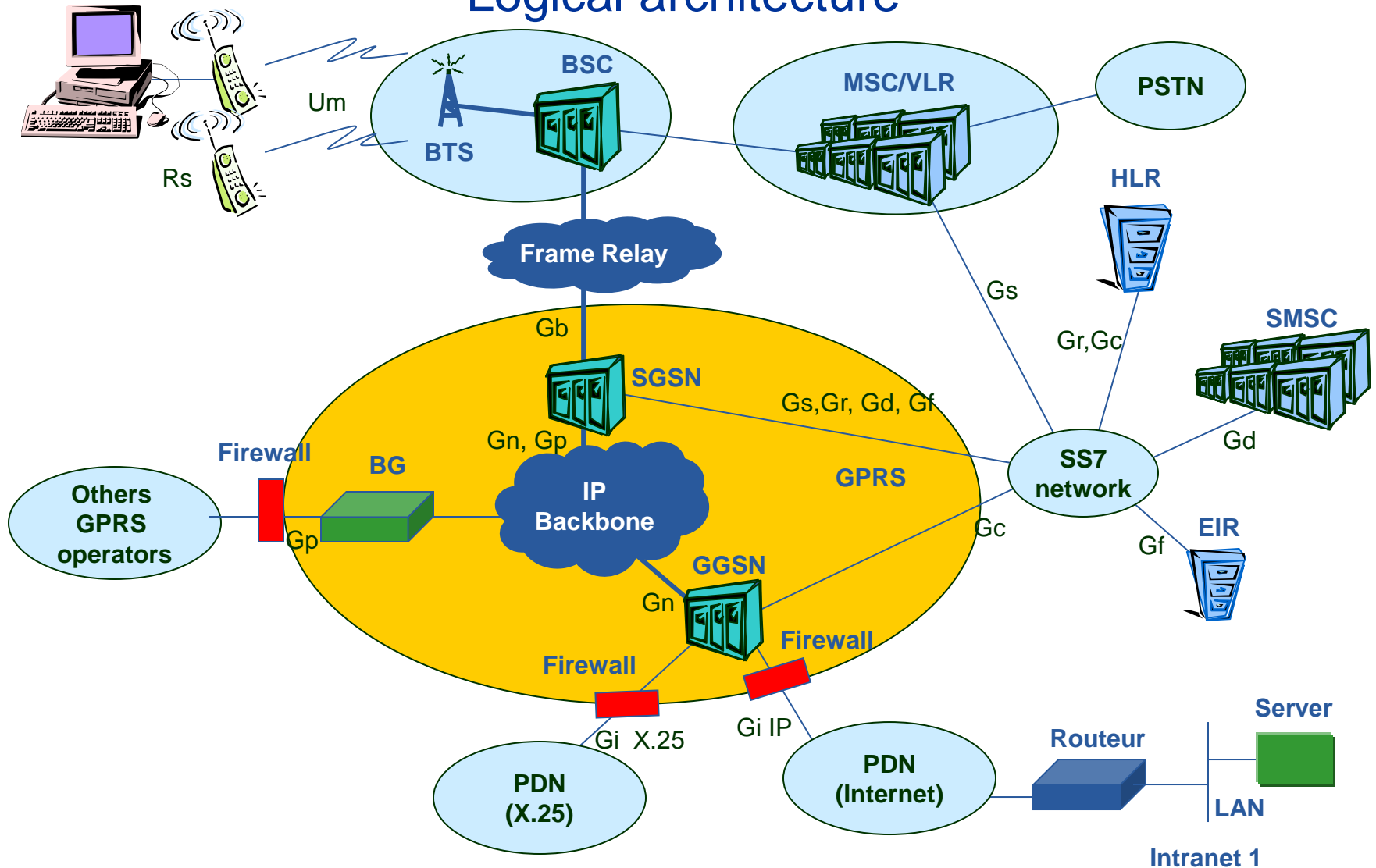
Interfaces to the GPRS network



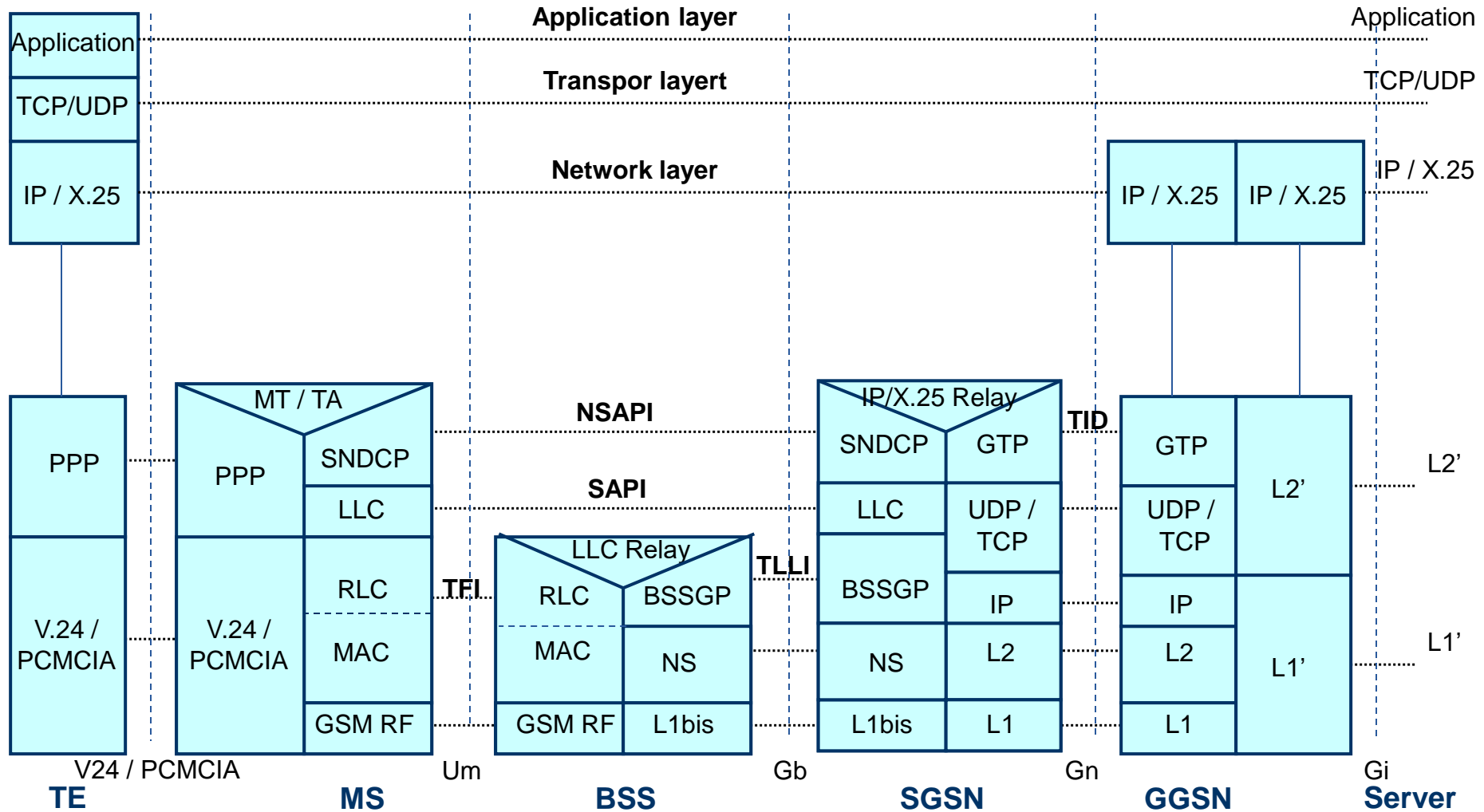
New nodes



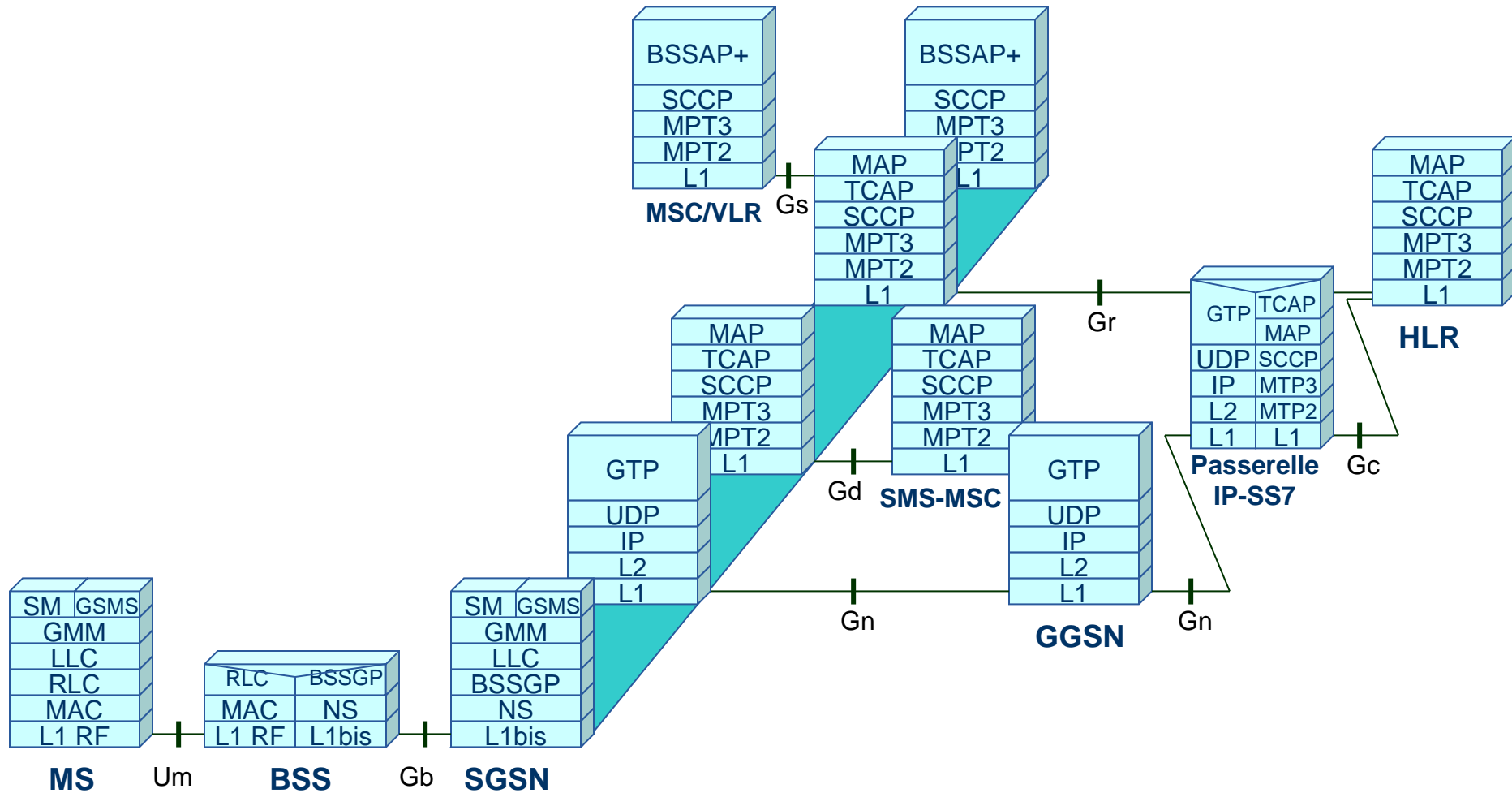
Logical architecture



Transport Plane



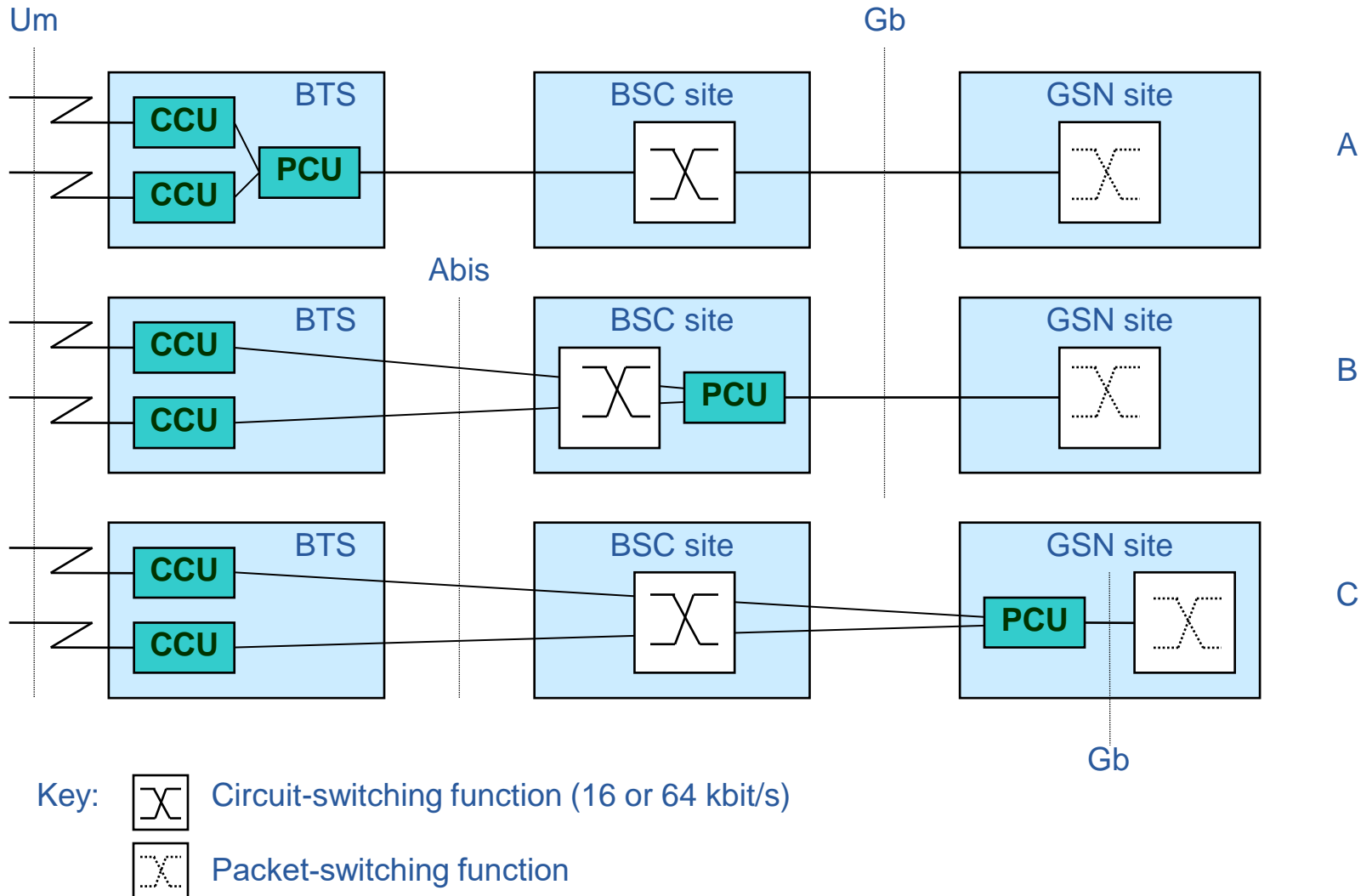
Signaling Plane (SS7)



3. FUNCTIONS OF THE NEW NODES AND EVOLUTION OF THE CURRENT ELEMENTS

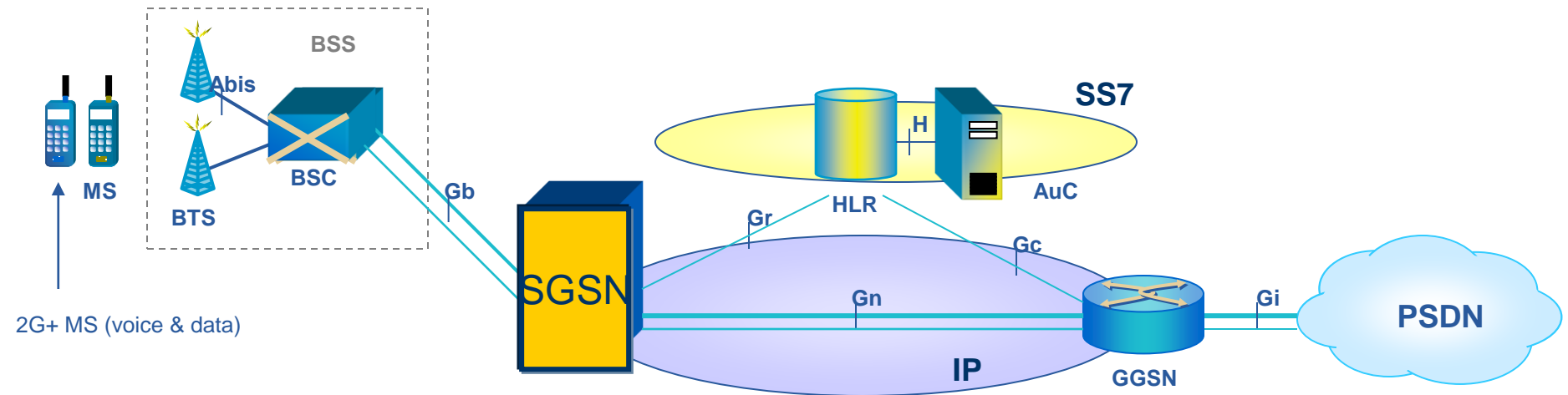
- **Impact on BSS**
- **Functions of SGSN**
- **Impact on HLR**
- **Impact on MSC/VLR**
- **Functions of GGSN**

Impact on BSS



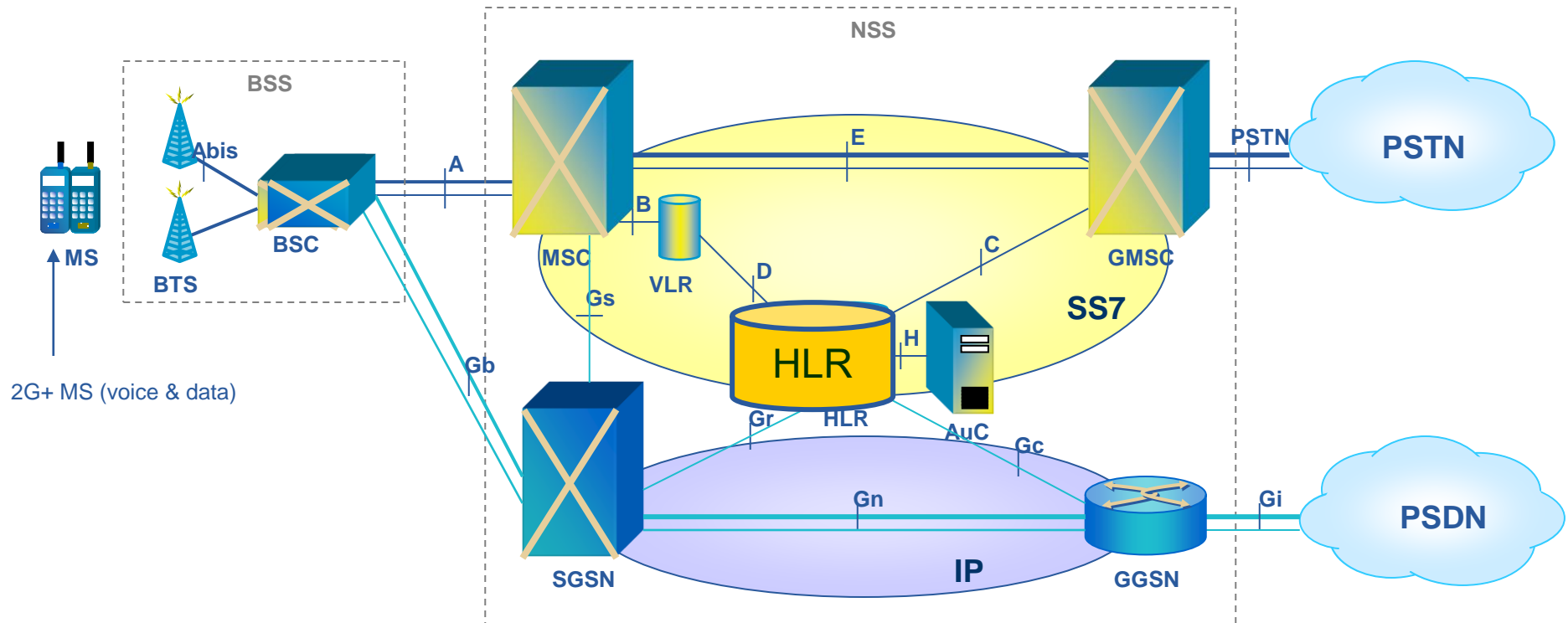
Function of Serving GPRS Support Node (SGSN)

- Control many BSS
- Control handsets mobility
- Data routing
- Security functions and access control with HLR



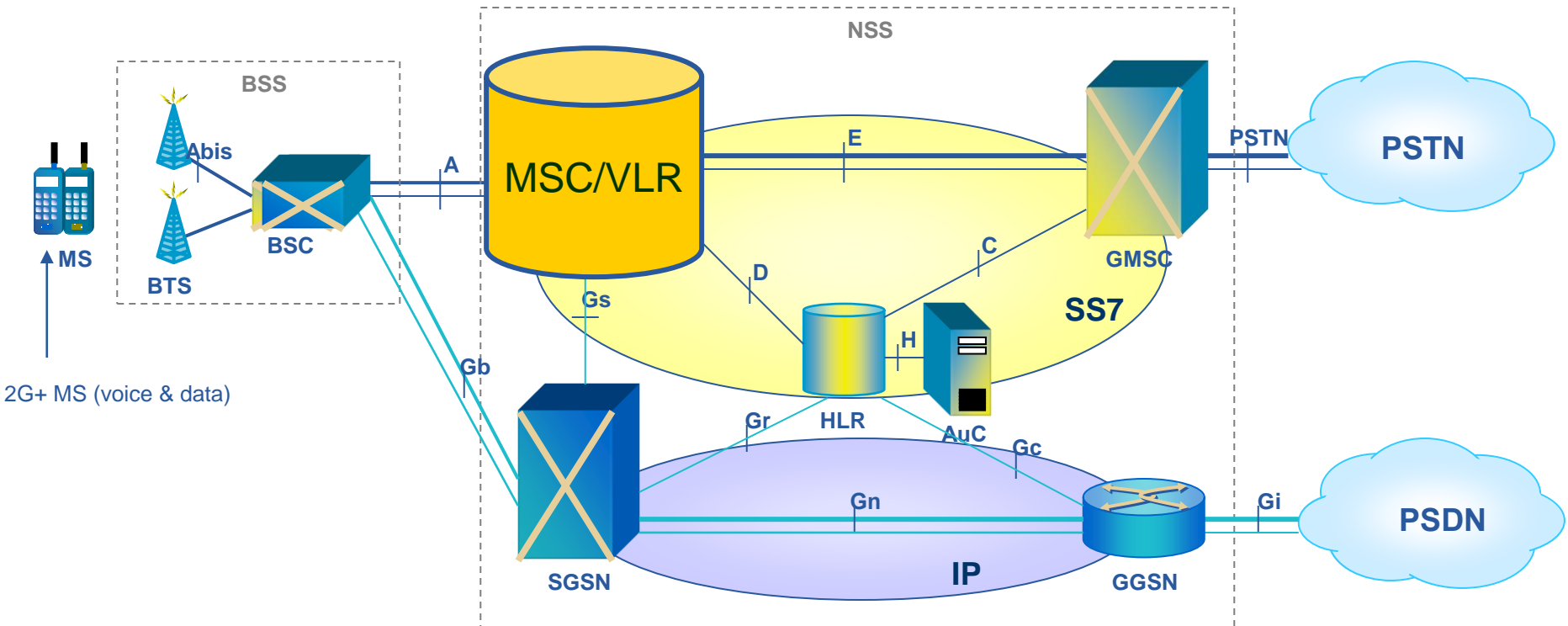
Impact on HLR

- Memorize data about subscribers
- The last SGSN stored
- Send to the SGSN the subscriber data



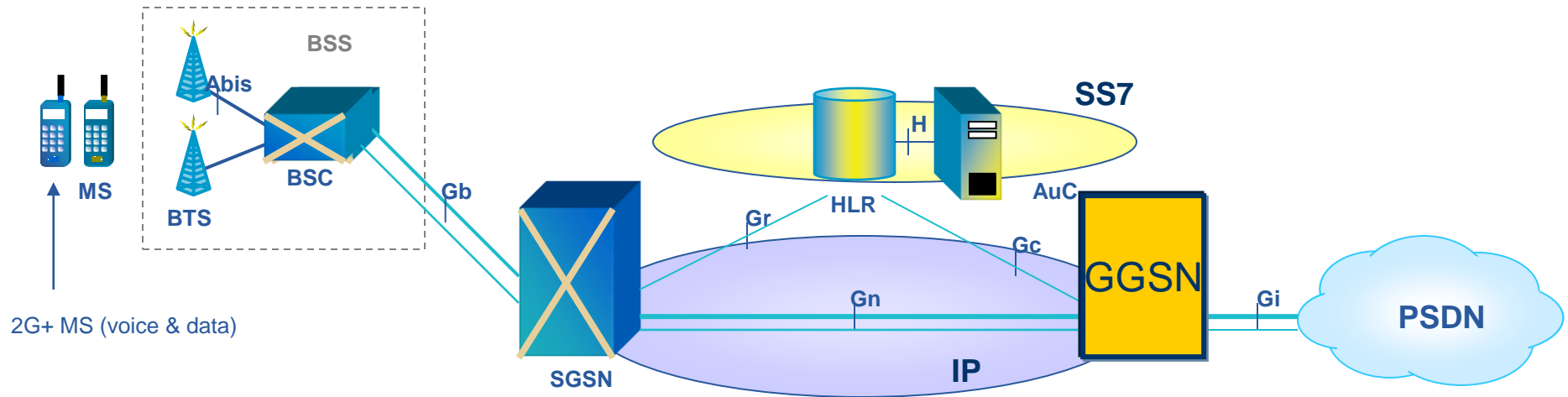
Impact on MSC/VLR

- GPRS and IMSI attach
- CS paging with GPRS network



Function of Gateway GPRS Support Node (GGSN)

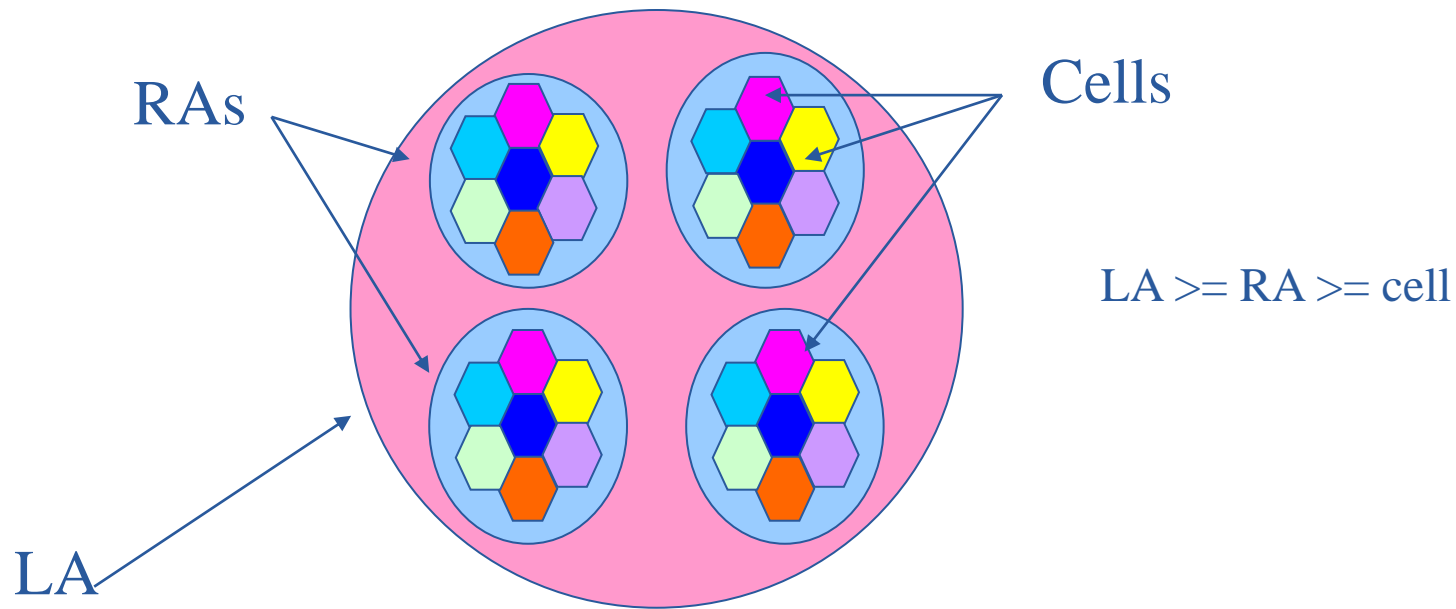
- Gateway to the PDN
- Store routing information for each subscriber
- Store informations on IP/X25 adress



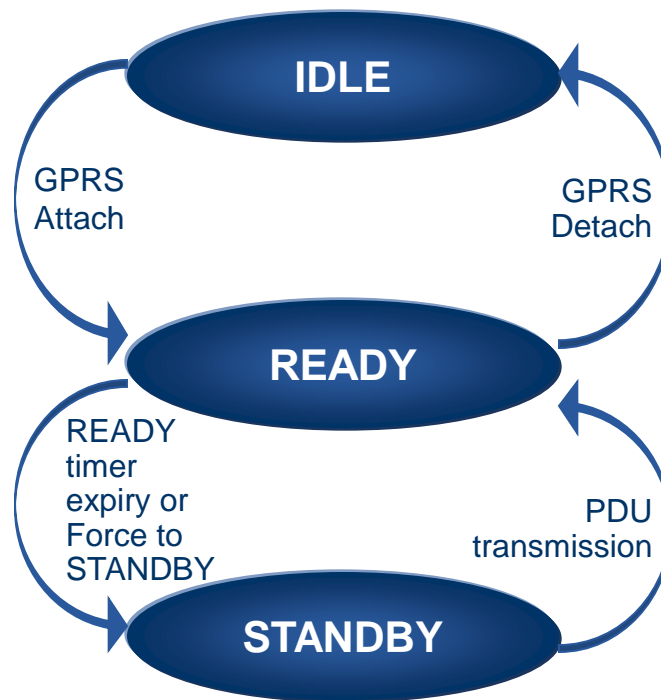
4. MOBILITY MANAGEMENT

- **Cells, Routing Area and Location Area**
- **Handsets states**
- **GPRS attach**
- **GPRS detach**
- **Localisation management**

Cells, Location Areas and Routing Areas

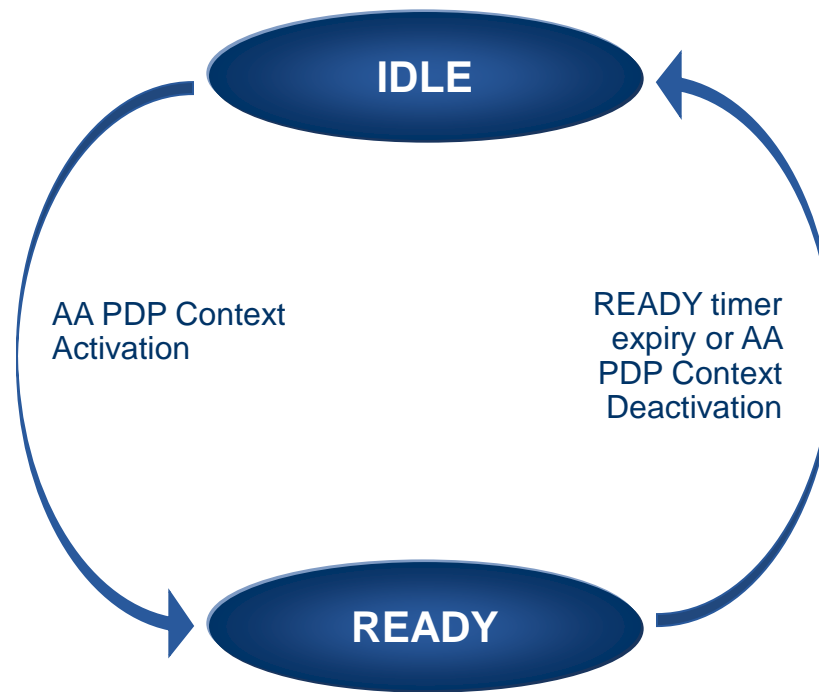


Etats GPRS MM



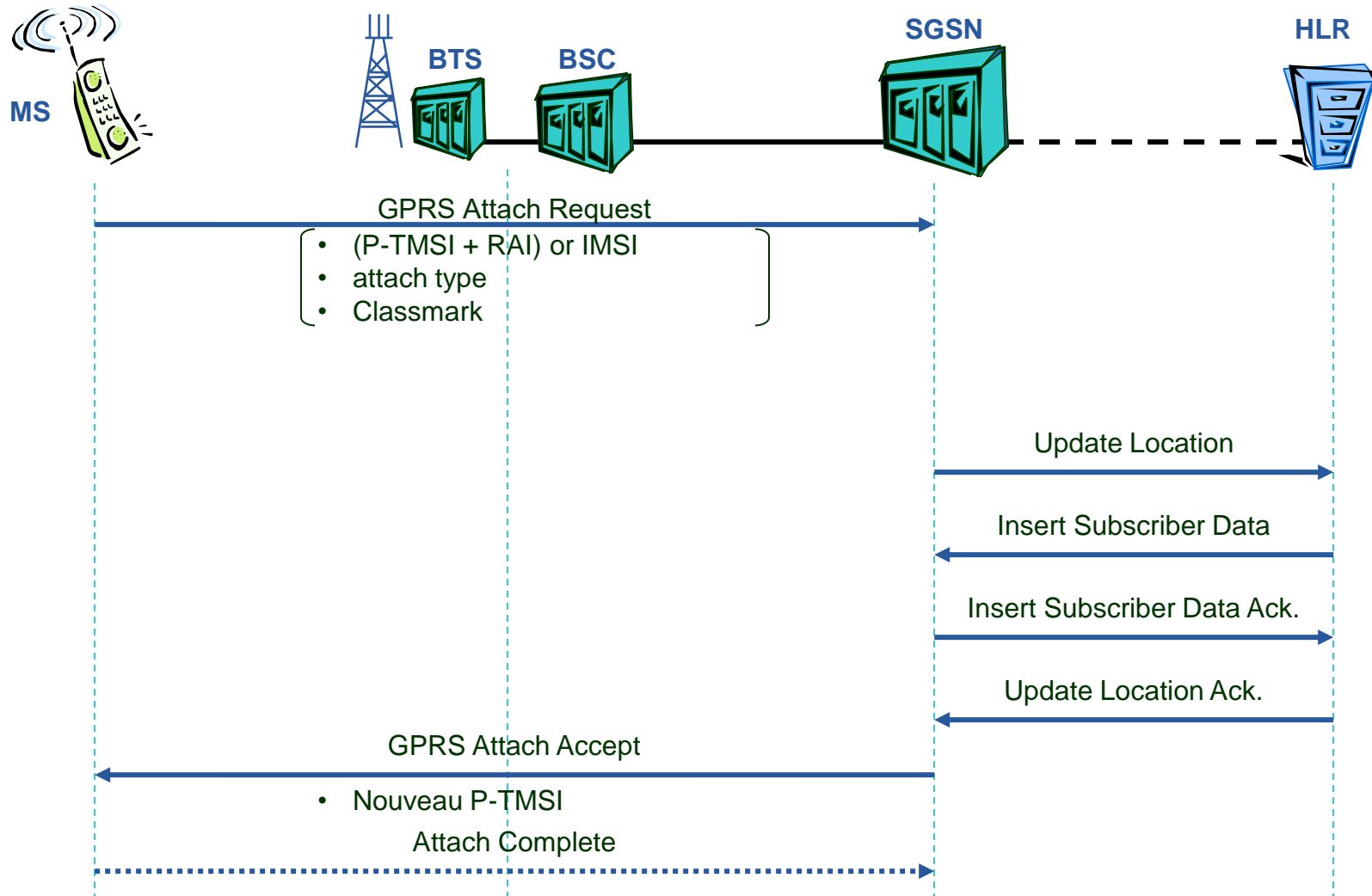
MM State Model of MS

Anonyme Mode

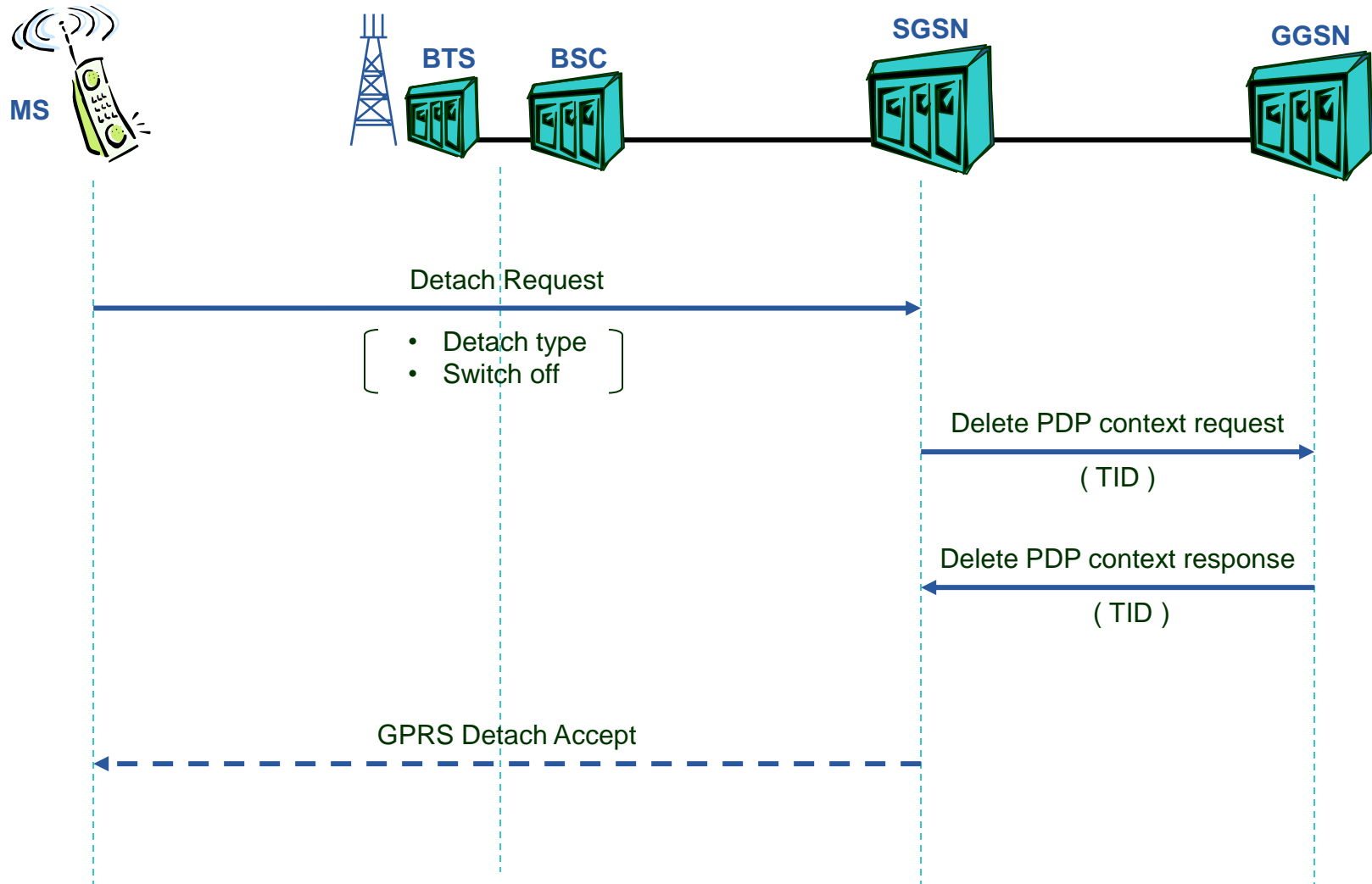


AA MM State Model of MS

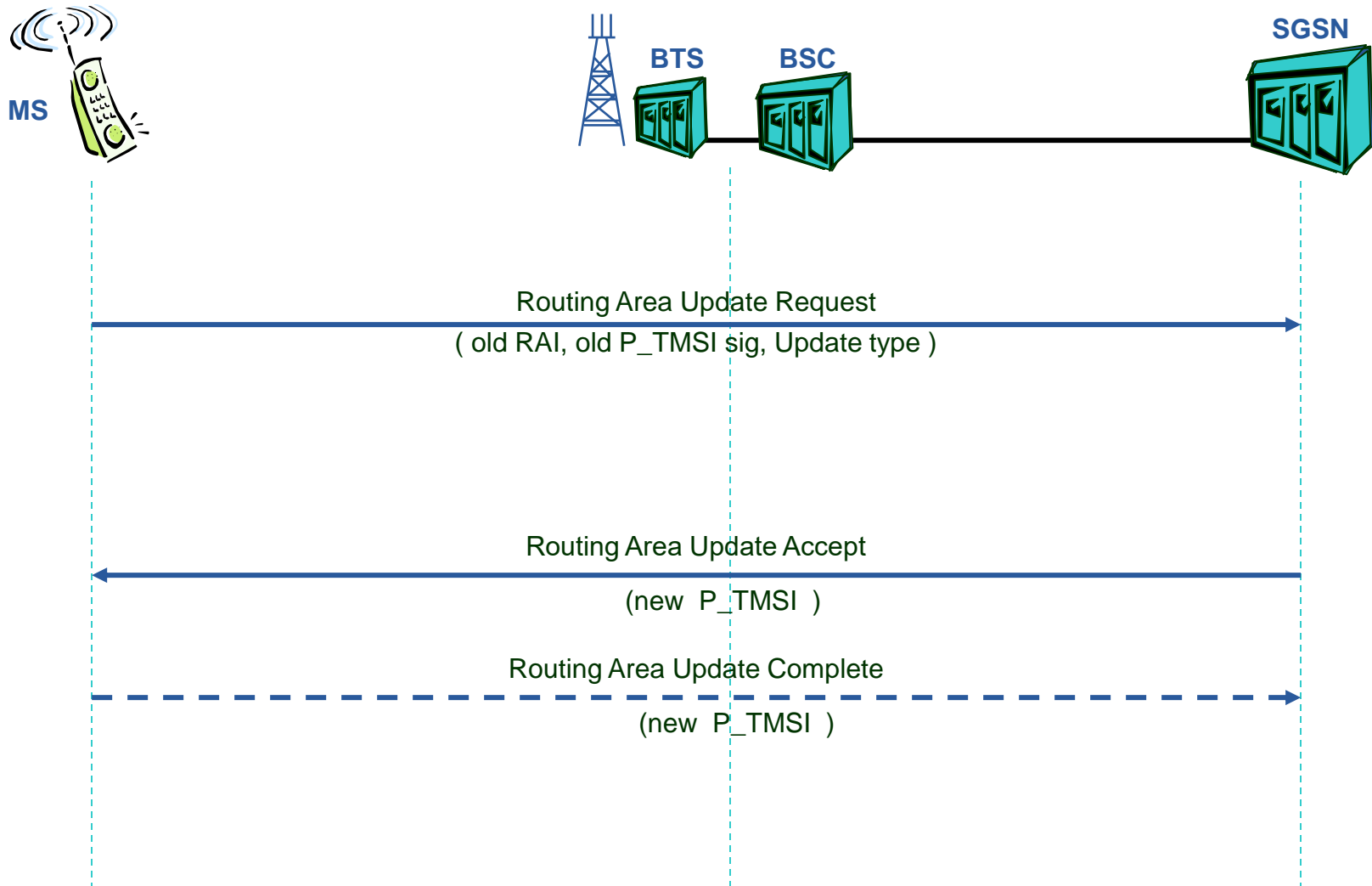
GPRS attach



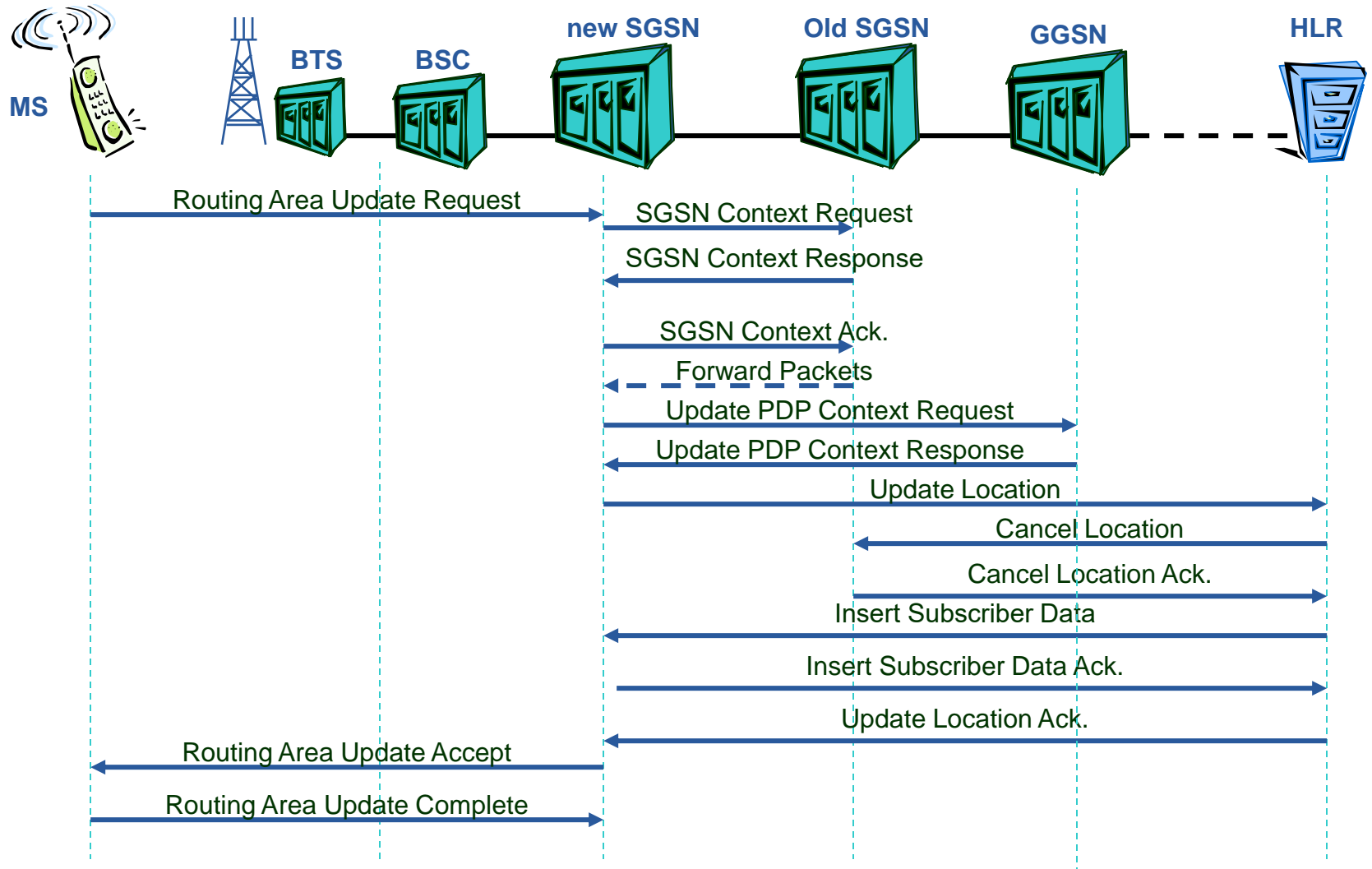
Detach GPRS



Intra SGSN Routing Area Update



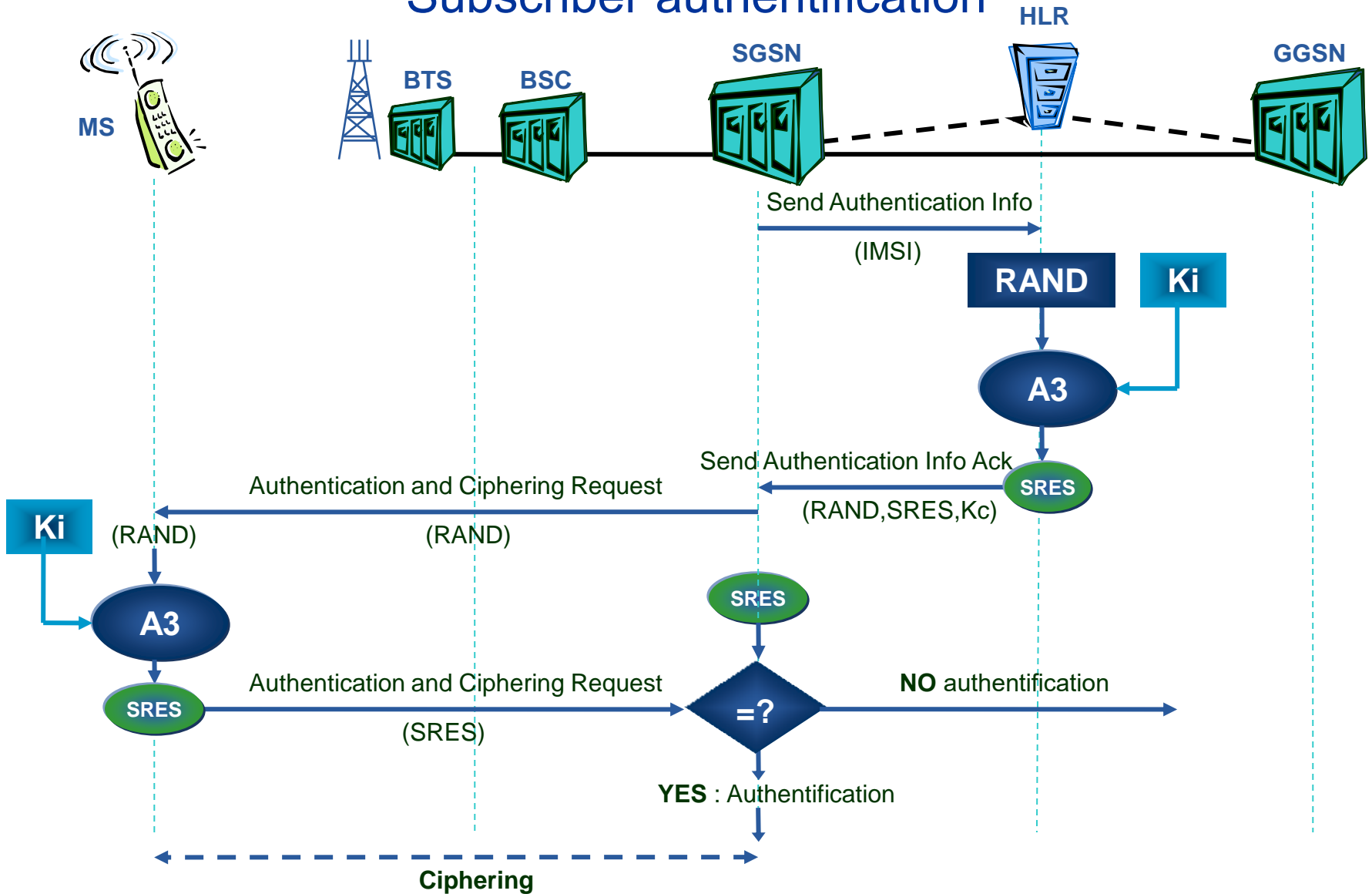
Inter SGSN Routing Area Update



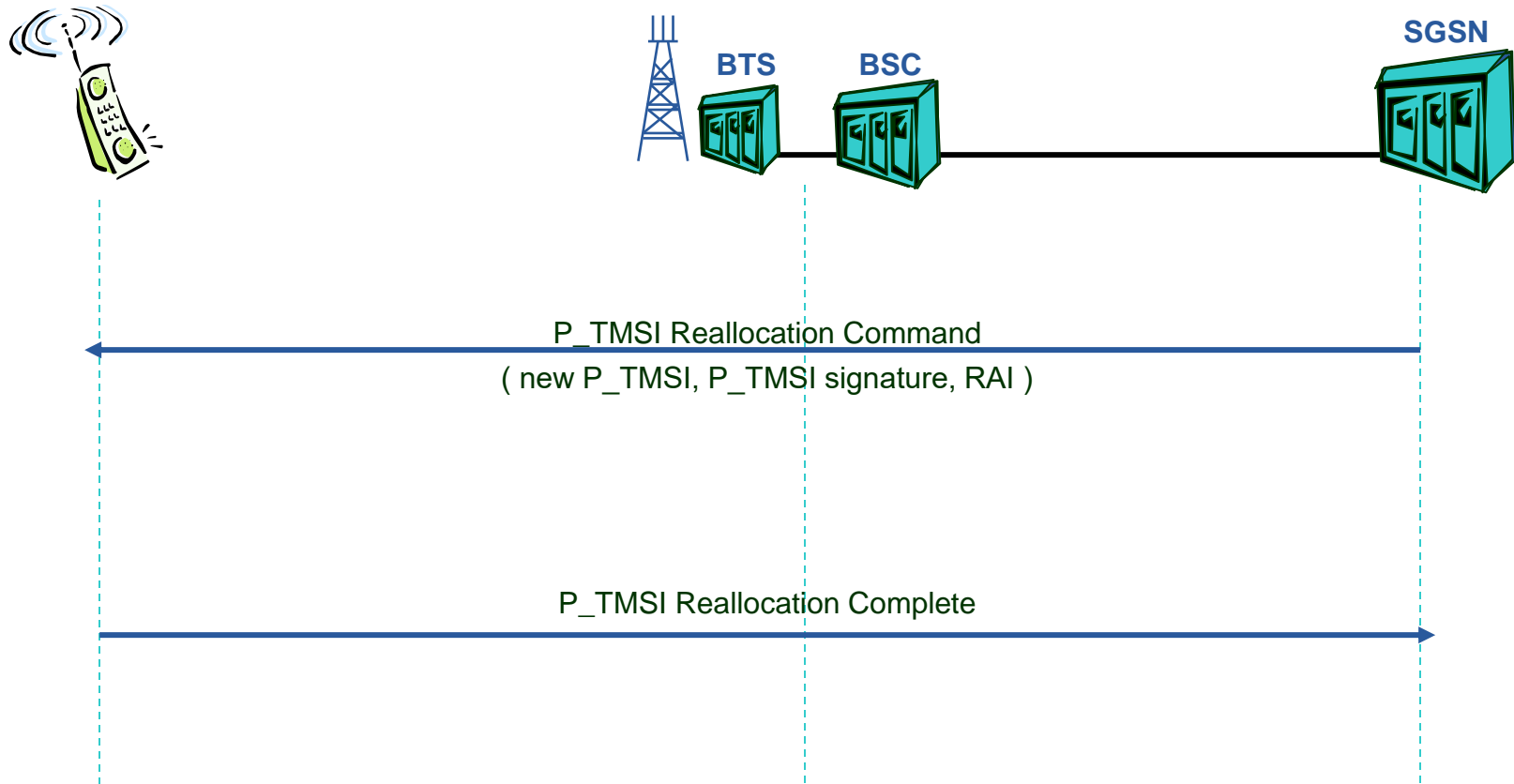
5. SECURITY MANAGEMENT

- **Subscriber authentication**
- **Intra SGSN Routeing Area Update to keep Confidential the subscriber identity**

Subscriber authentication



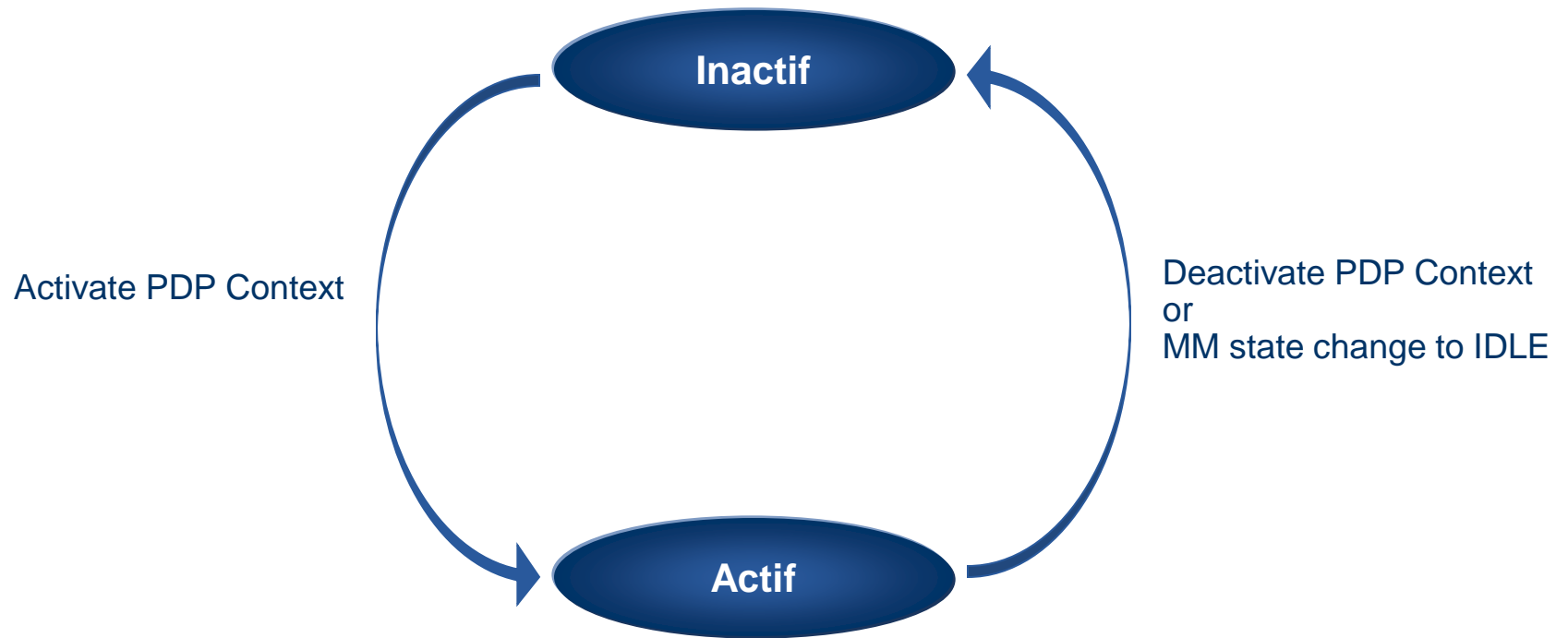
Reallocation of P_TMSI



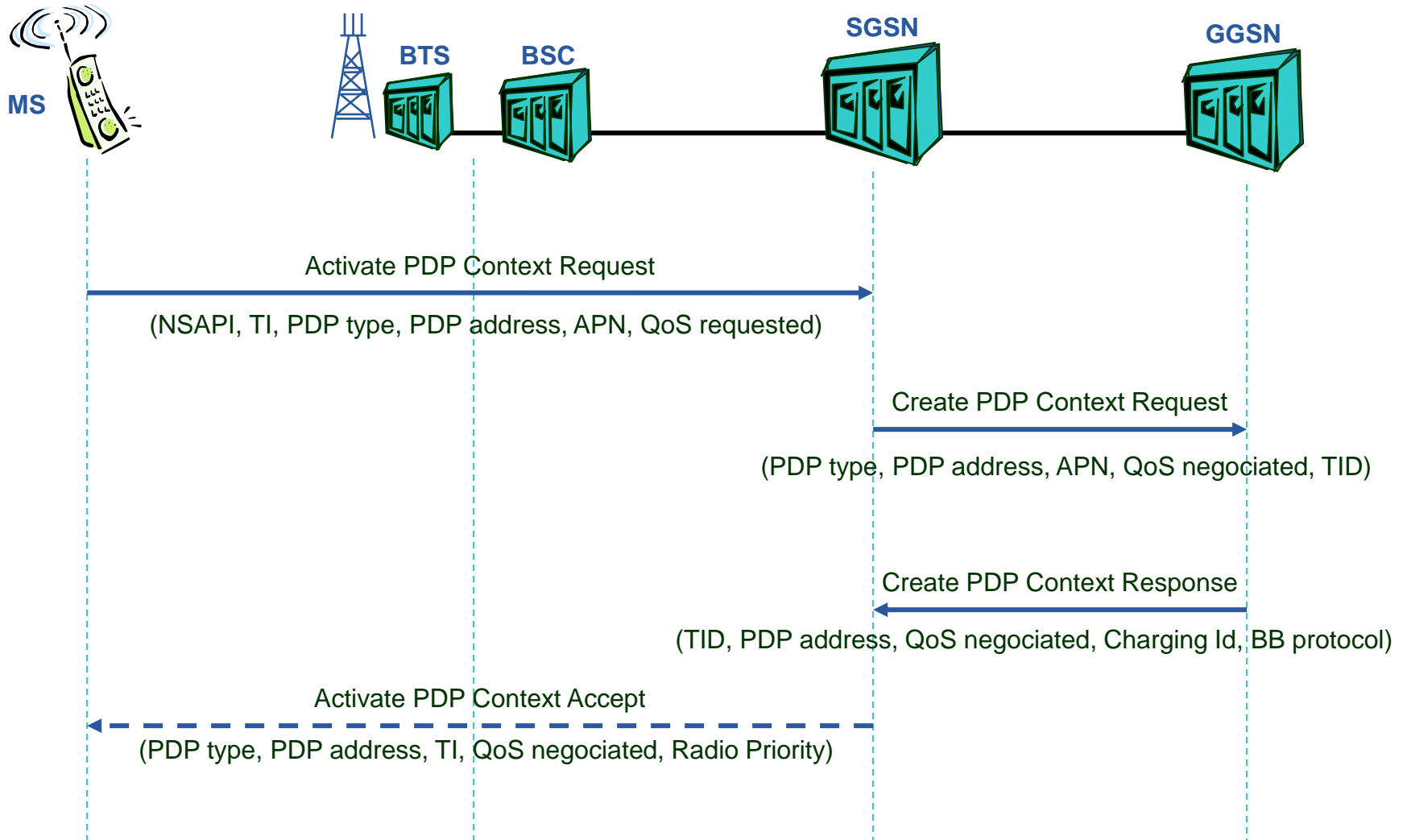
6. SESSIONS MANAGEMENT

- **PDP Context**
- **Activate PDP context**
- **Modification of PDP context**
- **Deactivate PDP context**

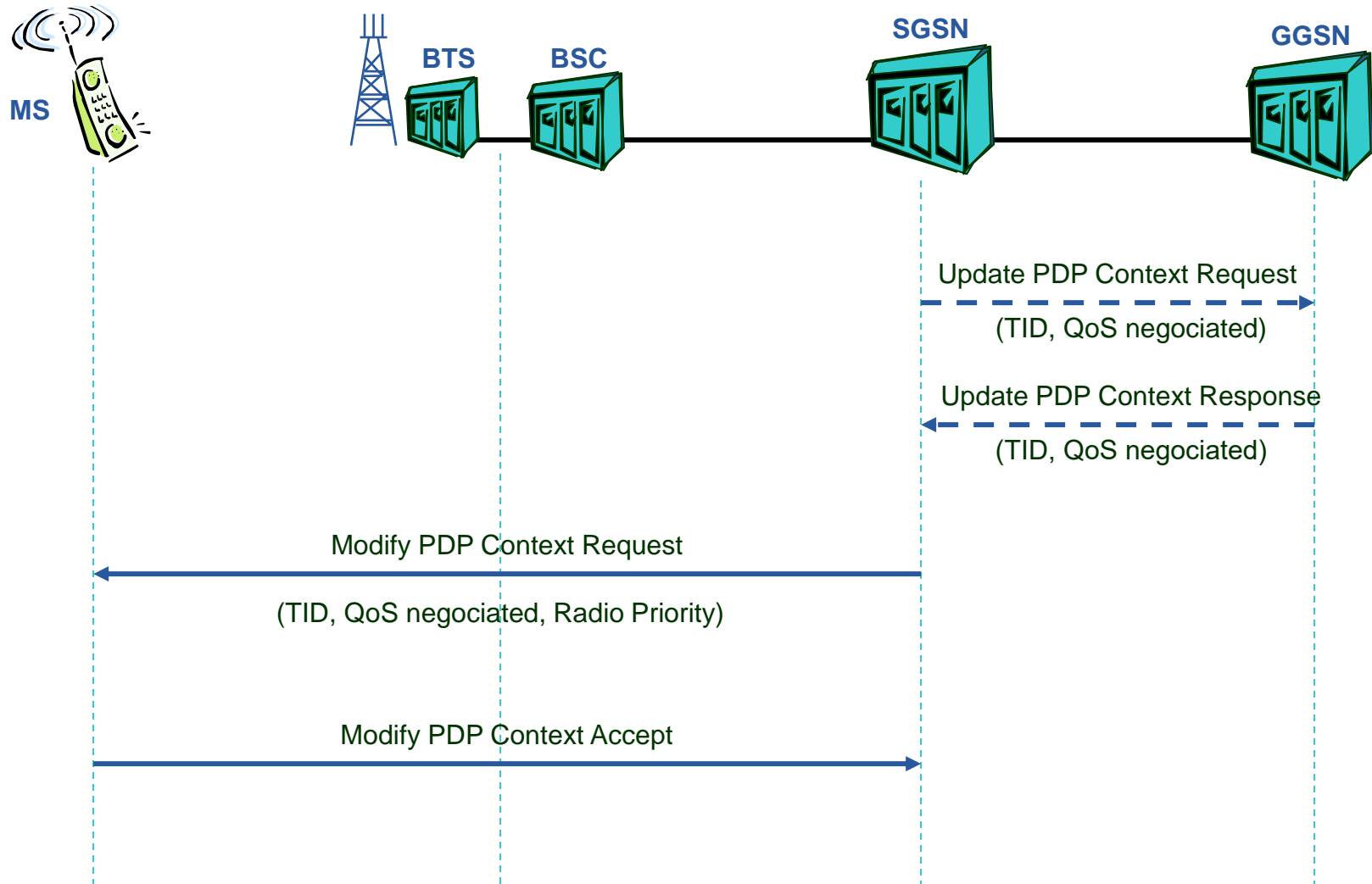
Modèle d'état PDP



Activate PDP context



Modification of PDP context



Deactivate PDP context

