2,5G, 2,75G Technologies

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GSM- HSCSD – GPRS - EDGE

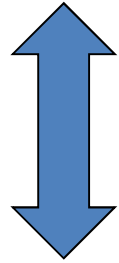❖ **GSM - G**lobal System for **M**obile communications

❖ **HSCSD - H**igh Speed Circuit Switched **D**ata

❖ **GPRS - G**eneral **P**acket **R**adio Service

❖ **EDGE** = **E**nhanced **D**ata rates for **GSM E**volution

HSCSD & GPRS

❖ **HSCSD - H**igh **S**peed **C**ircuit Switched **D**ata

❖ **GPRS - G**eneral **P**acket **R**adio Service
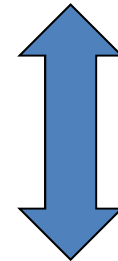
HSCSD & GPRS vs GSM

Multislot   Uni-timeslot

HSCSD e GPRS   GSM

GSM + GPRS

1. BSS : software upgrade
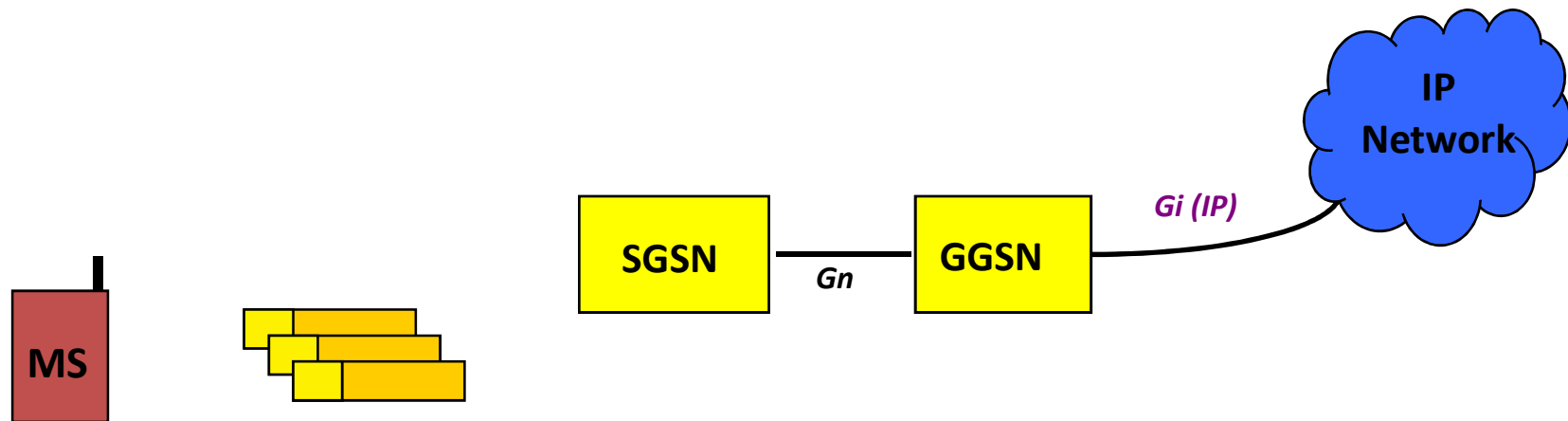   hardware upgrade

2. New components
   (SGSN – GGSN)

PSTN

Other nets

GGSN

MSC

SGSN

BSC

PCU

GSM
BTS

GSM
BTS
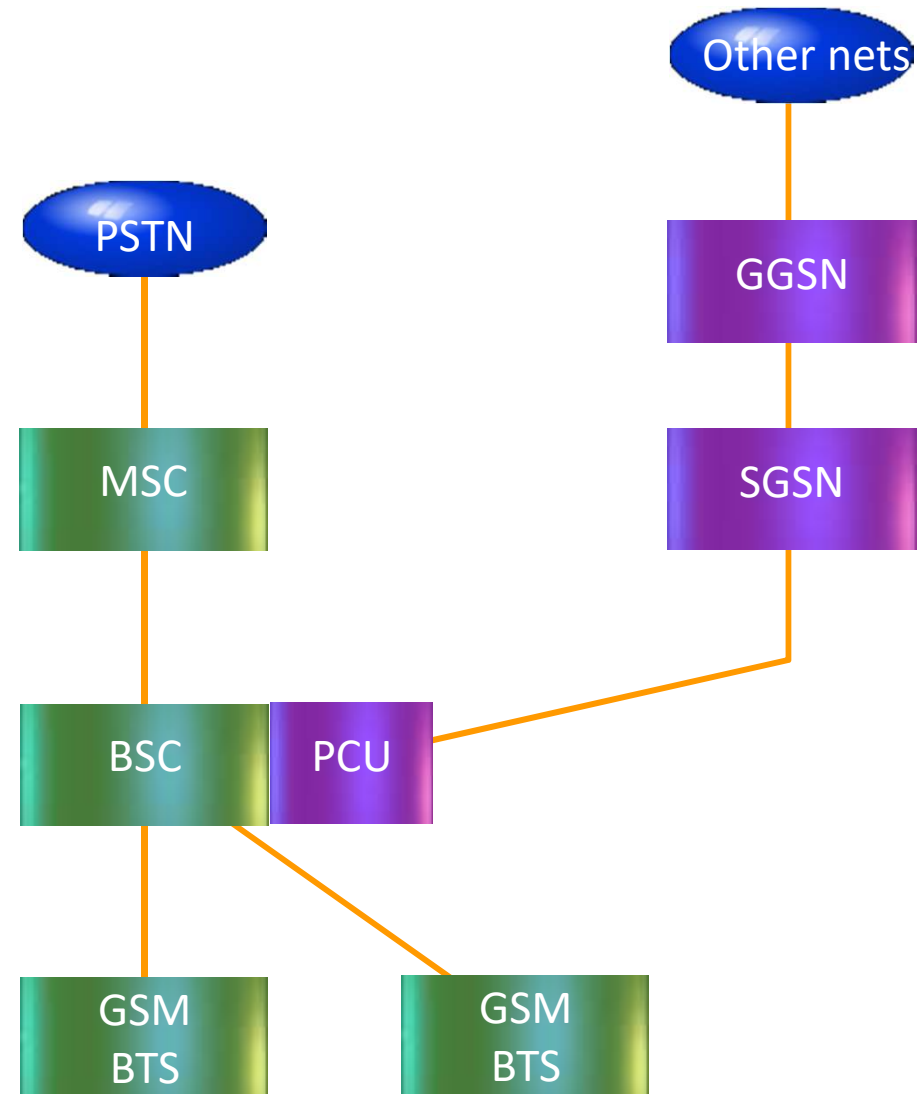
Gateway GPRS Support Node GGSN

➢ **Interface for external Nets**

➢ **Like traditional Gateway**

➢ **Routing**

➢ **...**

IP Network

Gi (IP)

GGSN

MS
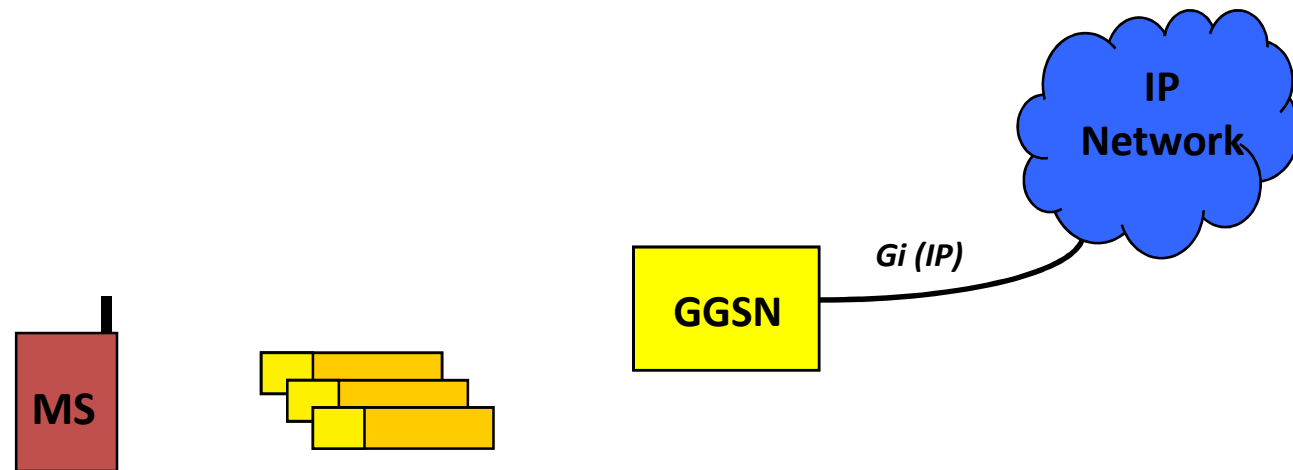
Serving GPRS Support Node - SGSN

➢ In same level like MSC
➢ Packets transfer between MS & GGSN.
➢ …

MS

SGSN —*Gn*— **GGSN** —*Gi (IP)*— **IP Network**

Coding Scheme

Coding Scheme	Coded bits	Punctured bits	Data Rate (kbps)	Multiple Slot Max. Data Rate (kbps)
CS-1	456	0	9,05	72,4
CS-2	588	132	13,4	107,2
CS-3	676	220	15,6	124,8
CS-4	456	0	21,4	171,2

Max. Per TS Data rate (kbps)

Timeslot sharing

| BCCH | TCH | TCH | TCH | TCH | GPRS | GPRS | GPRS |

CS2 = 40.2 kbps

BTS

Timeslot sharing

| BCCH | TCH | TCH | TCH | TCH | TCH | GPRS | GPRS |

CS2 = 26.8 kbps

BTS

MS States

GPRS Attach

Explicit Detach

unreachable mobile
GPRS Detach

Timer expiry/
Force STANDBY/
Abnormal RLC condition

reachable mobile

PDU Transmission /Reception

IDLE

READY

STANDBY
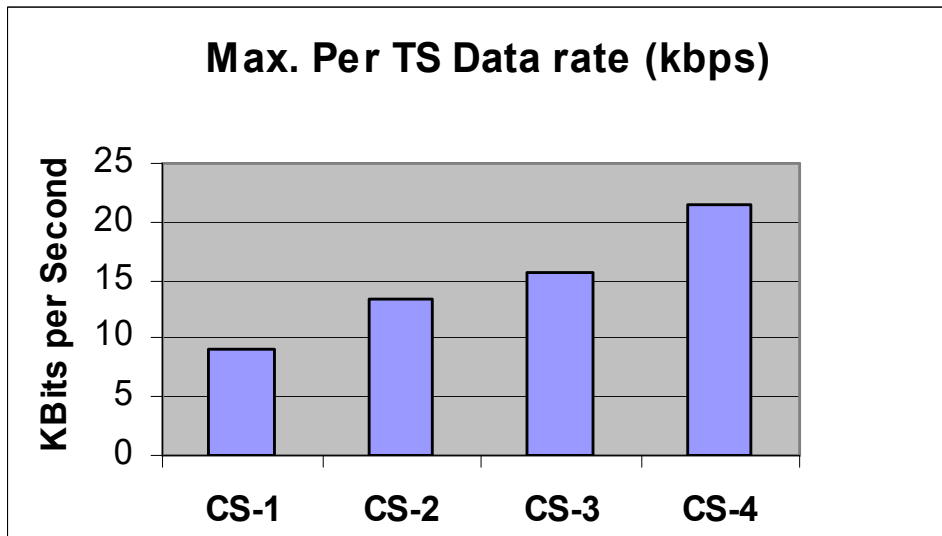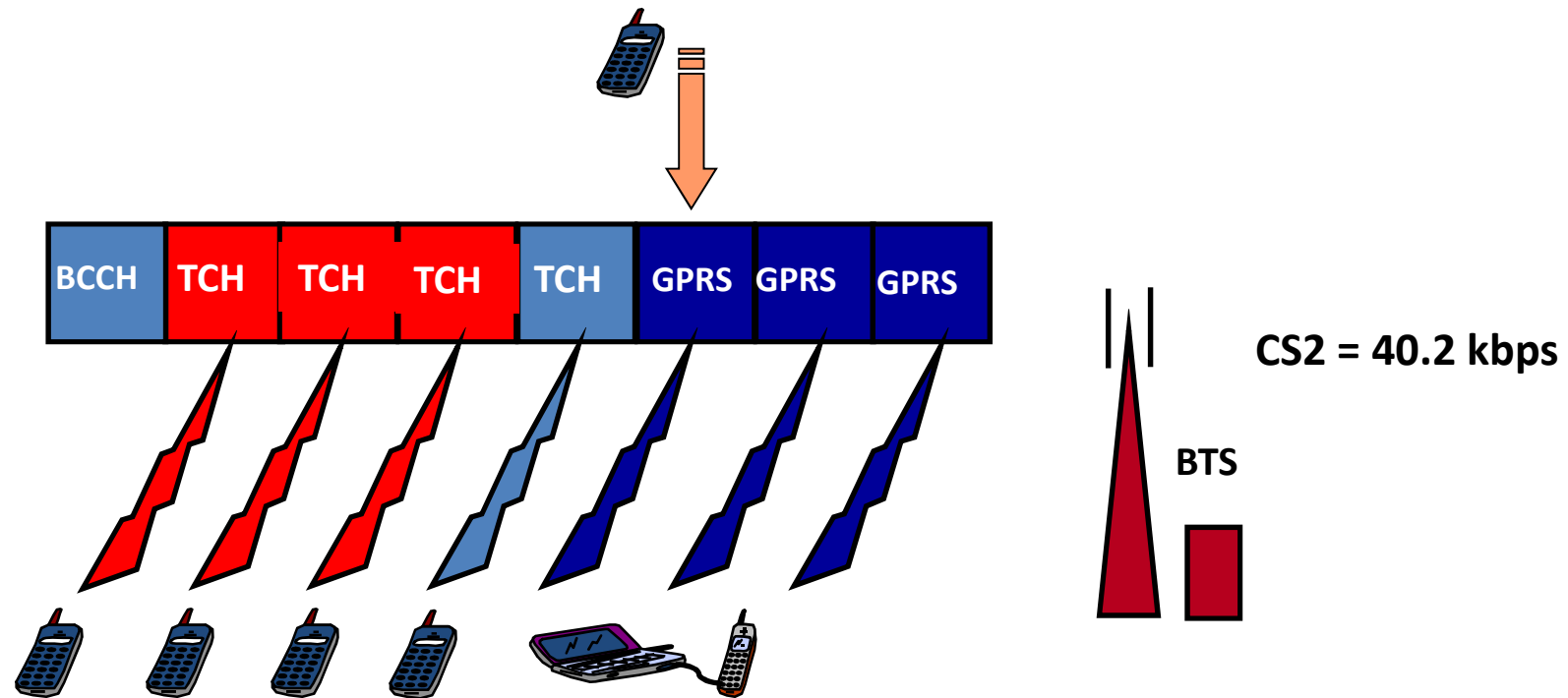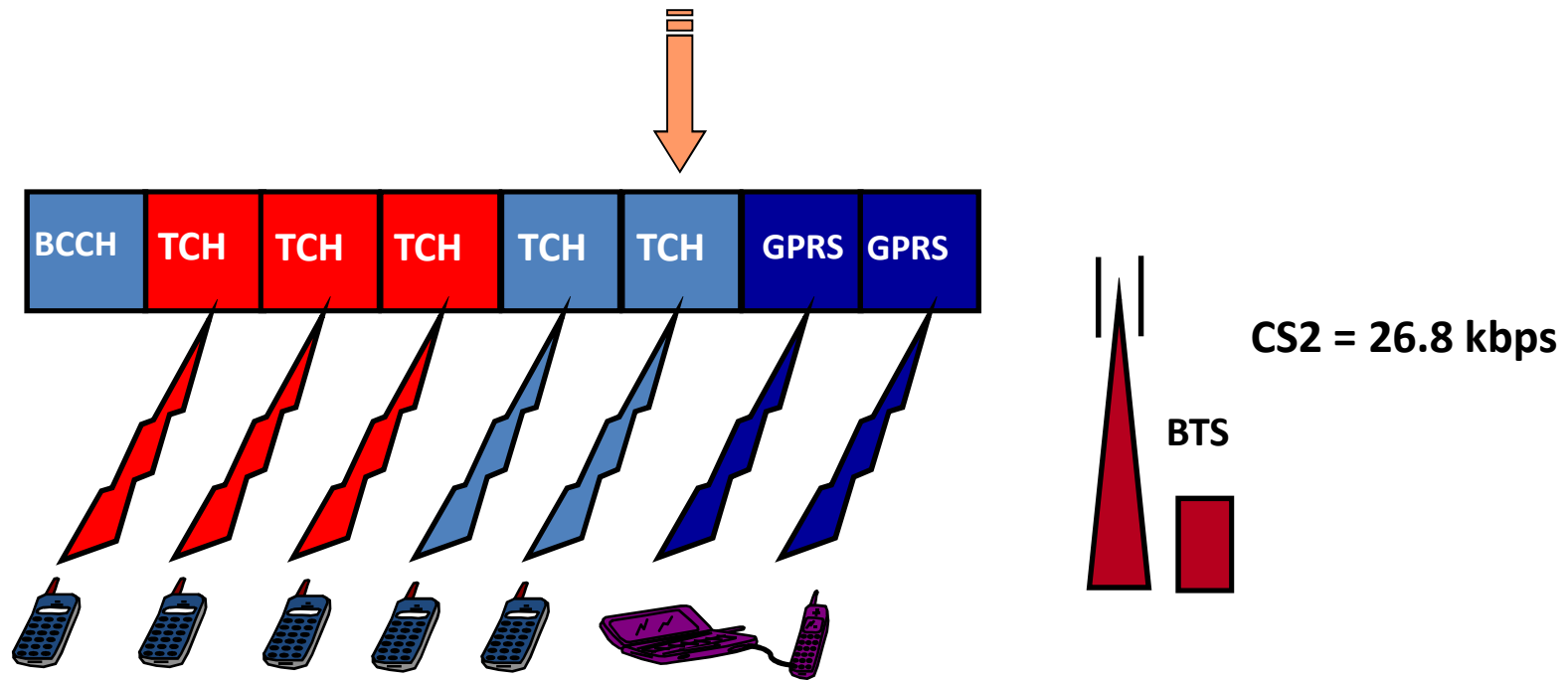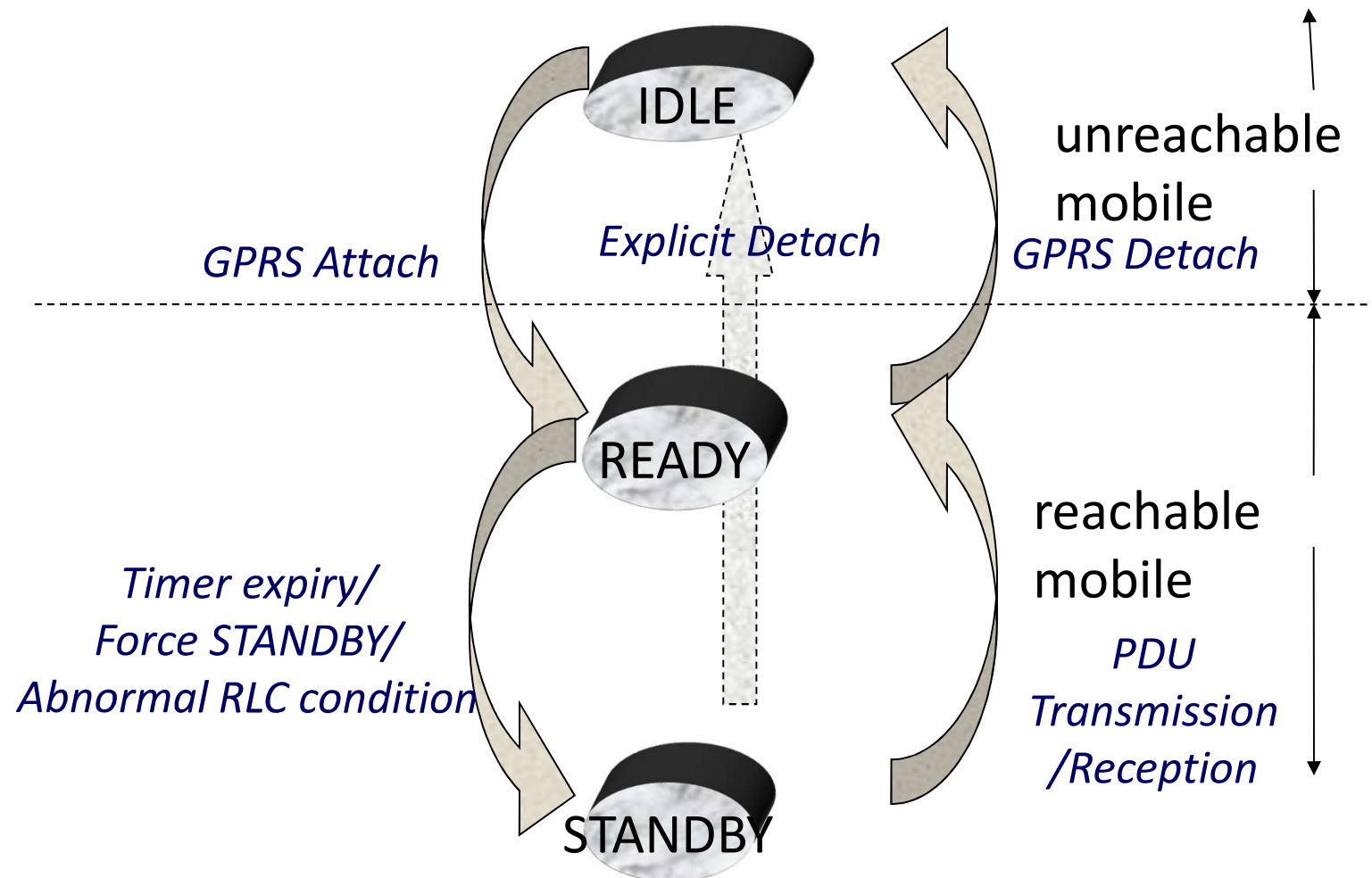
Attach
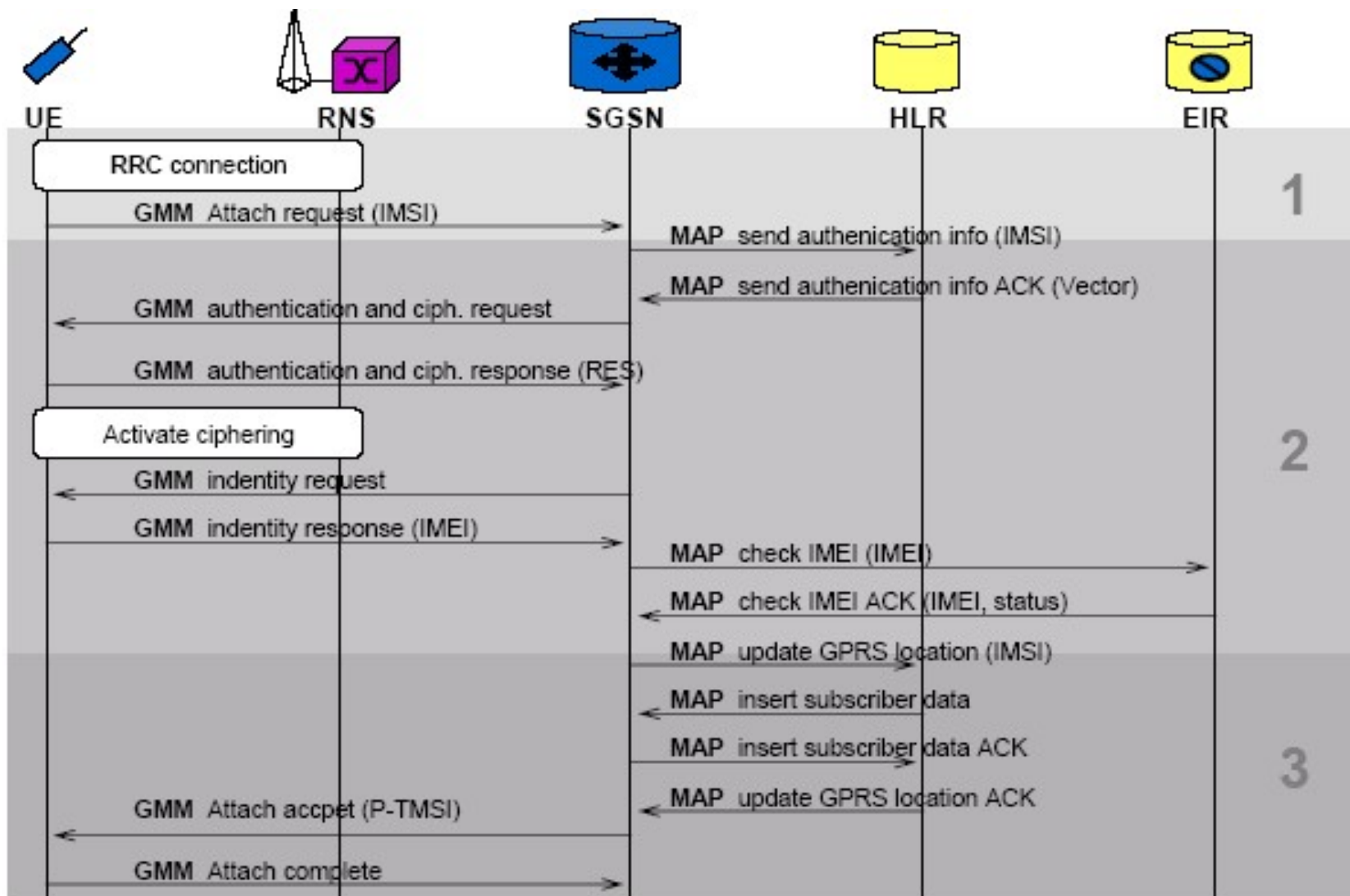
Detach
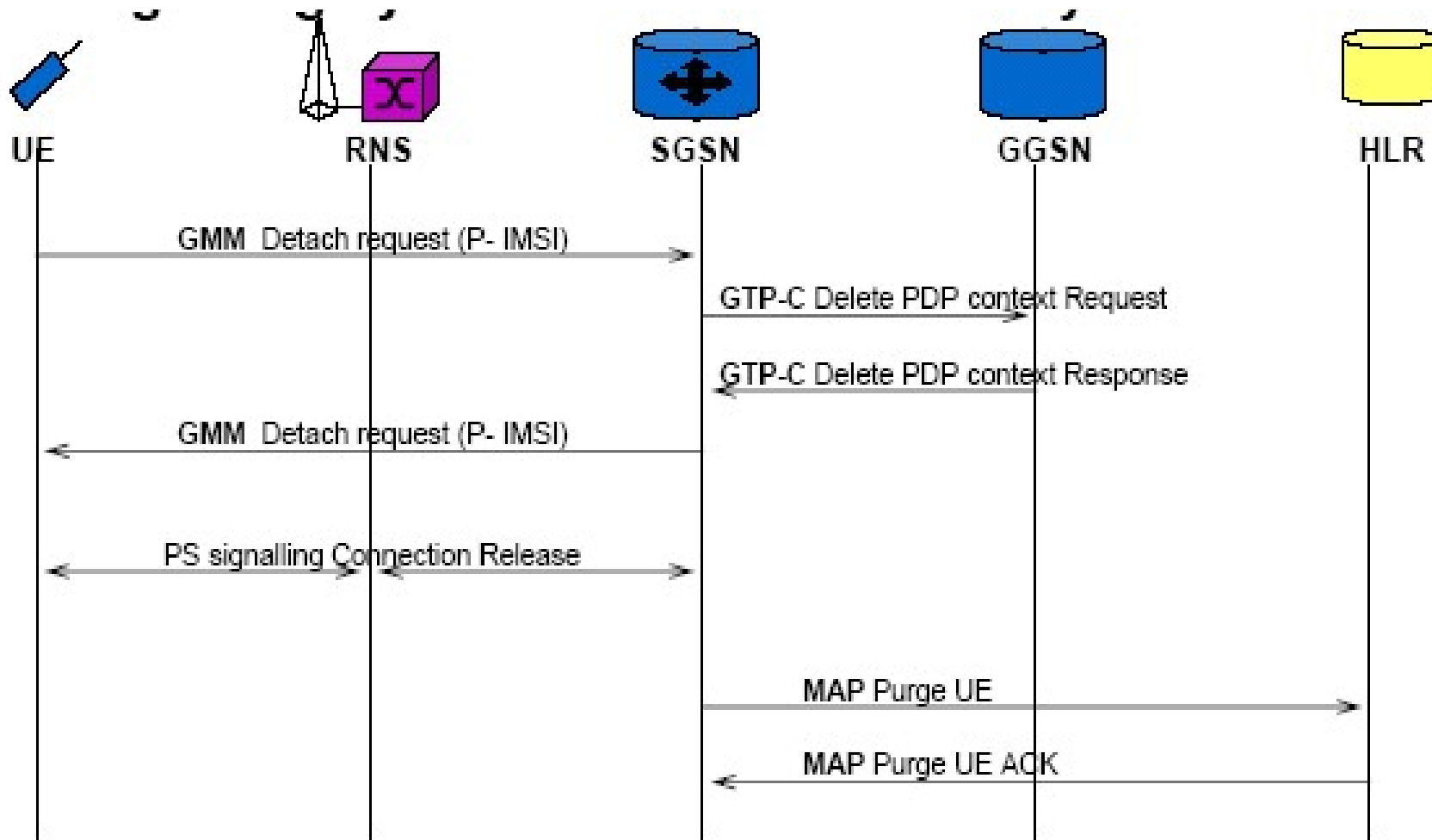
EDGE

❖ **EDGE** = **E**nhanced **D**ata rates for **GSM** **E**volution

EDGE Classes

BTS

MS
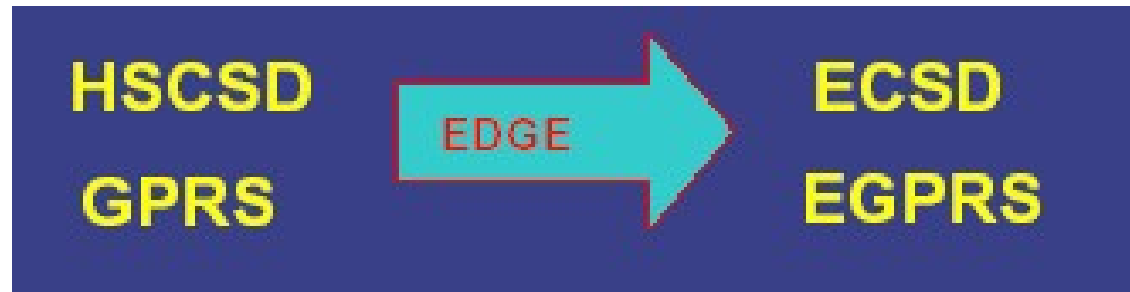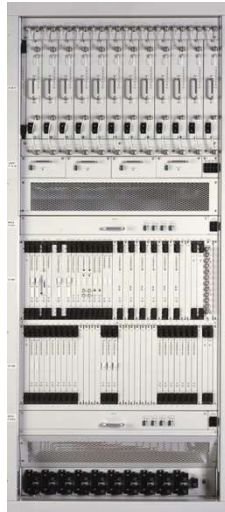
Downlink

Uplink

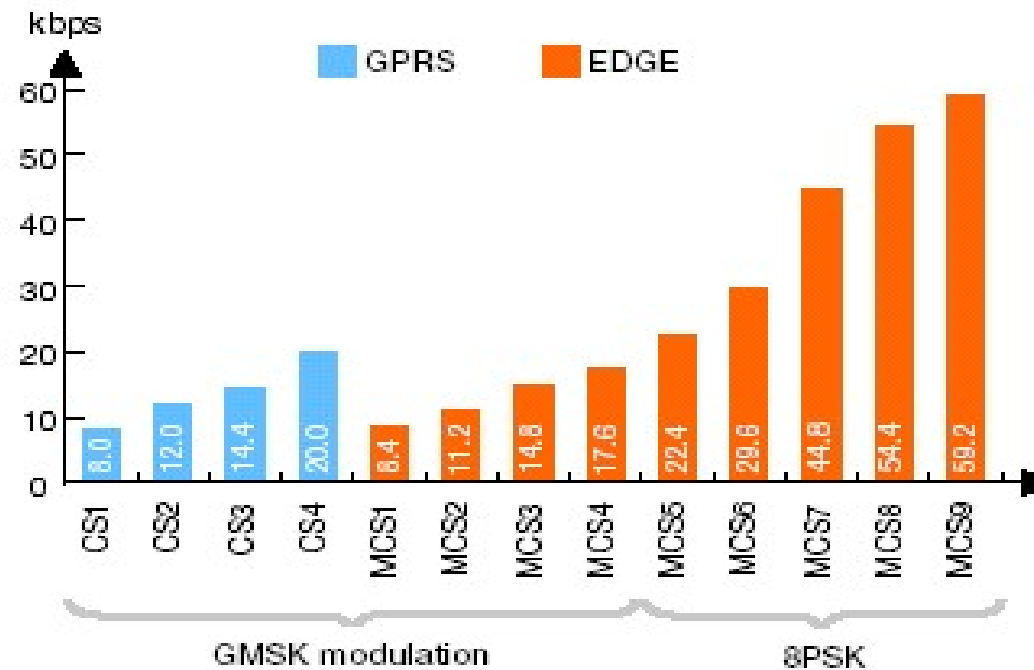| Classe	Downlink	Uplink
A	8PSK	GMSK
B	8PSK	8PSK

EDGE Coding Schemes

Figure 4. Coding schemes for GPRS and EGPRS (user data rate). (Key: 8PSK, 8-phase shift keying; CS, Coding scheme; EGPRS, Enhanced GPRS; GMSK, Gaussian minimum shift keying; MCS, Modulation coding scheme)

EDGE Impact

❖ Hardware upgrade in BSS

❖ Software upgrade for BS and BSC

❖ New Terminals
  - Terminal : 8PSK uplink e downlink
  - Terminal : GMSK uplink e 8PSK downlink

GSM + GPRS + EDGE

BTS

Abis

BSC

NEW

Abis

A

PSTN

A

MSC

NEW

D

H?R

NEW

Gb

Gs

Gc

BTS

NEW

NEW

NEW

NEW

SGSN

NEW

Gn

NEW

NEW

Gn

NEW

GGSN

NEW

NEW

NEW

PDN