GSM Network and Services
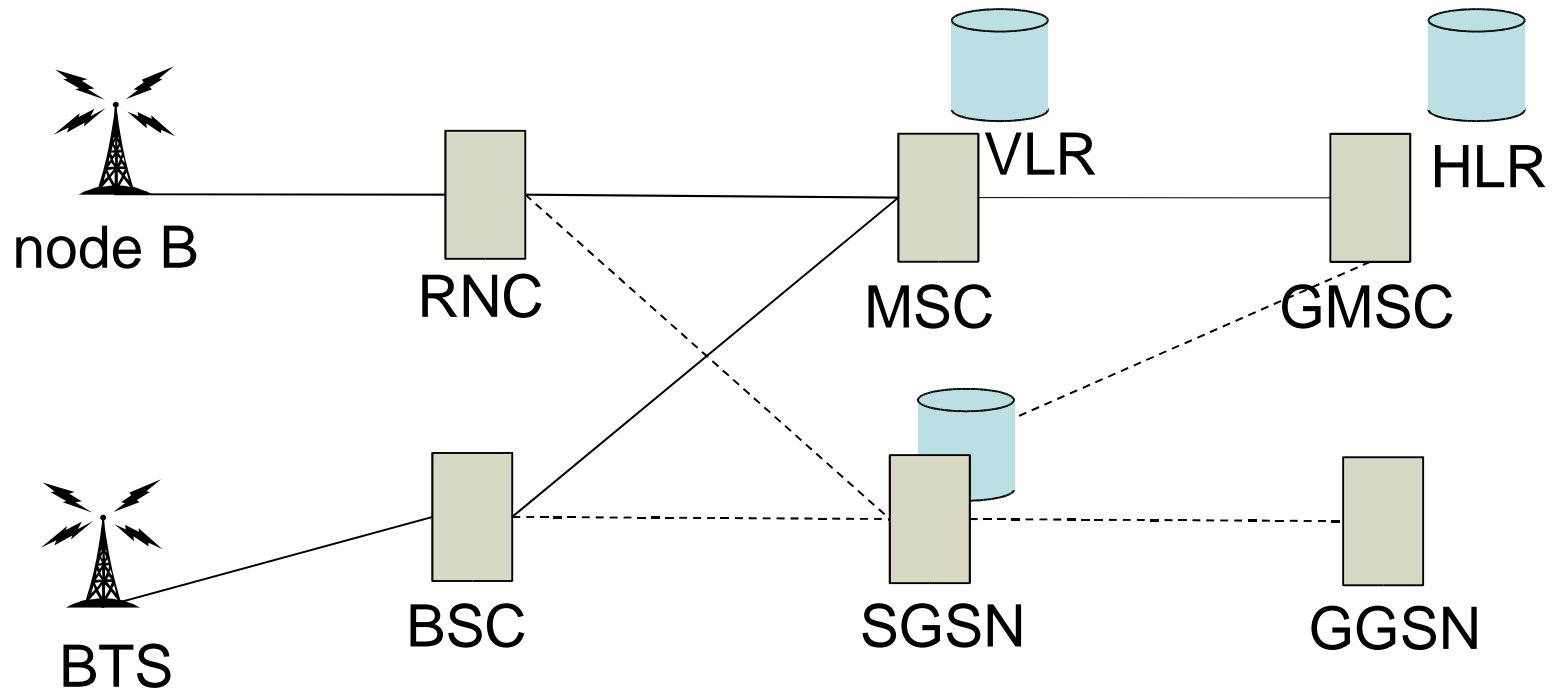
UMTS and IMS

- the future of 3GPP

3GPP process
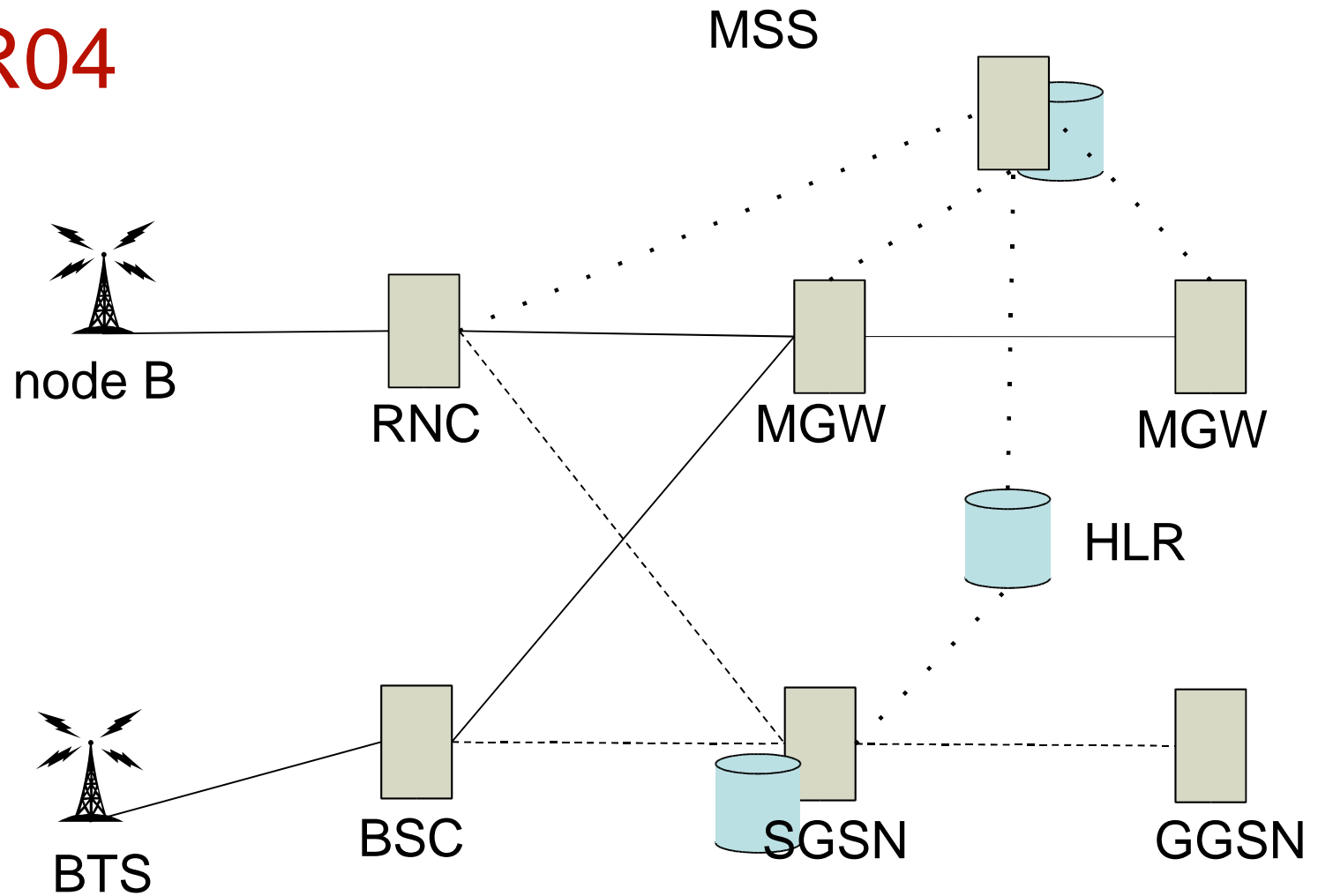
- ## Release 99

  - new radio interface, WCDMA

- ## Release 04

  - separation of MSC into switching and logical nodes

  - ATM as transport layer

- ## Release 05

  - Removing of Circuit Switched domain (optional)

  - IP as transport layer
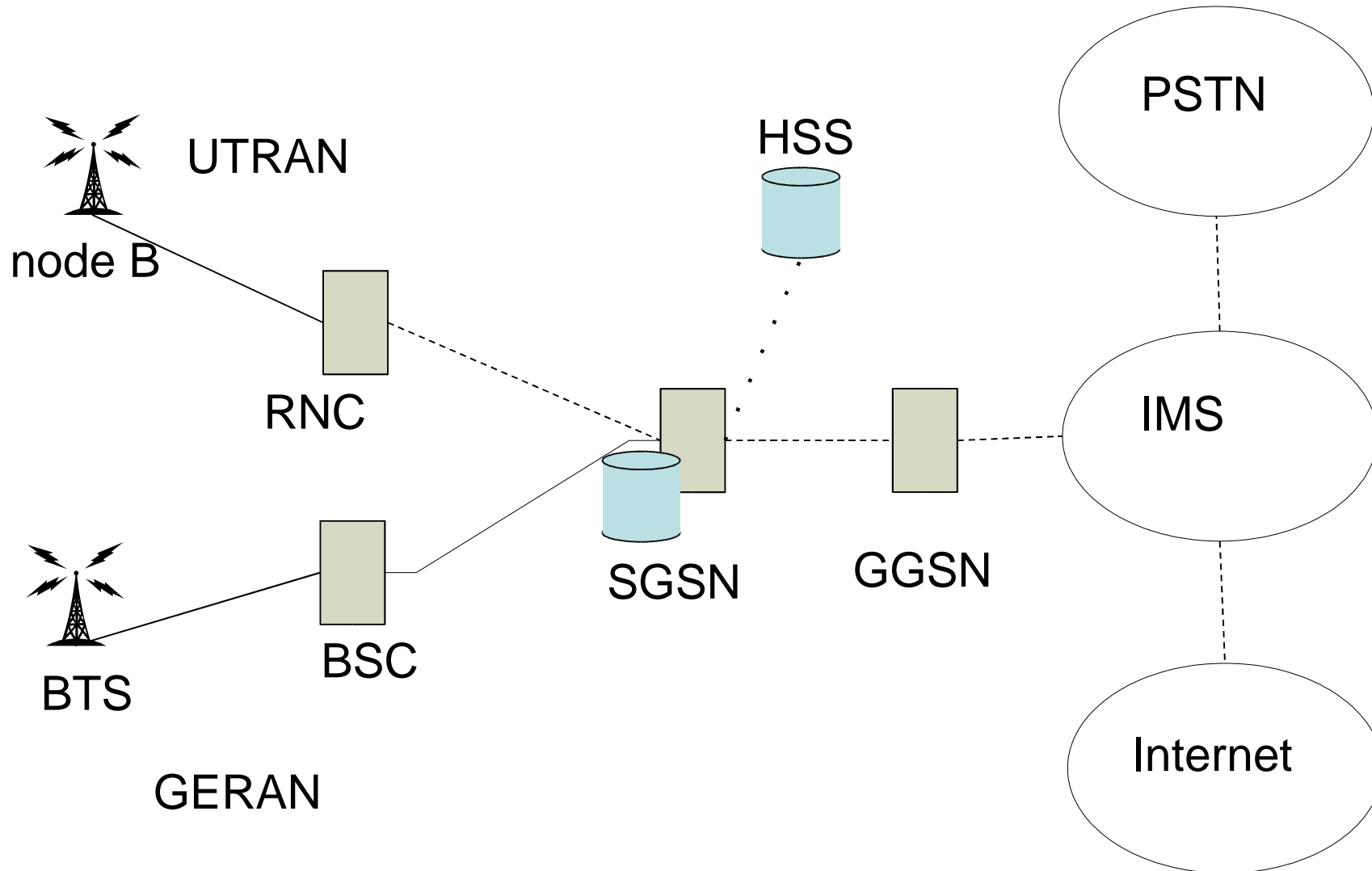
  - IMS for applications

R99

R04

MSS

node B

RNC

MGW

MGW

HLR

BTS

BSC

SGSN

GGSN

R05

UTRAN

node B

RNC

HSS

BTS

BSC

GERAN

SGSN

GGSN

PSTN

IMS

Internet

WCDMA

- **Wide band**
  - 5 MHz carrier
- Code Division
  - used for both multiple access and cells
  - frequency division duplex, but there is a specification for time division duplex
- Pros
  - higher max bit rate
  - more robust carrier, softer handover, ...
  - flexible resource sharing!
  - 155MHz of new spectrum!

HSDPA

- High Speed Downlink Packet Access
  - a shared channel
  - downlink only
  - speed > 10 Mb/s
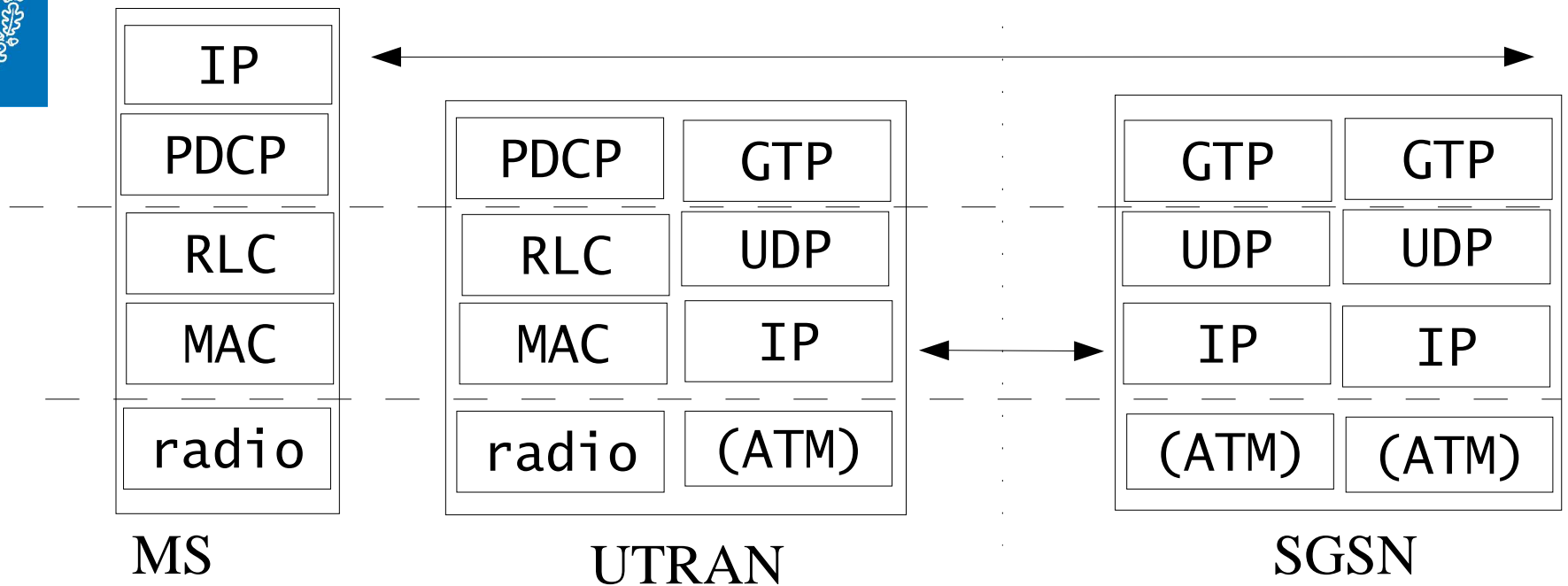 - smart retransmission
- A WLAN killer?
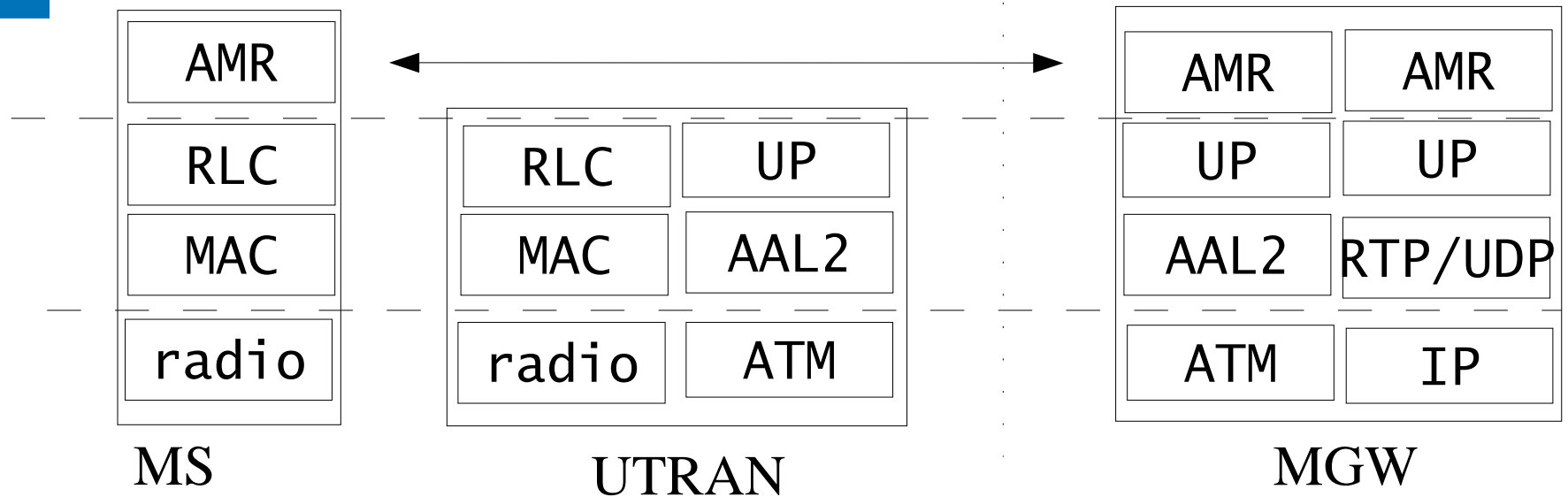
QoS in 3GPP

- More QoS parameters
  - conversational: fixed delay, fixed bit rate
  - streaming: variable delay, fixed bit rate
  - interactive: variable delay, variable bit rate
  - background: "best effort
- IP core network needs to support QoS
  - DiffServ, MPLS, ..
- How is QoS supported over the air?

IP in 3GPP

MS	UTRAN	SGSN

Voice in 3GPP Rel 04

AMR
RLC
MAC
radio

MS

RLC	UP
MAC	AAL2
radio	ATM

UTRAN

AMR	AMR
UP	UP
AAL2	RTP/UDP
ATM	IP

MGW

"All-IP"

- "All IP" describes how all transport layers in Rel 5/6 are replaced by IP.

- User IP is transported on top of different IP layers.

- The IP layers can be implemented on top of ATM, SDH, Ethernet, ...

IMS - Rel 05

- IP Multimedia Subsystem
- An application network:
  - VoIP
  - IM,messaging, presence
  - streaming, video, audio..
  - location based services
  - ...
- All services can be delivered without IMS, so why IMS?
- It's easier to charge for services!

IMS – more acronyms

Media Gateway Control Function

HSS

MGCF

P-CSCF

I-CSCF   **S-CSCF**

MGW

GGSN
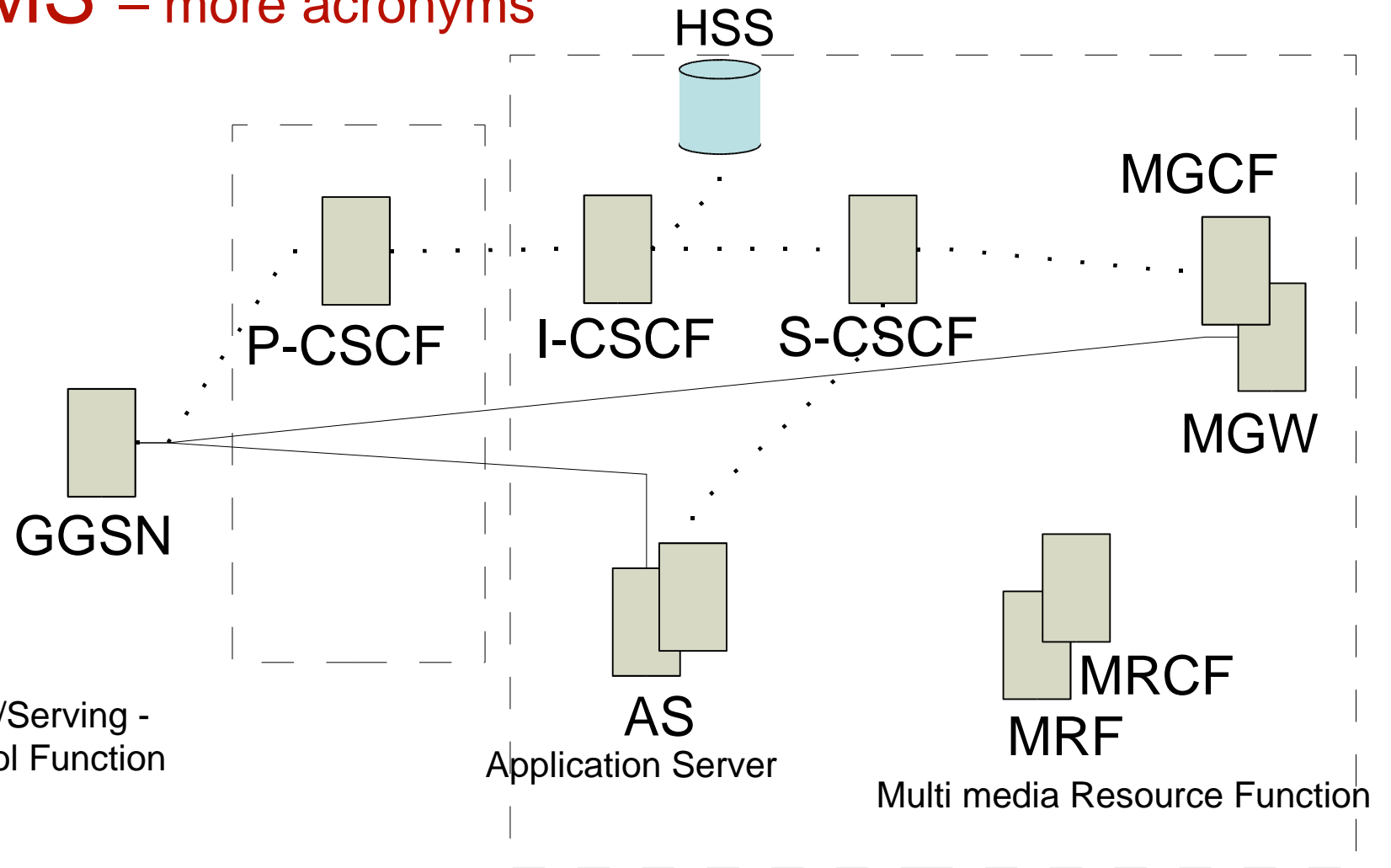
Proxy/Interrogating/Serving -
Call Session Control Function

AS
Application Server

MRCF

MRF

Multi media Resource Function

IMS – the good part

- IMS uses SIP as the session management protocol.
- Applications are not defined by 3GPP, rather existing protocols are supported allowing easier deployment of applications.