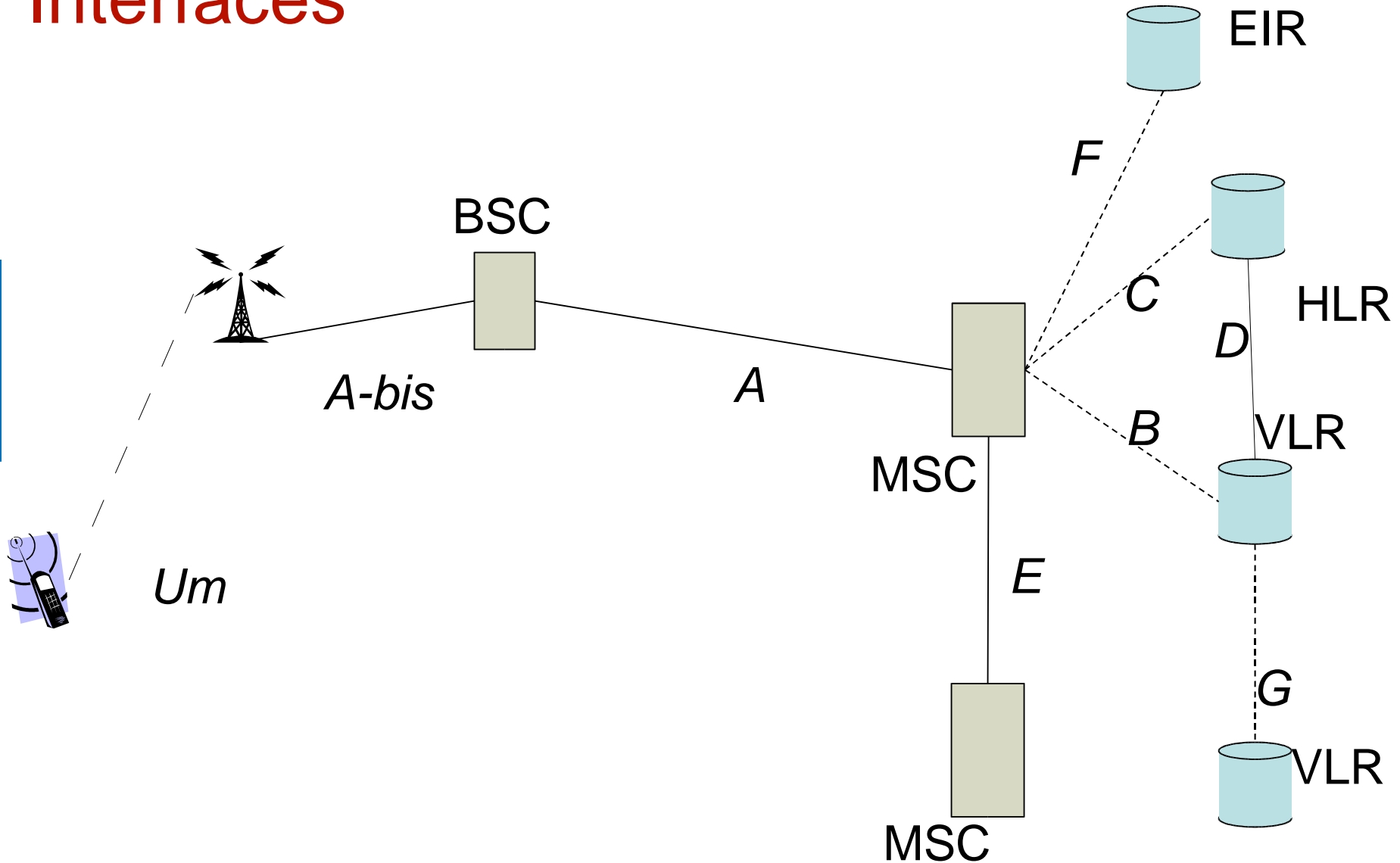


GSM Network and Services

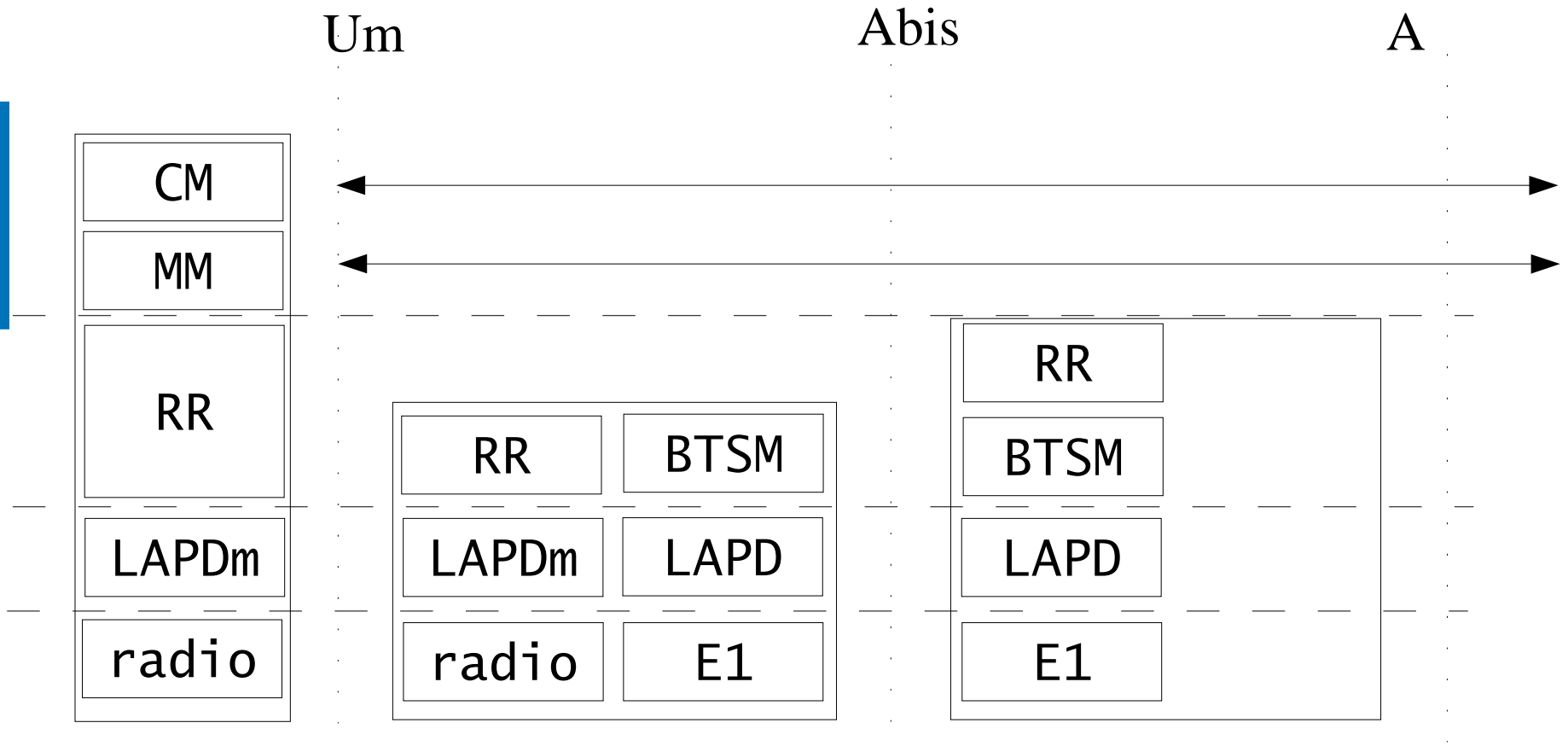


Interfaces and protocols
- even more three letter acronyms

Interfaces

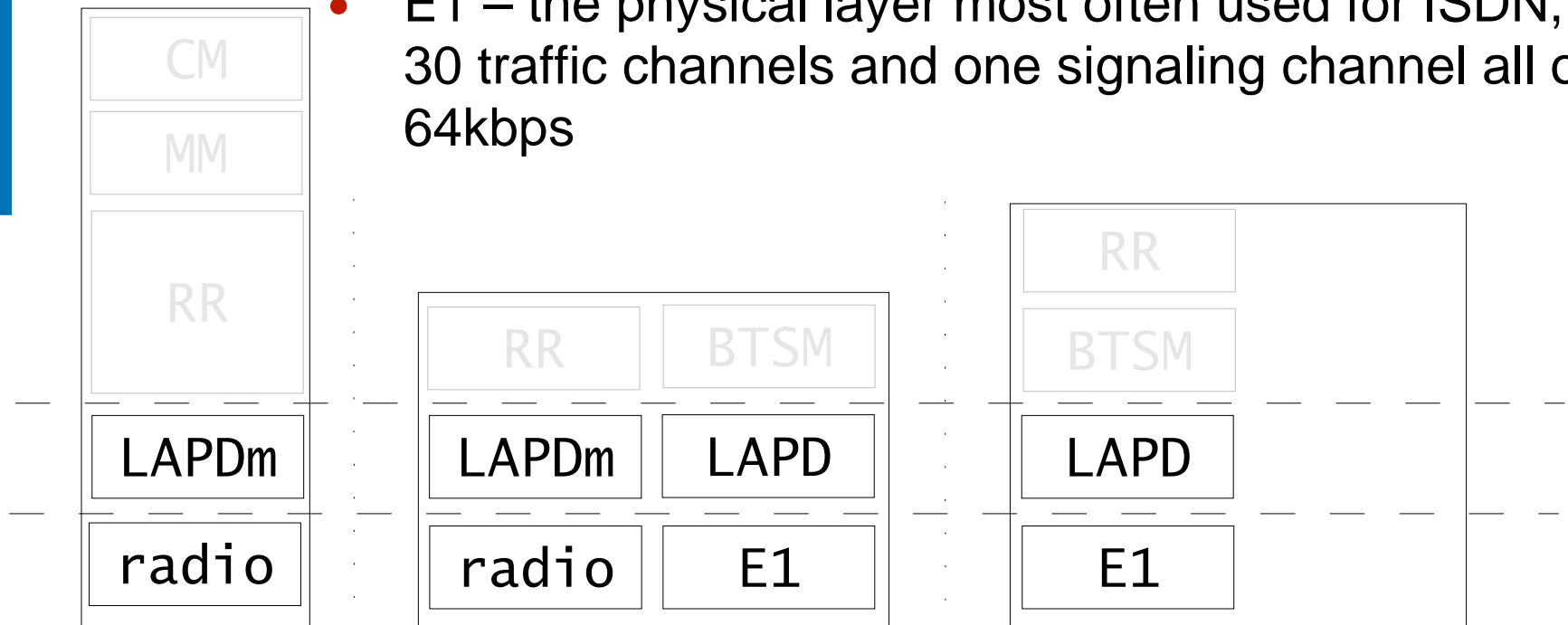


Signaling protocols BSS



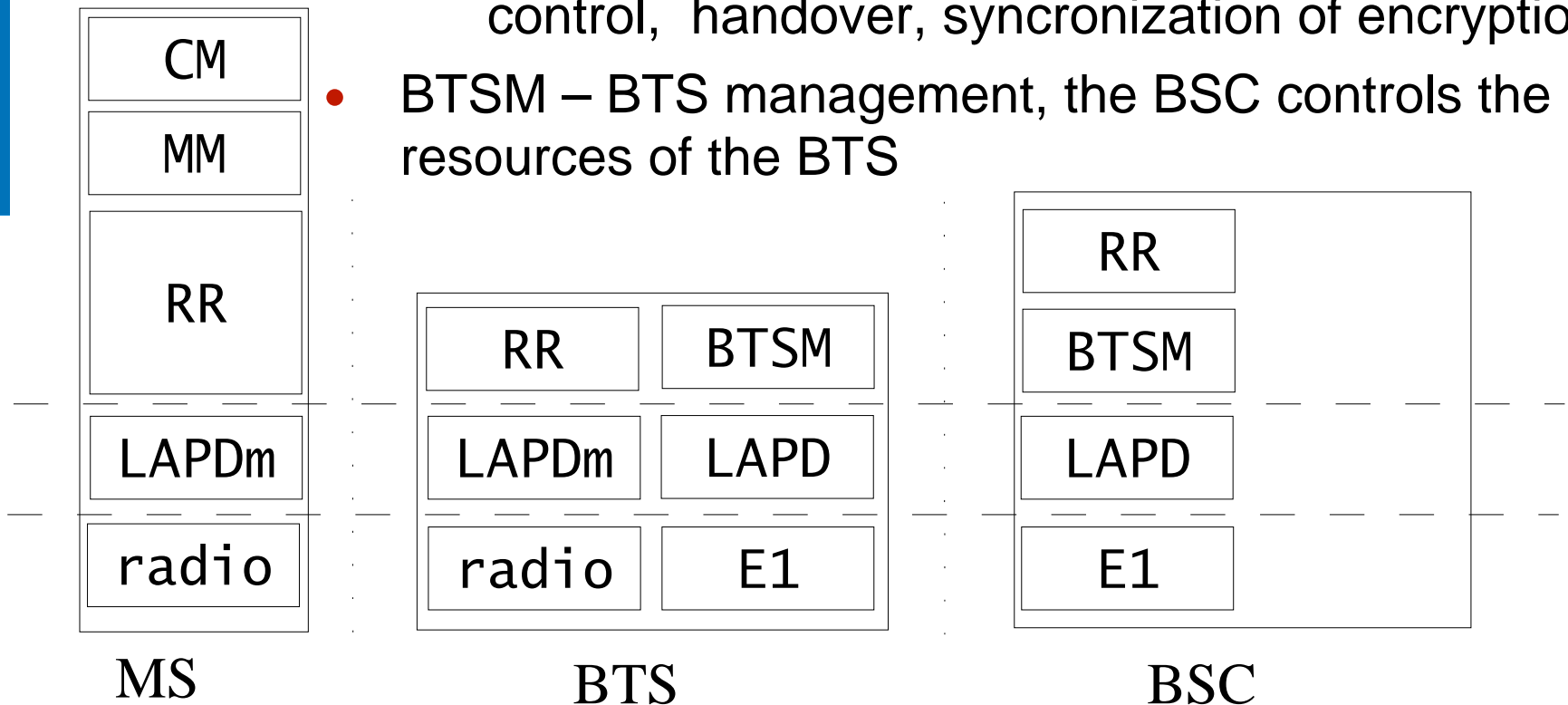
Signaling protocols BSS

- LAPD – Link Access Procedure D channel, the link layer defined for ISDN, provides retransmission, error detection ...
- E1 – the physical layer most often used for ISDN, 30 traffic channels and one signaling channel all of 64kbps

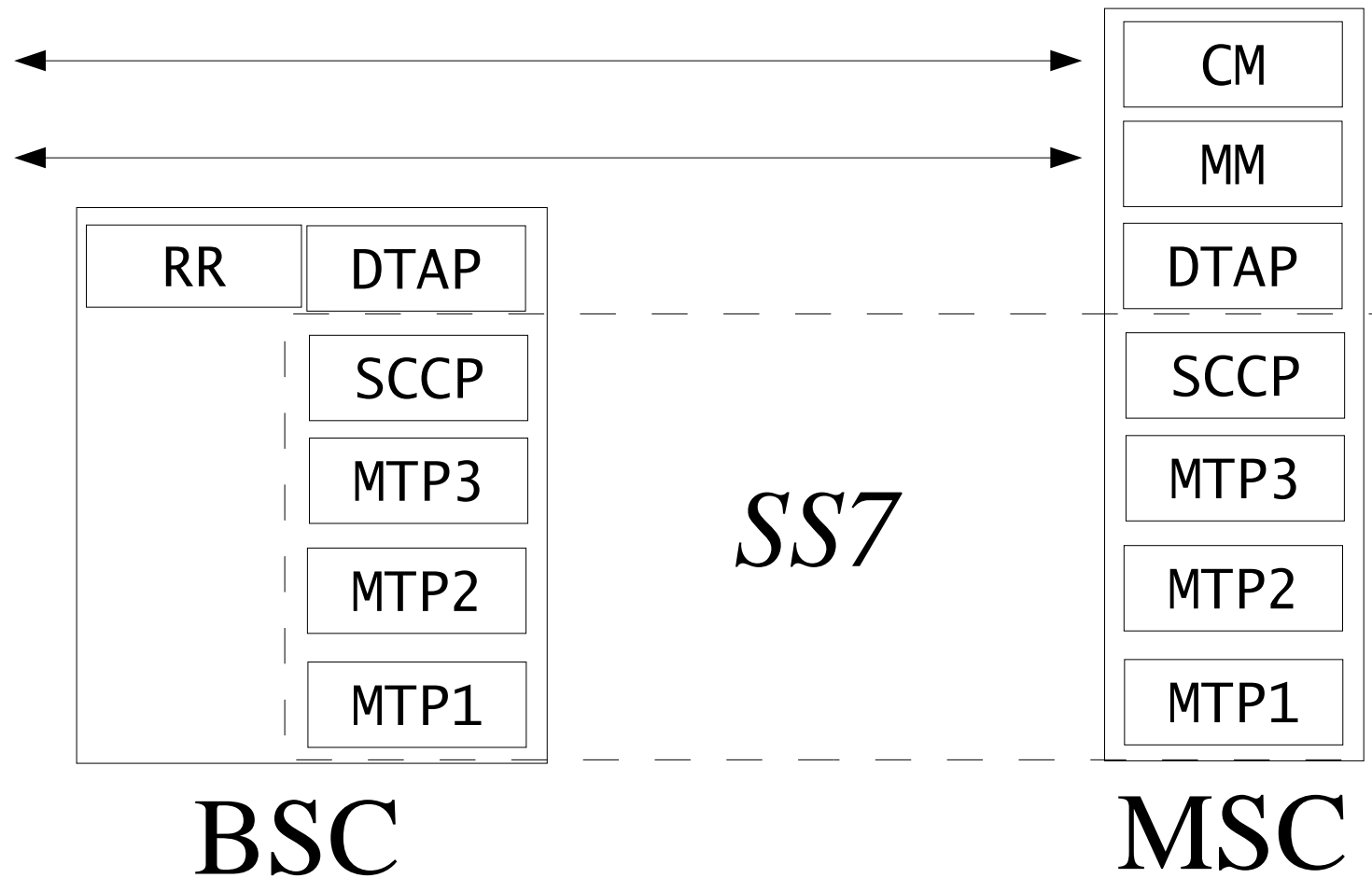


Signaling protocols BSS

- RR – radio resource management
 - idle mode: monitoring broadcast channels
 - dedicated mode: request, measure quality, power control, handover, synchronization of encryption, ...
- BTSM – BTS management, the BSC controls the radio resources of the BTS



Signaling protocols – MS/BSC/MSC



SS7 – signaling system number 7

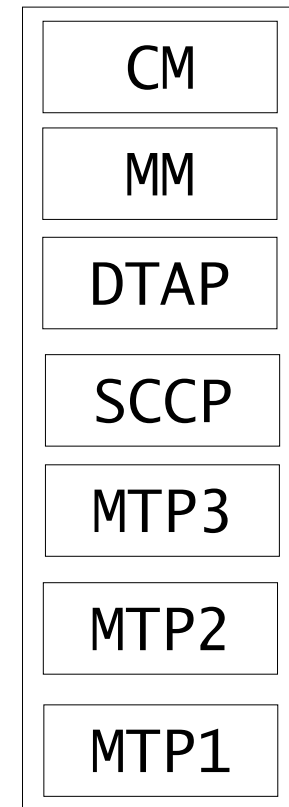


- MTP – message transfer part, defines layer one to three.
 - MTP1: could be E1
 - MTP2: link layer, error detection, retransmission...
 - MTP3: addressing in the form of signaling points, one interface has a unique address, limited address range
- SCCP – signaling connection control part
 - segmentation, global addressing, sub addressing (similar to UDP ports), each mobile has a MSC unique SCCP address

DTAP/MM/CM



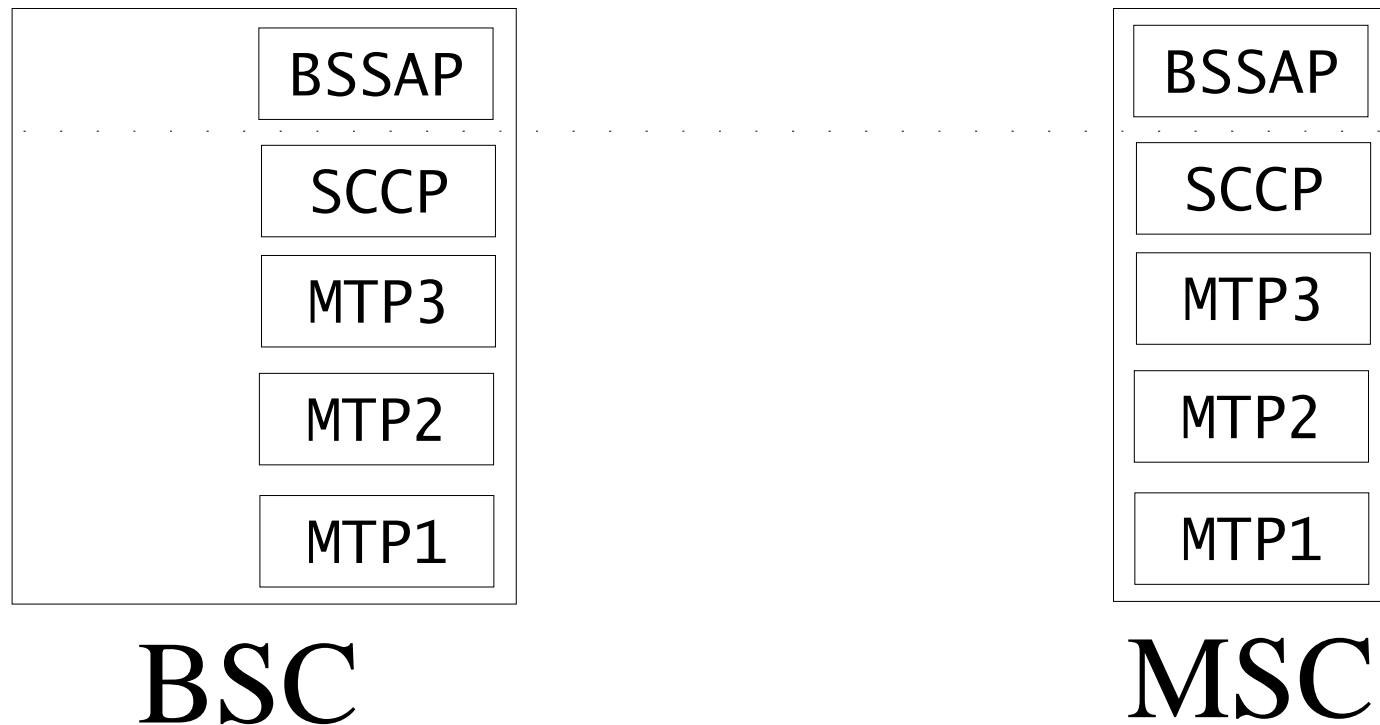
- Direct transfer application part
 - Will enclose a MM message so that it is transparently shipped over the BSC and BT to the MM layer at the mobile phone
- Mobility management
 - location area updating, paging, authentication ...
- Connection Management
 - Call control, SMS, supplementary services



MSC

Signaling protocols – BSC/MS

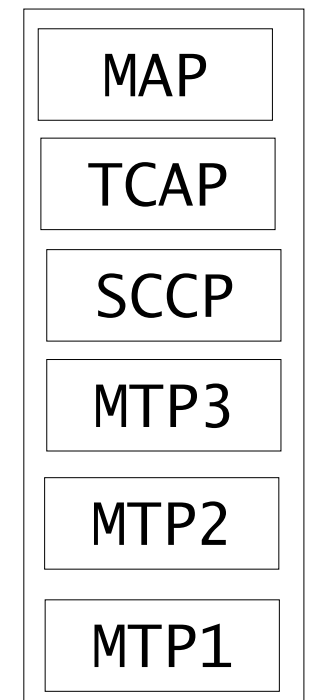
- BSS Application Part – the MSC will direct the BSC, for example when doing handover between two BSCs



Signaling protocols – MSC/HLR/VLR/...



- TCAP - transaction capabilities application part, defined in the SS7 stack
- MAP – mobile application part, this is the application layer protocol used by the nodes for example register updating and query





Which are important

- MAP
- BSSAP / BTSM
- CM
- MM
- RR
- LAPDm
- Radio
- ... and of course the traffic channels

Services – what is offered



- Bearer services
 - basic bit pipes in various sizes
- Tele services
 - Speech, SMS, fax, teletext ...
- Supplementary services
 - Controls the tele services

Bearer services



- Circuit switched data services
 - up to 9.6 kbps
 - up to 57.6 kbps using 4x14.4 HSCSD (how)
- Circuit switched data comes as:
 - transparent or non-transparent, the network does error detection and retransmission
- GPRS has introduced new bearer services
 - data services are migrating to GPRS



Teleservices

- Voice, TS11
- Emergency call, TS12
- Fax, TS61
- SMS,
 - mobile terminating TS21
 - mobile originating TS22
- Message Handling System, TS31
- Teletext TS51 – does anyone use this?



Supplementary services

- Call forwarding
 - always/busy/no reply/not reachable
- Barring
 - Outgoing: all or international
 - Incoming: all or international when roaming
- Number presentation
- Call waiting
- Multi-party

Transport of voice

- GSM Speech Code is converted in the TRAU (often in the BSC) to A-law (regular phone voice codec)

