

CSC411: Advanced Networks

Wireless Networks: Types

Note: This class lecture will be recorded!

If you do not consent to this recording, please do not ask questions via your video, audio or public chat; send your question to the instructor using the private chat.

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Wireless Networks

- ▶ Basic Elements
 - Wireless hosts
 - Wireless links
 - Base station
- ▶ Two Types
 - Infrastructure
 - Ad hoc
- ▶ Further divided
 - Single-hop
 - Multi-hop

Link-Layer Differences

- ▶ Decreasing signal strength
- ▶ Interference from other sources
- ▶ Multipath propagation

- ▶ Code Division Multiple Access (CDMA)

Wireless Site Survey

- ▶ Conduct needs assessment
- ▶ Obtain copy of blueprints
- ▶ Walk-through
- ▶ Identify possible AP locations
- ▶ Verify AP locations
- ▶ Document findings

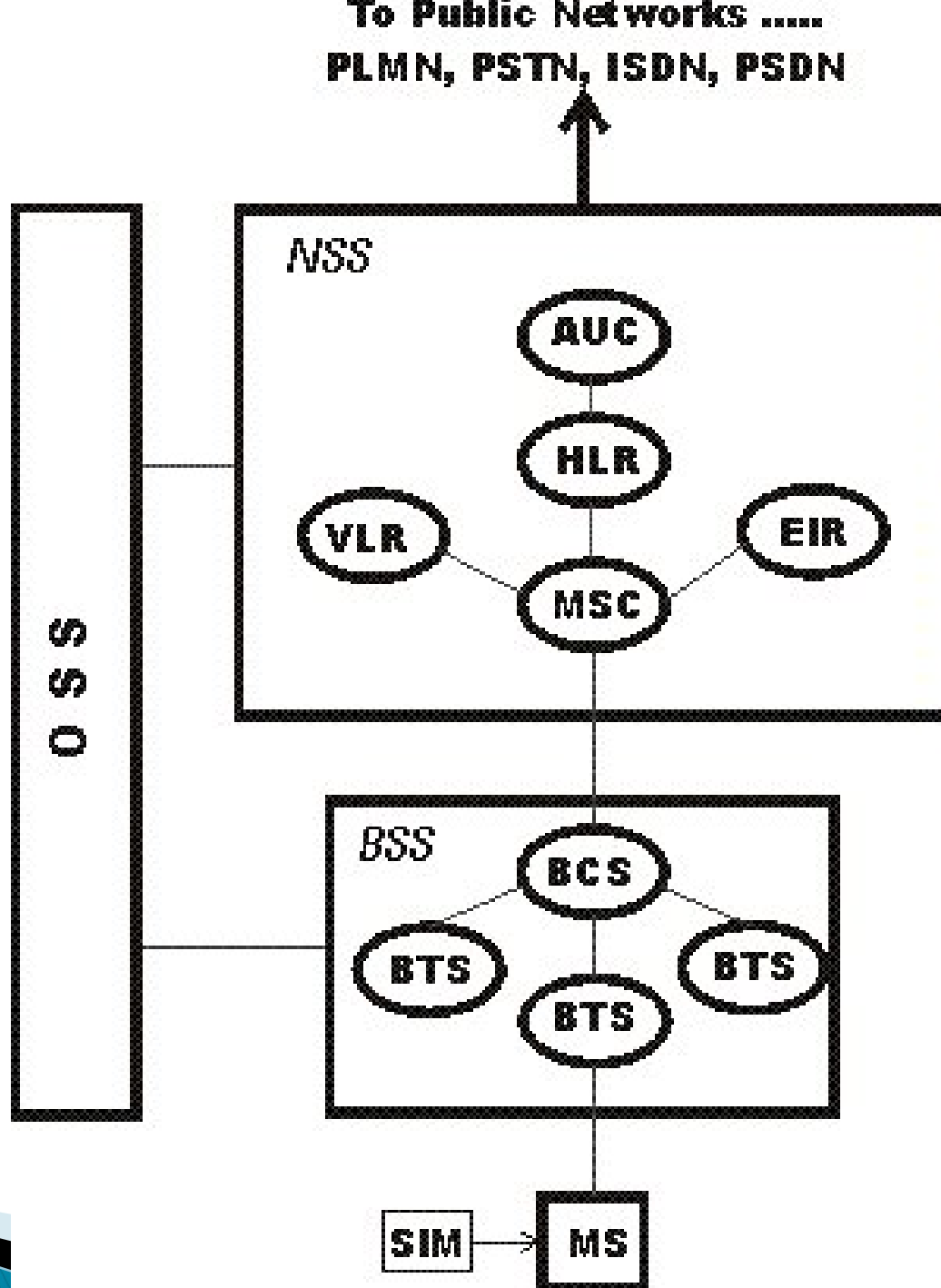
Cellular Networks

- ▶ Global System for Mobile (GSM) Communications
 - 80% worldwide subscribers
- ▶ Generations
 - 1G – analog FDMA; voice only
 - 2G – voice only (2.5G – voice and data)
 - 3G – voice and data; faster
 - 4G – faster
- ▶ Universal Mobile Telecommunications Service (UMTS)

Cellular Network Architecture

- ▶ Cellular
 - Cells
 - Base Transceiver Station (BTS)
- ▶ Four main areas
 - Mobile Station (MS)
 - Base–Station Subsystem (BSS)
 - Network and Switching Subsystem (NSS)
 - Operation and Support Subsystem (OSS)

GSM Arch.



Mobile Station

- ▶ Cell / mobile phones
- ▶ Two main elements
 - Mobile Equipment (ME)
 - Subscriber Identity Module (SIM)
- ▶ International Mobile Equipment Identity (IMEI)
- ▶ International Mobile Subscriber Identity (IMSI)

Base Station Subsystem (BSS)

- ▶ Base Transceiver Station (BTS)
 - Radio transmitter receivers and antennas
 - Defining element for each cell
- ▶ Base Station Controller (BSC)
 - Controls group of BTSs

Network Switching Subsystem (NSS)

- ▶ Mobile Switching services Centre (MSC)
 - Switching node
 - Interface to PSTN
- ▶ Home Location Register (HLR)
 - DB of subscriber information
- ▶ Visitor Location Register (VLR)
 - Selected information from HLR

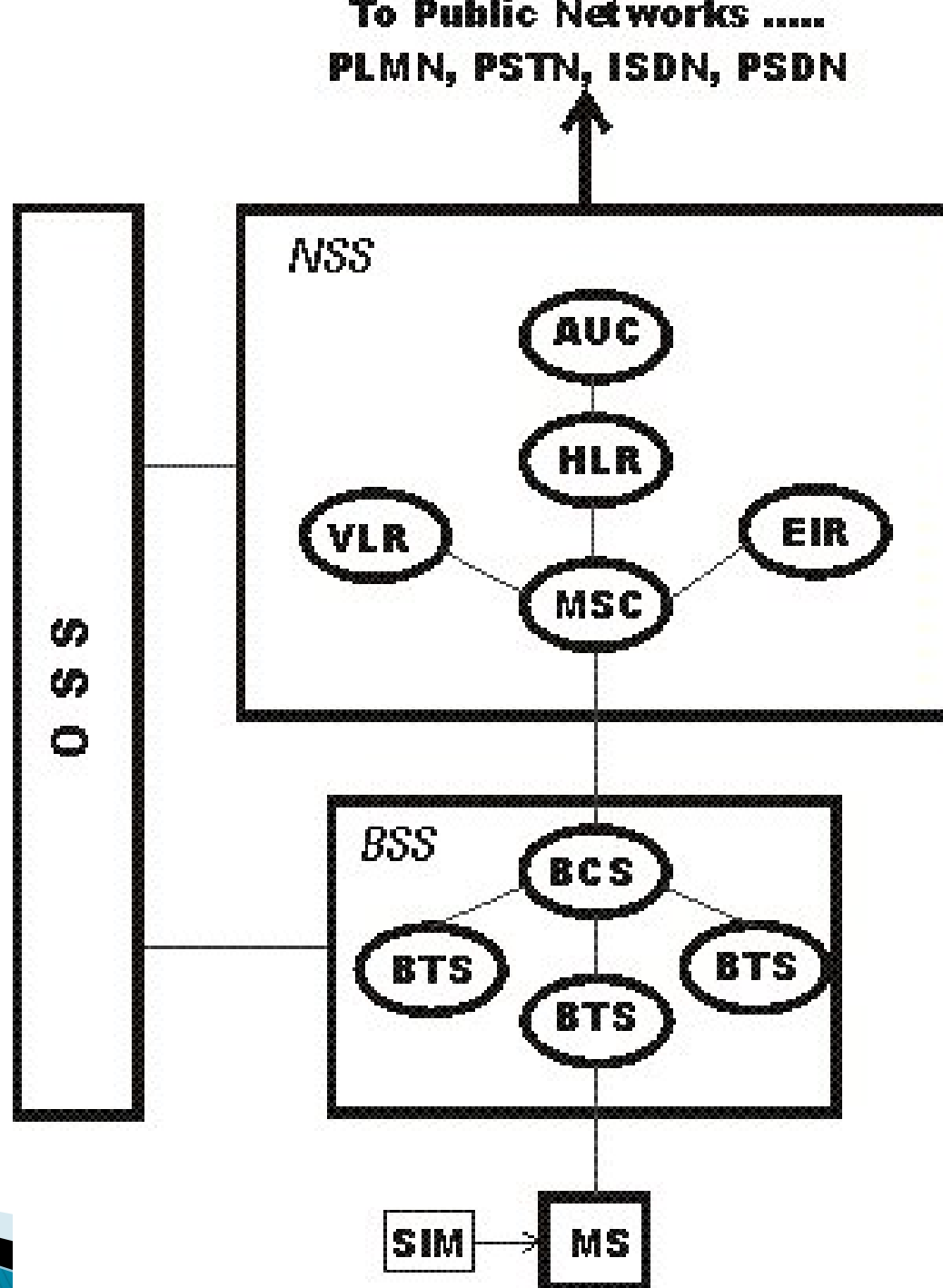
NSS, cont.

- ▶ Equipment Identity Register (EIR)
 - DB of mobile equipment (IMEI)
 - Determines if equipment allowed on network
- ▶ Authentication Centre (AuC)
 - Algorithms for authentication & encryption
- ▶ Gateway Mobile Switching Centre (GMSC)
 - Interconnects cellular network and PSTN

Operation and Support Subsystem (OSS)

- ▶ Connected to components of NSS and BSC
- ▶ Control and monitor overall GSM network

GSM Arch.



Ad Hoc Networks

- ▶ Routing and resource management distributed
- ▶ Deploy quickly and cheaply
- ▶ Some applications
- ▶ New or updates protocols
 - MAC
 - Routing