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## SIGNALING

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## SIGNALING

- ✘ Signaling is used between user and the network, or between two network elements to exchange various control information
- ✘ Signaling is used to establish, monitor, and release *connections*.
- ✘ before, during, after connection/call
  - + call setup and teardown (state)
  - + call maintenance (state)
  - + measurement, billing (state)

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## CONT'D

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- × between:
  - + end-user <-> network
  - + end-user <-> end-user
  - + network element <-> network element
  
- + **Example: SS7 (Signaling System no. 7):  
telephone network**

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## INBAND VERSUS OUTBAND SIGNALING

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- × *Inband signaling* refers to using the same voice frequency band to carry signaling information as that used to carry voice (i.e., 300-3400Hz). An example is DTMF signaling, which is used on most telephone lines to exchanges.
- × In contrast, *outband signaling* refers to using frequencies above the voice band. (but below the upper threshold of 4000Hz) to carry signaling information.

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## LINE VERSUS REGISTER SIGNALING

- ✘ Line Signaling is concerned with conveying information on the state of the line or channel, such as on-hook, off-hook (together referred to as supervision), ringing current (alerting), and recall.
- ✘ Register Signaling is concerned with conveying addressing information, such as the calling and/or called telephone number.

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## TELEPHONE NETWORK: SERVICES

- ✘ point-to-point POTS calls
- ✘ special telephone numbers:
  - + 800 number service: free call to customer
  - + 900 number service: bill caller
- ✘ Caller ID
- ✘ Calling card/third part charging
- ✘ Support for cellular roaming: "home" number routed to current cell location



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## SIGNALING SYSTEM 7: TELEPHONE NETWORK SIGNALING

- ✘ SS7 is a set of telephony signaling protocols which are used to set up most of the world's public switched telephone network telephone calls.
- ✘ The main purpose is to set up and tear down telephone calls. Other uses include number translation, prepaid billing mechanisms, short message service (SMS), and a variety of other services
- ✘ *out-of-band signaling*: telephony signaling carried over *separate* network from telephone calls (data).

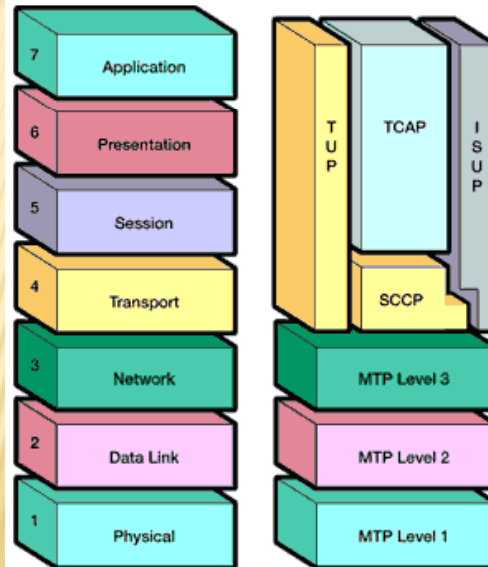
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## SIGNALING ARCHITECTURE

- ✘ Three essential components, connected by signaling links
- ✘ Signal switching points (SSPs)
- ✘ Signal transfer points (STPs)
- ✘ Signal control points (SCPs)

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## SS7 PROTOCOL STACK



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## LAYERS OF SS7 PROTOCOL

- ✘ Physical layer
- ✘ Message Transfer Part (MTP level 2)
- ✘ Message Transfer Part (MTP level 3)
- ✘ ISDN User Part (ISUP)
- ✘ Signaling Connection Control Part (SCCP)
- ✘ Transaction Capabilities Application Part (TCAP)

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## SIGNALING UNIT

✘ Signaling units are packets of digital information that follow a specific format. They are composed of various fields, which differ depending on the type of signaling unit and its purpose. Three following signaling units includes:

- + Message signal units (MSUs)
- + Link status signal units (LSSUs)
- + Fill-in signal units (FISUs)

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## CONT'D

