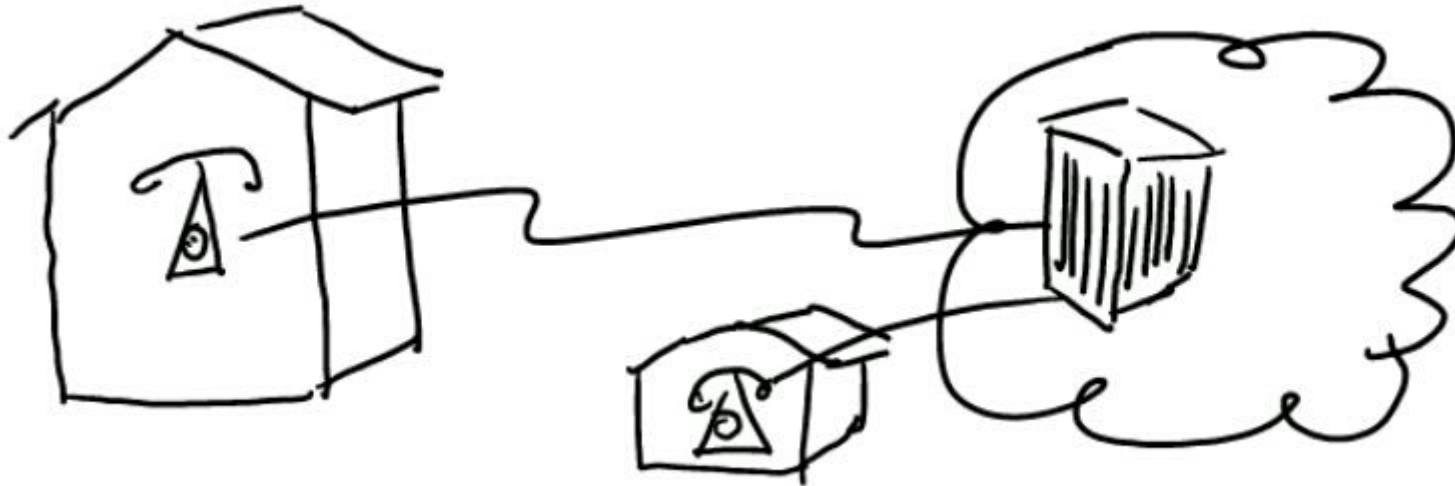


A call from your landline



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Telephone Instrument

- Electronic instrument – patent granted in 1876 to Alexander Graham Bell.
- Mechanism to sense voice, transfer it over pair of wires and reproducing it a other end.
- 48V DC supply from the exchange – gives power to equipment.
- Independent of home supply.



Image source: wikipedia.org



- Telephone – ringer unit – to indicate incoming call.
- Telephone need to be connected to telephone exchange (switch) – a telephone wire from your home to operator



Steps involved in a call

- You lift the handset
 - It has microphone and earphone, and you hold it with your hands.
- The wire from your phone connected to a electronic circuit in exchange (line interface card or line-card)



Image source: wikipedia.org



- Line card detects – handset lifted from cradle.
- Applies dial tone
 - you cannot dial a number before you get a dial tone.
 - Indicates that line card ready to receive digits from you.
- Dial digits
 - Pulses, cards counts the pulses and find the dialled digits.
 - DTMF (dual tone multi frequency), push button – sends two tones.
 - Card find the pushed digit based on combination of tones received.
- On receiving digits
 - line cards applies hunting tone to phone, indicating call setup in progress
 - The numbers are passed to exchange processor.



- Exchange processor

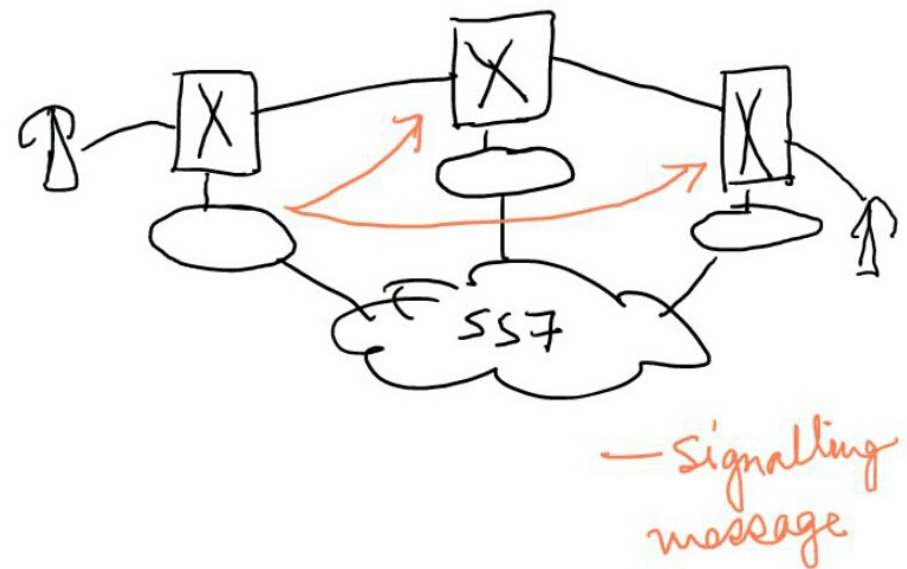
- From the port id (where wire from home is attached), knows who you are?
- It analyses if the call you want is permitted or not (based on your subscription)
- It then looks at routing tables for how the call can be routed to destination.
 - Complete route is decided
 - Only the next exchange (switch) is decided. Next switch responsible for further onward routing.



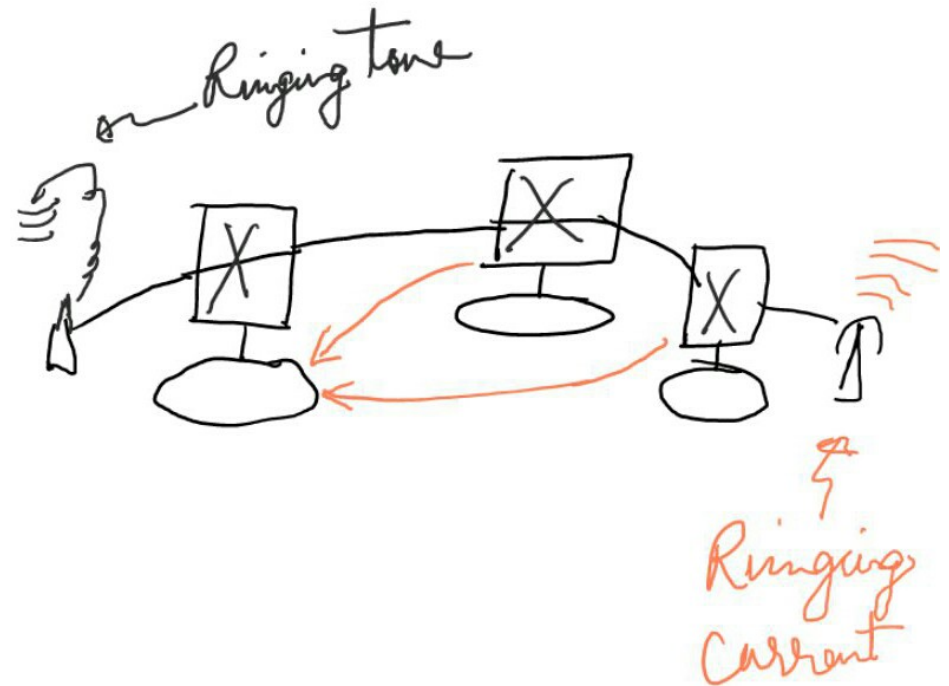
- Each exchange runs software (intelligent entity) on its processor.
- Intelligent entities in all the exchanges (switches) can interact with each other – same way as PCs can interact over internet.
- A network is formed for message transfer between these entities – SS7 network.
- SS7 (signaling system no.7)



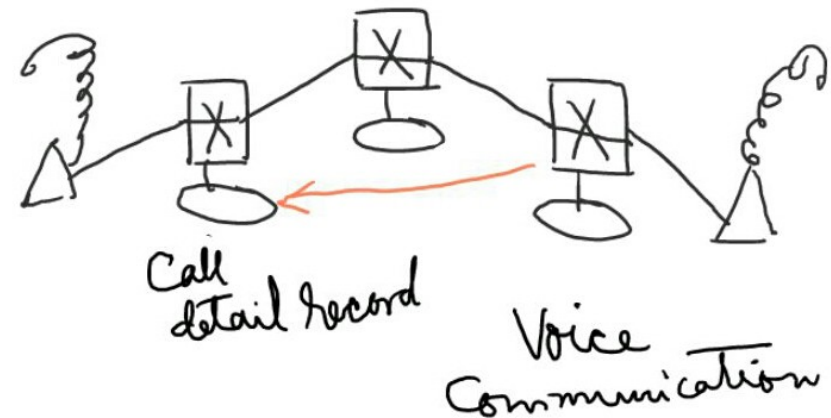
- Exchange processor send messages to all the intermediate exchanges, asking for resources (reservation of bandwidth for your call)
- Also ask the last exchange if the user is busy.
- All exchanges, blocks the resources – bandwidth



- Destination exchange confirm if the user is free.
- Source exchange ask everyone to setup the path.
- Asks destination exchange to apply ringing current to destination phone.
- Hunting tone is stopped.
- Destination current send ringing tone back to source phone.



- Once the person at other end, lifts the handset
- Destination exchange stops the ringing current and ringing tone both and path is finally made through.
- Destination exchange also sends message to source that call is through.
- Source exchange records the details
 - Call detail record (CDR)
 - Used for generating bill



- For a call two paths are used
 - One in each direction
 - Inefficient, as information – not transferred in both the direction all the time.
- DTMF – the tones in voice band are used.
 - Once a call is through
 - DTMF can be used to signal the equipment at the other end of the path

