

# MOBILE IP NETWORK LAYER

## Lesson 01

### OSI (open systems interconnection) Seven Layer and TCP/IP Five Layer Protocols

# OSI (OPEN SYSTEMS INTERCONNECTION)

- Seven layer model for data communication between two ends
  - (i) physical ( $L1$ ) for sending and receiving signals wirelessly (for example, TDMA or CDMA coding with FEC), or over wire/fibre
  - (ii) data-link ( $L2$ ) (for example, for linking to the destination computer using MAC address)
  - (iii) network ( $L3$ ) (for example, for routing through a chain of routers)

# OSI

- (iv) transport (*L4*) (for example, for defining sequencing and for repeat transmission, if required)
- (v) session (*L5*) (for example, for defining the transaction and session protocol for establishing end-to-end connectivity)

# OSI

- (vi) presentation (*L6*) (for example, for defining the data encoding format)
- (vii) application (*L7*) (for example, for running a web browser, mail transfer, or mobile e-business application)

# TRANSMISSION

- A physical network transmits data of one-end application (L7) to another-end application (L7) through the various intermediate layers
- At a layer, data received from the upper layer can be suitably divided (for example, packetized at the L3 IP layer)

# L7 TO L1 TRANSMISSION

- At each layer, data or each section of data suitably encoded (for example, by adding a header) for transmission to the lower layer

# L1 TO L7 RECEPTION

- At the receiving end of the network, the bits in the header fields are decoded (for example, by extracting the header) upon reception before passing the data to the upper layer

# DATA ENCODING (LEFT) AND DECODING (RIGHT) IN TCP/IP MODEL

Refer Figure 6.1



# L2 AND L1

- Usually associated with the communication and physical network radio and switching infrastructure, for example, in GSM or CDMA systems

# L3

- For networking (using a path chosen among the large number of paths available) through a chain of in-between routers
- IP protocol
- Mobile IP protocol

# L4

- Data transfer after a session is established through the session layer (*L5*) between two ports on the network to the *L4*
- Transport layer, *L4*: The protocol header fields of this layer define the sequences and other required fields for data transfer to and from a port in a network

# L4 IN TCP/IP MODEL

- Additional function of session establishment

# L5

- Defines how various sessions are established (for example, a call set up session)
- Not present in the TCP/IP model does not provide for a separate session layer and establishment and close functions included at L4

# L6

- Defines how the data from the port is to be presented or formatted
- Not present in the TCP/IP model does not provide for a separate session layer and presentation functions included at L7

# L7

- Supports multiple applications (Ports)
- Each port defines a protocol for transferring application contents and data of port

# L7

- Each port (application) defines a service access point at the *L7* layer
- Port — specify a distinct application deploying a distinct protocol for data transfer between the *L7*s at transmitter and receiver



# L7 Output Port (SOFTWARE)

- An output port transmits the service (application) contents and data employing a distinct protocol
- Port— service access point at *L7*
- Example— HTTP (hypertext transfer protocol)

# L7 LAYER — Input Port (SOFTWARE) (SERVICE ACCESS POINT) AT THE L7 LAYER

- A corresponding data input port (software) at the receiver L7 layer (service access point)
- Same protocol used to retrieve the service (application) contents and data as during transmission
- Example— HTTP (hypertext transfer protocol)

# L7 LAYER— Port number for specifying an application

- A port number can be defined for each application
- A port can be numbered in order to define and distinguish each application's data easily
- Example— HTTP port in the TCP/IP model, through which all the HTML files are transferred through the network, is numbered 80

# SUMMARY

- OSI Seven Model layers L7 to L1 transmission and L1 to L7 receiving functions
  - TCP/IP model— No L5 layer
  - Session establishment function by Transport layer
  - TCP/IP model — No L6 layer
  - Presentation function by an application layer protocol
- ...

## ... SUMMARY

- Port specify the protocol used for L7 layer application
- Port number specify distinct application
- IP protocol or Mobile IP protocol at L3 in TCP/IP model

## End of Lesson 01

# OSI (open systems interconnection) Seven Layer and TCP/IP Five Layer Protocols