

COMPUTER SCIENCE

Basic Networking Concepts

CONTINUATION.....

. Protocols -Define the rules that govern the communications between two computers connected to the network. -Roles: addressing and routing of messages, error detection and recovery, sequence and flow controls etc. -A protocol specification consists of the syntax, which defines the kinds and formats of the messages exchanged, and the semantic, which specifies the action taken by each entity when specific events occur. Example: HTTP protocol for communication between web browsers and servers. 13 S: MAIL FROM: Paul@Alpha.ARPA R: 250 OK S: RCPT TO: Jack@Beta.ARPA R: 250 OK S: DATA R: 354 Beginning of mail; ending by . S: Blah blah blah S: ...etc. S: . R: 250 OK Request For Comments (RFC): specifications of the protocols involved in Internet Communications. -Example: sample of

RFC 821 describing communications between SMTP server and client.

14 nth layer (n-1)th layer ... nth layer (n-1)th layer ... Network -

Protocols are designed based on a layered architecture such as the

OSI reference model. -Each entity at a layer n communicates only with

entities at layer n-1. -The data exchanged, known as Protocol Data

Unit (PDU), goes back and forth through the layers, each layer adds or

removes its own header and vice-versa. Therefore a layer n PDU may

become a layer n-1 data. 15 3. Protocol Layers The OSI (Open Systems

Interconnection) .

3. Protocol Layers The OSI (Open Systems Interconnection) Data

Model -ISO standard for computer networks design and functioning. -

Involves at least 7 layers, each playing a specific role when

applications are communicating over the net. -During the sending

process, each layer (from top to down) will add a specific header to

the raw data. -At the reception, headers are eliminated conversely

until the data arrived to the receiving application. 16 OSI Layers

Physical layer (defines the physical characteristics of the network)

Data-link layer (provides safe communication of data over the

physical network) Network layer (handles connection to the network

by the higher layers) Transport layer (provides end-to-end errors

detection and correction) Session layer (manages sessions among

applications) Presentation layer (provides standard data

representations for applications) Application layer (applications

connected to the network) 17 Physical layer: ensures a safe and efficient travel of data; consists of electronic circuits for data transmission etc. Data link layer: in charge of data encapsulation under the form of packets and their interpretation at the physical layer. Network layer: in charge of packets transmission from a source A to a destination B. Transport layer: in charge of the delivery of packets from a source A to a destination B Session layer: in charge of the management of network access. Presentation layer: determines the format of the data transmitted to applications, data compressing/decompressing, encrypting etc. Application layer: contains the applications which are used by the end-user, such as Java, Word etc. 18 The TCP/IP Model -Consists of only 4 layers: application, trans