

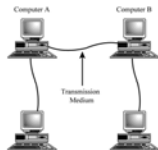
What is TCP/IP

In This Lecture

- Define network
- Explain what a network protocol suite is
- Explain what TCP/IP is
- Discuss the history of TCP/IP
- List some important features of TCP/IP
- Identify the organizations that oversee TCP/IP and the Internet
- Explain what RFCs are and where to find them

Network

A network is a collection of computers or computer-like devices that can communicate across a common transmission medium.



transmission medium: Any material substance, such as fiber-optic cable, twisted-wire pair, coaxial cable, dielectric-slab waveguide, water, and air, that can be used for the propagation of signals, usually in the form of modulated radio, light, or acoustic waves, from one point to another. Note: By extension, free space can also be considered a transmission medium for electromagnetic waves, although it is not a material medium. (ATIS Telecom Glossary 2000)

What is a Protocol

- protocol: 1. A formal set of conventions governing the format and control of interaction among communicating functional units. (ATIS Telecom Glossary 2000)

Example

- 8 5 12 12 15 0 23 15 18 12 4
- Without the key it is meaningless
- But if you are told that a=1 and z=26 and 0="space" then the message can be decoded
- "Hello World"

TCP/IP Protocol Suite

Transmission Control Protocol / Internet Protocol

- The protocols of TCP/IP defines:
 - How data should be processed
 - Transmitted
 - Received
- The act of formatting and processing TCP/IP transmissions is performed by a software component that is known as the TCP/IP Stack

Standard vs. Implementation

Be aware of the following distinction:

- • The TCP/IP standard is a system of rules defining communication on TCP/IP networks.

- • A TCP/IP implementation is a software component that performs the functions that enable a computer to participate in a TCP/IP network.

Purpose of TCP/IP Standards

- Ensure the compatibility of all TCP/IP implementations regardless of version or vendor.

History of TCP/IP History of TCP/IP

- 1962 Global network of computers proposed by MIT
- 1965 1st network between MIT and UCLA over phone lines.
- 1969 ARPANET
- 1972 Email was added to ARPANET
- 1972 TELNET
- 1973 FTP

History of TCP/IP History of TCP/IP

- 1977 TCP/IP Introduced
- 1989 Archie (search for files available via FTP)
- 1991 Gopher (user friendly interface)
- 1991 WWW
- 1981 Listserv
- 1993 First Graphical browser.

Design Criteria of the ARPANET

- The network concept was conceived to allow uninterrupted communications even if major parts of the network were destroyed by nuclear war!
- Communications had to be able to be “routed” around effected areas of the network.

TCP/IP Features

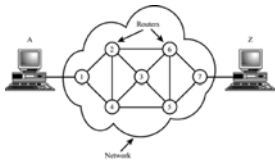
- Logical Addressing
- Routing
- Name Service
- Error Control and Flow Control
- Application Support

Addressing

- Every Network Interface Card (NIC) has a unique address programmed at the factory. This is known as the NIC Address or the Physical Address. (6 – 2 digit hex values)
- Most internet addressing is done via Logical Addressing. This allows for the internet to be broken into subnets. (usually represented as a “dot address” ie 131.117.95.1)

Routing

- A router is a special device that can read logical addressing information and direct data across the network to its destination



Name Resolution

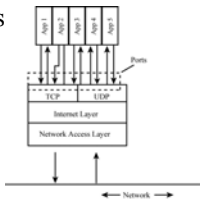
- Since people use the internet, and NIC and Logical addresses are not easy to remember.
- Name resolution allows a name like USM.EDU to be used.
- These names are referred to as DOMAIN NAMES

Error and Flow Control

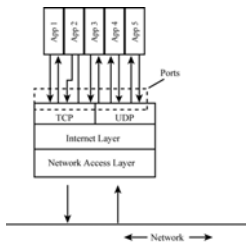
- Allows for error free transfer of data
- Verifies receipt of transmission.

Application Support

- Allows multiple programs to use the same network connection (email, WWW, FTP)
- Applications differentiate (application) numbers to



Application Support



Request for Comment (RFC)

- These documents make up the rules of the TCP/IP protocol.
- Many organizations play a roll in creating RFC's.

Bibliography

- “Teach Yourself TCP/IP in 24 Hours, Second Edition”, Joe Casad, Sams Publishing, March 01, 2001
- T1 Glossary 2000, <http://www.atis.org/tg2k/> 8/23/04
