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Lab 2 OSI Model and TCP/IP Model

Objective

● Describe the four layers of the TCP/IP model.

● Name the physical devices or components that operate at each layer

● Relate the seven layers of the OSI model to the four layers of the TCP/IP model.

● Name the primary TCP/IP protocols and utilities that operate at each layer.

Background

This lab will help to develop a better understanding of the seven layers of the OSI model. Specifically as they relate to the most popular functioning networking model in existence, the TCP/IP model. The Internet is based on TCP/IP. TCP/IP has become the standard language of networking. However, the seven layers of the OSI model are the ones most commonly used to describe and compare networking software and hardware from various vendors. It is very important to know both models and be able to relate or map the layers of one to the other. An understanding of the TCP/IP model and the protocols and utilities that operate at each layer is essential when troubleshooting.

Steps

1. Use the table below to compare the OSI layers with the TCP/IP protocol stack. In column two, indicate the proper name for each of the seven layers of the OSI model corresponding to the layer number. List the TCP/IP layer number and its correct name in the next two columns. Also list the term used for the encapsulation units, the related TCP/IP protocols and utilities that operate at each TCP/IP layer. More than one OSI layer will be related to certain TCP/IP layers.

OSI Comparison with TCP/IP Protocol Stack

OSI #	OSI Layer Name	TCP/IP #	TCP/IP Layer name	Encapsul. Units	TCP/IP Protocols at each TCP/IP layer	TCP Utilities
7	Application	4	Application	Data	HTTP, FTP, SMTP, DNS	Ping, Traceroute, Telnet
6	Presentation	4	Application	Data	TLS, SSL	
5	Session	4	Application	Data	NetBIOS, SMB	
4	Transport	3	Transport	Segment	TCP, UDP	Netstat, Nmap
3	Network	2	Internet	Packet	IP, ICMP, ARP, RIP, OSPF	Ping, IPConfig, Traceroute
2	Data Link	1	Network Interface	Frame	Ethernet, PPP, ATM	
1	Physical	1	Network Interface	Bits	Ethernet, DSL, ISDN	

Lab 2 Model Characteristics and Devices

Objective

· Name the seven layers of the OSI model, in order. Use a mnemonic.

· Describe the characteristics, functions and keywords relating to each layer.

· Describe the packaging units used to encapsulate each layer.

· Name the physical devices or components that operate at each layer.

Background

This lab will help to develop a better understanding of the seven layers of the OSI model. Specifically as they relate to the most popular functioning networking model in existence, the TCP/IP model. The Internet is based on TCP/IP. TCP/IP has become the standard language of networking. However, the seven layers of the OSI model are the ones most commonly used to describe and compare networking software and hardware from various vendors. It is very important to know both models and be able to relate or map the layers of one to the other. An understanding of the TCP/IP model and the protocols and utilities that operate at each layer is essential when troubleshooting.

Steps

1.   List the seven layers of the OSI model from the top to the bottom. Give a mnemonic word for each layer that can help you remember it. Then list the keywords and phrases that describe the characteristics and function of each.

Layer #	Name	Mnemonic	Key Words and Description of Function
7	Application	Away	Interfaces with the user; provides network services such as HTTP, FTP, and email applications.
6	Presentation	Pizza	Responsible for data translation, encryption, and compression; ensures the data is in a usable format.
5	Session	Sausage	Manages and controls the connections between computers; establishes, maintains, and terminates sessions.
4	Transport	Throw	Ensures error-free data transmission between hosts; uses flow control and error handling (TCP/UDP).
3	Network	Not	Determines the best path for data across a network; routes packets through routers using IP addressing.
2	Data Link	Do	Handles error detection, correction, and physical addressing (MAC); ensures reliable data transfer across the physical link.
1	Physical	Please	Defines the physical hardware for transmitting raw bits over a communication medium (e.g., cables, signals).

2. List the seven layers of the OSI model and the encapsulation unit used to describe the data grouping at each layer. Also list the networking devices that operate at each layer, if applicable.

Layer #	Name	Encapsulation Unit or Logical Grouping	Devices or Components that Operate at this Layer
7	Application	Data	Computer, Browser
6	Presentation	Data	Encryption devices
5	Session	Data	Gateways, Firewalls
4	Transport	Segment	Router, Switch
3	Network	Packet	Router, Switch
2	Data Link	Frame	Switch, Bridge
1	Physical	Bits	Hubs, Network cables