

Describe in detail the process of transition of IPv4 to IPv6.

Describe in detail about ICMP.

TCP:

Is TCP connection oriented or connection-less protocol? Justify your answer

Discuss in detail the various congestion control mechanisms in TCP.

WWW and HTTP

Analyze the message format and the message transfer and the underlying protocol involved in the working of electronic mail.

Firewall

1. What is the purpose of including the IPv4 header and the first 8 bytes of datagram data in the error-reporting ICMPv4 messages?

The error-reporting messages report problems that a router or a host (destination) may encounter when it processes an IP packet. One of the main responsibilities of ICMP is to report errors. Although technology has produced increasingly reliable transmission media, errors still exist and must be handled. IP is an unreliable protocol. This means that error checking and error control are not a concern of IP. ICMP was designed, in part, to compensate for this shortcoming. However, ICMP does not correct errors-it simply reports them. Error correction is left to the higher-level protocols. Error messages are always sent to the original source because the only information available in the datagram about the route is the source and destination IP addresses. ICMP uses the source IP address to send the error message to the source (originator) of the datagram.

2. What are the metrics used in determining the best path for a routing protocol?

- Hop count.
- Path reliability.
- Path speed.
- Load.
- Bandwidth.
- Latency.
- Maximum transmission unit

UDP is a message-oriented protocol. TCP is a byte-oriented protocol. If an application needs to protect the boundaries of its message, which protocol should be used, UDP or TCP?

UDP is preferred because each user datagram can be used for each chunk of data.

Compare the TCP header and the UDP header. List the fields in the TCP header that are missing from UDP header. Give the reason for their absence.

Transmission Control Protocol (TCP) and User Datagram Protocol (UDP) are the two standard transport layers used with internet protocol (IP).

TCP will be connection-oriented – after an interconnection is made, data is usually mailed bidirectional.

UDP is often a simpler, connectionless Web protocol. Multiple communications usually are sent as packages throughout pieces exploitation UDP.

The field that are missing in the UDP header but present in the TCP header are - The sequence number, acknowledge number, and Window fields.

This is because UDP is significantly more limited in capability than TCP, its headers are much smaller. A UDP header contains 8 bytes, whereas each TCP header has ten required fields totalling up to 20 bytes (160 bits) in size. They can also optionally include an additional data section up to 40 bytes in size.

Differentiate Connectionless and Connection-Oriented Services of transport layer protocols.

In connection less service there is no connection between transmitter & receiver Ex: UDP

In connection oriented service there is a connection between transmitter & receiver Ex: TCP

What is the major difference between Integrated Services and Differentiated Services?

INTEGRATED SERVICES	DIFFERENTIATED SERVICES
Architecture that specifies the elements to guarantee Quality of Service (QoS) on network	Architecture that specifies a simple and scalable mechanism for classifying and managing network traffic and providing QoS on modern IP networks
Involve prior reservation of resources before sending to achieve the required Quality of Service	Mark the packets with priority and send it to the network and do not require prior reservation
Also called IntServ	Also called DiffSer
Not scalable	Scalable
Involve per flow setup	Involve long term setup
Involve end to end service scope	Involve domain service scope
	Visit www.PEDIAA.com

Classify the types of WWW documents.

The documents in the WWW can be grouped into three broad categories: static, dynamic and active.

- A) Static: Fixed-content documents that are created and stored in a server.
- B) Dynamic: Created by web server whenever a browser requests the document.
- C) Active: A program to be run at the client side.

What are the parts of a browser?

Each browser usually consists of three parts: a controller, client protocol, and interpreters. The controller receives input from the keyboard or the mouse and uses the client programs to access the document. After the document has been accessed, the controller uses one of the interpreters to display the document on the screen. The client protocol can be one of the protocols such as FfP or HTIP. The interpreter can be HTML, Java, or JavaScript, depending on the type of document.

Write short notes on SSL.

The Secure Socket Layer (SSL) is an open protocol designed by Netscape; it specifies a mechanism for providing data security layered between application protocols (such as HTTP, Telnet, NNTP, or FTP) and TCP/IP. It provides data encryption, server authentication, message integrity, and optional client authentication for a TCP/IP connection.

How is HTTP related to WWW?

The Hypertext Transfer Protocol (HTTP) is a protocol used mainly to access data on the World Wide Web. HTTP functions as a combination of FTP and SMTP. It is similar to FfP because it transfers files and uses the services of TCP. However, it is much simpler than FfP because it uses only one TCP connection. There is no separate control connection; only data are transferred between the client and the server. HTTP is like SMTP because the data transferred between the client and the server look like SMTP messages.

What do you mean by reliable flooding?

It is the process of making sure that all the nodes participating in the routing protocol get a copy of the link state information from all the other nodes.

Explain why most of the addresses in class A are wasted. Explain why a medium-size or large-size corporation does not want a block of class C addresses.

What are the advantages of using UDP over TCP?

- UDP does not include the overhead needed to detect reliability
- It does not need to maintain the unexpected deception of data flow
- UDP requires less processing at the transmitting and receiving of hosts.
- It is simple to use for a network
- The OS does not need to maintain UDP connection information

What do you mean by QoS? Also infer how to improve QoS.

Quality of Service is used in some organizations to help provide an optimal end user experience for audio and video communications. QoS is most commonly used on networks where bandwidth is limited with a large number of network packets competing for a relatively small amount of available and width.

TECHNIQUES TO IMPROVE QoS

1. scheduling,
2. traffic shaping,
3. admission control, and
4. resource reservation.

Suppose a TCP connection is transferring a file of 5000 bytes. The first byte is numbered 10001. What are the sequence numbers for each segment if data is sent in five segments, each carrying 1000 bytes?

Segment 1 Sequence Number: 10,001

(range: 10,001 to 11,000)

Segment 2 Sequence Number: 11,001

(range: 11,001 to 12,000)

Segment 3 Sequence Number: 12,001

(range: 12,001 to 13,000)

Segment 4 Sequence Number: 13,001

(range: 13,001 to 14,000)

Segment 5 Sequence Number: 14,001

(range: 14,001 to 15,000)

List the services of end to end services.

- Guarantee message delivery.
- Delivery messages in the same order they are sent.
- Deliver at most one copy of each message.
- Support arbitrarily large message.
- Support synchronization.

Define Persistent and Non-persistent connections.

- A nonpersistent connection is the one that is closed after the server sends the requested object to the client.
- Persistent connections, the server leaves the TCP connection open after sending responses and hence the subsequent requests and responses between the same client and server can be sent

Write short notes on the protocols used for email security.

The standard email protocol list includes SMTP, POP3, and IMAP. Each of them operates differently and provides a different service for managing your email account.

SMTP

[SMTP](#) stands for Simple Mail Transfer Protocol, and it is responsible for sending email messages. This protocol is used by email clients and mail servers to exchange emails between computers.

POP3

The [POP3](#) abbreviation stands for Post Office Protocol version 3, which provides access to an inbox stored in an email server. It executes the download and delete operations for messages.

IMAP

The Internet Message Access Protocol ([IMAP](#)) allows you to access and manage your email messages on the email server. This protocol permits you to manipulate folders, permanently delete and efficiently search through messages.

Define DNS.

DNS is a client/server application that identifies each host on the internet with a unique user friendly name. It involves the mapping of Domain names to IP addresses.

Analyze the requirements of Cryptographic algorithms.

Security Requirements

Authentication

Data integrity

Confidentiality

Non-repudiation

Cryptographic algorithms

- Symmetric
- asymmetric