Unit 8 - Week 06: P2P Nodes Communications Challenges in Heterogeneous Network Environments, P2P Overlaid Multicast, and A Design of P2P Email System

Assignment_6

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-10-28, 23:59 IST.

1) Consider the following statements about P2P Multicast system? *1 point*

i. P2P multicasting is an efficient method to provide streaming of various content over the Internet.
ii. The objective of content distribution can be twofold: maximization of the system throughput (i.e. the streaming rate) and minimization of the streaming cost while guaranteeing the particular streaming rate.
iii. The content to be distributed through P2P multicasting can be divided into two categories: elastic content (file sharing system), and streaming content (live streaming system) with specific bit rate requirements (e.g. media streaming)
iv. P2P multicasting must be provided with delivery guarantees.

Which of the above is statement/s is/are correct? Select the correct code.

- ○ i, ii
- ○ iii only
- ○ iv only
- ○ All of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
All of the above

2) Consider the following statements about survivability of P2P Multicast system? *1 point*

i. There are two basic approaches to provide network survivability: protection and restoration.
ii. The distinction between protection and restoration consists in the different time scale in which they operate. Protection needs pre-allocated network resources while restoration applies dynamic resource establishment.
iii. The main advantage of protection is quick reaction to the failure guaranteeing small restoration time.
iv. To protect the P2P multicasting system, one can establish two (or more) failure disjoint P2P multicast trees streaming the same content.

Which of the above is statement/s is/are **NOT** correct? Select the correct code.

- ○ i, ii
- ○ iii only
- ○ iv only
- ○ None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
None of the above

3) Consider the following statements about performance criteria of the P2P live streaming Multicast system. *1 point*

i. The total bandwidth utilization in the network.
ii. The quality of the stream delivered to the user.
iii. The scalability measured as number of forwarding entries.

Which of the above is statement/s is/are correct? Select the correct code.

- ☐ i only
- ☐ ii only
- ☐ iii only
- ☐ None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
i only
ii only
iii only

4) Consider the following statements about IP Multicast and application layer multicast. *1 point*

i. The IP multicast network allows one or more sources to efficiently send data to a group of recipients whereby the sources transmit only one copy of the data and the appropriate routers efficiently made duplicate copies along the way to each receiver.
ii. In the application layer protocol (overlaid multicast), end systems implement all the multicast related functionality as all the routers mandatorily do not support multicast.
iii. The IP multicast incurs larger end-to-end delays than Application layer multicast.
iv. In the application layer multicast, the data delivery can be based on single shared, source rooted tree or multiple shared trees.

Which of the above is statement/s is/are correct? Select the correct code.

- ☐ i, ii
- ☐ iii only
- ☐ iv only
- ☐ All of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
i, ii
iv only

5) Consider the following statements about P2P networking with firewall and VPN. *1 point*

i. A firewall allows all kind of traffic from inside to outside and vice-versa.
ii. Even when the P2P nodes are in network using private IP, the firewall can allow it to communicate with the P2P nodes on the network with public IP.
iii. A NAT is a kind of firewall with address translation mechanism additionally implemented.
iv. Secure link between P2P Nodes can be considered as VPN of two nodes.

Which of the above statement/s is/are true? Select the correct code.

- ○ i
- ○ ii, iii
- ○ iv
- ○ iii, iv

No, the answer is incorrect.
Score: 0
Accepted Answers:
iii, iv

6) Firewalls can be categorized as: *1 point*

i. Packet Filtering Firewall : It is used to control network access by monitoring outgoing and incoming packet and allowing them to pass or stop based on source and destination IP address, protocols and ports.
ii. Stateful Inspection Firewall: Stateful firewalls are able to determine the connection state of packet. It keeps track of the state of networks connection travelling across it, such as TCP streams. So the filtering decisions would not only be based on defined rules, but also on packet's history in the state table.
iii. Application Layer Firewall: Application layer firewall can inspect and filter the packets on any layer, up to the application layer. It has the ability to block specific content, also recognize when certain application and protocols (like HTTP, FTP) are being misused. In other words, Application layer firewalls are hosts that run proxy servers. A proxy firewall prevents the direct connection between either sides of the firewall; each packet has to pass through the proxy. It can allow or block the traffic based on predefined rules.
iv. Next Generation Firewalls (NGFW): Next Generation Firewalls are being deployed these days to stop modern security breaches like advance malware attacks and application-layer attacks. NGFW consists of Deep Packet Inspection, Application Inspection, SSL/SSH inspection and many functionalities to protect the network from these modern threats.

Which of the above statement/s is/are true? Select the correct code.

- ○ i
- ○ ii, iii
- ○ iv
- ○ All of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
All of the above

7) Consider the following statements about NAT. *1 point*

i. NAT device normally have no permanently visible public ports on the Internet to which incoming TCP or UDP connections from other peers can be directed.
ii. The illusion of anonymity (private IP addresses) and inaccessibility of the internal hosts behind a NAT device is not a problem for applications such as Web browsers, which on-ly need to initiate outgoing connections.
iii. When a host in a private realm initiates an outgoing session to host in the public realm through a NAT device, the NAT device assign a public endpoint to translate the private endpoint so that subsequent response packets from the external host can be received by the NAT, translated, and forwarded to the private endpoint. The assignment by the NAT device to translate a private endpoint to public endpoint and vice versa is called End-point Mapping. NAT uses endpoint mapping to perform translation for the duration of the session.
iv. A NAT-friendly P2P application is a P2P application that is designed to work effective-ly even as peering nodes are located in distinct IP address realms, connected by one or more NATs.

Which of the above statement/s is/are **NOT** true? Select the correct code.

- ○ i
- ○ ii, iii
- ○ iv
- ○ None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
None of the above

8) Consider the following statements about HTTP tunneling and proxy. *1 point*

i. When navigating through different networks of the Internet, proxy servers and HTTP tunnels are facilitating access to content on the World Wide Web. A proxy can be on the user's local computer, or anywhere between the user's computer and a destination server on the Internet.
ii. TOR (The Onion Router), routes internet traffic through multiple proxies for anonymity.
iii. There are two types of proxies forward proxies (or tunnel, or gateway) and reverse proxies (used to control and protect access to a server for load-balancing, authentication, and decryption or caching).
iv. The HTTP tunneling transmits private network data and protocol information through public network by encapsulating the data. HTTP tunneling is using a protocol of higher level (HTTP) to transport a lower level protocol (e.g. TCP).

Which of the above statement/s is/are **NOT** true? Select the correct code.

- ○ i
- ○ ii, iii
- ○ iv
- ○ None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
None of the above

9) Consider the following statements about design characteristics of a P2P E-mail system. The Alice and Bob are two users in the system which represents the sender and receiver, respectively. *1 point*

i. Alice and Bob must know each other end point address.
ii. Bob should be able to receive the message irrespective of the Alice is alive or not. Alice should be able to send the message irrespective of Bob is alive or not.
iii. The Mail content may or may not be encrypted.
iv. The Non-repudiation property must be implemented in P2P email system.

Which of the above statement/s is/are **NOT** true? Select the correct code.

- ○ i only
- ○ ii, iv
- ○ iii only
- ○ None the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
None the above

10) Consider the following sequence of events that occur when Alice wants to sends Bob an E-mail in P2P Email system and how Bob retrieve this message. The Alice and Bob are two users in the system which represents the sender and receiver, respectively. *1 point*

A. Alice Mail Send Steps
S1. Alice and Bob clients must acquire the certificate from authentication server. After this, their mail ID becomes the part of the certficate.
S2. Alice will find the endpoint of address of each node ID retrieved. Each node is root for its own node ID, unless it is leaf node in Base DHT.
S3. Alice communicates with the Bob directly, does mutual authentication and then transfers the mail. No encryption and signatures needed, as they are communicating over secure channel directly.
S4. If Bob is not reachable on any device, then find the root(hash(Bob's emailD_copy1)) mail_storage DHT layer. Send the packaged email to it for transient storage.
S5. This root node automatically populates the stored email to root(hash(Bob's emailD_copy2)).

B. Bob Mail Retrieving Steps
R1. Bob when comes alive, connects to root(hash(Bob'sEmailD_copy1)), retrieves all the emails for it.
R2. Bob decrypts the encryption key using its private key.
R3. Bob using encryption key, decrypts the email.
R4. Bob verifies the signature on the message using Alice's Certificate. If certificate is not here, retrieve it from Base DHT layer.

Which of the following statement/s is/are **NOT** true? Select the correct code.

- ☐ Alice and Bob have multiple node ID and each node have public and private key pairs.
- ☐ Alice and Bob also have public and private key pairs. Bob mail retrieving Step R4, ensures the Non-repudiation property of the mail system.
- ☐ Step S5, ensures the resilience property of the mail system.
- ☐ None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
None of the above