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Information

All the questions on this page are essay questions.

Question **46**

Not yet answered

Marked out of 6.00

Please compare link-state routing protocols with distance-vector routing protocols regarding their message complexity, speed of convergence, and robustness.



**Distance Vector scales better:**

- Has lower message complexity as only sends messages to adjacent nodes
- Has worse convergence time, as if a link cost increase, there can be a chance of the count to infinity problem, where it'll take a long time for routers to know the truth.
- Less robust as each router only computes a partial shortest path, errors will propagate through the entire network

**Link State can only scale to a network of a few hundred routers:**

- Has high message complexity due to flooding all nodes in the network
- Has better convergence as it will converge in  $O(n^2)$  worst case
- More robust because every router computes the entire routing table, stops errors propagating

Question **47**

Not yet answered

Marked out of 6.00

1. What are the main differences between UDP and TCP?
2. Why do we need both of them?

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1.

- **TCP provides point-to-point reliable data transfer, while UDP provides its "best-effort" service**
- **This is because TCP is connection orientated thanks to its 3-way handshaking technique, while UDP is connectionless - each UDP segment is handled independently of each other.**
- **Another difference is there is congestion and flow control for TCP, while no congestion and flow control for UDP**

2.

- **We need both services as they solve each other's weaknesses and together provide a wide range of services**
- **TCP is good for making sure packets get sent in order so is good for messages and emails or on demand videos as it adapts to the best picture quality by transmitting every frame.**
- **while UDP offers reduced latency over TCP's reliability to provide a faster service. UDP doesn't care for the frame loss TCP cares about, or wait for ACK from the client side and retransmission of a lost packet and, leading to less buffering and reduced video playout delays. It is good for things that have tight timing constraints such as teleconferencing and internet telephony, or live streaming in real time.**

Question **48**

Not yet answered

Marked out of 4.00

It is said that retransmissions treat a symptom of network congestion, but not the cause of network congestion. Please give your understanding of this statement.

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"It is said that retransmissions treat a symptom of network congestion,..." - this means that retransmitting a packet only solves the problem after a packet loss has occurred, which is a consequence (symptom) of a congested network.

"but not the cause of network congestion." - because retransmissions do not solve the root of what is causing the congested network, which is to prevent a packet loss to occur in the first place.


We must solve the problem of overflowing buffers with congestion control, as this will treat the cause of congestion control and prevent packet loss. However, if a packet loss does occur, we can treat this symptom of network congestion by retransmitting it.

Question **49**

Not yet answered

Marked out of 4.00

Please describe briefly the main application layer protocols used in a typical Email system.



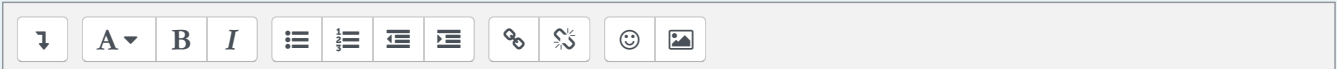
- **SMTP for delivery/storage from user agent to the receiver's mail server**
- **Mail access protocol: retrieval from the server**
  - **POP3: Post Office Protocol [RFC 1939]**
    - authorization between the user agent and mail server for and download
    - **Does not provide any means for a user to create remote folders and assign messages to folders;**
    - **Messages are downloaded to the local machine, so when you log into another server cannot find those messages**
    -
  - **IMAP: Internet Mail Access Protocol [RFC 1730]**
    - more features (more complex)
    - **Address the problem of POP3 by having folders and allowing users to organize them.**
    - **Keep all messages in one place: the server**
    - **Keep user state across sessions so if you organize the folders, and then log in to the new device, you can see the updated changes be made.**
    - **Permits user agent to obtain components of messages, e.g., message header only;**
    -
  - **HTTP:**
    - The user communicates with its remote mailbox via HTTP
    - uses TCP for reliable data transfer as it doesn't tolerate the loss of packets.

Question **50**

Not yet answered

Marked out of 4.00

Usually we can visit the same website by accessing either [www.websitename.co.nz](http://www.websitename.co.nz) or [websitename.co.nz](http://websitename.co.nz); and the website has email addresses ending with [@websitename.co.nz](mailto:@websitename.co.nz). (e.g., "[www.trademe.co.nz](http://www.trademe.co.nz)", "[trademe.co.nz](http://trademe.co.nz)", "[customerservice@trademe.co.nz](mailto:customerservice@trademe.co.nz)") Please try to explain how this works based on your understanding of DNS.



- DNS is a distributed database storing resource records, which uses UDP as the small request fits well into UDP segments and transport them faster.
- [@websitename.co.nz](mailto:@websitename.co.nz) is a type MX record for a mail server, where its value is the canonical name of the mail server associated with the alias name
- [www.websitename.co.nz](http://www.websitename.co.nz) is a type A record for a webserver, where its value is its canonical name
- This tells the top-level domain server that this is my authoritative name server

[◀ Quiz: Web and HTTP \(practice copy\)](#)

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