
Mid Semester Assignment
Course: - Distributed Computing

Deadline: - Mentioned on SIC

Marks: - 30

Program: - MS (CS)

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Class and Section: MsCs Semester 4th

Question1: Provide an example of a modern Distributed System not discussed in the course; discuss how this system solves certain challenges by employing distributed architecture.(5)

Ans1: Among the examples of modern distributed systems is cluster file system. Cluster file system provides certain features that includes independent location addressing and redundancy, this improves reliability and thus reduces the complexity in different parts of the cluster. In cluster file system we have parallel file system that spread data across multiple storage nodes for better redundancy and performance. A cluster file system is a system that is shared simultaneously on multiple servers. there are several approaches to clustering most of which do not employ to a clustered file system.

Question2: Among the trends of Distributed Systems discussed in C1-Lec2, which trend in your opinion will be most dominant in the future and why? (4)

Ans2: I am of the opinion that mobile and ubiquitous computing will be most dominant because technological advances has lead to miniaturization, whereas wireless networking on the other hand have lead to the integration of small and portable computing devices into distributed systems. More over every person has his/her portable devices and has an easy access to each and every thing like ordering something buying, searching, transferring data or goods so we have a very good user mobility as well.

Question3: Among the challenges of Distributed Systems discussed in C1-Lec2, which problem in your opinion will accompany distributed systems into the future and why? (3)

Ans3: among the challenges of distributed system I am of the opinion that security is the most vulnerable challenge to distributed system as through out the world access to the internet via different devices through distributed system is in practice where as to keep the data confidential and secure their should be minimum loophole in the security Example Mobile app for online banking are being hacked and money is being transferred from people account this is a loophole now and steps need to be taken.

Question4: The design of distributed systems can be described and discussed in threeways i.e Physical Model, Architectural Model and Fundamental Model. Describe the example of distributed system in Question1 with respect to these three models?(5)

Ans4:cluster computing have hardware composition of a system in terms of computer and their interconnected networks, it is extensible set of computers nodes interconnected by a computer network. In Cluster file system A shared file disk system uses a storage area network (SAN) to allow multiple computers to gain direct disk access at the block level Access control and translation from file level operations that applications use to block level operations used by the SAN must take place on the client node. The assumption of cluster file system is that it provides redundancy as parallel file system is involved due to which the data is save and reliable.

Question5: What is the purpose of Inter Process Communication (IPC) in distributed systems? Given the choice which protocol out of UDP and TCP will you use for your own distributed system and why?(5)

Ans5: Inter-process communication (IPC) refers specifically to the mechanisms an operating system provides to allow the processes to manage shared data. Many applications are both clients and servers, as commonly seen in distributed computing. If the decision is mine to make between UDP and TCP I will go for TCP because UDP provides unreliable delivery datagrams may be lost due to electrical interference, congestion or physical disconnection. On the other hand TCP provides reliable delivery and supports end to end streaming communication. To support reliable delivery each packet is acknowledged.

Question6: The following are some of the threats and attacks on Distributed Systems. Provide potential solutions as how may be these threats and attacks be mitigated? (8)

1. Leakage
2. Tampering
3. Vandalism
4. Eavesdropping.

Ans6: 1) Leakage:

Businesses must recognize how to identify their own critical data, we should consider encrypting any private confidential or sensitive information while encryption is not impenetrable, it is the best way to keep the data secure. An encryption implemented with care and key management process renders stolen data unreadable useless,.

2) **Tampering :**

It's still necessary to keep a close eye on your organizations databases servers and networks no security policy is perfect. But with IT security management tools and these technologies in place organizations are much less likely to be vulnerable to a data tampering attack.

3) **Vandalism :**

Vandalism monitoring system architecture can be used by the power companies to monitor the transformers against vandals. It is going to design such a monitoring system that would be able to detect the presence of a vandal near transformer also raise the alarm and send a message or a call to the control room officer or security officer in an designated area for response .

4) **Eavesdropping :**

Eavesdropping has four main components which are listed below.

Confidentiality:

Keep information secret

Authentication:

Receiver can verify who the sender or party A was.

Integrity

This detects modified messages .

Non Repudiation

Sender cannot deny falsely sending a message and receiver cannot deny receiving it.

THE END !!