CECS 327 Assignment 1 - Introduction to Distributed Systems

20 points

Assignment Description. Answer the following questions from the Chapter 1 reading from your textbook.

Be through and complete with your answers. You may work on these questions with a partner (no

more than two working together), but both students must submit the document individually on Beachboard

Dropbox along with both students’ names on each submission.

1. Name two advantages and two disadvantages of distributed systems over centralized systems.

Advantages:

1. With distributed systems you can spread the data load across several systems rather than just one.
2. A high amount of requests will bottleneck a centralized system and a distributed system can handle them better.

Disadvantages:

1. Security risks and issues are higher in distributed systems.
2. There are multiple points of failure possible in a distributed system.
3. Describe what is meant by a scalable system.

A scalable system is one that can change size whether that is in terms of the network, software, etc. capabilities. The versatility of the system is a direct reflection of the scalability of it.

1. Executing nested transactions requires some form of coordination. Explain what a coordinator should be doing in a scenario like this.

During a nested transaction the coordinator should be waiting until every commit has happened because of the risk of failure during the transactions.

1. What is the role of middleware in a distributed system?

Middleware is used to boost the transparency in a distributed system. Middleware is used to distribute between computers and their local operating systems.

1. Explain what is meant by a virtual organization and give an example on how such organizations could be implemented.

Organizations are brought together to allow the collaboration of a group of people from different institutions. One example where this would be used is in grid computing.

1. What is the difference between multiprocessor and multicomputer?

Multiprocessor has only a single computer with more than one processor, this single computer takes longer to load and have a single physical address shared by the CPU. Multiprocessor uses parallel computing.

Multicomputer has multiple computers and will run faster than the multiprocessor, there are also multiple addresses per CPU. This is a cluster of computers that operate as a single computer.

1. Why is it sometimes so hard to hide the occurrence and recovery from failures in a distributed system?

Because sometimes a system can run super slow sometimes it makes it hard to detect whether a system is truly down or just not responding quickly. This may make the system report that the service is not available.

1. In class, I discussed why having transparency isn’t always a good thing. Do you agree with me?

Yes, I agree with you. Sometimes hiding too much from the user can hinder rather than help by slowing systems or making it so that systems are harder to fix.

1. Scalability in distributed systems can be achieved by applying different techniques. What are these techniques?
2. Scale up- Add resources to a single node
3. Scale out- Add more nodes to a system
4. When a transaction is aborted, the computing system has to be restored to its previous state as if the transaction never happened. This is actually a lie. Give an example where resetting the computing system is practically impossible.

An example of this would be going back to our 326 class in the example dealing with the printer printing onto a paper. Once it has been printed it cannot be taken back.