Name: Pheng Male

ID: e20190813

Group: I4-B

TP1: Introduction to Distribute Systems

1. What is distribute system?

2. What are the characteristic of distributed system? Explain.

3. List down the 8 challenges of distributed system? Explain.

4. What are the disadvantage of distributed system? Explain.

5. What are the 8 forms of transparency in distributed system? Explain.

6. Give 5 types of hardware/software resources that can by share. Give example of theirs sharing as it occurs in practice in distributed systems.

7. What is single-point-of-failure and how can distribution help here?

8. When will we need distributed system? Give your ideas?

Answer

1. Distributed system is a type of computer system, where components of the system are spread out across different physical locations, connected by a network.

2. Characteristic of distributed system:

   - Concurrency of components: In distributed systems, each node can act independently of the others, allowing multiple tasks to be processed concurrently.

   - Lack of a global clock: In distributed systems, each node in the system is autonomous and has its own local clock. As a result, there is no global clock that can be used to coordinate actions between nodes.

   - Independent failures of components: In distributed systems, each node can have its own independent failure. This means that if one node goes down, the system can still continue to function, as the other nodes can still process the data

3. The challenges of distributed systems include:

   - Heterogeneity of components: Distributed systems must be able to operate on a variety of different hardware and software components. This requires the system to be able to effectively handle the different components and ensure that they all function properly together.

- Openness: In distributed systems, components can be added or replaced without affecting the overall system. Thus, the system must be open to allow for new components to be added or for existing components to be replaced with newer technologies.

- Security: In distributed systems, components must be properly secured to protect against malicious attacks. This includes authentication and authorization, encryption, and access control.

- Scalability: The system must be able to effectively scale to meet increased demands for workloads, resources, and data.

- Failure handling: In distributed systems, nodes can fail, and the system must be able to handle those failures gracefully. This includes ensuring that the data is still accessible and that the system can still operate in the event of a failure.

- Concurrency of components: In distributed systems, components must be able to work concurrently with each other without interfering with each other.

- Transparency: In distributed systems, components must be able to interact with each other without requiring the users to know the details of the underlying system.

- Quality of service (QoS): In distributed systems, components must be able to provide a certain level of quality of service in order to meet user expectations. This includes ensuring that tasks are completed in a timely manner and that data is accessible.

4. Disadvantages of distributed system:

- Increased complexity: Distributed systems are more complex than traditional systems due to the added complexity of managing multiple components. This can make development and maintenance more difficult and time-consuming.

- Reduced reliability: In distributed systems, components can fail, leading to decreased reliability and increased downtime.

- Security risks: With distributed systems, there is an increased risk of security breaches due to the increased complexity of managing multiple components.

- Increased costs: Distributed systems typically require more resources to operate, leading to increased costs.

- Latency: In distributed systems, there is often a higher level of latency due to the increased complexity of managing multiple components. This can result in slower

5 The 8 forms of transparency in distributed systems are :

- View transparency: Ensures that users can access remote resources in the same way as local resources, without being aware of the differences in the physical location of resources. It is achieved through the use of standard interfaces and protocols that provide a uniform way of accessing resources, regardless of their location
- Location transparency: Ensures that users can access resources without knowing their physical location. The system hides the details of resource location and provides a uniform naming scheme for resources, making it easy for users to access them.
- Replication transparency: ensures that users can access resources in a concurrent manner without the need for explicit coordination. The system manages resource allocation and synchronisation, making it transparent to users
- Migration transparency: Ensures that users can access replicated resources without knowing the location or the number of replicas. The system manages replication and synchronisation, making it transparent to users.
- concurrency transparency: Ensures that users can access resources even in the presence of failures. The system hides the details of failure handling and provides a uniform error handling mechanism.
- failure transparency: Ensures that users can access resources even when they move from one location to another. The system hides the details of resource movement and provides a uniform way of accessing resources regardless of their location.
- Performance transparency: Ensures that users can access resources without being aware of their performance characteristics. The system manages resource allocation and optimization, making it transparent to users.
- scalability transparency: Ensures that users can access resources even as the system scales up or down. The system hides the details of scaling and provides a uniform way of accessing resources regardless of the system size.

6. Give 5 types of hardware/software resources that can be shared: printer, plotter, storage space, cd drive, DVD drive, processing power.

7. Single-point-of-failure (SPOF) is a system or component that, if it fails, will cause the entire system to fail.

8. Distributed systems are used when a workload is too great for a single computer or device to handle. They're also helpful in situations when the workload is subject to change, such as e-commerce traffic on Cyber Monday