**NAME: PETER EMANUEL KIMINDU**

**REG NO: S13/02616/20**

**COURSE: COMPUTER SCIENCE**

**UNIT: COMP 361 {ADVANCED SOFTWARE ENGINEERING}**

**ASSIGNMENT 1.**

**DATE: 17th FEB, 2023.**

**FACULTY OF SCIENCE**

**EGERTON UNIVERSITY**

**(1)Applications of distributed architecture individually**

Distributed systems are architectures that allow multiple processes to run on multiple computers and networks simultaneously. This type of architecture can provide a variety of benefits, such as enhanced scalability, increased security, improved availability and reliability, better fault tolerance, and more efficient use of resources.

For individual applications, distributed architectures can be used to provide more efficient, reliable, and secure data storage and processing. For example, in a distributed architecture, data can be stored in multiple locations, which increases the likelihood of reliable backup if one of the servers fails. This ensures that any data stored in the system is not lost in the event of a system failure.

In addition, distributed architectures can provide more efficient data processing. When the data is stored in multiple locations, each location can be used to process a portion of the data in parallel, allowing for faster, more efficient processing. This can be especially useful for applications that require large amounts of data to be processed quickly, such as analytics or machine learning applications.

Finally, distributed architectures can provide improved security for individual applications. Since the data is stored in multiple locations, it makes it more difficult for hackers to access it, since they would need to gain access to multiple points of entry. This provides an additional layer of security for an application and its data.

**2.Compare distributed multi-tier architecture with 3-Multi-tier**

Distributed multi-tier architecture refers to a computing architecture where an application is split into multiple components which are spread across multiple physical machines. These components communicate with each other in order to provide a service to their users.

3-Multi-tier is a distributed architecture where the application is divided into three tiers: the front-end tier, the back-end tier, and the middle-tier. The front-end tier handles user interactions and provides a user interface. The back-end tier stores data and provides business logic. The middle-tier connects the front-end and back-end tiers and performs calculations and computations.

The main difference between distributed multi-tier architecture and 3-multi-tier is that distributed multi-tier architecture allows for more complex applications and is more scalable, whereas 3-multi-tier architecture is simpler and easier to implement. Additionally, distributed multi-tier architecture allows for better distribution of workloads and avoids potential bottlenecks that can occur with 3-multi-tier architecture.

**3. Highlight advantages and disadvantages between distributed and peer to peer architectures**

Distributed architectures provide a number of advantages over traditional peer-to-peer systems. First, distributed architectures are able to handle high levels of complexity and scale more easily due to the decentralized nature of the system. This makes them ideal for large-scale applications, such as enterprise networks.

Second, distributed architectures provide more fault tolerance and redundancy than peer-to-peer networks. This is because each component of the architecture is connected to more than one other component, meaning that individual components can be taken offline without affecting the performance of the entire system.

Third, distributed architectures are more secure than peer-to-peer networks due to the added complexity and redundancy of the system. This means that it is harder for malicious actors to gain access to the data or disrupt service.

However, distributed architectures also have a number of disadvantages. First, distributed architectures can be difficult to maintain and manage due to the complexity of the system. This can require specialized skills and knowledge, as well as expensive hardware and software.

Second, distributed architectures can be slower than peer-to-peer networks since data must be distributed among multiple components before it is available to the user. This can lead to slower response times and degraded performance.

Finally, distributed architectures are also more expensive to implement and maintain than peer-to-peer networks due to the cost of hardware, software, and specialized personnel. This can be a limiting factor for smaller businesses or organizations.

**4.Compare 3-tier architecture with peer to peer architecture**

3-tier architecture is a client-server architecture used in modern networked applications. It is composed of three distinct layers: the presentation layer, the application layer, and the data layer. The presentation layer typically involves user interfaces, such as web pages or mobile apps, that interact with the user. The application layer manages the logic of the application and is responsible for performing business logic tasks. The data layer stores and retrieves data from the database.

Contrasted with a 3-tier architecture, a peer to peer architecture does not involve a central server. Instead, peers in the network connect directly to each other to send and receive data. This architecture is suitable for applications where there is no single point of failure and where data is distributed across the network. Additionally, it can be used in applications where data privacy is important and data is not shared with a third-party. However, peer to peer architectures are not suitable for applications that require a large number of simultaneous connections or for applications that need to serve high-bandwidth content.