Top of FormBottom of Form**Unit 5: Current and Future Challenges of Operating Systems and Distributed Systems**

Welcome to Week 5. This week we shall gain an appreciation of some of the current and potential future challenges of developing operating and distributed systems. This considers challenges such as the scale of operations, in addition to the variety of solutions which have been provisioned.

**On completion of this unit, you will be able to:**

* + Appreciate the challenges of running secure operating and distributed systems in the modern world.
  + Research the state-of-the-art literature to examine current approaches used to support distributed networking.
  + Research the use of system modelling tools.

**Reflection:**

A **distributed system** is a group of autonomous computing nodes that can effectively communicate and collaborate with one another via the hardware and software connections among them. When building and deploying systems, it is important to keep in mind the obstacles that ensuring security in a distributed system presents. Information is not necessarily at risk solely on the hacked computer or network; malware might spread to other systems or network nodes (GeeksforGeeks, 2022).

Because the failure is partial in distributed systems—some parts stop working while others keep running—handling it can be tricky. To put it simply, concurrency is the potential of several clients attempting to access the same shared resource at the same time. Providing sufficient **security in distributed systems** is challenging since it requires protecting not just the individual nodes but also the connections between them. It's possible for some of your messages and data to get garbled up as they travel from node to node in a network.

The **client-server architecture**, broker pattern, and service-oriented architecture are the three most common application architectures for distributed applications (Bos, n.d.).

Based on the depth of the design, the **System Modeling Tool** often handles only a part of the entire needs. Therefore, changes to the needs baseline can be suggested using the System Modeling Tool, but these changes are managed and tracked formally using the Requirements Management Tool (Graves, 2012). Modeling tools can be thought of as "model-based testing tools" because they are used to create test inputs and test cases based on model data (such as a state diagram). It's useful for checking the accuracy of system or programmed models.

**References:**

Bos, S. (n.d.). *What Is a Distributed Application?* [online] JRebel by Perforce. Available at: <https://www.jrebel.com/blog/distributed-application>.

GeeksforGeeks. (2022). *Security in Distributed System*. [online] Available at: https://www.geeksforgeeks.org/security-in-distributed-system/ [Accessed 18 Jun. 2022].

Graves, H. (2012). Integrating Reasoning with SysML. *INCOSE International Symposium*, 22(1), pp.2228–2242. doi:10.1002/j.2334-5837.2012.tb01470.x.