***MICROSERVICES***

**What are Microservices?**

**Definition:** According to Sam Newman, **“**Microservices are the small services that work together.**”**

>According to James Lewis and Martin Fowler, **“**The microservice architectural style is an approach to develop a single application as a suite of small services. Each microservice runs its process and communicates with lightweight mechanisms. These services are built around business capabilities and independently developed by fully automated deployment machinery.**”**

There is a bare minimum of centralized management of these services, which may be written in different programming languages and use different data storage technologies.

**Points to remember**

• These are the services which are exposed by REST.

• These are small well-chosen deployable units.

• The services must be cloud-enabled.

> The microservice defines an approach to the architecture that divides an application into a pool of loosely coupled services that implements business requirements. It is next to Service-Oriented Architecture (SOA). The most important feature of the microservice-based architecture is that it can perform continuous delivery of a large and complex application.

Microservice helps in breaking the application and build logically independent smaller applications. For example, we can build a cloud application with the help of Amazon AWS with minimum efforts.

**Principles of Microservices:**

There are the following principles of Microservices:

• Single Responsibility principle

• Modeled around business domain

• Isolate Failure

• Infrastructure automation

• Deploy independently

>Single Responsibility Principle:

-- The single responsibility principle states that a class or a module in a program should have only one responsibility. Any microservice cannot serve more than one responsibility, at a time.

>Modeled around business domain:

-- Microservice never restricts itself from accepting appropriate technology stack or database. The stack or database is most suitable for solving the business purpose.

**Advantages of Microservices:**

• Microservices are self-contained, independent deployment modules.

• The cost of scaling is comparatively less than the monolithic architecture.

• Microservices are independently manageable services. It can enable more and more services as the need arises. It minimizes the impact on existing service.

• It is possible to change or upgrade each service individually rather than upgrading in the entire application.

• Microservices allows us to develop an application which is organic (an application which later upgrades by adding more functions or modules) in nature.

• It enables event streaming technology to enable easy integration in comparison to heavyweight interposed communication.

• Microservices follow the single responsibility principle.

• The demanding service can be deployed on multiple servers to enhance performance.

• Less dependency and easy to test.

• Dynamic scaling.

• Faster release cycle.

**Disadvantages of Microservices:**

• Microservices have all the associated complexities of the distributed system.

• There is a higher chance of failure during communication between different services.

• Difficult to manage a large number of services.

• The developer needs to solve the problem, such as network latency and load balancing.

• Complex testing over a distributed environment.

**Microservices Monitoring:**

-- Monitoring is the control system of the microservices. As the microservices are more complex and harder to understand its performance and troubleshoot the problems. Given the vivid changes to software delivery, it is required to monitor the service. There are five principles of monitoring microservices, as follows:

• Monitor containers and what's inside them.

• Alert on service performance.

• Monitor services that are elastic and multi-location.

• Monitor APIs.

• Monitor the organizational structure.

-- These principles allow us to address technological changes associated with the microservices and organizational changes related to them.

**Microservices Monitoring Tool:**

There are three monitoring tools are as follows:

• Hystrix dashboard

• Eureka admin dashboard

• Spring boot admin dashboard

**Microservice Virtualization:**

-- Microservices virtualization is the method to simulate the behavior of specific components in various component-based applications like cloud-based application, SOA, and API driven architecture. Service virtualization also reduces cost and saves time. By combining service virtualization, an organization can develop the application which can be delivered from various locations and dissimilar environments.