## **Introduction to Software Environments and CI/CD**

Modern software development involves multiple environments to ensure quality, reliability, and smooth deployment. These environments allow teams to build, test, and release applications in a controlled manner.

**Why Multiple Environments?**

* Reduce risk of failures in production
* Enable thorough testing at different stages
* Provide isolation for development and testing

**CI/CD (Continuous Integration and Continuous Deployment)** CI/CD automates the process of integrating code changes and deploying them across environments. It ensures:

* Faster delivery
* Consistent builds
* Automated testing and deployment

## 

## **Development and QA Environments**

### **Development Environment (Dev Env)**

* Hosted on a **VM in the cloud**
* Used by developers to write and test code locally
* Provides flexibility for rapid changes

### **QA Environment**

* Another **VM in the cloud**
* Purpose: **Testing and bug fixing**
* Process:
  + Test the application
  + File bugs
  + Fix issues
  + Achieve a stable build (GREEN)

## **Staging, UAT, and Pre-Production**

### **Staging Environment**

* Another VM in the cloud
* Mimics production environment
* Used for **integration testing** and **final checks**

### **UAT (User Acceptance Testing)**

* Focus on **Load Testing** and **Stress Testing**
* Ensures the application can handle real-world usage
* Validates business requirements

### **PPE (Pre-Production Environment)**

* Another VM
* Final round of testing before going live
* Confirms readiness for production

## **Production Environment and Best Practices**

### **Production Environment**

* The live environment where the application is deployed
* **GO LIVE** stage
* Accessible to end-users

### **Best Practices for Multi-Environment Setup**

1. Automate deployments using CI/CD pipelines
2. Keep environments isolated to avoid conflicts
3. Use consistent configurations across environments
4. Monitor performance and logs in all environments
5. Document environment details for transparency

**Benefits:**

* Improved quality assurance
* Reduced downtime
* Faster release cycles