# **Day 5: Jenkins for Continuous Integration (CI) Assignment**

1. **Understanding Jenkins Architecture**

a. Write a brief document explaining the Jenkins architecture, including the concepts of Jenkins master and agents (slaves). Describe how Jenkins interacts with different cloud platforms.

**Jenkins Architecture Overview**

Jenkins is an open-source automation server that facilitates continuous integration and continuous deployment (CI/CD) by automating the building, testing, and deployment of software applications. Its architecture follows a distributed model consisting of a **Jenkins Master** and **Jenkins Agents (Slaves)** to efficiently handle build tasks.

**Jenkins Master**

The Jenkins Master is the central control unit responsible for:

* Managing the overall Jenkins environment
* Scheduling and delegating build jobs to agents
* Monitoring and reporting build statuses
* Hosting the web-based Jenkins dashboard
* Storing configurations, job definitions, and plugin data

**Jenkins Agents (Slaves)**

Jenkins Agents (also known as Slaves) are worker nodes that execute tasks delegated by the Master. Key responsibilities of agents include:

* Running build, test, and deployment jobs
* Supporting various environments and platforms
* Enhancing scalability by distributing workloads

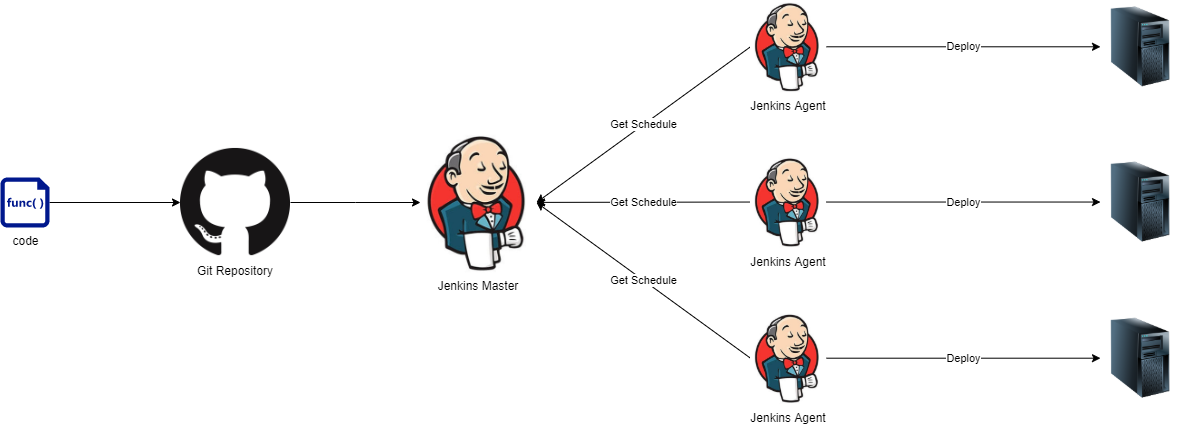
Jenkins supports different agent configurations, including static, dynamic, and cloud-based agents.

**Interaction with Cloud Platforms**

Jenkins integrates seamlessly with multiple cloud platforms to extend its capabilities. These integrations include:

* **AWS**: Jenkins can utilize AWS services such as EC2 instances for scalable agent provisioning, S3 for artifact storage, and CodeDeploy for application deployments.
* **Azure**: Integration with Azure DevOps and virtual machines enables cloud-based CI/CD pipelines, artifact storage in Azure Blob Storage, and deployment using Azure Kubernetes Service (AKS).
* **Google Cloud Platform (GCP)**: Jenkins can leverage Google Compute Engine (GCE) for dynamic agent provisioning and Google Kubernetes Engine (GKE) for containerized deployments.
* **Kubernetes**: Jenkins can be deployed within a Kubernetes cluster using Jenkins X, allowing for cloud-native CI/CD pipelines with dynamic scaling and containerized builds.

**B. Include a diagram illustrating the Jenkins architecture in your documentation.**

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