Introduction on DevOps

1. **what is cloud.**

**Sol:** The cloud is a network of remote servers that store and process data for other devices and computers. It provides a range of services, including storage, databases, networking, software, and analytics.

**2. what is cloud computing.**

Cloud computing is the delivery of computing services over the internet,The cloud it allows users to access computing resources and services on-demand, without the need to manage physical resources.

1. **Service mood**
2. **Deployment mode**

**Service Mood**: Cloud services are available in different .

* **Infrastructure as a Service (IaaS)**

Provides on-demand infrastructure resources, such as storage, compute, networking, and virtualization.

* **Platform as a Service (PaaS)**

Provides and manages hardware and software resources for developing, testing, and managing cloud applications.

* **Software as a Service (SaaS)**

Provides a full application stack as a service that customers can access and use

And some examples: of cloud services is Amazon Web Services (AWS), Google Cloud Platform (GCP), Microsoft Azure, Dropbox , and Salesforce, IBM, Alibaba,oracle.

**Deployment mood:**

Different types of cloud Deployment mode s are their.

1. **Public cloud:** The public cloud makes it possible for anybody to access systems and services. The public cloud may be less secure as it is open to everyone. The public cloud is one in which cloud infrastructure services are provided over the internet to the general people.  It is a type of cloud hosting that allows customers and users to easily access systems and services.

**Some examples are:** many cloud providers offer hosted private clouds provided for

* AWS (Amazon web Services)
* Microsoft Azure
* GCP(Google cloud Platform)

1. **Private cloud**: The private cloud deployment is the environment dedicated to a single organization. It provides greater Security and when compare to public cloud

**Some examples are** : many cloud providers offer hosted private clouds provided for

* IBM cloud provider
* AWS( Amazon web service)
* VM ware cloud on AWS

1. **Hybrid cloud:** The Hybrid cloud is a combination of private and public cloud. By combining the security and control of private clouds with the scalability and cost-efficiency of public clouds, organizations can achieve a balance that best suits their specific needs.

**Some examples are** : many cloud providers offer hosted hybrid clouds used for

* Financial
* Healthcare
* E-commerce platform

1. **Community cloud** : The community cloud It allows systems and services to be accessible by a group of organizations. It is a distributed system that is created by integrating the services of different clouds to address the specific needs of a community, industry, or business. The infrastructure of the community could be shared between the organization which has shared concerns or tasks. It is generally managed by a third party or by the combination of one or more organizations in the community.

**Some examples are** : many cloud providers offer hosted community clouds used for

* Healthcare
* Education
* Government

**AWS (Amazon web services):**

* Aws started in 2005
* Amazon Web Services (AWS) is a leading top platform in providing the web services of various domains.
* It is the first cloud which is introduced in the market.
* AWS is covering 18 Geographical regions.
* Without any Physical space AWS allows peoples to store the data.
* It covers a wider range of customers of different domains to expand their business operations.
* This Article covers the fundamentals of AWS and its scope of IT business.
* **SaaS (Software as a Service)** and **PaaS (Platform as a Service)** are often used in conjunction to create powerful and flexible cloud-based solutions. Here's a breakdown of how they complement each other
* “Pay as you go “This means you only pay for the specific cloud resources you consume, such as computing power, storage, and database usage.

**DevOps:**

DevOps the process of Delivering the product or project by ensuring automation in place ensuring the quality with continuous Monitoring and continuous testing.

Devops is a basically Software development strategy which bridges the gap Between the deaf side(Development) offside(Operation) of the company. So devops is basically a term for a group of concepts that while not all half catalyse into a movement and a rapidly. Devops is a methodology to study of building evolving &operating rapidly changing system at scale.

**Why Devops:**

* To deliver the software (or) project (or) product on Time.
* **Faster Time to Market**  DevOps such as continuous integration and continuous delivery (CI/CD), enable organizations to release software more frequently and rapidly.
* Reduced Time to Resolution Automated processes and efficient workflows help to quickly identify and fix issues, minimizing downtime.
* Faster Feature Delivery Customers benefit from timely updates and new features.
* **Enhanced Reliability:** Fewer outages and faster issue resolution lead to a better customer experience.
* By implementing DevOps practices, organizations can achieve a competitive advantage, deliver higher-quality software, and respond more effectively to market demands.

**Some real world example:**

**Netflix:**

* **Rapid Deployment:** Netflix deploys code multiple times a day, ensuring that new features and bug fixes are delivered to users quickly.
* **Scalability:** Their infrastructure is highly scalable, allowing them to handle peak traffic during popular show releases.
* **A/B Testing:** They leverage DevOps to conduct A/B tests on new features, optimizing user experience.

**SDLC ( Software development Life cycle**) :

Software Development Life Cycle, and it's a structured process that **is used to design, develop, and test good-quality software**, and maintain software. The goal of SDLC is to create high-quality software that meets customer expectations in a cost-effective and timely manner.

Here are the key phases of the SDLC:

1. **Planning:**
2. **Requirements Analysis:**
3. **Design:**
4. **Development:**
5. **Testing:**
6. **Deployment:**
7. **Maintenance:**

**Waterfall model:** Waterfall model is a sequential approach and the workflow that breaks down development activities into phases that are completed in sequence. Each phase is depends on the deliverables of the previous one, goals for each phase.

Phases:

1. **Requirement analysis:** The first phase involves gathering requirements from stakeholders and analyzing them to understand the scope and objectives of the project. this is also(SRS) software requirement specifination.
2. **System Design:** Once the requirements are understood, the design phase begins. This involves creating a detailed design document that outlines the software architecture, user interface, and system components.
3. **Development:** The Development phase include implementation involves coding the software based on the design specifications. This phase also includes unit testing to ensure that each component of the software is working as expected.
4. **Testing:** In the testing phase, the software is tested as a whole to ensure that it meets the requirements and is free from defects.
5. **Deployment:** Once the software has been tested and approved, it is deployed to the production environment.
6. **Maintenance:** The final phase of the Waterfall Model is maintenance, which involves fixing any issues that arise after the software has been deployed and ensuring that it continues to meet the requirements over time.

**Class 2**

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**Agile Model :**

The agile model is a software development methodology that breaks down large projects into smaller parts and delivers them in regular cycles**.**

* It's an iterative approach that allows teams to deliver a product incrementally, with each delivery building on the previous one.
* Every software shopping, amazon, Flipcart, Myntra, Ajio ,Social media, Face book, Twitter, Instagram, Whatsapp.
* Agile is the ability to respond to the changes from requirements, Technology &people.
* It is an incremental model& it is iterative to develop a software an application.
* When frequent modifications need to be made, this method is implemented.

**Phases of Agile:**

* Requirement analysis
* System Design
* Development
* Testing
* Deployment
* Review
* Delivering
* Feedback
* System Design

**Advantages of Agile:**

* Requirement changes are allowed at any stage of development.
* Releases will be very fast within 1week
* Customers no need of waiting for longer Time.
* Good communication will be there between all the teams.
* It is very easy to adapt.

**Disadvantages of Agile:**

* The lack of formal documents creates confusion and important decisions taken during different phases can be misinterpreted at any time by different team members.
* It is not suitable for handling complex dependencies.
* Less focus on Design and Documentation.

Phases of Agile.

**Testing:**

software testing is the process of finding errors in a product, Whether it be web application or mobile application Errors include bugs in the code, missing requirements, glitches, and more.

Testing s are two types

1. Manual Testing

2. Automated Testing

1. **Manual Testing**

* Block Box testing
* White Box Testing
* Grey Box Testing

**Block Box Testing : Black Box Testing** is a software testing technique Examine the functionality of software Development. without knowing its internal workings or code structure.

* Functional ----------🡪 **Unit Testing**: only test piece of software

**Integration Testing**: Units are combine in this integration.

**System Testing**: whole system will be tested

* Non-Functional

**White Box Testing :**

* Developer will test each and every line of the code.
* Need programming skills to Design the test cases.
* Developer fixes bugs and performs 1 round of White box testing and send it to the testing team.
* Fixing bugs: clearing the errors---- Deleting the Bugs.

**What is Bug:** Developer will develop a code in the operation team they will perform testing to finding any errors that is known as Bug.

**What is error :** Mistake in coding that is done by Developer.

**What is Failure:** Complete code is wrong.

**Tools Required In Devops:**

1. **Planning/ Coding/SCM : Git, Jira**
2. **Building Code: Maven, Gradle, Apache ANT**
3. **Testing: Selenium testing with Python**
4. **Integration: Jenkins (CI/CD)**
5. **Deployment: Dockers, Kubernates**
6. **Operations: Ansible Managing**
7. **Monitoriong: Teraform**