**DevOps**

**What is meant by cloud:** It is a platform to produce the processes of data and uses of the applications.

* It refers to a network of servers that will provide various computing services over the internet
* It is a online storage space where people and businesses to store files and applications, and we can accessible from anywhere with an internet access connection.
* It is enables the users to access the same files and the applications from the all devices from anywhere.
* It is stored on the servers in off-site locations.
* In cloud we can save any kind of data like files, videos, images or business date etc.

We can install almost all the applications like Linux, windows, Jenkins, MySql, Git etc.

**Why we use cloud:**

It is an organization to access and store the information with out managing their own physical devices or IT infrastructure

**Advantages of cloud:**

* **Flexibility:** we can access the data or resources anytime from anywhere.
* **Cost -Effective:** We have pay the money for what we have use the services only.
* **Scalability:** It will be easily expand or it will be reduce the resources based on demands.
* **Collaboration:** we will work with the others in real time from the different locations.

**Disadvantages of cloud:**

* **Security and privacy risks**
* **Ongoing cost**
* **Downtime Risks**

**About Cloud Computing:**

It is the study of cloud services like storage, servers, databases, networking, software in the cloud computing.

**Key characteristics of cloud computing**

* **On-Demand Self-Service**
* **Scalability**
* **Cost Efficiency**
* **Accessibility**
* **Resource Pooling**

**There are two types of cloud computing:**

1. **Services Mode**
2. **Deployment mode**

**Services Mode:** In these services mode there are four types they are

* 1. **Infrastructure as a service (IaaS)**

It will provide the virtualized computing resources like servers and storage.

Ex: AWS, Microsoft Azure

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

It will give the platform to develop, test, and deploy applications.

Ex: AWS Elastic Bean stack

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

It Delivers software applications over the internet.

Ex: Zoom, Goole application

* 1. **Function as a service (FaaS)**

It will allows the developers to create and run the functions in the cloud**.**

**Deployment mode:** It is one of the cloud computing. It is moved (or) shifted from the local server to the global server**.**

**In these are four types they are**

1. **Private cloud**
2. **Public cloud**
3. **Hybrid cloud**
4. **Community cloud**

**Private cloud:** In the private cloud we can only access the data or information and it is a single users and it is more security and control.

* It is an local servers area network
* It only free servers
* System are running with the private ip’s address only

**Public cloud**: In the public cloud any one can access the date or information from any one it can access each and every one from where every they want. It can use multiple users.

* It is an open source and internal access
* It only paid servers
* By defaults access it’s running on the VPC’S
* It is owned by third party cloud provides.

**Hybrid cloud:** It is combination of the private cloud and public cloud any one can access this hybrid cloud

* It is a private cloud + public cloud

**Community cloud**: It is combined with the two organization and that allows the system and services to be accessibility by the group.

There are 10 cloud providers:

1. AWS 6. Alibaba Cloud
2. Microsoft azure 7. Salesforce
3. Google cloud 8. Digital Ocean
4. IBM cloud 9. VMware Cloud
5. Oracle Cloud 10. Tencent Cloud

**AWS (Amazon web services)**

* It is the top and best most cloud provide in the AWS.
* It is the first cloud which is introduced in the market.
* In this AWS there is perfect combination are SaaS & PaaS.
* Without any physical space this AWS allow the people to store there data any files etc.
* In the AWS we have pay the money to the services what we have use
* Pay as we go
* We have the 18 geographical regions in the AWS
* There are like AWS, Microsoft Azure, Google Cloud, IBM cloud like this etc.
* It is started in 2005
* Amazon Web Services (AWS) ---- 36%.
* Microsoft Azure ----- 27%.
* Google Cloud ------- 15%.
* IBM Cloud ------------- 10%.
* Oracle Cloud----------------- 3%
* Alibaba Cloud ------------- 10%.
* Salesforce -----------------11%
* Tencent Cloud -------------- 7%
* Digital Ocean -------- 0
* VMware Cloud ------------- 0

**DevOps**

**Dev + Ops------ Development + Operations**

* It is combination of developer team and operation team.
* It is the way of software development.
* It is also known as methodology.
* DevOps it is a set of tools in this.
* It is the way of the automate things.

**DevOps:** It is the process of delivering the product/project by the ensuring the automation in place, ensuring the quality with continuous monitoring and continuous testing.

**Why DevOps:**

* It used to deliver the software or project/product on time to them.
* It is used to time savings.
* It is used CI/CD (continuous integration/continuous deployment)
* It will delivery into the market.
* It has scalability and flexibility and it will improved collaboration
* It has the higher efficiency through

**SDLC (software development life cycle)**

It is known as step by step process in SDLC

1. Gathering
2. Analysis (or) Planning
3. Design
4. Coding
5. Testing
6. Deployment
7. Maintenance
8. Final output

There are two models in SDLC they are:

1. Waterfall model
2. Agile model

**Waterfall model:** It is a sequential project management methodology in it where it will one phase is completely finished then it will goes to the another phase and it being then.

* It is also called as “Linear Sequential Development Model”
* This model does not allow the developers to go back to the previous steps.
* It is an non-iterative process.

In these waterfall model life cycle is

Requirement analysis 🡪 System design 🡪 Implementation 🡪

Deployment 🡪 Maintenance.

**Requirement analysis:** we will collect the all information about the product or project from the client. After gathering the requirements will prepare the document Business Requirements Specifications(BRS). After sending requirements to forward to analysis**.** After complete the understanding they will prepare the document is Software Requirement Specification(SRS). And also planning the team, schedules, strategy etc...

**System Design:** Then we will prepare the blue print for the application. And the work or the tasks will be assign to them. In this there are two terms

1. High level
2. Low level

**Implementation**: In this they will start the coding what the clients need.

**Deployment:** They will check the all the coding and document whether all are ok or not. And they will test the coding also.

**Maintenance:** At last we have to hand over that all project to the client.

**Agile model:**

* It is means the ability to respond to the changes from the requirements, technology & people.
* In each & every s/w directly (or) indirectly will linked with the Agile model.

Ex: For shopping ----- Amazon, Flipkart, Myntra, Ajio etc…

For social media ------ FB, WhatsApp, Instagram, Twitter etc…

* It is an incremental model and it will delivery the output very fast compares to the waterfall model
* It is an iterative process to develop a s/w or application. And it is a re-cycling model.
* Here we can release the product at any stage. And we can remodel the changes b/w the process also.

**Why we use Agile model:** To deliver a working model of the s/w to the all customers in very short time. And almost all the large scale project of in there companies are using this method only.

**Advantages of Agile model:**

1. In these the requirements changes are allowed at any stage of the development**.**
2. It releases the output very fast.
3. In this there is no need to wait for the long time to the customers.
4. There will be an at good communication will be there b/w all the team members.
5. It is very easy to adopt any one into this.

**Disadvantages of Agile model:**

1. It has less focus on design & documentation.
2. There will be an lack of documentation.

**Testing:** It is release the quality to the client. And ensure the bug free, customers requirements & software specifications and fixing the bugs identified after release is more expensive

* It is used to check the errors correction and bugs in the code.
* The software is rigorously tested to identify and fix defects.
* It will under goes into the manual testing.

In the manual testing there are 3types

1. White box testing
2. Black box testing
3. Grey box testing

**Black Box Testing:** It is mainly used by the testers

* It will be examine the functionality of the software (to check the o/p is right or wrong).
* In this the code will not be visible.
* It is mainly applicable to the high level of testing like (Acceptance, System).
* It is also called as Functional testing (or) closed testing.

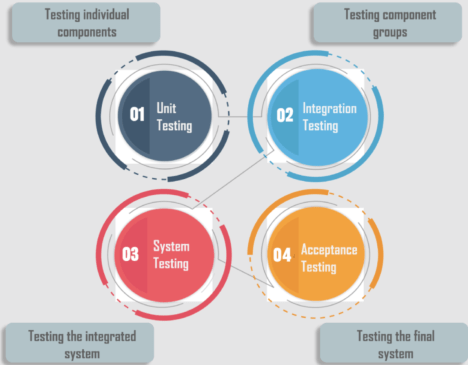
In Black Box testing it is divided into two types:

1. Functional Testing
2. Non Functional Testing

**Functional Testing**: Checking the all user requirements and actions will be performed it is know as functional testing.

In these there are 3 types:

1. Unit Testing
2. Integration Testing
3. System Testing



**Unit Testing:** It is the type of functional testing, where the individual units or the components of a software are tested.

* It is first level of testing done by developers.
* It is a white box testing type and it is also known as module level testing.
* The developers are checking the code after development by using white box testing technique.

**Integration Testing:**

* It is done by developers. It is an a white box testing type.
* Here developers are integrated with the one module to another module and they will checking the data between 2 modules.

**System Testing:** It is done by testers. It is a black box testing. Here testers are validation the functional and non functional.

**Non Functional Testing:** It is a graphical visible it is known as the non functional testing.

**White box testing:** It is mainly used by the Developers

* It is also called as Structural testing techniques.
* It is applicable for the lower level of testing like (unit, integration).
* We need the programming skills to design the test cases.
* Developer will check & test each line of the coding.
* Developers fixes bugs & perform the 1st round of white box testing and they will send it to the testing team.
* There are two types

1. Path Testing
2. Loop Testing

**Grey box testing:** It is the combination of white box and black box testing to find the defects in the application**.** The tester is not required to design the test cases.

**Error:** Mistakes in the coding are done by the developers. A human will made mistakes

**Defect:** Errors are accepted by the developers.

**Bug:** Defect is accepted by developer.

**Failure:** Total wrong (or) Defect found by market user in their environment is known as failure.

And there will be some another models in the waterfall model

1. V- model
2. Spiral model
3. Proto Type model
4. Increment model

**We will use the this tools in DevOps: they are**

1. Planning/Coding -------- Git, Jira
2. Building ---------- Maven, Gradle, Apache, ANT
3. Testing --------- Selenium testing with python
4. Integration ---------- Jenkins (CI/CD)
5. Deployment --------------Dockers, Kubernetes
6. Operation ------------- Ansible (managing)
7. Monitoring -------------- Terraform