

DevOps

Software Development Lifecycle















PLANNING

Talk to customer and understand the requirements



Define the requirements and stick to them

DESIGNING

Design the solution with right approach

BUILDING

Development following guidelines

TESTING

Make sure that your code is working

DEPLOYMENT

Make your app available for rest of the world

Waterfall Model





Requirement Specification



System Design



Design Implementation



Verification & Testing



System Deployment

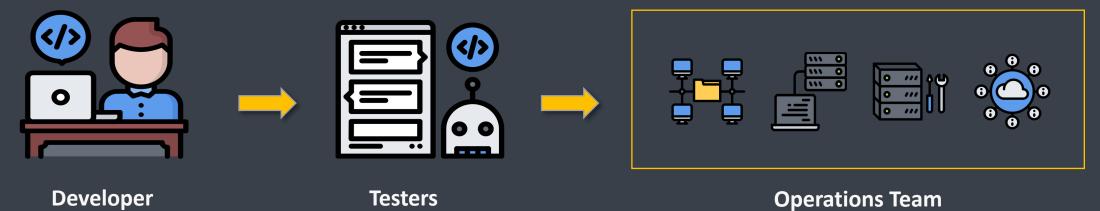


Software Maintenance



Entities involved





Testers Operations Team

Responsibilities



Developers and Testers

- Developers
 - Develop the application
 - Package the application
 - Fix the bugs
 - Maintain the application
- Testers
 - Thoroughly test the application manually or using test automation
 - Report the bugs to the developer

Operations Team

- Make all the necessary resources ready
- Deploy the application
- Maintain multiple environments
- Continuously monitor the application
- Manage the resources





Challenges



Developers and Testers

- The process is slow
- The pressure to work on the newer features and fix the older code
- Not flexible

Operations Team

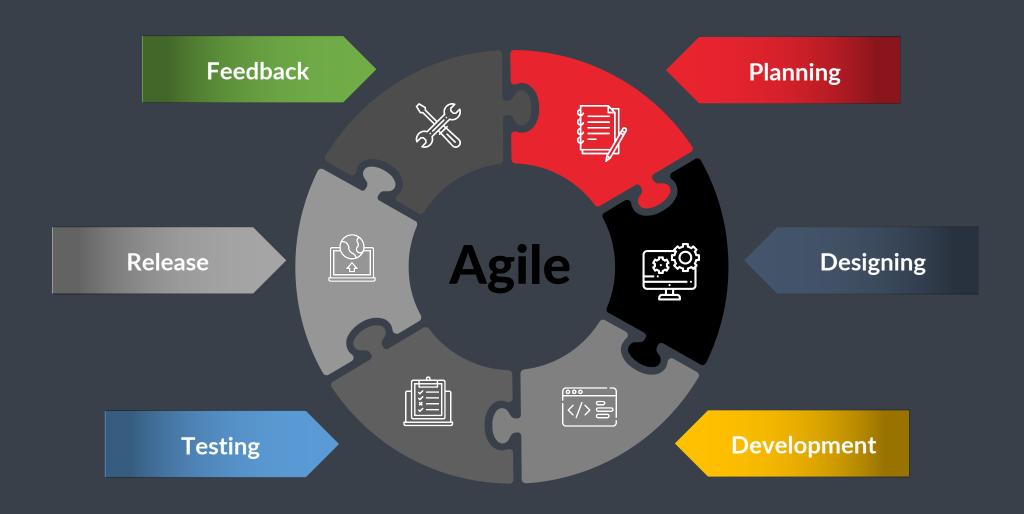
- Uptime
- Configure the huge infrastructure
- Diagnose and fix the issue





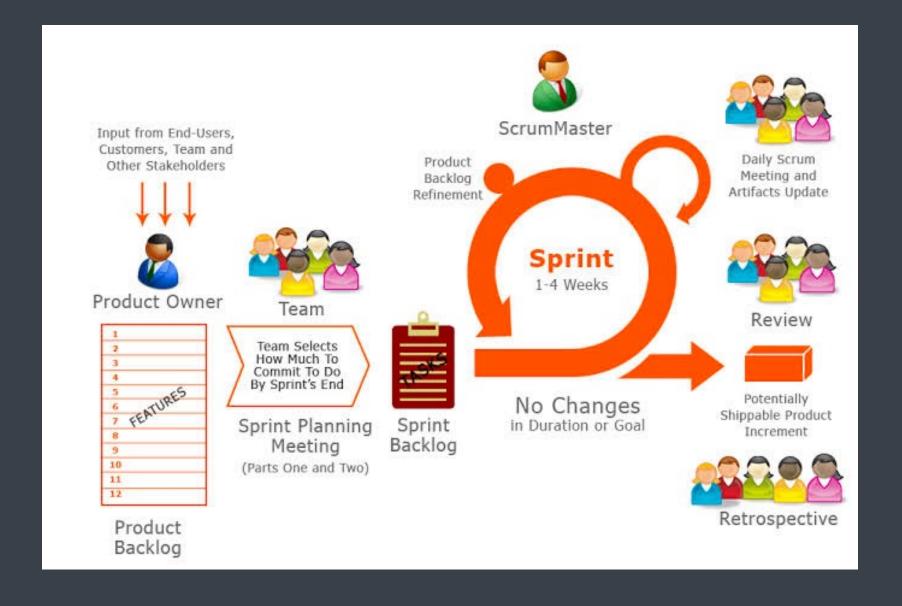
Agile Development





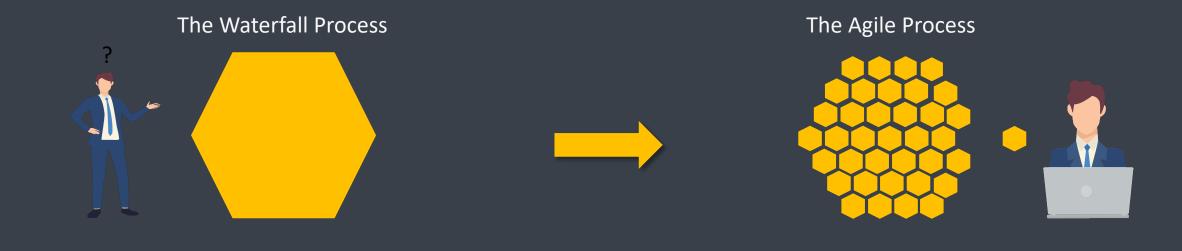
Scrum Process



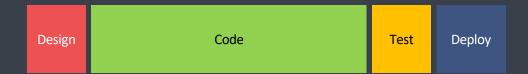


Waterfall Vs Agile





This project has got so big.
I am not sure I will be able to deliver it!



It is so much better delivering this project in bite-sized sections



Problems



- Managing and tracking changes in the code is difficult
- Incremental builds are difficult to manage, test and deploy
- Manual testing and deployment of various components/modules takes a lot of time
- Ensuring consistency, adaptability and scalability across environments is very difficult task
- Environment dependencies makes the project behave differently in different environments

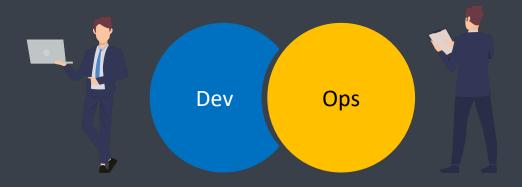
Solutions to the problem

- Managing and tracking changes in the code is difficult: SCM tools
- Incremental builds are difficult to manage, test and deploy: Jenkins
- Manual testing and deployment of various components/modules takes a lot of time: Selenium
- Ensuring consistency, adaptability and scalability across environments is very difficult task: Puppet
- Environment dependencies makes the project behave differently in different environments: Docker

What is DevOps?



- DevOps is a combination of two words development and operations
- Promotes collaboration between Development and Operations Team to deploy code to production faster in an automated & repeatable way
- DevOps helps to increases an organization's speed to deliver applications and services
- It allows organizations to serve their customers better and compete more strongly in the market
- Can be defined as an alignment of development and IT operations with better communication and collaboration
- DevOps is not a goal but a never-ending process of continuous improvement
- It integrates Development and Operations teams
- It improves collaboration and productivity by
 - Automating infrastructure
 - Automating workflow
 - Continuously measuring application performance



Why DevOps is Needed?



- Before DevOps, the development and operation team worked in complete isolation
- Testing and Deployment were isolated activities done after design-build. Hence they consumed more time than actual build cycles.
- Without using DevOps, team members are spending a large amount of their time in testing, deploying, and designing instead of building the project.
- Manual code deployment leads to human errors in production
- Coding & operation teams have their separate timelines and are not in synch causing further delays

Common misunderstanding

- DevOps is not a role, person or organization
- DevOps is not a separate team
- DevOps is not a product or a tool
- DevOps is not just writing scripts or implementing tools

Reasons to use DevOps



Predictability

DevOps offers significantly lower failure rate of new releases

Reproducibility

Version everything so that earlier version can be restored anytime

Maintainability

Effortless process of recovery in the event of a new release crashing or disabling the current system

Time to market

- DevOps reduces the time to market up to 50% through streamlined software delivery
- This is particularly the case for digital and mobile applications

Greater Quality

DevOps helps the team to provide improved quality of application development as it incorporates infrastructure issues

Reduced Risk

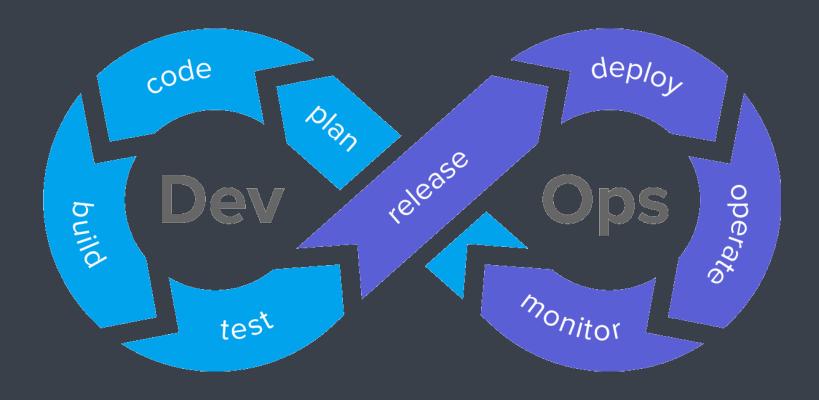
DevOps incorporates security aspects in the software delivery lifecycle. It helps in reduction of defects across the lifecycle

Resiliency

■ The Operational state of the software system is more stable, secure, and changes are auditable

DevOps Lifecycle

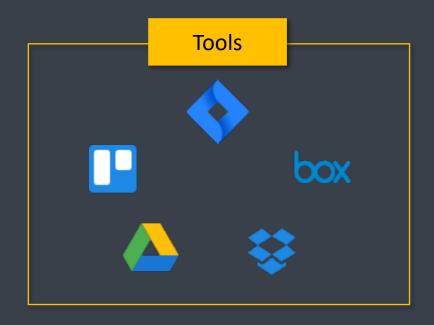


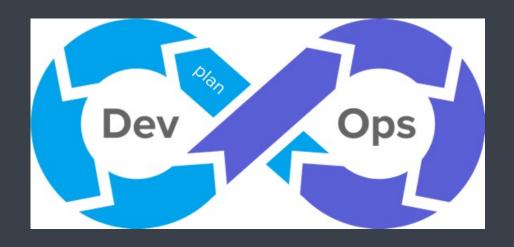


DevOps Lifecycle - Plan



■ First stage of DevOps lifecycle where you plan, track, visualize and summarize your project before you start working on it

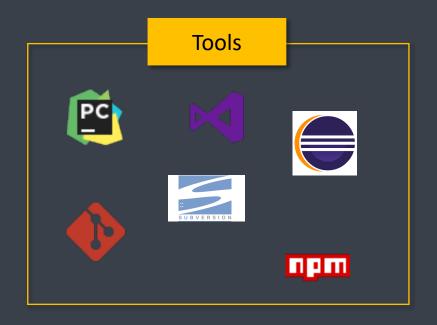


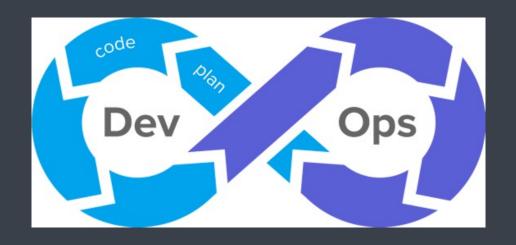


DevOps Lifecycle - Code



Second stage where developer writes the code using favorite programming language

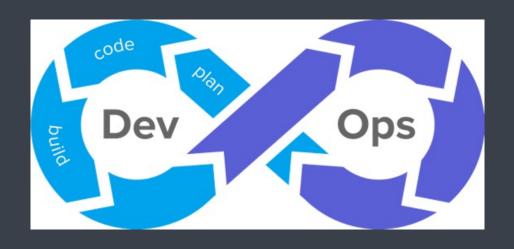




DevOps Lifecycle -Build

- Integrating the required libraries
- Compiling the source code
- Create deployable packages

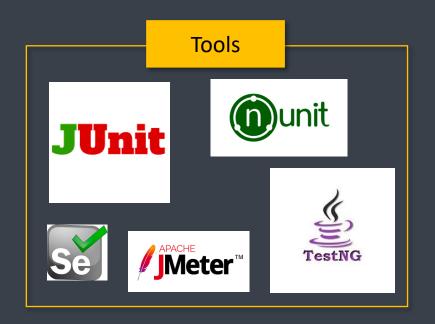


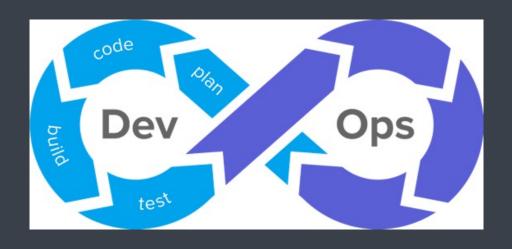


DevOps Lifecycle - Test



- Process of executing automated tests
- The goal here is to get the feedback about the changes as quickly as possible

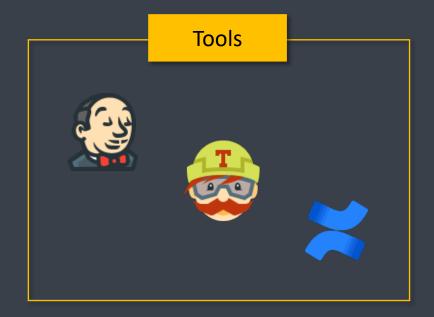


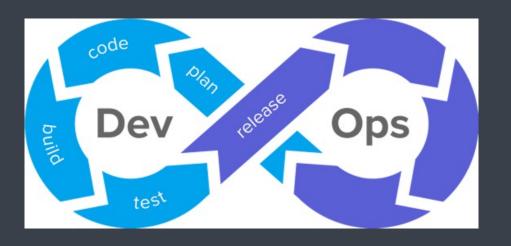


DevOps Lifecycle - Release



■ This phase helps to integrate code into a shared repository using which you can detect and locate errors quickly and easily



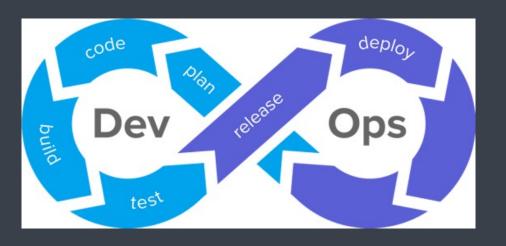


DevOps Lifecycle - Deploy



■ Manage and maintain development and deployment of software systems and server in any computational environment



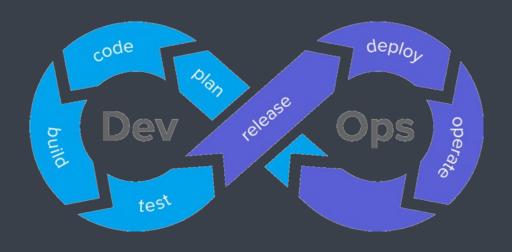


DevOps Lifecycle - Operate



This stage where the updated system gets operated



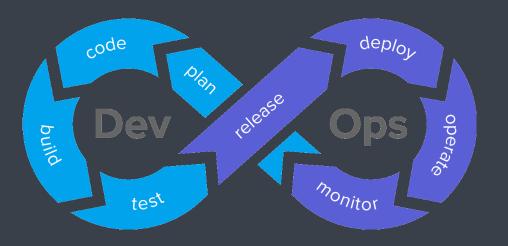


DevOps Lifecycle - Monitor



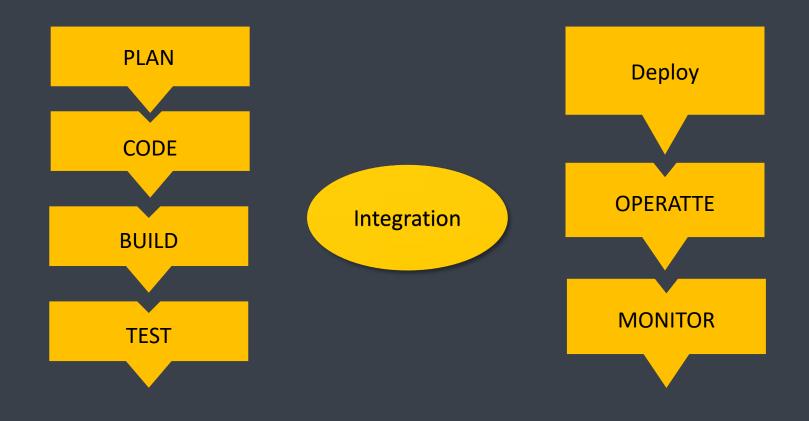
- It ensures that the application is performing as expected and the environment is stable
- It quickly determines when a service is unavailable and understand the underlying causes





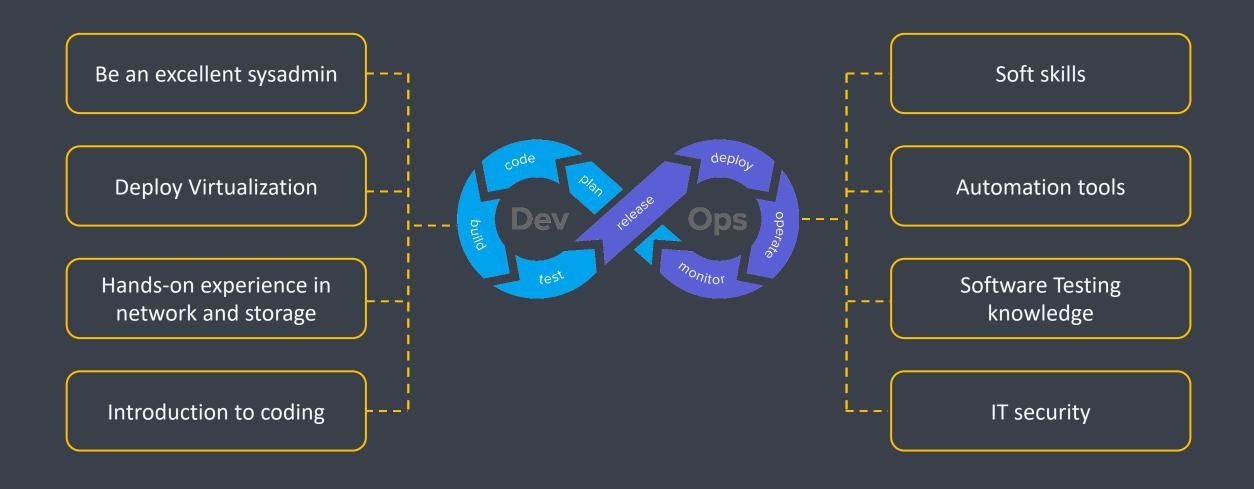
DevOps Terminologies





Responsibilities of DevOps Engineer





Skills of a DevOps Engineer



Skills	Description
Tools	 Version Control – Git/SVN Continuous Integration – Jenkins Virtualization / Containerization – Docker/Kubernetes Configuration Management – Puppet/Chef/Ansible Monitoring – Nagios/Splunk
Network Skills	General Networking SkillsMaintaining connections/Port Forwarding
Other Skills	 Cloud: AWS/Azure/GCP Soft Skills People management skill