COMP1531

9.1- Deployment

Preface

1. Tute solutions published soon
2. Remember to submit your labs
3. Lab09 will be released very soon
4. Deployment is a new topic

Diagrams sourced from atlassian, gitlab, microsoft

Software Deployment

Deployment: Activities relating to making a **software system available for use**.

Simple example: CSE

Every CSE student has a **public_html** folder that is exposed to the internet.

This can be our simplest example for deployment

Historical Deployment

Historically, **deployment** was a much less frequently occurring process.

Code would be worked on for days at a time without being tested, and deployed sometimes years at a time. This is largely due to software historically being a physical asset

Something changed

Two major changes have occurred over the last 10 years:

- Increased prevalence of web-based apps (no installs)
- Improvement to internet connectivity, speed, bandwidth

These changes (and more) have allowed for the pushing of updated software to **users** to be substantially more possible. Subsequently, users have come to expect more rapid updates.

A movement from software as an asset, to software as a service, has catalysed this transition

Software as a service (Sass)

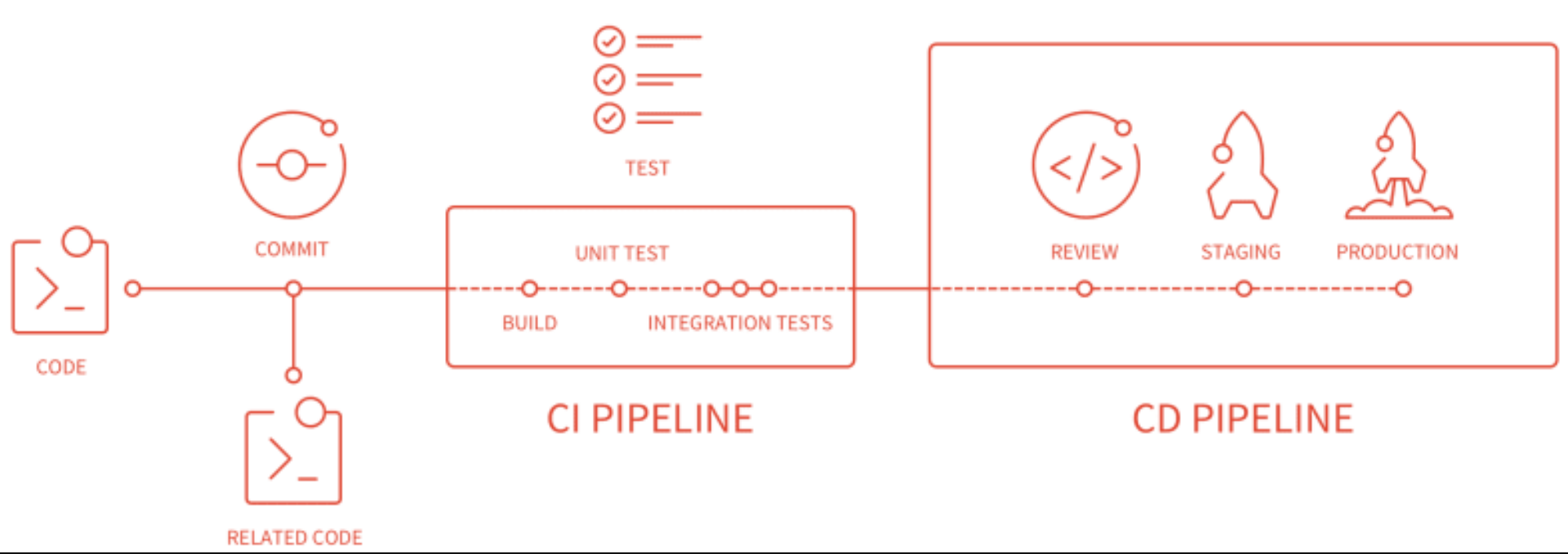
Service vs Asset

A simple case study can be found in Microsoft's movement of Windows from shipping a product, to shipping a service.

Modern Deployment

To achieve these rapid deployment cycles, modern deployment isn't as simple as pushing code. Rather, a heavily **integrated** and **automated** approach is preferred.

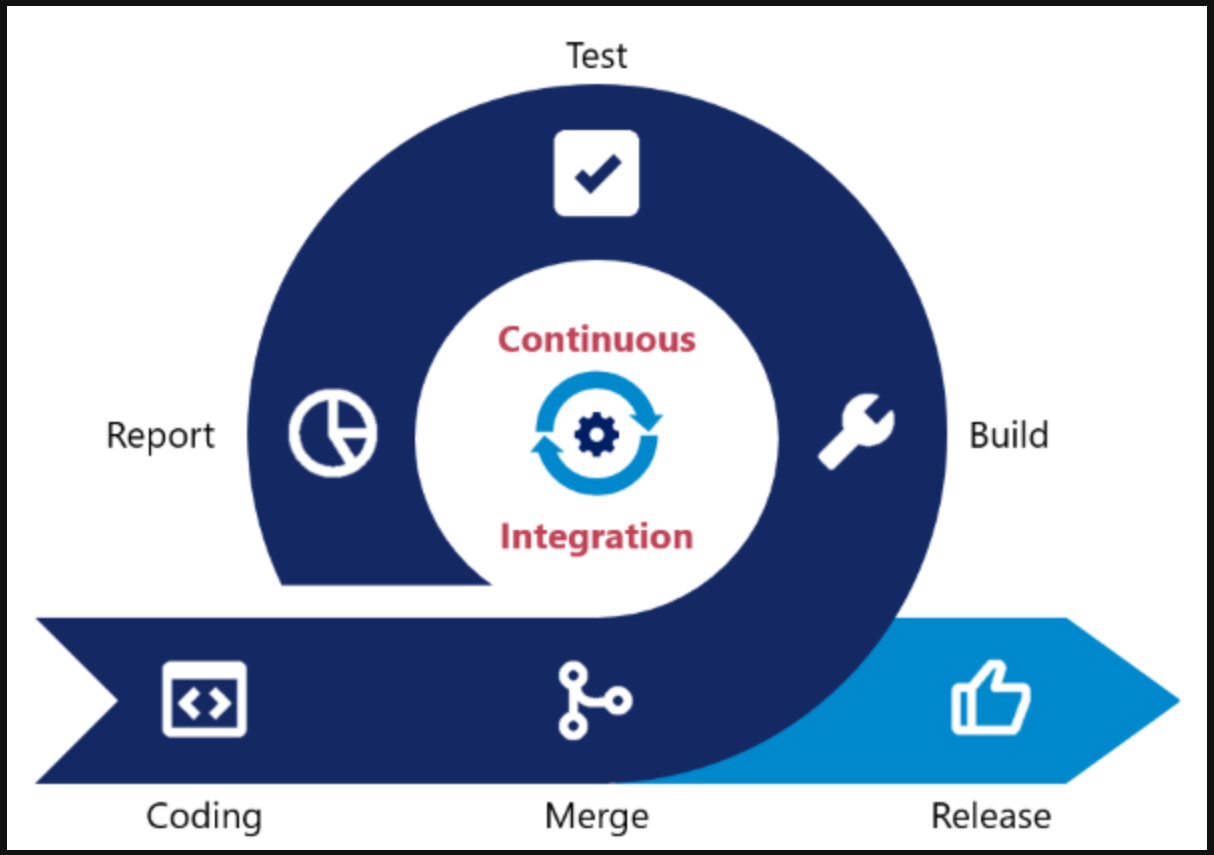
Two key aspects of this are CI and CD



Continuous Integration

Continuous integration: Practice of automating the integration of code changes from multiple contributors into a single software project.

Continuous Integration



Continuous Integration

Key principles and processes:

1. Write tests:
    1. Ideally tests for each story
    2. Broad tests: unit, integration, acceptance, UI tests
2. Use code coverage checkers
3. Merge and integrate code as often as possible
4. Ensure the build always works (i.e. is "green")

How it works

- Typically tests will be run by a "runner", which is an application that works with your version control software (git) to execute the tests. This is because tests can require quite resource intensive activities
  - Gitlab: No runners built in
  - Bitbucket: Runners built in

CI: Readings

We will assume you have read the following items:

- https://about.gitlab.com/product/continuous-integration/
- https://www.atlassian.com/continuous-delivery/continuous-integration/how-to-get-to-continuous-integration

Continuous Delivery

Continuous delivery: Allows accepted code changes to be deployed to customers quickly and sustainability. This involves the **automation of the release process**, with a **manual trigger** step by humans.

Different deployments

A typical project will have 3 core tiers:

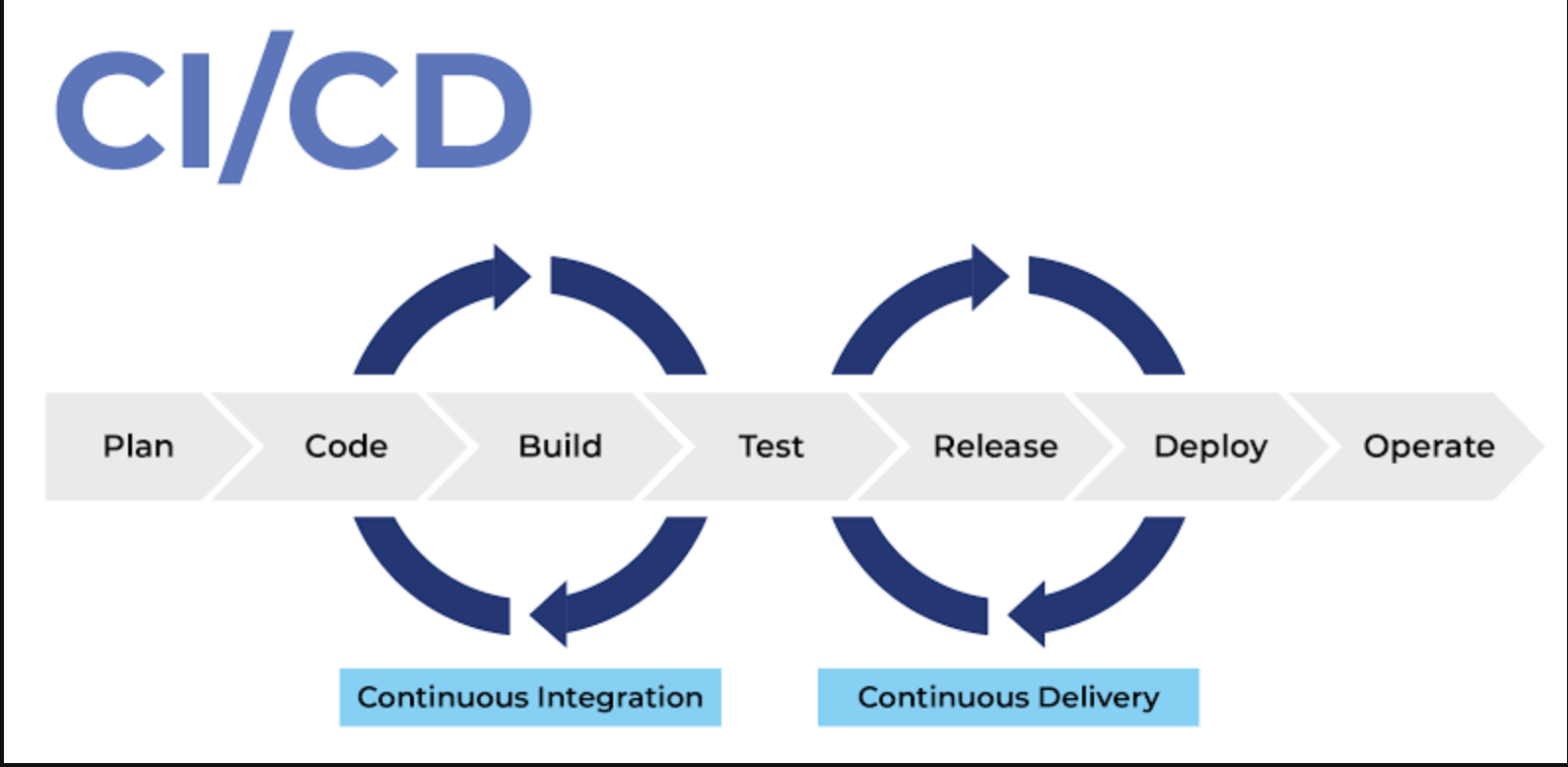
- **dev**:
  - released often, available to developers to see their changes in deployment
- **test**:
  - As close to release as possible, ideally identical to prod
- **prod**:
  - Released to customers, ideally as quickly as possible

There is no schema or structure for this.

Continuous Delivery

- Many companies will have a daily or weekly "ship"
- Often there is some "sign off" process before things are finally shipped
- Since the process is highly controlled, less likely to make mistakes during testing

CI/CD relationship



CD: Readings

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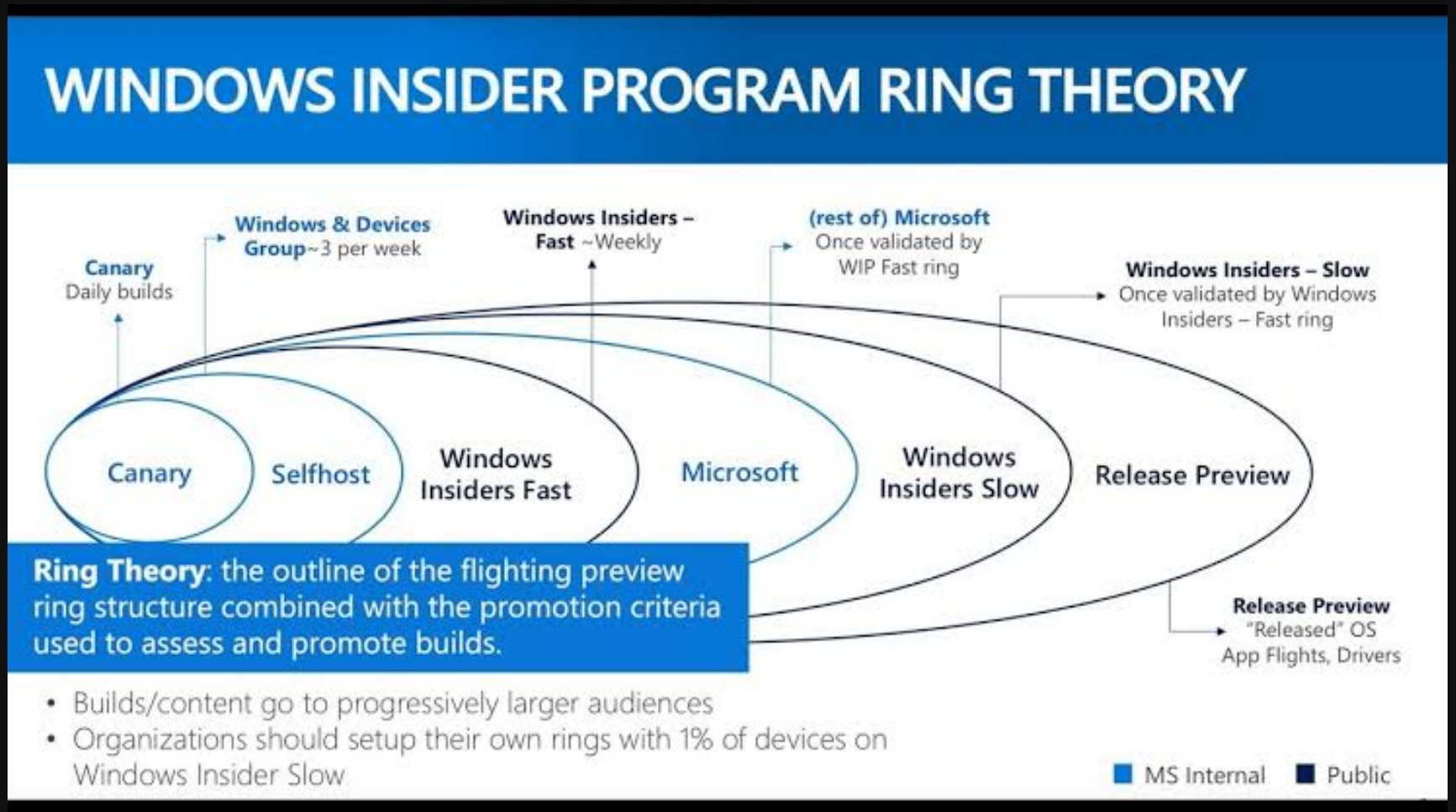
- https://about.gitlab.com/product/continuous-integration/
- https://www.atlassian.com/continuous-delivery/principles

Flighting

Continuous delivery is concerned with automatically pushing code out to dev, test, prod.

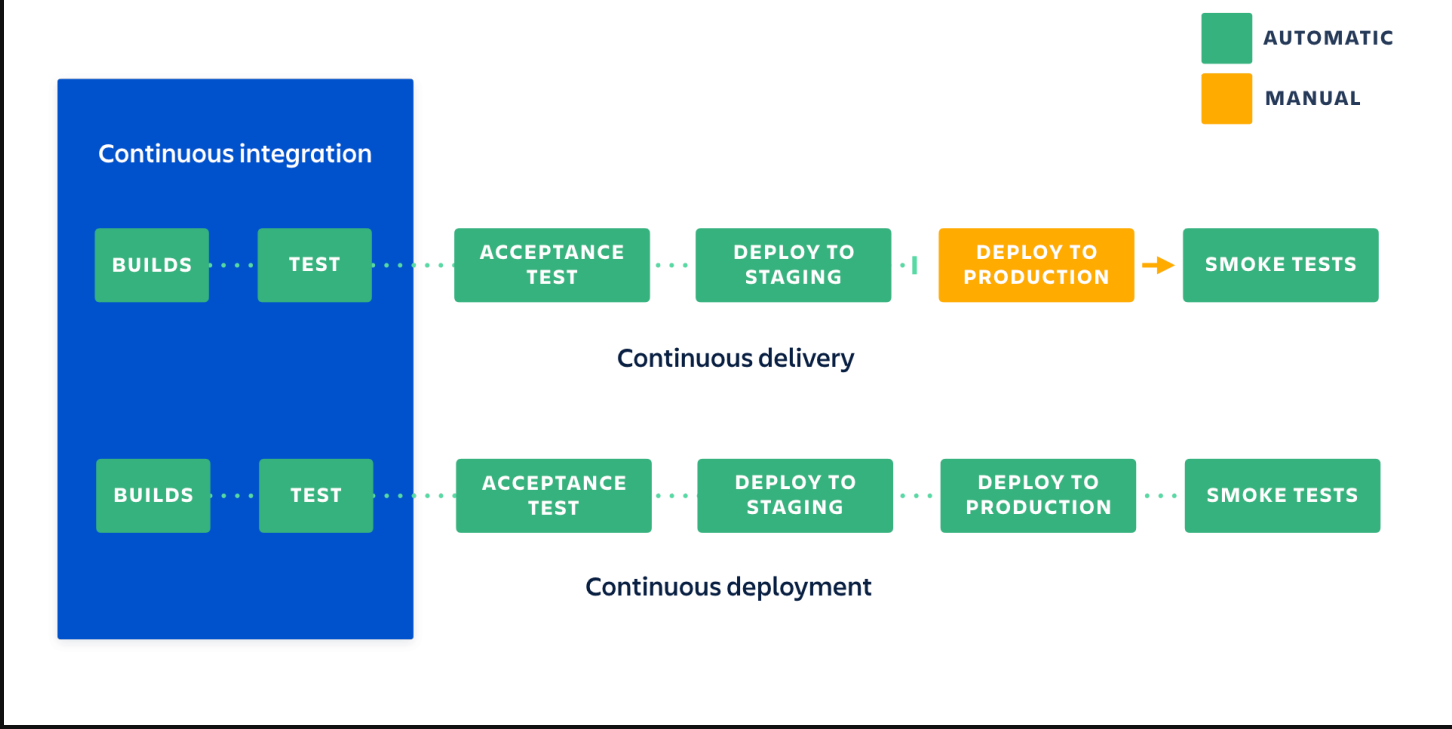
Flighting is a term used predominately in larger software projects to describe moving builds out to particular slices of users, beyond the simplicity of "dev", "test", "prod"

Flighting


WINDOWS INSIDER PROGRAM RING THEORY
Canary
Daily builds
Windows & Devices Group~3 per week
Windows Insiders – Fast ~Weekly
(rest of) Microsoft
Once validated by WIP Fast ring
Windows Insiders – Slow
Once validated by Windows Insiders – Fast ring
Canary
Selfhost
Windows Insiders Fast
Microsoft
Windows Insiders Slow
Release Preview
Ring Theory: the outline of the flighting preview ring structure combined with the promotion criteria used to assess and promote builds.
Release Preview
"Released" OS
App Flights, Drivers
• Builds/content go to progressively larger audiences
• Organizations should setup their own rings with 1% of devices on Windows Insider Slow
MS Internal
Public

Continuous Deployment

Continuous Deployment is an extension of Continuous Delivery whereby changes attempt to flight toward production automatically, and the only thing stopping them is a failed test



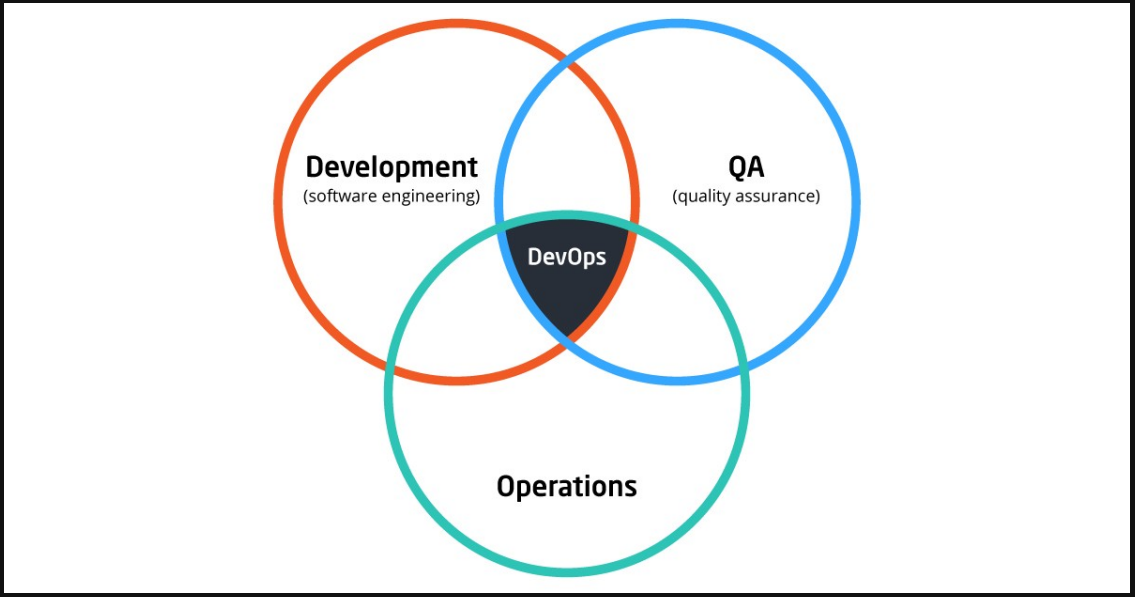
CD: Readings

We will assume you have read the following items:

- https://www.atlassian.com/continuous-delivery/principles/continuous-integration-vs-delivery-vs-deployment

DevOps

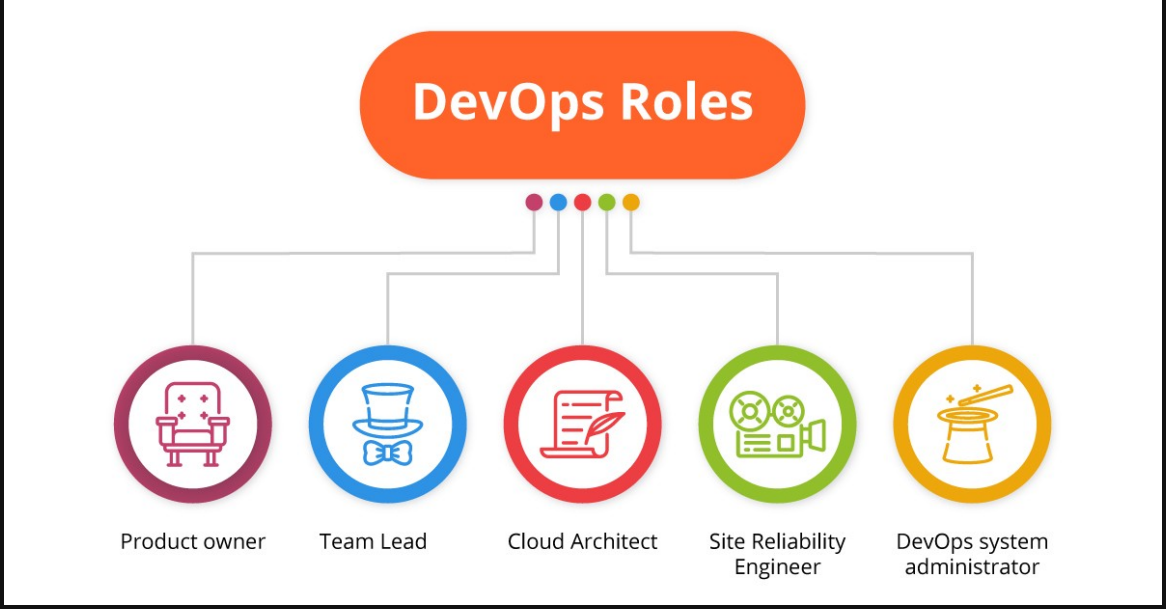
A decade ago, the notion of dev ops was quite simple. It was a role dedicated to gluing in the 3 key pillars of deploying quality assured software



DevOps is a set of practices intended to reduce the time between committing a change to a system and the change being placed into normal production, while ensuring high quality [Wikipedia. Yes, Wikipedia]

DevOps

As development teams become less silo'ed, modern DevOps is less a role, and more a series of roles or aspect of a role.



Source & Reading: https://hackernoon.com/devops-team-roles-and-responsibilities-6571cfb56843

Demos & Use Cases

CD on AWS

Amazon Web Services

Git Hooks

Demonstration of:

- pre-commit hook
- prepare-commit-message
- commit-message

Read more about this here

Next lecture

- CI with python
- Deploy flask server
- Maintenance