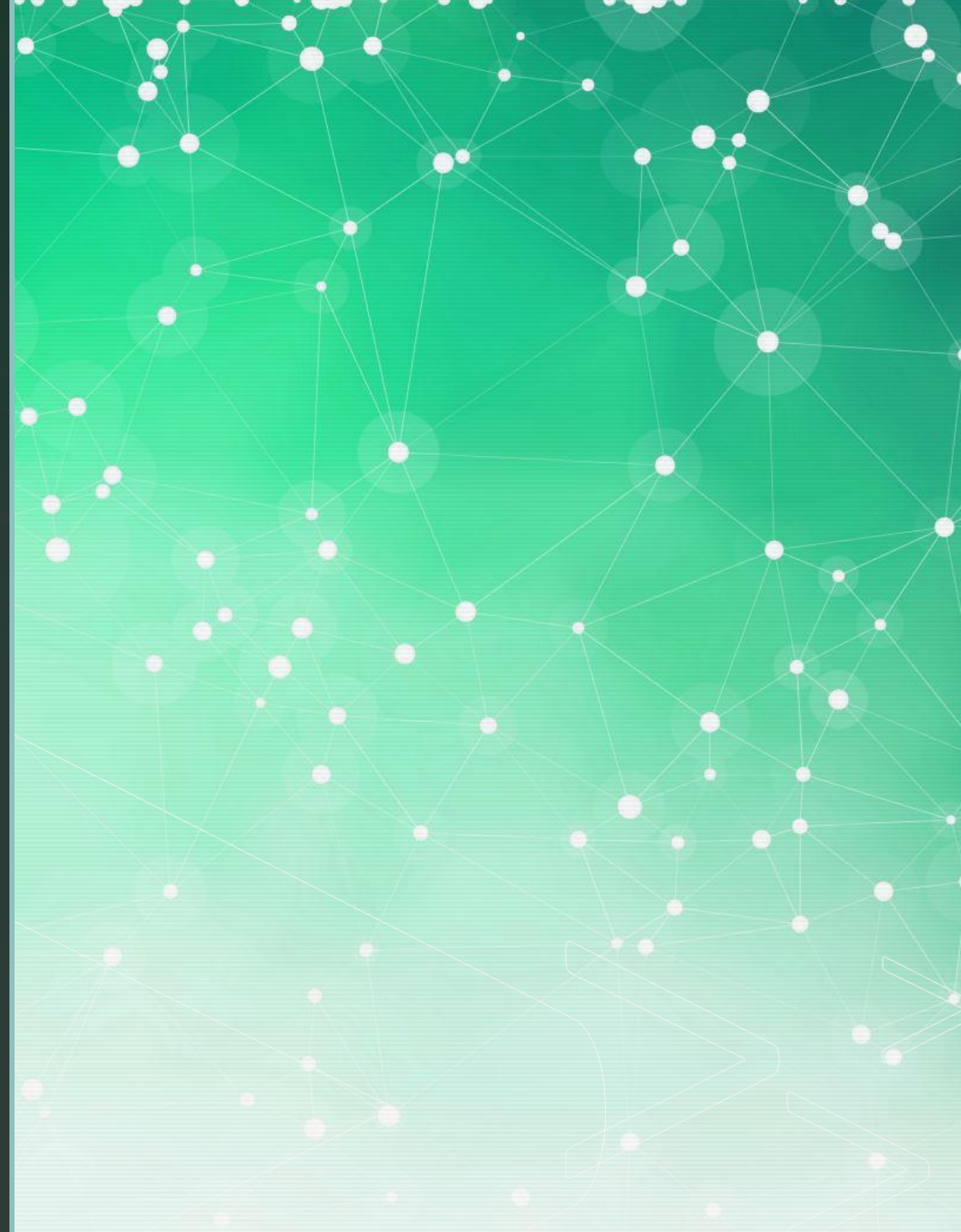


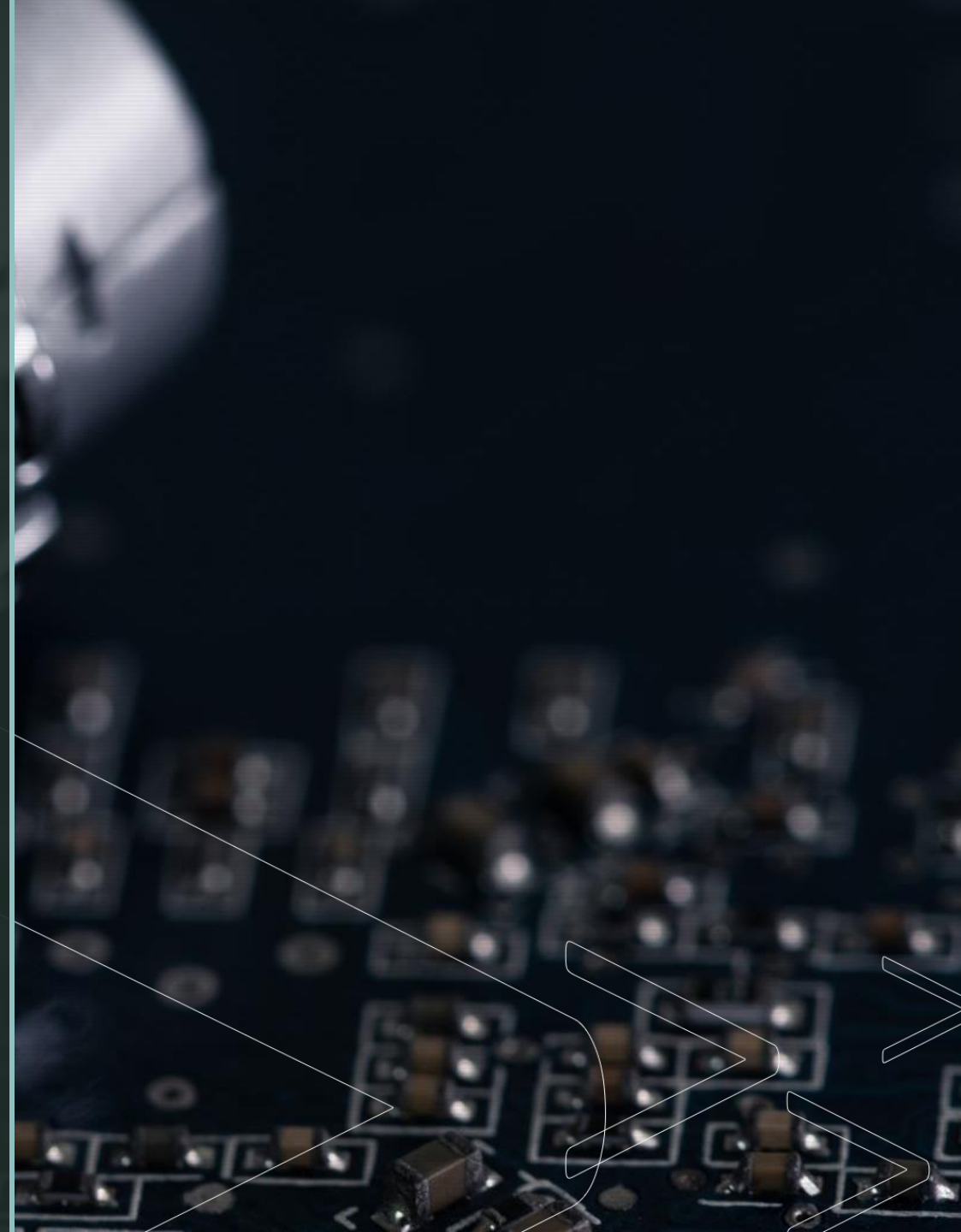
# GitOps

Modern Infrastructure and  
Application Management  
approach

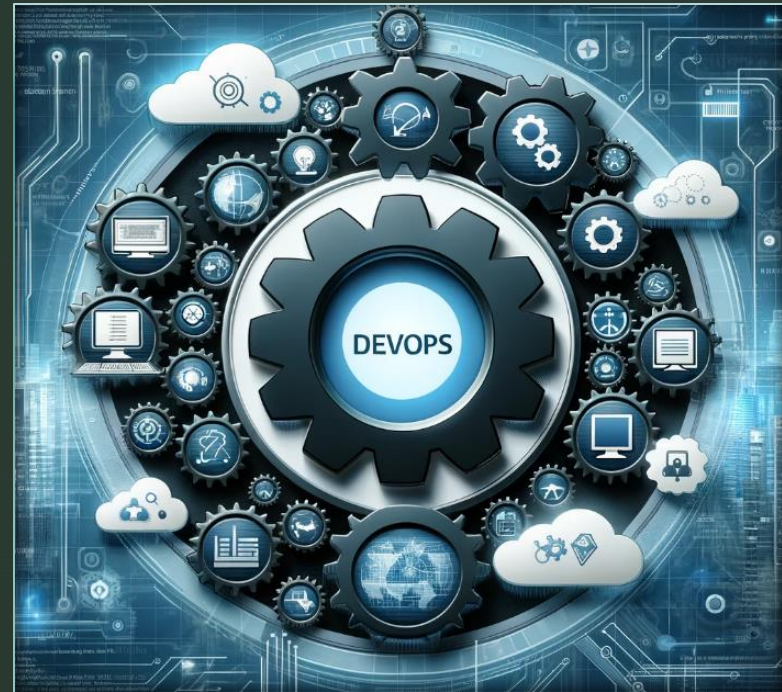
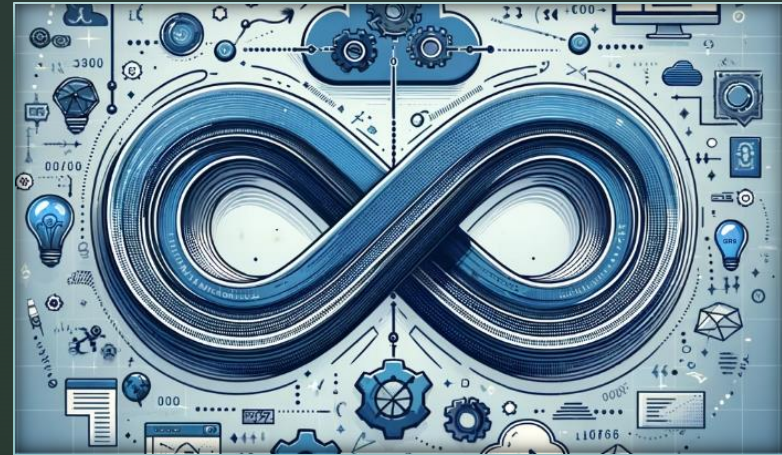


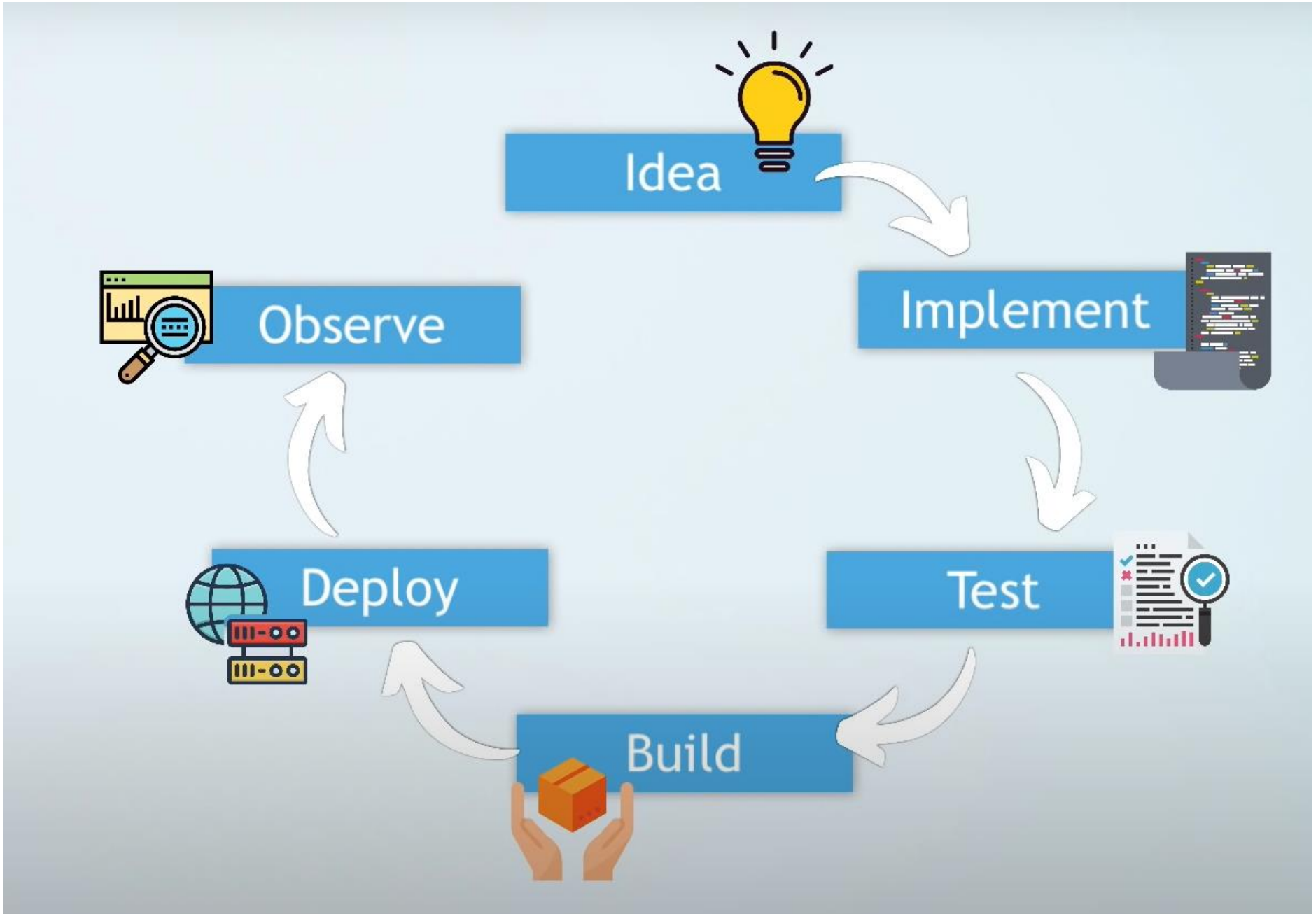
## Lecture plan:

- DevOps, what is this, key concepts
- Infrastructure as Code, IaC
- GitOps



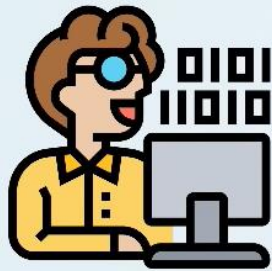
DevOps is a methodology in the software development and IT industry. Used as a set of practices and tools, DevOps integrates and automates the work of software development (Dev) and IT operations (Ops) as a means for improving and shortening the systems development life cycle.





# Challenges DevOps tries to solve

## 1) Miscommunications & Lack of Collaboration

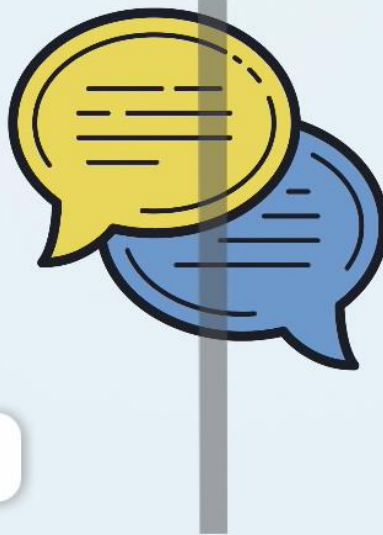


**Developers**

Code the application

✗ Can't deploy & run the app

✗ Don't consider, where app gets deployed



**Operations**

Deploy & Operate the application

✗ Don't know how the app works

# Challenges DevOps tries to solve

## 2) Conflict of Interest

Responsible  
for Development



Responsible  
for Operations



Both have **different incentives**



New features fast!



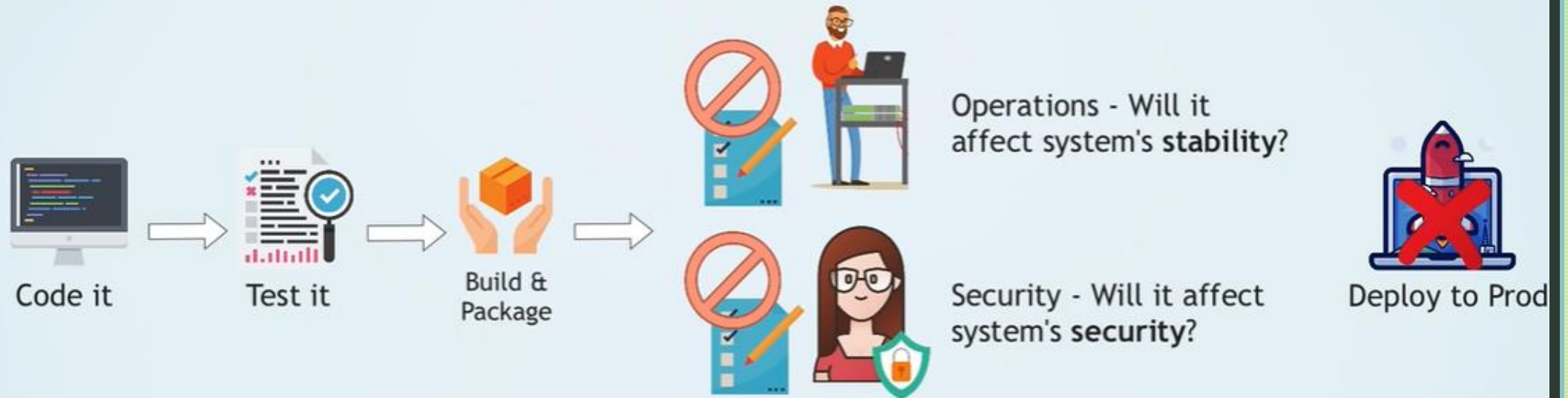
Maintain stability



App available

# Challenges DevOps tries to solve

## 3) Security



**X** Manual, bureaucratic process

**X** Checklists & Documentations



# Challenges DevOps tries to solve

## 4) Application Testing



Testers



Often manually

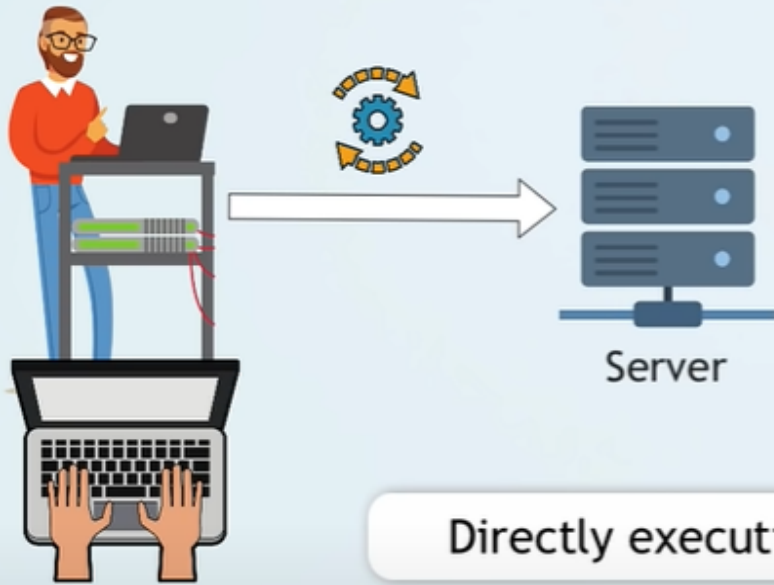
Testing the app on different levels

- ▶ Test specific features
- ▶ End to End tests
- ▶ Testing on different environments
- ▶ Performance tests

Can't rely on automated tests fully!

# Challenges DevOps tries to solve

## 5) Manual Work



- ▶ Manually deploying app
- ▶ Manually preparing the deployment environment
- ▶ Manually configuring Jenkins build jobs
- ▶ Manually configuring user access & permissions

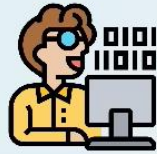
Directly executing commands

Execute scripts manually

SH



## DevOps as a separate Role



Developers doing DevOps



Doing only DevOps



Operations doing DevOps

## DevOps as a Set of Tools

- ▶ DevOps is not primarily about Tools, but...



Source Code Management



Continuous Integration/  
Delivery



Container Orchestration



Continuous Monitoring



Package Management

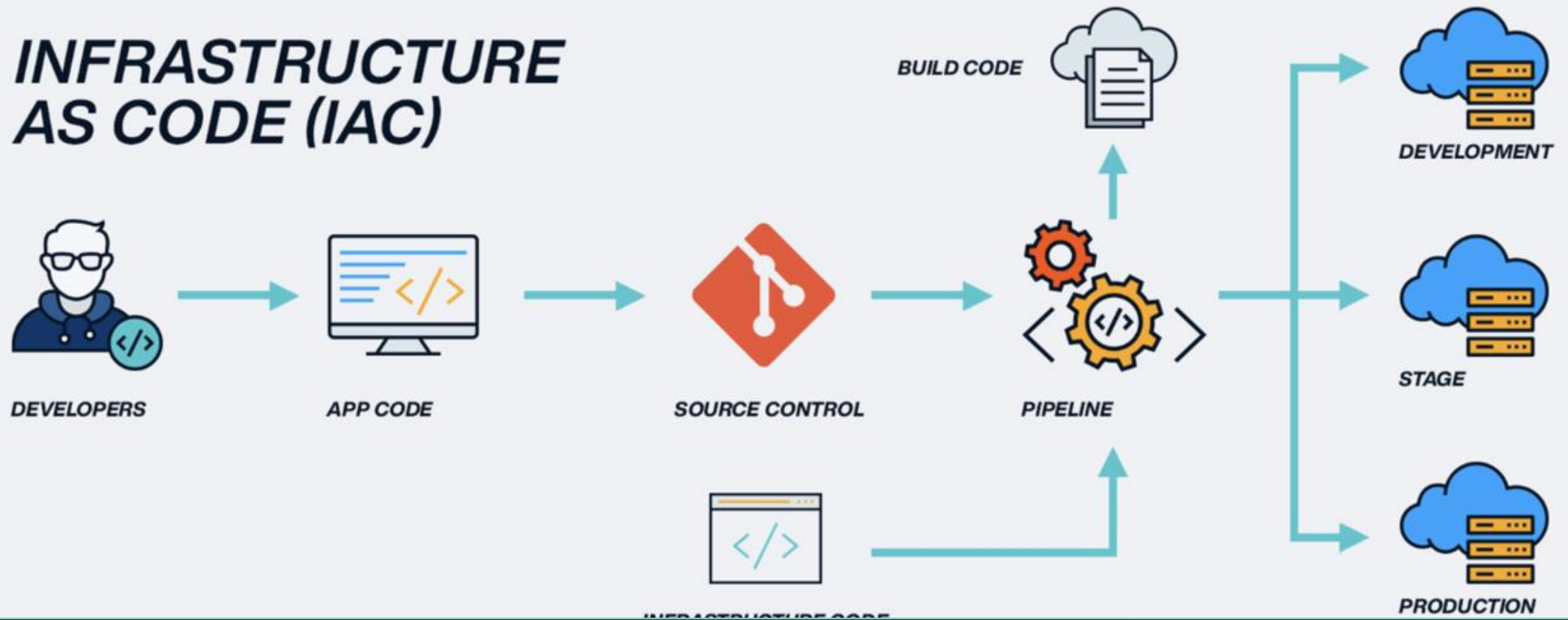


Treat Infrastructure  
as Code




Cloud

# INFRASTRUCTURE AS CODE (IAC)



IaC



## What is Infrastructure as Code (IaC)?

- Infrastructure as Code (IaC) is a process of managing and provisioning infrastructure using machine-readable definition files instead of manual configuration. With IaC, organizations can define their infrastructure in a text file, which can be version controlled and deployed automatically using tools like Terraform, Ansible, and Chef.

## DevOps tasks **before** automation



my-app



- ▶ setup servers
- ▶ configure networking
- ▶ create route tables
- ▶ install software
- ▶ configure software
- ▶ install DB

## What is Infrastructure as Code? 🤔

- ▶ IaC is a concept
- ▶ IaC tools/programs, which carry out these tasks



programs and applications



ANSIBLE





# Infrastructure as Code



done **right**

# X as Code



Infrastructure as Code



Network as Code



Policy as Code



Configuration as Code

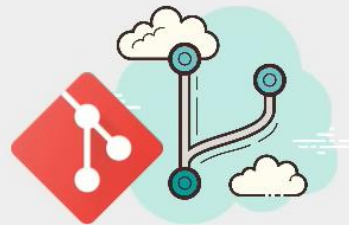


Security as Code

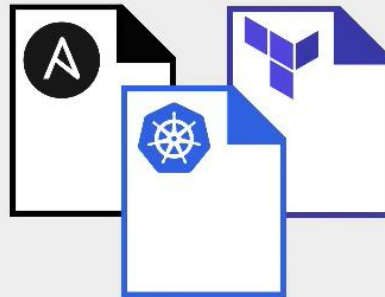


laC hosted on Git Repository

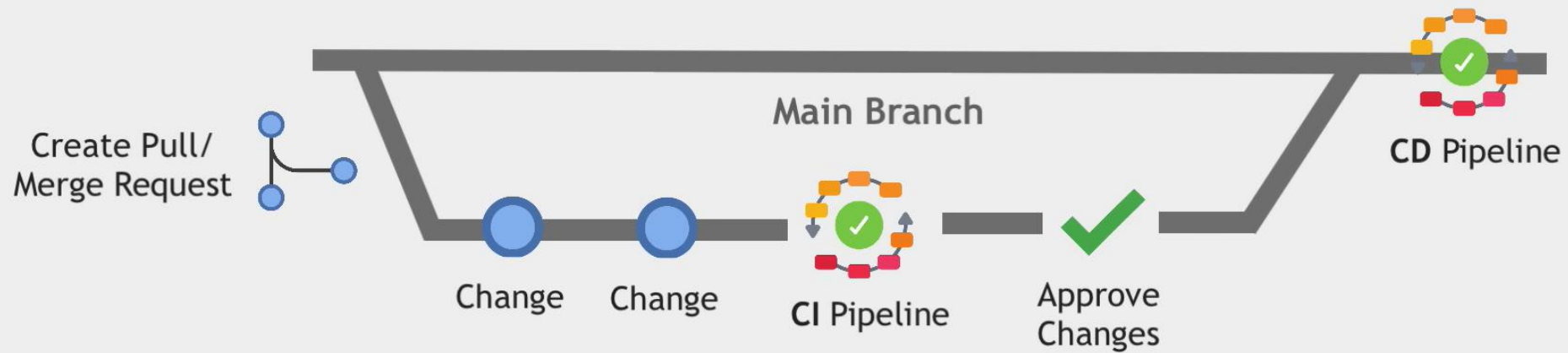
- ✓ Version Controlled
- ✓ Team Collaboration



Git Repository



# GitOps Flow



2) Run CI Pipeline



3) Approve Changes



4) Run CD Pipeline



Deployed to environment

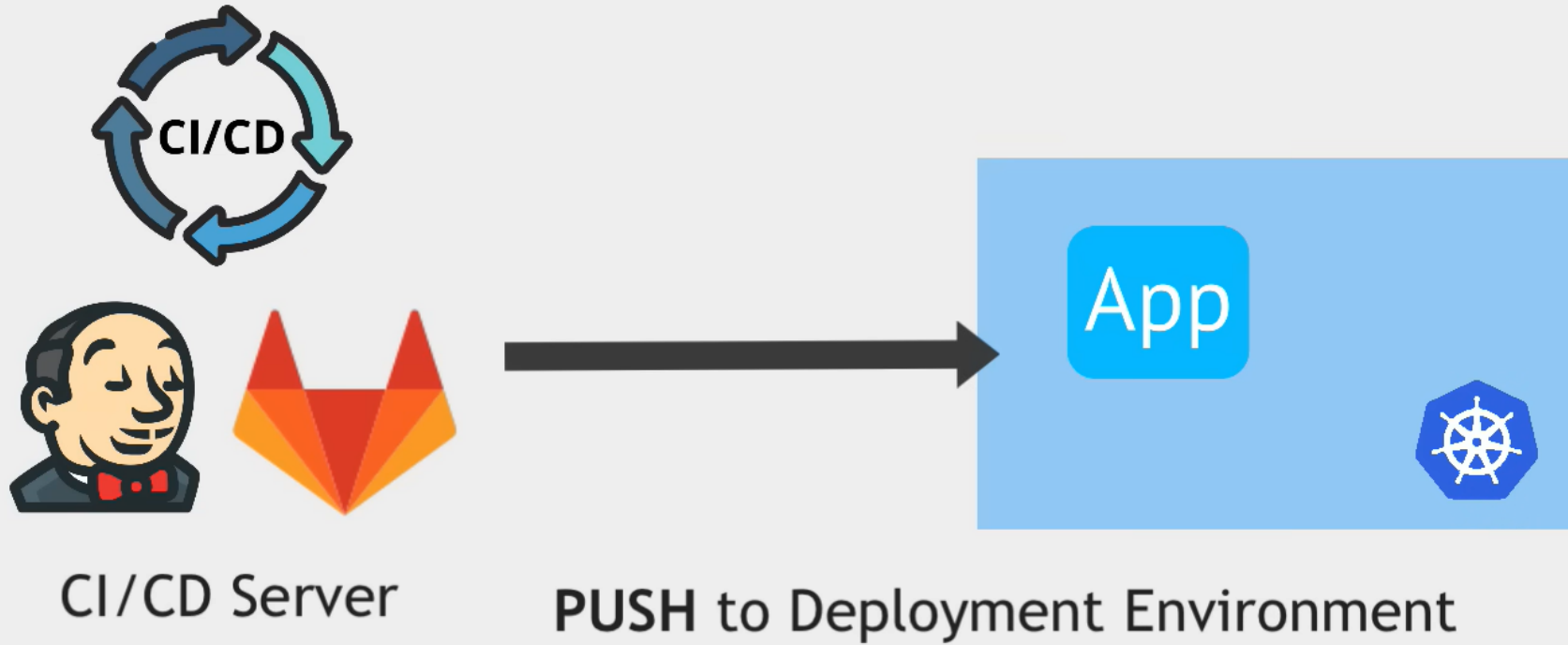




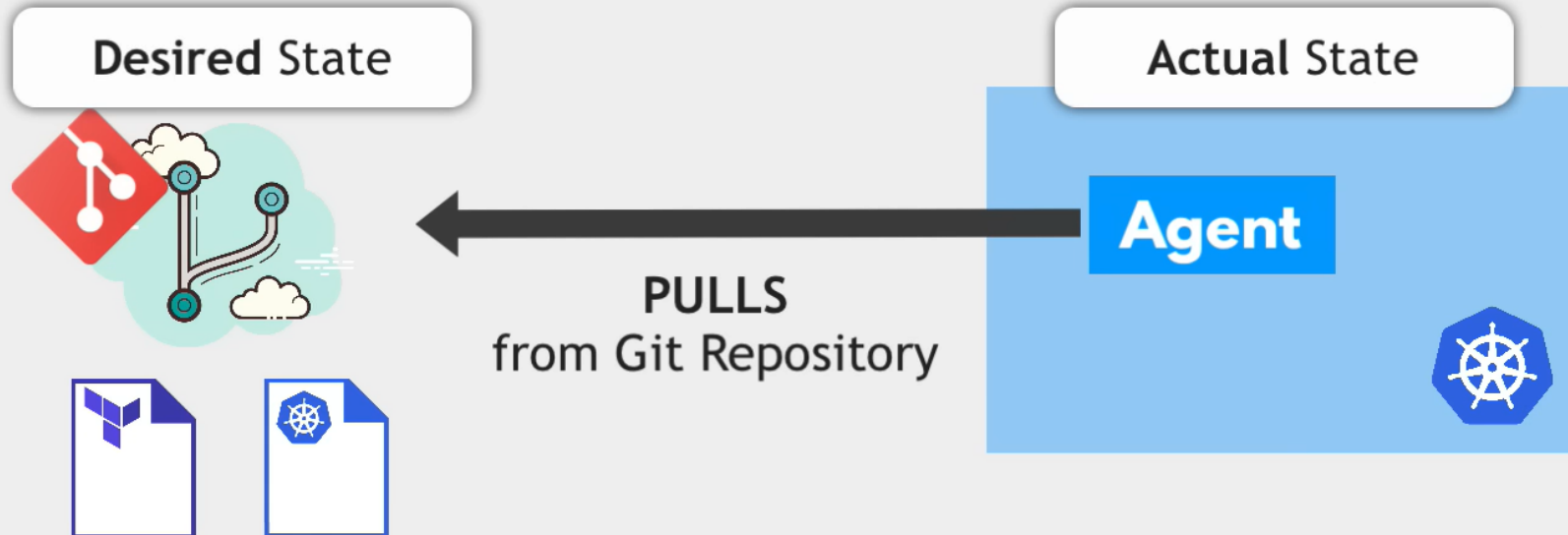
**Push Deployment**

**Pull Deployment**

## Push Deployment

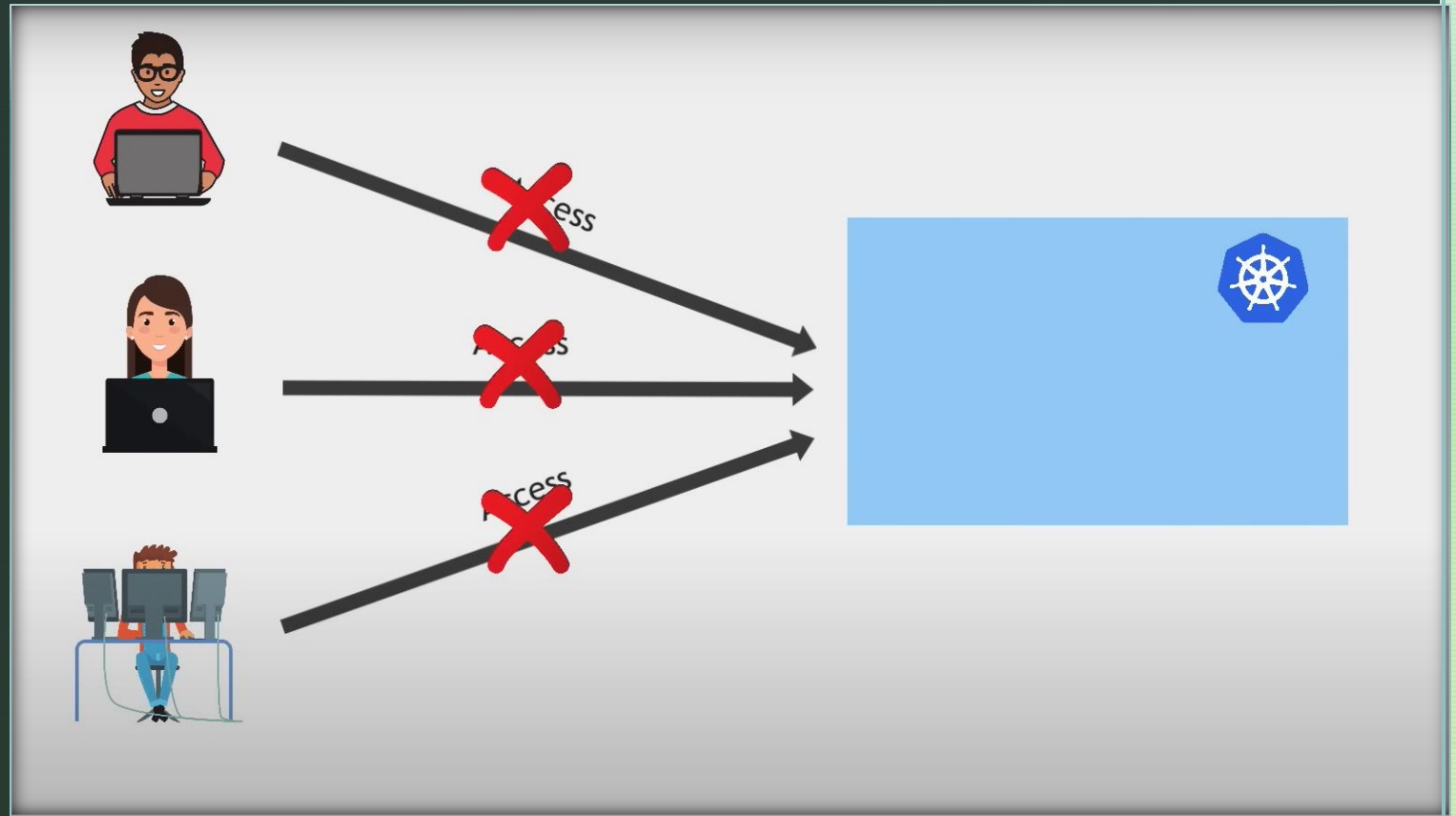


## Pull Deployment

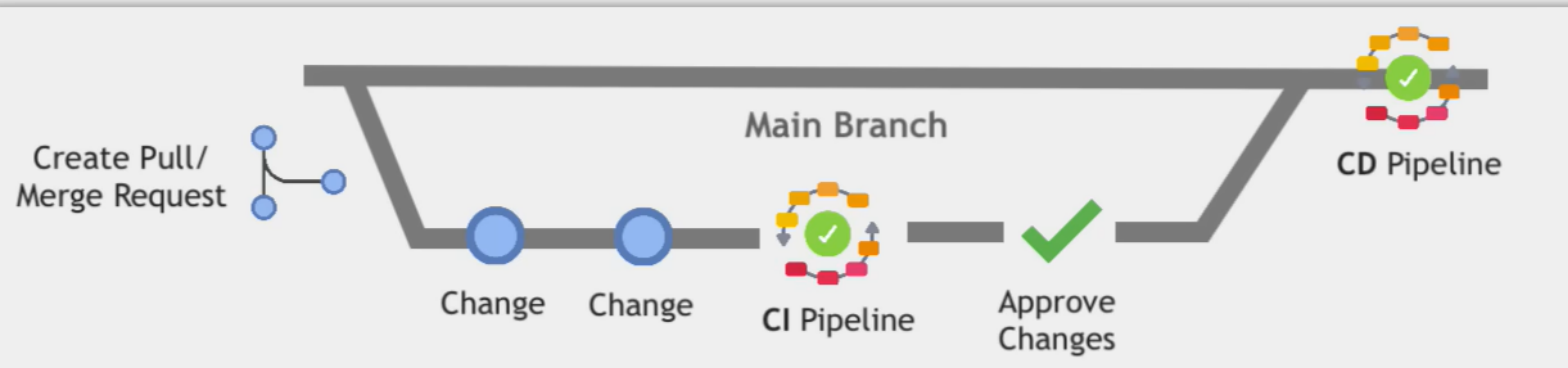


- ▶ **Agent** installed in the environment, e.g. in K8s cluster
- ▶ **Monitors** and **compares** desired state with actual state
- ▶ **Applies** the **changes** necessary to get to desired state

# Security



- ▶ Anyone can propose changes
- ▶ Smaller group can approve



# Demo time



<https://youtu.be/Qhy1IxKbLHM?si=8mJNs2oYC7PRF4QU>



# Dou DevOps podcast

[https://youtu.be/8cQIbQ9D1nc?si=h6qpYJ\\_dCWMWStIuj](https://youtu.be/8cQIbQ9D1nc?si=h6qpYJ_dCWMWStIuj)



**Let's be in touch!**

<https://www.linkedin.com/in/dyuvzhenko/>

