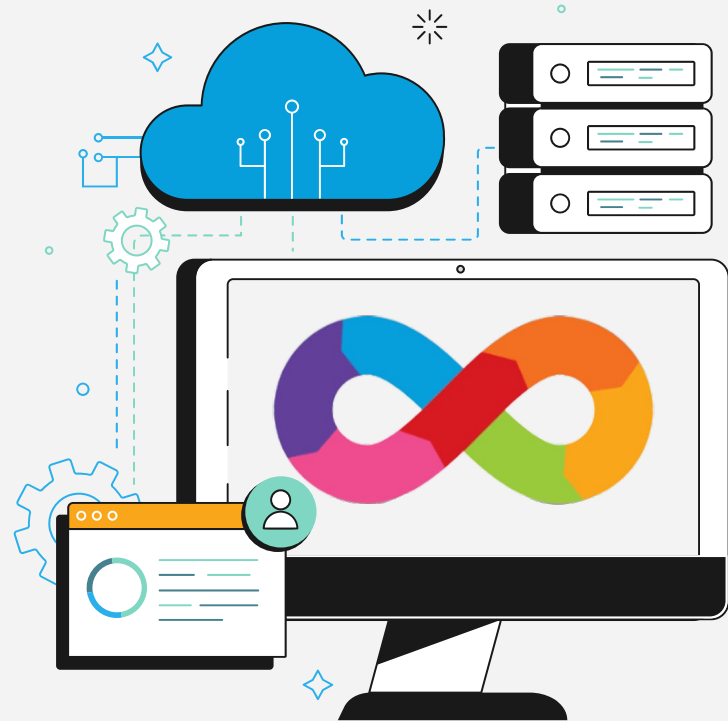


# Introduction to DevOps





@ IBA - SMCS

Week 05  
Infrastructure as  
Code (IaC)



Obaid ur Rehman  
Software Architect / Engineering Manager @ Folio3

# Infrastructure as Code (IaC)

- Traditional infrastructure Deployment
- Infrastructure as Code (IaC)
- Imperative V/S declarative
- Terraform Deepdive
  - Overview: HCL, Providers
  -  Code →  Plan →  Apply →  Destroy
  - State Management
  - Drift
- A real life Cloud Infrastructure example.
- A peek at real life IaC Code.
- Other IaC Tools

# What is Cloud Infrastructure

Infrastructure refers the services that are provisioned to ensure the delivery, function of a software system on the Cloud. This can include:

- Compute resources: Virtual Machines, Clusters
- Storage
- Database
- Network
- Policies
- CI/CD Pipelines.

# Traditional infrastructure deployment

- Graphical User Interface
- Scripts

## **Limitation:**

- Error prone
- Management was a mess
- Maintenance was difficult.
- Difficult to Manage Drift.

# Infrastructure as Code (IaC)

If you use **code** to provision and configure the infrastructure, it is called Infrastructure as code (IaC).

To put it simply, **codifying** the infrastructure provisioning and configuration.



# Infrastructure as Code Tools



**Terraform**



**AWS CLOUDFORMATION**



**puppet**



**ANSIBLE**

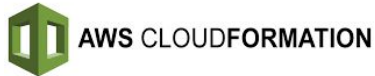


**Pulumi**

# IaC Tools categorization

## Infra Provisioning tools

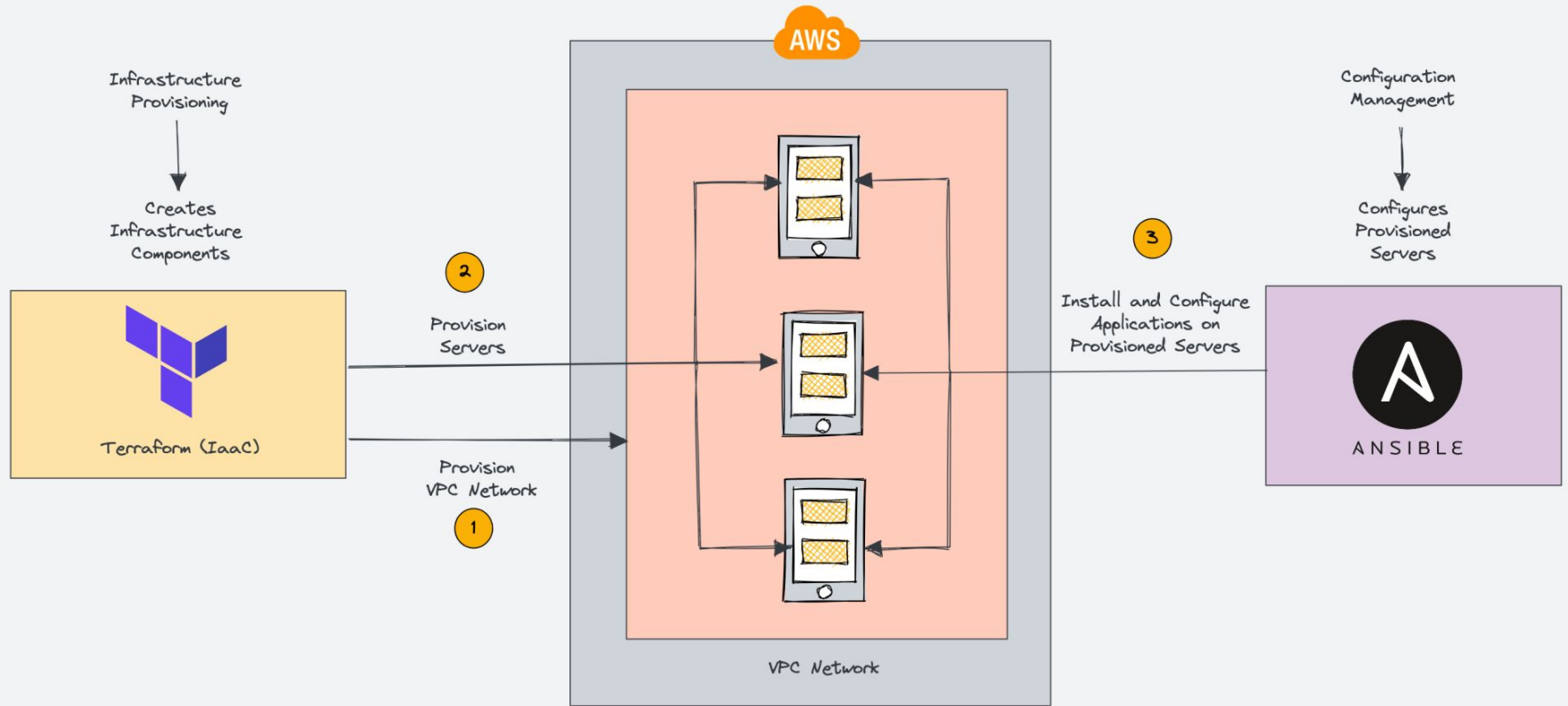
- ✓ Spin up new VMs
- ✓ Create new Database
- ✓ Create Load Balancer
- ✓ Create Kubernetes Cluster



## Configurations management tools

- ✓ Install software *e.g: Nginx*
- ✓ Configure software
- ✓ Run Software on all VMs







# Declarative v/s Imperative

## Declarative

● We specify what result we expect from the program.

Example:

*Create a VM with 2 VCPU, 8 GB RAM →  
Create LB → Bind them both.*



## Imperative

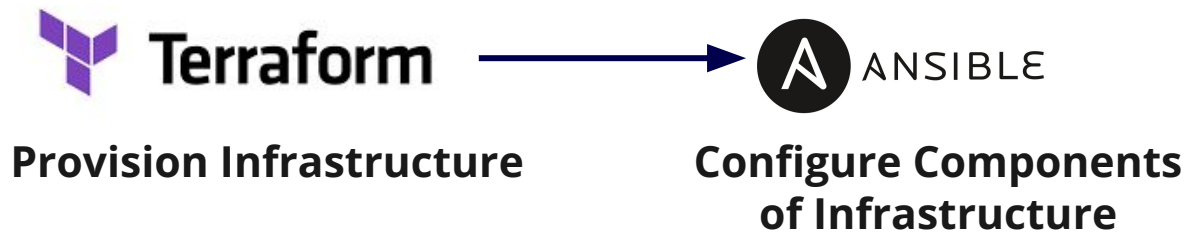
● We provide step by step instructions.

Example:

*Start VM → Install Apache → Configure  
Apache → Start Apache → Done.*



# Typical approach

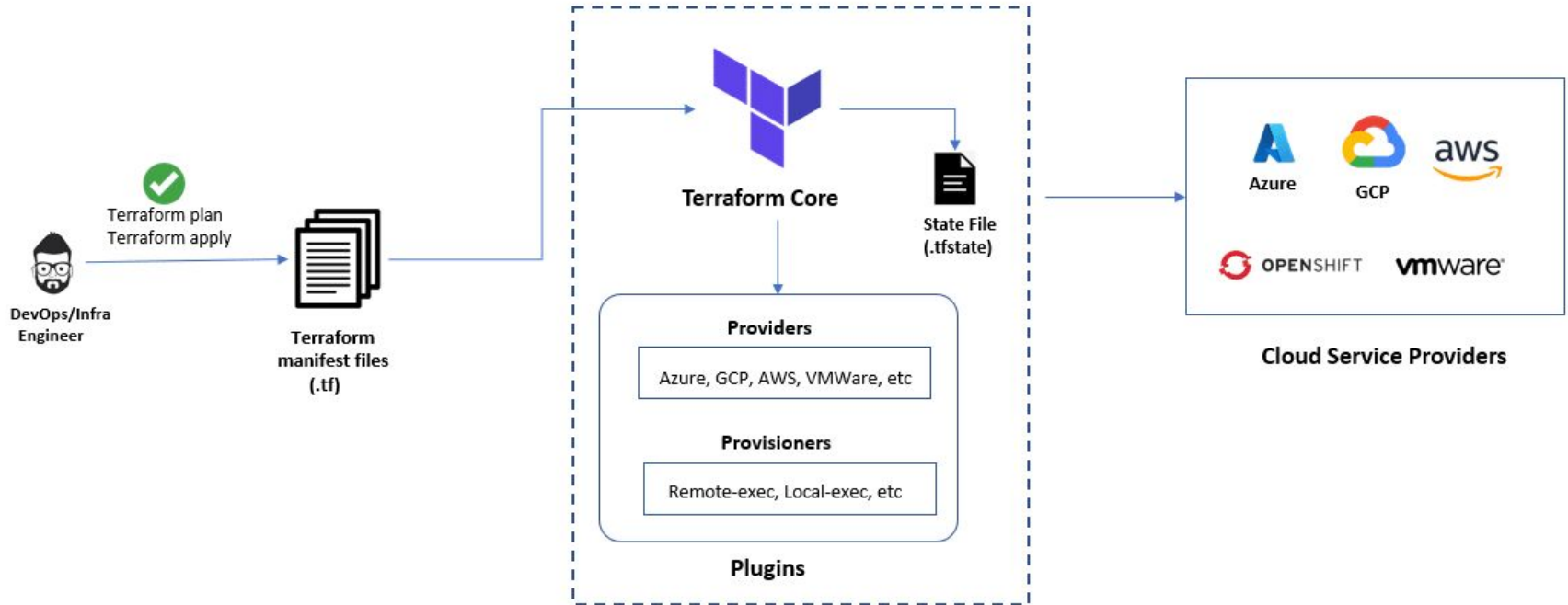




# Benefits of IaC

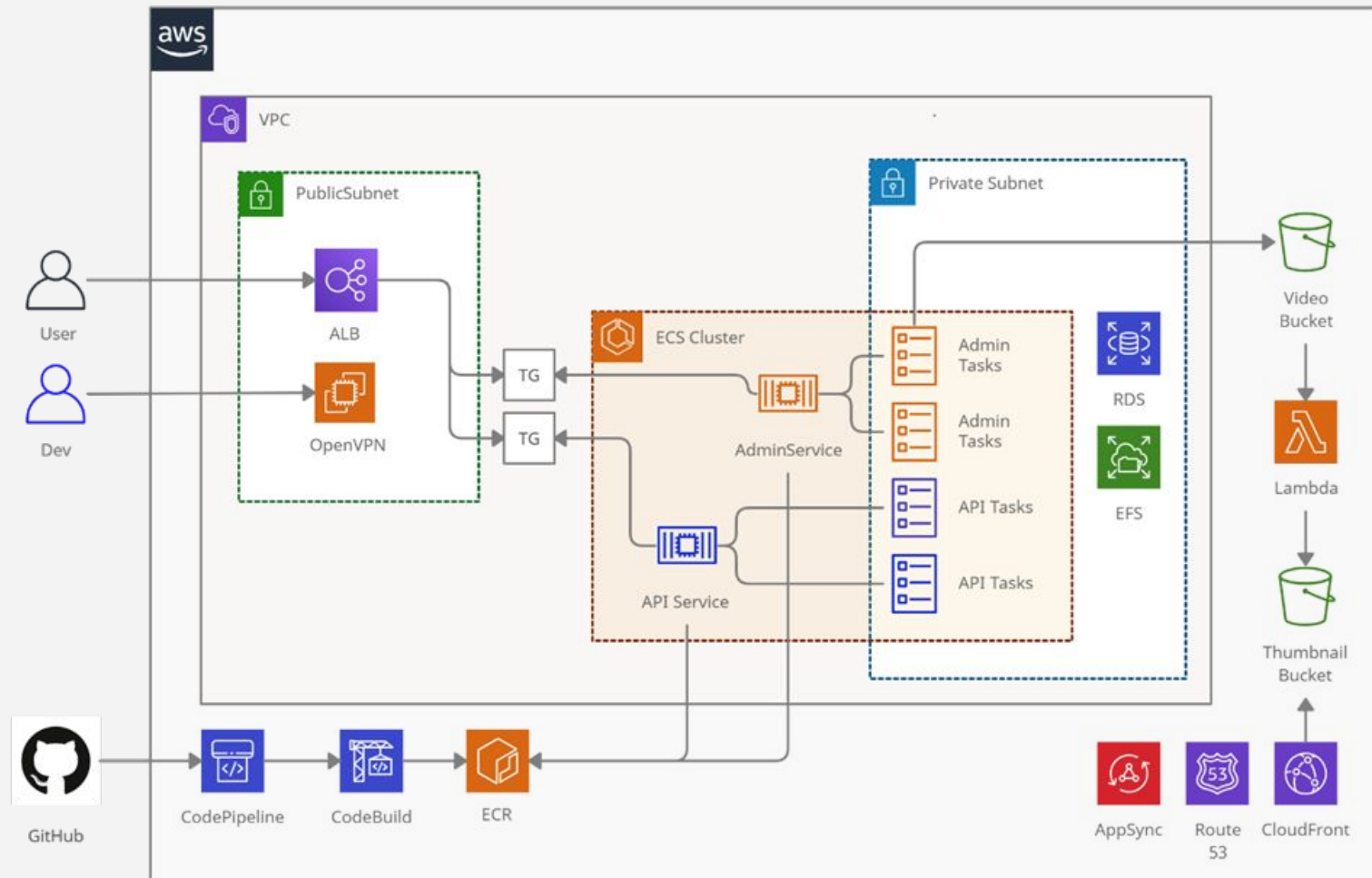
- With IaC, you can recreate any complex infrastructure with just one click in a matter of minutes.
- You can version control your infrastructure state in the form of IaC.
- Developer-centric workflow: Like developing applications, a standard practice for IaC code is to follow all standard coding practices like testing, review, PR etc.

# Terraform Overview



# Terraform Deep Dive

1. Setup
2. Code
3. Basic overview
4. Plan
5. Apply
6. State
  - a. Local
  - b. Remote
7. Destroy



# End of Week 1

## Q&A

