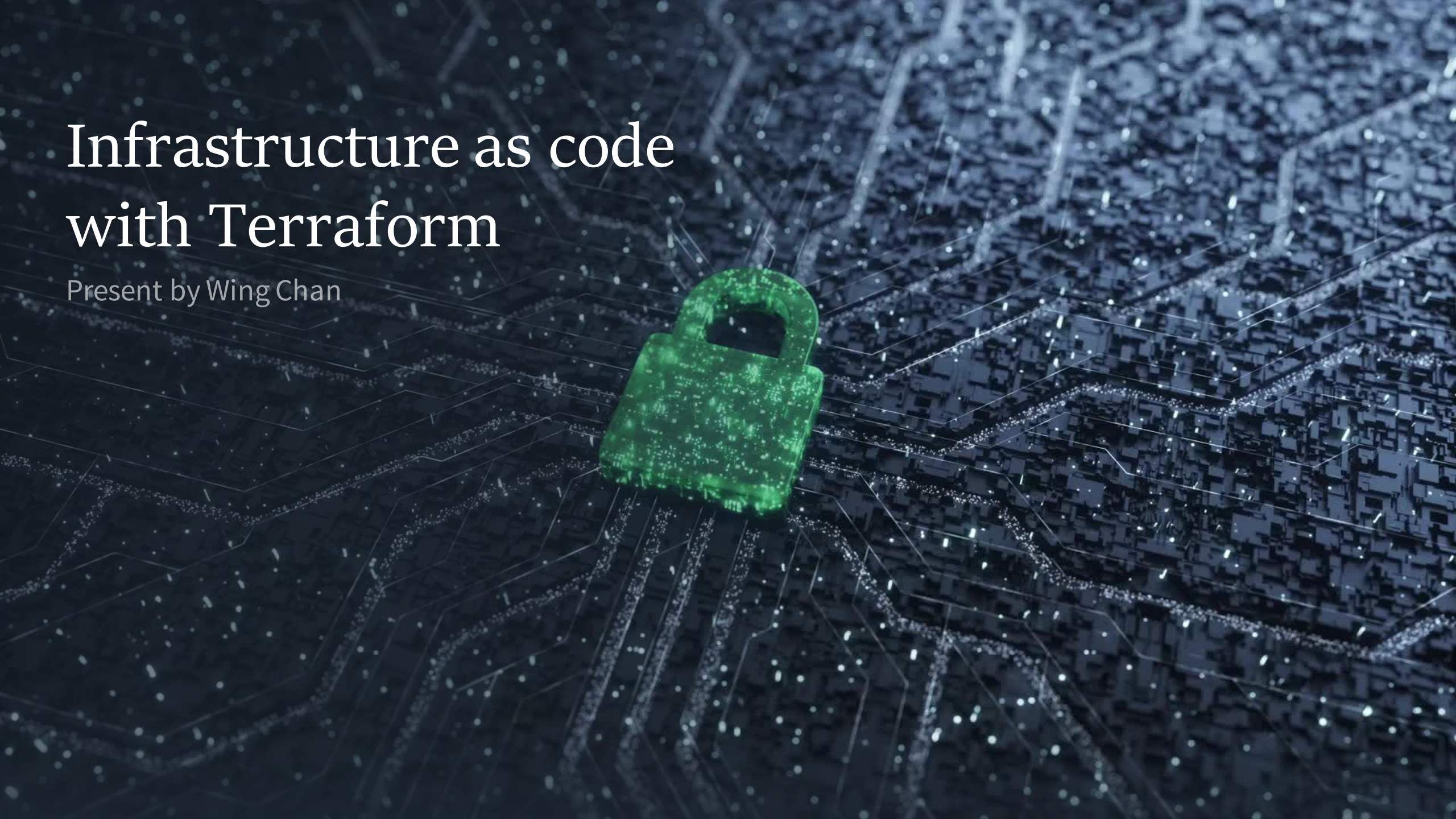
Infrastructure as code with Terraform

Present by Wing Chan



Agenda

What is Infrastructure as Code (IaC)?

What is Terraform?

What's HCL?

Demo

What's Infrastructure as Code (IaC)?

- Definition: IaC is the process of managing and provisioning your IT infrastructure thru declarative definition files, rather than physical hardware configuration or interactive configuration tools.
- Benefits:

Speed

- Enabling you quickly set up your complete infrastructure by running a script per each environment. It make SDLC more efficient.

Consistency

- Avoid manually configuration per environment. All infrastructure settings come from the same set of configuration files.

Traceability

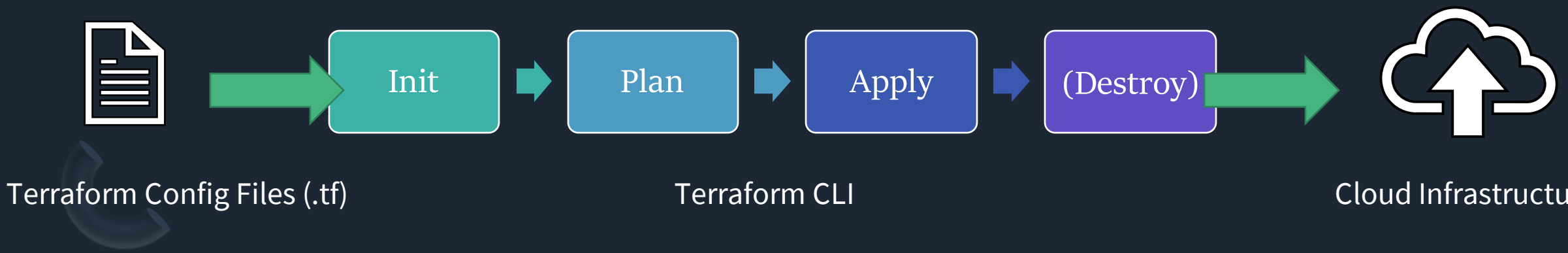
- Since you can version IaC configuration files like any source code file, you have full traceability of their changes.

Lower cost

- Infrastructure deployments are repeatable, scalable and can be fully automated.

What is Terraform?

- An open-source tool created by HashiCorp and released in 2014. Using a *declarative* configuration language aka *HashiCorp Configuration Language* (HCL) to manage infrastructure as code.
- It supports an extensive list of cloud infrastructure *providers* such as AWS, Azure, GCP, etc.
- Workflow:



HashiCorp Configuration Language (HCL)

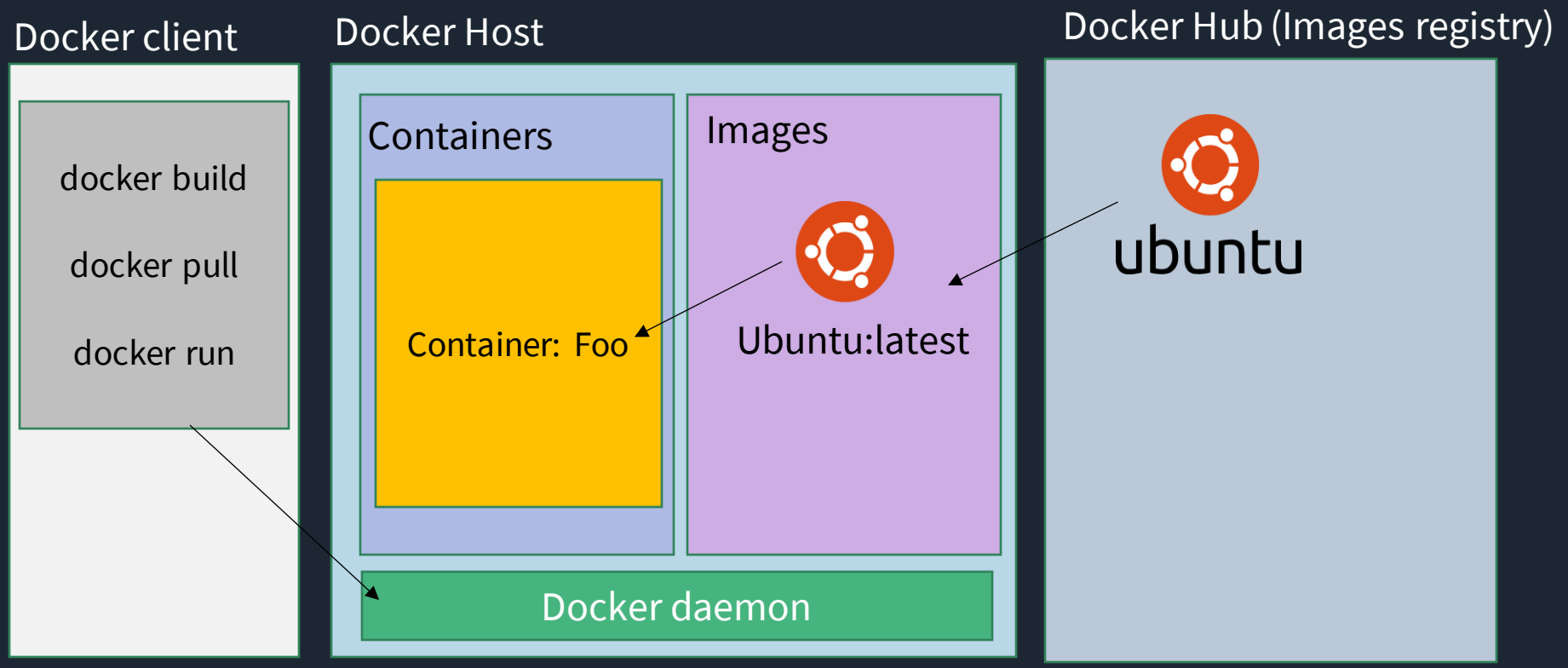
```
resource "aws_vpc" "main" {
  cidr_block = var.base_cidr_block
}

<BLOCK TYPE> "<BLOCK LABEL>" "<BLOCK LABEL>" {
  # Block body
  <IDENTIFIER> = <EXPRESSION> # Argument
}
```

- *Blocks* are containers for other content and usually represent the configuration of some kind of object, like a resource. Blocks have a block type, can have zero or more labels, and have a body that contains any number of arguments and nested blocks. Most of Terraform's features are controlled by top-level blocks in a configuration file. Here is the list of block types: resource, data, provider, variable, output and module
- *Arguments* assign a value to a name. They appear within blocks.
- *Expressions* represent a value, either literally or by referencing and combining other values. They appear as values for arguments, or within other expressions.

Prerequisites

- Installation Instructions:
  - Terraform CLI: https://learn.hashicorp.com/tutorials/terraform/install-cli?in=terraform/aws-get-started
  - AWS CLI: https://docs.aws.amazon.com/cli/latest/userguide/cli-chap-install.html
  - Docker: https://docs.docker.com/get-docker/

Docker Demo


Docker client
docker build
docker pull
docker run
Docker Host
Containers
Container: Foo
Images
Ubuntu:latest
Docker daemon
Docker Hub (Images registry)
ubuntu

AWS Demo

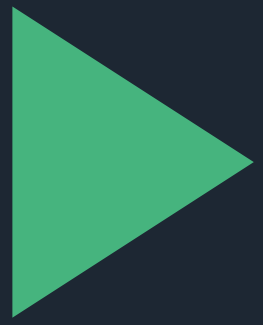
AWS Cloud: region: us-east-1

Virtual Private Cloud (VPC): cidr block: 10.0.0.0/16

EC2 Instance

Name: app_server;
AMI: Ubuntu Server 20.04 LTS (HVM), SSD
Volume Type, 64-bit (x86)
Type: t2.micro

Private Subnet: 10.0.1.0/24



Terraform Demos

References

- Learning Terraform: https://learn.hashicorp.com/terraform
- Demo Codes: https://github.com/wingchanatibsa/LearningSessions/tree/master/Terraform/demo