

Automate Secure Infrastructure with Packer, Vault and Terraform

Course Summary

Description

Transitioning from traditional infrastructure deployment and management processes can be challenging. Implementing infrastructure as code principles and using best practices leads to repeatable results, fewer manual errors, and overall quicker application releases for your customers. This class focuses on using automation tools to build, deploy, and manage security-hardened infrastructure. Using Packer, students can automate building a golden base image consisting of company policies and best practices. This image can then be deployed with Terraform, using Vault to manage sensitive passwords and secrets.

Objectives:

Attendees will understand best practices for automated building of secure infrastructure using code, storing that code in version control, and deployment using Terraform and managing secrets with Vault. They will also use Packer to automate building of “golden images”.

Topics

- Configuration Management
- Packer
- Packer Builders
- Provisioners
- Post Processors
- Terraform Introduction
- Programming Structure
- Resources
- Variables
- Terraform CLI
- State management
- Provisioners
- Modules and Workspaces
- Security
- Vault Introduction
- Secret Engines
- Policies
- Vault Agent
- Putting it all together
- Wrap-up

Audience

This class's audience is Developers, DevOps, Architects, Team Leads, Operations, and any other Engineering personnel interested in learning best practices for automating, deploying, managing, and securing infrastructure and application code.

Prerequisites

Attendees should have a basic understanding of Linux and command-line experience.

Duration

Three days

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Course Outline

I. Configuration Management

- A. Configuration Drift
- B. Challenges with Manual Configuration
- C. Infrastructure as Code
- D. Introduction to Automation Tools
- E. Packer
- F. Terraform
- G. Vault
- H. Benefits of Configuration Management

II. Packer

- A. Introduction
- B. Features
- C. Commands
- D. Terminology
- E. Language (HCL)

III. Packer Builders

- A. Overview
- B. Builder types
- C. Cloud
- D. Docker
- E. VMware

IV. Provisioners

- A. Types
- B. Shell, Ansible, Chef
- C. Cleanup provisioner
- D. Template syntax

V. Post Processors

- A. Overview
- B. Use cases
- C. Best practices

VI. Terraform Introduction

- A. Overview
- B. Architecture
- C. Why Terraform?
- D. Comparison of tools
- E. Core components
- F. Fundamental concepts

VII. Programming Structure

- A. Providers
- B. Resources
- C. Variables
- D. Data sources
- E. Outputs

- F. Cloud integration

VIII. Resources

- A. Types and Arguments
- B. Behavior
- C. Dependencies
- D. Local only resources

IX. Variables

- A. Inputs
- B. References
- C. Outputs and Locals
- D. Overrides

X. Terraform CLI

- A. Features
- B. Commands
- C. Managing infrastructure

XI. State management

- A. Local or Remote?
- B. Remote storage options
- C. S3
- D. AzureRM
- E. Google File Storage
- F. Integrating with Git
- G. Challenges with State file locking
- H. Importing existing resources

XII. Provisioners

- A. Types of Provisioners
- B. Remote execute provisioners
- C. Local execute provisioners
- D. Storing provisioners in repository

XIII. Modules and Workspaces

- A. Understanding DRY (Don't Repeat Yourself) principle
- B. Variables and Modules
- C. Terraform module registry
- D. Terraform workspace

XIV. Security

- A. The right way to handle Access & Secret keys
- B. Managing resources in multiple regions
- C. Terraform and Identity Access Management (IAM)

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Course Outline (cont'd)

XV. Vault Introduction

- A. Overview
- B. Architecture
- C. Comparison of tools
- D. Core components
- E. Fundamental concepts
- F. Platforms

XVI. Secret Engines

- A. Static secrets
- B. Cubbyhole secret engine
- C. Dynamic secrets
- D. Encryption
- E. Authentication

XVII. Policies

- A. Configuration
- B. Authentication methods
- C. Syntax
- D. Constraints

XVIII. Vault Agent

- A. Overview
- B. Auto-Auth
- C. Methods
- D. Caching

XIX. Putting it all together

- A. Building images with Packer
- B. Creating and managing infrastructure with Terraform
- C. Deploying Vault
- D. Integration with Kubernetes
- E. Securely deploying applications

XX. Wrap-up

- A. Review
- B. Q&A
- C. Next steps