



ORACLE
PRESS

DevSecOps in Oracle Cloud

Securing and Automating
Oracle Cloud Infrastructure

ORACLE

Erik Benner
Ahmed Aboulnaga
Dhrumil Patel

DevSecOps in Oracle Cloud: Securing and Automating Oracle Cloud Infrastructure

Erik Benner, ACED
Ahmed Aboulnaga, ACE Pro
Dhrumil Patel



Pearson

DevSecOps in Oracle Cloud: Securing and Automating Oracle Cloud Infrastructure

Table of Contents

Cover

Title Page

Copyright Page

About the Authors

Dedications

Acknowledgments

Contents at a Glance

Contents

Introduction

1 Introduction to OCI and DevSecOps

What Is DevSecOps?

Why DevSecOps?

What Makes Up a DevSecOps Team?

Benefits of OCI

OCI Free Services

Summary

2 Oracle Cloud Infrastructure Governance

Tenancy Account Management and Governance

Creating a New Tenancy

Organizational Governance

Cloud Advisor

Table of Contents

Cost Management

Performance

High Availability

Billing and Budgets

Dashboards

Summary

3 Oracle IaaS Security

Identity and Access Management (IAM)

Security Zones

Bastions

Threat Intelligence Service

Web Application Firewall (WAF)

Firewall

Vault

Audit

Summary

4 Oracle IaaS Cloud-Native Technologies

Functions

Setting Up the Tenancy

Creating the Application

Setting Up the Linux Host

Creating and Running a Function

Streams

Events

Oracle Kubernetes Engine (OKE)

Docker

Key Terms

Summary

Table of Contents

5 Oracle IaaSNetwork

Getting Started with OCI Networking

- Understanding Concepts and Terminology

- Walking Through a Basic Network Architecture Diagram

Creating Your First VCN and Subnet

- Creating a VCN

- Creating a Subnet

- Updating the Security List

Connecting VCNs Through Local Peering

- Creating Local Peering Gateways and Establishing Peering

- Adding a New Route Rule to the Route Table

- Creating Network Security Groups (NSGs)

- Attaching VNIC to the Network Security Group

Creating Flow Logs

Using Network Path Analyzer

Understanding Gateways

Securing Your Network

Summary

6 Oracle IaaSCompute

Building a VM

- X86 and ARM, AMD vs. Intel What's the Scoop?

- A VM Is More Than a VM; There Are Options

- OS Images and the Marketplace

- Custom OS Images

Summary

7 Oracle IaaSStorage

- Block Volume

Table of Contents

- Creating and Attaching
- Configuring Performance
- Performing a Backup

- Object Storage

- File Storage

- Archive Storage

- How to Secure Your Storage

- Summary

8 Oracle DBaaS Databases

- Oracles DBaaS Offerings

- Database as a Base Database Service
 - Exadata Cloud Service and Exadata Cloud@Customer
 - Autonomous Database Services
 - MySQL and MySQL HeatWave
 - NoSQL

- How to Provision Databases

- Provisioning Base Database Service
 - Provisioning the Autonomous Database Service
 - Provisioning MySQL Database
 - Provisioning the NoSQL Database

- Summary

9 OCI DevOps Service

- Overview of OCI DevOps

- Deployment Environments
 - Deployment Strategies

- DevOps Components and Resources

- How to Create a Working Sample Project

- Creating Compute Instances to Deploy To

Table of Contents

- Granting Permissions to Compute Instance Run Command Plug
- Creating an Artifact Registry to Host Artifacts
- Uploading a Script to the Artifact Registry
- Creating a Notification Topic
- Creating a DevOps Project
- Creating an Environment in the DevOps Project
- Adding an Artifact from the Artifact Registry to the DevOps Project
- Adding an Instance Group Deployment Configuration Artifact
- Creating a Deployment Pipeline
- Running the Deployment Pipeline

Summary

10 Data Safe

Security Assessment

- User Assessment

Data Discovery

Data Masking

Activity Auditing

Alerts

How to Add a Database

- Registering an Autonomous Database
- Registering an Oracle Base Database System
- Registering an On-Premises Database

Summary

11 Identity and Access Management

Compartments

Users

- Database Passwords
- API Keys

Table of Contents

Groups

Dynamic Groups

Policies

Federation

Summary

12 Operating System Security

Oracle Ksplice

Oracle Autonomous Linux

Vulnerability Scanning Service (VSS)

Summary

13 Observability and Management

OCI Logging Service

Log Format

Log Types

Log Groups

Exercise 1: Enabling a Service Log

Exercise 2: Creating a Custom Log

Oracle Cloud Logging Analytics

Setting Up Logging Analytics for the First Time

Downloading and Installing the Management Agent

Clearing and Resetting Logging Analytics

Summary

14 Cloud Guard

Initial Configuration

Recipe Management

Using Detector Recipes

Using Responder Recipes

Table of Contents

Accessing Cloud Guard Recipes

Managing Detector Recipes

Managing Responder Recipes

Security Zones

Adding a New Security Zone

Summary

15 An Introduction to Ansible

What Is Ansible?

What Is OLAM?

Sizing the Deployment

OCI Authentication

Getting the OCI Information

Adding the OLAM Credential

Collections and Modules

Installing the OCI Collection on Your OCI Development System

Playbooks

Introduction to YAML

Summary

16 Using Ansible in OCI

Using Ansible

Writing Playbooks

Sample Playbooks

Common OCI Playbooks

Summary

17 Ansible Installing and Configuring OLAM

Installation

Preparing Linux

Table of Contents

Setting Up PostgreSQL

Installing OLAM

OLAM Management

Resource Management

Templates

Credentials

Projects

Inventory

Hosts

Access Management

Organizations

Users

Teams

OLAM Administrative Options

Credential Types

Notifications

Management Jobs

Instance Groups

Applications

Execution Environments

Summary

18 Ansible Full Stack Sample

Ansible in the Real World

Planning a Team

Creating Users

Creating Teams

Setting Up an Inventory

Summary

19 Infrastructure as Code

Table of Contents

The Problem That IaC Solves

Introducing Terraform as an IaC Tool

Terraform Concepts and Terminology

- Declarative Approach

- State File

- Immutable Infrastructure

- Plug-ins

Terraform and OCI

- Terraform Best Practices

Summary

20 Terraform API with Examples

Setting Up Terraform in OCI

- Downloading and Installing Terraform

- Creating RSA Keys Required for API Signing

- Adding a Policy for the User to Read OCI Resources

Exercise 1: Running Terraform for the First Time

- Creating a Working Directory

- Creating an Initial Terraform Script

- Running Terraform Initialize for the First Time

- Running terraform plan for the First Time

- Running terraform apply for the First Time

Exercise 2: Parameterizing Terraform Configuration

Exercise 3: Understanding the Terraform OCI Documentation

- Updating Terraform Configuration from the Terraform OCI Documentation

- Running the Terraform Script to Create and List a Block Volume

- Updating a Resource

- Parameterizing from Other Output

- Debugging Errors

Summary

Table of Contents

21 Terraform Sample Use Case

- Confirming IAM Policies

- Setting Up Terraform

 - Applying the Changes

- Creating a New Compartment

 - Applying the Changes

 - Rerunning Terraform Apply with No Changes

 - Rerunning Terraform Apply After a Change in Terraform Configuration

 - Rerunning Terraform Apply After a Change on the OCI Console

- Creating a Virtual Cloud Network

 - Defining a VCN Module

 - Defining Security Lists and Ingress/ Egress Rules

 - Defining the Private and Public Subnets

 - Updating the Outputs File

 - Applying the Changes

- Creating a Compute Instance

 - Applying the Changes

- Creating an Autonomous Database

 - Applying the Changes

- Replicating to a Production Environment

- Using Other Terraform Commands

 - Formatting Terraform Configuration

 - Validating Terraform Configuration

 - Listing All Resources in the Terraform State

 - Displaying Details of All Resources from the Terraform State

 - Viewing the Terraform Output

- Destroying Resources

 - Destroying the Entire Infrastructure

Table of Contents

Destroying a Single Terraform Resource

Stopping/Starting Instances with Terraform

Summary

22 Enterprise Manager Cloud Control Installation

Installing and Configuring the Repository Database

Installing and Configuring Oracle Management Service

OPatch

Oracle Enterprise Manager 13c Update 12 for OMS

Oracle Enterprise Manager 13c Release 5 Update 12 for Oracle Management Agent

Installing and Configuring Oracle Analytics Server

Installing JDK

Installing FMW Infrastructure

Installing OAS

Configuring OAS

Integrating OAS with Oracle Enterprise Manager

Configuring Security Infrastructure

Configuring the Required OAS Datasource

Setting OAS Support for Oracle Enterprise Manager-Provided Reports

Summary

23 Using Oracle Enterprise Manager Cloud Control

Setting Up Administrators and Users

Monitoring OCI Environments

Monitoring OCI Compute Instance

Monitoring OCI Autonomous Database

Integrating Oracle Enterprise Manager with OCI

Setting Up Preferred Credentials

Creating an Enterprise Manager Target Group

Table of Contents

Creating an Oracle Enterprise Manager Super Administrator

Creating a Global Named Credential

Incorporating Best Practices

Monitoring Database Security

Patching Oracle Enterprise Manager

Sizing Oracle Enterprise Manager

Summary

Index