DevOps Automation on OCI Workshop

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Agenda

- DevOps Introduction
- Challenges in DevOps
- Automation Tooling (Terraform, PSM)
- Workshop Overview
- Workshop Terraform Templates
- Labs

Goals and Objectives

- Understand DevOps automation concepts
- Describe the 4 categories of automation
- Compare and contrast different automation tools and categories
- Use Terraform and CLI to create, discover, and terminate resources
- Use Terraform with the OCI provider to provision IaaS resources, PaaS services
- Use Terraform with CLI to configure and deploy applications

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DevOps Intro

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Core Business Values of DevOps

FASTER RELEASES

- Quickly align with business requirements
- Increase accuracy of releases - avoid downtime

SAVE MONEY

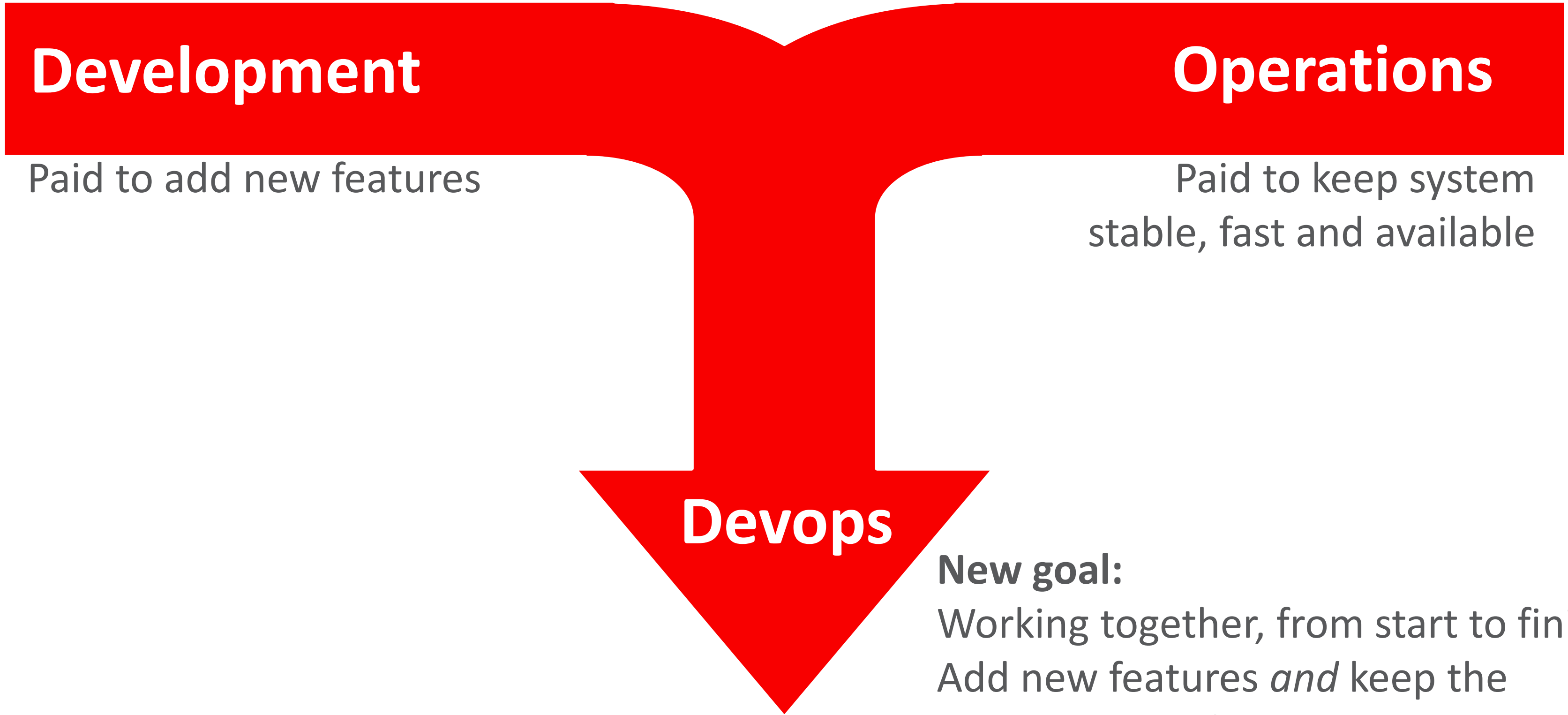
- Automate manual processes to reduce OPEX
- Prevent human error and reducing downtime

FOCUS ON BUSINESS

Allow high value employees to focus on higher value activities

DevOps Principles

Cultural movement enabled by technology

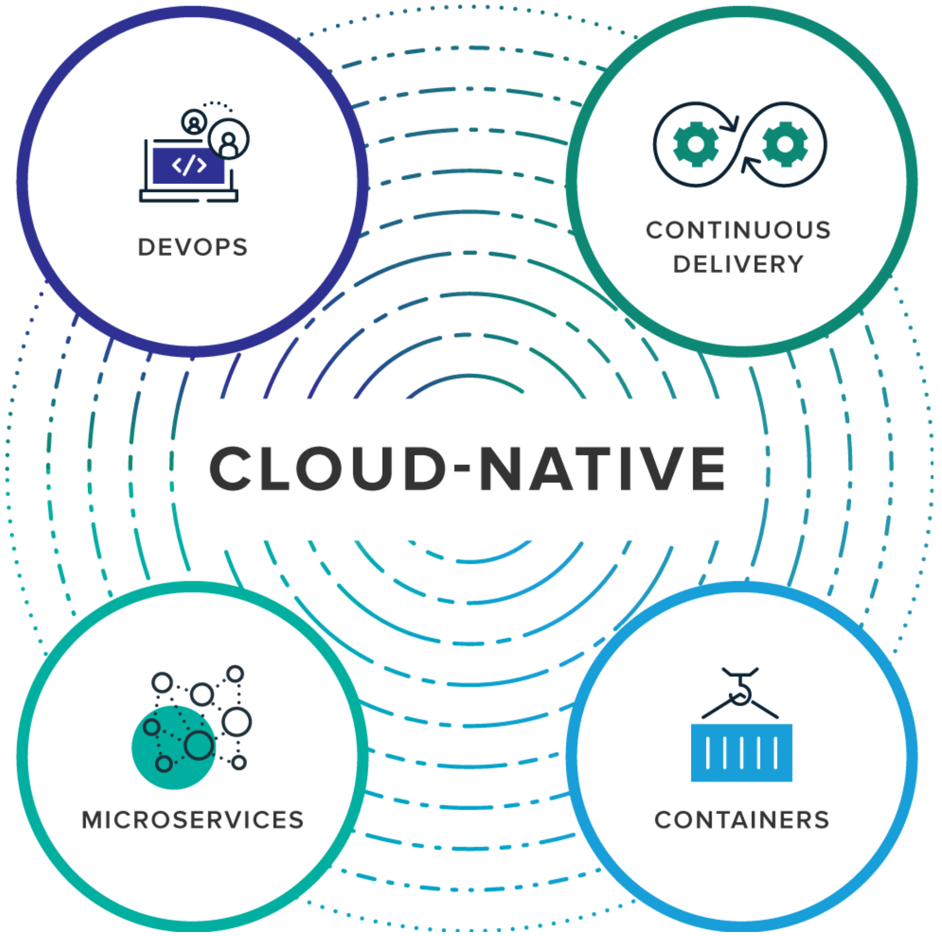


Paid to add new features

Paid to keep system stable, fast and available

New goal:
Working together, from start to finish.
Add new features *and* keep the system stable, fast and available

DevOps

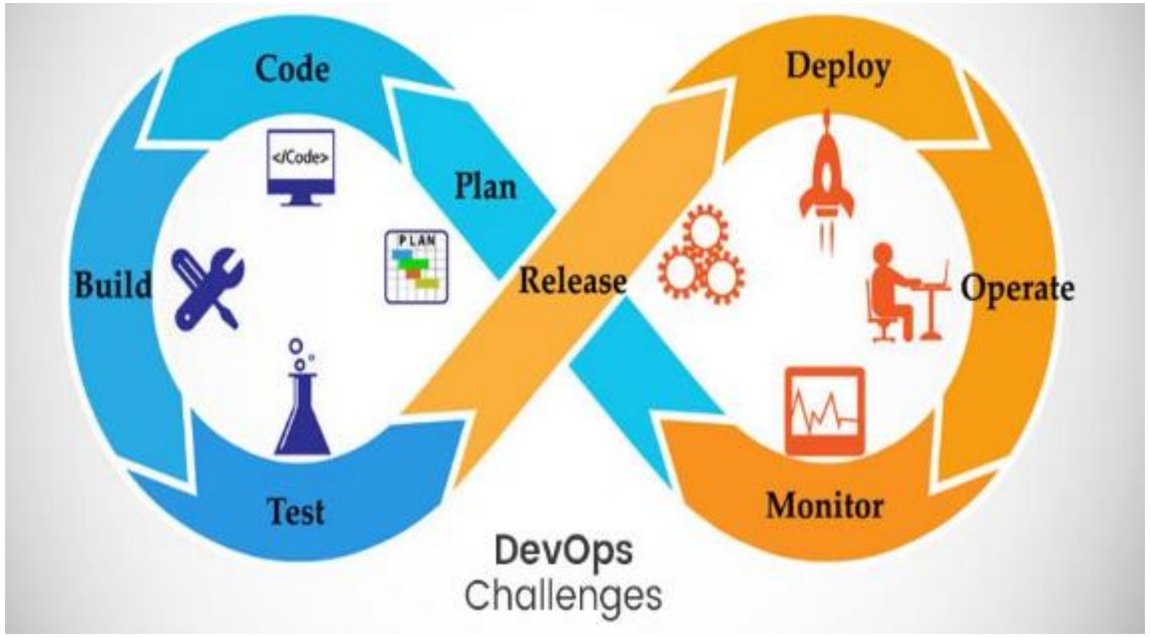


- Fully exploits the advantages of the cloud computing delivery model
- *Cloud Native* is not a specific workload, neither does it just apply to Development, but also a design & philosophy for Operations
- Oracle Cloud is providing the building blocks to enable higher value abstractions, automation and services
- This workshop provides the starting template for DevOps Automation

Challenges in DevOps

Top 10 DevOps Challenges

- Environment provisioning
- Manual testing
- No DevOps center of excellence
- Test data
- Manual deployments
- Planning in a DevOps environment
- DevOps and suppliers
- DevOps and governance
- No integrated tools architecture
- Manual releases



https://techbeacon.com/

The Power of Automation

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4 Categories Automation Tools

1. Infrastructure Provisioning
   - Terraform, cloud formation, heat…
2. Server Templating
   - Packer, Vagrant, Docker…
3. Configuration Management
   - chef, puppet, ansible…
4. Ad hoc scripts
   - Shell scripts, CLI

HashiCorp Terraform

ORACLE Cloud Infrastructure

Automation Tooling

Terraform – Built By HashiCorp

- Create and Manage infrastructure as Code
- Provisioning tool for managing Infrastructure Resources and Lifecycle
    - Provision
    - Update
    - Destroy
- Open Source Software with wide adoption in the market
    - – Written in Go
- HCL - Hashi Configuration Language
    - – simple markup format & JSON interoperable
- Enterprise support for Terraform available from HashiCorp

Terraform provider for Oracle Cloud Infrastructure

- Recommended way for deploying and managing stacks on OCI
- OCI Services supported
  - Core Services (Networking, Compute, Block Volume)
  - Container Engine (OKE)
  - Database
  - DNS
  - Email
  - File Storage
  - IAM
  - Load Balancing
  - Object Storage

OCI Terraform Samples

- https://github.com/terraform-providers/terraform-provider-oci/tree/master/docs/examples
  - 1 click deploy to OCI
  - Contains ~20 templates for basic resource management

- https://github.com/oracle/terraform-examples/tree/master/examples/oci
  - Additional templates for use-case specific stacks, e.g. MS SQL Always On, MongoDB, GlusterFS

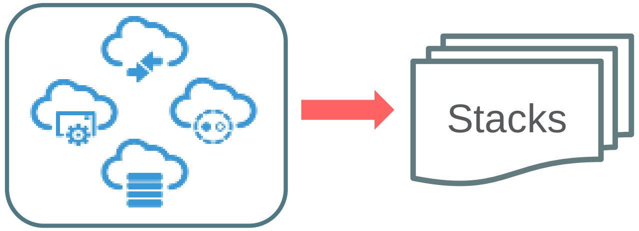
Terraform Provider for Oracle Cloud Platform

- Supported Oracle PaaS
  - Oracle Database Cloud Service
  - Oracle Java Cloud Service
  - MySQL
  - ACCS
- Supports creation and lifecycle management of Oracle PaaS
- Supports both OCI and OCI Classic

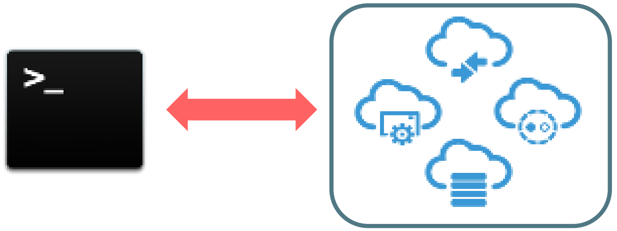
PaaS Provisioning

- Oracle PaaS Service Manager provides
  - Service Automation
  - Service and Stack Provisioning
  - API/CLI for DevOps

Cloud formations
With Stack Manager



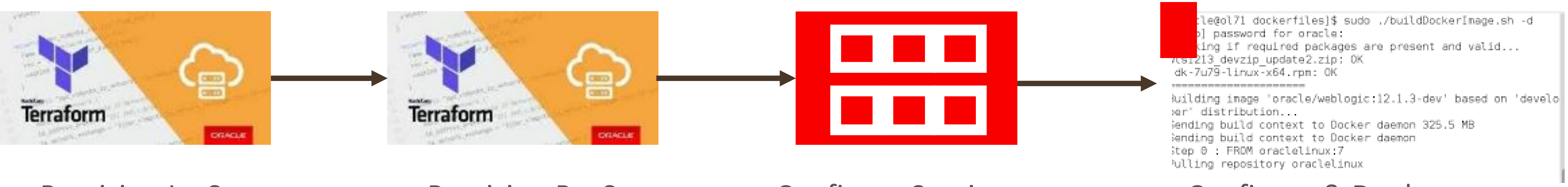
CLI for DevOps



Overview of the CLI

- The CLI is an essential tool for managing your OCI resources. It provides much of the same functionality found in the console, and extended functionality through the use of scripts.
- Built with the Python SDK
- Compatible with Python 2.7.5+ or 3.5+
- Compatible with Mac, Windows, and Linux
- Direct OCI API interaction

Putting It All Together with Automation in Oracle Cloud



```
cle@ol71 dockerfiles]$ sudo ./buildDockerImage.sh -d
o] password for oracle:
king if required packages are present and valid...
/ls1213_devzip_update2.zip: OK
 dk-7u79-linux-x64.rpm: OK
=========================
uilding image 'oracle/weblogic:12.1.3-dev' based on 'develo
er' distribution...
ending build context to Docker daemon 325.5 MB
ending build context to Docker daemon
tep 0 : FROM oraclelinux:7
ulling repository oraclelinux
```

Provision IaaS

Provision PaaS

Configure Services & Connectivity

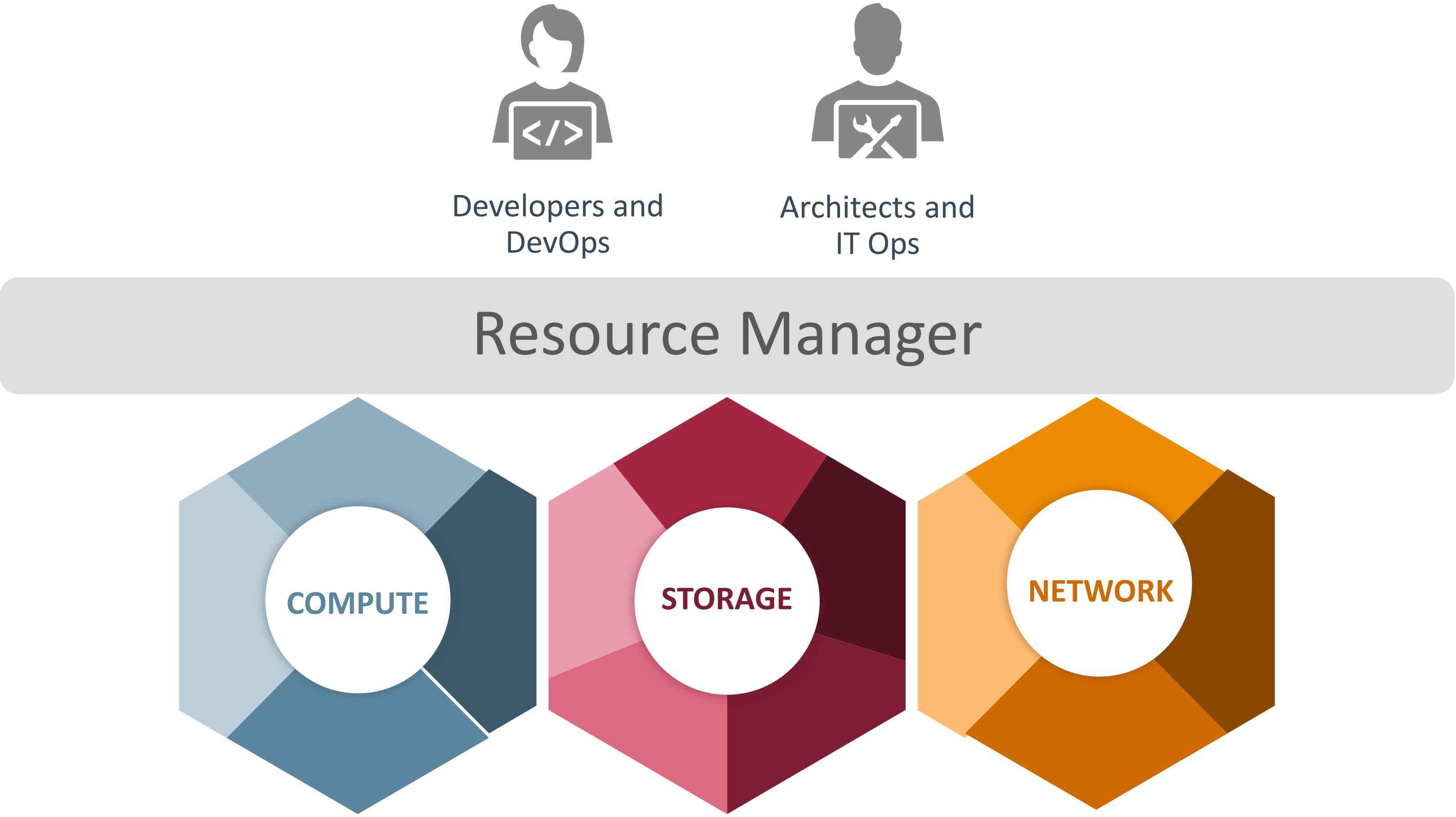
Configure & Deploy Application

Putting It All Together with Automation in Oracle Cloud

- Provision Oracle Cloud Service Instances
  - IaaS: Terraform
  - PaaS: Terraform
  - PaaS: PaaS Service Manager
- Configure Oracle Cloud Service Instances
  - Configure Service Instances
  - Configure Connectivity and Interconnectivity between instances
- Configure & Deploy Applications
  - Configure Application Deployment Parameters
  - Application startup
- Run Validation tests
- Return Environment Access Info

Introducing OCI Resource Manager

Manage your infrastructure resources using Terraform

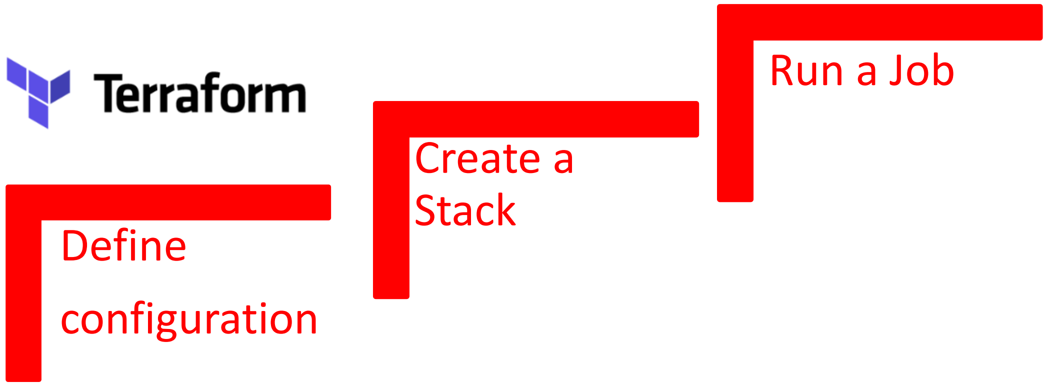


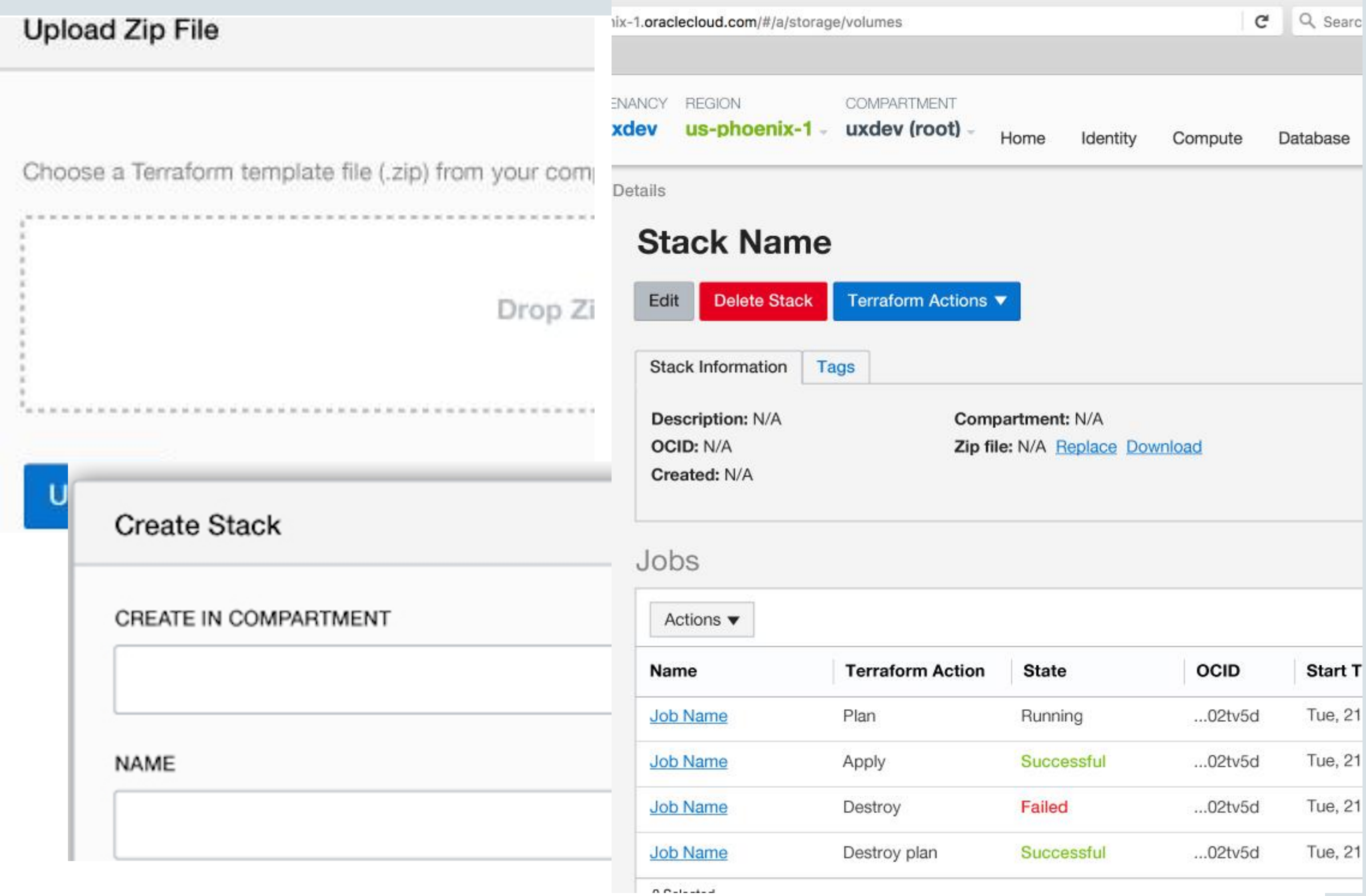
Developers and DevOps

Architects and IT Ops

Resource Manager

OCI Resource Manager




Upload Zip File

Choose a Terraform template file (.zip) from your com

Drop Zi

Create Stack

CREATE IN COMPARTMENT

NAME

ix-1.oraclecloud.com/#/a/storage/volumes

ENANCY xdev | REGION us-phoenix-1 | COMPARTMENT uxdev (root)

Details

Stack Name

Description: N/A
OCID: N/A
Created: N/A
Compartment: N/A
Zip file: N/A Replace Download

Jobs

Name	Terraform Action	State	OCID	Start T
Job Name	Plan	Running	...02tv5d	Tue, 21
Job Name	Apply	Successful	...02tv5d	Tue, 21
Job Name	Destroy	Failed	...02tv5d	Tue, 21
Job Name	Destroy plan	Successful	...02tv5d	Tue, 21

- Define Terraform template
- Write optional modules
- Upload Terraform files
- Reuse Terraform templates

- Represents a set of OCI resources you create in your tenancy.
- Each stack maps to a Terraform configuration and state file

- Represents an action on a stack
- Possible actions are Plan, Apply & Destroy

Workshop Overview

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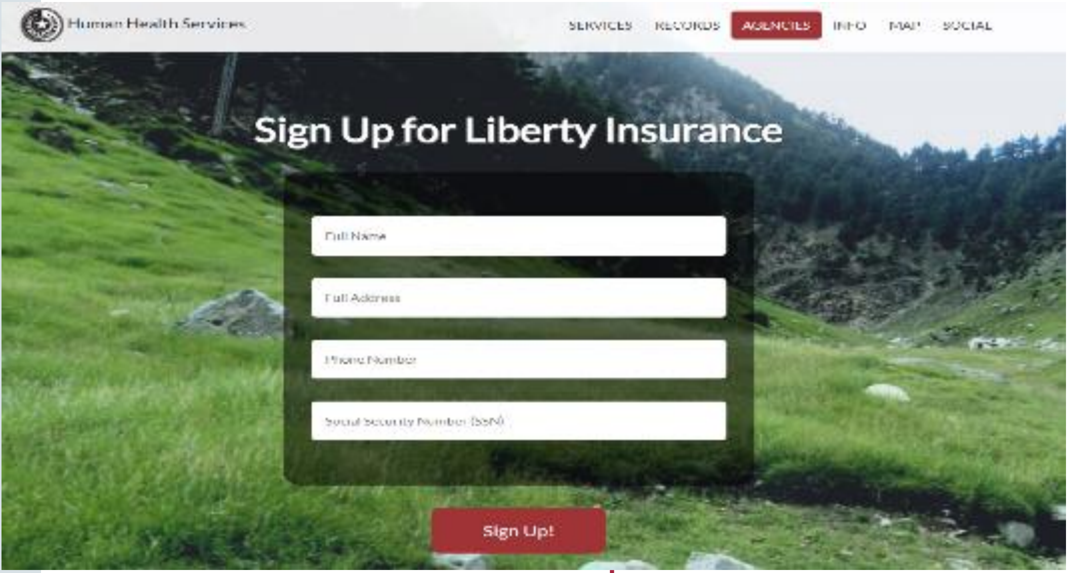
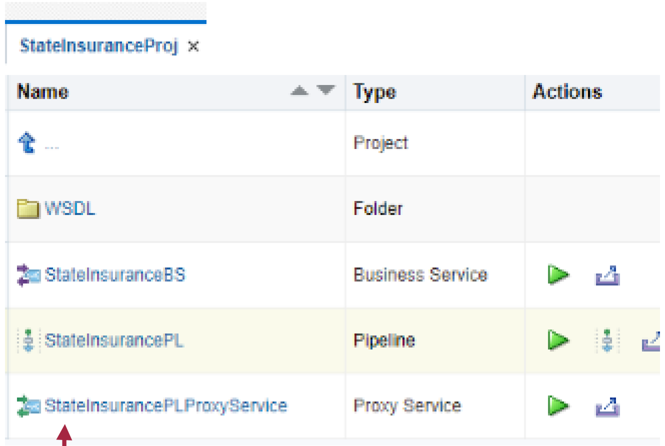
Workshops Overview

- Focus on **Provisioning of IaaS and PaaS** and **Applications Configuration/Deployment**
- Leverage Terraform & other configuration and deployment tools to provide ENVaaS to end users
- Targeting Real-World Applications that are complex and use many services like HIX
- Components used including vcn, compute, OCI database, JCS, SOACS and Docker Container running on compute.
- Tools: Terraform, PSM, Stack Manager, wlst, sqlplus and scripts

Workshop Sample Application – HHS Application

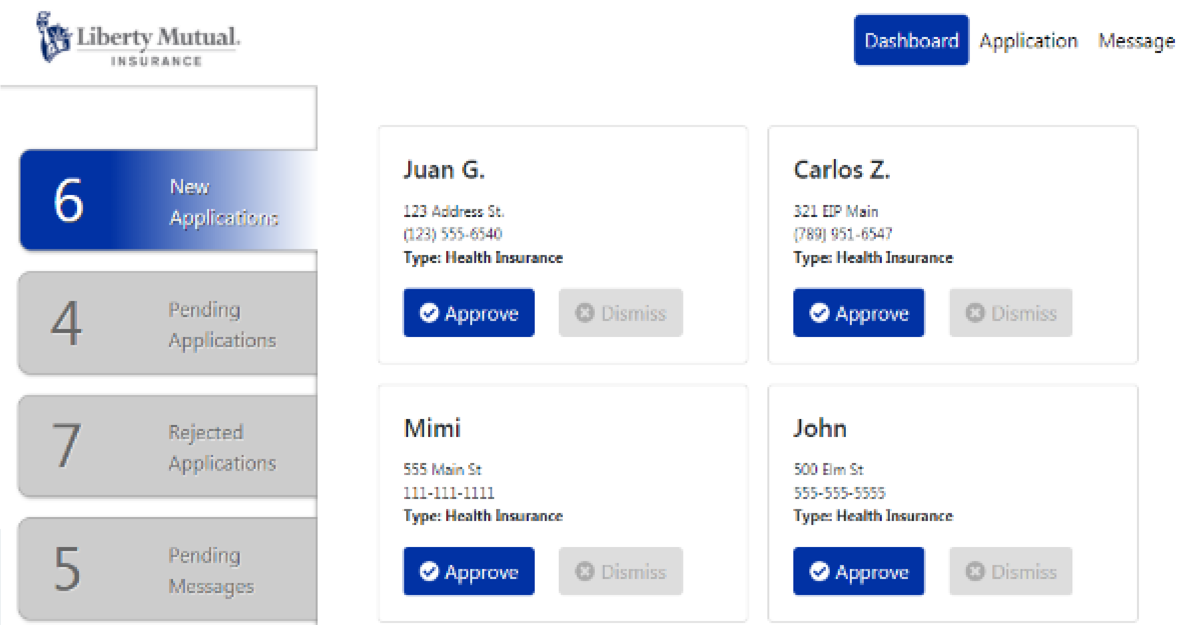


WS/SOAP Call to
Service Bus
Proxy Service



Name	Type	Actions
...	Project	
WSDL	Folder	
StateInsuranceBS	Business Service	
StateInsurancePL	Pipeline	
StateInsurancePLProxyService	Proxy Service	

WS/SOAP Call to Liberty Insurance WS



6 New Applications

4 Pending Applications

7 Rejected Applications

5 Pending Messages

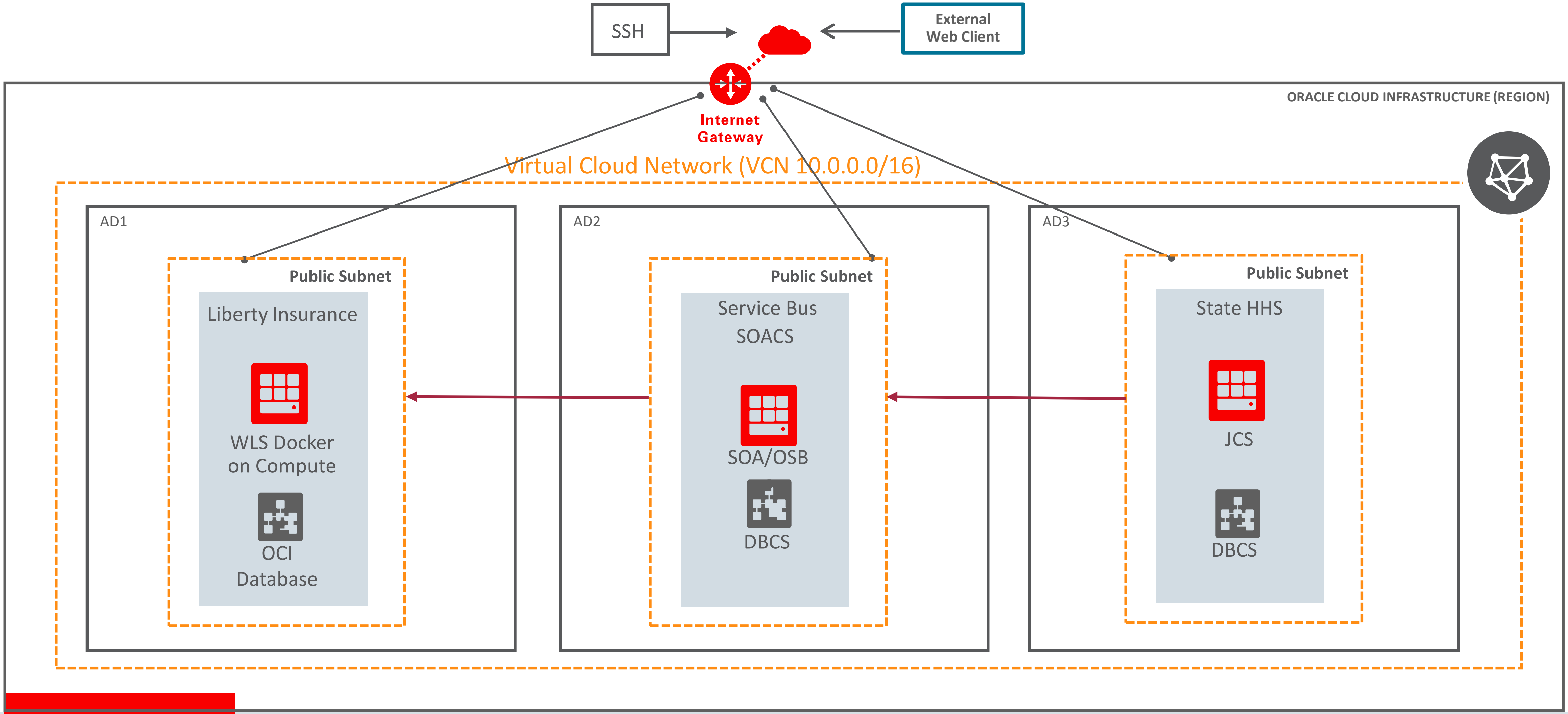
Juan G.
123 Address St.
(123) 555-6540
Type: Health Insurance
Approve Dismiss

Carlos Z.
321 EIP Main
(789) 951-6547
Type: Health Insurance
Approve Dismiss

Mimi
555 Main St
111-111-1111
Type: Health Insurance
Approve Dismiss

John
500 Elm St
555-555-5555
Type: Health Insurance
Approve Dismiss

Workshop Sample Application Architecture



Workshop Terraform Templates

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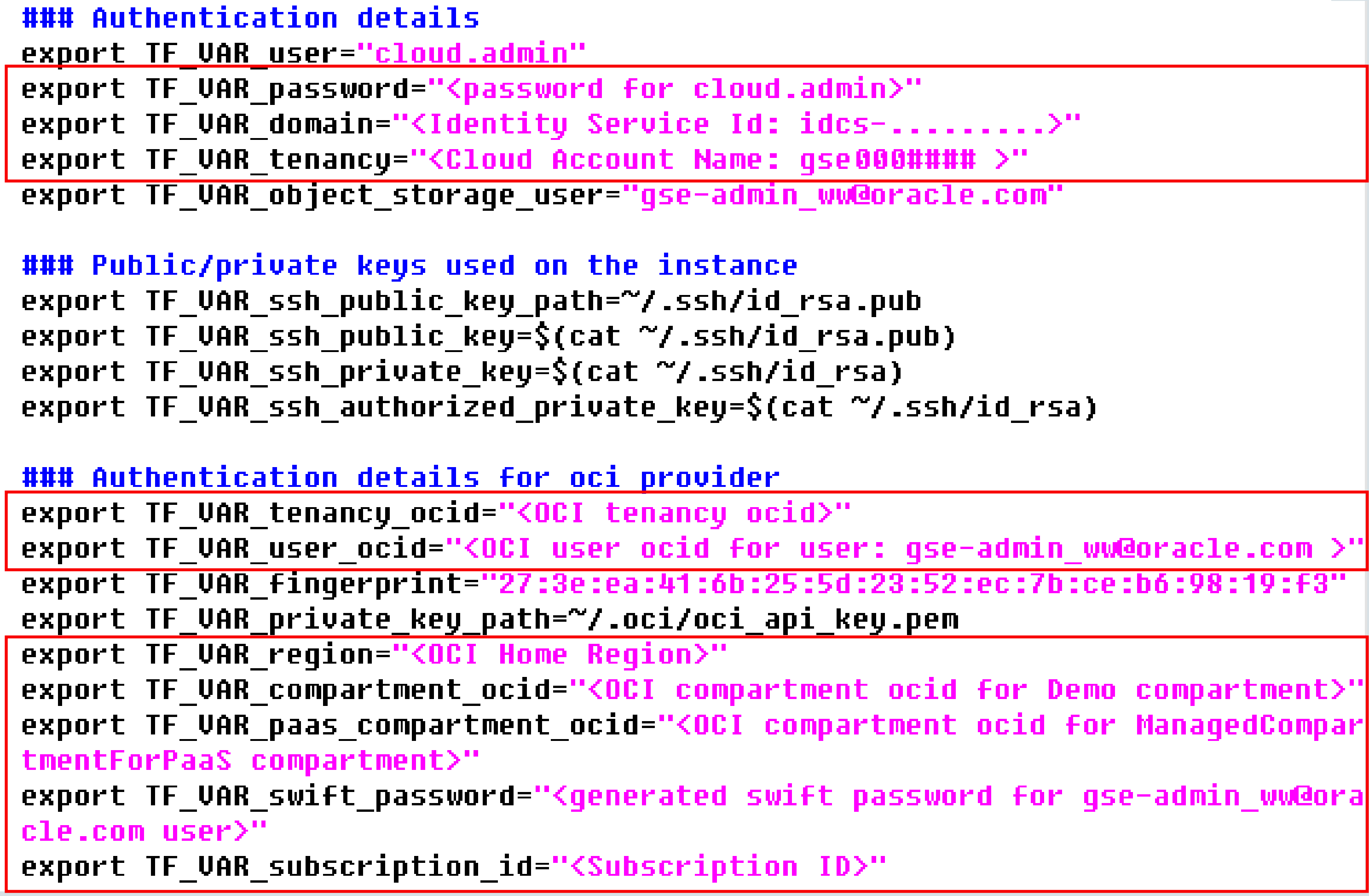
Terraform Templates

- Lab 1 – Provisioning Environment
  - **env-var**
  - main.tf
    - module storage-swift
    - module vcn
    - module compute-instance
    - module database
    - module docker-config
    - module paas-config
    - output compute-instance public ip
    - output database public ip
  - provider.tf
  - vars.tf

env-var



```
### Authentication details
export TF_VAR_user="cloud.admin"
export TF_VAR_password="<password for cloud.admin>"
export TF_VAR_domain="<Identity Service Id: idcs-.........>"
export TF_VAR_tenancy="<Cloud Account Name: gse000#### >"
export TF_VAR_object_storage_user="gse-admin_ww@oracle.com"

### Public/private keys used on the instance
export TF_VAR_ssh_public_key_path=~/.ssh/id_rsa.pub
export TF_VAR_ssh_public_key=$(cat ~/.ssh/id_rsa.pub)
export TF_VAR_ssh_private_key=$(cat ~/.ssh/id_rsa)
export TF_VAR_ssh_authorized_private_key=$(cat ~/.ssh/id_rsa)

### Authentication details for oci provider
export TF_VAR_tenancy_ocid="<OCI tenancy ocid>"
export TF_VAR_user_ocid="<OCI user ocid for user: gse-admin_ww@oracle.com >"
export TF_VAR_fingerprint="27:3e:ea:41:6b:25:5d:23:52:ec:7b:ce:b6:98:19:f3"
export TF_VAR_private_key_path=~/.oci/oci_api_key.pem
export TF_VAR_region="<OCI Home Region>"
export TF_VAR_compartment_ocid="<OCI compartment ocid for Demo compartment>"
export TF_VAR_paas_compartment_ocid="<OCI compartment ocid for ManagedCompar
tmentForPaaS compartment>"
export TF_VAR_swift_password="<generated swift password for gse-admin_ww@ora
cle.com user>"
export TF_VAR_subscription_id="<Subscription ID>"
```

Terraform Templates

- Lab 1 – Provisioning Environment
  - env-var
  - **main.tf**
    - **module storage-swift**
    - **module vcn**
    - **module compute-instance**
    - module database
    - module docker-config
    - module paas-config
    - output compute-instance public ip
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  - provider.tf
  - vars.tf

main.tf

```
module "object_storage" {
  source = "../modules/storage-swift"
  bucket_names = "${var.bucket_names}"
  env_prefix = "${var.env_prefix}"
  compartment_id = "${var.compartment_ocid}"
}

module "vcn" {
  source = "../modules/vcn"
  tenancy_ocid = "${var.tenancy_ocid}"
  compartment_ocid = "${var.compartment_ocid}"
  dns_vcn = "${var.env_prefix}${var.dns_vcn}"
  vcn_display = "${var.env_prefix}${var.vcn_display}"
}

module "compute" {
  source = "../modules/compute-instance"
  tenancy_ocid = "${var.tenancy_ocid}"
  compartment_ocid = "${var.compartment_ocid}"
  ssh_public_key = "${var.ssh_public_key}"
  ssh_private_key = "${var.ssh_authorized_private_key}"
  instance_shape = "${var.instance_shape}"
  subnet = "${module.vcn.subnet1_ocid}"
  name = "${var.env_prefix}${var.compute_name}"
  availability_domain = "${module.vcn.subnet1_ad}"
}
```

Terraform Templates

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    - **module docker-config**
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main.tf

```
module "database" {
  source = "../modules/database"
  tenancy_ocid = "${var.tenancy_ocid}"
  compartment_ocid = "${var.compartment_ocid}"
  availability_domain = "${module.vcn.subnet1_ad}"
  SubnetOCID = "${module.vcn.subnet1_ocid}"
  ssh_public_key = "${var.ssh_public_key}"
  DBNodeDomainName = "${module.vcn.subnet1_label}.${var.env
_prefix}${var.dns_vcn}.oraclevcn.com"
  DBNodeShape = "${var.DBNodeShape}"
  DBAdminPassword = "${var.DBAdminPassword}"
  DBName = "${var.DBName}"
  DBNodeDisplayName = "${var.env_prefix}${var.DBName}"
  PDBName = "${var.PDBName}"
  ssh_private_key = "${var.ssh_authorized_private_key}"
}

module "docker-config" {
  source = "../modules/docker-config"
  tenancy_ocid = "${var.tenancy_ocid}"
  compartment_ocid = "${var.compartment_ocid}"
  public-ip = "${module.compute.public-ip}"
  ssh_private_key = "${var.ssh_authorized_private_key}"
  config_src_dir = "${var.config_src_dir}"
}
```

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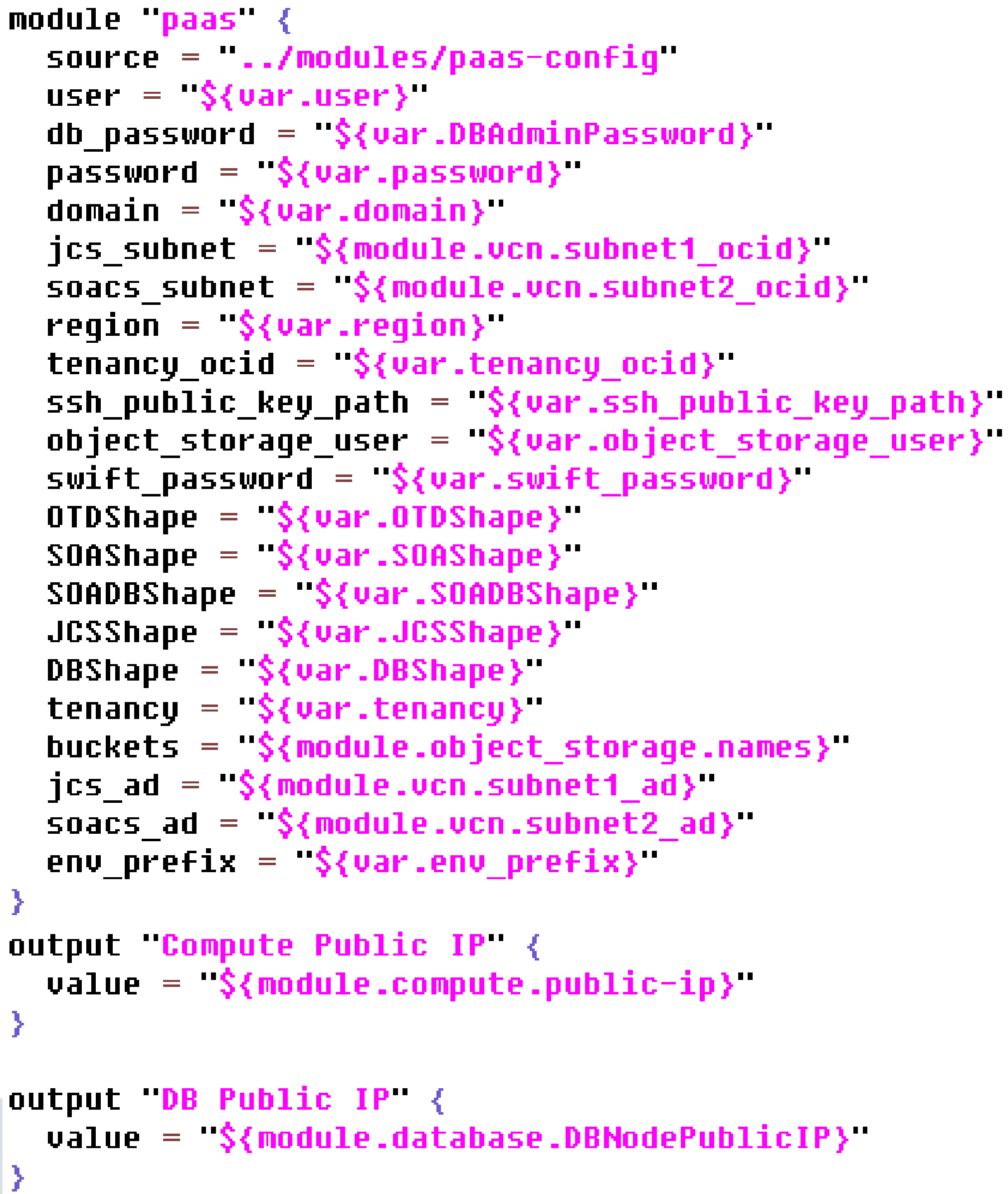
main.tf



```
module "paas" {
  source = "../modules/paas-config"
  user = "${var.user}"
  db_password = "${var.DBAdminPassword}"
  password = "${var.password}"
  domain = "${var.domain}"
  jcs_subnet = "${module.vcn.subnet1_ocid}"
  soacs_subnet = "${module.vcn.subnet2_ocid}"
  region = "${var.region}"
  tenancy_ocid = "${var.tenancy_ocid}"
  ssh_public_key_path = "${var.ssh_public_key_path}"
  object_storage_user = "${var.object_storage_user}"
  swift_password = "${var.swift_password}"
  OTDShape = "${var.OTDShape}"
  SOAShape = "${var.SOAShape}"
  SOADBShape = "${var.SOADBShape}"
  JCSShape = "${var.JCSShape}"
  DBShape = "${var.DBShape}"
  tenancy = "${var.tenancy}"
  buckets = "${module.object_storage.names}"
  jcs_ad = "${module.vcn.subnet1_ad}"
  soacs_ad = "${module.vcn.subnet2_ad}"
  env_prefix = "${var.env_prefix}"
}
output "Compute Public IP" {
  value = "${module.compute.public-ip}"
}

output "DB Public IP" {
  value = "${module.database.DBNodePublicIP}"
}
```

Terraform Templates

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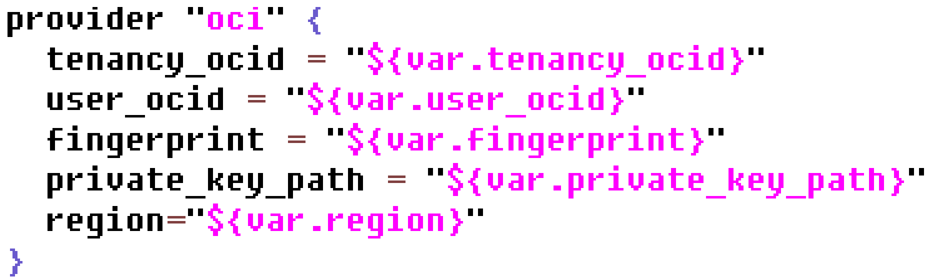
provider.tf



```
provider "oci" {
  tenancy_ocid = "${var.tenancy_ocid}"
  user_ocid = "${var.user_ocid}"
  fingerprint = "${var.fingerprint}"
  private_key_path = "${var.private_key_path}"
  region="${var.region}"
}
```

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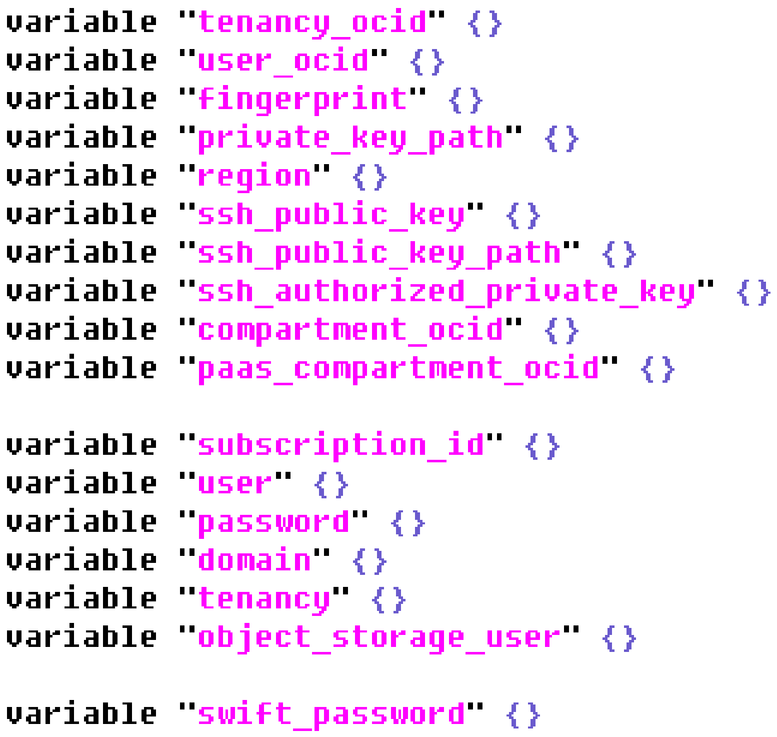
vars.tf



```
variable "tenancy_ocid" {}
variable "user_ocid" {}
variable "fingerprint" {}
variable "private_key_path" {}
variable "region" {}
variable "ssh_public_key" {}
variable "ssh_public_key_path" {}
variable "ssh_authorized_private_key" {}
variable "compartment_ocid" {}
variable "paas_compartment_ocid" {}

variable "subscription_id" {}
variable "user" {}
variable "password" {}
variable "domain" {}
variable "tenancy" {}
variable "object_storage_user" {}

variable "swift_password" {}
```

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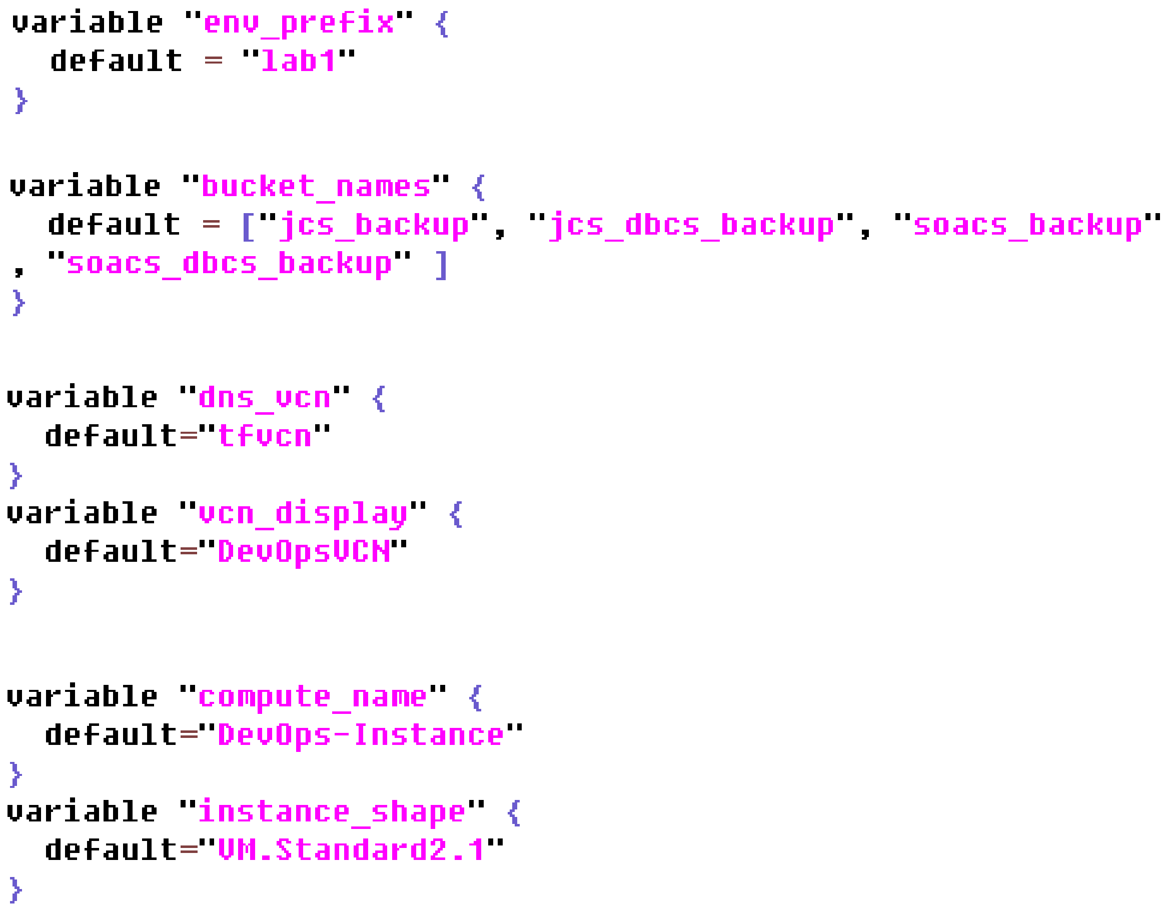
vars.tf



```
variable "env_prefix" {
  default = "lab1"
}

variable "bucket_names" {
  default = ["jcs_backup", "jcs_dbcs_backup", "soacs_backup"
, "soacs_dbcs_backup" ]
}


variable "dns_vcn" {
  default="tfvcn"
}
variable "vcn_display" {
  default="DevOpsVCN"
}


variable "compute_name" {
  default="DevOps-Instance"
}
variable "instance_shape" {
  default="VM.Standard2.1"
}
```

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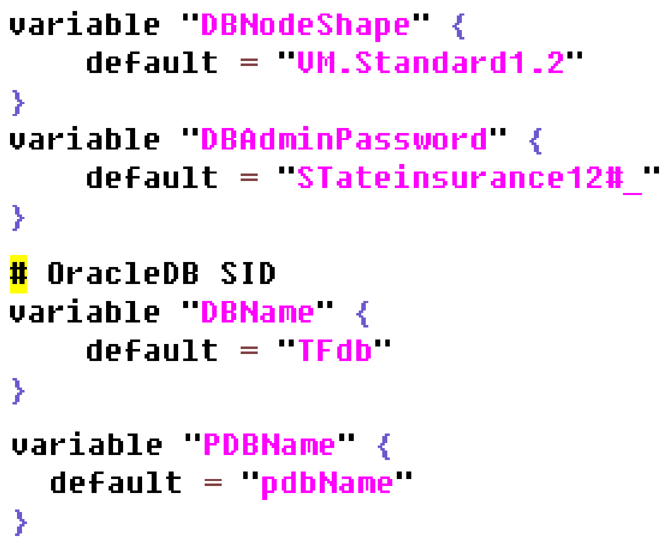
vars.tf



```
variable "DBNodeShape" {
    default = "VM.Standard1.2"
}
variable "DBAdminPassword" {
    default = "STateinsurance12#_"
}

# OracleDB SID
variable "DBName" {
    default = "TFdb"
}

variable "PDBName" {
  default = "pdbName"
}
```

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Terraform Templates

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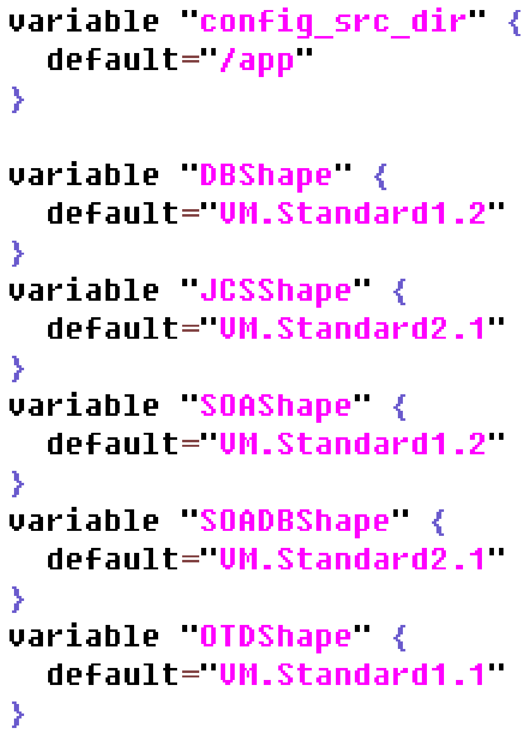
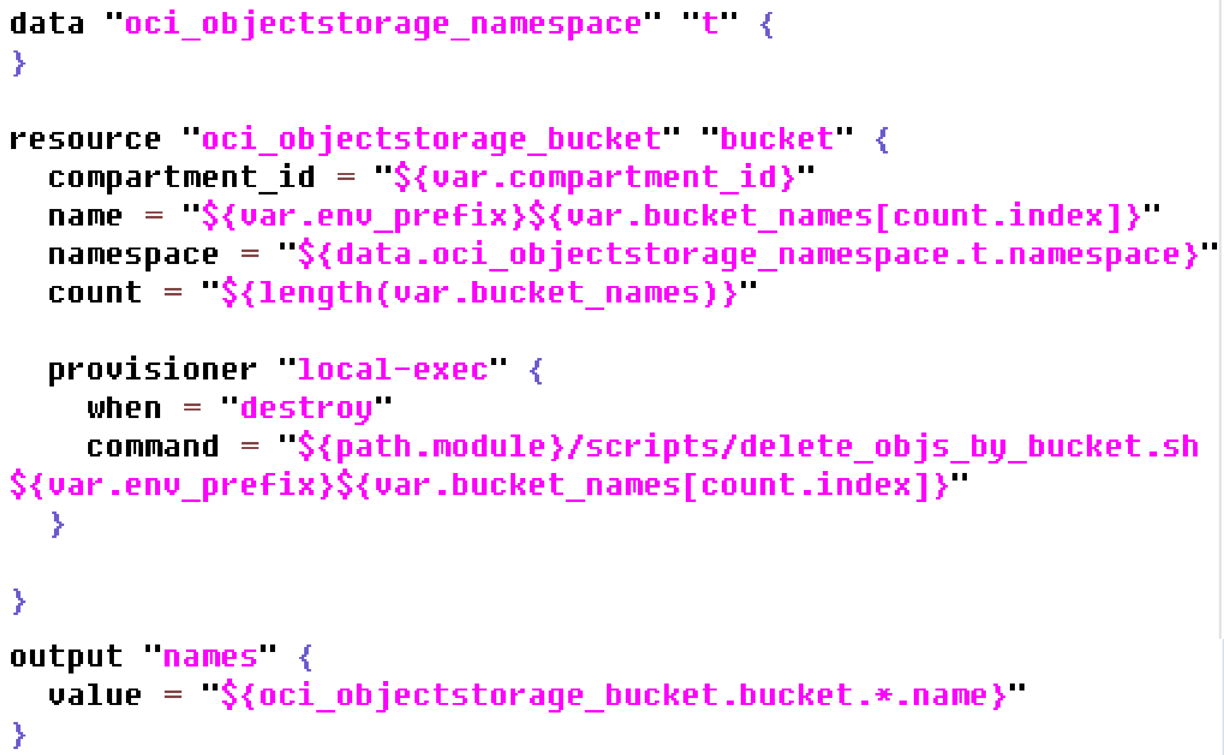
vars.tf



```
variable "config_src_dir" {
  default="/app"
}

variable "DBShape" {
  default="VM.Standard1.2"
}
variable "JCSShape" {
  default="VM.Standard2.1"
}
variable "SOAShape" {
  default="VM.Standard1.2"
}
variable "SOADBShape" {
  default="VM.Standard2.1"
}
variable "OTDShape" {
  default="VM.Standard1.1"
}
```

Terraform Modules

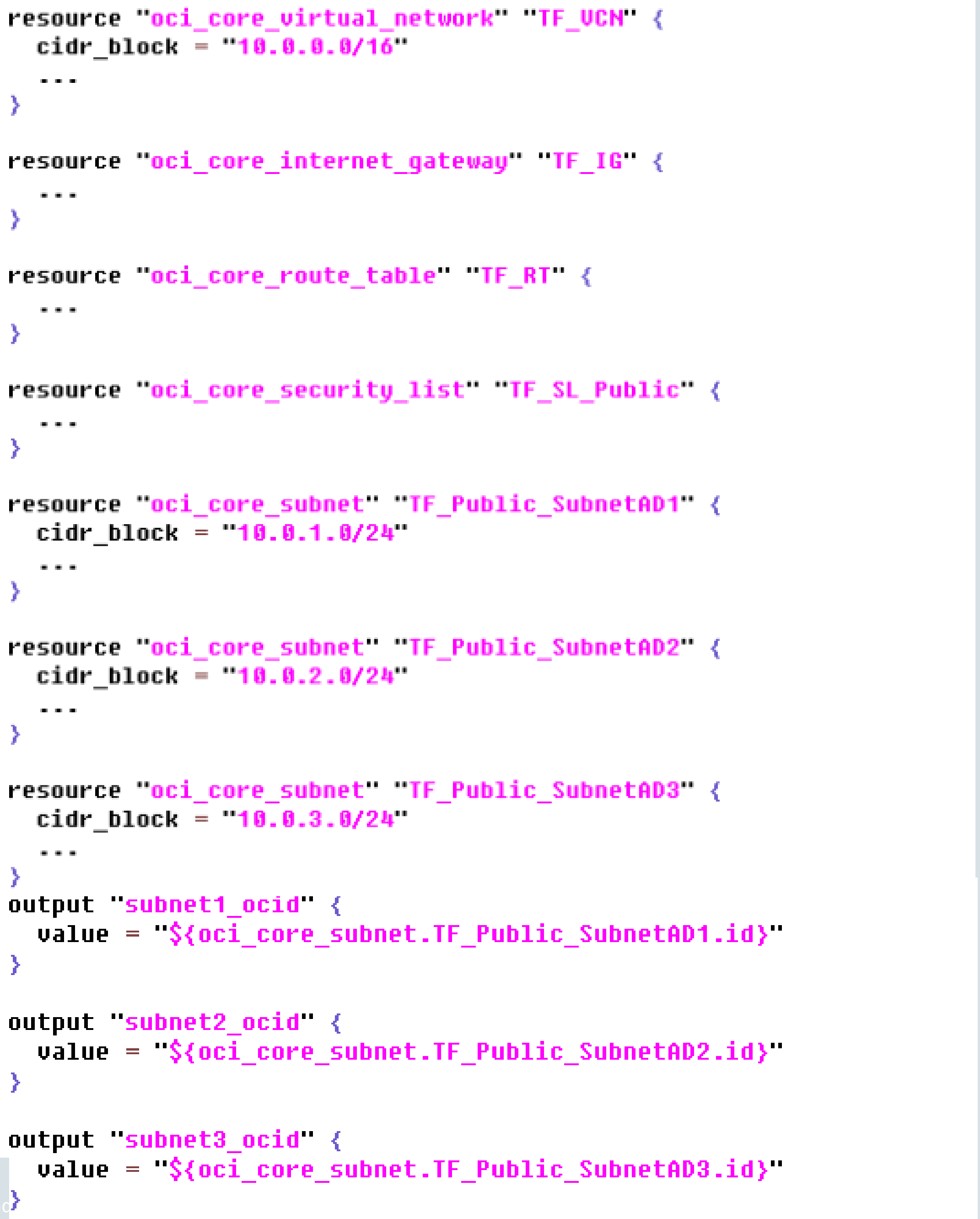
- storage-swift
  - main.tf
    - create buckets from input variable bucket_names (list)
    - on destroy, run a script to bulk delete objects in bucket before destroy of the bucket
  - scripts/delete_objs_by_bucket.sh
  - output.tf
    - output bucket names
  - vars.tf
    - Input variables for the module
    - Any input variable without a default value is required when calling the module



```
data "oci_objectstorage_namespace" "t" {
}

resource "oci_objectstorage_bucket" "bucket" {
  compartment_id = "${var.compartment_id}"
  name = "${var.env_prefix}${var.bucket_names[count.index]}"
  namespace = "${data.oci_objectstorage_namespace.t.namespace}"
  count = "${length(var.bucket_names)}"

  provisioner "local-exec" {
    when = "destroy"
    command = "${path.module}/scripts/delete_objs_by_bucket.sh
${var.env_prefix}${var.bucket_names[count.index]}"
  }

}

output "names" {
  value = "${oci_objectstorage_bucket.bucket.*.name}"
}
```

Terraform Modules

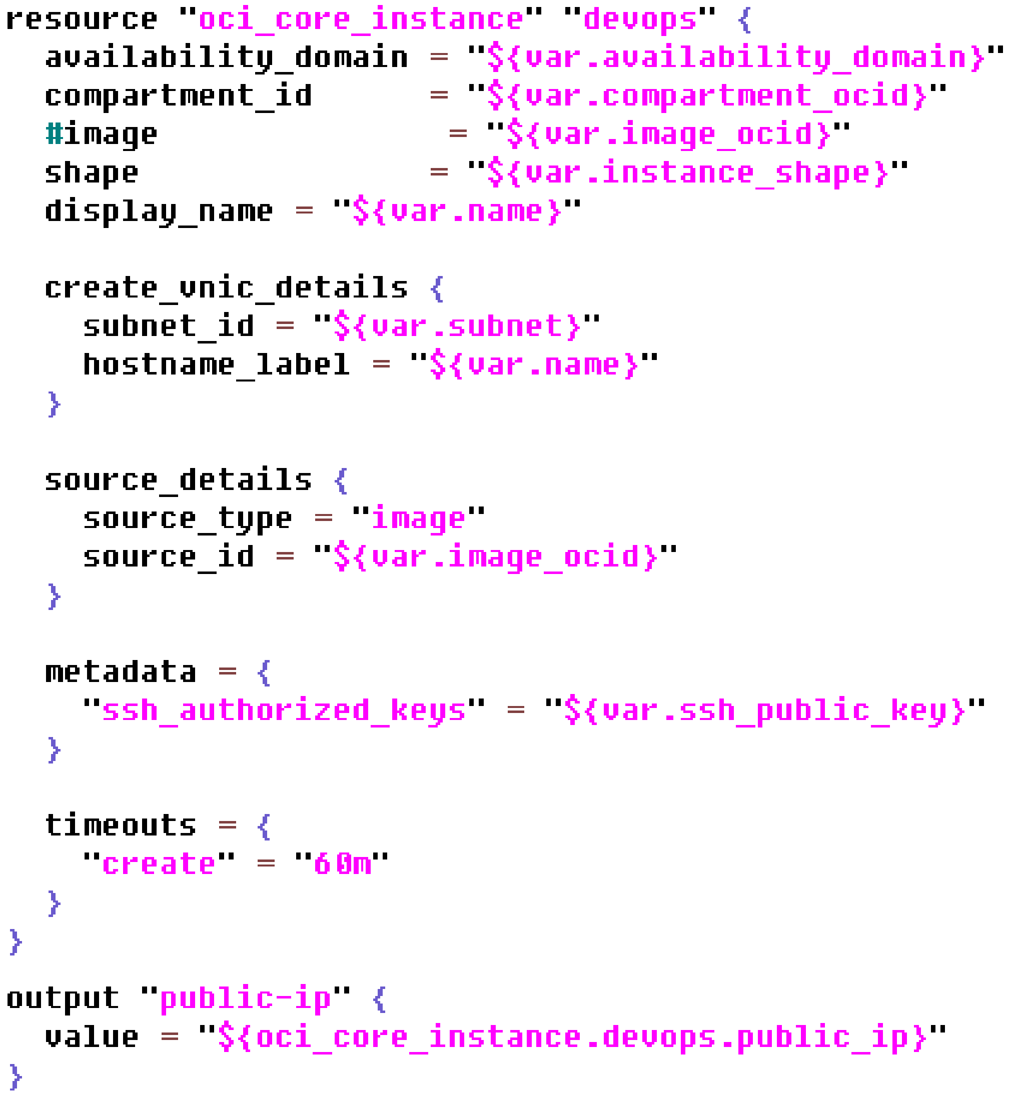
- vcn
  - datasources.tf
    - Lookup AD
  - main.tf
    - virtual cloud network
    - internet gateway
    - route table
    - security list
    - public subnet in each AD
  - outputs.tf
    - output subnet id
    - output subnet dns label
    - output subnet AD
  - vars.tf



```
resource "oci_core_virtual_network" "TF_VCN" {
  cidr_block = "10.0.0.0/16"
  ...
}

resource "oci_core_internet_gateway" "TF_IG" {
  ...
}

resource "oci_core_route_table" "TF_RT" {
  ...
}

resource "oci_core_security_list" "TF_SL_Public" {
  ...
}

resource "oci_core_subnet" "TF_Public_SubnetAD1" {
  cidr_block = "10.0.1.0/24"
  ...
}

resource "oci_core_subnet" "TF_Public_SubnetAD2" {
  cidr_block = "10.0.2.0/24"
  ...
}

resource "oci_core_subnet" "TF_Public_SubnetAD3" {
  cidr_block = "10.0.3.0/24"
  ...
}
output "subnet1_ocid" {
  value = "${oci_core_subnet.TF_Public_SubnetAD1.id}"
}

output "subnet2_ocid" {
  value = "${oci_core_subnet.TF_Public_SubnetAD2.id}"
}

output "subnet3_ocid" {
  value = "${oci_core_subnet.TF_Public_SubnetAD3.id}"
}
```

Terraform Modules

- compute-instance
  - datasources.tf
    - Lookup AD
  - compute.tf
    - Create compute instance
  - output.tf
    - output public ip
  - vars.tf



```
resource "oci_core_instance" "devops" {
  availability_domain = "${var.availability_domain}"
  compartment_id      = "${var.compartment_ocid}"
  #image               = "${var.image_ocid}"
  shape               = "${var.instance_shape}"
  display_name = "${var.name}"

  create_vnic_details {
    subnet_id = "${var.subnet}"
    hostname_label = "${var.name}"
  }

  source_details {
    source_type = "image"
    source_id = "${var.image_ocid}"
  }

  metadata = {
    "ssh_authorized_keys" = "${var.ssh_public_key}"
  }

  timeouts = {
    "create" = "60m"
  }
}

output "public-ip" {
  value = "${oci_core_instance.devops.public_ip}"
}
```

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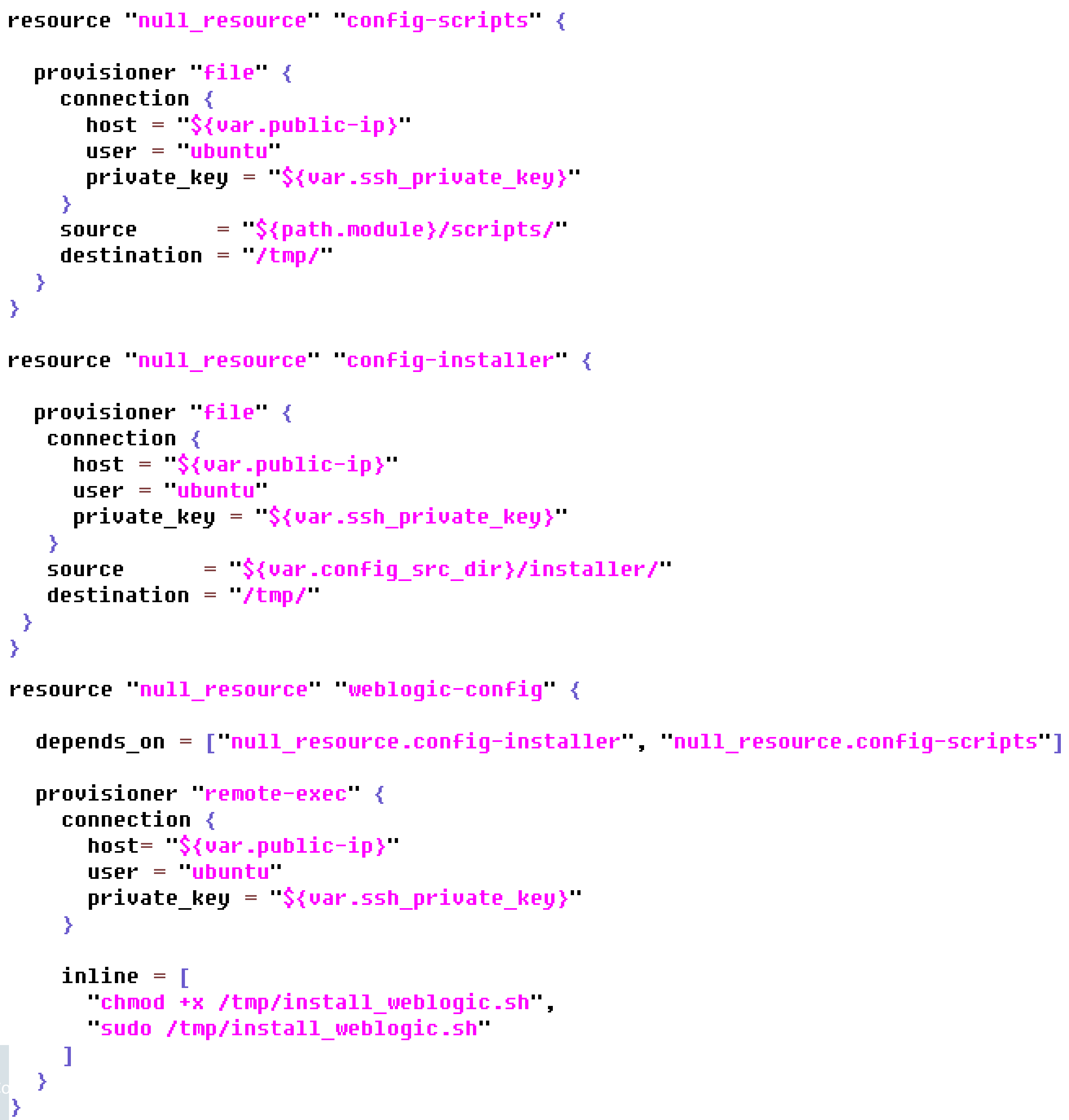
Terraform Modules

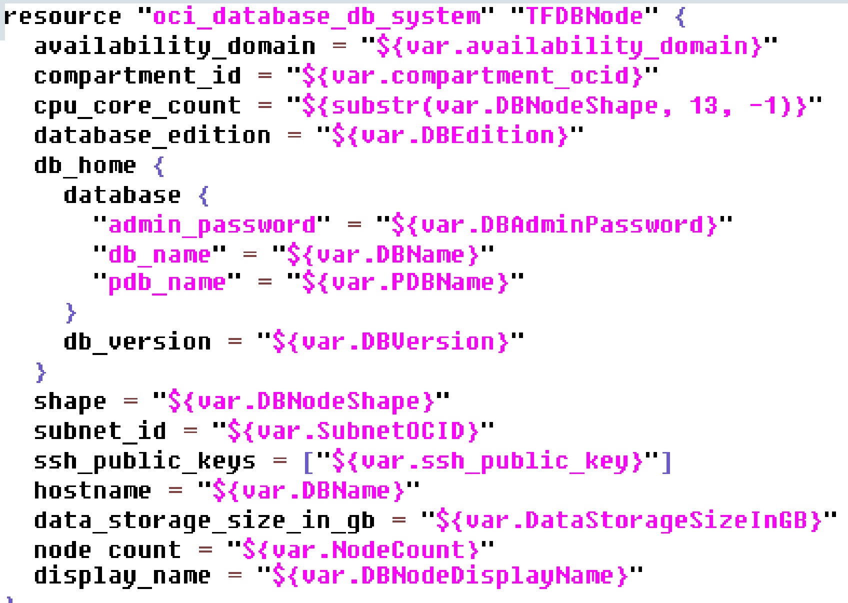
- docker-config
  - main.tf
    - Copy scripts, docker files and WebLogic installation packages
    - Configure docker container
    - Install WebLogic
    - Configure WebLogic Domain
    - Start WebLogic Server
  - scripts/install_weblogic.sh
  - vars.tf



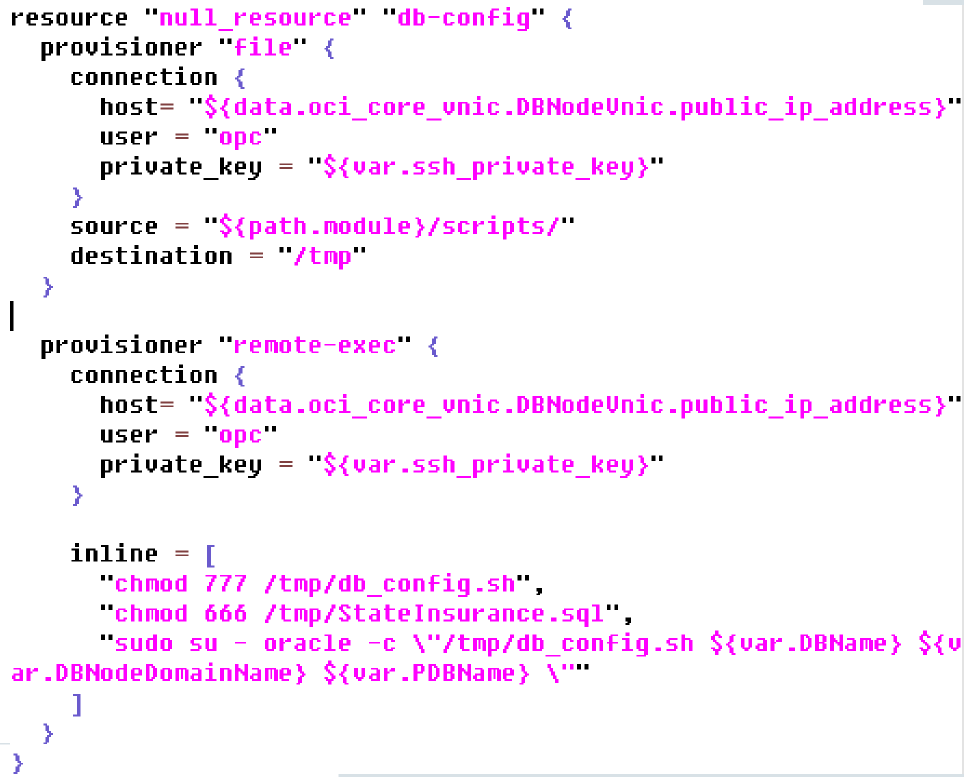
```
resource "null_resource" "config-scripts" {

  provisioner "file" {
    connection {
      host = "${var.public-ip}"
      user = "ubuntu"
      private_key = "${var.ssh_private_key}"
    }
    source      = "${path.module}/scripts/"
    destination = "/tmp/"
  }
}

resource "null_resource" "config-installer" {

  provisioner "file" {
   connection {
     host = "${var.public-ip}"
     user = "ubuntu"
     private_key = "${var.ssh_private_key}"
   }
   source      = "${var.config_src_dir}/installer/"
   destination = "/tmp/"
 }
}
resource "null_resource" "weblogic-config" {

  depends_on = ["null_resource.config-installer", "null_resource.config-scripts"]

  provisioner "remote-exec" {
    connection {
      host= "${var.public-ip}"
      user = "ubuntu"
      private_key = "${var.ssh_private_key}"
    }

    inline = [
      "chmod +x /tmp/install_weblogic.sh",
      "sudo /tmp/install_weblogic.sh"
    ]
  }
}
```

Terraform Modules

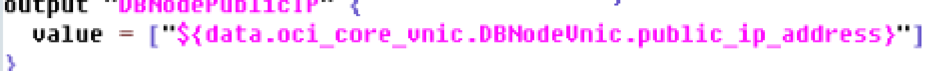
- Database
  - datasources.tf
    - Lookup AD
    - Get Vnic of DB Node
  - main.tf
    - Create database system
  - config.tf
    - Run scripts to configure pdb by creating schema and tables needed
  - Scripts
    - db_config.sh
    - StateInsurance.sql
  - output.tf
    - output public ip
  - vars.tf



```
resource "oci_database_db_system" "TFDBNode" {
  availability_domain = "${var.availability_domain}"
  compartment_id = "${var.compartment_ocid}"
  cpu_core_count = "${substr(var.DBNodeShape, 13, -1)}"
  database_edition = "${var.DBEdition}"
  db_home {
    database {
      "admin_password" = "${var.DBAdminPassword}"
      "db_name" = "${var.DBName}"
      "pdb_name" = "${var.PDBName}"
    }
    db_version = "${var.DBVersion}"
  }
  shape = "${var.DBNodeShape}"
  subnet_id = "${var.SubnetOCID}"
  ssh_public_keys = ["${var.ssh_public_key}"]
  hostname = "${var.DBName}"
  data_storage_size_in_gb = "${var.DataStorageSizeInGB}"
  node_count = "${var.NodeCount}"
  display_name = "${var.DBNodeDisplayName}"
}
```



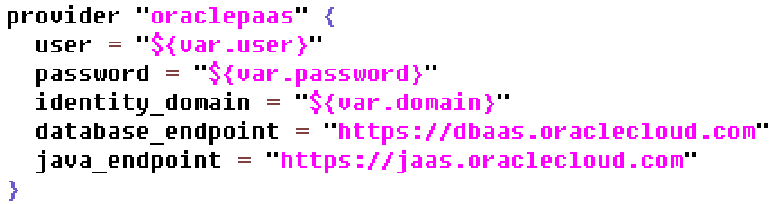
```
resource "null_resource" "db-config" {
  provisioner "file" {
    connection {
      host= "${data.oci_core_vnic.DBNodeVnic.public_ip_address}"
      user = "opc"
      private_key = "${var.ssh_private_key}"
    }
    source = "${path.module}/scripts/"
    destination = "/tmp"
  }

  provisioner "remote-exec" {
    connection {
      host= "${data.oci_core_vnic.DBNodeVnic.public_ip_address}"
      user = "opc"
      private_key = "${var.ssh_private_key}"
    }

    inline = [
      "chmod 777 /tmp/db_config.sh",
      "chmod 666 /tmp/StateInsurance.sql",
      "sudo su - oracle -c \"/tmp/db_config.sh ${var.DBName} ${v
ar.DBNodeDomainName} ${var.PDBName} \""
    ]
  }
}
```



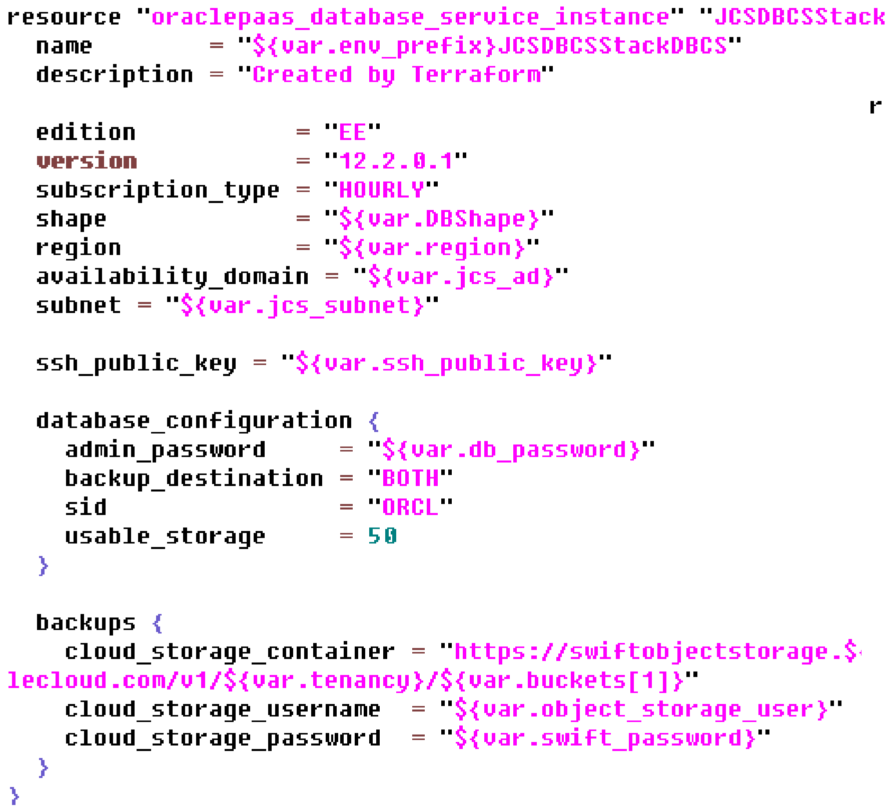
```
output "DBNodePublicIP" {
  value = ["${data.oci_core_vnic.DBNodeVnic.public_ip_address}"]
}
```

Terraform Modules

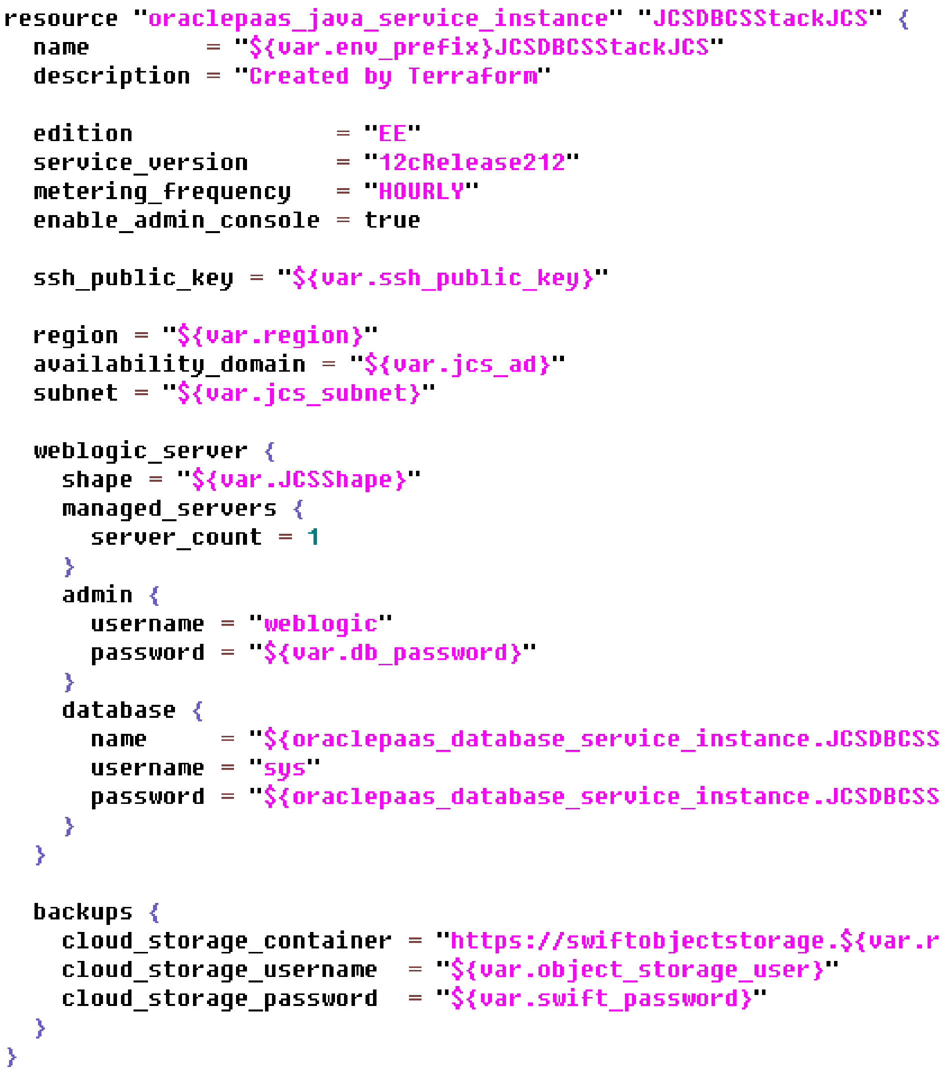
- PaaS – JCS & SOACS
  - main.tf
    - JCS
      - Use oraclepaas provider
      - Create DBCS
      - Create JCS
    - SOACS
      - Python script



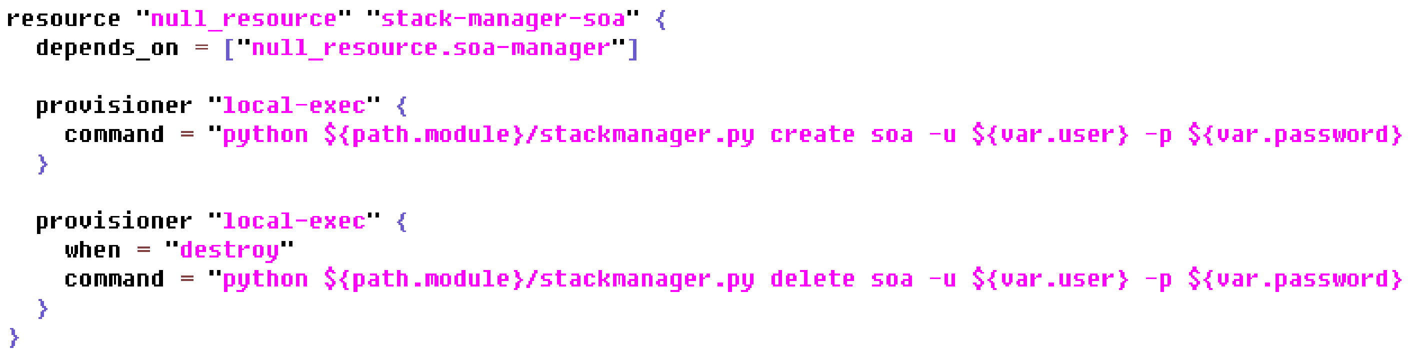
```
provider "oraclepaas" {
  user = "${var.user}"
  password = "${var.password}"
  identity_domain = "${var.domain}"
  database_endpoint = "https://dbaas.oraclecloud.com"
  java_endpoint = "https://jaas.oraclecloud.com"
}
```



```
resource "oraclepaas_database_service_instance" "JCSDBCSStackDBCS" {
  name        = "${var.env_prefix}JCSDBCSStackDBCS"
  description = "Created by Terraform"

  edition             = "EE"
  version             = "12.2.0.1"
  subscription_type   = "HOURLY"
  shape               = "${var.DBShape}"
  region              = "${var.region}"
  availability_domain = "${var.jcs_ad}"
  subnet = "${var.jcs_subnet}"

  ssh_public_key = "${var.ssh_public_key}"

  database_configuration {
    admin_password      = "${var.db_password}"
    backup_destination = "BOTH"
    sid                 = "ORCL"
    usable_storage      = 50
  }

  backups {
    cloud_storage_container = "https://swiftobjectstorage.$
lecloud.com/v1/${var.tenancy}/${var.buckets[1]}"
    cloud_storage_username   = "${var.object_storage_user}"
    cloud_storage_password   = "${var.swift_password}"
  }
}
```



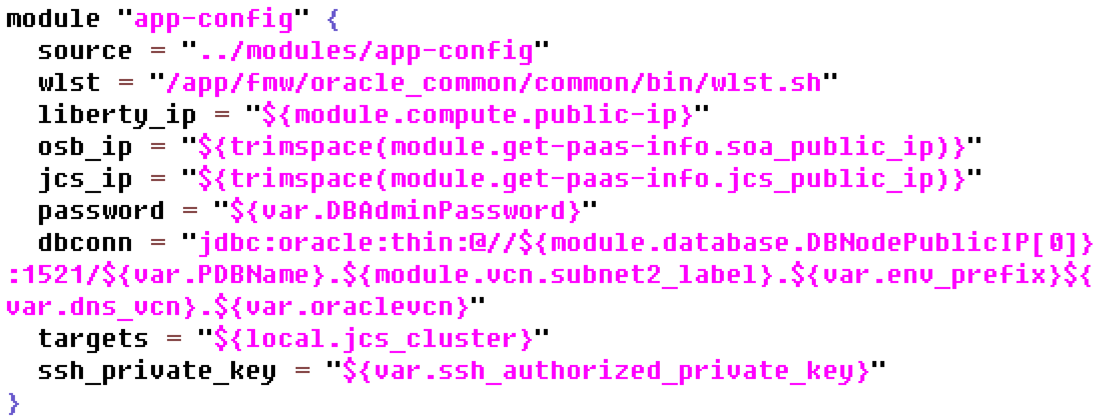
```
resource "oraclepaas_java_service_instance" "JCSDBCSStackJCS" {
  name        = "${var.env_prefix}JCSDBCSStackJCS"
  description = "Created by Terraform"

  edition              = "EE"
  service_version      = "12cRelease212"
  metering_frequency   = "HOURLY"
  enable_admin_console = true

  ssh_public_key = "${var.ssh_public_key}"

  region = "${var.region}"
  availability_domain = "${var.jcs_ad}"
  subnet = "${var.jcs_subnet}"

  weblogic_server {
    shape = "${var.JCSShape}"
    managed_servers {
      server_count = 1
    }
    admin {
      username = "weblogic"
      password = "${var.db_password}"
    }
    database {
      name     = "${oraclepaas_database_service_instance.JCSDBCSS
      username = "sys"
      password = "${oraclepaas_database_service_instance.JCSDBCSS
    }
  }

  backups {
    cloud_storage_container = "https://swiftobjectstorage.${var.r
    cloud_storage_username   = "${var.object_storage_user}"
    cloud_storage_password   = "${var.swift_password}"
  }
}
```



```
resource "null_resource" "stack-manager-soa" {
  depends_on = ["null_resource.soa-manager"]

  provisioner "local-exec" {
    command = "python ${path.module}/stackmanager.py create soa -u ${var.user} -p ${var.password}
  }

  provisioner "local-exec" {
    when = "destroy"
    command = "python ${path.module}/stackmanager.py delete soa -u ${var.user} -p ${var.password}
  }
}
```

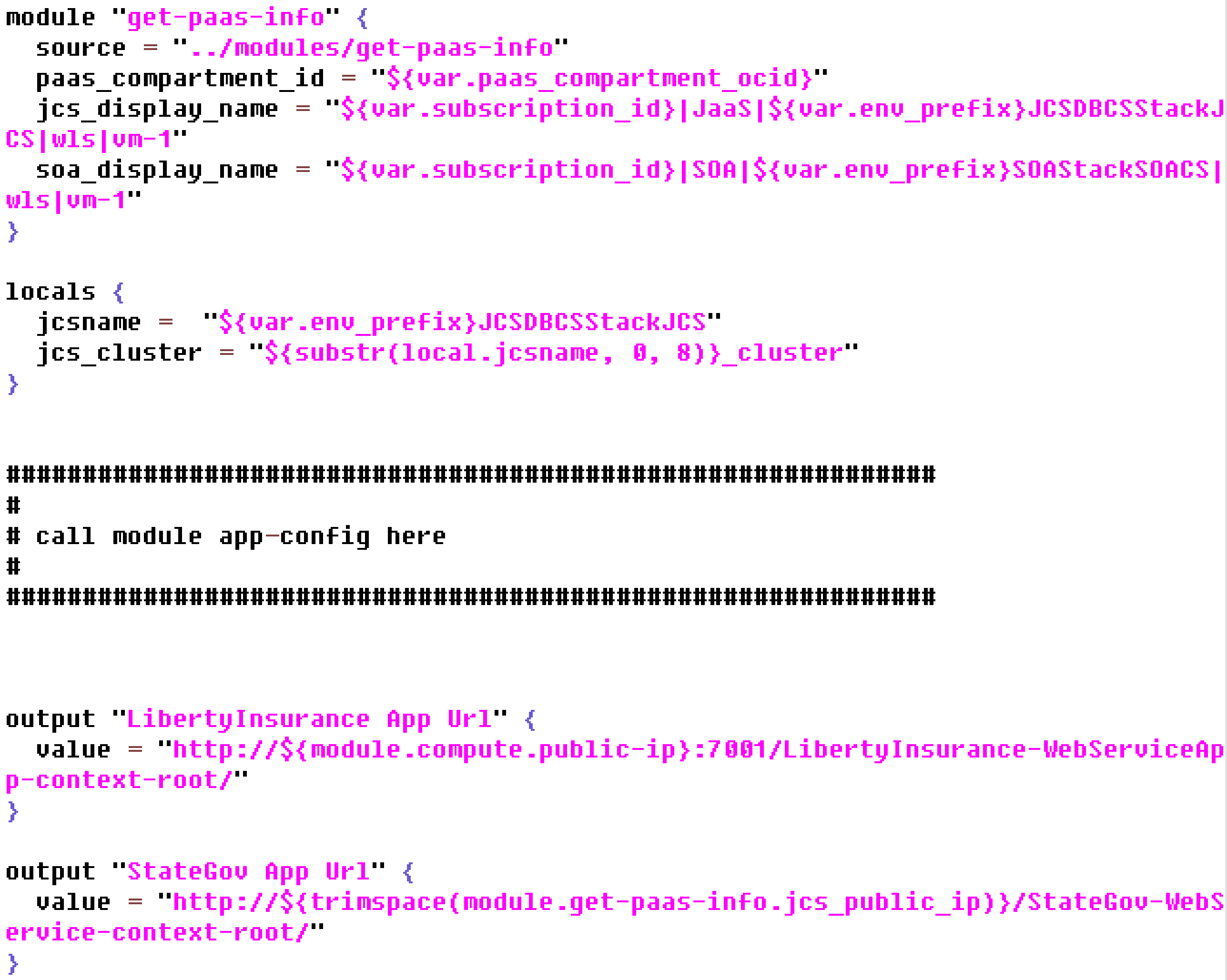
Terraform Templates

- Lab 2 – Configure/Deploy Applications
  - app_config.tf.template
    - Add the following section



```
module "app-config" {
  source = "../modules/app-config"
  wlst = "/app/fmw/oracle_common/common/bin/wlst.sh"
  liberty_ip = "${module.compute.public-ip}"
  osb_ip = "${trimspace(module.get-paas-info.soa_public_ip)}"
  jcs_ip = "${trimspace(module.get-paas-info.jcs_public_ip)}"
  password = "${var.DBAdminPassword}"
  dbconn = "jdbc:oracle:thin:@//${module.database.DBNodePublicIP[0]}:1521/${var.PDBName}.${module.vcn.subnet2_label}.${var.env_prefix}${var.dns_vcn}.${var.oraclevcn}"
  targets = "${local.jcs_cluster}"
  ssh_private_key = "${var.ssh_authorized_private_key}"
}
```

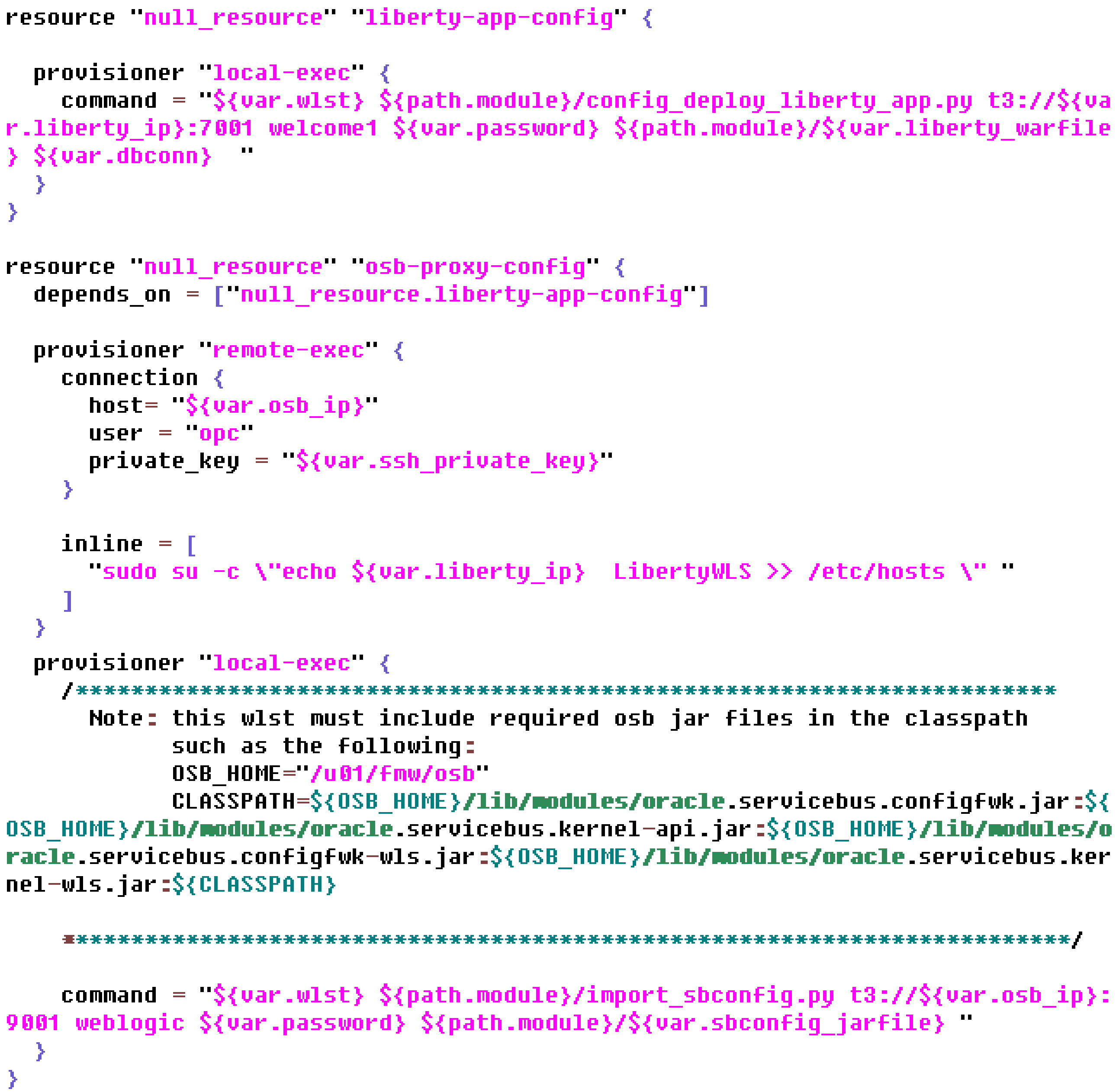
  - app_config.tf.solution



```
module "get-paas-info" {
  source = "../modules/get-paas-info"
  paas_compartment_id = "${var.paas_compartment_ocid}"
  jcs_display_name = "${var.subscription_id}|JaaS|${var.env_prefix}JCSDBCSStackJCS|wls|vm-1"
  soa_display_name = "${var.subscription_id}|SOA|${var.env_prefix}SOAStackSOACS|wls|vm-1"
}

locals {
  jcsname =  "${var.env_prefix}JCSDBCSStackJCS"
  jcs_cluster = "${substr(local.jcsname, 0, 8)}_cluster"
}


##############################################################
#
# call module app-config here
#
##############################################################



output "LibertyInsurance App Url" {
  value = "http://${module.compute.public-ip}:7001/LibertyInsurance-WebServiceApp-context-root/"
}

output "StateGov App Url" {
  value = "http://${trimspace(module.get-paas-info.jcs_public_ip)}/StateGov-WebService-context-root/"
}
```

Terraform Modules

- app-config
  - main.tf
    - **On WebLogic Server running on Docker Container, configure JDBCS Data Source to OCI Database and deploy Liberty Insurance App**
    - **On SOACS, Import Service Bus Project**
    - On JCS, deploy State HHS app
  - config_deploy_liberty_app.py
  - LibertyInsurance-WebServiceApp-context-root.war
  - import_sbconfig.py
  - sbconfig.jar



```
resource "null_resource" "liberty-app-config" {

  provisioner "local-exec" {
    command = "${var.wlst} ${path.module}/config_deploy_liberty_app.py t3://${va
r.liberty_ip}:7001 welcome1 ${var.password} ${path.module}/${var.liberty_warfile
} ${var.dbconn}  "
  }
}

resource "null_resource" "osb-proxy-config" {
  depends_on = ["null_resource.liberty-app-config"]

  provisioner "remote-exec" {
    connection {
      host= "${var.osb_ip}"
      user = "opc"
      private_key = "${var.ssh_private_key}"
    }

    inline = [
      "sudo su -c \"echo ${var.liberty_ip}  LibertyWLS >> /etc/hosts \" "
    ]
  }
  provisioner "local-exec" {
    /***********************************************************************
      Note: this wlst must include required osb jar files in the classpath
            such as the following:
            OSB_HOME="/u01/fmw/osb"
            CLASSPATH=${OSB_HOME}/lib/modules/oracle.servicebus.configfwk.jar:${
OSB_HOME}/lib/modules/oracle.servicebus.kernel-api.jar:${OSB_HOME}/lib/modules/o
racle.servicebus.configfwk-wls.jar:${OSB_HOME}/lib/modules/oracle.servicebus.ker
nel-wls.jar:${CLASSPATH}

    *************************************************************************/

    command = "${var.wlst} ${path.module}/import_sbconfig.py t3://${var.osb_ip}:
9001 weblogic ${var.password} ${path.module}/${var.sbconfig_jarfile} "
  }
}
```

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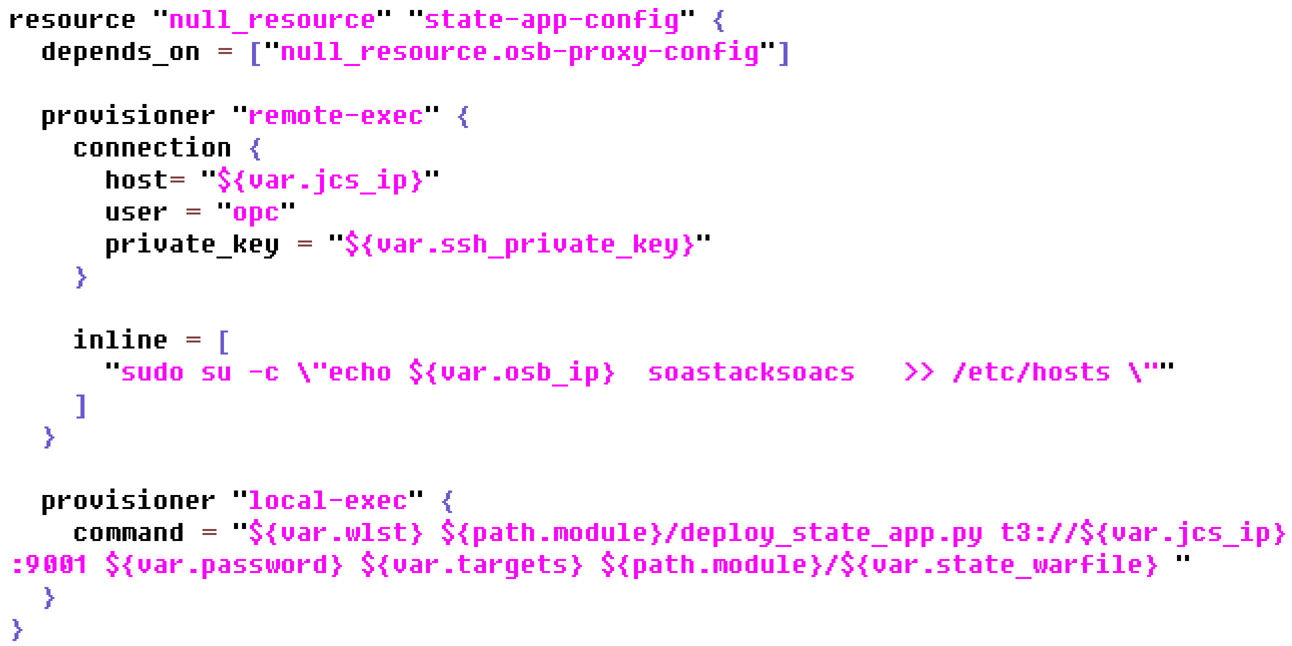
Terraform Modules

- app-config
  - deploy_state_app.py
  - StateGov-WebService-context-root.war
  - vars.tf



```
resource "null_resource" "state-app-config" {
  depends_on = ["null_resource.osb-proxy-config"]

  provisioner "remote-exec" {
    connection {
      host= "${var.jcs_ip}"
      user = "opc"
      private_key = "${var.ssh_private_key}"
    }

    inline = [
      "sudo su -c \"echo ${var.osb_ip}  soastacksoacs   >> /etc/hosts \""
    ]
  }

  provisioner "local-exec" {
    command = "${var.wlst} ${path.module}/deploy_state_app.py t3://${var.jcs_ip}
:9001 ${var.password} ${var.targets} ${path.module}/${var.state_warfile} "
  }
}
```

Labs

Lab Environment

- Lab Environment Access Details

Workshop VM Access	
Public IP	129.213.85.88
Username	devop00
OCI Cloud Account Access	
Identity Domain	gse00014442
Login Username	cloud.admin
Login Password	sTeady@3Finger
OCI Console URL	https://console.us-ashburn-1.oraclecloud.com/#/a/
Cloud Service Dashboard URL	https://myservices-gse00014442.console.oraclecloud.com/mycloud/cloudportal/dashboard
Swift Password	Y}uneQp8GF9TNJsCwW){

- ssh keys
  - testdrive-private.ppk for putty
  - testdrive_unix.prv for ssh

Demo and Hands-on Lab 1

Lab1

45

Minutes

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Demo and Hands-on Lab 2

Lab2

45

Minutes

Recap & Final Terraform for Oracle PaaS Demo

Thank you!

Q&A