

Resource Manager

Level 100

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Safe Harbor Statement

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Objectives

After completing this lesson, you should be able to:

- Describe the basic components of Resource Manager
- Describe the benefits of Resource Manager
- Prepare Terraform files for Resource Manager
- Resource Manager Demo

Introducing the Oracle Cloud Infrastructure Resource Manager

Manage your infrastructure resources using Terraform



Developers and
DevOps



Architects and
IT Ops

Resource Manager



Resource Manager Benefits

- Automate and standardize your infrastructure and easily replicate environments
- Deep integration with OCI Platform and its services
- Seamlessly manages state files and improves team collaboration
- Fully managed service for the Terraform engine
- You only pay for the underlying compute, storage, network or any other resource you provision using Resource Manager.

Resource Manager Components

You can think of the Resource Manager as Terraform-as-a-Service for Oracle Cloud Infrastructure resources. Once you have your terraform files ready and your variables file adjusted for Resource Manager you can start building **Stacks** and executing **Jobs**:

Stack - Represents a set of OCI resources you want to create in a compartment. Each Stack has a *configuration*, which is a set of Terraform files that specify the resources you want to manage together using the Resource Manager.

Job - Represents a request to take a Terraform Action on a Stack. Resource Manager provides three job-types: **plan**, **apply** and **destroy**

Resource Manager - Access Control & Permissions

- To use the Resource Manager, you must have the required OCI Identity and Access Management (IAM) permissions.
- Following are example policy statements that grant a group called ADMIN-XYZ the ability to manage all the Resource Manager resources in the tenancy:

Allow group ADMIN-XYZ to manage orm-stacks in tenancy

Allow group ADMIN-XYZ to manage orm-jobs in tenancy

- DEV-XYZ is a developer group is able to read Stacks and to execute Jobs - except for destroy – only within in a specific compartment:

Allow group DEV-XYZ to use orm-stacks in compartment XYZ

Allow group DEV-XYZ to use orm-jobs in compartment XYZ where target.job.operation !=
‘DESTROY’

Prepare your Terraform files to work with Resource Manager

- With the Resource Manager all that is required is an OCI Identity and Access Management (IAM) permissions.
- You can omit the user OCID, private key, fingerprint, and tenancy OCID from provider configuration.

Open Source OCI Terraform Provider

```
variable "user_ocid" {}
variable "fingerprint" {}
variable "private_key_path" {}
variable "private_key_password" {}

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

Resource Manager

```
variable "region" {}
variable "compartment_ocid" {}

provider "oci" {
  region = "${var.region}"
}
```


Resource Manager Variables

Resource Manager give you a possibility to enter extra variables to help with your deployment. Here is an example of adding a public ssh key:

Terraform Resource Manager file

```
variable "region" {}  
variable "compartment_ocid" {}  
variable "ssh_public_key" {}
```

Variables

Terraform variables for this stack.

KEY	VALUE	
<input type="text" value="region"/>	<input type="text" value="us-phoenix-1"/>	✕
<input type="text" value="compartment_ocid"/>	<input type="text" value="ocid1.compartment.oc1..aaaaaaaac3xqsvobxzeg13prj4axprdyd
uedvpitffnskrz7kakfxn2gouq"/>	✕
<input type="text" value="ssh_public_key"/>	<input type="text" value="ssh-rsa"/>	✕

+ Additional Variable

Resource Manager Workflow: Step 1

Define configuration



- Create the Terraform configuration for resources
- Write optional Terraform modules
- Create a zip file containing the Terraform files
- Avoid supplying confidential information in your configuration like passwords and SSH keys.

Resource Manager Workflow: Step 2

Create a Stack



Define
configuration

Create a
Stack

Run a Job

- Stack represents a set of resources you manage within a compartment
- Each Stack maps to Terraform configuration files and a Terraform state file

Create Stack [help](#) [cancel](#)

CREATE IN COMPARTMENT
Demo
bmc-flaviop (root)/Demo

NAME OPTIONAL
Web-Servers-Deployment

DESCRIPTION OPTIONAL
This stack creates 3 Web-Servers on different ADs

SELECT A TERRAFORM CONFIGURATION (.ZIP) FILE TO UPLOAD
Drop Zip file here [Browse](#)

base-web-servers.zip x

WORKING DIRECTORY
[Use Terraform config files in root folder]
The file path to the directory from which to run Terraform.

Variables

Terraform variables for this stack.

KEY	VALUE
region	us-phoenix-1 x
compartment_ocid	ocid1.compartment.oc1..aaaaaaaf3xqsyobxzeg13brj4axpfdyduedvpjtfnskrz7kafxn2qouq x
ssh_public_key	ssh-rsa x

+ Additional Variable

TAGS OPTIONAL
Tagging is a metadata system that allows you to organize and track resources within your tenancy. Tags are composed of keys and values which can be attached to resources.
[Learn more about tagging](#)

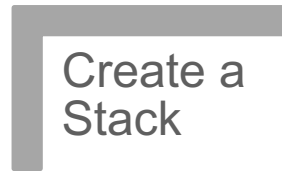
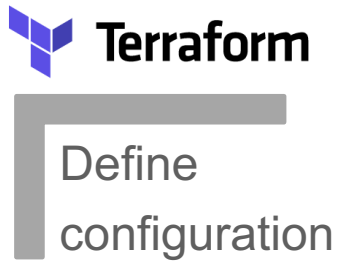
TAG NAMESPACE	TAG KEY	VALUE
No namespace (Free-Form tag) ▾		

+ Additional Tag

Create

Resource Manager Workflow: Step 3

Run a Terraform Job



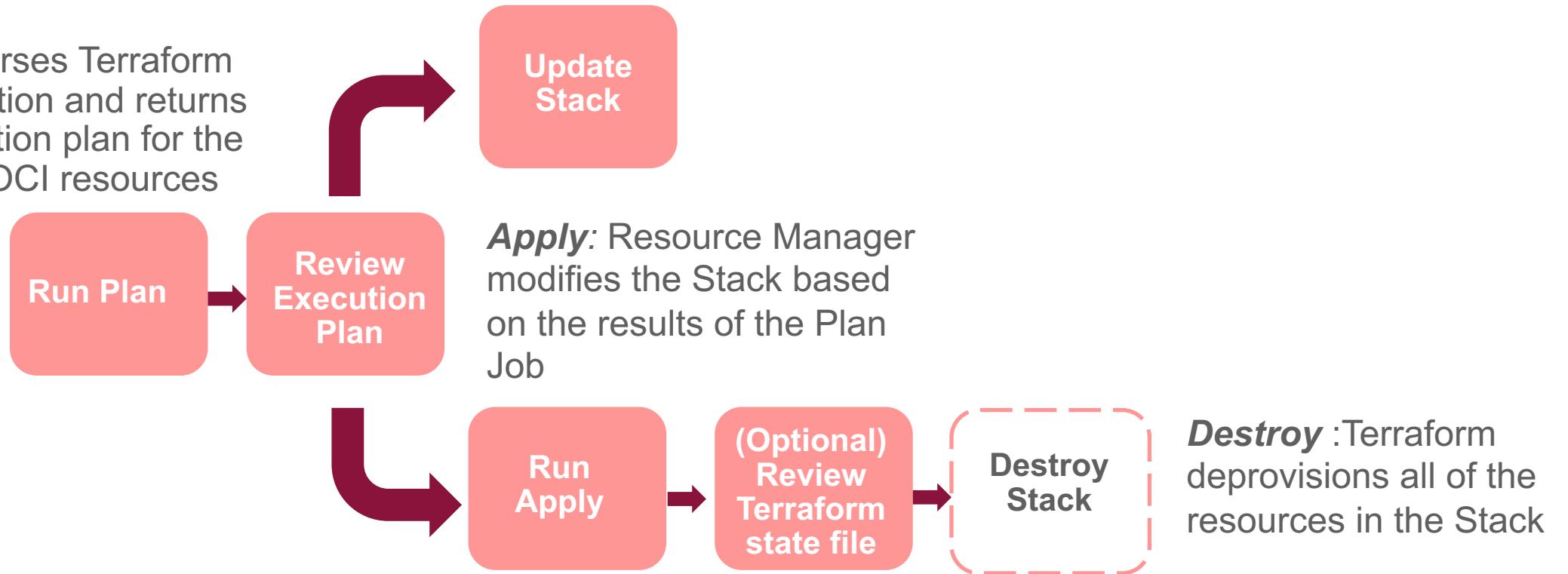
- A Job is a Terraform Action executed against a Stack
- Job actions include Plan, Apply, and Destroy

The screenshot shows the Oracle Cloud Resource Manager interface. The breadcrumb trail is "Resource Manager » Stacks » Stack Details". The main heading is "Web-Servers-Deployment". Below the heading are buttons: "Edit Stack", "Terraform Actions" (with a dropdown menu open showing "Plan", "Apply", and "Destroy"), "Delete Stack", and "Add Tag(s)". The "Stack Information" section includes a description "Servers on different ADs", an OCID "...h6pkwa" with "Show" and "Copy" links, and a creation time "Created: Fri, 08 Feb 2019 22:36:46 GMT". On the left, there are tabs for "Resources", "Jobs" (selected), and "Variables". The "Jobs" table is currently empty.

Name	Type
------	------

Resource Manager Execution

Plan : Parses Terraform configuration and returns an execution plan for the effected OCI resources



Resource Manager Demo

Summary

- Build on Open Source Software, Resource Manager is fully-managed service that makes easier to use Terraform on Oracle Cloud Infrastructure
- You can leverage your existing Terraform templates to deploy with Resource Manager
- There are no charges for using the Oracle Cloud Infrastructure Resource Manager.
- You can try Resource Manager, by sign up for a free trial OCI account here: <https://cloud.oracle.com/tryit> and follow the steps on this guide: <http://bit.ly/hol-orm>
- Resource Manager Documentation: <https://docs.cloud.oracle.com/iaas/Content/ResourceManager/Concepts/resourcemanager.htm>



cloud.oracle.com/iaas

cloud.oracle.com/tryit

Resource Manager Demo: Step 1

Go to **Menu** → **Resource Manager** → **Stack** and click **Create Stack**

☰

ORACLE Cloud

🔍

us-phoenix-1

🔔

?

👤

Resource Manager

Stacks

Jobs

List Scope

COMPARTMENT

Demo

⌵

bmc-flaviop (root)/Demo

Stacks in Demo *Compartment*

Create Stack

Name	Description	State	Created
No items			

Showing 0 Stacks < Page 1 >

Resource Manager Demo: Step 2

- Select the target compartment
- Enter a Name and Description
- Upload your Terraform zip file
- Enter the variables
- Click Create

You will see your Stack created showing an **Active State**

Resource Manager

Stacks

Jobs

List Scope

COMPARTMENT

Demo

Stacks in Demo Compartment

Create Stack

Name	Description
Web-Servers-Deployment	This will deploy 3 web servers.

Create Stack

helpcancel

CREATE IN COMPARTMENT

Demo

bmc-flaviop (root)/Demo

NAME OPTIONAL

Web-Servers-Deployment

DESCRIPTION OPTIONAL

This will deploy 3 web servers.

SELECT A TERRAFORM CONFIGURATION (.ZIP) FILE TO UPLOAD

Drop Zip file here [Browse](#)

base-web-servers.zip

WORKING DIRECTORY

[Use Terraform config files in root folder]
The file path to the directory from which to run Terraform.

Variables

Terraform variables for this stack.

KEY	VALUE
region	us-phoenix
compartment_ocid	ocid1.compartment.oc1..aaaaaaaf3xqsvobxzeg3brj4axpfdyduedvpjffnkrz7kakhn2qouq
ssh_public_key	anyconnect-10-154-138-75.vpn.oracle.com
ssh_private_key	-----BEGIN PRIVATE KEY----- MIIEvgIBADANBgkqhkiG9w0BAQEFADBIAQAAAgEAAQEA... uaSTH6tMSOahfREHWUnm98k4CgxK1SQjANR2WZHGoJXFQ3mEq8AZg==

+ Additional Variable

TAGS OPTIONAL

Tagging is a metadata system that allows you to organize and track resources within your tenancy. Tags are composed of keys and values which can be attached to resources.
[Learn more about tagging](#)

TAG NAMESPACE	TAG KEY	VALUE
No namespace (Free-Form tag)		

+ Additional Tag

Create

Resource Manager Demo: Step 3

- Select the Stack you created
- Select "Plan" on the Terraform Actions menu
- Give it a name and click the "Plan" button

Plan [help](#) [cancel](#)

NAME OPTIONAL

Web-Servers-Plan

TAGS OPTIONAL

Tagging is a metadata system that allows you to organize and track resources within your tenancy. Tags are composed of keys and values which can be attached to resources.

[Learn more about tagging](#)

TAG NAMESPACE	TAG KEY	VALUE
No namespace (Free-Form tag)		

+ Additional Tag

Plan

Resource Manager » Stacks » Stack Details



Web-Servers-Deployment

Edit Stack

Terraform Actions

Delete Stack

Add Tag(s)

Stack Information

Description

OCID: ...so2hfa [Show](#) [Copy](#)

Created: Fri, 08 Feb 2019 22:51:25 GMT

- Plan
- Apply
- Destroy

Resource Manager Demo: Step 4

- Select "Apply" on the Terraform Actions menu
- Give it a name and click the "Apply" button

Resource Manager » Stacks » Stack Details

S

Web-Servers-Deployment

Edit Stack

Terraform Actions

Delete Stack

Add Tag(s)

Apply

Stack Information

Plan

Apply

Destroy

Description

...cczqvq

Show

Copy

Created

Fri, 08 Feb 2019 23:03:05 GMT

Compartment

bmc-flaviop (root)/Demo

Terraform Config (.zip)

Uploaded

Upload New

Download

Resources

Jobs

Variables

Name	Type	State	Start Time	End Time
Web-Servers-Plan	Plan	● Succeeded	Fri, 08 Feb 2019 23:03:17 GMT	Fri, 08 Feb 2019 23:07:02 GMT

Showing 1 Jobs < Page 1 >

Apply

NAME

OPTIONAL

Web-Servers-Apply

TAGS

OPTIONAL

Tagging is a metadata system that allows you to organize and track resources within your tenancy. Tags are composed of keys and values which can be attached to resources.

[Learn more about tagging](#)

TAG NAMESPACE

No namespace (Free-Form tag)

TAG KEY

VALUE

+ Additional Tag

Resource Manager Demo: Step 5

Under Jobs you can see the job history and the state of the actions.

Resource Manager » Stacks » Stack Details

S

Resources

Jobs

Variables

Web-Servers-Deployment

Edit Stack

Terraform Actions ▾

Delete Stack

Add Tag(s)

Stack Information

Tags

Description: This stack will deploy 3 Web servers.

OCID: ...cczqvq Show Copy

Created: Fri, 08 Feb 2019 23:03:05 GMT

Compartment: bmc-flaviop (root)/Demo

Terraform Config (.zip): Uploaded Upload New Download

Jobs




Name	Type	State	Start Time ▾	End Time
Web-Servers-Apply	Apply	● Accepted	Fri, 08 Feb 2019 23:09:46 GMT	-
Web-Servers-Plan	Plan	● Succeeded	Fri, 08 Feb 2019 23:03:17 GMT	Fri, 08 Feb 2019 23:07:02 GMT

Showing 2 Jobs < Page 1 >

Resource Manager Demo: Step 6

Navigate to **Compute > Instances** and see the created Web-Servers

Create Instance

Sort by: Created Date (Desc) ▾		Displaying 3 Instances < Page 1 >		
 RUNNING	tf-server-2 OCID: ...vqvcna Show Copy	Shape: VM.Standard2.1	Region: phx Availability Domain: Akfl:PHX-AD-2 Fault Domain: FAULT-DOMAIN-1	Created: Fri, 08 Feb 2019 23:13:14 GMT Maintenance Reboot: - ⋮
 RUNNING	tf-server-3 OCID: ...45r5ra Show Copy	Shape: VM.Standard2.1	Region: phx Availability Domain: Akfl:PHX-AD-3 Fault Domain: FAULT-DOMAIN-3	Created: Fri, 08 Feb 2019 23:13:14 GMT Maintenance Reboot: - ⋮
 RUNNING	tf-server-1 OCID: ...hfvqdq Show Copy	Shape: VM.Standard2.1	Region: phx Availability Domain: Akfl:PHX-AD-1 Fault Domain: FAULT-DOMAIN-2	Created: Fri, 08 Feb 2019 23:13:14 GMT Maintenance Reboot: - ⋮
		Displaying 3 Instances < Page 1 >		

Resource Manager Demo: Step 7

For each Job, download the Logs, Terraform configuration and Terraform State

Resource Manager » Stacks » Web-Servers-Deployment » Job Details

J

Web-Servers-Plan

Download Terraform Config

Add Tag(s)

Job Information

Tags

OCID: ...6a6fsq

Show

Copy

Job Type: Plan

Working Directory: [Not Specified]

End Time: Fri, 08 Feb 2019 23:07:02 GMT

Resources

Logs

Variables

Download Logs

2019-02-08T23:07:00.116Z [INFO]

2019-02-08T23:07:00.121Z [INFO] Initializing provider plugins...

2019-02-08T23:07:00.121Z [INFO]

2019-02-08T23:07:00.121Z [INFO] The following providers do not have any version constraints in configuration,

2019-02-08T23:07:00.121Z [INFO] so the latest version was installed.

2019-02-08T23:07:00.121Z [INFO]

2019-02-08T23:07:00.121Z [INFO] To prevent automatic upgrades to new major versions that may contain breaking

2019-02-08T23:07:00.121Z [INFO] changes, it is recommended to add version = "...*" constraints to the

2019-02-08T23:07:00.121Z [INFO] corresponding provider blocks in configuration, with the constraint strings

2019-02-08T23:07:00.121Z [INFO] suggested below.

2019-02-08T23:07:00.121Z [INFO]

2019-02-08T23:07:00.121Z [INFO] * provider.oci: version = "~> 3.13"

2019-02-08T23:07:00.121Z [INFO] Terraform has been successfully initialized!

2019-02-08T23:07:00.121Z [INFO]

2019-02-08T23:07:00.121Z [INFO] You may now begin working with Terraform. Try running "terraform plan" to see

2019-02-08T23:07:00.121Z [INFO] any changes that are required for your infrastructure. All Terraform commands

Resource Manager » Stacks » Web-Servers-Deployment » Job Details

J

Web-Servers-Apply

Download Terraform Config

Download Terraform State

Add Tag(s)

Job Information

Tags

OCID: ...wveysa

Show

Copy

Job Type: Apply

Working Directory: [Not Specified]

End Time: Fri, 08 Feb 2019 23:15:36 GMT

Compartment: bmc-flaviop (root)/Demo

State: Succeeded

Start Time: Fri, 08 Feb 2019 23:09:46 GMT

Resources

Logs

Variables

Download Logs

2019-02-08T23:13:09.906Z [INFO]

2019-02-08T23:13:09.913Z [INFO] Initializing provider plugins...

2019-02-08T23:13:09.913Z [INFO]

2019-02-08T23:13:09.913Z [INFO] The following providers do not have any version constraints in configuration,

2019-02-08T23:13:09.913Z [INFO] so the latest version was installed.

2019-02-08T23:13:09.913Z [INFO]

2019-02-08T23:13:09.913Z [INFO] To prevent automatic upgrades to new major versions that may contain breaking

2019-02-08T23:13:09.913Z [INFO] changes, it is recommended to add version = "...*" constraints to the

2019-02-08T23:13:09.913Z [INFO] corresponding provider blocks in configuration, with the constraint strings

2019-02-08T23:13:09.913Z [INFO] suggested below.

2019-02-08T23:13:09.913Z [INFO]

2019-02-08T23:13:09.913Z [INFO] * provider.oci: version = "~> 3.13"

2019-02-08T23:13:09.913Z [INFO] Terraform has been successfully initialized!

2019-02-08T23:13:09.913Z [INFO]

2019-02-08T23:13:09.913Z [INFO] You may now begin working with Terraform. Try running "terraform plan" to see

2019-02-08T23:13:09.913Z [INFO] any changes that are required for your infrastructure. All Terraform commands