How To Make The Best Use Of Live Sessions

- Please login on time
- Please do a check on your network connection and audio before the class to have a smooth session
- All participants will be on mute, by default. You will be unmuted when requested or as needed
- Please use the “Questions” panel on your webinar tool to interact with the instructor at any point during the class
- Ask and answer questions to make your learning interactive
- Please have the support phone number (US : 1855 818 0063 (toll free), India : +91 90191 17772) and raise tickets from LMS in case of any issues with the tool
- Most often logging off or rejoining will help solve the tool related issues

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AWS Certified DevOps Engineer

COURSE OUTLINE

MODULE 04

Introduction To DevOps On Cloud

Automating Infrastructure With CloudFormation

Application Deployment using Elastic Beanstalk

Configuration Management using OpsWorks

Continuous Monitoring and Management

Security, Governance and Validation

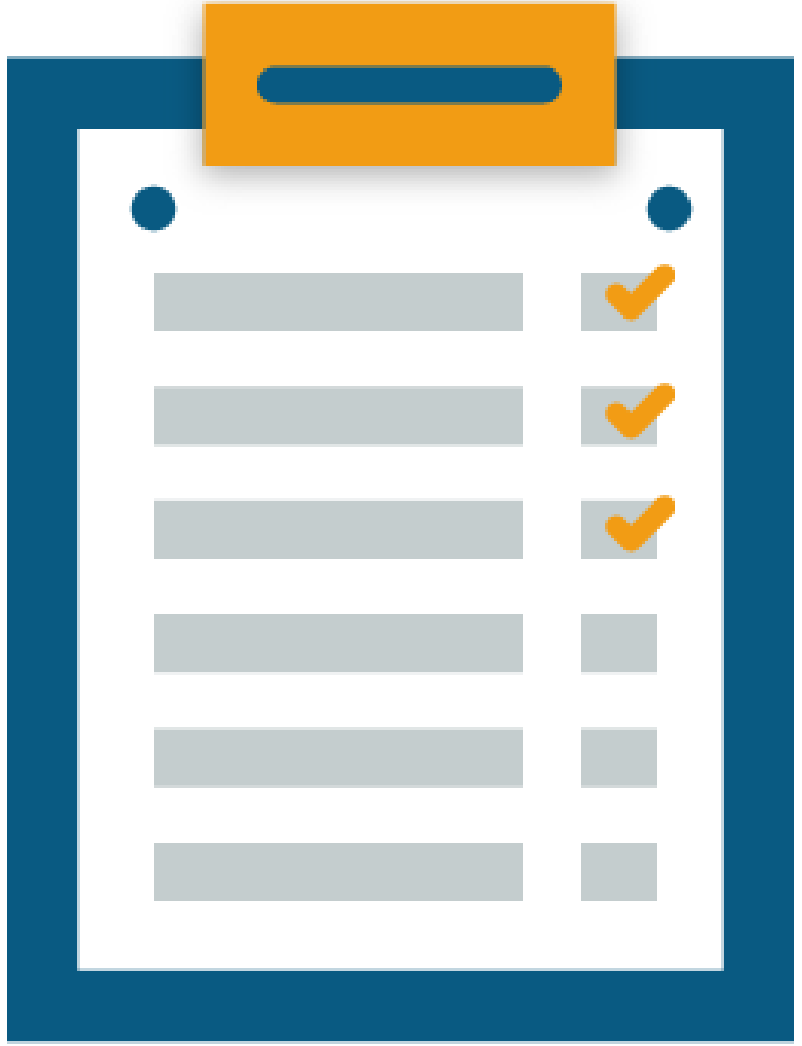
Elasticity and High Availability

AWS Certified DevOps Engineer Exam Discussion

Objectives

At the end of this module, you will be able to:

- Understand what is AWS OpsWorks and its types
- Describe OpsWorks Components
- Work with OpsWorks Stacks
- Understand Lifecycle events of OpsWorks
- Know the deployment commands
- Manage permission in a stack
- Auto Heal the Instance



AWS OpsWorks

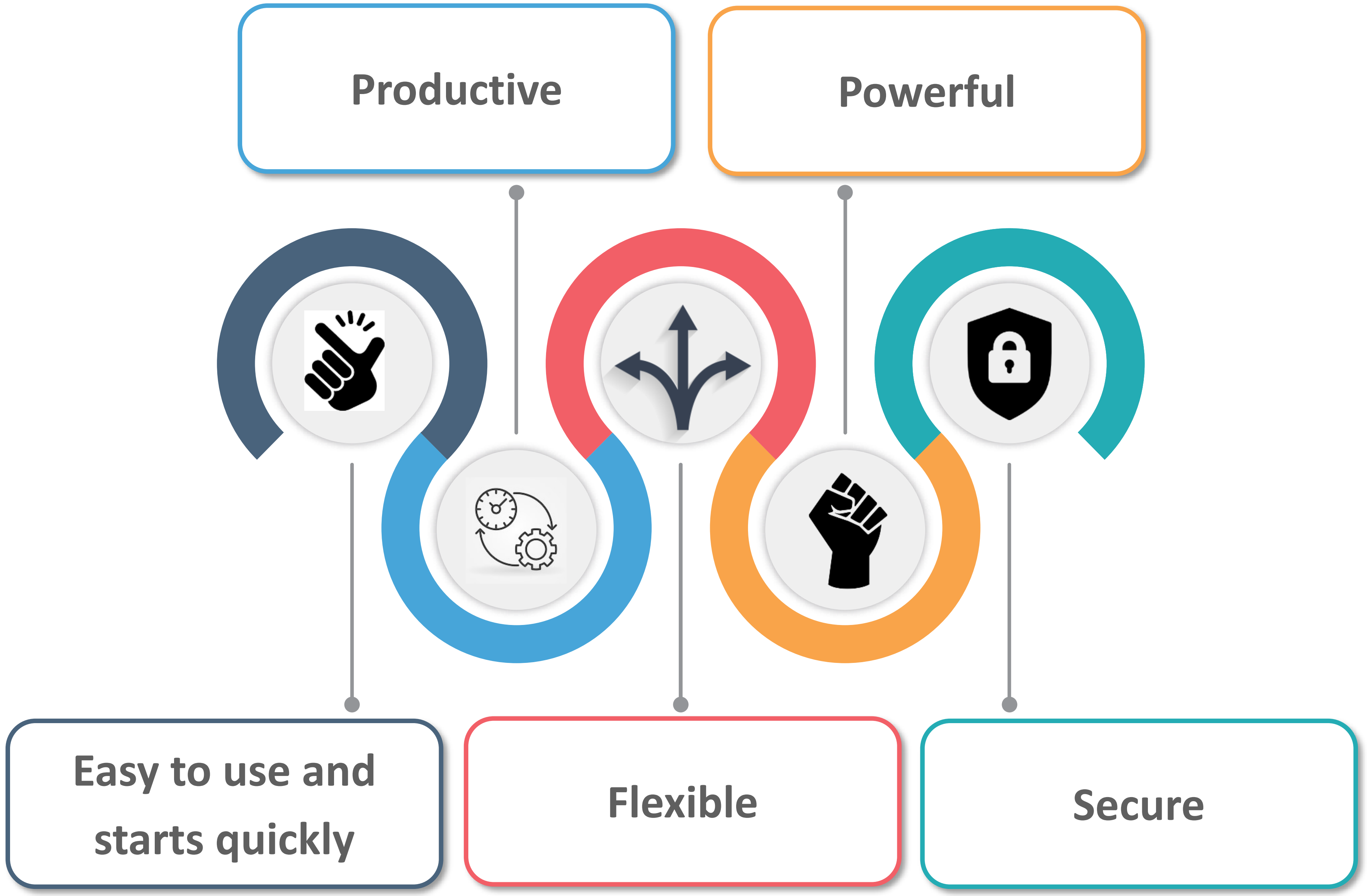
Why Do We Need OpsWorks?

Suppose you want to change ***properties file*** of ***1000 servers*** running at a time

With the help of OpsWorks tools you can do it seamlessly

All you have to do is only once deploy the changes and it will replicate them across all the components

The reasons why should we choose OpsWorks are-



Productive

Powerful

Easy to use and starts quickly

Flexible

Secure

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What Is AWS OpsWorks?

AWS OpsWorks is a configuration management service that helps you build and operate highly dynamic applications and propagate changes instantly

The automated platforms like ***Chef and Puppet*** permit the user to use OpsWorks as ***configuration as code service*** to ***automate*** their ***server configurations***

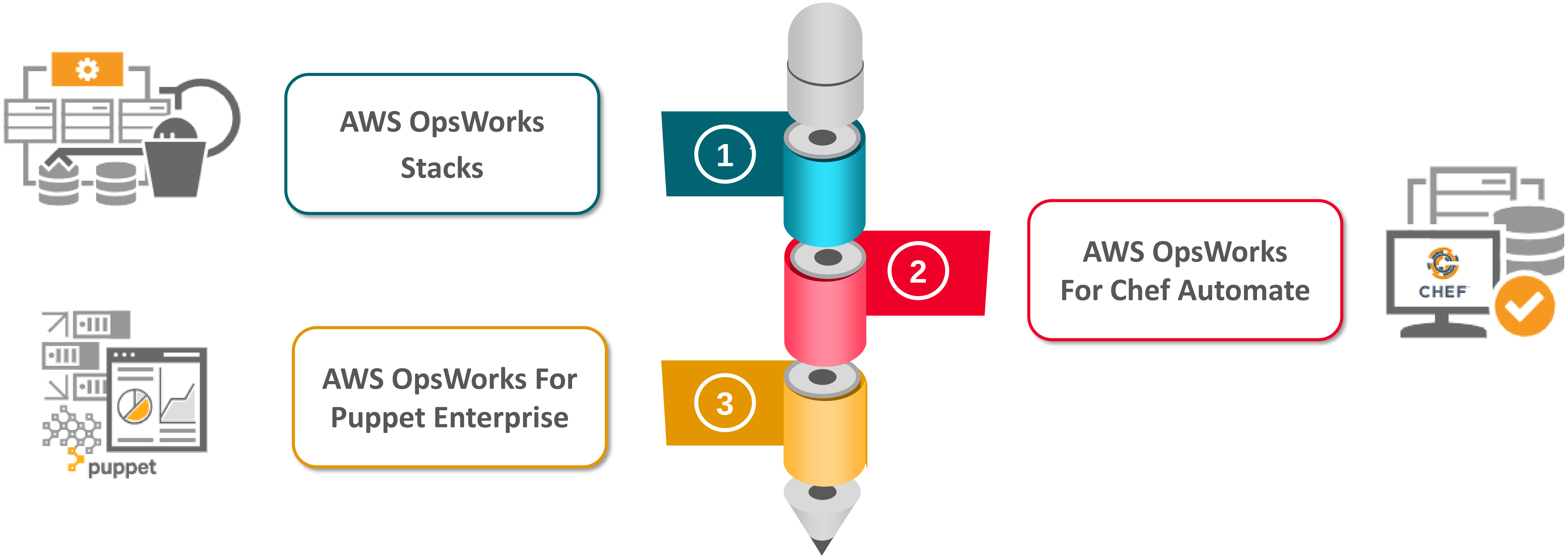
It makes easy to ***manage*** complete ***application lifecycle*** including resource provisioning, configuration, management, application deployment, software updates, monitoring and access control

AWS OpsWorks

AWS OpsWorks Services

AWS OpsWorks Services

AWS OpsWorks mainly offers ***3*** types of services:



1 AWS OpsWorks Stacks

2 AWS OpsWorks For Chef Automate

3 AWS OpsWorks For Puppet Enterprise

AWS OpsWorks for Chef Automate and ***AWS OpsWorks Stacks*** let you use ***Chef cookbooks*** and ***solutions*** for ***configuration management***, while ***OpsWorks for Puppet Enterprise*** lets you ***configure*** a ***Puppet Enterprise master server*** in ***AWS***

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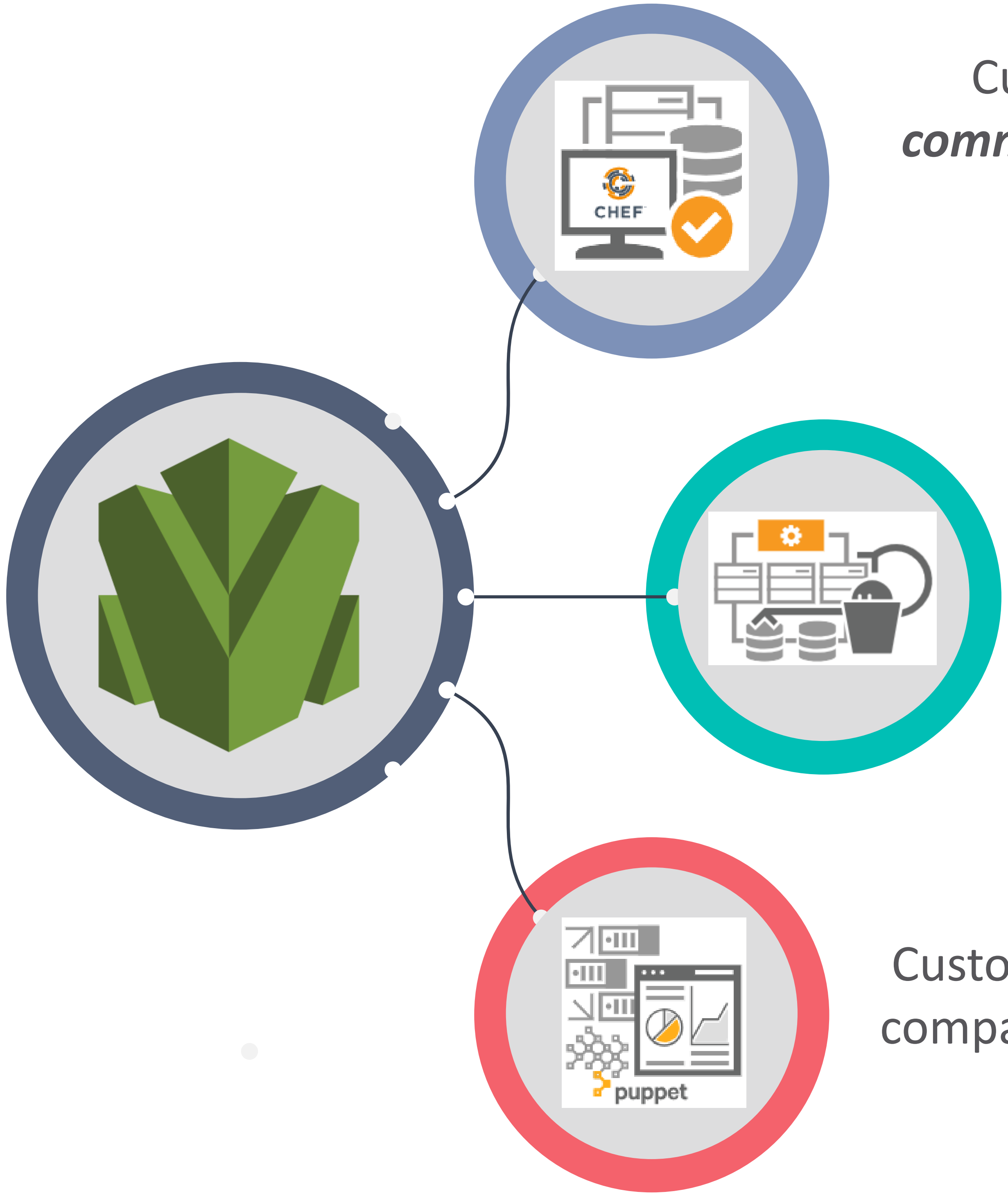
Which OpsWorks Service To Choose?



Customers who are looking for ***configuration management with community scripts and tooling***, which is ***compatible with Chef without any operational overhead*** can go for this

Customers who are looking for ***end- to-end configuration solution*** with better ***automation and management solution*** can go for this

Customers who are looking for ***configuration management***, which is compatible with ***Puppet including all Puppet Forge modules***, ***without operational overhead*** can go for this

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AWS OpsWorks Stacks

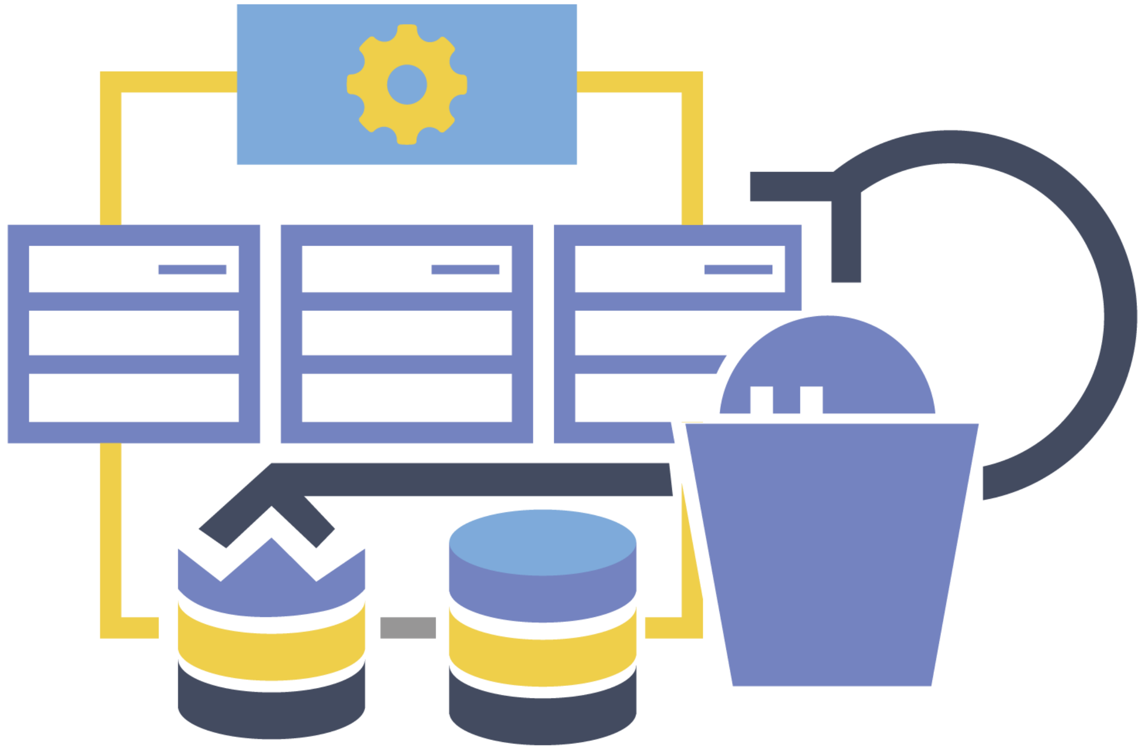
AWS OpsWorks Stacks

AWS OpsWorks Stacks lets you ***manage*** applications and servers on ***AWS*** and ***on-premises***

Using it you can model your application as a ***stack containing different layers***, such as load balancing, database, and application server

It helps you model, manage and provision your applications on AWS using ***the embedded Chef solo client*** that is ***installed*** on ***EC2*** instances on your behalf

Used by ***System administrators*** and ***ops-minded developers*** who are looking for ***end-to-end configuration management solution***



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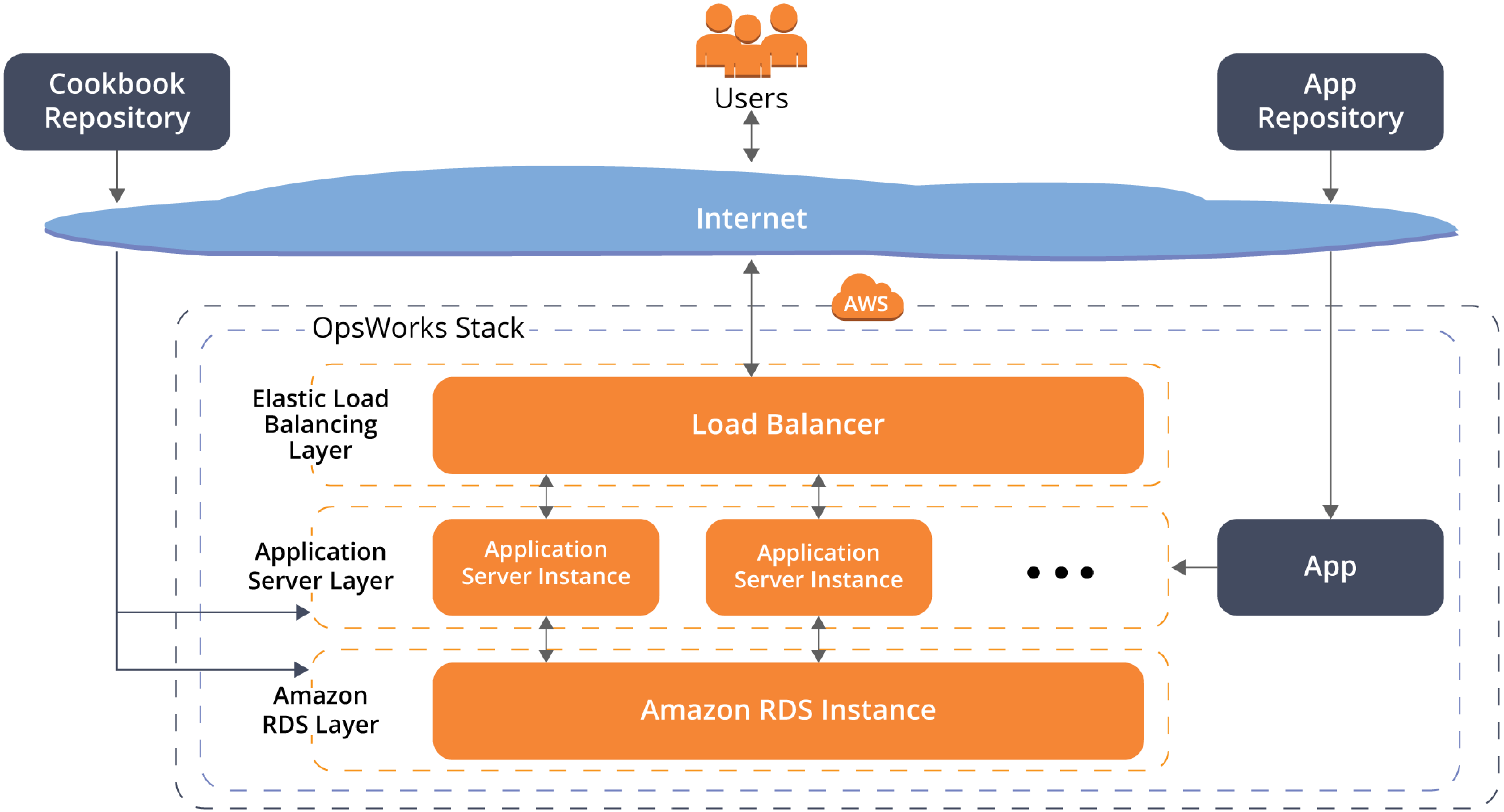
AWS OpsWorks Stacks



Components Of AWS OpsWorks Stacks

Components Of OpsWorks – Stack

Stack

Layer

Instances

Apps

- Stack is ***top level*** of AWS OpsWorks entity
- It is basically a container that contains a ***set of resources*** that we want to ***manage collectively***
- Example-EC2 instances, EBS volumes, Load Balancers
- It handles tasks like managing resources, default configuration settings and cookbooks, assigned to the group of instances

Stack

Components Of OpsWorks – Layer

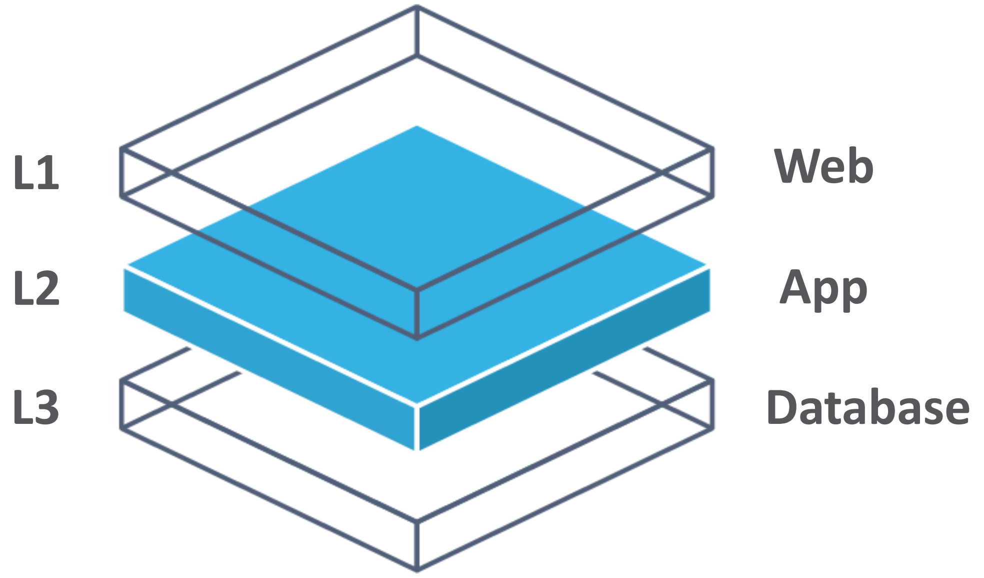
Stack

Layer

Instances

Apps

- Every stack contains one or more ***layers***
- Each layer represents ***a set of instances*** that servers for a ***particular purpose*** like load balancer or application servers
- Layer can be made up of multiple resources that share ***same configuration*** like installing packages, deploying application or running scripts can you ***chef recipes to automate them***



Example: DEV Stack

Components Of OpsWorks – Instances

Stack

Layer

Instances

Apps

- An ***instance*** represents a computing resource, like Amazon EC2 instance, which handles the work of serving applications

- There is a chef agent which runs on your instances and applies the configuration with chef recipes

- Types of Instances Supported in AWS OpsWorks
  - ***24/7 Instances***: ***You*** have to ***start*** these instances and they keep ***running*** until ***you stop*** them
  - ***Time-Based Instances***: Instances run by AWS ***OpsWorks*** on a specified ***daily*** and ***weekly*** schedule. Here, ***stack*** automatically ***adjust*** the ***number*** of ***instances*** to accommodate predictable usage patterns
  - ***Load-Based Instances***: These instances are turned ***on*** and ***off*** by ***OpsWorks*** based on specified ***load metrics*** such as ***CPU utilization***

Instance

Components Of OpsWorks – Apps

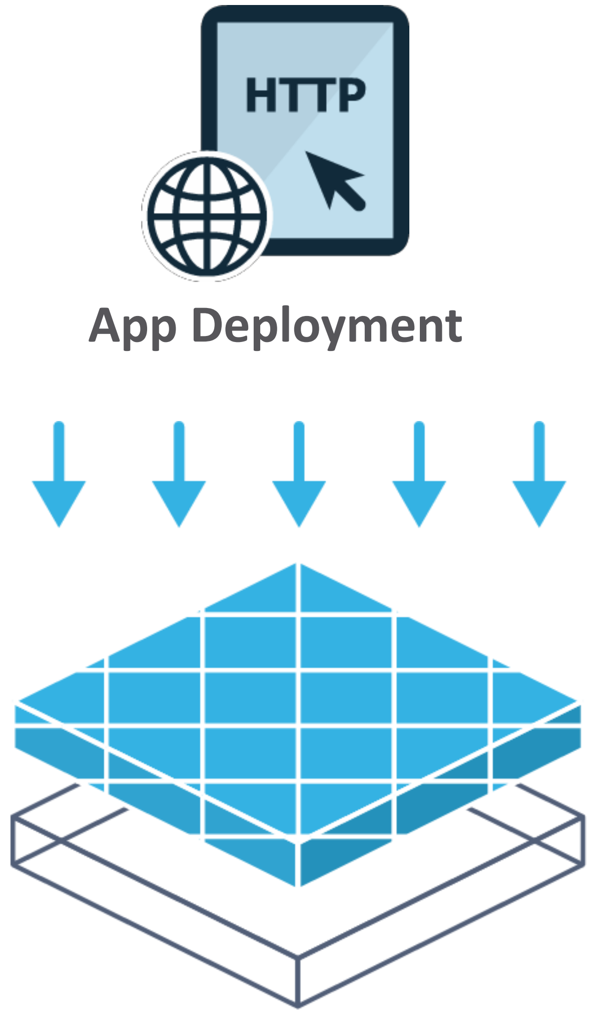
Stack

Layer

Instances

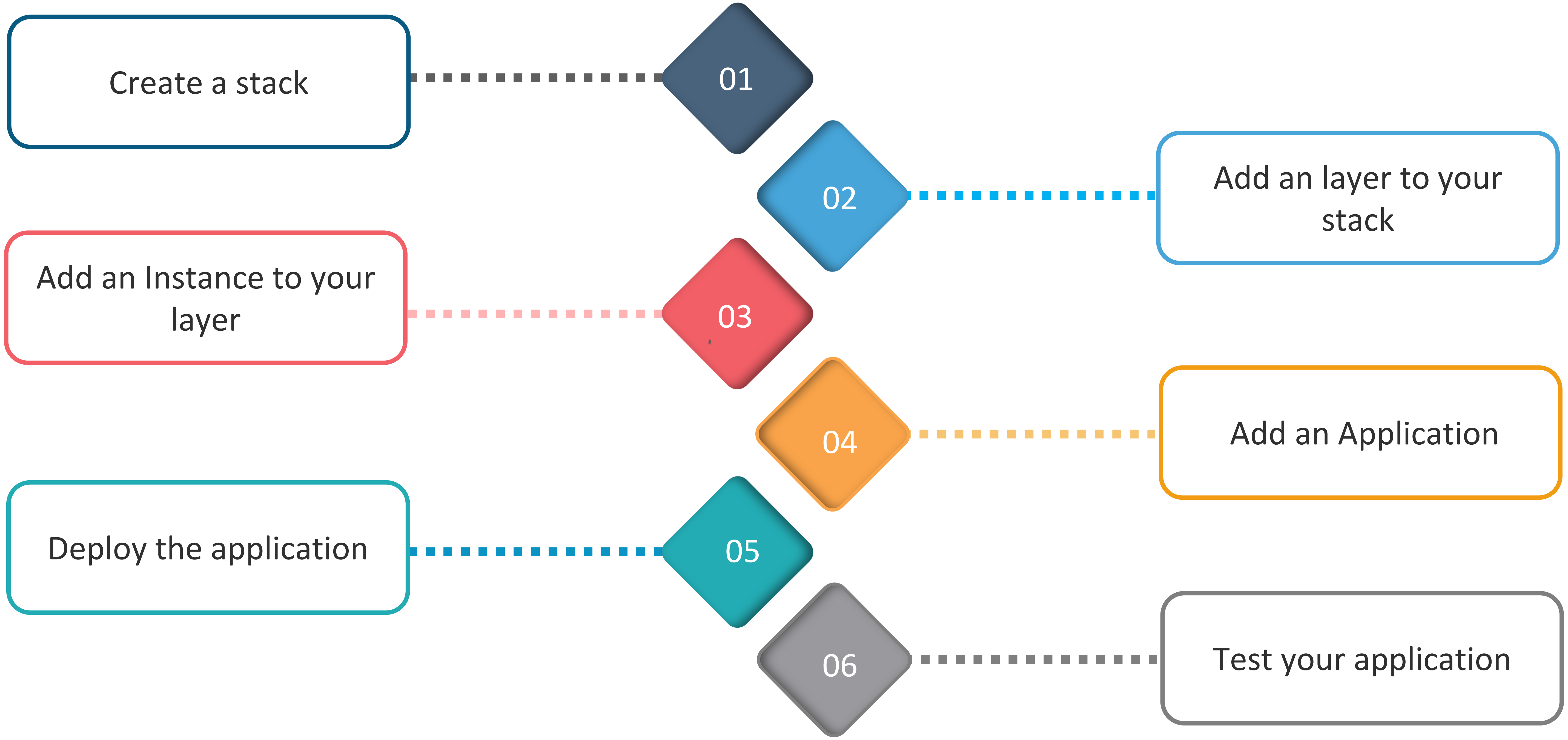
Apps

- An AWS OpsWorks ***app*** represents ***code*** that you want to run on an ***application server***
- The app contains the information required to deploy the code to the appropriate application server instances
- You can deploy apps in the following ways:
  - ➢ ***Automatically***: When you start instances, AWS OpsWorks automatically runs the instance's deploy recipes
  - ➢ ***Manually***: If you have a new app or want to update an existing one, you can manually run the online instances deploy recipes



Demo: AWS OpsWorks Stacks

Demo: AWS OpsWorks Stack



01 Create a stack

02 Add an layer to your stack

03 Add an Instance to your layer

04 Add an Application

05 Deploy the application

06 Test your application

Note: Refer to the Demo-1 in LMS to see the detailed steps

Cookbooks, Recipes, Data Bags And Berkshelf

Cookbooks

- A cookbook is like a "***package***" for ***Chef recipes***
- It contains all the ***recipes, files, templates, libraries***, etc. required to ***configure*** a portion of your ***infrastructure***

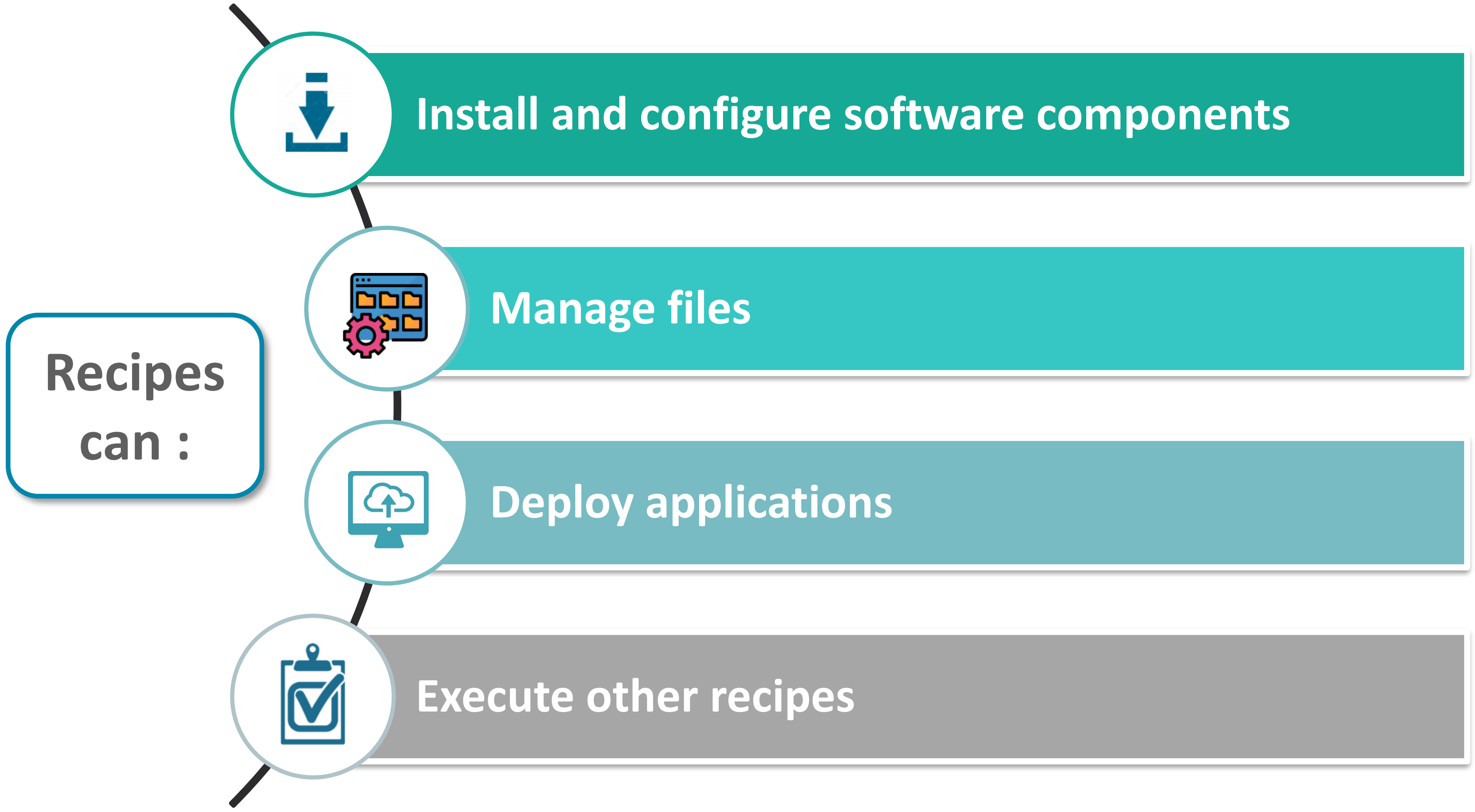
To create a cookbook

```
Knife cookbook create opswork(name of cookbook)
```

// The cookbook created is a directory format where in all the subfolders like recipes etc. get created automatically

Recipes

Recipes are the codes written in ***Ruby language*** and are attached to the ***layer***
They are also known as ***configuration files*** describe resources(building blocks of chef) and their ***desired state***
It has the ability to run on-demand or in response to events



Recipes can :

- Install and configure software components
- Manage files
- Deploy applications
- Execute other recipes

Note: When the ***cookbooks*** are created the ***recipes*** are created ***automatically*** with a default file
For example:
cookbooks/opswork/recipes/default.rb

Data Bags

Data Bag is a ***global variable*** that is stored in ***JSON format*** which is accessible from chef

01 Here the app's source, host name of the instance and the stack's VPC identifier is know as global variable

02 The stack exposes these data bags as settings to the recipes

03 Each Stack instance would contain this data bag

04 Each data bag can contain zero or more data bag items which are JSON formatted files

05 Chef recipes access data bag, data item or data content through chef search or direct search

Search Indexes

Search Indexes	Description
aws_opsworks_app	Used for the search related to deployed app in the stack like app_id, app_source, data_source, environment and many more
aws_opsworks_instance	Used for the search related to the set of instance in the stack like ami_id, availability_zone, elastic_ip and many more
aws_opsworks_layer	Used for search related to the stack like layer_id, name, type and volume configurations
aws_opsworks_stack	Used for the search related to stack like arn, custom_cookbooks_source, stack_id and many more
aws_opsworks_user	Used for search related to set of users of the stack like IAM users, remote access, administrator_privileges and many more

Berkshelf

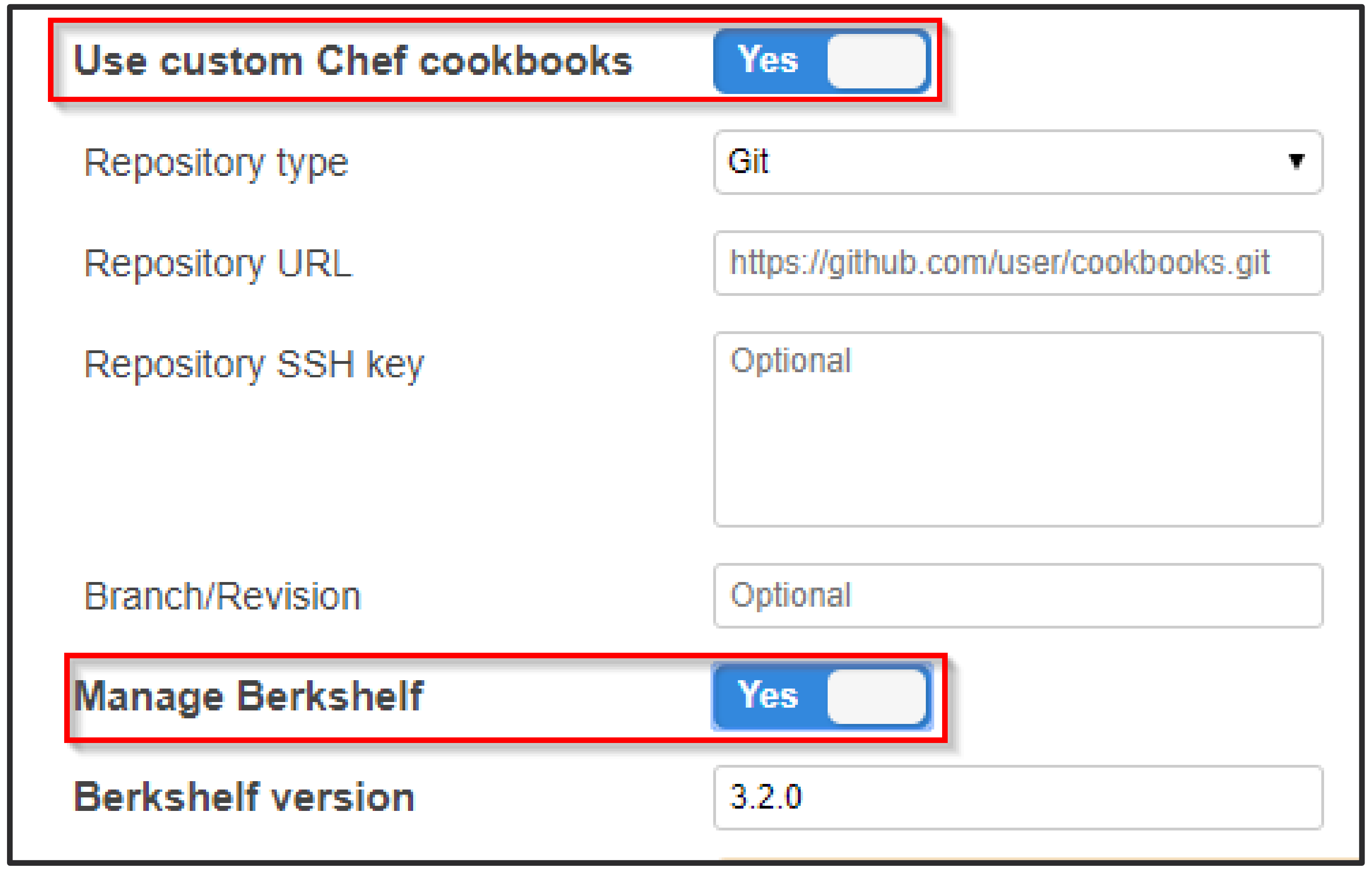
Chef 11.10 Linux stacks allows you to ***install custom cookbooks*** from multiple repositories using ***Berkshelf*** which is a ***dependency manager***

- To use an external custom cookbooks you need to copy it to your own custom cookbook and manage dependency which can be avoided using Berkshelf

- To use Berkshelf:

  ➢ Firstly enable custom cookbooks and then ***enable manage Berkshelf***

  ➢ Secondly ***add berkfile*** which contains ***source and cookbook declarations*** for all dependent cookbooks, to root directory of the cookbook repository



Use custom Chef cookbooks	Yes
Repository type	Git
Repository URL	https://github.com/user/cookbooks.git
Repository SSH key	Optional
Branch/Revision	Optional
Manage Berkshelf	Yes
Berkshelf version	3.2.0

OpsWorks Lifecycle Events

OpsWorks Lifecycle Events

Setup

- Occurs after a started instance ***complete*** booting
- Includes deploy event
- Used for ***initial installation*** of software & service

Configure

- Notify all the instances when the state of the stack changes
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- ***Triggered*** when ever an application is ***deployed***

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- Used to ***remove apps*** from running instances

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- Occurs before the associated EC2 instance is terminated
- Used to perform ***cleanup tasks*** by running the chef recipes

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Deployment Commands

Deployment Commands In OpsWorks

Undeploy lifecycle event is triggered to run undeploy recipes, to remove all versions of app

Undeploy

Runs recipes on the specified instance to start the application server

Start Web Server

Runs recipes on the specified instance to start the application server

Restart Web Server

Restores the Previous version

Rollback

Runs recipes on the specified instance to start the application server

Stop Web Server

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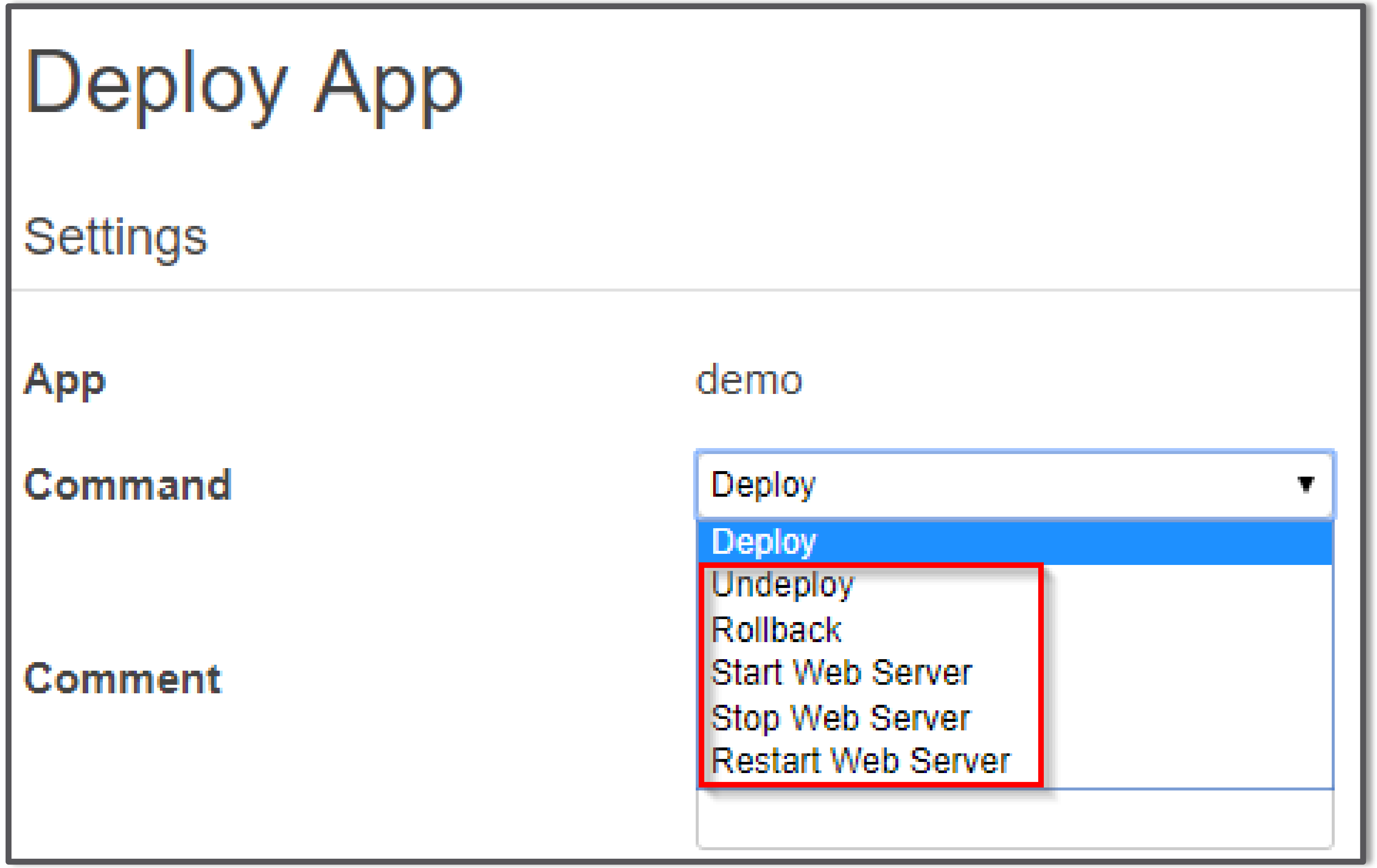
Deployment Commands In OpsWorks

The deployment commands can be found in the Deployment Section of the OpsWorks Stack dashboard



Deploy App

Settings

App demo

Command Deploy

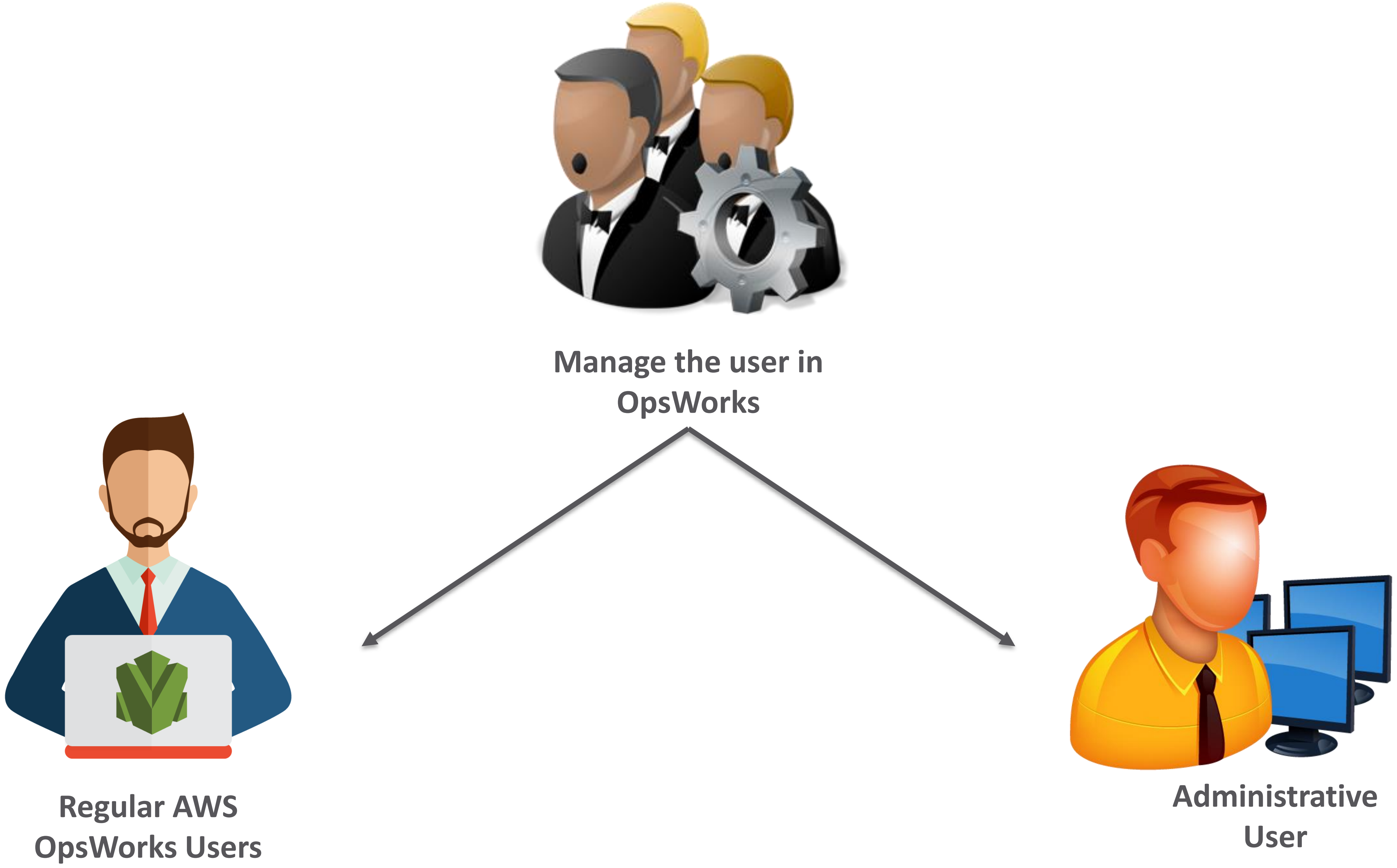
Comment

Rollback, Start, Stop and Restart Web Server are essentially ***customized versions of the Execute Recipes*** stack command and these commands ***only work on application server layer***

Managing Permissions

Manage Users

To manage your permissions, OpsWorks divide the users into two categories



Manage the user in OpsWorks

Regular AWS OpsWorks Users

Administrative User

Regular AWS Stack User

Regular user do not need any externally attached policy to the IAM as it uses the AWS OpsWorks Stack permission page to do that in stack-by-stack level

Permission levels of regular OpsWorks User

Show

Allows users to view the stack but it does not allow to perform any operations

Deploy

Allows users to deploy and update apps along with the show permissions

Manage

Allows users to perform management operations along with the deploy permissions

Deny

Denies the access to the stack

IAM Policies Only

Create a custom user permission by attaching an IAM policies

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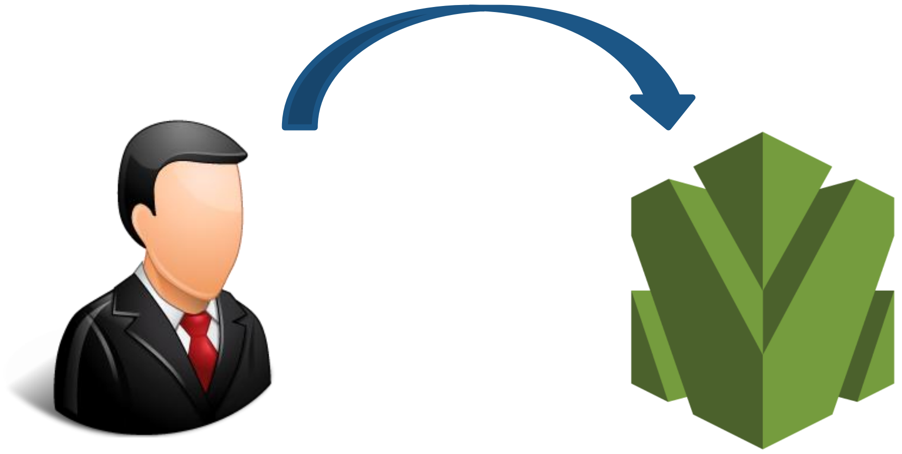
Administrative User

Administrative users are the users who own the account or an IAM user who is attached with the AWSOpsWorksFullAccess policy

In addition to manage permissions this policy includes permissions that cannot be granted through the **Permissions** page which includes:

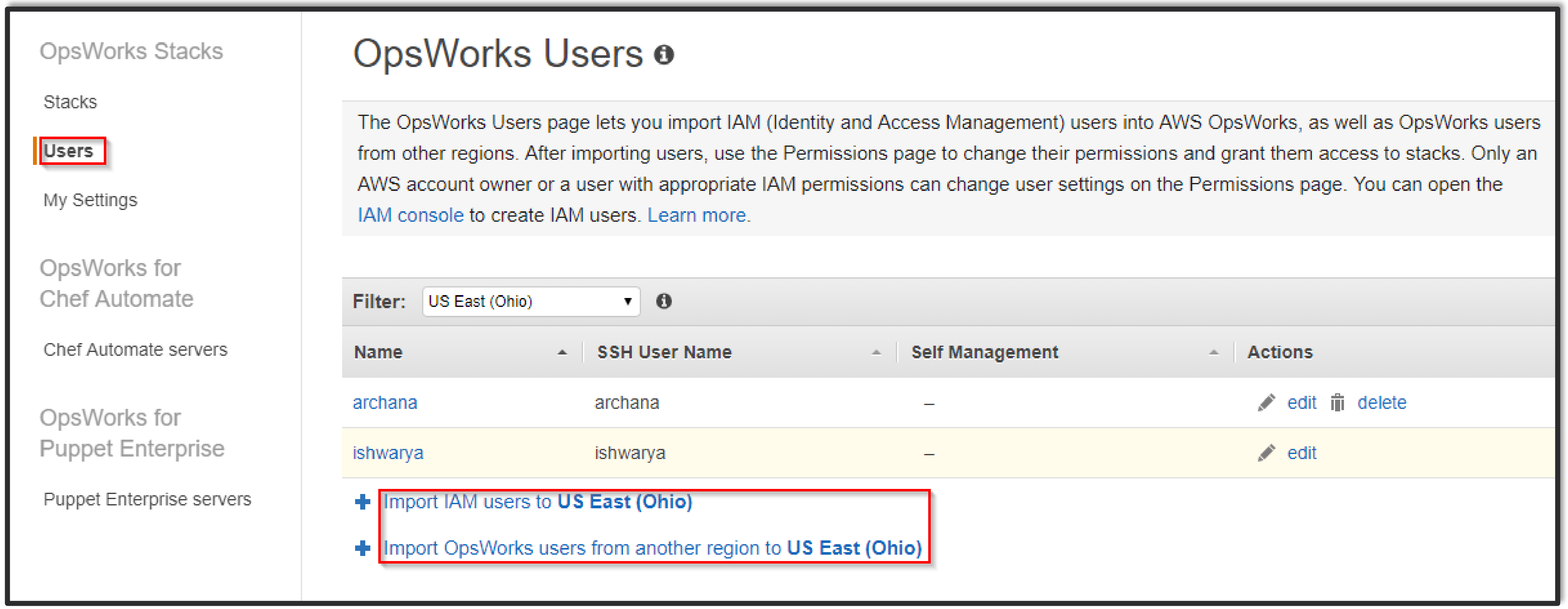
Importing users into AWS OpsWorks Stacks



Creating and cloning stacks

Importing User Into AWS OpsWorks

Administrative users can import IAM users to AWS OpsWorks Stacks regional endpoint or they can import users from one regional endpoint to another



OpsWorks Stacks

Stacks

Users

My Settings

OpsWorks for Chef Automate

Chef Automate servers

OpsWorks for Puppet Enterprise

Puppet Enterprise servers

OpsWorks Users

The OpsWorks Users page lets you import IAM (Identity and Access Management) users into AWS OpsWorks, as well as OpsWorks users from other regions. After importing users, use the Permissions page to change their permissions and grant them access to stacks. Only an AWS account owner or a user with appropriate IAM permissions can change user settings on the Permissions page. You can open the IAM console to create IAM users. Learn more.

Filter: US East (Ohio)

Name	SSH User Name	Self Management	Actions
archana	archana	–	edit delete
ishwarya	ishwarya	–	edit

+ Import IAM users to **US East (Ohio)**

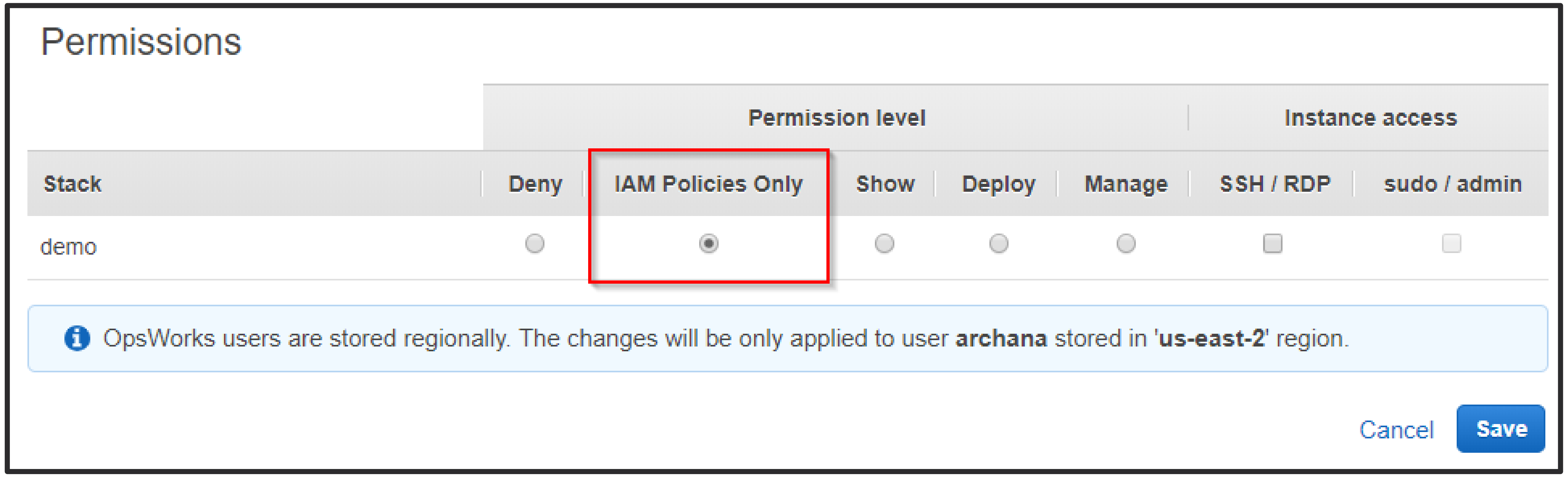
+ Import OpsWorks users from another region to **US East (Ohio)**

- After Sign in into AWS OpsWorks stack as Administrative user
- Choose user from the OpsWorks stack dashboard
- Select the users from the list you want to import
- Click on Import to Opsworks

Managing Permissions

In OpsWorks Sign in as the Administrative or Manage user to modify the permissions settings

By default, the permission level is IAM policies only, when you create a new stack or when you import a user from IAM or another region



Permissions

	Permission level					Instance access	
Stack	Deny	IAM Policies Only	Show	Deploy	Manage	SSH / RDP	sudo / admin
demo	○	●	○	○	○	□	□

OpsWorks users are stored regionally. The changes will be only applied to user **archana** stored in '**us-east-2**' region.

Auto Healing

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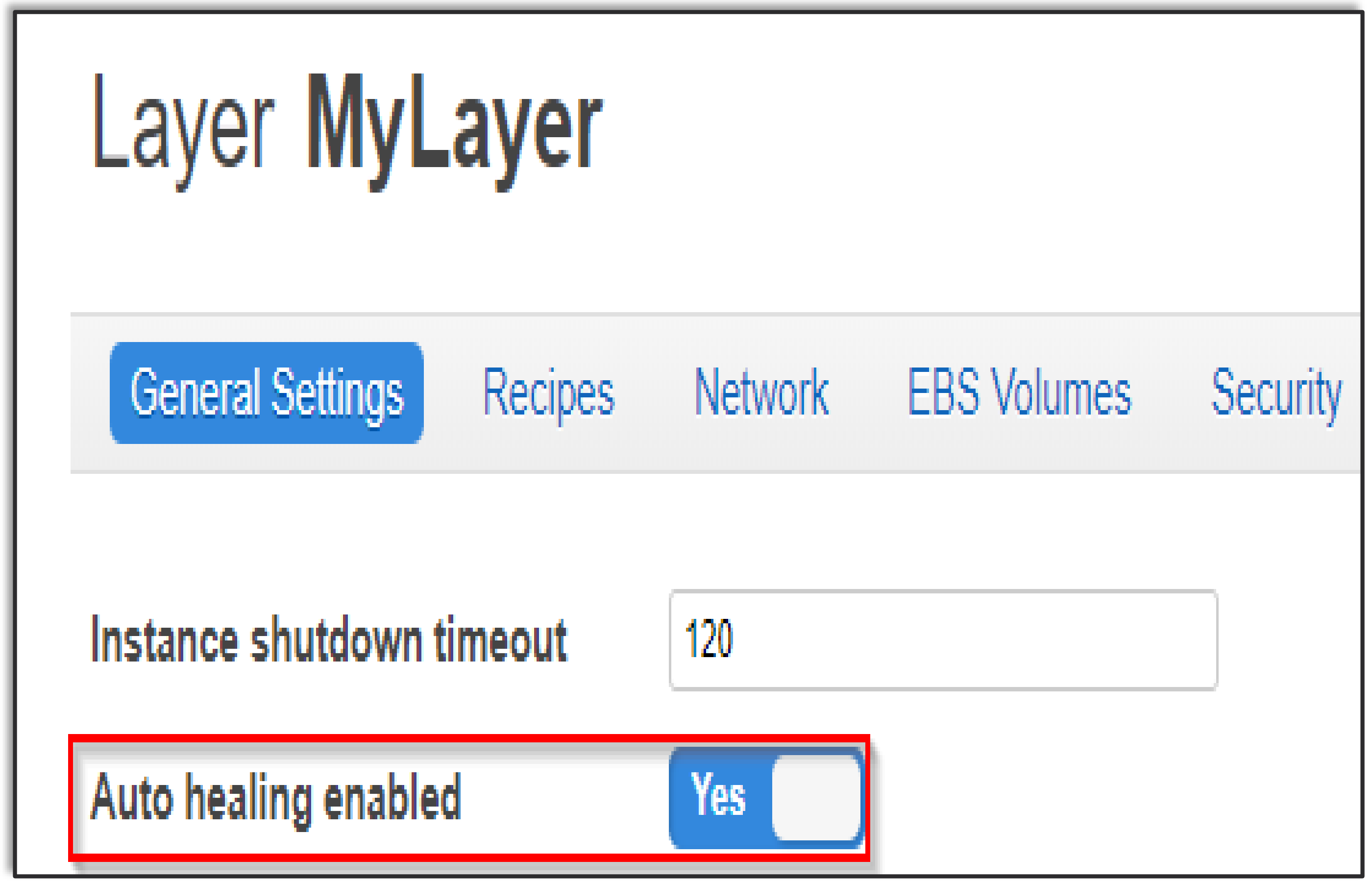
Auto Healing

Auto Healing is the process of bringing back your instance to online, if they stop communicating with the OpsWorks

Every instance in the stack has an ***OpsWorks Stack Agent*** that communicates with the service regularly, to monitor the health of the instance

If the service didn't hear anything from the agent for ***more than five minutes***, then it considers the instance to be ***failed*** and ***auto heals*** that instance

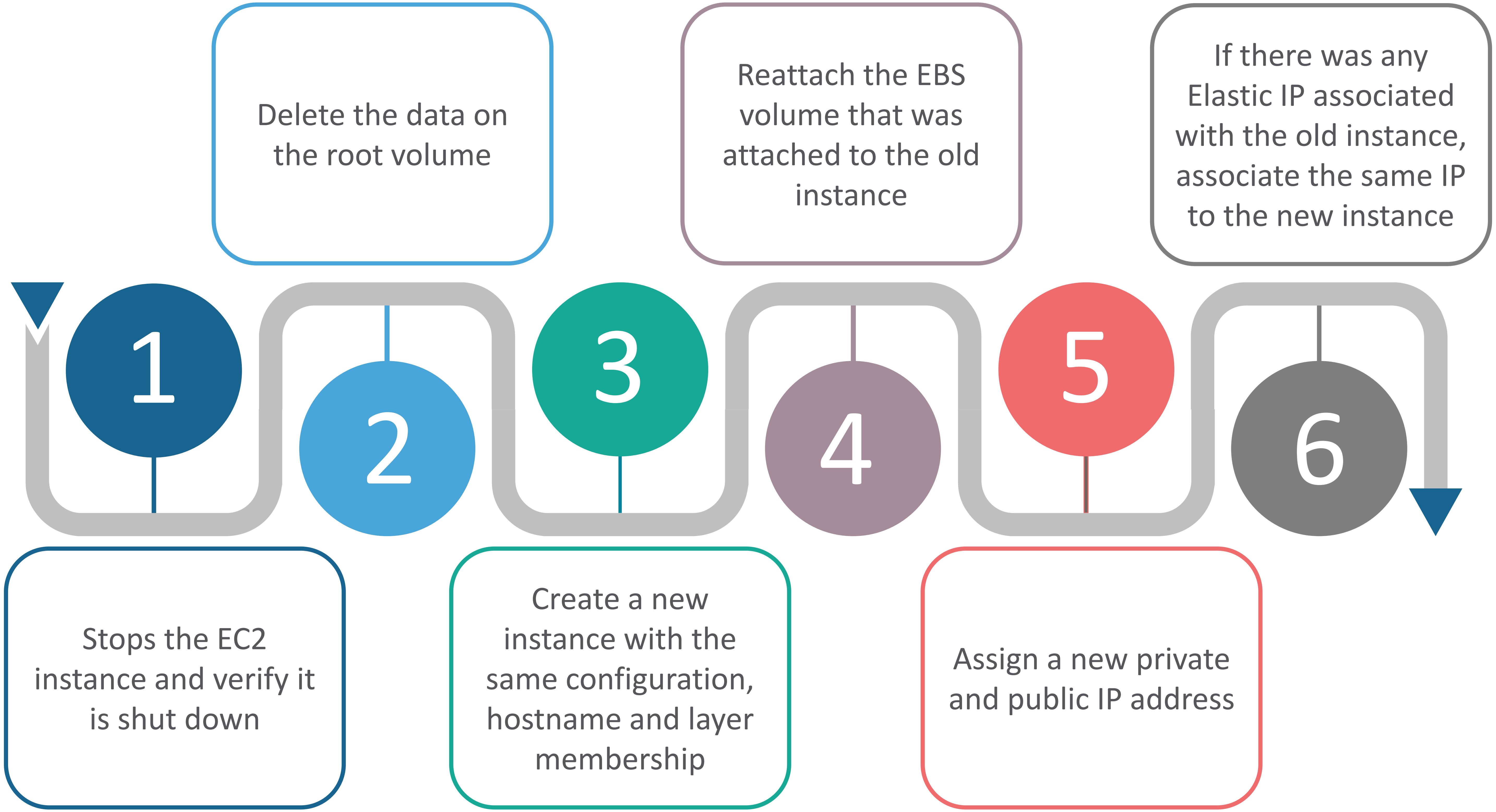


Instance shutdown timeout: 120

Auto healing enabled: Yes

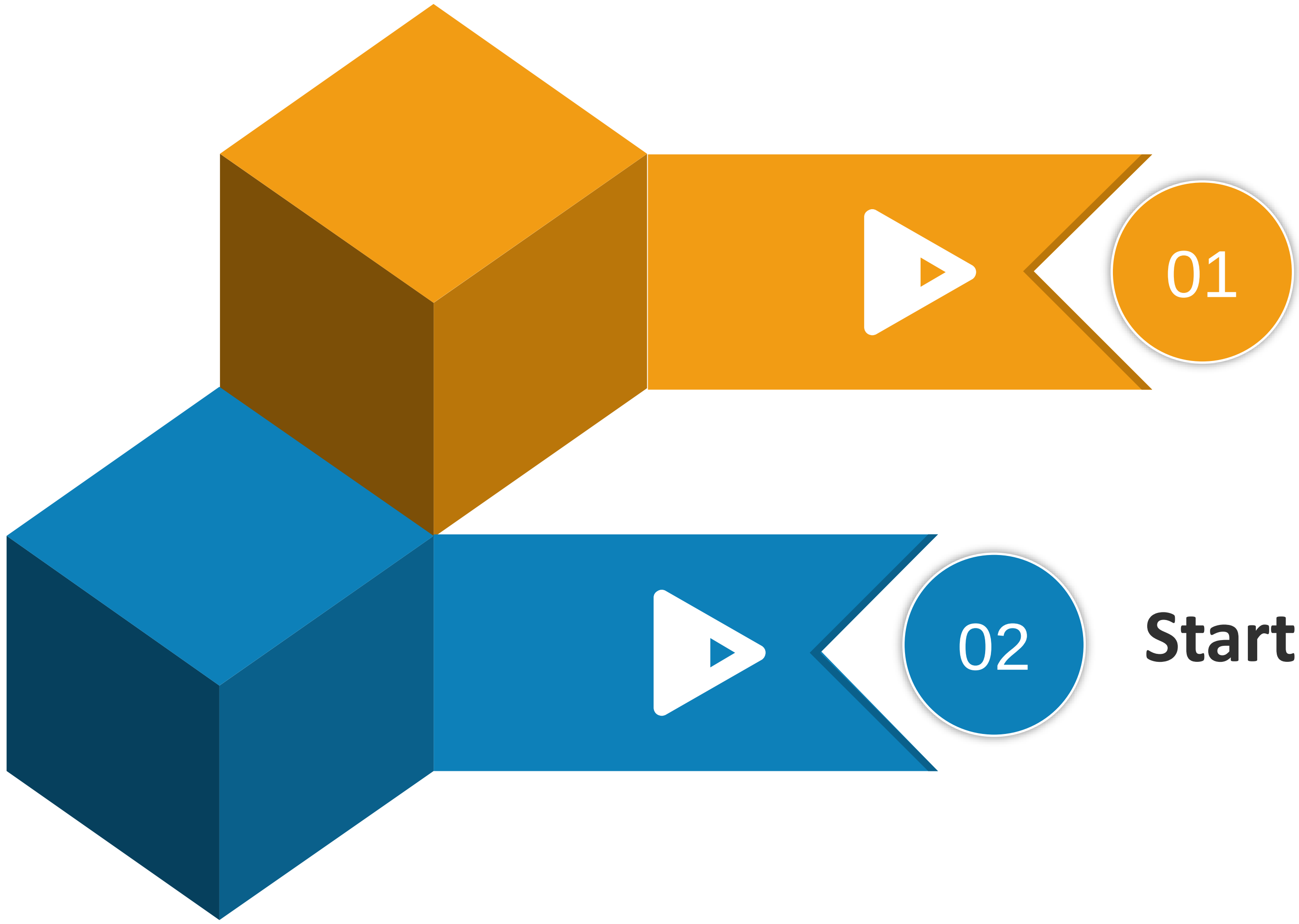
It is set at the layer level and enabled by default

Auto Healing: With Instance Stored Backed Instance



1. Stops the EC2 instance and verify it is shut down
2. Delete the data on the root volume
3. Create a new instance with the same configuration, hostname and layer membership
4. Reattach the EBS volume that was attached to the old instance
5. Assign a new private and public IP address
6. If there was any Elastic IP associated with the old instance, associate the same IP to the new instance

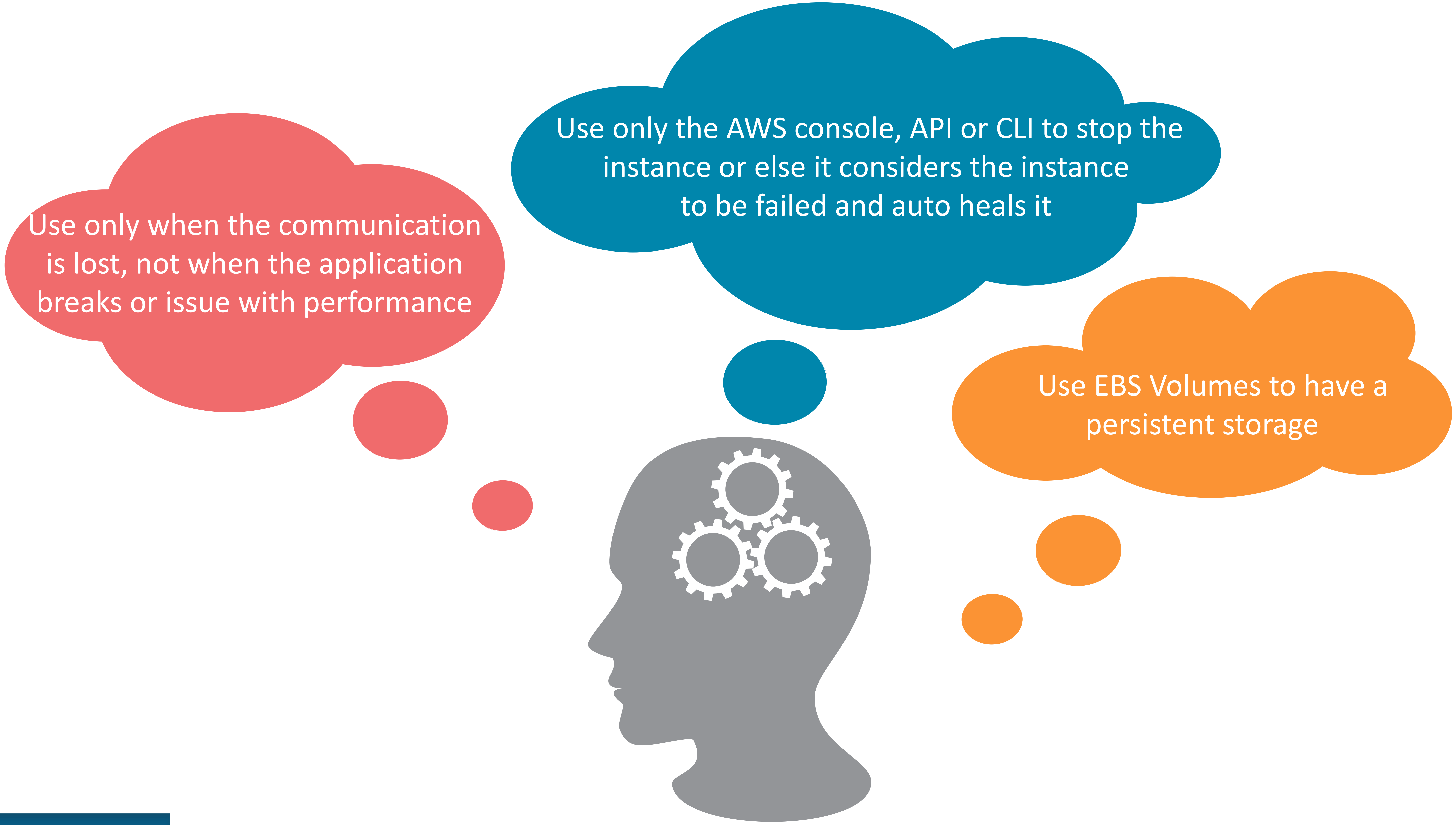
Auto Healing: With EBS-Backed Instance



Stop the EC2 Instance and verify that it has stopped

Starts the EC2 Instance

Points To Remember While Using Auto Healing



Use only when the communication is lost, not when the application breaks or issue with performance

Use only the AWS console, API or CLI to stop the instance or else it considers the instance to be failed and auto heals it

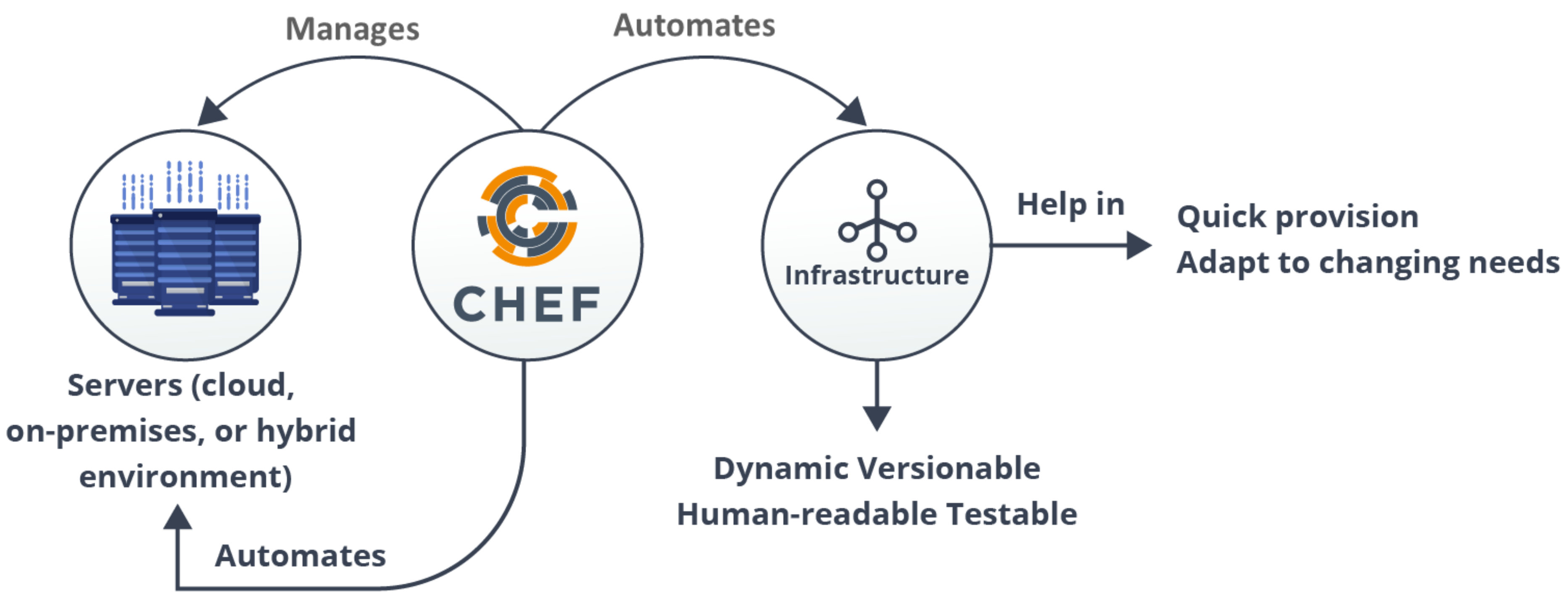
Use EBS Volumes to have a persistent storage

AWS OpsWorks For Chef Automate

AWS OpsWorks For Chef Automate

AWS OpsWorks for Chef is a configuration management service which provides Chef server and lets the service operate it along with backups and software updates

- It is ***compatible*** with Chef's Supermarket ***cookbooks*** and ***recipes*** plus supports the tools like ***knife*** and ***testkitchen***
- It is mainly used by people looking for a ***configuration management experience*** i.e. ***fully compatible*** with ***Chef*** including all community scripts and tooling
- It helps you in ***automating*** entire ***infrastructure*** and ***managing*** them across ***multiple end points***



AWS OpsWorks For Puppet Enterprise

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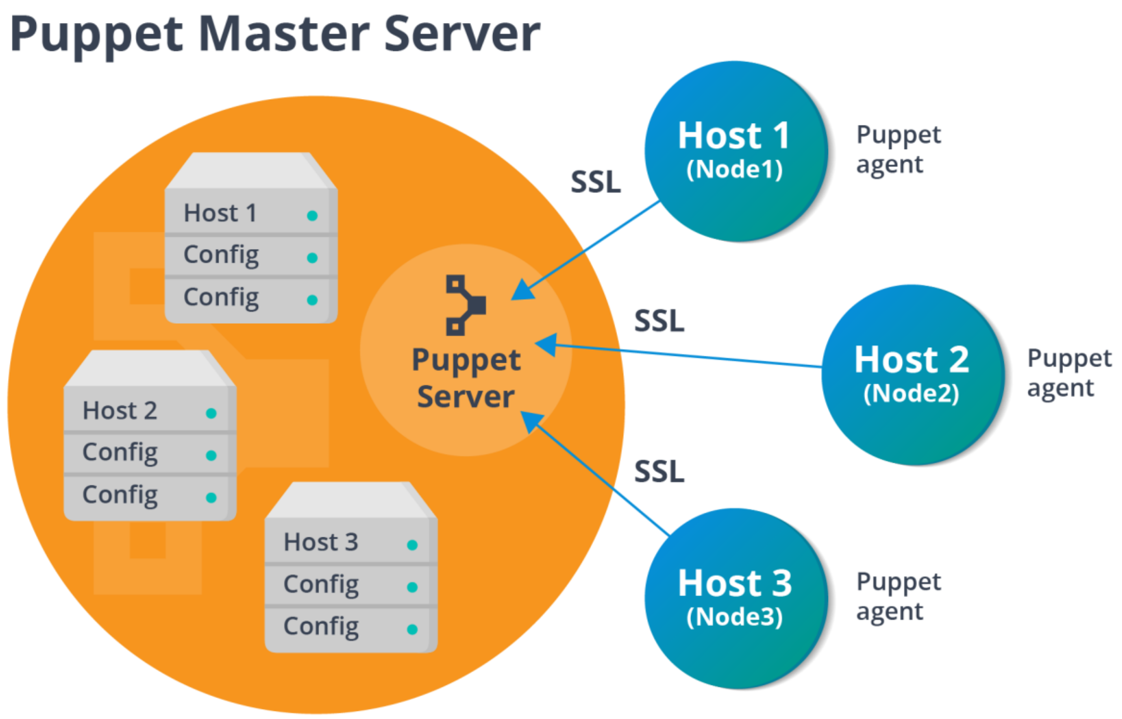
AWS OpsWorks For Puppet Enterprise

OpsWork for Puppet Enterprise provides managed puppet enterprise servers with set of automation tools which offers ***workflow*** automation for ***orchestration***, ***automated provisioning*** and ***visualization***

- It lets you to create ***AWS managed master servers***
- Master server ***manages nodes*** in infrastructure, holds ***information*** of those nodes and acts as ***central repository*** for puppet modules
- ***Modules*** are the ***reusable and sharable units of puppet code***, containing ***instructions*** about ***infrastructure configuration***
- Its ***servers*** provision ***full stack automation*** for managing tasks like ***software and OS configuration, package installation, database setup*** and more
- It is mainly ***used*** by people in search of ***managed configuration management experience*** i.e. ***compatible*** with ***puppet*** along with ***all puppet forge modules*** for puppet enterprise without ***operational over head***



Comparison Of CloudFormation And OpsWorks

Comparison Of CloudFormation And OpsWorks

CloudFormation	OpsWorks
CloudFormation is used to ***automate*** the process of ***creating resources*** and ***interconnecting*** them	OpsWorks is used to create an ***end-to-end*** platform, which gives the DevOps experience
It defines ***templates*** and use them to ***provision and manage*** AWS resources, OS and application code through a JSON formatted file	It uses a ***configuration management model*** and integrates them with deployment, auto-scaling, monitoring, and automation
They use ***most of the AWS resources*** without any model for development and operations	They use ***narrow range of AWS resources*** such as EC2, EBS, Elastic IPs, RDS and Cloud Metrics
Can have more no of errors while scripting	Can reduce the no of errors using recipes
Used by the ***developers***	Used by ***IT administrators and ops-minded developers***

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Summary

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AWS OpsWorks is a configuration management service that helps you build and operate highly dynamic applications and propagate changes instantly

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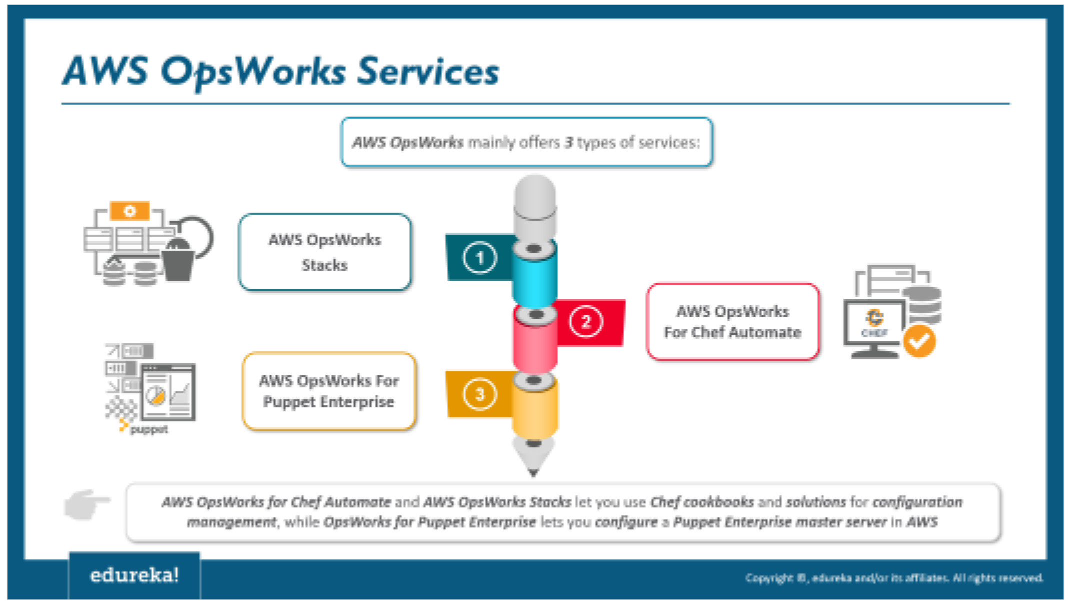

AWS OpsWorks Services

AWS OpsWorks mainly offers ***3*** types of services:

1
AWS OpsWorks Stacks
2
AWS OpsWorks For Chef Automate
3
AWS OpsWorks For Puppet Enterprise
puppet
CHEF

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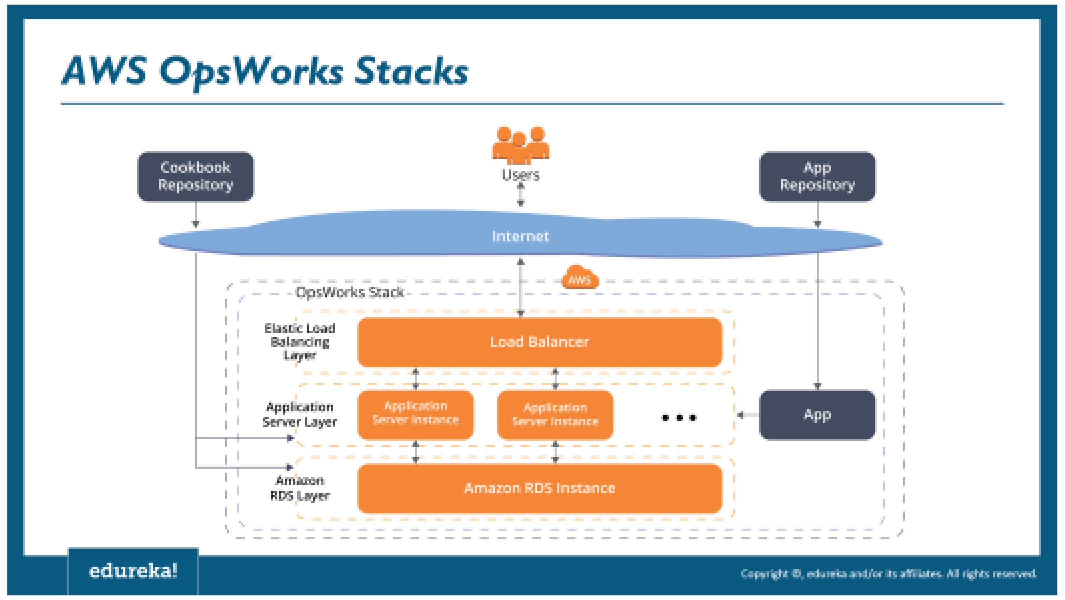

AWS OpsWorks Stacks

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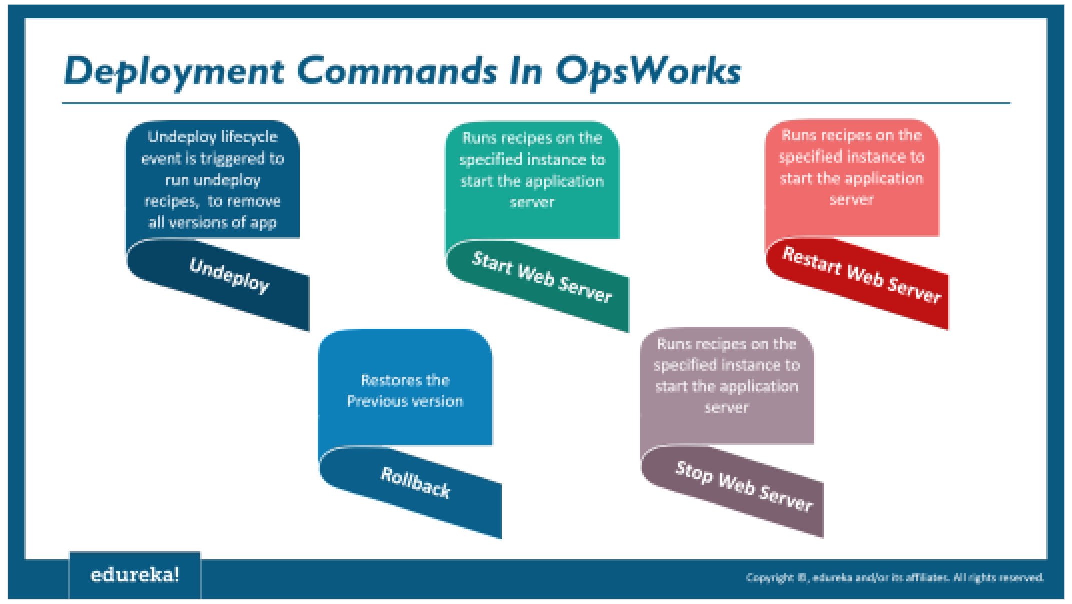

Deployment Commands In OpsWorks

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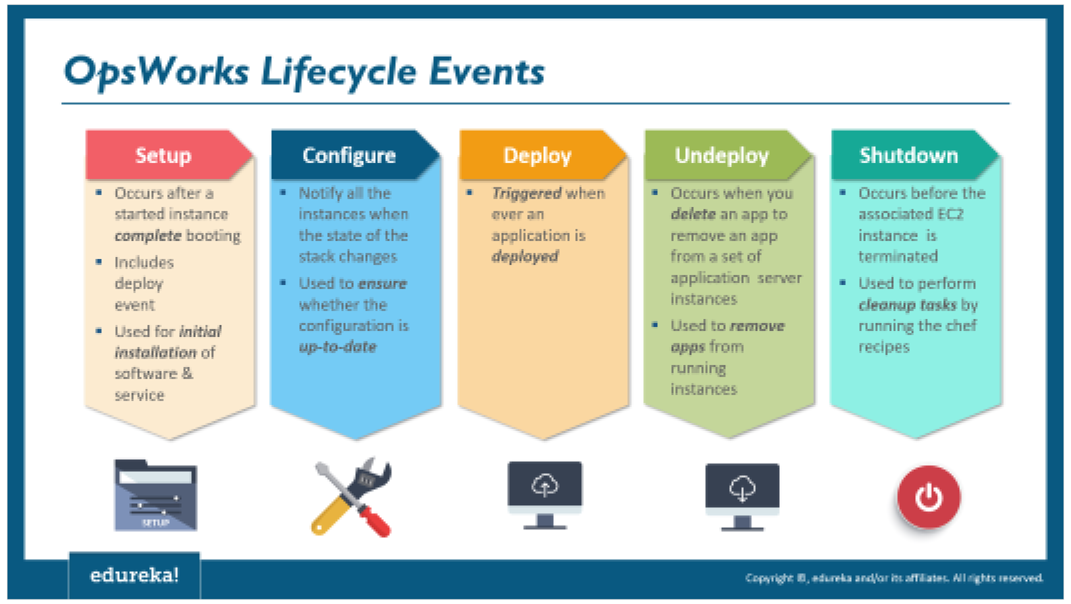

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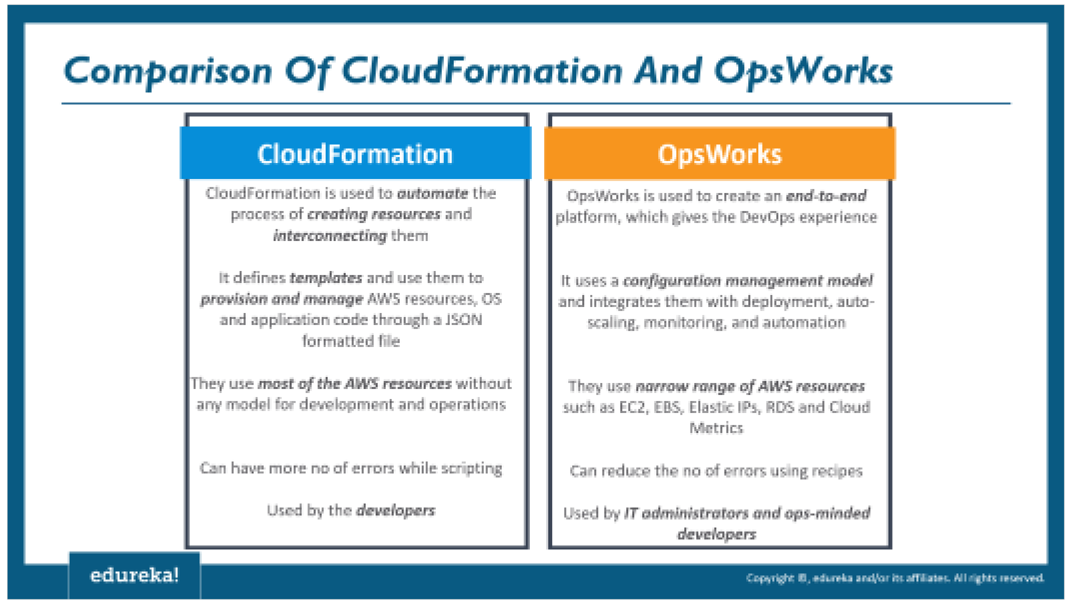

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Questions

FEEDBACK

Comments

Ratings

Suggestions

Survey

Likes

Ideas

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Thank You

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