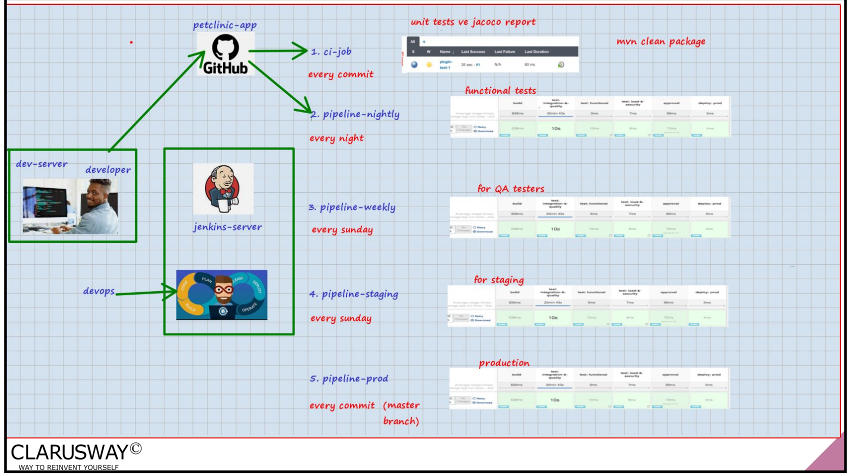
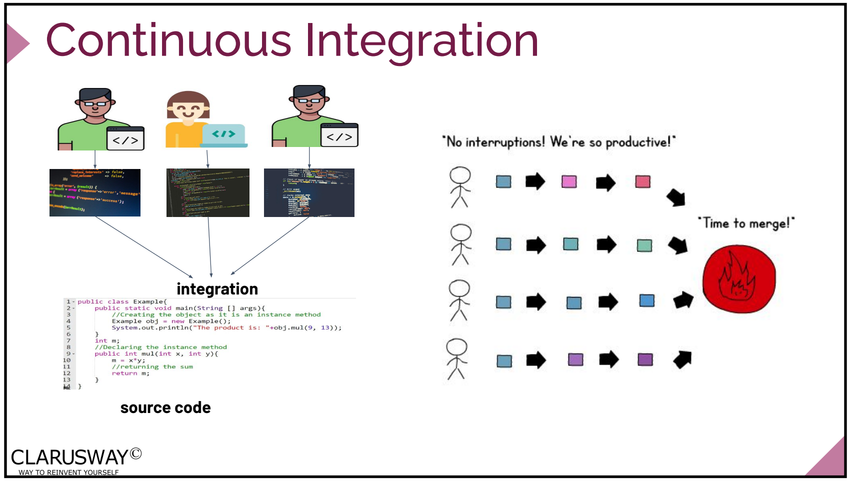


Pipelines to be Configured

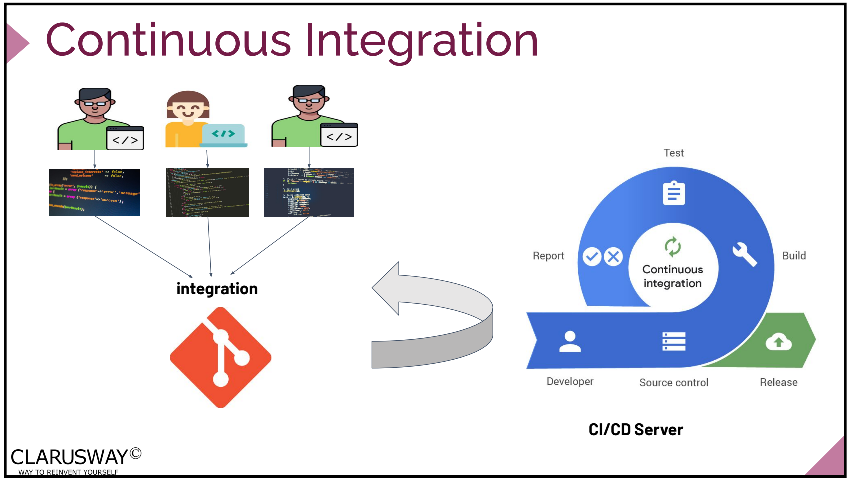
Name	Branch	Trigger	Environment / Test Type	Tools
petclinic-ci-job	dev feature** bugfix**	**Webhook** on each commit	Unit Test	jenkins, maven, git, github, jacoco
petclinic-nightly	dev	**Cronjob** every night 11.59pm	Functional IT	jenkins, git, github, docker, docker-compose, kubernetes, ansible, maven, selenium with python, bash scripting, aws cli / ecr / cloudformation
petclinic-weekly	release	**Cronjob** every sunday 11.59pm	Manual QA	jenkins, git, github, docker, docker-compose, kubernetes, ansible, maven, bash scripting, aws cli / ecr / terraform
petclinic-staging	release	**Cronjob** every sunday 11.59pm	Staging Env.	jenkins, git, github, docker, rancher, kubernetes, maven, bash scripting, aws cli / ecr / terraform, rancher
petclinic-prod	master	**Webhook** on each commit	Production Env.	jenkins, git, github, docker, rancher, kubernetes, maven, bash scripting, aws cli / ecr / terraform, rancher



Continuous Integration

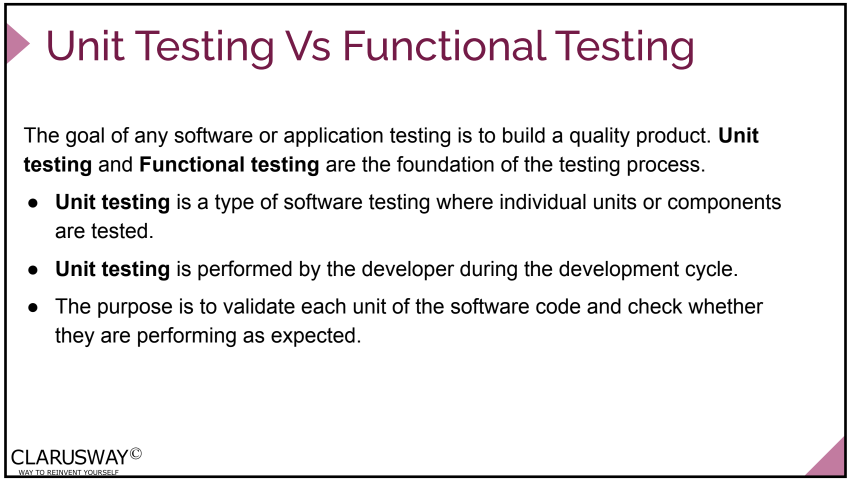
```
public class Example{
    public static void main(String [] args){
        //Creating the object as it is an instance method
        Example obj = new Example();
        System.out.println("The product is: "+obj.mul(9, 13));
    }
    int m;
    //Declaring the instance method
    public int mul(int x, int y){
        m = x*y;
        //returning the sum
        return m;
    }
}
```

source code



Continuous Integration

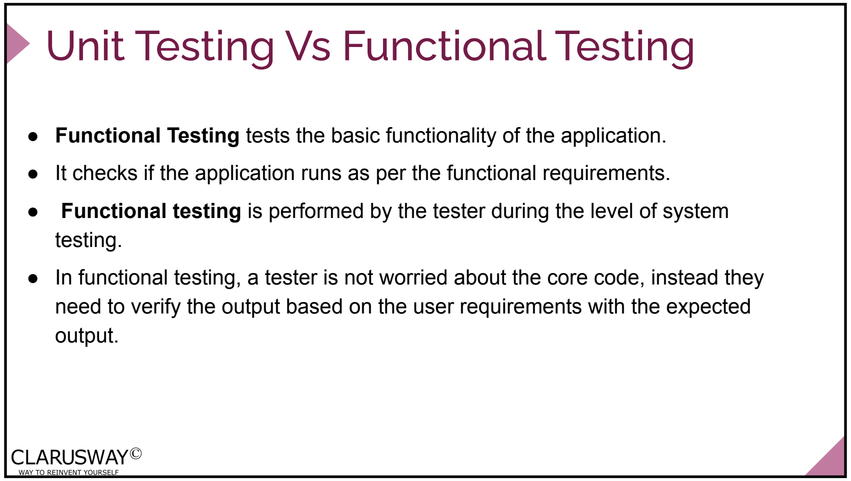
CI/CD Server



Unit Testing Vs Functional Testing

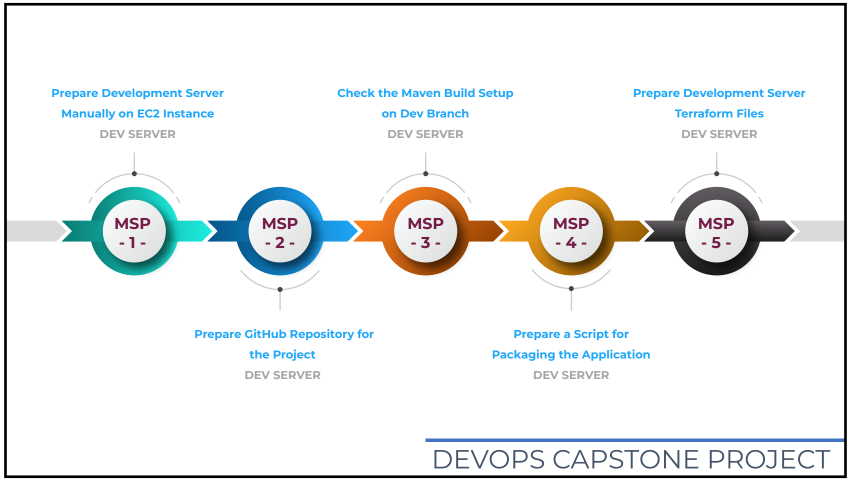
The goal of any software or application testing is to build a quality product. **Unit testing** and **Functional testing** are the foundation of the testing process.

- **Unit testing** is a type of software testing where individual units or components are tested.
- **Unit testing** is performed by the developer during the development cycle.
- The purpose is to validate each unit of the software code and check whether they are performing as expected.



Unit Testing Vs Functional Testing

- **Functional Testing** tests the basic functionality of the application.
- It checks if the application runs as per the functional requirements.
- **Functional testing** is performed by the tester during the level of system testing.
- In functional testing, a tester is not worried about the core code, instead they need to verify the output based on the user requirements with the expected output.



MSP - 1 -
Prepare Development Server Manually on EC2 Instance
DEV SERVER

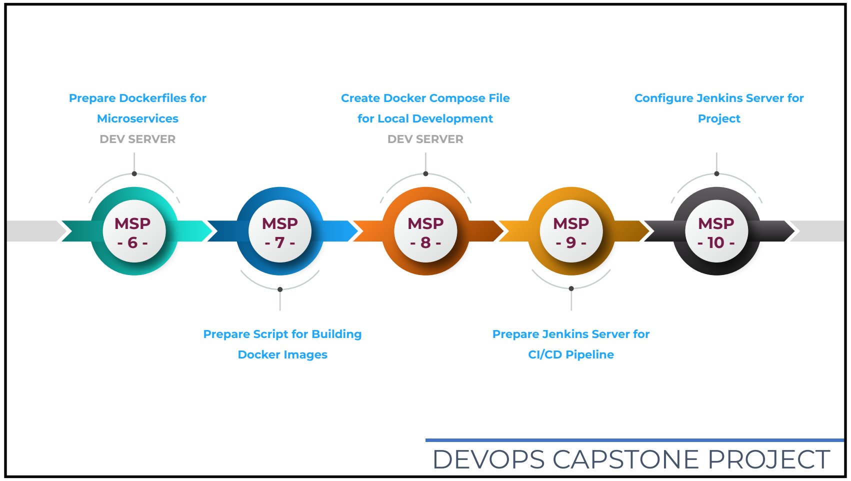
MSP - 2 -
Prepare GitHub Repository for the Project
DEV SERVER

MSP - 3 -
Check the Maven Build Setup on Dev Branch
DEV SERVER

MSP - 4 -
Prepare a Script for Packaging the Application
DEV SERVER

MSP - 5 -
Prepare Development Server Terraform Files
DEV SERVER

DEVOPS CAPSTONE PROJECT



MSP - 6 -
Prepare Dockerfiles for Microservices
DEV SERVER

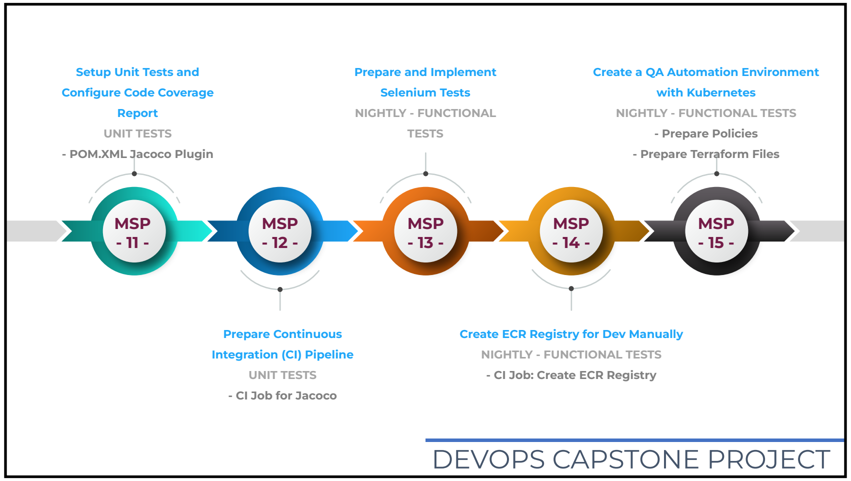
MSP - 7 -
Prepare Script for Building Docker Images

MSP - 8 -
Create Docker Compose File for Local Development
DEV SERVER

MSP - 9 -
Prepare Jenkins Server for CI/CD Pipeline

MSP - 10 -
Configure Jenkins Server for Project

DEVOPS CAPSTONE PROJECT



Setup Unit Tests and Configure Code Coverage Report

UNIT TESTS

- POM.XML Jacoco Plugin

Prepare Continuous Integration (CI) Pipeline

UNIT TESTS

- CI Job for Jacoco

Prepare and Implement Selenium Tests

NIGHTLY - FUNCTIONAL TESTS

Create ECR Registry for Dev Manually

NIGHTLY - FUNCTIONAL TESTS

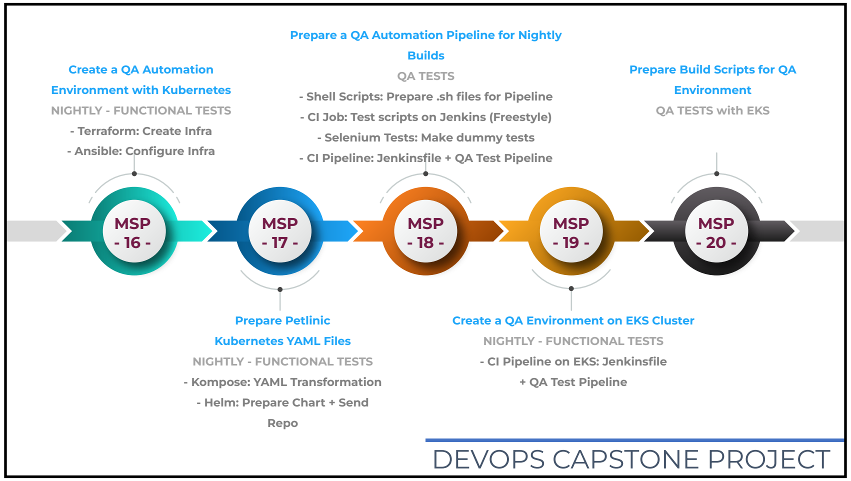
- CI Job: Create ECR Registry

Create a QA Automation Environment with Kubernetes

NIGHTLY - FUNCTIONAL TESTS

- Prepare Policies
- Prepare Terraform Files

DEVOPS CAPSTONE PROJECT



Create a QA Automation Environment with Kubernetes

NIGHTLY - FUNCTIONAL TESTS

- Terraform: Create Infra
- Ansible: Configure Infra

Prepare Petlinic Kubernetes YAML Files

NIGHTLY - FUNCTIONAL TESTS

- Kompose: YAML Transformation
- Helm: Prepare Chart + Send Repo

Prepare a QA Automation Pipeline for Nightly Builds

QA TESTS

- Shell Scripts: Prepare .sh files for Pipeline
- CI Job: Test scripts on Jenkins (Freestyle)
- Selenium Tests: Make dummy tests
- CI Pipeline: Jenkinsfile + QA Test Pipeline

Create a QA Environment on EKS Cluster

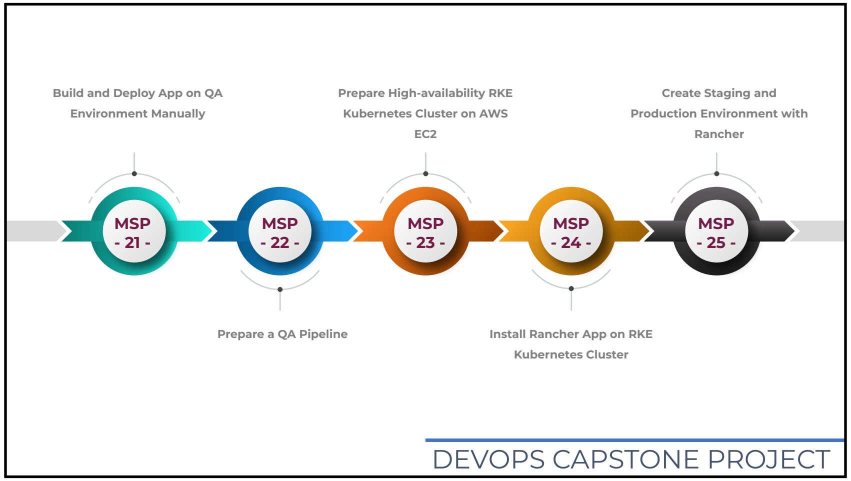
NIGHTLY - FUNCTIONAL TESTS

- CI Pipeline on EKS: Jenkinsfile + QA Test Pipeline

Prepare Build Scripts for QA Environment

QA TESTS with EKS

DEVOPS CAPSTONE PROJECT



MSP - 21 - Build and Deploy App on QA Environment Manually

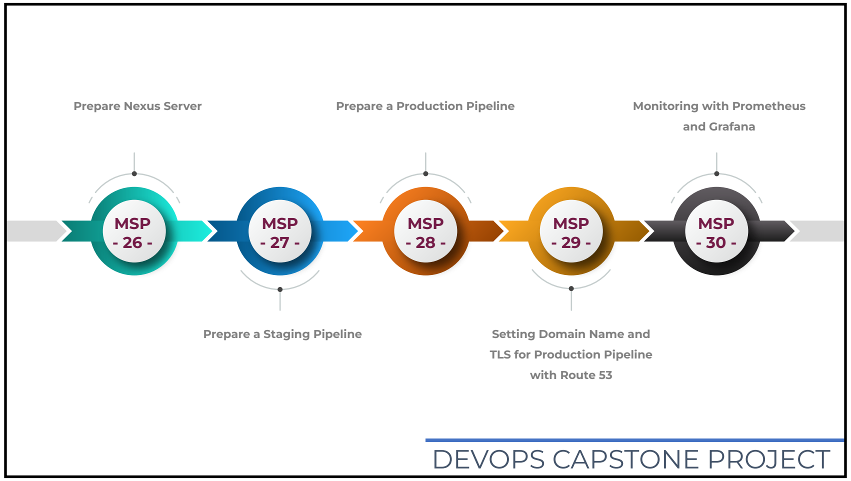
MSP - 22 - Prepare a QA Pipeline

MSP - 23 - Prepare High-availability RKE Kubernetes Cluster on AWS EC2

MSP - 24 - Install Rancher App on RKE Kubernetes Cluster

MSP - 25 - Create Staging and Production Environment with Rancher

DEVOPS CAPSTONE PROJECT



MSP - 26 - Prepare Nexus Server

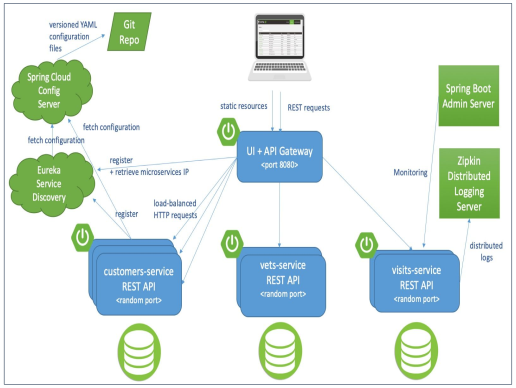
MSP - 27 - Prepare a Staging Pipeline

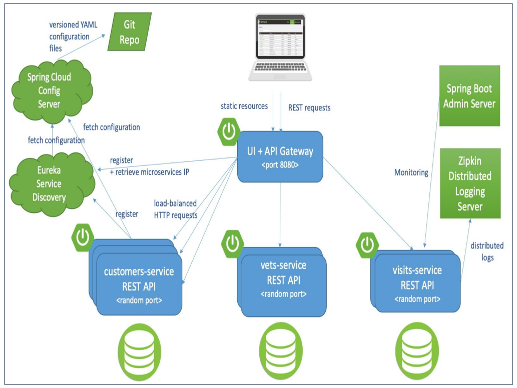
MSP - 28 - Prepare a Production Pipeline

MSP - 29 - Setting Domain Name and TLS for Production Pipeline with Route 53

MSP - 30 - Monitoring with Prometheus and Grafana

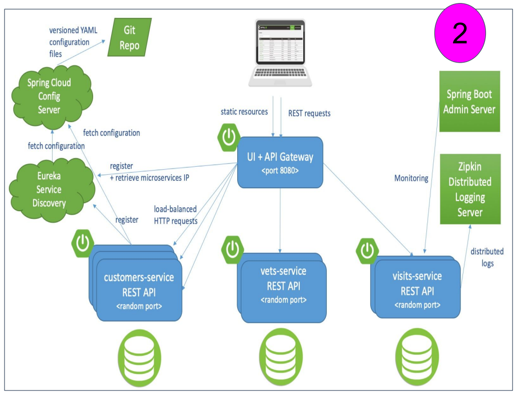
DEVOPS CAPSTONE PROJECT


versioned YAML configuration files
Git Repo
Spring Cloud Config Server
fetch configuration
fetch configuration
Eureka Service Discovery
register + retrieve microservices IP
static resources
REST requests
UI + API Gateway <port 8080>
load-balanced HTTP requests
register
Spring Boot Admin Server
Monitoring
Zipkin Distributed Logging Server
distributed logs
customers-service REST API <random port>
vets-service REST API <random port>
visits-service REST API <random port>


versioned YAML configuration files
Git Repo
Spring Cloud Config Server
fetch configuration
fetch configuration
Eureka Service Discovery
register + retrieve microservices IP
static resources
REST requests
UI + API Gateway <port 8080>
load-balanced HTTP requests
register
Spring Boot Admin Server
Monitoring
Zipkin Distributed Logging Server
distributed logs
customers-service REST API <random port>
vets-service REST API <random port>
visits-service REST API <random port>

1

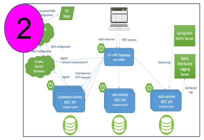
3



2
versioned YAML configuration files
Git Repo
Spring Cloud Config Server
fetch configuration
fetch configuration
static resources
REST requests
Spring Boot Admin Server
UI + API Gateway <port 8080>
register + retrieve microservices IP
Eureka Service Discovery
Monitoring
Zipkin Distributed Logging Server
load-balanced HTTP requests
register
distributed logs
customers-service REST API <random port>
vets-service REST API <random port>
visits-service REST API <random port>

1

2



3

Create infrastructure

- Launch instances with terraform ***
- Setup Kubernetes cluster with ansible ***

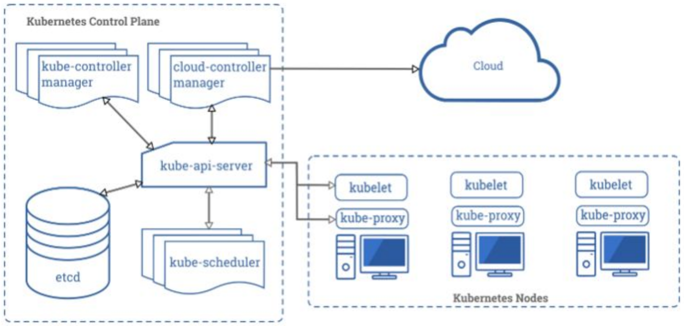
Create application and deploy to kubernetes cluster

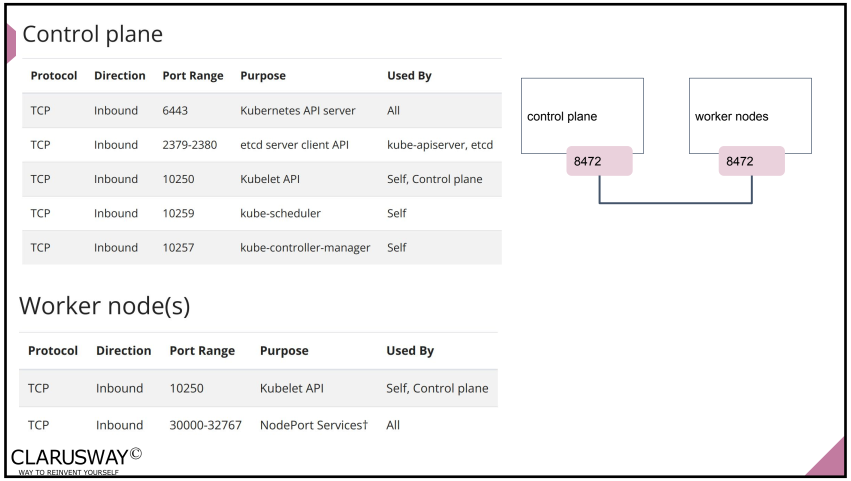
- Create ECR repo ***
- Prepare Docker Images ***
- Push Images to ECR Repo ***
- Create Kubernetes manifest files ***
- Create helm charts ***
- Deploy application on Kubernetes cluster with helm ***

Run Functional test with selenium ***

Name	Project	environment	role
kube-master	tera-kube-ans	dev	master
worker-1	tera-kube-ans	dev	worker
worker-2	tera-kube-ans	dev	worker

Control Plane Components





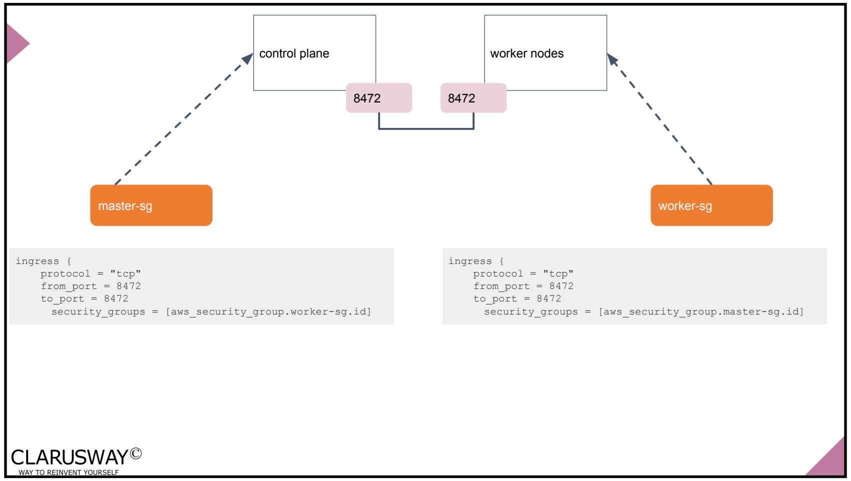
Control plane

Protocol	Direction	Port Range	Purpose	Used By
TCP	Inbound	6443	Kubernetes API server	All
TCP	Inbound	2379-2380	etcd server client API	kube-apiserver, etcd
TCP	Inbound	10250	Kubelet API	Self, Control plane
TCP	Inbound	10259	kube-scheduler	Self
TCP	Inbound	10257	kube-controller-manager	Self

Worker node(s)

Protocol	Direction	Port Range	Purpose	Used By
TCP	Inbound	10250	Kubelet API	Self, Control plane
TCP	Inbound	30000-32767	NodePort Services†	All

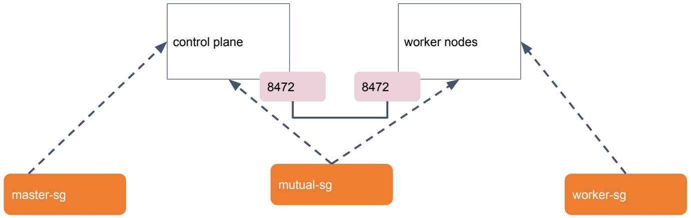
CLARUSWAY©
WAY TO REINVENT YOURSELF



```
ingress {
    protocol = "tcp"
    from_port = 8472
    to_port = 8472
      security_groups = [aws_security_group.worker-sg.id]
```

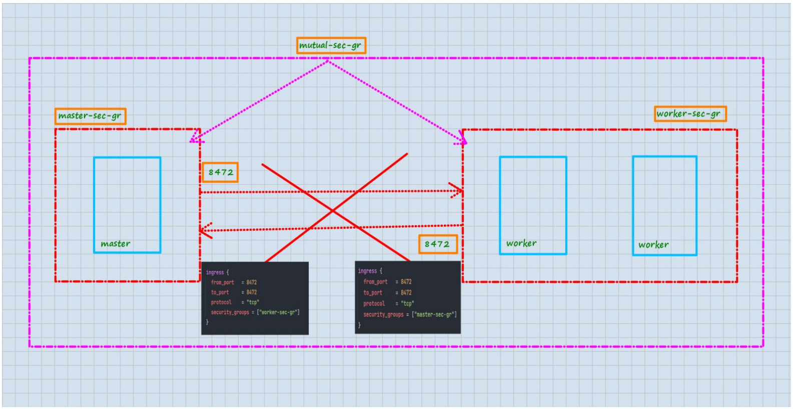
```
ingress {
    protocol = "tcp"
    from_port = 8472
    to_port = 8472
      security_groups = [aws_security_group.master-sg.id]
```

CLARUSWAY©
WAY TO REINVENT YOURSELF



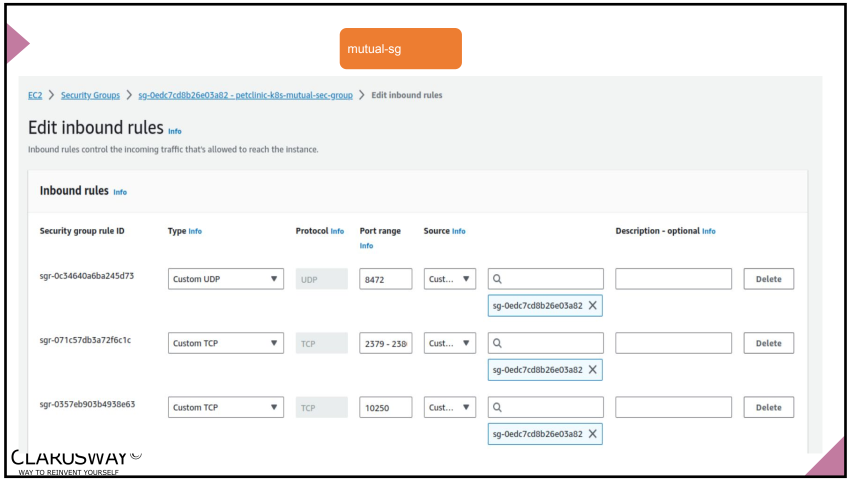
```
ingress {
    protocol = "tcp"
    from_port = 8472
    to_port = 8472
      security_groups = [aws_security_group.mutual-sg.id]
```

```
ingress {
    protocol = "tcp"
    from_port = 8472
    to_port = 8472
      security_groups = [aws_security_group.mutual-sg.id]
```



```
ingress {
  from_port       = 8472
  to_port         = 8472
  protocol        = "tcp"
  security_groups = ["worker-sec-gr"]
}
```

```
ingress {
  from_port       = 8472
  to_port         = 8472
  protocol        = "tcp"
  security_groups = ["master-sec-gr"]
}
```



mutual-sg

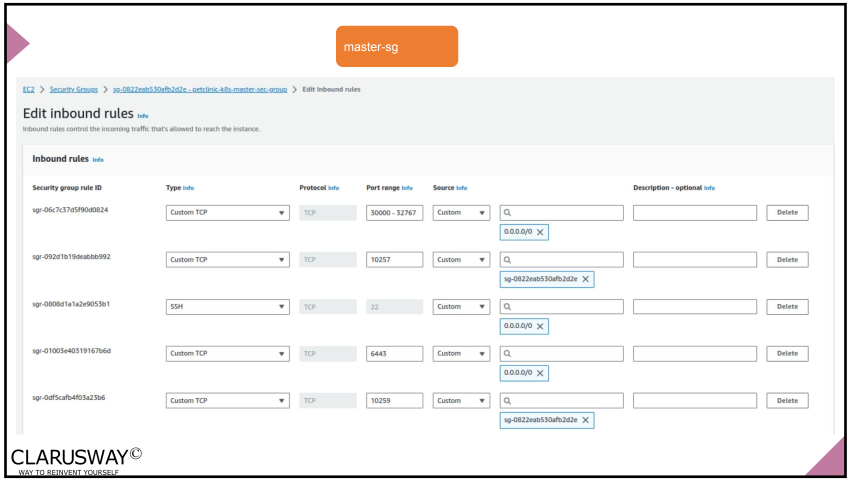
EC2 > Security Groups > sg-0edc7cd8b26e03a82 - petclinic-k8s-mutual-sec-group > Edit inbound rules

Edit inbound rules Info

Inbound rules control the incoming traffic that's allowed to reach the instance.

Inbound rules Info

Security group rule ID	Type Info	Protocol Info	Port range Info	Source Info		Description - optional Info	
sgr-0c34640a6ba245d73	Custom UDP	UDP	8472	Cust...	sg-0edc7cd8b26e03a82		Delete
sgr-071c57db3a7f6c1c	Custom TCP	TCP	2379 - 238	Cust...	sg-0edc7cd8b26e03a82		Delete
sgr-0357eb903b4938e63	Custom TCP	TCP	10250	Cust...	sg-0edc7cd8b26e03a82		Delete



master-sg

EC2 > Security Groups > sg-0822eab530afb2d2e - petclinic-k8s-master-sec-group > Edit inbound rules

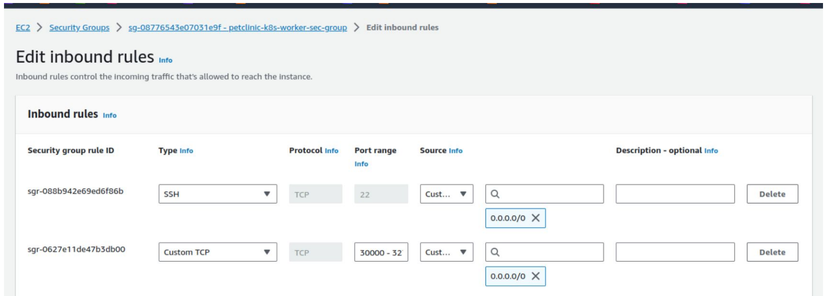
Edit inbound rules Info

Inbound rules control the incoming traffic that's allowed to reach the instance.

Inbound rules Info

Security group rule ID	Type Info	Protocol Info	Port range Info	Source Info		Description - optional Info	
sgr-06c7c37d5f90d0824	Custom TCP	TCP	30000 - 32767	Custom	0.0.0.0/0		Delete
sgr-092d1b19deabbb992	Custom TCP	TCP	10257	Custom	sg-0822eab530afb2d2e		Delete
sgr-0808d1a1a2e9053b1	SSH	TCP	22	Custom	0.0.0.0/0		Delete
sgr-01003e40319167b6d	Custom TCP	TCP	6443	Custom	0.0.0.0/0		Delete
sgr-0df5cafb4f03a23b6	Custom TCP	TCP	10259	Custom	sg-0822eab530afb2d2e		Delete

worker-sg



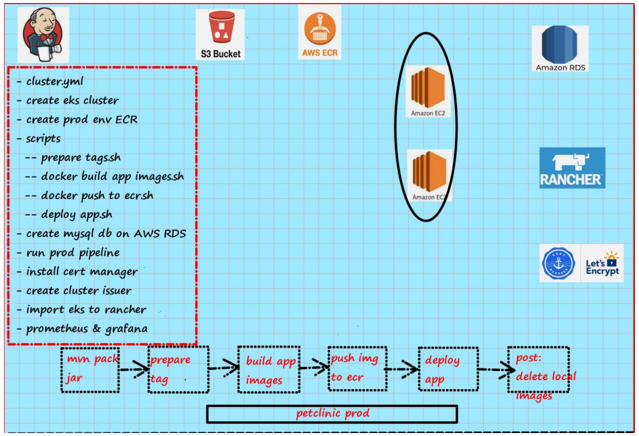
EC2 > Security Groups > sg-08776543e07031e9f - petclinic-k8s-worker-sec-group > Edit inbound rules

Edit inbound rules Info

Inbound rules control the incoming traffic that's allowed to reach the instance.

Inbound rules Info

Security group rule ID	Type Info	Protocol Info	Port range Info	Source Info		Description - optional Info	
sgr-088b942e69ed6f86b	SSH	TCP	22	Cust...	0.0.0.0/0		Delete
sgr-0627e11de47b3db00	Custom TCP	TCP	30000 - 32	Cust...	0.0.0.0/0		Delete



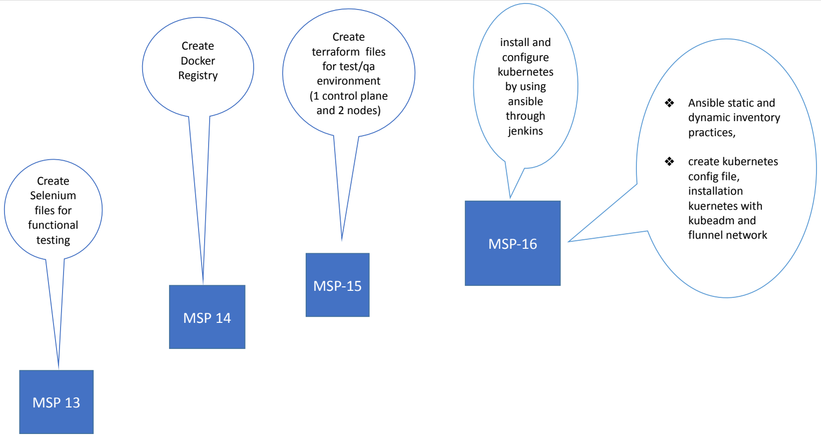
- cluster.yml
- create eks cluster
- create prod env ECR
- scripts
  -- prepare tags.sh
  -- docker build app images.sh
  -- docker push to ecr.sh
  -- deploy app.sh
- create mysql db on AWS RDS
- run prod pipeline
- install cert manager
- create cluster issuer
- import eks to rancher
- prometheus & grafana

mvn pack jar → prepare tag → build app images → push img to ecr → deploy app → post: delete local images

petclinic prod

THANKS!

Any questions?



MSP 13

Create Selenium files for functional testing

MSP 14

Create Docker Registry

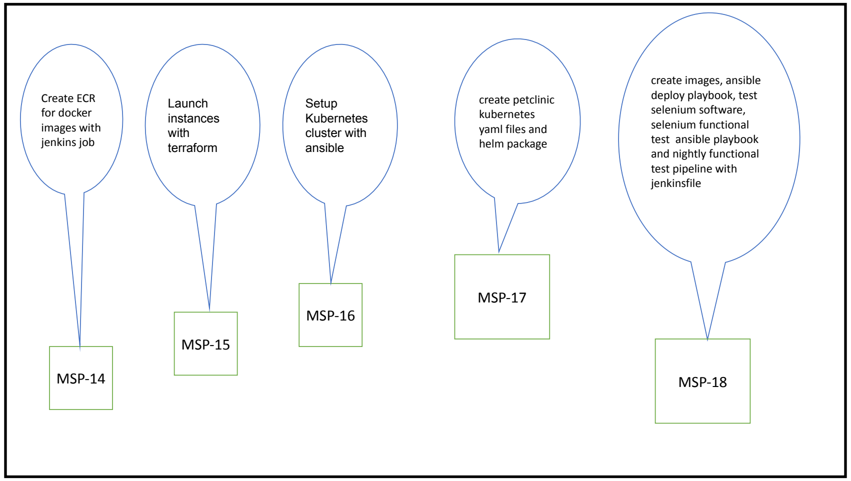
MSP-15

Create terraform files for test/qa environment (1 control plane and 2 nodes)

MSP-16

install and configure kubernetes by using ansible through jenkins

- ❖ Ansible static and dynamic inventory practices,
- ❖ create kubernetes config file, installation kuernetes with kubeadm and flunnel network



Create ECR for docker images with jenkins job

MSP-14

Launch instances with terraform

MSP-15

Setup Kubernetes cluster with ansible

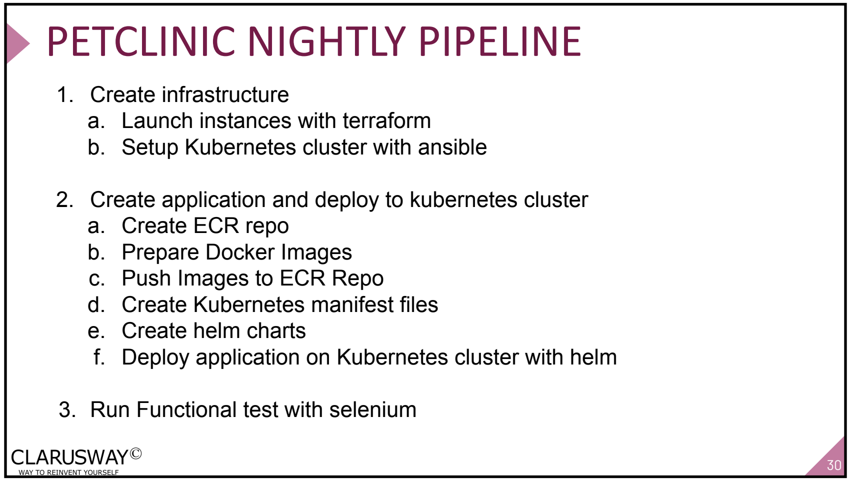
MSP-16

create petclinic kubernetes yaml files and helm package

MSP-17

create images, ansible deploy playbook, test selenium software, selenium functional test ansible playbook and nightly functional test pipeline with jenkinsfile

MSP-18

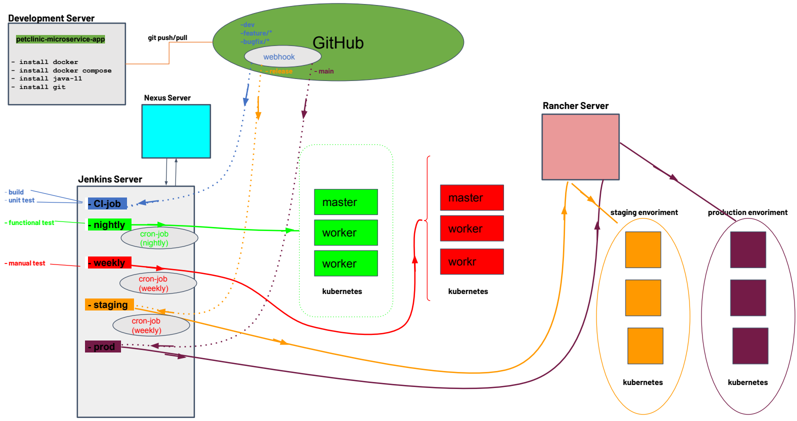


PETCLINIC NIGHTLY PIPELINE

1. Create infrastructure
   a. Launch instances with terraform
   b. Setup Kubernetes cluster with ansible

2. Create application and deploy to kubernetes cluster
   a. Create ECR repo
   b. Prepare Docker Images
   c. Push Images to ECR Repo
   d. Create Kubernetes manifest files
   e. Create helm charts
   f. Deploy application on Kubernetes cluster with helm

3. Run Functional test with selenium



PETCLINIC NIGHTLY PIPELINE

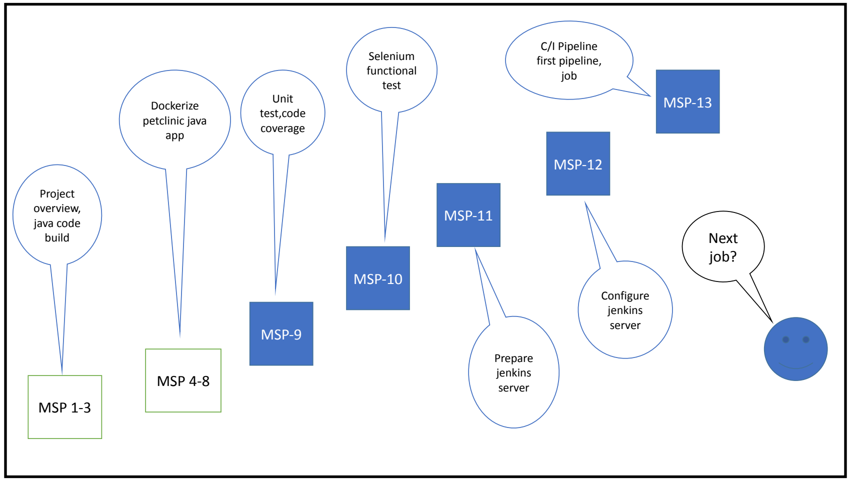
- Create ECR Repo
- Package Application
- Prepare Tags for Docker Images
- Build App Docker Images
- Push Images to ECR Repo
- Create Key Pair for Ansible
- Create QA Automation Infrastructure
- Create Kubernetes Cluster for QA Automation Build
- Deploy App on Kubernetes cluster
- Test the Application Deployment
- Run QA Automation Tests

PETCLINIC NIGHTLY PIPELINE

- Create infrastructure with Terraform
- Launch Kubernetes Cluster with Ansible
- Create and push the helm charts to AWS S3
- Create images of services
- Deploy application on Kubernetes cluster with helm as helm release
- Run QA Automation Tests

PETCLINIC NIGHTLY PIPELINE

- Create infrastructure with terraform
    - Create Key Pair for Ansible
    - Create QA Automation Infrastructure
- Launch Kubernetes Cluster with ansible
    - Create Kubernetes Cluster for QA Automation Build
- Create image of services
    - Create ECR Repo
    - Package Application
    - Prepare Tags for Docker Images
    - Build App Docker Images
    - Push Images to ECR Repo
- Deploy App on Kubernetes cluster
    - Create and push the helm charts to AWS S3
    - Deploy application on kubernetes cluster with helm as helm release
- Run QA Automation Tests



Project overview, java code build

MSP 1-3

Dockerize petclinic java app

MSP 4-8

Unit test,code coverage

MSP-9

Selenium functional test

MSP-10

MSP-11

Prepare jenkins server

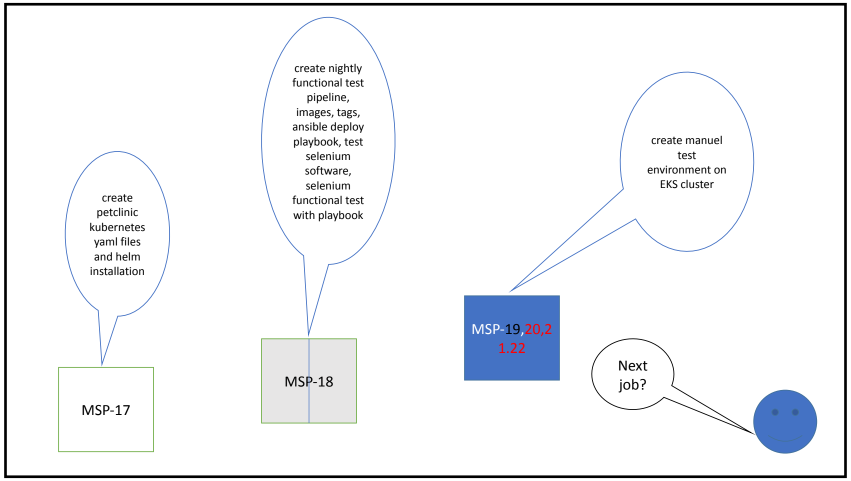
MSP-12

Configure jenkins server

C/I Pipeline first pipeline, job

MSP-13

Next job?



create petclinic kubernetes yaml files and helm installation

MSP-17

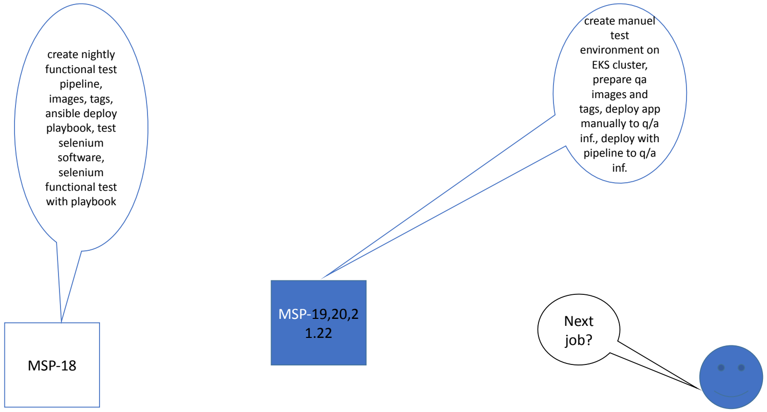
create nightly functional test pipeline, images, tags, ansible deploy playbook, test selenium software, selenium functional test with playbook

MSP-18

create manuel test environment on EKS cluster

MSP-19,20,21.22

Next job?



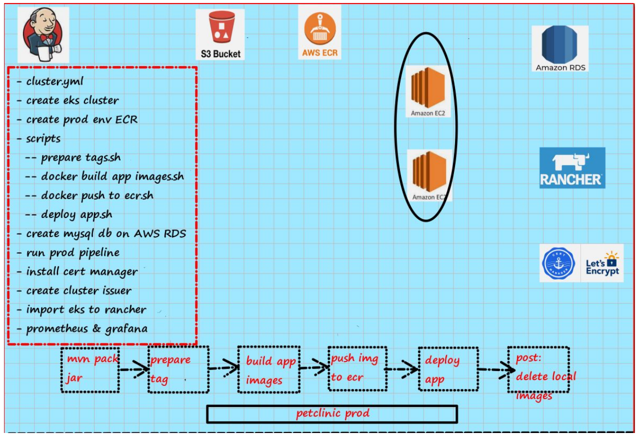
MSP-18

create nightly functional test pipeline, images, tags, ansible deploy playbook, test selenium software, selenium functional test with playbook

MSP-19,20,21.22

create manuel test environment on EKS cluster, prepare qa images and tags, deploy app manually to q/a inf., deploy with pipeline to q/a inf.

Next job?



- cluster.yml
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  -- prepare tags.sh
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  -- deploy app.sh
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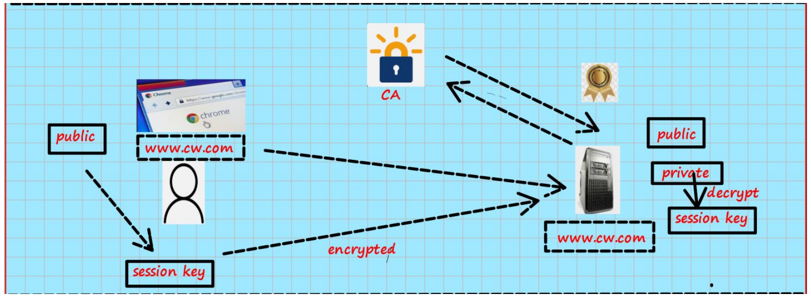
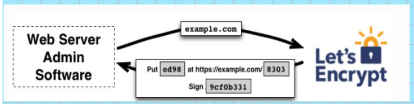
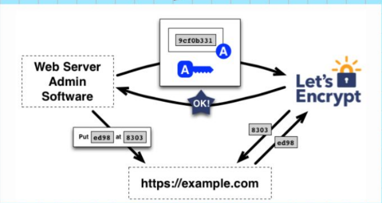
mvn pack jar → prepare tag → build app images → push img to ecr → deploy app → post: delete local images

petclinic prod


CA
public
www.cw.com
session key
encrypted
public
private
decrypt
session key
www.cw.com


Web Server Admin Software
example.com
Put ed98 at https://example.com/ 8303
Sign 9cf0b331
Let's Encrypt


Web Server Admin Software
9cf0b331
A
A
OK!
Let's Encrypt
Put ed98 at 8303
8303
ed98
https://example.com