CI/CD pipeline for web app

Oleg Roztorguiev

<epam> Kharkiv DevOps KhNURE

o1eg.pp.ua

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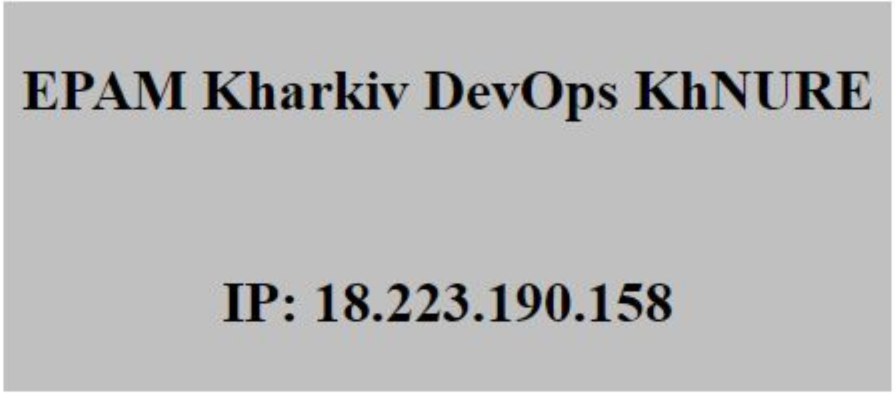
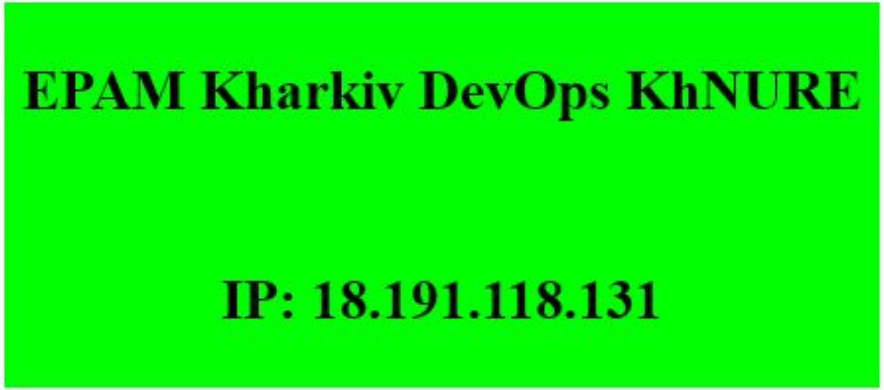
Github


EPAM Kharkiv DevOps KhNURE

IP: 18.223.190.158

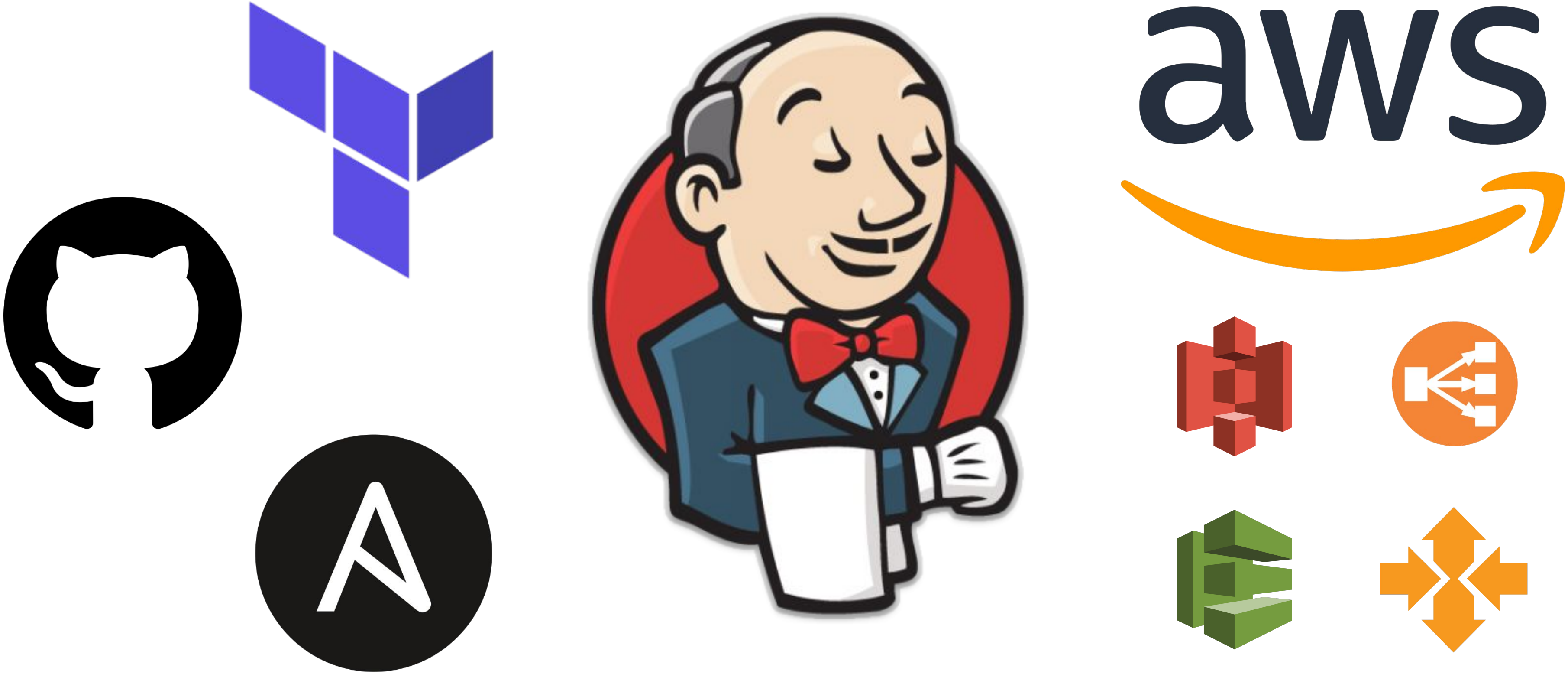

EPAM Kharkiv DevOps KhNURE

IP: 18.191.118.131

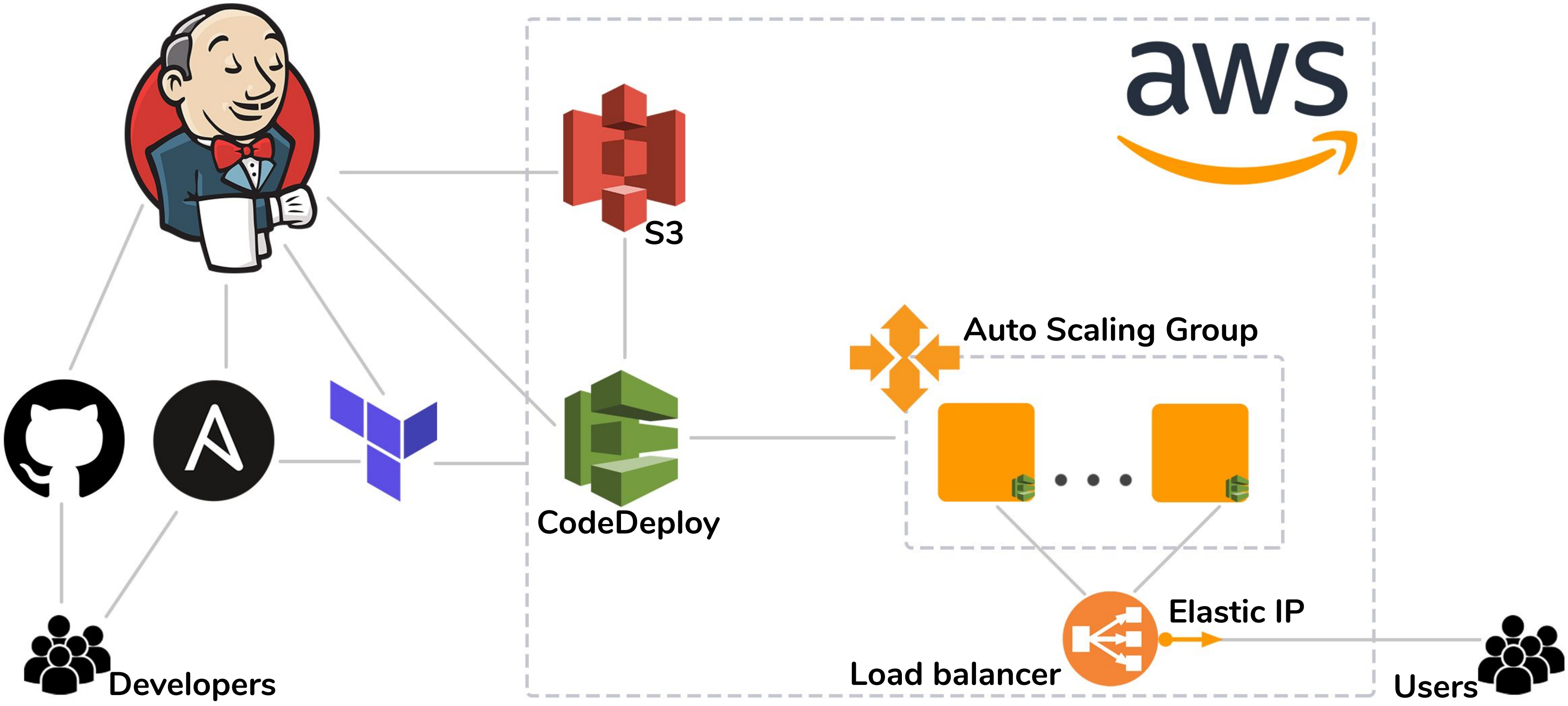
Magic happening now

Please wait...

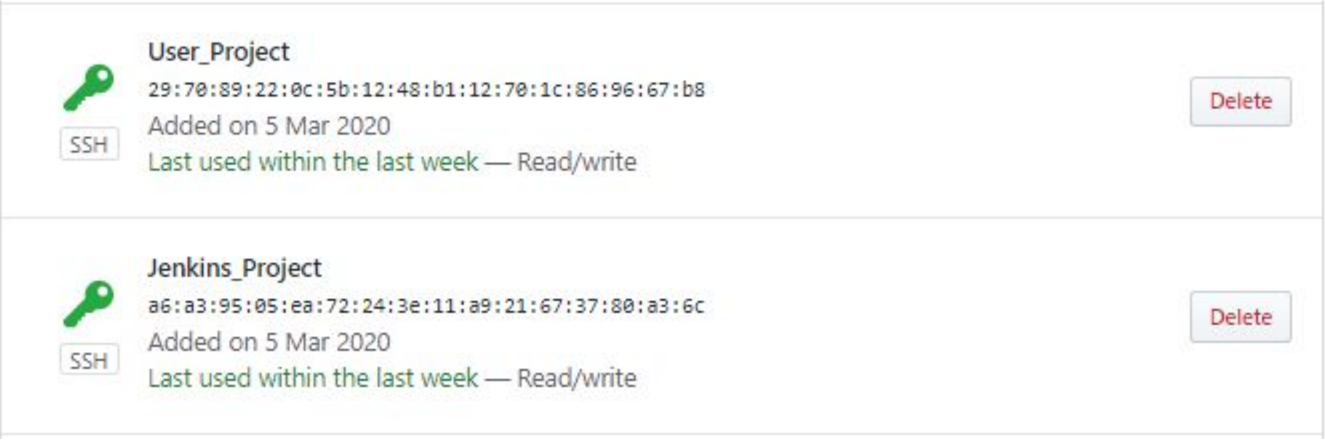
Tools



Project architecture



Github



SSH

User_Project

29:70:89:22:0c:5b:12:48:b1:12:70:1c:86:96:67:b8

Added on 5 Mar 2020

Last used within the last week — Read/write

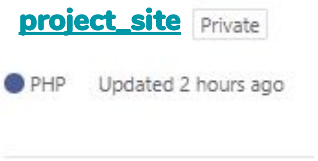
SSH

Jenkins_Project

a6:a3:95:05:ea:72:24:3e:11:a9:21:67:37:80:a3:6c

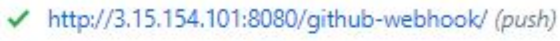
Added on 5 Mar 2020

Last used within the last week — Read/write

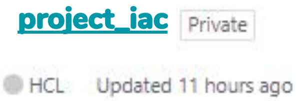


project_site Private

● PHP Updated 2 hours ago



✓ http://3.15.154.101:8080/github-webhook/ *(push)*

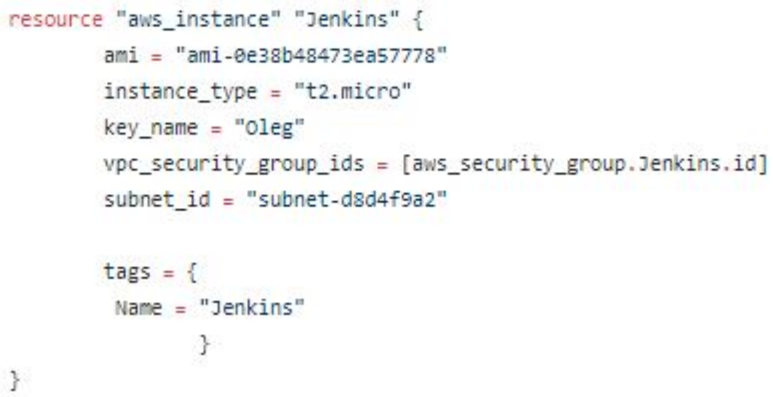


project_iac Private

● HCL Updated 11 hours ago

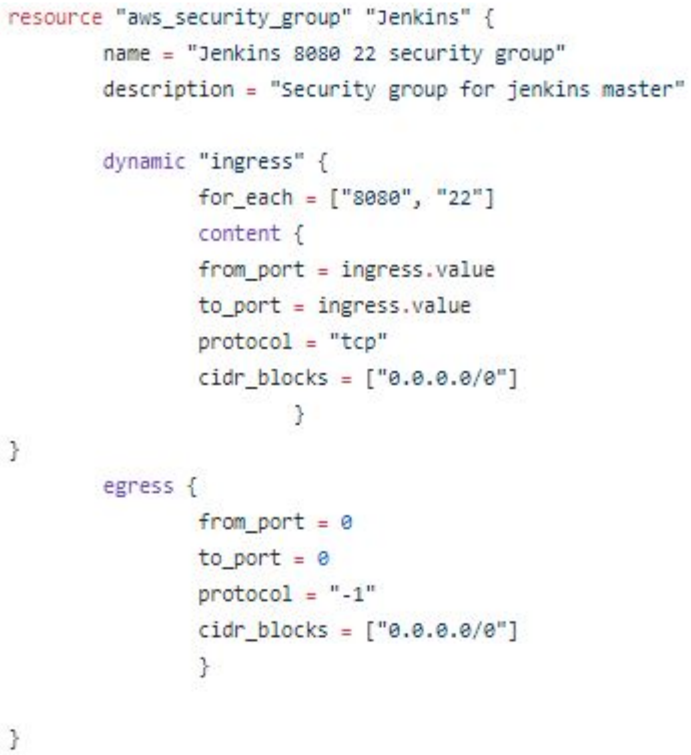
Terraform

EC2 instance



```
resource "aws_instance" "Jenkins" {
        ami = "ami-0e38b48473ea57778"
        instance_type = "t2.micro"
        key_name = "Oleg"
        vpc_security_group_ids = [aws_security_group.Jenkins.id]
        subnet_id = "subnet-d8d4f9a2"

        tags = {
         Name = "Jenkins"
                }
}
```

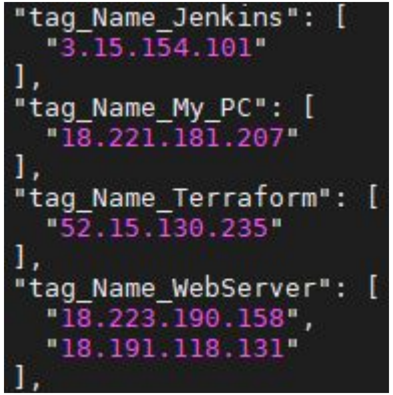
Security group



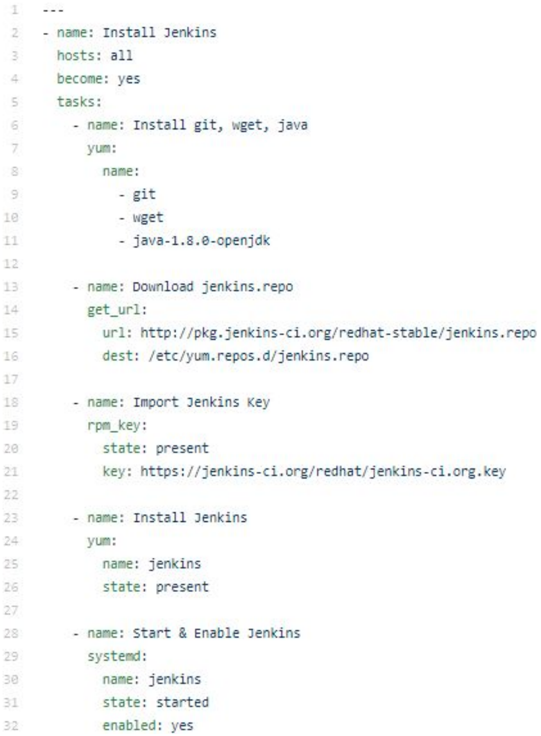
```
resource "aws_security_group" "Jenkins" {
        name = "Jenkins 8080 22 security group"
        description = "Security group for jenkins master"

        dynamic "ingress" {
                for_each = ["8080", "22"]
                content {
                from_port = ingress.value
                to_port = ingress.value
                protocol = "tcp"
                cidr_blocks = ["0.0.0.0/0"]
                        }
}
        egress {
                from_port = 0
                to_port = 0
                protocol = "-1"
                cidr_blocks = ["0.0.0.0/0"]
                }

}
```

Ansible

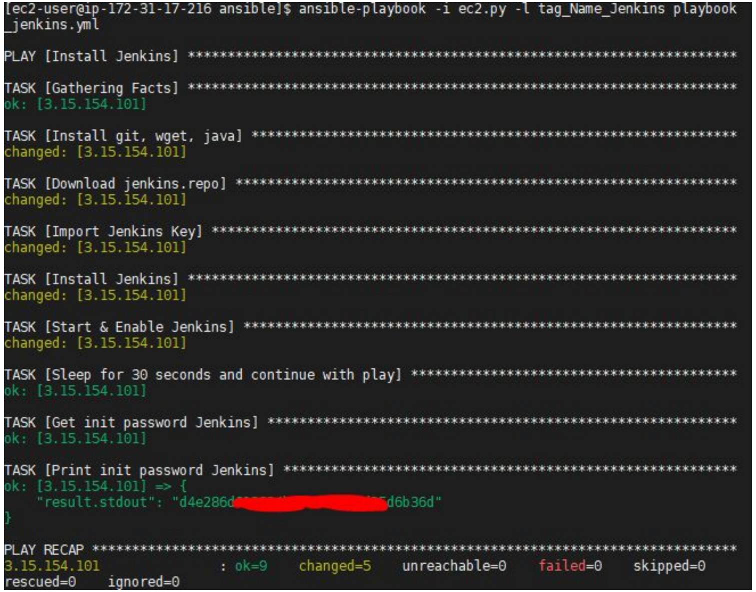
Dynamic inventory



```
"tag_Name_Jenkins": [
  "3.15.154.101"
],
"tag_Name_My_PC": [
  "18.221.181.207"
],
"tag_Name_Terraform": [
  "52.15.130.235"
],
"tag_Name_WebServer": [
  "18.223.190.158",
  "18.191.118.131"
],
```

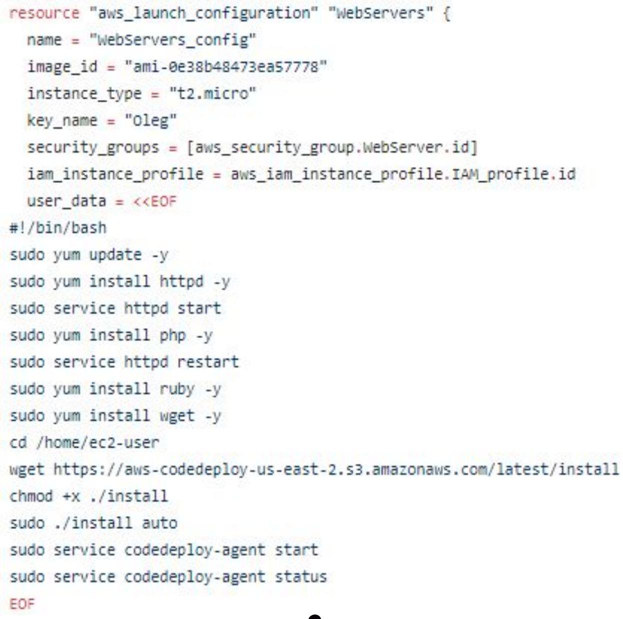


```yaml
---
- name: Install Jenkins
  hosts: all
  become: yes
  tasks:
    - name: Install git, wget, java
      yum:
        name:
          - git
          - wget
          - java-1.8.0-openjdk

    - name: Download jenkins.repo
      get_url:
        url: http://pkg.jenkins-ci.org/redhat-stable/jenkins.repo
        dest: /etc/yum.repos.d/jenkins.repo

    - name: Import Jenkins Key
      rpm_key:
        state: present
        key: https://jenkins-ci.org/redhat/jenkins-ci.org.key

    - name: Install Jenkins
      yum:
        name: jenkins
        state: present

    - name: Start & Enable Jenkins
      systemd:
        name: jenkins
        state: started
        enabled: yes
```



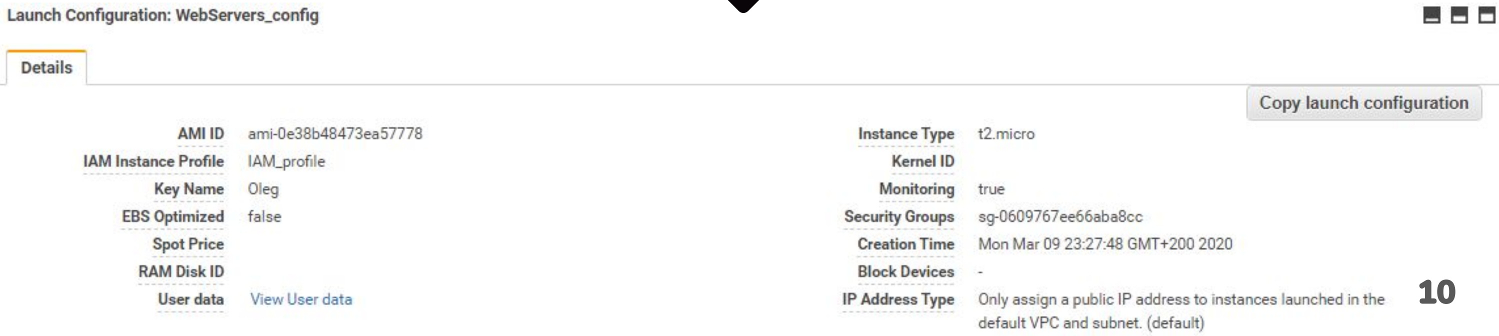
```
[ec2-user@ip-172-31-17-216 ansible]$ ansible-playbook -i ec2.py -l tag_Name_Jenkins playbook
_jenkins.yml

PLAY [Install Jenkins] *********************************************************************

TASK [Gathering Facts] *********************************************************************
ok: [3.15.154.101]

TASK [Install git, wget, java] *************************************************************
changed: [3.15.154.101]

TASK [Download jenkins.repo] ***************************************************************
changed: [3.15.154.101]

TASK [Import Jenkins Key] ******************************************************************
changed: [3.15.154.101]

TASK [Install Jenkins] *********************************************************************
changed: [3.15.154.101]

TASK [Start & Enable Jenkins] **************************************************************
changed: [3.15.154.101]

TASK [Sleep for 30 seconds and continue with play] *****************************************
ok: [3.15.154.101]

TASK [Get init password Jenkins] ***********************************************************
ok: [3.15.154.101]

TASK [Print init password Jenkins] *********************************************************
ok: [3.15.154.101] => {
    "result.stdout": "d4e286d[redacted]d6b36d"
}

PLAY RECAP *********************************************************************************
3.15.154.101               : ok=9    changed=5    unreachable=0    failed=0    skipped=0
rescued=0    ignored=0
```

ansible-playbook -i ec2.py -l tag_Name_Jenkins playbook_jenkins.yml



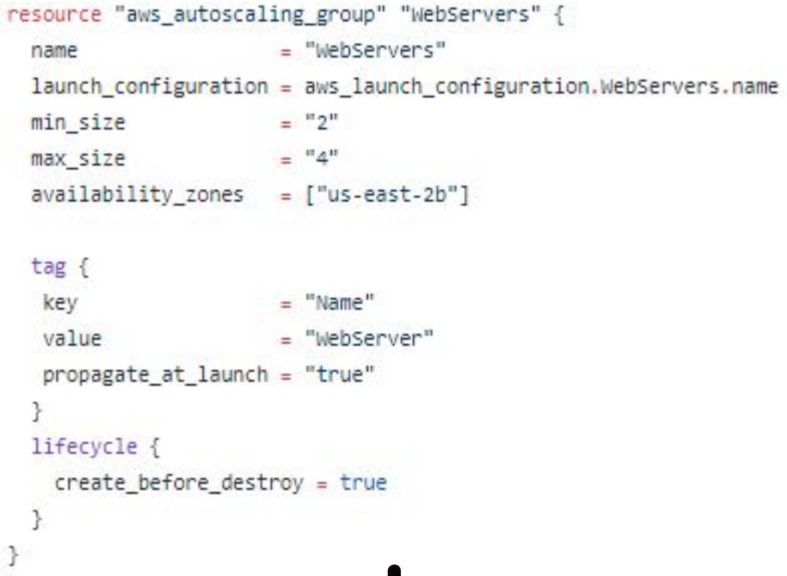
```
resource "aws_launch_configuration" "WebServers" {
  name = "WebServers_config"
  image_id = "ami-0e38b48473ea57778"
  instance_type = "t2.micro"
  key_name = "Oleg"
  security_groups = [aws_security_group.WebServer.id]
  iam_instance_profile = aws_iam_instance_profile.IAM_profile.id
  user_data = <<EOF
#!/bin/bash
sudo yum update -y
sudo yum install httpd -y
sudo service httpd start
sudo yum install php -y
sudo service httpd restart
sudo yum install ruby -y
sudo yum install wget -y
cd /home/ec2-user
wget https://aws-codedeploy-us-east-2.s3.amazonaws.com/latest/install
chmod +x ./install
sudo ./install auto
sudo service codedeploy-agent start
sudo service codedeploy-agent status
EOF
```

↓

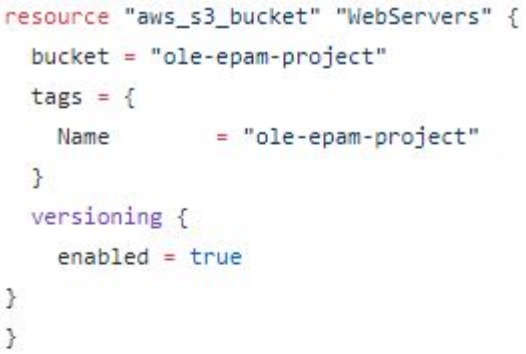


Launch Configuration: WebServers_config

AMI ID	ami-0e38b48473ea57778	Instance Type	t2.micro
IAM Instance Profile	IAM_profile	Kernel ID	
Key Name	Oleg	Monitoring	true
EBS Optimized	false	Security Groups	sg-0609767ee66aba8cc
Spot Price		Creation Time	Mon Mar 09 23:27:48 GMT+200 2020
RAM Disk ID		Block Devices	-
User data	View User data	IP Address Type	Only assign a public IP address to instances launched in the default VPC and subnet. (default)

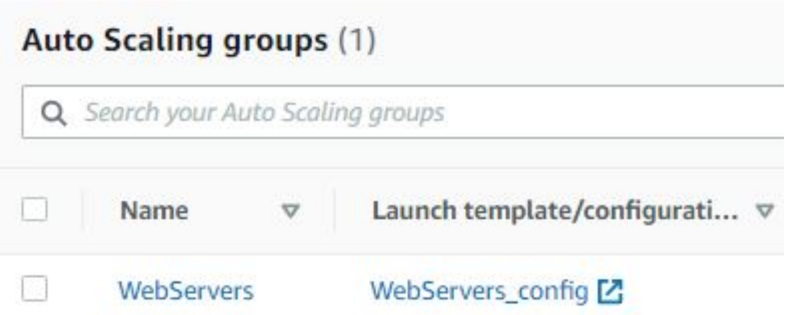


```
resource "aws_autoscaling_group" "WebServers" {
  name                 = "WebServers"
  launch_configuration = aws_launch_configuration.WebServers.name
  min_size             = "2"
  max_size             = "4"
  availability_zones   = ["us-east-2b"]

  tag {
   key                 = "Name"
   value               = "WebServer"
   propagate_at_launch = "true"
  }
  lifecycle {
    create_before_destroy = true
  }
}
```



```
resource "aws_s3_bucket" "WebServers" {
  bucket = "ole-epam-project"
  tags = {
    Name         = "ole-epam-project"
  }
  versioning {
    enabled = true
  }
}
```

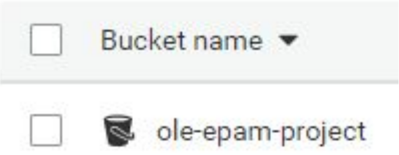
↓



Auto Scaling groups (1)

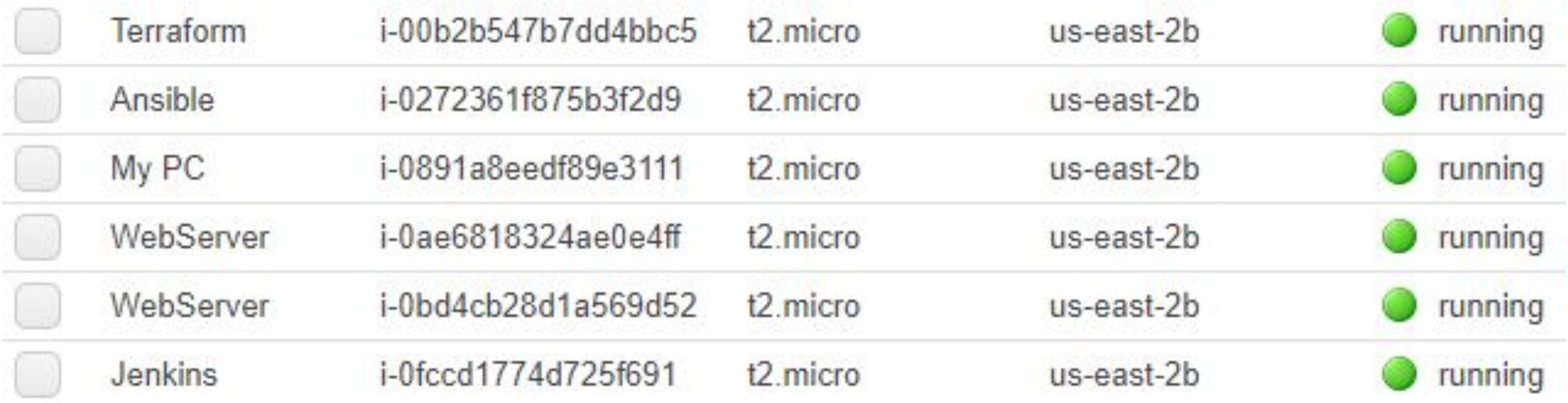
□	Name	Launch template/configurati...
□	WebServers	WebServers_config

↓



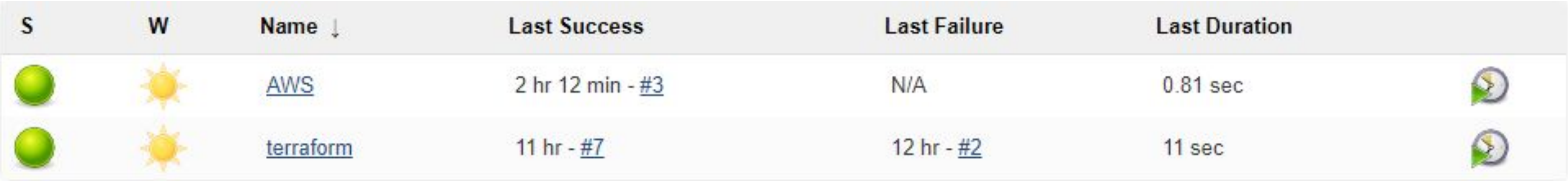
□	Bucket name
□	ole-epam-project

AWS

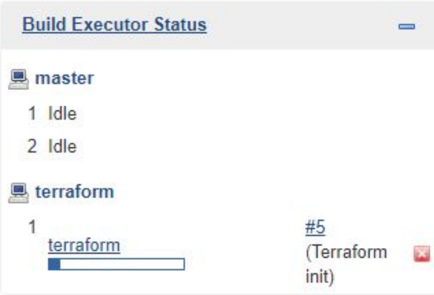


□	Terraform	i-00b2b547b7dd4bbc5	t2.micro	us-east-2b	● running
□	Ansible	i-0272361f875b3f2d9	t2.micro	us-east-2b	● running
□	My PC	i-0891a8eedf89e3111	t2.micro	us-east-2b	● running
□	WebServer	i-0ae6818324ae0e4ff	t2.micro	us-east-2b	● running
□	WebServer	i-0bd4cb28d1a569d52	t2.micro	us-east-2b	● running
□	Jenkins	i-0fccd1774d725f691	t2.micro	us-east-2b	● running

Jenkins



S	W	Name ↓	Last Success	Last Failure	Last Duration	
●	☀	AWS	2 hr 12 min - #3	N/A	0.81 sec	
●	☀	terraform	11 hr - #7	12 hr - #2	11 sec	



Build Executor Status

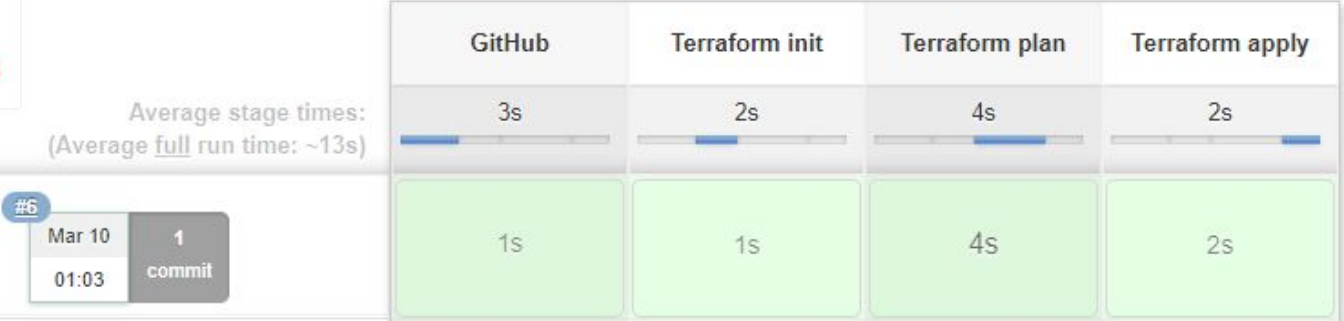
master

1 Idle

2 Idle

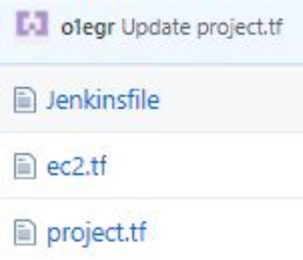
terraform

1 terraform #5 (Terraform init)



	GitHub	Terraform init	Terraform plan	Terraform apply
Average stage times: (Average full run time: ~13s)	3s	2s	4s	2s
#6 Mar 10 01:03 1 commit	1s	1s	4s	2s

Jenkinsfile

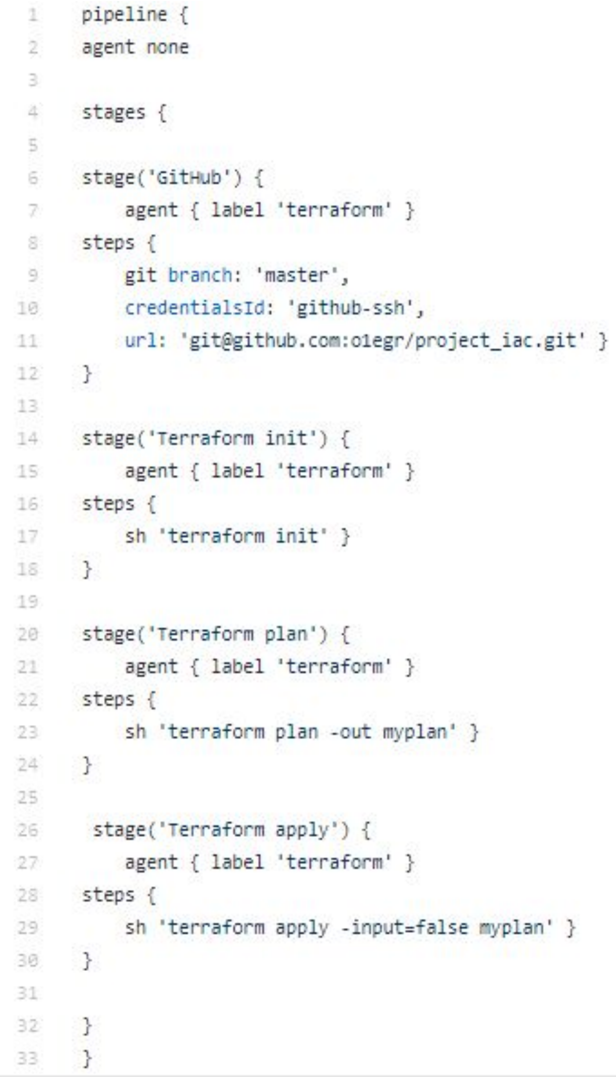


o1egr Update project.tf

Jenkinsfile

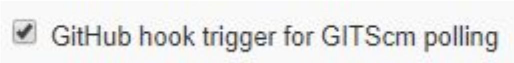
ec2.tf

project.tf

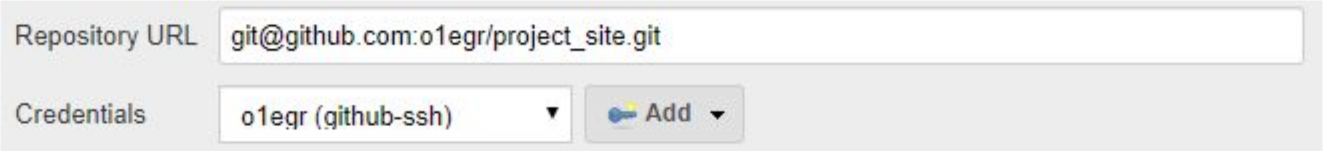


```
pipeline {
agent none

stages {

stage('GitHub') {
    agent { label 'terraform' }
steps {
    git branch: 'master',
    credentialsId: 'github-ssh',
    url: 'git@github.com:o1egr/project_iac.git' }
}

stage('Terraform init') {
    agent { label 'terraform' }
steps {
    sh 'terraform init' }
}

stage('Terraform plan') {
    agent { label 'terraform' }
steps {
    sh 'terraform plan -out myplan' }
}

 stage('Terraform apply') {
    agent { label 'terraform' }
steps {
    sh 'terraform apply -input=false myplan' }
}

}
}
```

AWS Codedeploy Plugin

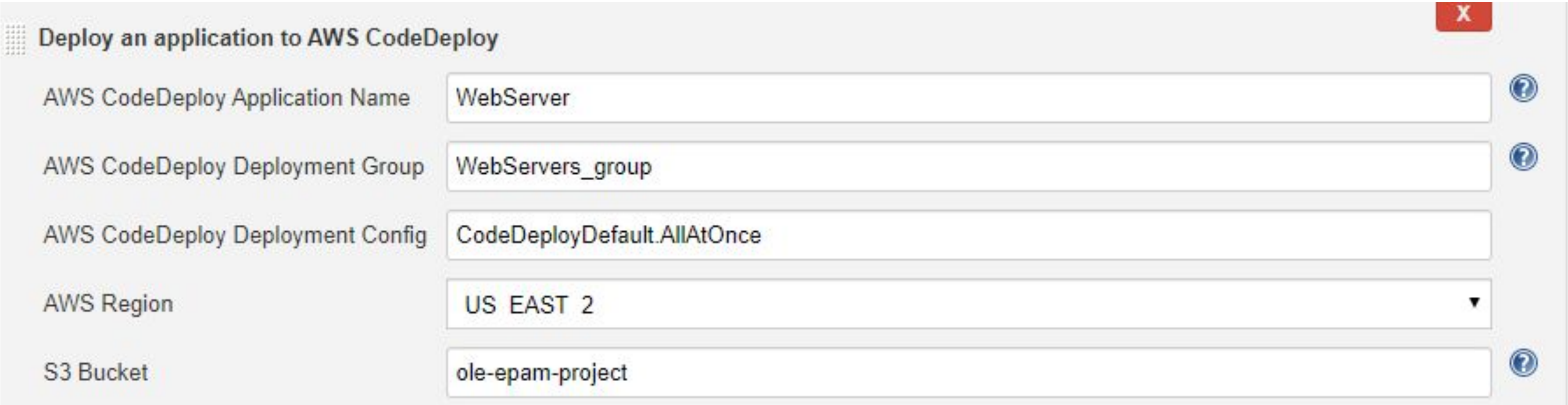


☑ GitHub hook trigger for GITScm polling



Repository URL: git@github.com:o1egr/project_site.git

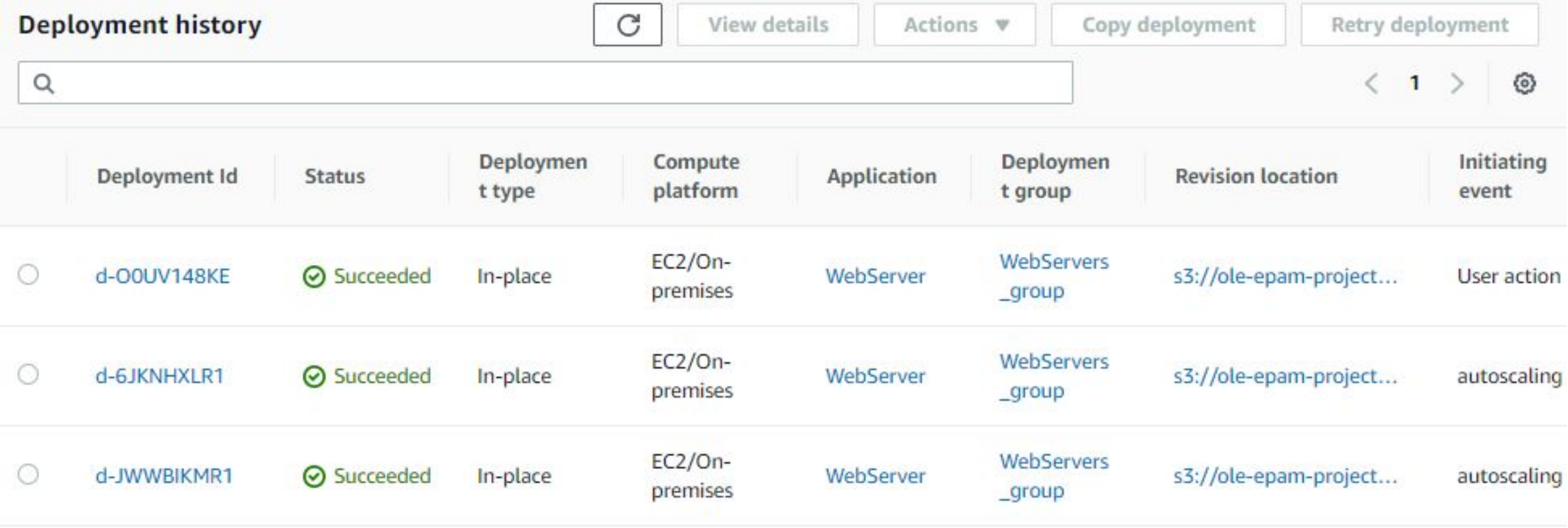
Credentials: o1egr (github-ssh) ▾



Deploy an application to AWS CodeDeploy

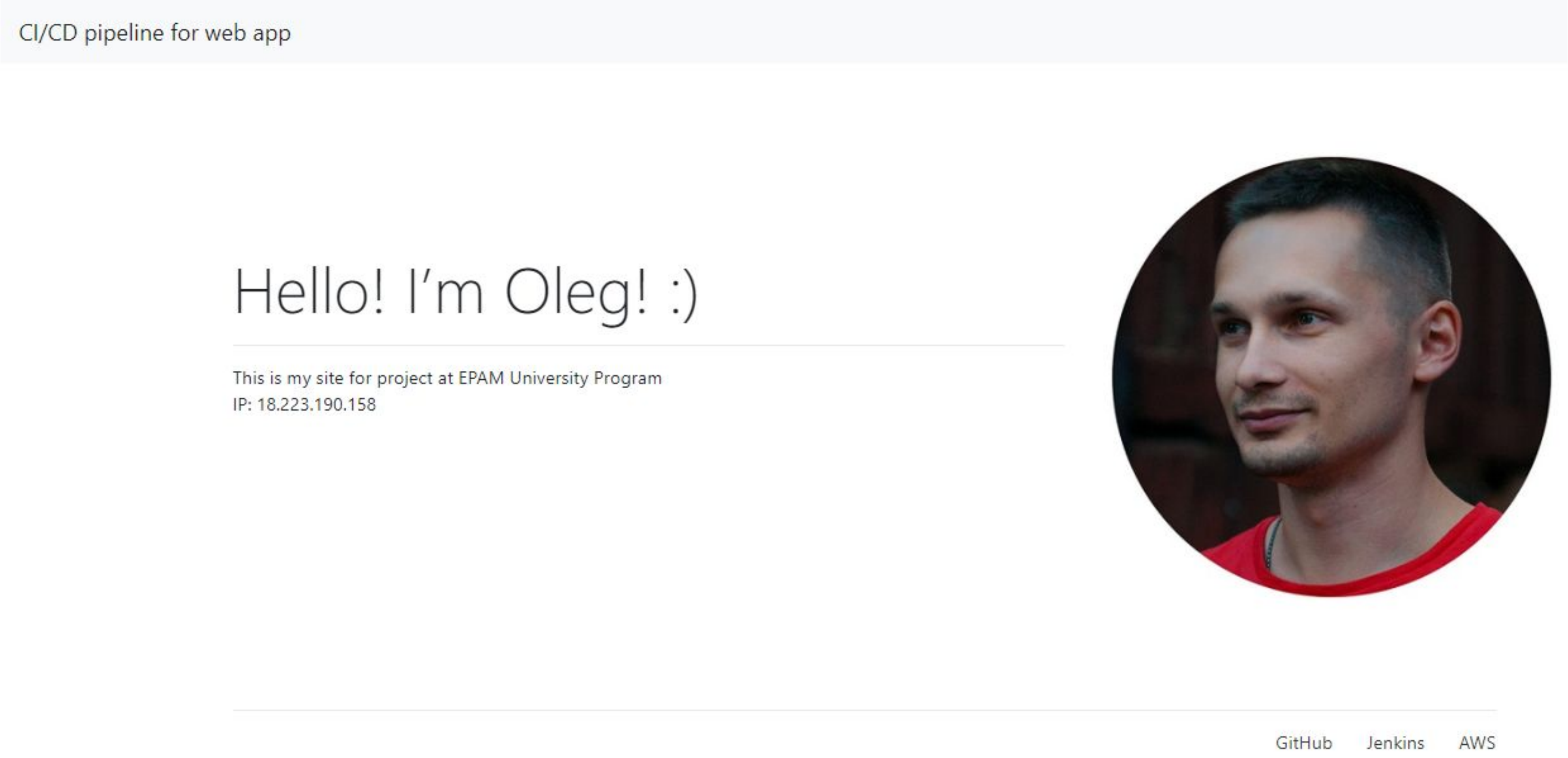
AWS CodeDeploy Application Name	WebServer
AWS CodeDeploy Deployment Group	WebServers_group
AWS CodeDeploy Deployment Config	CodeDeployDefault.AllAtOnce
AWS Region	US EAST 2 ▾
S3 Bucket	ole-epam-project

AWS Codedeploy



	Deployment Id	Status	Deployment type	Compute platform	Application	Deployment group	Revision location	Initiating event
○	d-O0UV148KE	✓ Succeeded	In-place	EC2/On-premises	WebServer	WebServers_group	s3://ole-epam-project...	User action
○	d-6JKNHXLR1	✓ Succeeded	In-place	EC2/On-premises	WebServer	WebServers_group	s3://ole-epam-project...	autoscaling
○	d-JWWBIKMR1	✓ Succeeded	In-place	EC2/On-premises	WebServer	WebServers_group	s3://ole-epam-project...	autoscaling

After deploy

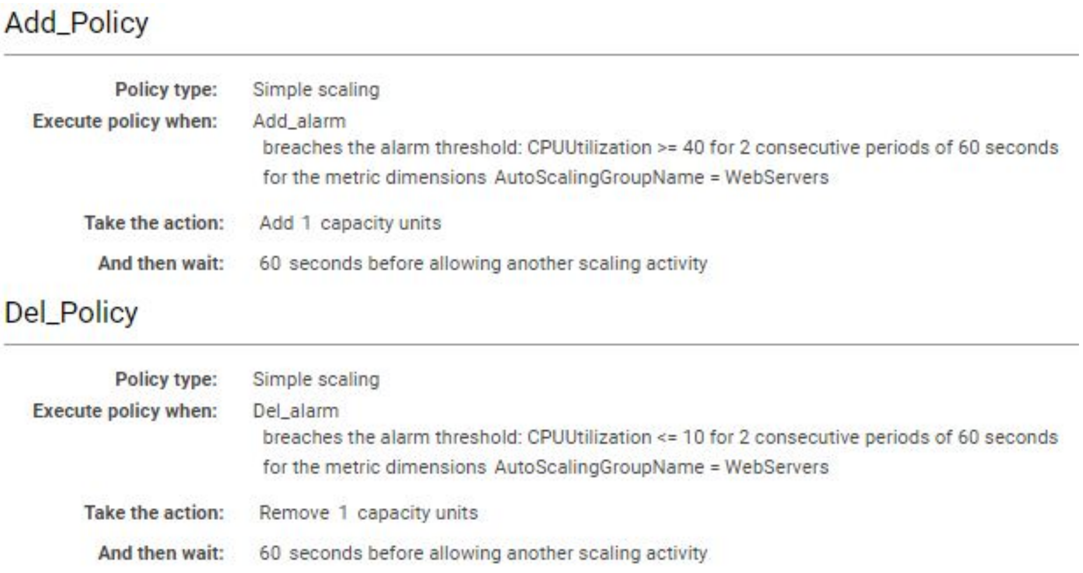


CI/CD pipeline for web app

Hello! I'm Oleg! :)

This is my site for project at EPAM University Program
IP: 18.223.190.158

Auto Scaling



Add_Policy

Policy type: Simple scaling

Execute policy when: Add_alarm
breaches the alarm threshold: CPUUtilization >= 40 for 2 consecutive periods of 60 seconds
for the metric dimensions AutoScalingGroupName = WebServers

Take the action: Add 1 capacity units

And then wait: 60 seconds before allowing another scaling activity

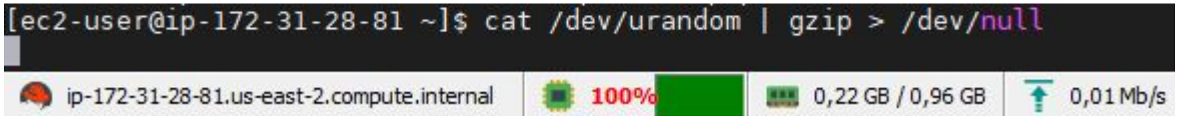
Del_Policy

Policy type: Simple scaling

Execute policy when: Del_alarm
breaches the alarm threshold: CPUUtilization <= 10 for 2 consecutive periods of 60 seconds
for the metric dimensions AutoScalingGroupName = WebServers

Take the action: Remove 1 capacity units

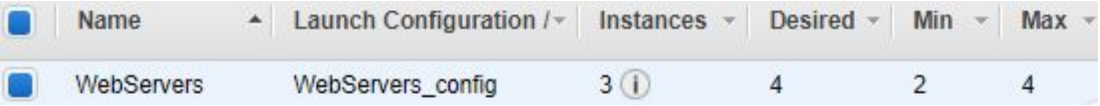
And then wait: 60 seconds before allowing another scaling activity



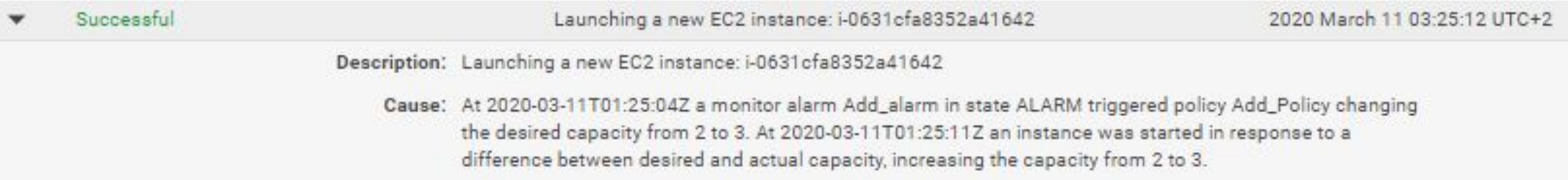
```
[ec2-user@ip-172-31-28-81 ~]$ cat /dev/urandom | gzip > /dev/null
```

ip-172-31-28-81.us-east-2.compute.internal | 100% | 0,22 GB / 0,96 GB | 0,01 Mb/s

Auto Scaling



■	Name ▲	Launch Configuration / ▾	Instances ▾	Desired ▾	Min ▾	Max ▾
■	WebServers	WebServers_config	3 ⓘ	4	2	4



```
▼   Successful          Launching a new EC2 instance: i-0631cfa8352a41642          2020 March 11 03:25:12 UTC+2

    Description:  Launching a new EC2 instance: i-0631cfa8352a41642

          Cause:  At 2020-03-11T01:25:04Z a monitor alarm Add_alarm in state ALARM triggered policy Add_Policy changing
                  the desired capacity from 2 to 3. At 2020-03-11T01:25:11Z an instance was started in response to a
                  difference between desired and actual capacity, increasing the capacity from 2 to 3.
```

Thank you for attention!

Q&A