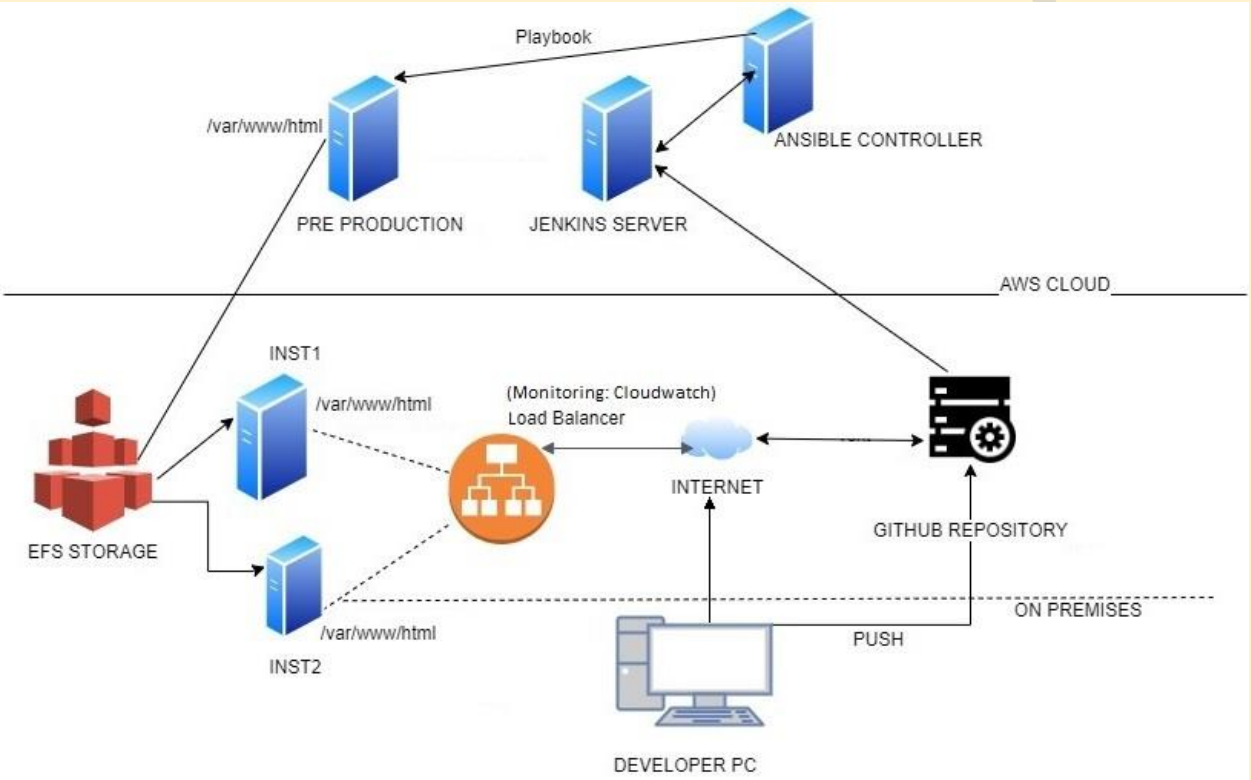
Implementation of a PHP based Application through DevOps Pipeline

Platform: AWS and On-premises.

Tools used: Git, GitHub, Jenkins, Ansible.

Project created by: PAYEL MOISHAL

PROJECT ARCHITECTURE



Following the above diagram, we proceed with the original project on AWS and On-premises platform using tools like GIT, GITHUB, JENKINS & ANSIBLE.

Steps involved are as follows:-

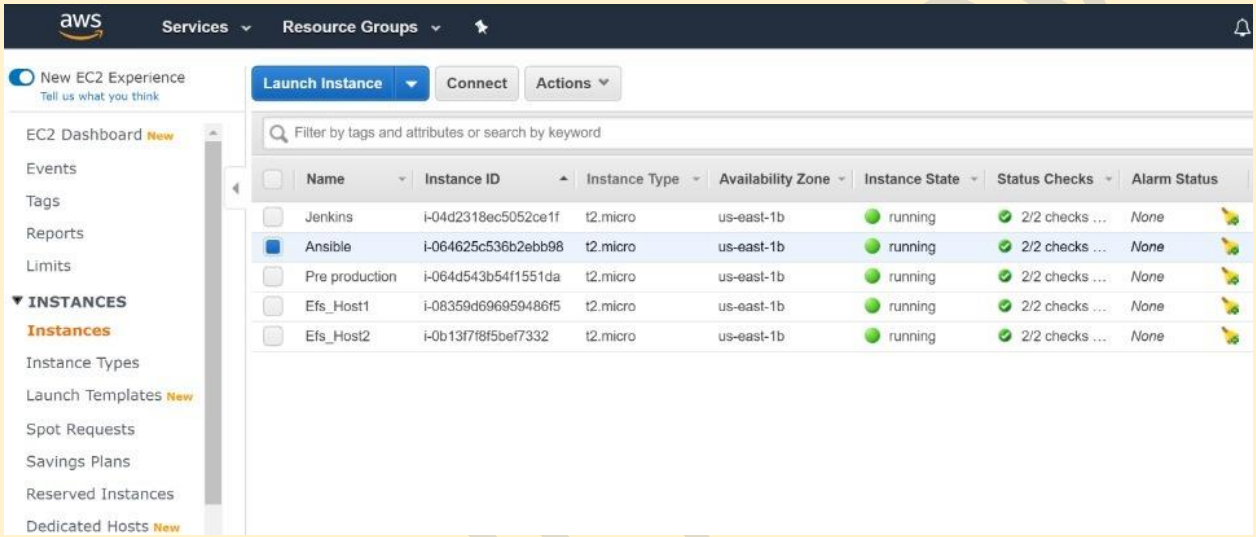
1) Configuration of local git along with github account:

Initialized Git on Local PC "/Downloads/project2" directory by using "Git for Windows".

git config – global user.name "payelmoishal"
git config – global user.email "moishalpayel@gmail.com'
git remote add origin "https://github.com/ payelmoishal /project2.git
Therefore, kept the local Git ready on PC.

2) Launching of amazon EC2 instances as required:

Started 5 Amazon Linux 2 Instances and named them. Please refer to the screenshot below.



Ansible IP Address: 23.19.194.247

Jenkins IP Address: 53.198.6.92

Preproduction IP Address: 3.82.29.189

Efs_Host1 IP Address: 3.84.79.204

Efs_Host1 IP Address: 3.82.56.216

3) Configuration of security group according to required inbound ports:

Created a security group manually and allowed the following required ports for ingress traffic.

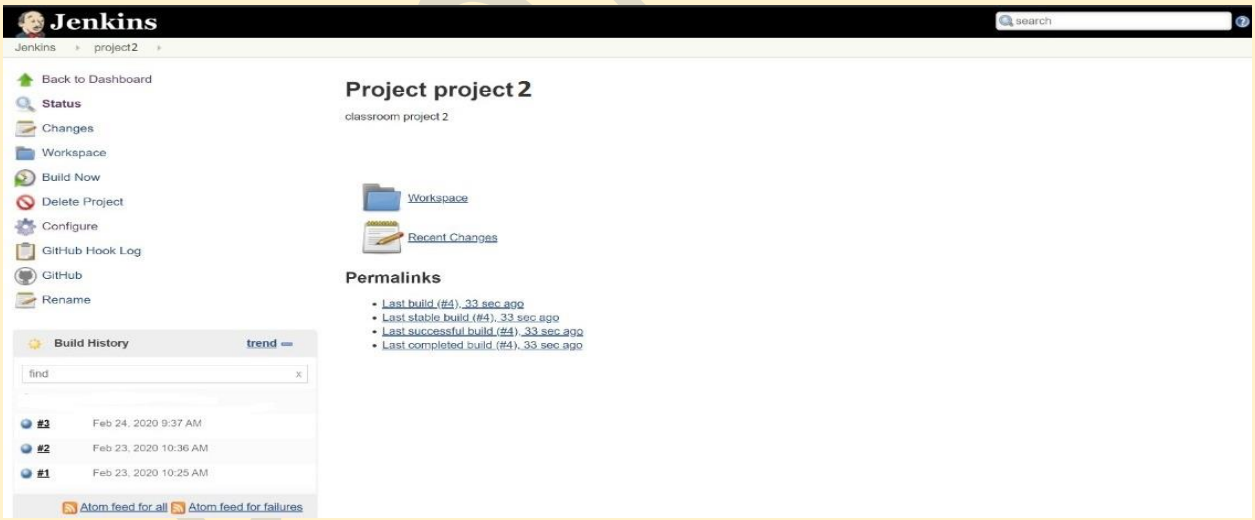
Port 22 – SSH
Port 80 – HTTP
Port 8080 – Custom TCP
Port 2049 – NFS

Then, associate the 5 instances to the respective custom security group.

4) Installing Jenkins on an Amazon EC2 instance:

```
yum update –y
yum install java-1.8.0 -y
wget -O /etc/yum.repos.d/jenkins.repo http://pkg.jenkins-ci.org/redhat/jenkins.repo
rpm --import http://pkg.jenkins-ci.org/redhat/jenkins-ci.org.key
yum install jenkins -y
service jenkins start
chkconfig jenkins on
cat /var/lib/jenkins/secrets/initialAdminPassword
yum install git –y
git init
```

5) Configuring github webhook under freestyle project2:



6) Creation and pushing of index.php under local git project2 directory:

```
vim index.php

<?php

phpinfo();

Save and exit

git add –A
git commit –m "index added"
git push origin master
```

7) Installing and configuring ansible controller on an amazon EC2 instance:

Installed ansible and configured the hosts file as below:

/etc/ansible/hosts

```
[jenkins]
53.198.6.92

[efsone]
3.84.79.204

[prepro]
3.82.29.189

[servers]
3.82.29.189
3.84.79.204
3.82.56.216
```

Next, uploaded the "p2key.pem" amazon key file via scp command from local downloads folder to /tmp directory of the ansible controller.

```
ssh-agent bash
ssh-add p2key.pem
```

8) Creation of ansible playbook files as required:

Created the ansible playbook files in yml file format.
The ansible playbooks are as follows:

[packageinstall.yml]

```
---
- name: Install Packages with Variables
  hosts: servers
  become: yes

  tasks:
   - name: Install Packages
     yum: name={{ item }} update_cache=yes state=latest
     with_items:
       - httpd
       - php
       - amazon-efs-utils

   - name: Start & Enable Apache
```

```
    systemd:
      name: httpd
      state: started
      enabled: true
```

[jenkinstoprepro.yml]

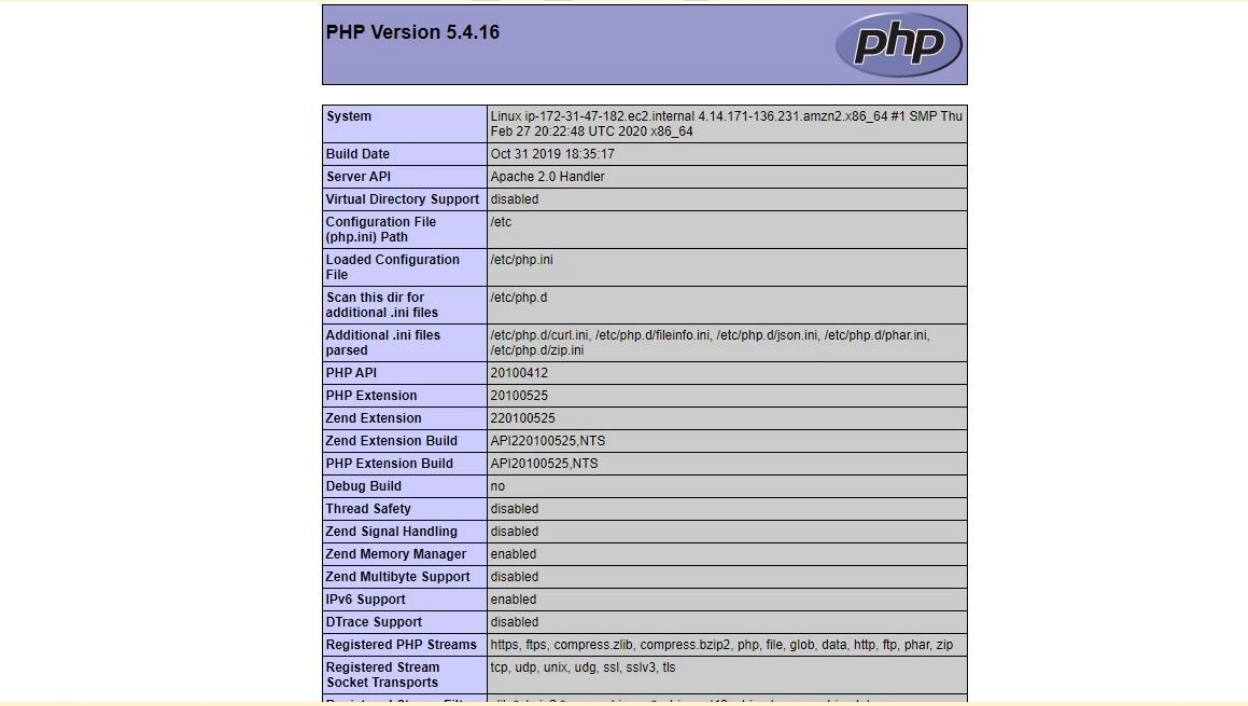
```
---
- name: Transfer data from remote jenkins to controller
  hosts: jenkins
  become: yes
  tasks:
    - fetch:
        src: /var/lib/jenkins/workspace/project2/index.php
        dest: /tmp/
        flat: true

- name: Transfer data from controller to remote preproduction
  hosts: prepro
  become: yes
  tasks:
    - copy:
        src: /tmp/index.php
        dest: /var/www/html/
```

---

ansible-playbook packageinstall.yml –u ec2-user
ansible-playbook jenkinstoprepro.yml –u ec2-user

9) Testing of PHP web application on preproduction server:



PHP Version 5.4.16

System	Linux ip-172-31-47-182.ec2.internal 4.14.171-136.231.amzn2.x86_64 #1 SMP Thu Feb 27 20:22:48 UTC 2020 x86_64
Build Date	Oct 31 2019 18:35:17
Server API	Apache 2.0 Handler
Virtual Directory Support	disabled
Configuration File (php.ini) Path	/etc
Loaded Configuration File	/etc/php.ini
Scan this dir for additional .ini files	/etc/php.d
Additional .ini files parsed	/etc/php.d/curl.ini, /etc/php.d/fileinfo.ini, /etc/php.d/json.ini, /etc/php.d/phar.ini, /etc/php.d/zip.ini
PHP API	20100412
PHP Extension	20100525
Zend Extension	220100525
Zend Extension Build	API220100525,NTS
PHP Extension Build	API20100525,NTS
Debug Build	no
Thread Safety	disabled
Zend Signal Handling	disabled
Zend Memory Manager	enabled
Zend Multibyte Support	disabled
IPv6 Support	enabled
DTrace Support	disabled
Registered PHP Streams	https, ftps, compress.zlib, compress.bzip2, php, file, glob, data, http, ftp, phar, zip
Registered Stream Socket Transports	tcp, udp, unix, udg, ssl, sslv3, tls

10) Launching of EFS storage and mounting it with html directory of two EC2 instances:

DNS name fs-2b620aab.efs.us-east-1.amazonaws.com

Amazon EC2 mount instructions (from local VPC)
Amazon EC2 mount instructions (across VPC peering connection)
On-premises mount instructions

Mount targets

VPC	Availability Zone	Subnet	IP address	Mount target ID	Network interface ID	Security groups	Mount target state
vpc-27b0e15d - default (default)	us-east-1d	subnet-3c7a7912 (default)	172.31.80.189	fsmt-5ac69fdb	eni-016b645106f2e826d	sg-0d5e672e37e95df0a - launch-wizard-1 sg-6a8bd238 - default	Available
	us-east-1a	subnet-30b86c7d (default)	172.31.18.245	fsmt-5bc69fda	eni-0e6beb24ecaef36e4	sg-0d5e672e37e95df0a - launch-wizard-1 sg-6a8bd238 - default	Available
	us-east-1e	subnet-2a470f14 (default)	172.31.74.169	fsmt-5cc69fdd	eni-0be5909b27c7ce37c	sg-0d5e672e37e95df0a - launch-wizard-1 sg-6a8bd238 - default	Available
	us-east-1f	subnet-14b14f1a (default)	172.31.53.189	fsmt-61c69fe0	eni-0e5d52e5de255ec9d	sg-0d5e672e37e95df0a - launch-wizard-1 sg-6a8bd238 - default	Available
	us-east-1c	subnet-dc5551bb (default)	172.31.9.136	fsmt-63c69fe2	eni-0c05d40f8c730183a	sg-0d5e672e37e95df0a - launch-wizard-1 sg-6a8bd238 - default	Available
	us-east-1b	subnet-683c3d34 (default)	172.31.43.211	fsmt-65c69fe4	eni-0749e8b12a54ffd8c	sg-0d5e672e37e95df0a - launch-wizard-1 sg-6a8bd238 - default	Available

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Amazon EC2 mount instructions (from local VPC)

Mounting your file system

1. Open an SSH client and connect to your EC2 instance. (Find out how to connect).
2. Create a new directory on your EC2 instance, such as "efs".
   - `sudo mkdir efs`
3. Mount your file system with a method listed following. If you need encryption of data in transit, use the EFS mount helper and the TLS mount option. Mounting considerations
   - Using the EFS mount helper:
     `sudo mount -t efs fs-2b620aab:/ efs`
   - Using the EFS mount helper and the TLS mount option:
     `sudo mount -t efs -o tls fs-2b620aab:/ efs`
   - Using the NFS client:
     `sudo mount -t nfs4 -o nfsvers=4.1,rsize=1048576,wsize=1048576,hard,timeo=600,retrans=2,noresvport fs-2b620aab.efs.us-east-1.amazonaws.com:/ efs`

If you can't to connect, see our troubleshooting documentation.

Close

Efs_Host1 (Mount Point): /var/www/html
Efs_Host2 (Mount Point): /var/www/html

11) Running of ansible playbook as required for production:

[preprotoefs1.yml]

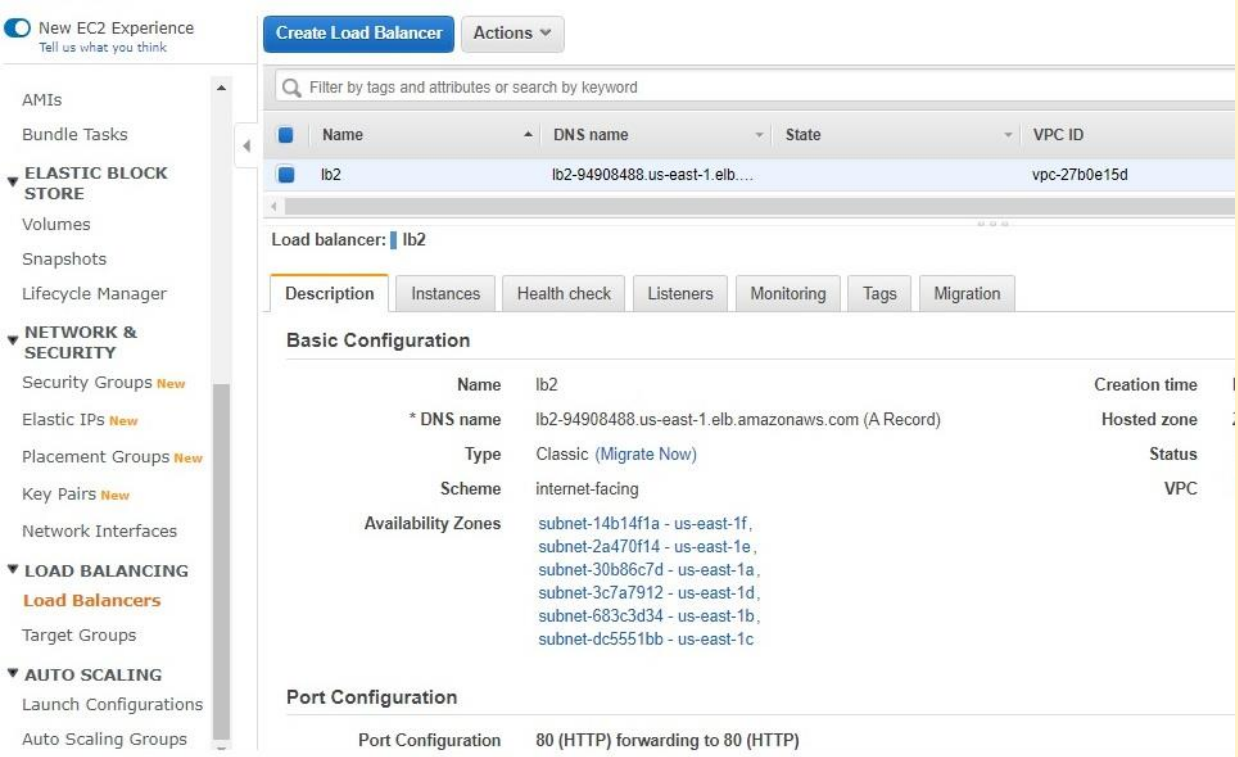
```
---
- name: Transfer data from remote prepro to controller
  hosts: prepro
  become: yes
  tasks:
    - fetch:
        src: /var/www/html/index.php
        dest: /tmp/
        flat: true

- name: Transfer data from controller to remote efs1
  hosts: efsone
  become: yes
  tasks:
    - copy:
        src: /tmp/index.php
        dest: /var/www/html/
```

---

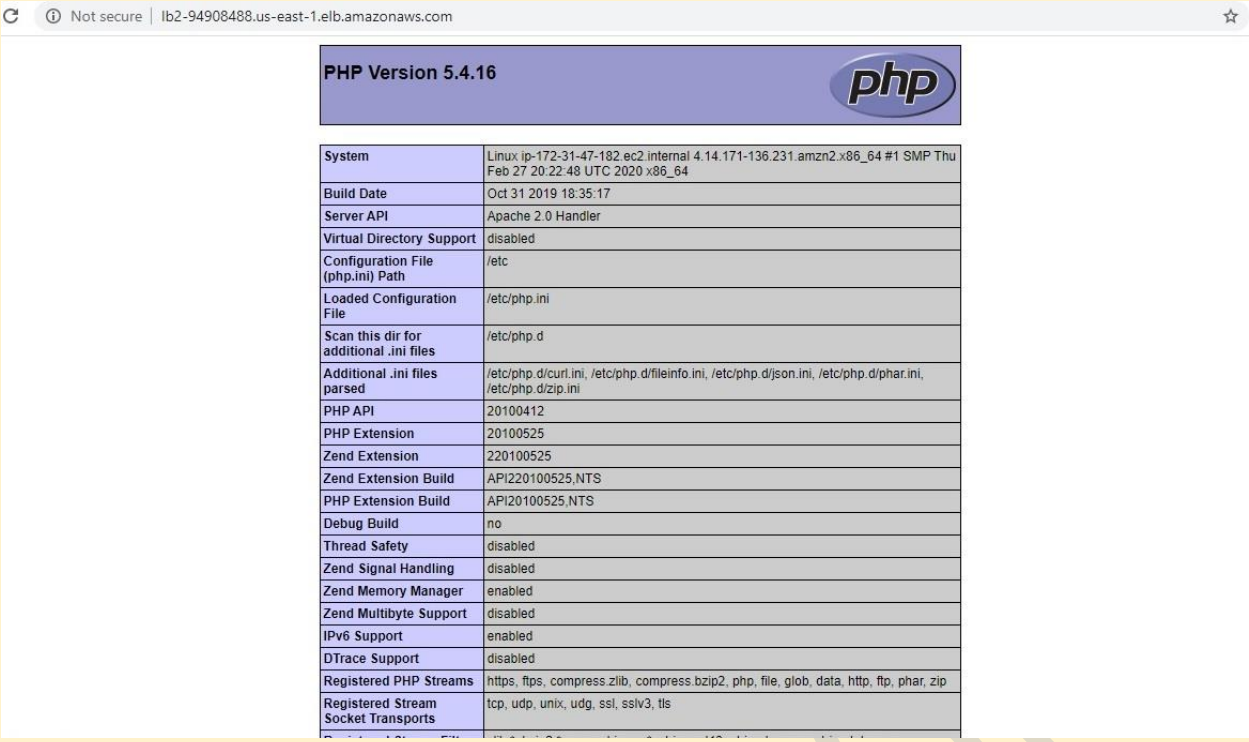
ansible-playbook preprotoefs1.yml –u ec2-user

12) Creation of a load balancer and integrating 2 EFS instances:



Load balancer DNS: http:// lb2-94908488.us-east-1.elb.amazonaws.com/

13) Testing the PHP web application through load balancer DNS:



Not secure | lb2-94908488.us-east-1.elb.amazonaws.com

PHP Version 5.4.16

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PHP API	20100412
PHP Extension	20100525
Zend Extension	220100525
Zend Extension Build	API220100525,NTS
PHP Extension Build	API20100525,NTS
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Zend Multibyte Support	disabled
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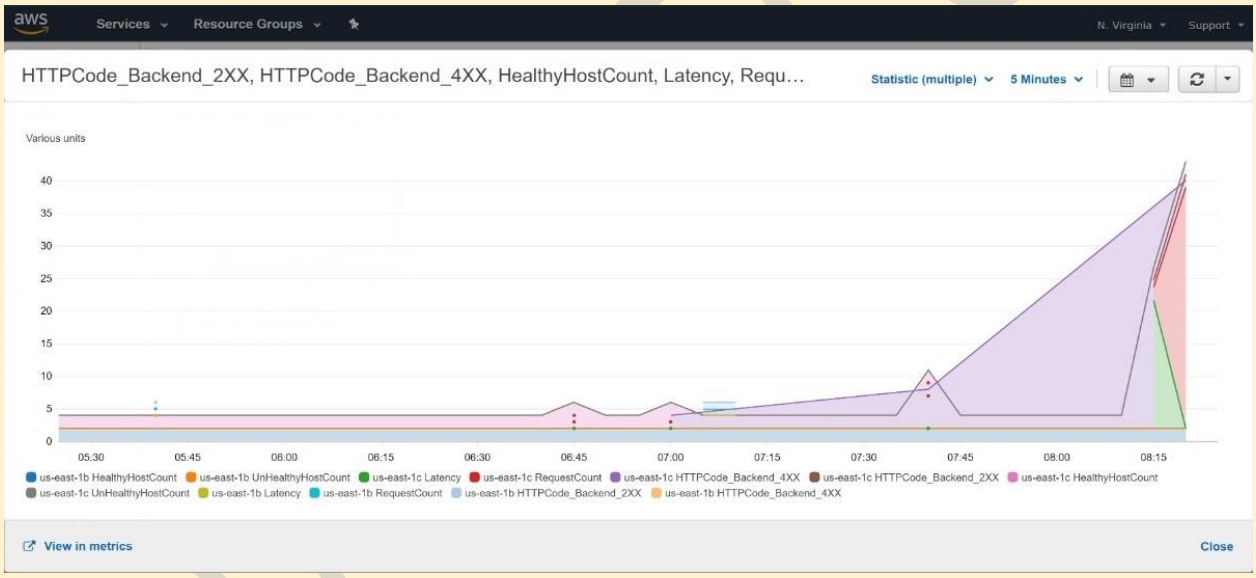
Registered Stream Socket Transports	tcp, udp, unix, udg, ssl, sslv3, tls

14) Cloudwatch monitoring for the Load balancer:



Thank you..