Document Overview

The various steps followed to perform the exercise assigned by Soltius for “The challenge - Cloud engineer” on AWS.

Amazon Web Services (AWS) provides a platform that is ideally suited for building fault-tolerant software systems.

The AWS platform is unique because it enables you to build fault-tolerant systems that operate with a minimal amount of human interaction.

AWS Architecture Design for Fault tolerant and Highly available application.

Amazon Web Services provides services and infrastructure to build reliable, fault-tolerant, and highly available systems in the cloud. These qualities have been designed into our services both by handling such aspects without any special action.

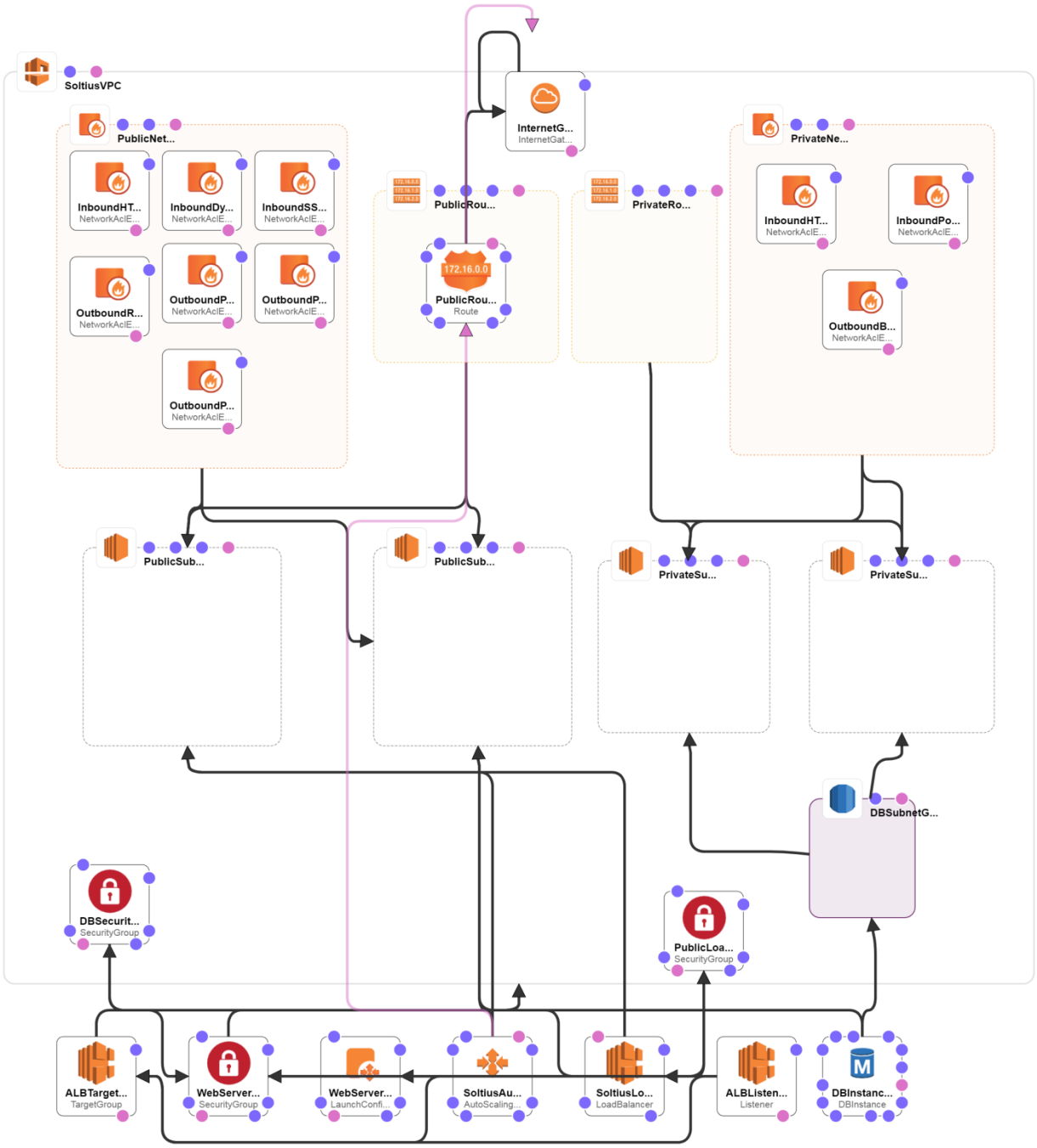
Amazon EC2 provides infrastructure building blocks that, by themselves, may not be fault-tolerant. Hard drives may fail, power supplies may fail, and racks may fail. It is important to use combinations of the features presented in this document to achieve fault tolerance and high availability.

Fault Tolerance and High Availability of Amazon Web Services.

Most of the higher-level services, such as Amazon SimpleDB, Amazon Auto-Scaling, and Amazon Elastic Load Balancing (ELB), were used to address this exercise, built with fault tolerance and high availability.

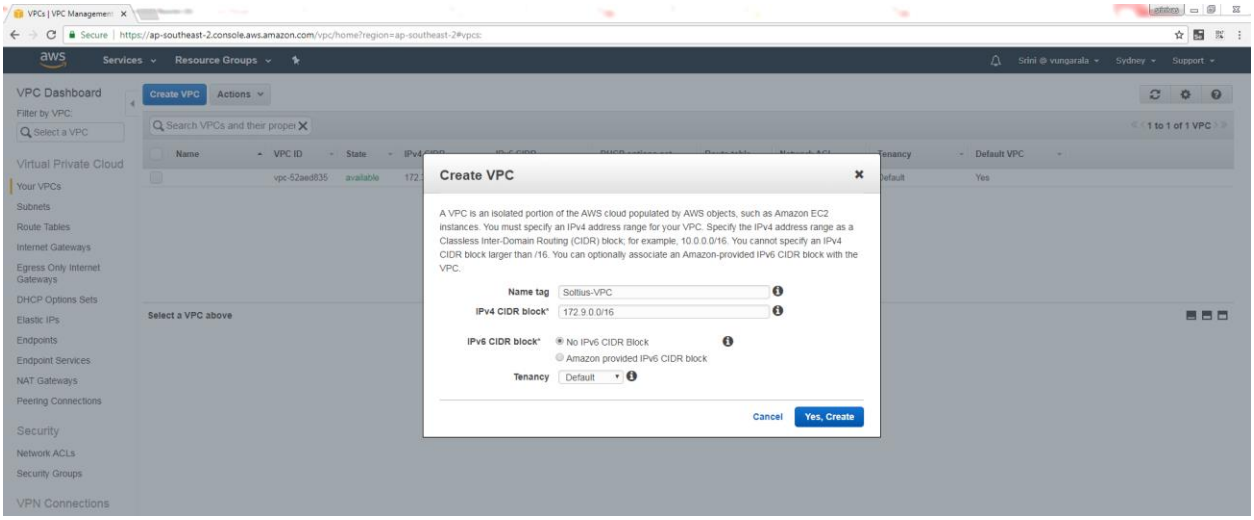
Services that provide basic infrastructure, such as Amazon Elastic Compute Cloud (EC2) and Amazon Elastic Block Store (EBS), provide specific features, such as availability zones, elastic IP addresses, and snapshots, that a fault-tolerant and highly available system must take advantage of and use correctly. Just moving a system into the cloud doesn't make it fault-tolerant or highly available.

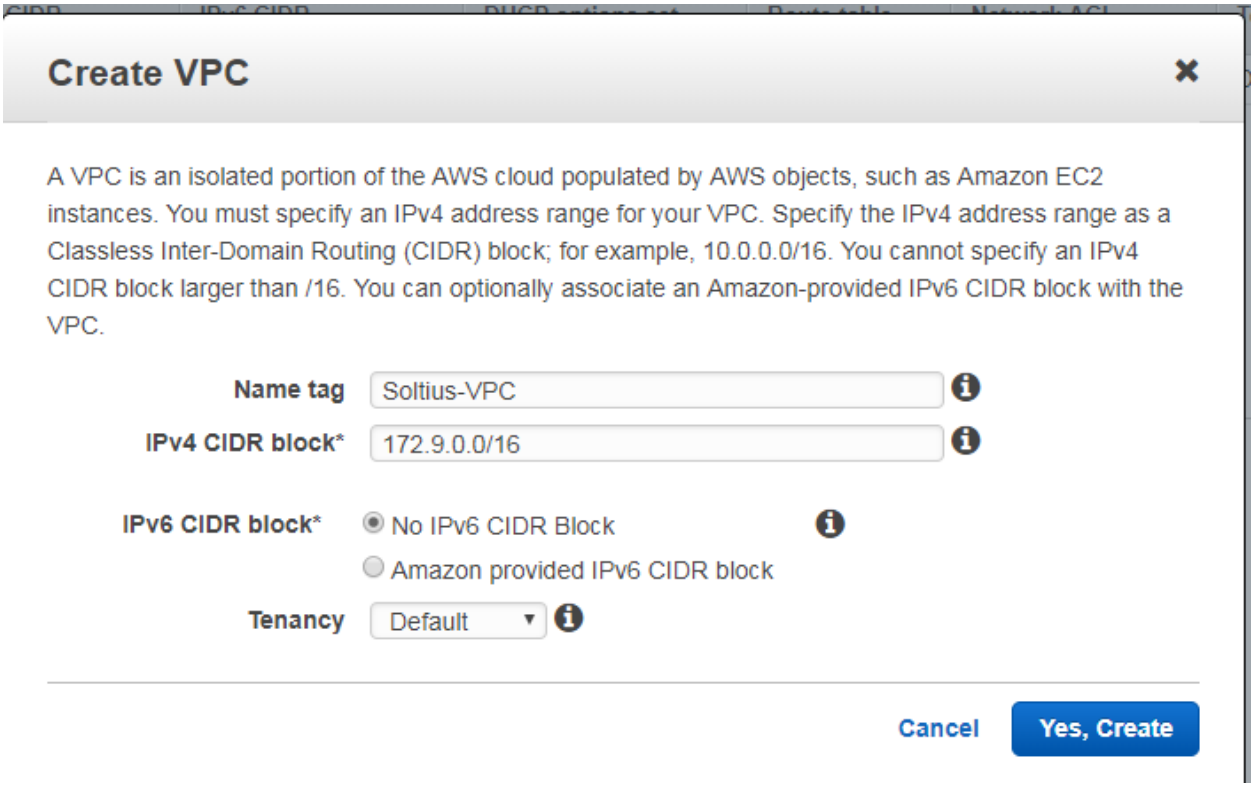
The following design and AWS Service used to address "The challenge - Cloud engineer".


SoltiusVPC
PublicNet...
InboundHT...
NetworkAclE...
InboundDy...
NetworkAclE...
InboundSS...
NetworkAclE...
OutboundR...
NetworkAclE...
OutboundP...
NetworkAclE...
OutboundP...
NetworkAclE...
OutboundP...
NetworkAclE...
InternetG...
InternetGat...
PublicRou...
172.16.0.0
PublicRou...
Route
PrivateRo...
PrivateNe...
InboundHT...
NetworkAclE...
InboundPo...
NetworkAclE...
OutboundB...
NetworkAclE...
PublicSub...
PublicSub...
PrivateSu...
PrivateSu...
DBSubnetG...
DBSecurit...
SecurityGroup
PublicLoa...
SecurityGroup
ALBTarget...
TargetGroup
WebServer...
SecurityGroup
WebServer...
LaunchConfi...
SoltiusAu...
AutoScaling...
SoltiusLo...
LoadBalancer
ALBListen...
Listener
DBInstanc...
DBInstance

Below are the captured screenshots for the steps followed to create a New project for Soltius assigned exercise for Cloud engineer from Console.

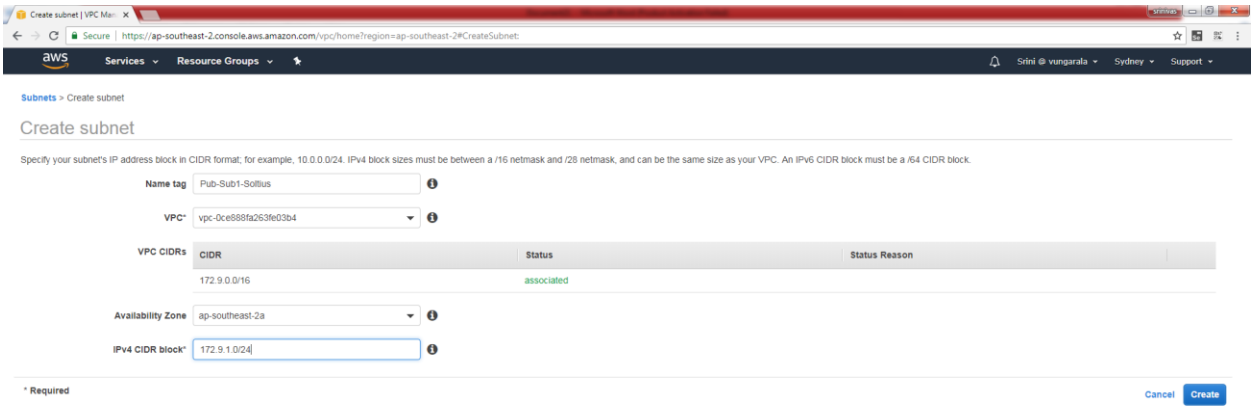
Creating of the New VPC – Soltius-VPS



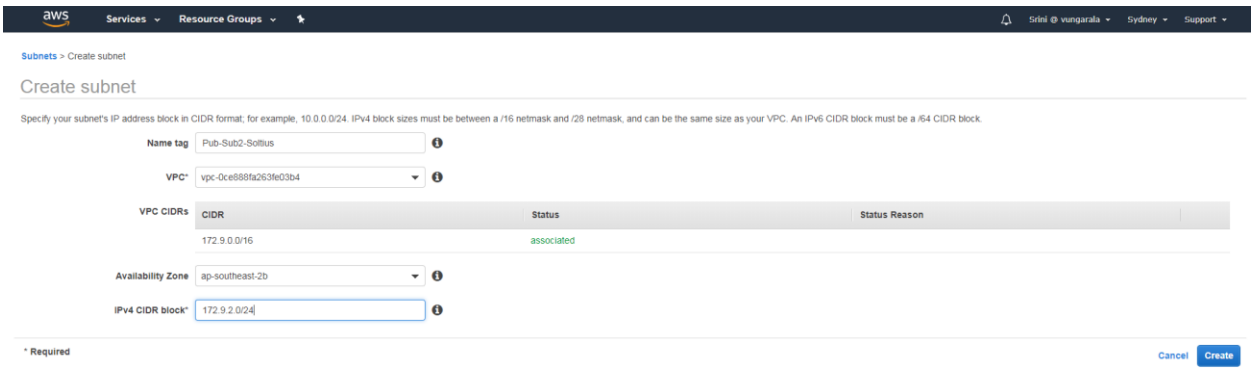


Creating of Subnets

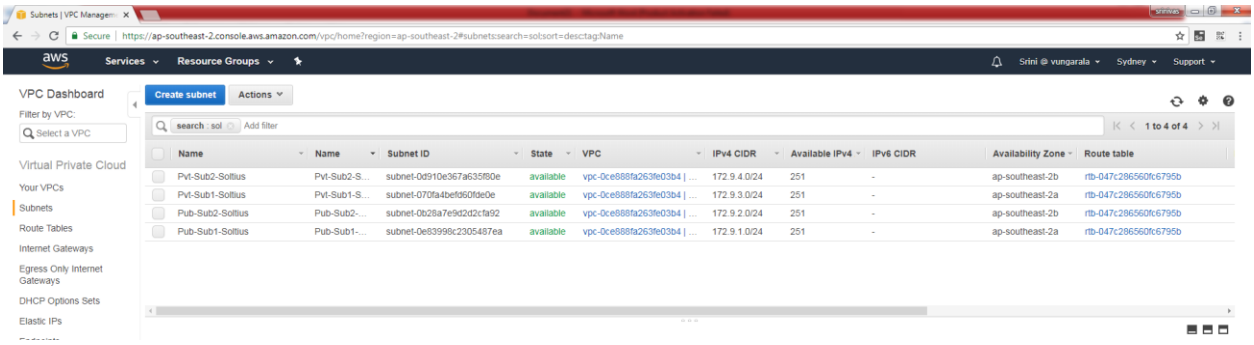
Public Subnet1 on Zone A

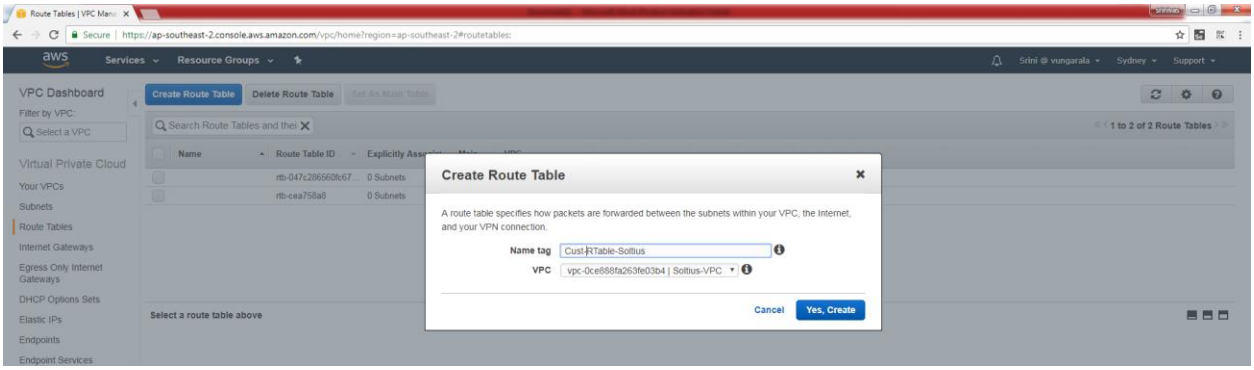


Public Subnet2 on Zone A

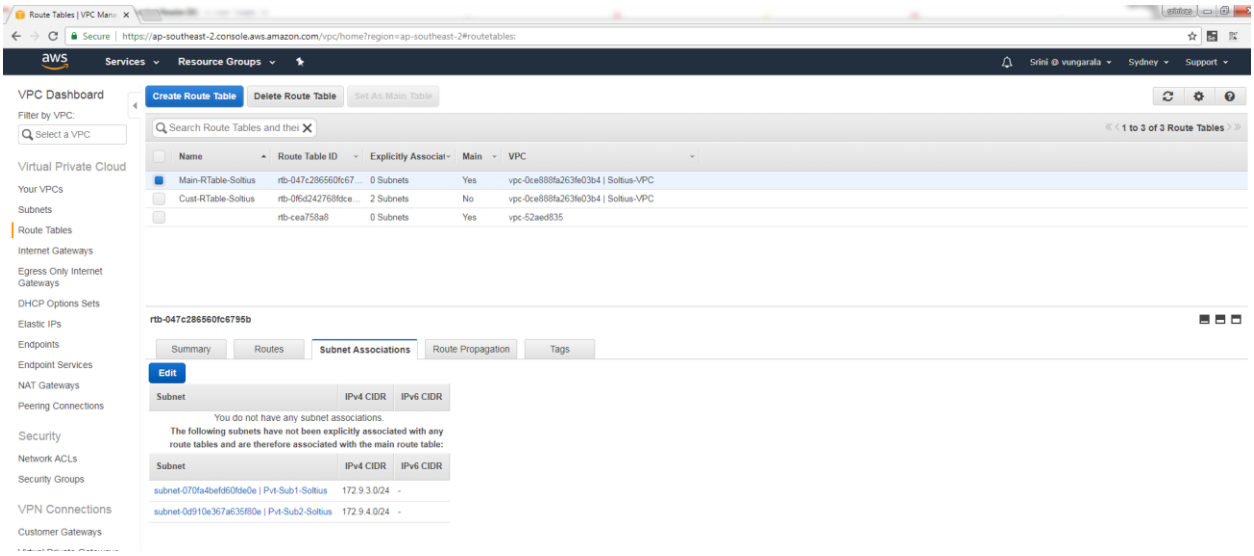


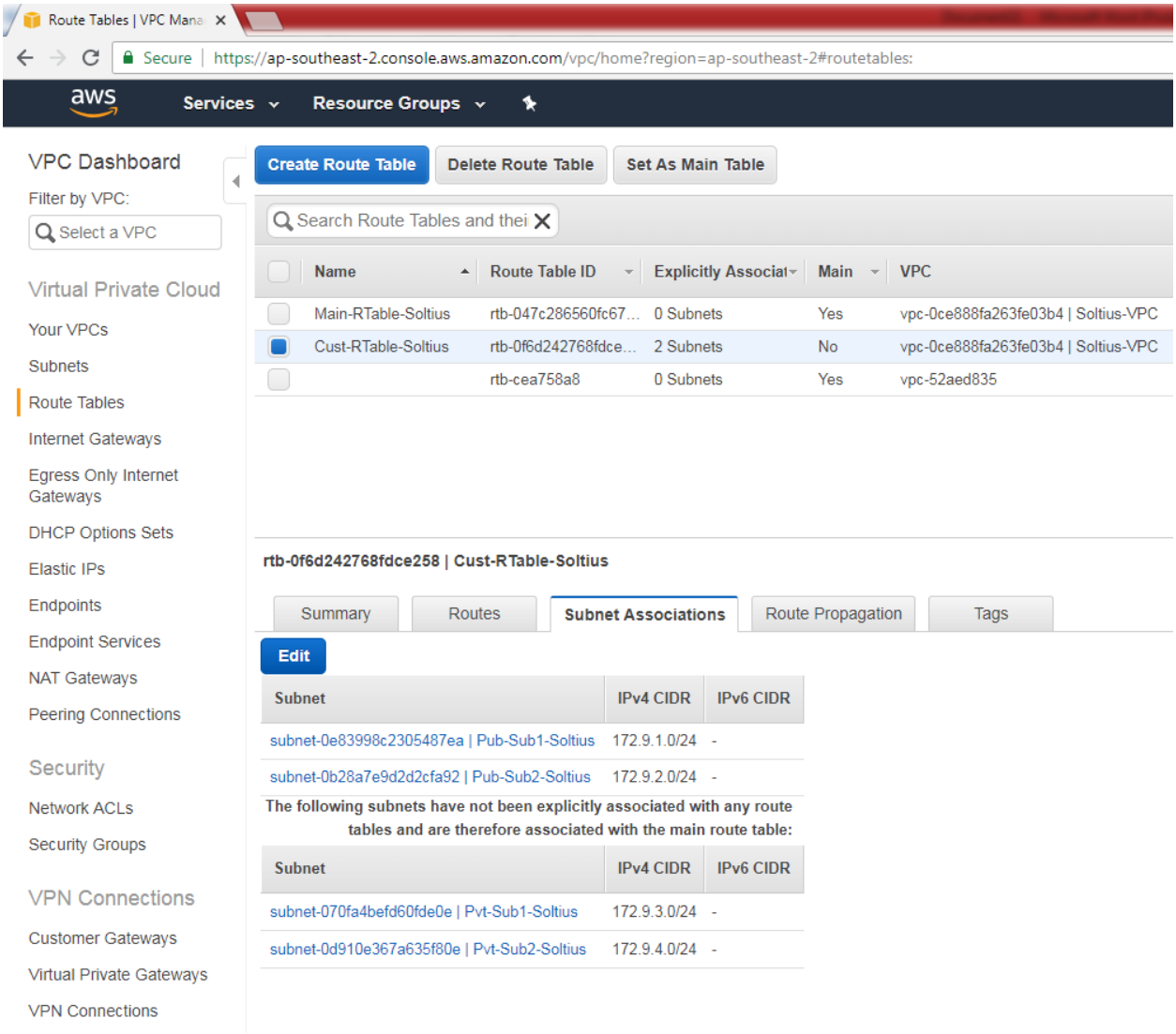
Subsequently Created Private Subnets on Zone A &B



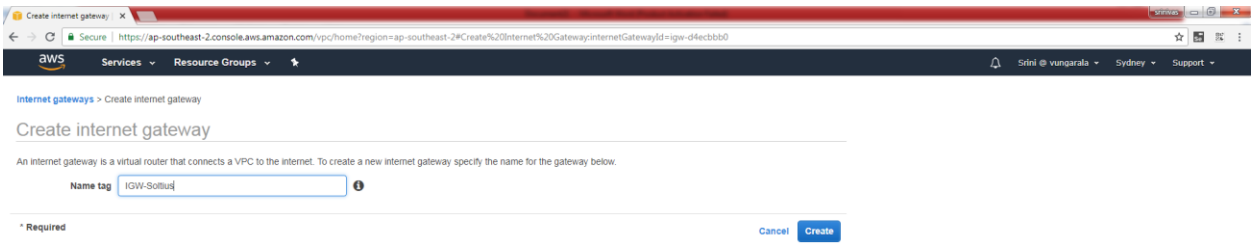


Public Subnet Associations with Custom Route Table

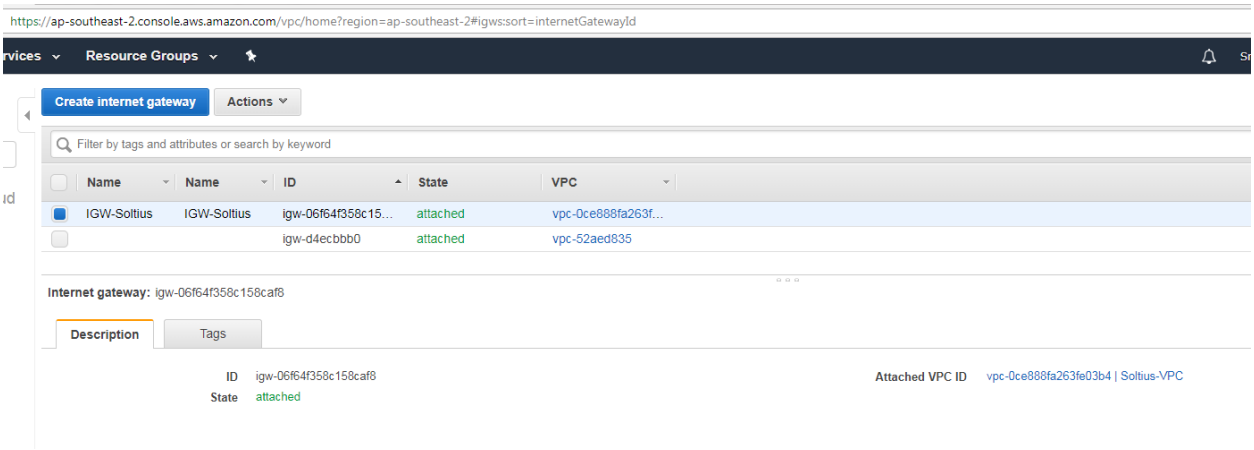




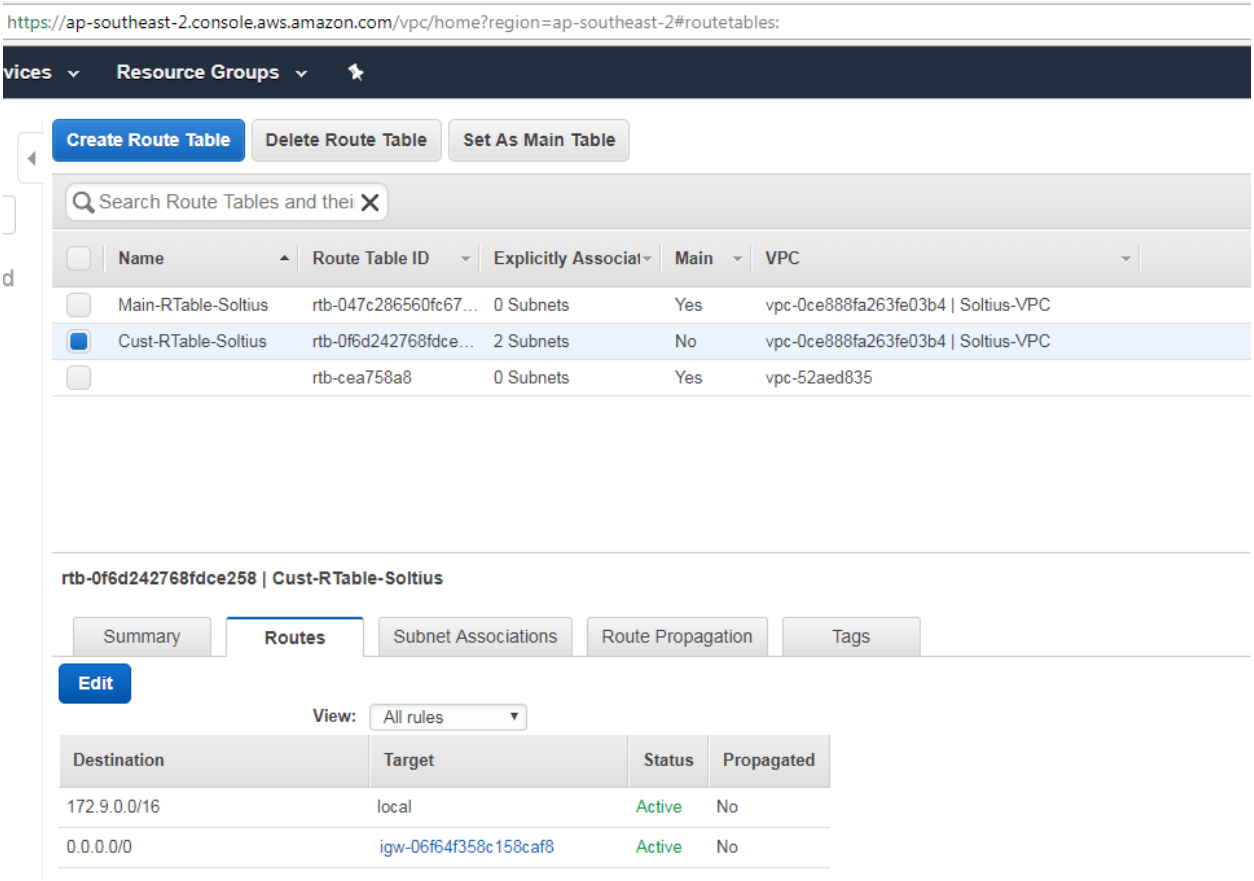
Creation of Internet Gateway:IGW-Soltius



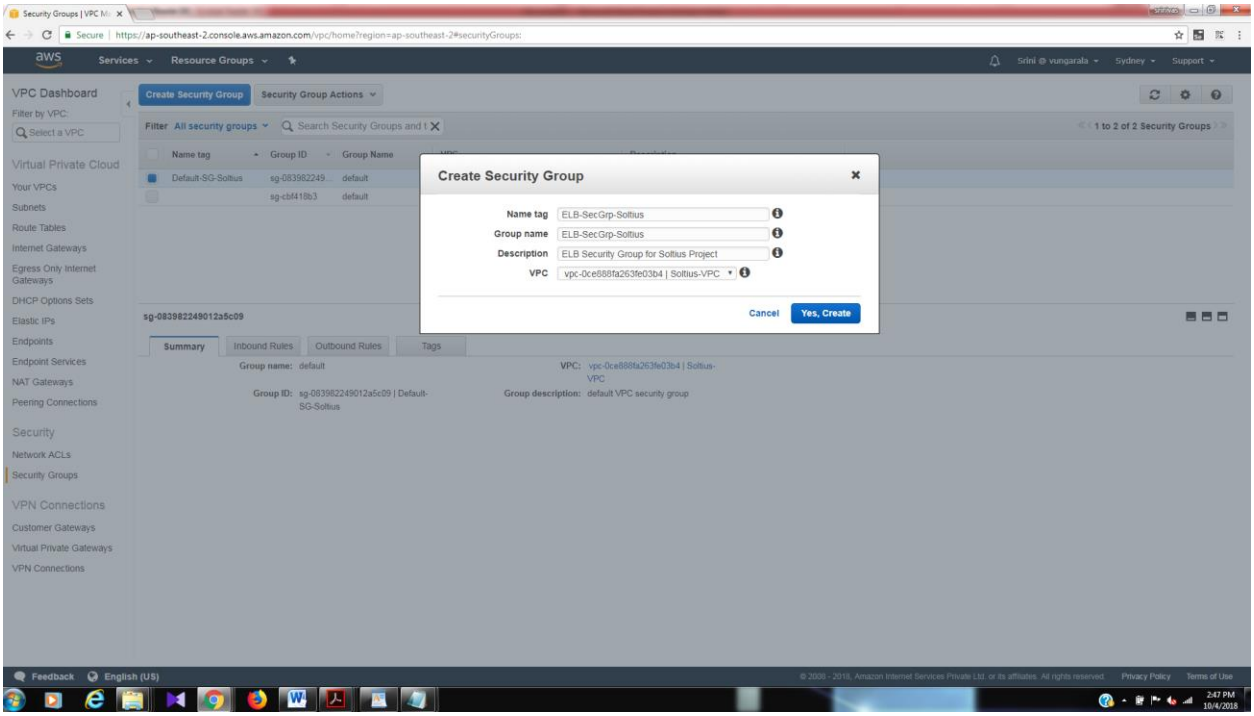
IGW Attachment with VPC

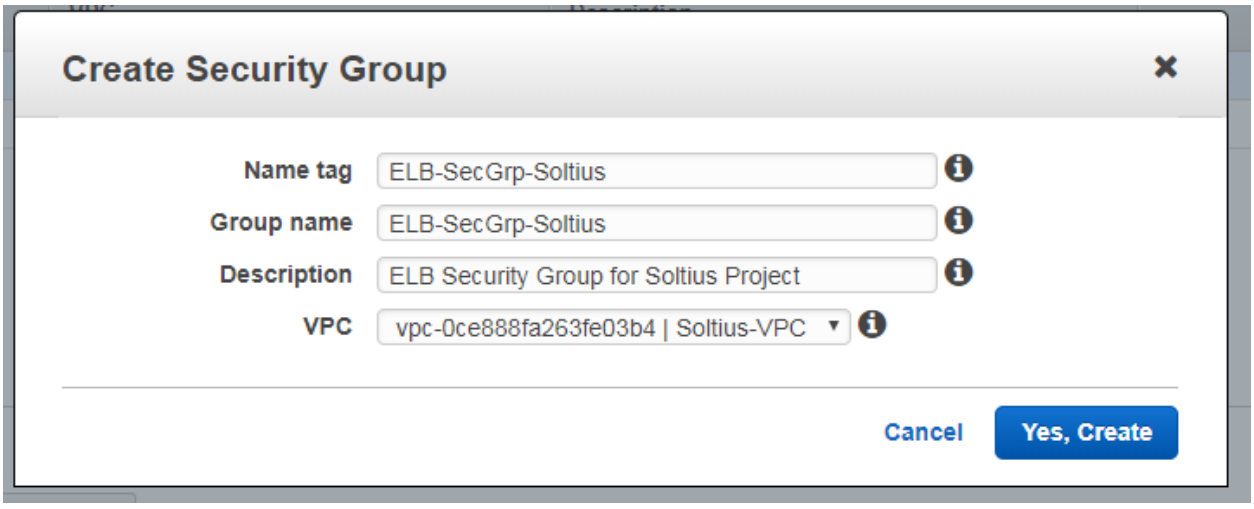


Assigning IGW to Custom Route Table

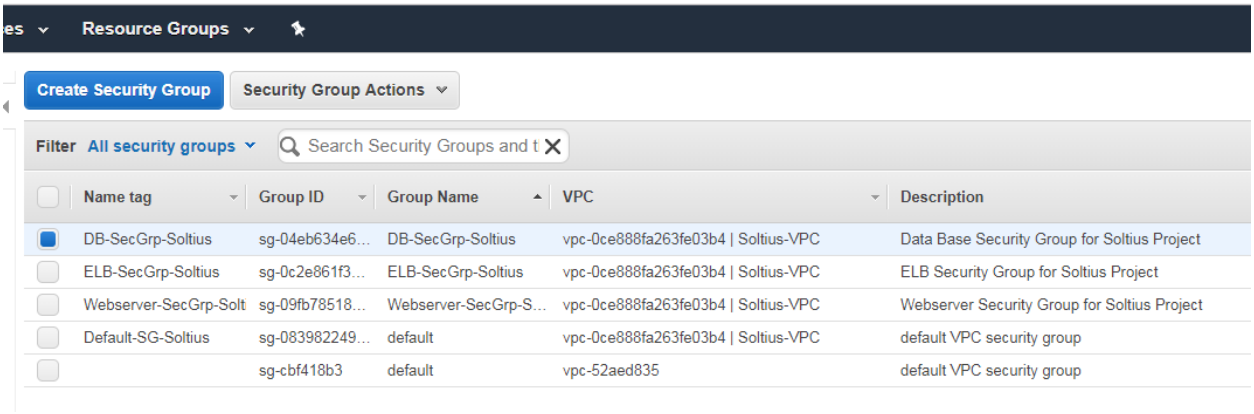


Creation of Security Groups for ELB, Webserver and DB Server.

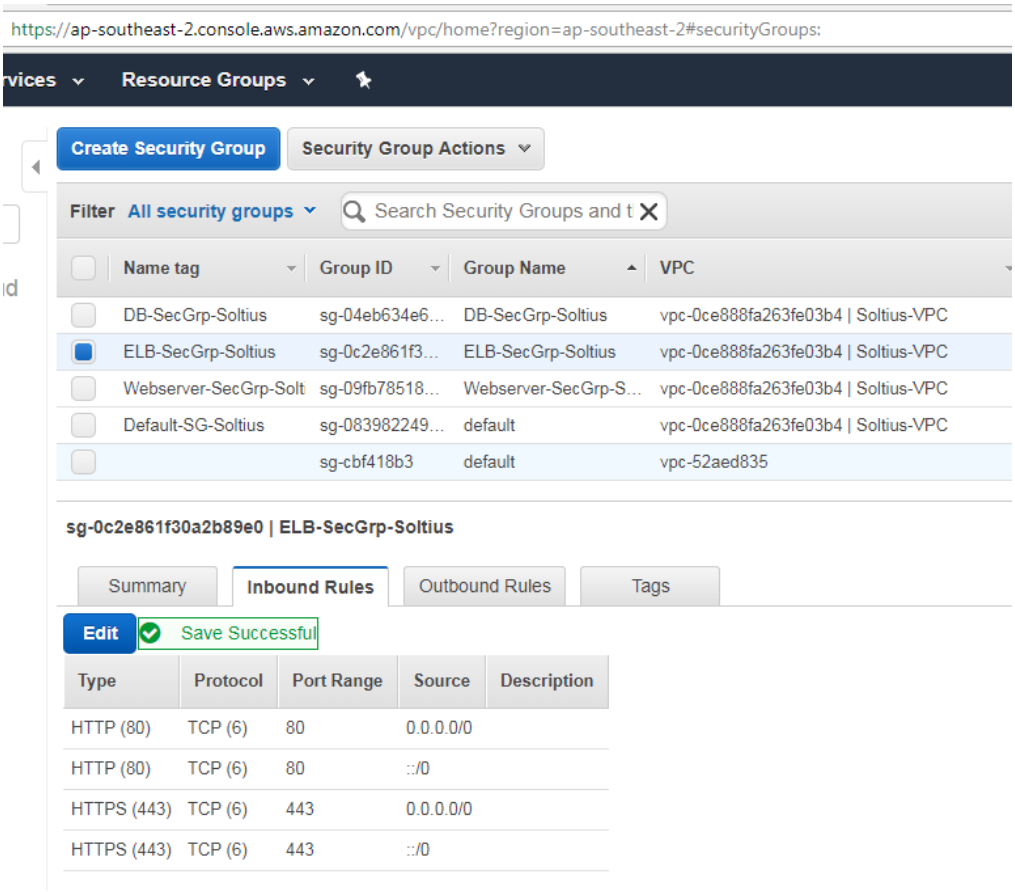




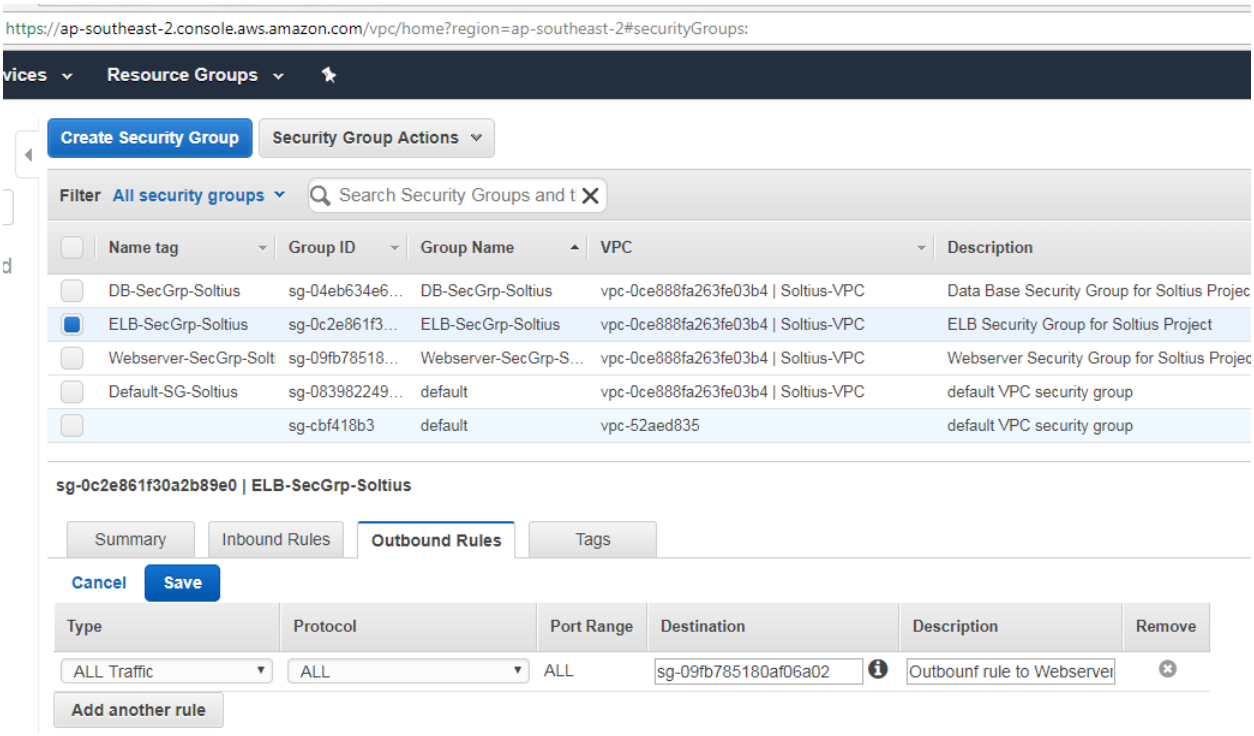
Subsequently Created Security Groups for Webserver and Database



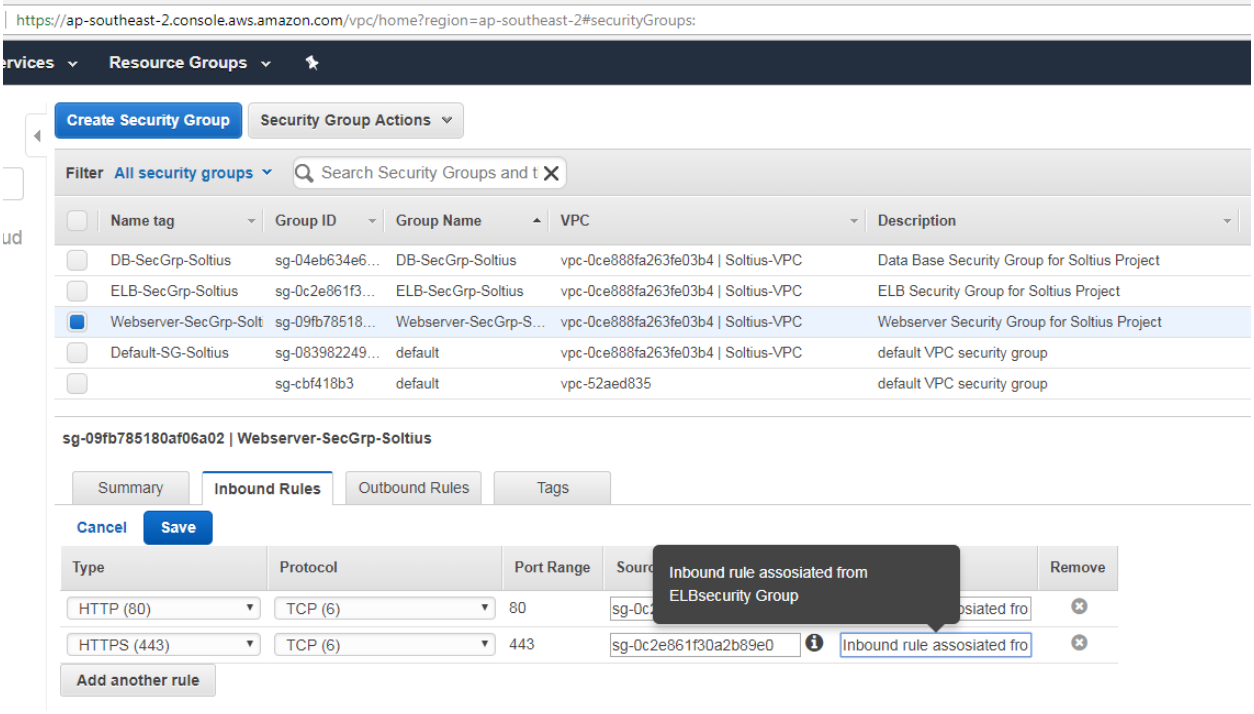
Elastic Load Balancer Inbound Rules.



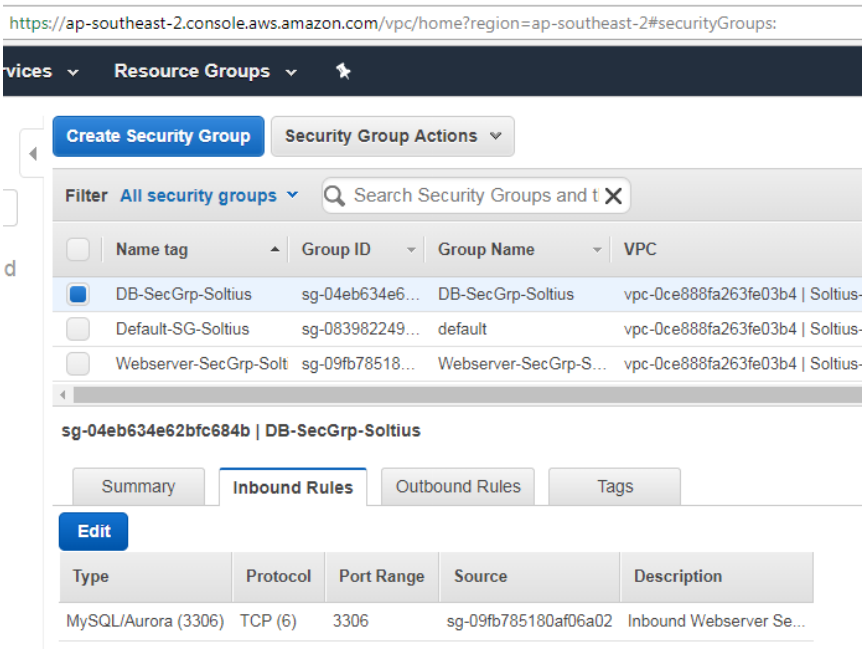
ELB Outbound Rule:



Nested Webserver Inbound Rules Association from ELB Security Group

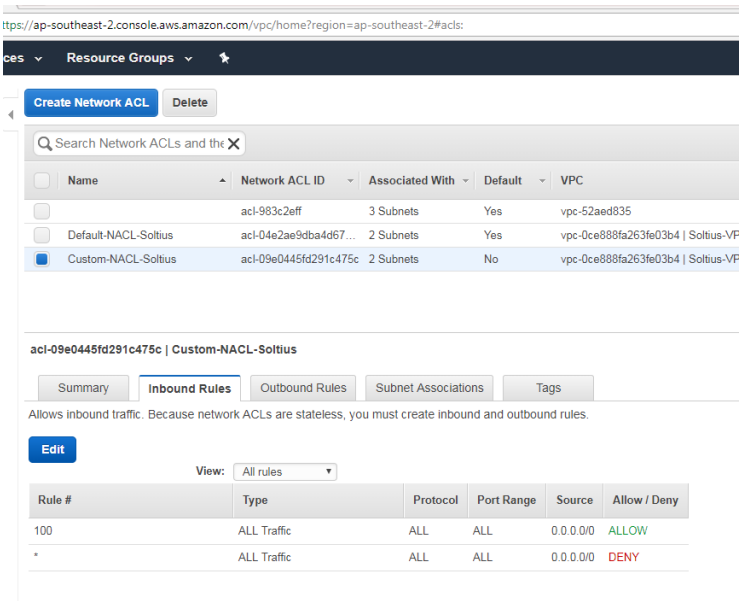


Nested Database Inbound Rules Nested from Webserver Security group.

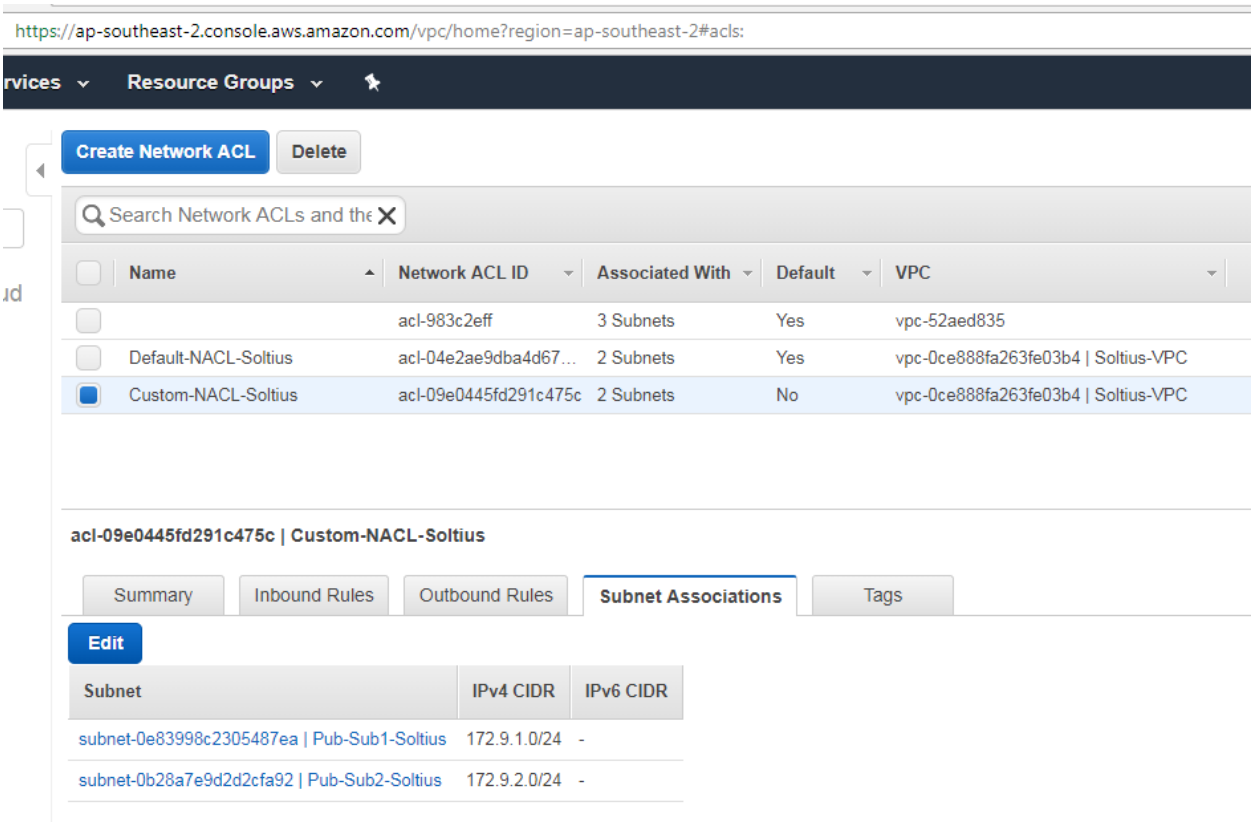


The Outbound rules kept as default for all the Security groups

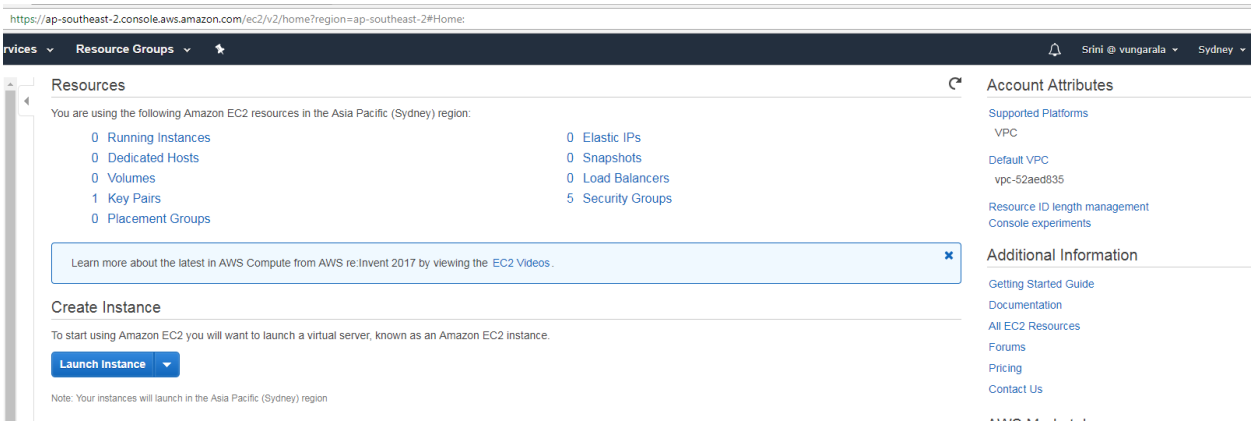
Custom Network Access Control List (NACL) Created for our Project configured with Inbound/Outbound rules and Subnet Associations.

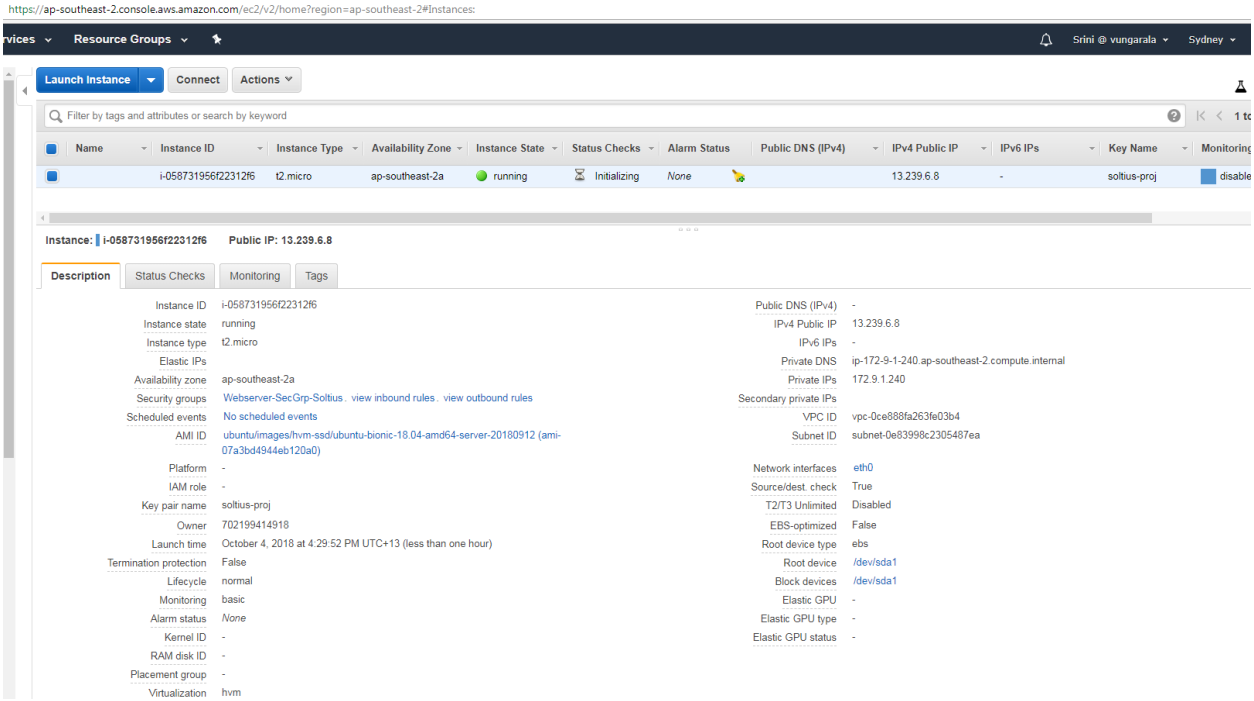


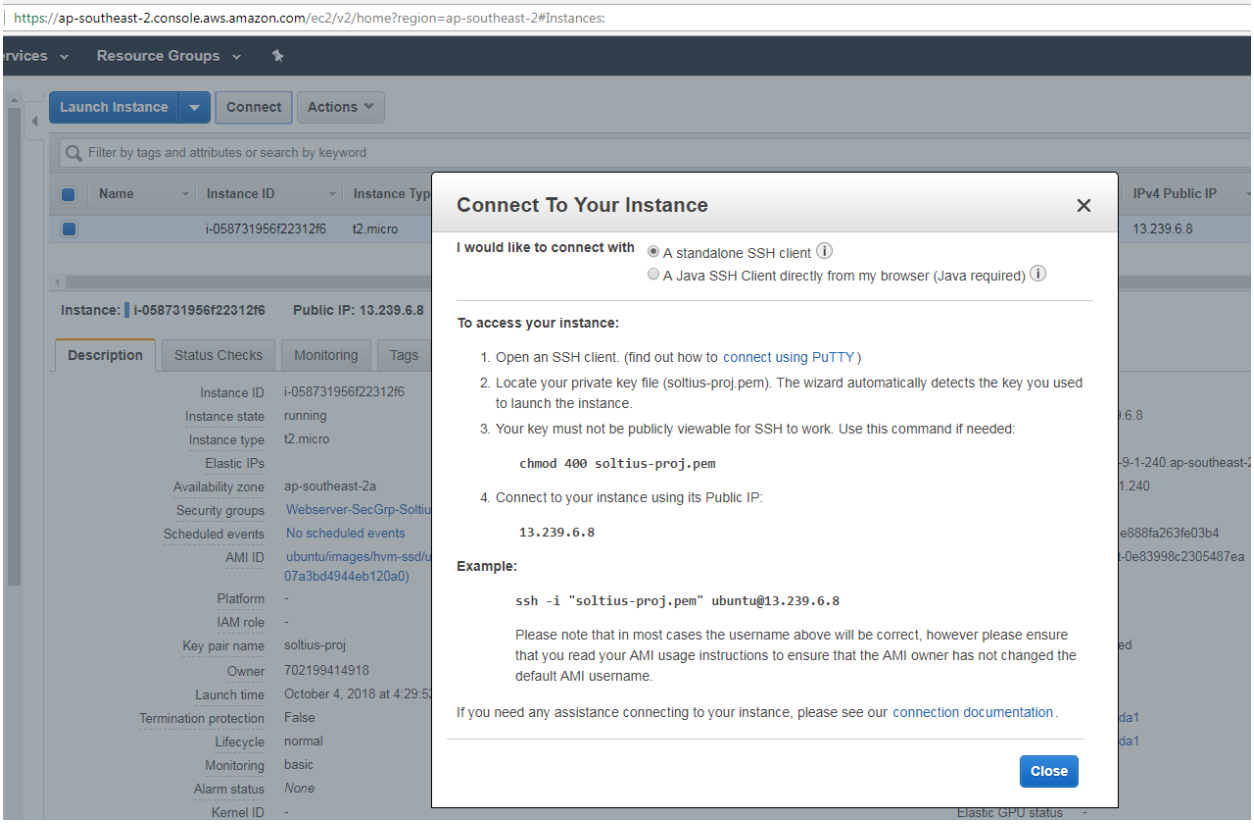
Public Subnets Associated with Custom NACL



Launching EC2 Instance using Ubuntu AMI




https://ap-southeast-2.console.aws.amazon.com/ec2/v2/home?region=ap-southeast-2#Instances:
Resource Groups
Srini @ vungarala
Sydney
Launch Instance
Connect
Actions
Filter by tags and attributes or search by keyword
Name
Instance ID
Instance Type
Availability Zone
Instance State
Status Checks
Alarm Status
Public DNS (IPv4)
IPv4 Public IP
IPv6 IPs
Key Name
i-058731956f22312f6
t2.micro
ap-southeast-2a
running
Initializing
None
13.239.6.8
soltius-proj
Instance: i-058731956f22312f6
Public IP: 13.239.6.8
Description
Status Checks
Monitoring
Tags
Instance ID i-058731956f22312f6
Instance state running
Instance type t2.micro
Elastic IPs
Availability zone ap-southeast-2a
Security groups Webserver-SecGrp-Soltius. view inbound rules. view outbound rules
Scheduled events No scheduled events
AMI ID ubuntu/images/hvm-ssd/ubuntu-bionic-18.04-amd64-server-20180912 (ami-07a3bd4944eb120a0)
Platform -
IAM role -
Key pair name soltius-proj
Owner 702199414918
Launch time October 4, 2018 at 4:29:52 PM UTC+13 (less than one hour)
Termination protection False
Lifecycle normal
Monitoring basic
Alarm status None
Kernel ID -
RAM disk ID -
Placement group -
Virtualization hvm
Public DNS (IPv4) -
IPv4 Public IP 13.239.6.8
IPv6 IPs -
Private DNS ip-172-9-1-240.ap-southeast-2.compute.internal
Private IPs 172.9.1.240
Secondary private IPs
VPC ID vpc-0ce888fa263fe03b4
Subnet ID subnet-0e83998c2305487ea
Network interfaces eth0
Source/dest. check True
T2/T3 Unlimited Disabled
EBS-optimized False
Root device type ebs
Root device /dev/sda1
Block devices /dev/sda1
Elastic GPU -
Elastic GPU type -
Elastic GPU status -


https://ap-southeast-2.console.aws.amazon.com/ec2/v2/home?region=ap-southeast-2#Instances:
Resource Groups
Launch Instance
Connect
Actions
Filter by tags and attributes or search by keyword
Connect To Your Instance
I would like to connect with
A standalone SSH client
A Java SSH Client directly from my browser (Java required)
To access your instance:
1. Open an SSH client. (find out how to connect using PuTTY)
2. Locate your private key file (soltius-proj.pem). The wizard automatically detects the key you used to launch the instance.
3. Your key must not be publicly viewable for SSH to work. Use this command if needed:
chmod 400 soltius-proj.pem
4. Connect to your instance using its Public IP:
13.239.6.8
Example:
ssh -i "soltius-proj.pem" ubuntu@13.239.6.8
Please note that in most cases the username above will be correct, however please ensure that you read your AMI usage instructions to ensure that the AMI owner has not changed the default AMI username.
If you need any assistance connecting to your instance, please see our connection documentation.
Close

Ubuntu config

#!/bin/bash

sudo apt-get update

sudo apt-get install php apache2

sudo apt-get install libapache2-mod-php

sudo apt-get install php-mysqli

sudo apachectl restart (echo "ServerName localhost" | sudo tee /etc/apache2/conf-available/servername.conf sudo service apache2 reload)

sudo service httpd start

sudo chkconfig httpd on

sudo apt-get install mysql-client

mysql -u root -p

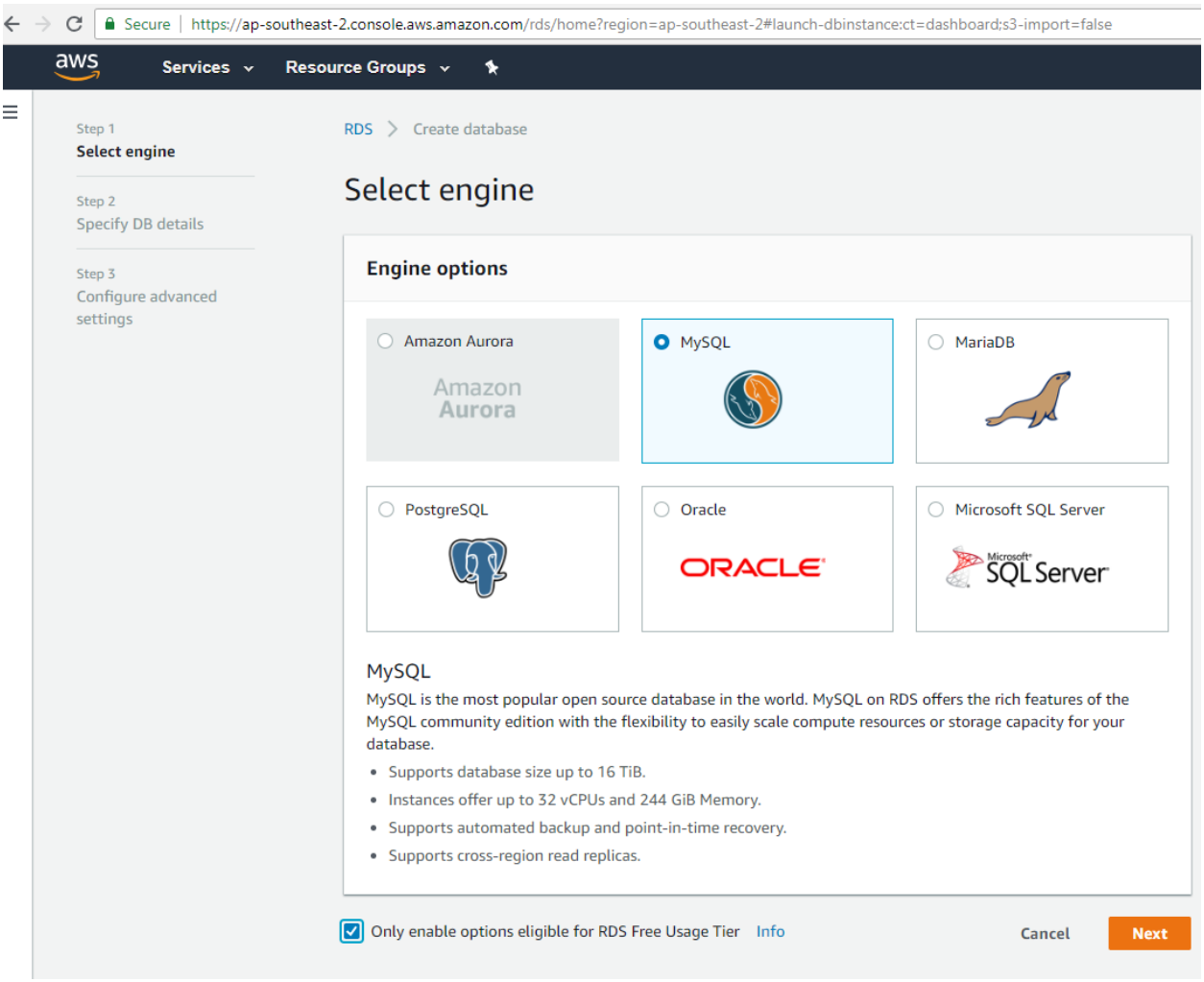
<Enter you mysql root password>

mysql> create database mydb; (don't forget semicolon)

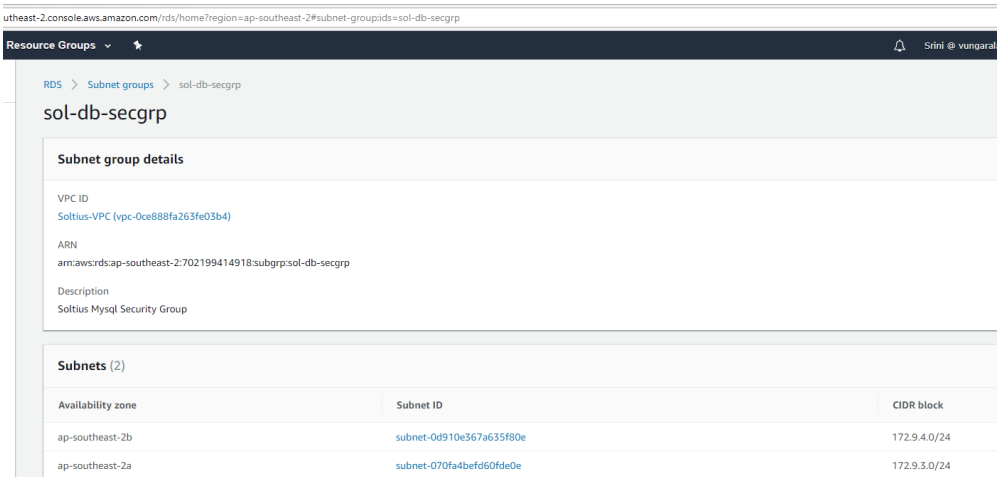
mysql> show databases;

mysql> exit

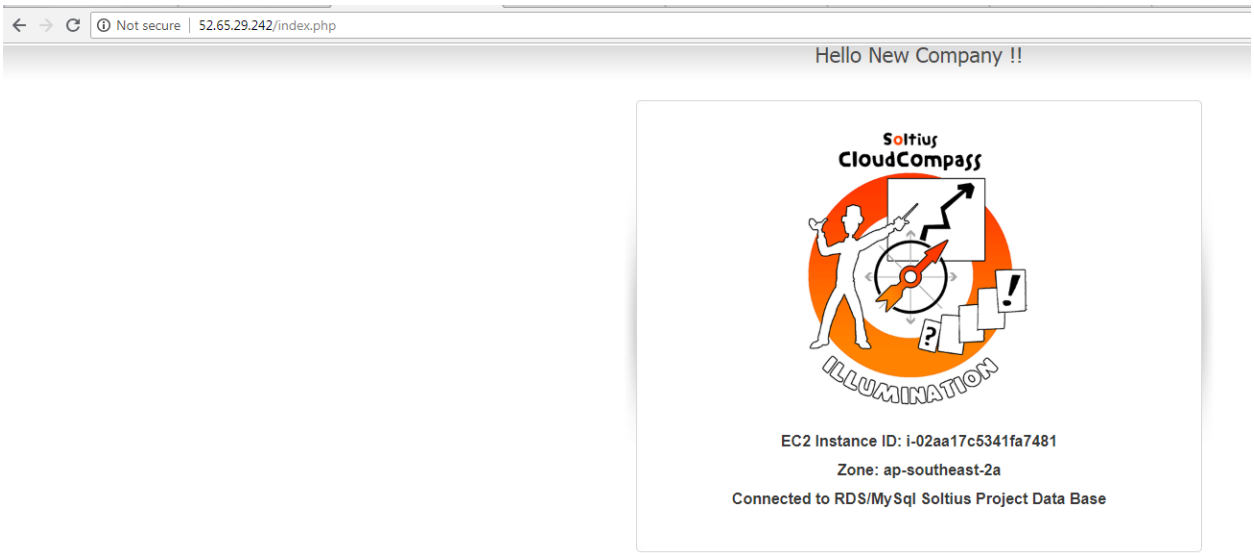
Creation of RDS MYSQL



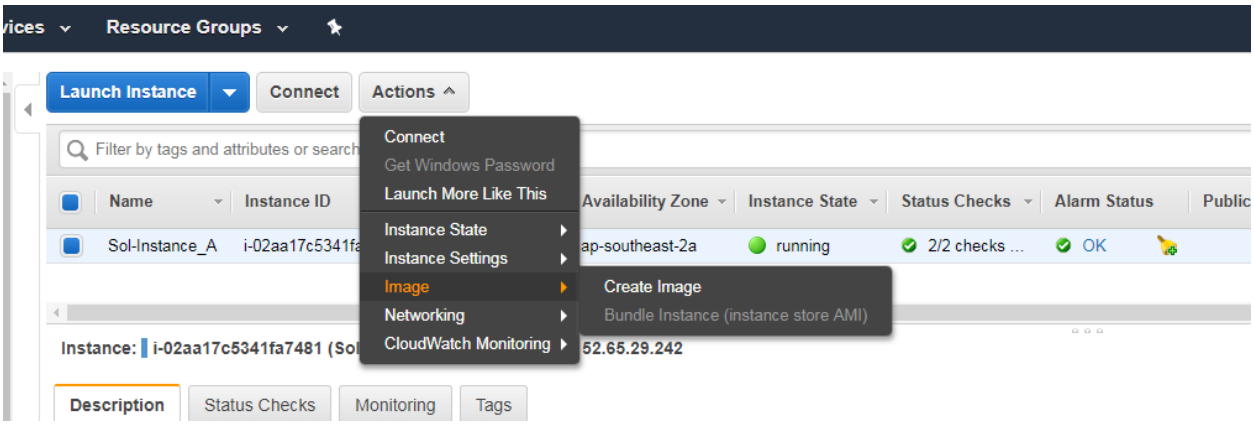
Creation and Assigning of Subnet Group



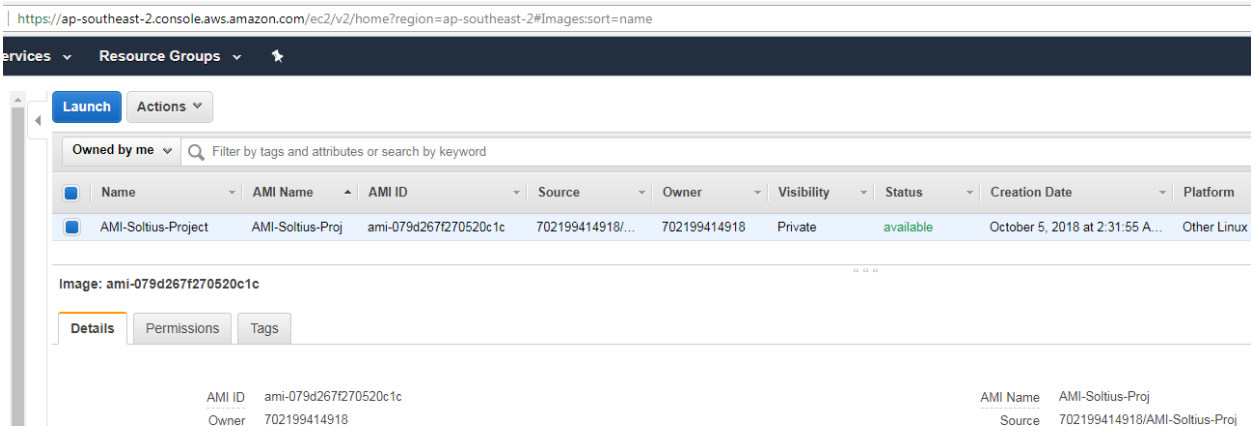
WebPage Display for Mysql DB Connectivity from PublicIP of the EC2 Instance



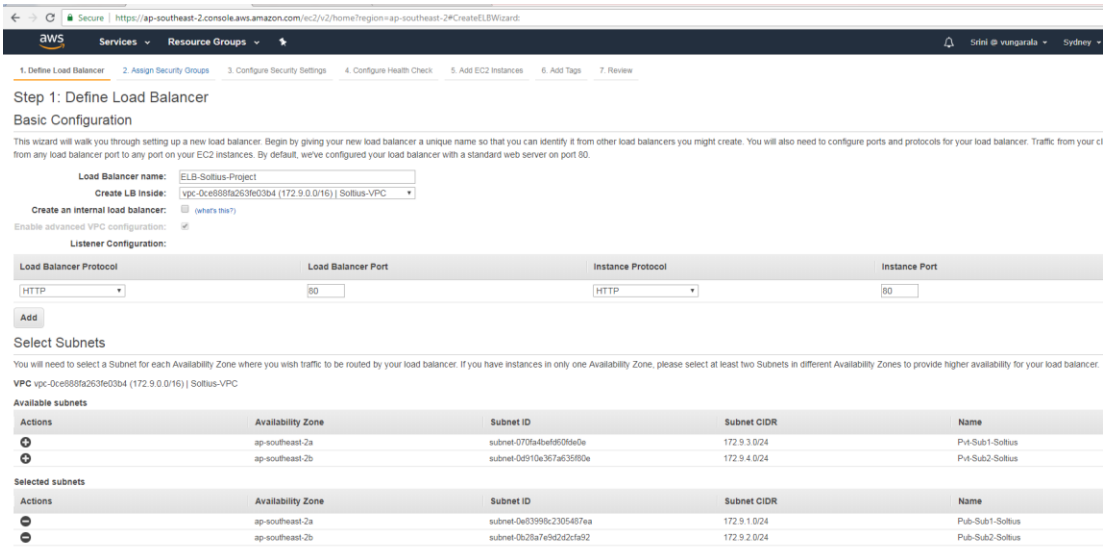
Creation of the AMI from the configured Instance

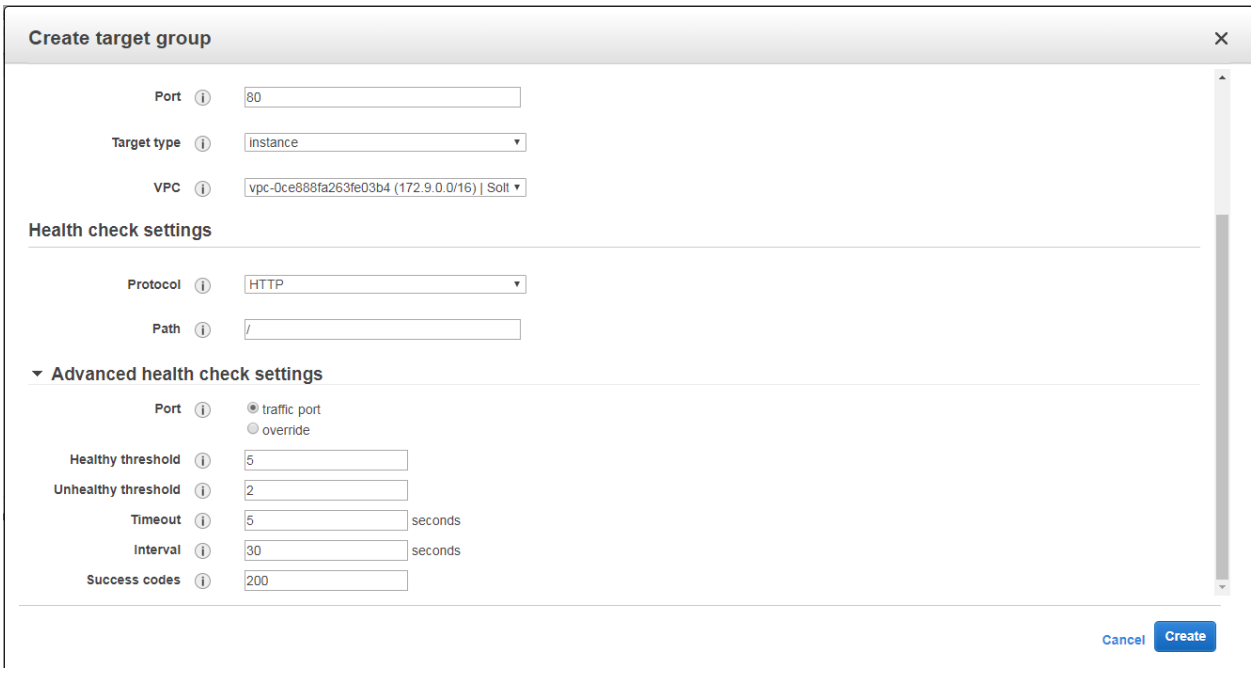


Ami (AMI-Soltius-Project) Created.

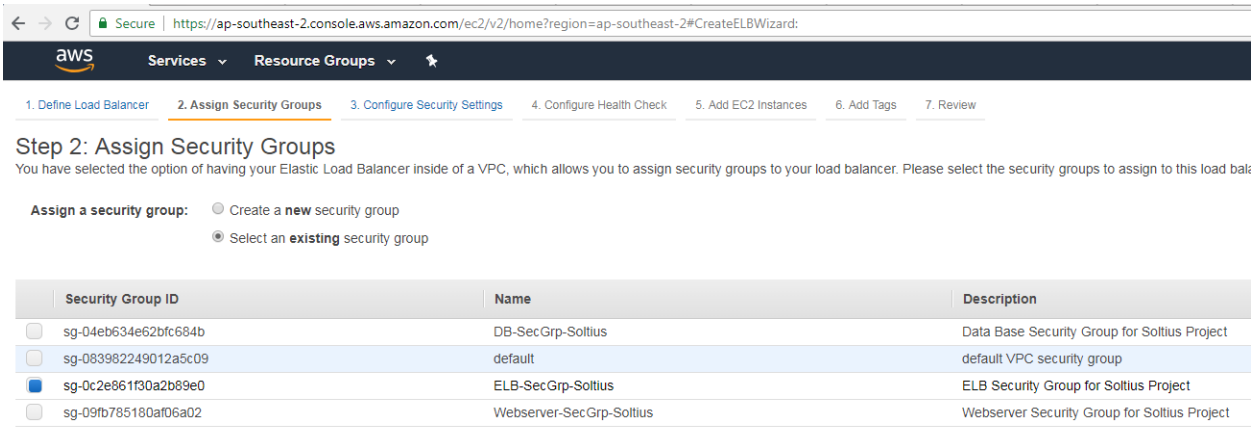


Creation of Classic ELB in Public Subnets

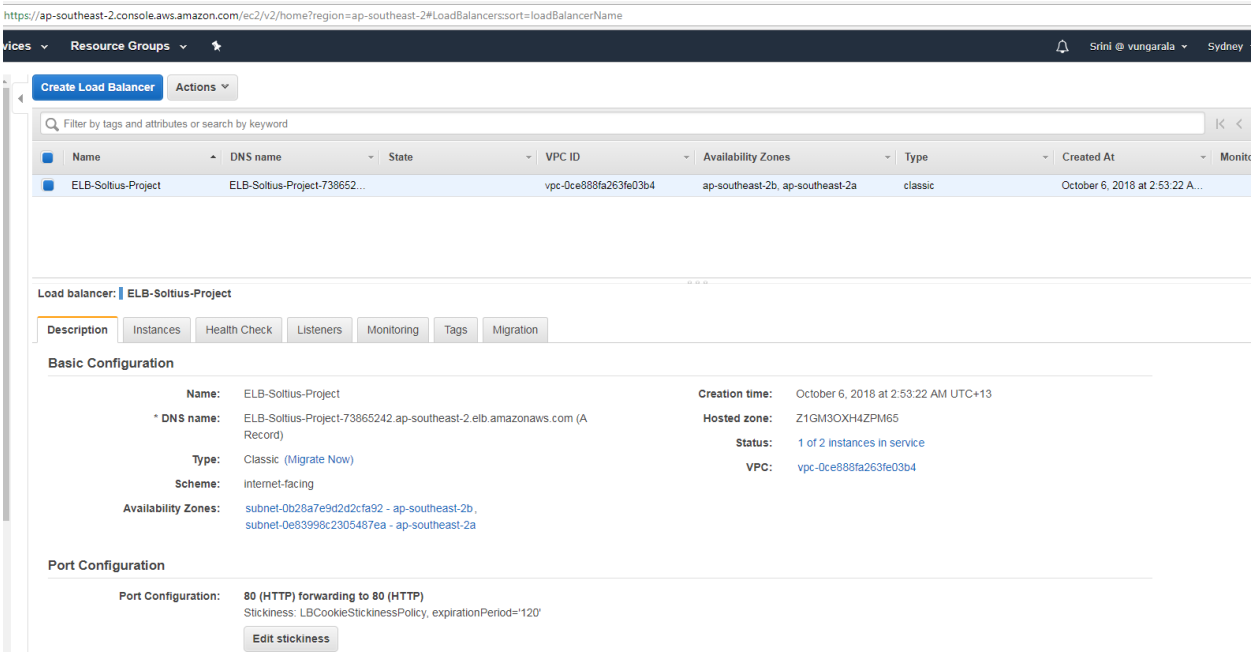




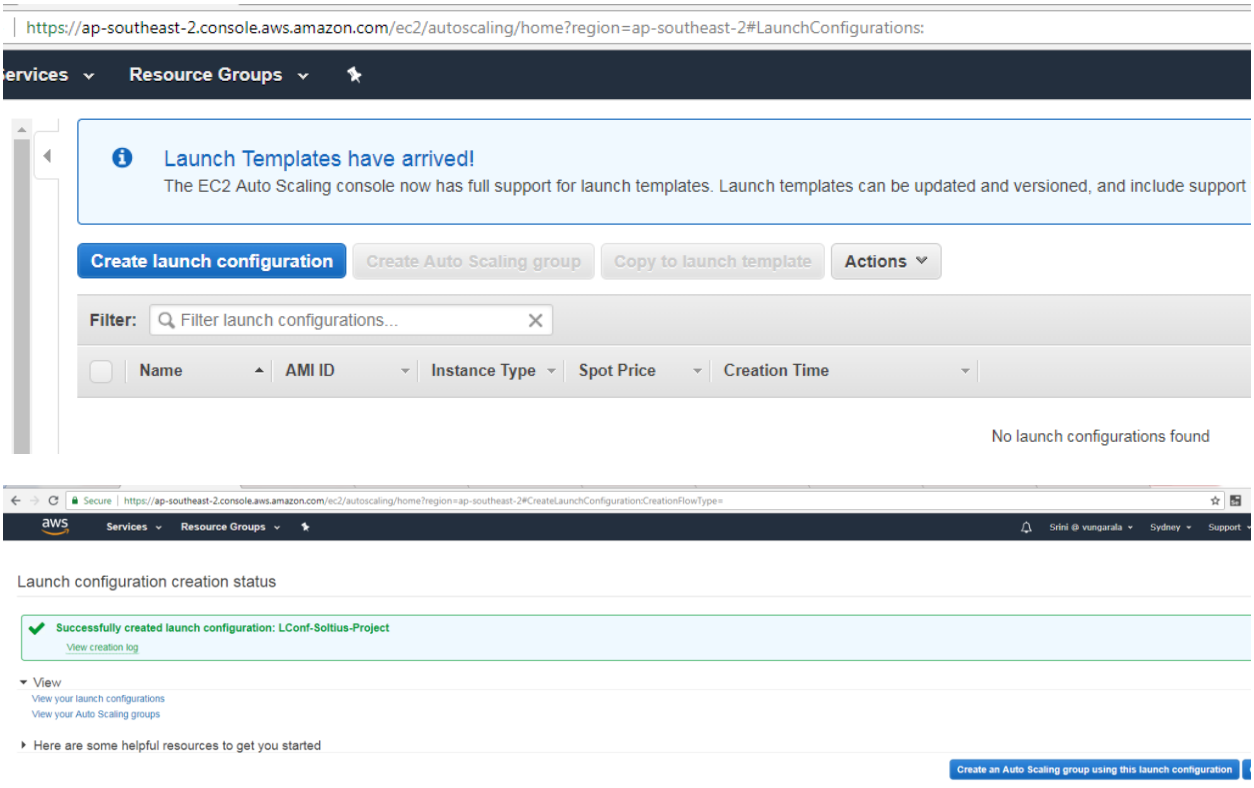
Assigning Security Group ELB-SecGrp-Soltius



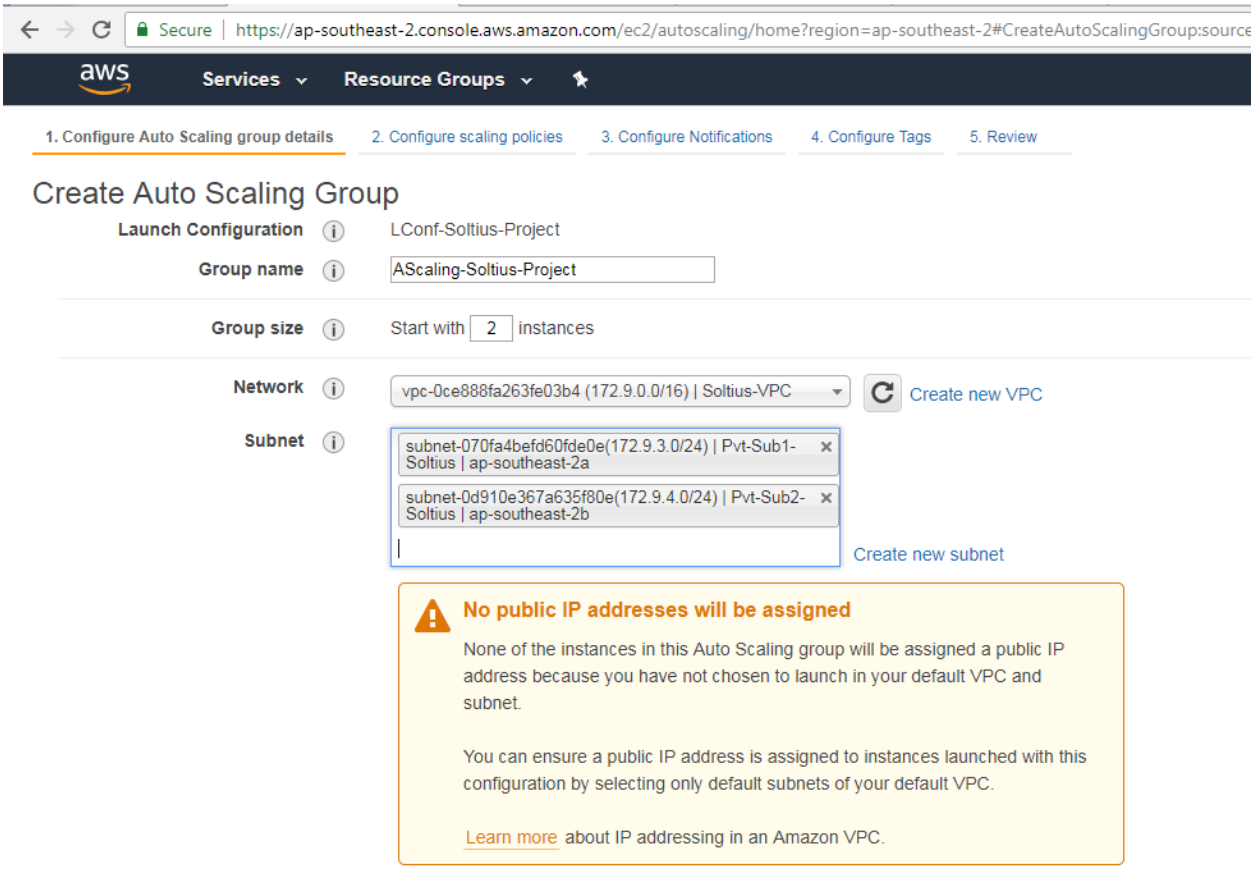
ELB Created Successfully.

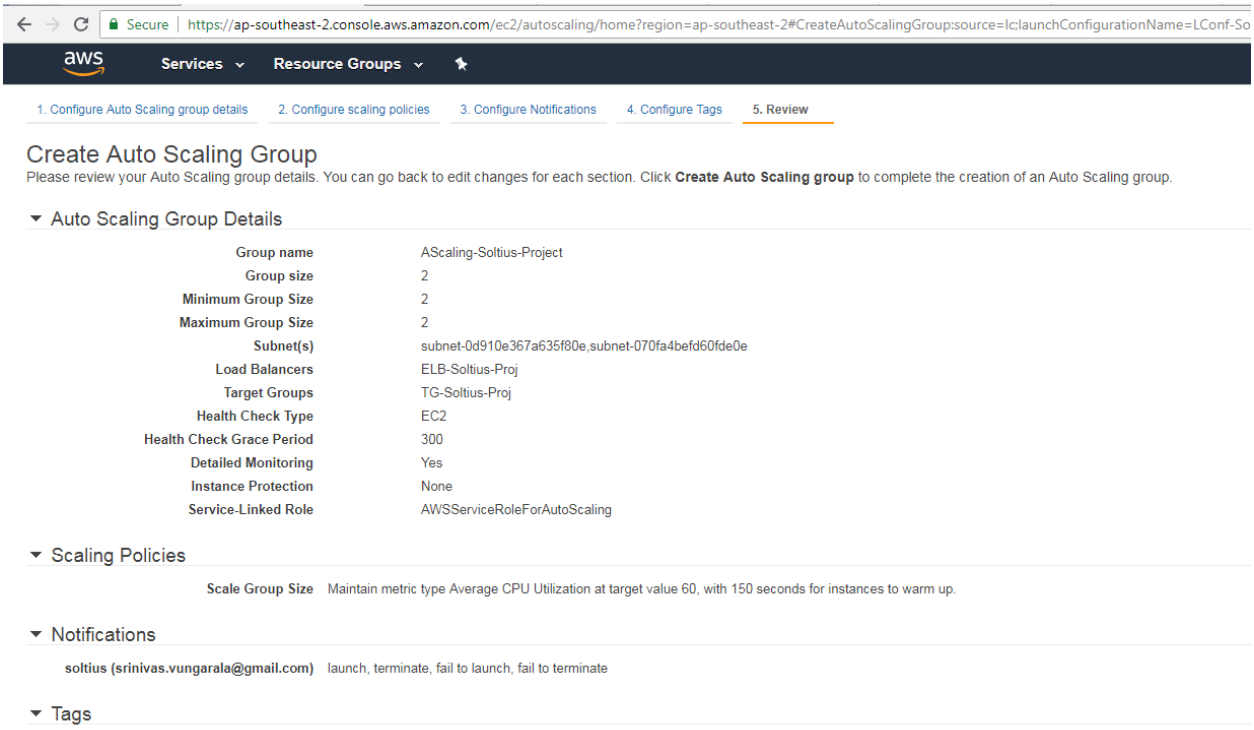


Creating Launch Configuration for Auto scaling and utilizing the newly created AMI (AMI-Soltius-Project)

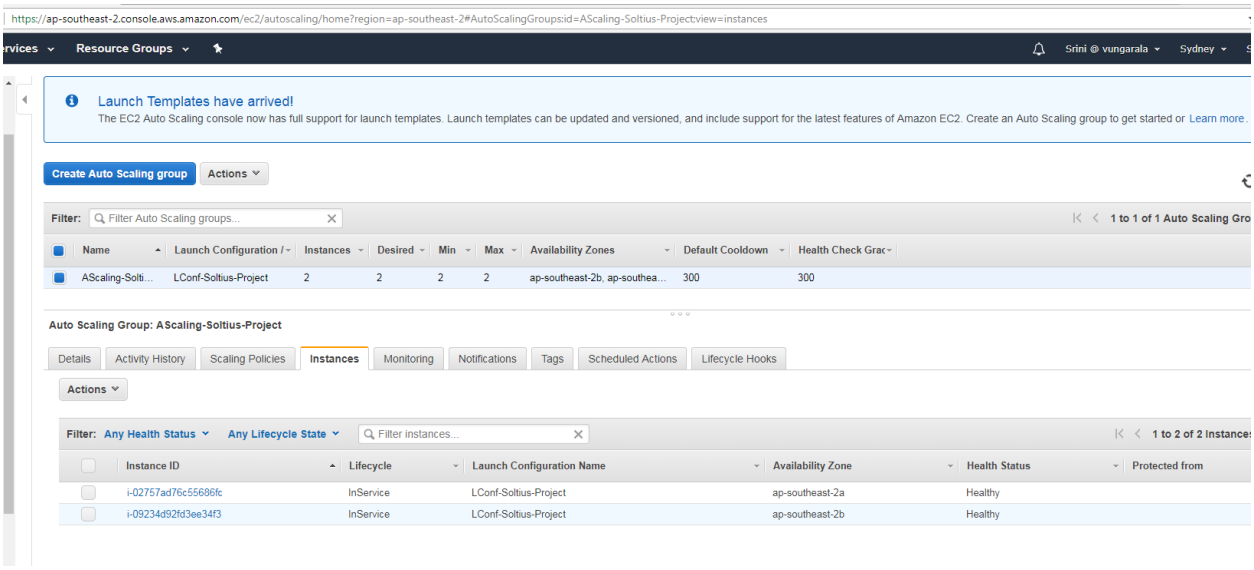


Creating Auto Scaling Group in Private subnets.

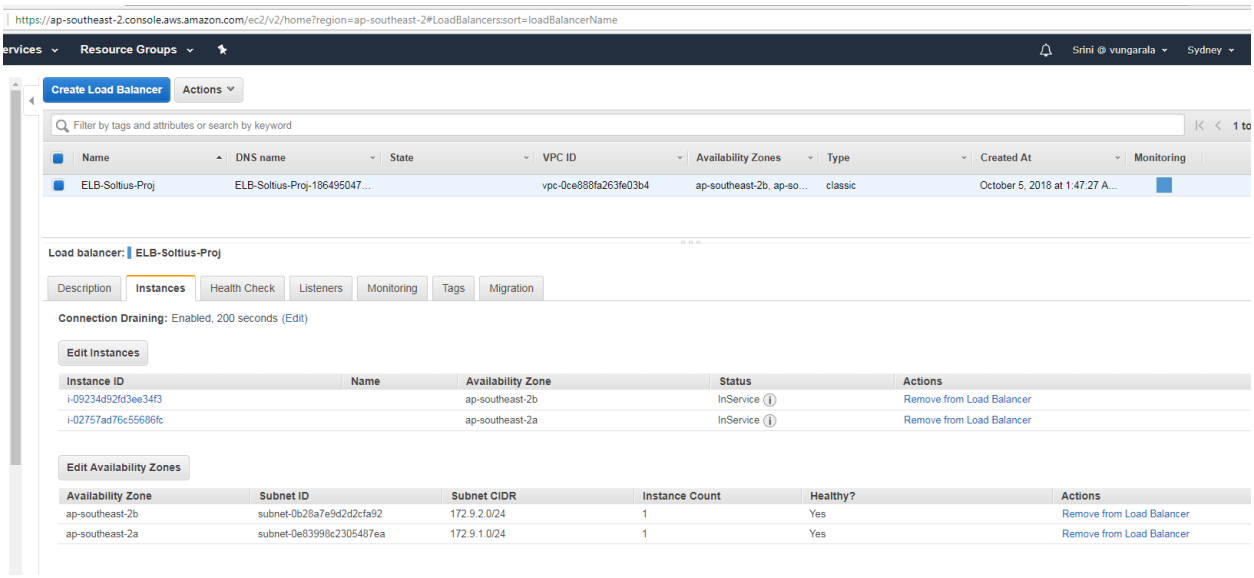




The Instances Launched successfully using Auto scaling

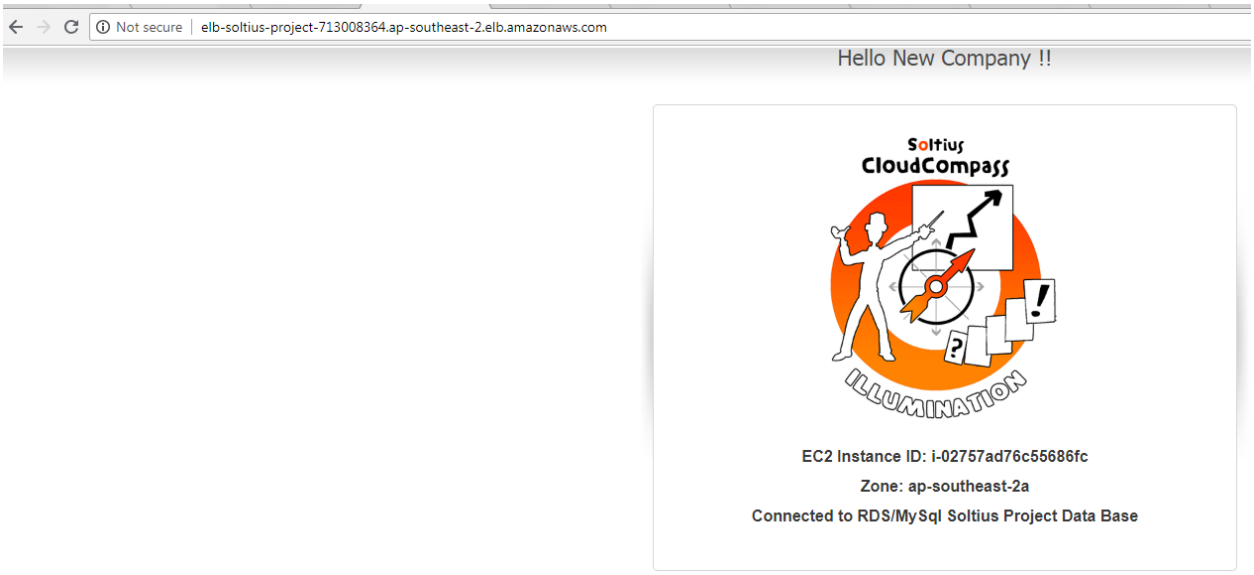


The ELB Updated with the instances attached and Healthy



Application successfully accessed from Load Balancer

Zone:ap-southeast-2a



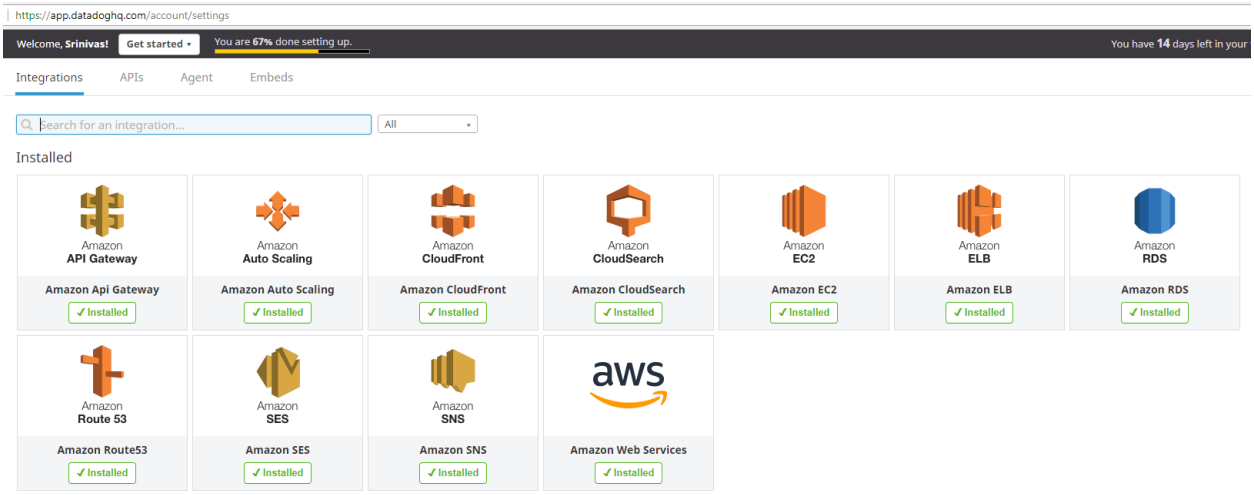
Zone:ap-southeast-2b

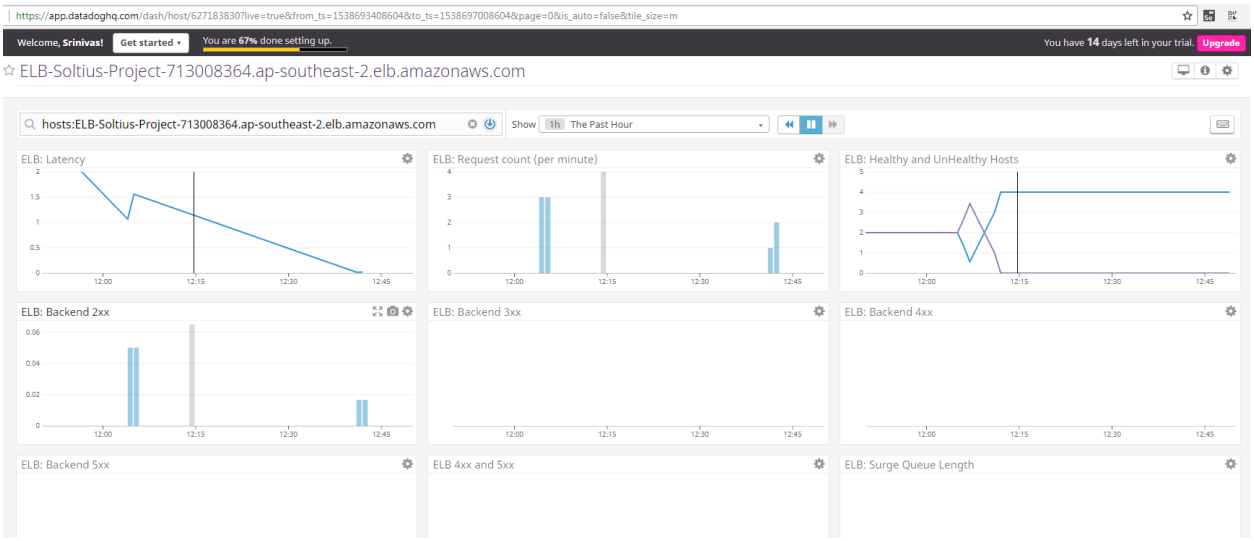
Not secure
elb-soltius-project-713008364.ap-southeast-2.elb.amazonaws.com
Hello New Company !!
Soltius
CloudCompass
ILLUMINATION
EC2 Instance ID: i-09234d92fd3ee34f3
Zone: ap-southeast-2b
Connected to RDS/MySql Soltius Project Data Base

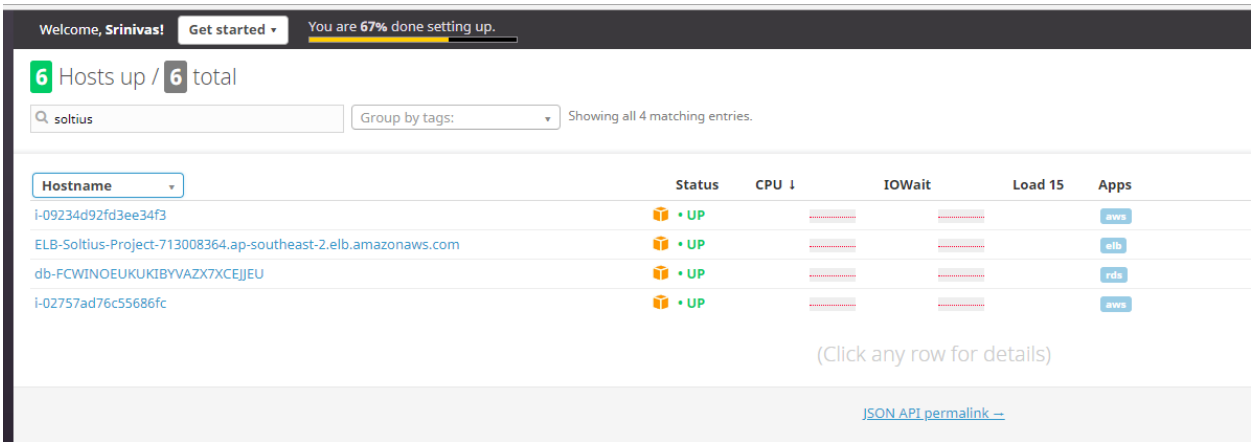
RDS Stopped

elb-soltius-project-713008364.ap-southeast-2.elb.amazonaws.com
Hello New Company !!
Soltius
CloudCompass
ILLUMINATION
EC2 Instance ID: i-02757ad76c55686fc
Zone: ap-southeast-2a
Failed to connect to RDS/MySQL: No route to host

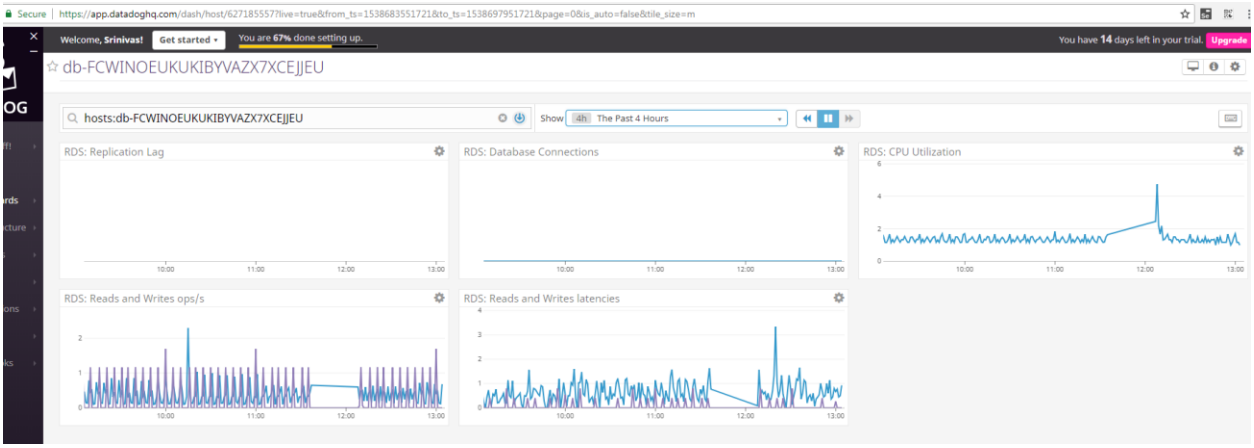
Integration and Configuration of Datadog for AWS



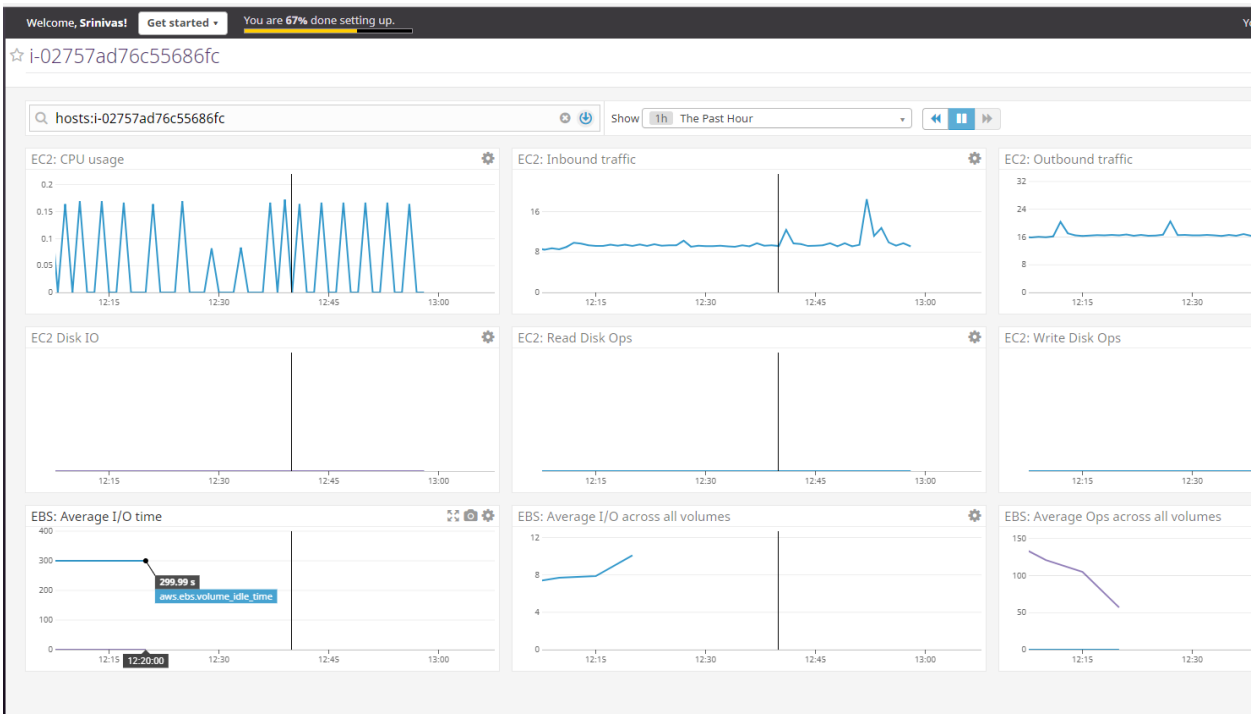


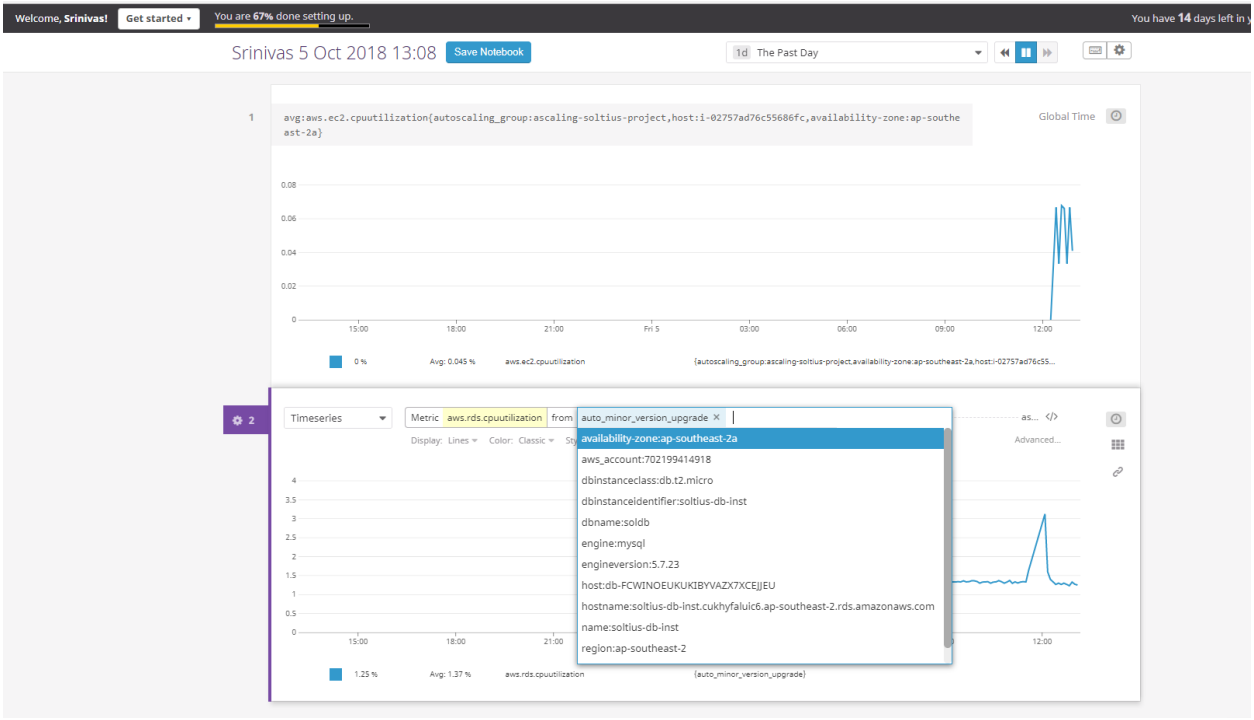


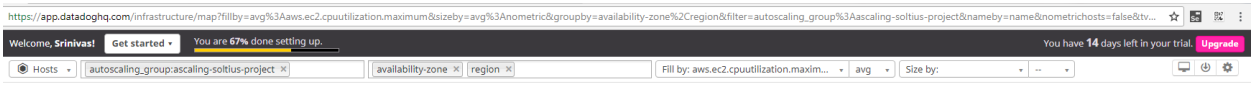
RDS Activity

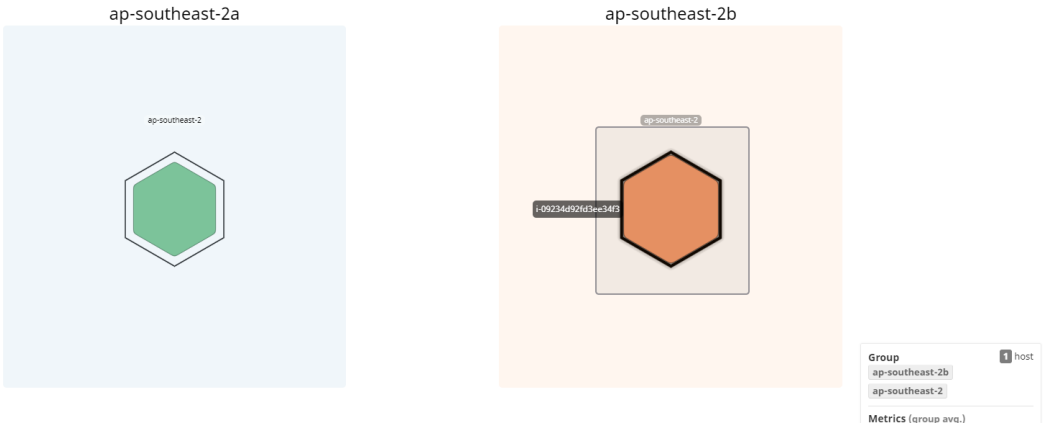


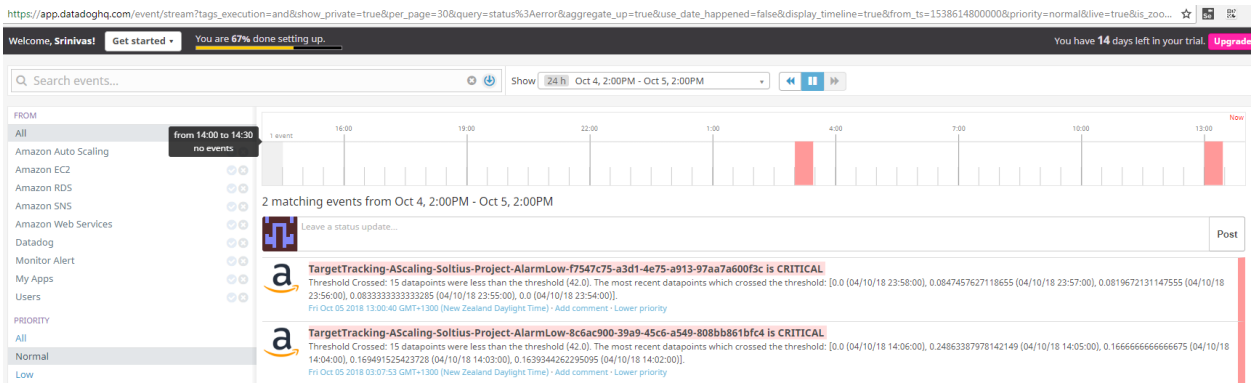
EC2




Welcome, Srinivas!
Get started
You are 67% done setting up.
You have 14 days left in
Srinivas 5 Oct 2018 13:08
Save Notebook
1d The Past Day
avg:aws.ec2.cputilization{autoscaling_group:ascaling-soltius-project,host:i-02757ad76c55686fc,availability-zone:ap-southeast-2a}
Global Time
0.08
0.06
0.04
0.02
0
15:00
18:00
21:00
Fri 5
03:00
06:00
09:00
12:00
0 %
Avg: 0.045 %
aws.ec2.cputilization
{autoscaling_group:ascaling-soltius-project,availability-zone:ap-southeast-2a,host:i-02757ad76c55...
2
Timeseries
Metric
aws.rds.cputilization
from
auto_minor_version_upgrade
Display: Lines
Color: Classic
Advanced...
availability-zone:ap-southeast-2a
aws_account:702199414918
dbinstanceclass:db.t2.micro
dbinstanceidentifier:soltius-db-inst
dbname:soldb
engine:mysql
engineversion:5.7.23
host:db-FCWINOEUKUKIBYVAZX7XCEJJEU
hostname:soltius-db-inst.cukhyfalulc6.ap-southeast-2.rds.amazonaws.com
name:soltius-db-inst
region:ap-southeast-2
4
3.5
3
2.5
2
1.5
1
0.5
0
15:00
18:00
21:00
12:00
1.25 %
Avg: 1.37 %
aws.rds.cputilization
{auto_minor_version_upgrade}


https://app.datadoghq.com/infrastructure/map?fillby=avg%3Aaws.ec2.cputilization.maximum&sizeby=avg%3Anometric&groupby=availability-zone%2Cregion&filter=autoscaling_group%3Aascaling-soltius-project&nameby=name&nometrichosts=false&tv...
Welcome, Srinivas!
Get started
You are 67% done setting up.
You have 14 days left in your trial.
Upgrade
Hosts
autoscaling_group:ascaling-soltius-project
availability-zone
region
Fill by: aws.ec2.cputilization.maxim...
avg
Size by:


ap-southeast-2a
ap-southeast-2
ap-southeast-2b
ap-southeast-2
i-09234d92fd3ee34f3
Group
host
ap-southeast-2b
ap-southeast-2
Metrics (group avg.)



End of the Exercise Cloud-Engineer