

# E91 Cloud DevOps: Fall 2018

## Assignment 1

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[https://code.harvard.edu/sta283/cscie-91\\_sta283](https://code.harvard.edu/sta283/cscie-91_sta283)

Assignment Instruction Manual:

<https://canvas.harvard.edu/courses/53026/files/6620943/download?wrap=1>

### Problem 1:

- 1) Setup a VPC with appropriate tag/name of CDR of 192.168.0.0/22
  - a. **Answer:** There are 1024 possible IPs in this CIDR of the selected VPC below
  - b. **Result:** The resulting VPC details are captured below

The screenshot shows the AWS VPC console. At the top, there's a 'Create VPC' button and an 'Actions' dropdown. Below is a search bar and a table of VPCs. The table has columns: Name, VPC ID, State, IPv4 CIDR, IPv6 CIDR, DHCP options set, Route table, and Network ACL. Three VPCs are listed: vpc-0a24fcd663589f1f8, hwk2\_vpc1, and vpc-d23c11b5. The 'hwk2\_vpc1' VPC is selected. Below the table, the details for 'vpc-00307c7ffde8a31ac | hwk2\_vpc1' are shown. The 'Summary' tab is active, displaying VPC ID, State (available), IPv4 CIDR (192.168.0.0/22), IPv6 CIDR, DHCP options set (dopt-fa2c709d), Route table (rtb-043f9d937fcb28de3), Network ACL (acl-0f00acf32ada14564), and Tenancy (Default).

Name	VPC ID	State	IPv4 CIDR	IPv6 CIDR	DHCP options set	Route table	Network ACL
	vpc-0a24fcd663589f1f8	available	10.0.0.0/16		dopt-fa2c709d	rtb-060f13fee7...	acl-0c9e138
hwk2_vpc1	vpc-00307c7ffde8a31ac	available	192.168.0.0/22		dopt-fa2c709d	rtb-043f9d937f...	acl-0f00acf3
	vpc-d23c11b5	available	172.31.0.0/16		dopt-fa2c709d	rtb-466cb520	acl-5357a83

**vpc-00307c7ffde8a31ac | hwk2\_vpc1**

**Summary** | CIDR Blocks | Flow Logs | Tags

VPC ID: vpc-00307c7ffde8a31ac | hwk2\_vpc1  
State: available  
IPv4 CIDR: 192.168.0.0/22  
IPv6 CIDR:  
DHCP options set: dopt-fa2c709d  
Route table: rtb-043f9d937fcb28de3  
Network ACL: acl-0f00acf32ada14564  
Tenancy: Default  
DNS resolution: yes  
DNS hostnames: no  
ClassicLink DNS Support: no

- 2) Split the VPC CIDR equally amongst two subnets tagged, Public and private
  - a. **Result:** The resulting public and private subnet details are captured below

### Public Subnet

The screenshot shows the AWS Subnet console. At the top, there's a search bar and a table of subnets. The table has columns: Name, Subnet ID, State, VPC, Available IPv4 Addresses, Availability Zone, IPv4 CIDR, IPv6 CIDR, Route Table, and Network ACL. Two subnets are listed: hwk2\_vpc1\_public and hwk2\_vpc1\_private. The 'hwk2\_vpc1\_public' subnet is selected. Below the table, the details for 'subnet-0335671bcd1625460' are shown. The 'Description' tab is active, displaying Subnet ID, VPC (vpc-00307c7ffde8a31ac | hwk2\_vpc1), Available IPv4 Addresses (505), Availability Zone (us-west-1a), State (available), IPv4 CIDR (192.168.0.0/23), IPv6 CIDR (-), Route Table (rtb-0a131f2c10276d858 | hwk2\_vpc1\_public\_rt), Network ACL (acl-0f00acf32ada14564), Default subnet (No), and Auto-assign public IPv4 address (Yes).


Name	Subnet ID	State	VPC	Available IPv4 Addresses	Availability Zone	IPv4 CIDR	IPv6 CIDR	Route Table	Network ACL
hwk2_vpc1_public	subnet-0335671bcd1625460	available	vpc-00307c7ffde8a31ac   hwk2_vpc1	505	us-west-1a	192.168.0.0/23	-	rtb-0a131f2c10276d858   hwk2_vpc1_public_rt	-
hwk2_vpc1_private	subnet-06743feb10f2e9f81	available	vpc-00307c7ffde8a31ac   hwk2_vpc1	506	us-west-1a	192.168.2.0/23	-	-	-

**Subnet: subnet-0335671bcd1625460**

**Description** | Flow Logs | Route Table | Network ACL | Tags

Subnet ID: subnet-0335671bcd1625460  
VPC: vpc-00307c7ffde8a31ac | hwk2\_vpc1  
Available IPv4 Addresses: 505  
Availability Zone: us-west-1a  
State: available  
IPv4 CIDR: 192.168.0.0/23  
IPv6 CIDR: -  
Route Table: rtb-0a131f2c10276d858 | hwk2\_vpc1\_public\_rt  
Network ACL: acl-0f00acf32ada14564  
Default subnet: No  
Auto-assign public IPv4 address: Yes  
Auto-assign IPv6 address: No

## Private Subnet

	hwk2_vpc1_private	subnet-06743feb10f2e9f81	available	vpc-00307c7ffde8a31ac   hwk2_vpc1	192.168.2.0/23	506	-
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Subnet: subnet-06743feb10f2e9f81							
Description		Flow Logs		Route Table		Network ACL	
						Tags	
Subnet ID		subnet-06743feb10f2e9f81		State		available	
VPC		vpc-00307c7ffde8a31ac   hwk2_vpc1		IPv4 CIDR		192.168.2.0/23	
Available IPv4 Addresses		506		IPv6 CIDR		-	
Availability Zone		us-west-1a		Route Table		rtb-0a79006348f131681   hwk2_vpc1_private_rt	
Network ACL		acl-0f00acf32ada14564		Default subnet		No	
Auto-assign public IPv4 address		No		Auto-assign IPv6 address		No	

### 3) Create a Nat gateway and Internet gateway

**Result: The resulting NAT and Internet gateway details are captured below**

## Nat Gateway

Create NAT Gateway		Actions					
Filter by tags and attributes or search by keyword							
<input type="checkbox"/>	Name	NAT Gateway ID	Status	Status Message	Elastic IP Address	Private IP Address	Network Interface
	nat-0a975683845...	nat-0a975683845dc1c25	available	-	52.8.207.86	192.168.0.41	eni-00eacef6a827...
<input type="checkbox"/>	nat-0f972dfcbca95...	nat-0f972dfcbca95dc1c25	deleted	-	54.193.49.246	192.168.1.61	eni-08d925ffe09d...

NAT Gateway: nat-0a975683845dc1c25							
Details		Monitoring		Tags			
NAT Gateway ID		nat-0a975683845dc1c25		Status		available	
Status Message		-		Elastic IP Address		52.8.207.86	
Private IP Address		192.168.0.41		Network Interface ID		eni-00eacef6a827665bd	
VPC		vpc-00307c7ffde8a31ac   hwk2_vpc1		Subnet		subnet-0335671bcd1625460   hwk2_vpc1_public	
Created		October 18, 2018 at 5:06:26 PM UTC-7		Deleted		-	

## Internet Gateway

Create internet gatewayActions

Filter by tags and attributes or search by keyword

1 to 2 of 2

<input type="checkbox"/>	Name	ID	State	VPC
<input checked="" type="checkbox"/>	hwk2_vpc1_igw	igw-04b4ea84e13f...	detached	-
<input type="checkbox"/>		igw-7be4c71f	attached	vpc-d23c11b5

- 4) Setup routes in route table so private subnet can access internet via NAT while public subnet has access via IGW

**Result: The NAT gateway, internet gateway, routing tables and subnet configuration details are shown below**

### Nat gateway config showing 192.168.0.41 IP in public subnet

Create NAT Gateway Actions

Filter by tags and attributes or search by keyword

Name	NAT Gateway ID	Status	Status Message	Elastic IP Address	Private IP Address	Network Interface	VPC
	nat-0a975683845...	available	-	52.8.207.86	192.168.0.41	eni-00eacef6a827...	vpc-00307...
	nat-0f972dfc9a95...	deleted	-	54.193.49.246	192.168.1.61	eni-08d925ffe09d...	vpc-00307...

NAT Gateway: nat-0a975683845dc1c25

Details Monitoring Tags

NAT Gateway ID	nat-0a975683845dc1c25	Status	available
Status Message	-	Elastic IP Address	52.8.207.86
Private IP Address	192.168.0.41	Network Interface ID	eni-00eacef6a827665bd
VPC	vpc-00307c7ffde8a31ac   hwk2_vpc1	Subnet	subnet-0335671bcd1625460   hwk2_vpc1_public
Created	October 18, 2018 at 5:06:26 PM UTC-7	Deleted	-

### Private routing table showing internet request redirection via Nat gateway

hwk2\_vpc1\_private\_rt rtb-0a79006348f131681 1 Subnet No vpc-00307c7ffde8a31ac | hwk2\_vpc1

rtb-0a79006348f131681 | hwk2\_vpc1\_private\_rt

Summary Routes Subnet Associations Route Propagation Tags

Edit

View: All rules

Destination	Target	Status	Propagated
192.168.0.0/22	local	Active	No
0.0.0.0/0	nat-0a975683845dc1c25	Active	No

### Private subnet showing attached private routing table

hwk2\_vpc1\_private subnet-06743feb10f2e9f81 available vpc-00307c7ffde8a31ac | hwk2\_vpc1 192.168.2.0/23 506 -

Subnet: subnet-06743feb10f2e9f81

Description Flow Logs Route Table Network ACL Tags

Subnet ID	subnet-06743feb10f2e9f81	State	available
VPC	vpc-00307c7ffde8a31ac   hwk2_vpc1	IPv4 CIDR	192.168.2.0/23
Available IPv4 Addresses	506	IPv6 CIDR	-
Availability Zone	us-west-1a	Route Table	rtb-0a79006348f131681   hwk2_vpc1_private_rt
Network ACL	acl-0f00ac32ada14564	Default subnet	No
Auto-assign public IPv4 address	No	Auto-assign IPv6 address	No

## Internet gateway showing attachment to the VPC

Create internet gateway

Actions

Filter by tags and attributes or search by keyword

<<

<

1 to 2 of 2

>

>>

<input type="checkbox"/>	Name	ID	State	VPC
<input checked="" type="checkbox"/>	hwk2_vpc1_igw	igw-04b4ea84e13f...	attached	vpc-00307c7ffde8a31ac   hwk2_vpc1
<input type="checkbox"/>		igw-7be4c71f	attached	vpc-d23c11b5

## Security group for public instance for allowing inbound http and https connections

Create Security Group

Security Group Actions

Filter All security groups

Search Security Groups and t X

<< 1 to 4 of 4 Security Groups >>

<input type="checkbox"/>	Name tag	Group ID	Group Name	VPC	Description
<input type="checkbox"/>	hwk2_ssh_internet	sg-0196d07fd...	hwk2_ssh_internet	vpc-00307c7ffde8a31ac   hw...	open ssh port to the internet
<input checked="" type="checkbox"/>	hwk2_internet_internet	sg-057cb4b49...	hwk2_internet_internet	vpc-00307c7ffde8a31ac   hw...	open http and https ports to the internet
<input type="checkbox"/>		sg-0c0104e83...	default	vpc-00307c7ffde8a31ac   hw...	default VPC security group
<input type="checkbox"/>		sg-ef68e094	default	vpc-d23c11b5	default VPC security group

sg-057cb4b4959061df7 | hwk2\_internet\_internet

Summary

Inbound Rules

Outbound Rules

Tags

Cancel

Save

Type	Protocol	Port Range	Source	Description	Remove
HTTP (80)	TCP (6)	80	0.0.0.0/0	opens http port to intern	X
HTTPS (443)	TCP (6)	443	0.0.0.0/0	opens https port to the ir	X

Add another rule

## Security group for public instance for allowing inbound ssh connections

Create Security Group

Security Group Actions

Filter All security groups

Search Security Groups and t

X

<< < 1 to 3 of 3 Security Groups > >>

<input type="checkbox"/>	Name tag	Group ID	Group Name	VPC	Description
<input checked="" type="checkbox"/>	hwk2_ssh_internet	sg-0196d07fd...	hwk2_ssh_internet	vpc-00307c7ffde8a31ac   hw...	open ssh port to the internet
<input type="checkbox"/>		sg-0c0104e83...	default	vpc-00307c7ffde8a31ac   hw...	default VPC security group
<input type="checkbox"/>		sg-ef68e094	default	vpc-d23c11b5	default VPC security group

sg-0196d07fd09191237 | hwk2\_ssh\_internet

Summary

Inbound Rules

Outbound Rules

Tags

Cancel

Save

Type	Protocol	Port Range	Source	Description	Remove
SSH (22)	TCP (6)	22	0.0.0.0/0	open 22 to the internet	
Add another rule					

Security group for private instance for allowing inbound ssh connections from public subnet

Create Security GroupSecurity Group Actions

FilterAll security groups

Search Security Groups and t

<< 1 to 5 of 5 Security Groups >>

	Name tag	Group ID	Group Name	VPC	Description
<input checked="" type="checkbox"/>	hwk2_ssh_publicSubnet	sg-0c8ecf07c0...	hwk2_ssh_publicSub...	vpc-00307c7ffde8a31ac   hw...	open ssh port to public subnet
<input type="checkbox"/>	hwk2_ssh_internet	sg-0196d07fd...	hwk2_ssh_internet	vpc-00307c7ffde8a31ac   hw...	open ssh port to the internet
<input type="checkbox"/>	hwk2_internet_internet	sg-057cb4b49...	hwk2_internet_internet	vpc-00307c7ffde8a31ac   hw...	open http and https ports to the internet
<input type="checkbox"/>		sg-0c0104e83...	default	vpc-00307c7ffde8a31ac   hw...	default VPC security group
<input type="checkbox"/>		sg-ef68e094	default	vpc-d23c11b5	default VPC security group

sg-0c8ecf07c05d7996f | hwk2\_ssh\_publicSubnet

Summary

Inbound Rules

Outbound Rules

Tags

Cancel

Save

Type	Protocol	Port Range	Source	Description	Remove
SSH (22)	TCP (6)	22	192.168.0.0/23	allow public subnet ssh	

Add another rule

5) Create an EC2 instance in both public and private subnet. Then demonstrate locking when connecting to Internet from both instances

Result:

Public Instance showing security groups, public IP, private IP etc.

Launch InstanceConnectActions

Filter by tags and attributes or search by keyword

<< 1 to 2 of 2 >>

	Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)
<input type="checkbox"/>	hwk2_vpc1_private_instance1	i-00aba849b20bcf55a	t2.micro	us-west-1a	running	Initializing	None	
<input checked="" type="checkbox"/>	hwk2_vpc1_public_instance1	i-0da8da272581e3e...	t2.micro	us-west-1a	running	2/2 checks ...	None	

Instance: i-0da8da272581e3e13 (hwk2\_vpc1\_public\_instance1)Public IP: 13.57.222.95

Description

Status Checks

Monitoring

Tags

Instance ID

Instance state

Instance type

Elastic IPs

Availability zone

Security groups

Scheduled events

AMI ID

Platform

IAM role

Key pair name

Owner

Launch time

Termination protection

Lifecycle

Monitoring

Alarm status

Public DNS (IPv4)

IPv4 Public IP

IPv6 IPs

Private DNS

Private IPs

Secondary private IPs

VPC ID

Subnet ID

Network interfaces

Source/dest. check

T2/T3 Unlimited

EBS-optimized

Root device type

Root device

Block devices

i-0da8da272581e3e13

running

t2.micro

us-west-1a

hwk2\_ssh\_internet , hwk2\_internet\_internet .  
view inbound rules . view outbound rules

No scheduled events

ubuntu/images/hvm-ssd/ubuntu-bionic-18.04-amd64-server-20180912 (ami-063aa838bd7631e0b)

-

-

e91\_key

293836347668

October 18, 2018 at 6:58:24 PM UTC-7 (less than one hour)

False

normal

basic

Alarm status

-

13.57.222.95

-

ip-192-168-1-102.us-west-1.compute.internal

192.168.1.102

vpc-00307c7ffde8a31ac

subnet-0335671bcd1625460

eth0

True

Disabled

False

ebs

/dev/sda1

/dev/sda1

## Private Instance showing security group, private IP etc.

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)
hwk2_vpc1_private_instance1	i-00aba649b20bcf55a	t2.micro	us-west-1a	running	Initializing	None	
hwk2_vpc1_public_instance1	i-0da8da272581e3e...	t2.micro	us-west-1a	running	2/2 checks ...	None	

Instance: i-00aba649b20bcf55a (hwk2\_vpc1\_private\_instance1) Private IP: 192.168.2.108

Description Status Checks Monitoring Tags

Instance ID	i-00aba649b20bcf55a	Public DNS (IPv4)	-
Instance state	running	IPv4 Public IP	-
Instance type	t2.micro	IPv6 IPs	-
Elastic IPs		Private DNS	ip-192-168-2-108.us-west-1.compute.internal
Availability zone	us-west-1a	Private IPs	192.168.2.108
Security groups	hwk2_ssh_publicSubnet . view inbound rules . view outbound rules	Secondary private IPs	
Scheduled events	No scheduled events	VPC ID	vpc-00307c7fde8a31ac
AMI ID	ubuntu/images/hvm-ssd/ubuntu-bionic-18.04-amd64-server-20180912 (ami-063aa838bd7631e0b)	Subnet ID	subnet-06743feb102e9f81
Platform	-	Network interfaces	eth0
IAM role	-	Source/dest. check	True
Key pair name	e91_key	T2/T3 Unlimited	Disabled
Owner	293836347668	EBS-optimized	False
Launch time	October 18, 2018 at 7:07:14 PM UTC-7 (less than one hour)	Root device type	ebs
Termination protection	False	Root device	/dev/sda1
Lifecycle	normal	Block devices	/dev/sda1
Monitoring	basic		

## Locking demonstration:

### Public Instance

when ssh port security group is disabled on the public instance via the AWS console

<input checked="" type="checkbox"/>	sg-057cb4b4959061df7	hwk2_internet_internet	open http and https ports to the internet
<input type="checkbox"/>	sg-0196d07fd09191237	hwk2_ssh_internet	open ssh port to the internet

There was no telnet response from local VM to public instance

```
stakes@CSCI91:~$ telnet 13.57.222.95 22
Trying 13.57.222.95...
```

However, when the ssh port security group on the public instance is reenabled, the telnet command indicates ssh connectivity via the public instance IP

```
stakes@CSCI91:~$ telnet 13.57.222.95 22
Trying 13.57.222.95...
Connected to 13.57.222.95.
Escape character is '^]'.
SSH-2.0-OpenSSH_7.6p1 Ubuntu-4
```

After accessing the public instance, the public instance also demonstrates internet connectivity via the “ping” command to google.com

```
ubuntu@ip-192-168-1-102:~$ ping google.com
PING google.com (172.217.0.46) 56(84) bytes of data.
64 bytes from lga15s43-in-f46.1e100.net (172.217.0.46): icmp_seq=1 ttl=48 time=1.87 ms
64 bytes from lga15s43-in-f46.1e100.net (172.217.0.46): icmp_seq=2 ttl=48 time=1.85 ms
64 bytes from lga15s43-in-f46.1e100.net (172.217.0.46): icmp_seq=3 ttl=48 time=1.86 ms
64 bytes from lga15s43-in-f46.1e100.net (172.217.0.46): icmp_seq=4 ttl=48 time=1.96 ms
^C
--- google.com ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3005ms
rtt min/avg/max/mdev = 1.856/1.890/1.969/0.070 ms
```

### Private Instance

When the ssh port to public subnet security group is disabled on the private instance via AWS console

---

<input type="checkbox"/>	sg-0c8ecf07c05d7996f	hwk2_ssh_publicSubnet	open ssh port to public subnet
--------------------------	----------------------	-----------------------	--------------------------------

---

There is no telnet response from the private instance

```
ubuntu@ip-192-168-1-102:~$ telnet 192.168.2.108 22
Trying 192.168.2.108...
```

However, when the ssh port to public subnet is reenabled, the telnet command indicates ssh connectivity via the private IP of the private instance.

```
ubuntu@ip-192-168-1-102:~$ telnet 192.168.2.108 22
Trying 192.168.2.108...
Connected to 192.168.2.108.
Escape character is '^]'.
SSH-2.0-OpenSSH_7.6p1 Ubuntu-4
```

The private instance also demonstrated internet connectivity via the ping command

```
ubuntu@ip-192-168-2-108:~$ ping google.com
PING google.com (216.58.194.174) 56(84) bytes of data.
64 bytes from sfo07s13-in-f14.1e100.net (216.58.194.174): icmp_seq=1 ttl=47 time=2.46 ms
64 bytes from sfo07s13-in-f14.1e100.net (216.58.194.174): icmp_seq=2 ttl=47 time=2.06 ms
64 bytes from sfo07s13-in-f14.1e100.net (216.58.194.174): icmp_seq=3 ttl=47 time=2.08 ms
64 bytes from sfo07s13-in-f14.1e100.net (216.58.194.174): icmp_seq=4 ttl=47 time=2.16 ms
64 bytes from sfo07s13-in-f14.1e100.net (216.58.194.174): icmp_seq=5 ttl=47 time=2.16 ms
64 bytes from sfo07s13-in-f14.1e100.net (216.58.194.174): icmp_seq=6 ttl=47 time=2.08 ms
^C
--- google.com ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5007ms
rtt min/avg/max/mdev = 2.066/2.169/2.460/0.136 ms
ubuntu@ip-192-168-2-108:~$
```



## Problem 2:

All commands were executed as captured in the snapshots below

```
stakes@CSCI91:~$ git clone git@code.harvard.edu:sta283/cscie-91_sta283.git
Cloning into 'cscie-91_sta283'...
remote: Counting objects: 13, done.
remote: Total 13 (delta 0), reused 0 (delta 0), pack-reused 13
Receiving objects: 100% (13/13), done.
stakes@CSCI91:~$ cd cscie-91_sta283/
stakes@CSCI91:~/cscie-91_sta283$ git branch dev
stakes@CSCI91:~/cscie-91_sta283$ git checkout dev
Switched to branch 'dev'
stakes@CSCI91:~/cscie-91_sta283$ mkdir assignment-02
stakes@CSCI91:~/cscie-91_sta283$ cd assignment-02/
stakes@CSCI91:~/cscie-91_sta283/assignment-02$ touch README.md
```

```
stakes@CSCI91:~/cscie-91_sta283$ git status
On branch dev
Untracked files:
  (use "git add <file>..." to include in what will be committed)

assignment-02/
```

```
stakes@CSCI91:~/cscie-91_sta283$ git add .
stakes@CSCI91:~/cscie-91_sta283$ git status
On branch dev
Changes to be committed:
  (use "git reset HEAD <file>..." to unstage)

    new file:   assignment-02/README.md

stakes@CSCI91:~/cscie-91_sta283$ git commit -m "committing assignment-02 to dev branch"
[dev 7bded6a] committing assignment-02 to dev branch
1 file changed, 0 insertions(+), 0 deletions(-)
create mode 100644 assignment-02/README.md
stakes@CSCI91:~/cscie-91_sta283$ git push origin dev
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Compressing objects: 100% (2/2), done.
Writing objects: 100% (4/4), 377 bytes | 377.00 KiB/s, done.
Total 4 (delta 0), reused 0 (delta 0)
To code.harvard.edu:sta283/cscie-91_sta283.git
 * [new branch]      dev -> dev
stakes@CSCI91:~/cscie-91_sta283$
```



The following are the GitHub snapshots demonstrating the successful “dev” branching, commit and push along with the new directory and file. Please visit [https://code.harvard.edu/sta283/cscie-91\\_sta283](https://code.harvard.edu/sta283/cscie-91_sta283) for more information

sta283 / cscie-91\_sta283 Private

Watch 0Star 0Fork 0

<> Code

Issues 0

Pull requests 0

Projects 0

Wiki

Insights

Settings

No description, website, or topics provided.

Edit

4 commits

2 branches

0 releases

1 contributor

Your recently pushed branches:

dev (3 minutes ago)

Compare & pull request

Branch: dev

New pull request

Create new file

Upload files

Find file

Clone or download

This branch is 1 commit ahead of master.

Pull request

Compare

sta283 committing assignment-02 to dev branch

Latest commit 7bded6a 4 minutes ago

assignment-02

committing assignment-02 to dev branch

4 minutes ago

assignment1

Assignment 1 completion

21 days ago

README.md

Initial Line/description added

21 days ago

## Problem 3:

- 1) Create an IAM Role with permission to fully manage EC2s and S3

- a. **Result:**

[Roles](#) > [hwk2\\_role](#) Delete role

### Summary

Role ARN	arn:aws:iam::293836347668:role/hwk2_role
Role description	Allows EC2 instances to call AWS services on your behalf.   <a href="#">Edit</a>
Instance Profile ARNs	arn:aws:iam::293836347668:instance-profile/hwk2_role
Path	/
Creation time	2018-10-18 22:13 PDT
Maximum CLI/API session duration	1 hour <a href="#">Edit</a>

**Permissions** | Trust relationships | Access Advisor | Revoke sessions

▼ Permissions policies (2 policies applied)

[Attach policies](#) [Add inline policy](#)

Policy name	Policy type	
AmazonEC2FullAccess	AWS managed policy	✕
AmazonS3FullAccess	AWS managed policy	✕

► Permissions boundary (not set)

- 2) Assign role to the private instance

- a. **Result:** Below shows the IAM role creation and attachment to the private instance.

[Instances](#) > [Attach/Replace IAM Role](#)

### Attach/Replace IAM Role

Select an IAM role to attach to your instance. If you don't have any IAM roles, choose Create new IAM role to create a role in the IAM console. If an IAM role is already attached to your instance, the IAM role you choose will replace the existing role.

Instance ID [i-00aba649b20bcf55a](#) ([hwk2\\_vpc1\\_private\\_instance1](#)) ⓘ

IAM role\* [hwk2\\_role](#) [Create new IAM role](#) ⓘ

[Cancel](#) [Apply](#)

[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)
hwk2_vpc1_private_instance1	i-00aba649b20bcf55a	t2.micro	us-west-1a	running	2/2 checks ...	None	
hwk2_vpc1_public_instance1	i-0da8da272581e3e...	t2.micro	us-west-1a	running	2/2 checks ...	None	

Instance: [i-00aba649b20bcf55a](#) ([hwk2\\_vpc1\\_private\\_instance1](#)) Private IP: 192.168.2.108

**Description** | Status Checks | Monitoring | Tags

Instance ID	i-00aba649b20bcf55a	Public DNS (IPv4)	-
Instance state	running	IPv4 Public IP	-
Instance type	t2.micro	IPv6 IPs	-
Elastic IPs		Private DNS	ip-192-168-2-108.us-west-1.compute.internal
Availability zone	us-west-1a	Private IPs	192.168.2.108
Security groups	<a href="#">hwk2_ssh_publicSubnet</a> . <a href="#">view inbound rules</a> . <a href="#">view outbound rules</a>	Secondary private IPs	
Scheduled events	No scheduled events	VPC ID	vpc-00307c7ffde8a31ac
AMI ID	ubuntu/images/hvm-ssd/ubuntu-bionic-18.04-amd64-server-20180912 (ami-063aa838bd7631e0b)	Subnet ID	subnet-06743feb10f2e9f81
Platform	-	Network interfaces	eth0
IAM role	<a href="#">hwk2_role</a>	Source/dest. check	True
Key pair name	e91_key	T2/T3 Unlimited	Disabled
Owner	293836347668	EBS-optimized	False

3) Log into the private instance.

- a. **Result:** As shown below, the private key is copied to the public instance. Using ssh, I accessed the public instance. From the public instance and using ssh, I accessed the private instance

```
stakes@CSCI91:~$ scp -i .ssh/e91_key.pem .ssh/e91_key.pem ubuntu@13.57.222.95:/home/ubuntu
e91_key.pem 100% 1692 24.3KB/s 00:00
```

```
stakes@CSCI91:~$ ssh -i .ssh/e91_key.pem ubuntu@13.57.222.95
Welcome to Ubuntu 18.04.1 LTS (GNU/Linux 4.15.0-1021-aws x86_64)
```

```
ubuntu@ip-192-168-1-102:~$ ssh -i .ssh/e91_key.pem ubuntu@192.168.2.108
Welcome to Ubuntu 18.04.1 LTS (GNU/Linux 4.15.0-1021-aws x86_64)
```

4) Install AWSCLI

- a. **Result:** Used “pip3 install awscli” to install awscli. Then used “aws configure” to set my availability zone to us-west-1a

```
ubuntu@ip-192-168-2-108:~$ pip3 install awscli
Collecting awscli
  Downloading https://files.pythonhosted.org/packages/b4/06/b6e6bd72bdd89ecd2ada65e7678ba
b03f2cb3ee0d46e4662dfe959aaa3e0/awscli-1.16.37-py2.py3-none-any.whl (1.4MB)
    100% |#####| 1.4MB 1.1MB/s
Collecting botocore==1.12.27 (from awscli)
```

5) Clone your repository and switch to the branch dev, and create a file inside assignment-02, name it problem-03, commit and push the file to the dev remote.

- a. **Result:** The instructions were all executed as shown by the screenshots below

```
ubuntu@ip-192-168-2-108:~$ git clone git@code.harvard.edu:sta283/cscie-91_sta283.git
Cloning into 'cscie-91_sta283'...
remote: Counting objects: 17, done.
remote: Total 17 (delta 0), reused 0 (delta 0), pack-reused 17
Receiving objects: 100% (17/17), done.
Resolving deltas: 100% (1/1), done.
```

```
ubuntu@ip-192-168-2-108:~/cscie-91_sta283$ ll assignment-02/
total 8
drwxrwxr-x 2 ubuntu ubuntu 4096 Oct 19 06:07 ./
drwxrwxr-x 5 ubuntu ubuntu 4096 Oct 19 06:05 ../
-rw-rw-r-- 1 ubuntu ubuntu  0 Oct 19 06:05 README.md
-rw-rw-r-- 1 ubuntu ubuntu  0 Oct 19 06:07 problem-03
ubuntu@ip-192-168-2-108:~/cscie-91_sta283$ git status
On branch dev
Your branch is up to date with 'origin/dev'.

Untracked files:
  (use "git add <file>..." to include in what will be committed)

        assignment-02/problem-03

nothing added to commit but untracked files present (use "git add" to track)
ubuntu@ip-192-168-2-108:~/cscie-91_sta283$ git add .
ubuntu@ip-192-168-2-108:~/cscie-91_sta283$ git status
On branch dev
Your branch is up to date with 'origin/dev'.

Changes to be committed:
  (use "git reset HEAD <file>..." to unstage)

        new file:   assignment-02/problem-03
```

```

ubuntu@ip-192-168-2-108:~/cscie-91_sta283$ git config --global user.email sta283@g.harvard.edu
ubuntu@ip-192-168-2-108:~/cscie-91_sta283$ git commit -m "committing assignment-02+empty_problem-03 to dev branch"
[dev 4cd5b46] committing assignment-02+empty_problem-03 to dev branch
1 file changed, 0 insertions(+), 0 deletions(-)
create mode 100644 assignment-02/problem-03
ubuntu@ip-192-168-2-108:~/cscie-91_sta283$ git push origin dev
Counting objects: 3, done.
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 388 bytes | 388.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0)
To code.harvard.edu:sta283/cscie-91_sta283.git
7bde6a..4cd5b46 dev -> dev
ubuntu@ip-192-168-2-108:~/cscie-91_sta283$

```

- 6) Use AWS CLI to list the IDs of EC2s, available volumes and S3 buckets
- a. Results: the executed commands and results are shown below

```

ubuntu@ip-192-168-2-108:~/cscie-91_sta283$ aws ec2 describe-instances | grep InstanceId
    "InstanceId": "i-0da8da272581e3e13",
    "InstanceId": "i-00aba649b20bcf55a",
ubuntu@ip-192-168-2-108:~/cscie-91_sta283$ aws ec2 describe-volumes | grep VolumeId
    "VolumeId": "vol-0abb5cbb5b2213602",
    "VolumeId": "vol-0abb5cbb5b2213602",
    "VolumeId": "vol-0884f9b2bb7030176",
    "VolumeId": "vol-0884f9b2bb7030176",
ubuntu@ip-192-168-2-108:~/cscie-91_sta283$ aws s3api list-buckets
{
  "Buckets": [],
  "Owner": {
    "DisplayName": "stephenakaeze",
    "ID": "933b0d8a05b1c4c8bb716a8010a6586b1954ec4cc11f76e591a0d0fa197d3120"
  }
}

```

- 7) Capture all above commands in problem 3 file
- a. Results: the commands are captured in the file as shown below

sta283 / cscie-91\_sta283 Private
Watch 0 Star 0 Fork 0

Code Issues 0 Pull requests 0 Projects 0 Wiki Insights Settings

Branch: dev cscie-91\_sta283 / assignment-02 / problem-03 Find file Copy path

sta283 committing assignment-02 final completion 1.0 to dev branch 121fa09 4 hours ago

1 contributor

22 lines (17 sloc) 1.22 KB Raw Blame History

```

1 FILE DESCRIPTION: ASSIGNMENT 2 PROBLEM 3 COMMAND LIST
2
3 (In Local VM) To copy private key to public Instance: "scp -i .ssh/e91_key.pem .ssh/e91_key.pem ubuntu@13.57.222.95:/home/ubunt
4 (In Local VM) To access public Instance via ssh & public IP address: "ssh -i .ssh/e91_key.pem ubuntu@13.57.222.95"
5 (In Public Instance) To move private key to .ssh directory in public instance: "mv e91_key.pem .ssh/"
6 (In Public Instance) To access private instance via ssh & private IP address: "ssh -i .ssh/e91_key.pem ubuntu@192.168.2.108"
7
8
9
10 ALL THE FOLLOWING COMMANDS ARE EXECUTED IN THE PRIVATE INSTANCE
11 Install AWS CLI : sudo apt install awscli, pip3 install awscli
12 AWS CLI configuration: aws configure
13 Cloning git repository: git clone git@code.harvard.edu:sta283/cscie-91_sta283.git
14 Switching to "dev" branch: git checkout dev
15 Creating problem 3 file: touch problem-03
16 Adding new file: git add .
17 Committing new changes: git commit -m "committing assignment-02+empty_problem-03 to dev branch"
18 Pushing new commit to "dev" branch: git push origin dev
19 To List EC2 IDs : "aws ec2 describe-instances | grep InstanceId"
20 To List available volumes : "aws ec2 describe-volumes | grep VolumeId"
21 To List S3 buckets : "aws s3api list-buckets"

```

## Problem 4:

Results: The original code from class came with bugs which were fixed and used the generate the required and specified network. Then it was stored as vpc-2subs-1ec2.sh in assignment-02 and pushed to dev. Below are individual proofs that the script was successful. Please visit [https://code.harvard.edu/sta283/cscie-91\\_sta283/blob/dev/assignment-02/vpc-2subs-1ec2.sh](https://code.harvard.edu/sta283/cscie-91_sta283/blob/dev/assignment-02/vpc-2subs-1ec2.sh) to view the script details

### Console output after running script

```
ubuntu@ip-192-168-2-108:~/cscie-91_sta283/assignment-02$ ./vpc-2subs-1ec2.sh
{
  "Return": true
}
{
  "AssociationId": "rtbassoc-0407c94e3905f9293"
}
ubuntu@ip-192-168-2-108:~/cscie-91_sta283/assignment-02$
```

### Instance created from script

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
hwk2_vpc1_private_instance1	i-00aba649b20bc55a	t2.micro	us-west-1a	running	2/2 checks passed	None	-	-	-	e91
hwk2_vpc1_public_instance1	i-06e481c9156d9fa66	t2.micro	us-west-1a	running	2/2 checks passed	None	54.183.219.251	-	-	e91
hwk2_vpc1_public_instance1	i-0da8da272581e3e...	t2.micro	us-west-1a	running	2/2 checks passed	None	13.57.222.95	-	-	e91

Instance: i-06e481c9156d9fa66 Public IP: 54.183.219.251

Description Status Checks Monitoring Tags

Instance ID: i-06e481c9156d9fa66  
Instance state: running  
Instance type: t2.micro  
Elastic IPs: -  
Availability zone: us-west-1a  
Security groups: open-sah-and-web1 - view inbound rules - view outbound rules  
Scheduled events: No scheduled events  
AMI ID: amzn2-ami-hvm-2.0.20181008-x86\_64-gp2 (ami-04534c96466647bfb)  
Platform: -  
IAM role: -  
Key pair name: e91\_key  
Owner: 293836347668  
Launch time: October 19, 2018 at 11:36:17 AM UTC-7 (5 hours)  
Termination protection: False  
Lifecycle: normal

Public DNS (IPv4): -  
IPv4 Public IP: 54.183.219.251  
IPv6 IPs: -  
Private DNS: ip-10-0-39-50.us-west-1.compute.internal  
Private IPs: 10.0.39.50  
Secondary private IPs: -  
VPC ID: vpc-0a24fcd663589f1f8  
Subnet ID: subnet-0d13dce16fa3163d7  
Network interfaces: eth0  
Source/dest. check: True  
T2/T3 Unlimited: Disabled  
EBS-optimized: False  
Root device type: ebs  
Root device: /dev/xvda  
Block devices: /dev/xvda

### VPC created from script

Search VPCs and their proper

<< 1 to 3 of 3 VPCs >>

Name	VPC ID	State	IPv4 CIDR	IPv6 CIDR	DHCP options set	Route table	Network ACL	Tenancy	Default VPC
hwk2_vpc1	vpc-0a24fcd663589f1f8	available	10.0.0.0/16	-	dopt-fa2c709d	rtb-060f13fee7...	acl-0c9e138f3dfaca07	Default	No
hwk2_vpc1	vpc-00307c7fde8a31ac	available	192.168.0.0/22	-	dopt-fa2c709d	rtb-043f9d937f...	acl-0f00acd32ada14564	Default	No
hwk2_vpc1	vpc-d23c11b5	available	172.31.0.0/16	-	dopt-fa2c709d	rtb-466cb520	acl-5357a835	Default	Yes

vpc-0a24fcd663589f1f8

Summary CIDR Blocks Flow Logs Tags

VPC ID: vpc-0a24fcd663589f1f8  
State: available  
IPv4 CIDR: 10.0.0.0/16  
IPv6 CIDR: -  
DHCP options set: dopt-fa2c709d  
Route table: rtb-060f13fee798ce38d

Network ACL: acl-0c9e138f3dfaca07  
Tenancy: Default  
DNS resolution: yes  
DNS hostnames: no  
ClassicLink DNS Support: no

## Subnets created from script

Create subnet

Actions

Filter by tags and attributes or search by keyword

<<

<

1 to 6 of 6

>

>>

<input type="checkbox"/>	Name	Subnet ID	State	VPC	IPv4 CIDR	Available IPv4	IPv6 CIDR	Availability Zone	Route table
<input checked="" type="checkbox"/>		subnet-0d13dce16fa3163d7	available	vpc-0a24fcd663589f1f8	10.0.0.0/17	32762	-	us-west-1a	rtb-0b6e8341644b8b1dc
<input checked="" type="checkbox"/>		subnet-01f90f1e878fe4608	available	vpc-0a24fcd663589f1f8	10.0.128.0/17	32763	-	us-west-1a	rtb-060f13fee798ce38d


## vpc-2subs-1ec2.sh @ code.harvard.edu

Branch: **dev**

**cscie-91\_sta283** / **assignment-02** / **vpc-2subs-1ec2.sh**

Find file

Copy path




 **sta283** committing assignment-02 completion to dev branch

6748959 6 hours ago

1 contributor

Executable File | 28 lines (14 sloc) | 1.6 KB

Raw | Blame | History

```
1  #!/bin/bash
2
3  VPCID=$(aws ec2 create-vpc --cidr-block 10.0.0.0/16 --output text | grep VPC | awk '{print $7}')
4
5  PubSub=$(aws ec2 create-subnet --cidr-block 10.0.0.0/17 --vpc-id $VPCID --availability-zone us-west-1a --output text | awk '{pr
6
7  PriSub=$(aws ec2 create-subnet --cidr-block 10.0.128.0/17 --vpc-id $VPCID --availability-zone us-west-1a --output text | awk '{
8
9  IGW=$(aws ec2 create-internet-gateway | jq .InternetGateway.InternetGatewayId | tr -d ' ')
10
11  aws ec2 attach-internet-gateway --vpc-id $VPCID --internet-gateway-id $IGW
12
13  PubRte=$(aws ec2 create-route-table --vpc-id $VPCID | grep rtb | awk '{print $2}' | tr -d ' ' | tr -d ',' | tr -d ',')
14
15  aws ec2 create-route --route-table-id $PubRte --destination-cidr-block 0.0.0.0/0 --gateway-id $IGW
16
17  aws ec2 associate-route-table --route-table-id $PubRte --subnet-id $PubSub
18
19  SGID=$(aws ec2 create-security-group --description 'open ports 22 and 80 to the world' --group-name open-ssh-and-web1 --vpc-id
20
21  aws ec2 authorize-security-group-ingress --group-id $SGID --protocol tcp --port 80 --cidr 0.0.0.0/0
22
23  aws ec2 authorize-security-group-ingress --group-id $SGID --protocol tcp --port 22 --cidr 0.0.0.0/0
24
25  AMI=$(aws ec2 describe-images --owners amazon --filters 'Name=name,Values=amzn2-ami-hvm-2.0.???????-x86_64-gp2' 'Name=state,Va
26
27  EC2ID=$(aws ec2 run-instances --image-id $AMI --count 1 --instance-type t2.micro --key-name e91_key --security-group-ids $SGID
```