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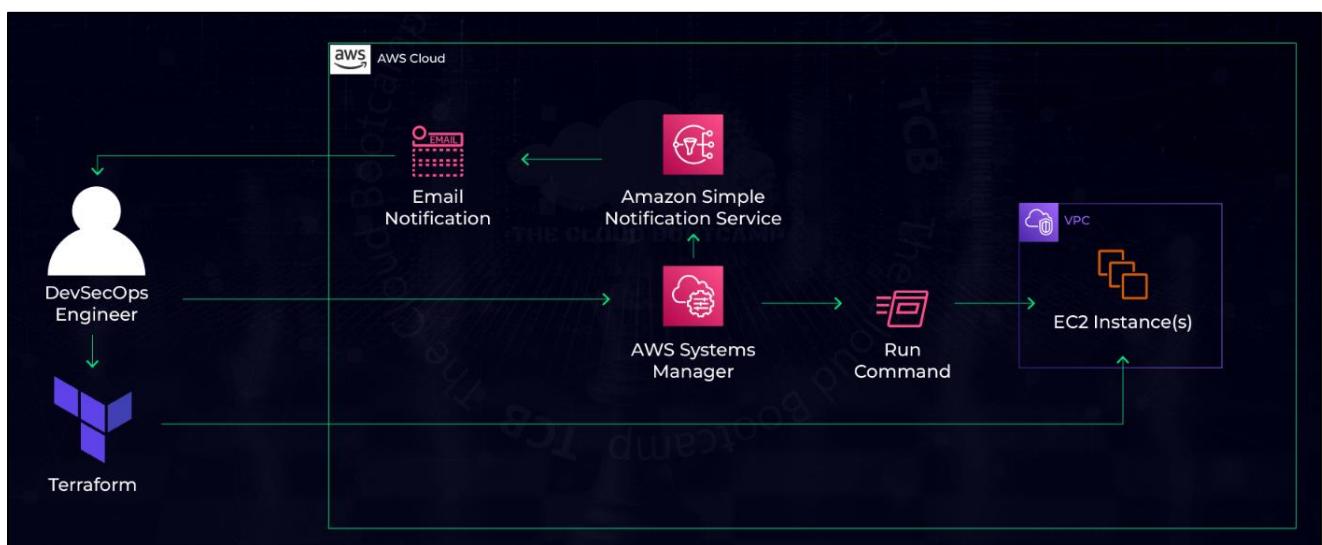
*Portfolio:* [https://medium.com/@Neel\\_Darji](https://medium.com/@Neel_Darji)



### AWS - Terraform Project

*Implementation of a set of EC2 instances using Terraform and AWS Systems Manager configuration with Amazon Simple Notification Service for automated installation of security officers*

**Solution Architecture:** Neel Darji



- **Project Definition:**

As AWS Cloud / DevOps Engineer, implement of a set of EC2 instances using Terraform and AWS Systems Manager configuration with Amazon Simple Notification Service for automated installation of security officers.

- **Project Description:**

In this project based on a real-world scenario, I acted as DevSecOps Engineer, and I deployed a set of EC2 instances and infrastructure in an automated way using Terraform (infrastructure as code - IaC). Also, it was necessary to install a specific security agent on all these instances in an automated way.

Once I provisioned the infrastructure, AWS System Manager and its component Command Run were used to install the security agents in an automated way. I used the Amazon Simple Notification Service – SNS to send an email informing the whole process status.

- **Technology used:**

- Terraform
- AWS EC2
- AWS Systems Manager
- Run Command
- AWS SNS (Simple Notification Services)

- **Solution: Terraform + AWS Systems Manager + AWS SNS**

Let's understand few terms used in this project.

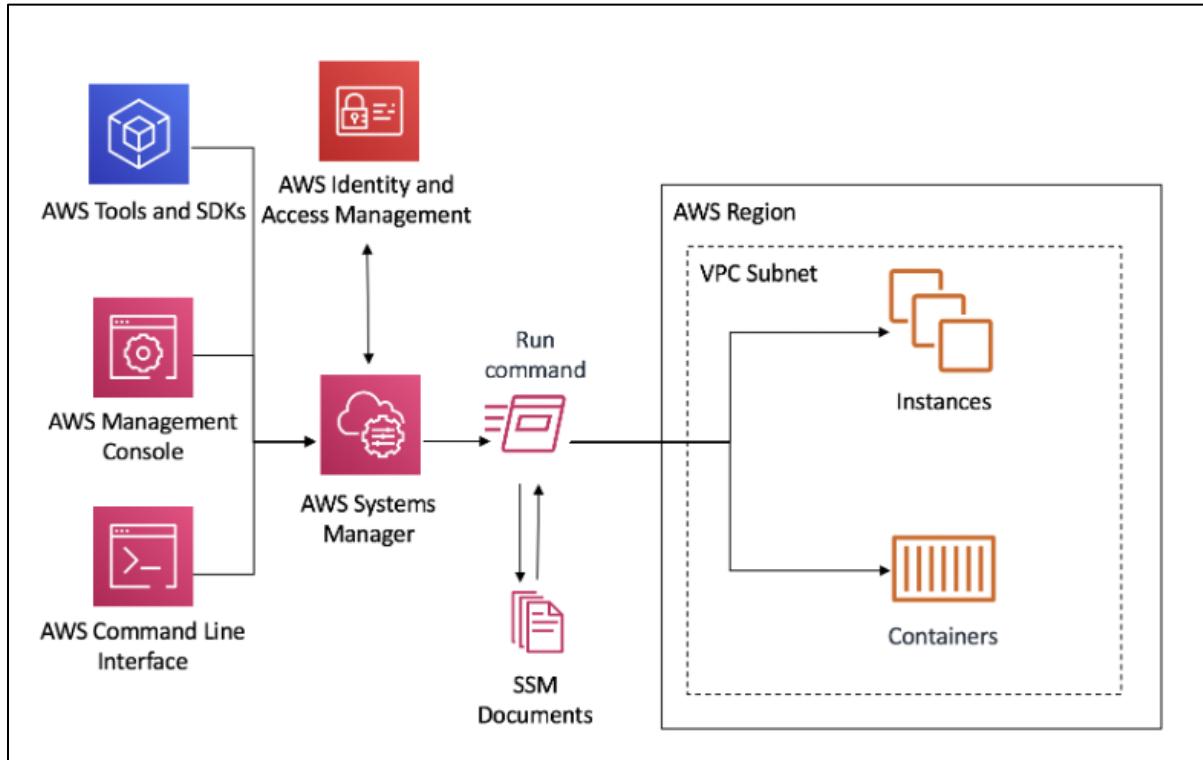
❖ **AWS Systems Manager:**

Amazon Systems Manager is a management service that helps you automatically collect software inventory, apply OS patches, create system images, and configure Windows and Linux operating systems. These capabilities help you define and track system configurations, prevent drift, and maintain software compliance of your EC2 and on-premises configurations.

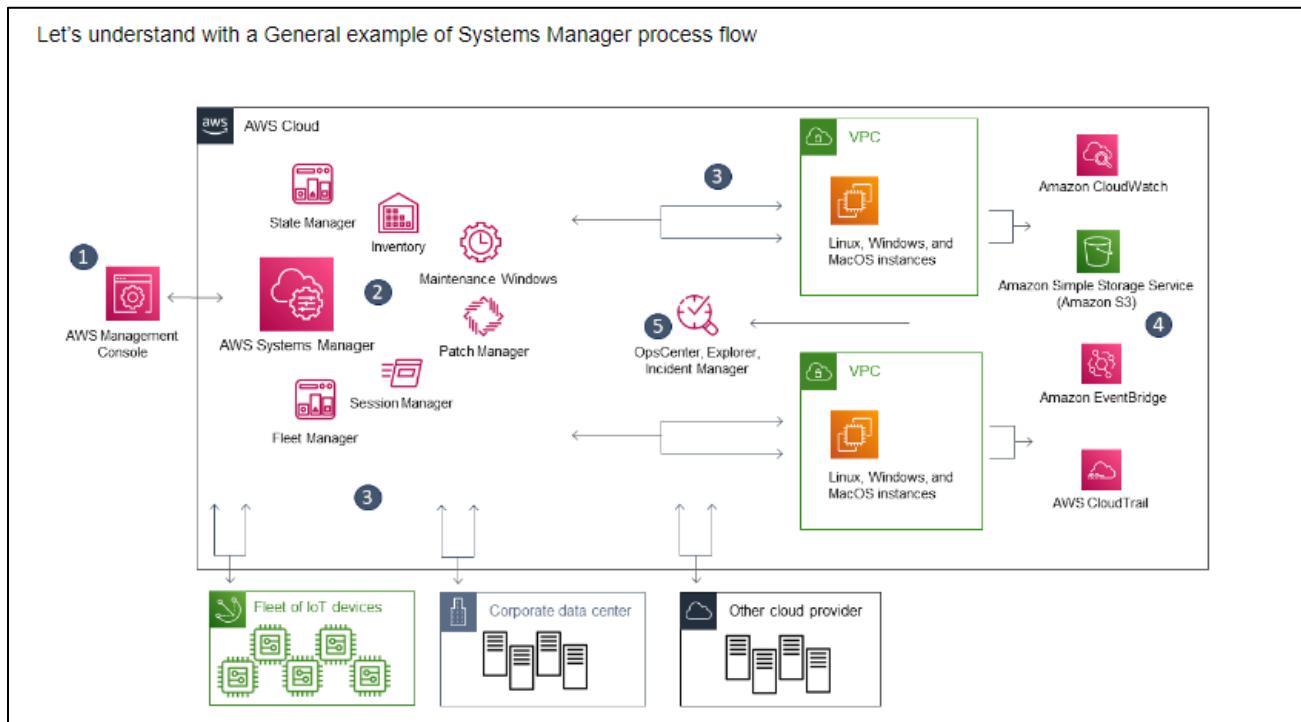
Recently at QSoft Org. due to some updates from our technical security team, we had to install an agent on all our hosting servers in the AWS account. We usually use to run multiple EC2 instances in our account according to client demands. These servers have varied Operating Systems. Also, these servers have different types of workloads. So, creating AMIs for each type of instance with the agent would have taken a long time and a huge effort which is not a good approach. Also, there are multiple servers that can't tolerate restart (for User data scripts to work).

Here comes our savior **AWS System Manager** also known as SSM that you can use to view and control your infrastructure and allows its users to run remote commands without the need for SSH, you can view operational data from multiple AWS services and automate operational tasks across your AWS resources. It helps you maintain security and compliance by scanning your

managed nodes (A managed node is any machine configured for Systems Manager) and reporting on any policy violations it detects.



## How does Systems Manager work?

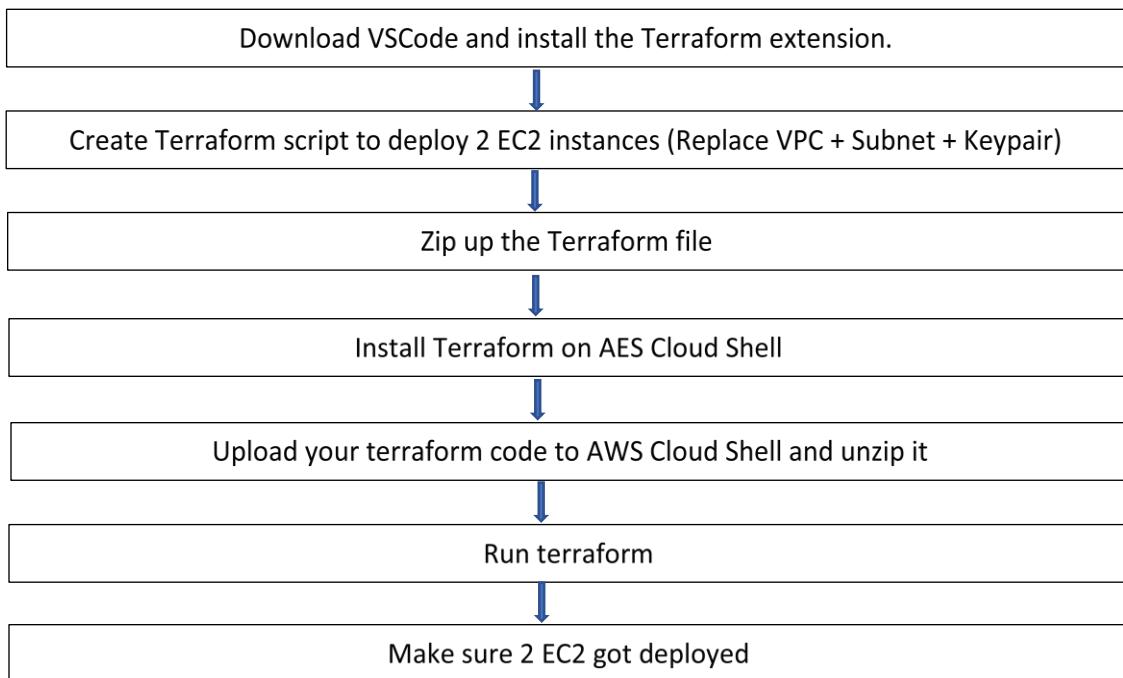


- 1) **Access Systems Manager** – The AWS Console provides access to the Systems Manager. You can use the AWS Command Line Interface, AWS Tools for Windows PowerShell, or the AWS SDK to manage resources programmatically. You may use Systems Manager to configure, schedule, automate, and execute operations on your AWS resources and managed nodes. AWS resources include users, groups, and roles in AWS Identity and Access Management (IAM); AWS Lambda functions; Amazon EC2 Auto Scaling groups; and Amazon Simple Storage Service (Amazon S3) buckets, to mention a few.
- 2) **Choose a Systems manager capability** – More than two dozen functions are included in Systems Manager to assist you in performing activities on your resources. Only a handful of the features that administrators employ to configure and manage their resources are shown in the illustration.
- 3) **Verification and processing** – Systems Manager verifies configurations, including permissions, and makes requests to the AWS Systems Manager agent (SSM Agent) running on your hybrid environment's instances, edge devices, or servers and VMs. The configuration changes given by SSM Agent are implemented.
- 4) **Reporting** – SSM Agent notifies the user, Systems Manager in the AWS Cloud, Systems Manager operations management capabilities, and various AWS services, if configured, about the status of the configuration changes and actions.
- 5) **Systems Manager operations management capabilities** – In reaction to events or issues with your resources, Systems Manager operations management features such as Explorer OpsCenter and Incident Manager aggregate operations data or create artefacts such as operational work items (OpsItems) and incidents if enabled. These features might assist you in investigating and troubleshooting issues.

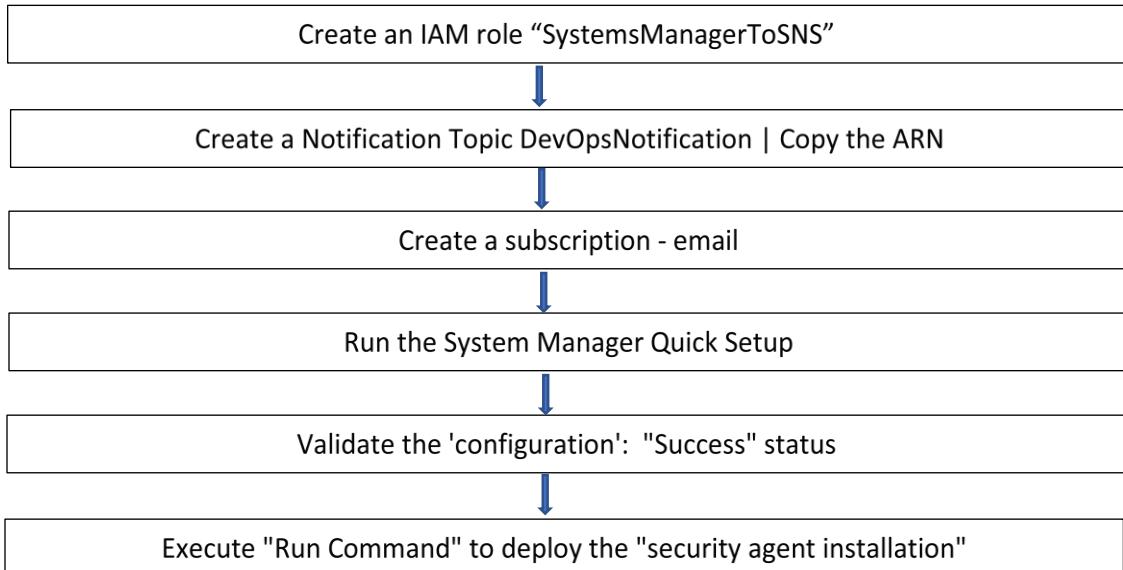
## SSM Agent

The AWS Systems Manager Agent (SSM Agent) is Amazon software that operates on Amazon EC2 instances, edge devices, and on-premises servers and virtual computers (VMs). Systems Manager may update, manage, and configure these resources using the SSM Agent. The agent receives requests from the AWS Cloud's Systems Manager service and executes them as stated in the request. The SSM Agent then uses the Amazon Message Delivery Service (service prefix: `ec2messages`) to deliver status and execution information back to the Systems Manager service.

❖ Project Implementation – Part A - **Terraform**



❖ Project Implementation – Part B - **AWS Systems Manager**



- Step-1: Download VSCode and install the Terraform extension:

<https://code.visualstudio.com/download>

- Step-2: Create Terraform script to deploy 2 EC2 instances.

1<sup>st</sup> we create “main.tf”.

```
data "aws_ami" "ubuntu" {
  most_recent = true

  filter {
    name    = "name"
    values  = ["ubuntu/images/hvm-ssd/ubuntu-focal-20.04-amd64-server-*"]
  }

  filter {
    name    = "virtualization-type"
    values  = ["hvm"]
  }

  owners = ["099720109477"] # Canonical
}

variable "vpc_id" {
  default = "vpc-0de6d21a52cf5c3e"
}

variable "subnet_id" {
  default = "subnet-0c16cf2e691b72877"
}

variable "key_name" {
  default = "sshkey1"
}

resource "aws_security_group" "allow_ssh" {
  name        = "allow_ssh"
  description = "Allow external SSH connectivity to EC2 instances"
  vpc_id      = var.vpc_id

  ingress {
    description = "SSH to EC2"
    from_port   = 22
  }
}
```

```

    to_port      = 22
    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"]
}

tags = {
    Name = "allow_ssh"
}
}

resource "aws_instance" "webserver1" {
    ami           = data.aws_ami.ubuntu.id
    instance_type = "t2.micro"
    key_name      = var.key_name
    subnet_id     = var.subnet_id
    vpc_security_group_ids = [aws_security_group.allow_ssh.id]
    associate_public_ip_address = true

    tags = {
        Name = "webserver1"
    }
}

resource "aws_instance" "webserver2" {
    ami           = data.aws_ami.ubuntu.id
    instance_type = "t2.micro"
    key_name      = var.key_name
    subnet_id     = var.subnet_id
    vpc_security_group_ids = [aws_security_group.allow_ssh.id]
    associate_public_ip_address = true

    tags = {
        Name = "webserver2"
    }
}
}

```

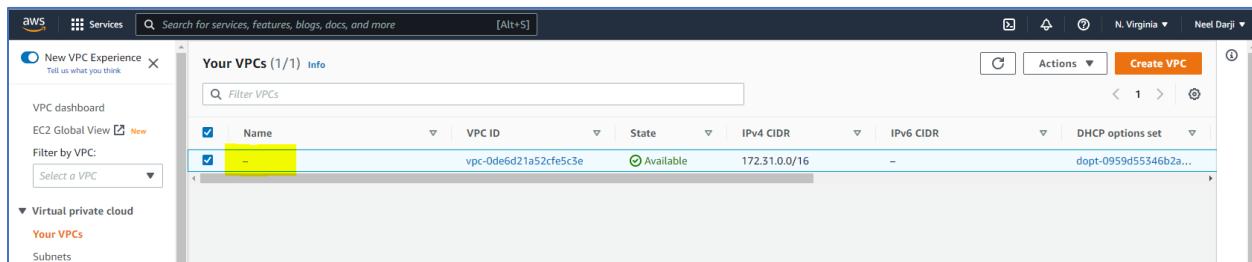
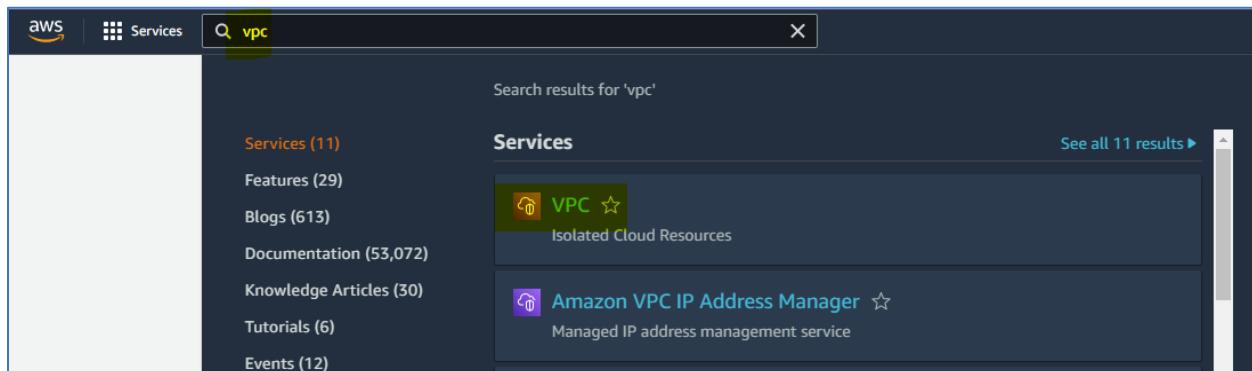
Note: You need to replace following 3 parameters as they unique to every environment:

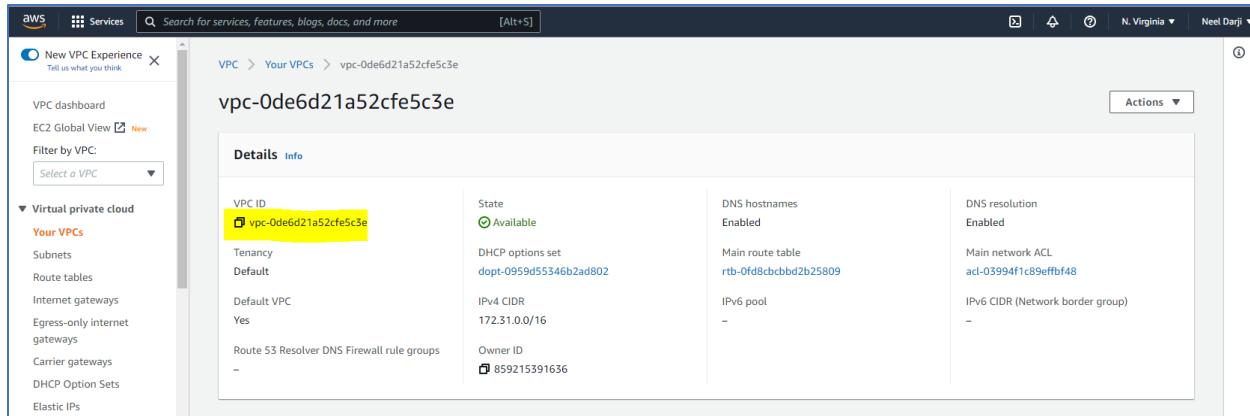
- `vpc_id`
- `subnet_id`
- `key_name`

Now, let's create "provider.tf" file.

```
provider "aws" {
  region = "us-east-1"
  #access_key = "XXXXXXXXXX"
  #secret_key = "XXXXXXXXXX"
}
```

Note: If you do not have `key_name`, let's create it shown below and then you can configure the same in "main.tf" file.





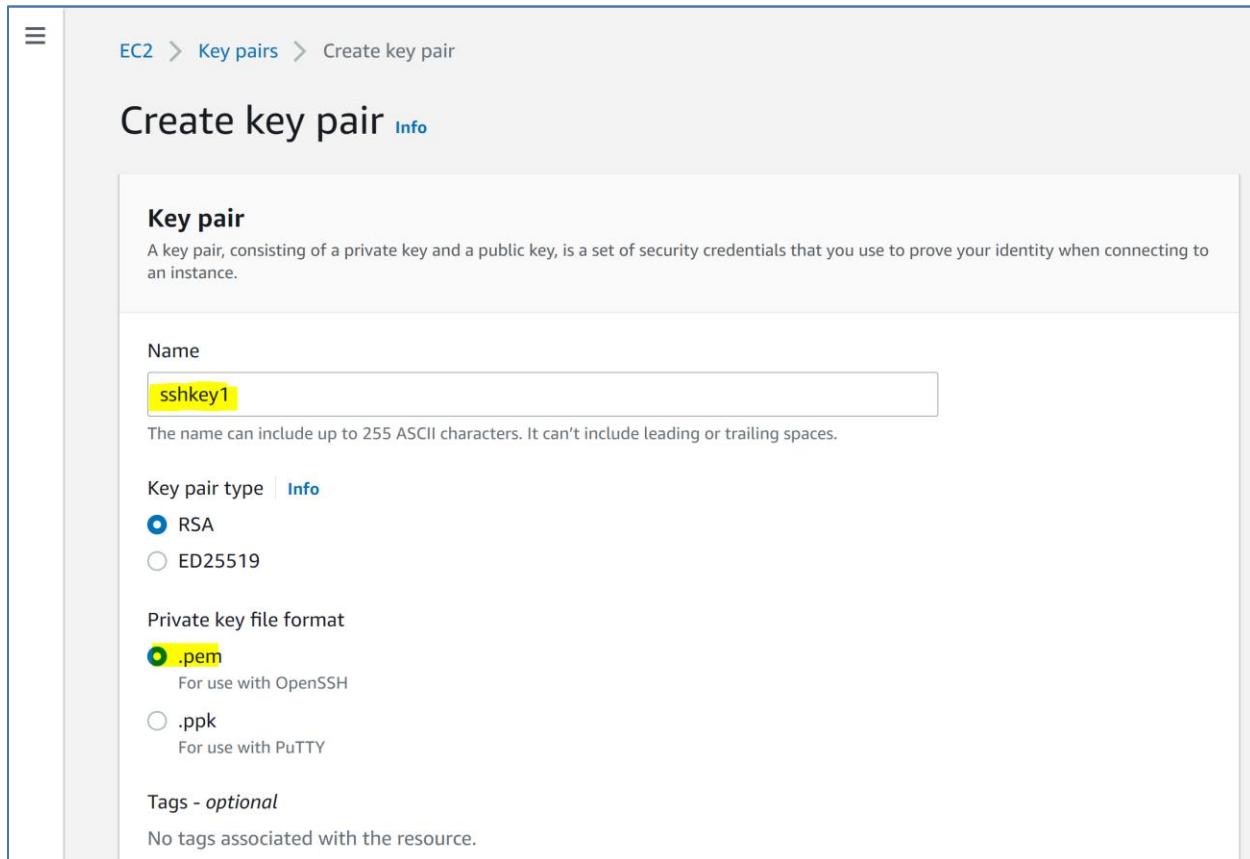
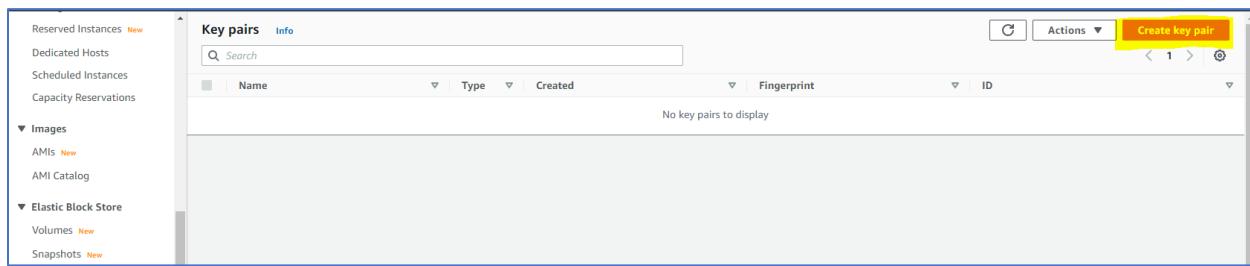
VPC ID: vpc-0de6d21a52cfe5c3e

State: Available

Tenancy: Default

Default VPC: Yes

Route 53 Resolver DNS Firewall rule groups: -



## Create key pair Info

### Key pair

A key pair, consisting of a private key and a public key, is a set of security credentials that you use to prove your identity when connecting to an instance.

**Name**  
sshkey1

The name can include up to 255 ASCII characters. It can't include leading or trailing spaces.

**Key pair type** Info

RSA

ED25519

**Private key file format**

.pem

For use with OpenSSH

.ppk

For use with PuTTY

**Tags - optional**

No tags associated with the resource.

The screenshot shows the AWS EC2 Key Pairs page. The sidebar on the left includes links for EC2 Dashboard, Events, Tags, Limits, Instances (with sub-links for Instances, Instance Types, Launch Templates, and Spot Requests), and a 'Tell us what you think' feedback link. The main content area is titled 'Key pairs (1)' and shows a table with one row. The table columns are Name, Type, Created, Fingerprint, and ID. The single row contains 'sshkey1', 'rsa', '2022/07/02 03:29 GMT-3', '71:e8:81:fb:05:1d:26:f6:a2:8d:98:0f:3a:...', and 'key-0c41841a80c15c583'. There are 'Actions' and 'Create key pair' buttons at the top right.

Step-3: Zip this Terraform code as we need this later to deploy in AWS Cloud Shell.

Step-4: Install Terraform on AWS Cloud Shell

**sudo yum install -y yum-utils**

```
[cloudshell-user@ip-10-0-156-61 ~]$ sudo yum install -y yum-utils
Loaded plugins: ovl, priorities
Resolving Dependencies
--> Processing Dependency: yum-utils.noarch 0:1.1.31-46.amzn2.0.1 will be installed
--> Processing Dependency: python-kitchen for package: yum-utils-1.1.31-46.amzn2.0.1.noarch
--> Processing Dependency: libxml2-python for package: yum-utils-1.1.31-46.amzn2.0.1.noarch
--> Processing Dependency: python-kitchen.noarch 0:1.1.1-6.amzn2.5.4 will be installed
--> Processing Dependency: python-kitchen.noarch 0:1.1.1-5.amzn2 will be installed
--> Processing Dependency: python-chardet for package: python-kitchen-1.1.1-5.amzn2.noarch
--> Processing Dependency: python-chardet.noarch 0:2.2.1-1.amzn2 will be installed
--> Finished Dependency Resolution
Dependencies Resolved
=====
Package           Arch      Version           Repository      Size
=====
Installing:
yum-utils         noarch   1.1.31-46.amzn2.0.1
Installing for dependencies:
libxml2-python    x86_64   2.9.1-4.amzn2.5.4
python-kitchen    noarch   2.2.1-1.amzn2
python-chardet    noarch   1.1.1-5.amzn2
python-kitchen    noarch   1.1.1-5.amzn2
=====
Transaction Summary
=====
Install 1 Package (+3 Dependent packages)

Total download size: 859 K
Installed size: 4.2 M
Downloading packages:
(1/4): libxml2-python-2.9.1-5.amzn2.5.4.x86_64.rpm 246 kB 00:00:00
(2/4): python-kitchen-2.2.1-1.amzn2.noarch.rpm 127 kB 00:00:00
(3/4): python-kitchen-1.1.1-5.amzn2.noarch.rpm 266 kB 00:00:00
(4/4): yum-utils-1.1.31-46.amzn2.0.1.noarch.rpm 128 kB 00:00:00
=====
Total
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Installing : python-chardet-2.2.1-1.amzn2.noarch
  Installing : python-kitchen-1.1.1-5.amzn2.noarch
  Installing : libxml2-python-2.9.1-6.amzn2.5.4.x86_64
4.9 MB/s | 859 kB 00:00:00
=====
1/4
2/4
3/4
3/4
```

**sudo yum-config-manager --add-repo**

<https://rpm.releases.hashicorp.com/AmazonLinux/hashicorp.repo>

```
[cloudshell-user@ip-10-1-185-50 ~]$ sudo yum-config-manager --add-repo https://rpm.releases.hashicorp.com/AmazonLinux/hashicorp.repo
Loaded plugins: ovl, priorities
adding repo from: https://rpm.releases.hashicorp.com/AmazonLinux/hashicorp.repo
grabbing file https://rpm.releases.hashicorp.com/AmazonLinux/hashicorp.repo to /etc/yum.repos.d/hashicorp.repo
repo saved to /etc/yum.repos.d/hashicorp.repo
[cloudshell-user@ip-10-1-185-50 ~]$
```

## sudo yum -y install terraform

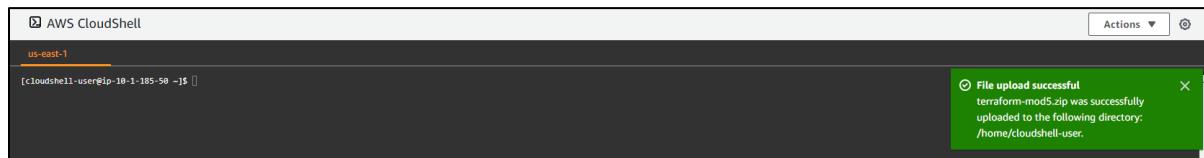
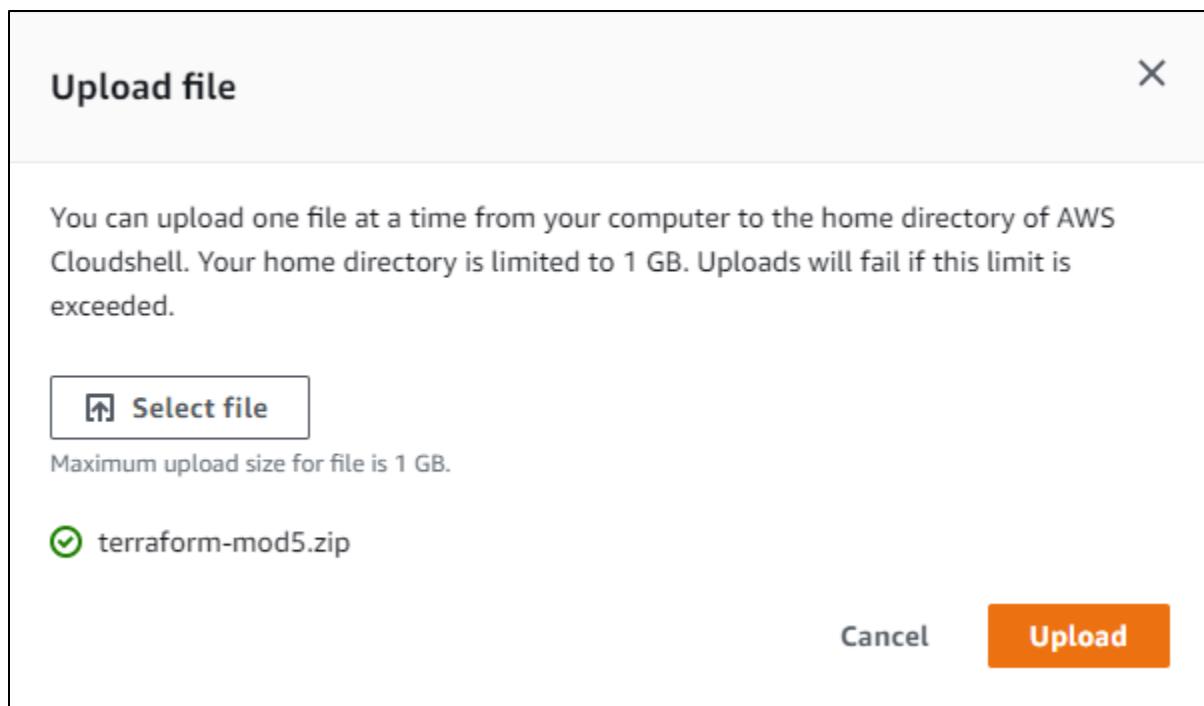
```
[cloudshell-user@ip-10-1-185-58 ~]$ sudo yum -y install terraform
Loaded plugins: ovl, priorities
Nothing to do
Resolving Dependencies
  --> Running transaction check
  --> Package terraform.x86_64 0:1.2.4-1 will be installed
  --> Processing Dependency: openssl for package: terraform-1.2.4-1.x86_64
  --> Running transaction check
  --> Package openssl.x86_64 1:1.0.2k-24.amzn2.0.3 will be installed
  --> Finished Dependency Resolution
Dependencies Resolved

=====
Package           Arch      Version           Repository      Size
=====
Installing:
  terraform        x86_64  1.2.4-1          hashicorp      13 M
Installing for dependencies:
  openssl          x86_64  1:1.0.2k-24.amzn2.0.3  amzn2-core    496 k

Transaction Summary
=====
Install 1 Package (+1 Dependent package)

Total download size: 13 M
Installed size: 61 M
Downloading packages:
(1/2): openssl-1.0.2k-24.amzn2.0.3.x86_64.rpm  | 496 kB  00:00:00
        https://aws.mirror.sdb8.ebay.com/x86_64/hashicorp/packages/terraform-1.2.4-1.x86_64.rpm: Header V4 RSA/SHA512 Signature, key ID a3219F7b: NOKEY
        Public key for terraform-1.2.4-1.x86_64.rpm is not installed
(2/2): terraform-1.2.4-1.x86_64.rpm  | 13 MB  00:00:00
        https://aws.mirror.sdb8.ebay.com/x86_64/hashicorp/packages/terraform-1.2.4-1.x86_64.rpm
36 MB/s | 13 MB  00:00:00

Total
Retrieving key from https://rpm.releases.hashicorp.com/gpg
Importing GPG key 0x03219F7b:
  Userid : HashiCorp Security (HashiCorp Package Signing) <security+packaging@hashicorp.com>
  Fingerprint: 6677 9d8b eb4e 1380 d720 d4d1 8c88 e311 977b
  From   : https://rpm.releases.hashicorp.com/GPG
Running transaction check
Running transaction test
Transacted packages
Running transaction
  Installing : 1:openssl-1.0.2k-24.amzn2.0.3.x86_64
  Installing : terraform-1.2.4-1.x86_64
  Verifying  : terraform-1.2.4-1.x86_64
  Verifying  : 1:openssl-1.0.2k-24.amzn2.0.3.x86_64
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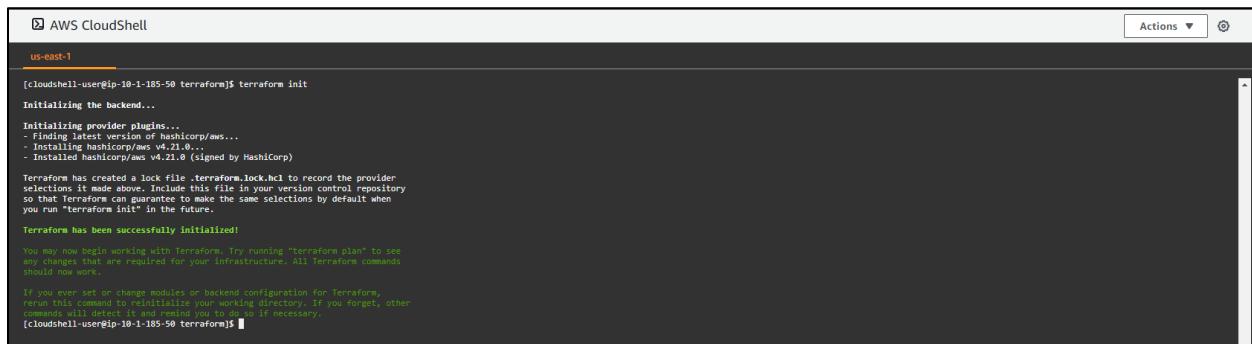


```
[cloudshell-user@ip-10-1-185-50 ~]$ ls -ltr
total 24
-rwxrwxr-x 1 cloudshell-user cloudshell-user 829 Nov 13 2021 aws-iam-create-user.sh
-rw-rw-r-- 1 cloudshell-user cloudshell-user 215 Jun 10 12:25 users2-211113-015749.csv
-rw-rw-r-- 1 cloudshell-user cloudshell-user 209 Jun 10 12:27 users2.csv
-rw-rw-r-- 1 cloudshell-user cloudshell-user 8216 Jul 2 06:45 terraform-mod5.zip
[cloudshell-user@ip-10-1-185-50 ~]$ unzip terraform-mod5.zip
Archive: terraform-mod5.zip
  inflating: terraform/main.tf
  inflating: terraform/provider.tf
  creating: terraform-mod5/
  creating: terraform-mod5/terraform/
  creating: terraform-mod5/terraform/.vs/
  inflating: terraform-mod5/terraform/.vs/slnx.sqlite
  creating: terraform-mod5/terraform/.vs/terraform/
  creating: terraform-mod5/terraform/.vs/terraform/v16/
  inflating: terraform-mod5/terraform/.vs/terraform/v16/.suo
  creating: terraform-mod5/terraform/.vscode/
  extracting: terraform-mod5/terraform/.vscode/settings.json
  inflating: terraform-mod5/terraform/main.tf
  inflating: terraform-mod5/terraform/provider.tf
[cloudshell-user@ip-10-1-185-50 ~]$
```

```
[cloudshell-user@ip-10-1-185-50 terraform]$ ls -ltr
total 8
-rw-rw-r-- 1 cloudshell-user cloudshell-user 103 Nov 24 2021 provider.tf
-rw-rw-r-- 1 cloudshell-user cloudshell-user 1522 Nov 24 2021 main.tf
[cloudshell-user@ip-10-1-185-50 terraform]$
```

## Step-6: Run Terraform

```
$ terraform init
```



```
AWS CloudShell
us-east-1
Actions ▾

[cloudshell-user@ip-10-1-185-50 terraform]$ terraform init
Initializing the backend...
Initializing provider plugins...
- Finding latest version of hashicorp/aws...
- Installing hashicorp/aws v4.21.0...
- Installed hashicorp/aws v4.21.0 (signed by HashiCorp)

Terraform has created a lock file .terraform.lock.hcl to record the provider
selections it made above. Include this file in your version control repository
so that Terraform can guarantee to make the same selections by default when
you run "Terraform init" in the future.

Terraform has been successfully initialized!

You may now begin working with Terraform. Try running "terraform plan" to see
any changes that are required for your infrastructure. All Terraform commands
should now work.

If you ever set or change modules or backend configuration for Terraform,
rerun this command to reinitialize your working directory. If you forget, other
commands will detect it and prompt you to do so if necessary.
[cloudshell-user@ip-10-1-185-50 terraform]$
```

\$ terraform plan

```
[cloudshell-user@ip-10-1-185-50 terraform]$ terraform plan
data.aws_ami.ubuntu: Reading...
data.aws_ami.ubuntu: Read complete after 1s [id=ami-0439517b5e436bdab]

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
+ create

Terraform will perform the following actions:

# aws_instance.webserver1 will be created
+ resource "aws_instance" "webserver1" {
  + ami = "ami-0439517b5e436bdab"
  + arn = (known after apply)
  + associate_public_ip_address = true
  + availability_zone = (known after apply)
  + cpu_core_count = (known after apply)
  + cpu_threads_per_core = (known after apply)
  + disable_api_stop = (known after apply)
  + disable_api_termination = (known after apply)
  + ebs_optimized = (known after apply)
  + get_password_data = false
  + host_id = (known after apply)
  + id = (known after apply)
  + instance_initiated_shutdown_behavior = (known after apply)
  + instance_state = (known after apply)
  + instance_type = "t2.micro"
  + ipv6_address_count = (known after apply)
  + ipv6_addresses = (known after apply)
  + key_name = "sshkey1"
  + monitoring = (known after apply)
  + outpost_arn = (known after apply)
  + password_data = (known after apply)
  + placement_group = (known after apply)
  + placement_partition_number = (known after apply)
  + primary_network_interface_id = (known after apply)
  + private_dns = (known after apply)
  + private_ip = (known after apply)
  + public_dns = (known after apply)
  + public_ip = (known after apply)
  + secondary_private_ips = (known after apply)
  + security_groups = (known after apply)
  + source_dest_check = true
  + subnet_id = "subnet-024f4a19ca57886c3"
  + tags {
    + "Name" = "webserver1"
  }
  + tags_all {
    + "Name" = "webserver1"
  }
}
```

```
$ terraform apply
```

```
☒ AWS CloudShell

us-east-1

]

[cloudshell-user@ip-10-1-185-50 terraform]$ terraform apply
data.aws_ami.ubuntu: Reading...
data.aws_ami.ubuntu: Read complete after 0s [id=ami-0439517b5e436bdab]

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
+ create

Terraform will perform the following actions:

# aws_instance.webserver1 will be created
+ resource "aws_instance" "webserver1" {
  + ami
  + arn
  + associate_public_ip_address
  + availability_zone
  + cpu_core_count
  + cpu_threads_per_core
  + disable_api_stop
  + disable_api_termination
  + ebs_optimized
  + get_password_data
  + host_id
  + id
  + instance_initiated_shutdown_behavior
  + instance_state
  + instance_type
  + ipv6_address_count
  + ipv6_addresses
  + key_name
  + monitoring
  + outpost_arn
  + password_data
  + placement_group
  + placement_partition_number
  + primary_network_interface_id
  + private_dns
  + private_ip
  + public_dns
  + public_ip
  + secondary_private_ips
  + security_groups
  + source_dest_check
  + subnet_id
  + tags
    + "Name" = "webserver1"
  }
  + tags_all
    + "Name" = "webserver1"
}
```

```
Do you want to perform these actions?
Terraform will perform the actions described above.
Only 'yes' will be accepted to approve.
```

```
Enter a value: yes
```

**AWS CloudShell**

us-east-1

```

+ id                      = (known after apply)
+ ingress                 = [
  +
  + cidr_blocks           = [
    +
    + "0.0.0.0/0",
  ]
+ description             = "SSH to EC2"
+ from_port               = 22
+ ipv6_cidr_blocks       = []
+ prefix_list_ids        = []
+ protocol                = "tcp"
+ security_groups         = []
+ self                     = false
+ to_port                 = 22
],
]
+ name                    = "allow_ssh"
+ name_prefix             = (known after apply)
+ owner_id                = (known after apply)
+ revoke_rules_on_delete = false
+ tags                    = {
  +
  + "Name" = "allow_ssh"
}
+ tags_all                = {
  +
  + "Name" = "allow_ssh"
}
+ vpc_id                  = "vpc-0de6d21a52cfe5c3e"
}

Plan: 3 to add, 0 to change, 0 to destroy.

Do you want to perform these actions?
Terraform will perform the actions described above.
Only 'yes' will be accepted to approve.

Enter a value: yes

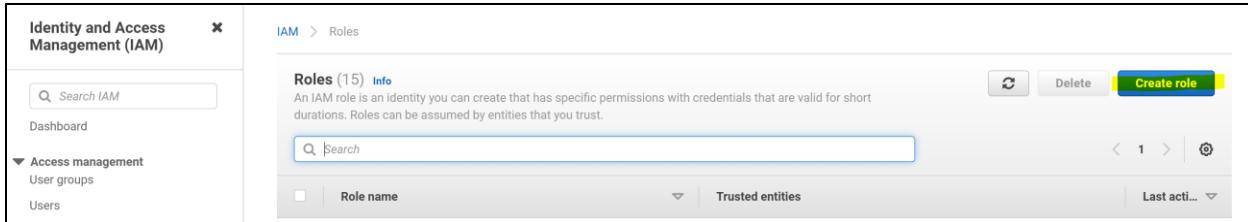
aws_security_group.allow_ssh: Creating...
aws_security_group.allow_ssh: Creation complete after 2s [id=sg-0338949516048ff91]
aws_instance.webserver1: Creating...
aws_instance.webserver2: Creating...
aws_instance.webserver1: Still creating... [10s elapsed]
aws_instance.webserver2: Still creating... [10s elapsed]
aws_instance.webserver1: Still creating... [20s elapsed]
aws_instance.webserver2: Still creating... [20s elapsed]
aws_instance.webserver1: Creation complete after 22s [id=i-038eeae9ac7a66656]
aws_instance.webserver2: Creation complete after 22s [id=i-038d2f886ed6c93d1]

Apply complete! Resources: 3 added, 0 changed, 0 destroyed.
[cloudshell-user@ip-10-1-185-50 terraform]$
```

Step-7: Here we go!!!! 2 EC2 instances got deployed successfully.

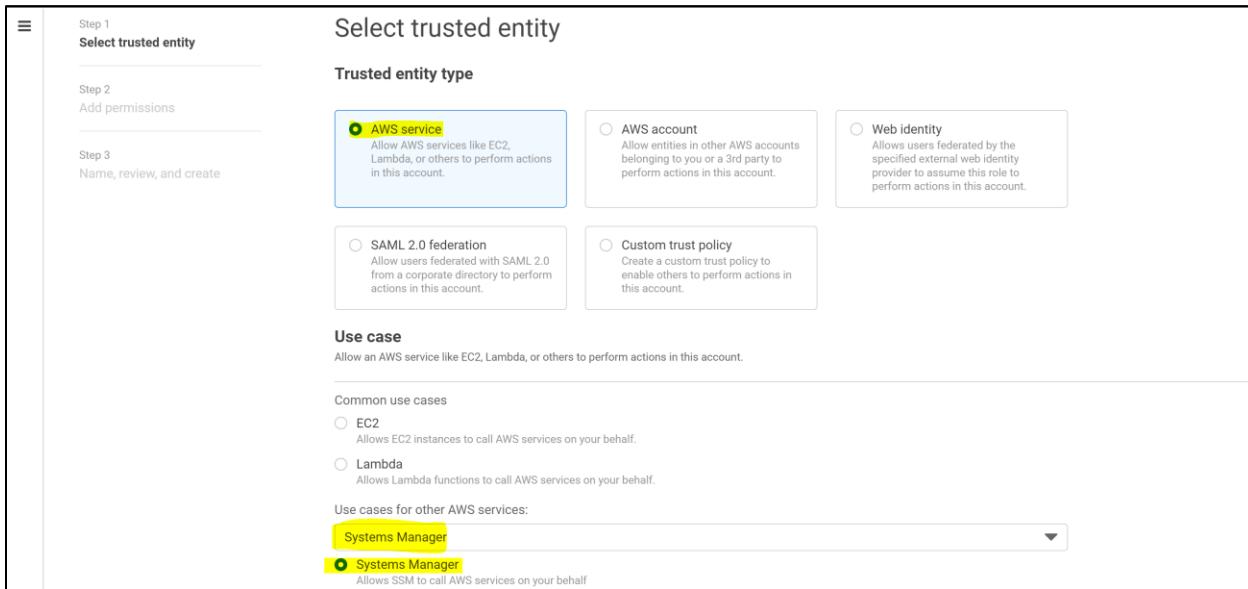
Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Publi
webserver1	i-038eeae9ac7a66656	Running	t2.micro	Initializing	No alarms	us-east-1b	ec2-18-234-27-179.co...	18.23
webserver2	i-038d2f886ed6c93d1	Running	t2.micro	Initializing	No alarms	us-east-1b	ec2-34-229-247-7.com...	34.22

## Step-8: Create an IAM role SystemsManagerToSNS



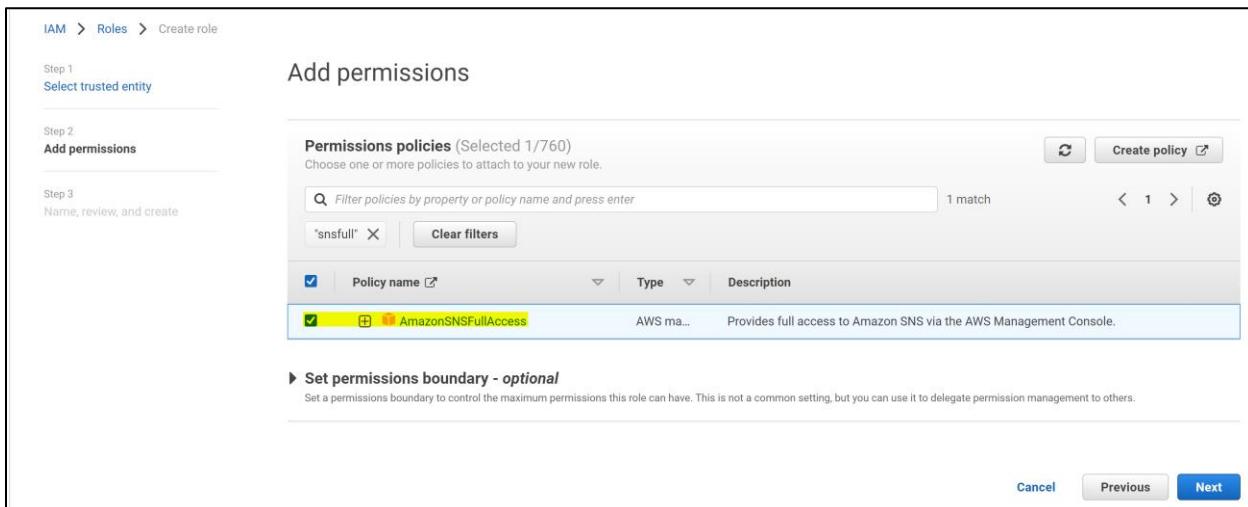
The screenshot shows the AWS IAM Roles page. On the left, there's a sidebar with 'Identity and Access Management (IAM)' and 'Access management' sections. The main area shows a list of roles with 15 items. A 'Create role' button is highlighted with a yellow box. The page includes a search bar, a 'Trusted entities' dropdown, and a 'Last acti...' link.

As we will be working for Systems Manager, we will select "systems manager" here.



The screenshot shows the 'Select trusted entity' step in the IAM role creation wizard. It has three steps: Step 1 (Select trusted entity, highlighted with a yellow box), Step 2 (Add permissions), and Step 3 (Name, review, and create). Under 'Trusted entity type', the 'AWS service' option is selected and highlighted with a yellow box. It allows AWS services like EC2, Lambda, or others to perform actions in the account. Other options like 'AWS account', 'Web identity', 'SAML 2.0 federation', and 'Custom trust policy' are also shown. Under 'Use case', 'Systems Manager' is selected and highlighted with a yellow box. The 'Common use cases' section shows 'EC2' and 'Lambda' as options. A dropdown for 'Use cases for other AWS services' also has 'Systems Manager' selected and highlighted with a yellow box.

## Policy: AmazonSNSFullAccess



The screenshot shows the 'Add permissions' step in the IAM role creation wizard. It has three steps: Step 1 (Select trusted entity), Step 2 (Add permissions, highlighted with a yellow box), and Step 3 (Name, review, and create). Under 'Permissions policies (Selected 1/760)', the 'AmazonSNSFullAccess' policy is selected and highlighted with a yellow box. It provides full access to Amazon SNS via the AWS Management Console. A note at the bottom says 'Set permissions boundary - optional'.

IAM > Roles > Create role

Step 1  
Select trusted entity

Step 2  
Add permissions

Step 3  
Name, review, and create

### Name, review, and create

#### Role details

**Role name**  
Enter a meaningful name to identify this role.  
**SystemsManagerToSNS**

Maximum 64 characters. Use alphanumeric and '+\_,@\_-' characters.

**Description**  
Add a short explanation for this role.  
Allows SSM to call AWS services on your behalf

Maximum 1000 characters. Use alphanumeric and '+\_,@\_-' characters.

**Step 1: Select trusted entities** Edit

```

1  {
2    "Version": "2012-10-17",
3    "Statement": [
4      {
5        "Sid": "",
6        "Effect": "Allow",
7        "Action": "sns:Publish"
8      }
9    ]
10  }

```

### Step 2: Add permissions

Edit

Permissions policy summary

Policy name	Type	Attached as
AmazonSNSFullAccess	AWS managed	Permissions policy

**Tags**

**Add tags (Optional)**  
Tags are key-value pairs that you can add to AWS resources to help identify, organize, or search for resources.

No tags associated with the resource.

Add tag

You can add up to 50 more tags

Cancel Previous Create role

The screenshot shows the AWS IAM Roles page. The left sidebar is titled 'Identity and Access Management (IAM)' and includes sections for 'Access management', 'Access reports', and 'Roles'. The 'Roles' section is currently selected. The main content area shows a role named 'SystemsManagerToSNS' with the ARN 'arn:aws:iam::859215391636:role/SystemsManagerToSNS'. The 'Summary' tab is selected, showing details like creation date (July 02, 2022, 23:03 (UTC-03:00)), last activity (None), and maximum session duration (1 hour). The 'Permissions' tab is active, showing a single policy attached: 'AmazonSNSFullAccess' (AWS managed). Other tabs include 'Trust relationships', 'Tags', 'Access Advisor', and 'Revoke sessions'.

arn:aws:iam::859215391636:role/SystemsManagerToSNS

### Step-9: Create a Notification Topic DevOpsNotification

The screenshot shows the AWS Services search results for 'sns'. The left sidebar is the same as the previous IAM screenshot. The search bar at the top shows 'sns'. The results are categorized into 'Services' and 'Features'. Under 'Services', there are cards for 'Simple Notification Service' (SNS managed message topics for Pub/Sub), 'Route 53 Resolver' (Resolve DNS queries in your Amazon VPC and on-premises network), 'Route 53' (Scalable DNS and Domain Name Registration), and 'Amazon Simple Email Service' (Email Sending and Receiving Service). Under 'Features', there are cards for 'Events' (ElastiCache feature) and 'DNS zones'.

Amazon SNS	
	Dashboard
	<b>Topics</b>
	Subscriptions
▼ Mobile	
	Push notifications
	Text messaging (SMS)
	Origination numbers

Amazon SNS > Topics

**Topics (5)**

Search

Edit Delete Publish message Create topic

Name	Type	ARN
BillingAlertNeel	Standard	arn:aws:sns:us-east-1:859215391636:BillingAlertNeel
Chatbot_Topic	Standard	arn:aws:sns:us-east-1:859215391636:Chatbot_Topic
CodeStarNotifications-demo-configuration-c30c0638df351a57292ed58e0872a71a47b5ad73	Standard	arn:aws:sns:us-east-1:859215391636:CodeStarNotifications-demo-configuration-c30c0638df351a57292ed58e0872a71a47b5ad73
New_Chime_Topic	Standard	arn:aws:sns:us-east-1:859215391636>New_Chime_Topic
slack-notification	Standard	arn:aws:sns:us-east-1:859215391636:slack-notification

Amazon SNS > Topics > Create topic

## Create topic

### Details

Type [Info](#)  
Topic type cannot be modified after topic is created

FIFO (first-in, first-out)

- Strictly-preserved message ordering
- Exactly-once message delivery
- High throughput, up to 300 publishes/second
- Subscription protocols: SQS

Standard

- Best-effort message ordering
- At-least once message delivery
- Highest throughput in publishes/second
- Subscription protocols: SQS, Lambda, HTTP, SMS, email, mobile application endpoints

Name

Maximum 256 characters. Can include alphanumeric characters, hyphens (-) and underscores (\_).

Display name - *optional*  
To use this topic with SMS subscriptions, enter a display name. Only the first 10 characters are displayed in an SMS message. [Info](#)

Maximum 100 characters.

► **Encryption - optional**  
Amazon SNS provides in-transit encryption by default. Enabling server-side encryption adds at-rest encryption to your topic.

► **Access policy - optional**  
This policy defines who can access your topic. By default, only the topic owner can publish or subscribe to the topic. [Info](#)

► **Delivery retry policy (HTTP/S) - optional**  
The policy defines how Amazon SNS retries failed deliveries to HTTP/S endpoints. To modify the default settings, expand this section. [Info](#)

► **Delivery status logging - optional**  
These settings configure the logging of message delivery status to CloudWatch Logs. [Info](#)

► **Tags - optional**  
A tag is a metadata label that you can assign to an Amazon SNS topic. Each tag consists of a key and an optional value. You can use tags to search and filter your topics and track your costs. [Learn more](#)

Cancel
Create topic

Amazon SNS
X
Topic DevOpsNotification created successfully.
Publish message
X

Amazon SNS > Topics > DevOpsNotification

DevOpsNotification
Edit
Delete
Publish message

**Details**

Name	Display name
DevOpsNotification	-
ARN	Topic owner
arn:aws:sns:us-east-1:859215391636:DevOpsNotification	859215391636
Type	
Standard	

SNS Topic ARN: `arn:aws:sns:us-east-1:859215391636:DevOpsNotification`

Step-10: Create a subscription - email

Subscriptions    Access policy    Delivery retry policy (HTTP/S)    Delivery status logging    Encryption    Tags

**Subscriptions (0)**

**Create subscription**

No subscriptions found

You don't have any subscriptions to this topic.

**Create subscription**

Topic ARN

arn:aws:sns:us-east-1:859215391636:DevOpsNotification

Protocol

The type of endpoint to subscribe

Email

Endpoint

An email address that can receive notifications from Amazon SNS.

neeld70@gmail.com

After your subscription is created, you must confirm it. [Info](#)

Subscription filter policy - *optional*

This policy filters the messages that a subscriber receives. [Info](#)

Redrive policy (dead-letter queue) - *optional*

Send undeliverable messages to a dead-letter queue. [Info](#)

Cancel    **Create subscription**

Amazon SNS X

Subscription to DevOpsNotification created successfully.  
The ARN of the subscription is arn:aws:sns:us-east-1:859215391636:DevOpsNotification:c5dba028-4d3d-4ea8-86db-0211c31fba89.

Dashboard Topics Subscriptions **Subscriptions** ▾ Mobile Push notifications Text messaging (SMS) Origination numbers

Amazon SNS > Topics > DevOpsNotification > Subscription: c5dba028-4d3d-4ea8-86db-0211c31fba89

Subscription: c5dba028-4d3d-4ea8-86db-0211c31fba89

Details

ARN arn:aws:sns:us-east-1:859215391636:DevOpsNotification:c5dba028-4d3d-4ea8-86db-0211c31fba89	Status Pending confirmation
Endpoint need70@gmail.com	Protocol EMAIL
Topic DevOpsNotification	

Edit Delete

Subscription ARN: arn:aws:sns:us-east-1:859215391636:DevOpsNotification:c5dba028-4d3d-4ea8-86db-0211c31fba89

1 of 66,001

AWS Notification - Subscription Confirmation Inbox X

AWS Notifications <no-reply@sns.amazonaws.com> to me 11:11 PM (3 minutes ago)

You have chosen to subscribe to the topic:  
arn:aws:sns:us-east-1:859215391636:DevOpsNotification

To confirm this subscription, click or visit the link below (If this was in error no action is necessary):  
[Confirm subscription](#)

Please do not reply directly to this email. If you wish to remove yourself from receiving all future SNS subscription confirmation requests please send an email to [sns-opt-out](#)

Reply Forward

**aws** Simple Notification Service

**Subscription confirmed!**

You have successfully subscribed.

Your subscription's id is:  
arn:aws:sns:us-east-1:859215391636:DevOpsNotification:c5dba028-4d3d-4ea8-86db-0211c31fba89

If it was not your intention to subscribe, [click here to unsubscribe](#).

The screenshot shows the Amazon SNS console. On the left, the navigation menu includes 'Topics' (which is selected and highlighted in orange). The main content area shows the 'DevOpsNotification' topic details. The 'Details' section lists the topic's name as 'DevOpsNotification', ARN as 'arn:aws:sns:us-east-1:859215391636:DevOpsNotification', and type as 'Standard'. The 'Display name' and 'Topic owner' fields are empty. Below the details, there are tabs for 'Subscriptions', 'Access policy', 'Delivery retry policy (HTTP/S)', 'Delivery status logging', 'Encryption', and 'Tags'. The 'Subscriptions' tab is selected, showing one subscription: 'c5dba028-4d3d-4ea8-86db-0211c31fba89' with the endpoint 'neeld70@gmail.com', marked as 'Confirmed' and using the 'EMAIL' protocol. There are buttons for 'Edit', 'Delete', 'Request confirmation', 'Confirm subscription', and 'Create subscription'.

## Step-11: Run the System Manager Quick Setup

The screenshot shows the Amazon SNS console with a search query 'systems mana' entered in the search bar. The results are categorized into 'Services' and 'Features'. The 'Services' section includes 'Systems Manager' (a central place to view and manage AWS resources), 'Incident Manager' (automated incident response plans), 'FSx' (fully managed third-party file systems), and 'AWS Marketplace Subscriptions' (a digital catalog for software). The 'Features' section includes 'Quick Setup' (a Systems Manager feature), 'Distributor' (another Systems Manager feature), and 'Inventory'. Each result card includes a small icon, a title, a description, and a star rating.

**AWS Systems Manager**

MANAGEMENT TOOLS

**Quick Setup**

Operations Management

- Explorer
- OpsCenter
- CloudWatch Dashboard
- Incident Manager

Application Management

- Application Manager
- AppConfig
- Parameter Store

Change Management

- Change Manager
- Automation
- Change Calendar
- Maintenance Windows

Node Management

- Fleet Manager
- Compliance

**AWS Systems Manager**  
Gain Operational Insight and Take Action on AWS Resources.

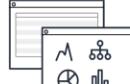
**Get Started with Systems Manager**

View operational data for groups of resources, so you can quickly identify and act on any issues that might impact applications that use those resources.

**How it works**



Group your resources  
Group your AWS resources and save them into resource groups



View insights  
See relevant operational data and dashboards about your



Take action  
Mitigate issues by performing operations directly on groups

**More resources**

- Documentation
- API reference
- FAQs

**AWS Systems Manager**

Management and Governance

**Quick Setup**

Operations Management

- Explorer
- OpsCenter
- CloudWatch Dashboard
- Incident Manager

Application Management

- Application Manager
- AppConfig
- Parameter Store

Change Management

- Change Manager
- Automation
- Change Calendar
- Maintenance Windows

**AWS Quick Setup**  
Automated and simplified setups based on best practices

AWS Quick Setup helps you configure frequently used AWS services and features across your organization with fewer clicks.

**Get started with Quick Setup**

To begin, choose a home AWS Region for Quick Setup. Quick Setup creates the AWS resources used to deploy your configurations in the Region you specify. The home Region can't be changed once chosen.

Choose a home Region

**us-east-1**

**Get started**

**How it works**



1. Choose a home Region



2. Choose a configuration type

Quick Setup creates the AWS resources used to deploy all of your configurations in the AWS Region you specify. The home Region can't be

Quick Setup provides a library of configuration types that automate common setup tasks and deploy configurations for services based on best

**More resources**

- Documentation
- FAQ
- Support forums

Systems Manager > Quick Setup

## Quick Setup

**Configuration types**

Filter below results

 **Host Management**  
Powered by Systems Manager

Configuration status  
 No configurations

Description  
Configures IAM roles and enables commonly used Systems Manager capabilities to securely manage your Amazon EC2 instances.

**Create**

 **Config Recording**  
Powered by AWS Config

Configuration status  
 No configurations

Description  
Enables the tracking and recording of changes to the AWS resource types you choose. Configures delivery and notifications options for the recorded data.

**Create**

 **Conformance Packs**  
Powered by AWS Config

Configuration status  
 No configurations

Description  
Deploys conformance packs provided by AWS Config. Conformance packs are collections of AWS Config rules and remediation actions that can be deployed as a single entity.

**Create**

 **DevOps Guru**  
Powered by DevOps Guru

Configuration status  
 No configurations

 **Distributor**  
Powered by Systems Manager

Configuration status  
 No configurations

**AWS Systems Manager**

**Quick Setup**

**Choose how you want to target instances**

**Current Region**  
Deploy configuration to the current Region.

**Choose Regions**  
Choose the Regions you want to deploy this configuration to.

**All instances**  
Deploy your configuration to all instances in the target account and Regions.

**Specify instance tag**  
Specify a tag key-value pair to select instances that share that tag.

**By Resource Group**  
Specify a resource group. Only instances in that group will be configured.

**Manual**  
Manually specify the instances you want to configure.

**Instances**

<input checked="" type="checkbox"/>	Name	Instance ID	Instance type	Instance state	Availability zone	IAM Instance profile name
<input checked="" type="checkbox"/>	webserver2	i-038d2f886ed6c93d1	t2.micro	running	us-east-1b	-
<input checked="" type="checkbox"/>	webserver1	i-038eeae9ac7a66656	t2.micro	running	us-east-1b	-

**Summary**

Choose "Create" to perform the following actions:

- Enable Systems Manager Explorer in all targeted accounts and Regions.
- Deploy IAM roles which enable State Manager to invoke Automation documents that apply selected configuration options.
- Create a State Manager association for each configuration option you have selected.
- Attach instance profiles or IAM roles with required Systems Manager permissions to targeted instances

**Create**

AWS Systems Manager

Quick Setup

Operations Management

- Explorer
- OpsCenter
- CloudWatch Dashboard
- Incident Manager

Application Management

- Application Manager
- AppConfig
- Parameter Store

Change Management

- Change Manager
- Automation
- Change Calendar
- Maintenance Windows

Your Host Management Quick Setup is being updated. 0%

Systems Manager > Quick Setup > Configuration details

Configuration details

AWS Systems Manager

Quick Setup

Operations Management

- Explorer
- OpsCenter
- CloudWatch Dashboard
- Incident Manager

Application Management

- Application Manager
- AppConfig
- Parameter Store

Change Management

- Change Manager
- Automation
- Change Calendar
- Maintenance Windows

Your Host Management Quick Setup was successfully updated.

Systems Manager > Quick Setup > Configuration details

Host Management

Status Settings

Filter by

- Regions
- Deployment status
- Association status

Configuration deployment status

The status of your configuration's deployment to its targets.

	Total	Success	Failed	Pending
1	1	1	0	0

Configuration association status

The status of the State Manager associations created by your configuration.

	Total	Success	Failed	Pending
5	3	3	0	2

Configuration details

The status of each configuration deployment.

Search account ID

Last updated: just now Configuration progress updated every 30 seconds. View details

Validate here as you can see above it should be all Green – Success!!!

**AWS Systems Manager**

**Quick Setup**

**Operations Management**

- Explorer
- OpsCenter
- CloudWatch Dashboard
- Incident Manager

**Application Management**

- Application Manager
- AppConfig
- Parameter Store

**Change Management**

- Change Manager
- Automation
- Change Calendar
- Maintenance Windows

**Host Management - 859215391636**

Region: us-east-1

**Associations**

Association name	Association status	Instances per status	Schedule rate	Last updated
AWS-QuickSetup-SSMHostMgmt-CollectInventory-fkluv	Pending	-	30 minutes	-
AWS-QuickSetup-SSMHostMgmt-UpdateSSMAgent-fkluv	Success	-	14 days	2 minutes ago
AWS-QuickSetup-SSMHostMgmt-EnableExplorer-fkluv	Success	-	-	1 minute ago
AWS-QuickSetup-SSMHostMgmt-ScanForPatches-fkluv	Success	-	1 day	2 minutes ago
AWS-QuickSetup-SSMHostMgmt-AttachIAMToInstance-fkluv	Success	2	30 days	just now

**Parameter Store**

**Change Management**

- Change Manager
- Automation
- Change Calendar
- Maintenance Windows

**Node Management**

- Fleet Manager
- Compliance
- Inventory
- Hybrid Activations
- Session Manager**
- Run Command
- State Manager
- Patch Manager
- Distributor

**Shared Resources**

- Documents

**Management**

## Session Manager

Quickly and securely access your Windows and Linux instances

Session Manager is a managed service that provides you with one-click secure access to your instances without the need to open inbound ports and manage bastion hosts. You have centralized access control over who can access your instances and full auditing capabilities to ensure compliance with corporate policies.

**How it works**

- Configure your instances to use Session Manager
- Assign user IAM policies to control instance access
- Specify account options for session logs
- Start a session on your instances by launching bash or shell terminal

**Why use Session Manager?**

**Start a session**

Connect to your instances by starting a secure and auditable session.

**Getting started**

- What is Session Manager?
- Set up Session Manager
- Set up session logging
- Set up session notifications
- Create and manage sessions
- Monitor session activity

**AWS Systems Manager**

**Quick Setup**

**Operations Management**

- Explorer
- OpsCenter
- CloudWatch Dashboard
- Incident Manager

**Application Management**

- Application Manager
- AppConfig
- Parameter Store

**Change Management**

- Change Manager
- Automation
- Change Calendar
- Maintenance Windows

**AWS Systems Manager > Session Manager > Start a session**

### Start a session

Select the instance that you would like to start a session on

**Reason**

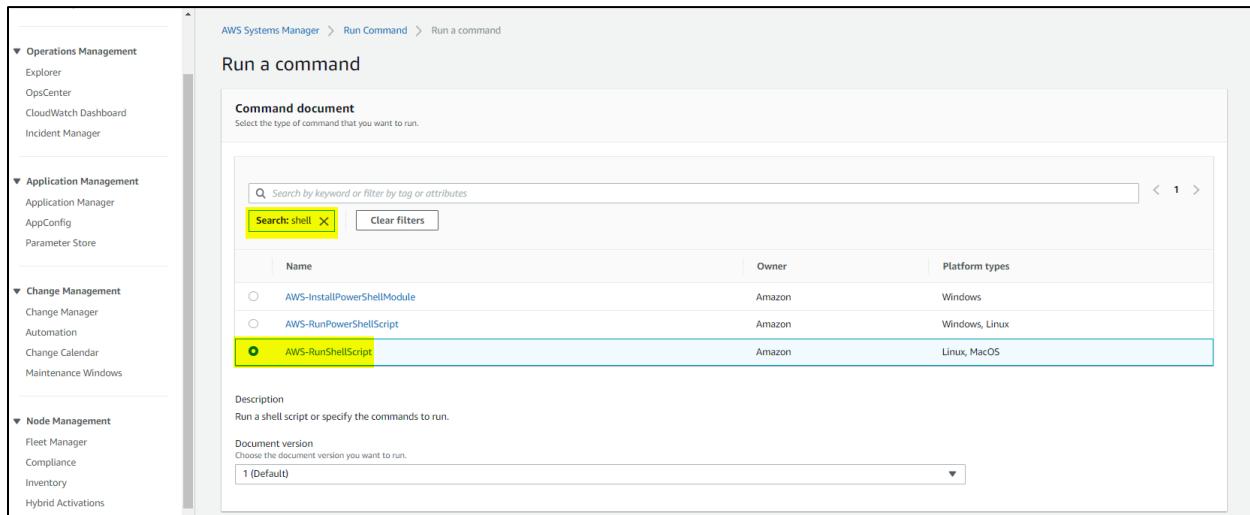
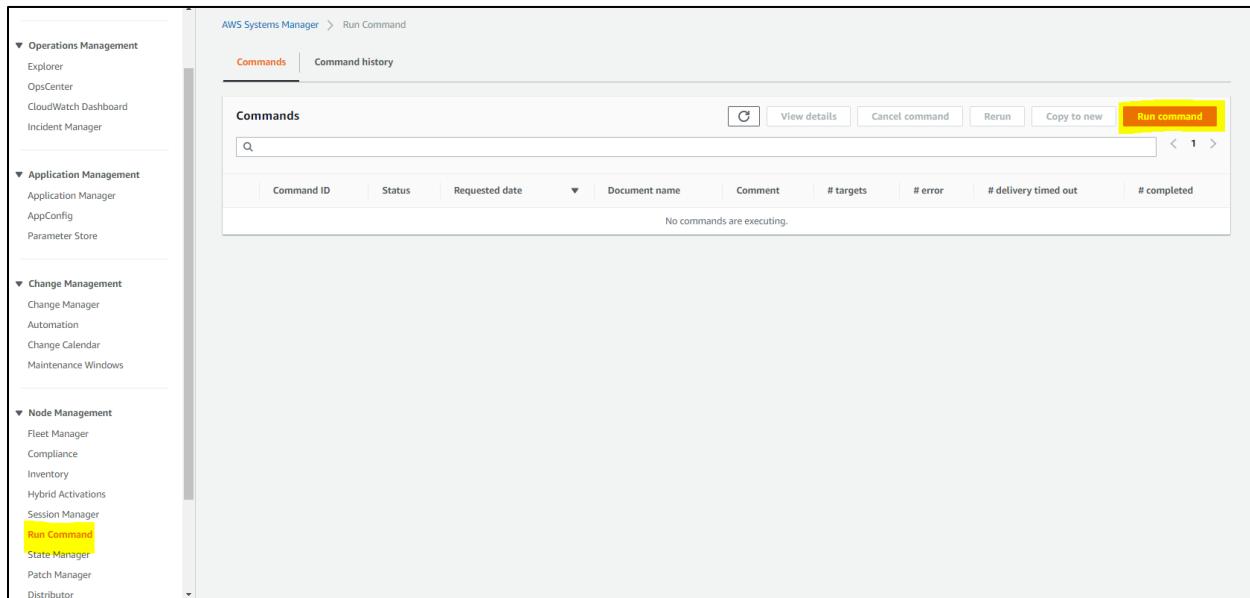
Reason for session – optional  
The reason for connecting to the instance. This value is included in the details of the event created by AWS CloudTrail when you start the session. The value can have up to 256 characters.

**Target instances**

Instance name	Instance ID	Agent version	Instance state	Availability zone	Platform
webserver2	i-038d2f886ed693d1	3.1.1188.0	running	us-east-1b	Ubuntu
webserver1	i-038beaae9ac7a66656	3.1.1188.0	running	us-east-1b	Ubuntu

**Cancel** **Start session**

## Step-12: Execute "Run Command" to deploy the "security agent installation"



```
sudo wget -q https://tcb-bootcamps.s3.amazonaws.com/bootcamp-aws/en/install_security_agent.sh -P /tmp
```

```
sudo chmod +x /tmp/install_security_agent.sh
```

```
sudo /tmp/install_security_agent.sh
```

```
ls -ltr /usr/bin/security_agent
```

### Command parameters

**Commands**  
(Required) Specify a shell script or a command to run.

```

1 sudo wget -q https://tcb-bootcamps.s3.amazonaws.com/bootcamp-aws/en/install_security_agent.sh -P /tmp
2 sudo chmod +x /tmp/install_security_agent.sh
3 sudo /tmp/install_security_agent.sh
4 ls -ltr /usr/bin/security_agent
5

```

### Targets

Targets  
Choose a method for selecting targets.

**Specify instance tags**  
Specify one or more tag key-value pairs to select instances that share those tags.

**Choose instances manually**  
Manually select the instances you want to register as targets.

**Choose a resource group**  
Choose a resource group that includes the resources you want to target.

i-038d2f886ed6c93d1  i-038eeae9ac7a66656

### Instances

<input checked="" type="checkbox"/>	Node ID	Source type	Source ID	Name	Ping status	Node state	Availability zone	Last ping time
<input checked="" type="checkbox"/>	i-038d2f886ed6c93d1	AWS::EC2::Instance	i-038d2f886ed6c93d1	webserver2	Online	running	us-east-1b	7/3/2022 at 15:12:23 GMT-03
<input checked="" type="checkbox"/>	i-038eeae9ac7a66656	AWS::EC2::Instance	i-038eeae9ac7a66656	webserver1	Online	running	us-east-1b	7/3/2022 at 15:10:16 GMT-03

### ▼ Output options

Write command output to an Amazon S3 bucket  
Write all command output to an Amazon S3 bucket. Command output in the console is truncated after 2500 characters.

**Enable an S3 bucket**

Send command output to Amazon CloudWatch logs  
You can stream and encrypt log data for all commands in your account to a CloudWatch Logs log group in your account. [Learn more](#)

**Enable CloudWatch logs**

▼ SNS notifications

SNS notifications

Configure Systems Manager to send notifications about command statuses using Amazon Simple Notification Service.

Enable SNS notifications

IAM role

Choose an IAM role to start SNS notifications

arn:aws:iam::859215391636:role/SystemsManagerToSNS

SNS topic

Enter an SNS topic. An SNS topic is a communication channel to subscribe to notifications. [Learn more](#).

arn:aws:sns:us-east-1:859215391636:DevOpsNotification

Event notifications

Choose the types of events you want to be notified about. [Learn more](#).

All events X

Change notifications

Choose when you would like to receive notifications about changes to Run Command.

Command status changes  
Notifies you when the status of a command changes.

Command status on each instance changes  
Notifies you when the command status of an instance changes

Operations Management

- Explorer
- OpsCenter
- CloudWatch Dashboard
- Incident Manager

Application Management

- Application Manager
- AppConfig
- Parameter Store

Change Management

- Change Manager
- Automation
- Change Calendar
- Maintenance Windows

Node Management

- Fleet Manager
- Compliance
- Inventory
- Hybrid Activations
- Session Manager
- Run Command**

Command ID: e1d519bd-7fff-4a4f-a627-3035c66c929b was successfully sent!

AWS Systems Manager > Run Command > Command ID: e1d519bd-7fff-4a4f-a627-3035c66c929b

Command ID: e1d519bd-7fff-4a4f-a627-3035c66c929b

Command status

Overall status	Detailed status	# targets	# completed	# error	# delivery timed out
<span style="color: orange;">●</span> In Progress	<span style="color: orange;">●</span> In Progress	0	0	0	0

Targets and outputs

Instance ID	Instance name	Status	Detailed Status	Start time	Finish time
i-038eeae9ac7a6656	ip-172-31-38-227.ec2.internal	<span style="color: orange;">●</span> In Progress	<span style="color: orange;">●</span> In Progress		
i-038d2f886ed6c93d1	ip-172-31-47-88.ec2.internal	<span style="color: orange;">●</span> In Progress	<span style="color: orange;">●</span> In Progress		

View output

Command description

Command parameters

Step-13: Wait for few more minutes and agents will be successfully installed as shown below. Also, as we have configured emails, we should receive email notifications as well.

Command ID: e1d519bd-7fff-4a4f-a627-3035c66c929b was successfully sent!

Overall status: Success

Detailed status: Success

# targets: 2

# completed: 2

# error: 0

# delivery timed out: 0

Targets and outputs

Instance ID	Instance name	Status	Detailed Status	Start time	Finish time
i-038eeae9ac7a66656	ip-172-31-38-227.ec2.internal	Success	Success	Sun, 03 Jul 2022 18:18:39 GMT	Sun, 03 Jul 2022 18:19:09 GMT
i-038d2f886ed6c93d1	ip-172-31-47-88.ec2.internal	Success	Success	Sun, 03 Jul 2022 18:18:39 GMT	Sun, 03 Jul 2022 18:19:09 GMT

Command description

Command parameters

EC2 Run Command Notification us-east-1

AWS Notifications <no-reply@sns.amazonaws.com> to me 3:18 PM (1 minute ago)

{"commandId": "e1d519bd-7fff-4a4f-a627-3035c66c929b", "documentName": "AWS-RunShellScript", "instanceId": "i-038eeae9ac7a66656", "requestedDateTime": "2022-07-03T18:18:39.288Z", "status": "InProgress", "detailedStatus": "InProgress", "eventTime": "2022-07-03T18:18:39.344Z"}

If you wish to stop receiving notifications from this topic, please click or visit the link below to unsubscribe:  
<https://sns.us-east-1.amazonaws.com/unsubscribe.html?SubscriptionArn=arn:aws:sns:us-east-1:850215391636:DevOpsNotification:c5dba028-4d3d-4ea8-86db-0211c31ba89&Endpoint=neel70@gmail.com>

Please do not reply directly to this email. If you have any questions or comments regarding this email, please contact us at <https://aws.amazon.com/support>

AWS Notifications <no-reply@sns.amazonaws.com> to me 3:18 PM (1 minute ago)

{"commandId": "e1d519bd-7fff-4a4f-a627-3035c66c929b", "documentName": "AWS-RunShellScript", "instanceId": "i-038eeae9ac7a66656", "requestedDateTime": "2022-07-03T18:18:39.445Z", "status": "InProgress", "detailedStatus": "InProgress", "eventTime": "2022-07-03T18:18:39.49Z"}

AWS Notifications <no-reply@sns.amazonaws.com> to me 3:19 PM (0 minutes ago)

{"commandId": "e1d519bd-7fff-4a4f-a627-3035c66c929b", "documentName": "AWS-RunShellScript", "instanceId": "i-038d2f886ed6c93d1", "requestedDateTime": "2022-07-03T18:18:39.288Z", "status": "Success", "detailedStatus": "Success", "eventTime": "2022-07-03T18:19:09.908Z"}

AWS Notifications <no-reply@sns.amazonaws.com> to me 3:19 PM (0 minutes ago)

{"commandId": "e1d519bd-7fff-4a4f-a627-3035c66c929b", "documentName": "AWS-RunShellScript", "instanceId": "i-038eeae9ac7a66656", "requestedDateTime": "2022-07-03T18:18:39.445Z", "status": "Success", "detailedStatus": "Success", "eventTime": "2022-07-03T18:19:10.066Z"}