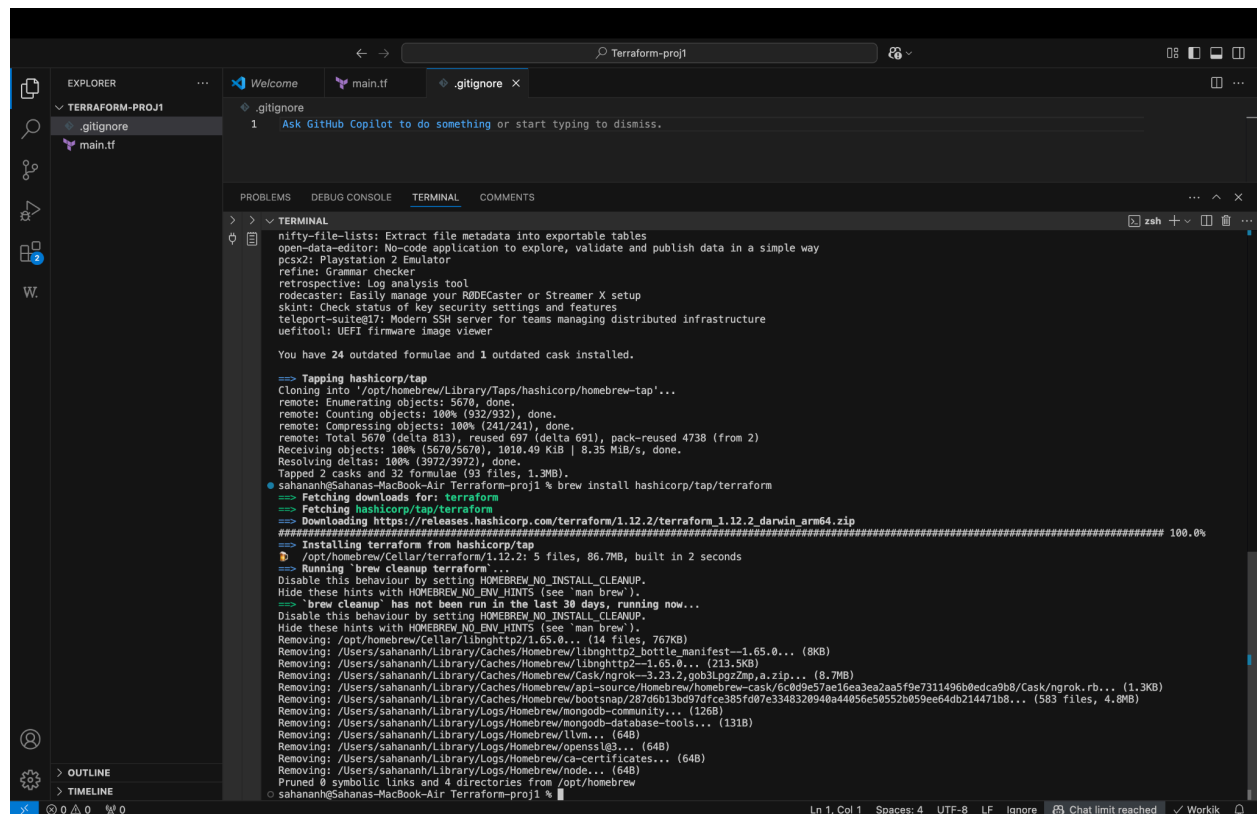


AWS Web Server Infrastructure with Terraform

Installation on MacOS

brew tap hashicorp/tap

brew install hashicorp/tap/terraform



```
Terminal
nifty-file-lists: Extract file metadata into exportable tables
open-data-editor: No-code application to explore, validate and publish data in a simple way
pcsx2: Playstation 2 Emulator
refine: Grammar checker
retrospectives: Log analysis tool
rodecaster: Easily manage your RodeCaster or Streamer X setup
skint: Check status of key security settings and features
teleport-suite@17: Modern SSH server for teams managing distributed infrastructure
uefi-tool: UEFI firmware image viewer

You have 24 outdated formulae and 1 outdated cask installed.

=> Tapping hashicorp/tap
Cloning into '/opt/homebrew/Library/Taps/hashicorp/homebrew-tap'...
remote: Enumerating objects: 5670, done.
remote: Counting objects: 100% (932/932), done.
remote: Compressing objects: 100% (241/241), done.
remote: Total 5670 (delta 813), reused 697 (delta 691), pack-reused 4738 (from 2)
Receiving objects: 100% (5670/5670), 1810.49 KiB | 8.35 MiB/s, done.
Resolving deltas: 100% (3972/3972), done.
Tapped 2 casks and 32 formulae (93 files, 1.3MB).
sahananh@sahanas-MacBook-Air Terraform-proj1 % brew install hashicorp/tap/terraform
=> Fetching downloads for: terraform
=> Downloading https://releases.hashicorp.com/terraform/1.12.2/terraform_1.12.2_darwin_arm64.zip
===== 100.0%
=> Installing terraform from hashicorp/tap
  /opt/homebrew/Cellar/terraform/1.12.2: 5 files, 86.7MB, built in 2 seconds
=> Running 'brew cleanup terraform'...
Disable this behaviour by setting HOMEBREW_NO_INSTALL_CLEANUP.
Hide these hints with HOMEBREW_NO_ENV_HINTS (see 'man brew').
=> 'brew cleanup' has not been run in the last 30 days, running now...
Disable this behaviour by setting HOMEBREW_NO_INSTALL_CLEANUP.
Hide these hints with HOMEBREW_NO_ENV_HINTS (see 'man brew').
Removing: /opt/homebrew/Cellar/Libnghttp2/1.65.0... (14 files, 767KB)
Removing: /Users/sahananh/Library/Caches/Homebrew/libnghttp2_bottle_manifest--1.65.0... (8KB)
Removing: /Users/sahananh/Library/Caches/Homebrew/libnghttp2--1.65.0... (213.5KB)
Removing: /Users/sahananh/Library/Caches/Homebrew/Cask/ngrok--3.23.2.gob3lpgz2mp.a.zip... (8.7MB)
Removing: /Users/sahananh/Library/Caches/Homebrew/api-source/Homebrew/homebrew-cask/6c0d9e57ae16ea3ea5f9e7311496bedca9b8/Cask/ngrok.rb... (1.3KB)
Removing: /Users/sahananh/Library/Caches/Homebrew/bootsnap/287d6b13bd97dfcc385fd87e3348326940a44056e50552b059ee64db214471b8... (583 files, 4.8MB)
Removing: /Users/sahananh/Library/Logs/Homebrew/mongodb-community... (1268)
Removing: /Users/sahananh/Library/Logs/Homebrew/mongodb-database-tools... (131B)
Removing: /Users/sahananh/Library/Logs/Homebrew/llvm... (64B)
Removing: /Users/sahananh/Library/Logs/Homebrew/openssl@3... (64B)
Removing: /Users/sahananh/Library/Logs/Homebrew/ca-certificates... (64B)
Removing: /Users/sahananh/Library/Logs/Homebrew/node... (64B)
Pruned 0 symbolic links and 4 directories from /opt/homebrew
sahananh@sahanas-MacBook-Air Terraform-proj1 %
```

Install AWS CLI

```
PROBLEMS  DEBUG CONSOLE  TERMINAL  COMMENTS
> > >
sahananh@Sahanas-MacBook-Air Terraform-proj1 % curl "https://awscli.amazonaws.com/AWSCLIV2.pkg" -o "AWSCLIV2.pkg"
sudo installer -pkg AWSCLIV2.pkg -target /
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
             Dload  Upload   Total     Spent    Left  Speed
100 37.7M  100 37.7M    0     0  34.6M    0  0:00:01  0:00:01 --:--:-- 34.7M
Password:
Installer: Package name is AWS Command Line Interface
Installer: Upgrading at base path /

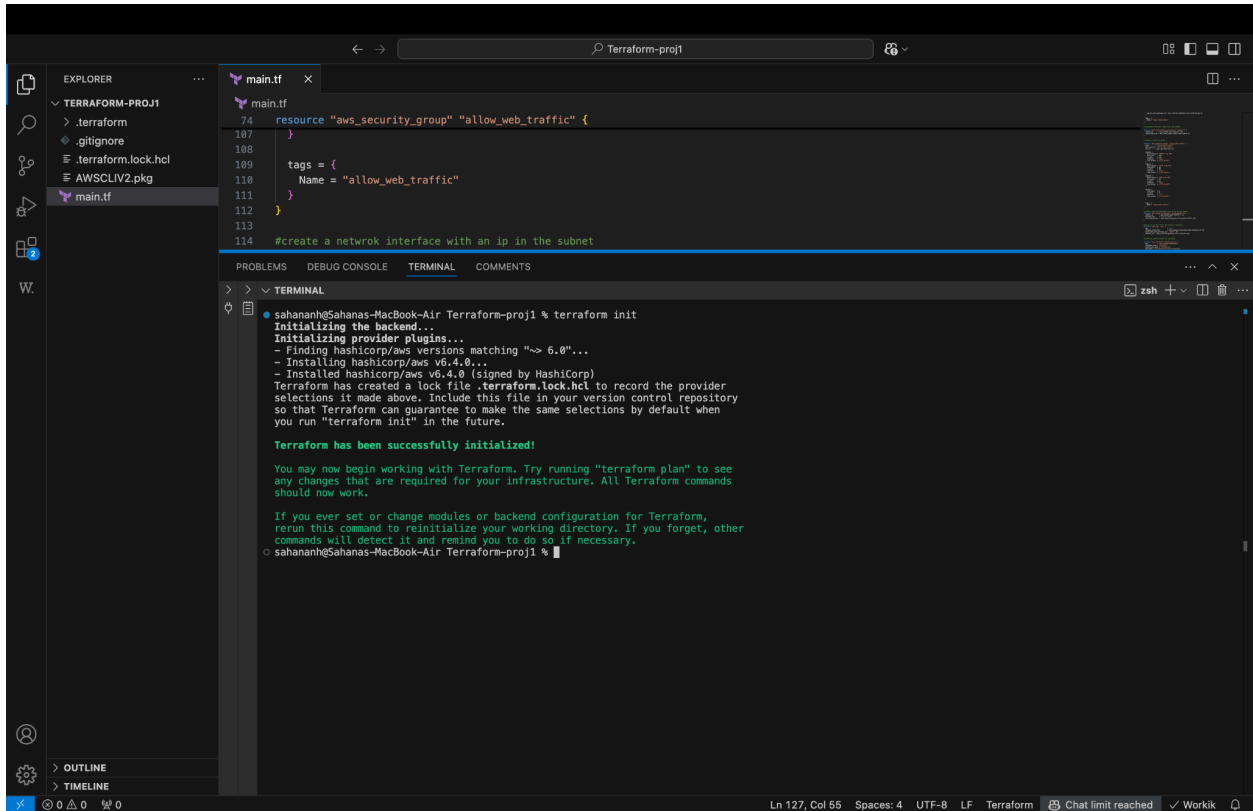
Installer: The upgrade was successful.
sahananh@Sahanas-MacBook-Air Terraform-proj1 %
sahananh@Sahanas-MacBook-Air Terraform-proj1 % curl "https://awscli.amazonaws.com/AWSCLIV2.pkg" -o "AWSCLIV2.pkg"
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
             Dload  Upload   Total     Spent    Left  Speed
100 37.7M  100 37.7M    0     0  21.2M    0  0:00:01  0:00:01 --:--:-- 21.2M
sahananh@Sahanas-MacBook-Air Terraform-proj1 % sudo installer -pkg ./AWSCLIV2.pkg -target /
Installer: Package name is AWS Command Line Interface
Installer: Upgrading at base path /
Installer: The upgrade was successful.
sahananh@Sahanas-MacBook-Air Terraform-proj1 % which aws
/usr/local/bin/aws
sahananh@Sahanas-MacBook-Air Terraform-proj1 % aws --version
aws-cli/2.27.56 Python/3.13.4 Darwin/24.5.0 exe/x86_64
sahananh@Sahanas-MacBook-Air Terraform-proj1 %
```

```
PROBLEMS  DEBUG CONSOLE  TERMINAL  COMMENTS
> > >
sahananh@Sahanas-MacBook-Air Terraform-proj1 % curl "https://awscli.amazonaws.com/AWSCLIV2.pkg" -o "AWSCLIV2.pkg"
sudo installer -pkg AWSCLIV2.pkg -target /
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
             Dload  Upload   Total     Spent    Left  Speed
100 37.7M  100 37.7M    0     0  34.6M    0  0:00:01  0:00:01 --:--:-- 34.7M
Password:
Installer: Package name is AWS Command Line Interface
Installer: Upgrading at base path /

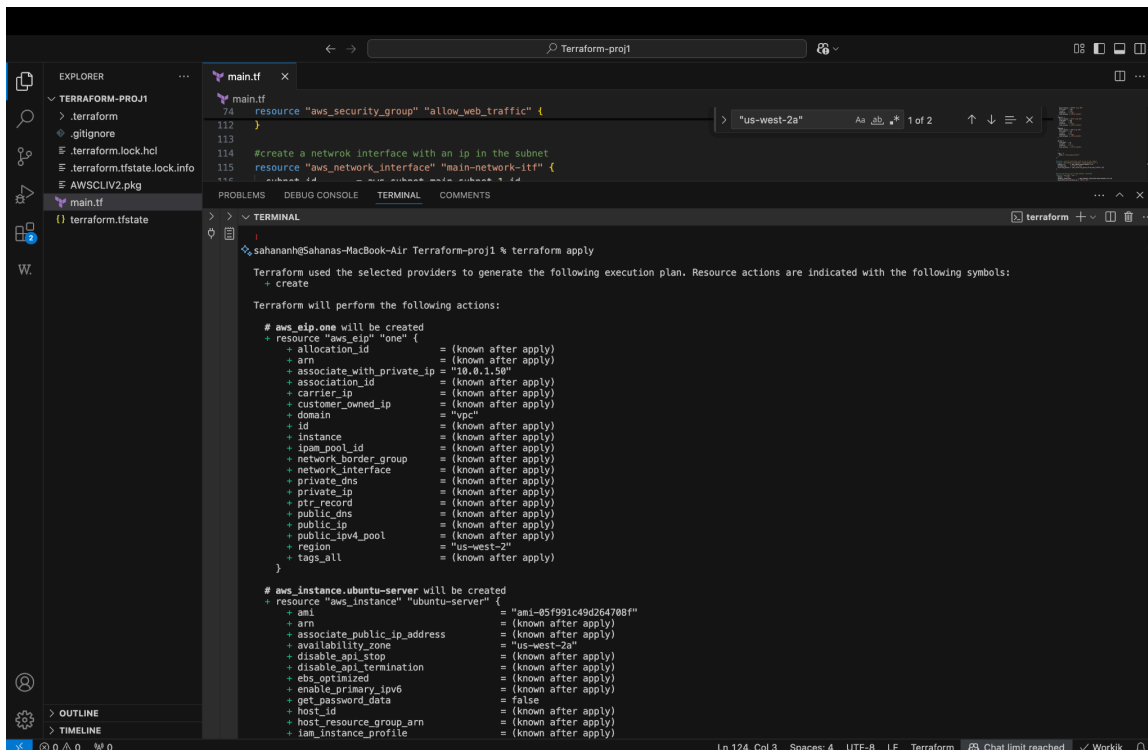
Installer: The upgrade was successful.
sahananh@Sahanas-MacBook-Air Terraform-proj1 %
sahananh@Sahanas-MacBook-Air Terraform-proj1 % curl "https://awscli.amazonaws.com/AWSCLIV2.pkg" -o "AWSCLIV2.pkg"
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
             Dload  Upload   Total     Spent    Left  Speed
100 37.7M  100 37.7M    0     0  21.2M    0  0:00:01  0:00:01 --:--:-- 21.2M
sahananh@Sahanas-MacBook-Air Terraform-proj1 % sudo installer -pkg ./AWSCLIV2.pkg -target /
Installer: Package name is AWS Command Line Interface
Installer: Upgrading at base path /
Installer: The upgrade was successful.
sahananh@Sahanas-MacBook-Air Terraform-proj1 % which aws
/usr/local/bin/aws
sahananh@Sahanas-MacBook-Air Terraform-proj1 % aws --version
aws-cli/2.27.56 Python/3.13.4 Darwin/24.5.0 exe/x86_64
sahananh@Sahanas-MacBook-Air Terraform-proj1 % aws configure
AWS Access Key ID [*****]: AKIARF6MWOXSKSBRKAVGR
AWS Secret Access Key [*****oCRLI]: ZT3iVLS1Lxw1XVv31FtMu/+5NwMtcagmJ+JoCRI
Default region name [N/A]: us-west-2
Default output format [None]:
sahananh@Sahanas-MacBook-Air Terraform-proj1 % aws iam list-users
{
  "Users": [
    {
      "Path": "/",
      "UserName": "DevOps-IAM-admin",
      "UserId": "AIDARF6MWOXK6JCBZ20ZD",
      "Arn": "arn:aws:iam:081496797333:user/DevOps-IAM-admin",
      "CreateDate": "2025-06-20T20:52:29+00:00",
      "PasswordLastUsed": "2025-07-22T08:03:59+00:00"
    }
  ]
}
sahananh@Sahanas-MacBook-Air Terraform-proj1 %
```

Go to EC2 instance in IAM user account and create a key pair

Initialize the terraform



Terraform apply



Verify VPC, Subnet, route table, EC2

us-west-2.console.aws.amazon.com/vpconsole/home?region=us-west-2#vpcs:

VPC > Your VPCs

VPC dashboard

EC2 Global View

Filter by VPC

- Virtual private cloud
 - Your VPCs
 - Subnets
 - Route tables
 - Internet gateways
 - Egress-only internet gateways
 - Carrier gateways
 - DHCP option sets
 - Elastic IPs
 - Managed prefix lists
 - NAT gateways
 - Peering connections
 - Route servers
- Security
 - Network ACLs
 - Security groups
- PrivateLink and Lattice
 - Getting started
 - Endpoints

Your VPCs (1/2)

Find VPCs by attribute or tag

Name	VPC ID	State	Block Public...	IPv4 CIDR	IPv6 CIDR
-	vpc-032e09fc569a42fe3	Available	Off	172.31.0.0/16	-
main-vpc	vpc-0a5c64be1d24f29ae	Available	Off	10.0.0.0/16	-

vpc-0a5c64be1d24f29ae / main-vpc

Details | Resource map | CIDRs | Flow logs | Tags | Integrations

Details
VPC ID
vpc-0a5c64be1d24f29ae
DNS resolution
Enabled
Main network ACL

State
Available
Tenancy
default
Default VPC

Block Public Access
Off
DHCP option set
dopt-0f30896ff9fd9017d
IPv4 CIDR

DNS hostnames
Disabled
Main route table
rtb-06c0010d507d98157
IPv6 pool

us-west-2.console.aws.amazon.com/vpconsole/home?region=us-west-2#subnets:

VPC > Subnets

VPC dashboard

EC2 Global View

Filter by VPC

- Virtual private cloud
 - Your VPCs
 - Subnets
 - Route tables
 - Internet gateways
 - Egress-only internet gateways
 - Carrier gateways
 - DHCP option sets
 - Elastic IPs
 - Managed prefix lists
 - NAT gateways
 - Peering connections
 - Route servers
- Security
 - Network ACLs
 - Security groups
- PrivateLink and Lattice
 - Getting started
 - Endpoints

Subnets (1/5)

Find subnets by attribute or tag

Name	Subnet ID	State	VPC	Block Public...	IPv4 C
-	subnet-0c13abcf9abd0d64c	Available	vpc-032e09fc569a42fe3	Off	172.31
-	subnet-045006b27742448fa	Available	vpc-032e09fc569a42fe3	Off	172.31
main-subnet-1	subnet-0c13aa6284f684815	Available	vpc-0a5c64be1d24f29ae main...	Off	10.0.1
-	subnet-048a626e73d312407	Available	vpc-032e09fc569a42fe3	Off	172.31
-	subnet-0de699752b170231f	Available	vpc-032e09fc569a42fe3	Off	172.31

subnet-0c13aa6284f684815 / main-subnet-1

Details | Flow logs | Route table | Network ACL | CIDR reservations | Sharing | Tags

Details
Subnet ID
subnet-0c13aa6284f684815
IPv4 CIDR
10.0.1.0/24
Availability Zone
us-west-2a

Subnet ARN
arn:aws:ec2:us-west-2:081496797333:subnet/subnet-0c13aa6284f684815
Available IPv4 addresses
250
Availability Zone ID
us-west-2a

State
Available
IPv6 CIDR
-
Network border group
-

Block Public Access
Off
IPv6 CIDR association ID
-
VPC
vpc-0a5c64be1d24f29ae | main-vpc

VPC dashboard

EC2 Global View

Filter by VPC

Virtual private cloud

Your VPCs

Subnets

Route tables

Internet gateways

Egress-only internet gateways

Carrier gateways

DHCP option sets

Elastic IPs

Managed prefix lists

NAT gateways

Peering connections

Route servers

Security

Network ACLs

Security groups

PrivateLink and Lattice

Getting started

Endpoints

Security Groups (1/3)

Find security groups by attribute or tag

	Name	Security group ID	Security group name	VPC ID	Description
<input checked="" type="checkbox"/>	allow_web_traffic	sg-09f5afe01ade75744	allow_web_traffic	vpc-0a5c64be1d24f29ae	Allow web
<input type="checkbox"/>	-	sg-010a2b508cbef5965	default	vpc-032e09fc569a42fe3	default VI
<input type="checkbox"/>	-	sg-00fe7ac451d8c04b7	default	vpc-0a5c64be1d24f29ae	default VI

sg-09f5afe01ade75744 - allow_web_traffic

Details

Inbound rules

Outbound rules

Sharing - new

VPC associations - new

Tags

Details

Security group name

allow_web_traffic

Security group ID

sg-09f5afe01ade75744

Description

Allow web traffic

VPC ID

vpc-0a5c64be1d24f29ae

Owner

081496797333

Inbound rules count

3 Permission entries

Outbound rules count

1 Permission entry

CloudShell

Feedback

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EC2

Dashboard

EC2 Global View

Events

Instances

Instance Types

Launch Templates

Spot Requests

Savings Plans

Reserved Instances

Dedicated Hosts

Capacity Reservations

Images

AMIs

AMI Catalog

Elastic Block Store

Volumes

Snapshots

Lifecycle Manager

Network & Security

Security Groups

Elastic IPs

Instances (1/1)

Find Instance by attribute or tag (case-sensitive)

All states

	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IP
<input checked="" type="checkbox"/>	HelloWorld	i-05c0333b20c7cd353	Running	t2.micro	2/2 checks passed	View alarms	us-west-2a	-

i-05c0333b20c7cd353 (HelloWorld)

Details

Status and alarms

Monitoring

Security

Networking

Storage

Tags

Instance summary

Instance ID

i-05c0333b20c7cd353

IPv6 address

-

Hostname type

IP name: ip-10-0-1-50.us-west-2.compute.internal

Answer private resource DNS name

-

Public IPv4 address

54.70.53.170 | open address

Instance state

Running

Private IP DNS name (IPv4 only)

ip-10-0-1-50.us-west-2.compute.internal

Instance type

t2.micro

Private IPv4 addresses

10.0.1.50

Public DNS

-

Elastic IP addresses

54.70.53.170 [Public IP]

CloudShell

Feedback

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access your server:

```
Wireshark 4.4. / ARM 64.dmg
sahananh@Sahanas-MacBook-Air downloads % chmod 400 "terraform-ec2-access-key-pair.pem"
sahananh@Sahanas-MacBook-Air downloads % ssh -i "terraform-ec2-access-key-pair.pem" ubuntu@54.70.53.170
The authenticity of host '54.70.53.170 (54.70.53.170)' can't be established.
ED25519 key fingerprint is SHA256:zMVdc0A150ybtbc914k2AF3xvQFwBSCSVanWruhJb8GK.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '54.70.53.170' (ED25519) to the list of known hosts.
Welcome to Ubuntu 24.04.2 LTS (GNU/Linux 6.8.0-1029-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/pro

System information as of Tue Jul 22 01:50:43 UTC 2025

System load:  0.0           Processes:    105
Usage of /:   25.6% of 6.71GB Users logged in:  0
Memory usage: 20%          IPv4 address for enX0: 10.0.1.50
Swap usage:   0%

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

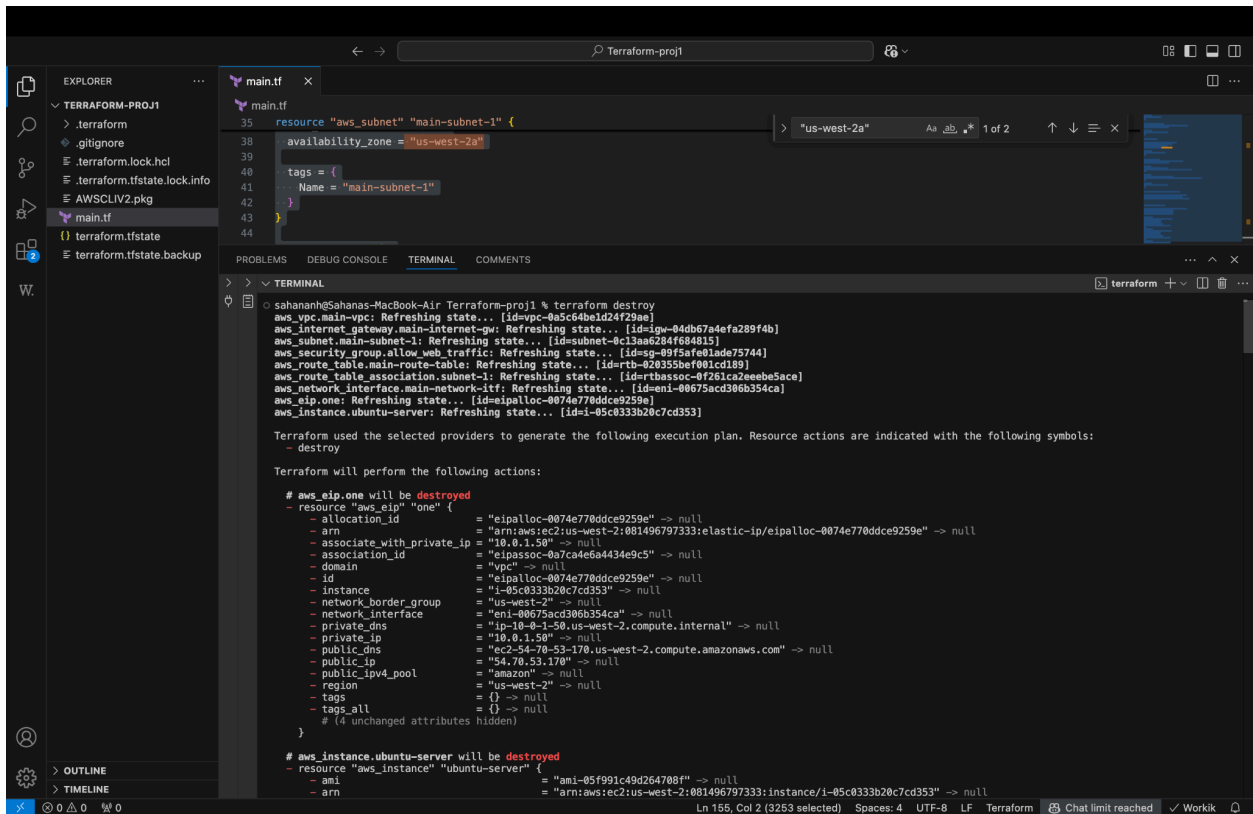
The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-10-0-1-50:~$
```

Terraform Destroy



```
main.tf
35 resource "aws_subnet" "main-subnet-1" {
36   availability_zone = "us-west-2a"
37
38   tags = {
39     Name = "main-subnet-1"
40   }
41 }
42
43
44

PROBLEMS  DEBUG CONSOLE  TERMINAL  COMMENTS

> > TERMINAL

sahananh@Sahanas-MacBook-Air Terraform-proj1 % terraform destroy
aws_vpc.main-vpc: Refreshing state... [id=vpc-0a5c64be1d24f29ae]
aws_internet_gateway.main-internet-gw: Refreshing state... [id=igw-04db67e4efa289f4b]
aws_subnet.main-subnet-1: Refreshing state... [id=subnet-0c3aa6284f684815]
aws_security_group.allow_web_traffic: Refreshing state... [id=sg-09f5afe01ade75744]
aws_route_table.main-route-table: Refreshing state... [id=rtb-020355bef081cd189]
aws_route_table_association.subnet-1: Refreshing state... [id=rtbassoc-0f261ca2eebe5ace]
aws_network_interface.main-network-1if: Refreshing state... [id=eni-00675acd386b354ca]
aws_eip.one: Refreshing state... [id=eipalloc-0074e770ddce9259e]
aws_instance.ubuntu-server: Refreshing state... [id=i-05c0333b20c7cd353]

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

Terraform will perform the following actions:

# aws_eip.one will be destroyed
- resource "aws_eip" "one" {
  - allocation_id      = "eipalloc-0074e770ddce9259e" -> null
  - arn                = "arn:aws:ec2:us-west-2:081496797333:elastic-ip/eipalloc-0074e770ddce9259e" -> null
  - associate_with_private_ip = "10.0.1.50" -> null
  - association_id     = "eipassoc-0a7ca4e6a4434e9c5" -> null
  - domain             = "eipalloc-0074e770ddce9259e" -> null
  - id                 = "i-05c0333b20c7cd353" -> null
  - instance           = "us-west-2" -> null
  - network_border_group = "us-west-2" -> null
  - network_interface   = "eni-00675acd386b354ca" -> null
  - private_dns         = "ip-10-0-1-50.us-west-2.compute.internal" -> null
  - private_ip         = "10.0.1.50" -> null
  - public_dns          = "ec2-54-70-53-170.us-west-2.compute.amazonaws.com" -> null
  - public_ip           = "54.70.53.170" -> null
  - public_ipv4_pool     = "amazon" -> null
  - region              = "us-west-2" -> null
  - tags                = {} -> null
  - tags_all            = {} -> null
  # [4 unchanged attributes hidden]
}

# aws_instance.ubuntu-server will be destroyed
- resource "aws_instance" "ubuntu-server" {
  - ami                = "ami-05f991c49d264708f" -> null
  - arn                = "arn:aws:ec2:us-west-2:081496797333:instance/i-05c0333b20c7cd353" -> null
```