Casper Node Deployment Guide

https://github.com/casper-network/casper-node-quickstart

Introduction

The Casper Node Quickstart provides CloudFormation templates to deploy and bootstrap a Casper Node on AWS.

The CloudFormation templates create the following components as part of the infrastructure:

- A VPC with public and private subnets, and all the routing configuration.
- A Single EC2 Instance that bootstraps a Casper node.
- A Security Group exposing necessary casper-node ports (7777,8888,35000)
- A CloudWatch dashboard with metrics to monitor the node.
- Configuration to access the node through Session Manager.

Supported Regions

- N Virginia (us-east-1)

Deployment Options

A Casper Node validator must only run a single instance with the same Validator Keypair at any given time.

As High Availability of the node is not required (periods of downtime are acceptable for a single node joining the distributed Casper Network) only a Single Availability Zone (AZ) deployment model is supported by the Quickstart.

Time to Complete

Running the Quickstart will take approximately 15 minutes.

Prerequisites

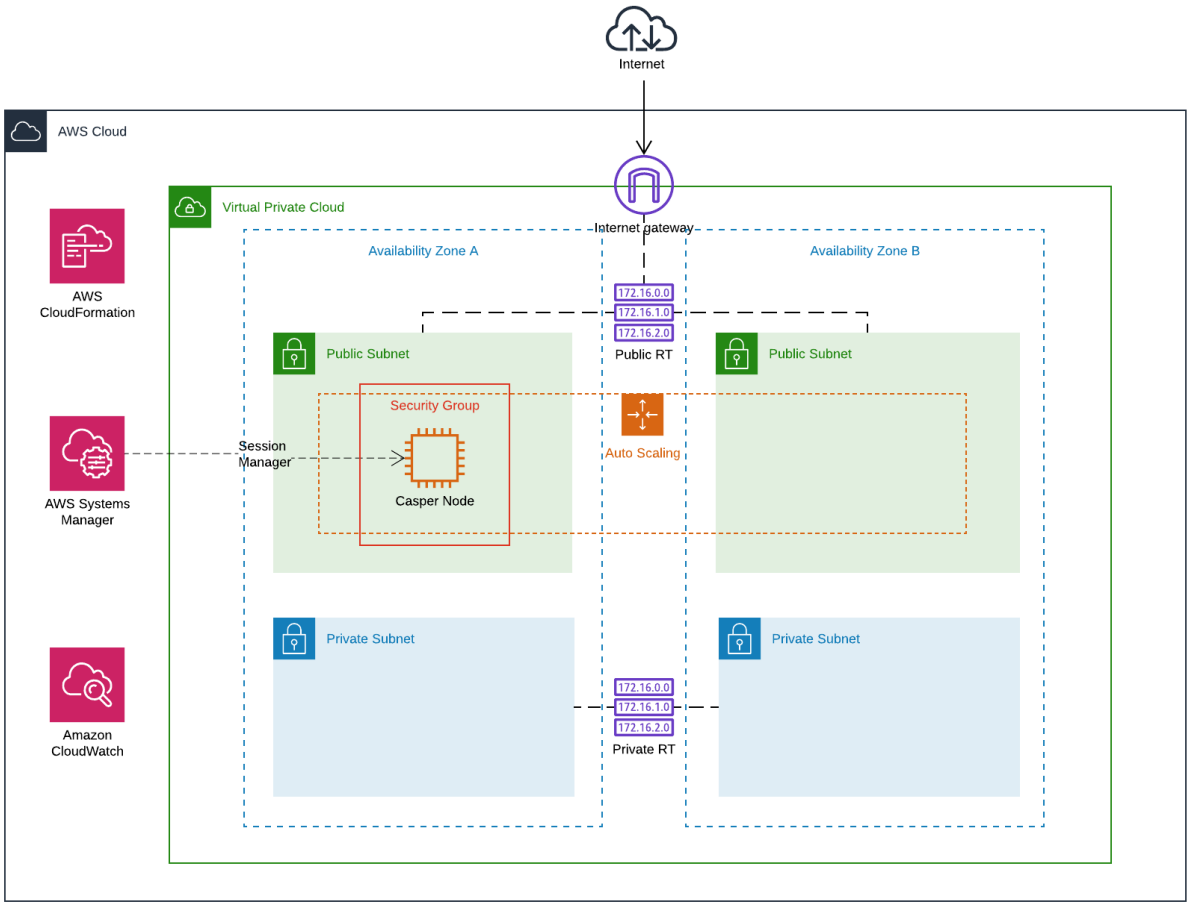
Skills

Basic familiarity with AWS and Ubuntu Linux is assumed.

Requirements

The Quickstart creates all resources necessary to run the node, only an AWS account is required to get started.

Architecture Diagram



Customer data is stored in the following locations:

- Instance's EBS Volume
- Cloudwatch (Logs)

Security

IAM

An IAM user with appropriate resource creation permissions should be used when running the Quickstart. Use of the AWS account's root user is discouraged.

Refer to the AWS documentation on Security best practices in IAM

Roles

An *Instance Role* to provide the EC2 Instance with access to Systems Manager & CloudWatch is created by the Quickstart

Sizing & Costs

Casper Node Hardware Requirements:

- CPU: 4 vCPU
- Memory: 32GB
- Disk: 2TB

The Quickstart defaults to a *r5.xlarge* instance with 2TB EBS storage to meet these requirements.

https://aws.amazon.com/ec2/instance-types/r5/

Cost Estimate (Apr 2023)

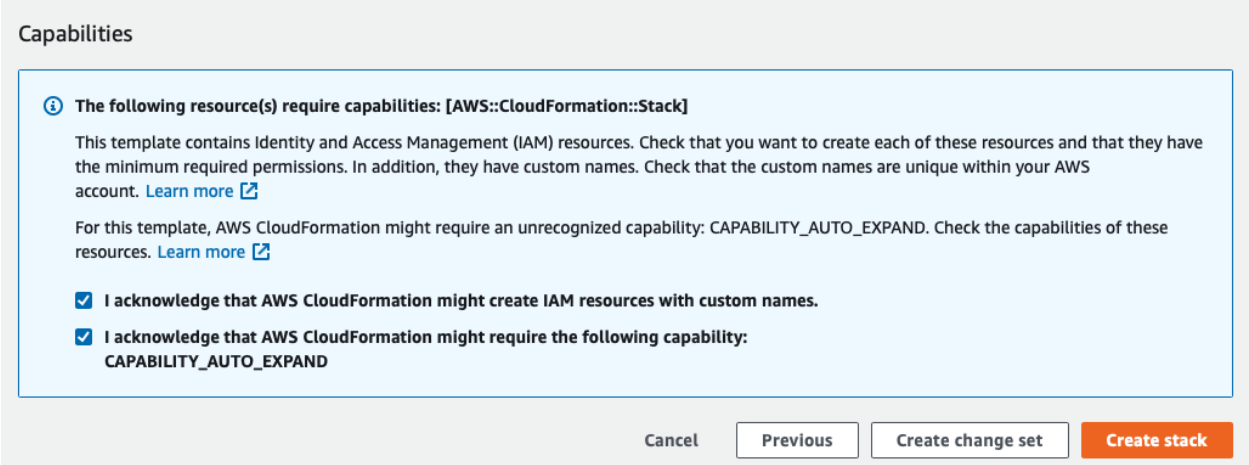
Amazon EC2 estimate (N.Virginia Region)

Amazon EC2 Reserved instances (monthly)
183 USD
Amazon Elastic Block Storage (EBS) pricing (monthly)
160 USD
Total monthly cost:
343 USD

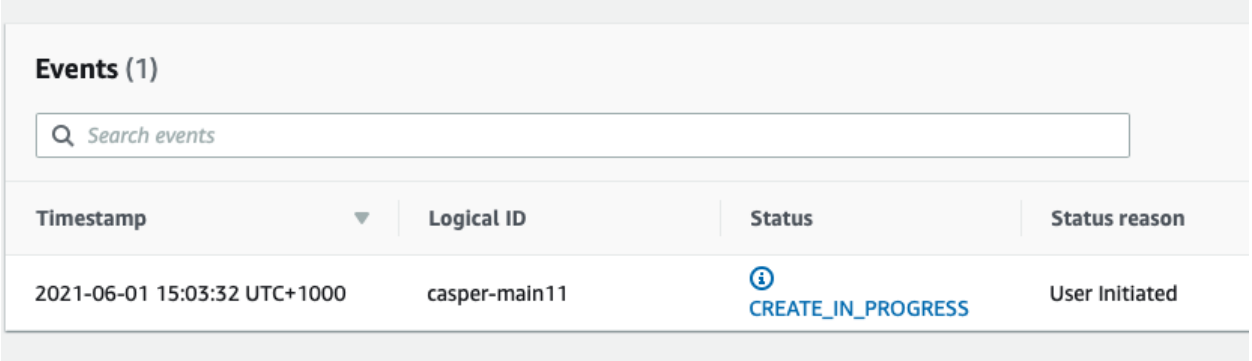
Deployment

- While logged into your AWS account, navigate in a browser to the Casper Node Quickstart Github project and click the *Launch Stac*k button. (https://github.com/casper-network/casper-node-quickstart)

- Set any desired options, and finally '**Create Stack**'



- CloudFormation will begin to create all necessary resources to run Casper Node



Accessing the Node

You can securely access the node in two ways:

1. Using AWS Session Manager by opening the console and clicking on *Start Session*, then just select your instance and you will get access to the node through a terminal embedded in the browser. *(Note: You can also access the node through your terminal by using the aws cli and the session manager plugin)*
2. Using SSH: To enable SSH access to your node you have to provide the *KeyName* and *IpWhiteList* parameters when you create the stack. To access the node, go to the EC2 Console, select the node and click on the *Connect* button, you can find the SSH tab there with sample commands to connect to the instance.
   For more information on how to create an AWS KeyPair check the AWS docs *It's important that you store the SSH key in a secure place since it provides access to your node.*

Troubleshooting

Process status

```
systemctl status casper-node-launcher
```

Casper Node Logs

```
tail -f /var/log/casper/casper-node.log
```

Cloudwatch Logs

An AWS CloudWatch dashboard is created as part of the infrastructure with metrics about the node. You can access the dashboard using the CloudWatch console or by opening the URL of the dashboard in the CloudFormation stack outputs.

Monitoring

NodeUtil watch tool

```
/etc/casper/node_util.py watch
```

Node Status Endpoint

```
http://node-public-ip:8888/status (browser)
curl localhost:8888/status (logged into node)
```

Prometheus Metrics Endpoint

```
http://node-public-ip:8888/metrics (browser)
curl localhost:8888/metrics (logged into node)
```

Community maintained Monitoring tools

- https://github.com/matsuro-hadouken/casper-tools

Backup

During node bootstrap, validator keys are created in `/etc/casper/validator_keys`

These keys should be backed up by the node operator and stored in a secure location.

AWS Data Lifecycle Manager can be optionally set up by the node operator to schedule periodic backups of the Casper Node EBS disk. As the snapshots will contain sensitive information (validator keys), appropriate IAM access controls should be applied.

Recovery

If an EBS snapshot is present, the node can be restored using the following process

- EC2 -> Snapshots -> Select Snapshot -> Create Image
- EC2 -> AMIs -> Select Image -> Launch

If no snapshot exists, A new node should be deployed using the Quickstart and the following process applied.

- `systemctl stop casper-node-launcher`
- replace `/etc/casper/validator_keys` with your previously backed up keys.
- `systemctl start casper-node-launcher`

Support

CasperLabs Support Portal

Discord is used as the primary communication medium to provide both support and announce information regarding network upgrades to node operators.

Casper Discord Server: https://discord.gg/casperblockchain

Additional Documentation

Casper Node Docs

Casper Node Configuration Guide