Etherem BlockChain Template
Hands-On Lab

July, 2018

Amazon Web Services

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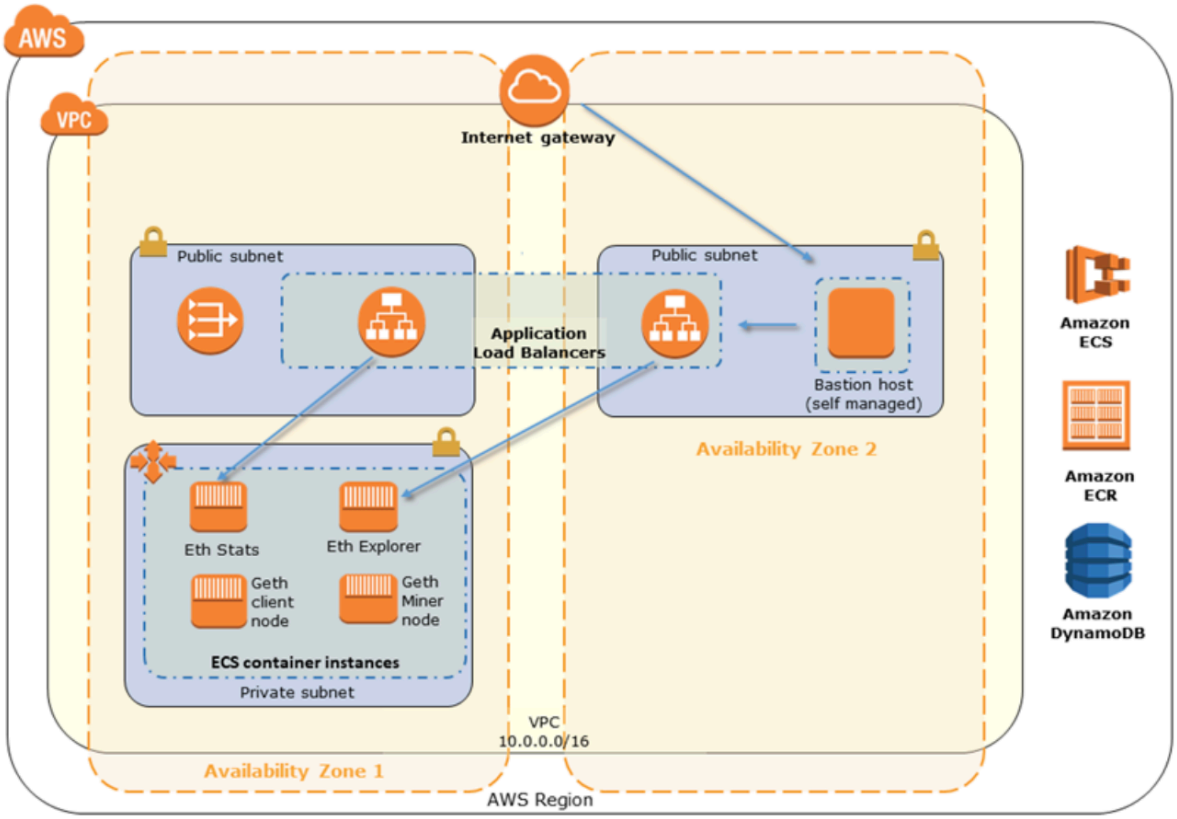
Overview

you create your Ethereum network on an ECS cluster composed of multiple EC2 instances, with an Application Load Balancer and related resources. The following diagram depicts a Ethereum network created using the template with the ECS container platform option:



0 Set Up Basic

Before you start with AWS Blockchain Templates, complete the following tasks:

Sign Up for AWS
Create an IAM User
Create a Key Pair

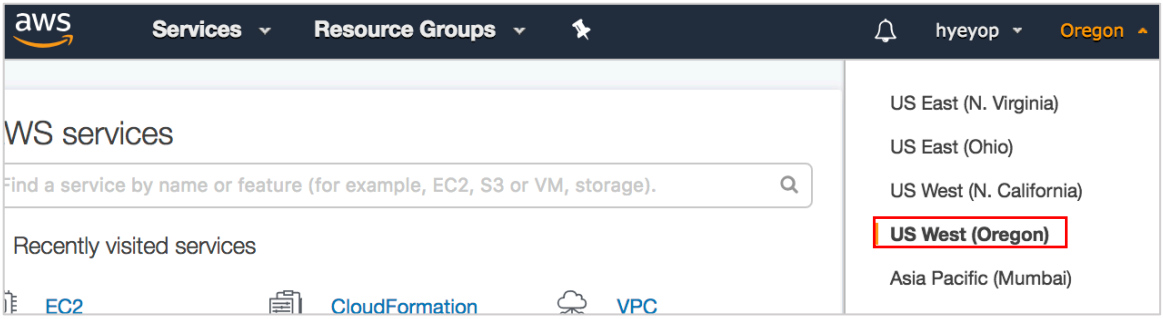
1 Set Up Prerequisites

※ For more information, see the Getting Started with AWS Blockchain Templates.

1. Create a VPC and Subsets

To select the Region

1. Open the Amazon VPC console at https://console.aws.amazon.com/.
2. Choose **US West(Oregon) region**.

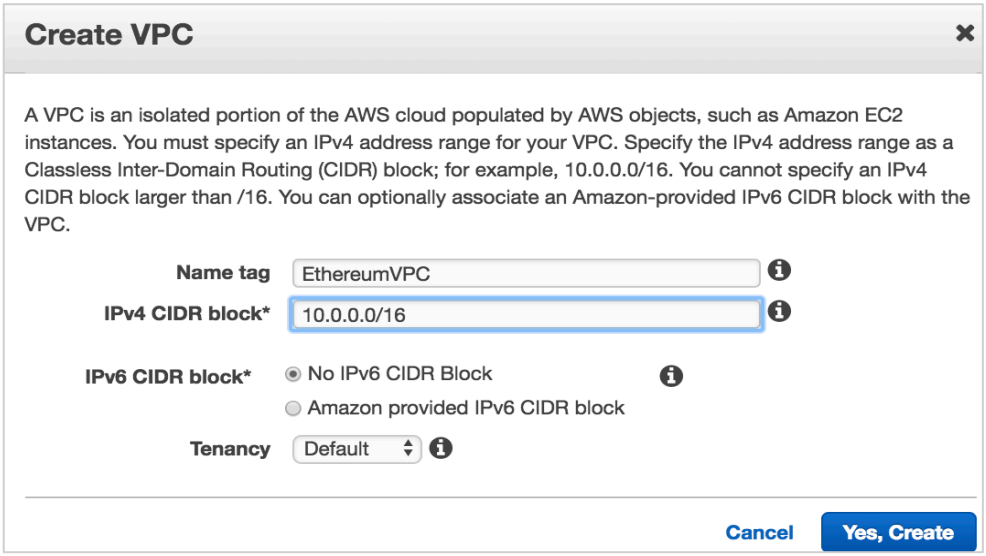


To create an Elastic IP address

1. Open the Amazon VPC console at https://console.aws.amazon.com/vpc/.
2. Choose **Elastic IPs**, **Allocate new address**, **Allocate**, **Close**.

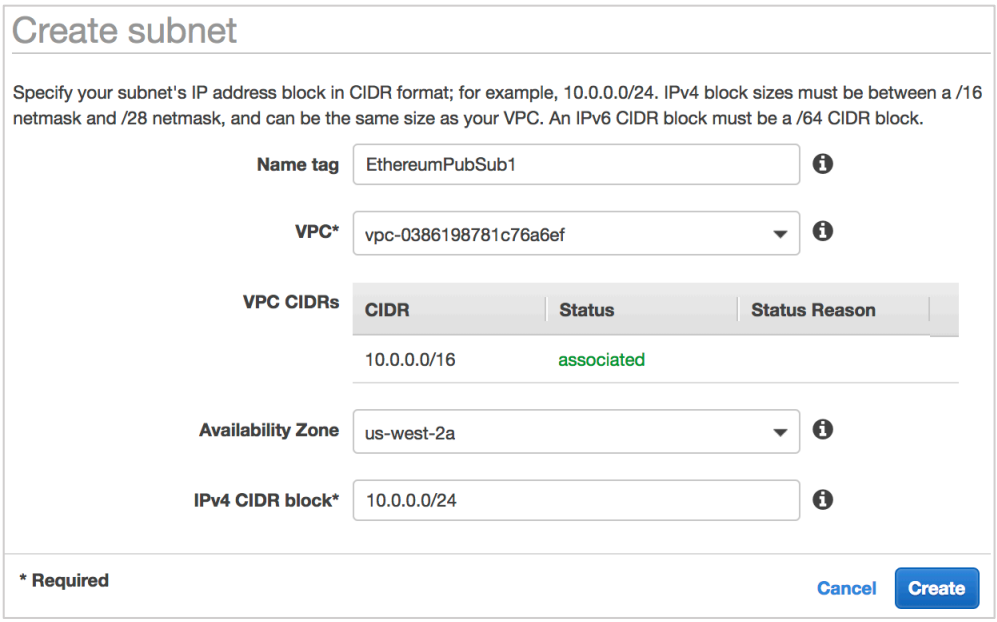
To create the VPC and Subnet

1. On the **Your VPCs**, click **Create the VPC**.



- **Name tag :** EthereumVPC
- **IPv4 CIDR:** 10.0.0.0/16

2. On **Subnets**, click **Create subnet**. (Total 3)



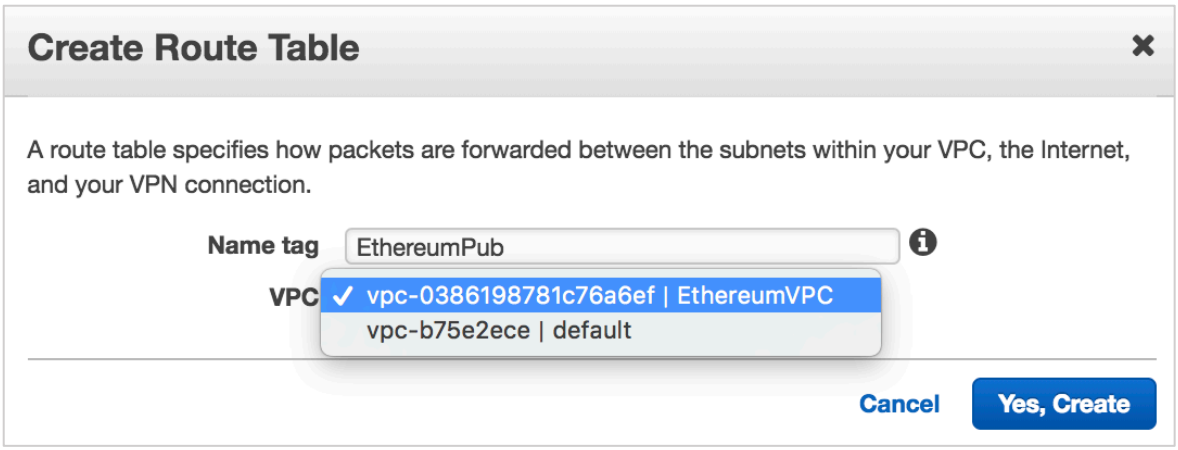
Total 3 subnets are described below:

Public Subnet1	▪ Name tag : EthereumPubSub1 ▪ VPC : (Ethereum VPC 선택) ▪ Availability Zone : us-west-2a ▪ IPv4 CIDR Zone : 10.0.0.0/24
Public Subnet2	▪ Name tag : EthereumPubSub2 ▪ VPC : (Ethereum VPC 선택) ▪ Availability Zone : us-west-2b ▪ IPv4 CIDR Zone : 10.0.1.0/24
Private Subnet	▪ Name tag : EthereumPvtSub1 ▪ VPC : (Ethereum VPC 선택) ▪ Availability Zone : us-west-2a ▪ IPv4 CIDR Zone : 10.0.2.0/24

To create Internet G/W, Public Route Table

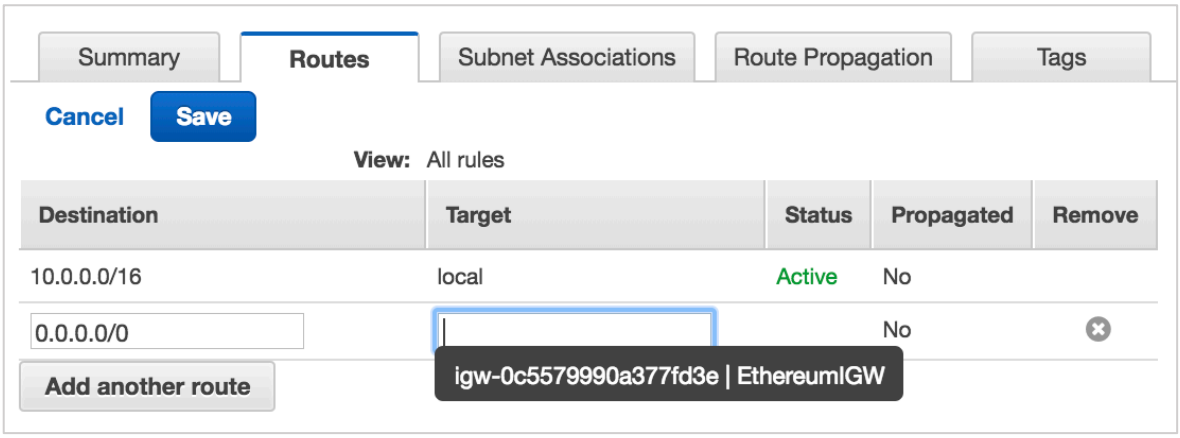
3. On **Internet Gateways**, click **Create Internet gateway**.
   - **Name tag :** EthereumIGW

4. Choose EthereumIGW on list and click **Actions**, **Attach to VPC, Attach** with EthereumVPC.
5. Click **Route Tables**, click **Create Route Table**.



- **Name tag :** EthereumPub
- **VPC :** EthereumVPC

6. Click **Routes** tab, **Edit, Add another route.**

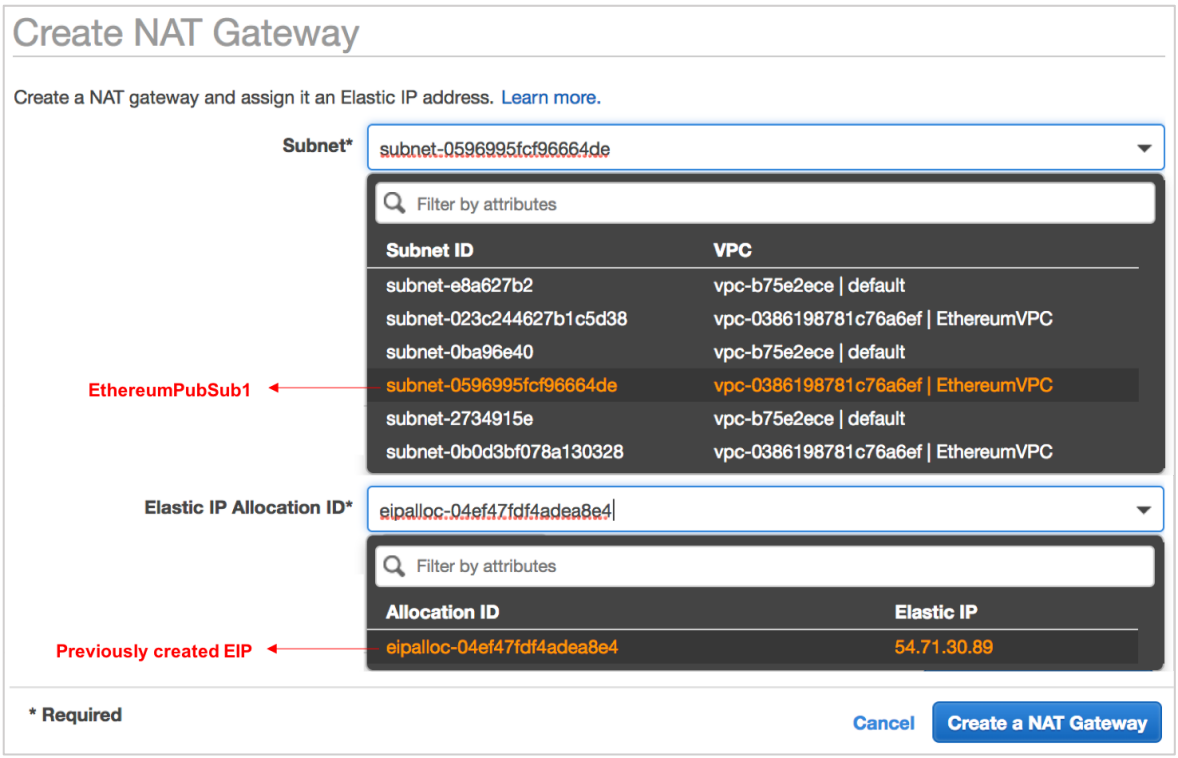


- **Destination :** 0.0.0.0/0
- **VPC :** EthereumIGW

7. Click **Subnet Assoiciations** tab and **Edit**.
   Select **EthereumPubSub1, EthereumPubSub2** and click **Save**.

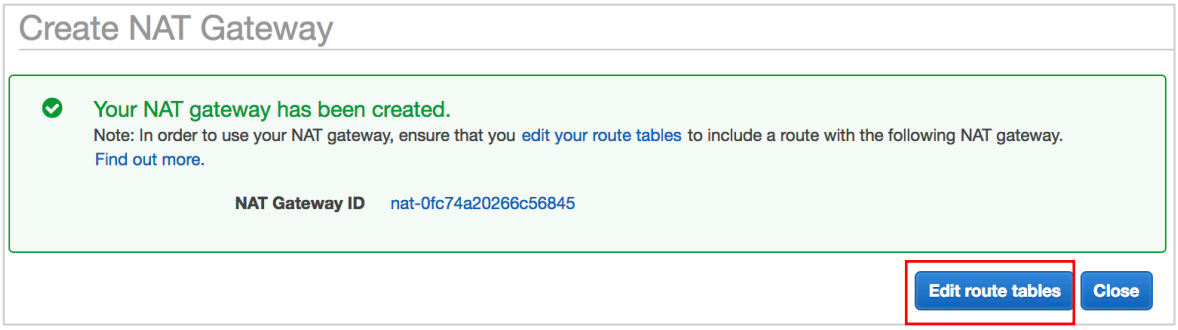
To create NAT Gateways, Private Route Table

8. On **NAT Gateways**. click **Create a NAT Gateway.**
   click **Create a Nat Gateway** With Previously created EthereumPubSub1 and EIP.

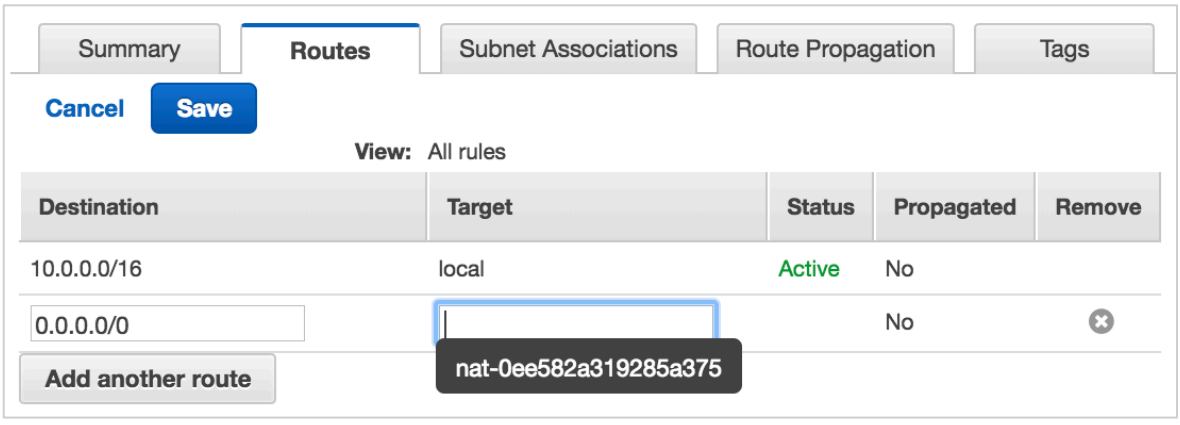


- **Subnet :** EthereumPubSub1
- **VPC :** EIP

9. Choose **Edit route tables**.



10. Click **Routes** tab, **Edit, Add another route, Save.**



- **Destination :** 0.0.0.0/0
- **VPC :** NAT Gateway (nat-xxxxxxxxx)

11. Click **Subnet Assoiciations** tab and **Edit**.
    Select **EthereumPvtSub1** and click **Save**.

2. Create the Security Groups

To create two security groups

1. Open the Amazon EC2 console at https://console.aws.amazon.com/ec2/.
2. In the navigation pane, choose **Security Groups**, **Create Security Group**, **Save.**

- **Security group name :** EthereumEC2-SG
- **VPC** : EthereumVPC

- **Security group name :** EthereumALB-SG
- **VPC** : EthereumVPC

Add inbound rules

1. Select **EthereumEC2-SG** from the list. On the **Inbound** tab, choose **Edit**.
   Total 2 inbound rules are described below :

- **Type :** All traffic
- **Source** : EthereumEC2-SG Group ID (sg-xxxxxx)

- **Type :** All traffic
- **Source** : EthereumALB-SG Group ID (sg-yyyyy)

2. Select **EthereumALB-SG** from the list. On the **Inbound** tab, choose **Edit**.
   Total 6 inbound rules are described below :

- **Type :** All traffic
- **Source** : EthereumEC2-SG Group ID (sg-xxxxxx)

- **Type :** All traffic
- **Source** : EthereumALB-SG Group ID (sg-yyyyy)

- **Type :** SSH
- **Source** : My IP

- **Type :** HTTP
- **Source** : 0.0.0.0/0

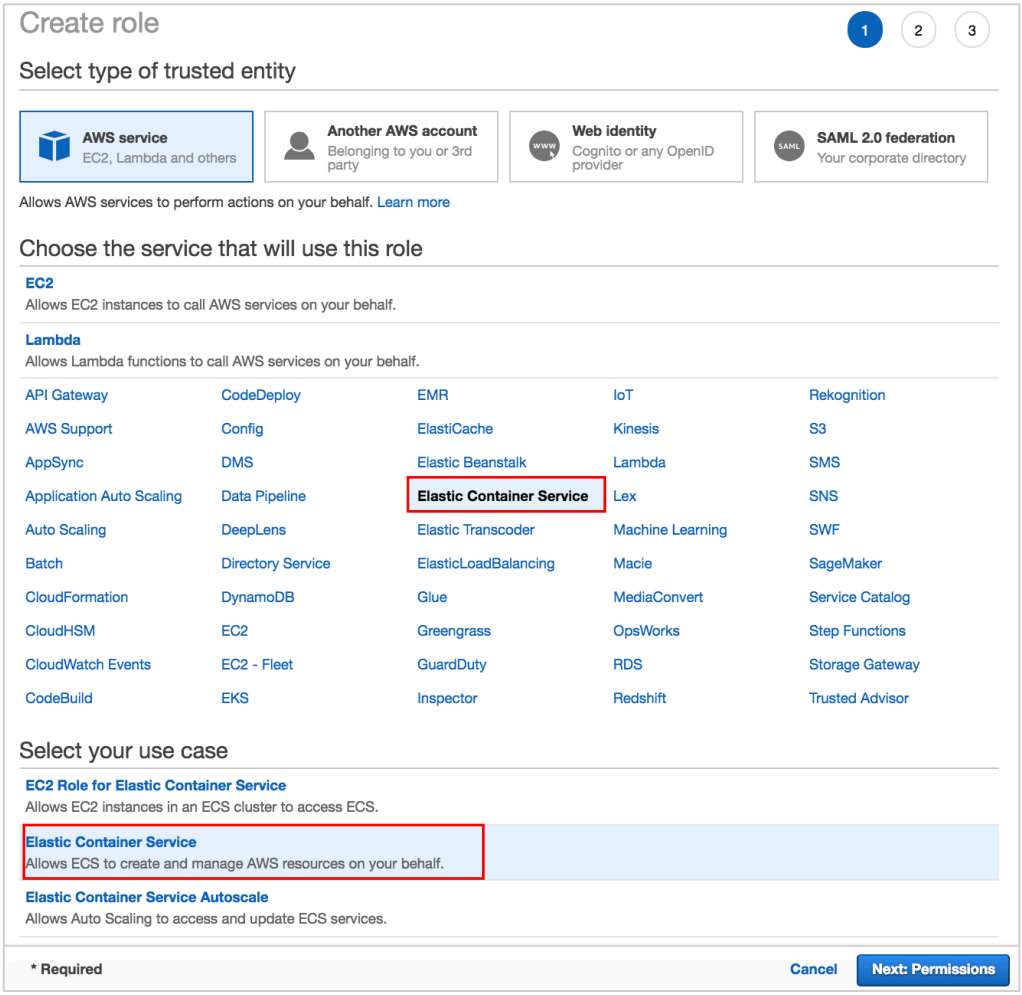
- **Type :** Custom TCP
- **Port Range** : 8080
- **Source** : My IP

- **Type :** Custom TCP
- **Port Range** :8545
- **Source** : My IP

3. Create IAM Role

To create the IAM role for ECS

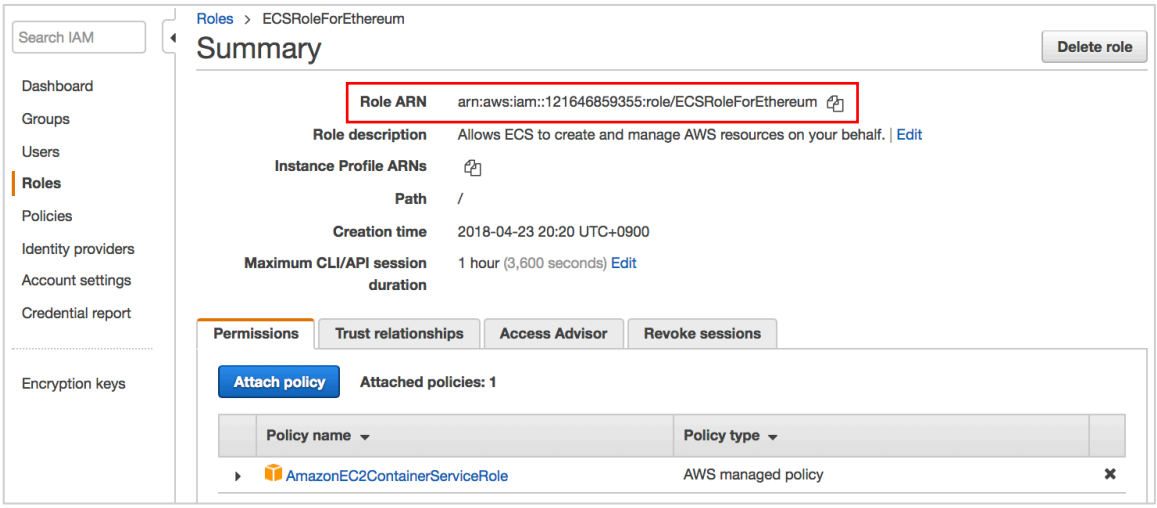
1. Open the IAM console at https://console.aws.amazon.com/iam/.
2. In the navigation pane, choose **Roles**, **Create Role**.
3. Under **Select type of trusted entity**, choose **AWS service**.
4. For **Choose the service that will use this role**, choose **Elastic Container Service**.
   Under **Select your use case**, choose **Elastic Container Service**, **Next:Permissions.**



5. For **Permissions policy**, leave the default policy (**AmazonEC2ContainerServiceRole**) selected, and choose **Next:Review**.
6. For **Role name**, enter a value that helps you identify the role. Choose **Create role**.
   - **Role Name :** ECSRoleForEthereum

7. Select **ECSRoleForEthereum** that you just created from the list. Copy the **Role ARN** value.

   ※ You need this **Role ARN** when you create the Ethereum network.



To create the EC2 instance profile

8. In the navigation pane, choose **Policies**, **Create policy**.
9. Choose **JSON** and replace the default policy statement with the following JSON policy:

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "ecs:CreateCluster",
        "ecs:DeregisterContainerInstance",
        "ecs:DiscoverPollEndpoint",
        "ecs:Poll",
        "ecs:RegisterContainerInstance",
        "ecs:StartTelemetrySession",
        "ecs:Submit*",
        "ecr:GetAuthorizationToken",
        "ecr:BatchCheckLayerAvailability",
        "ecr:GetDownloadUrlForLayer",
        "ecr:BatchGetImage",
        "logs:CreateLogStream",
        "logs:PutLogEvents",
```

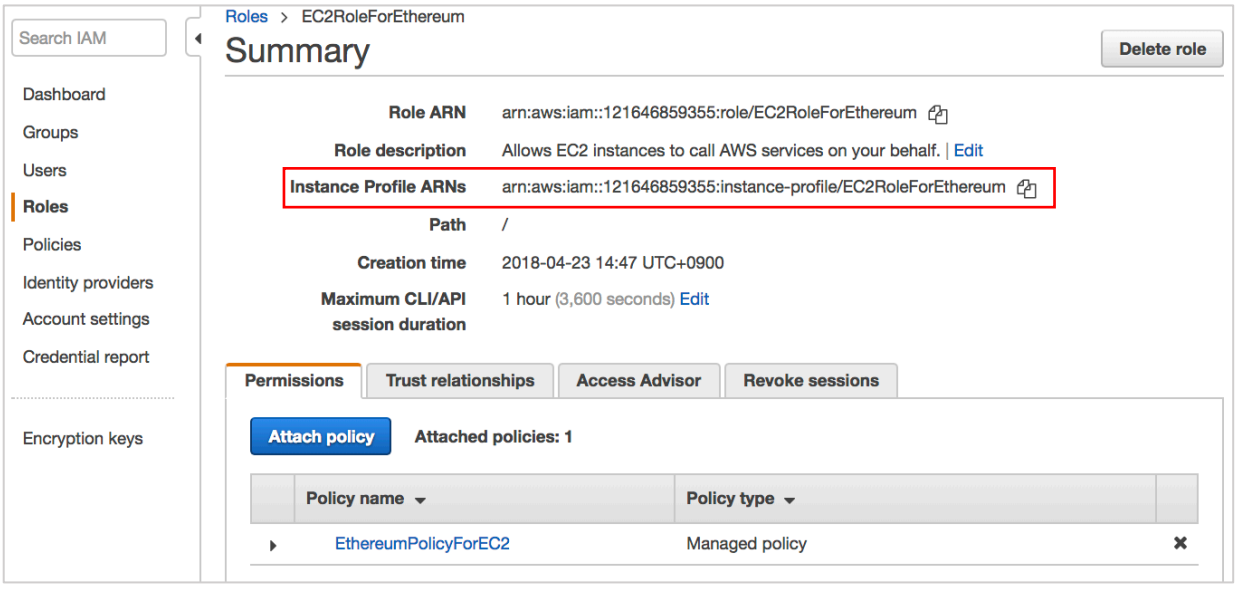
```
            "dynamodb:BatchGetItem",
            "dynamodb:BatchWriteItem",
            "dynamodb:PutItem",
            "dynamodb:DeleteItem",
            "dynamodb:GetItem",
            "dynamodb:Scan",
            "dynamodb:Query",
            "dynamodb:UpdateItem"
        ],
        "Resource": "*"
    }
  ]
}
```

10. Choose **Review policy**.
11. Enter Name, Description. Choose **Create policy**
    - **Name :** EthereumPolicyForEC2

12. Choose **Roles**, **Create role**.
13. Choose **EC2**, **Next: Permissions**.
14. In the **Search** field, enter EthereumPolicyForEC2.
15. Select it and choose **Next : Review**
16. enter Role Name, Description. Choose **Create role**.
    - **Role Name :** EC2RoleForEthereum

17. Select **ECSRoleForEthereum** that you just created from the list. Copy the **Instance Profile ARN** value.

    ※ You need **EC2 Instance Profile ARN** when you create the Ethereum network.



4. Create a Bastion Host

1. Open the IAM console at https://console.aws.amazon.com/ec2/.
2. Choose Launch Instance.

Step2	▪ **Type** : T2.micro
Step3	▪ **Network** : (EthereumVPC) ▪ **Subnet** : (EthereumPubSub1) ▪ **Auto-assign Public IP** : Enable
Step5	▪ **Key :** Name ▪ **Value :** EthereumBastion
Step6	▪ **Assign a security group :** ⦿ Select an **existing** security group (EthereumALB-SG)

2 Create the Ethereum Network

To create the Ethereum Network

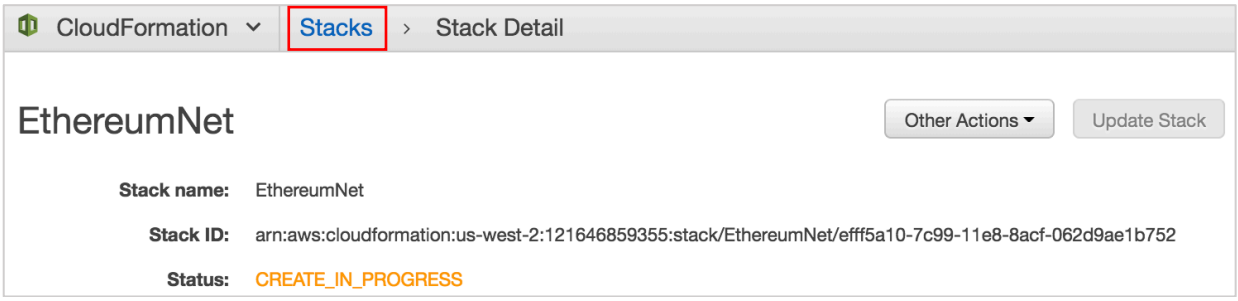
1. Open the latest AWS Blockchain Template for Ethereum in the AWS CloudFormation console
   ▪ Launch in US West (Oregon) region (us-west-2)

2. Enter values according to the following guidelines :

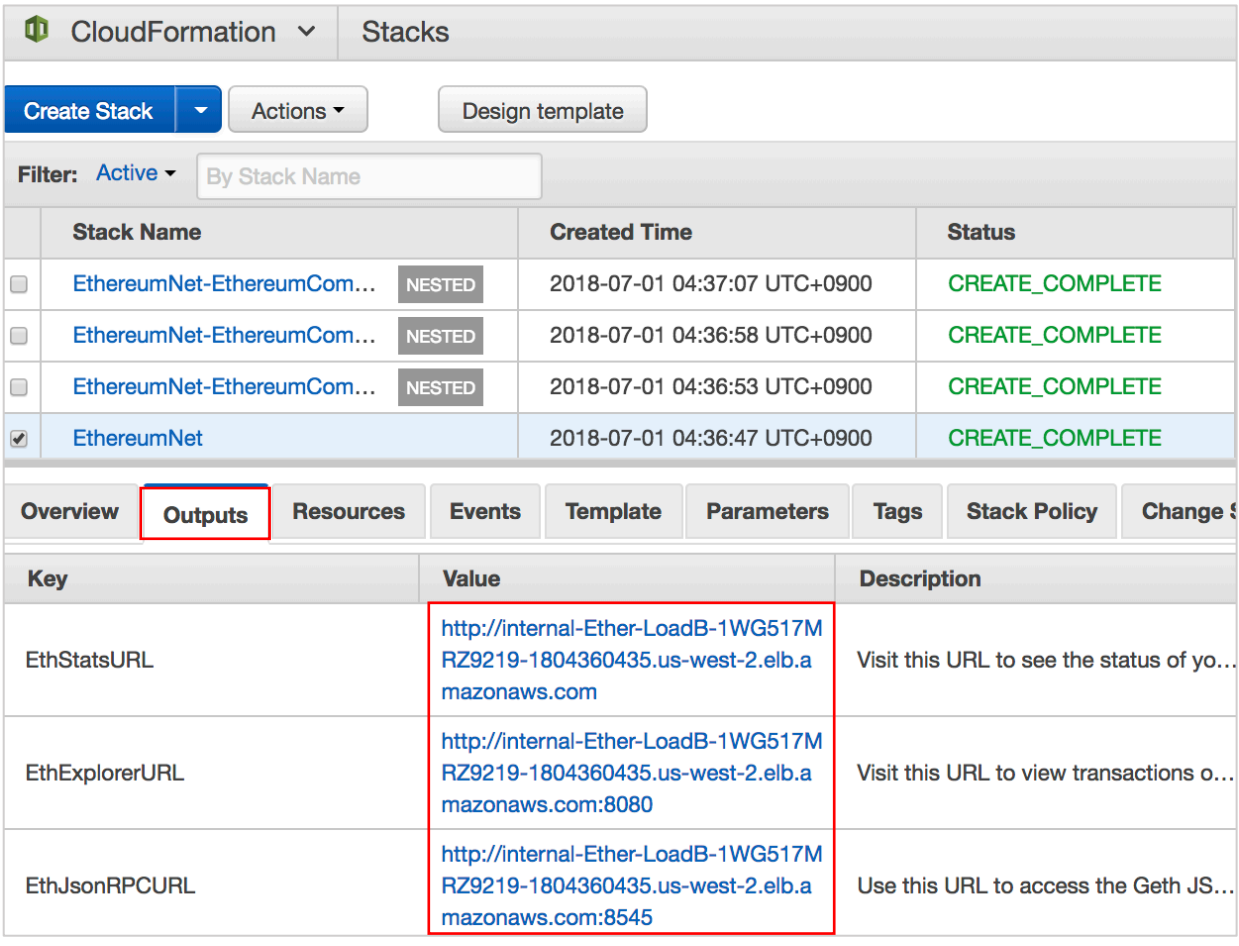
Details	▪ **Stack Name** : TestNet
Ethereum network parameters	default
Private Ethereum network parameters	default
Platform configuration	default
VPC network configuration	▪ **VPC ID** : EthereumVPC ▪ **List of VPC Subnets to use** : EthereumPvtSub1 ▪ **ALB Subnet IDs :** EthereumPutSub1, EthereumPubSub2
Security Configuration	▪ **EC2 Key Pair** :

	▪ **EC2 Security Group** : EthereumEC2-SG ▪ **IAM Role :** ▪ **EC2 Instance Profile ARN :** ▪ **Application Load Balancer Security Group** : EthereumALB-SG
ECS cluster configuration	default
EthStats	▪ **Deploy EthStats** : true ▪ **EthStats Connection Secret** : (at least 6 character)

3. Choose **Create**. Choose Stacks to monitor the progress of the stacks.



4. When all stacks show **CREATE_COMPLETE** for **Status**, click **Outputs** tab of the root stack.



3 Connect to the Ethereum Network using the Bastion

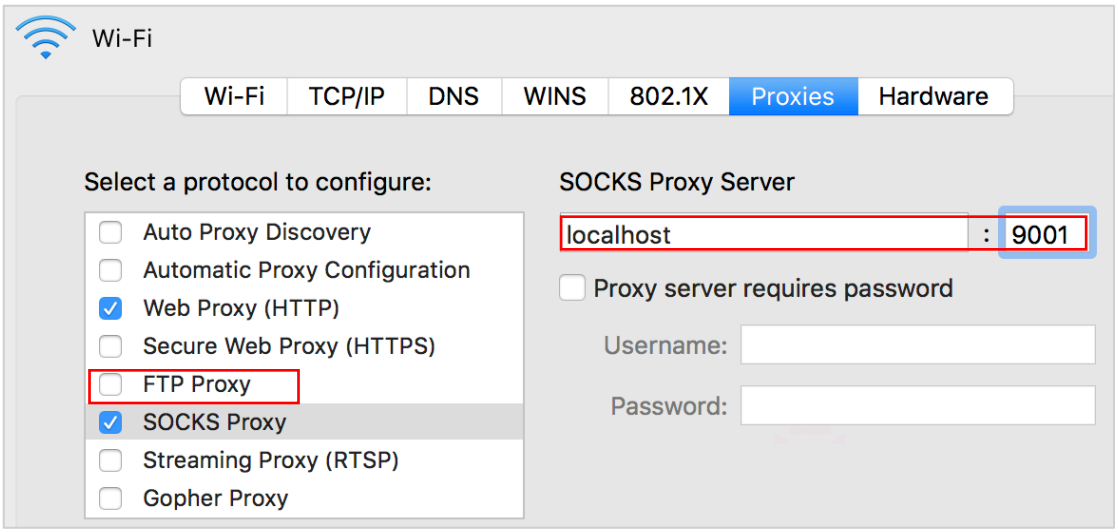
※ For more information, see the Connect to Your Instanace.

(Mac OSX) To connect to the bastion with SSH port forwarding using SSH

1. When connecting to your Bastion, add -D 9001 to SSH command.

```
ssh -i path/key-pair.pem ec2-user@bastion-dns -D 9001
```

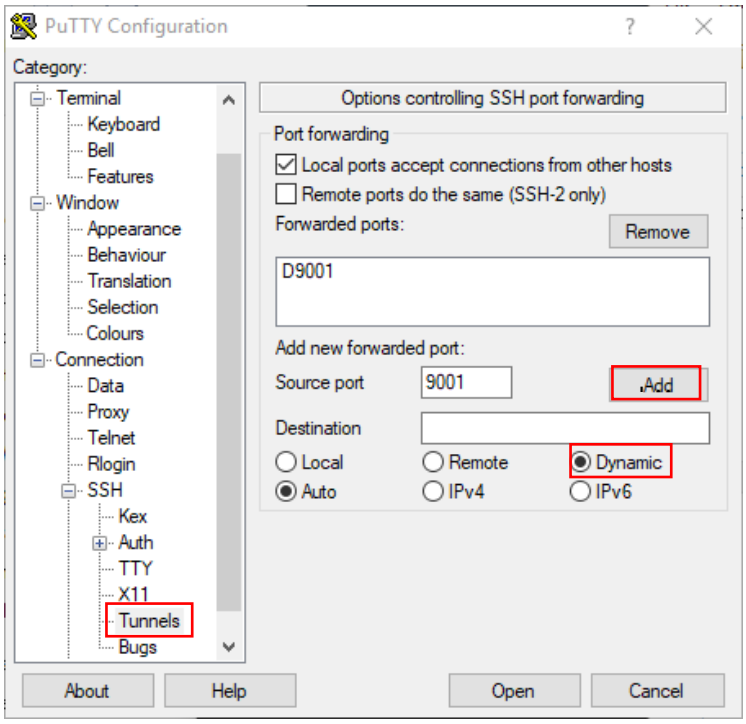
2. To configure your browser to use SOCKS proxy for localhost:9001 select System Preferences, Network, Advanced, select SOCKS proxy, and type **localhost:9001**.



※Using FoxyProxy Standard with Chrome,
select **More Tools**, **Extensions**. Under **FoxyProxy Standard**, select **Details**, **Extension options**, **Add New Proxy**. Select **Manual Proxy Configuration**. For **Host or IP Address** type **localhost** and for **Port** type **9001**. Select **SOCKS proxy, Save**.

(Windows) To connect to the bastion with SSH port forwarding using PuTTY

1. Starting a PuTTY session, add **Connection**, **SSH**, **Tunnels**.
2. For **Port forwarding**, choose **Local ports accept connections from other hosts**.
3. Under **Add new forwarded port :**



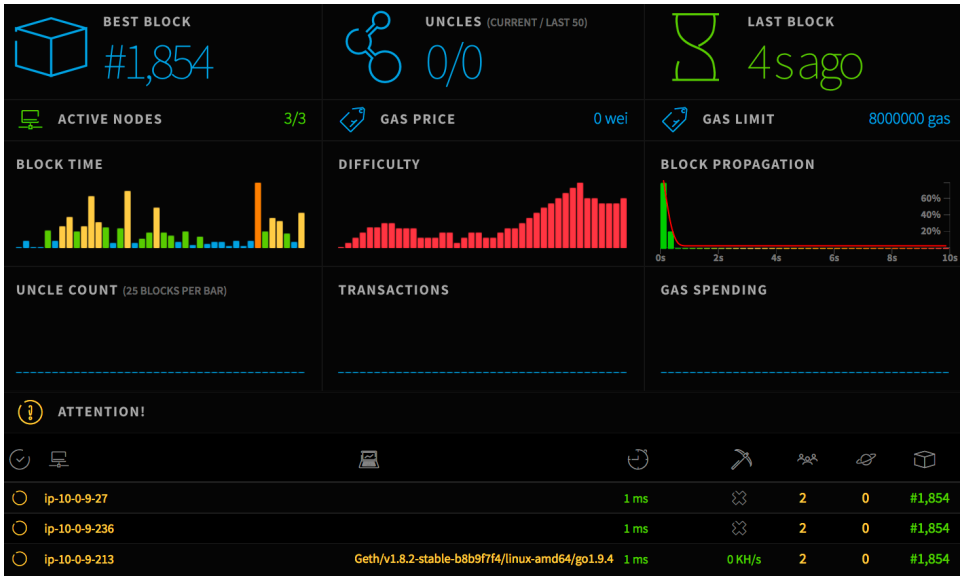
- **Source port**, enter **9001**.
- Leave **Destination** blank.
- Select **Dynamic**.
- Choose **Add**.

Choose **Open**.

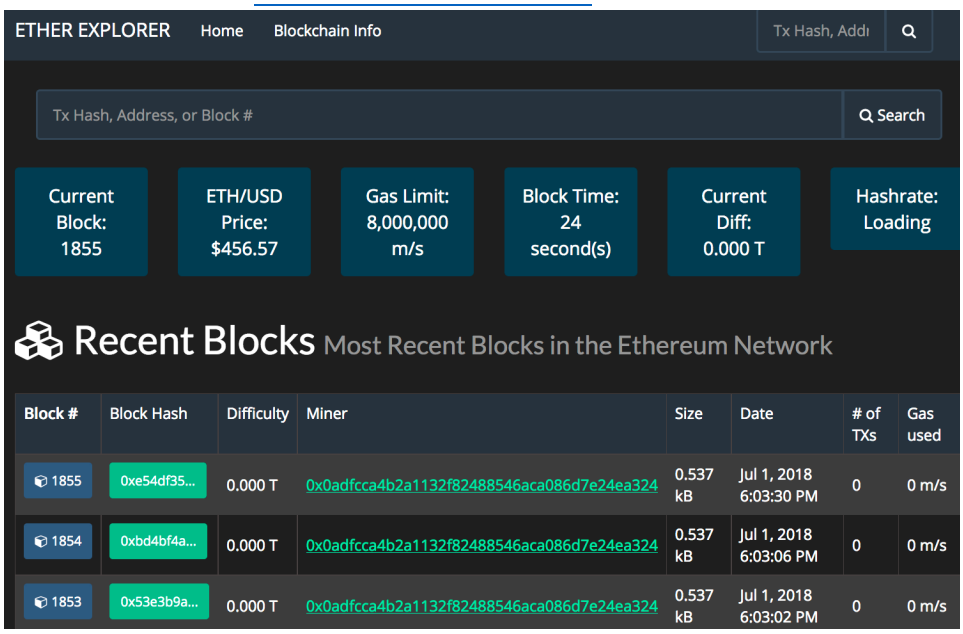
To check the results of the Ethereum Network

You are now able to connect to the Ethereum URLs, which are available on CloudFormation console using the **Outputs** tab of the root stack that you created with the template.

- **EthStats Web** : http://<ALB-DNS>



- **EthStats Web** : http://<ALB-DNS>:8080



- **EthJsonRPC Call** : http://<ALB-DNS>:8545

```
$ curl -X POST -d
'{"jsonrpc":"2.0","method":"eth_getBalance","params":["0x0ADfCCa4B2a1132F82488546AcA086D7E24EA324", "latest"],"id":1}' -H 'Content-Type:application/json' http://<ALB-DNS>:8545

{"jsonrpc":"2.0","id":1,"result":"0x282a92ca9849fdc0000"}

$ curl -X POST -d '{"jsonrpc":"2.0","method":"eth_blockNumber","params":[], "id":1}' -H 'Content-Type:application/json' http://<ALB-DNS>:8545

{"jsonrpc":"2.0","id":1,"result":"0x865"}
```