



Testing VPC Connectivity

L

Louis Moyo

```
<body>
<center><h1>301 Moved Permanently</h1></center>
<hr><center>nginx</center>
</html>
[ec2-user@ip-10-0-196 ~]$ curl https://learn.nextwork.org/projects/aws-host-a-website-on-s3
<!DOCTYPE html>
<html lang="en">

<head>
    <meta charset="UTF-8" />
    <title>NextWork - Host a Website on Amazon S3</title>
    <meta content="NextWork - host your very own website on Amazon S3!" name="description" />
    <meta content="NextWork - Host a Website on Amazon S3" property="og:title" />
    <meta content="NextWork - host your very own website on Amazon S3!" property="og:description" />
    <meta content="/static/og-project.png" property="og:image" />
    <meta content="NextWork - Host a Website on Amazon S3" property="twitter:title" />
    <meta content="NextWork - host your very own website on Amazon S3" property="twitter:description" />
    <meta content="/static/og-project.png" property="twitter:image" />

    <meta property="og:type" content="website" />
    <meta property="summary_large_image" name="twitter:card" />
    <meta name="viewport" content="width=device-width, initial-scale=1.0" />
<link rel="icon" href="/favicon.ico?7=2" sizes="32x32" />
<link rel="icon" href="/favicon.ico?7=2" type="image/pngxml" />
<link href="https://fonts.googleapis.com/" />
<link rel="preconnect" href="https://fonts.gstatic.com" crossorigin />
<link href="https://fonts.googleapis.com/css2?family=Inter:wght@100..900&family=Just+Me+Again+Down+Here&display=swap" rel="stylesheet" />

<script type="module" src="/static/assets/entry-aa60bbc6.js"></script>
<link rel="stylesheet" href="/static/assets/index-9e989327.css" />

<style>
    body {
        margin: 0;
        padding: 0;
        overscroll-behavior: none;
        background-color: #fff;
    }
</style>
```



Introducing Today's Project!

What is Amazon VPC?

Amazon VPC (Virtual Private Cloud) lets you create an isolated, customisable section of AWS where you can launch resources, control networking, and secure them with subnets, route tables, NACLs, and security groups.

How I used Amazon VPC in this project

I used Amazon VPC to set up public and private subnets, configure route tables, NACLs, and security groups, and connect EC2 instances to each other and the internet for testing.

One thing I didn't expect in this project was...

I used Amazon VPC to connect to my public server, test communication between public and private EC2 instances, and verify internet access from the public subnet.

This project took me...

I didn't expect that both NACLs and security groups had to be configured to allow ICMP traffic for pings to work between the servers.



Connecting to an EC2 Instance

Connectivity means how well systems exchange data within a network or to the internet. It's crucial for enabling communication, resource sharing, and application access, ensuring smooth operations from simple web hosting to large-scale platforms.

My first connectivity test was whether I could connect to the louis m public server using its public IP to confirm it was reachable and properly set up for inbound connections.

The screenshot shows a terminal window with a dark background. At the top, there is a header bar with the AWS logo, a search bar containing "Search", and a keybinding "[Alt+S]". The main terminal area displays a welcome message for Amazon Linux 2023, which includes a stylized tree logo and a URL: <https://aws.amazon.com/linux/amazon-linux-2023>. Below this, the command prompt shows the user is connected to an EC2 instance with the IP address 10-0-0-196.

```
aws | ■■■ Search [Alt+S]
.
.
.
Amazon Linux 2023
https://aws.amazon.com/linux/amazon-linux-2023
[ec2-user@ip-10-0-0-196 ~]$
```

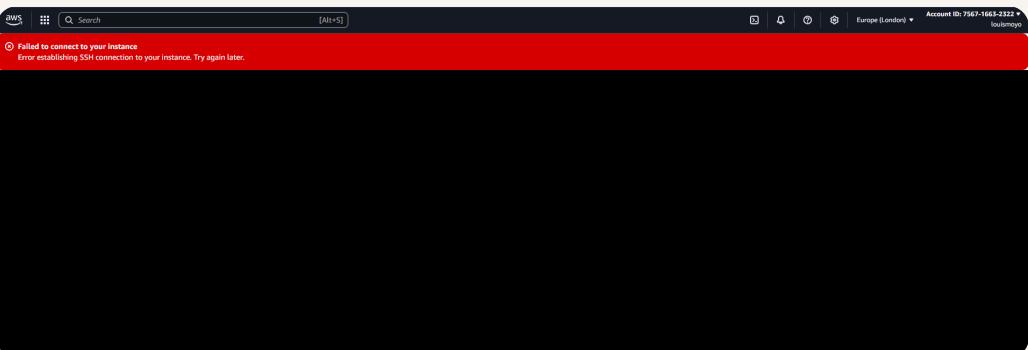


EC2 Instance Connect

I connected to my EC2 instance using EC2 Instance Connect, which is a console-based SSH tool that securely logs you in without manual key pair setup by generating a temporary key for each session.

My first attempt at getting direct access to my public server resulted in an error, because the security group allowed only HTTP traffic and didn't have an inbound rule for SSH connections.

I fixed this error by adding an inbound rule to the security group allowing SSH from Anywhere-IPv4, ensuring EC2 Instance Connect could reach the server regardless of its IP range.



Connectivity Between Servers

The connection failed because the private subnet's NACL blocked inbound and outbound ICMP traffic, preventing ping replies from reaching the public server.

The ping command I ran was ping 10.0.1.187 to test ICMP connectivity from my public server to the private server's internal IP address within the VPC.

The first ping returned only one line showing a sent packet with no replies. This meant the request went out but ICMP responses were blocked by NACL and security group rules.

```
          #          Amazon Linux 2023
  ~\ _###\ https://aws.amazon.com/linux/amazon-linux-2023
  ~~ \##|
  ~~   \|/
  ~~     V~ ' ->
  ~~~
  ~~~-. / \
  ~~~-. / \
  ~~~-. / \
[ec2-user@ip-10-0-0-196 ~]$ ping ^C
ping: : Name or service not known
[ec2-user@ip-10-0-0-196 ~]$ ping 10.0.1.187
PING 10.0.1.187 (10.0.1.187) 56(84) bytes of data.
```

Troubleshooting Connectivity

I troubleshooted this by allowing ICMP in the private subnet's NACL inbound/outbound rules and adding an inbound ICMP rule in the private server's security group for the public server's SG.

```
64 bytes from 10.0.1.187: icmp_seq=1208 ttl=127 time=0.809 ms
64 bytes from 10.0.1.187: icmp_seq=1209 ttl=127 time=0.481 ms
64 bytes from 10.0.1.187: icmp_seq=1210 ttl=127 time=0.409 ms
64 bytes from 10.0.1.187: icmp_seq=1211 ttl=127 time=0.424 ms
64 bytes from 10.0.1.187: icmp_seq=1212 ttl=127 time=0.562 ms
64 bytes from 10.0.1.187: icmp_seq=1213 ttl=127 time=0.416 ms
64 bytes from 10.0.1.187: icmp_seq=1214 ttl=127 time=0.398 ms
64 bytes from 10.0.1.187: icmp_seq=1215 ttl=127 time=0.656 ms
64 bytes from 10.0.1.187: icmp_seq=1216 ttl=127 time=1.01 ms
64 bytes from 10.0.1.187: icmp_seq=1217 ttl=127 time=0.413 ms
64 bytes from 10.0.1.187: icmp_seq=1218 ttl=127 time=0.810 ms
64 bytes from 10.0.1.187: icmp_seq=1219 ttl=127 time=0.373 ms
64 bytes from 10.0.1.187: icmp_seq=1220 ttl=127 time=0.551 ms
64 bytes from 10.0.1.187: icmp_seq=1221 ttl=127 time=0.621 ms
64 bytes from 10.0.1.187: icmp_seq=1222 ttl=127 time=0.627 ms
64 bytes from 10.0.1.187: icmp_seq=1223 ttl=127 time=0.418 ms
64 bytes from 10.0.1.187: icmp_seq=1224 ttl=127 time=0.826 ms
64 bytes from 10.0.1.187: icmp_seq=1225 ttl=127 time=0.499 ms
64 bytes from 10.0.1.187: icmp_seq=1226 ttl=127 time=0.459 ms
64 bytes from 10.0.1.187: icmp_seq=1227 ttl=127 time=0.467 ms
64 bytes from 10.0.1.187: icmp_seq=1228 ttl=127 time=0.536 ms
64 bytes from 10.0.1.187: icmp_seq=1229 ttl=127 time=0.756 ms
64 bytes from 10.0.1.187: icmp_seq=1230 ttl=127 time=0.407 ms
64 bytes from 10.0.1.187: icmp_seq=1231 ttl=127 time=0.352 ms
64 bytes from 10.0.1.187: icmp_seq=1232 ttl=127 time=0.398 ms
64 bytes from 10.0.1.187: icmp_seq=1233 ttl=127 time=0.450 ms
64 bytes from 10.0.1.187: icmp_seq=1234 ttl=127 time=0.394 ms
64 bytes from 10.0.1.187: icmp_seq=1235 ttl=127 time=0.418 ms
64 bytes from 10.0.1.187: icmp_seq=1236 ttl=127 time=0.452 ms
64 bytes from 10.0.1.187: icmp_seq=1237 ttl=127 time=0.398 ms
64 bytes from 10.0.1.187: icmp_seq=1238 ttl=127 time=0.529 ms
64 bytes from 10.0.1.187: icmp_seq=1239 ttl=127 time=0.473 ms
64 bytes from 10.0.1.187: icmp_seq=1240 ttl=127 time=0.567 ms
64 bytes from 10.0.1.187: icmp_seq=1241 ttl=127 time=0.596 ms
64 bytes from 10.0.1.187: icmp_seq=1242 ttl=127 time=0.455 ms
64 bytes from 10.0.1.187: icmp_seq=1243 ttl=127 time=0.622 ms
64 bytes from 10.0.1.187: icmp_seq=1244 ttl=127 time=0.737 ms
64 bytes from 10.0.1.187: icmp_seq=1245 ttl=127 time=0.375 ms
64 bytes from 10.0.1.187: icmp_seq=1246 ttl=127 time=0.416 ms
64 bytes from 10.0.1.187: icmp_seq=1247 ttl=127 time=0.406 ms
64 bytes from 10.0.1.187: icmp_seq=1248 ttl=127 time=0.494 ms
```



Connectivity to the Internet

Curl is a command-line tool that transfers data to or from a server, often used to fetch or send content over protocols like HTTP, HTTPS, FTP, and more.

I used curl to test the connectivity between my public server and the internet by requesting and receiving website HTML content.

Ping vs Curl

Ping and curl are different because ping tests basic network reachability using ICMP, while curl tests application-level connectivity and retrieves actual data over protocols like HTTP.

Connectivity to the Internet

I ran the curl command `curl https://learn.nextwork.org/projects/aws-host-a-website-on-s3` which returned the full HTML content of the NextWork web app project page.

```
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<center><h1>301 Moved Permanently</h1></center>
<hr><center>nginx</center>
</body>
</html>
[ec2-user@ip-10-0-0-196 ~]$ curl https://learn.nextwork.org/projects/aws-host-a-website-on-s3
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  <meta content="Let's host your very own website on Amazon S3!" property="og:description" />
  <meta content="/static/og-project.png" property="og:image" />

  <meta content="NextWork - Host a Website on Amazon S3" property="twitter:title" />
  <meta content="Let's host your very own website on Amazon S3!" property="twitter:description" />
  <meta content="/static/og-project.png" property="twitter:image" />

  <meta property="og:type" content="website" />
  <meta content="summary large image" name="twitter:card" />
  <meta name="viewport" content="width=device-width, initial-scale=1.0" />

  <link rel="icon" href="/favicon.ico?w=2" sizes="32x32" />
  <link rel="icon" href="/static/favicon.svg?w=2" type="image/svg+xml" />
  <link rel="preconnect" href="https://fonts.googleapis.com" />
  <link rel="preconnect" href="https://fonts.gstatic.com" crossorigin="anonymous" />
  <link href="https://fonts.googleapis.com/css2?family=Inter:wght@100..900&family=Just+Me+Again+Down+Here&display=swap" rel="stylesheet" />

  <script type="module" src="/static/assets/entry-aa60bbc6.js"></script>
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<style>
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