ICT 171 Assignment 2

Name :NADIR Student ID: 34893132

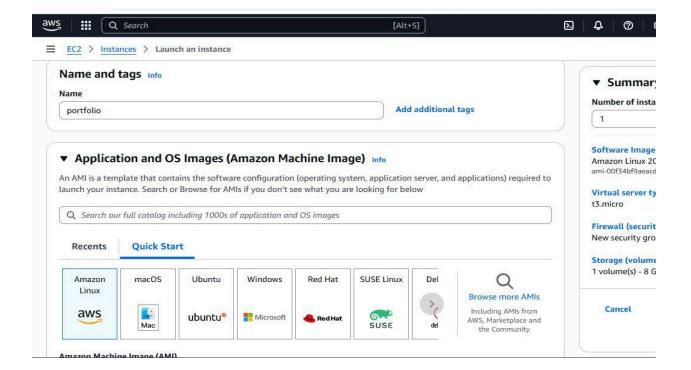
Steps For Creating and launching an EC2 Server

Prerequisites

- AWS account
- · Access to GitHub repository
- SSH client (e.g., CMD)
- PEM key file (downloaded during EC2 key pair creation)
- Domain (optional for now)

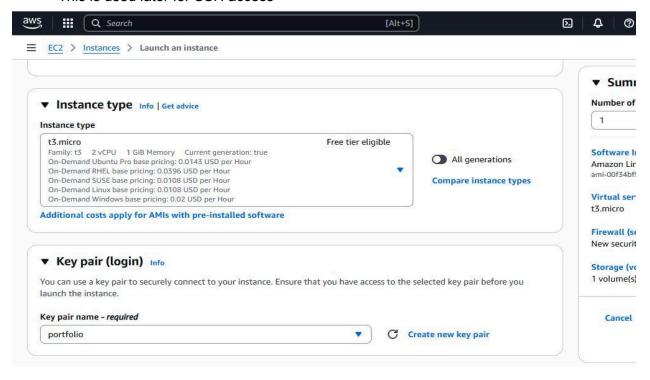
1. Launch an EC2 Instance

- Go to the AWS EC2 Console and click "Launch Instance"
- Name your instance, e.g., portfolio
- Select Amazon Linux
- Choose Instance type: t3.micro (eligible for Free Tier)



2. Configure Key Pair Authentication

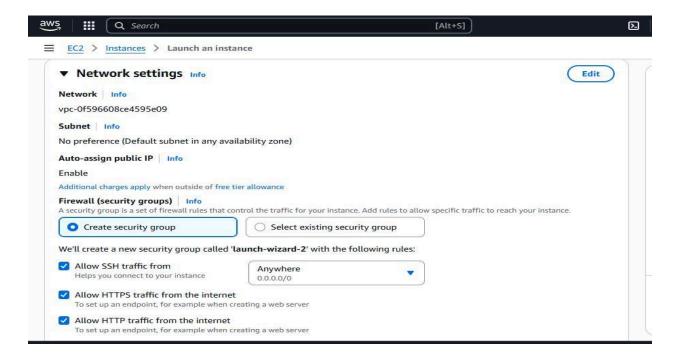
- Under Key pair login, select "Create new key pair"
- Choose .pem format and download the key (e.g., portfolio.pem)
- This is used later for SSH access



3. Configure Network Settings

In Network settings, ensure the following security group rules are added:

- SSH (port 22) from your IP
- HTTP (port 80) from Anywhere
- HTTPS (port 443) from Anywhere



4. Connect to the Instance

Open CMD or Terminal, navigate to your key file:

To Connect to your EC2 instance, go to the instance and click connect. Choose the SSH option and it will give the command. Copy and paste it in your CMD.

5. Switch to Superuser and Install Apache

Run the following commands Sudo su yum install -y httpd

```
_/m/
[ec2-user@ip-172-31-31-220 ~]$
[ec2-user@ip-172-31-31-220 ~]$
[ec2-user@ip-172-31-31-220 ~]$ sudo su
[root@ip-172-31-31-220 ec2-user]#
```

```
[root@ip-172-31-31-220 ec2-user]# yum update
Amazon Linux 2023 Kernel Livepatch repository
                                                                                                                     149 kB/s | 16 kB
                                                                                                                                                  00:00
 ependencies resolved.
Nothing to do.
Complete!
[root@ip-172-31-31-220 ec2-user]# yum install -y httpd
.ast metadata expiration check: 0:00:12 ago on Mon Jun 2 20:34:24 2025.
 ependencies resolved.
                                           Architecture
 Package
                                                                    Version
                                                                                                                       Repository
Installing:
                                           x86_64
                                                                    2.4.62-1.amzn2023
                                                                                                                       amazonlinux
                                                                                                                                                         48 k
Installing dependencies:
                                                                    1.7.5-1.amzn2023.0.4
1.6.3-1.amzn2023.0.1
18.0.0-12.amzn2023.0.3
2.4.62-1.amzn2023
2.4.62-1.amzn2023
                                           x86_64
x86_64
                                                                                                                                                       129 k
                                                                                                                       amazonlinux
                                                                                                                       amazonlinux
                                                                                                                                                        98 k
 generic-logos-httpd
                                          noarch
x86_64
                                                                                                                                                        19 k
                                                                                                                       amazonlinux
                                                                                                                       amazonlinux
                                                                                                                                                       1.4 M
14 k
 httpd-core
                                           noarch
                                                                                                                       amazonlinux
                                          x86_64
x86_64
noarch
                                                                    2.4.62-1.amzn2023
                                                                                                                       amazonlinux
                                                                                                                                                         81 k
                                                                    1.0.9-4.amzn2023.0.2
                                                                                                                       amazonlinux
                                                                                                                                                        315 k
                                                                    2.1.49-3.amzn2023.0.3
                                                                                                                       amazonlinux
                                                                                                                                                         33 k
Installing weak dependencies:
                                           x86 64
                                                                    1.6.3-1.amzn2023.0.1
                                                                                                                       amazonlinux
                                                                                                                                                         17 k
 apr-util-openssl
```

6. Navigate to Web Directory

7. Download Portfolio from GitHub

Use wget to download the zip file of your GitHub repository:

wget https://github.com/nadir3470/portfolio/archive/refs/heads/main.zip

Unzip it using the command: unzip main.zip

Copy Portfolio Files to Web Root : cp -r portfolio-main/* /var/www/html/

Clean Up Extra Files: rm -rf portfolio-main main.zip README.md

```
[root@ip-172-31-31-220 html]# cp -r portfolio-main/* /var/www/html
[root@ip-172-31-31-220 html]# ls
README.md about.html certifications.html contact.html index.html main.zip photo.jpg portfolio-main styles.css
[root@ip-172-31-31-220 html]# rm -rf portfolio-main main.zip README.md
[root@ip-172-31-31-220 html]# ls
about.html certifications.html contact.html index.html photo.jpg styles.css
[root@ip-172-31-31-220 html]# systemctl enable httpd

created symlink /etc/systemd/system/multi-user.target.wants/httpd.service → /usr/lib/systemd/system/httpd.service.
[root@ip-172-31-31-220 html]# systemctl start httpd
[root@ip-172-31-31-220 html]# systemctl start httpd
[root@ip-172-31-31-220 html]#
```

8. Start Apache Service

Run the following commands:

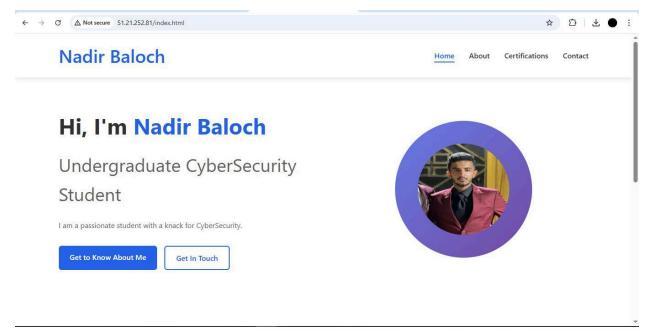
systemctl enable httpd systemctl start httpd

```
[root@ip-172-31-31-220 html]# cp -r portfolio-main/* /var/www/html
[root@ip-172-31-31-220 html]# cp -r portfolio-main/* /var/www/html
[root@ip-172-31-31-220 html]# ls
README.md about.html certifications.html contact.html index.html main.zip photo.jpg portfolio-main styles.css
[root@ip-172-31-31-220 html]# rm -rf portfolio-main main.zip README.md
[root@ip-172-31-31-220 html]# ls
about.html certifications.html contact.html index.html photo.jpg styles.css
[root@ip-172-31-31-220 html]# systemctl enable httpd
[created symlink /etc/systemd/system/multi-user.target.wants/httpd.service → /usr/lib/systemd/system/httpd.service.
[root@ip-172-31-31-220 html]# systemctl start httpd
[root@ip-172-31-31-220 html]#
```

9. Access the portfolio through Browser

Go to your EC2 instance and copy the public IPv4 Address.

In my case it is: http://51.21.252.81/



You'll see the portfolio being hosted on the IPv4 Address through EC2 server. However this is HTTP-based. The next series of steps would be pointing a domain name to this public address and then installing a SSL Certificate to add HTTPS.

Pointing a Namecheap Domain to Your EC2 Instance

To access the hosted portfolio using a custom domain follow the steps below to map domain to EC2 public IP.

I've used Namecheap for domain registration.

Prerequisites

- A registered domain on Namecheap
- Access to the domain's Advanced DNS settings
- A running EC2 instance with a public IPv4 address
- A web server (Apache) running and accessible on HTTP port (80)

1. Get Your EC2 Public IPv4 Address

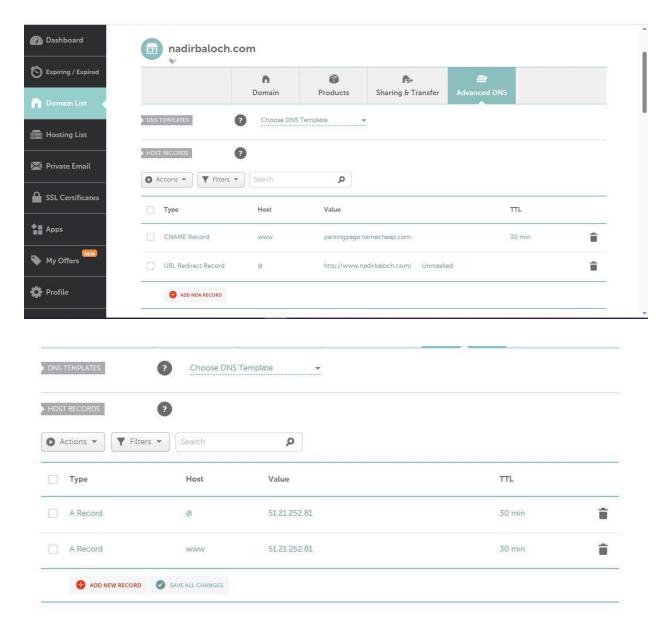
- Go to AWS EC2 Console
- Select the instance
- Copy the Public IPv4 address

2. Update DNS Settings in Namecheap

Log in to your Namecheap Account

- Go to Domain List and then Click Manage next to your domain
- Click on the Advanced DNS tab

Under the Host Records section, choose type as A Record, value as the public IPv4 Address of the EC2 instance and TTL as 30 minutes.



After performing the said steps, The portfolio shall be pointed to the domain, In my case it is on https://nadirbaloch.com/

Installing an SSL Certificate

Prerequisites

- A domain name pointing to your EC2 instance
- An active SSL certificate from Namecheap
- Apache web server installed and running on EC2
- Root access to your EC2 instance

1. Generate a CSR and Private Key on EC2

Use the following command

Replace the <u>yourdomain.com</u> in the following command with with your actual domain. In my case it is <u>nadirbaloch.com</u> as shown in the screenshot below.

sudo openssl req -new -newkey rsa:2048 -nodes -keyout yourdomain.com.key -out yourdomain.com.csr

When prompted, enter your domain information. Most important is the Common Name, which should be www.yourdomain.com (in my case it is www.nadirbaloch.com as shown in the screenshot) or your root domain.

```
You are about to be asked to enter information that will be incorporated
into your certificate request.
What you are about to enter is what is called a Distinguished Name or a DN.
There are quite a few fields but you can leave some blank
For some fields there will be a default value,
If you enter '.', the field will be left blank.
Country Name (2 letter code) [XX]:AU
State or Province Name (full name) []:WA
Locality Name (eg, city) [Default City]:Perth
Organization Name (eg, company) [Default Company Ltd]:Nadir Baloch
Organizational Unit Name (eg, section) []:
Common Name (eg, your name or your server's hostname) []:www.nadirbaloch.com
Email Address []:Nadirshah9202@gmail.com
Please enter the following 'extra' attributes
to be sent with your certificate request
A challenge password []:
An optional company name []:
```

After that it will generate a CSR file.

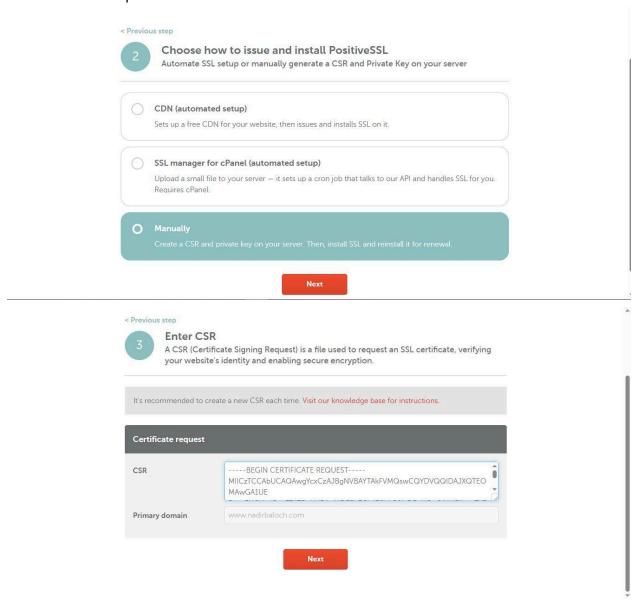
```
A challenge password []:
An optional company name []:
[ec2-user@ip-172-31-31-220 ~]$ cat nadirbaloch.com.csr
----BEGIN CERTIFICATE REQUEST----
MIICzTCCAbUCAQAwgYcxCzAJBgNVBAYTAkFVMQswCQYDVQQIDAJXQTEOMAwGA1UE
BwwFUGVydGgxFTATBgNVBAoMDE5hZGlyIEJhbG9jaDEcMBoGA1UEAwwTd3d3Lm5h
ZGlyYmFsb2NoLmNvbTEmMCQGCSqGSIb3DQEJARYXTmFkaXJzaGFoOTIwMkBnbWFp
bC5jb20wggEiMA0GCSqGSIb3DQEBAQUAA4IBDwAwggEKAoIBAQD1QLaI/55wKh9L
OZIPGpaNxY8Qk1AE99vmfQ2MyRs66vB3MQAhSyOVHEFIQxkZFMSQCEuzyNc/Lcuf
icbg4AELdbMn35K/wsLasfu/EMRlYa9R8AE6RAQujDFkwO5mY5MEDJV6I+hxUFS2
DYqCl90+Iscg9jt/aVzQJ4kwnEFbh3Vd36rdAYPDbevHnE2y7Q+b9bMRdHyvsHIK
2514BzaniOWcpjervN9yU5ycjmdByt12T6HiFAGdlgwMYpyfs83YKehMNg05M+L6
eFD8oBLIQGiC3DiY8++jNhzaMyYoGu/JaXgQKr/xsUi26ABb07TJ1DtY0jlWth6o
dV81h4dvAgMBAAGgADANBgkqhkiG9w0BAQsFAAOCAQEAzFmsAhYJy6SvcDWTxP05
803h7swBtSZTLtk6mkIAu5MWDRXUPsLz2NFf3xELHgWmgHfC/wUBkWMAKWJJ6S2V
/Op4AXkS2Q21mkKQe8q5+JHBecN3nRMAB4Uoo9ULA/sgHrnZG7sxqtLKfUT80150
c2yGl3mzPDP2Zbivd2oaeMZfCx3bKh6HVhsCkGvsaEWS1TBMxS3UMLNpxlFmbsFY
CCTNX+9xv25/NYRuo0Gb3imFy9szflHp6rs04QMGtw2AUtIcFi9n7Q8Ly0XCtF7l
Nca/+4z6KcdRa+8Ne27F71AQf/LfAoXUQriKlRQjkSnOGvqer+cuvME3abKcPS4t
NO==
----END CERTIFICATE REQUEST----
[ec2-user@ip-172-31-31-220 ~]$
```

2. Submit CSR to Namecheap

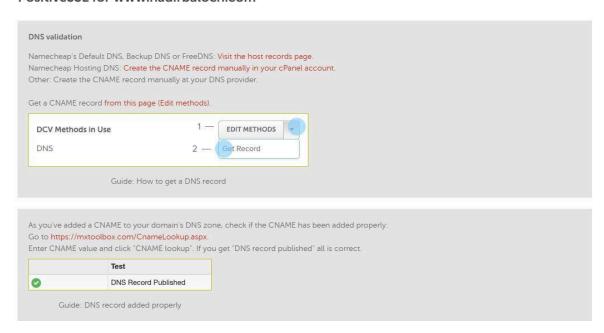
- Log into your Namecheap account.
- Go to SSL Certificates → Activate.

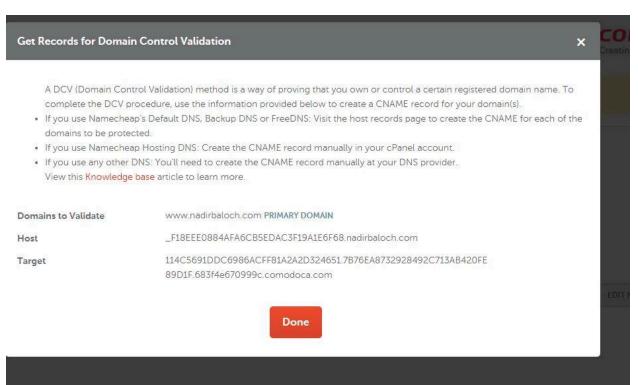
- Paste the contents of yourdomain.com.csr when prompted.
- Choose Apache as your server type.
- After email/domain validation, Namecheap will provide a ZIP containing your certificate files

Domain validation process is shown as below.

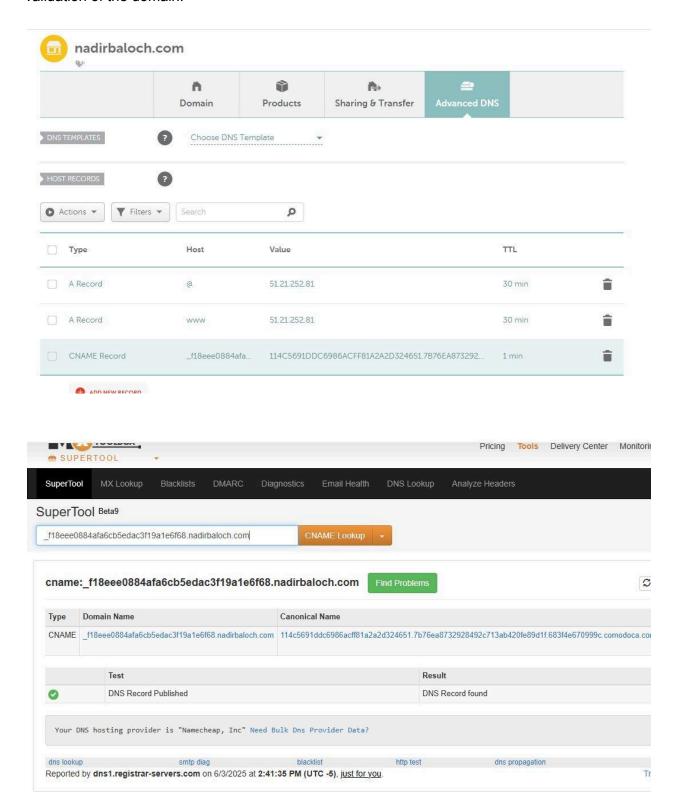


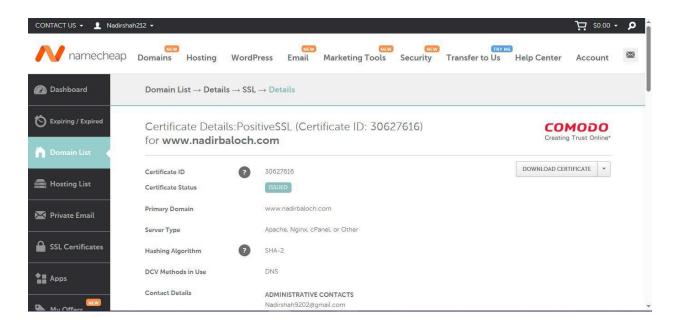
PositiveSSL for www.nadirbaloch.com



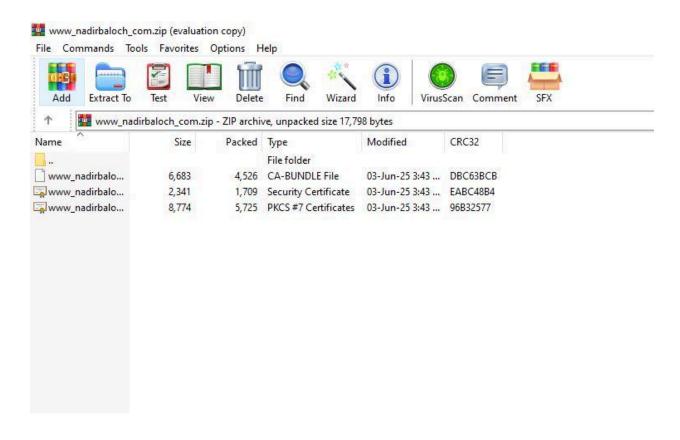


Adding CName Record in our advanced DNS tab of the domain to prove ownership and validation of the domain.





Certificate is obtained.



3. Upload and Extract Certificate Files

Extract the ZIP locally and load the files on the EC2 server through scp

```
C:\Users\WAJIZ.PK\Downloads>scp -i portfolio.pem www_nadirbaloch_com.crt ec2-user@ec2-51-21-252-81.eu-north-1.compute.am
azonaws.com:/home/ec2-user/
www_nadirbaloch_com.crt 100% 2341 14.7KB/s 00:00
C:\Users\WAJIZ.PK\Downloads>
```

Connect to the EC2 instance

Move the cert files and your private key into a secure directory:

The commands used are as below:

sudo mkdir -p /etc/ssl/nadirbaloch sudo mv www_nadirbaloch_com /etc/ssl/nadirbaloch/nadirbaloch_com.crt sudo mv www_nadirbaloch_com.ca-bundle /etc/ssl/nadirbaloch/ca-bundle.crt sudo mv nadirbaloch.com.key /etc/ssl/nadirbaloch/

```
[ec2-user@ip-172-31-31-220 ~]$ sudo mkdir -p /etc/ssl/nadirbaloch
[ec2-user@ip-172-31-31-220 ~]$ sudo mv www_nadirbaloch_com.crt /etc/ssl/nadirbaloch/nadirbaloch_com.crt
[ec2-user@ip-172-31-31-220 ~]$ sudo mv www_nadirbaloch_com.ca-bundle /etc/ssl/nadirbaloch/ca-bundle.crt
[ec2-user@ip-172-31-31-220 ~]$ sudo mv nadirbaloch.com.key /etc/ssl/nadirbaloch/
[ec2-user@ip-172-31-31-220 ~]$
```

4. Configure Apache for SSL

sudo nano /etc/httpd/conf.d/ssl.conf

```
[ec2-user@ip-172-31-31-220 ~]$
[ec2-user@ip-172-31-31-220 ~]$ sudo nano /etc/httpd/conf.d/ssl.conf
[ec2-user@ip-172-31-31-220 ~]$ sudo nano /etc/httpd/conf.d/ssl.conf
[ec2-user@ip-172-31-31-220 ~]$ sudo nano /etc/httpd/conf.d/ssl.conf
```

Update the lines as follows

```
Listen 443 https
<VirtualHost *:443>
      ServerName www.nadirbaloch.com
DocumentRoot /var/www/html
      SSLEngine on
      SSLCertificateFile /etc/ssl/nadirbaloch/nadirbaloch_com.crt
SSlCertificateKeyFile /etc/ssl/nadirbaloch/nadirbaloch.com.key
SSLCertificateChainFile /etc/ssl/nadirbaloch/ca-bundle.crt
      <Directory "/var/www/html">
  Options Indexes FollowSymLinks
  AllowOverride All
            Require all granted
       </Directory>
      ErrorLog logs/ssl_error_log
TransferLog logs/ssl_access_log
LogLevel warn
</VirtualHost>
                                                                                            [ Read 23 lines ]
                           ^O Write Out
^R Read File
                                                      ^F Where Is
^\ Replace
^G Help
^X Exit
                                                                                  ^K Cut
^U Paste
                                                                                                                                         ^C Location
^/ Go To Lin
                                                                                                                                                                    M-U Undo
                                                                                                                                                                                               M-A Set Mark
                                                                                                                  Execute
```

5. Restart Apache

sudo systemctl restart httpd

```
[ec2-user@ip-172-31-31-220 ~]$ sudo apachectl configtest
Syntax OK
[ec2-user@ip-172-31-31-220 ~]$ sudo systemctl restart httpd
```

Now we can verify that the SSL certificate is installed by ensuring the lock icon is visible on the browser search bar.

The portfolio can be accessed here: https://www.nadirbaloch.com/

Scripting for Contact Form Functionality In the Portfolio

Integrated EmailJS into a portfolio to send contact form submissions directly to my email without needing a backend.

The Script used in the contact form is as follows

```
<!-- Scripting part. -->
 <!-- EmailJS SDK via CDN -->
 <script src="https://cdn.jsdelivr.net/npm/@emailjs/browser@4/dist/email.min.js"></script>
 <script>
  window.onload = function () {
   emailjs.init("-SEj5Uo9_8jR9mc9a"); // EmailJS public key
   document.getElementById("sendButton").addEventListener("click", function (e) {
     e.preventDefault();
     const params = {
      name: document.getElementById("name").value,
      email: document.getElementById("email").value,
      message: document.getElementById("message").value,
    };
            //SERVICE KEY
                                  //TEMPLATE KEY
     emailjs.send("service_q63gz3j", "template_r5zlsop", params)
      .then(function(response) {
       alert("Email sent successfully!");
       console.log("SUCCESS!", response.status, response.text);
      }, function(error) {
       alert("Failed to send email.");
       console.error("FAILED...", error);
     });
   });
  };
 </script>
```

This script enables contact form to send emails using EmailJS, A client-side email service that doesn't require a backend.

Explanation

The First line is used to import the EmailJS SDK into HTML so that i can use its functions in JavaScript.

When the page loads, window onload ensures everything is ready before executing.

emailjs.init() initializes the SDK with my public key, linking the script to my EmailJS account.

```
const params = {
  name: document.getElementById("name").value,
  email: document.getElementById("email").value,
  message: document.getElementById("message").value,
  };
```

This block shown above collects the values from the inputs in my contact form. These values are stored in a params object, which will be sent to EmailJS.

```
emailjs.send("service_q63gz3j", "template_r5zlsop", params)
```

This line sends the email using: service_q63gz3j: r EmailJS Service ID template_r5zlsop: EmailJS Template ID params: the form input data

If the email is sent successfully, the website will show a success alert and log the success response in the console.

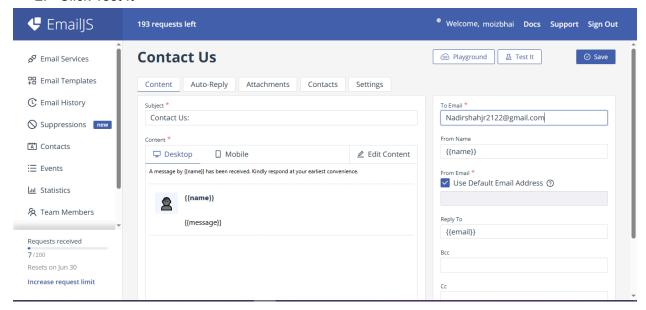
If the email fails the website will show an error alert and log the error details in the console

This script helps me to

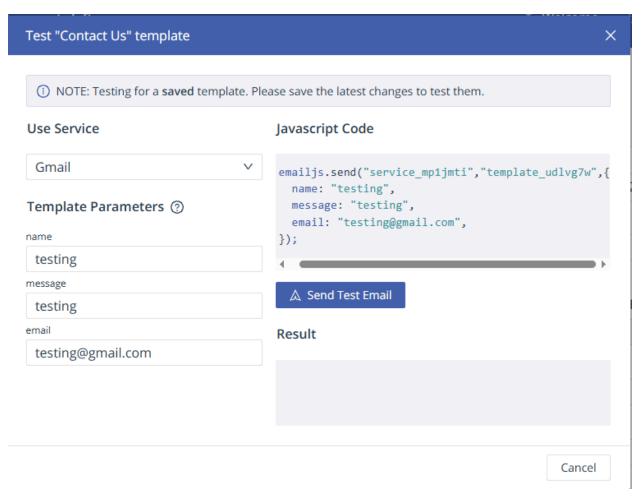
- 1. Collects Form Data
- 2. Sends an Email Using EmailJS
- 3. Handles Success & Failure of Email being sent

To test the script, follow these steps.

- 1. Create an account on EmailJS and click on Email Templates
- 2. Click Test It



3. Provide the necessary data for testing



4. Click send test mail and an email will be sent.

References

https://www.emailjs.com/docs/tutorial/creating-contact-form/

https://aws.amazon.com/getting-started/hands-on/host-static-website/

https://www.namecheap.com/support/knowledgebase/article.aspx/9837/46/how-to-connect-a-domain-to-a-server-or-hosting/

https://www.namecheap.com/support/knowledgebase/article.aspx/795/14/how-to-install-ssl-certificates/

https://www.namecheap.com/support/knowledgebase/article.aspx/9593/33/installing-an-ssl-certificate-on-amazon-web-services-aws/