



# Network Diagram

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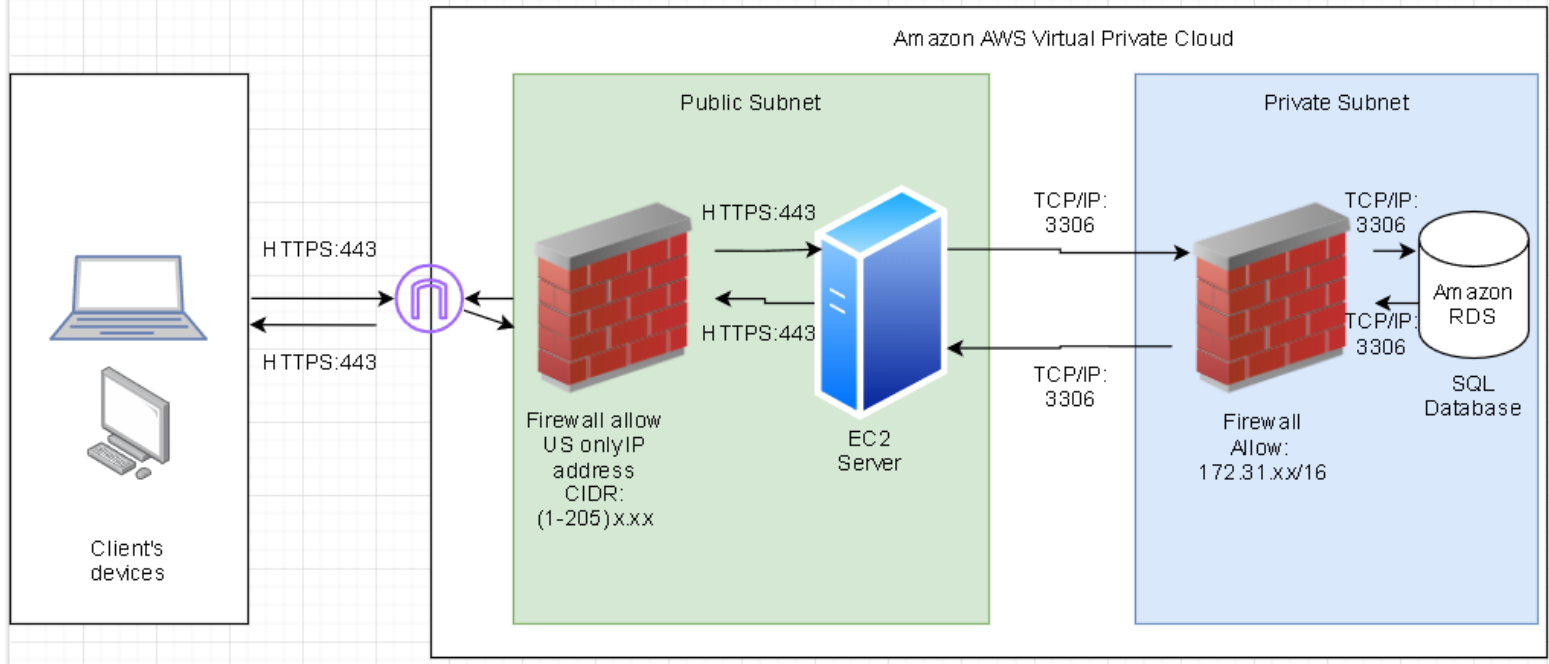
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# 1 Network Diagram



## 2 Protocol

### 2.1 HTTPS:

Hypertext transfer protocol secure which is HTTP but uses SSL/TLS protocol with certification verification to increase security by preventing man-in-the-middle attacks.

### 2.2 SSL/TLS:

Uses certificate exchange similar to asymmetric encryption to verify identities of 2 points connections to prevent eavesdropping.

### 2.3 TCP/IP:

the protocol that is used to communicate between different computers including servers. TCP/IP layers include application, transport, internet, and network with the application being the highest level.

## 3 Technical Specifications

### 3.1 EC2 Server:

#### 3.1.1 Hardware specification:

CPU: 1 virtual CPU  
RAM: 1GiB RAM  
Storage: 30 GB SSD

#### 3.1.2 Operating systems:

Operating system: Ubuntu 20.04 LTS

### **3.2 Amazon RDS database:**

#### **3.2.1 Hardware specification:**

CPU: 1 virtual CPU

RAM: 1GB

Storage: 20 GB SSD

DBMS: MariaDB 2.6+

## **4 Connection description**

Clients will be limited to only United States of America region. HTTPS requests coming from client devices will be passed through a firewall that will only allow United States of America IP addresses from (1-205).x.x.x ranges. The clients will have to pass through their ISP providers first before being able to access the internet and then to our webserver.

We will be using the EC2 service to host our server provided by Amazon AWS. The EC2 server will be processing client HTTPS requests on port 443 which implements SSL/TLS to ensure security. In addition, SSL/TLS connection will prevent man-in-the-middle attacks using certificate verification. Communication between the backend server and the SQL Database using Amazon RDS service will be using TCP/IP protocol on port 3306. This connection will be further protected by implementing SSL/TLS protocol to ensure data is stored and accessed securely.

The server will then send responses to the clients using HTTPS protocol through port 443. Our backend server will be using Apache HTTP 2.4+.

## **5 Virtual Private Cloud**

Both the webserver and the database will be residing in the same virtual private cloud. However, they will be in different subnets with the webserver which will be hosting our application being on the public subnet to handle HTTPS requests from clients with access through the internet gateway.

On the other hand, the relational database will be on a private subnet with no access to the internet gateway (not available publicly). Connection to the database for querying data will be limited to the private IP address range of 172.31.x.x/16 within the Virtual Private Cloud.

## 5 References

1. Amazon EC2 instance IP addressing - docs.aws.amazon.com. (n.d.). Retrieved October 20, 2021, from <https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/using-instance-addressing.html>.
2. Cal Ism lapsz. (1989). LS. Amazon. Retrieved October 20, 2021, from [https://lightsail.aws.amazon.com/ls/docs/en\\_us/articles/compare-options-choose-lightsail-instance-image](https://lightsail.aws.amazon.com/ls/docs/en_us/articles/compare-options-choose-lightsail-instance-image).
3. Colegio Oficial de Médicos de la Provincia, Valladolid. (2016). VPC: Validación Periódica de La Colegiación. Amazon. Retrieved October 23, 2021, from [https://docs.aws.amazon.com/vpc/latest/userguide/VPC\\_Scenario2.html#nacl-rules-scenario-2](https://docs.aws.amazon.com/vpc/latest/userguide/VPC_Scenario2.html#nacl-rules-scenario-2).
4. Connecting to an Amazon RDS DB instance - amazon relational database ... - docs.aws.amazon.com. (n.d.). Retrieved October 21, 2021, from [https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/CHAP\\_CommonTasks.Connect.html](https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/CHAP_CommonTasks.Connect.html).
5. Daly, D. J., & Daly, D. J. (1987). Economics 2: EC2. Amazon. Retrieved October 20, 2021, from <https://aws.amazon.com/ec2/pricing/?p=ft&c=cp&z=3>.
6. mohitmunmohitmun 5, Michael - sqlbotMichael - sqlbot 146k2121 gold badges272272 silver badges345345 bronze badges, PavelPavel 3, AravindAravind 3, Rakesh SoniRakesh Soni 7, & SameerSameer 3111 bronze badge. (1965, March 1). What is difference between Lightsail and EC2? Stack Overflow. Retrieved October 20, 2021, from <https://stackoverflow.com/questions/40927189/what-is-difference-between-lightsail-and-ec2>.
7. Nehrenz, M. T. (2010). Initial design and simulation of the attitude determination and control system for lightsail-1. Amazon. Retrieved October 20, 2021, from <https://aws.amazon.com/lightsail/pricing/?p=ft&c=cp&z=3>.
8. Scenarios for accessing a DB instance in a VPC - amazon ... (n.d.). Retrieved October 21, 2021, from [https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/USER\\_VPC.Scenarios.html](https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/USER_VPC.Scenarios.html).
9. Usher, S. (2021). Free. Amazon. Retrieved October 20, 2021, from <https://aws.amazon.com/free/compute/?p=ft&c=nhp&z=2&awswt=203b>.
10. Wikimedia Foundation. (2021, October 13). Internet protocol suite. Wikipedia. Retrieved October 20, 2021, from [https://en.wikipedia.org/wiki/Internet\\_protocol\\_suite](https://en.wikipedia.org/wiki/Internet_protocol_suite).
11. Wikimedia Foundation. (2021, October 18). HTTPS. Wikipedia. Retrieved October 20, 2021, from <https://en.wikipedia.org/wiki/HTTPS>.