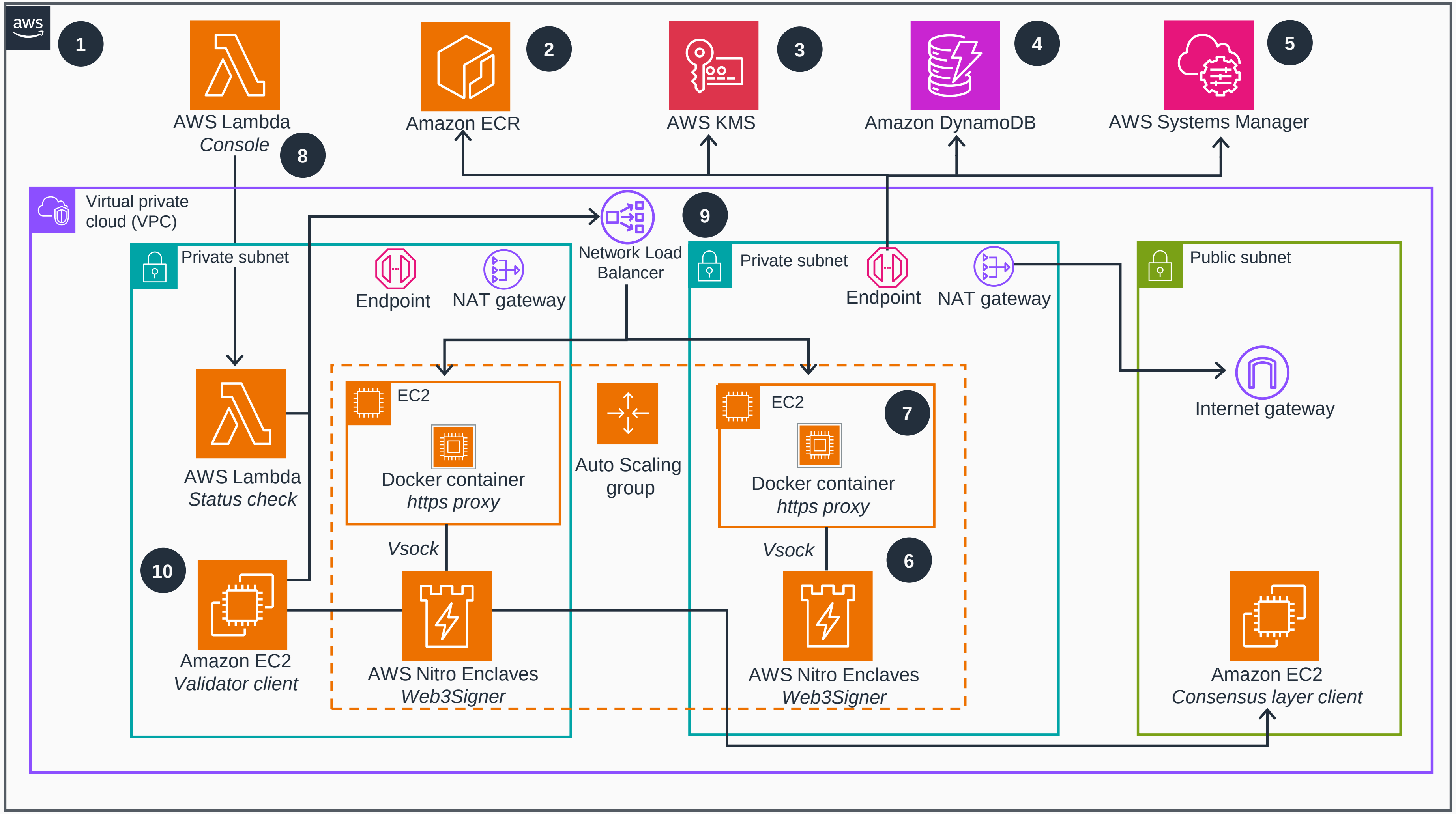
Guidance for Secure Blockchain Validation Using AWS Nitro Enclaves

This architecture diagram shows a secure, scalable, and cost-efficient blockchain key management solution that offers flexibility in signing algorithms and can be used for blockchain validation.



1 Run the **AWS Cloud Development Kit** (AWS CDK) stack through your local machine.

2 Once you run the **AWS CDK** stack, the required container artifacts are uploaded to the **Amazon Elastic Container Registry** (Amazon ECR). All Docker containers will be pulled from **Amazon ECR** later.

3 Config artifacts are encrypted through a symmetric encryption key using **AWS Key Management Service** (AWS KMS).

4 Encrypted config artifacts are stored in **Amazon DynamoDB**.

5 Run the Web3Signer initialization with an **AWS Systems Manager** command.

6 AWS Nitro Enclaves automatically decrypt config artifacts through **AWS KMS** using cryptographic attestation.

7 The Web3Signer process starts with Nitro Enclaves and exposes the HTTPS API on a parent **Amazon Elastic Compute Cloud** (Amazon EC2) instance.

8 Control the Web3Signer status through the **AWS Lambda** console. The *state* command provides information about the current status of the **Lambda** function.

9 Requests are routed through a Network Load Balancer to the next healthy **Amazon EC2** instance that runs isolated in a private subnet.

10 Requests originating from the **Amazon EC2** validator or consensus client can be routed to a Web3Signer instance through a Network Load Balancer. The validator client is not enclosed in this Guidance.

Reviewed for technical accuracy March 12, 2024

AWS Reference Architecture