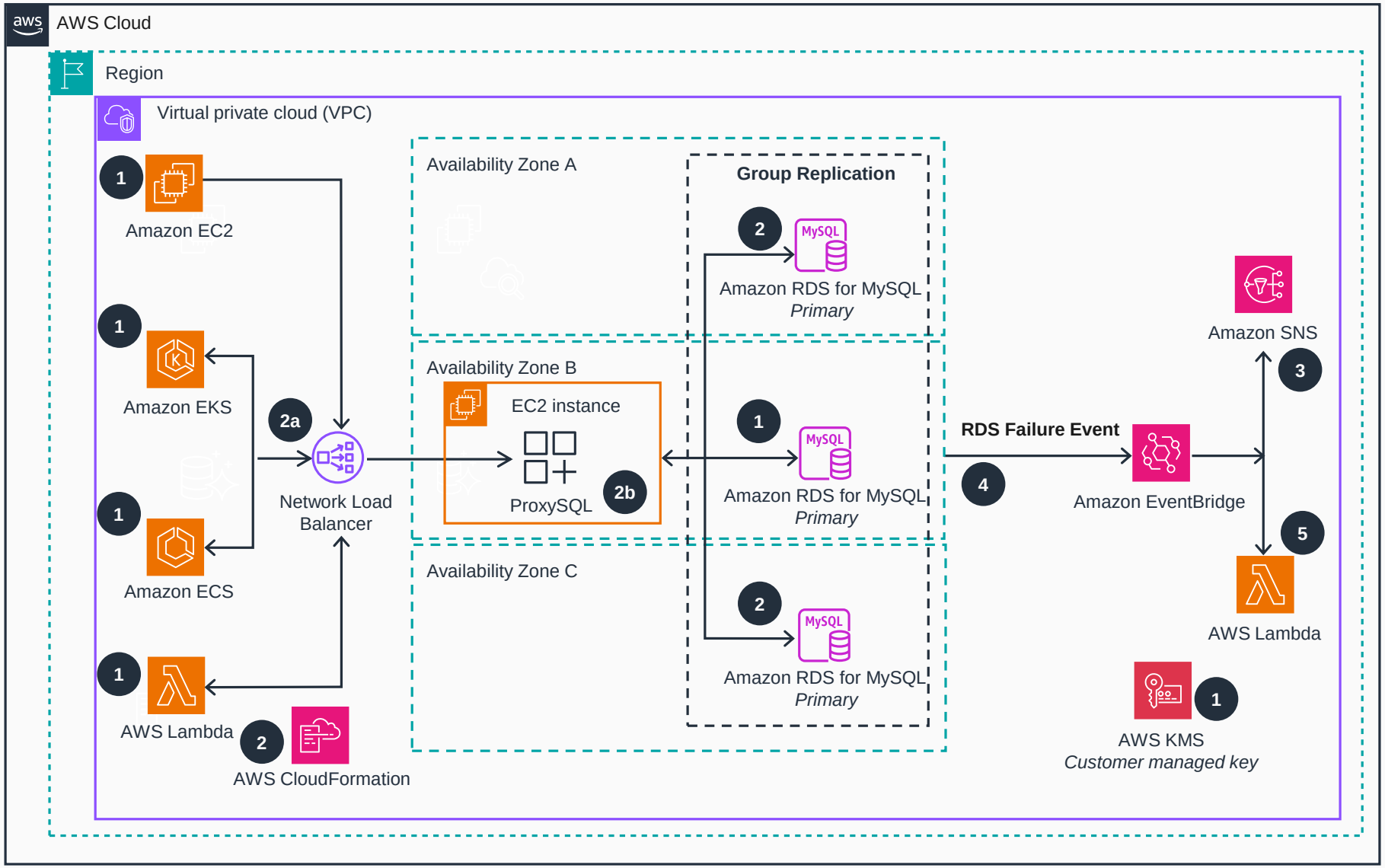
Guidance for Active-Active Replication on Amazon RDS for MySQL

This architecture diagram shows how to setup an active-active replication configuration for up to 9 Amazon RDS for MySQL instances using the Group Replication plugin. This allows for high availability and failover capabilities for your MySQL database. Steps 1-2 are described here; for details on steps 3-5, refer to the next slide.



1 An existing **Amazon Relational Database Service (Amazon RDS) for MySQL** instance is required to deploy this Guidance. The source application runs on **Amazon Elastic Compute Cloud (Amazon EC2), Amazon Elastic Kubernetes Service (Amazon EKS)**, **Amazon Elastic Container Service (Amazon ECS)**, or an environment of your choice. In this Guidance, we assume the application is deployed through **Amazon EC2** instances across multiple Availability Zones (AZs). The **Amazon RDS for MySQL** instance can be encrypted using the default **Amazon Key Management Service (AWS KMS)** or a customer managed key.

2 Once the prerequisites are complete, the **AWS CloudFormation** stacks will create resources such as **RDS for MySQL** instances, ProxySQL, and a Network Load Balancer. Additionally, an **Amazon Simple Notification Service** (Amazon SNS) topic, an **AWS Lambda** function, and **Amazon EventBridge** rules will be deployed.

- 2a: Network Load Balancer automatically distributes your incoming traffic from your applications across multiple targets, such as ProxySQL on **Amazon EC2** instances, in one or more AZs.
- 2b: ProxySQL redirects the traffic to the active DB instance of the Group Replication cluster.

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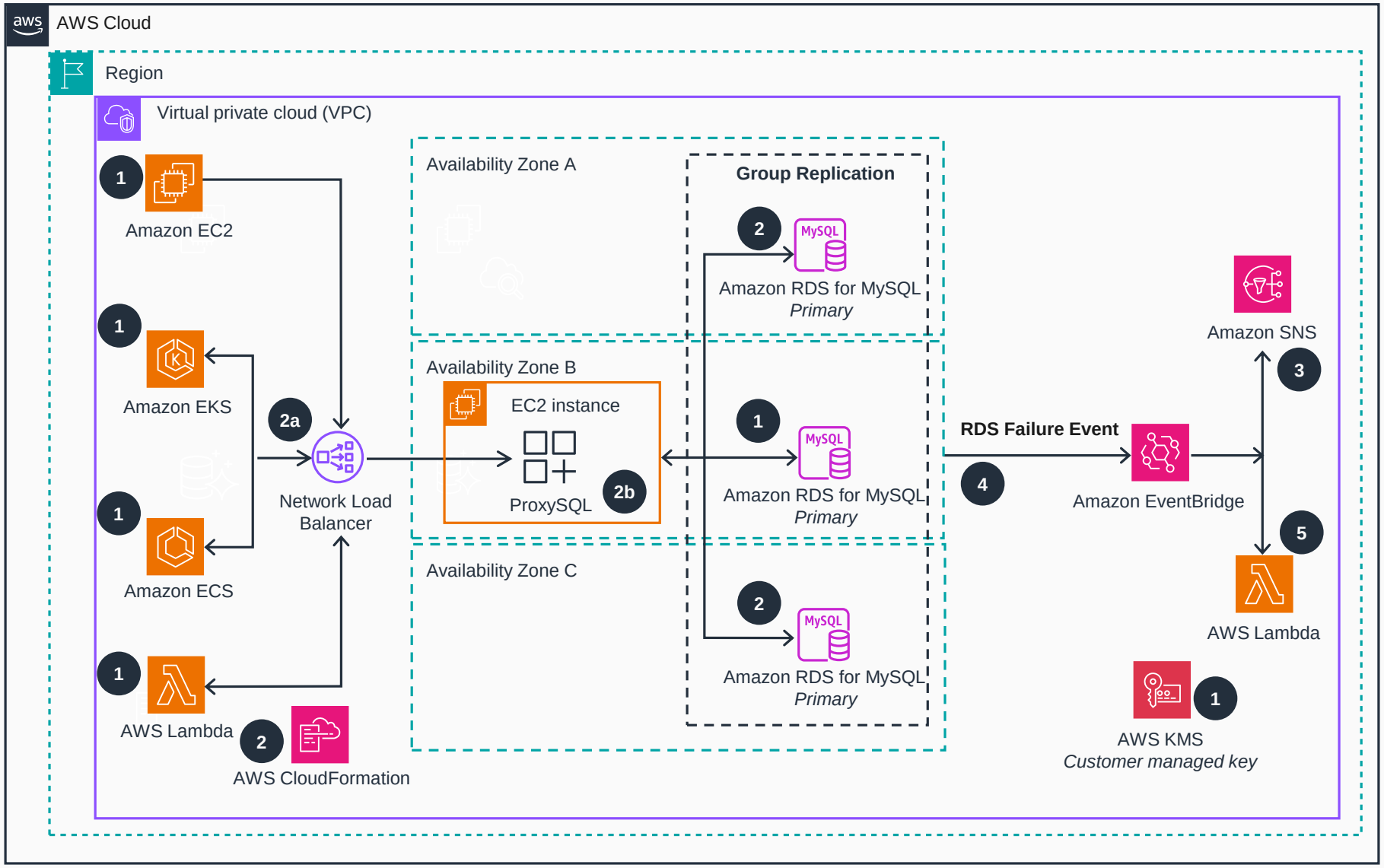
Steps 3-5



3 An **Amazon CloudWatch** alarm is created to monitor RDS failure events *(*such as DB instance shutdown, restart, failover, or failure*)* and notify through an **Amazon SNS** topic.

4 An **Amazon EventBridge** rule is configured to monitor for **RDS** failure events (such as DB instance shutdown, restart, or failure) and sends notifications through an **Amazon SNS** topic. The rule also calls a **Lambda** function when the event occurs.

5 A **Lambda** function provides a framework to add any additional functionalities during the **RDS** failure event. Some of the functionalities that can be added, but are not limited to, are:

- If one of the instances in a Group Replication topology is restarted, verify that the restarted DB instance is joined back to the Group Replication topology.
- If one of the instances in a Group Replication topology is upgraded, the DB instance will be in *read_only* mode. In this case, upgrade the other DB instances in the replication topology.
- Perform periodic health checks using MySQL performance schema tables, and if one DB instance is in a suspended state, redirect the traffic to other DB instances in the Group Replication topology.

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