# Cloud Patterns: Part 2

Systems Analysis & Design

Learning Objectives

By the end of this session, you will have acquired the following information:

- Ambassador
- Anti-Corruption Layer
- Backends for Frontends
- Retry
- Circuit Breaker
- Bulkhead
- Dead Letter Queue
- Rolling Deployment
- Blue-Green Deployment
- Canary Deployment
- Scatter-Gather
- CQRS

Dead Letter Queue: Problem

- The system cannot process the message due to errors.
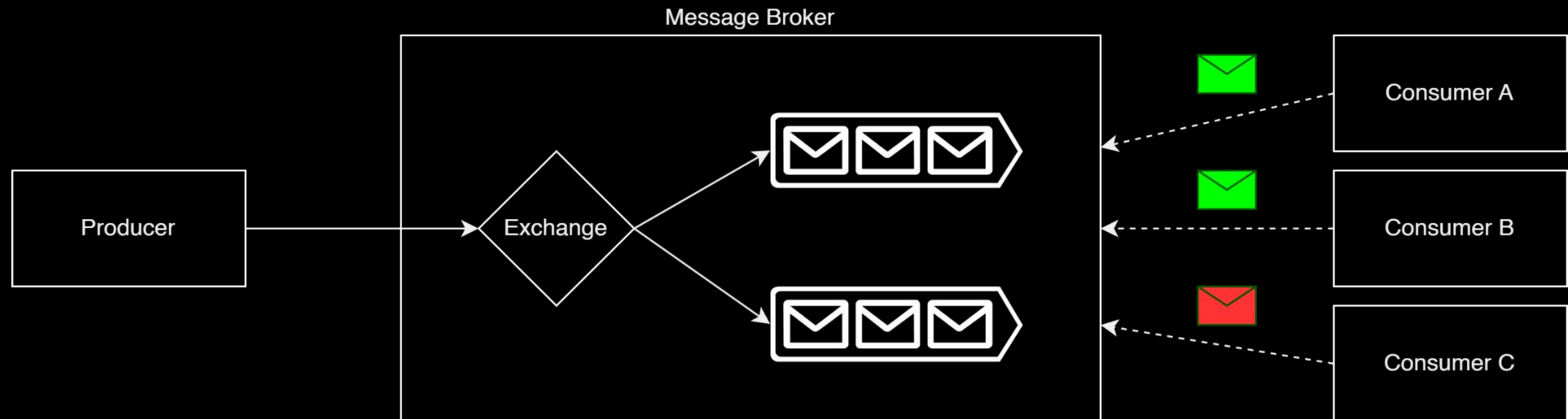
Dead Letter Queue: Solution

- Special queue in a message broker for messages that cannot be delivered to their destination or processed.
- It's important to add information about the reason for the failure to the message that goes into the DLQ.
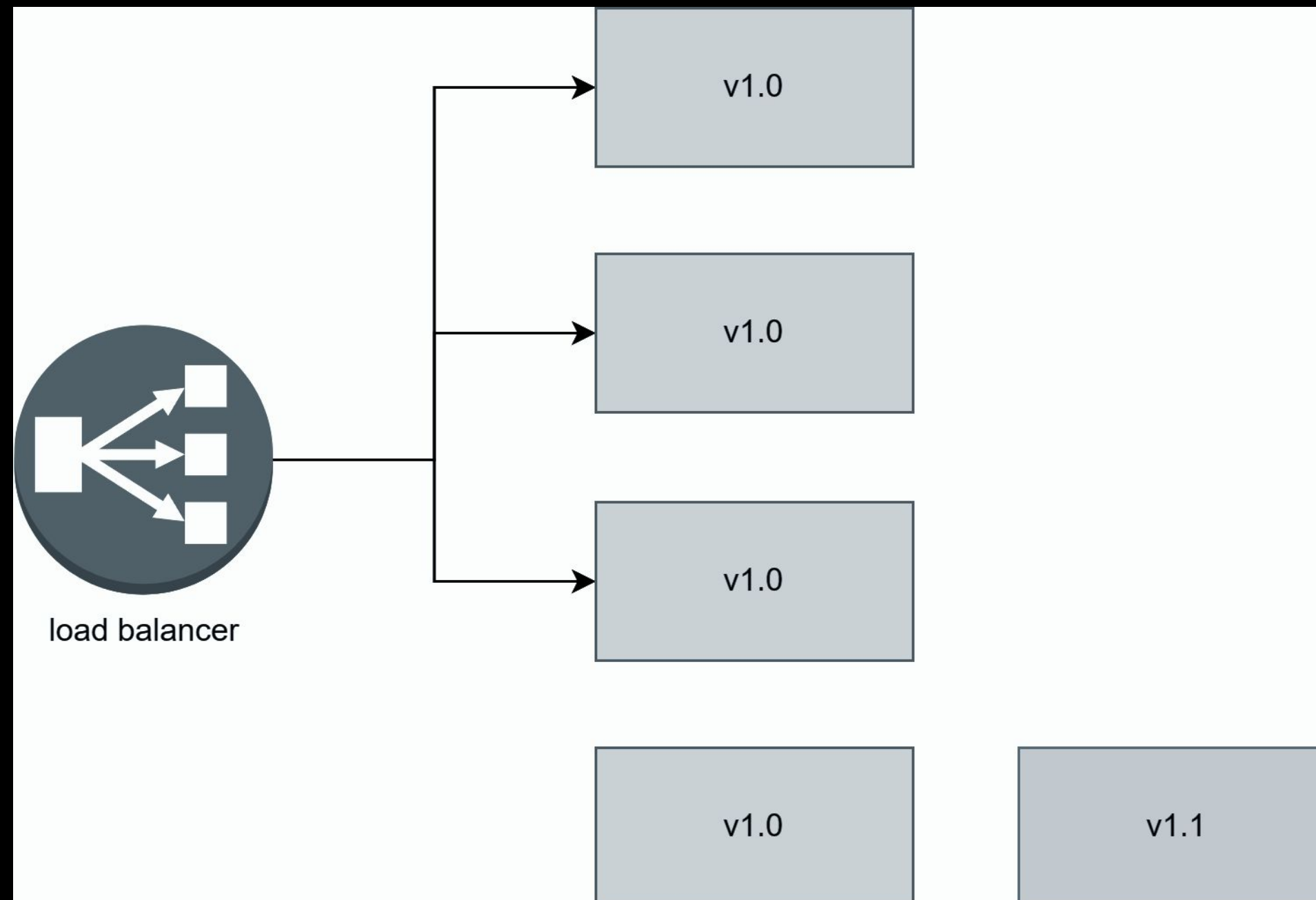- Messages in the DLQ indicate an issue
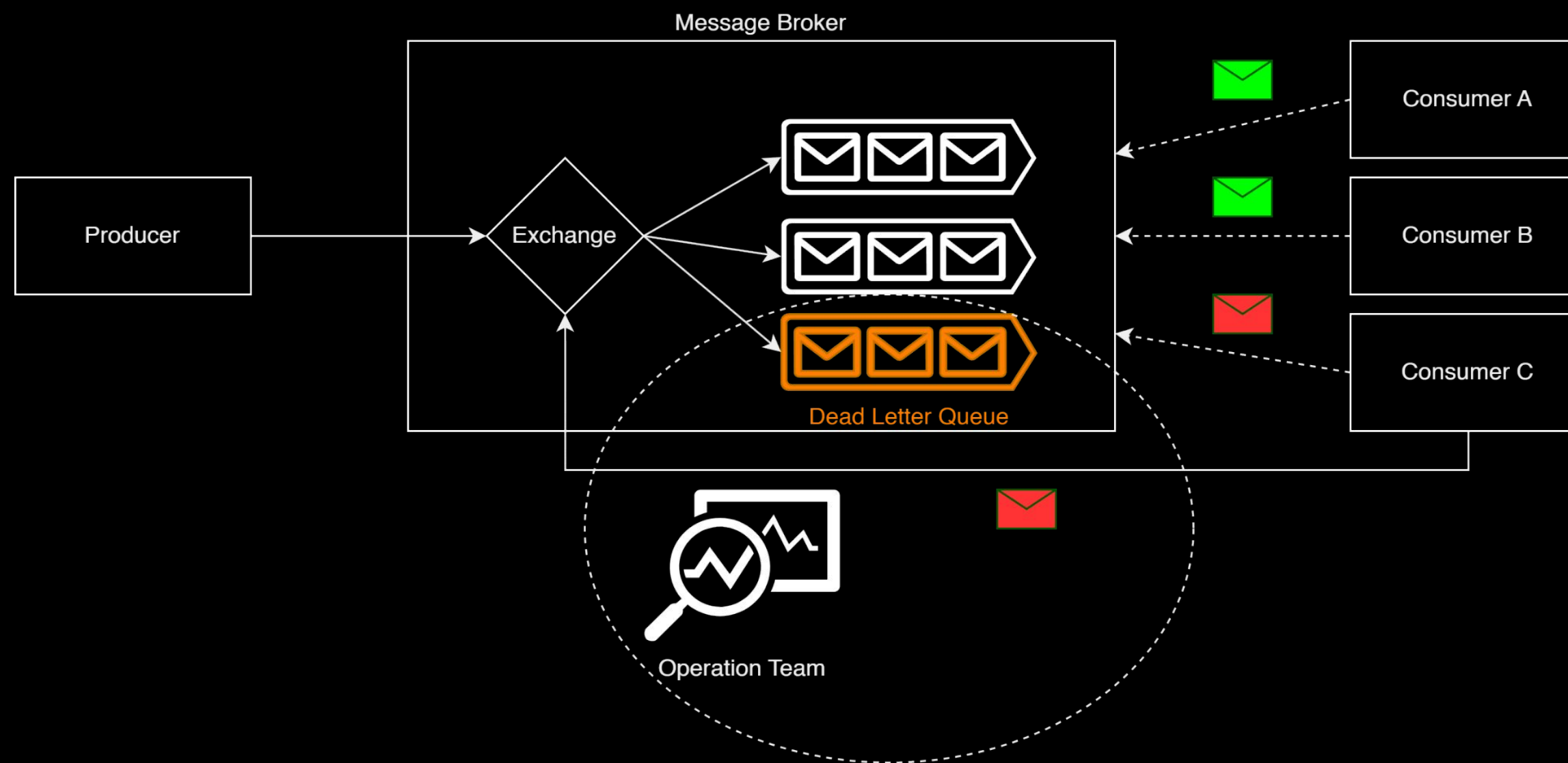
Rolling Deployment: Problem

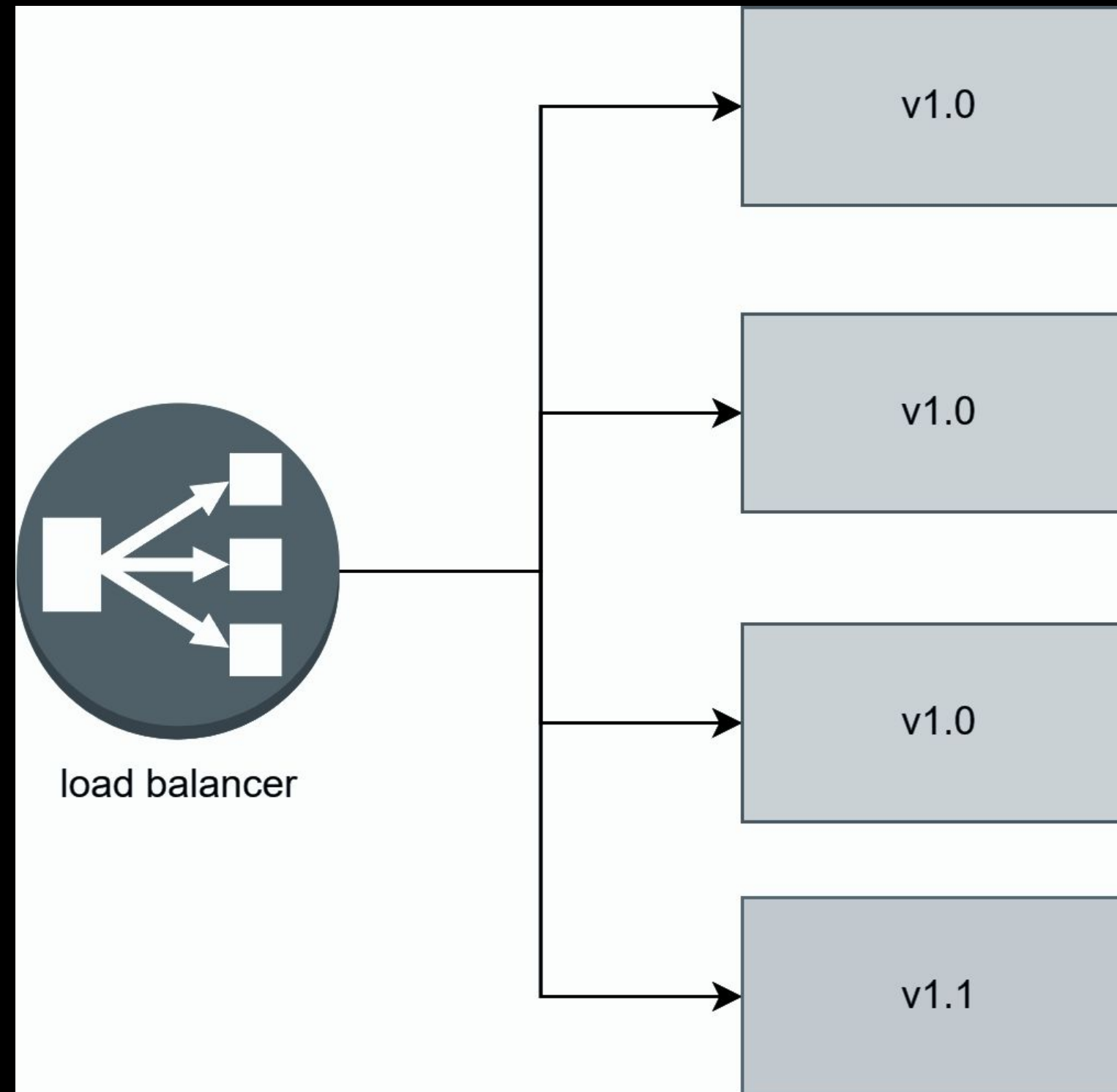- How does one replace previous versions of an application with new versions?
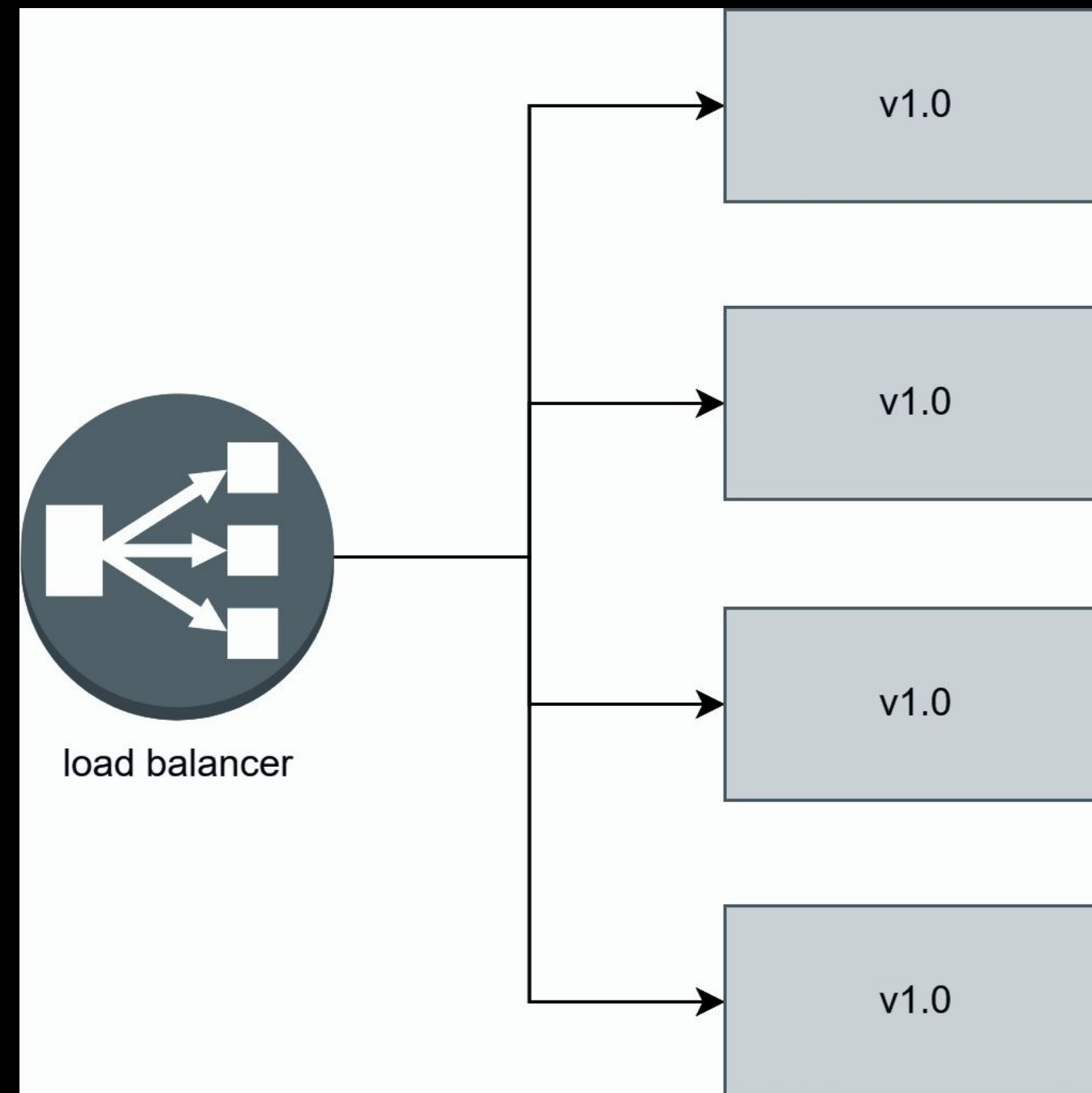
Rolling Deployment: Solution

- Start by deploying one additional node containing the new functionality.
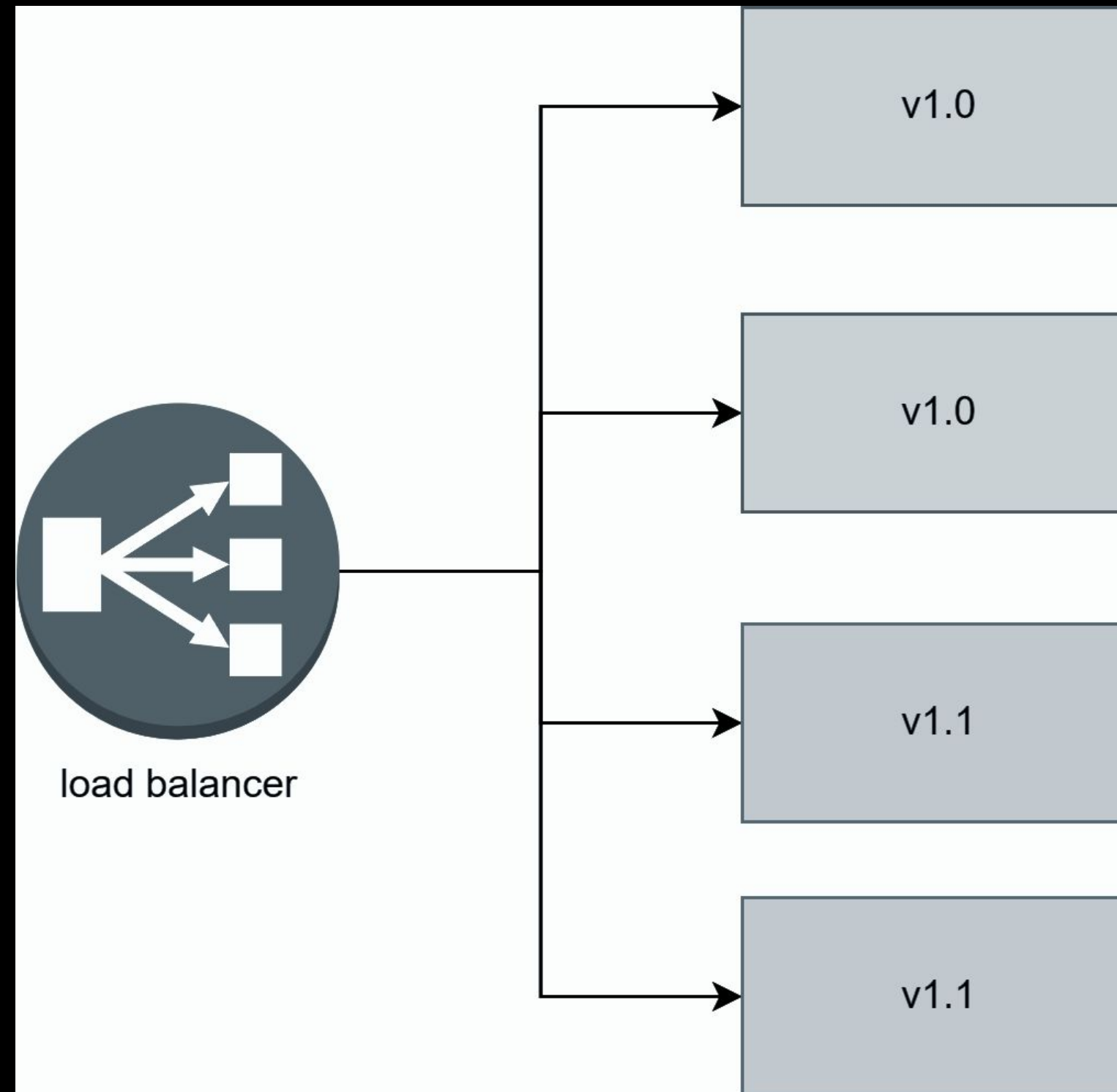
Rolling Deployment: Solution

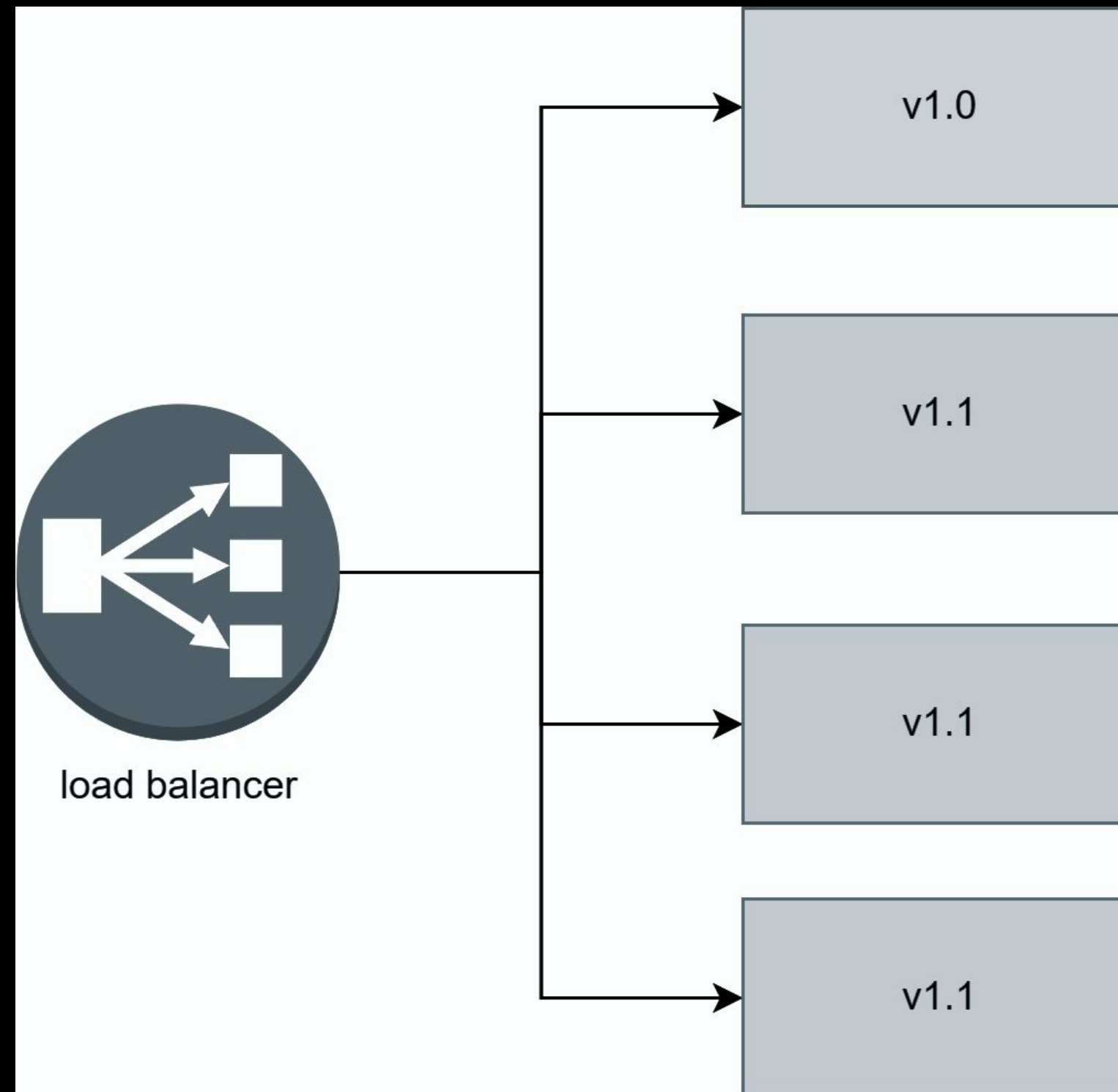- Reconfigure the system such that the new node replaces one of the old nodes.

Rolling Deployment: Solution

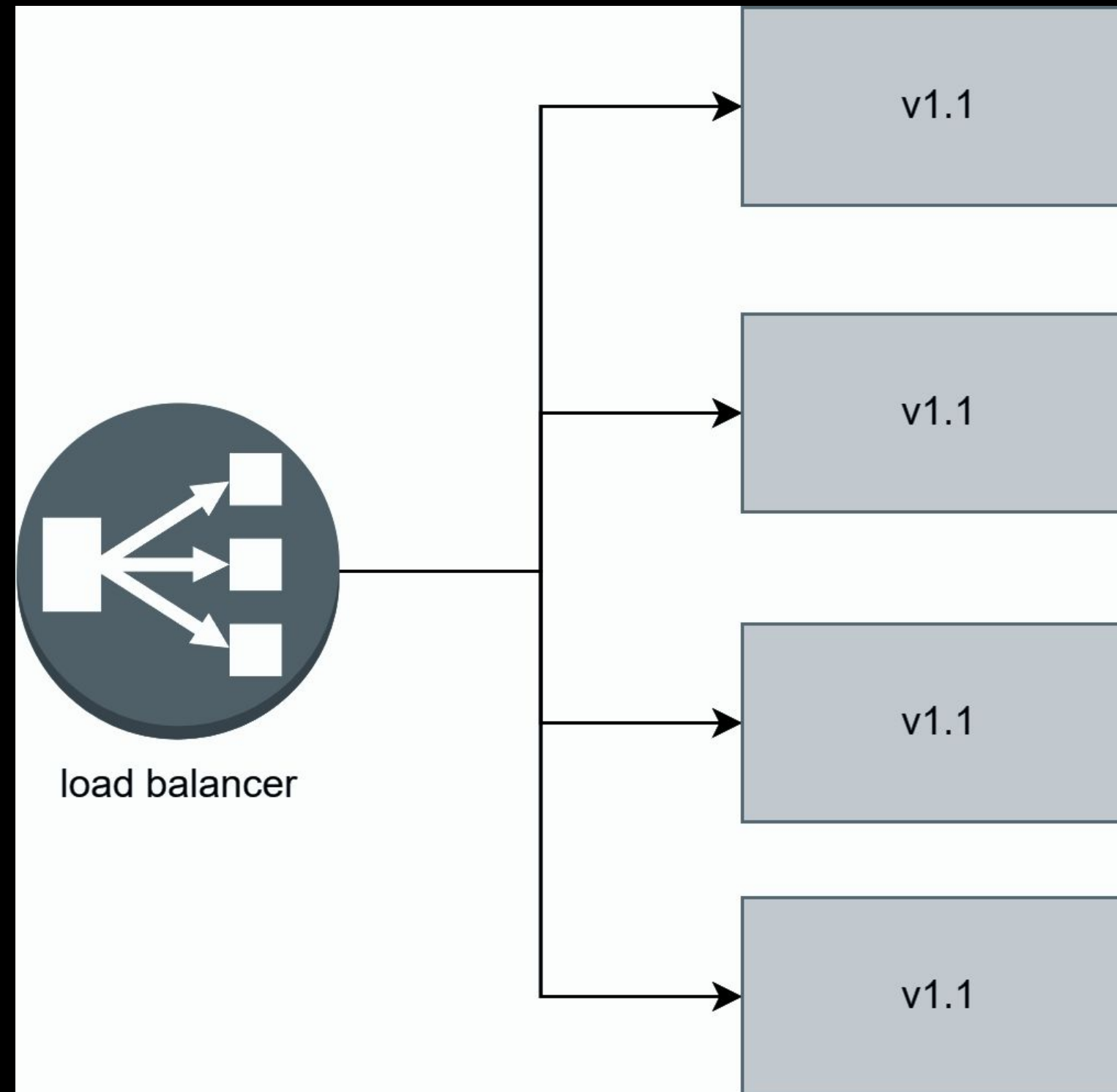● Repeat this process until all the old nodes have been replaced by new ones.

Rolling Deployment: Solution

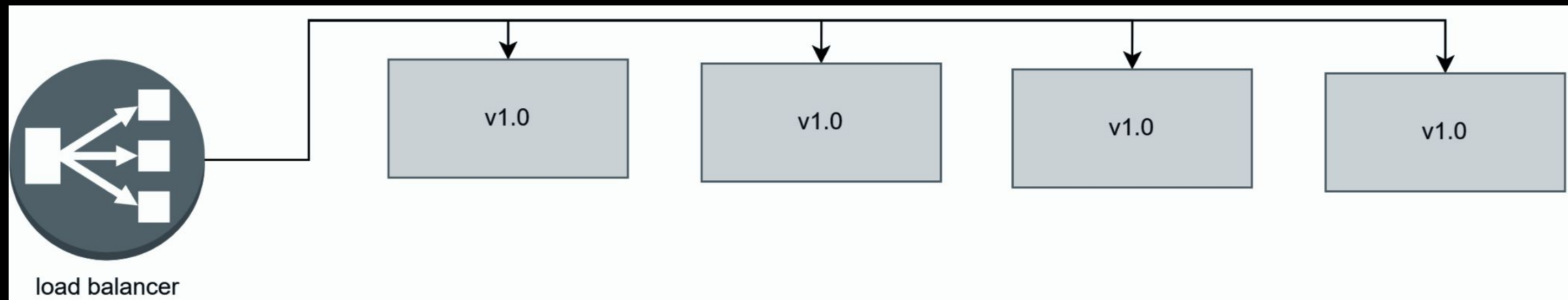- Repeat this process until all the old nodes have been replaced by new ones.

Rolling Deployment: Solution

- Repeat this process until all the old nodes have been replaced by new ones.

Blue-Green Deployment: Problem

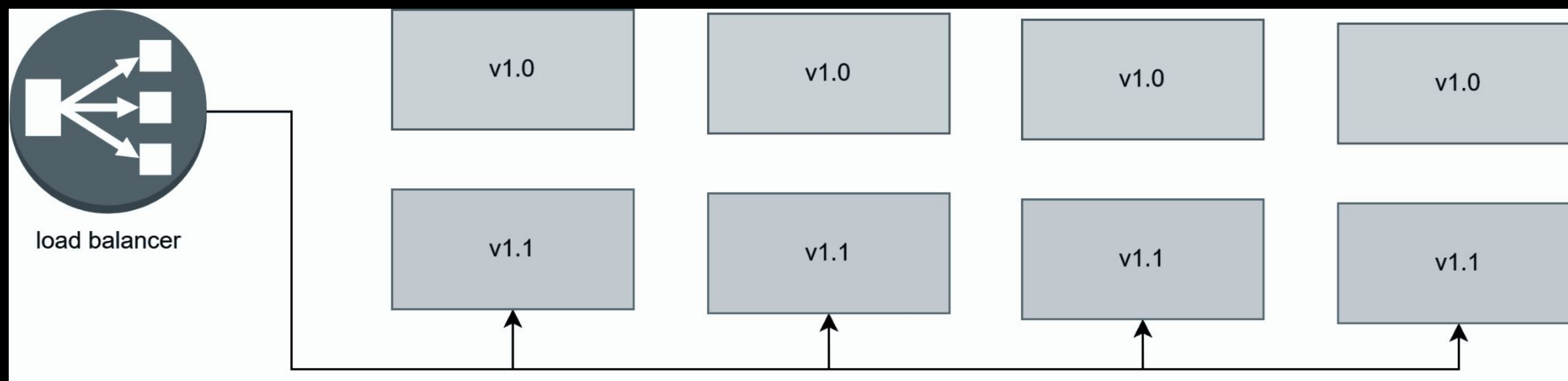- How does one replace previous versions of an application with new versions?

Blue-Green Deployment: Solution

- Blue environment: This is the live production environment currently serving all user traffic.
- Green environment: This is the idle environment to which the new version of the application is deployed.
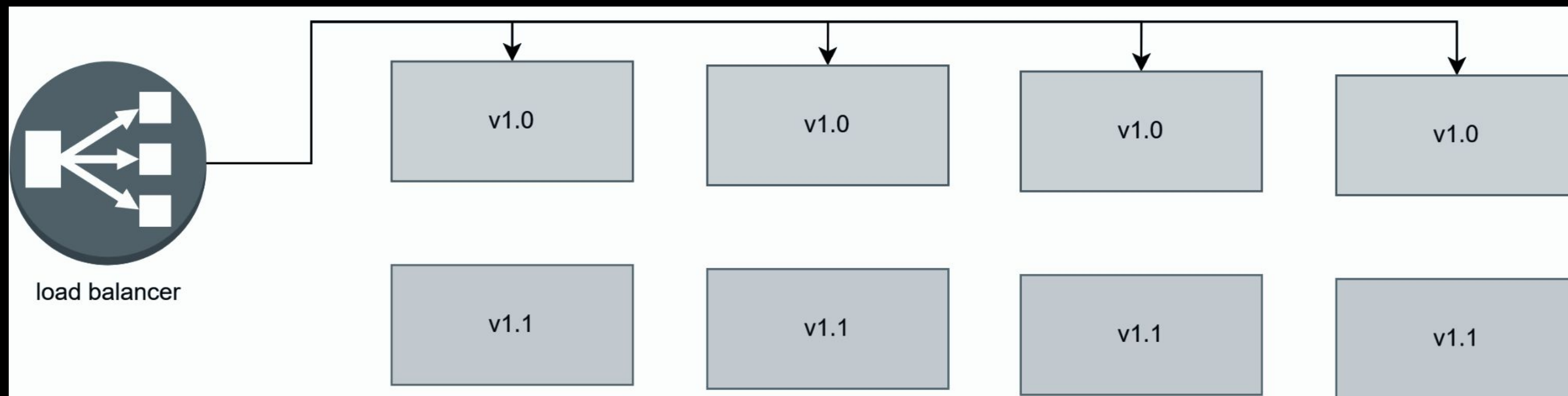
Blue-Green Deployment: Solution

- The new version is tested in the Green environment.
- Once testing is completed and the new version is verified, the router is reconfigured to switch user traffic from the Blue environment to the Green environment.
- If everything runs smoothly, the Blue environment is idled. However, if something goes wrong, you can roll back by switching user traffic back to the Blue environment.

Canary Deployment: Problem

- How does one replace previous versions of an application with new versions?
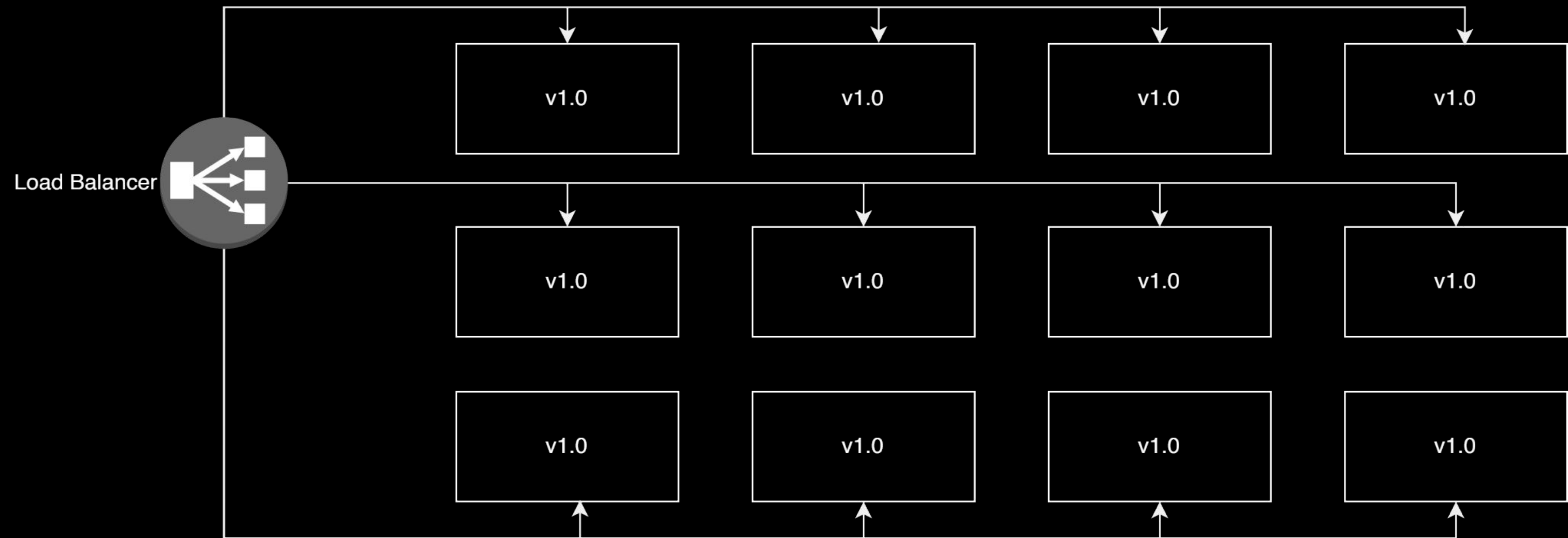
Canary Deployment: Solution

- A new version of the software is deployed to a small subset of users (the "canaries").
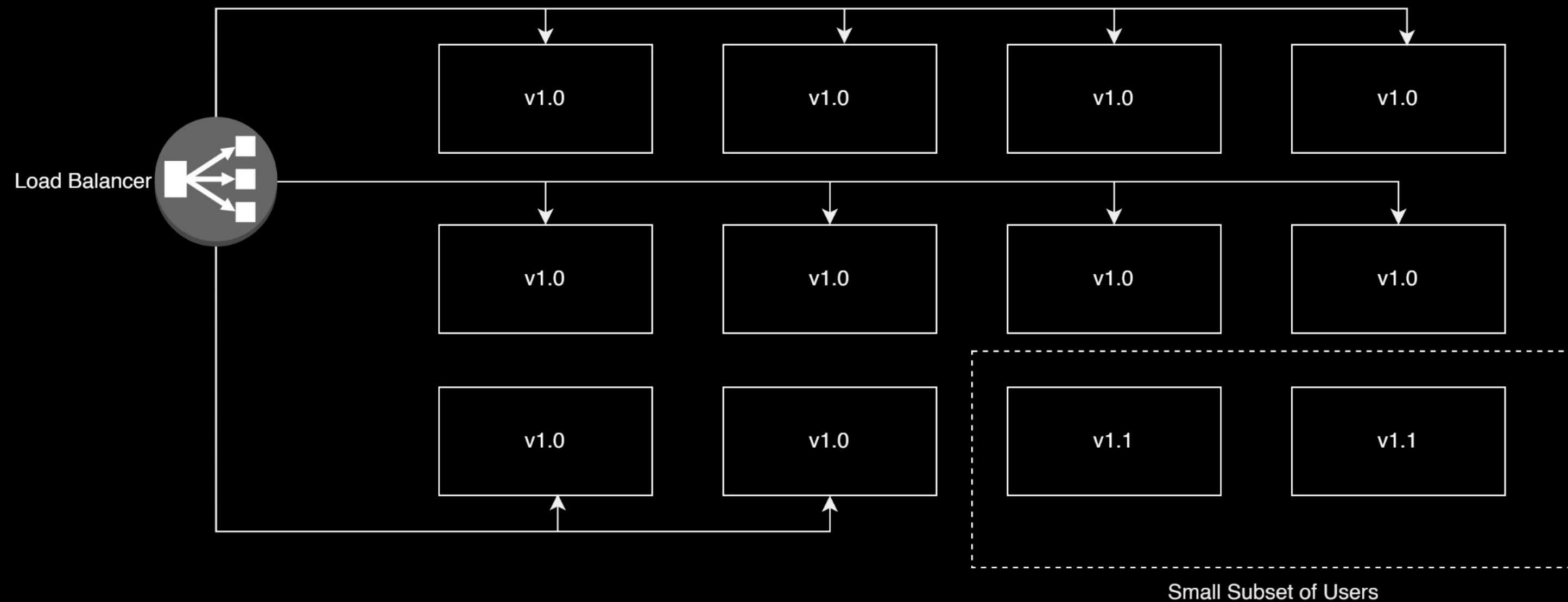
Canary Deployment: Solution

- This subset of users tests the new version and provides feedback.
- If the new version works well and is accepted, it is then rolled out to the rest of the users.

Load Balancer

v1.0 v1.0 v1.0 v1.0
v1.0 v1.0 v1.0 v1.0
v1.0 v1.0 v1.1 v1.1

Some users ~ 5%

Scatter-Gather: Problem

Scatter-Gather: Solution

- The pattern broadcasts a message to multiple recipients.
- Each recipient processes the message independently and sends a response.
- The Scatter-Gather pattern then aggregates all these responses into a single message.
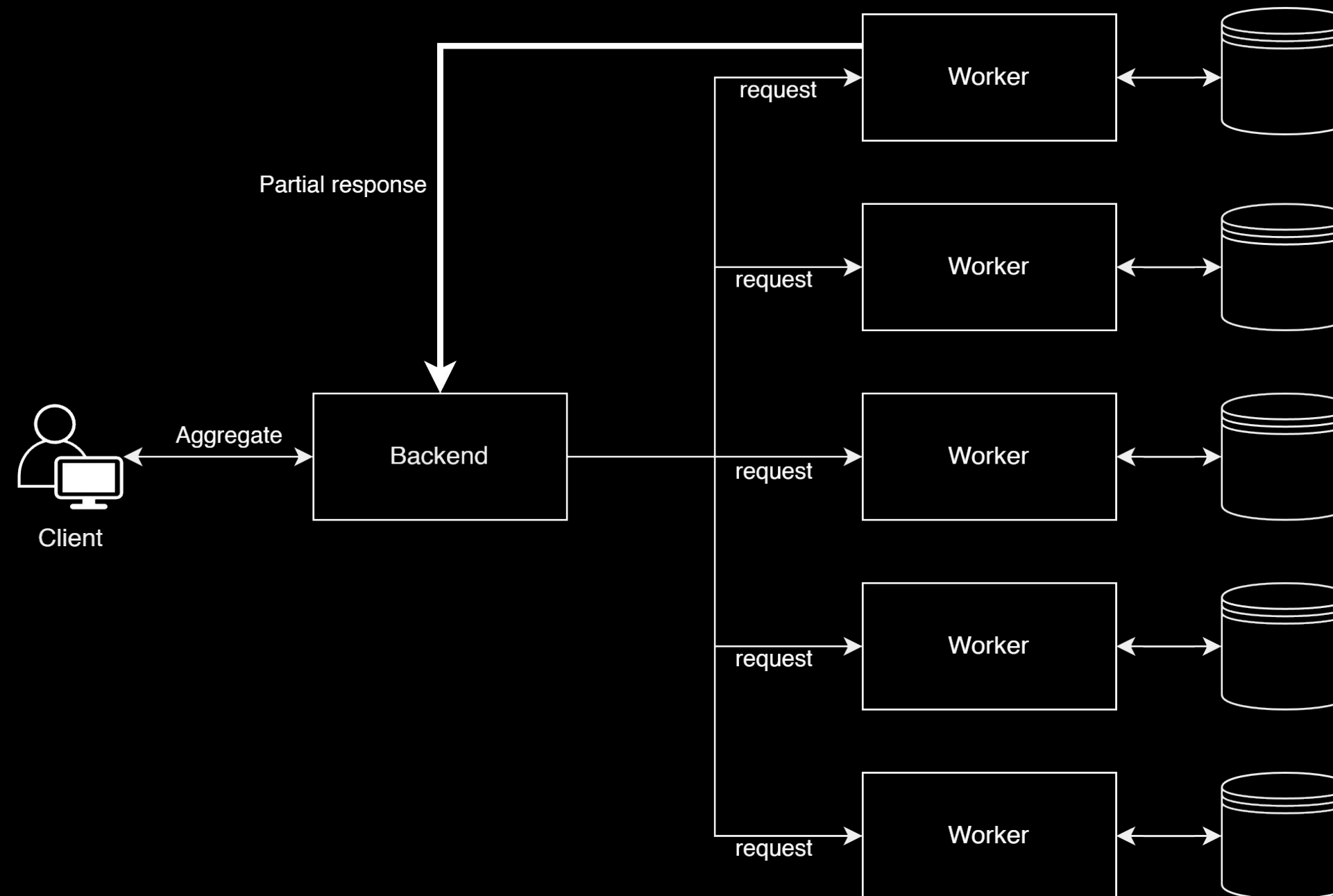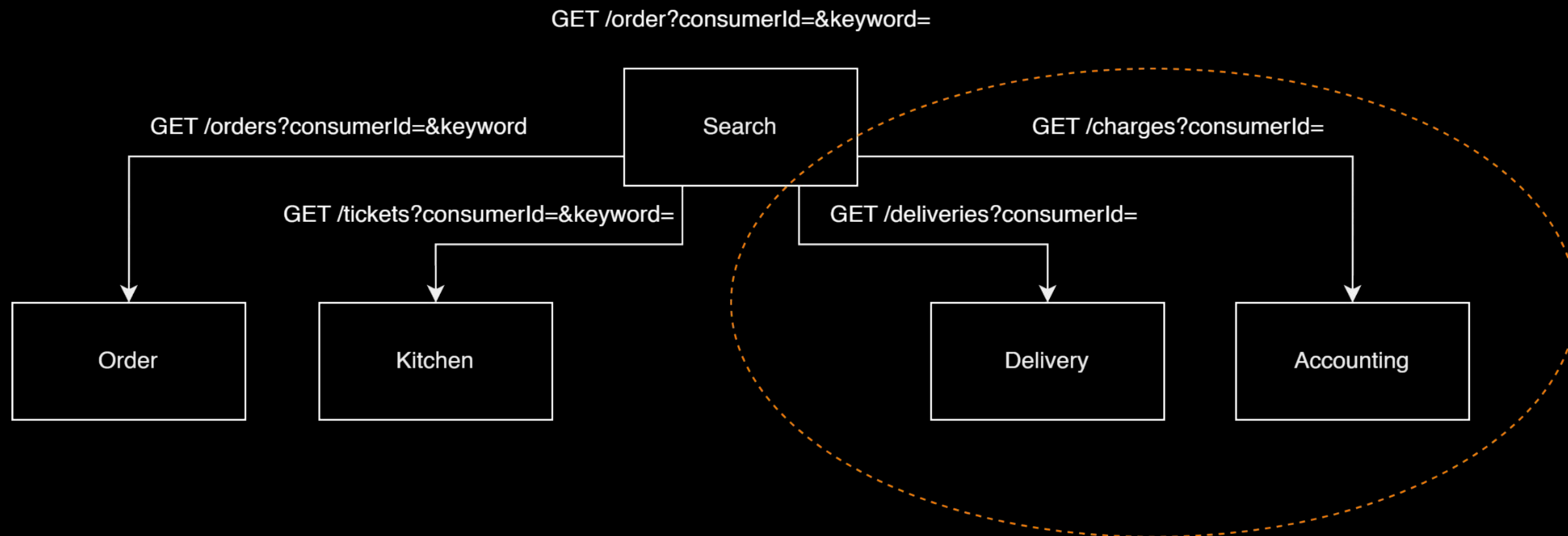
CQRS: Problem

- Each service in a microservices architecture contains only a subset of the total data.
- A developer could query each service and perform a join operation at the application level, but this method is not optimal.
- Due to the large volume of data, it might not all fit in memory.

These services don't store the data needed for a keyword search, so will return all of a consumer's orders.

CQRS: Solution

- It efficiently implements queries that retrieve data owned by multiple services
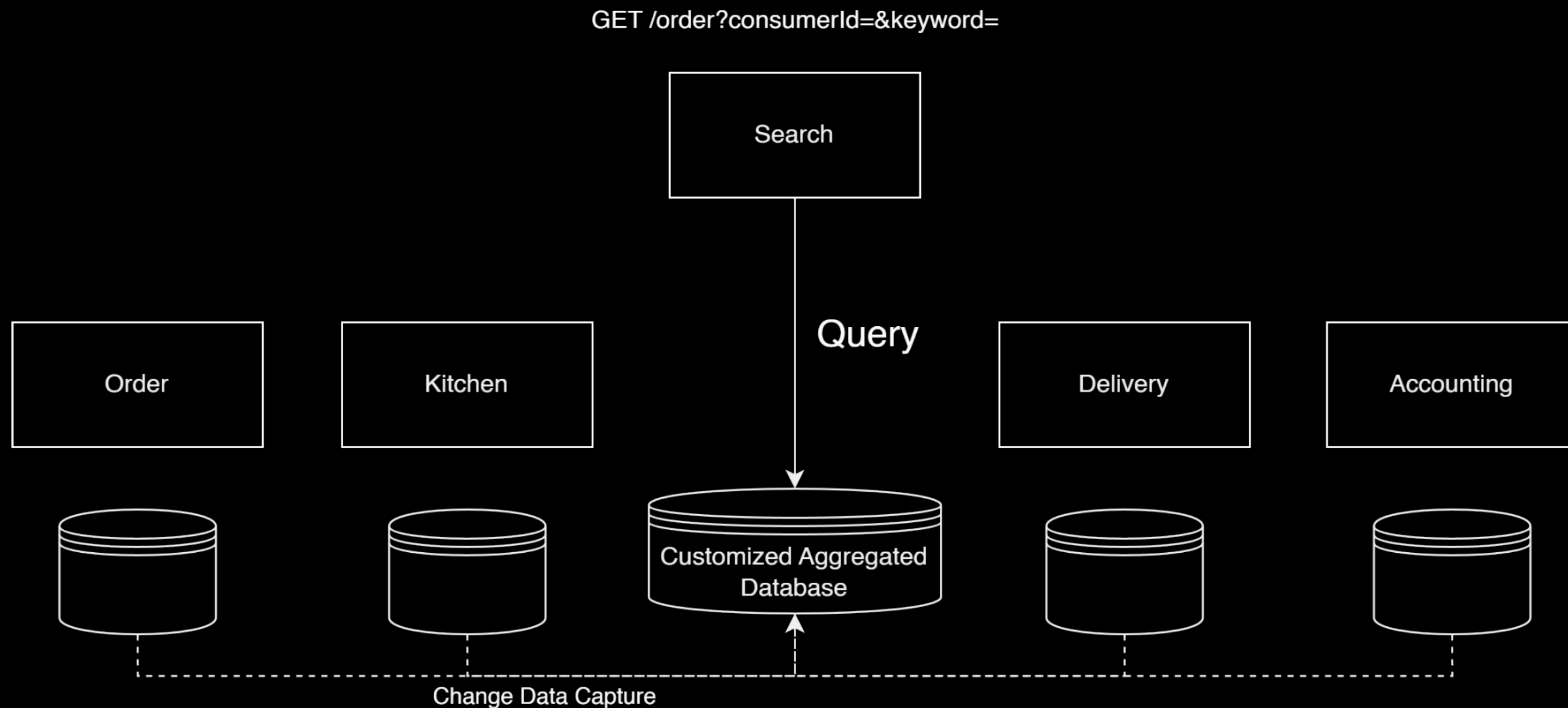
Further Resources

- youtube.com/@golemcourse