

Caching

2019

People matter, results count.

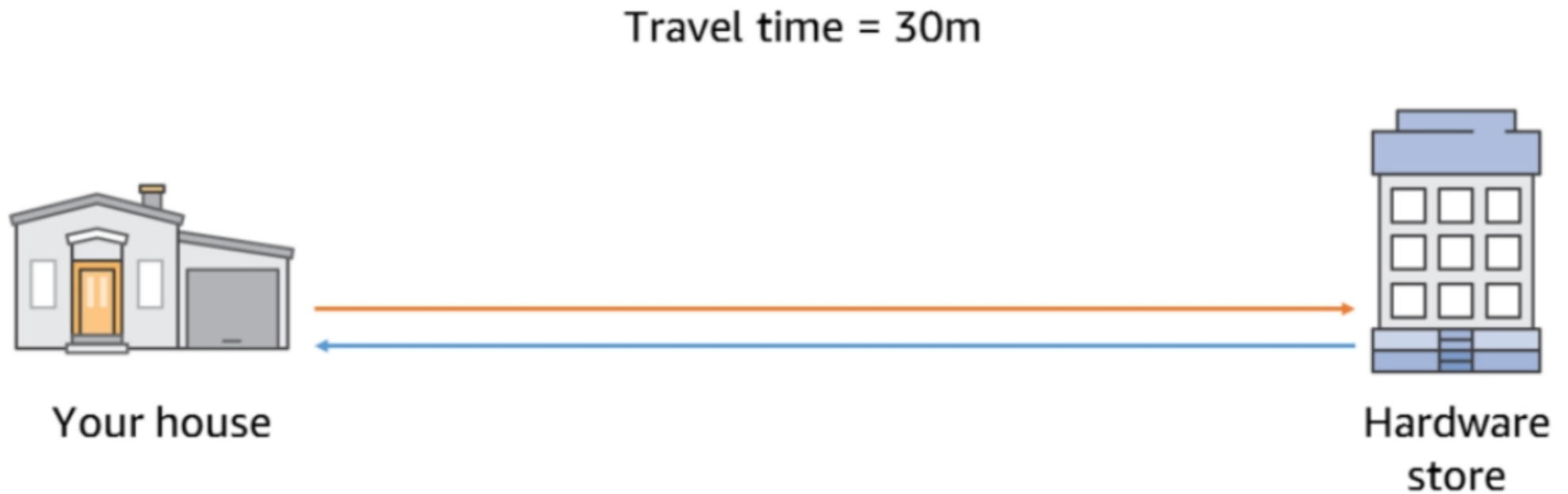
Agenda

- 1 Caching Overview
- 2 Caching on AWS
- 3 Caching Your Web Tier
- 4 Caching Your Database



Caching Overview

Familiar Caches



Familiar Caches

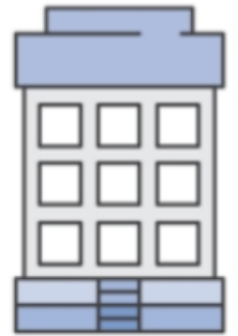
Travel time = 2m



Your house



Tool shed



Hardware store

What Should I Cache?



- Data that requires a slow and expensive query to acquire



- Relatively static and frequently accessed data - for example, a profile for your social media website



- Information that can be stale for some time, such as a publicly traded stock price

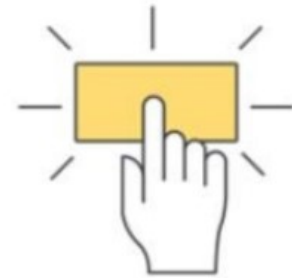
Benefits of Caching



Improve application speed



Alleviates the burden of time-consuming DB queries



Reduces response latency

Types of Caching Your Architecture

Client side



Client-side web browser

Server side



Web server



Reverse proxy cache

A hand in a dark suit sleeve holds a glowing, translucent cube. Above the hand, several semi-transparent rectangular boxes float in the air, each containing a different icon: a group of three people, a globe with arrows, a cloud, a line graph with an upward arrow, a smartphone, and a network diagram. The background is a solid light gray.

Caching on *AWS*

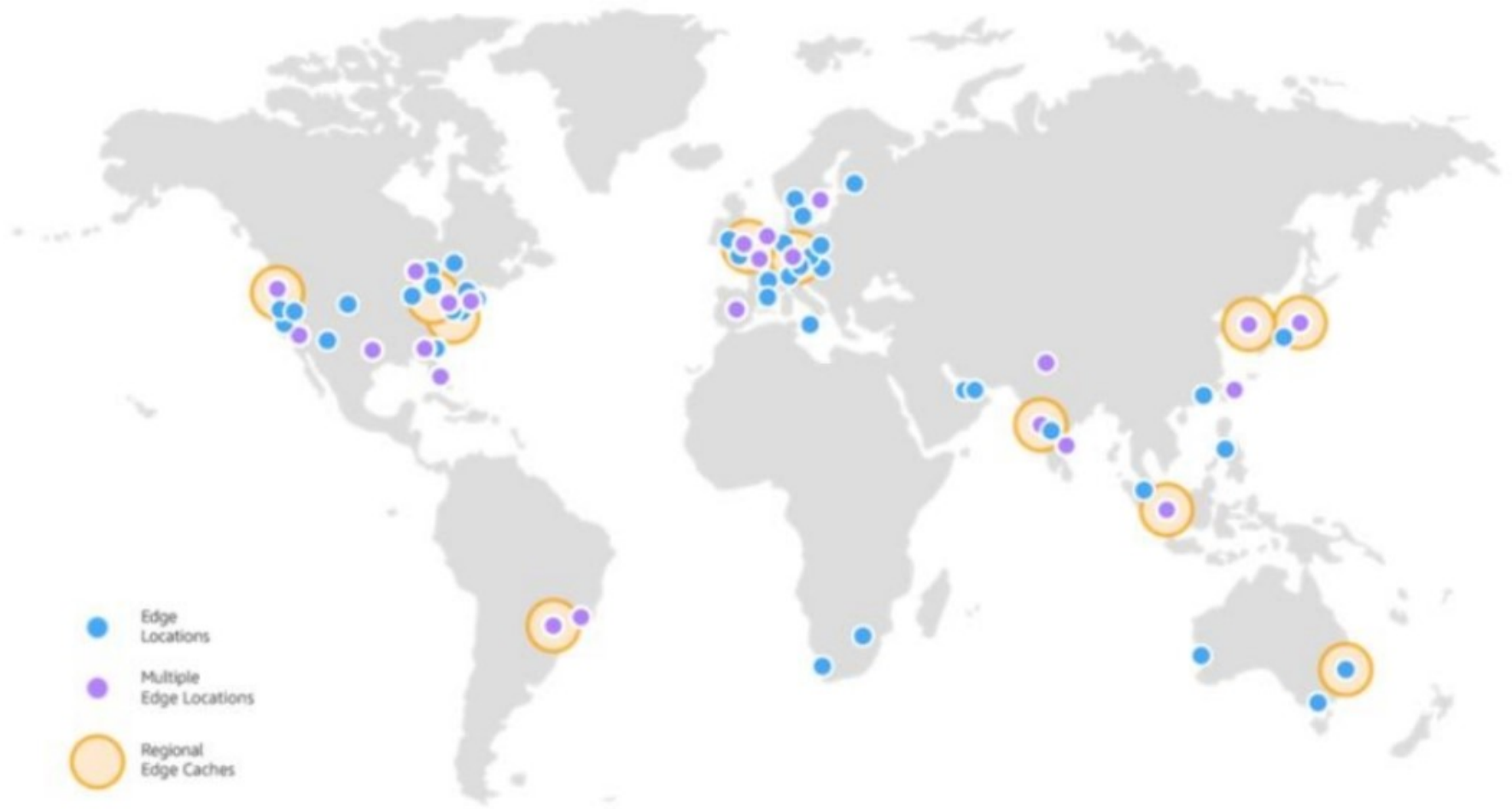
The Data Journey



Lets Talk about Edge Caching



Content Delivery Network (CDN)



Amazon Cloud Front



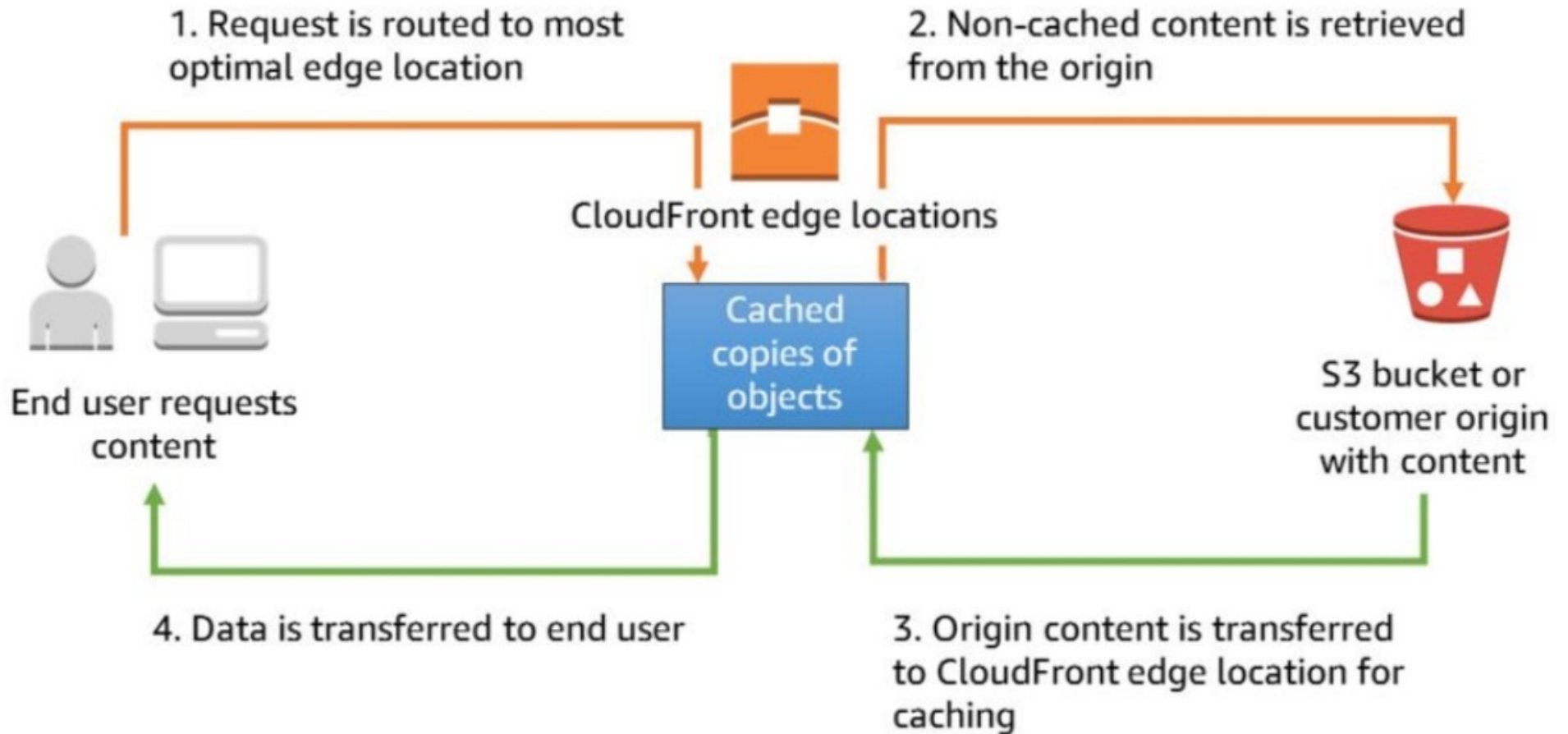
Amazon's global content delivery network (CDN)

Optimized for all delivery use cases with a multi-tier cache by default and extensive flexibility

Provides an additional layer of security for your architectures

Supports WebSocket protocol

How Cache works in Amazon CloudFront

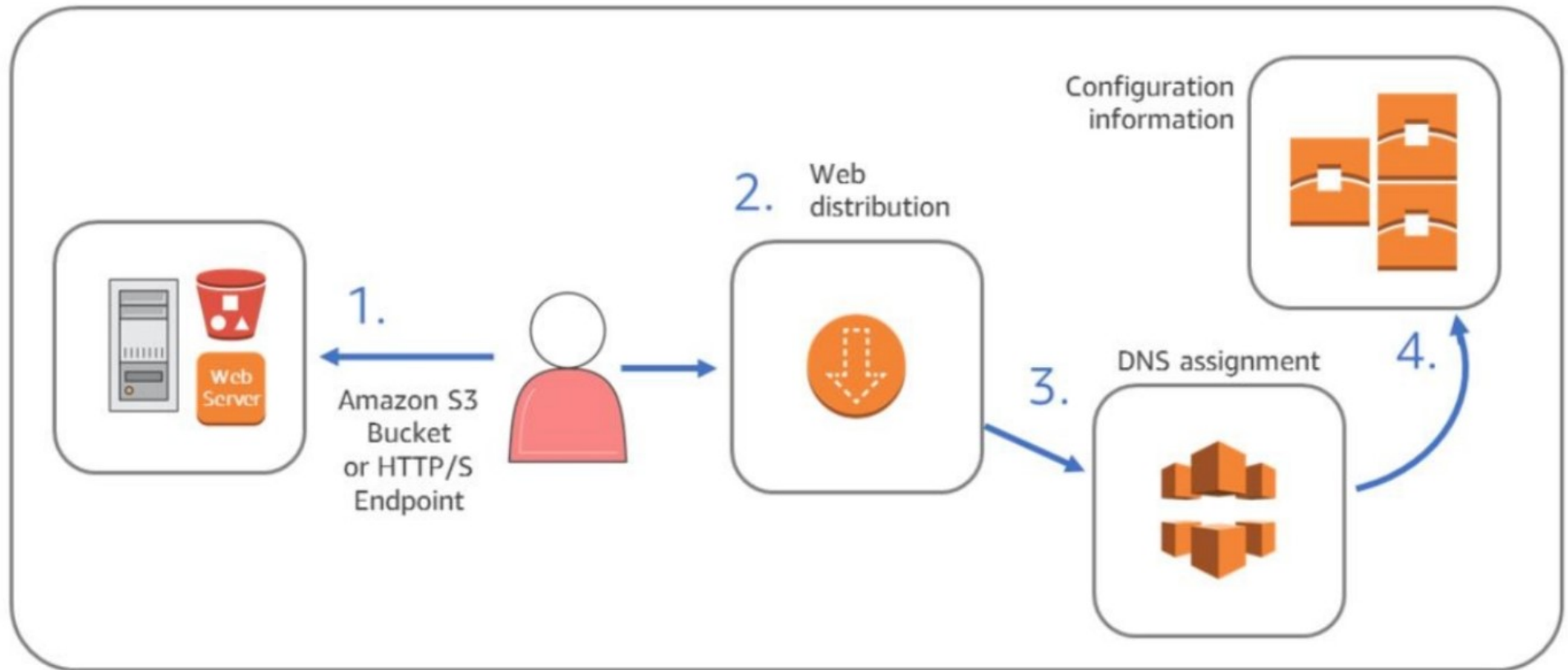


What Type of Content Can You Cache

The image shows a screenshot of the Amazon homepage with several annotations:

- Secure:** Points to the URL bar showing a secure connection (https://).
- Dynamic (Zero TTL):** Points to the search bar and the "Go" button, indicating that the search results are dynamic and have a zero time-to-live (TTL).
- Static (Can be cached!):** Points to a video player showing a person using a Kindle Fire HDX tablet, indicating that the video content is static and can be cached.
- User Input:** Points to the search bar, indicating that the search results are generated based on user input.
- Video:** Points to a small video player icon, indicating that the video content is static and can be cached.

How to Configure CloudFront



How to Expire Contents

Time to Live (TTL)

- Fixed period of time(expiration period)
- Set by you
- GET request to origin from CloudFront will use If-Modified-Since header

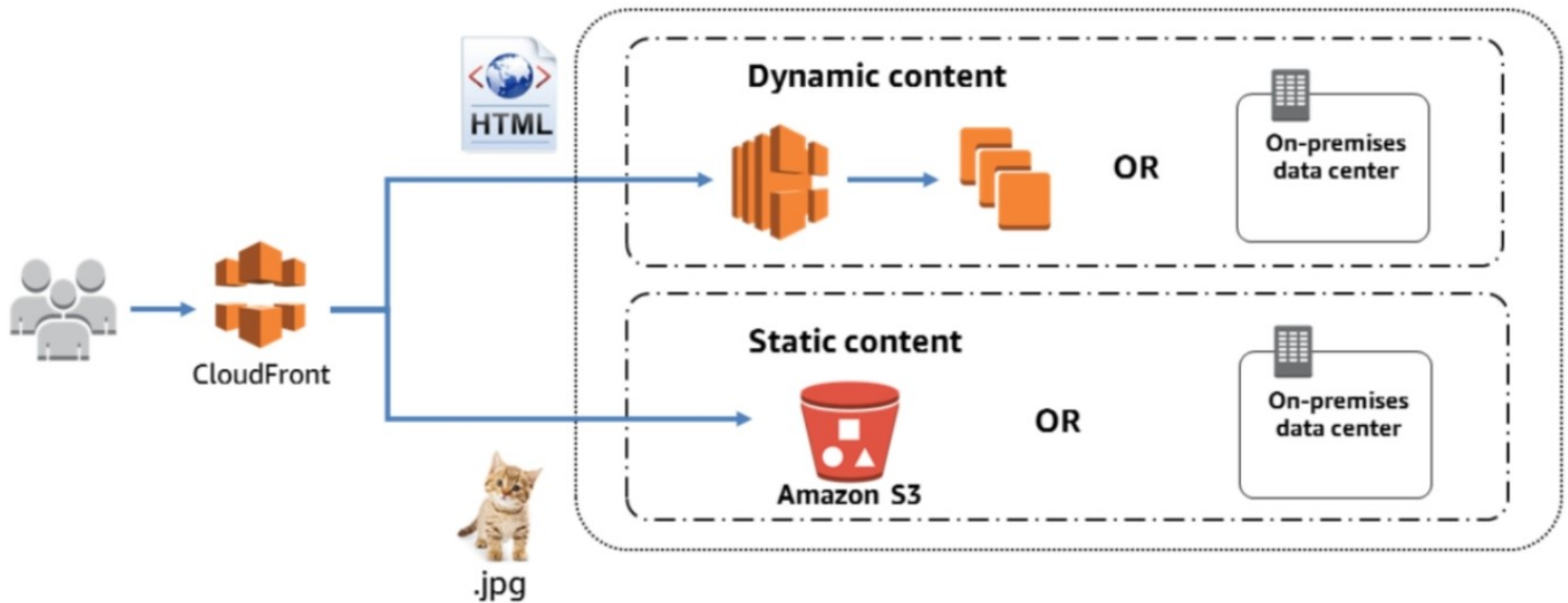
Change Object name

- Header-v1.jpg becomes Header-v2.jpg
- New name forces refresh

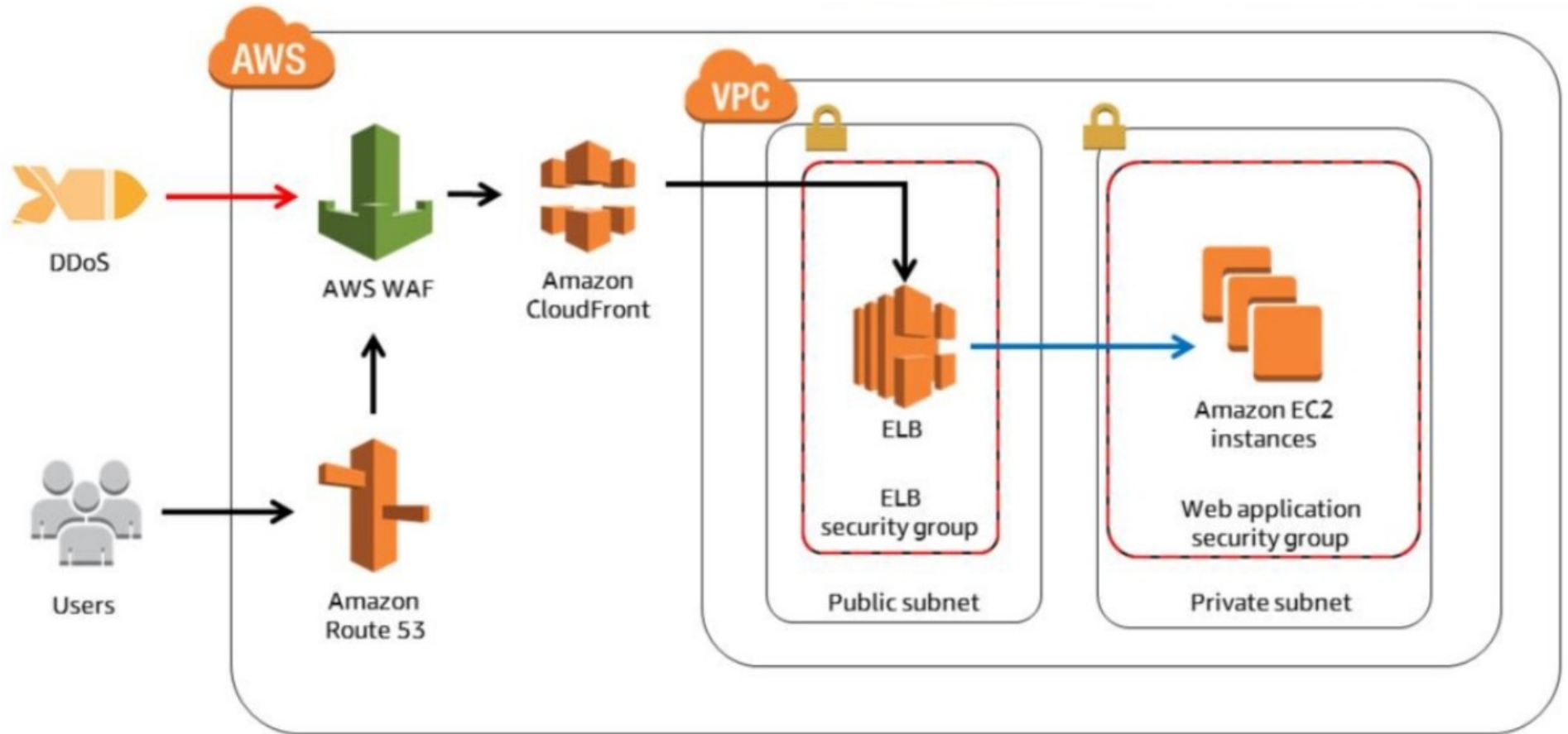
Invalidate object

- Last resort: very inefficient and very expensive

Architectural Example



DDO's Migration Example



The Data Journey





Caching Your Web Tier

Session Management

Elastic Load
Balancing



Sticky sessions

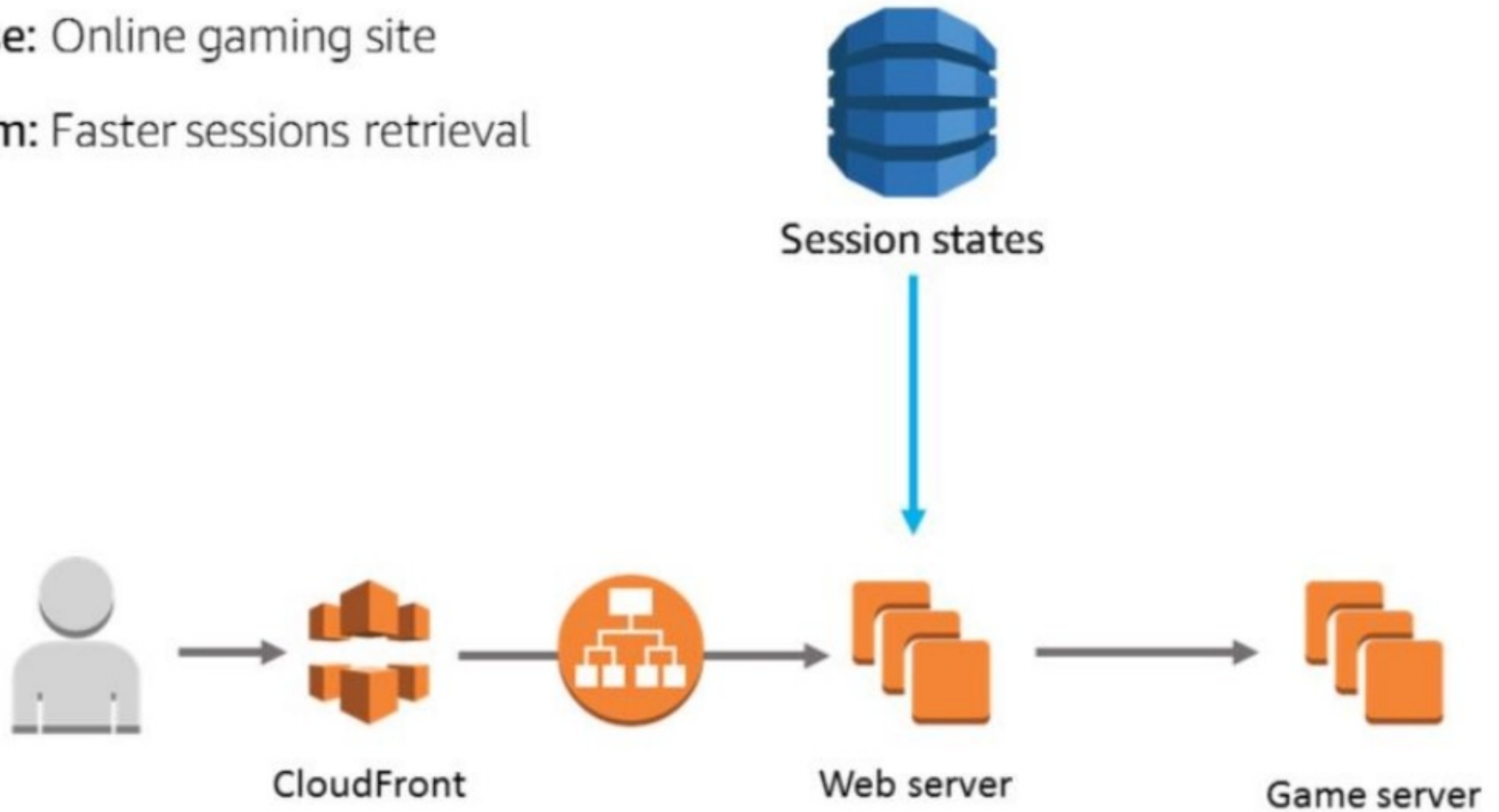
Allows you to route a request to the specific server managing the user's session

- Client-side cookies
- Cost-effective
- Speeds up retrieval of sessions

When using DynamoDB for State Information

Use case: Online gaming site

Problem: Faster sessions retrieval





Caching Your Database

The Data Journey



When Should You Start Caching Your Database



You are concerned about response times for your customer



You find heavy-hitting, high-volume requests inundating your database

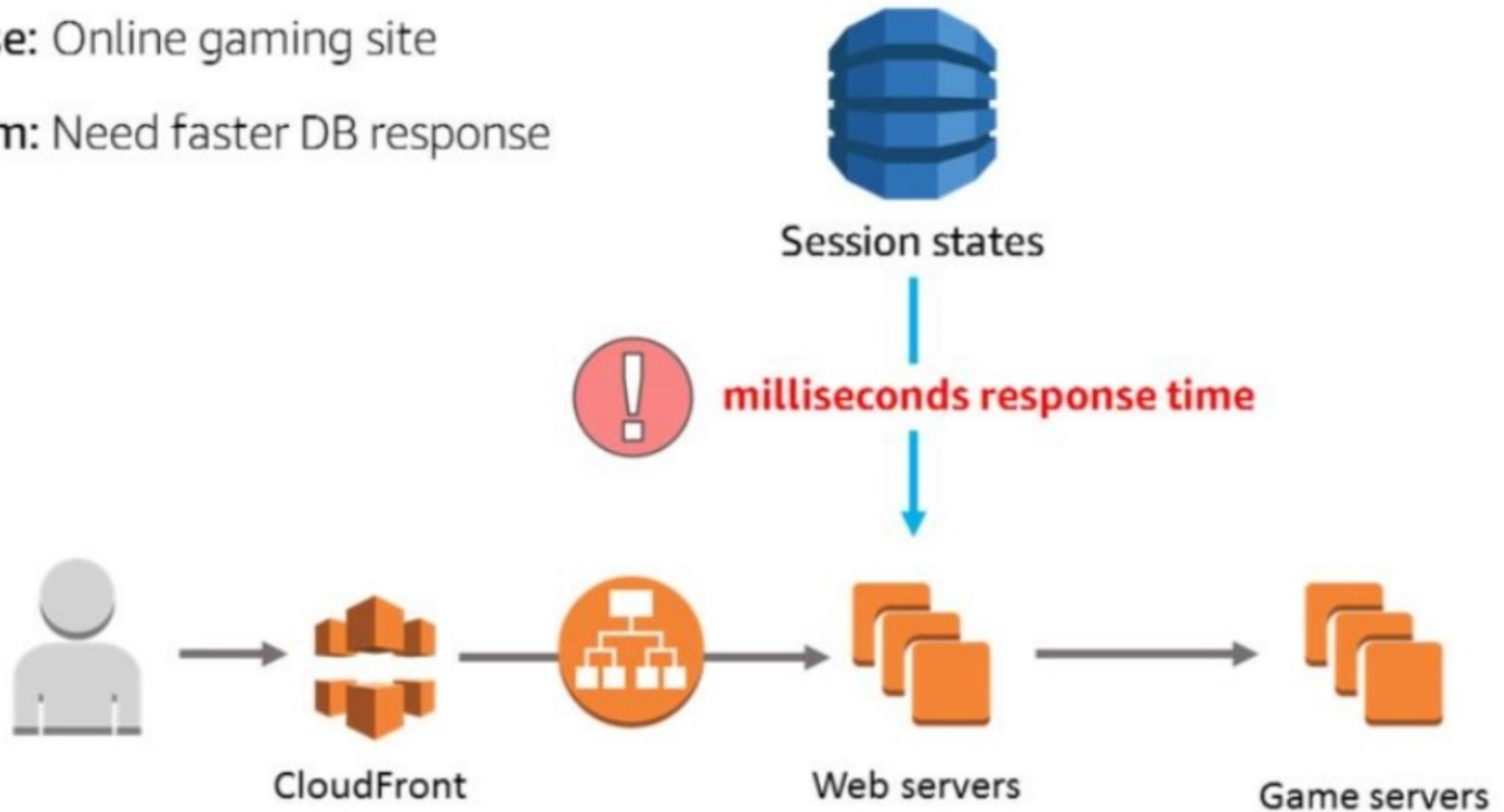


You would like to reduce your database costs

When using DynamoDB for State Information

Use case: Online gaming site

Problem: Need faster DB response



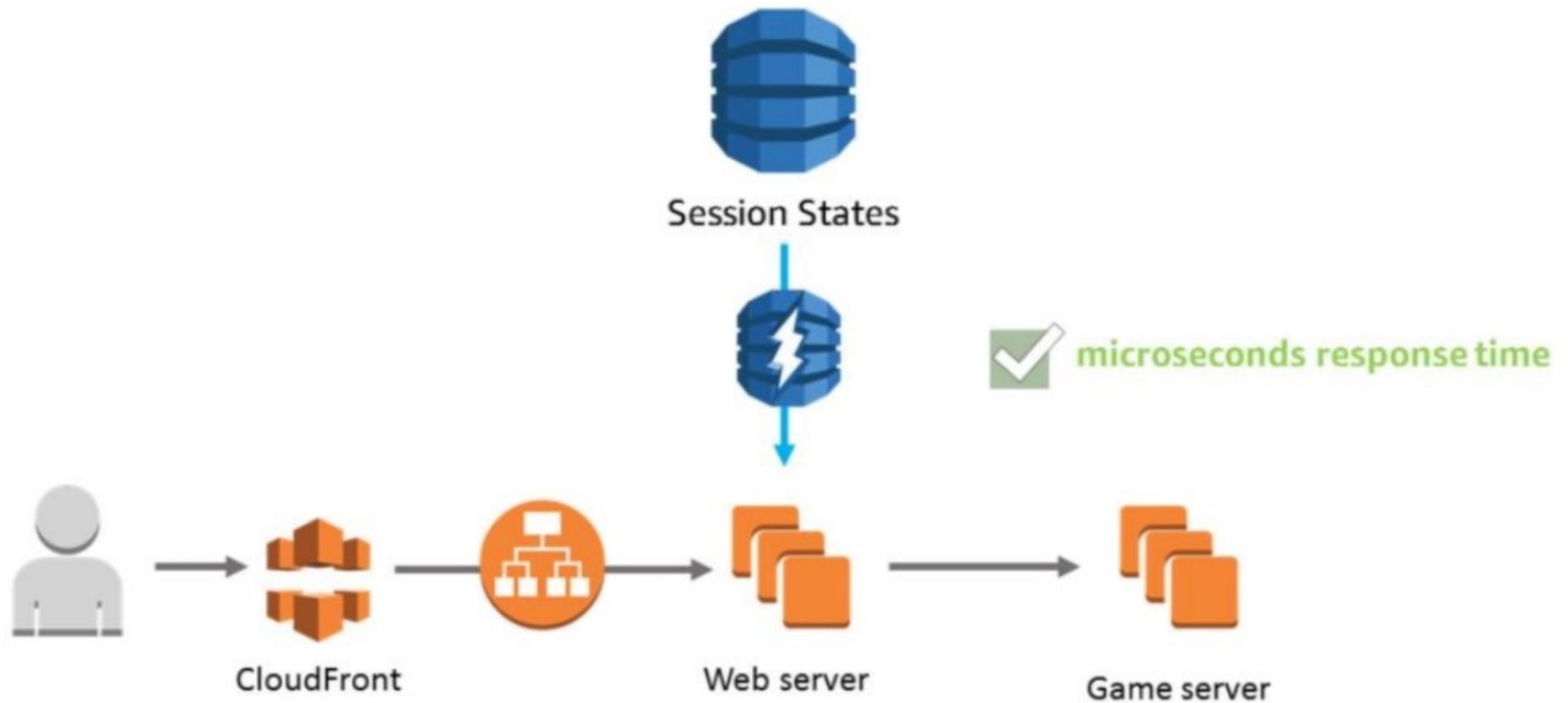
Amazon DynamoDB Accelerator



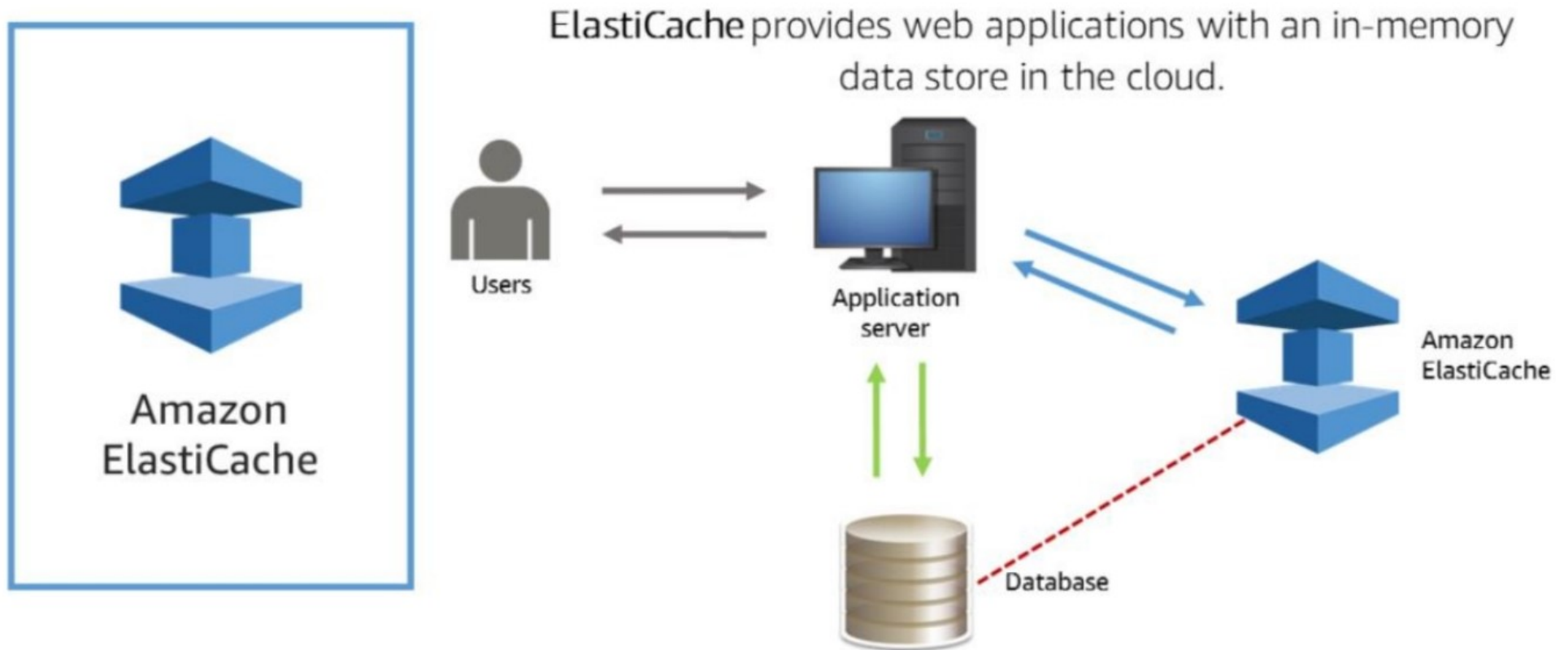
Amazon
DynamoDB
Accelerator

- **Extreme Performance**
- **Highly Scalable**
- **Fully Managed**
- **API Compatible with DynamoDB**
- **Flexible**
- **Secure**

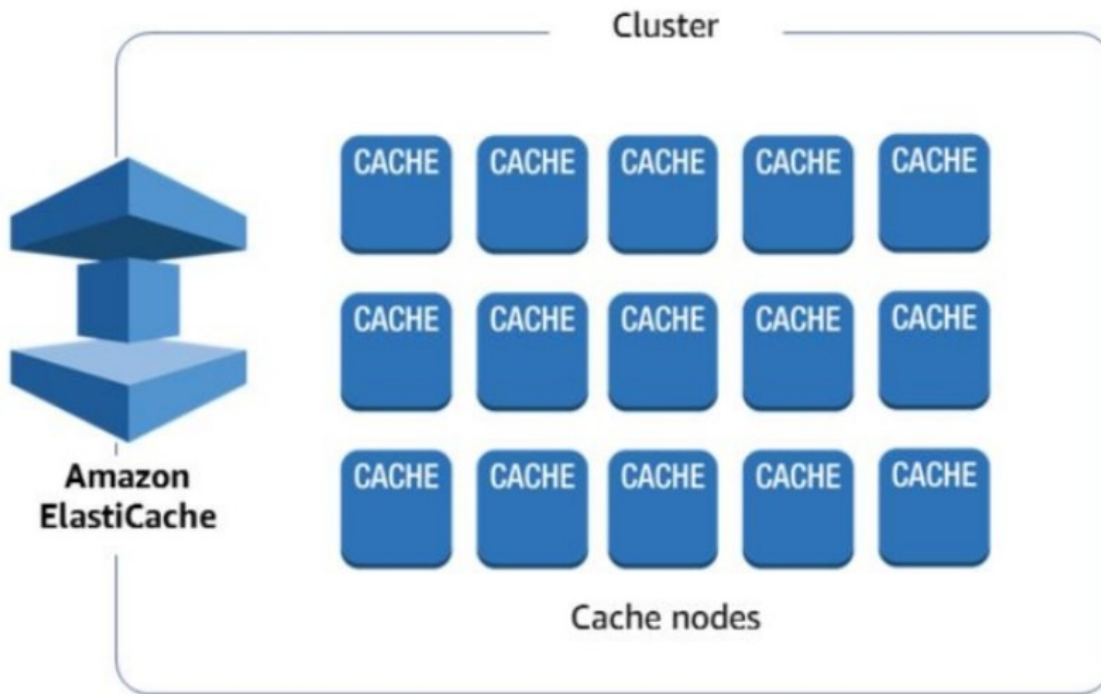
When using DynamoDB for State Information



Amazon ElasticCache

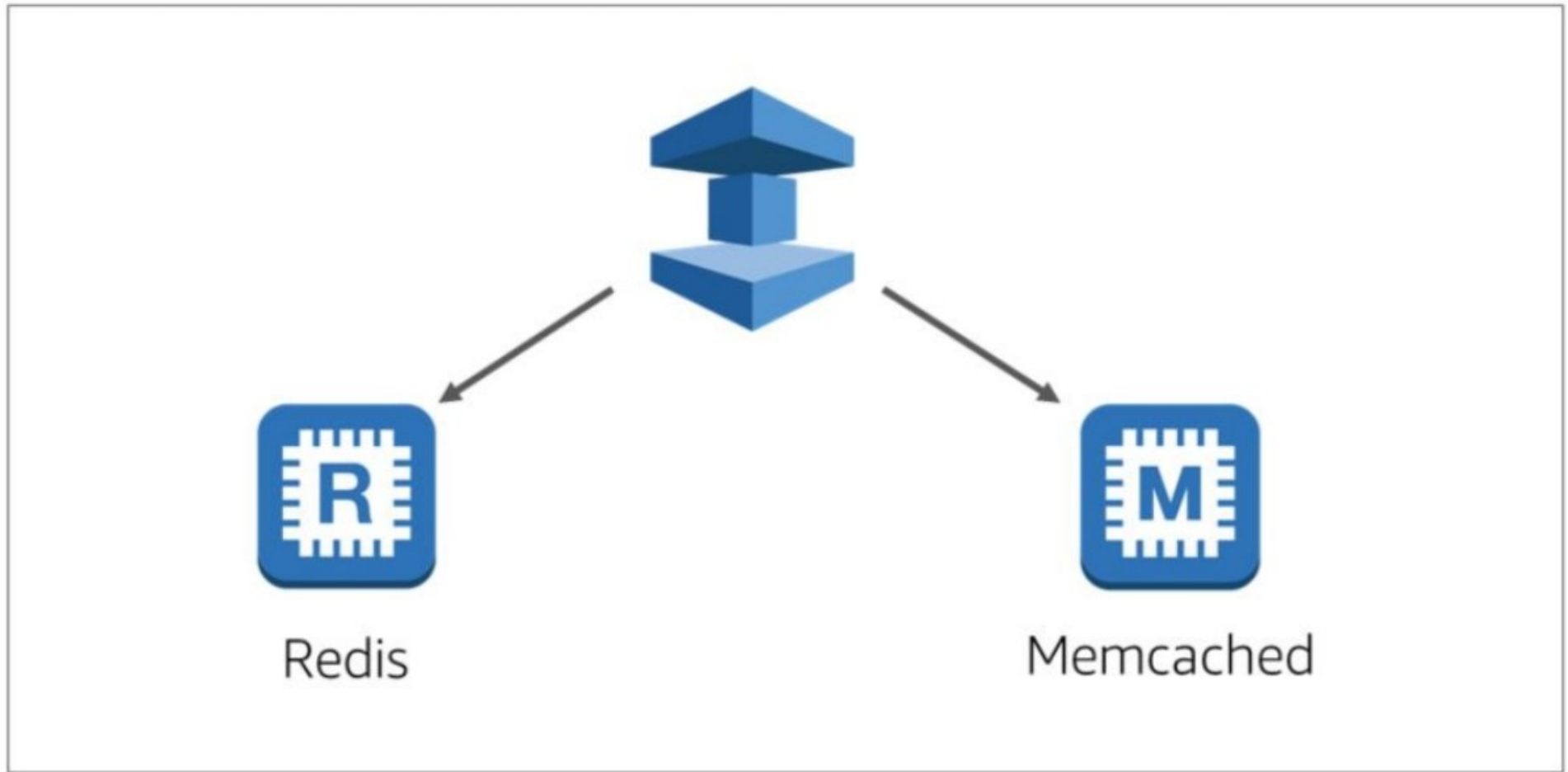


How Does It Works?



- A node is the smallest block of an ElasticCache deployment
- Each node has its own Domain Name Service(DNS) name and port
- Fully managed service

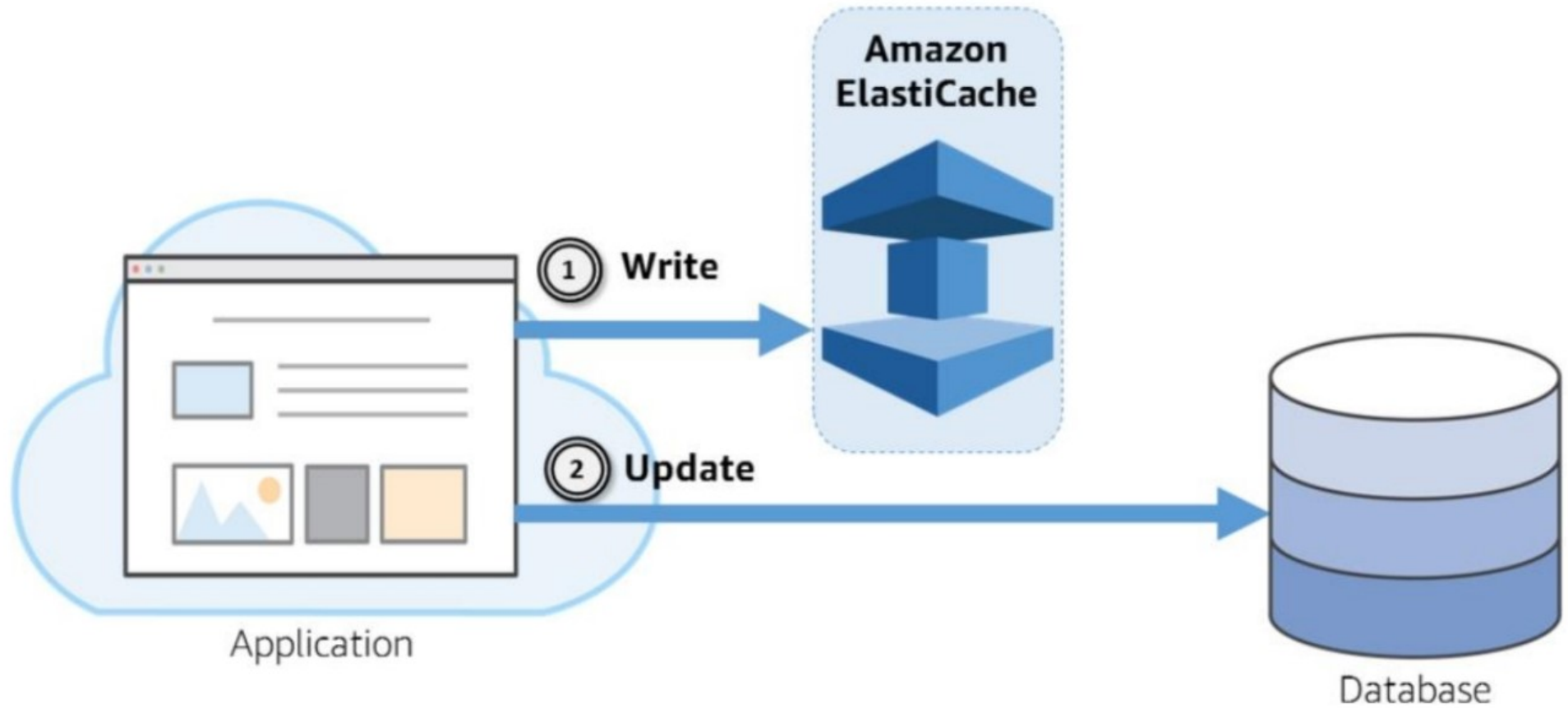
Redis and Memcached



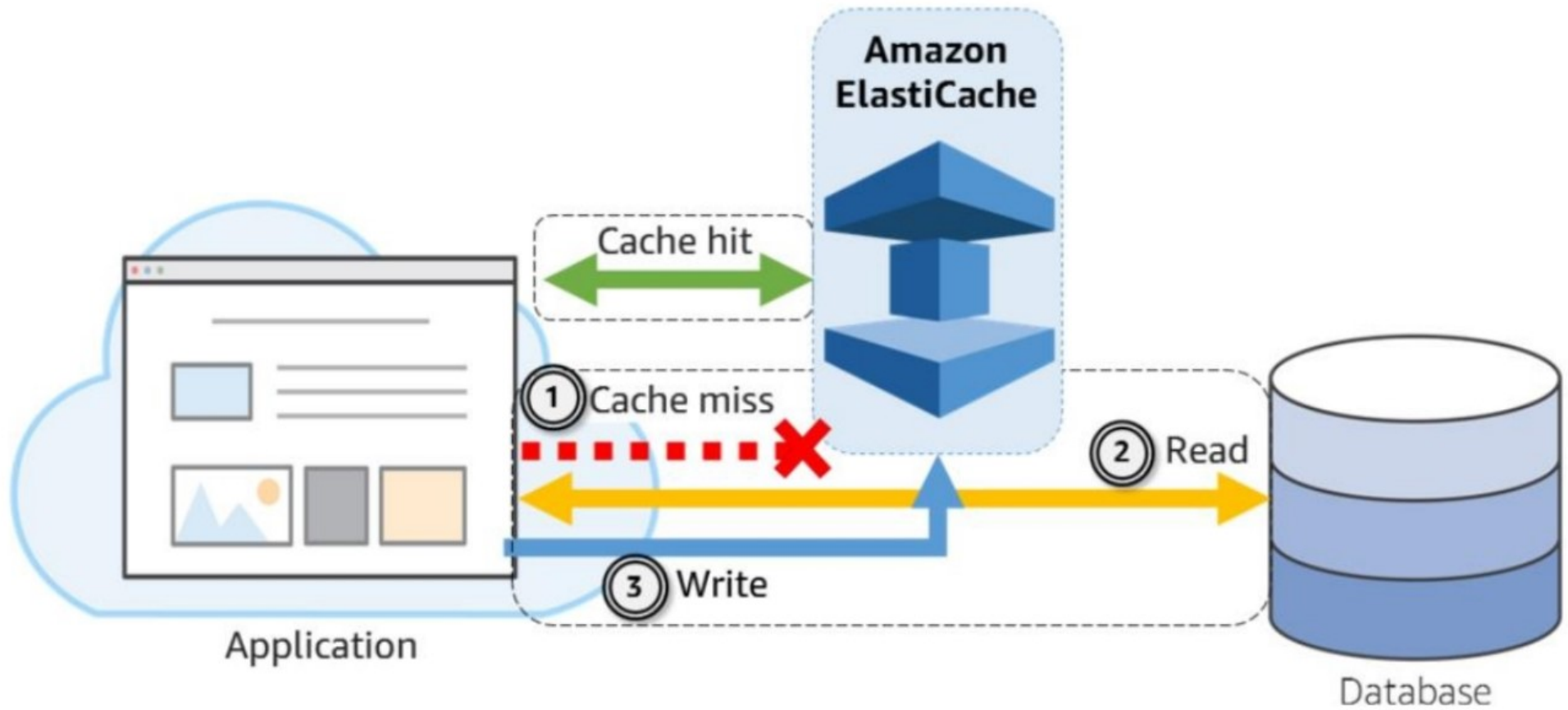
Comparison

	Memcached	Redis
Simple cache to offload DB burden	Yes	Yes
Ability to scale horizontally for writes/storage	Yes	No
Multi-threaded performance	Yes	No
Advanced data types	No	Yes
Sorting/ranking data sets	No	Yes
Pub/sub capability	No	Yes
Multi-Availability Zone with Auto Failover	No	Yes
Persistence	No	Yes

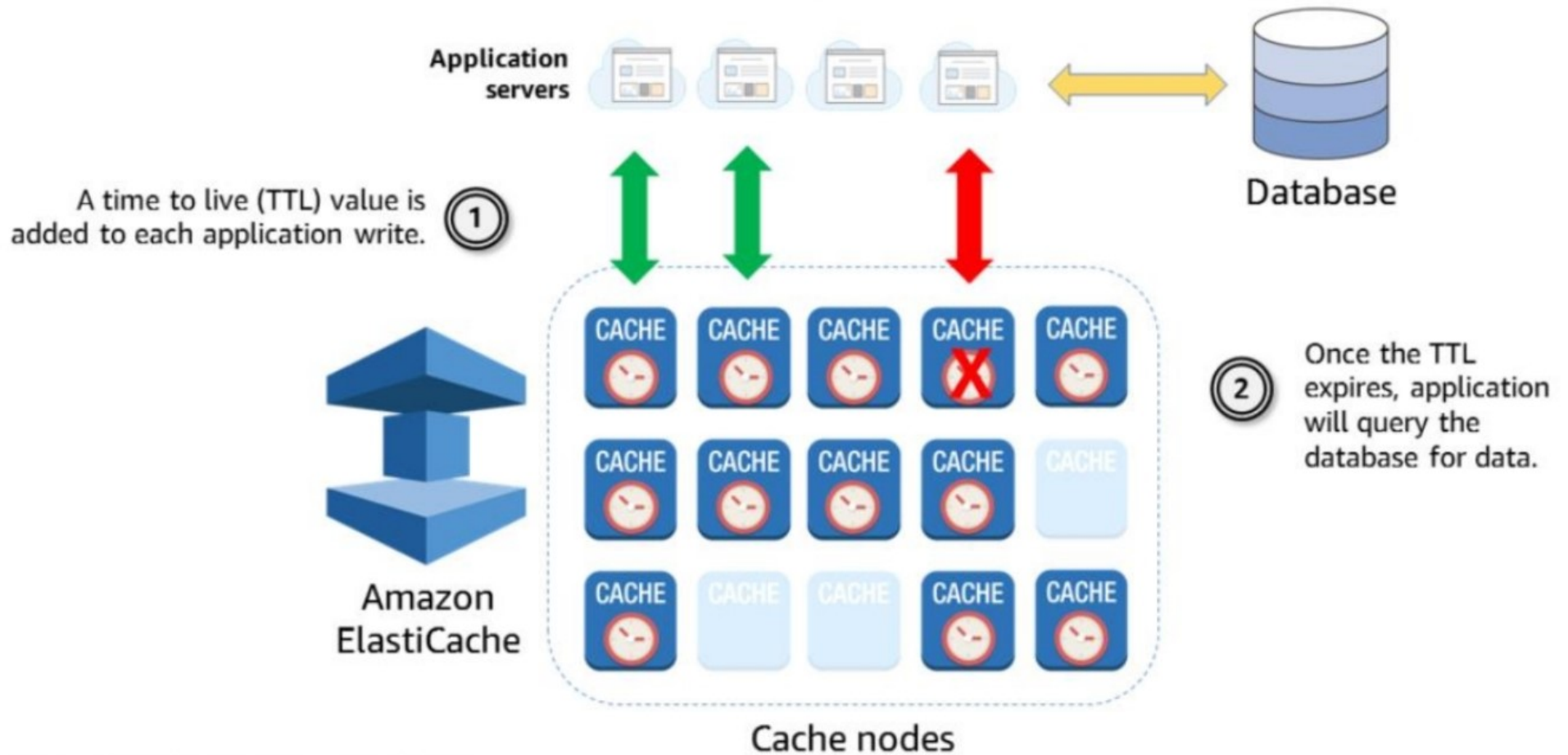
Write Through



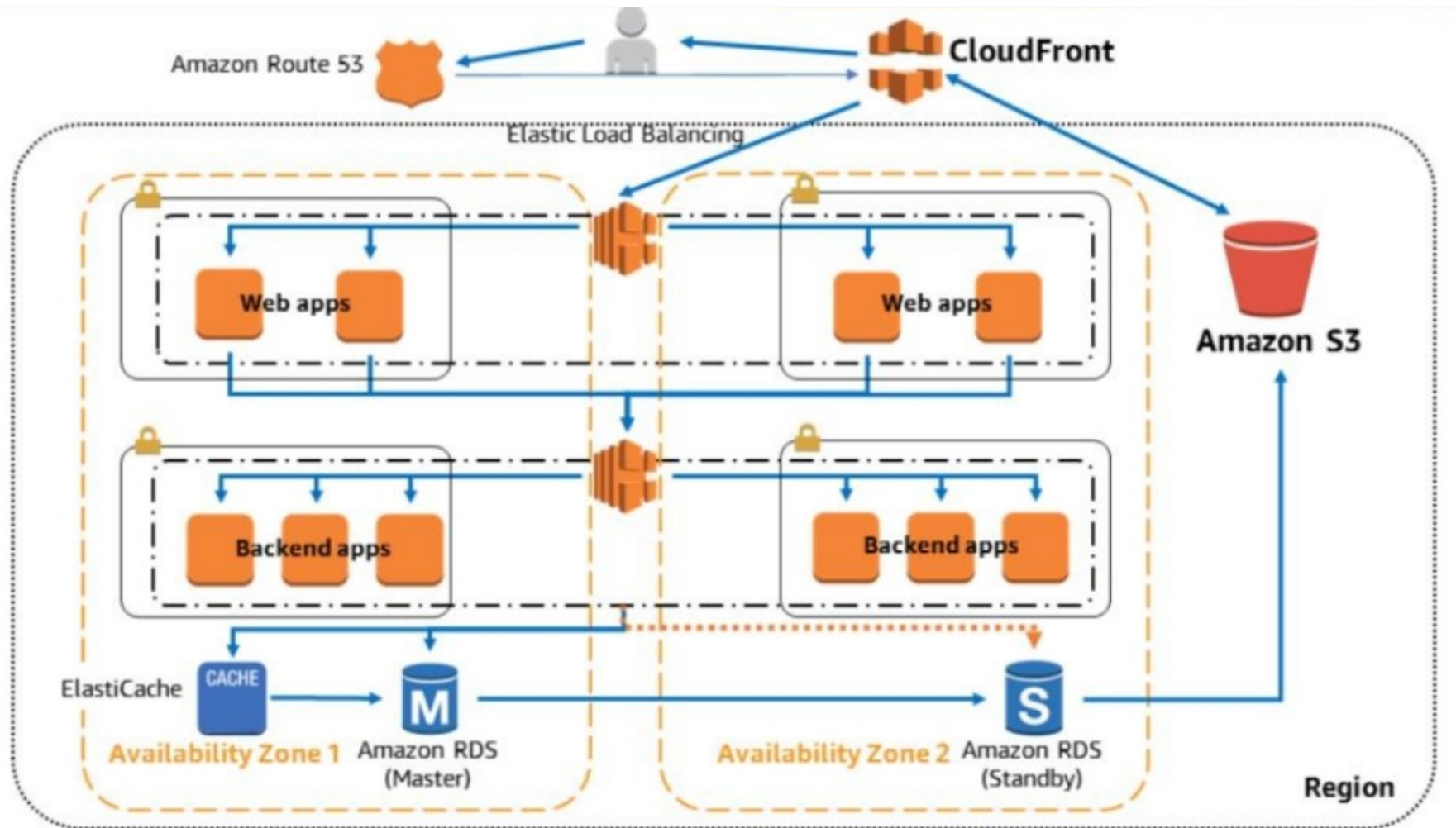
Lazy Loading



Adding TTL



AWS Cloud Architecture: Web Hosting



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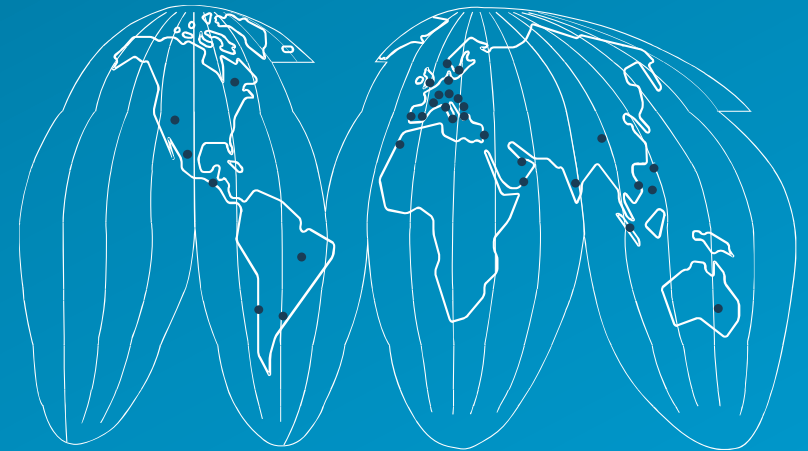


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