Caching

Module 10

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The architectural need

Your infrastructure's capacity is constantly being overloaded with the same requests. This is inefficiently increasing cost and latency.

Module Overview

- Caching Overview
- Edge Caching
- Database Caching

Caching Overview

Familiar Caches

Travel time = 30m

Your house

Hardware store

Familiar Caches

Travel time = 2m

Your house

Tool shed
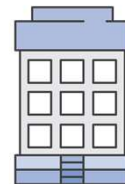
Hardware store

What Should I Cache?

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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

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Improve application speed

Alleviates the burden of time-consuming DB queries
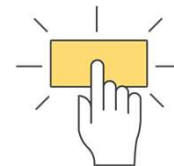
Reduces response latency

Types of Caching For Your Architecture

Client side

Server side

Client-side web browser
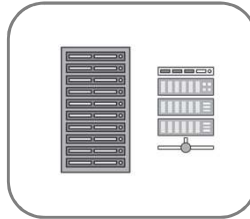
Web server

Reverse proxy cache

Caching On AWS

The Data Journey

Users   Internet/edge   Web   App   Database

Let's Talk About Edge Caching

Users   Internet/edge   Web   App   Database

Content Delivery Network (CDN)

- Edge Locations
- Multiple Edge Locations
- Regional Edge Caches
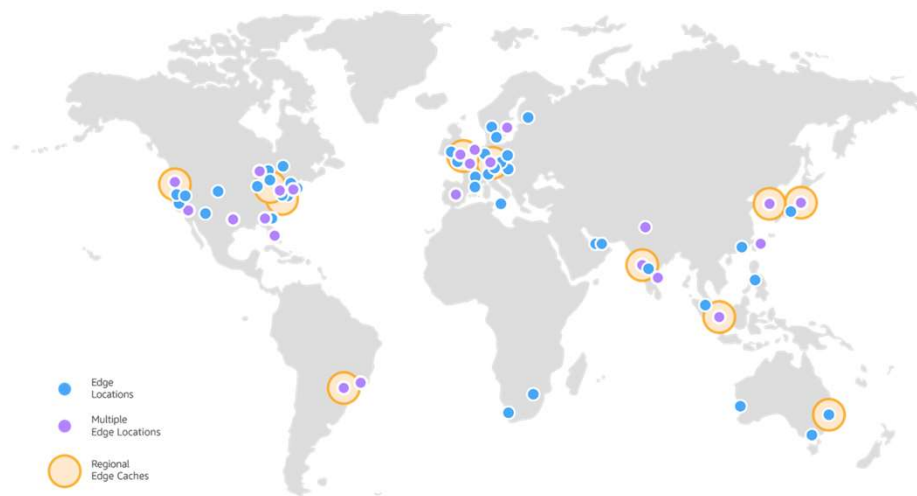
Amazon CloudFront

Amazon CloudFront

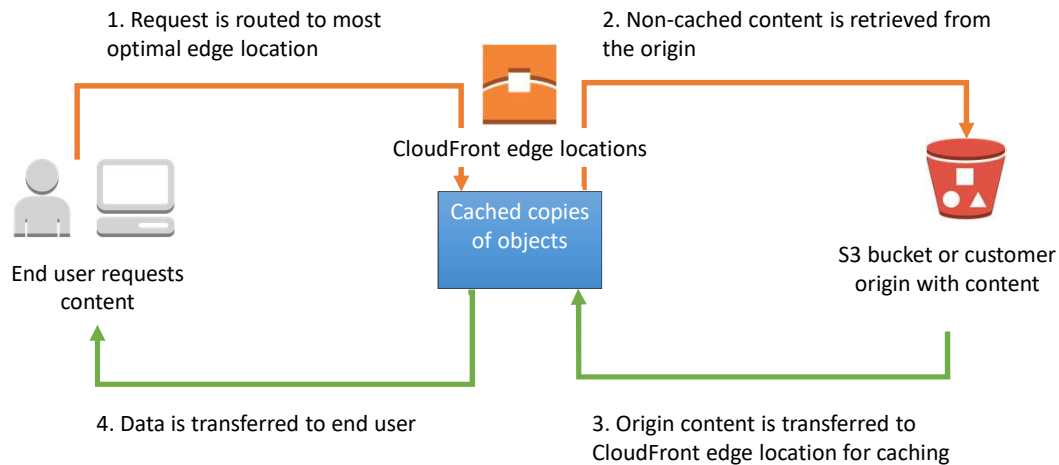Amazon's global content delivery network (CDN)

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 Caching Works in Amazon CloudFront

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1. Request is routed to most optimal edge location

2. Non-cached content is retrieved from the origin

CloudFront edge locations

Cached copies of objects

End user requests content

S3 bucket or customer origin with content

4. Data is transferred to end user

3. Origin content is transferred to CloudFront edge location for caching

How to Expire Contents

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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

The Data Journey

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Users → Internet/Edge → Web → App → Database

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Caching Your Database

The Data Journey

Users — Internet/edge — Web — App — Database

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

Amazon DynamoDB Accelerator

Amazon
DynamoDB
Accelerator

- Extreme performance

- Highly scalable
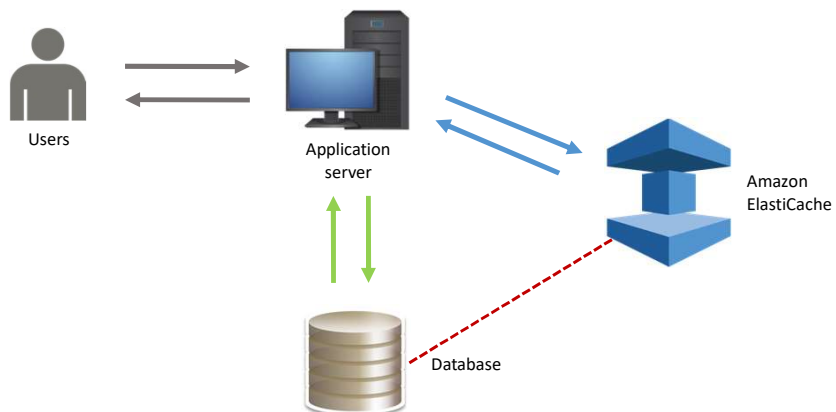
- Fully managed

- API compatible with DynamoDB

- Secure

Amazon ElastiCache

Amazon
ElastiCache

ElastiCache provides web applications with an in-memory data store in the cloud.

Users

Application
server

Amazon
ElastiCache

Database

Redis and Memcached

Redis

Memcached

Thank You