

DynamoDB, APIGateway and CloudFront



Todays' Agenda

- What is DynamoDB
- DynamoDB Architecture and It's Performance Features
- DynamoDB Indexes
- DynamoDB streams and Triggers
- APIGateway

DynamoDB

- NoSQL Public Database which can store Key/Value Pairs
- Completely Managed Service
- Performance can be increased based on the demand
- Regional Service (Across AZs)
- SSD backed storage
- Backup feature is available
- Can be restored to point in time
- Event Driven Integration

DynamoDB Tables Architecture

A **Table** is a grouping of **ITEMS** with the same **PRIMARY KEY**

Capacity (**speed**) is set on a table
(Writes) 1 **WCU** = 1KB per second
(Reads) 1 **RCU** = 4KB per second

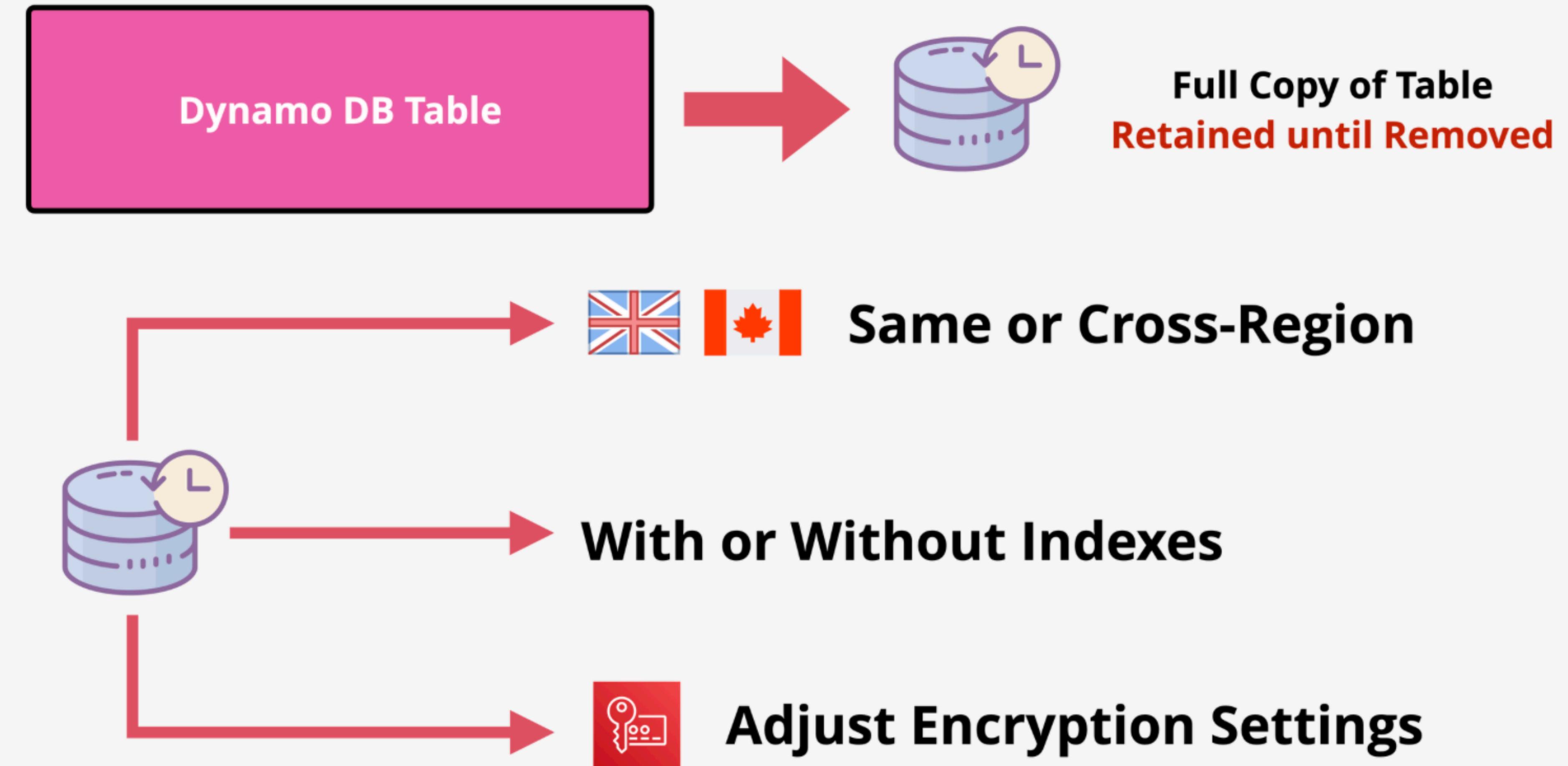


Simple (Partition) or Composite (Partition & Sort) PRIMARY KEY

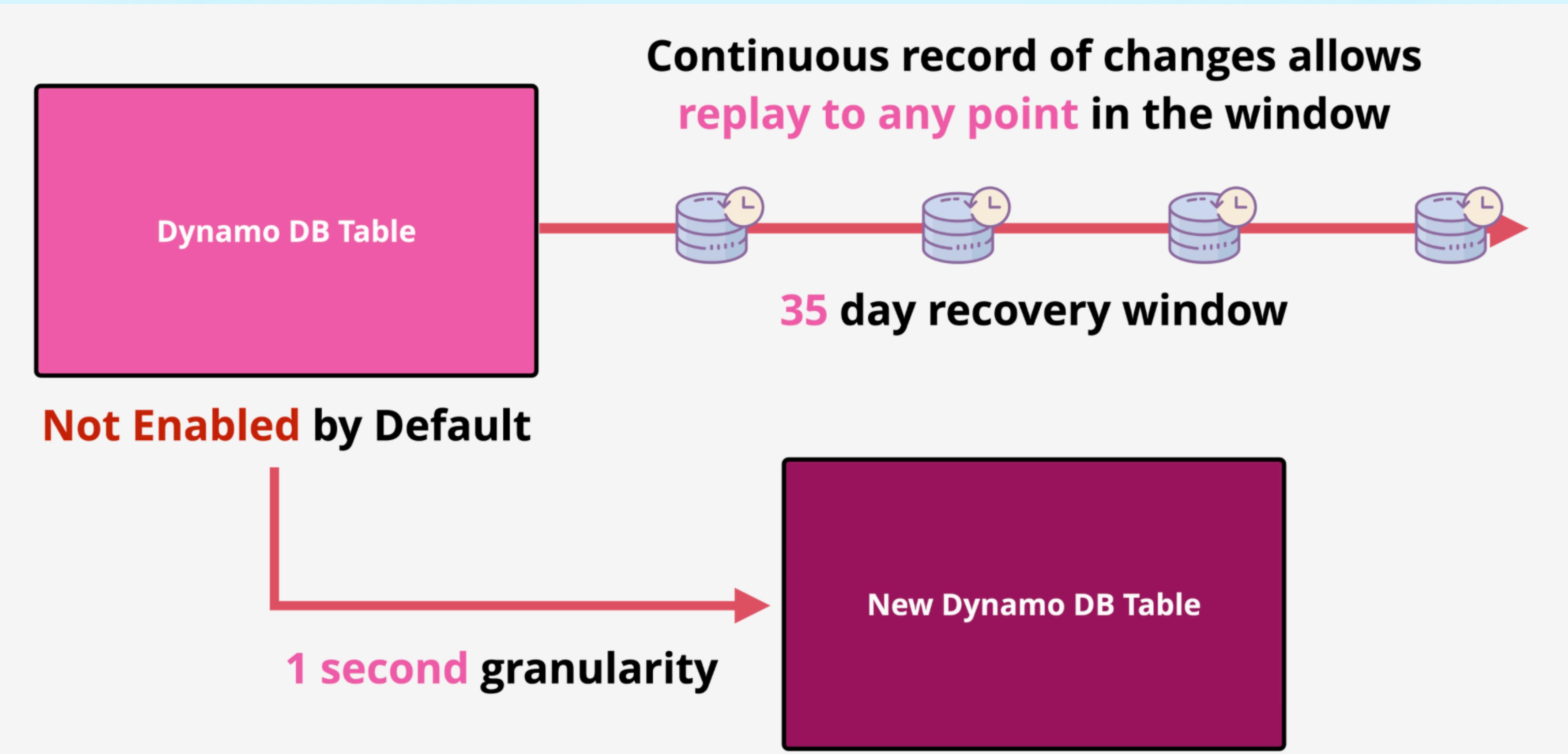
Each item **MUST** have a unique value for **PK** and **SK**.
Can have **none**, **all**, **mixture** or **different** attributes
(DDB has **no rigid attribute schema**)

DynamoDB Tables Architecture

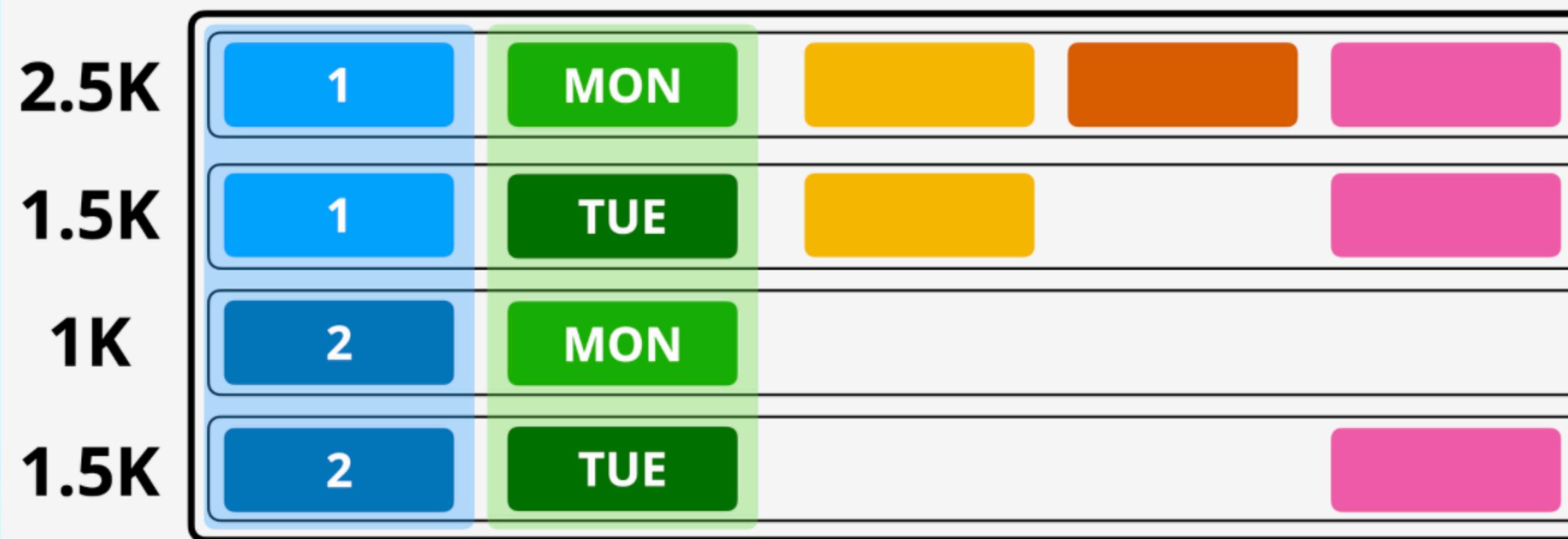
**On-Demand
Backup**



DynamoDB Tables Architecture

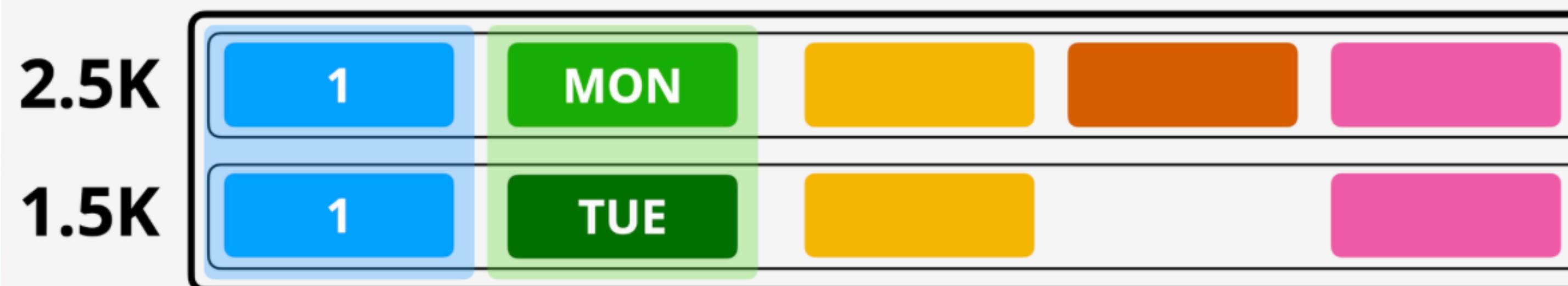


DynamoDB Tables Operations - Query

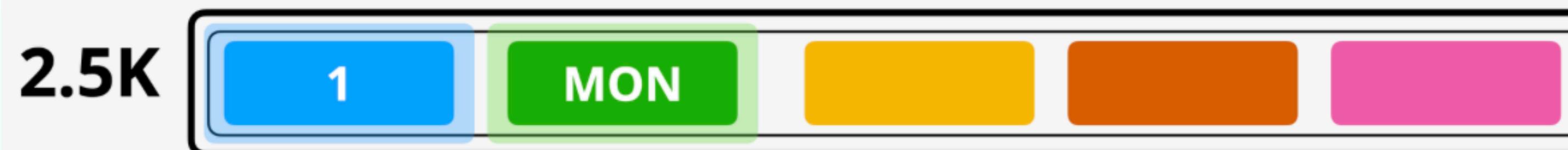


Query accepts a single PK value and optionally a SK or range. Capacity consumed is the size of all returned items. Further filtering discards data - capacity is still consumed.

Can ONLY query on PK or PK and SK



Query (PK=1)
Capacity consumed
2.5K + 1.5K = 4K = 1 RCU



Query (PK=1, Day=MON)
Capacity consumed 2.5K = 1 RCU

DynamoDB Tables Operations - Scan

5K	1	MON	Yellow	Orange	Pink
4K	1	TUE	Yellow		Pink
2K	2	MON			
3K	2	TUE			Pink

SCAN moves through a table consuming the capacity of every ITEM. You have complete control on what data is selected, any attributes can be used and any filters applied but SCAN consumes capacity for every ITEM scanned through

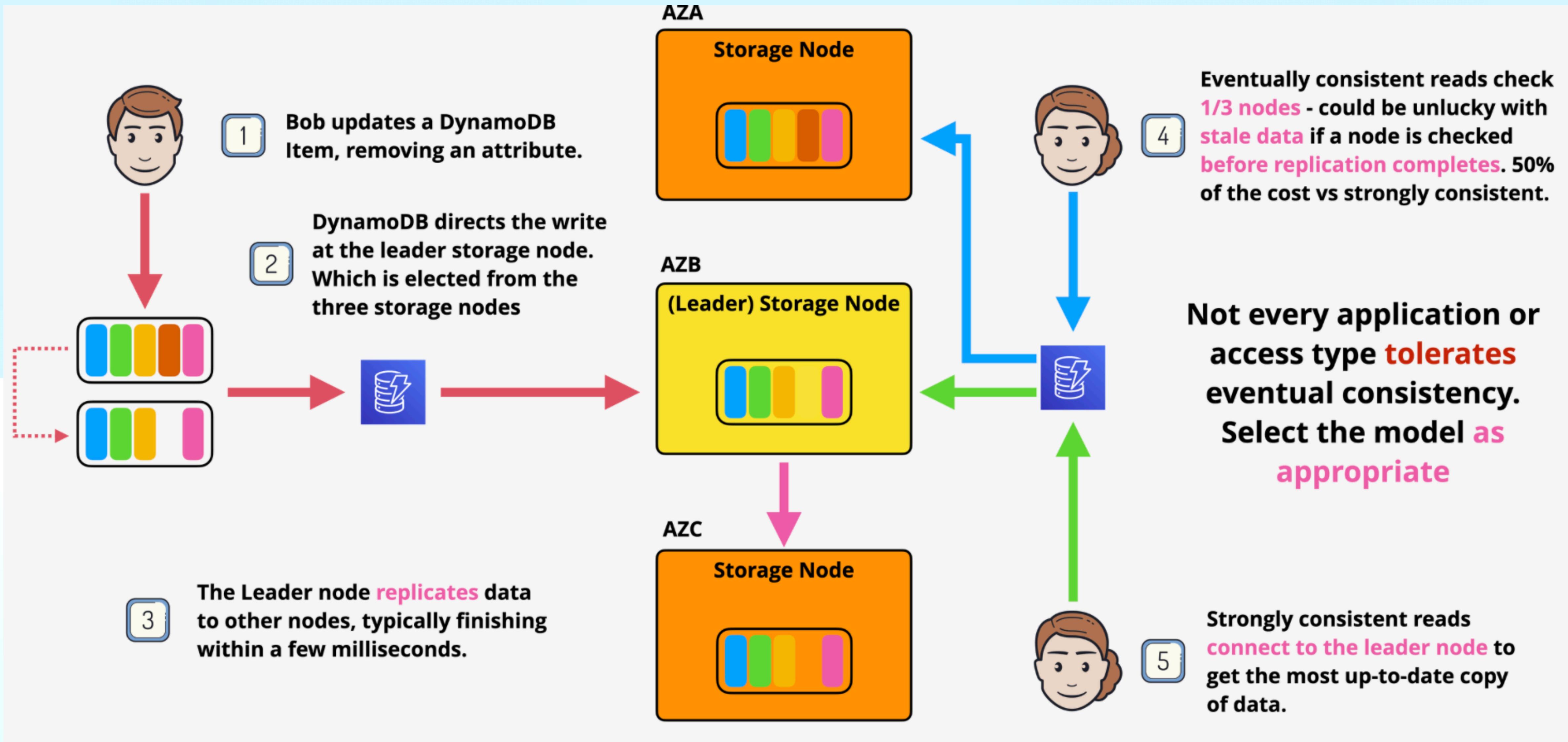
1	MON	Yellow	Orange	Pink	
1	TUE	Yellow		Pink	
NOT RETURNED - BUT CAPACITY CONSUMED					
NOT RETURNED - BUT CAPACITY CONSUMED					

Scan ()

Consumes **5K+4K+2K+3K = 14K = 4 RCU**

Returns **5K+4K of Data ...**
remaining discarded

DynamoDB Consistency Model



DynamoDB - Local Secondary Index

5K	1	MON			
4K	1	TUE			
2K	2	MON			
3K	2	TUE			

SCAN moves through a table consuming the capacity of every ITEM. You have complete control on what data is selected, any attributes can be used and any filters applied but SCAN consumes capacity for every ITEM scanned through

1	MON				
1	TUE				
NOT RETURNED - BUT CAPACITY CONSUMED					
NOT RETURNED - BUT CAPACITY CONSUMED					

Scan ()

Consumes **5K+4K+2K+3K = 14K = 4 RCU**

Returns **5K+4K of Data ...**
remaining discarded

DynamoDB - Global Secondary Index

1	MON			ALARM
1	TUE			ALARM
2	MON			
2	TUE			ALARM

GSI's are **always eventually consistent**, replication between base and GSI is **Asynchronous**

GSI's are **sparse**, only ITEMS which have values in the new PK and optional SK are added

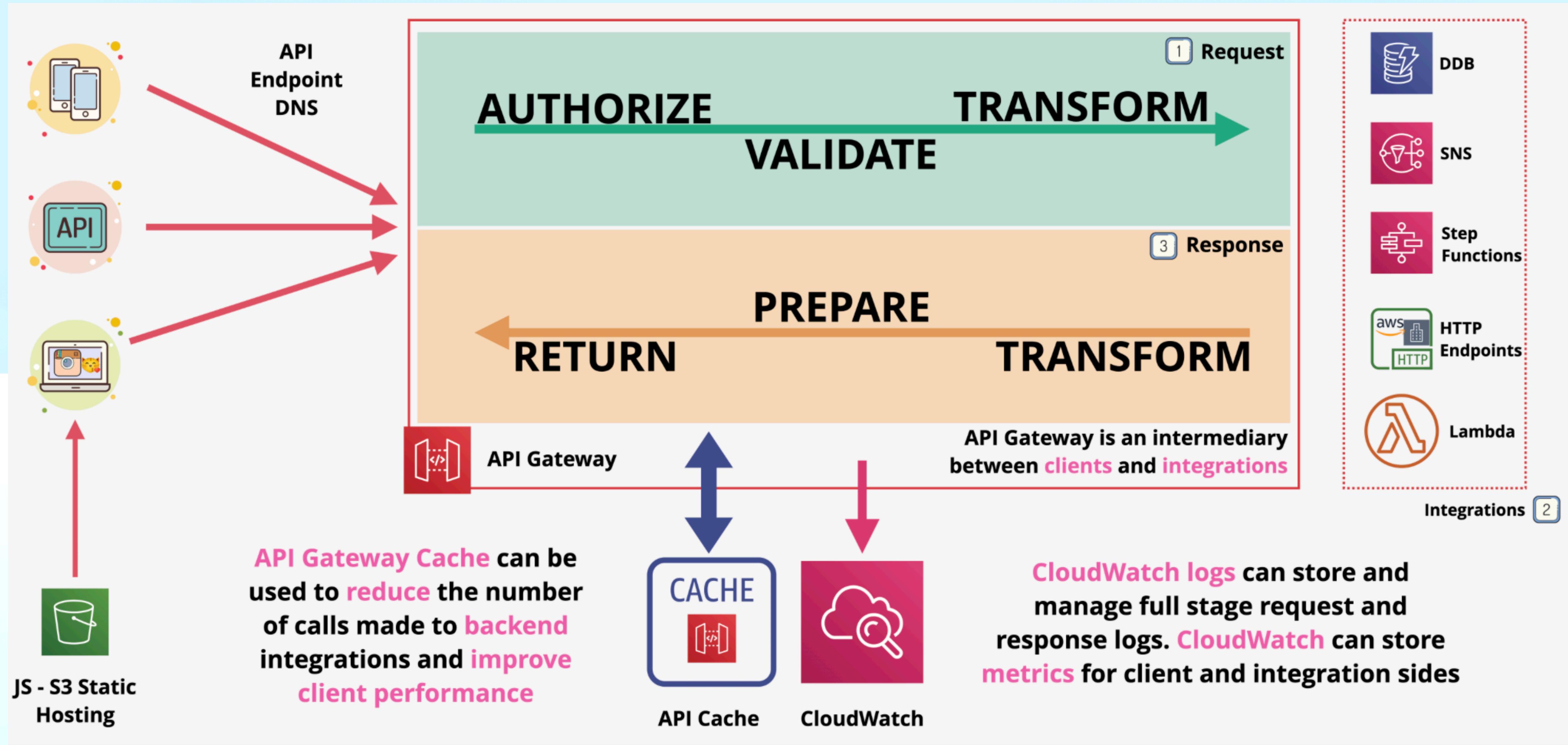
GSI's are an alternative view on the base table with alternative **PK** and **SK** they have their own **RCU** and **WCU** and can be created at any time

ALARM	1			MON
ALARM	1			TUE
	2			MON
ALARM	2			TUE

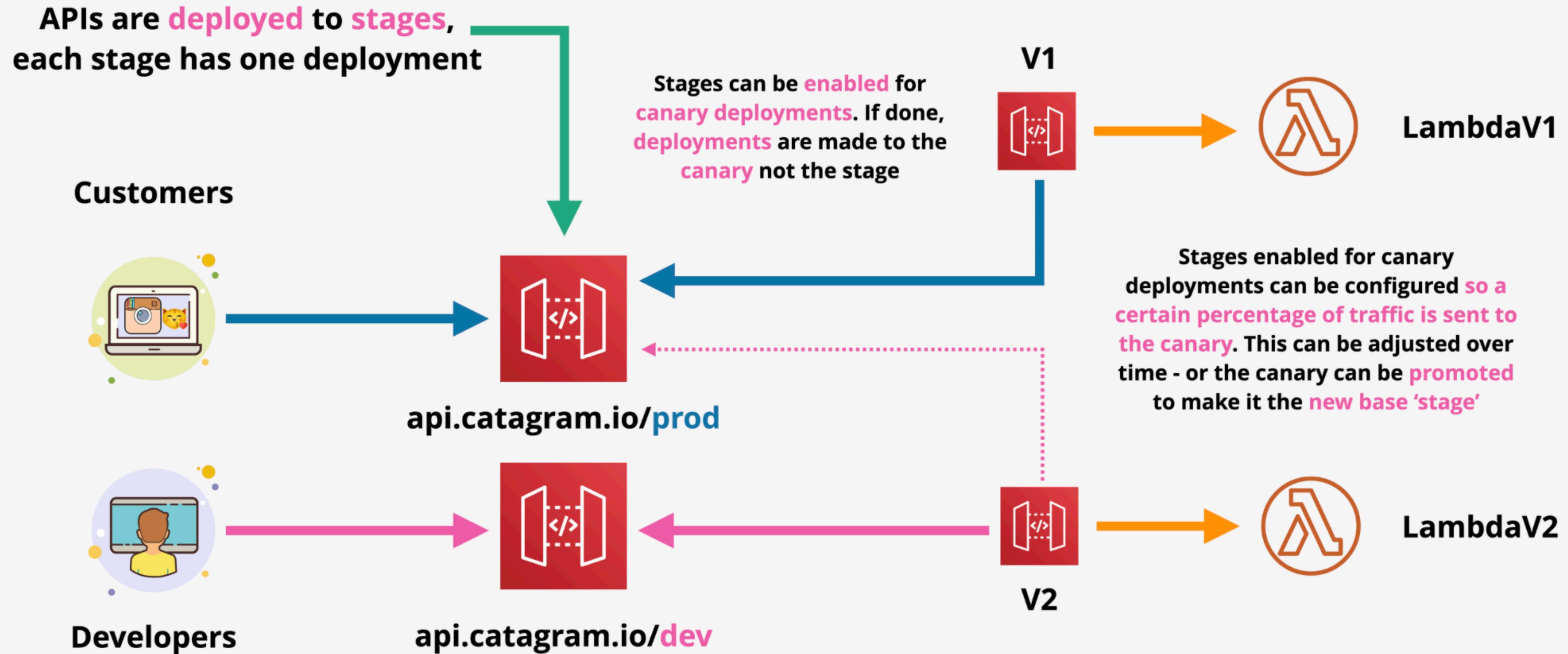
APIGateway OverView

- Create and Manage APIs
- Endpoint/Entry-point for applications
- Sits between applications and integrations
- Highly available, Scalable
- Provides Authorisation
- Can create HTTP, REST and WebSocket APIs

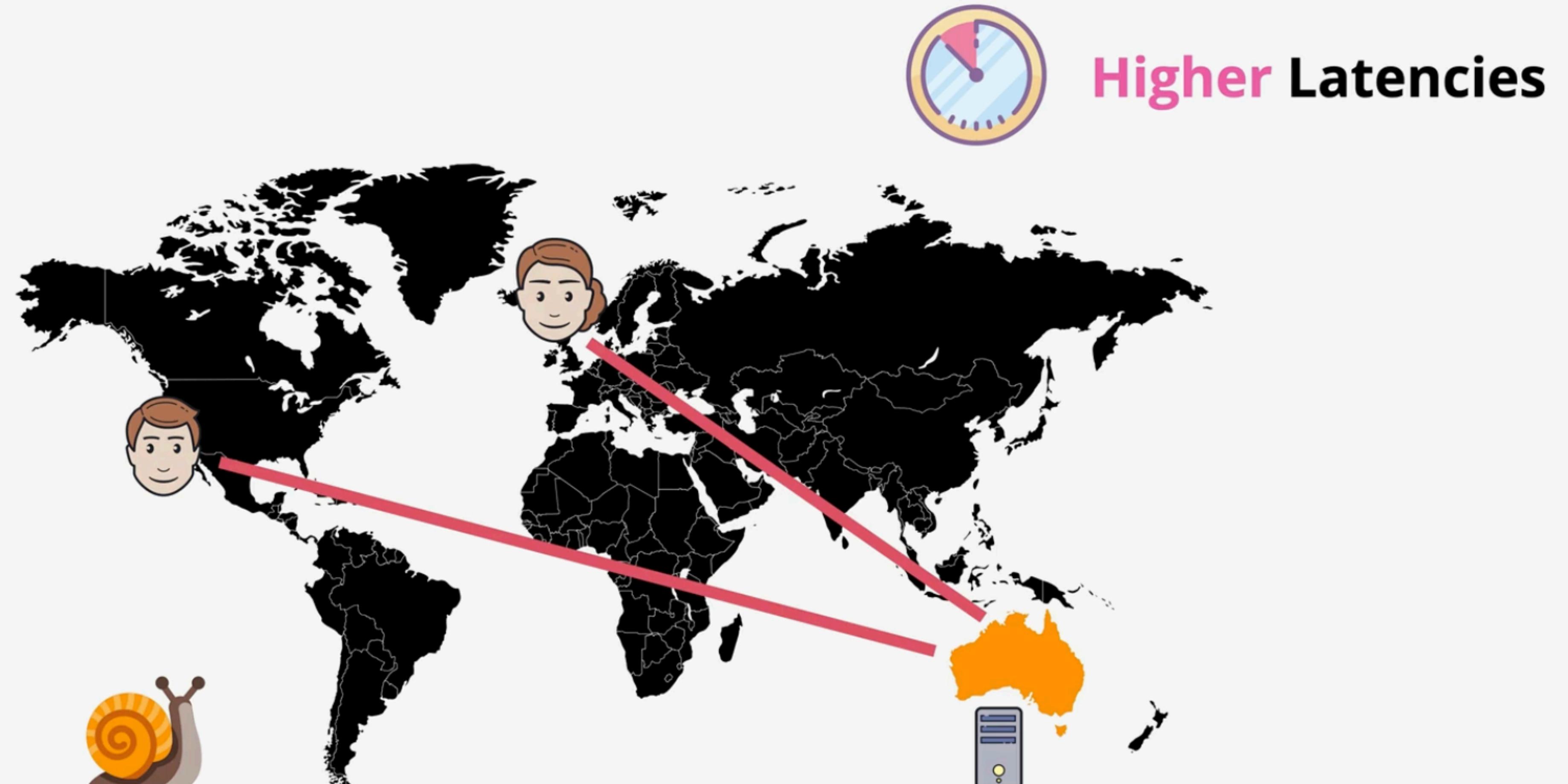
APIGateway OverView



APIGateway OverView



CloudFront



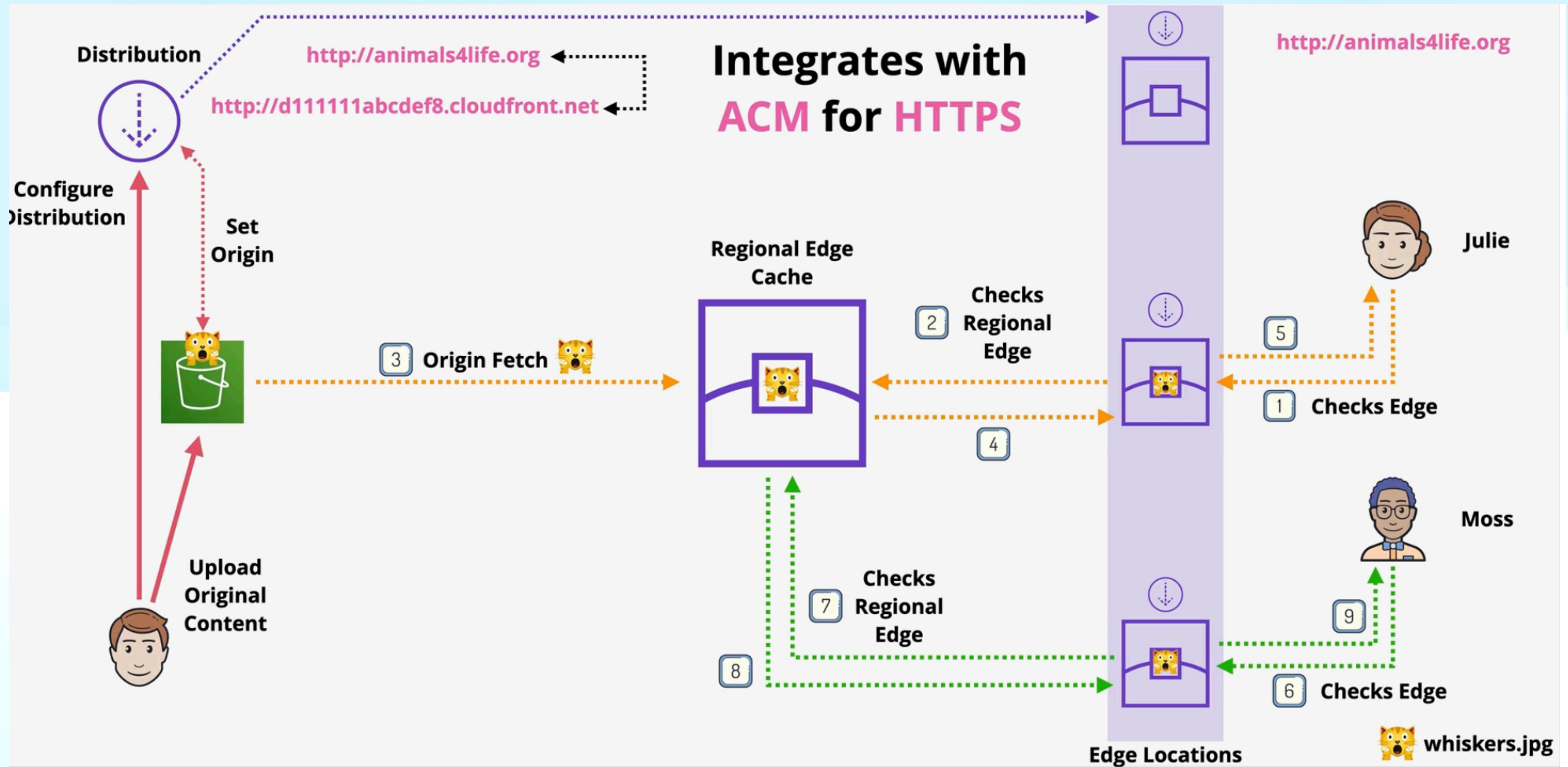
Slow Transfer Speeds

Somecatwebsite

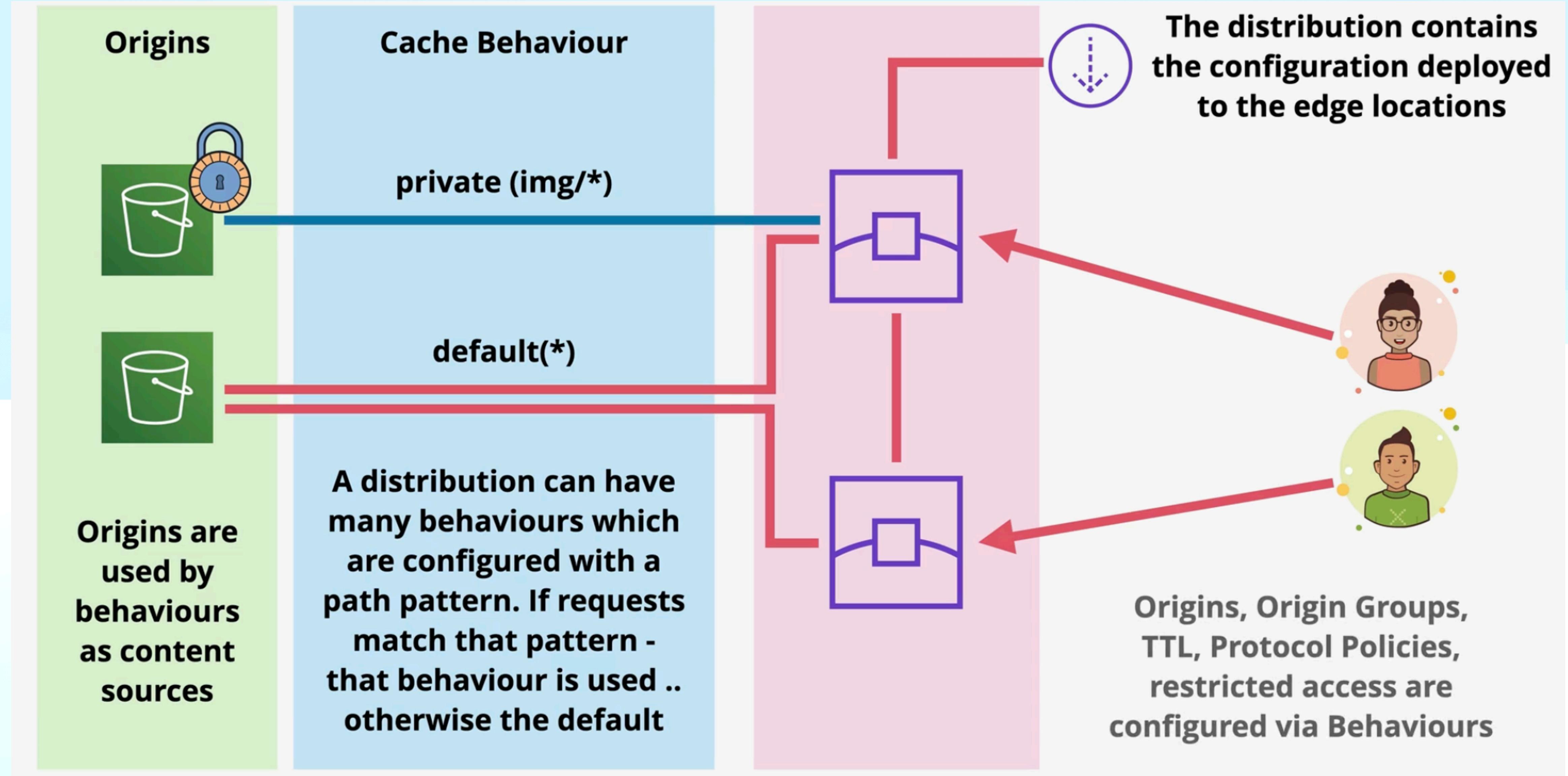
CloudFront Terms

- Origin - The Source location of your content
- S3 Origin or Custom Origin
- Distribution - Configuration unit of CloudFront
- Edge Location - Local cache of your data
- Regional Edge Cache - Provides another layer of caching. Much bigger than the Edge location.

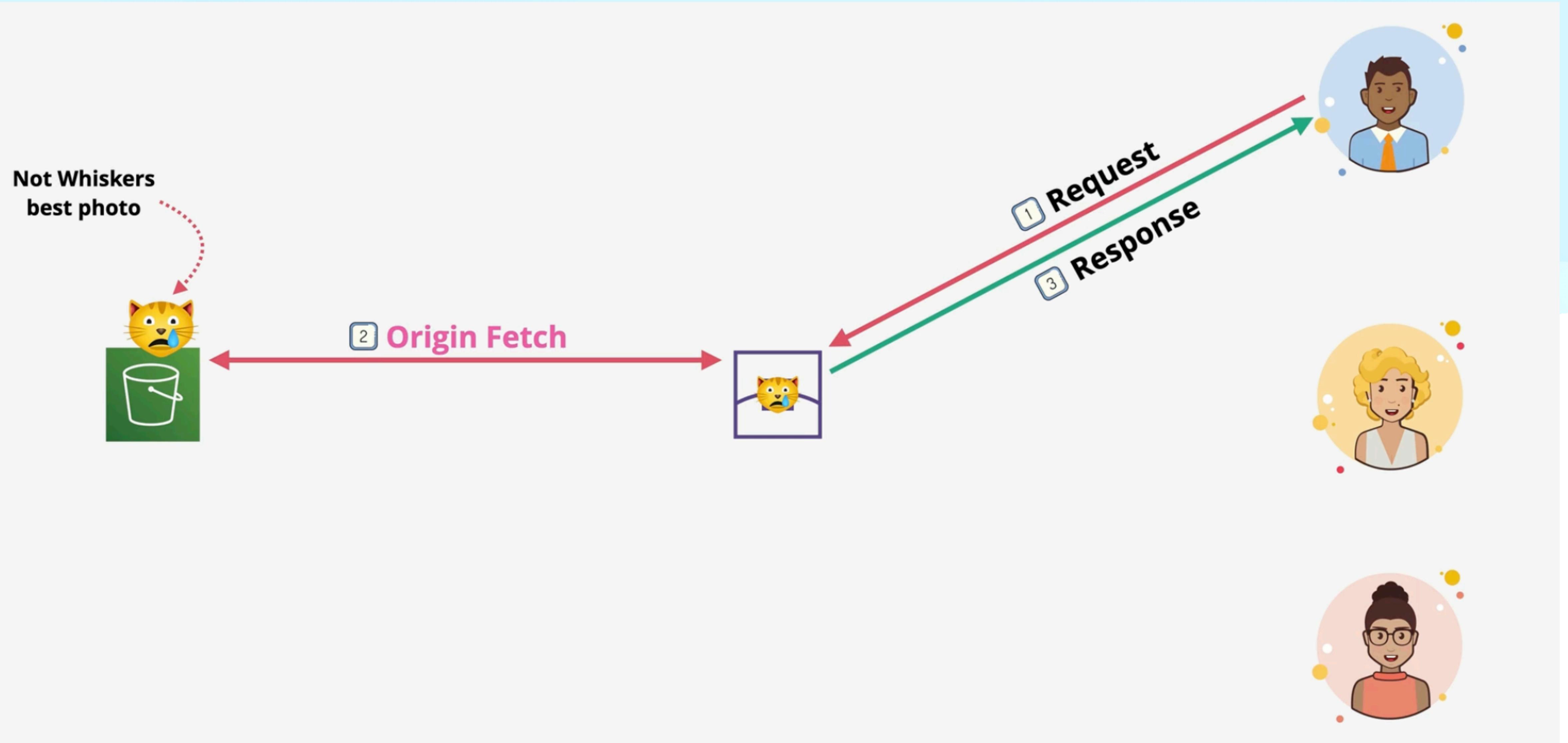
CloudFront Architecture



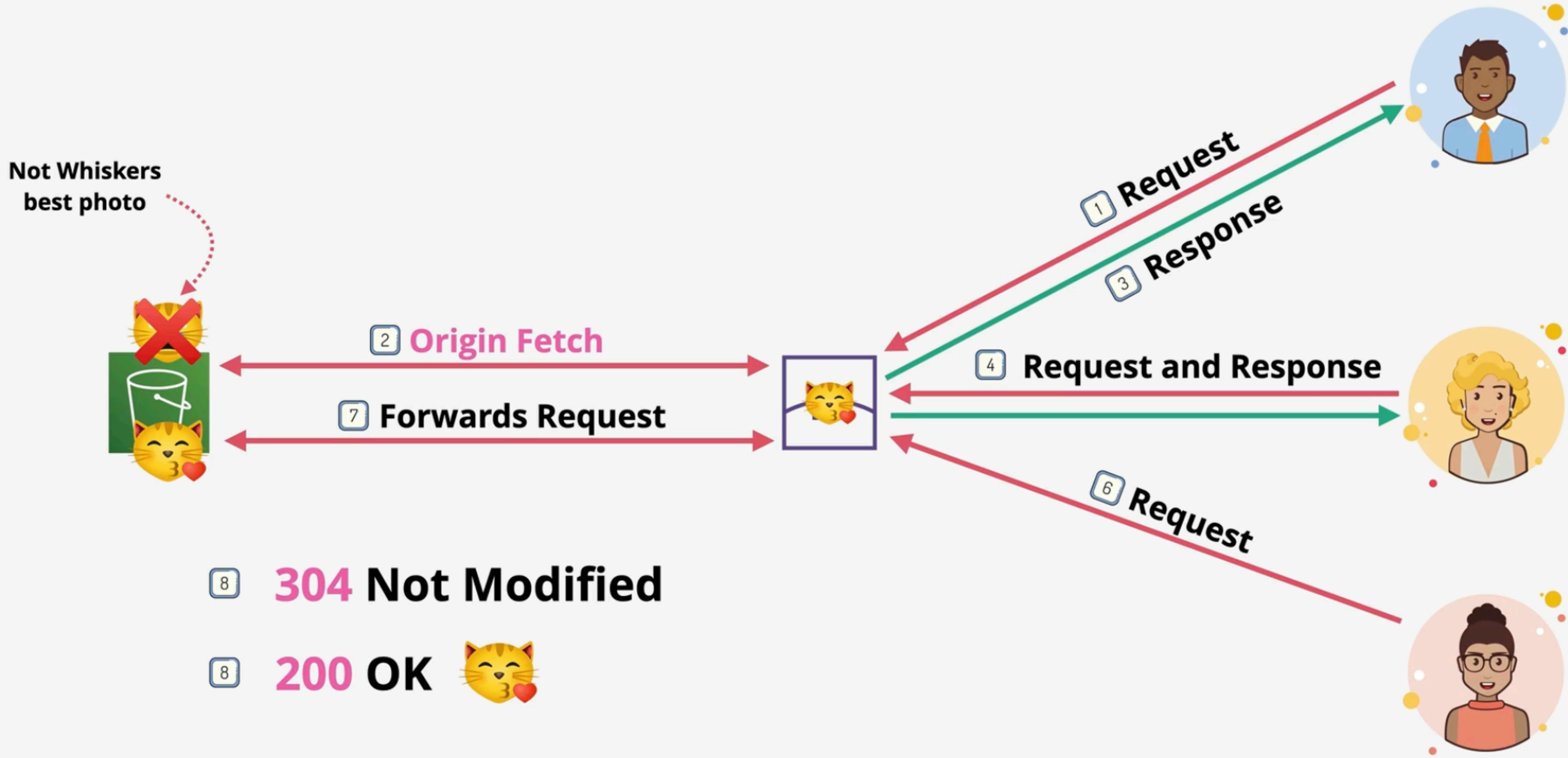
CloudFront Architecture



CloudFront TTL and Invalidation



CloudFront TTL and Invalidation



CloudFront TTL and Invalidations

- Cache Invalidation performed at distribution
- Invalidation applies to all the edge location - but it takes time
- Examples of objects to provide for invalidation
 - /images/whiskers1.jpg
 - /images/whiskers*
 - /images/*
 - /*

QUIZ TIME

Q & A