Getting Started with Caching Resources

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Coming Up

Cacheable constraint

HTTP cache

- Cache types
- Expiration and validation models
- Cache-Control header

Response caching middleware

Supporting the Cacheable Constraint

Each response should define itself as cacheable or not

HTTP Caching

http://bit.ly/2hJTTxD (RFC 2616)

http://bit.ly/2in4uzh (RFC 7234)

“Caching would be useless if it did not significantly improve performance. The goal of caching in HTTP/1.1 is to eliminate the need to send requests in many cases, and to eliminate the need to send full responses in many other cases.”

HTTP standard

The Purpose of Caching

Eliminate the number of requests

Reduces network-roundtrips

Expiration mechanism

Eliminate the need to send full responses

Reduces network bandwidth

Validation mechanism

The cache is a separate component

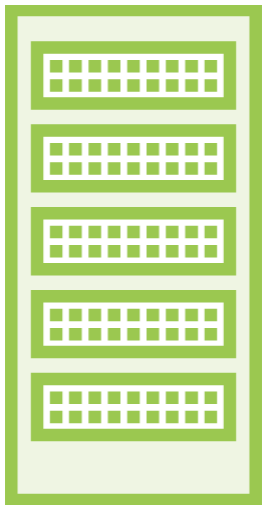
- Accepts requests from consumer to the API
- Receives responses from the API and stores them if they are deemed cacheable

It's the middle-man of request-response communication

Cache Types

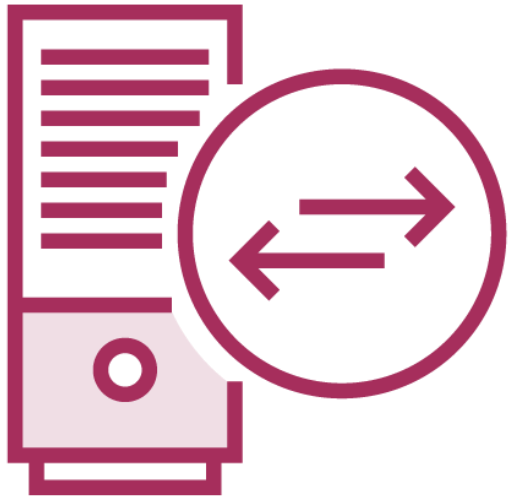
Client Cache

Lives on the client
Private cache



Gateway Cache

Lives on the server
Shared cache



Proxy Cache

Lives on the network
Shared cache

Response Cache Attribute and Middleware

State for each resource whether or not it's cacheable

- Cache-Control: max-age=120
- ResponseCache attribute
- This does not actually cache anything

Cache store

- Response caching middleware

Demo

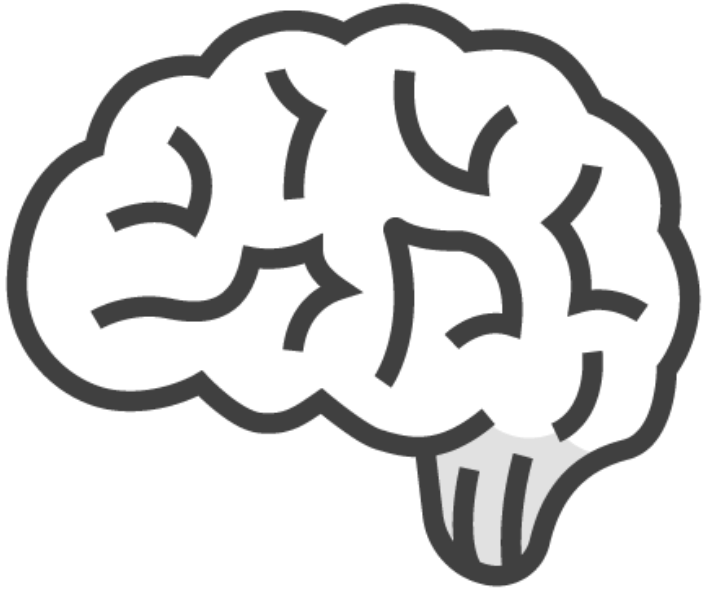
Adding cache headers to the response

Demo

Adding a cache store with the ResponseCaching middleware

Demo

Using cache profiles to apply the same rules to different resources



Expiration Model

Allows the server to state how long a response is considered fresh

Expiration Model

Expires header

Expires: Sat, 21 Sep 2019 15:23:40 GMT

Clocks must be synchronised

Offers little control

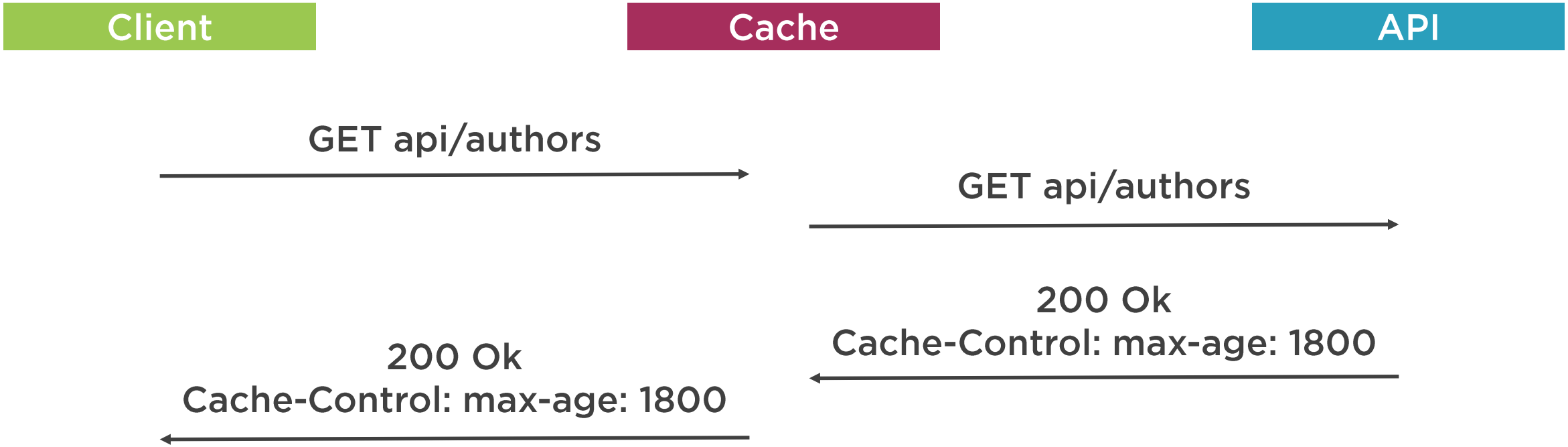
Cache-Control header

Cache-Control: public, max-age=60

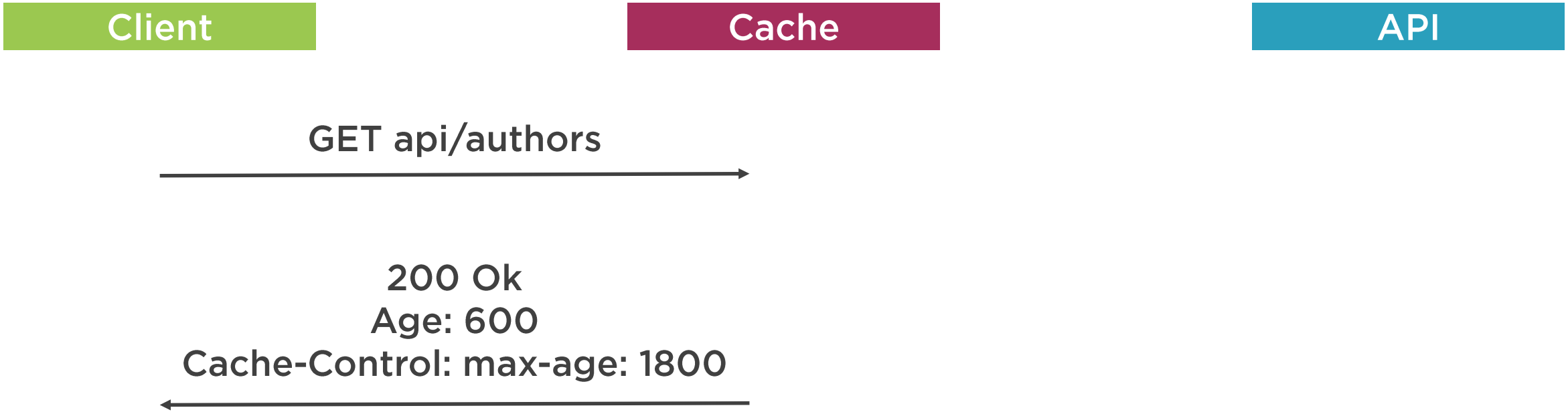
Preferred header for expiration

Directives: http://bit.ly/1Ups120

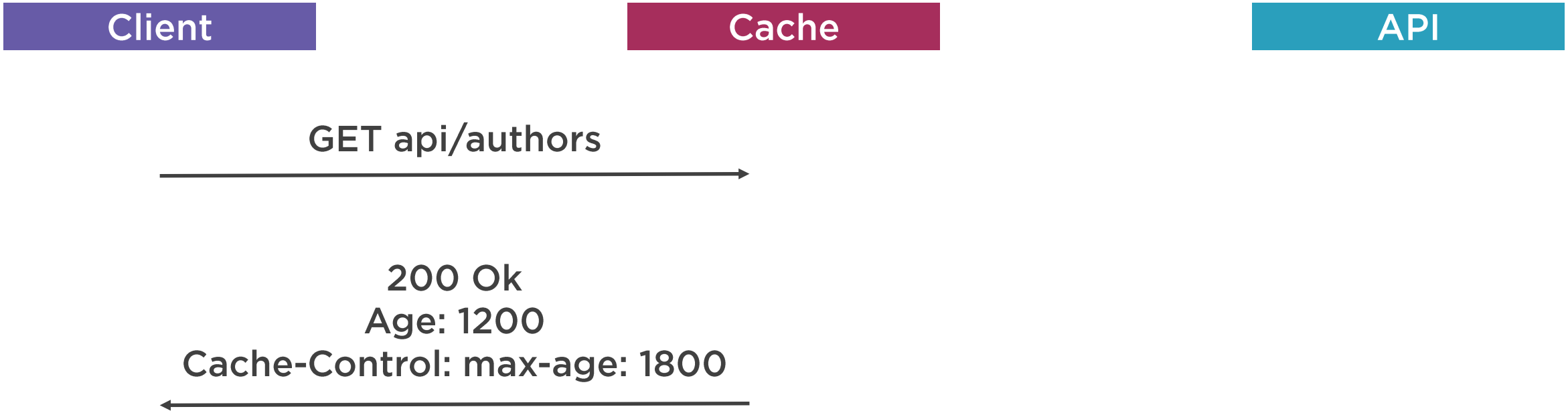
Expiration Model



Expiration Model



Expiration Model



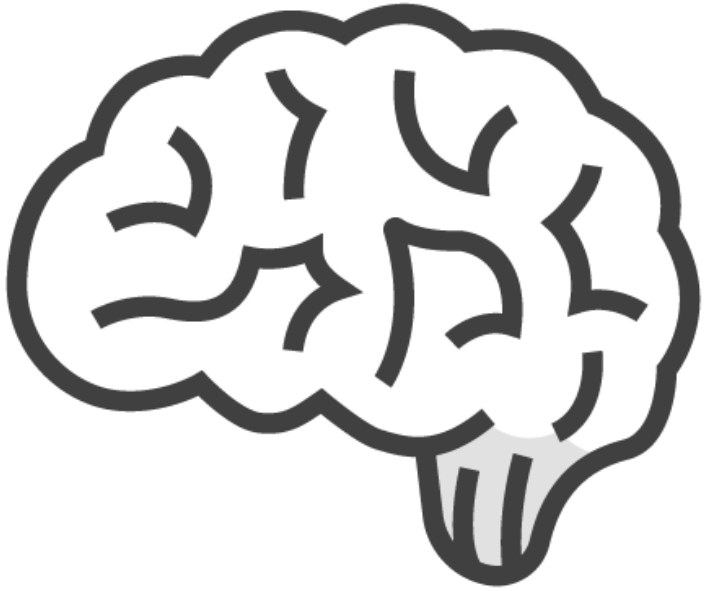
Expiration Model and Cache Types

Private cache

- Reduces bandwidth requirements
- Less requests from cache to API

Shared (public) cache

- Doesn't save bandwidth between cache and API
- Drastically lowers requests to the API



Validation Model

Used to validate the freshness of a response that's been cached

Validators

Strong validators

Change if the body or headers of a response change

ETag (Entity Tag) response header
ETag: “123456789”

Can be used in any context (equality is guaranteed)

Weak validators

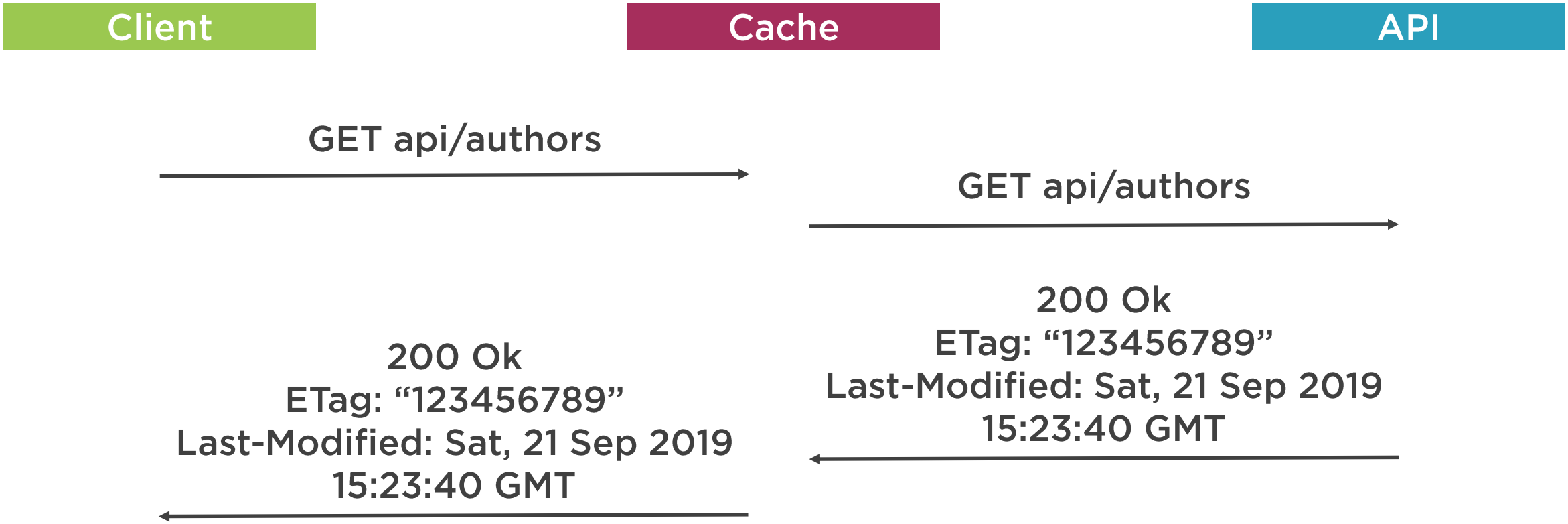
Don’t always change when the response changes (eg: only on significant changes)

Last-Modified: Sat, 21 Sep 2019 15:23:40 GMT

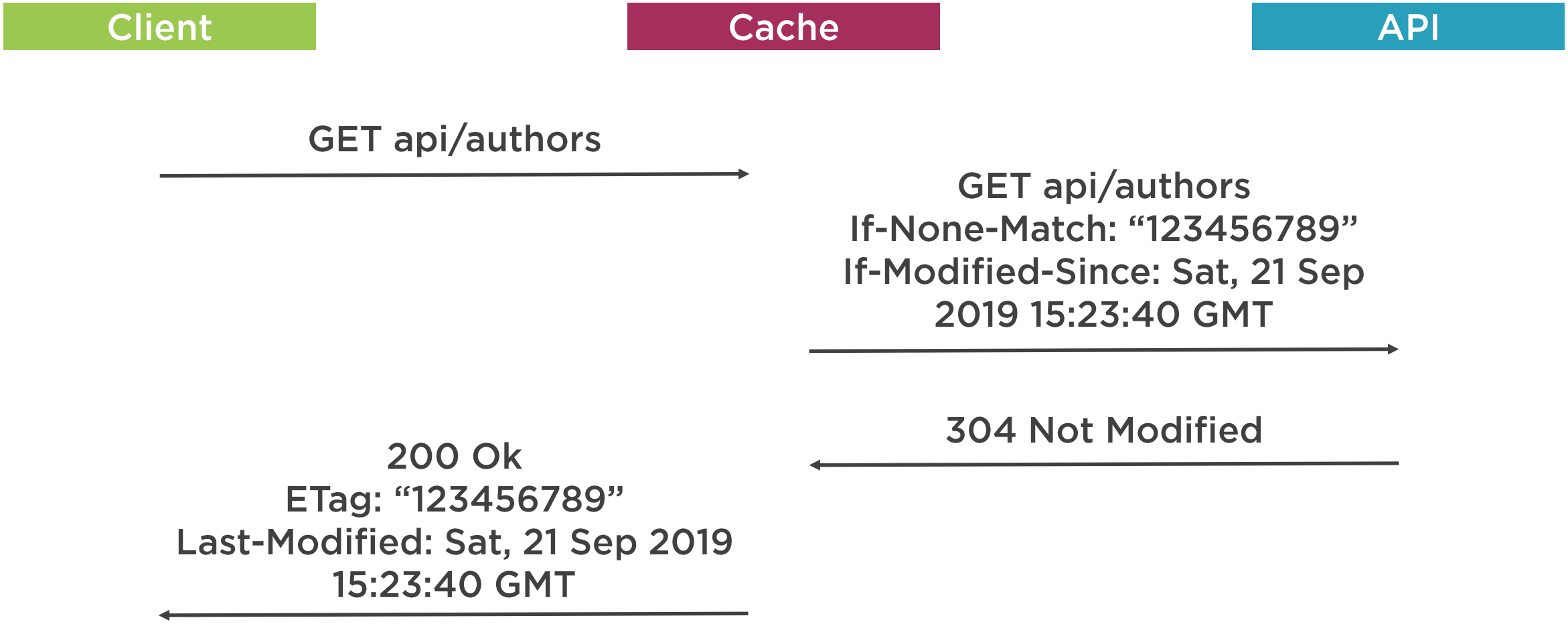
ETag: “w/123456789”

Equivalence, but not equality

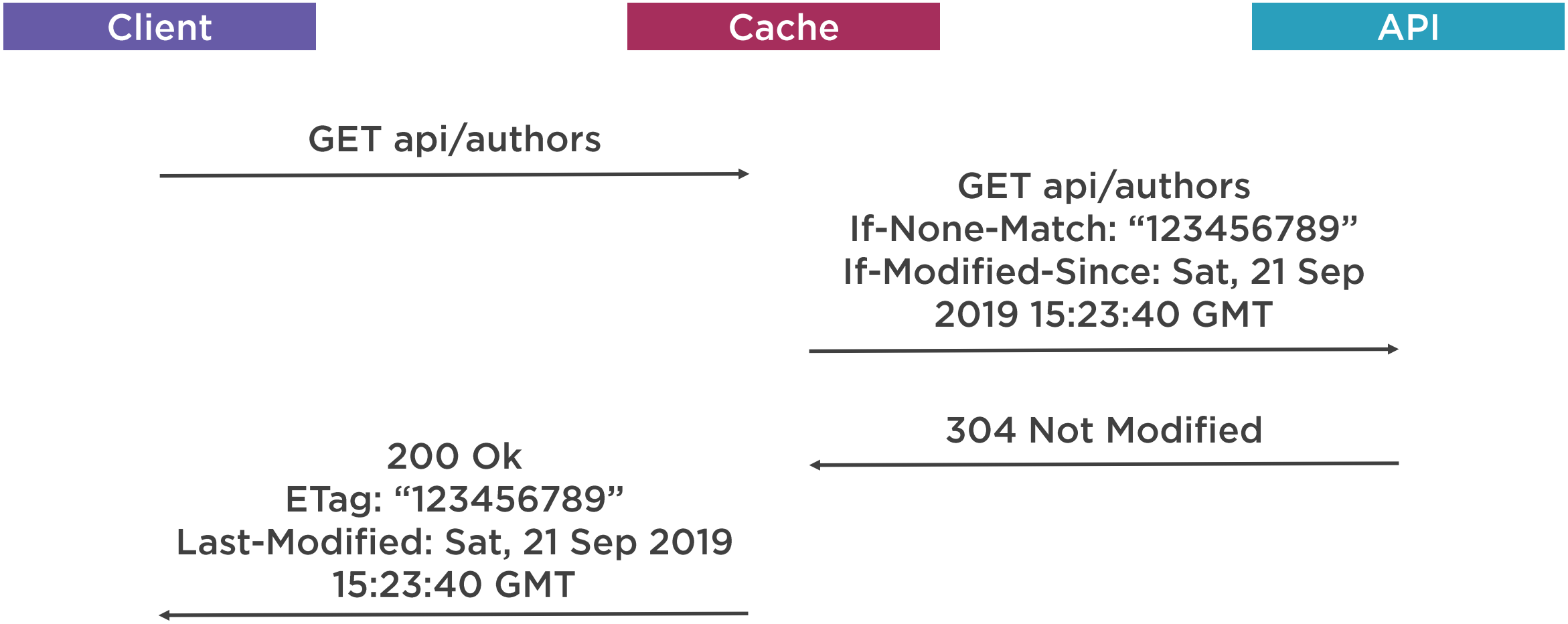
Validation Model



Validation Model



Validation Model



Validation Model and Cache Types

Private cache

Reduces bandwidth requirements

Shared (public) cache

Saves bandwidth between cache and API

Expiration and Validation Combined

Private cache

As long as the response hasn't expired (isn't stale), that response can be returned from the cache

Reduces communication with the API (including response generation), reduces bandwidth requirements

If it has expired, the API is hit

Bandwidth usage and response generation is potentially reduced even more

Shared (public) cache

As long as the response hasn't expired (isn't stale), that response can be returned from the cache

Reduces bandwidth requirements between cache and API, dramatically reduces request to the API

If it has expired, the API is hit

Bandwidth usage between cache and API and response generation is potentially reduced

The Holy Grail of Caching

Combine private and shared caches

Exploring Cache-Control Directives

Response

Freshness
max-age, s-maxage

Cache type
public, private

Validation
no-cache, must-revalidate, proxy-revalidate

Other
no-store, no-transform

Request

Freshness
max-age, min-fresh, max-stale

Validation
no-cache

Other
no-store, no-transform, only-if-cached

Summary

Each response must state whether or not it can be cached

Cache types

- Private or shared
- Depending on the type, a model can reduce bandwidth requirements and/or network roundtrips

Summary

Caching: expiration model

- Allows the server to state how long a response is considered fresh
- Cache-Control header

Summary

Caching: validation model

- Used to validate the freshness of a response that's been cached
- ETag, Last-Modified headers

Summary

Implementation

- Control the Cache-Control header with the ResponseCache attribute
- Store responses with the ResponseCaching middleware