



Google

Developers

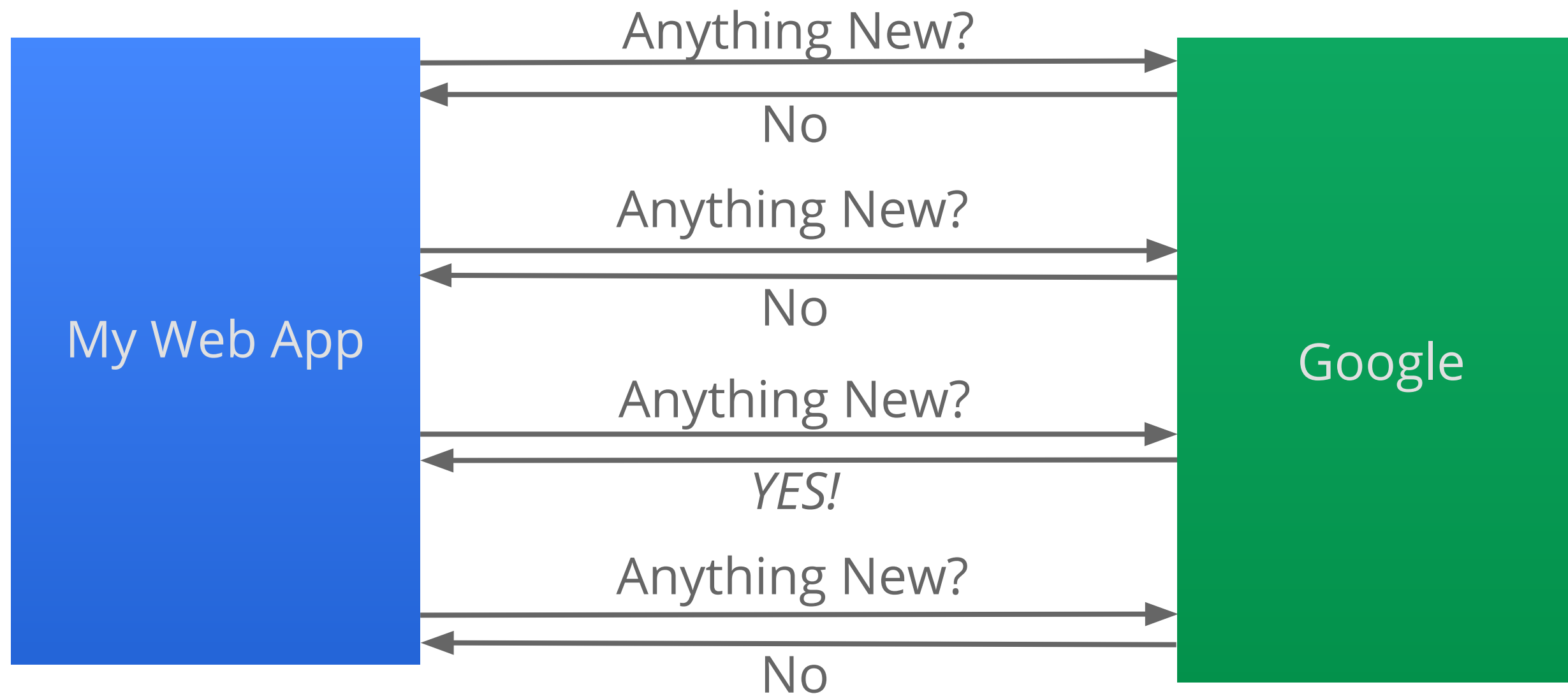


YouTube API Push Notifications

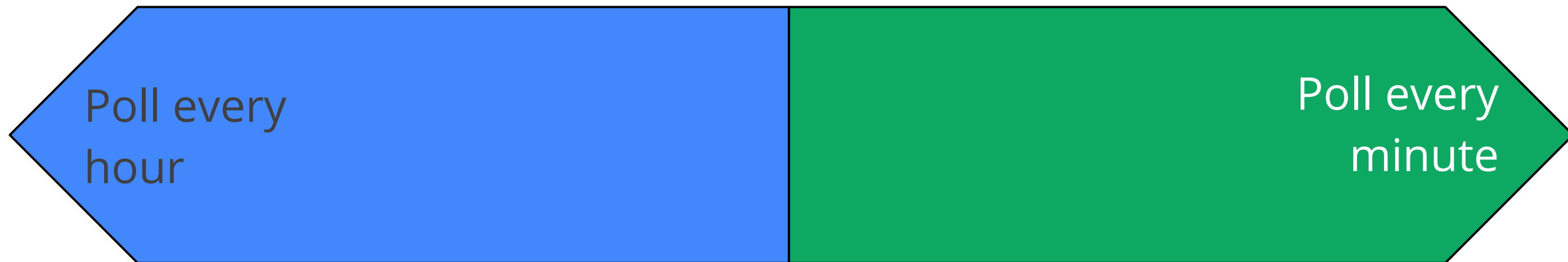
Yaniv Inbar, Software Engineer

Jeff Posnick, Developer Programs Engineer

Polling is Bad



Say "No!" to Polling



- Receive event late
- May miss events

- Waste network bandwidth
- Quota issues

Say "Yes!" to Push Notifications



- Lower network bandwidth
- Lower quota consumption
- Receive all events immediately
- Better user experience





Life of a Notification Channel

Webhook

Register Application

<https://cloud.google.com/console>

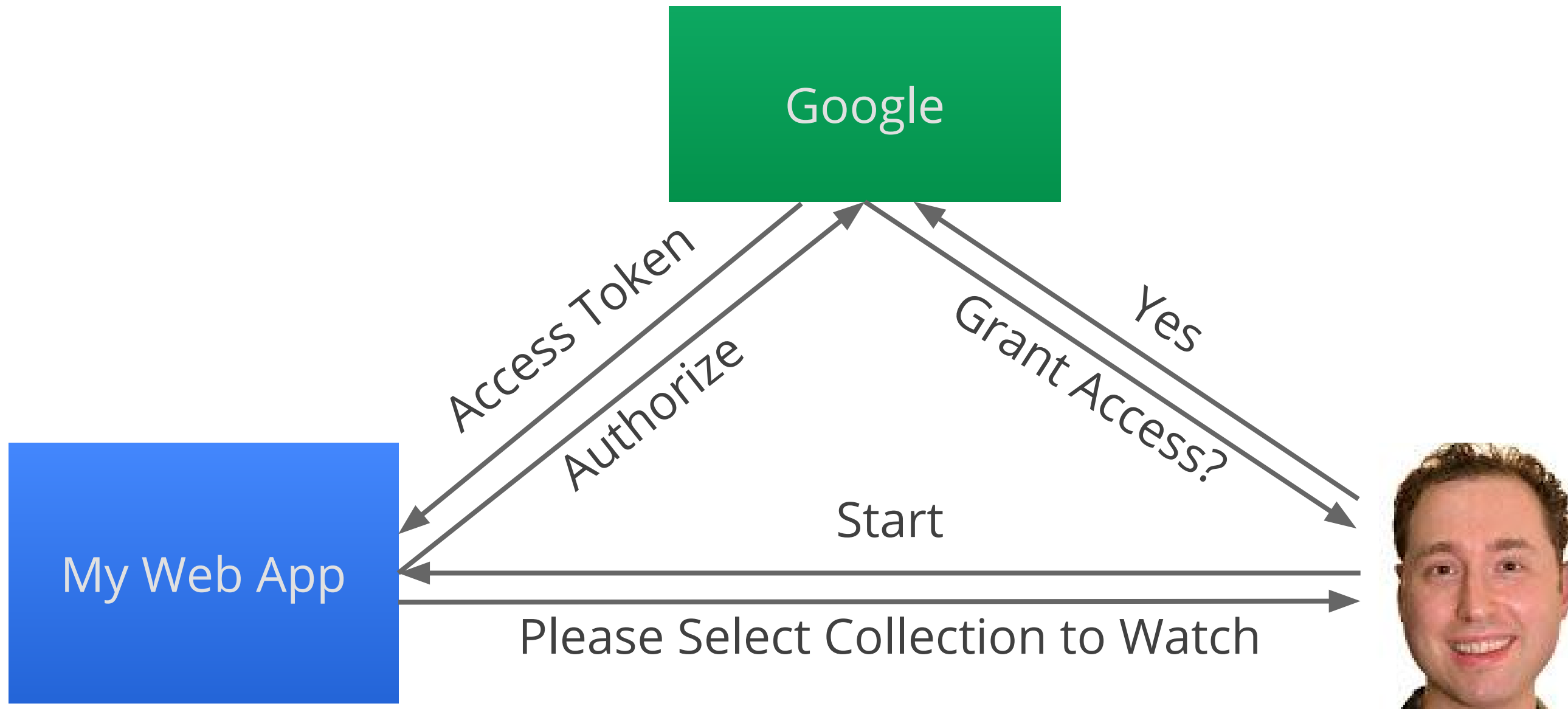
My Web App
and
Notifications
Endpoint

Google

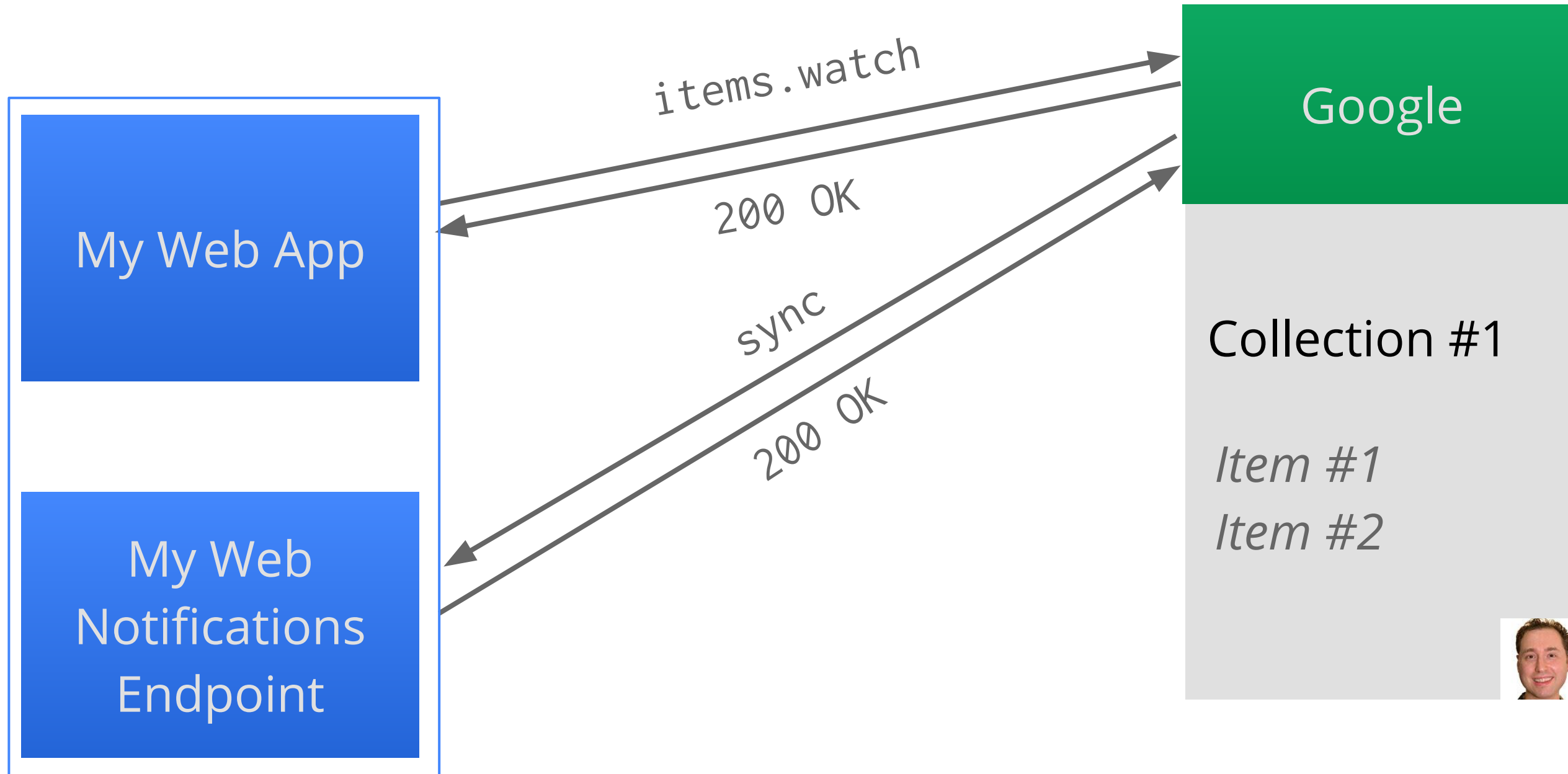
- Enable YouTube Data API v3
- Register App with Name & Platform
- Domain of Notifications Endpoint (*soon*)



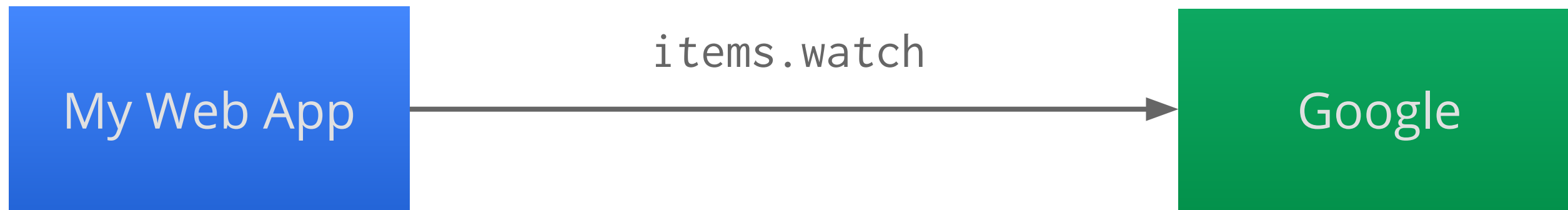
OAuth 2



Watch for Changes to Collection



Watch Request



- Collection ID
- Authorization access token
- Notification endpoint address
- Channel ID (UUID)
- Channel token (*optional*)



Watch Request (HTTP)

HTTP

POST `https://www.googleapis.com/youtube/v3/playlistItems/watch?`

`playlistId=PL56...62&part=snippet`

Authorization: Bearer `1/cT...Zk`

Content-Type: `application/json; charset=UTF-8`

`{"type": "web_hook",`

`"address": "https://mywebapp.com/notifications",`

`"id": "88...2d",`

`"token": "custom"}
}`



Watch Response



- Channel expiration time (*if applicable*)



Watch Response (HTTP)

HTTP

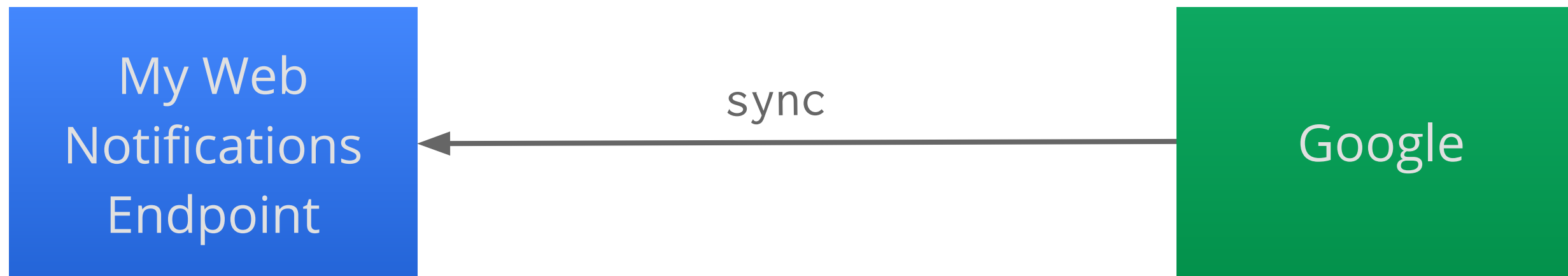
200 OK

Content-Type: application/json; charset=UTF-8

```
{ "kind": "api#channel",  
  "id": "88...2d",  
  "resourceId": "UE...kc",  
  "resourceUri": "https://www.googleapis.com/youtube/v3/playlistItems?  
maxResults=50&part=snippet&playlistId=PL56...62",  
  "token": "custom",  
  "expiration": "1367620590885" }
```



Sync Notification Request



- Resource state (sync)
- Channel ID (UUID)
- Channel token (*optional*)



Sync Notification Request (HTTP)

HTTP

POST https://mywebapp.com/notifications

X-Goog-Message-Number: 1

X-Goog-**Resource-State**: **sync**

X-Goog-Resource-Id: UE...kc

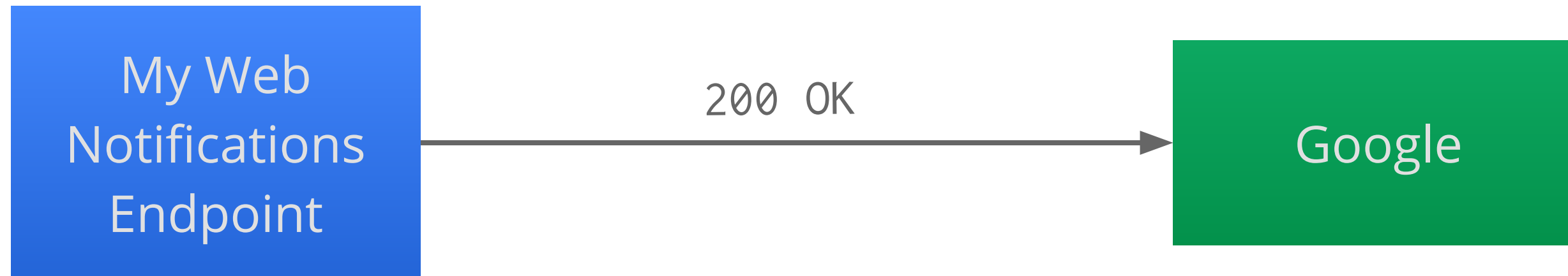
X-Goog-Resource-Uri: https://www.googleapis.com/youtube/v3/playlistItems?
maxResults=5&part=snippet&playlistId=PL56...62

X-Goog-**Channel-Id**: **88...2d**

X-Goog-Channel-Expiration: Wed 15 May 2013 22:36:30 GMT

X-Goog-**Channel-Token**: **custom**

Successful Notification Response



Successful Notification Response (HTTP)

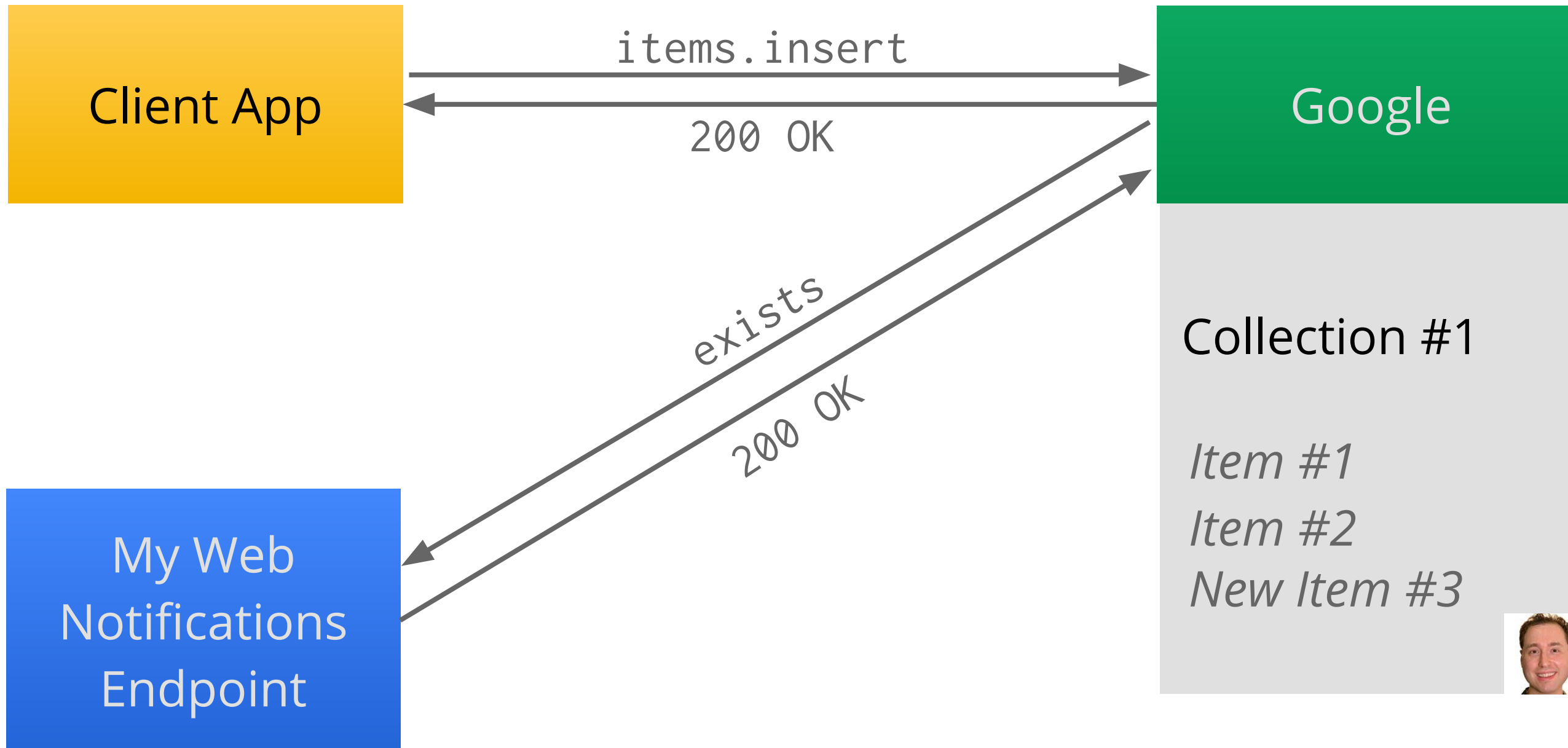
200 OK

HTTP



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Insert Item to Collection



Exists (Insert) Notification Request



- Resource state (**exists**)
- Channel ID (UUID)
- Channel token (*Optional*)



Exists (Insert) Notification Request (HTTP)

HTTP

POST https://mywebapp.com/notifications

X-Goog-Message-Number: 51230

X-Goog-**Resource-State**: **exists**

X-Goog-Resource-Id: UE...kc

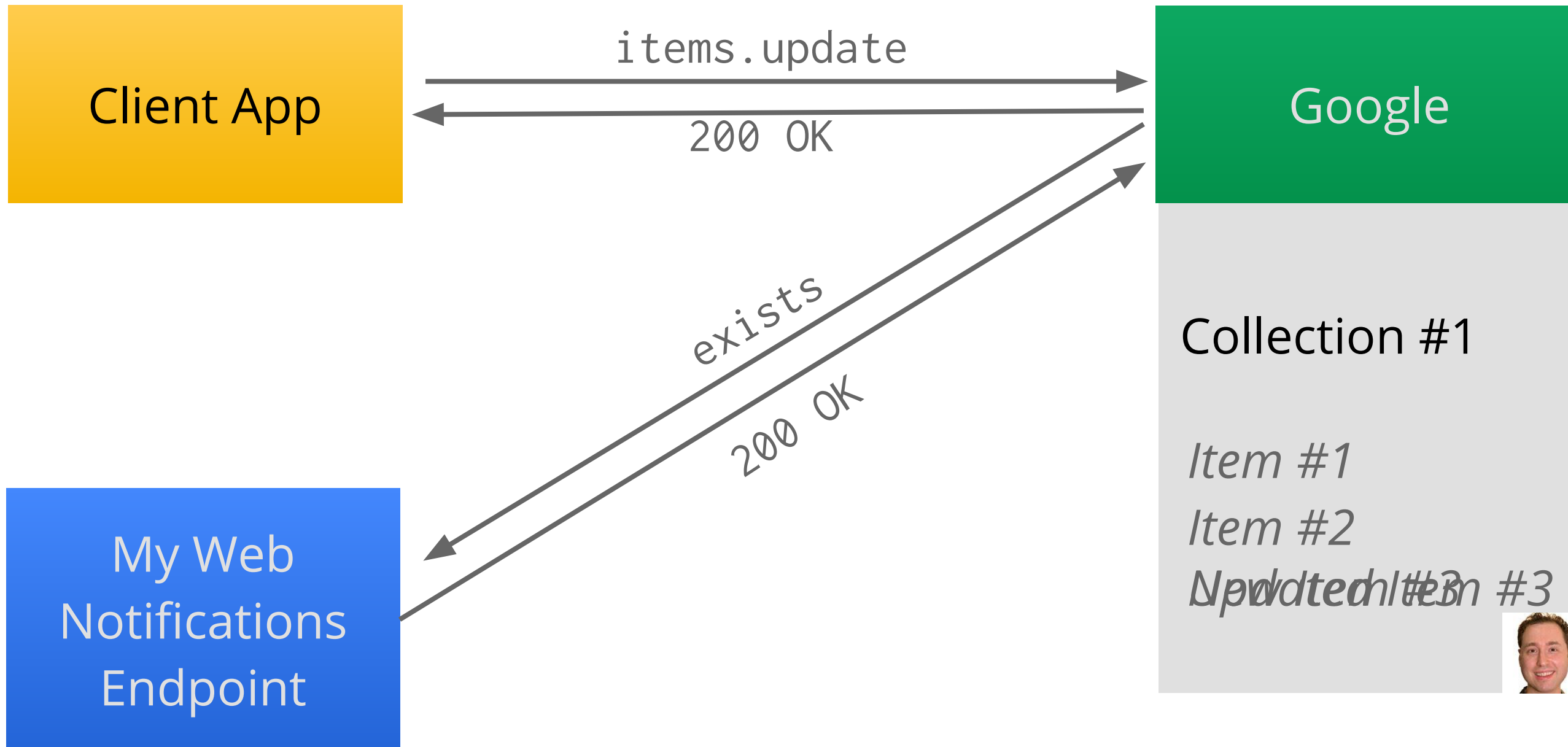
X-Goog-Resource-Uri: https://www.googleapis.com/youtube/v3/playlistItems?
maxResults=5&part=snippet&playlistId=PL56...62

X-Goog-**Channel-Id**: **88...2d**

X-Goog-Channel-Expiration: Wed 15 May 2013 22:36:30 GMT

X-Goog-**Channel-Token**: **custom**

Update Item



Exists (Update) Notification Request (HTTP)

HTTP

POST https://mywebapp.com/notifications

X-Goog-Message-Number: 62341

X-Goog-**Resource-State**: **exists**

X-Goog-Resource-Id: UE...kc

X-Goog-Resource-Uri: https://www.googleapis.com/youtube/v3/playlistItems?
maxResults=5&part=snippet&playlistId=PL56...62

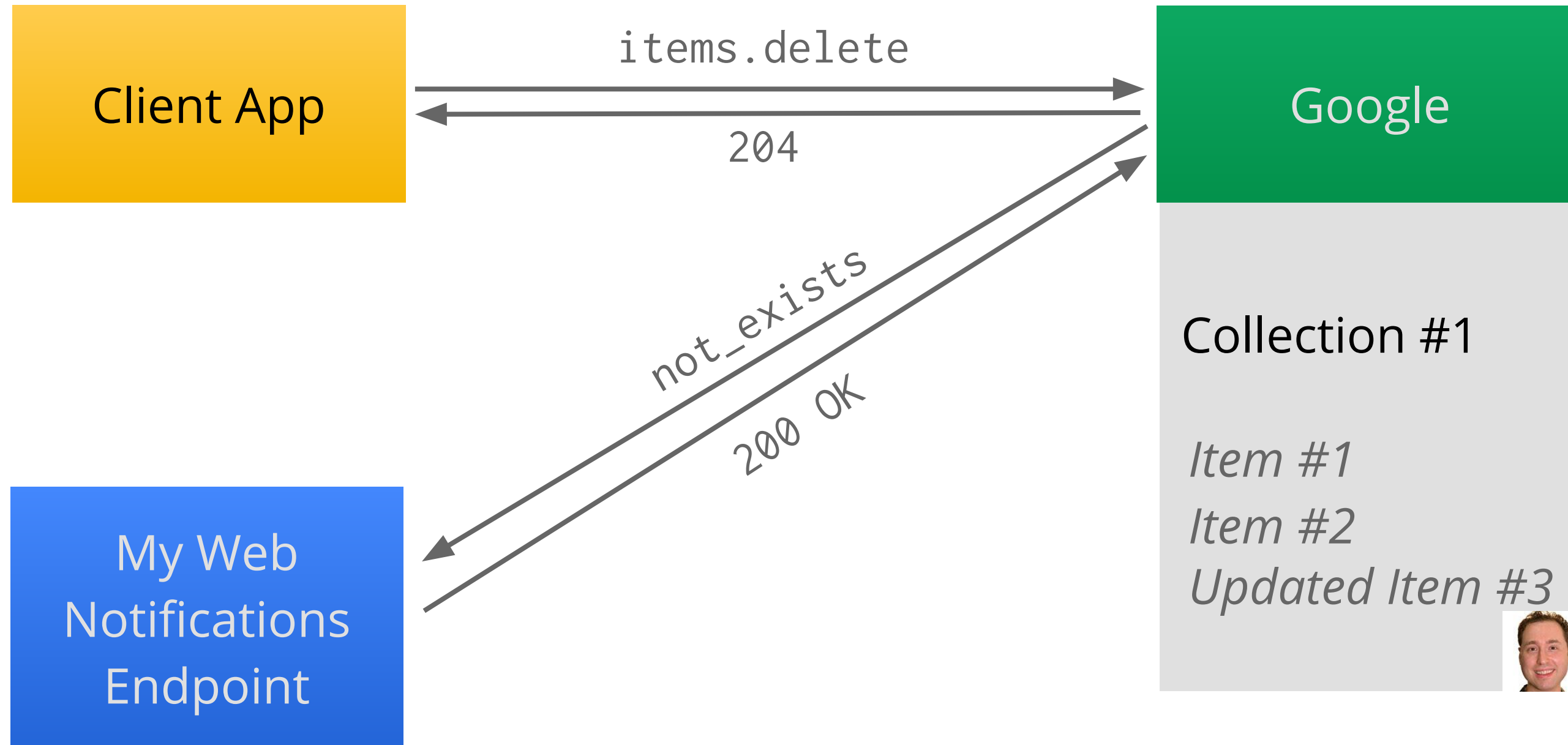
X-Goog-Channel-Id: 88...2d

X-Goog-Channel-Expiration: Wed 15 May 2013 22:36:30 GMT

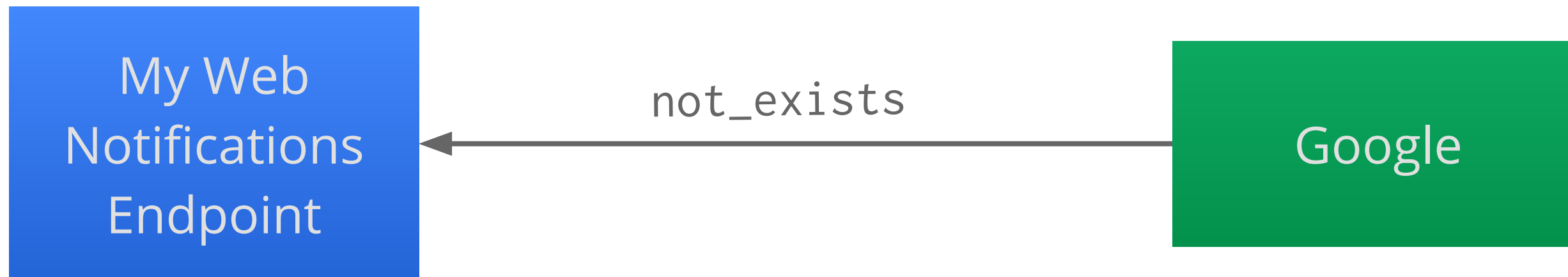
X-Goog-Channel-Token: custom



Delete Item



Not_Exists Notification Request



- Resource state (**not_exists**)
- Channel ID (UUID)
- Channel token (*Optional*)



Not_Exists Notification Request (HTTP)

HTTP

POST https://mywebapp.com/notifications

X-Goog-Message-Number: 89864

X-Goog-**Resource-State**: **not_exists**

X-Goog-Resource-Id: UE...kc

X-Goog-Resource-Uri: https://www.googleapis.com/youtube/v3/playlistItems?
maxResults=5&part=snippet&playlistId=PL56...62

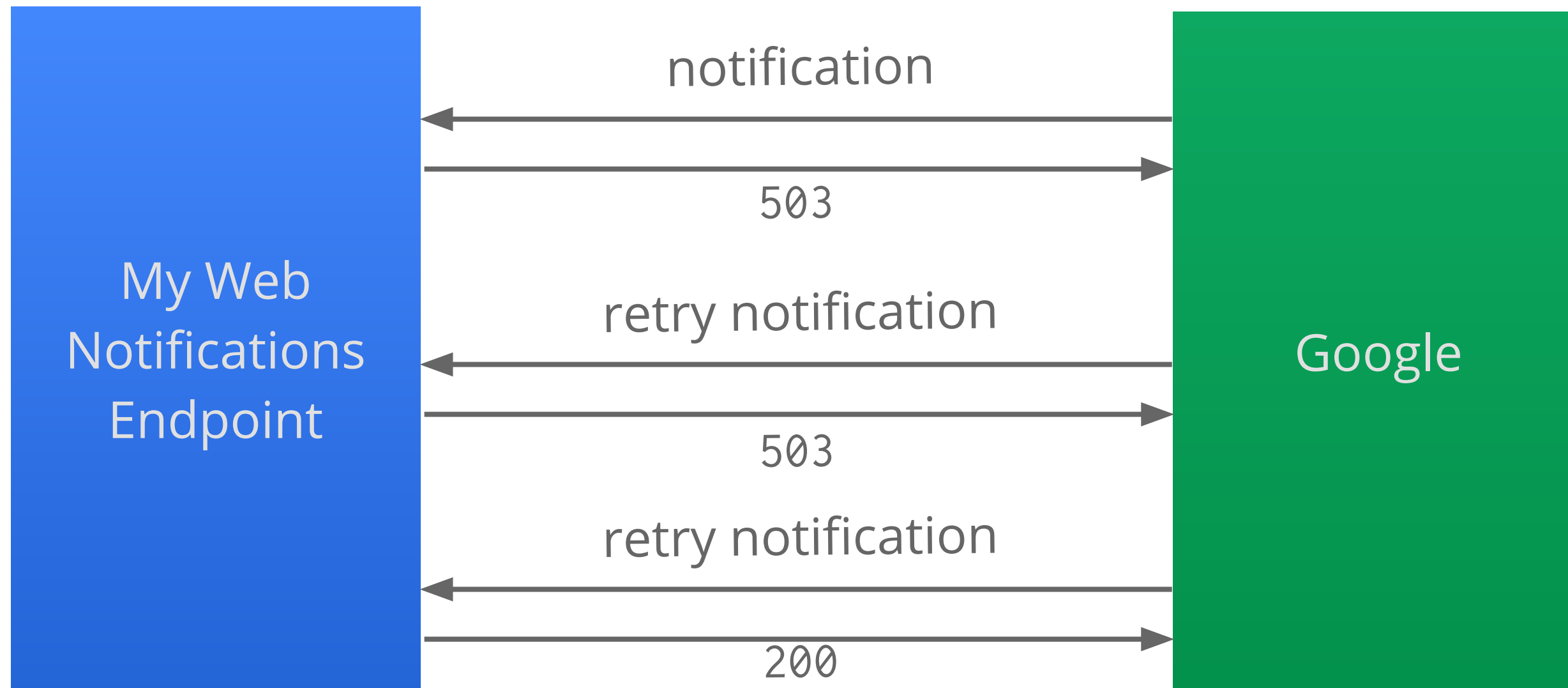
X-Goog-Channel-Id: 88...2d

X-Goog-Channel-Expiration: Wed 15 May 2013 22:36:30 GMT

X-Goog-Channel-Token: custom

Retry on Server Errors for Notifications

Errors codes (401, 404, 500, 502, 503, & 504)



Option 1: Stop Channel Response



Option 1: stop Channel Response (HTTP)

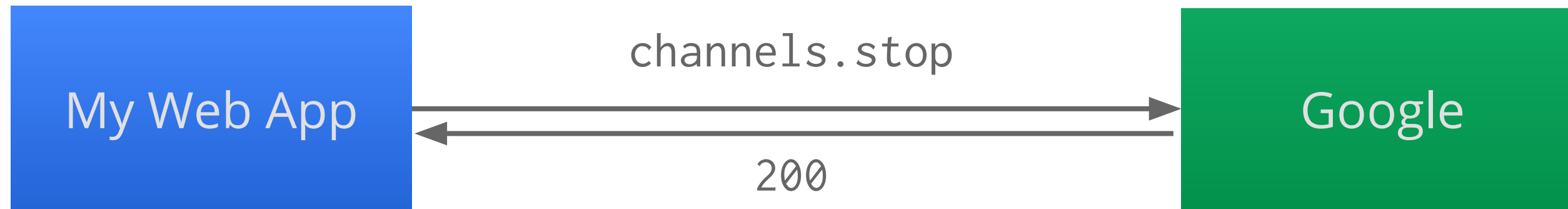
200 OK

X-Goog-Channel: **stop**

HTTP



Option 2: Stop Channel Request



- Authorization access token
- Channel ID (UUID)

Option 2: Stop Channel Request (HTTP)

HTTP

POST `https://www.googleapis.com/youtube/v3/playlistItems/stop?`

`part=snippet`

Authorization: Bearer `1/cT...Zk`

Content-Type: `application/json; charset=UTF-8`

`{"id": "88...2d"}`



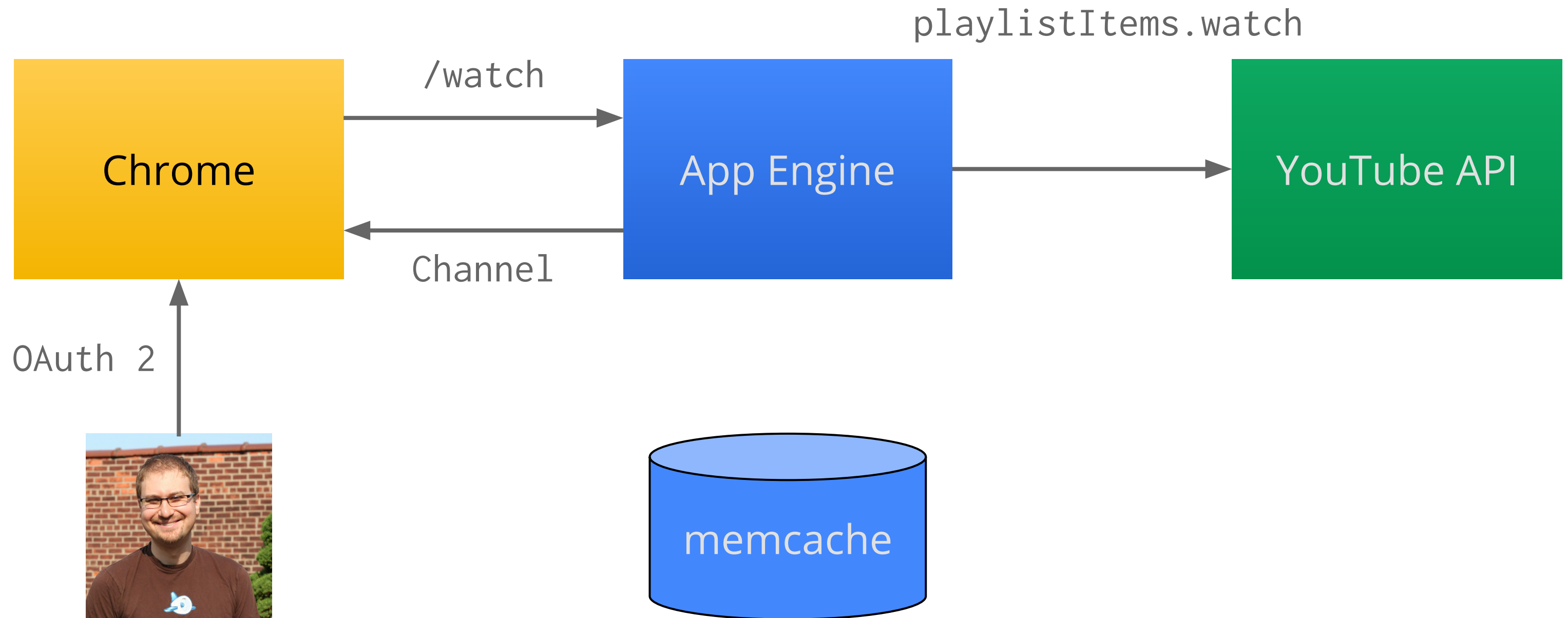


Working with Push Notifications

Sample Application

Demo App: Chrome Extension

Watch



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Demo App: Chrome Extension

Watch

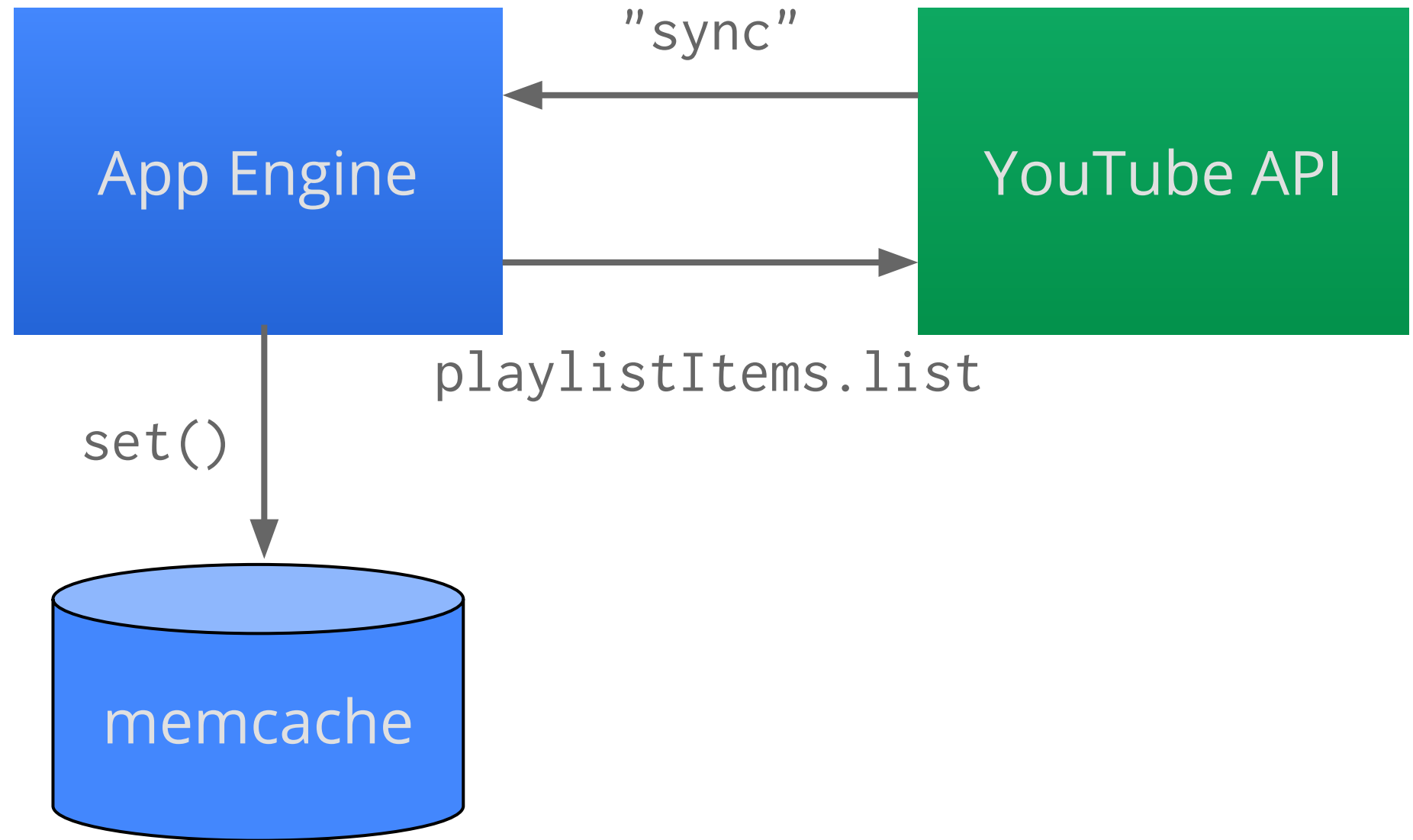
Python

```
youtube.playlistItems().watch(  
    playlistId=playlist_id,  
    part="snippet",  
    body={  
        "type": "web_hook",  
        "address": "https://mywebbapp.com/notifications",  
        "token": playlist_id,  
        "id": str(uuid.uuid4())  
    }  
).execute()
```



Demo App: Chrome Extension

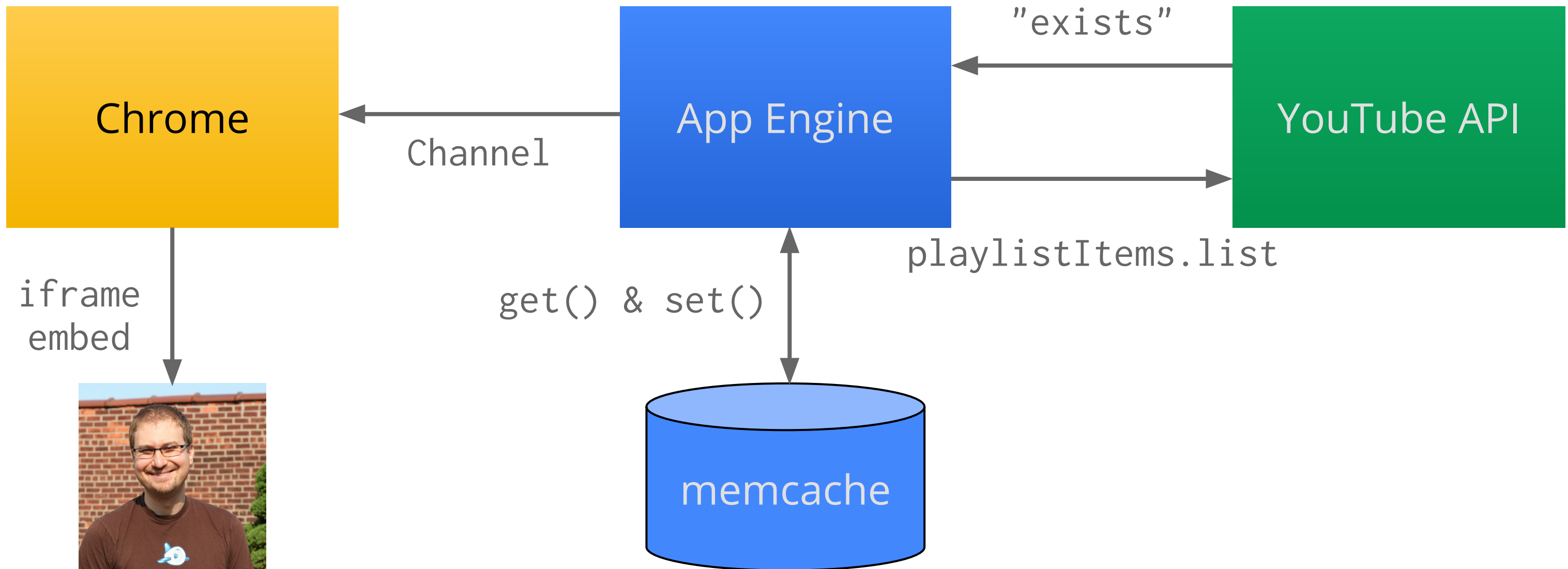
"sync"



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Demo App: Chrome Extension

"exists"



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Demo App: Chrome Extension

Handling Notifications

Python

```
playlist_id = self.request.headers["X-Goog-Channel-Token"]
video_ids = set()
request = youtube.playlistItems().list(playlistId=playlist_id,
    part="snippet", maxResults=50)
while request:
    response = request.execute()
    for playlist_item in response["items"]:
        video_ids.add(playlist_item["snippet"]["resourceId"]["videoId"])
    request = youtube.playlistItems().list_next(request, response)
```



Demo App: Chrome Extension

Handling Notifications

Python

```
channel_id = self.request.headers["X-Goog-Channel-Id"]
if self.request.headers["X-Goog-Resource-State"] == "sync":
    memcache.set(channel_id, video_ids)
elif self.request.headers["X-Goog-Resource-State"] == "exists":
    previous_video_ids = memcache.get(channel_id)
    memcache.set(channel_id, video_ids)
    new_video_ids = current_video_ids - previous_video_ids
    if new_video_ids:
        # Notify Chrome extension of new videos.
```



Google APIs Client Libraries

General Availability

Java

Objective-C

Python

Beta

.NET

JavaScript

PHP

Alpha

Go

Ruby

GWT

Dart

Node.js



<Thank You!>

developers.google.com/youtube • google.com/+YouTubeDev

Slides at <http://goo.gl/s3gej>

google.com/+JeffPosnick

google.com/+YanivInbar





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