

“The Netflix of sports”

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Wie zijn wij?

- Henk van de Crommert is consultant bij Microsoft Consulting Services. Hij houdt zich bezig met het ontwerpen, plannen en realiseren van custom applicaties in het algemeen en Azure en SharePoint in het bijzonder.
- Erwyn van der Meer is consultant bij Microsoft Consulting Services. Hij houdt zich bezig met het ontwerpen, verbeteren en testen van custom applicaties op Azure.

Wie is de klant?

- ...Is een nederlandse startup
- ... heeft de ambitie om de grootste te worden in next-gen video
- ...heeft ervaring in de wereld van sportwedstrijden
- ... heeft de middelen en de connecties, maar niet de kennis of de mensen
- ... onderkent dat de manier van tv kijken veranderd
- ...ziet mogelijkheden om het concept te toetsen in de Amerikaanse markt
- ... wil een kwaliteitsproduct neerzetten

A photograph of a crowd of Chilean football fans at night. In the foreground, a young man on the left is shirtless and wears a blue and white beanie with 'CHILE' written on it. Next to him, a woman wears a hat shaped like a red and white soccer ball and a blue scarf, blowing into it. Other fans in the background are also wearing Chilean-themed clothing and looking in the same direction. The scene is lit with warm, ambient light from the background.

Wat wil de klant?

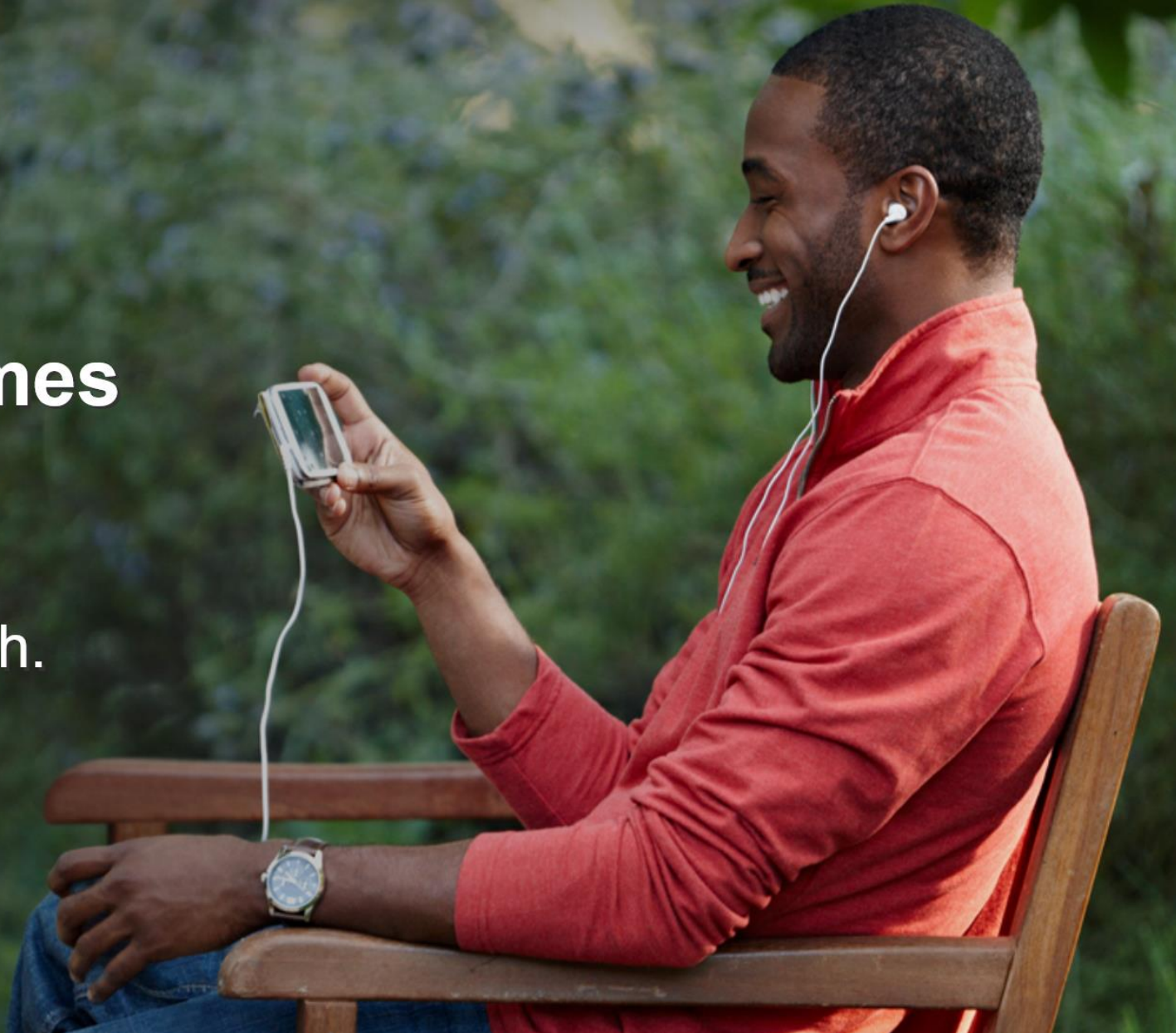
Kickoff session, juni 2014

NETFLIX

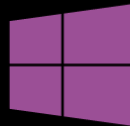
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Beschikbaar op ieder mobiel apparaat



Opleverdatum: 1 September, 2014.

Filosofie vanuit de klant

- De traditionele aanpak is geen optie.
- Grootse ambities vereisen grote partners.
- Succes wordt bepaald door de schaalgrootte en executiesnelheid.

A background image for a Netflix advertisement showing a person's hand resting on their knee while sitting outdoors, with a blurred green background.

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Wat heb je nodig?

- web site
- Mobile app
- On-demand video
- Statistieken / sportdata
- Social login (Facebook, Google)
- Gebruikersbeheer
- Abonnementen
- Verzamelen credit cards
- Handmatige en periodieke betalingen
- Correspondentie (email)

The background of the advertisement is a blurred image of a person sitting in a wooden chair outdoors, surrounded by green foliage. The person's hand is resting on their lap, and they are wearing blue jeans. The overall tone is relaxed and natural.

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..Netflix biedt geen sport..

- Live video
- Real-time statistieken
- Notificaties tijdens wedstrijden

A background image for a Netflix advertisement showing a person's hand resting on their knee while sitting on a wooden chair outdoors, with lush green foliage in the background.

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... en een solution is nog geen service....

- Monitoring van componenten
- Monitoring van video streams
- Portaal voor het beheren van gebruikers
- Regelmatige backup van gebruikersdata

A background image for a Netflix advertisement showing a person's hand resting on their knee while sitting on a wooden chair outdoors. The background is a soft-focus view of green foliage.

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En de business?

- Inzicht in gebruikers:
 - Registratie
 - Abonnement mutaties
 - Reviews
 - Telemetrie vanuit apps/web site
- Inzicht in kosten/baten
 - Infrastructuur
 - Dienstverlening
 - Abonnementen
 - Sales tax

opta



THE CAPITALS

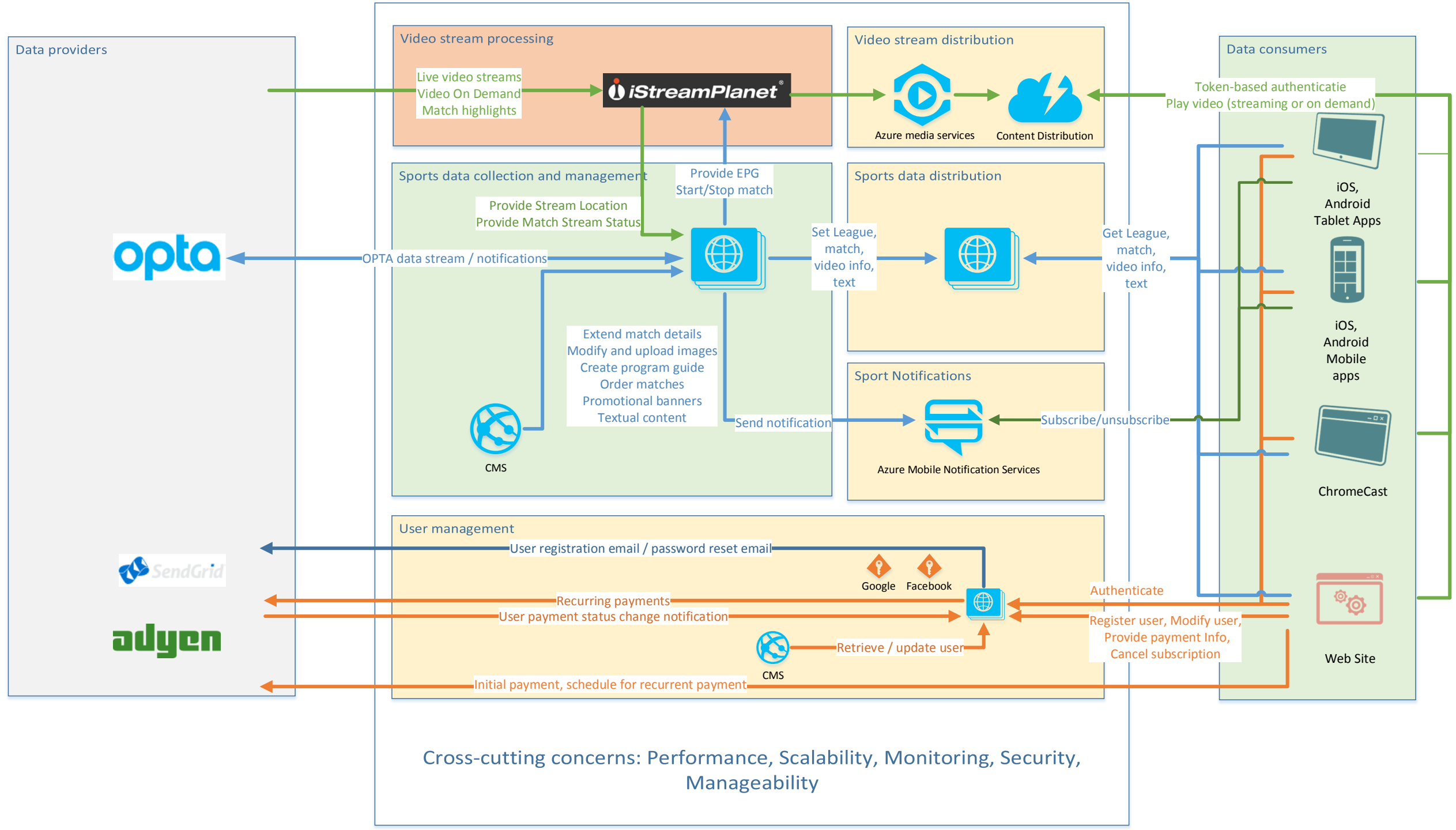


adyen

TAM / TAM



Level(3)



Architectuurprincipes

- Gebruik PaaS waar mogelijk.
- Houd rekening met een globale uitrol en schaal
- Minimaliseer IO
- Maximaliseer asynchroniteit

Video distribution

Live video streams are encoded by iStreamPlanet and packaged by Azure Media Services

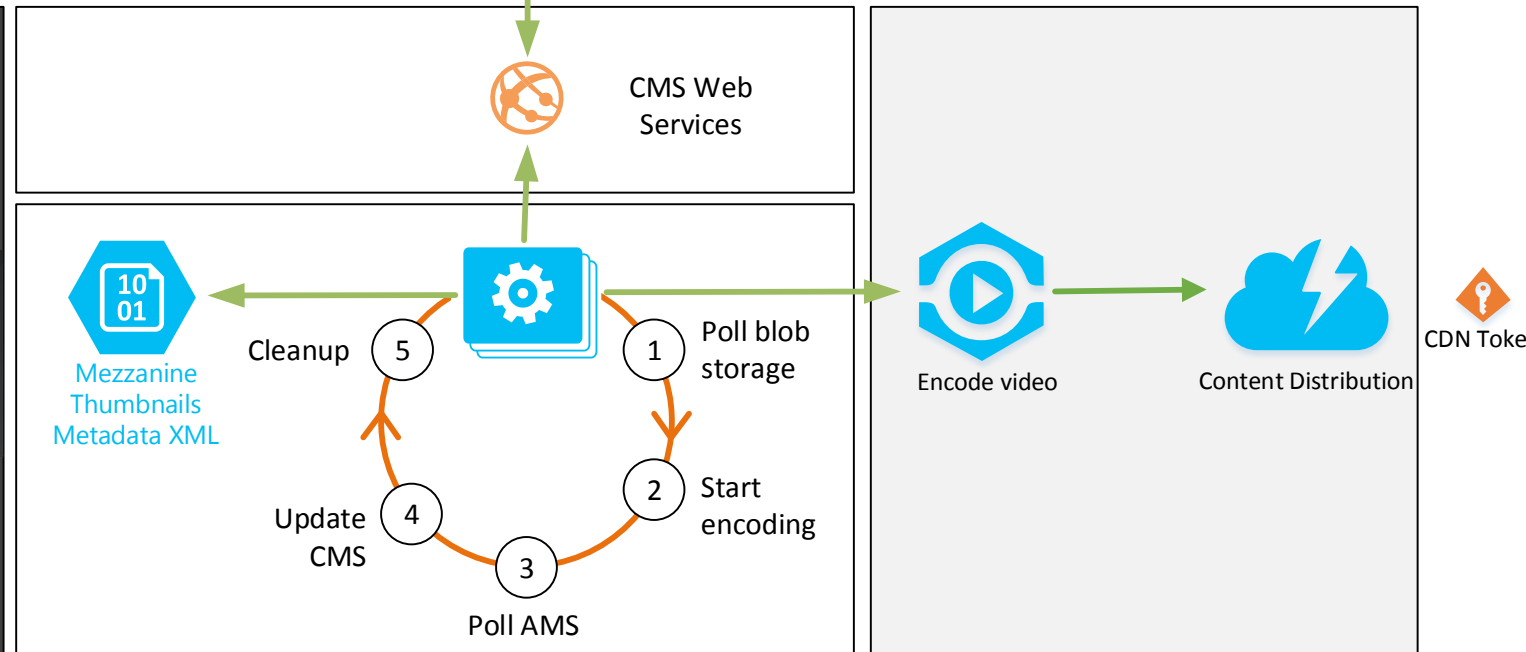
Level(3)

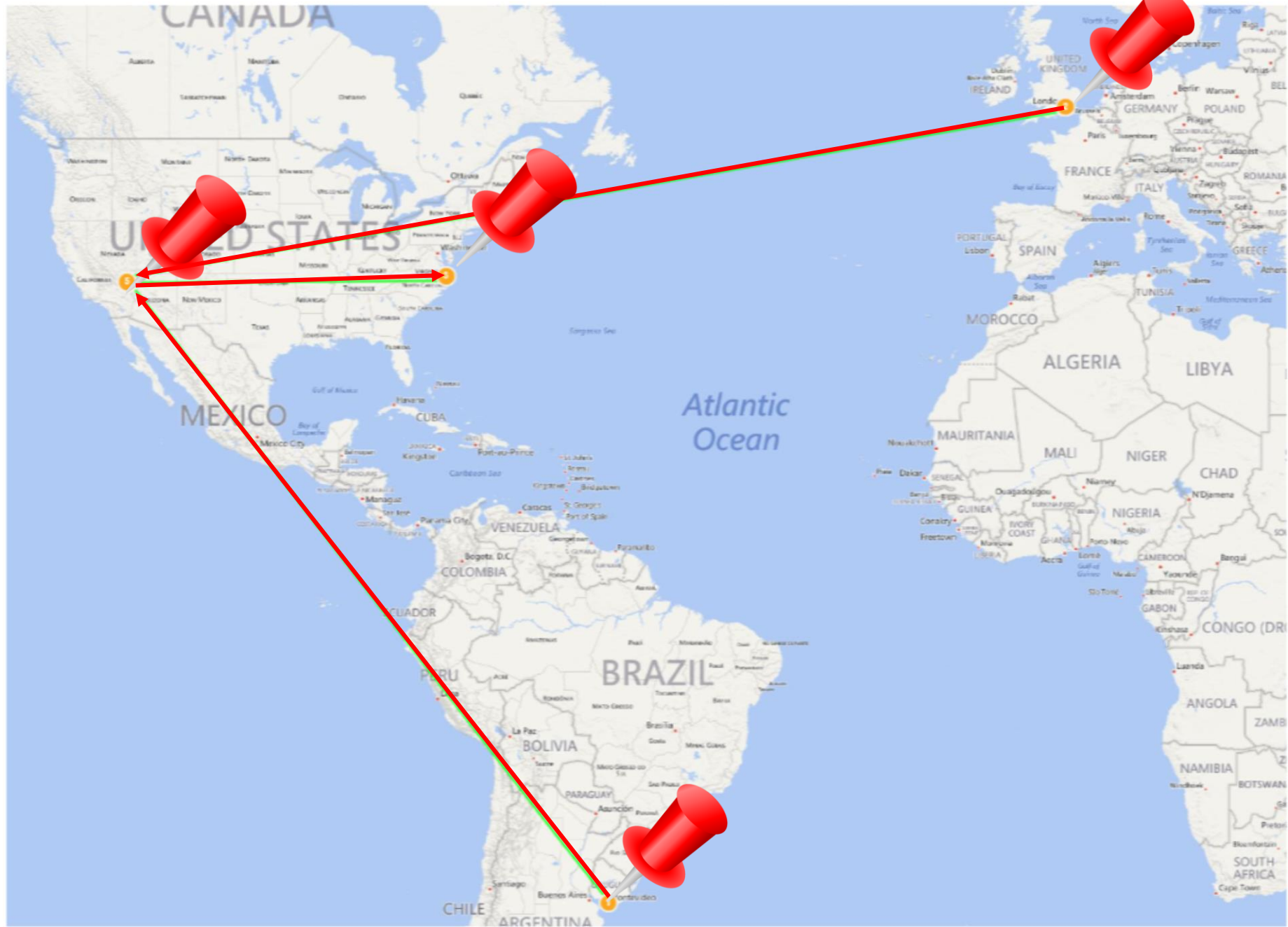
iStreamPlanet
THE LEADER IN LIVE

On-demand video is encoded and packaged by Azure Media Services

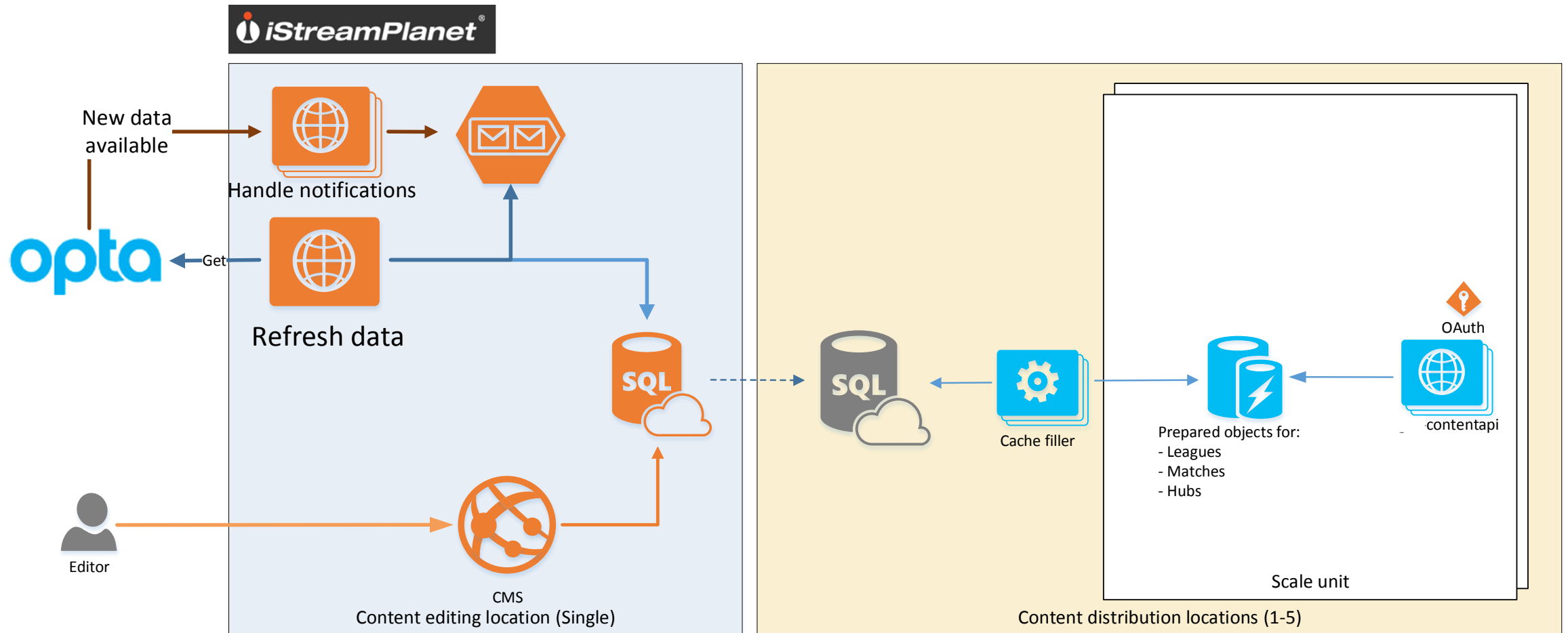
PERFORM
PROGRESSIVE SPORTS MEDIA

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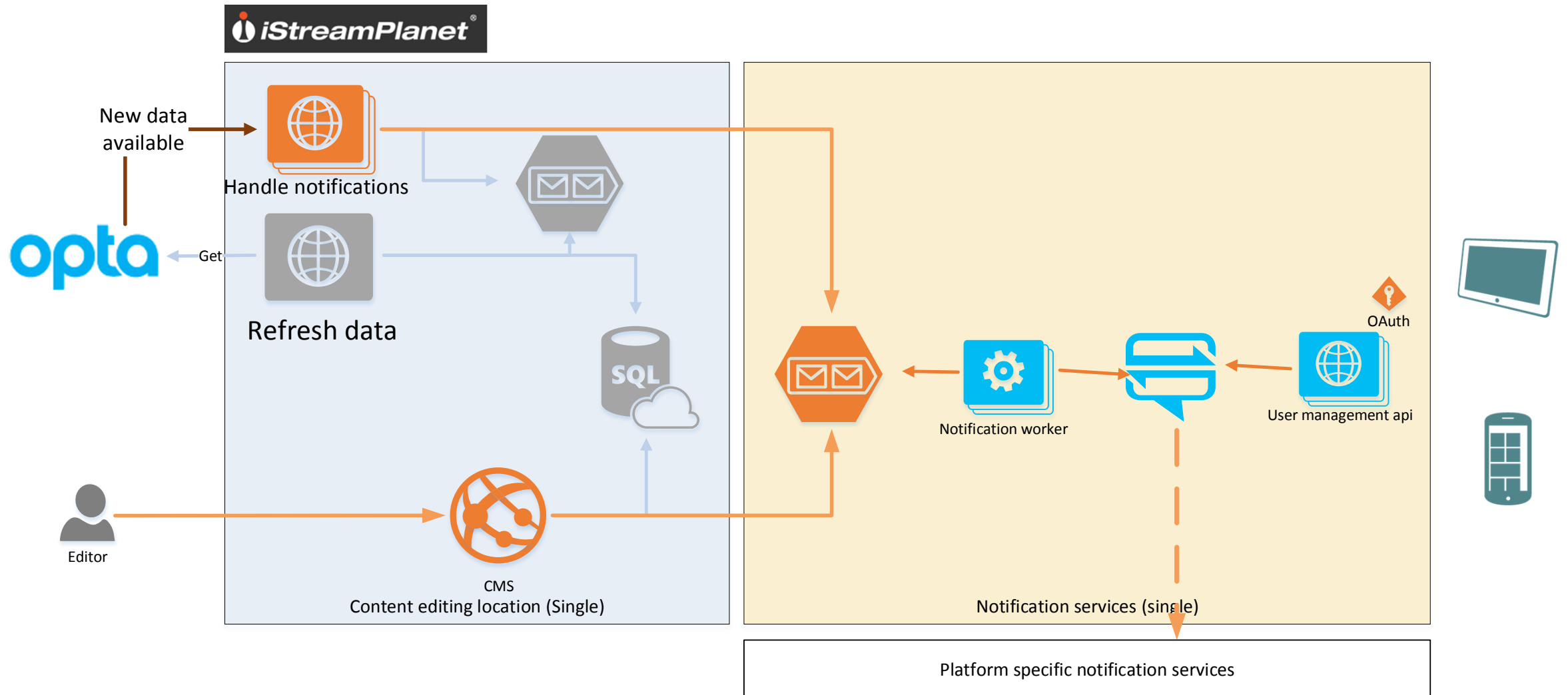




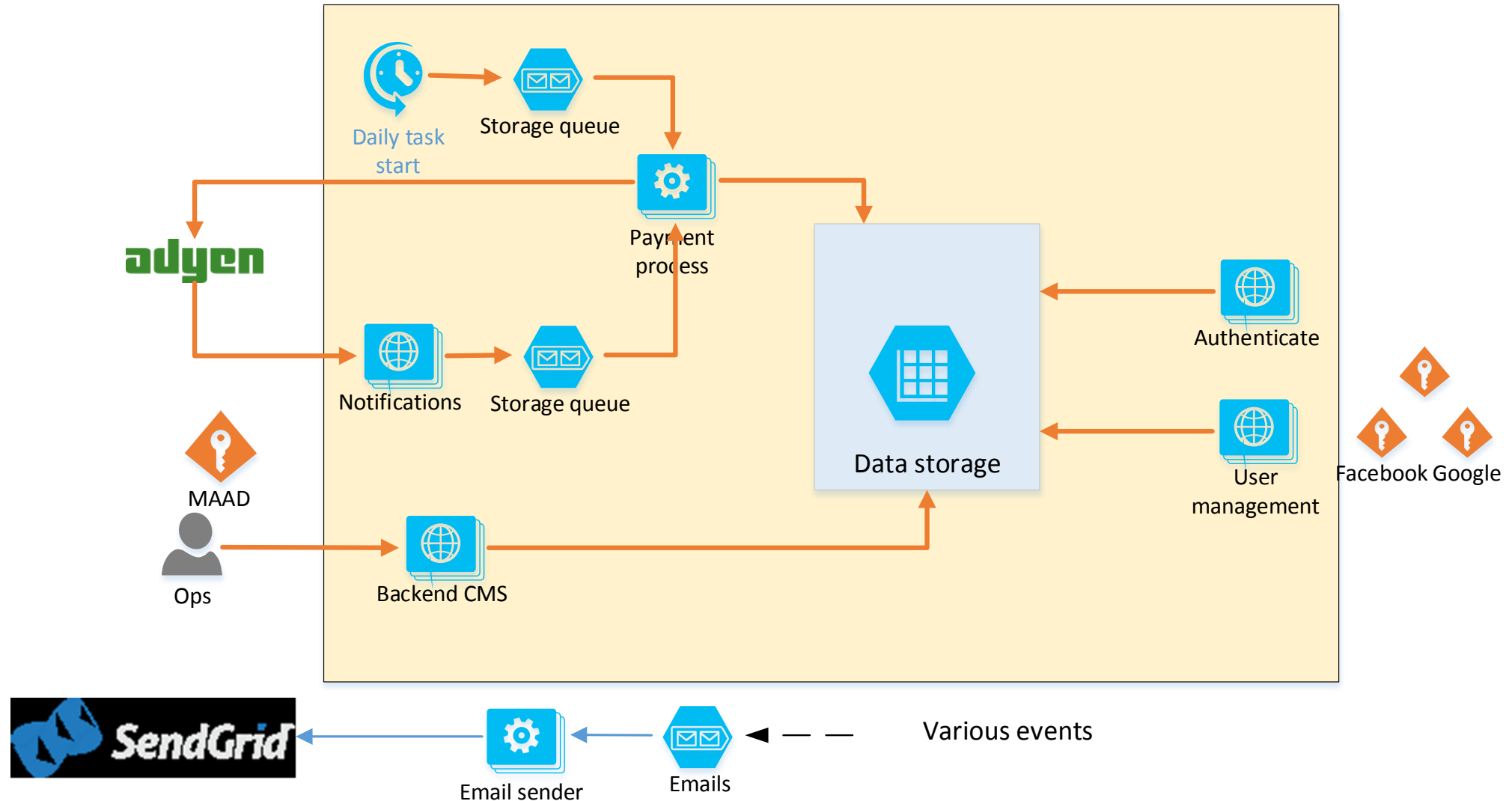
Sport statistics distribution

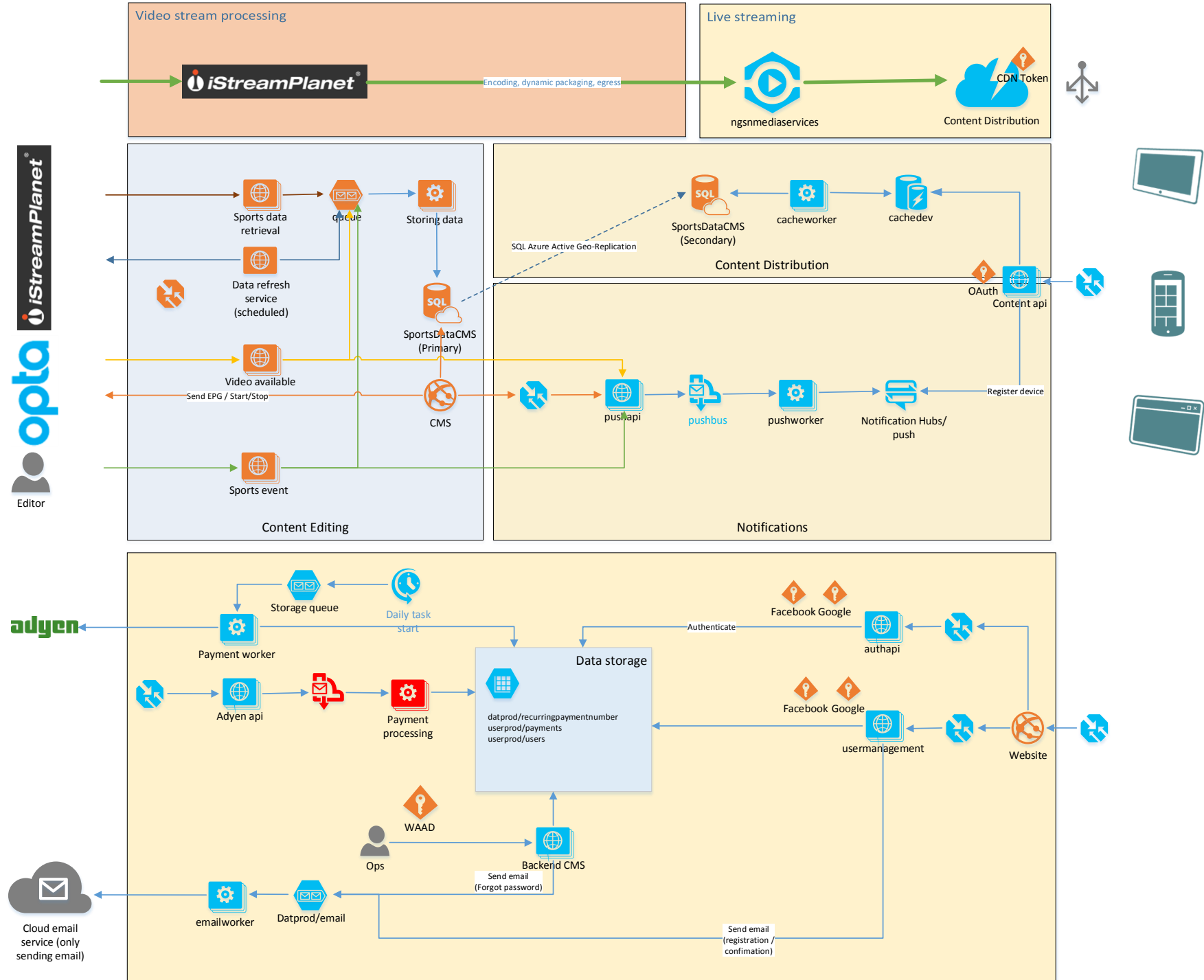


Sports notifications

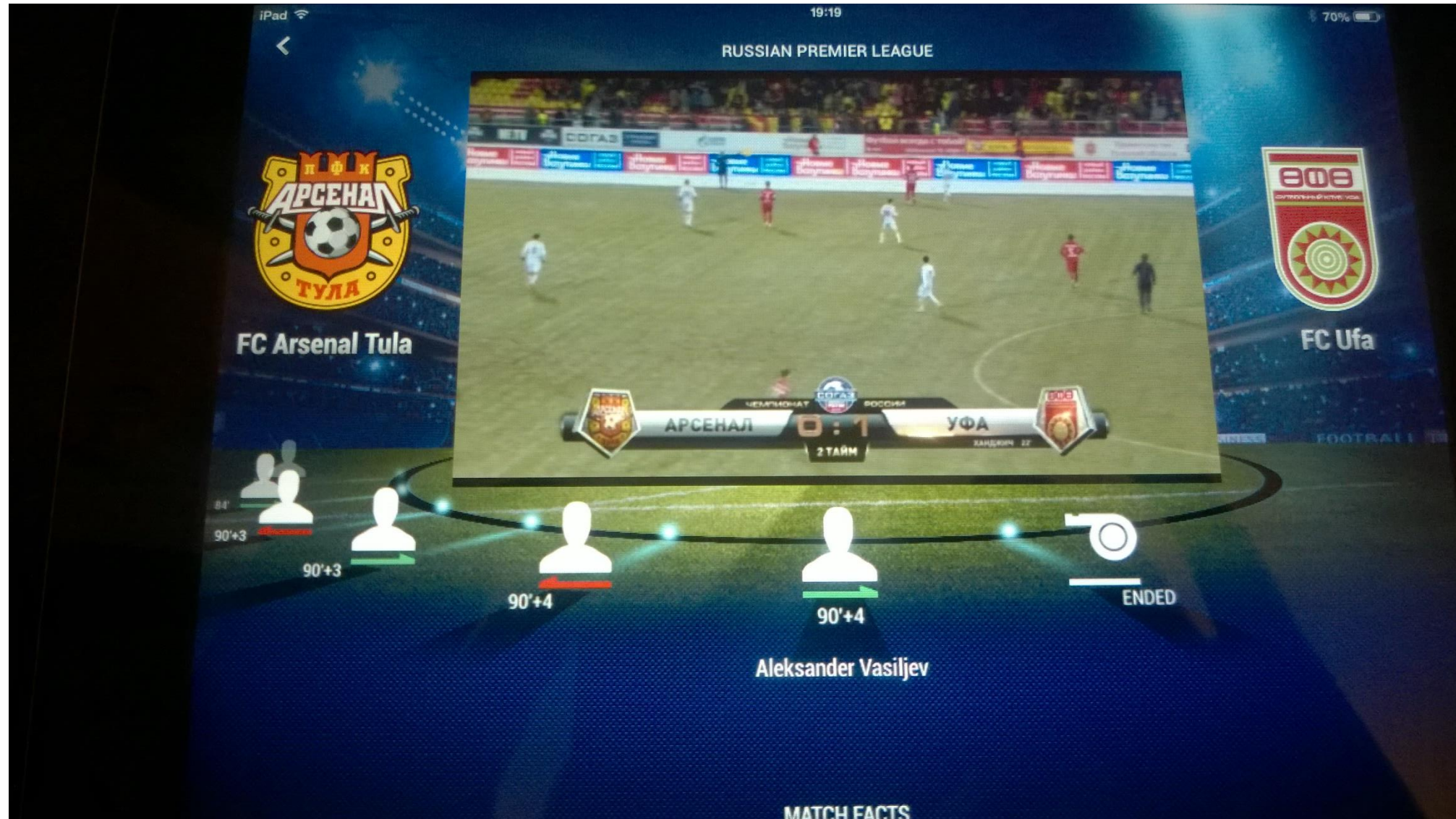


User & Payment management

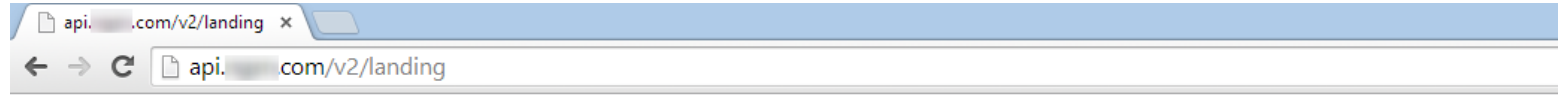




Sports Data Distribution aka Content API



Content API



```
[
  {
    "rounds": [
      {
        "round_number": 16,
        "matches": [
          {
            "id": 7947,
            "sort_order": 0,
            "state": "result",
            "starting_time": "2014-11-08T01:30:00Z",
            "league_id": 21,
            "round": 16,
            "club_home": {
              "id": 238,
              "name": "Querétaro",
              "logo": "https://az693845.vo.msecnd.net/club-logos/images/4047.png"
            },
            "club_away": {
              "id": 251,
              "name": "Monarcas Morelia",
              "logo": "https://az693845.vo.msecnd.net/club-logos/images/1289.png"
            },
            "score_home": 2,
            "score_away": 0,
            "minute": 95,
            "formatted_minute": "90'+5"
          },
          {
            "id": 7948,
```

Live match data

- Quick updates
 - multiple times per minute
- Potentially millions of connected devices

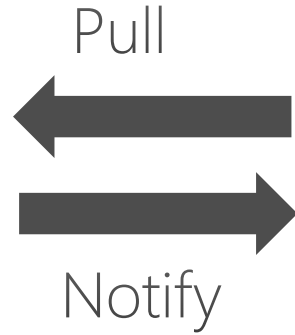


⇒ High performance and scalable web service needed

Data source



External sources



Sports CMS
Azure Web Site

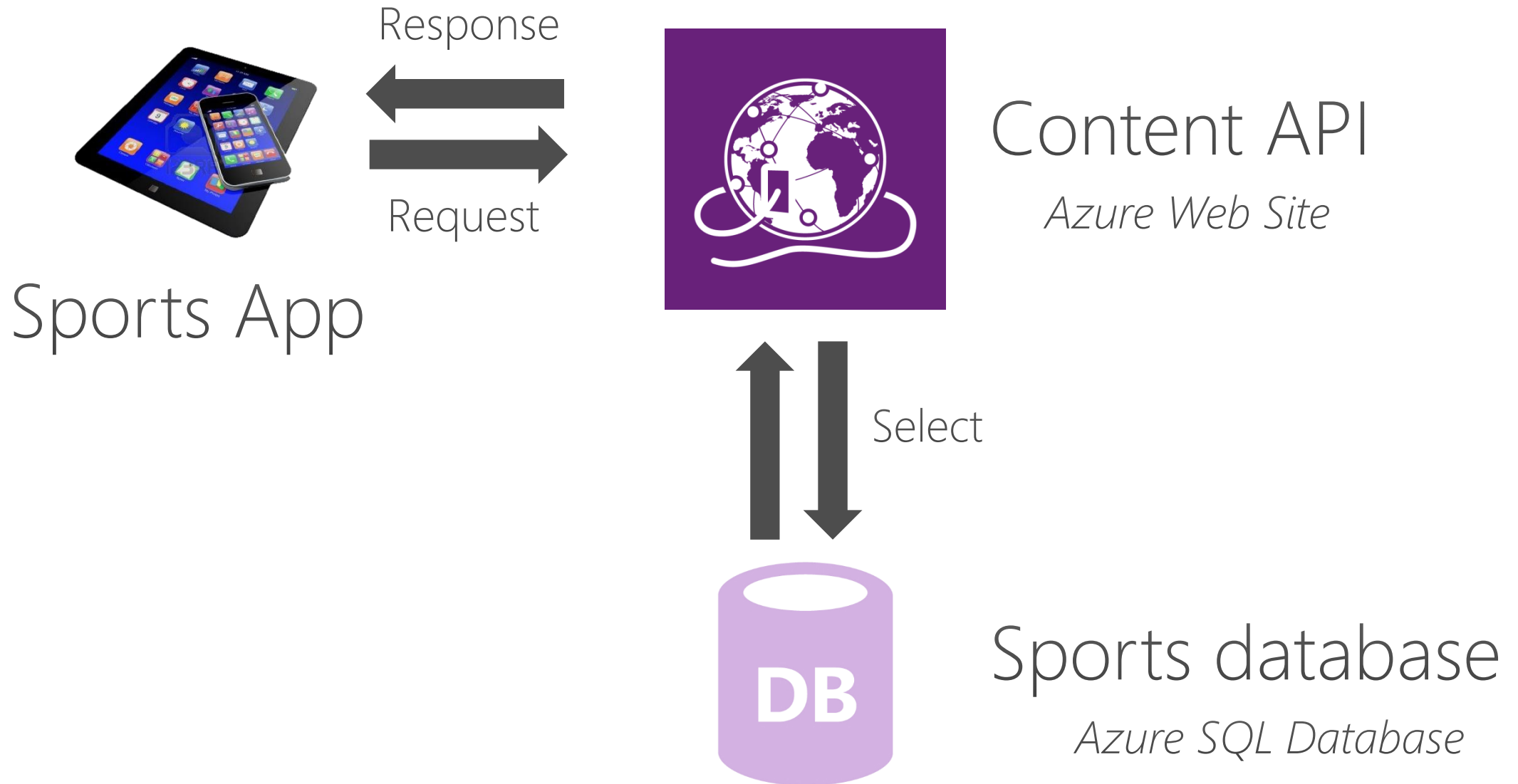


Insert/update



Sports database
Azure SQL Database

Naive approach



Scale



Sports App



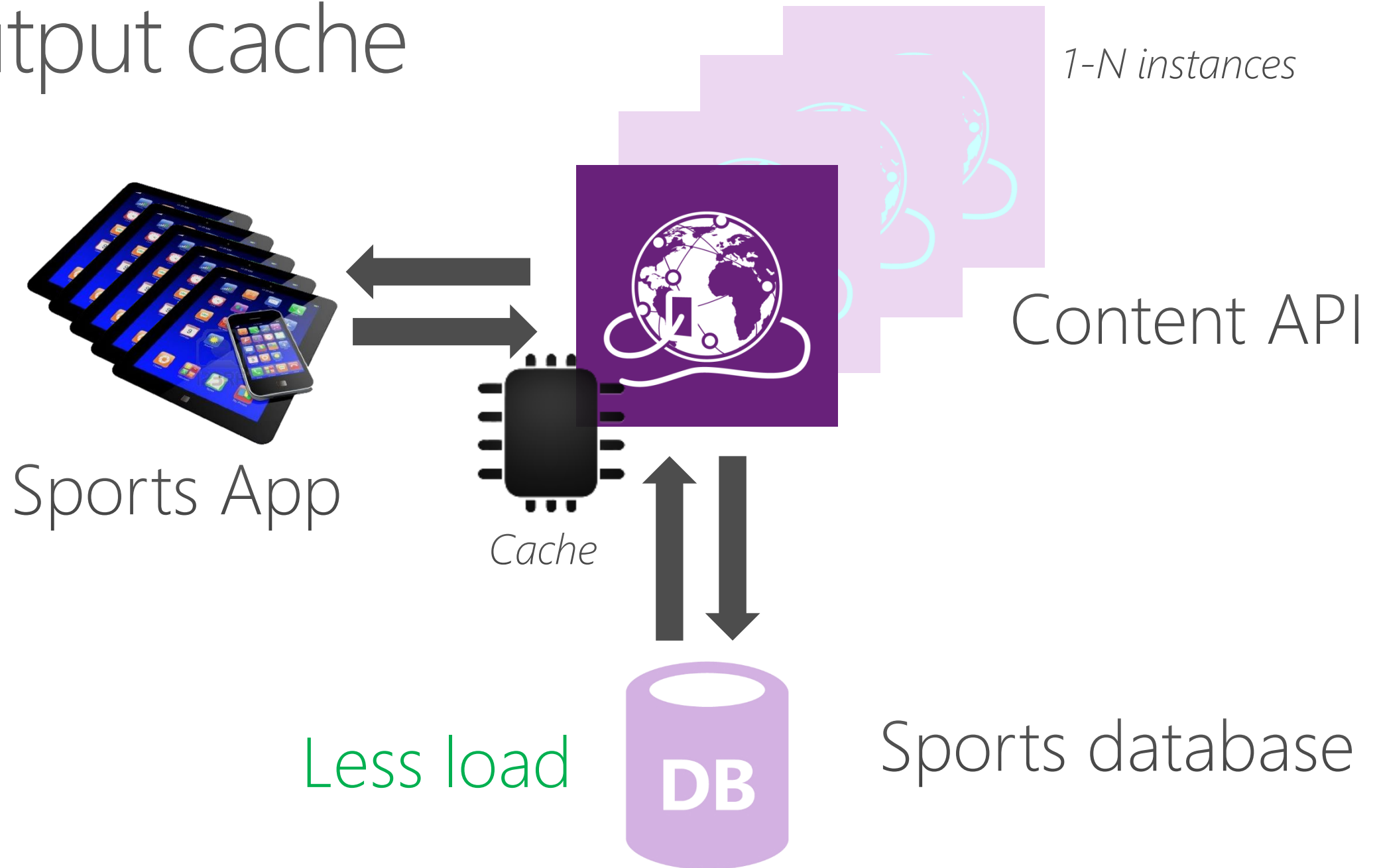
Content API



Sports database

Overload!

Output cache



Output cache improvements

- ASP.NET Web API is lacking good output caching
- Some open source available
- Make sure not all threads for similar requests go into calculation when content expires
⇒ Block all threads except one

Even better:

- Soft-block using async
- Return slightly stale data for other requests while one thread calculates new content for one request

Problem solved?

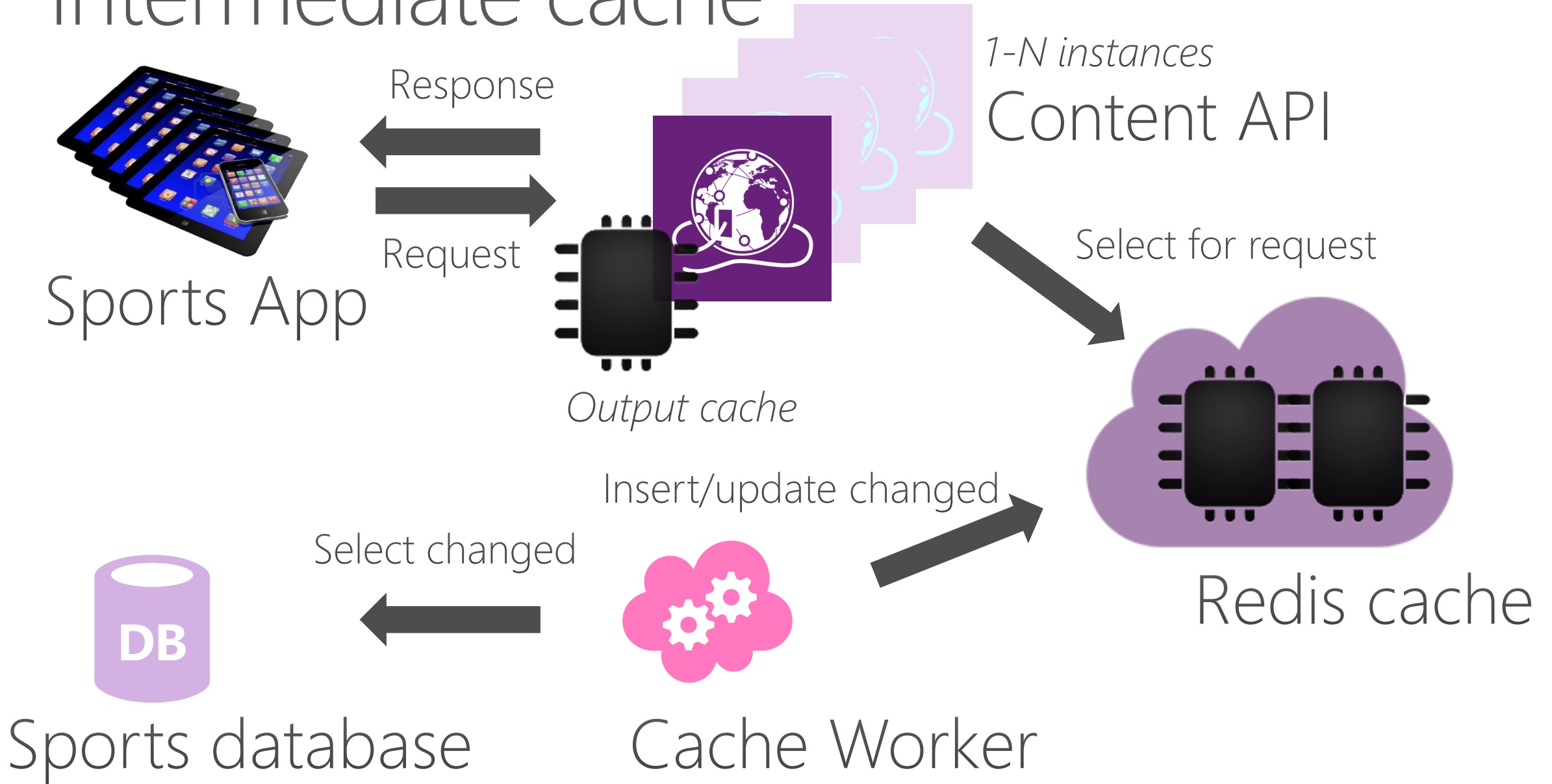
😊 Reduces load on SQL

😞 Still large complex queries to fulfill requests

😞 But it still increases linearly with number of requests!

😐 How to update cache quickly enough?

Intermediate cache



Redis cache considerations

😊 Reduces load on SQL

😊 Constant load on SQL

😊 Redis cache contains intermediate hierarchical format

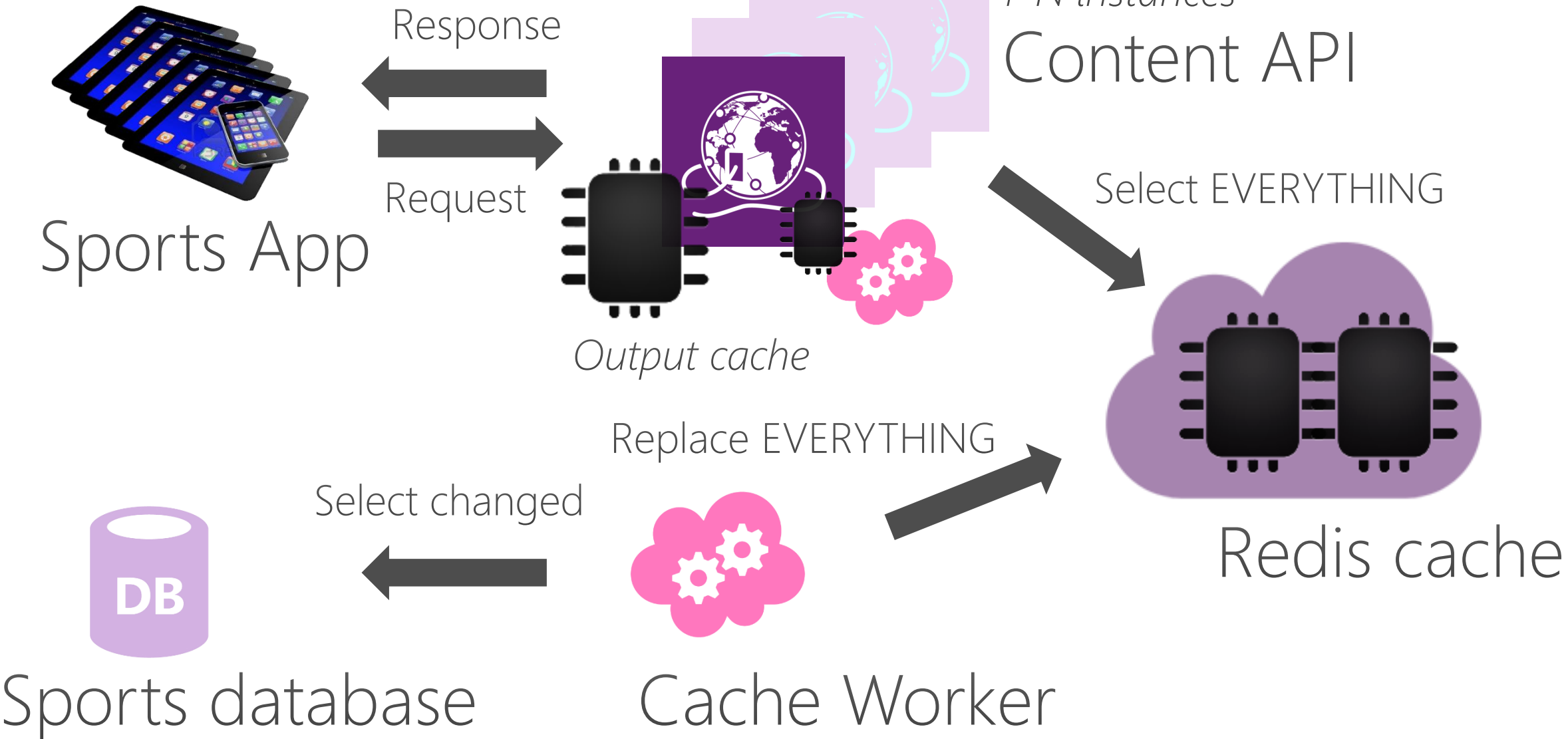
😊 Redis cache has query language

All good??

Redis cache downsides

- ☹️ Redis cache is still a single machine (+ hot standby)
- ☹️ Network bandwidth is a bottleneck
- ☹️ You have to use expensive “large” cache to get more bandwidth
- ☹️ You need more than one cache to scale (scale units)

Best approach



Performance results

CacheWorker	0	1202	Match: Incremental update for 1 cache instances of 0 modified out of 1939 Match items completed. Delta fetched in 00:00:00.0890760. Cache update complete in 00:00:00.3448298.
CacheWorker	0	0	All 1939 Match serialized in 3497693 bytes in 00:00:00.1007568, written to cache [REDACTED]leprod2.redis.cache.windows.net:6380 after 00:00:00.2484789

contentapi-su1-	0	0	Local Cache constructed in 00:00:00.4544566 @ machine RD000D3A1083B6.
contentapi-su1-	0	0	Total length 13450 for 1 serialized Hub objects from Redis @ machine RD000D3A1083B6.
contentapi-su1-	0	0	Total length 3497693 for 1939 serialized Match objects from Redis @ machine RD000D3A1083B6.
contentapi-su1-	0	0	Total length 26038 for 10 serialized League objects from Redis @ machine RD000D3A1083B6.

Content API maximum throughput

Per A3 website instance for Content API

- Very diverse content mix in loadtest
- 95+% CPU utilization
- 1500 requests per second
- Disk IO < 1 MB/sec
- Network IO 50-200 Mbps
- Redis traffic in 750 kB/sec
- HTTP traffic out to test agents 10.5 MB/sec
- HTTP traffic in from test agents 840 kB/sec
- HTTP traffic in/out for CDN token logging (table storage) 40 kB/sec
- Physical memory utilization 35%
- 64-bit w3wp with 1 GB working set

Best approach for us

- 😊 Use Protobuf for fast/compressed serialization
- 😊 *All* data can be updated within a second
- 😊 Low network and CPU utilization
- 😊 Very fast in memory queries *on same machine* for requests not in output cache
- 😊 Only *one* Redis cache instances needed for many website instances
- 😊 Predictable bandwidth utilization to/from Redis cache

(Tussentijdse) resultaten

- Klant wil 'in beta' lanceren voor kerst
- 'In beta' lancering wordt begeleid met marketing campagne.
- De apps en de web site zijn 'bijna klaar'
- Backend services zijn klaar
- Support tooling is klaar
- Video komt regelmatig door
- Alle partijen gaan van 'project' naar 'support'odus

Op de backlog..

Backend:

- Nieuwe regio's
- Nieuwe sporten
- “package deals”
- Multi-datacenter
- Instant messaging
- Video calls
- Fantasy football

Client apps:

- Windows Phone
- Windows Tablet
- Xbox 360

