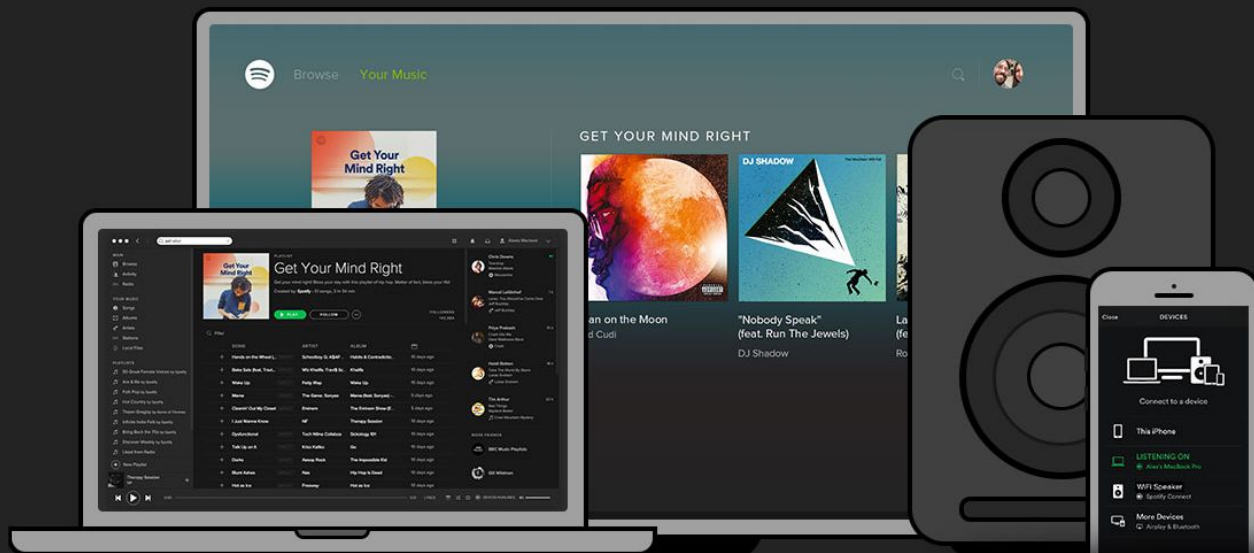




# Evolution of Spotify's Ads Architecture

A case study on evolving complex systems

Email : [kinshuk@spotify.com](mailto:kinshuk@spotify.com)  
Twitter : [@\\_kinshukmishra](https://twitter.com/_kinshukmishra)



# Play on all your devices

MOBILE - COMPUTER - TABLET - CAR - SPEAKER - PLAYSTATION® - TV - ANDROID WEAR - WEB PLAYER

# Go get the music.

Listen free.

Or go Premium to play on-demand, anywhere.

## Spotify

\$0.00 / month

Enjoy your favorite albums and artists, with occasional ads.

GET SPOTIFY FREE

## Spotify Premium

\$9.99 / month

Family and Student offers available

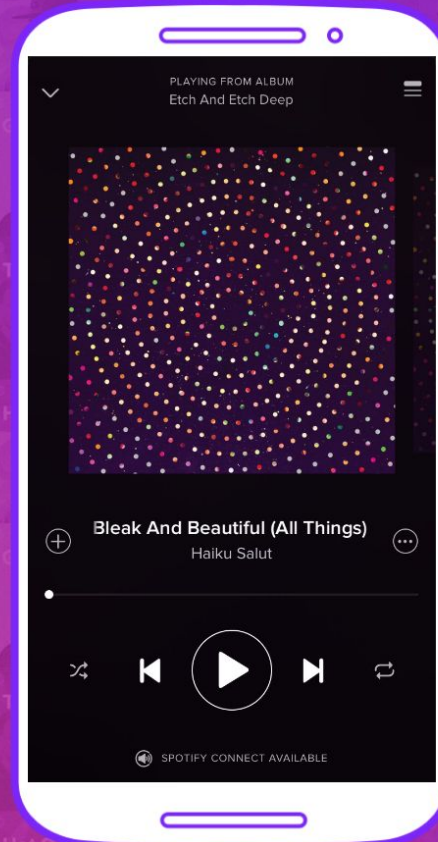
Play on-demand.

Listen offline.

No ads.

High quality audio.

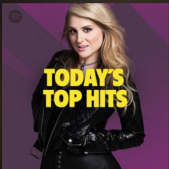
GET SPOTIFY PREMIUM





Verizon 12:21 PM

< ...



### Today's Top Hits

FOLLOW

3,923,986 FOLLOWERS • BY SPOTIFY

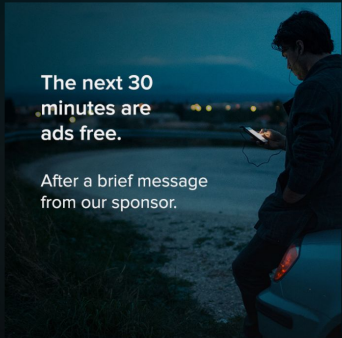
▶ SHUFFLE PLAY

INCLUDES

- Want To Want Me  
Jason Derulo • Want To Want Me
- Where Are Ü Now (with Justin Bieb...  
Jack Ü • Skrillex and Diplo present Jack Ü
- Hold My Hand  
Jess Glynne • Hold My Hand

AT&T 4:14 PM

ADVERTISEMENT



The next 30 minutes are ads free.

After a brief message from our sponsor.

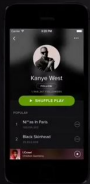
NO THANKS, I'LL KEEP THE ADS.

0:01 0:05

⏮ ⏸ ⏭

Verizon 12:10 PM

Spotify



0:04 0:15


⏮ ⏸ ⏭

Verizon 12:10 PM

ADVERTISEMENT

Listen ad-free and on-demand with **Premium.**

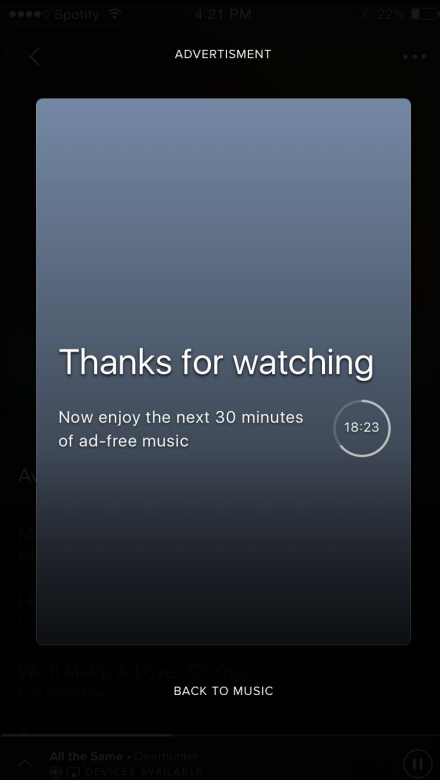
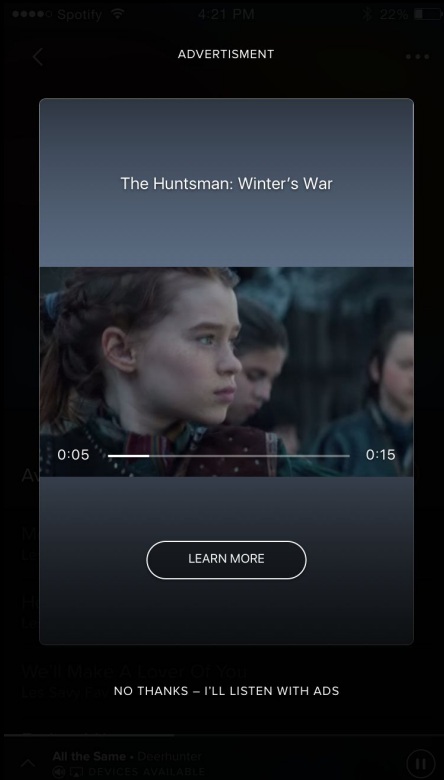
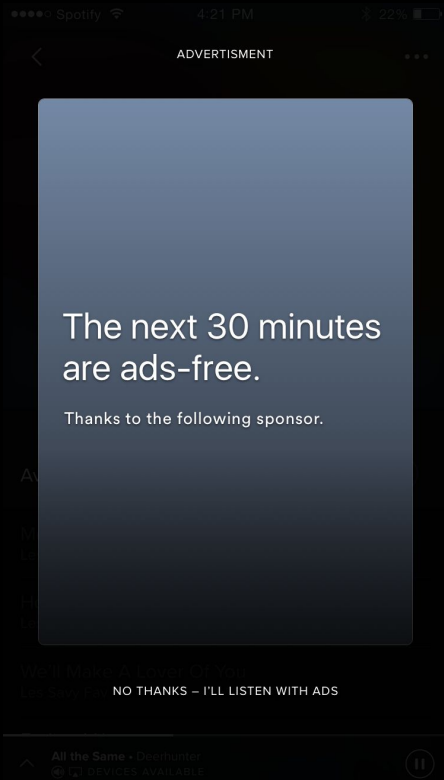
TRY PREMIUM FREE



Spotify  
Spotify

0:01 0:07

⏮ ⏸ ⏭



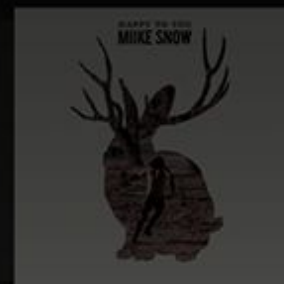


**FOSTER<sup>THE</sup> PEOPLE**

**NEW ALBUM SUPERMODEL**

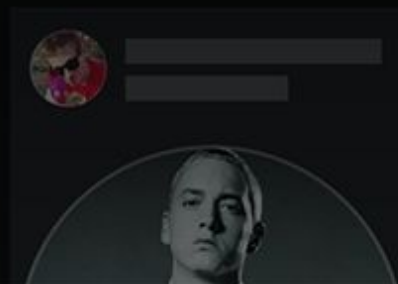
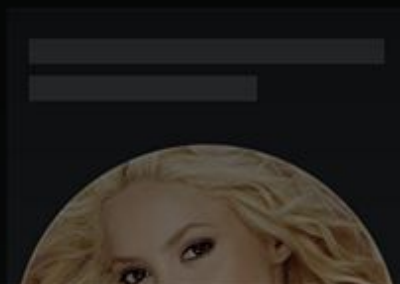
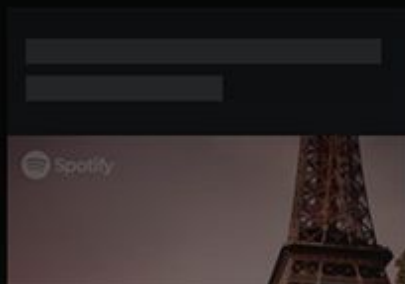
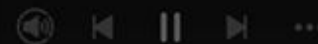
FEATURING "COMING OF AGE" & "BEST FRIEND"

LISTEN ON  Spotify

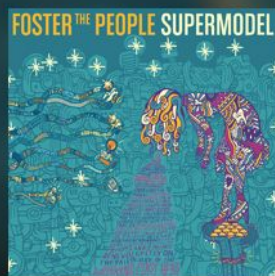


Happy To You  
Mike Snow

Enter The Jokers Lair







ALBUM

## Supermodel

Foster The People

Listen to the latest album from Foster The People.

▶ PLAY

+ SAVE

...

SPONSORED

OVERVIEW

CHARTS

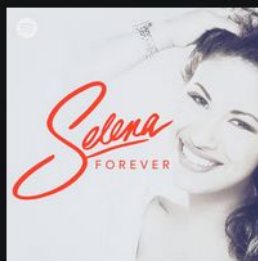
GENRES & MOODS

NEW RELEASES

NEWS

DISCOVER

Remembering a true Queen.



### Selena Forever

Remembering the Queen of Tex-Mex music on the 20th



### New Music Tuesday

The best newly released songs packed into one playlist. Updated



### Today's Top Hits

The 50 best from the world of music. Always fresh and always



### Latin American Indie

Nada más que lo mejor de la música indie latinoamericana



### Afternoon Acoustic

Unwind and let the afternoon unfold in all its acoustic glory



### Fresh R&B

The best of fresh R&B. Keep up to date with the hottest tracks right



**Why did Spotify evolve Ads  
architecture?**

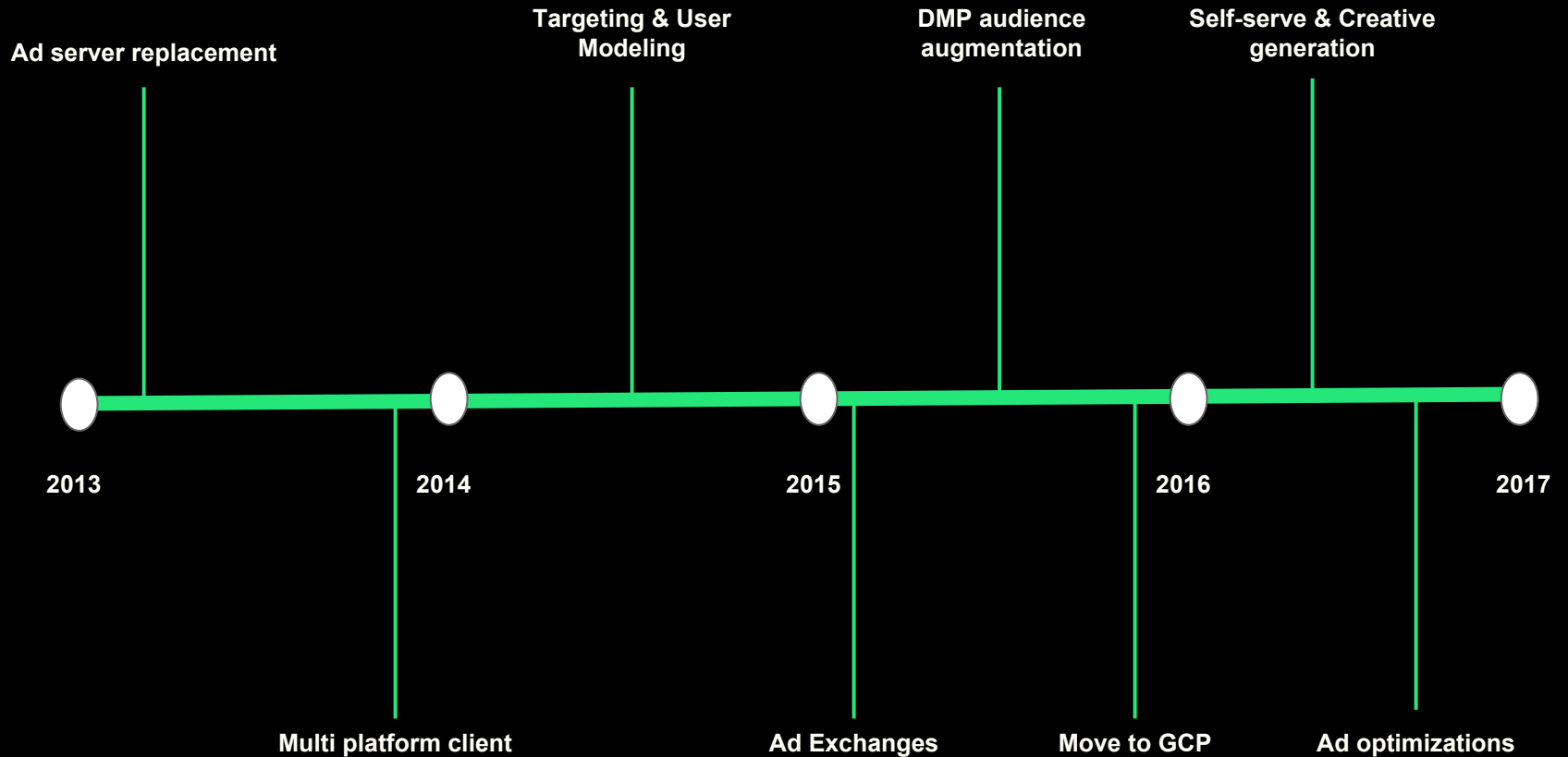
# Our new needs

- **Change in scale**
- **Emergence of new client platforms**
- **Cheap computing**
- **New ways to create demand**
- **New features to meet business objectives**

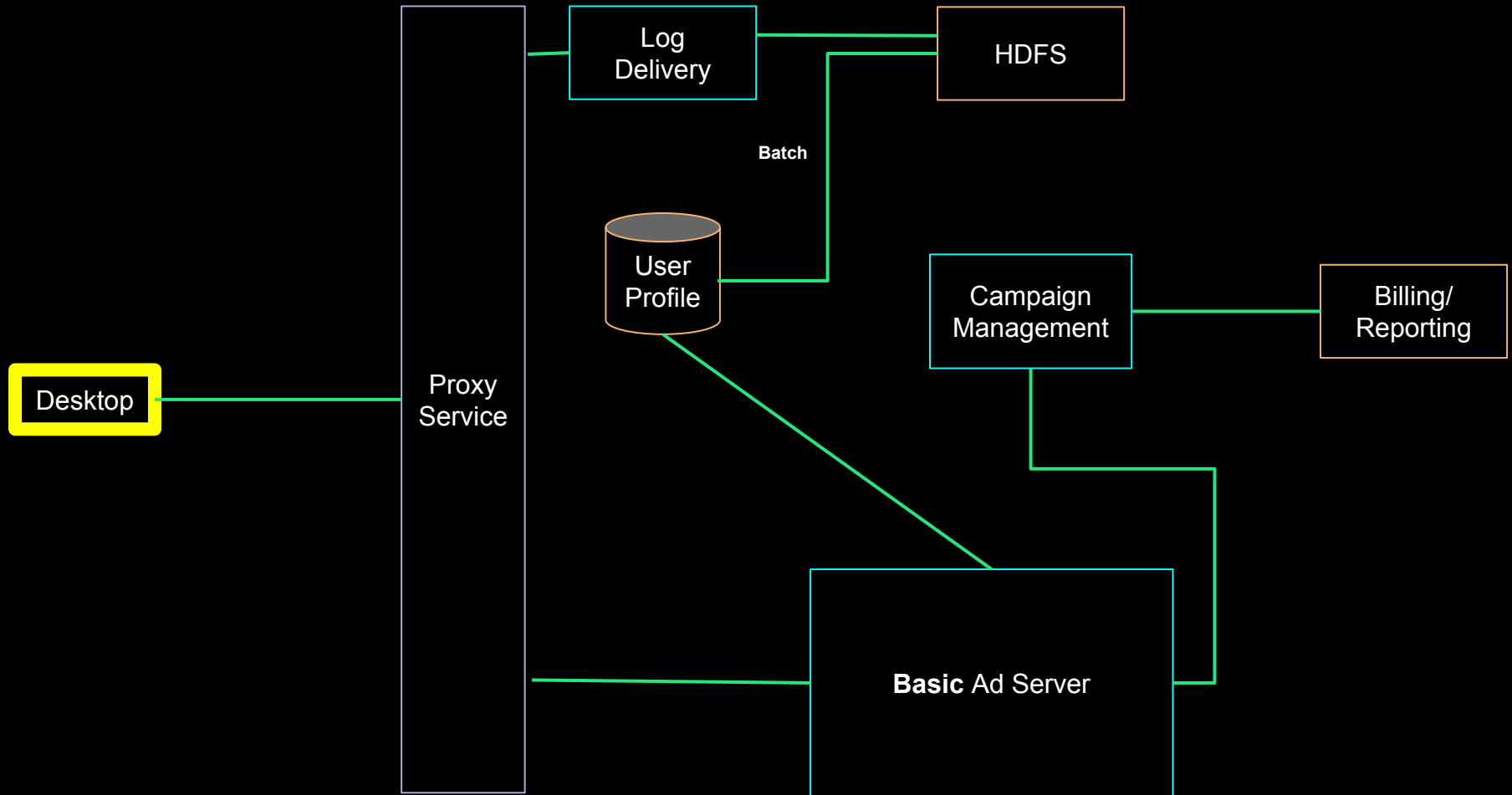
# Context of Spotify's Ads scale and challenges

- 70+ million MAU free users
- 60 countries
- 10+ billion ad impressions per month
- 10 ad formats over 3 media types (audio, video, display)
- Multi-platform (mobile, desktop, TVs, web)

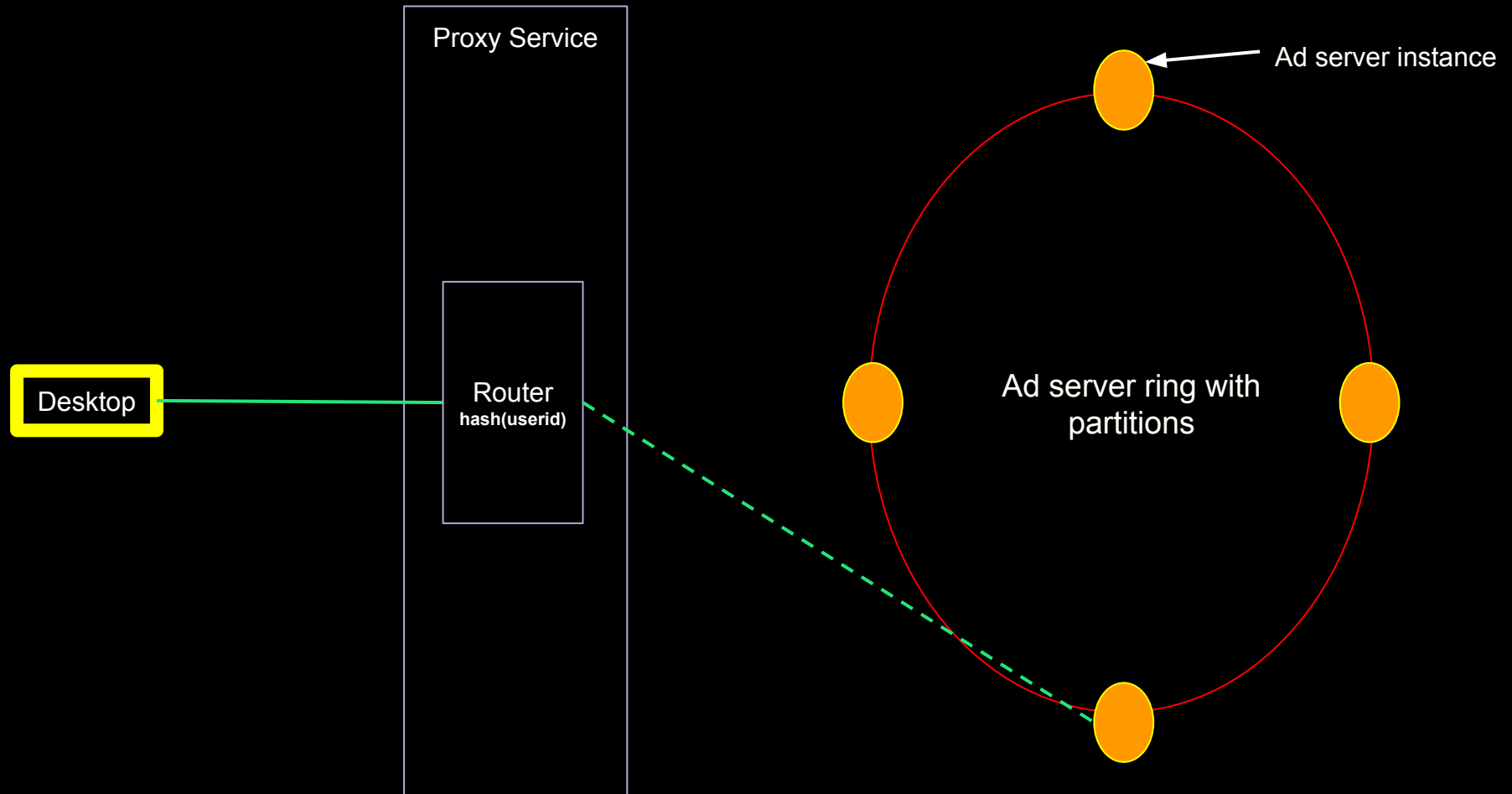
# Evolution timeline



# Circa 2013

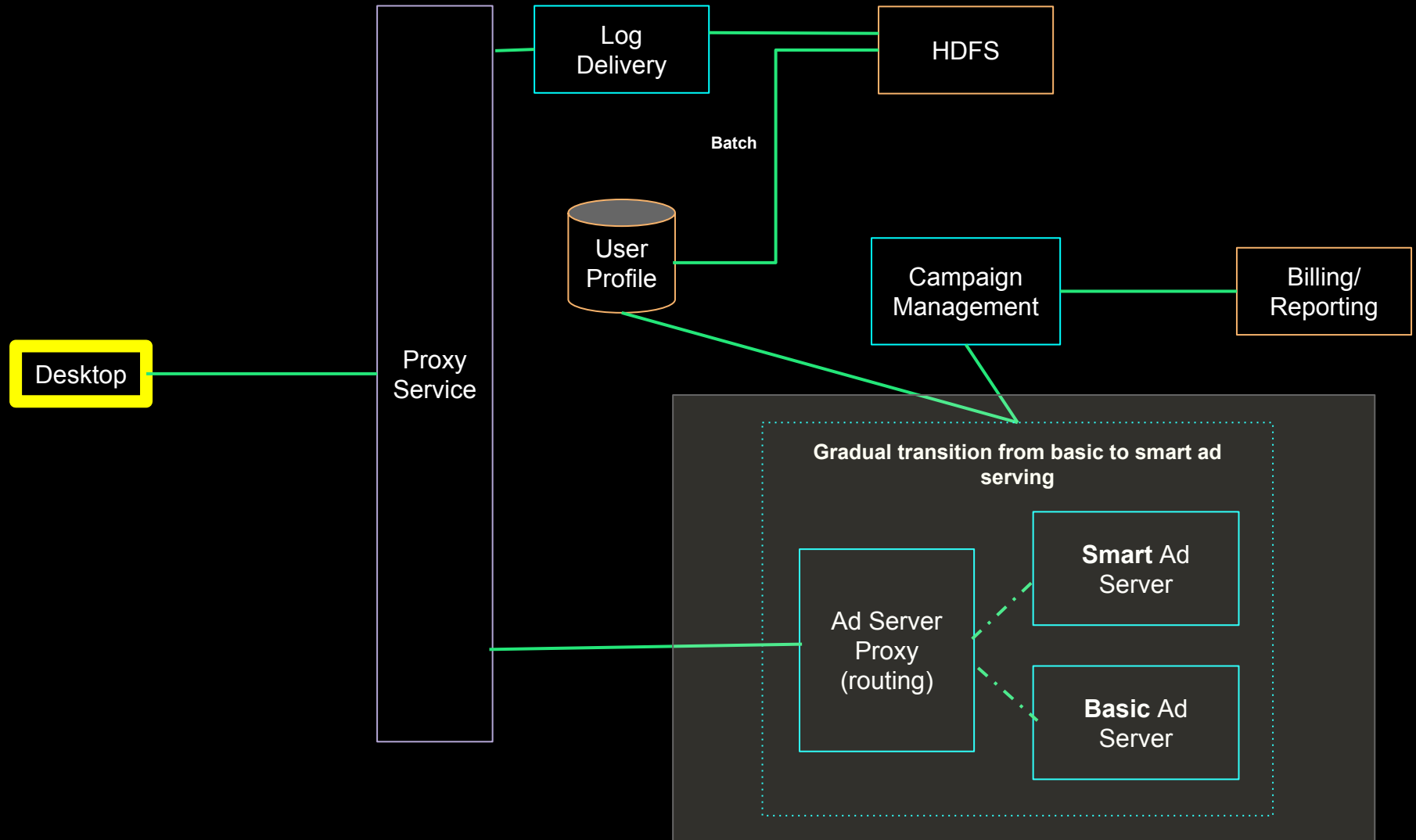


# Ad server design flaws

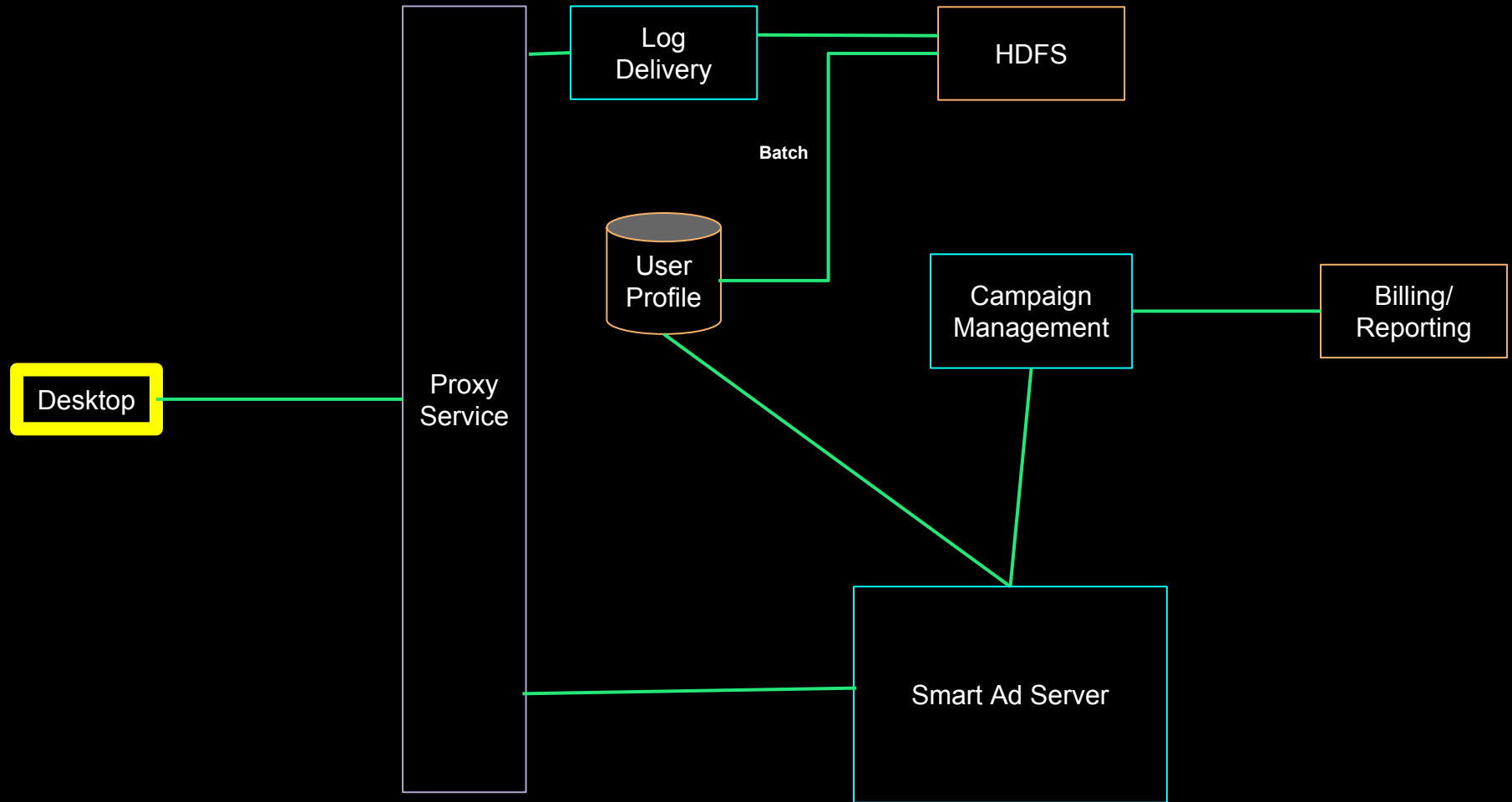




# During the ad server transition

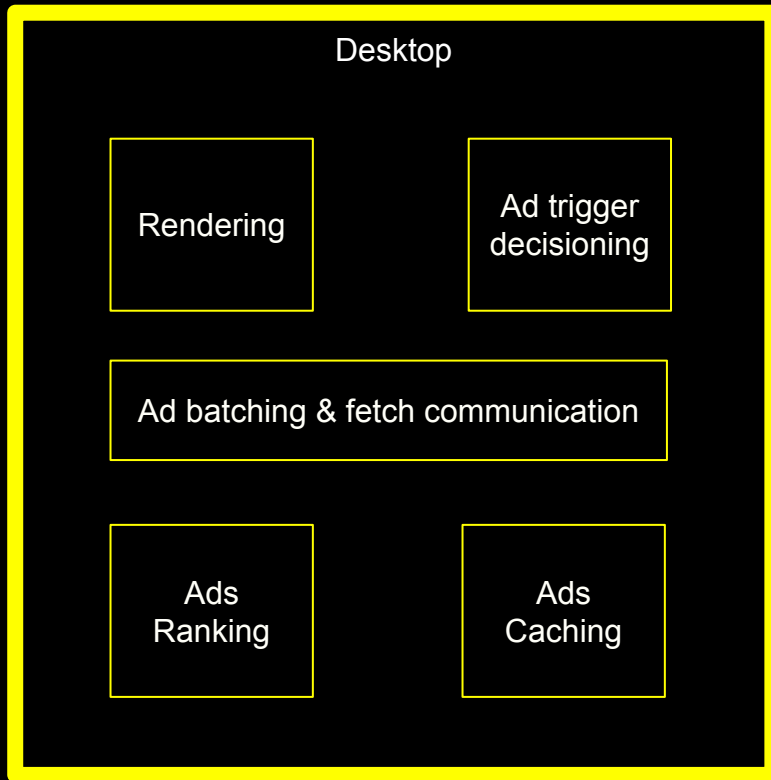


# After the ad server transition

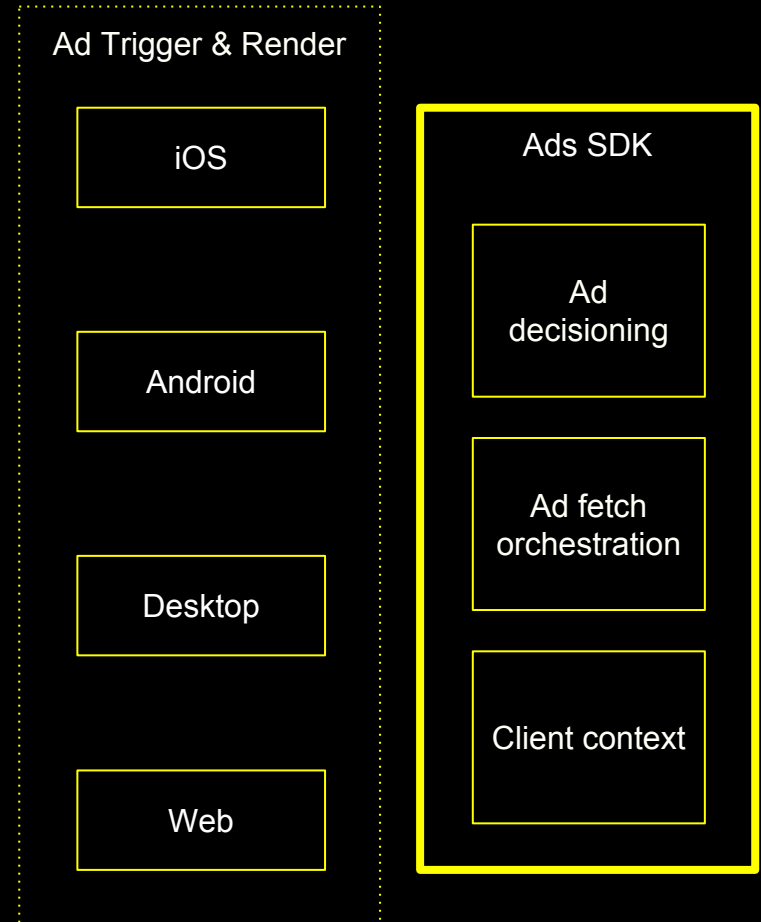


# Division of responsibilities

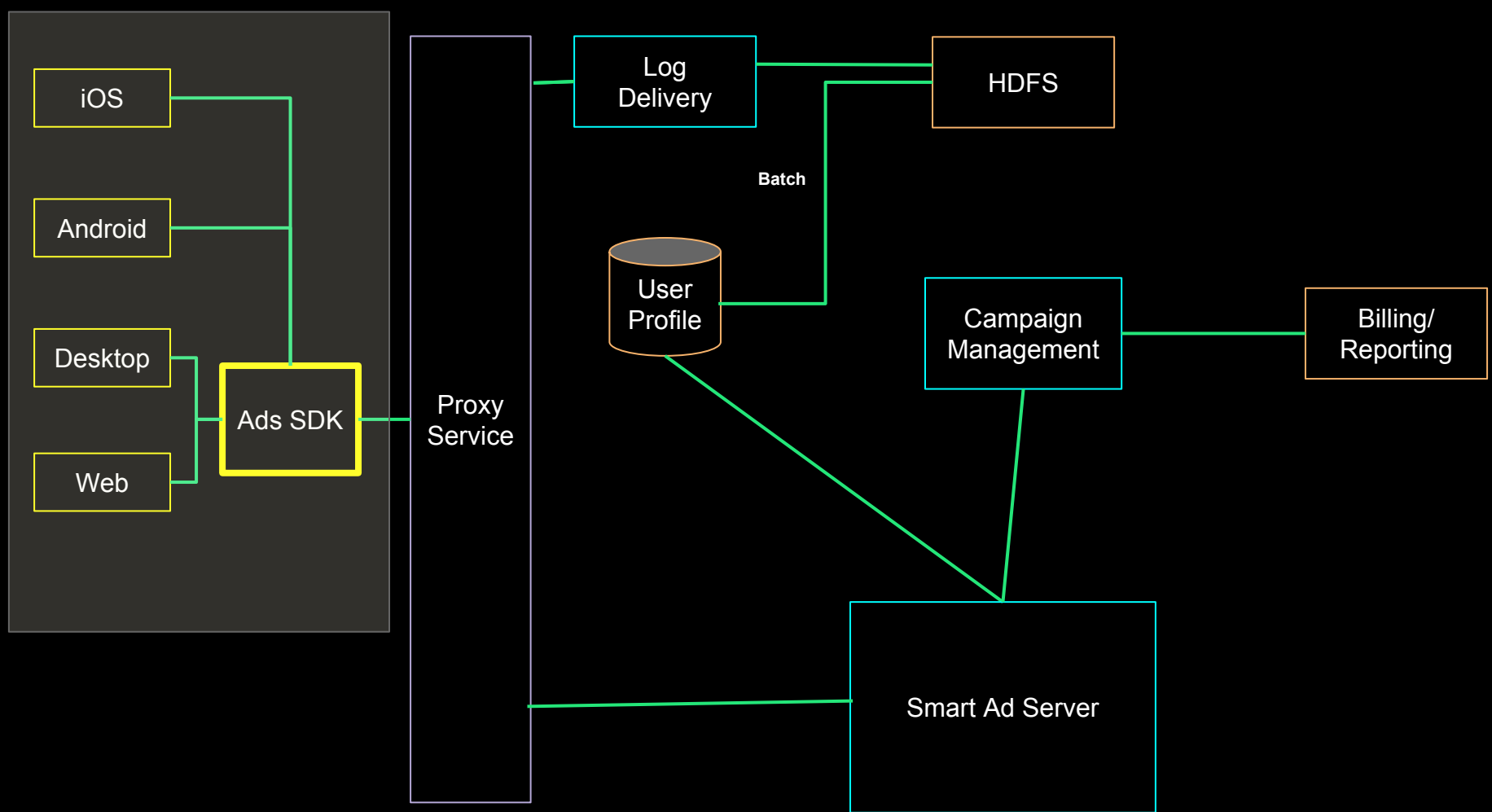
Before



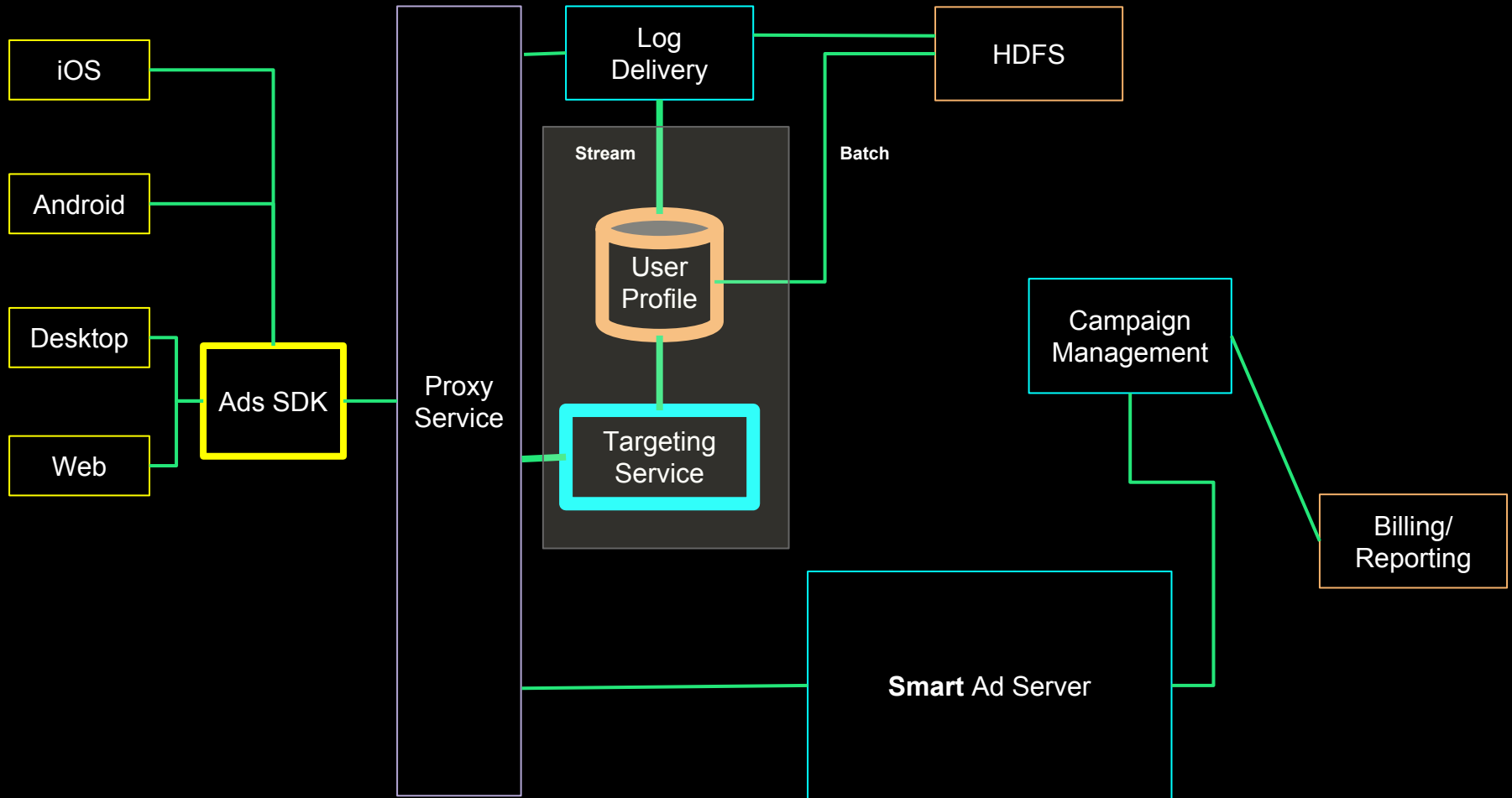
After



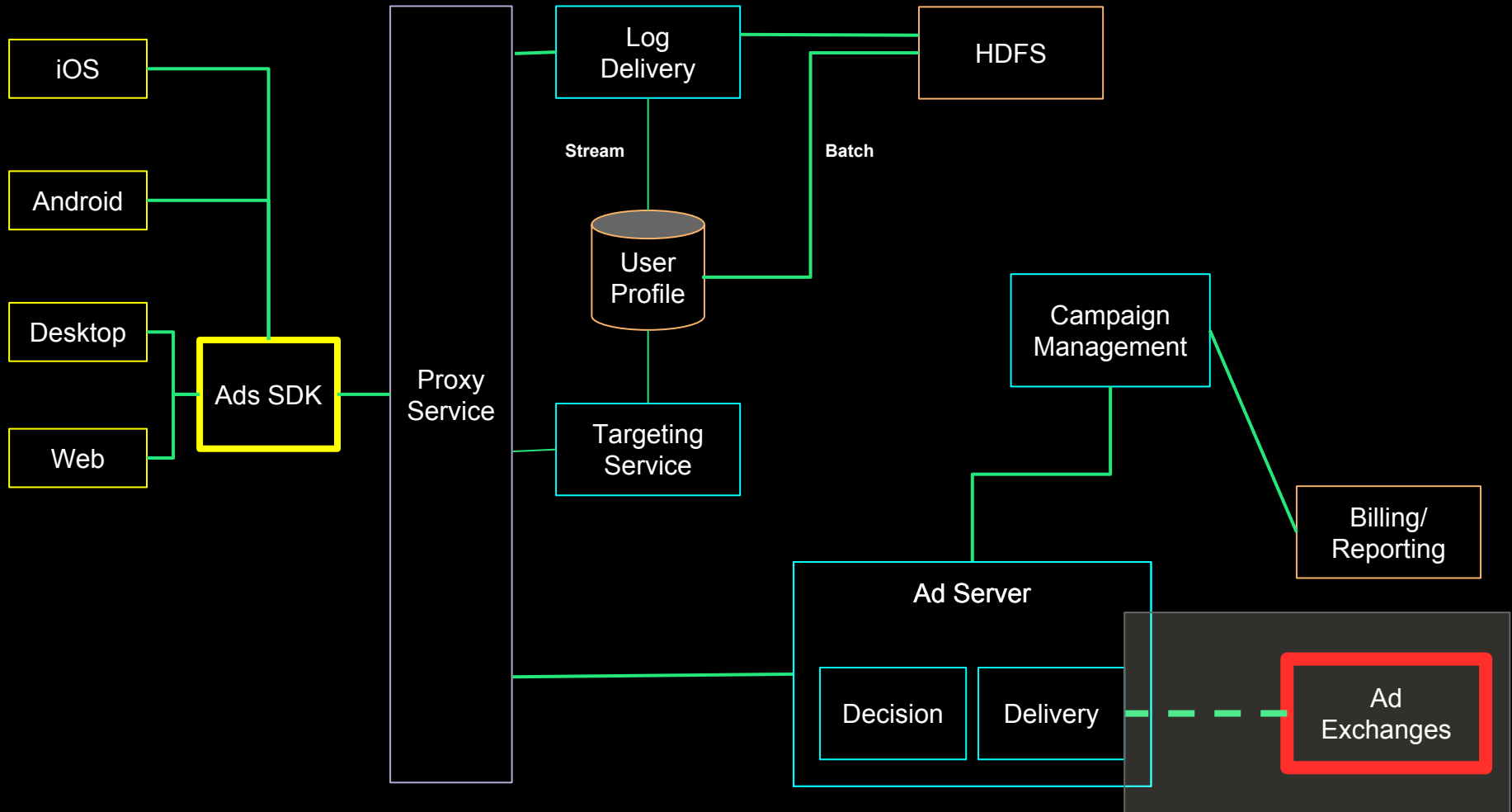
# Multi platform client design



# Targeting & User Modeling

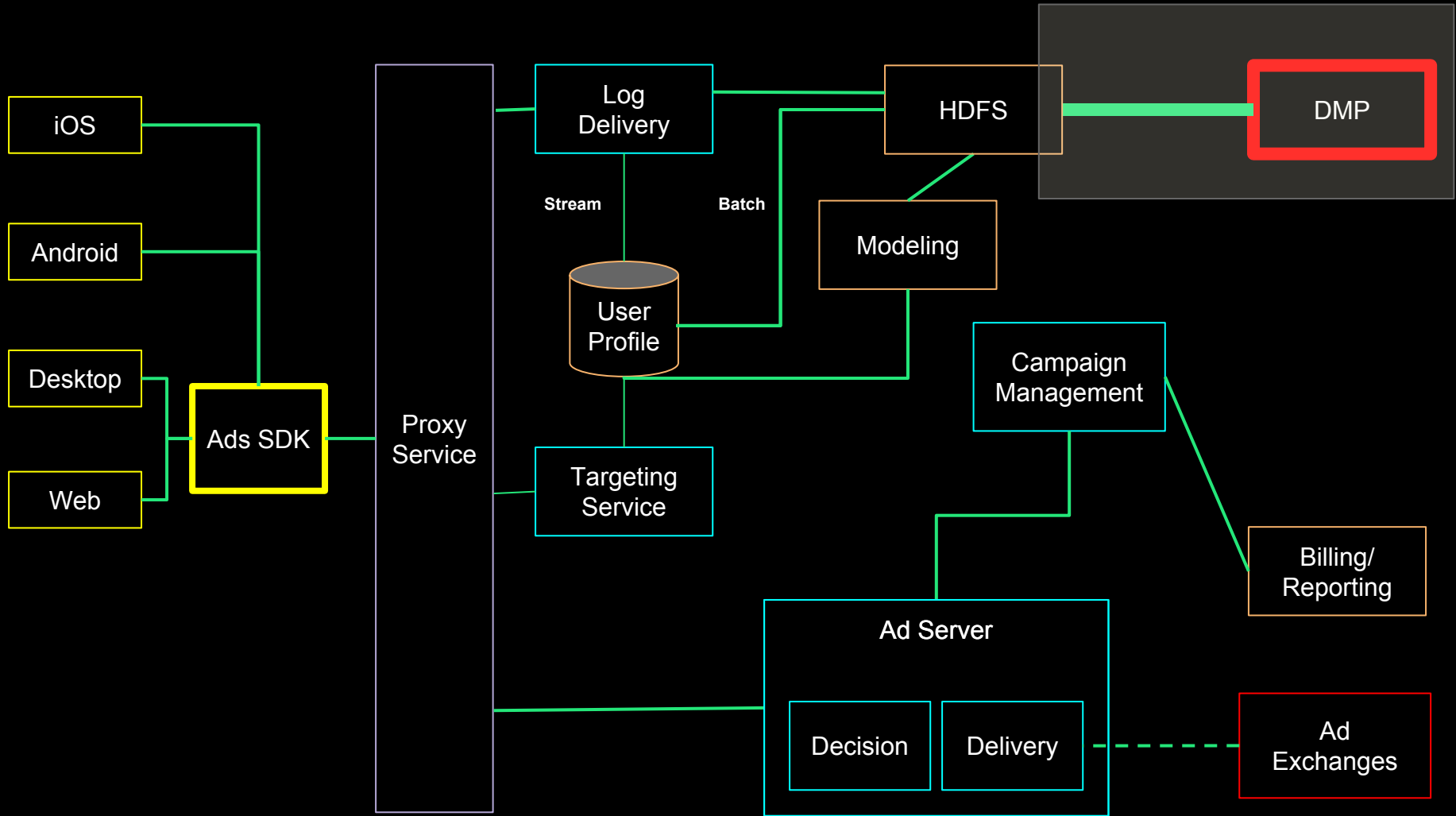


# Ad Exchange Integration

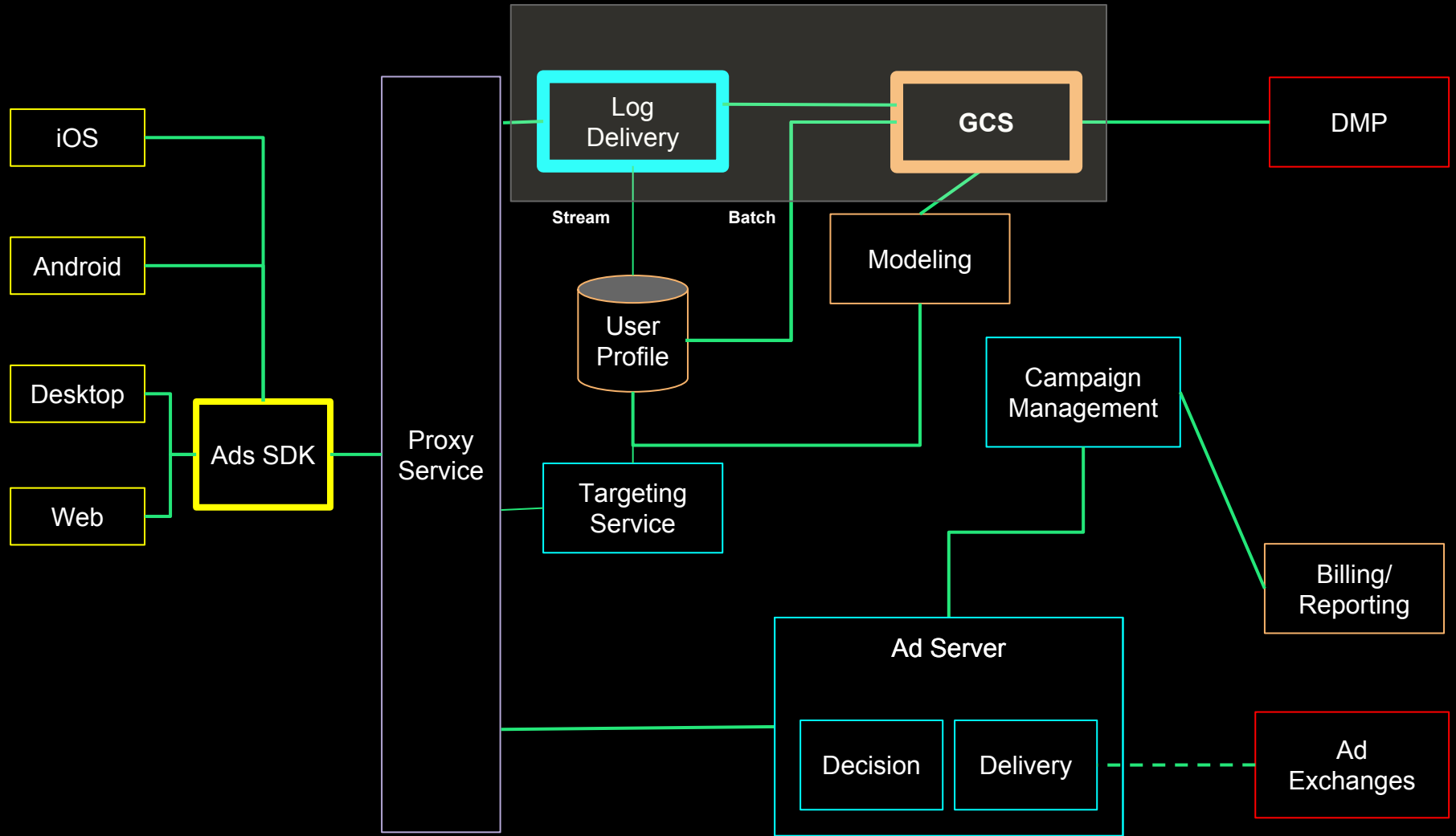




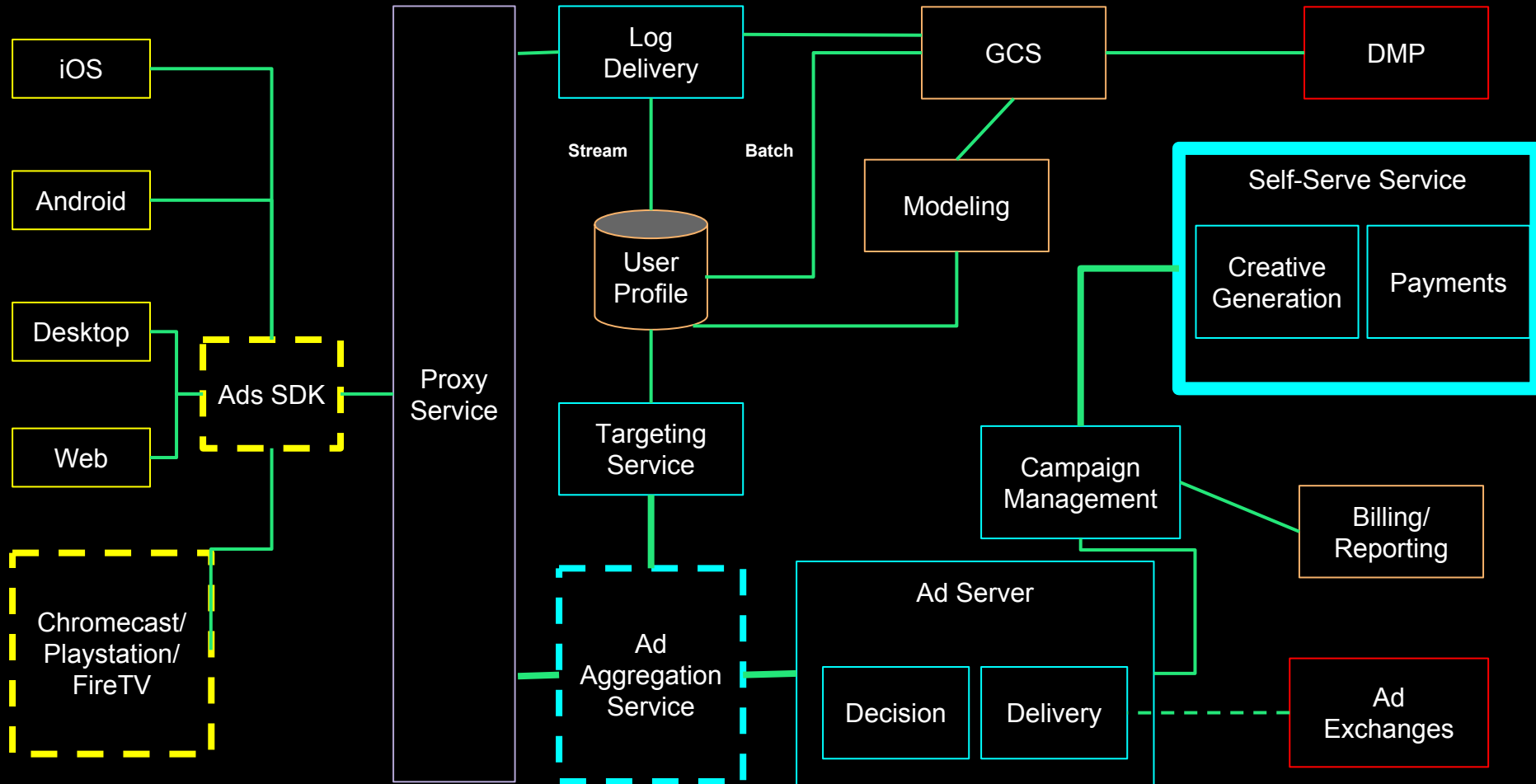
# DMP audience augmentation



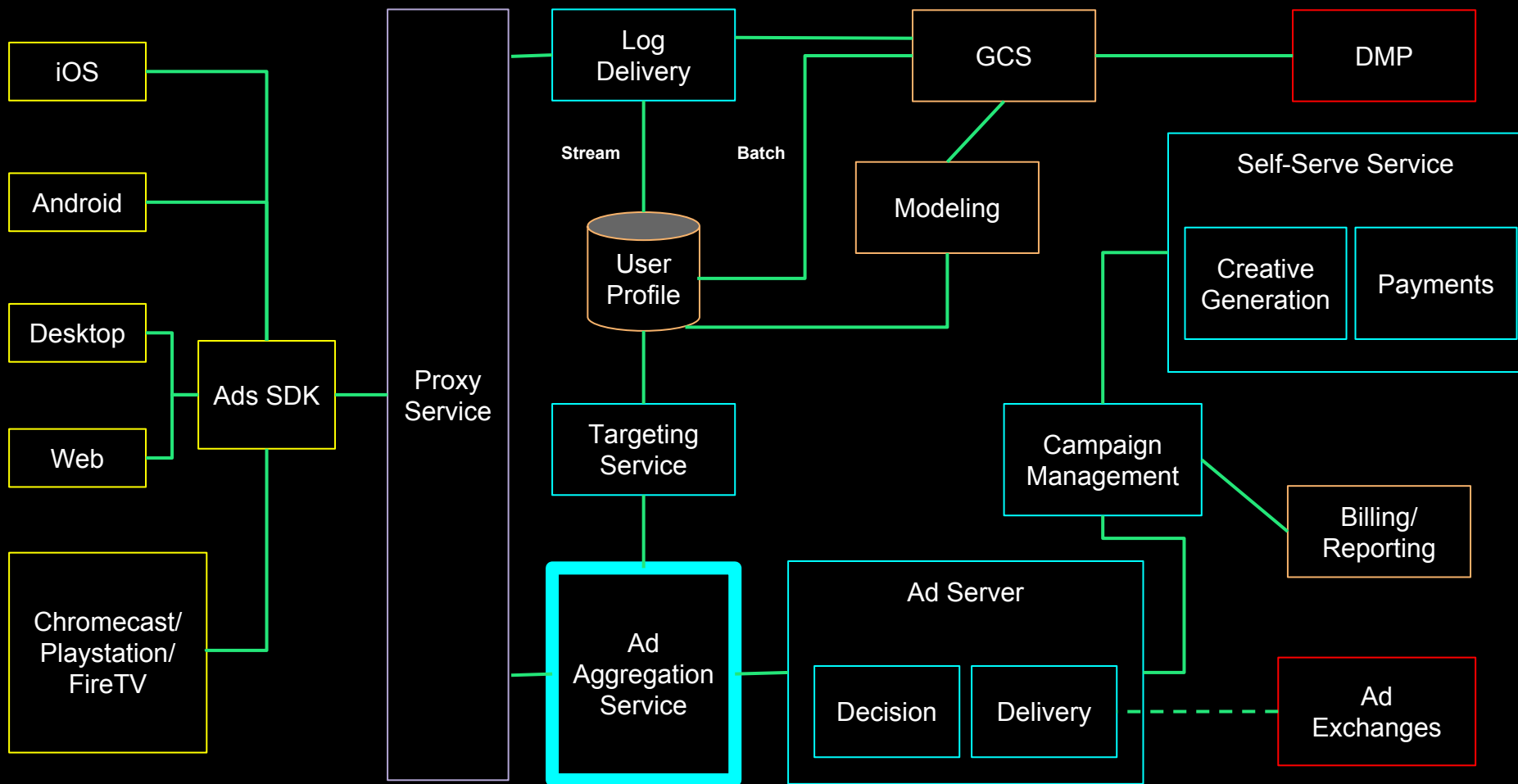
# Move to Google Cloud Platform



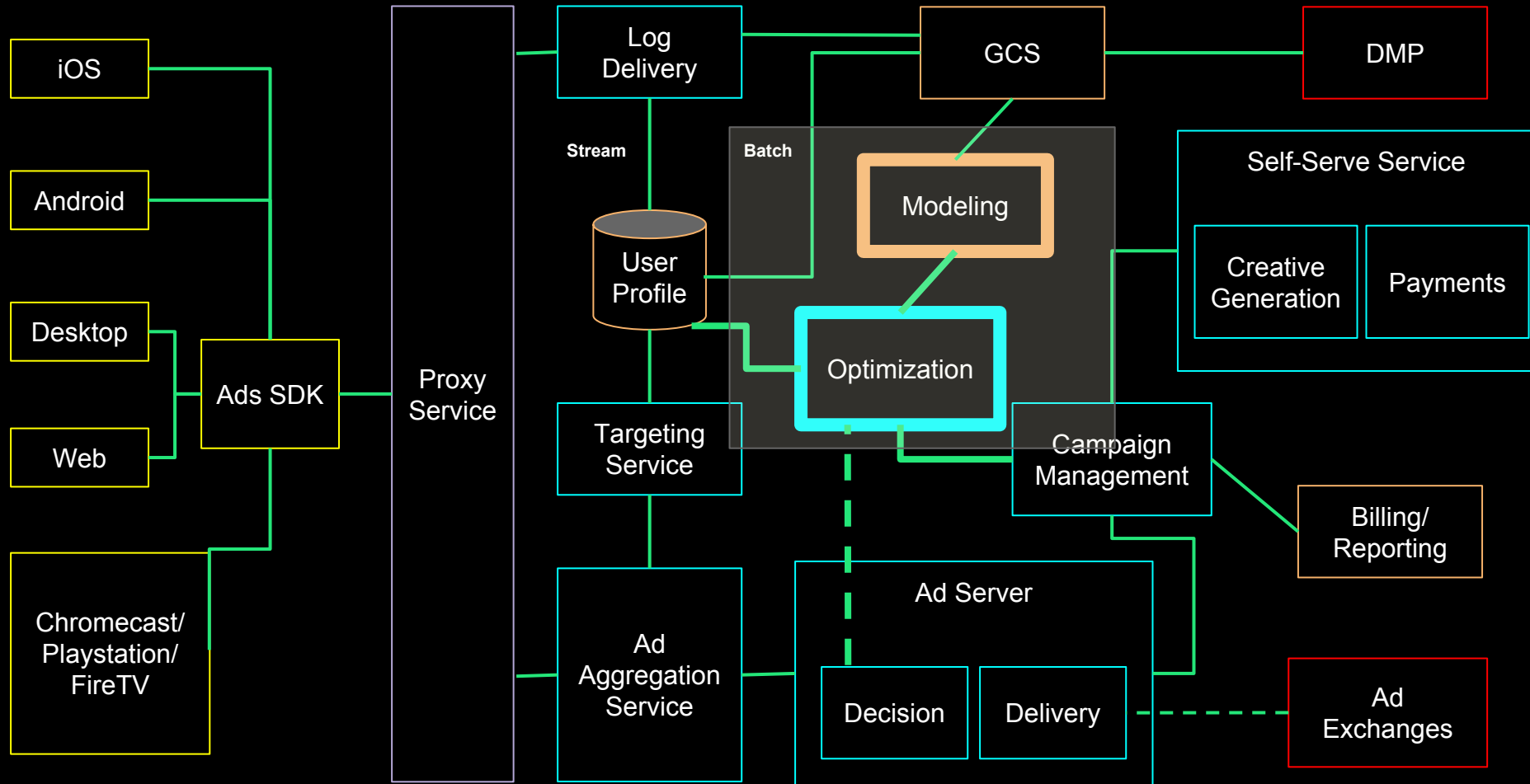
# Self-serve and Creative generation



# Client got even thinner



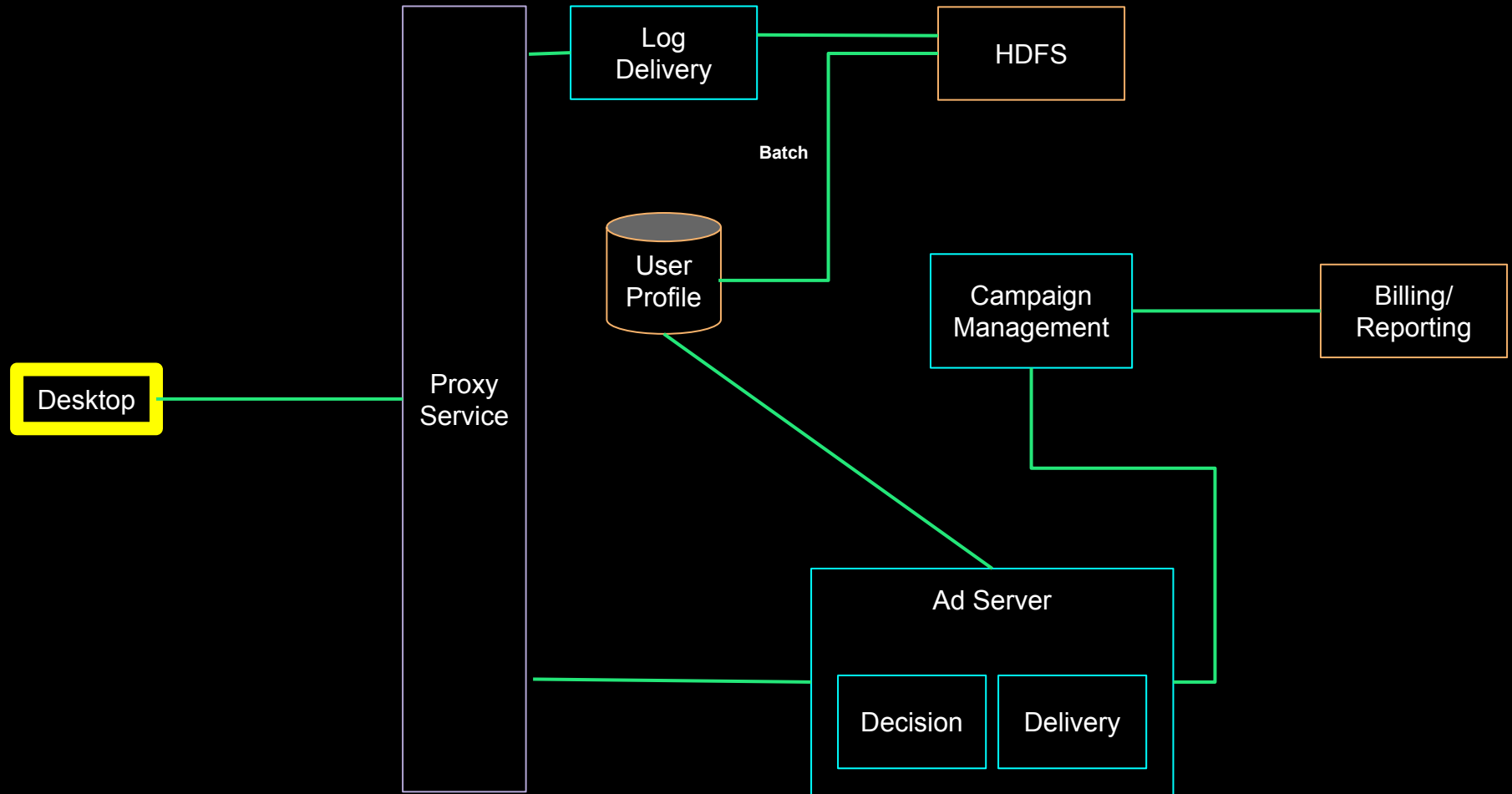
# Ad Optimizations



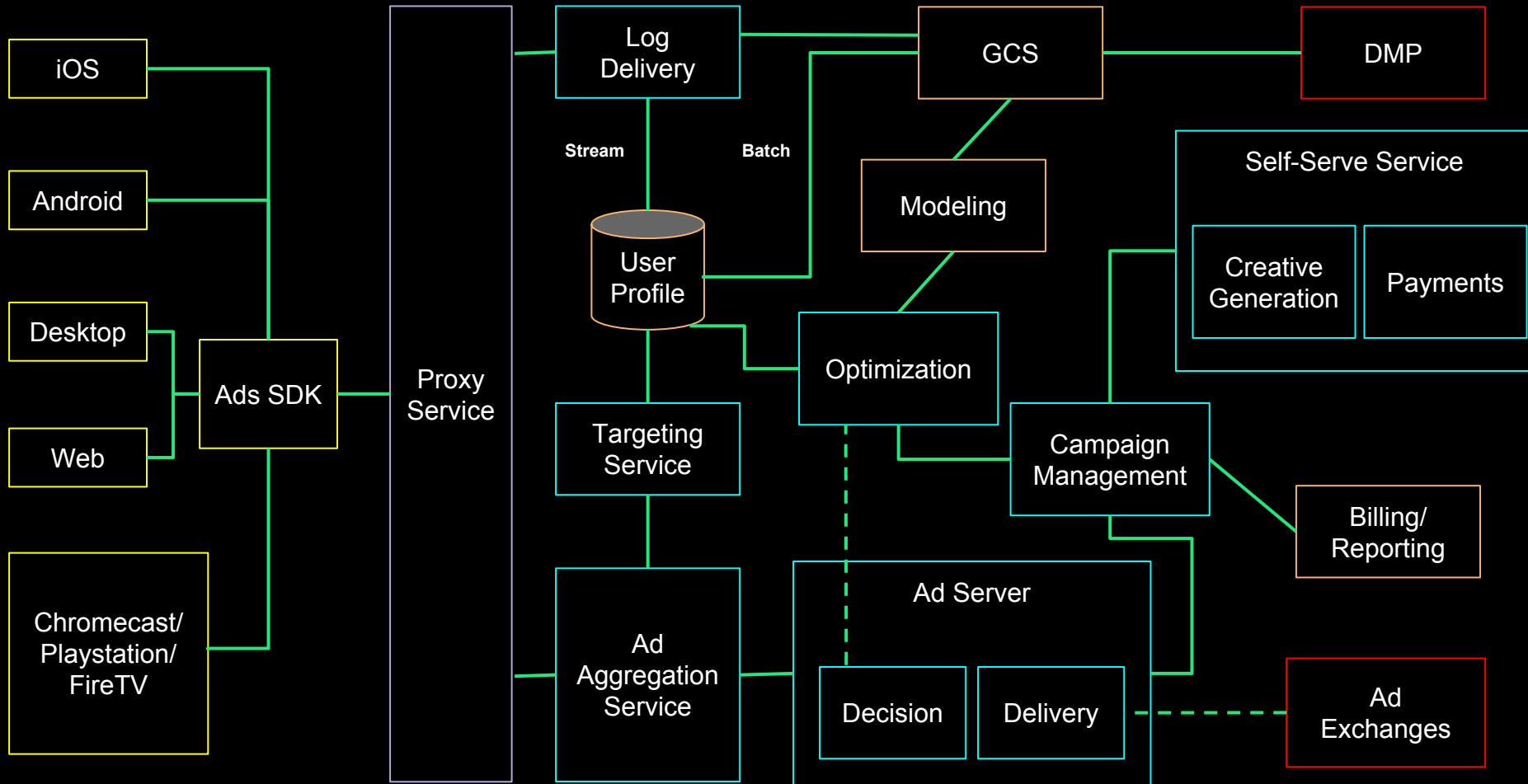
**Connecting all the dots ...**



# Then



# Now

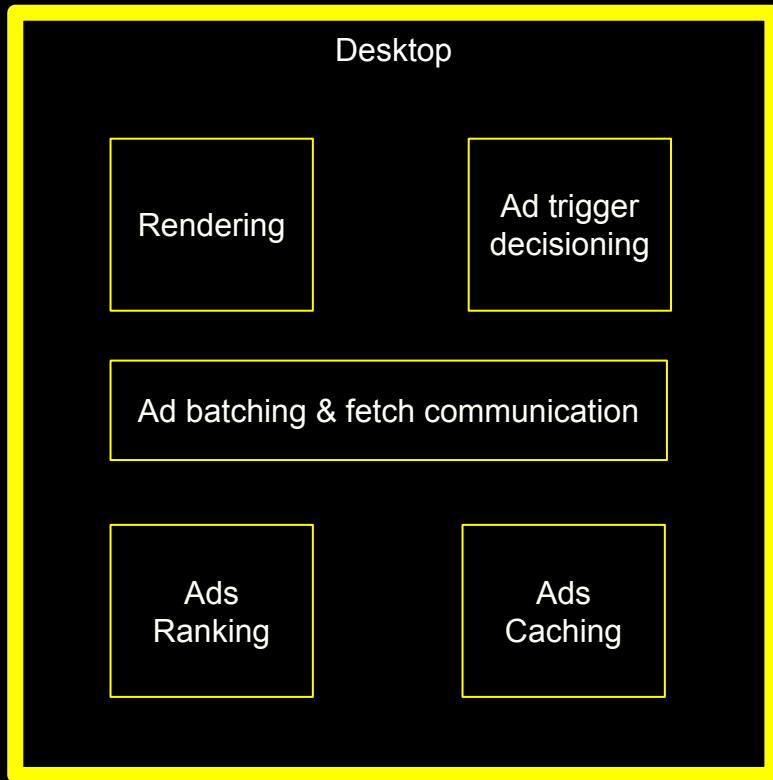


# **War stories and lessons learnt**

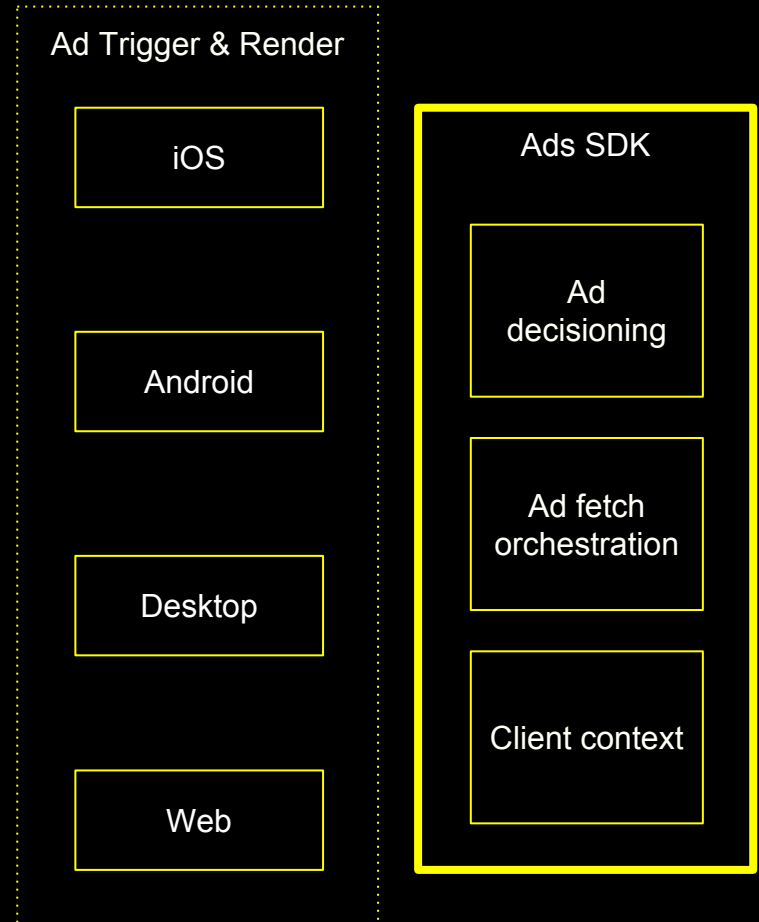
**Design your systems to be  
master of one thing**

# Remember division of responsibilities?

**BAD**



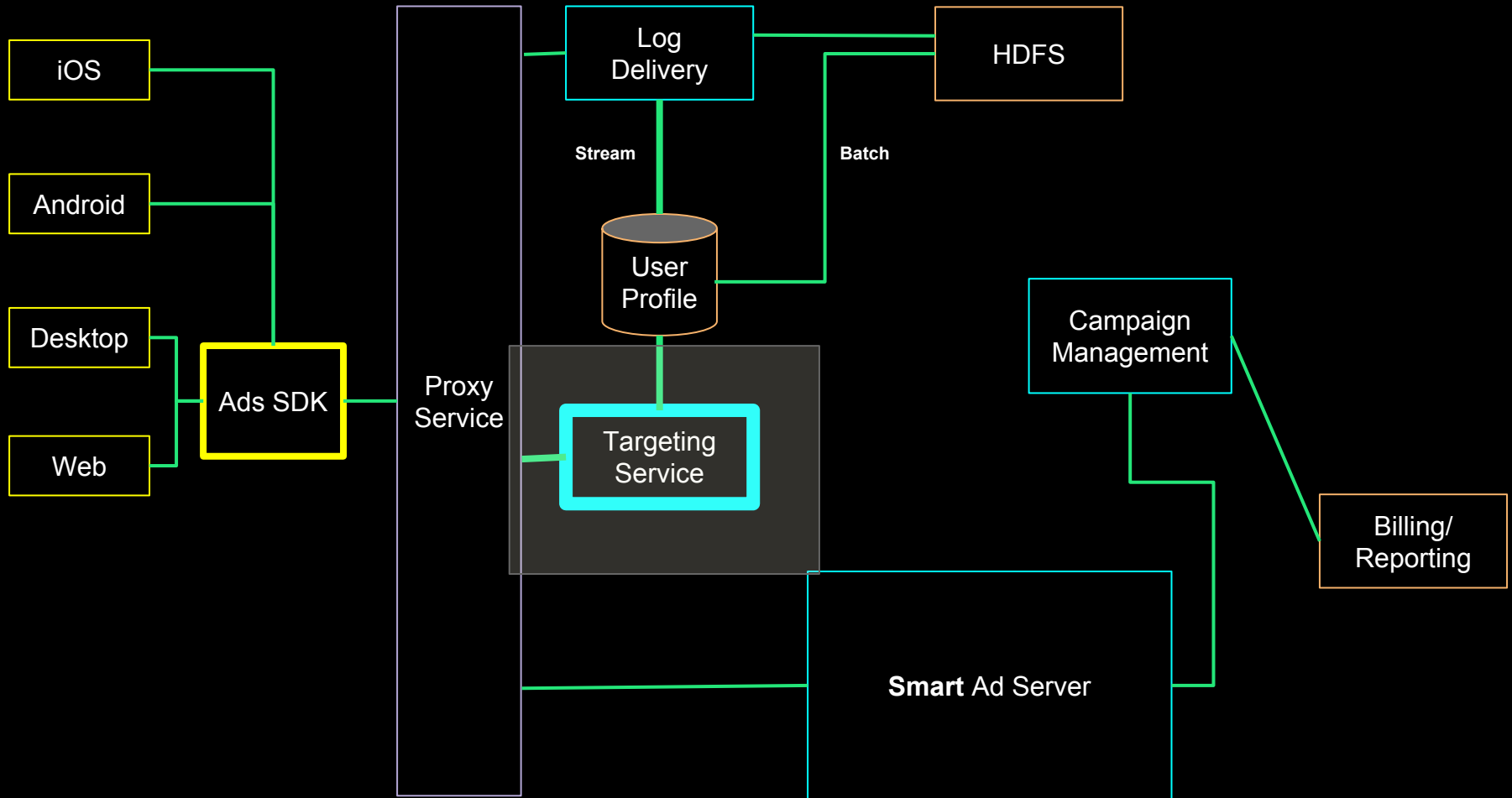
**GOOD**



**Appends are easier than updates**



# Remember that time?



**The 100:10:1 rule**

**Agile is your friend**

**Test with minimal blast radius**

**Things will always go wrong!**



# Thank You!

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Twitter : [@\\_kinshukmishra](https://twitter.com/_kinshukmishra)