GIAC BEIJING Dec.12.16-17

架構 ARCHNOTES

Big Data in Hulu

Yuming Liang

技术架构未来

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Agenda

- What is Hulu?
- Big Data in Hulu
- How Data Helps Marketing
- How Data Helps Advertising
- Q&A

Hulu Introduction – Overview

GAMING • CONNECTED TVS • MOBILE • COMPUTER

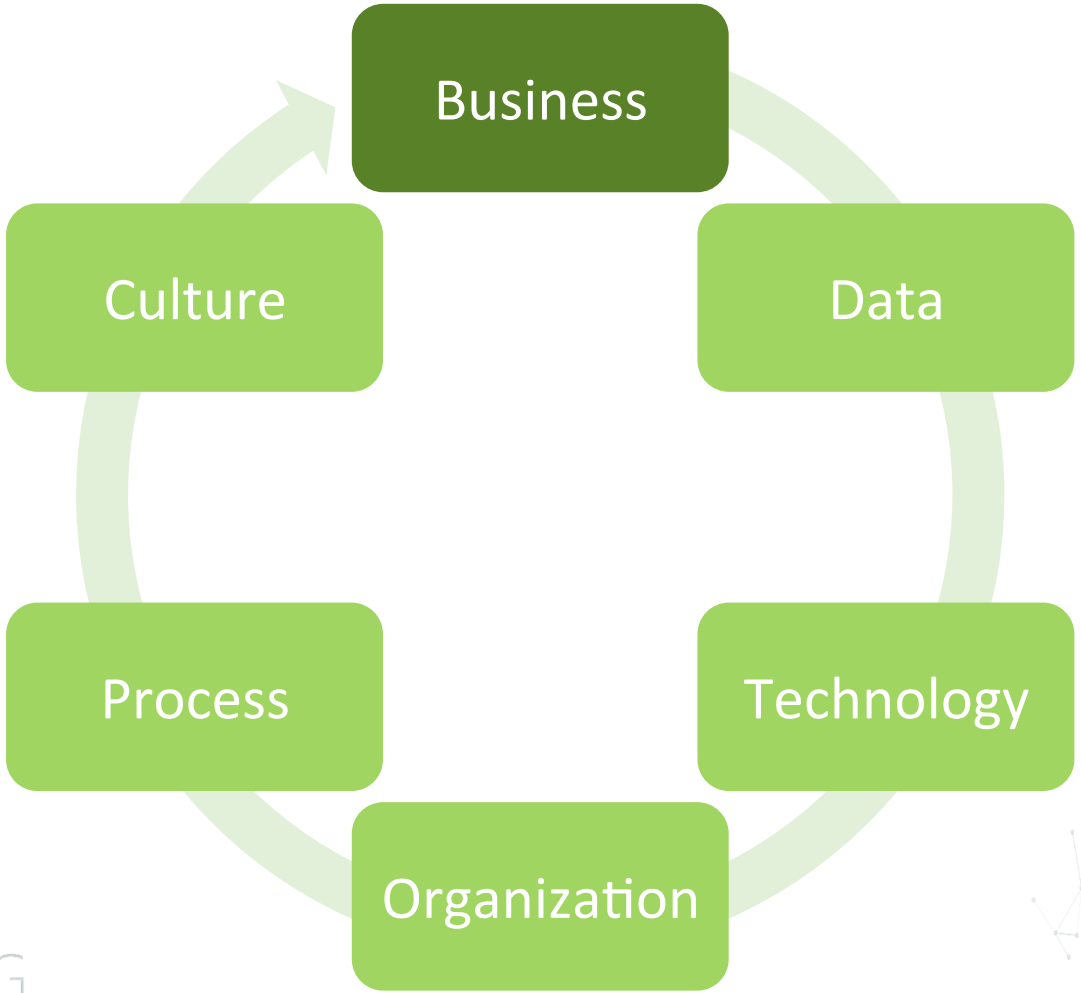
Hulu Introduction – Overview

Big Data in Hulu – Framework

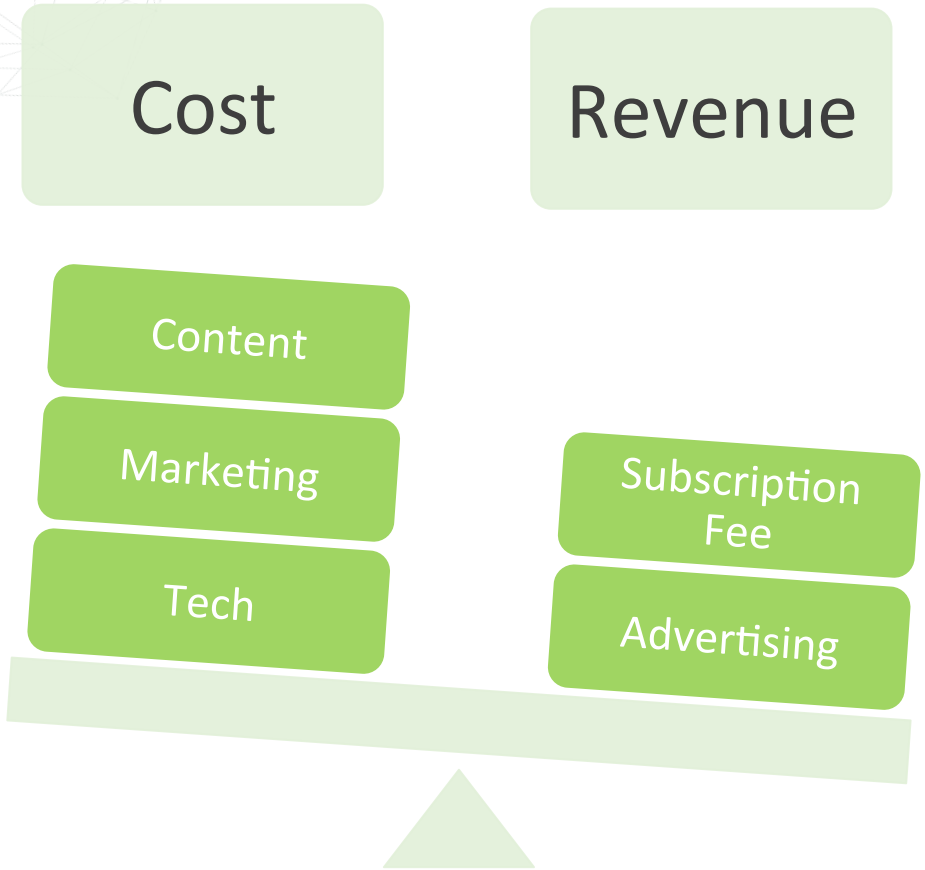
Doing Things Right

Doing the Right Things

Big Data in Hulu – Framework

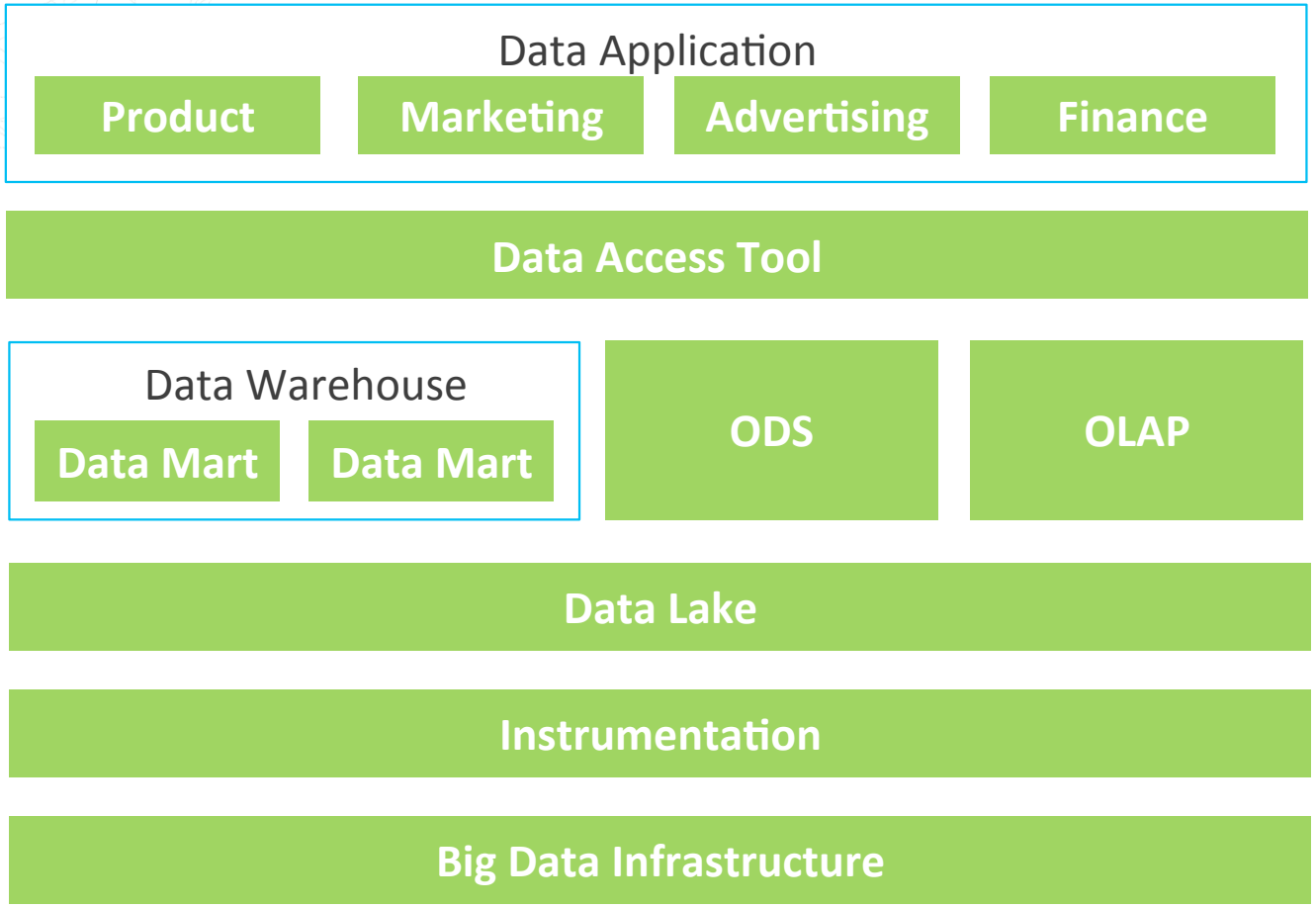


Big Data In Hulu – Business Model



1. Start from business
2. Figure out how data could help on:
   - support daily operation
   - reduce cost
   - increase revenue

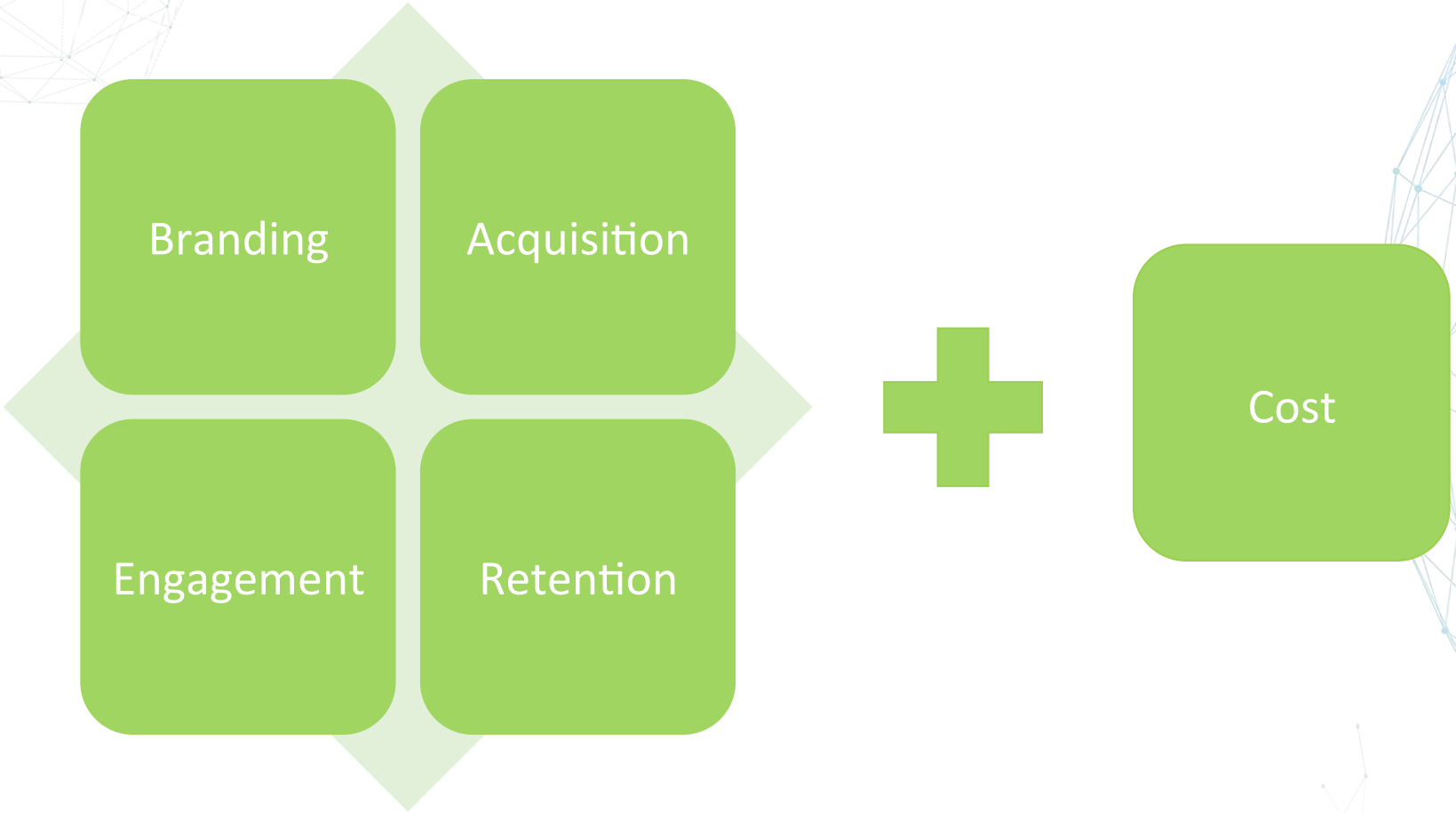
Big Data In Hulu – Overview



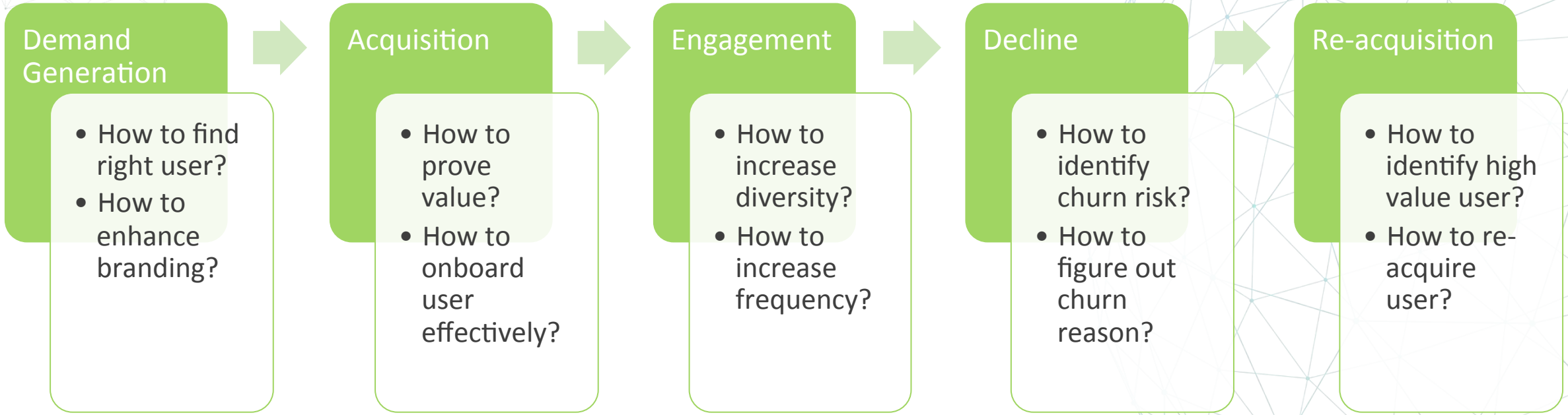
1. Combine general purpose big data technology stack with company specific business scenarios
2. Combine analytics system with operational system

Marketing in Hulu

Marketing In Hulu – Goal



Marketing In Hulu – Customer Lifecycle



Marketing In Hulu – Key Consideration

Context awareness:

1. Varies from different customer lifecycle stage
2. Varies from combination of key consideration

Channel:

1. On Hulu
2. Off Hulu + Online
3. Offline

Marketing In Hulu – Matrix

	Demand Generation	Acquisition	Engagement	Decline	Re-acquisition
Targeting					
Product					
Pricing					
Channel	What is the ROI for each of our paid media channels? What cost per sign-up should we target to profitably acquire new subscribers? Use CLV and Attribution in combination to determine the CPS target for each channel.				
Messaging					

Data:
1. Cost / Value of each channel
2. CLV of each user

System:
1. MTA, Dimensional analysis
2. CRM database

Marketing In Hulu – Requirement

Data Lake / Data Mart

- First party / Third party
- KPI / Reporting

CRM system

- Fact
- User persona

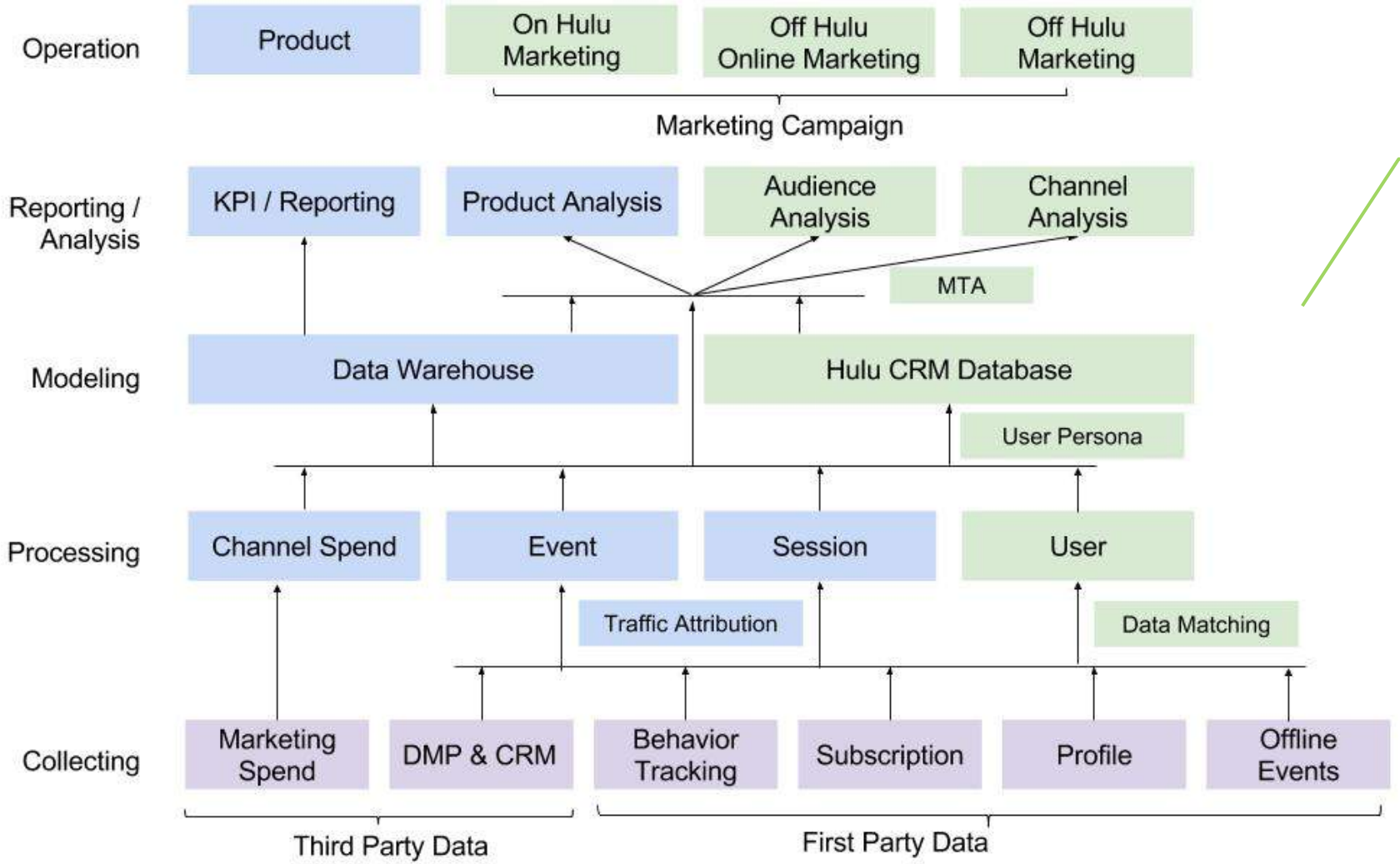
Marketing campaign management

- In house
- External

Advanced analytics system

- MMM / MTA
- OLAP / Cohort / Funnel
- Data Mining

Logical Architecture



Data:

1. 1st party vs 3rd party
2. implicit and explicit

System:

1. analytics oriented vs operational oriented
2. Fine-grained vs coarse-grained

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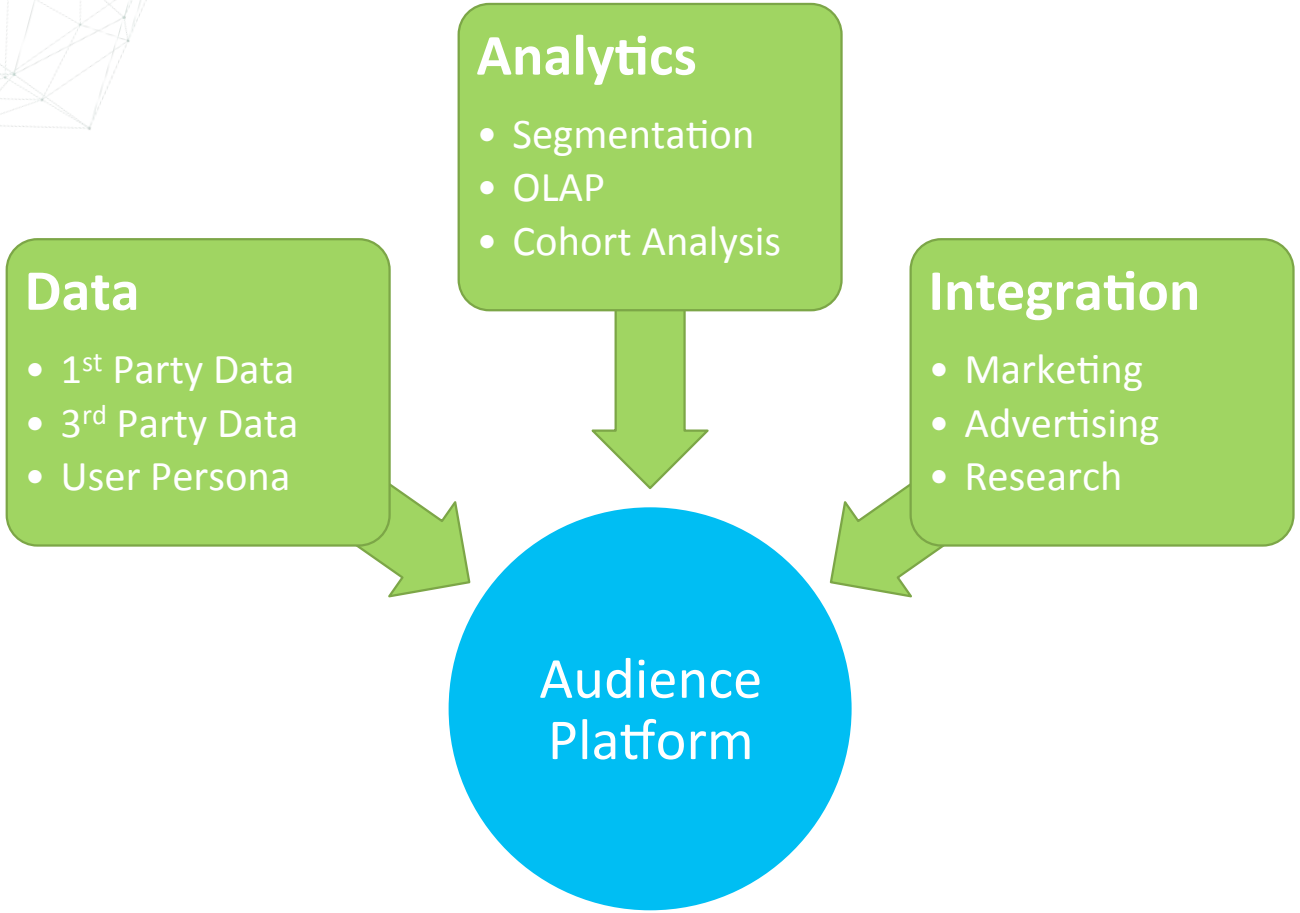
Audience Platform - Overview



1. Aggregate data at user level
2. Optimized for operational purpose
3. Optimized for advanced analysis

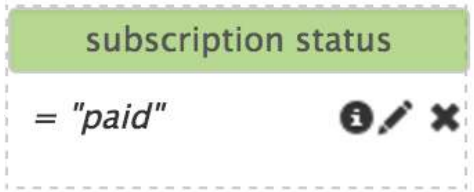
Audience Platform - Overview

DATA SOURCE

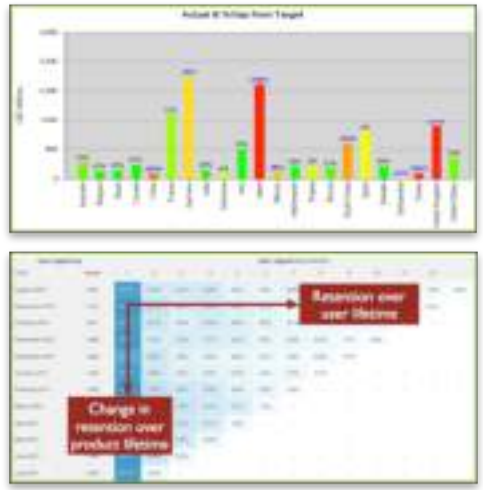
- First party data
  - Profile
  - Behaviors
    - Onboarding
    - Engagement
    - Payment
    - Churn
  - User persona
    - Advertisement
    - Product
    - Marketing
    - Finance
- Third party data
  - Facebook
  - BlueKai
  - Acxiom
  - Experian
  - *DataLogix

CORE FUNCTIONS

- User Cohort



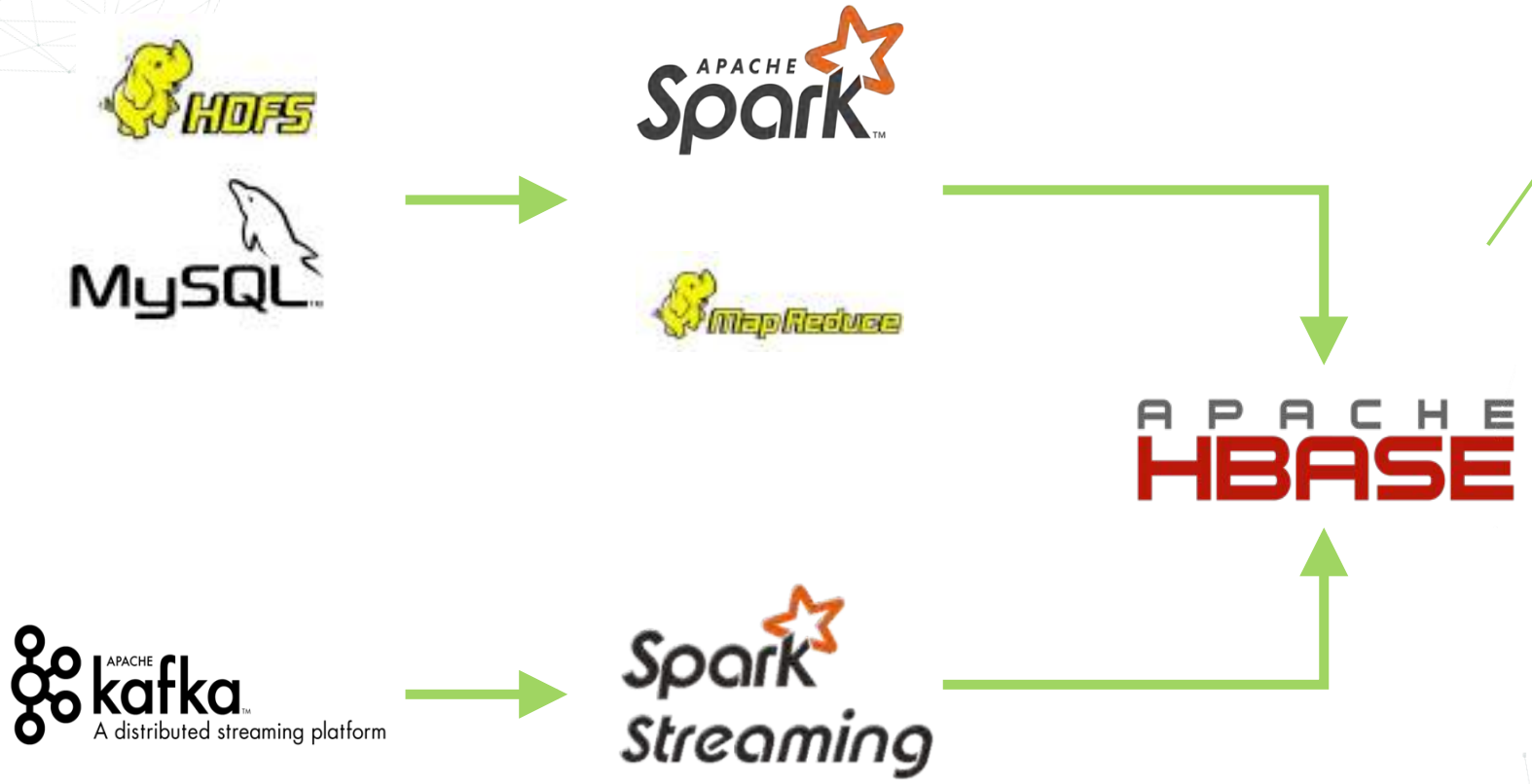
- Deep analysis



INTEGRATIONS

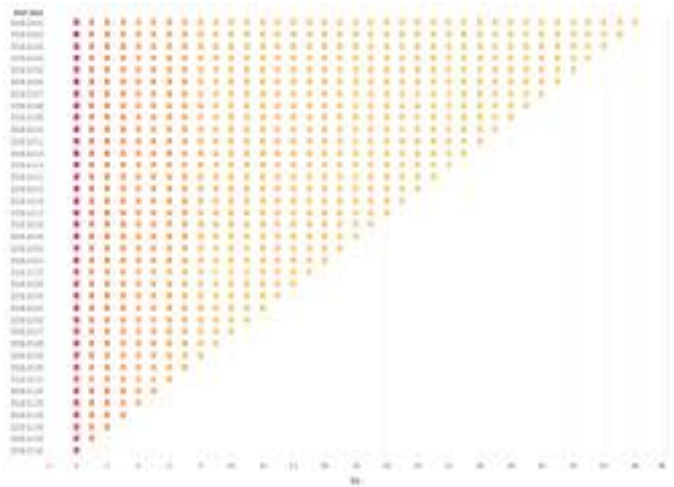
- Marketing
  - Online + On Hulu
    - Push notification
    - Email
    - In house ads
    - Masthead
  - Online + Off Hulu
    - Social Targeting
    - DMP
  - Offline + Off Hulu
    - Analysis
    - Panel matching
- Advertisement
  - Audience Targeting
    - First party
    - Third party
  - Exchanging data with third party

Audience Platform – Data Pipeline



1. Logical architecture
2. 3rd party is ingested in similar way
3. Several down streaming integration

Audience Platform – Analytics Engine (1)



1. How to make it fast enough?
2. Presto is too slow for this cases due to joining too many tables

Audience Platform – Analytics Engine (2)


```
{
 "userid": "cbjwilr98dkxk3lc88u3",
 "int_attr1": "1998-08-08",
 "int_attr2": "mark",
 "int_attr3": 1,
 "int_attr4": "paid",
 "ad_exposure": [
  {"content": 42212, "ts": "2016-11-15 08:25:11",
  "campaign": 89, "creative": 3876}
 ],
 "watch": [
  {"duration": 369, "platform": "xbox_one",
  "ts": "2016-09-15 18:25:11", "show": 53}
 ],
 "label_churn_prob": 0.23,
 "bk_tag1": true
}
```


- User id as key
- nested data
- all historical data
- 3rd party and label data included

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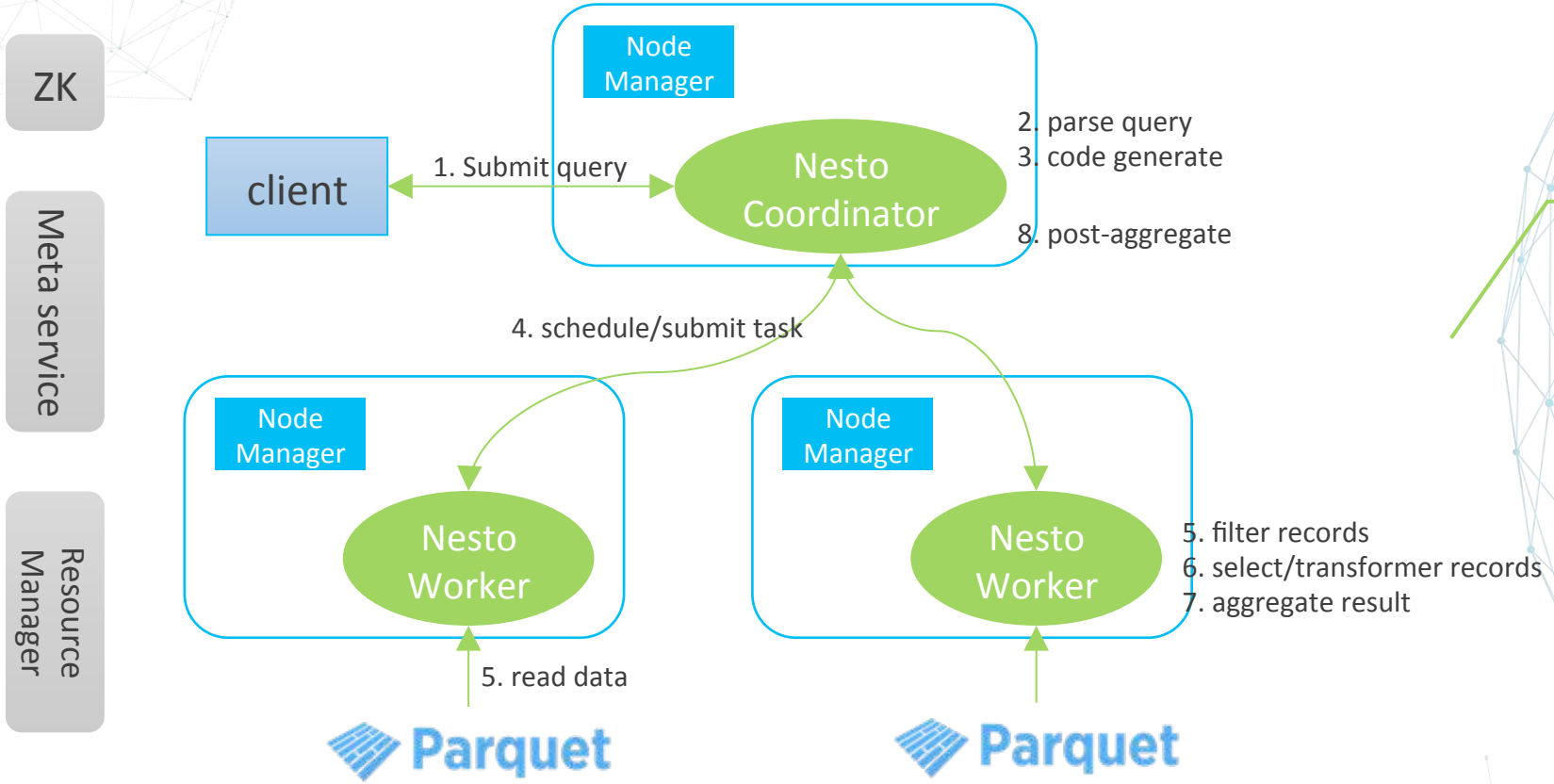
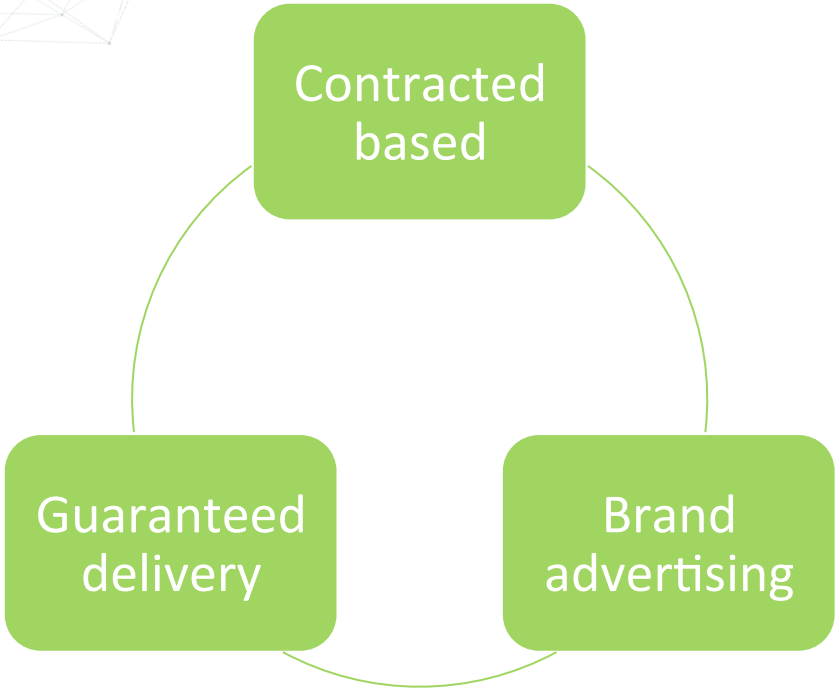
Audience Platform – Analytics Engine (3)

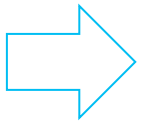


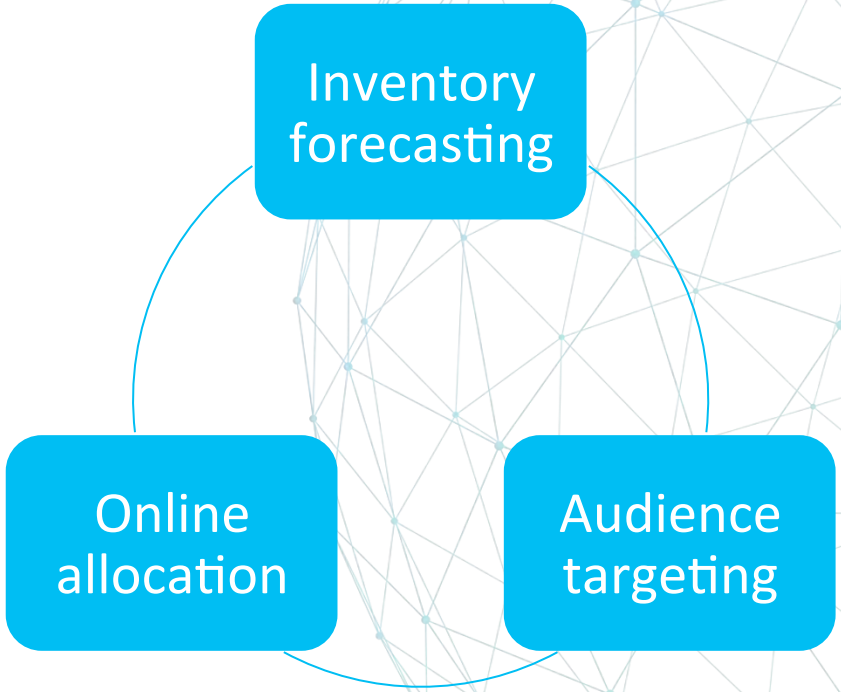
1. Dedicated query engine for nested data
2. Optimized for advanced analytics

Advertising In Hulu

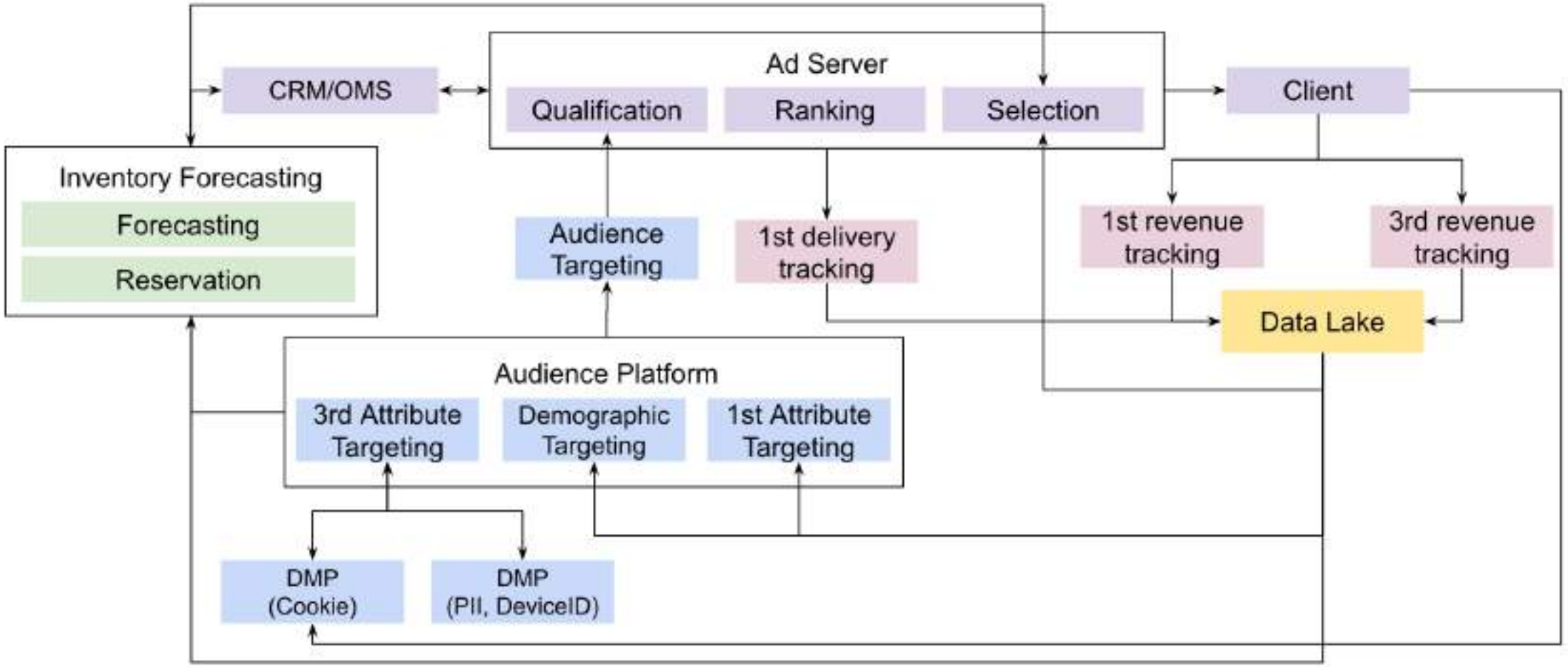
Advertising in Hulu – Overview



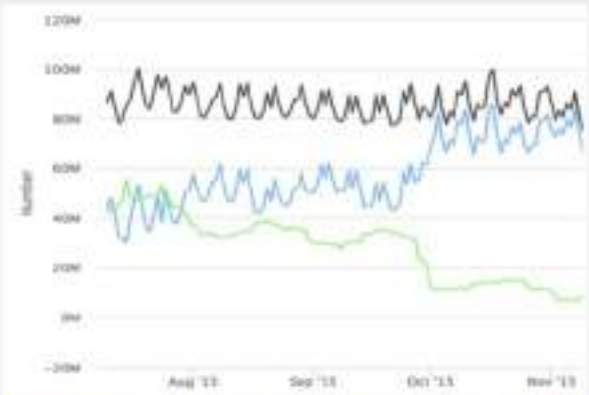




Advertising In Hulu - Architecture



Advertising In Hulu - Projects



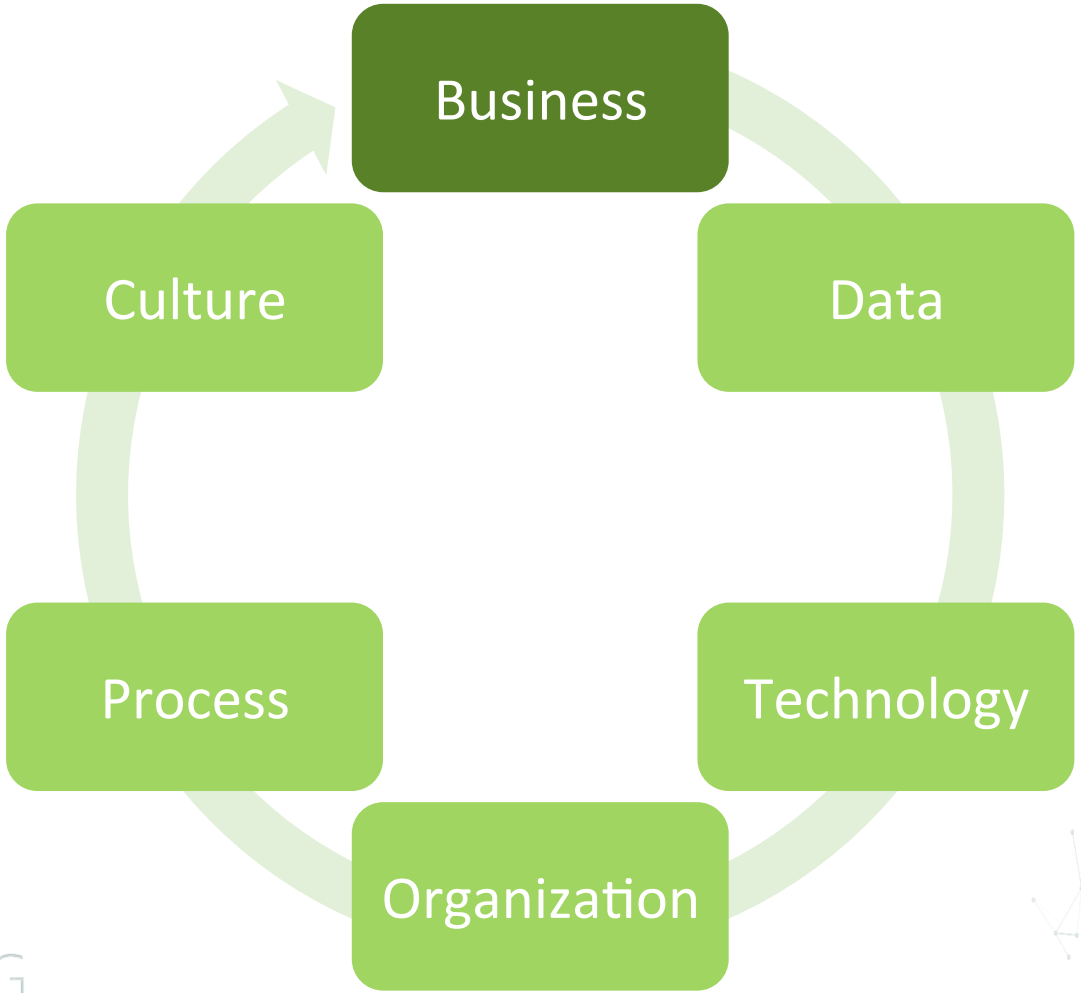
INVENTORY PREDICTION

AD BI TOOL

DELIVERY INSIGHTS

DATA PIPELINE

Summary



Q & A

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Thank you !