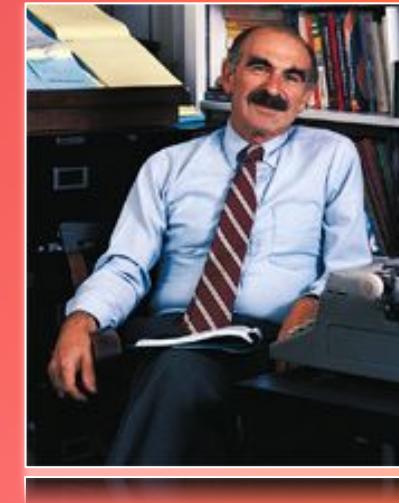


# Introduction to Big Data (Analytics)

Prof. Dr. Jan Kirenz  
HdM Stuttgart

**1960**

Companies are too focused on producing goods or services and don't spend enough time understanding what customers want or need.



T. Levitt

From customer experience (CX) to

business of experience (BX)

**2021**

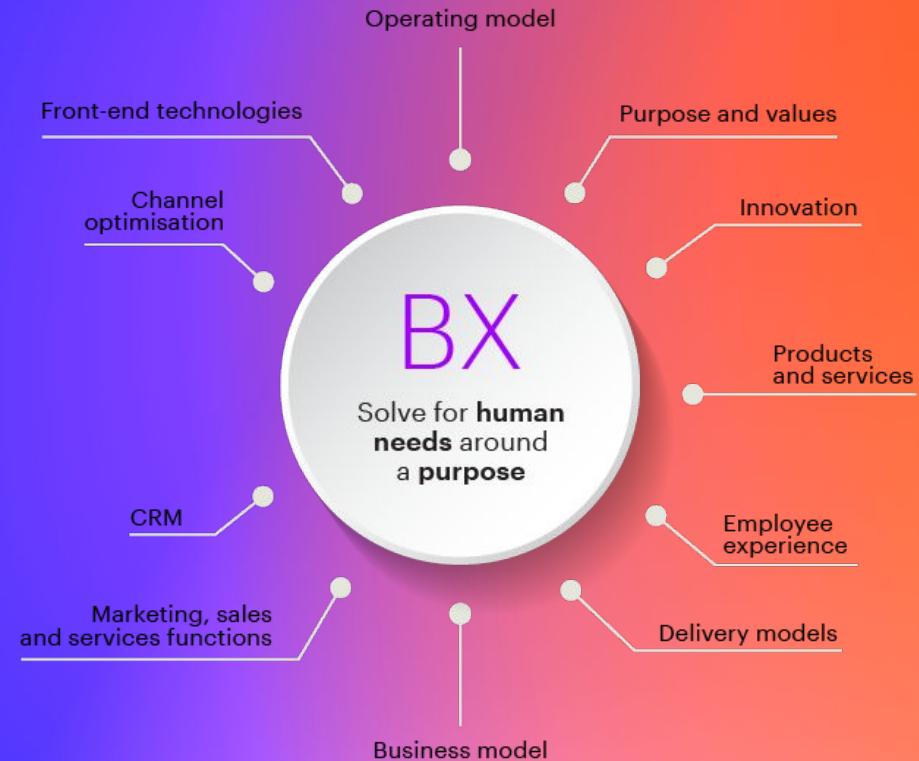


# From customer experience (CX) to



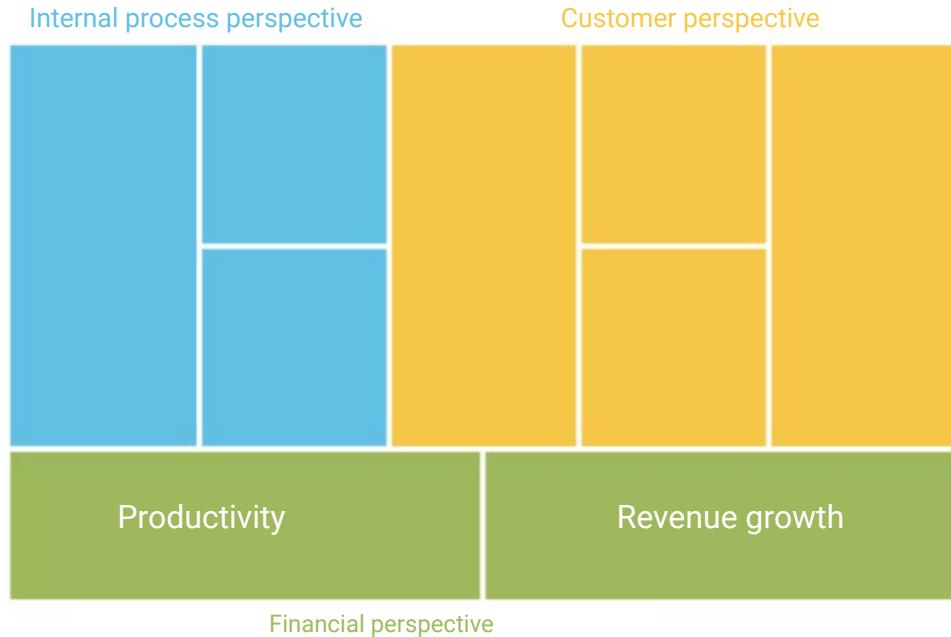
# business of experience (BX)

**2021**



	<b>CX thinking</b>	<b>BX thinking</b>	<b>Ways BX comes to life</b>
<b>CEO</b>	Maximize profitability.	Profit from purpose + experience.	Prioritizing purpose, innovation and delivering holistic experiences to drive business success (i.e., profit).
<b>Marketing and Brand</b>	Making people want things.	Making things people want.	Shaping brand evolution by recognizing brand is built on experiences that connect customers to what they want, not the other way around.
<b>Sales</b>	Focus on the product the company wants to sell.	Focus on the outcome the customer wants.	Ensure the experience is available at defining moments that matter in a consumer's life
<b>Product Development</b>	Making products easy to use.	Making products that continually adapt to how customers use them.	Investment in insight/design research combined with big data to spot user-driven opportunities.
<b>Talent</b>	Using traditional metrics based on employee performance within a function (onboarding, annual reviews, etc.)	Inspiring and incentivizing behaviors that drive better outcomes for the entire organization.	Empowering employees to feel accountable for customer outcomes.
<b>Tech and Data</b>	Enabling business processes at greater scale.	Enabling customer-centricity at greater scale.	Unlocking efficiencies that can be reinvested to drive continuous performance and innovation.
<b>Operations</b>	Providing efficiency for the company that often limits growth.	Providing efficiency for the customer and the experience that enables them to drive growth.	Measuring customer operational efficiency, engaging operations in innovation from the get-go.
<b>Supply chain</b>	Moving products and goods to consumers.	Making it easy for consumers to get products and services when and where they want them.	Providing customers with visibility into sourcing and progress of their orders, and innovating last-mile experience to exceed expectations.

# How do we create, deliver and capture value?

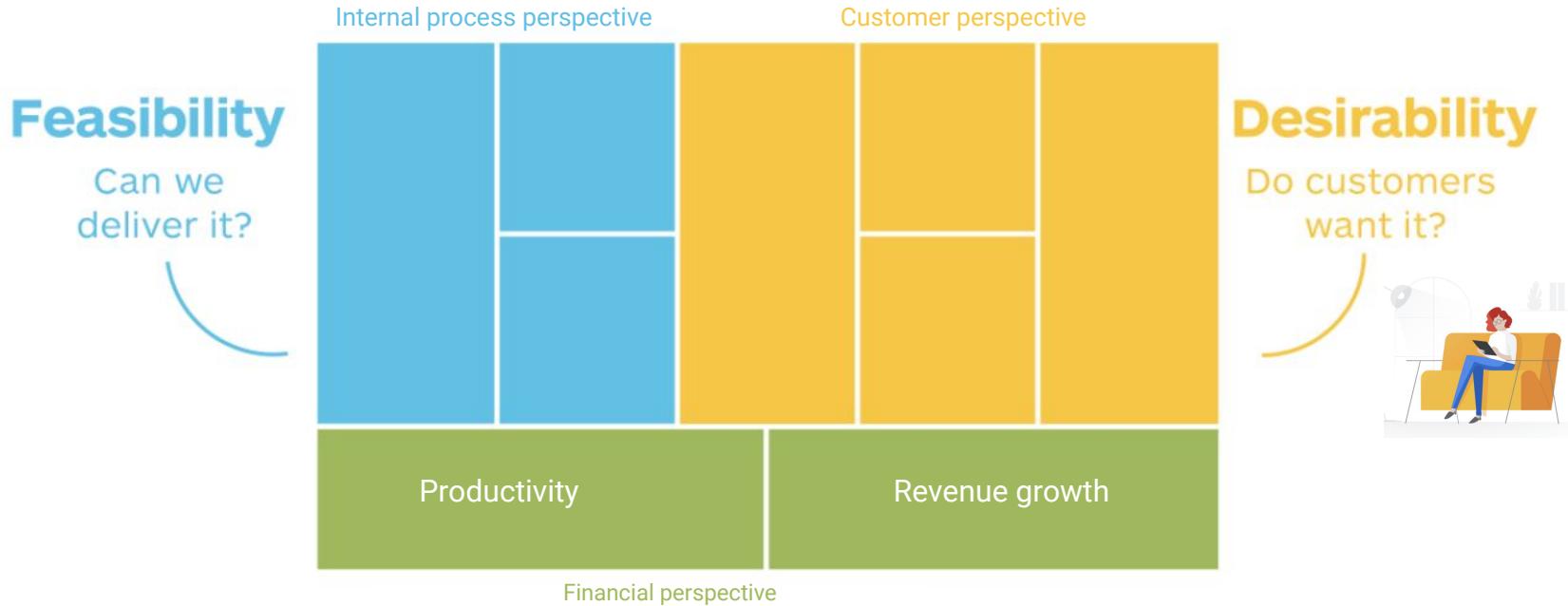


**Desirability**

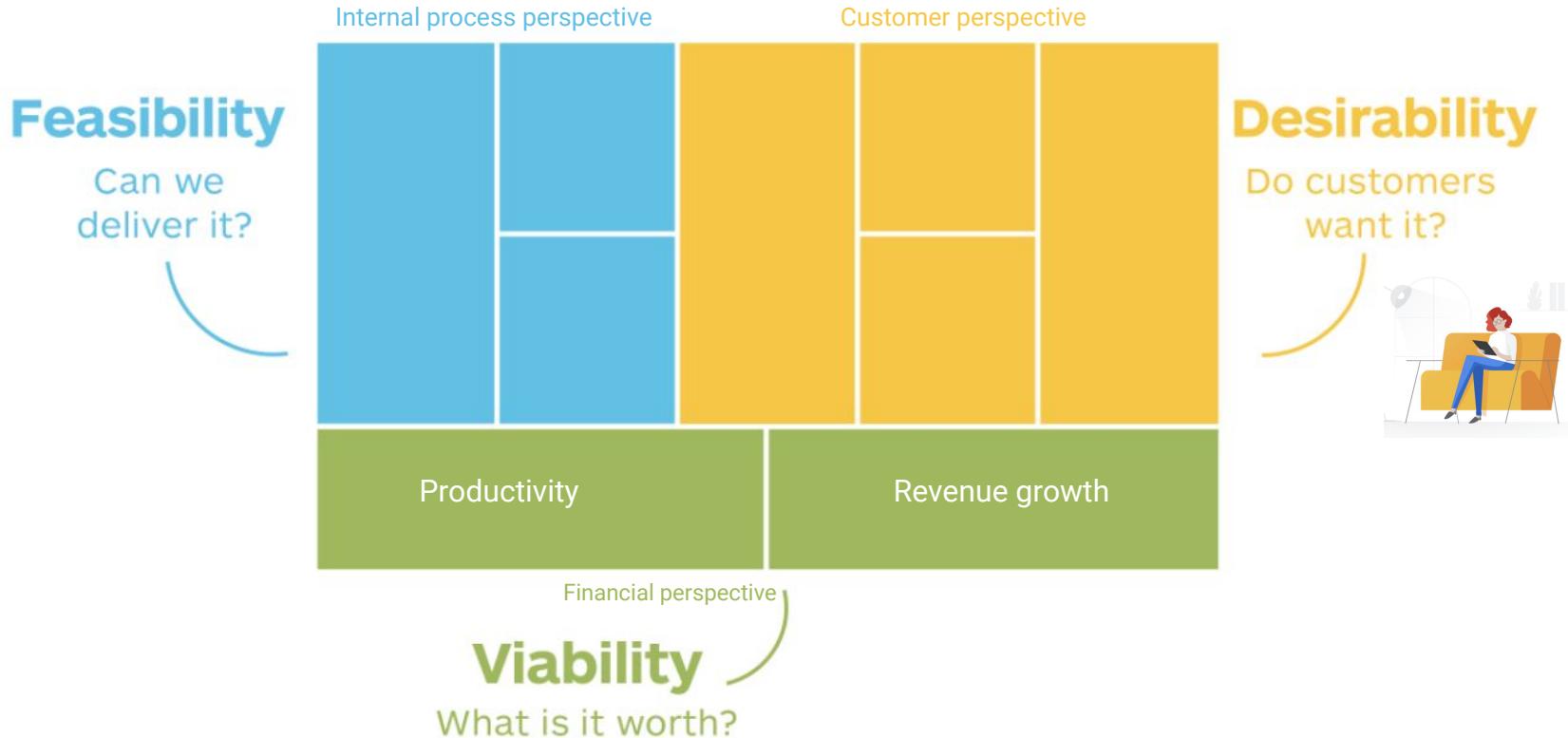
Do customers  
want it?



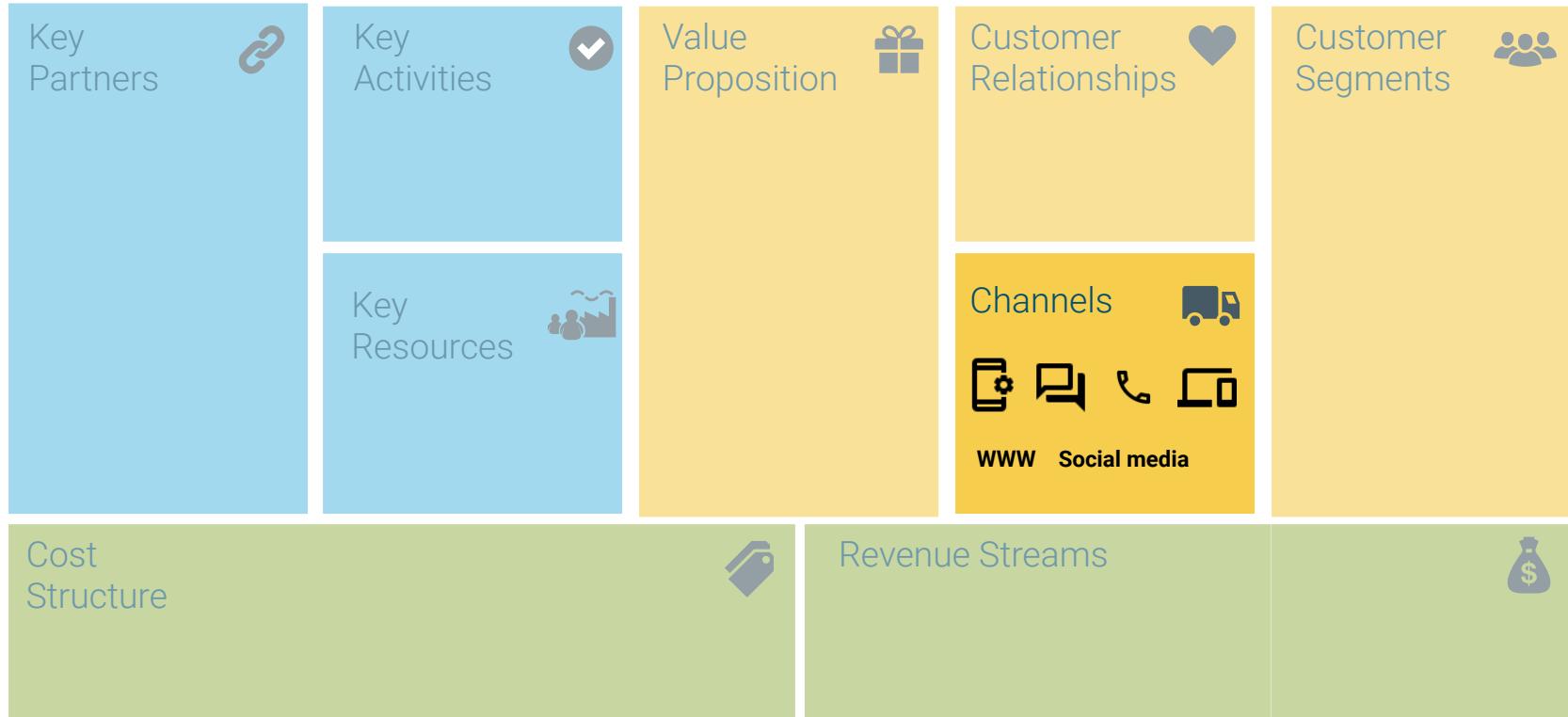
# How do we create, deliver and capture value?



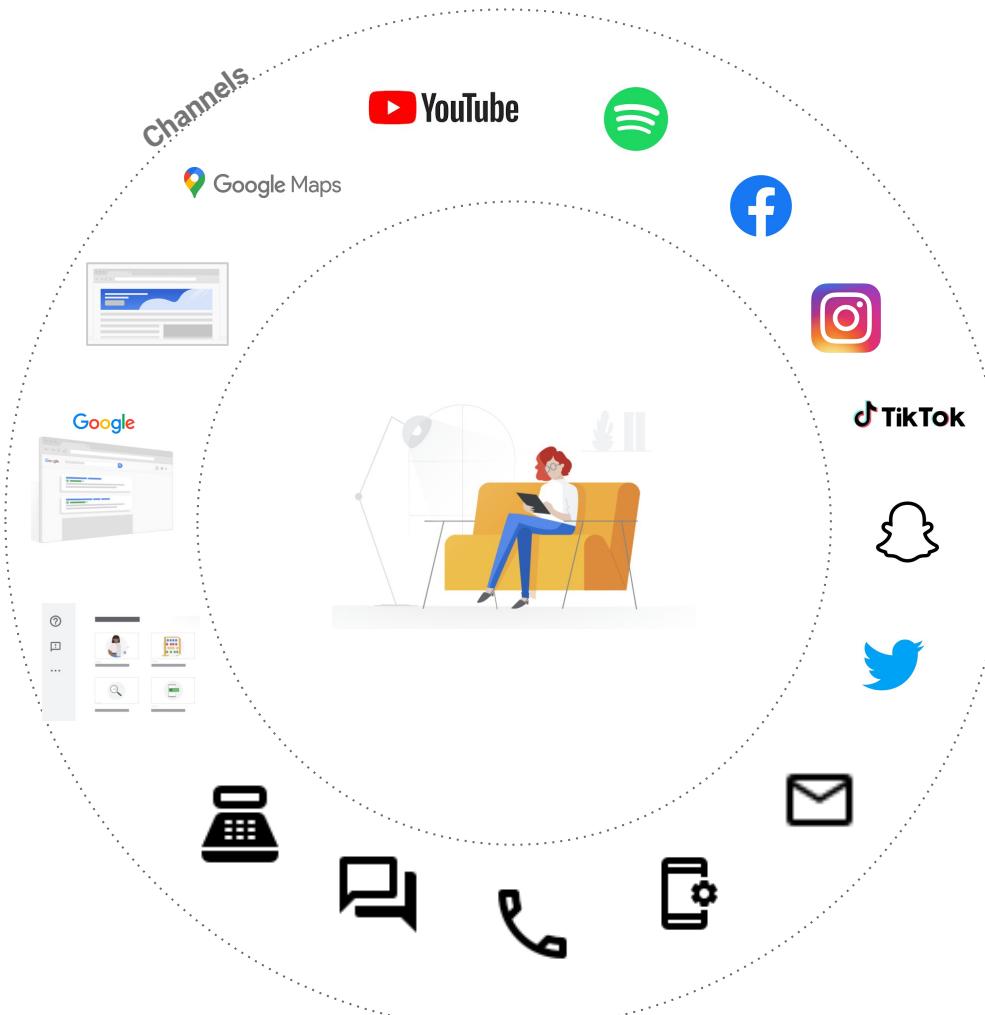
# How do we create, deliver and capture value?



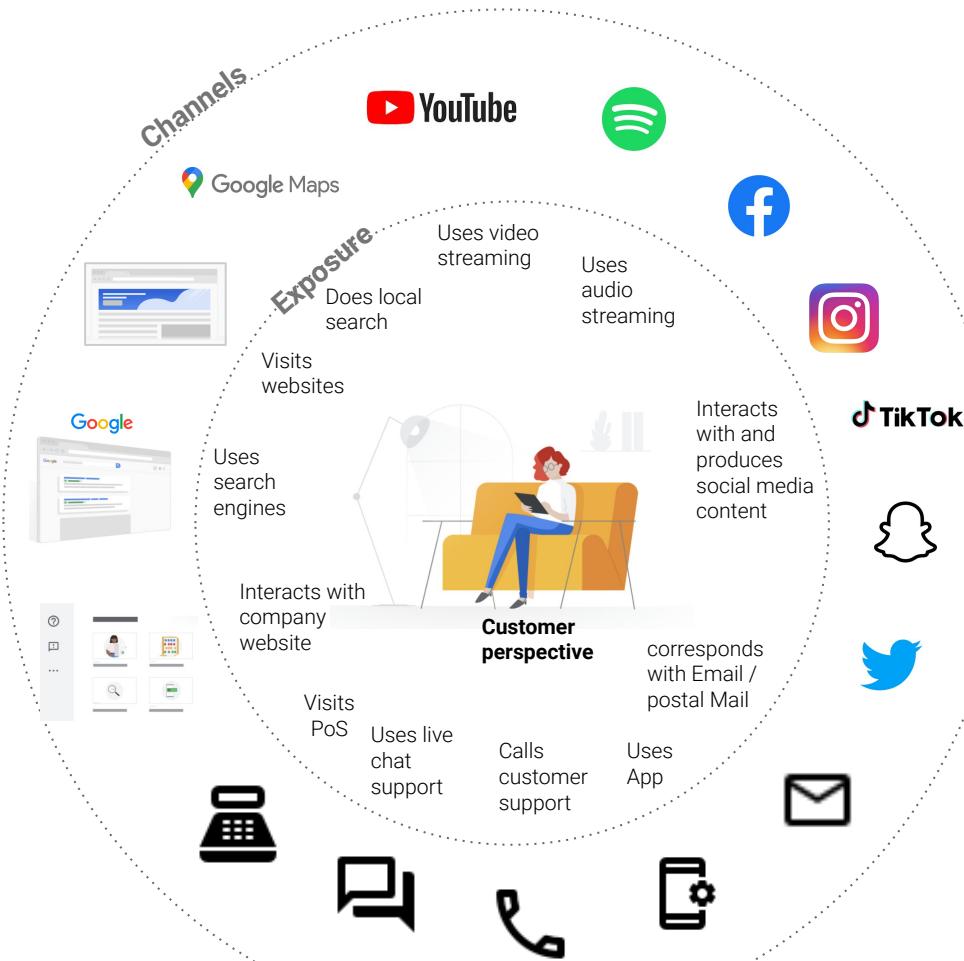
# Business Model Canvas: Channels



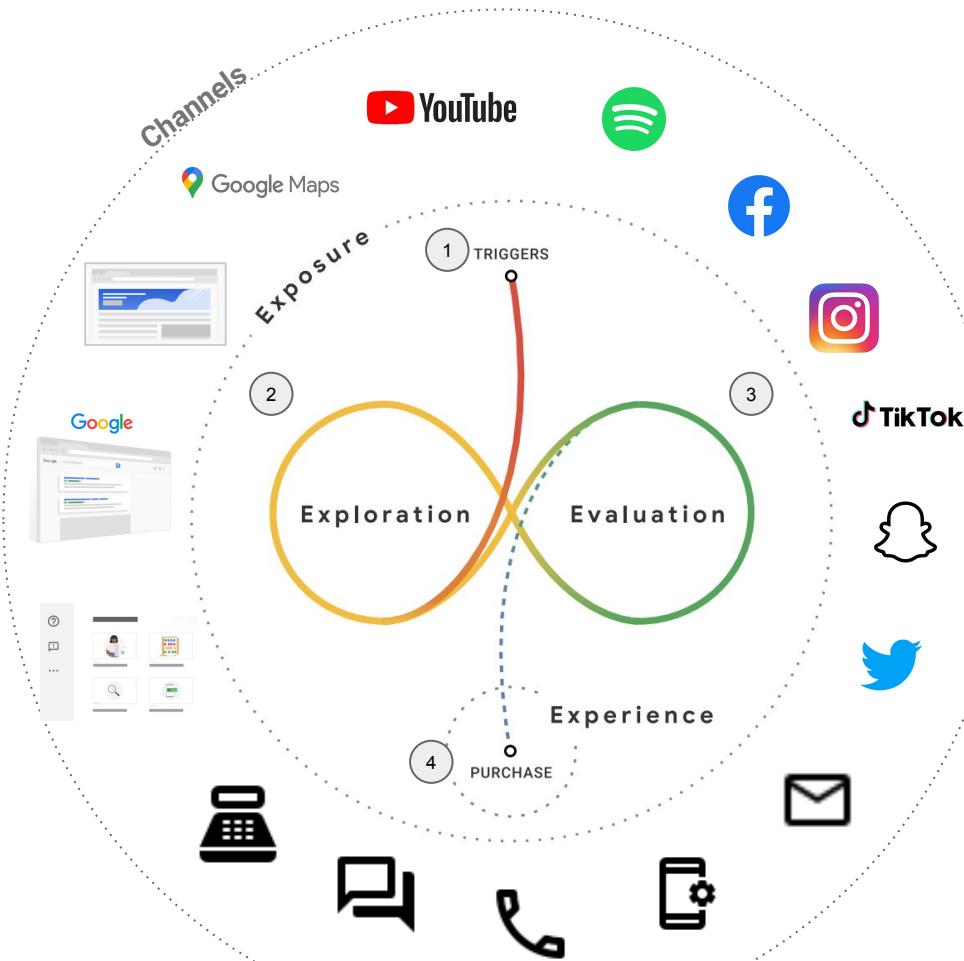
# Customer channels



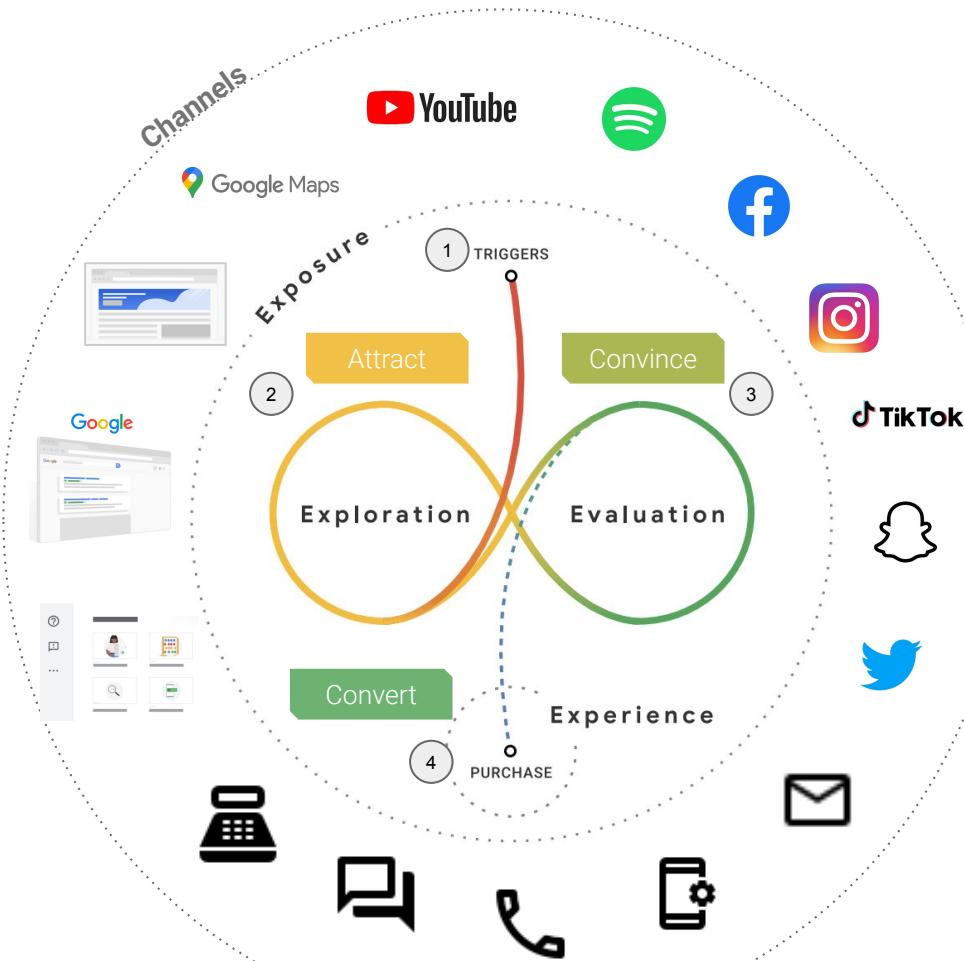
# Customer channels



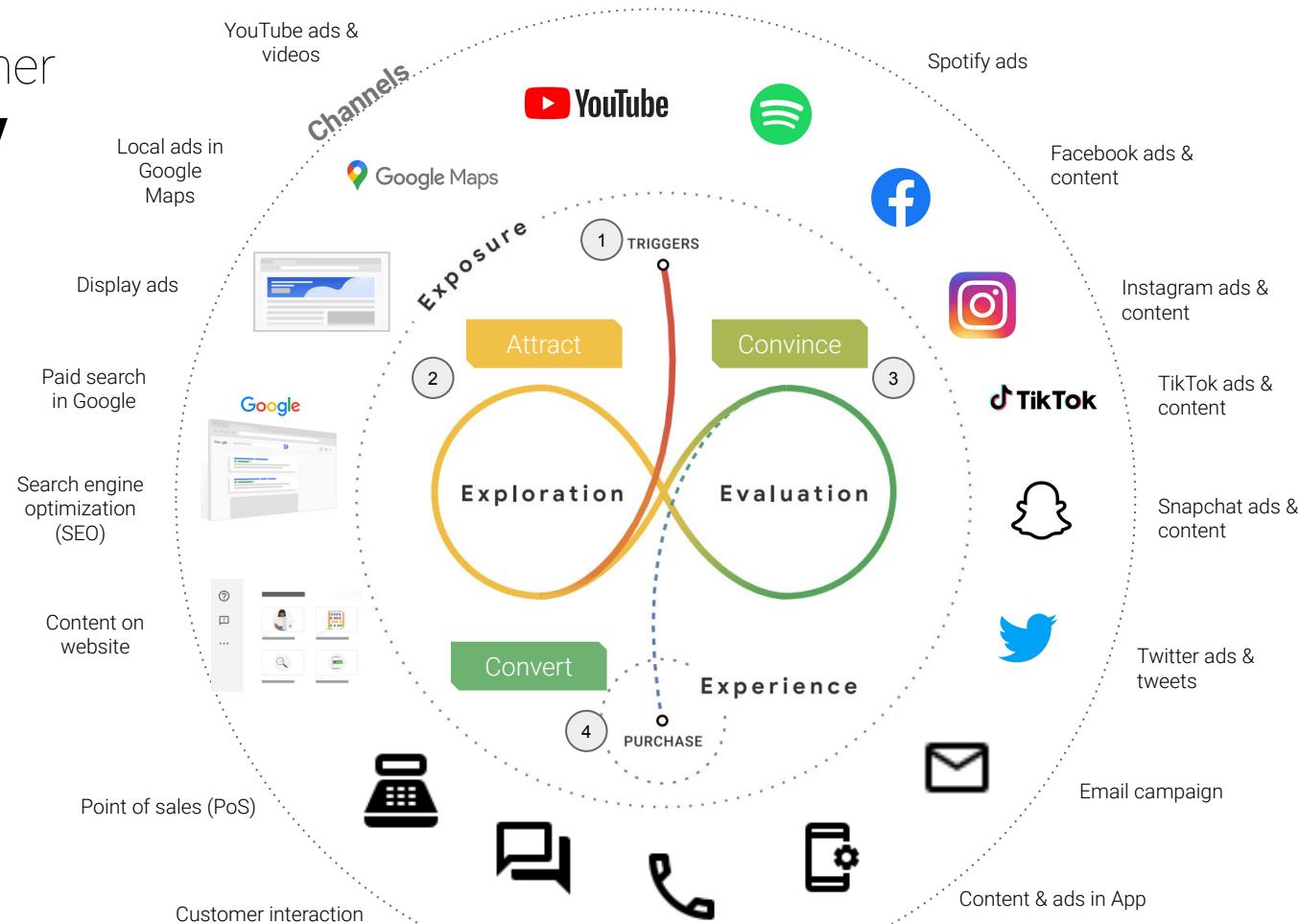
# Customer journey



# Customer journey

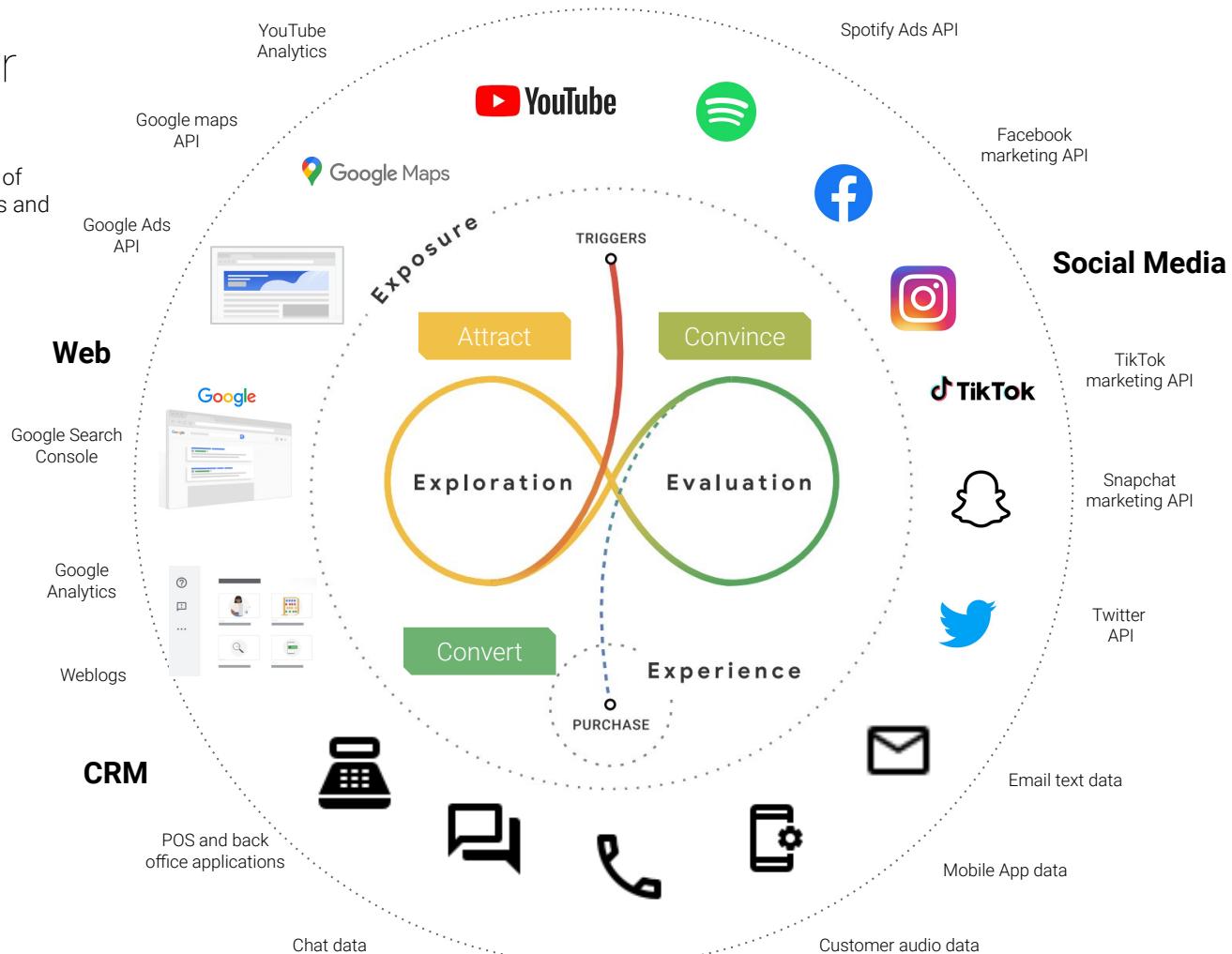


# Customer journey



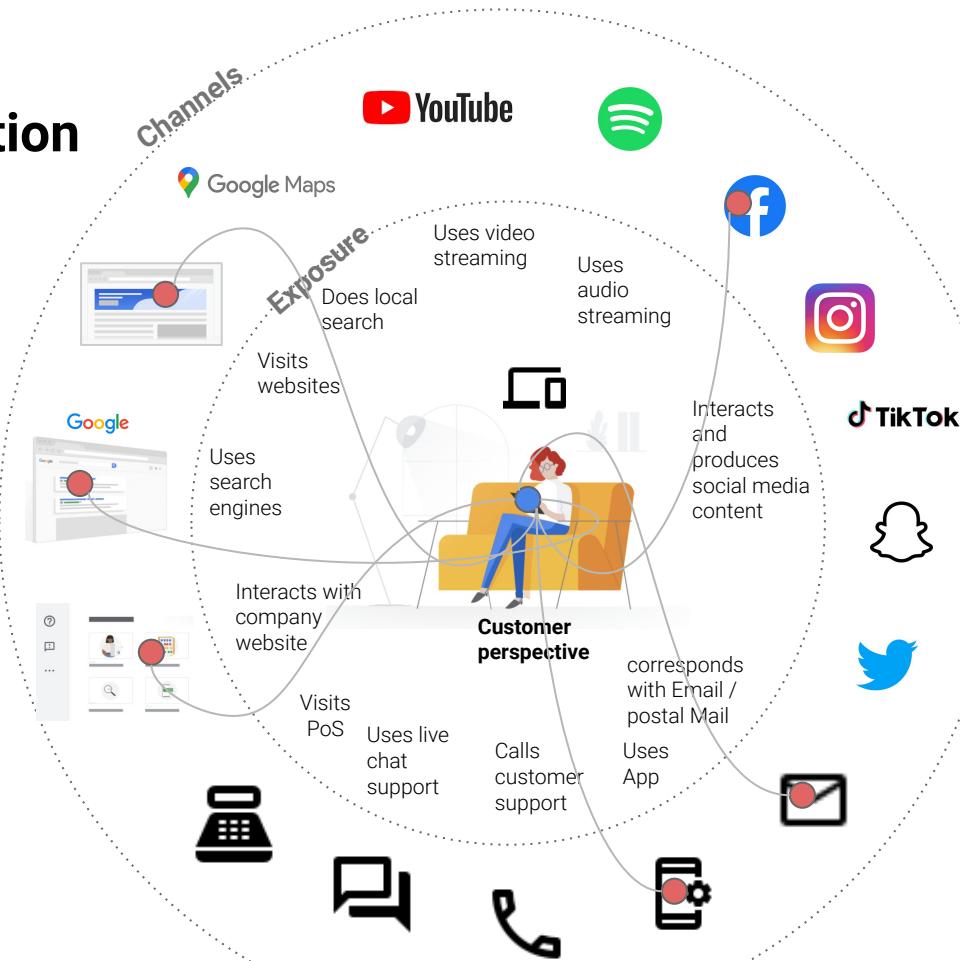
# Customer data

Data as (by)product of running the business and serving users



# Customer identity resolution

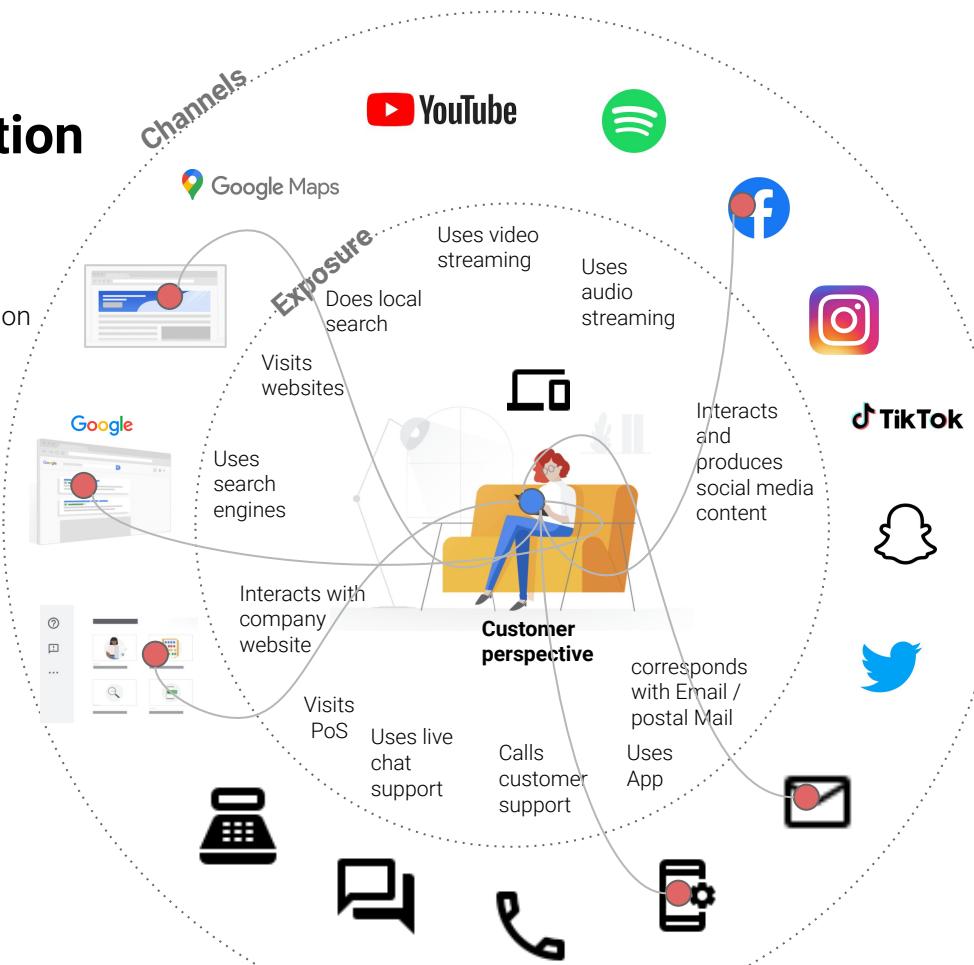
Up-to date customer profile data



# Customer **identity resolution**

Up-to date customer profile data

- Personalization
  - Recommendation
  - Next best action/conversation
  - Ad targeting
  - Ad attribution



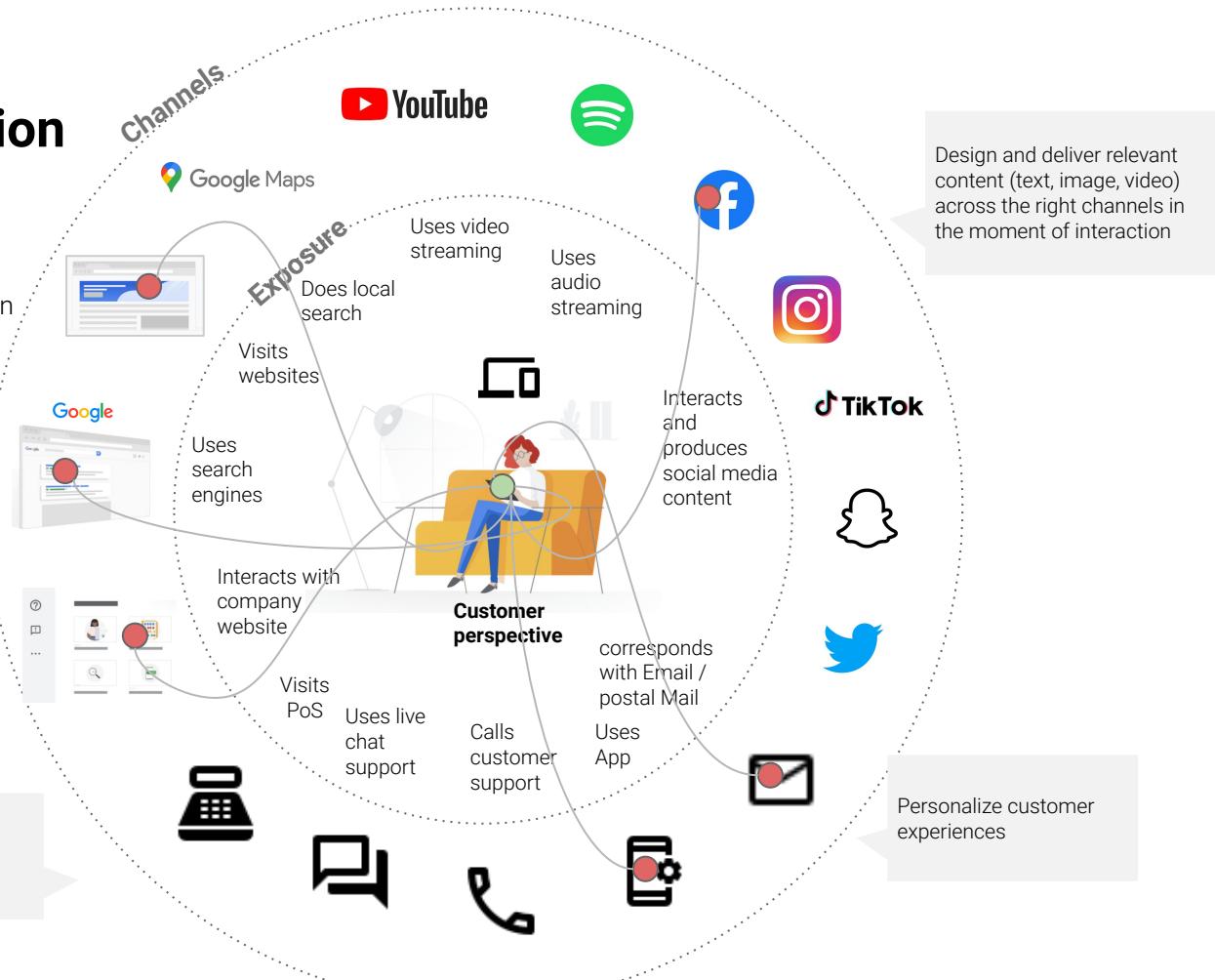
# Customer identity resolution

Up-to date customer profile data

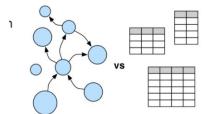
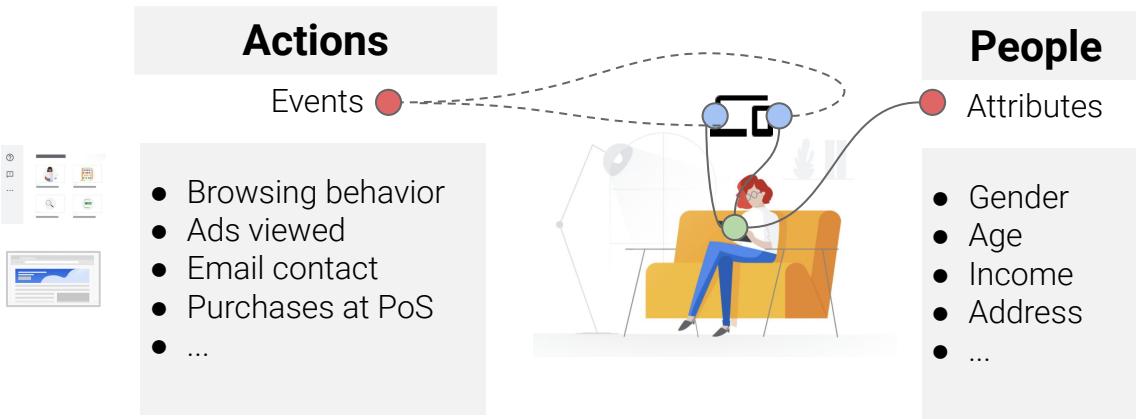
- Personalization
- Recommendation
- Next best action/conversation
- Ad targeting
- Ad attribution

Show relevant product recommendations

Assist staff with next best conversation



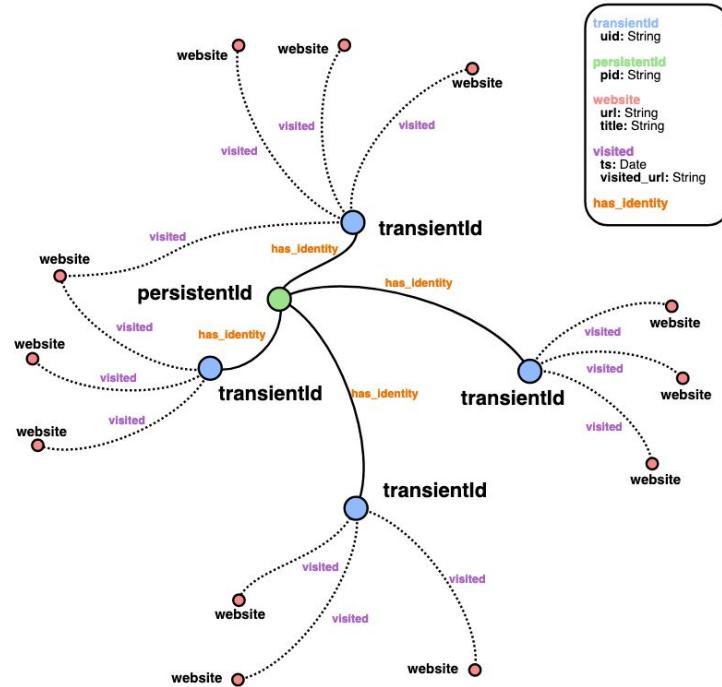
# Basic customer journey data types



"What happened?"  
"When did it happen?"  
"Who did it (device ID, cookie, IP address)?"

# Customer centric database

- Provides a 360° view of customers to understand the customer journey in chronological order.
- Provides a single unified view of customers and prospects based on their interactions with a product or website across a set of devices and identifiers.



# How to identify customers?

## Identifier

Some options



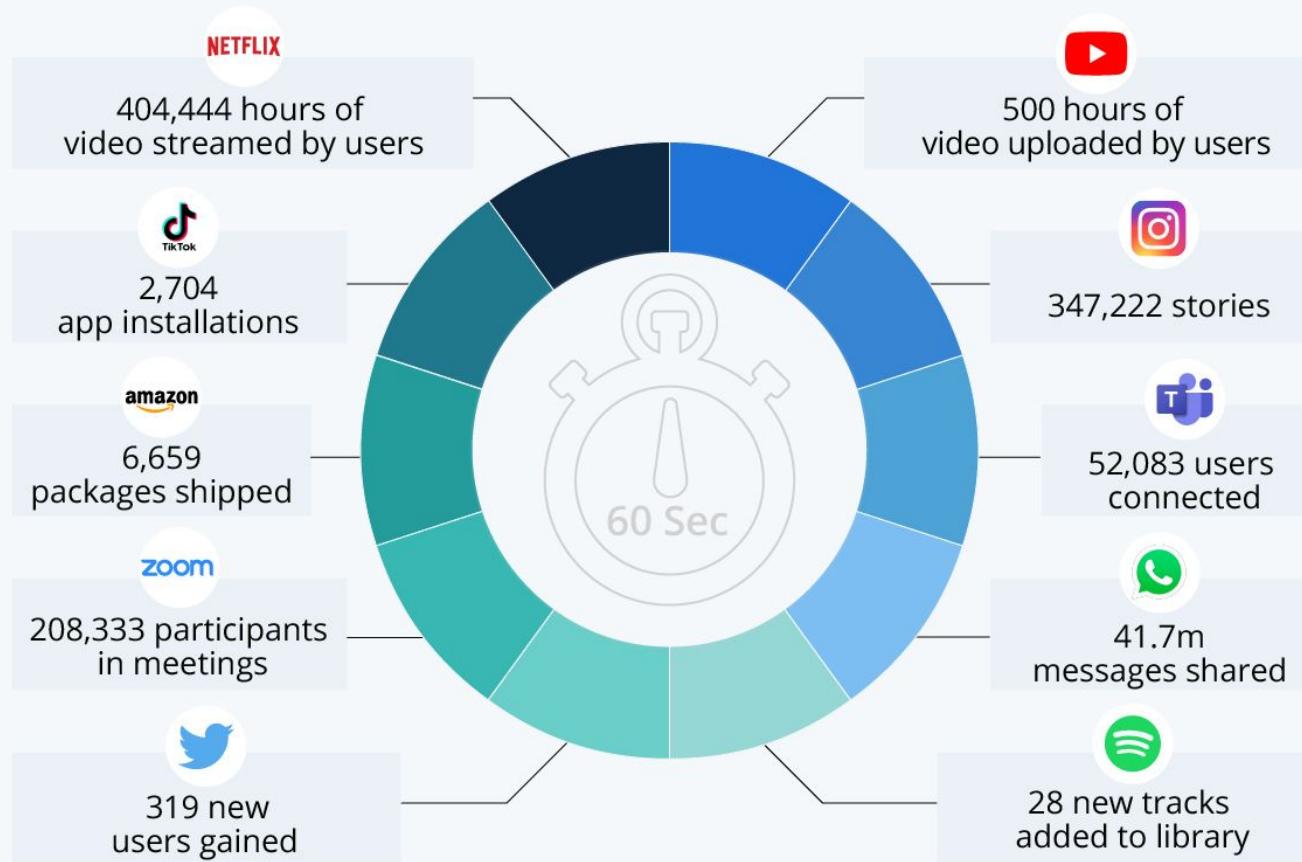
- Weblogs: cookies, IP address, ...
- Email: address
- CRM: unique key



## Challenges

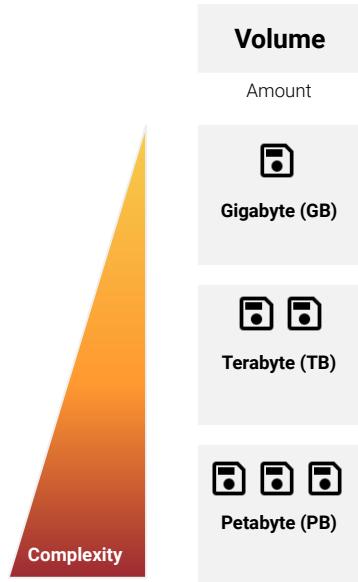
- Ban of third-party cookies
- Usage of multiple devices
- Multiple Email addresses
- Data privacy

# Data Management

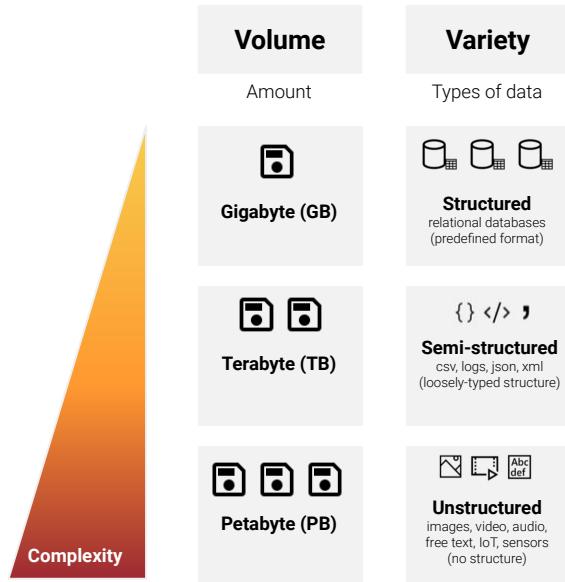


Amount of data created in one minute

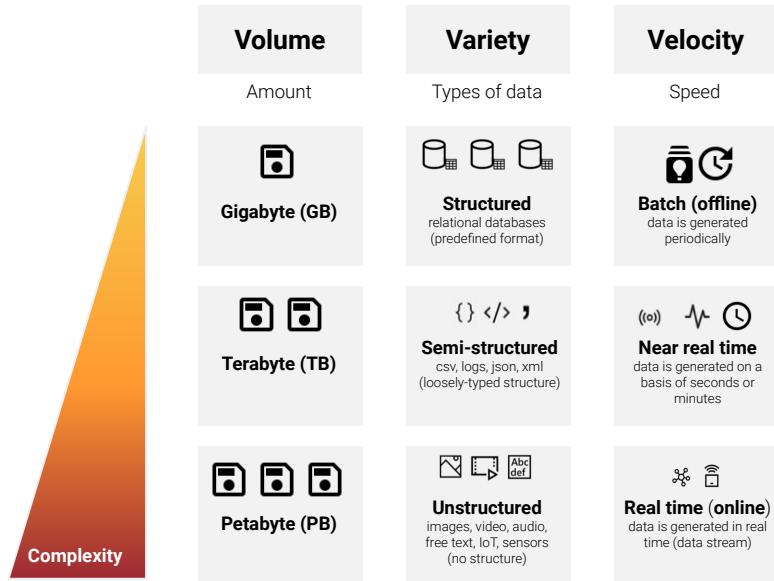
# (Big) data characteristics



# (Big) data characteristics



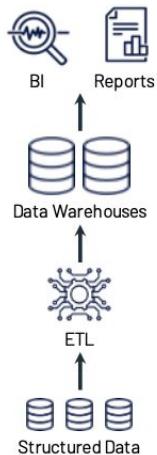
# (Big) data characteristics



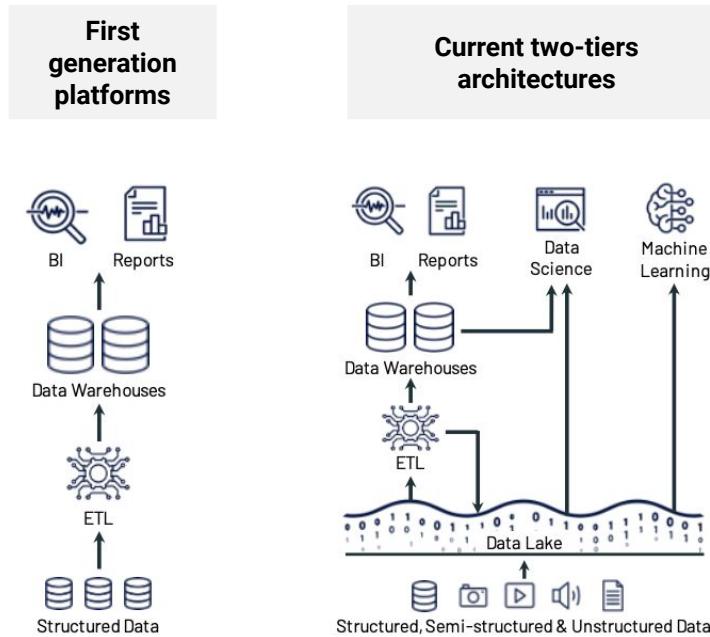
# Data platform architectures

# Evolution of data platform architectures

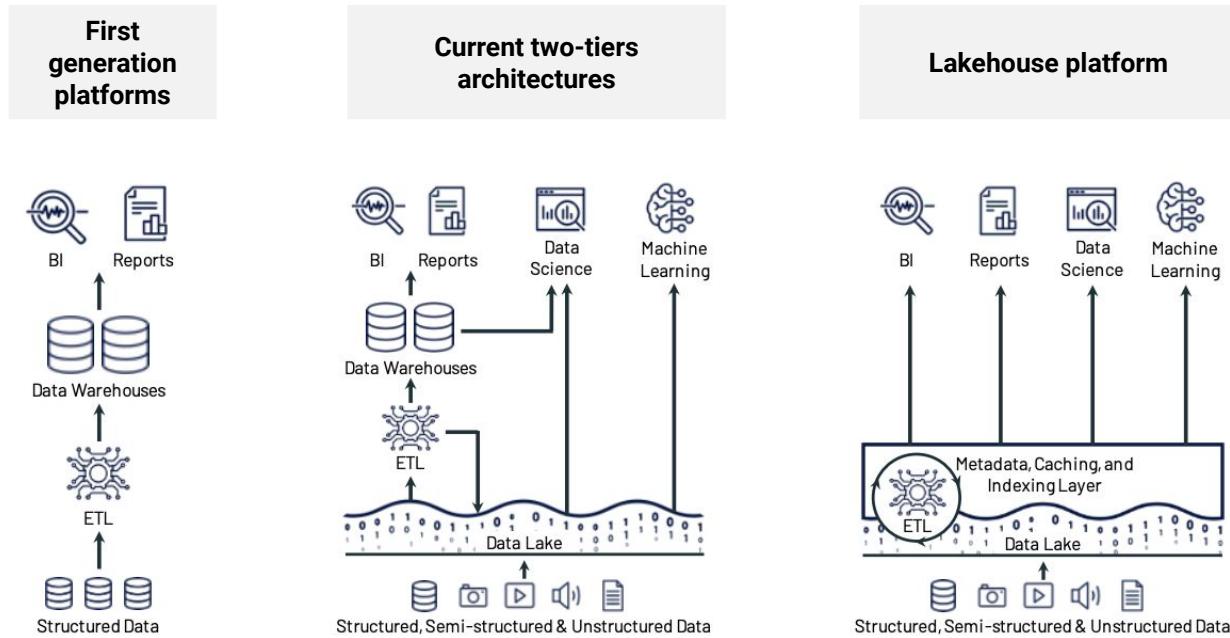
## First generation platforms



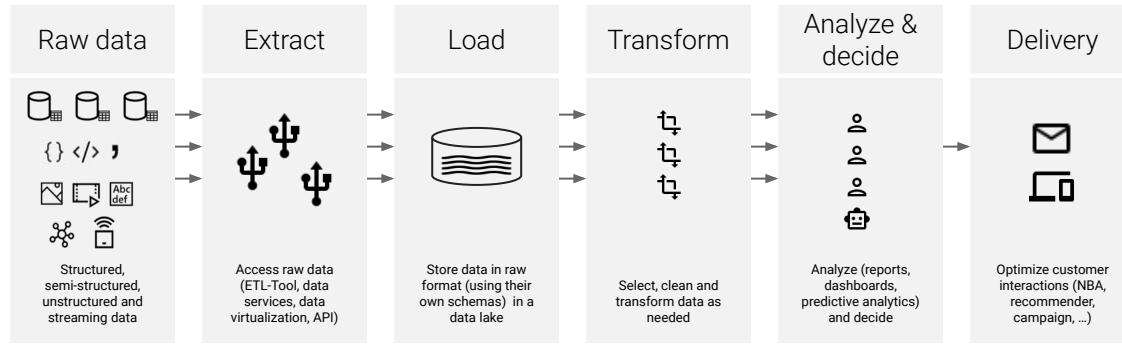
# Evolution of data platform architectures



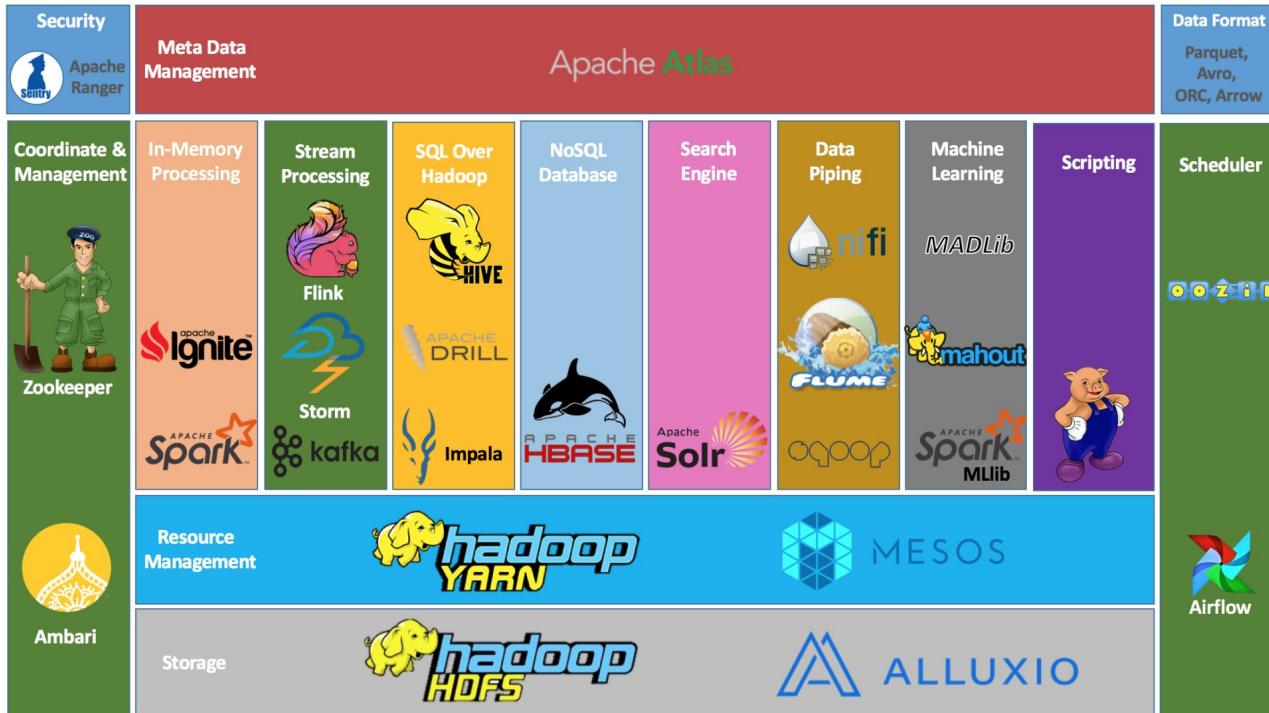
# Evolution of data platform architectures



# Building a data platform



How to build  
your solution?



Overview of the Apache big data ecosystem (open source software)

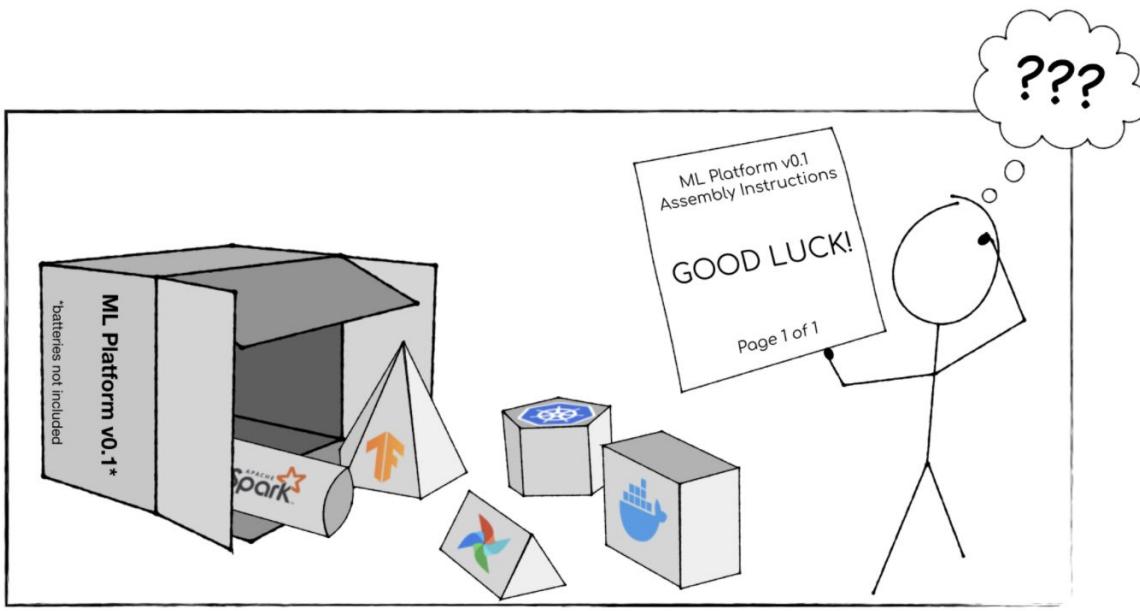


Figure 1: ML Platforms usually come with lots of pieces missing and little to no assembly instructions (Image by author, logos from open source projects [Spark](#), [TensorFlow](#), [Airflow](#), [Kubernetes](#), and [Docker](#))

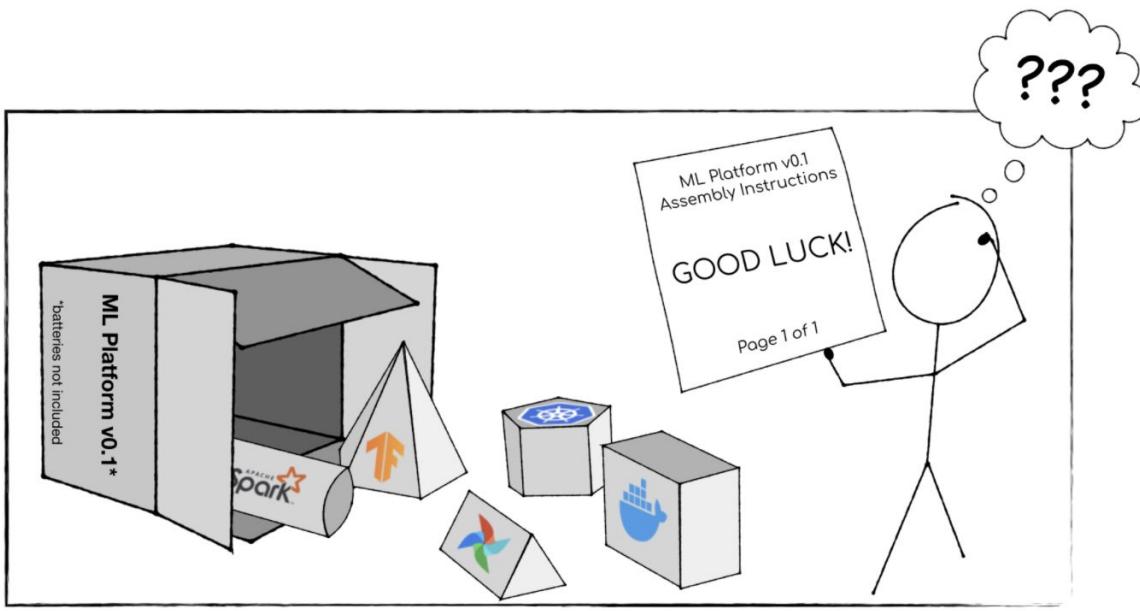
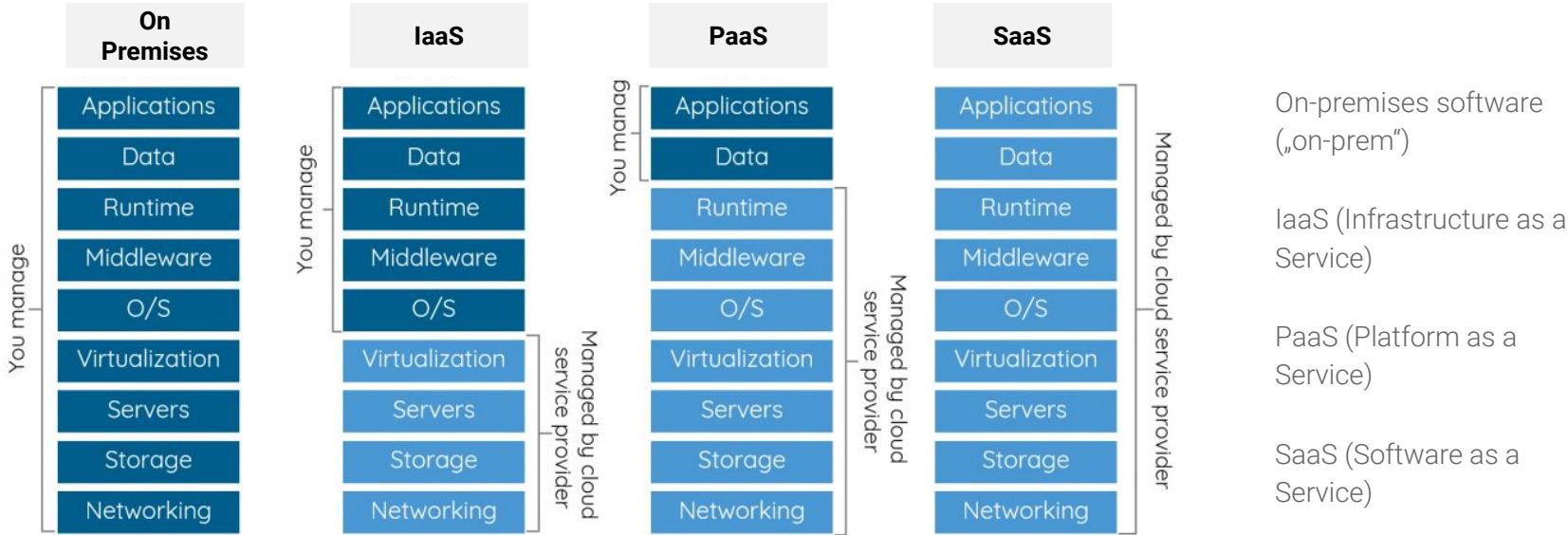


Figure 1: ML Platforms usually come with lots of pieces missing and little to no assembly instructions (Image by author, logos from open source projects [Spark](#), [TensorFlow](#), [Airflow](#), [Kubernetes](#), and [Docker](#))

“AI developer stacks today are like DIY craft kits, with the instructions and 70% of the parts missing.”

# On premises, IaaS, PaaS or SaaS

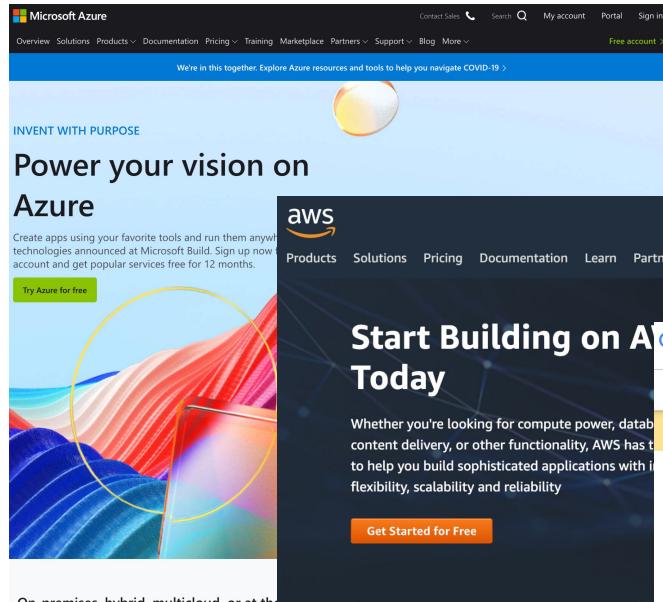




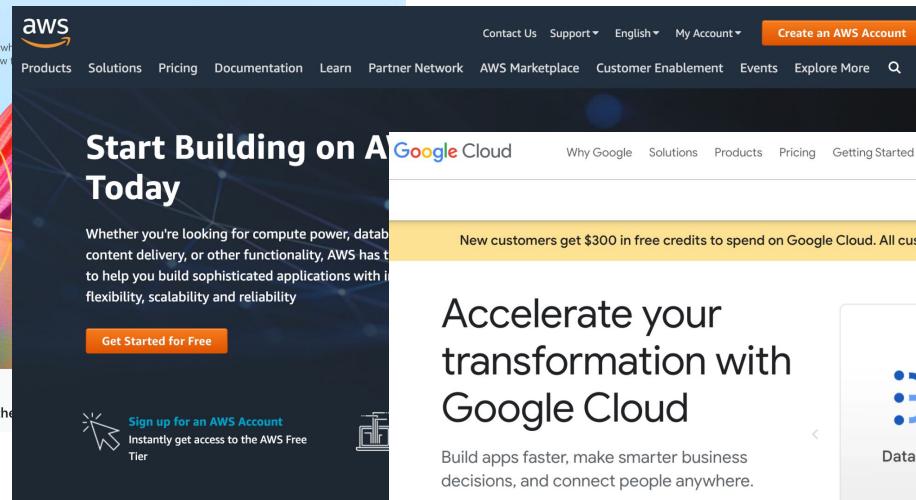
# Magic Quadrant for Cloud Infrastructure and Platform Services (2020)

Link: <https://www.gartner.com/doc/reprints?id=1-1ZDZDMTF&ct=200703&st=sb>

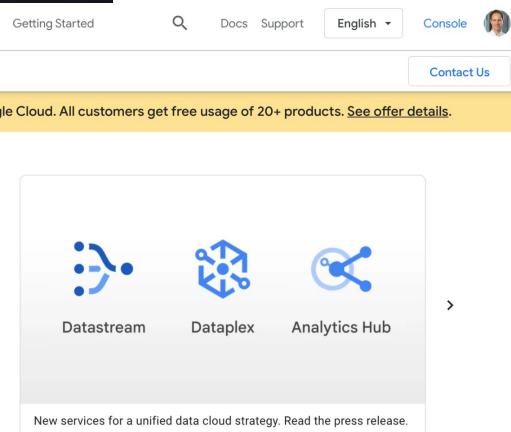
Prof. Dr. Jan Kirenz



The Microsoft Azure homepage features a top navigation bar with links for Contact Sales, Search, My account, Portal, and Sign in. Below this is a secondary navigation bar with links for Overview, Solutions, Products, Documentation, Pricing, Training, Marketplace, Partners, Support, Blog, and More. A banner at the top states "We're in this together. Explore Azure resources and tools to help you navigate COVID-19 >". The main headline reads "INVENT WITH PURPOSE" followed by "Power your vision on Azure". A callout box on the left encourages users to "Create apps using your favorite tools and run them anywhere" and "Try Azure for free". The background shows a colorful abstract image of a landscape.

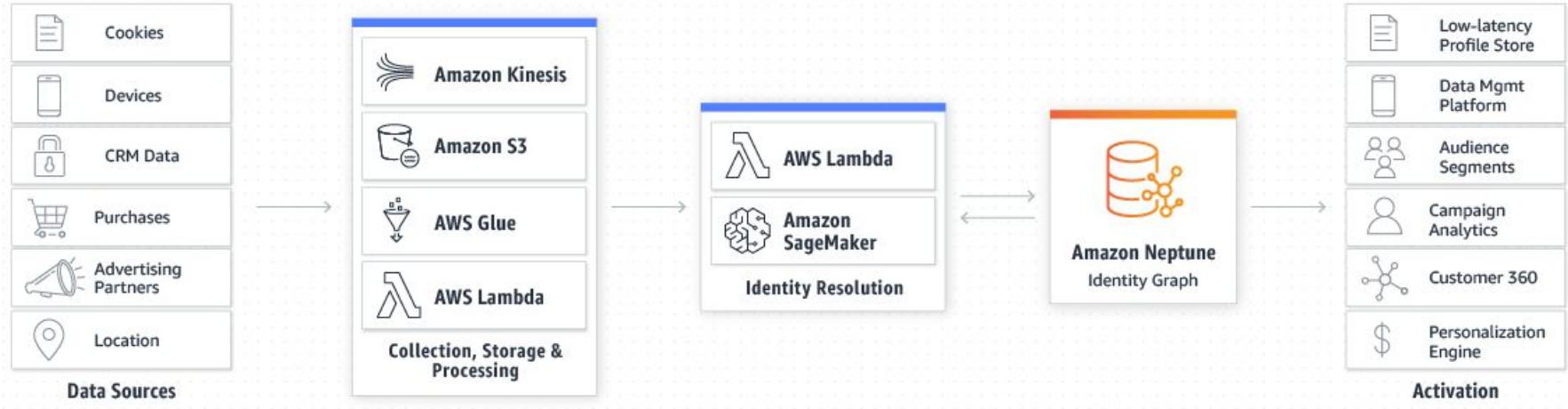


The AWS homepage has a dark header with the AWS logo and links for Contact Us, Support, English, My Account, and Create an AWS Account. Below the header is a navigation bar with links for Products, Solutions, Pricing, Documentation, Learn, Partner Network, AWS Marketplace, Customer Enablement, Events, Explore More, and a search bar. The main section features a large banner with the text "Start Building on AWS Today". It highlights that AWS has everything needed to build sophisticated applications with flexibility, scalability, and reliability. A "Get Started for Free" button is present. A sidebar on the left offers to "Sign up for an AWS Account" and "Instantly get access to the AWS Free Tier".

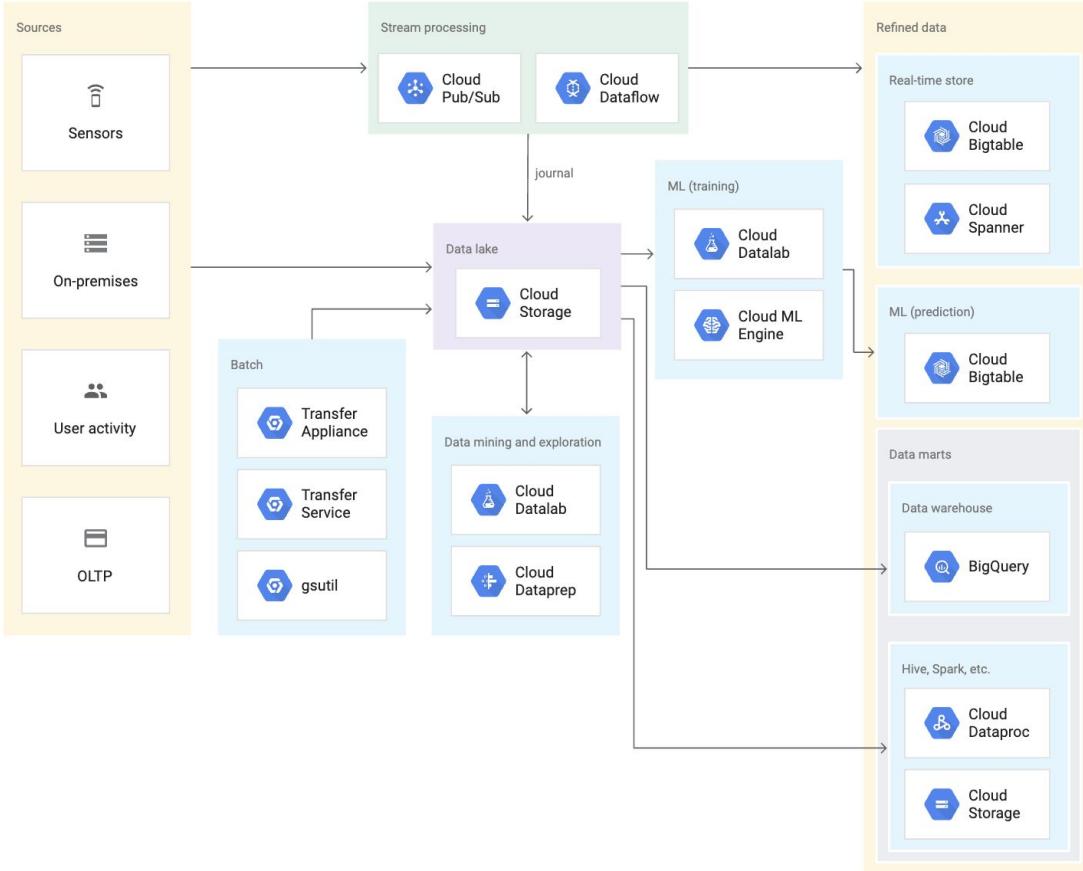


The Google Cloud homepage features a dark header with the Google Cloud logo and links for Why Google, Solutions, Products, Pricing, and Getting Started. Below the header is a navigation bar with links for a search bar, Docs, Support, English, Console, and a user profile. A yellow banner at the top right says "New customers get \$300 in free credits to spend on Google Cloud. All customers get free usage of 20+ products. See offer details." The main section features a large banner with the text "Accelerate your transformation with Google Cloud". It highlights building apps faster, making smarter business decisions, and connecting people anywhere. A "Go to console" button is present. To the right, there is a section for "New services for a unified data cloud strategy" featuring icons for Datastream, Dataplex, and Analytics Hub.

# Cloud Infrastructure and Platform Services



Implementation example for Amazon AWS



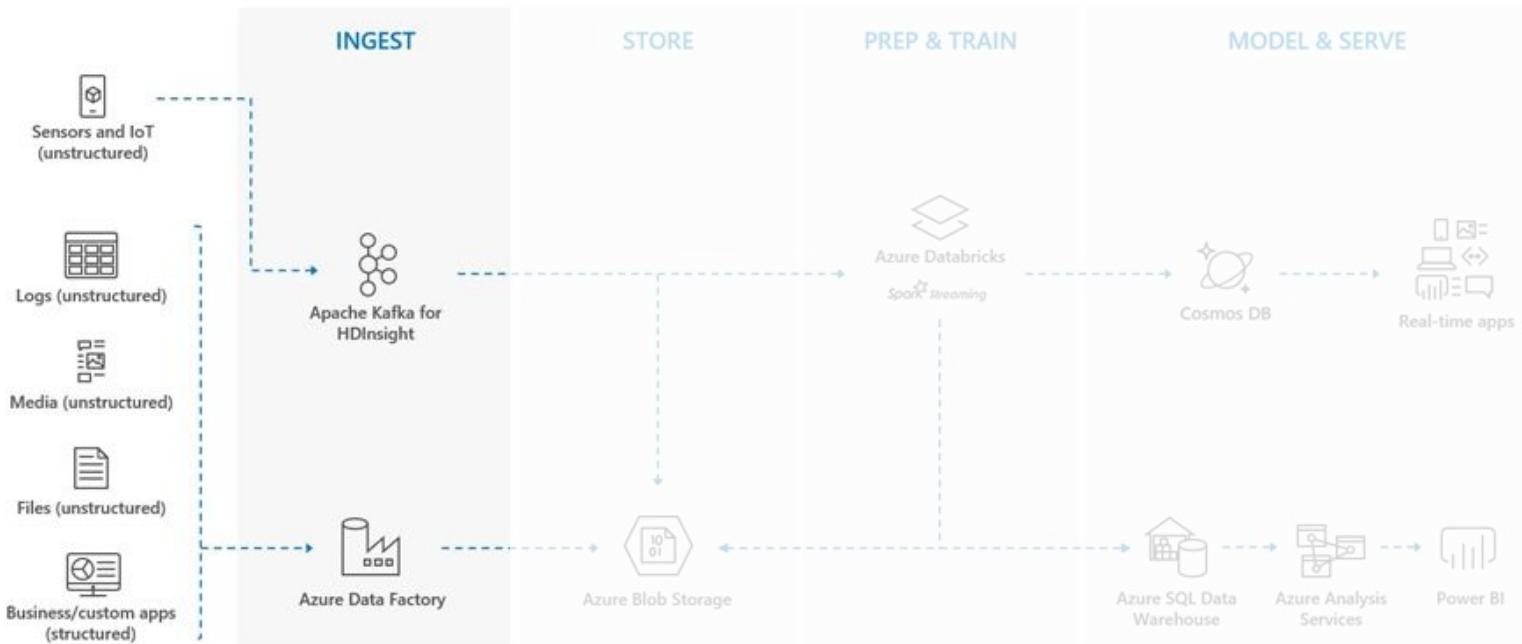
# Architecture example for Google Cloud

# Modern data warehouse



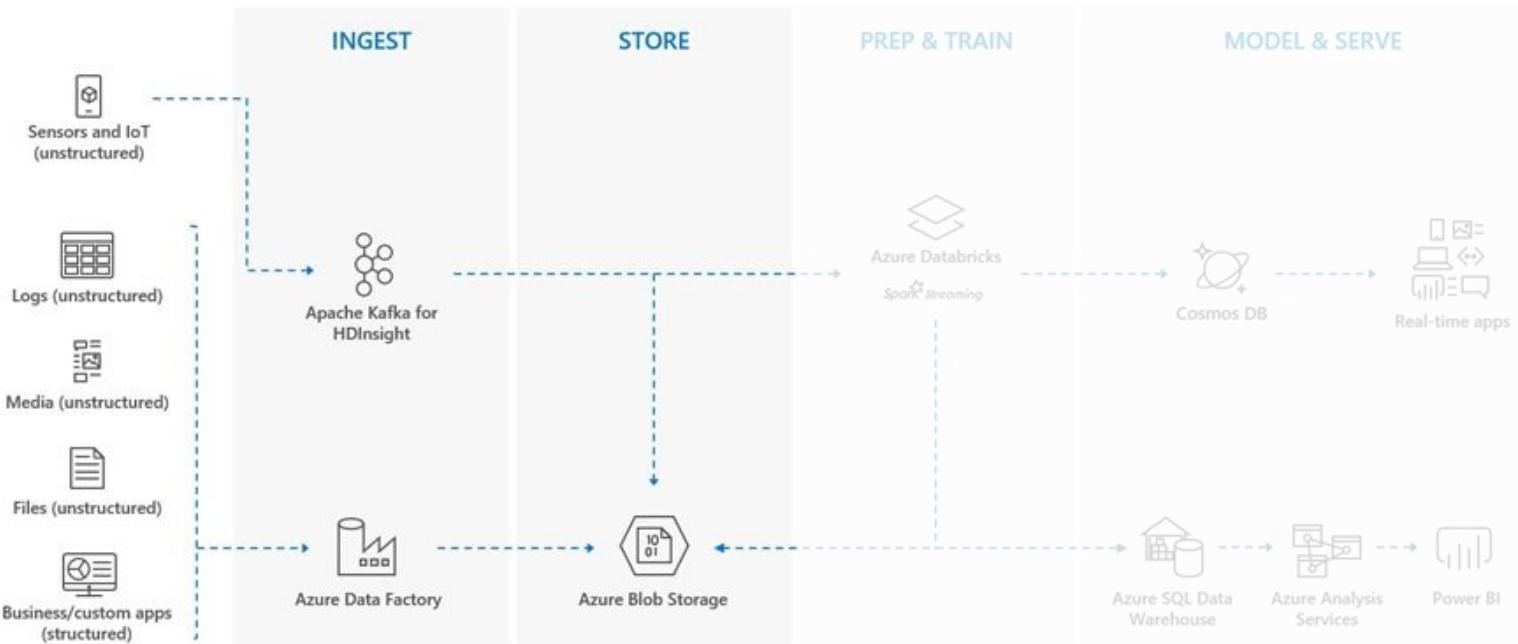
Source: Microsoft (2018)

# Modern data warehouse



Source: Microsoft (2018)

# Modern data warehouse



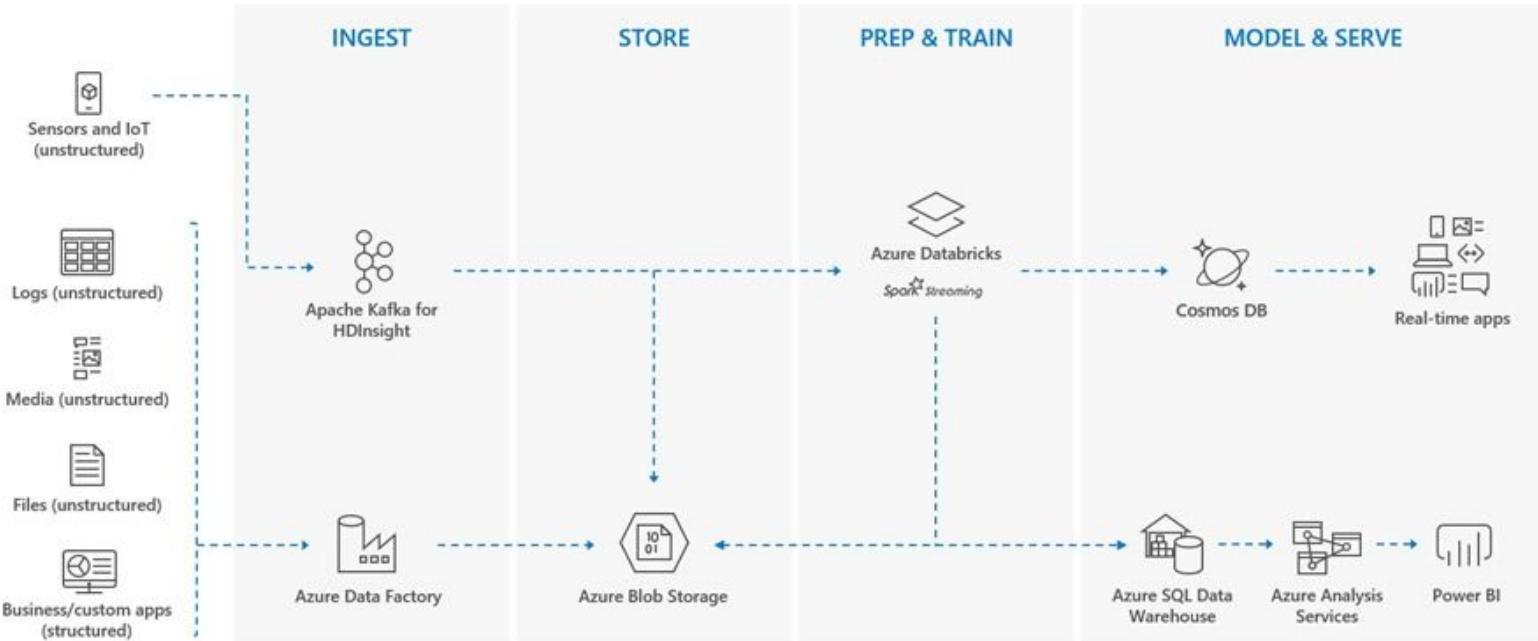
Source: Microsoft (2018)

## Modern data warehouse



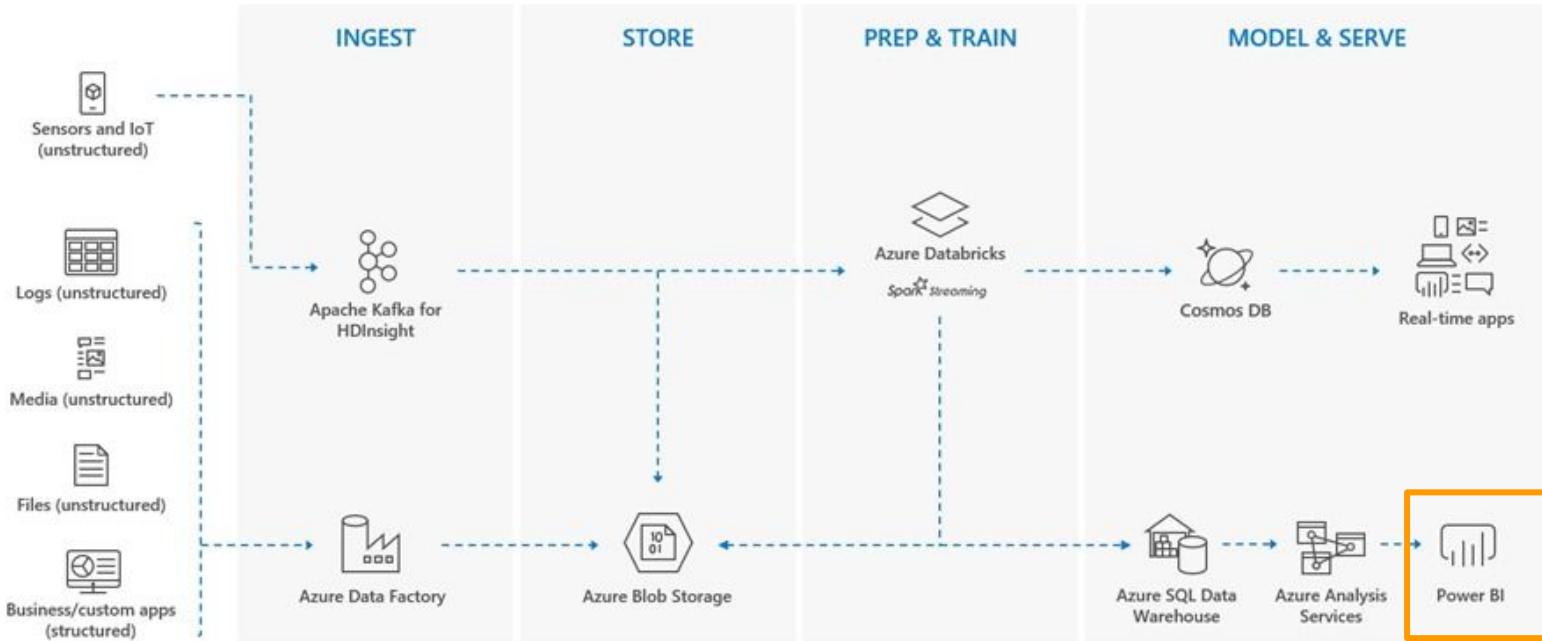
Source: Microsoft (2018)

## Modern data warehouse



Source: Microsoft (2018)

## Modern data warehouse



Source: Microsoft (2018)

Power BI Desktop



Power BI service



Power BI Mobile





Standarddaten  
Zum Auswählen Ihrer Daten klicken

11.03.2019 - 07.04.2019

## Overview

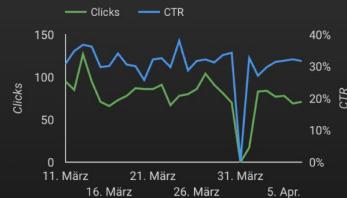
### Click Through Rate & Impressions

by Clicks, CTR, and Impressions

Clicks  
**2.176,0**  
-3.7%

CTR  
**31,7 %**  
+ 0.1%

Impressions  
**6.860,0**  
-3.8%



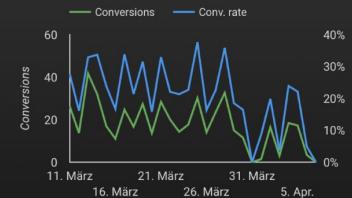
### Conversion Rate & Cost

by Conversions Rate and Cost / Conv.

Conversions  
**491,1**  
+ 2.2%

Conv. rate  
**22,6 %**  
+ 6.1%

Cost / conv.  
**\$1,53**  
- 7.2%



### Cost Per Click

by Cost, CPC, and CPM

Cost  
**\$753,60**  
- 9.6%

Avg. CPC  
**\$0,35**  
+ 13.8%

Avg. CPM  
**\$109,85**  
+ 13.9%



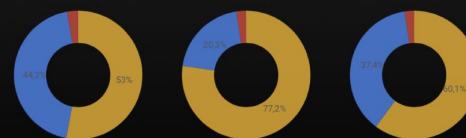
### Top Campaigns

by CTR, Avg. CPC, and Cost / Conv.

Campaign	CTR	Avg. CPC	Cost / conv.
1. 1000549   Google Analytics Demo   DR   Jo...	36,57 %	\$0,43	\$1,6
2. 1000549   Google Analytics Demo   DR   jon...	35,07 %	\$0,3	\$1,31
3. 1000549   Google Analytics Demo   DR   Jo...	33,33 %	\$0,57	\$0
4. 1000549   Google Analytics Demo   DR   Jo...	28,13 %	\$0,48	\$1,96
5. 1000549   Google Analytics Demo   DR   Jo...	27,05 %	\$0,31	\$1,37

### Device Breakdown

by Clicks, Cost, and Conversions





# Challenges

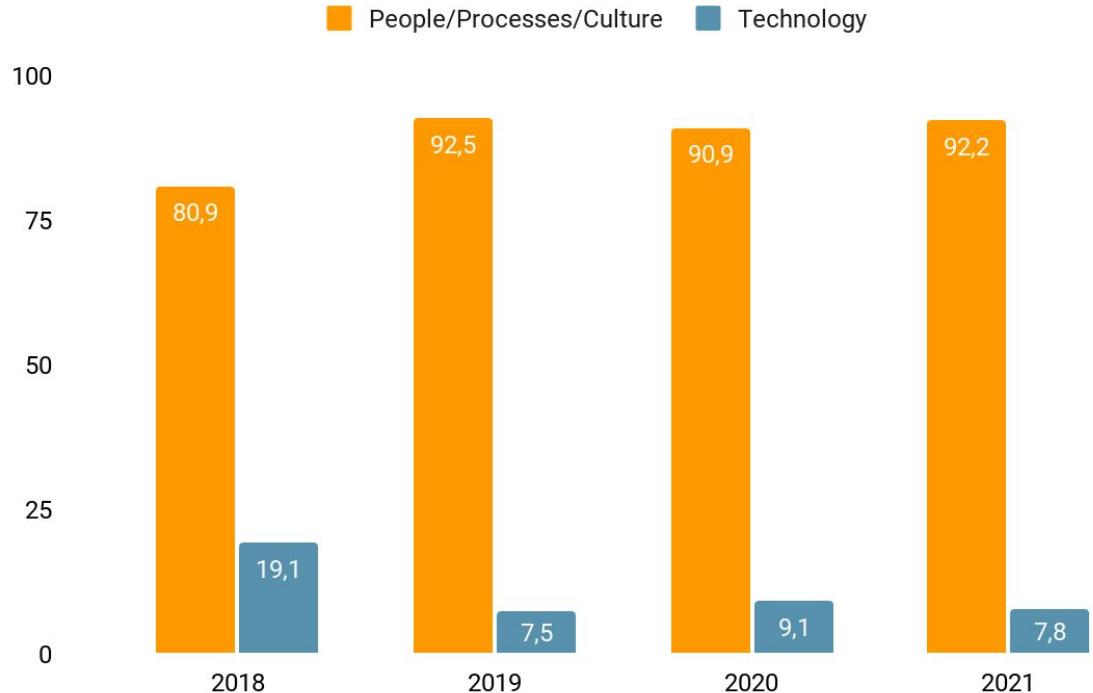
Only 39.3% are managing data as a business asset

Only 30.0% have a well-articulated data strategy for their company

Only 24.4% have forged a data culture

Only 24.0% have created a data-driven organization.

# The Journey to Becoming Data-Driven: A Progress Report on the State of Corporate Data Initiatives (2021)



Principle challenge to becoming data-driven

Source: NewVantage Partners (2021), n = 85, Fortune 1000 companies, 76.0% of respondents held the role of Chief Data Officer or Chief Analytics Officer

Prof. Dr. Jan Kirenz

“Organizations which design systems [...] are constrained to produce designs which are copies of the communication structures of these organizations”

Melvin E. Conway

The next best  
product

# Marketing Technology Landscape

The Martech 5000

Total Solutions 8,000

Advertising &amp; Promotion 922

Content &amp; Experience 1936

Social &amp; Relationships 1969

Commerce &amp; Sales 1,314

Data 1,258

Management 601

 Access all the data of this landscape & more at [martech5000.com](https://martech5000.com)

 2019  
7,040 solutions

 2018  
6,829 solutions

 2017  
5,351 solutions

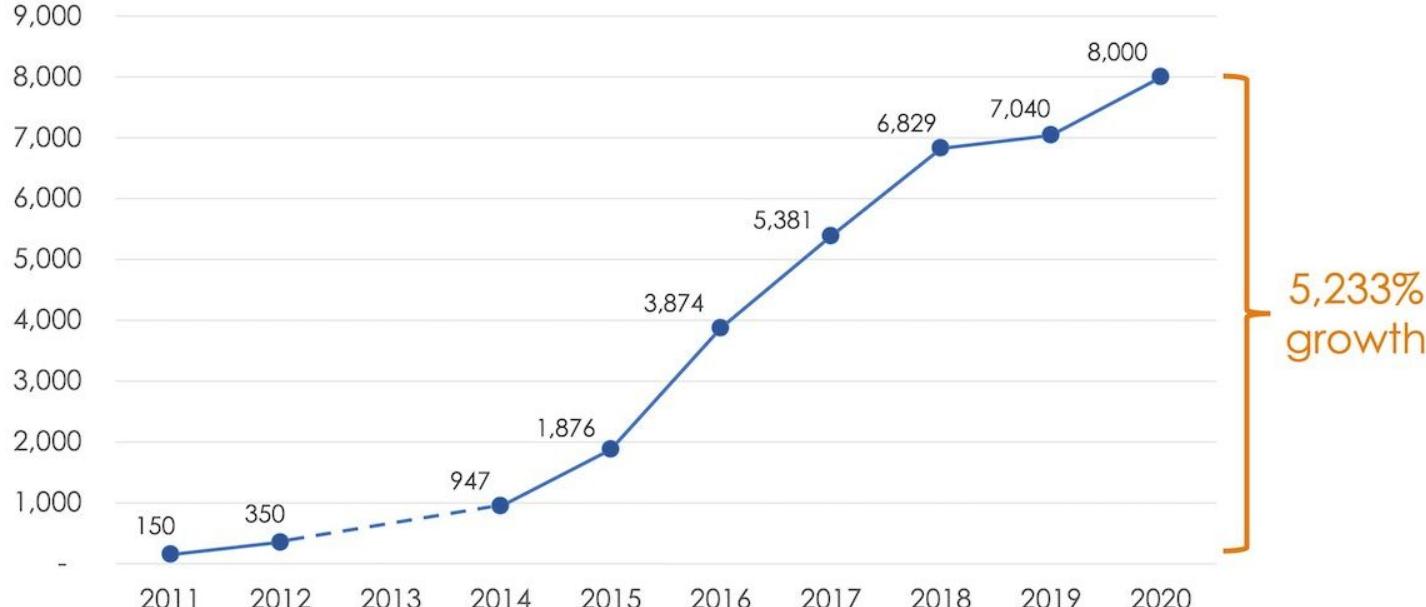
 2016  
3,874 solutions

 2015  
1,876 solutions

 2014  
947 solutions

 Copyright © 2020 Marketing Technology Media, LLC. See <https://chiefmartec.com/2020/04/marketing-technology-landscape-2020-martech-5000/> for details and sources.

Produced by Scott Brinker (@chiefmartec) and Blue Green Brands (@bluegreenbrands).

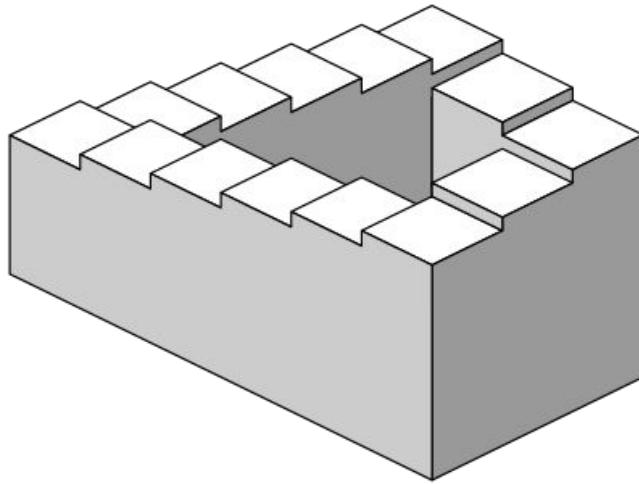


## Growth of Martech Landscape 2011-2020

Total Solutions	8,000	Growth Since 2019	Biggest Subcategory Growth (Percentage) Since 2019	
<b>Advertising &amp; Promotion</b>	922	4.1% ↑	Print	35% ↑
<b>Content &amp; Experience</b>	1,936	5.6% ↑	Video Marketing	26% ↑
<b>Social &amp; Relationships</b>	1,969	13.7% ↑	Conversational Marketing & Chat	70% ↑
<b>Commerce &amp; Sales</b>	1,314	9.0% ↑	Retail Proximity & IOT	15% ↑
<b>Data</b>	1,258	25.5% ↑	Governance, Compliance & Privacy	68% ↑
<b>Management</b>	601	15.2% ↑	Projects & Workflow	41% ↑

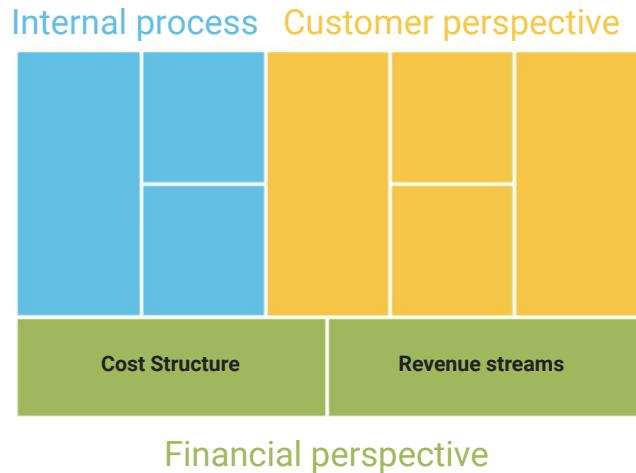
# The never ending trap

1. Evaluate and select “best” product
2. Implement solution without an information architecture
3. Project is late and costs more than planned
4. Solution fails to meet expectations and active adoption
5. Blame current products used
6. Evaluate and select a new “best” product
7. Go back to step 2

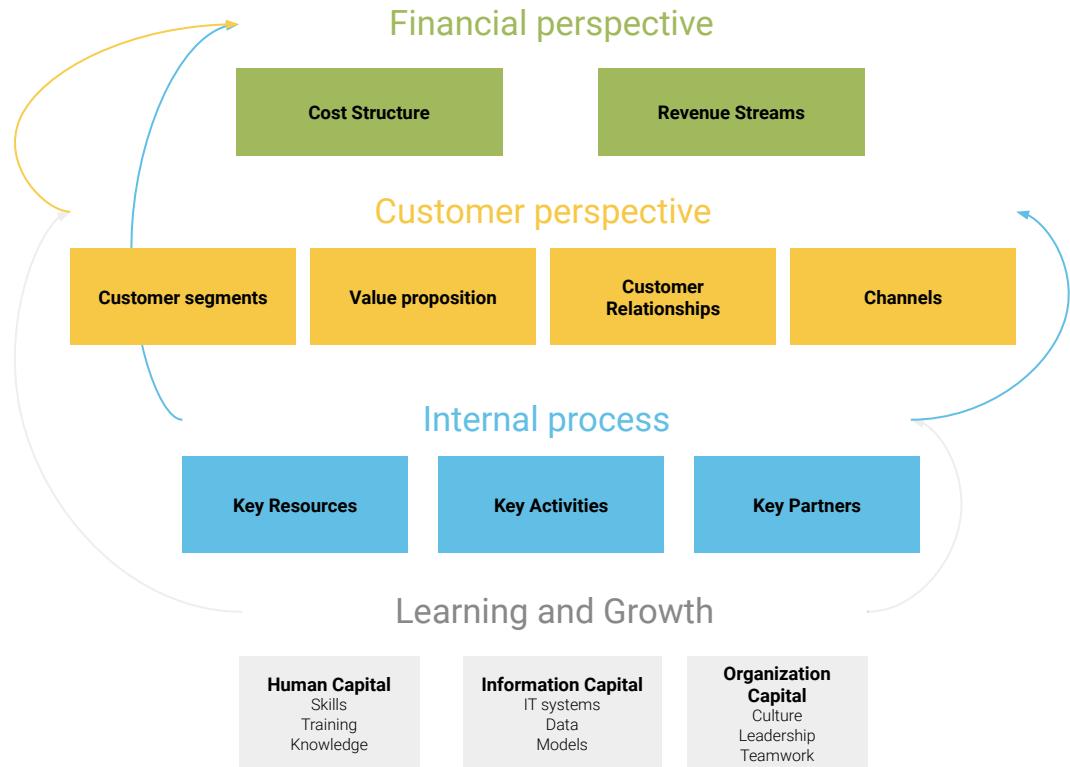
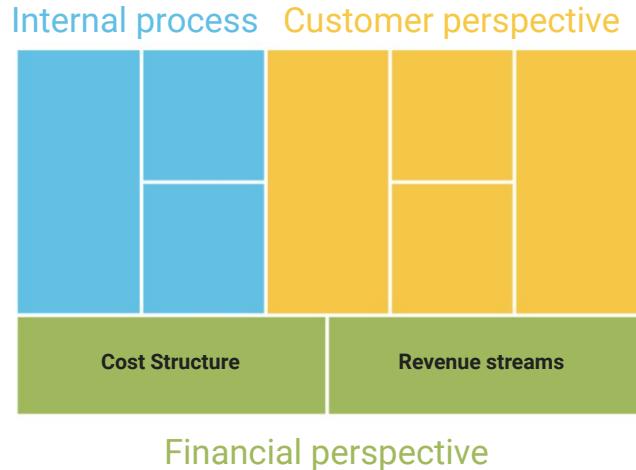


A different  
approach

# From BMC to information architecture



# From BMC to information architecture



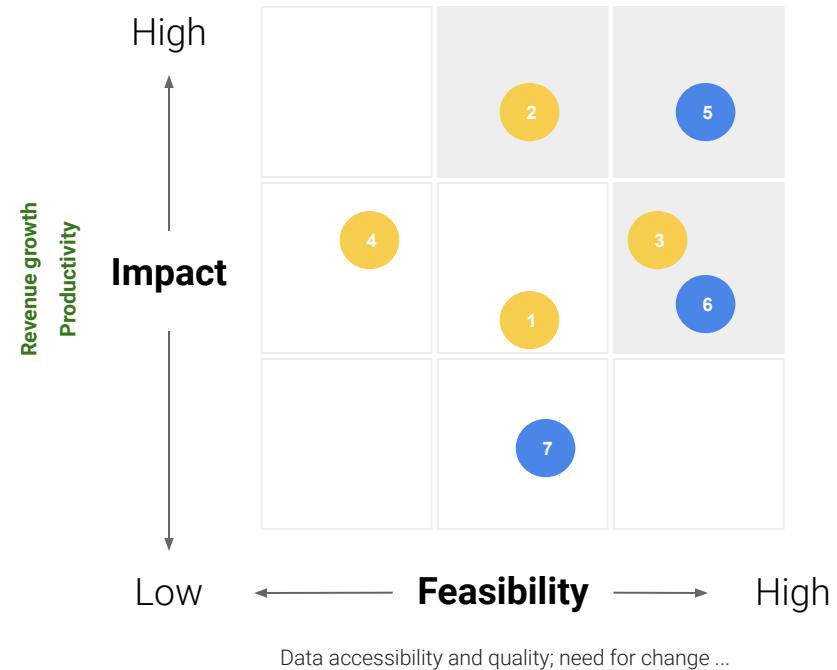
# Use case prioritization and (data) ownership

## Customer perspective

1. Customer segments initiative
2. Value proposition initiative
3. Channels initiative
4. Customer relationship initiative

## Internal process

5. Key activities initiative
6. Key resources initiative
7. Key partners initiative



# 2021

## From customer experience (CX) to business of experience (BX)

