AWS re:Invent

ADM201-L

Advertising & Marketing Industry Leadership Session

Dmitri Tchikatilov, Head, Worldwide Business Development, Advertising & Marketing Industry, AWS

Tejas Desai
Vice President, Technology, Nielsen

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GM of TV and Audio, Nielsen

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SVP, Engineering, The Trade Desk

Calvin French-Owen
Chief Technical Officer, Segment

AWS re:Invent

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aws

Five Areas of Innovation in Advertising & Marketing

Key areas of innovation in advertising & marketing



Data analysis



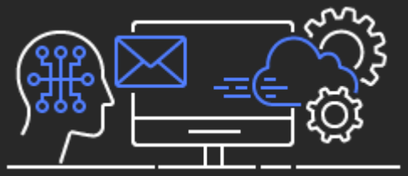
Measurement



RTB in the cloud



Identity graph



Personalization

Key areas of innovation in advertising & marketing

theTradeDesk



Data analysis



Measurement



RTB in the cloud



Identity graph



Personalization

nielsen

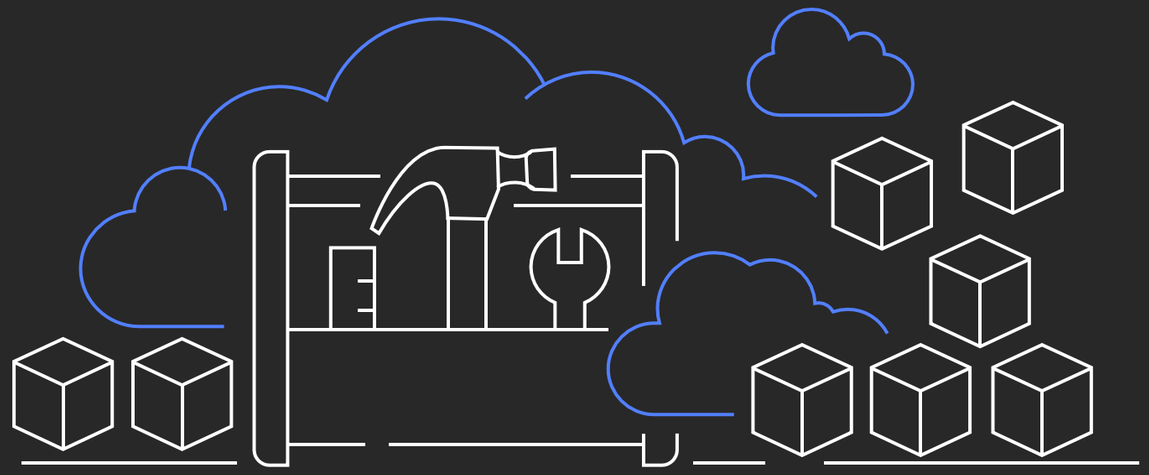
Segment

How AWS empowers customers in Advertising & Marketing

Unmatched breadth & depth of technology

AWS gives companies in advertising and marketing a technology edge they cannot get from any other cloud provider. AWS has a **broader selection of services, more functionality in areas like big data and machine learning, and technology** simply not available on other cloud platforms—unlocking opportunities for innovation, scale, and cost-savings only available on AWS.

- **165 fully featured cloud services** for compute, storage, database, networking, analytics, machine learning—**more than any cloud provider**
- Networking tools designed for the scale and millisecond latency of advertising technology, including **AWS Global Accelerator**
- Purpose-built tools for data analysis at petabyte scale, including **AWS Lake Formation, Amazon EMR, Amazon Redshift**
- Machine learning services like **Amazon SageMaker** and **Amazon Personalize**



Cost-leadership at scale and low latency

The unmatched breadth of services and purpose-built technology available from AWS gives companies **more opportunities to optimize costs and save money** on workloads like analytics, ad serving, real-time bidding, and machine learning than with any other cloud provider.

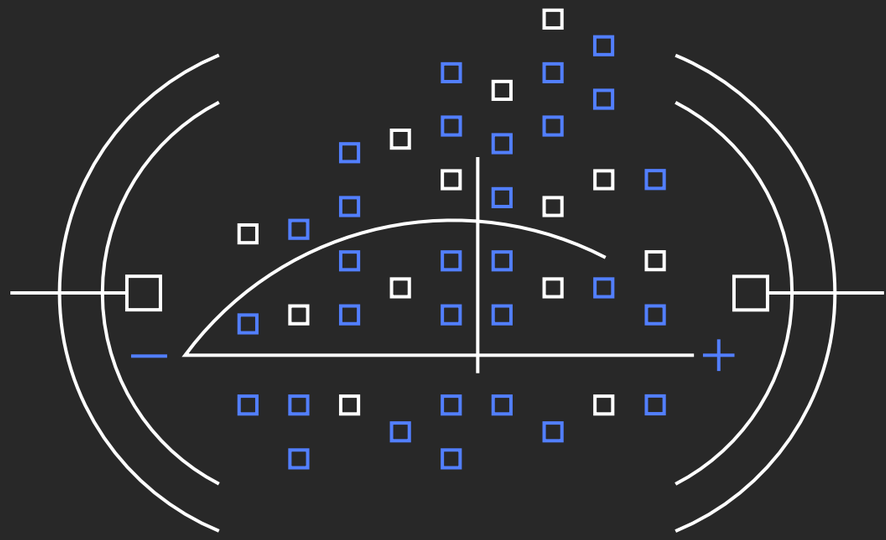
- **Reduce costs up to 70%** on data processing, machine learning, and programmatic advertising workloads
- Amazon EC2 Spot Instances give customers up to **90% cost reduction** vs. on-demand prices
- Leverage machine learning services like **Amazon SageMaker** and **Amazon Forecast** to cost-optimize advertising and analytics workloads



Customer cloud experience

AWS has over a decade of experience helping companies handle virtually any cloud workload for advertising & marketing. Our breadth of services, leadership position, and sheer volume of usage means **AWS has learned lessons about scale, reliability, security, and speed** that other cloud providers simply haven't had to learn yet—especially at the petabyte scale and millisecond latency required by today's marketing stack.

- **More big data workloads** than any other cloud: 10,000 data lakes run on AWS
- **More machine learning** runs on AWS than any other cloud. 85% of TensorFlow across the cloud happens on AWS
- **50%+ of Kubernetes workloads** running on AWS across cloud providers



10,000 ML customers

More machine learning happens on AWS than anywhere else.



“We innovate by starting with the customer and working backwards.”

Let’s start **working backwards**

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Advertising & Marketing Industry Leadership Session

Tejas Desai
Vice President of Technology
Nielsen

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General Manager, Head of TV and Audio Products
Nielsen

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Agenda

One media truth

Measuring the total audience

Our cloud journey

What the cloud has enabled

Our platform

Intelligence Studio

Understanding what’s next

ONE MEDIA TRUTH

Only Nielsen provides a fair playing field for the business of media. Our unbiased metrics create the shared understanding of the industry required for markets to function.



Truth is our only agenda.

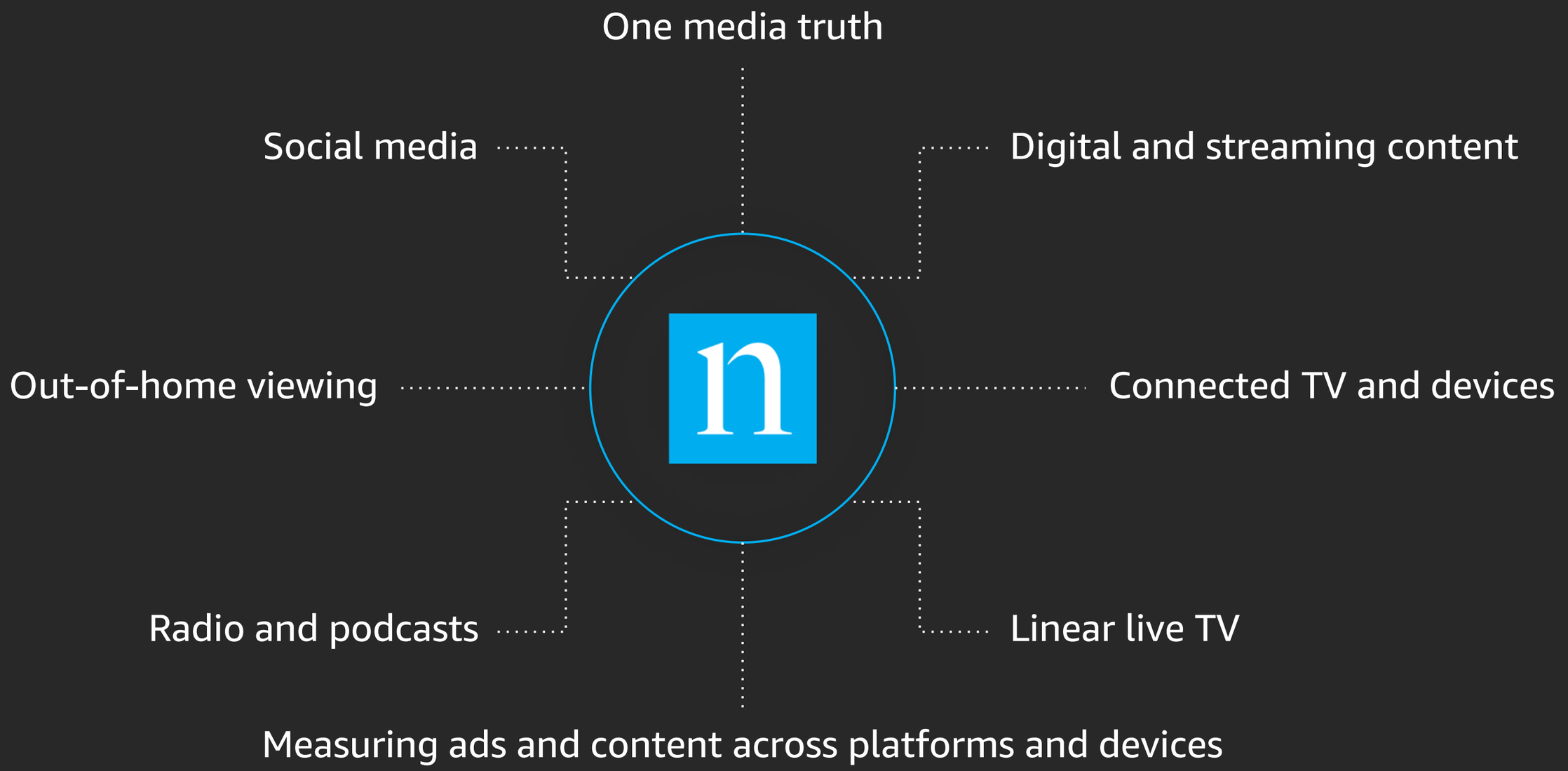


Metrics that
make markets.

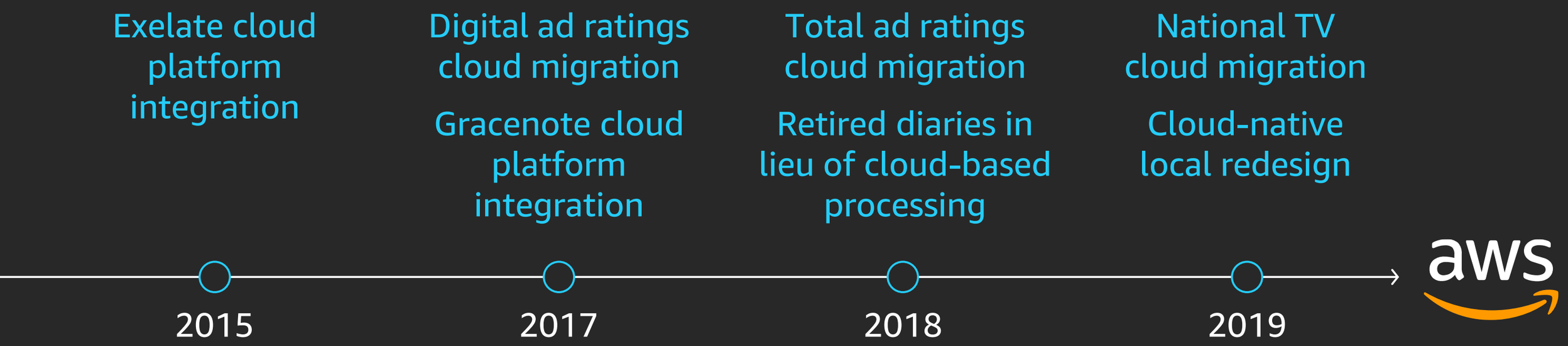


Accurate insights depend
on an accurate picture.

Measuring the total audience



Our cloud journey



Our cloud-based platform now processes tens of billions of events

Transforming Nielsen to a modern, big data focused organization

What the cloud has enabled

Increased coverage and ratings stability

Expanded number of households from 40K to 30M in 2020

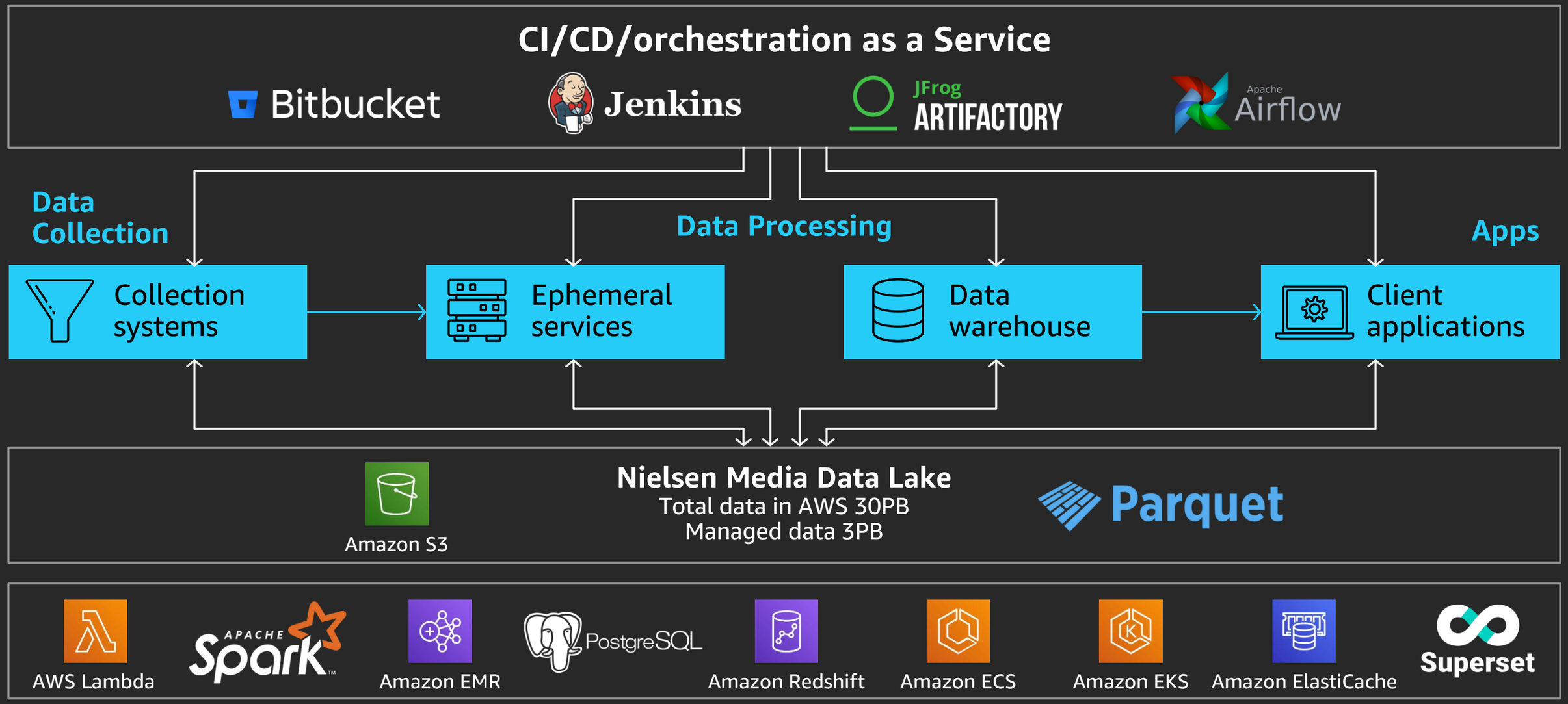
New National Out-of-Home Ratings Service, launching 2020

Avoided large capital expenses on hardware

Simplified disaster recovery strategy

Sophisticated machine learning algorithms

Our platform



Modern collaboration with clients

Singular data storage location = faster, cleaner data

Intelligence studio
SDLC for data science



Sharing & harmonization
Co-mingles data



Cloud compute

Data lake

Cloud storage



Our move to a cloud infrastructure is game changing—providing clients the scale and flexibility to solve their biggest data challenges.



The power of transformation

Now that our platform is cloud-based, scaled, processing production data and the backbone of our SDLC, we can leverage it for a data exchange with our clients.



Modern data delivery

Provides modern, flexible data delivery to our clients at the speed that they demand.



Enabling innovation

Our cloud transformation allows Nielsen Media clients to spend less time working with our data and more time understanding the valuable insights we deliver.

Thank you!

Tejas Desai
Vice President of Technology
Nielsen

Scott N. Brown
General Manager, Head of TV and Audio Products
Nielsen

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Advertising & Marketing Industry Leadership Session

Calvin French-Owen

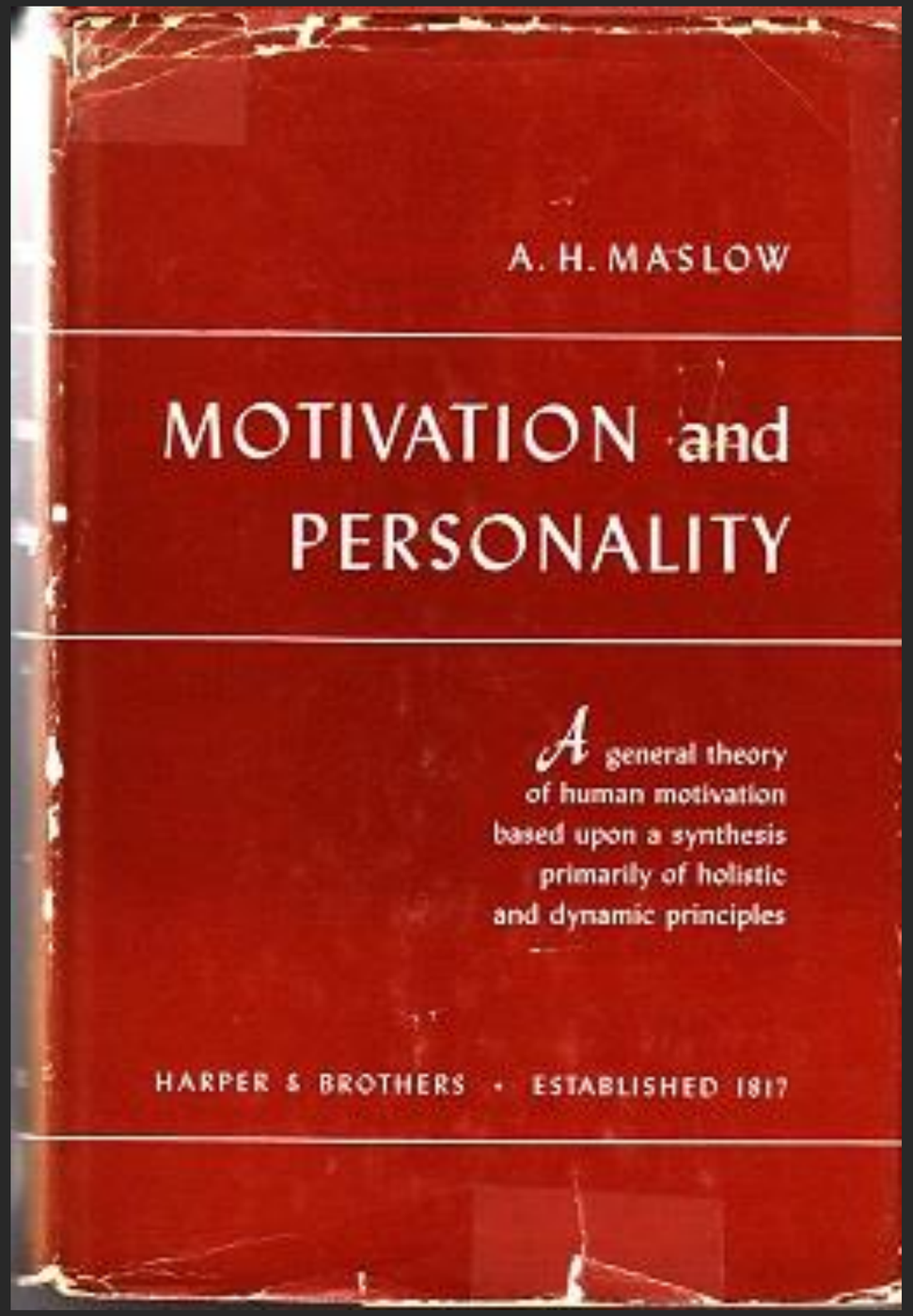
Chief Technical Officer,
Segment

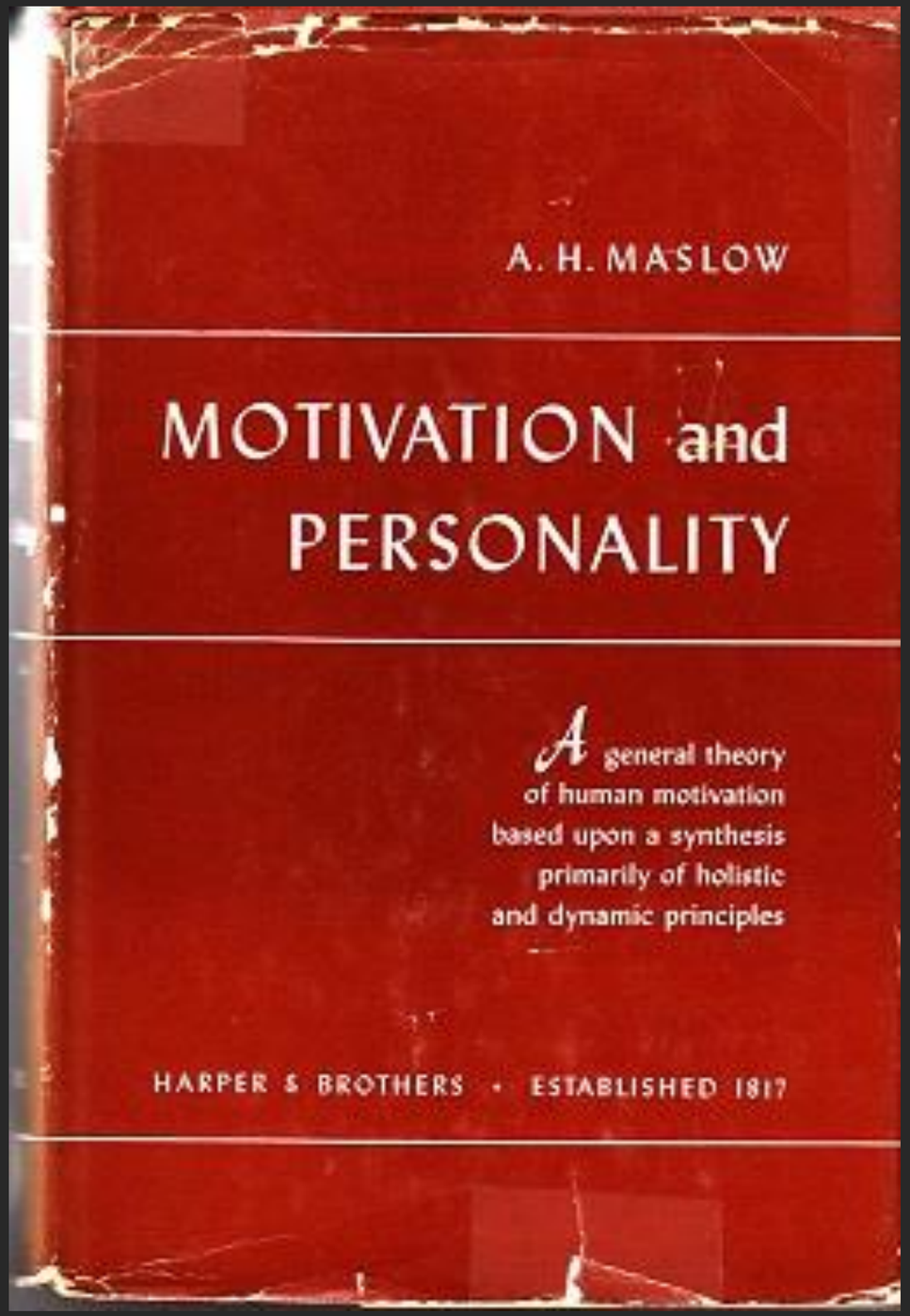
AWS re:Invent

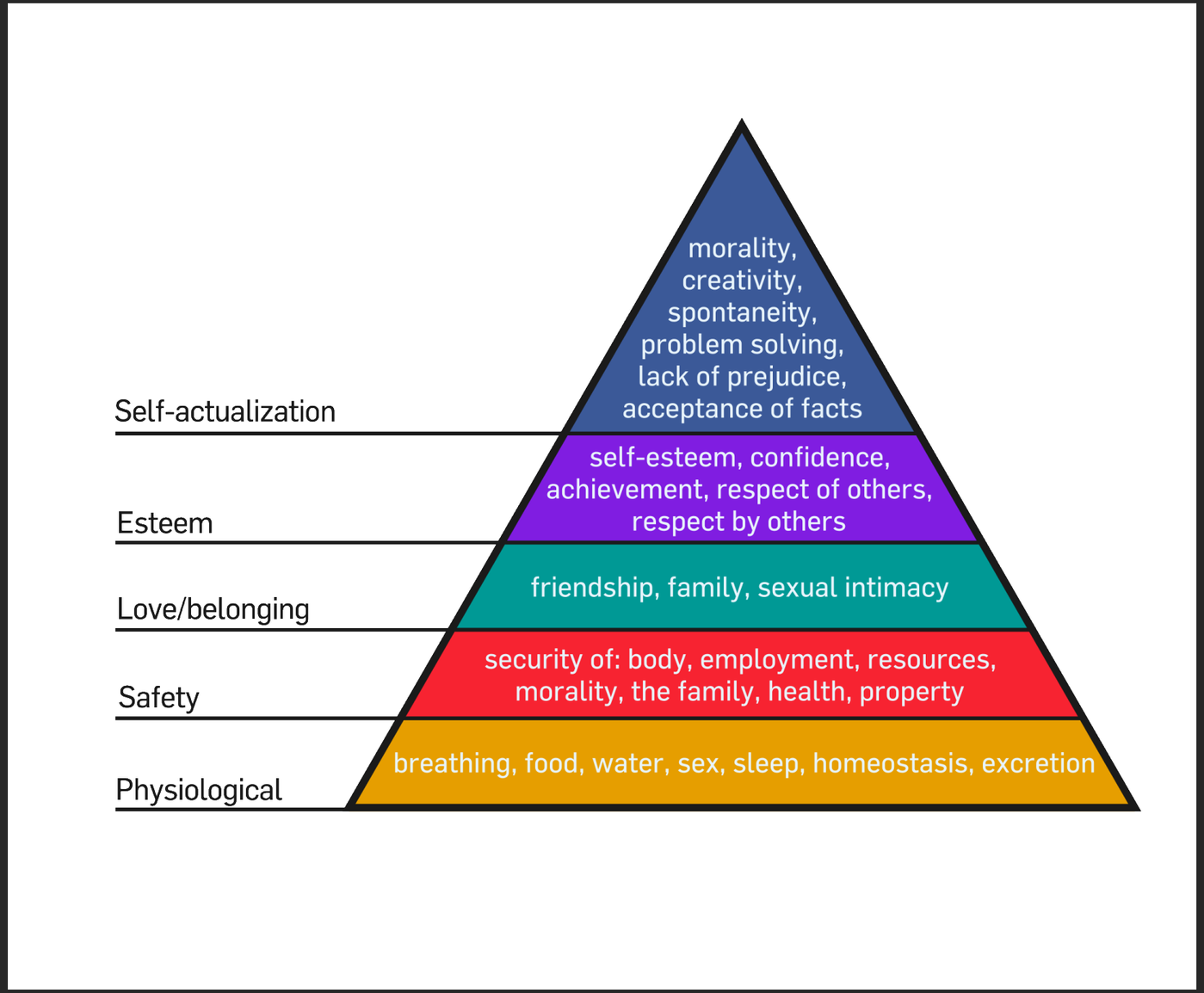
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A. H. MASLOW
MOTIVATION and PERSONALITY
A general theory of human motivation based upon a synthesis primarily of holistic and dynamic principles
HARPER & BROTHERS · ESTABLISHED 1817


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Self-actualization
morality, creativity, spontaneity, problem solving, lack of prejudice, acceptance of facts
Esteem
self-esteem, confidence, achievement, respect of others, respect by others
Love/belonging
friendship, family, sexual intimacy
Safety
security of: body, employment, resources, morality, the family, health, property
Physiological
breathing, food, water, sex, sleep, homeostasis, excretion

Today, we embark on our own journey to data enlightenment

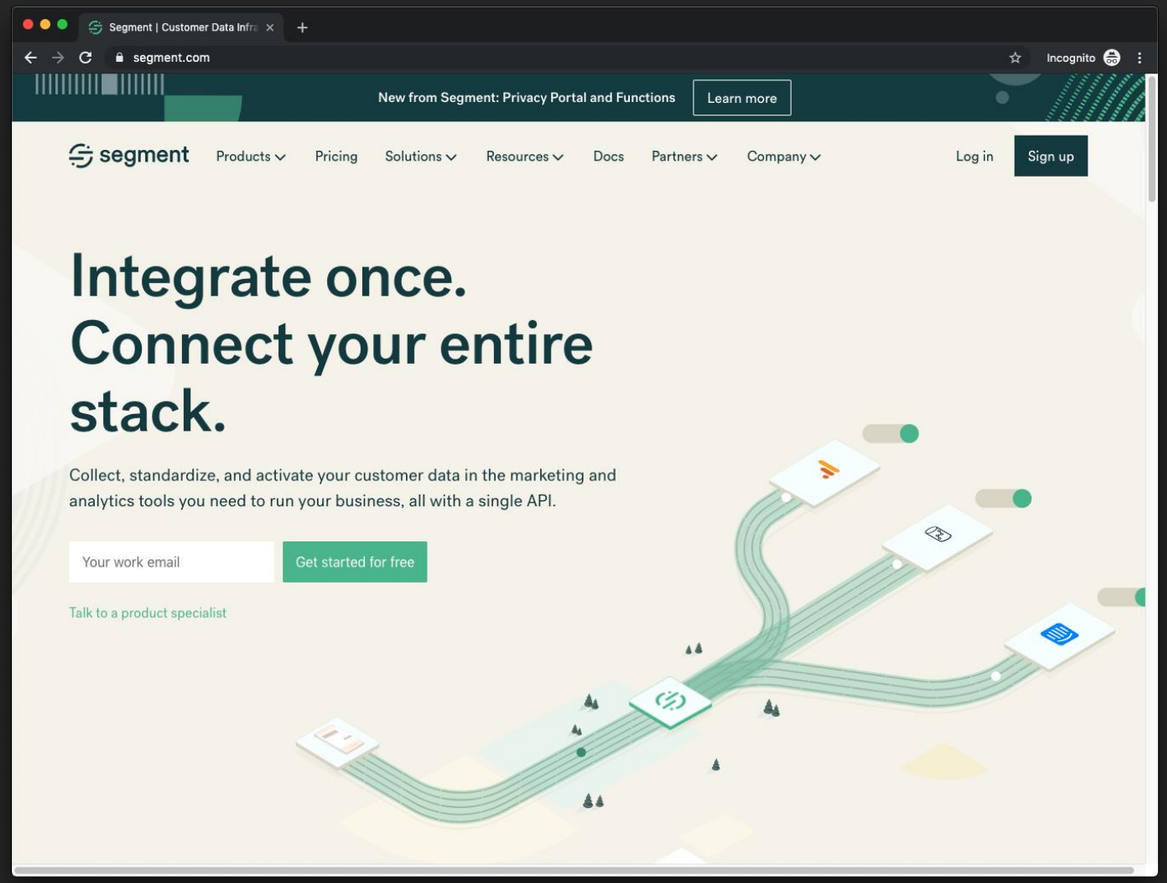
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Every company should be able to provide a world-class customer experience.

Segment helps companies deliver world-class experiences

- Segment provides infrastructure to mange your customer data.
- We help companies gather customer data from **sources**: their websites, mobile apps and cloud tools
- We **unify** and **organize** that data into one consistent view
- Adapt that data to **250+ destinations**



By the numbers

- **450B** events passing through our pipeline every month
- **19,000** companies sending us data
- Hundreds of enterprise customers: **IBM, Intuit, Levi's, Atlassian**
- 16,000 **ECS containers**



























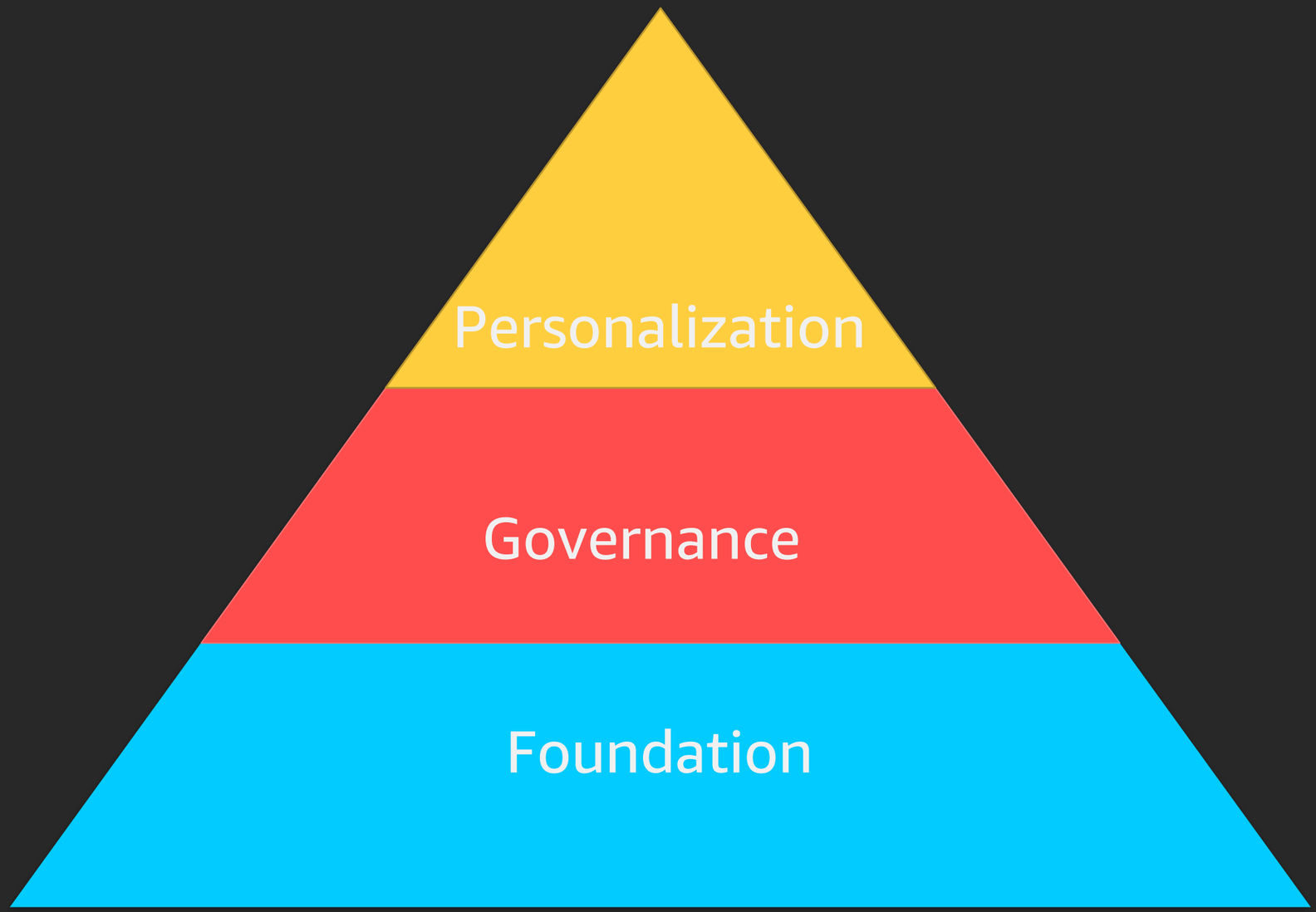


Our road to data enlightenment

Data foundation

Governance

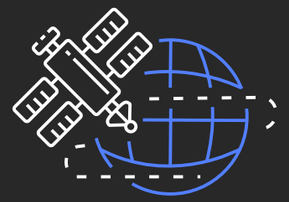
Personalization



Data foundation

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The layers of your foundation



Collect

APIs, Libraries



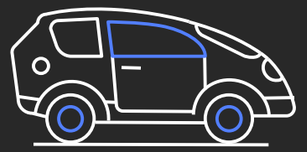
Process

Transforms, Filters



Archive

Data Storage



Activate

Act on the data

The layers of your foundation



Collect

APIs, Libraries



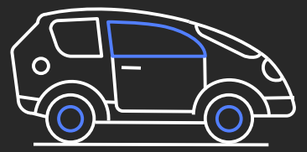
Process

Transforms, Filters



Archive

Data Storage



Activate

Act on the data

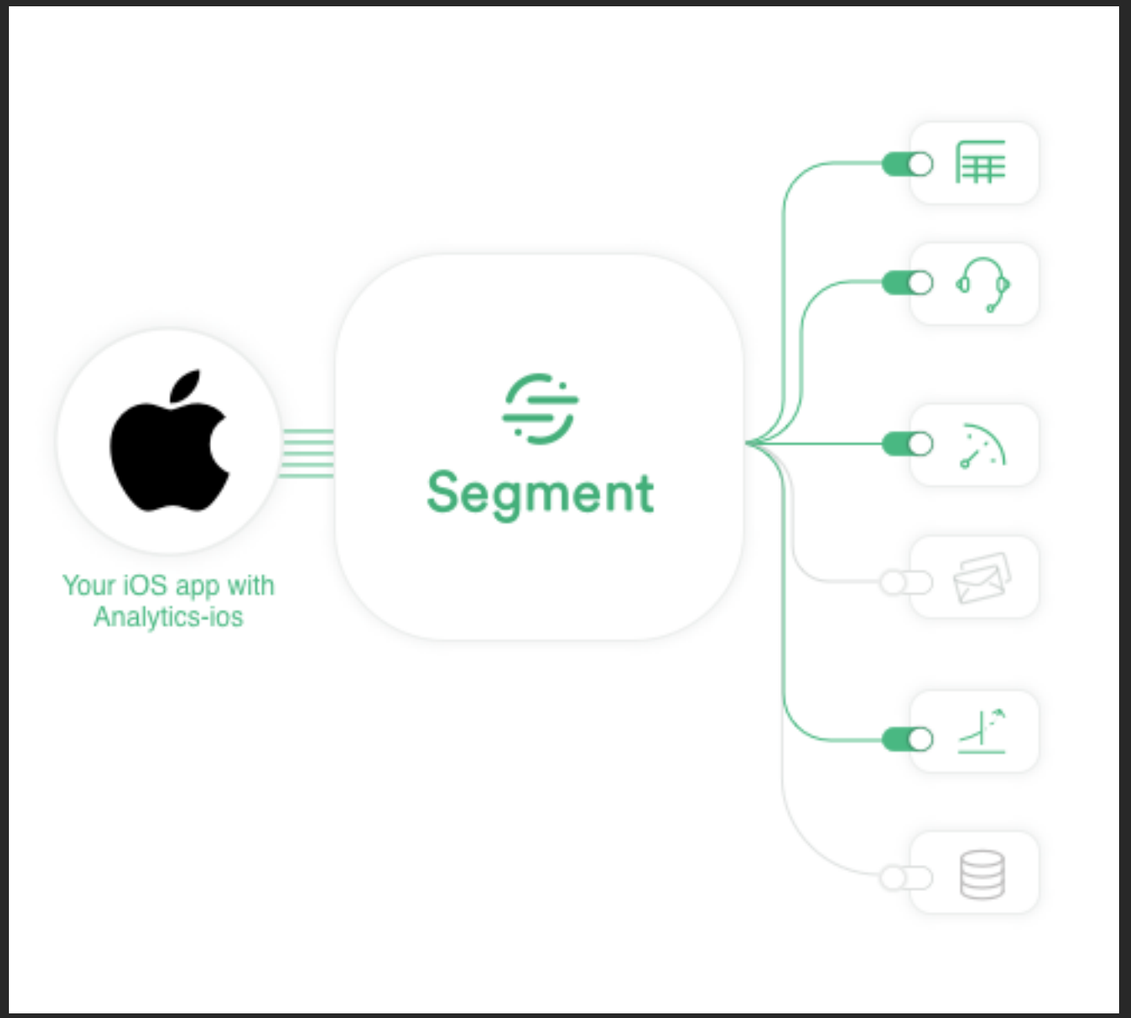
Foundation rule #1:
Meet the developer on their level

Collection: meet the developer on their level

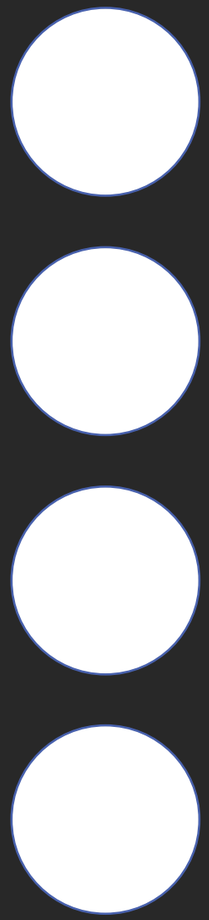
Build language-level libraries, and endpoints

Make the contract intuitive

Never block core functionality



Collection: meet the developer on their level



```
analytics.identify({
  userId:’0feea358210f’,
  name: ‘Calvin French-Owen‘,
  company: ‘Segment'
  city: ‘San Francisco’
});
```

Who?

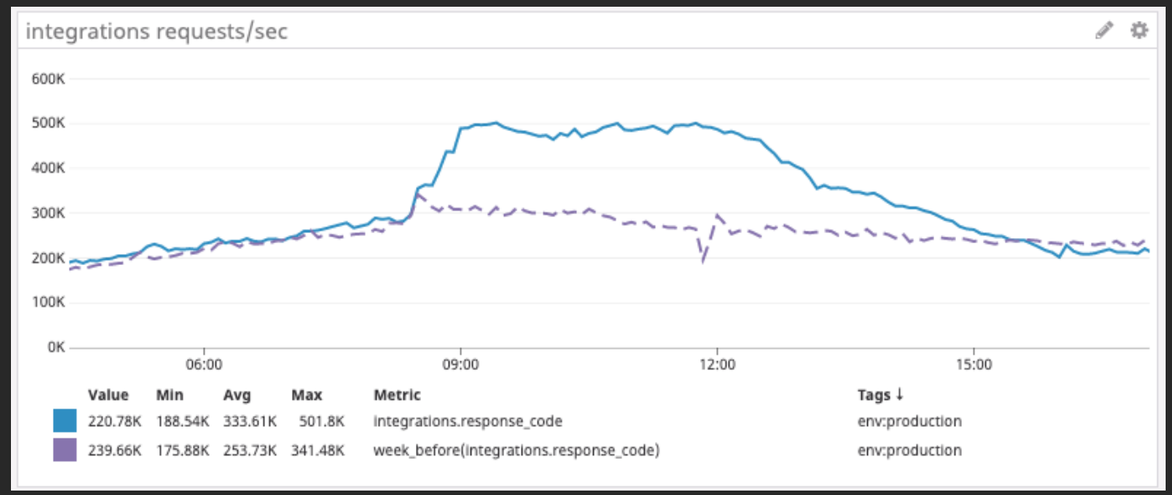
```
analytics.track({
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  event: ‘Played Song’,
  title: ‘Blank Space',
  artist: ‘Taylor Swift’
});
```

What?

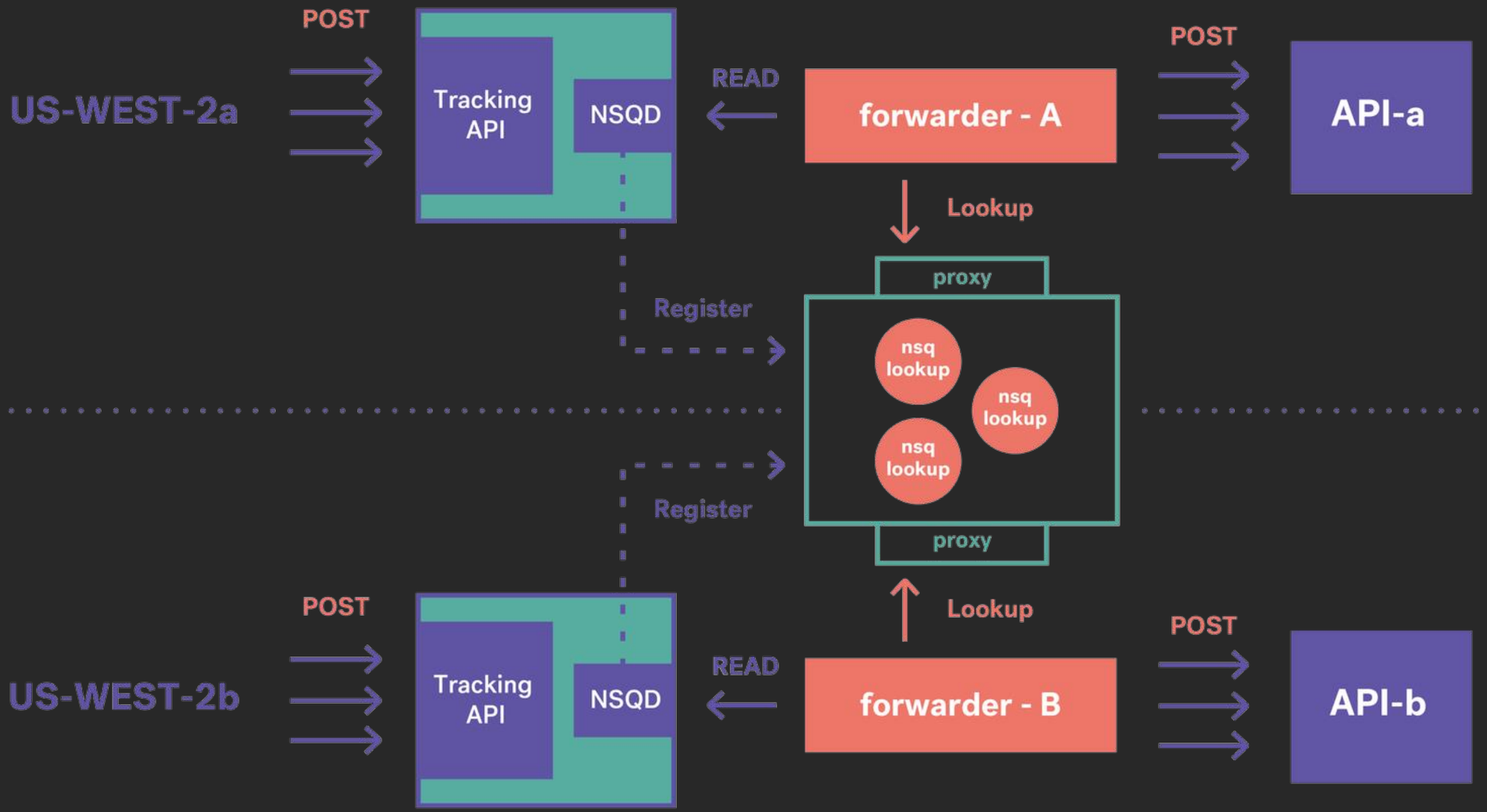
Foundation rule #2:
Never ever lose data

Collection: never ever lose data

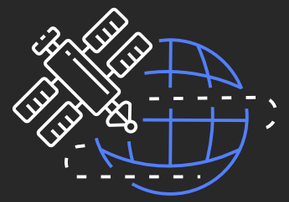
- Keep your API performant and scaled up
- Keep the edge stateless
- Use queues / Kafka liberally
- Try and persist data as soon as possible
- Plan for outages + network partitions



Collection: never ever lose data



The layers of your foundation



Collect

APIs, Libraries



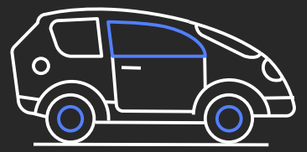
Process

Transforms, Filters



Archive

Data Storage

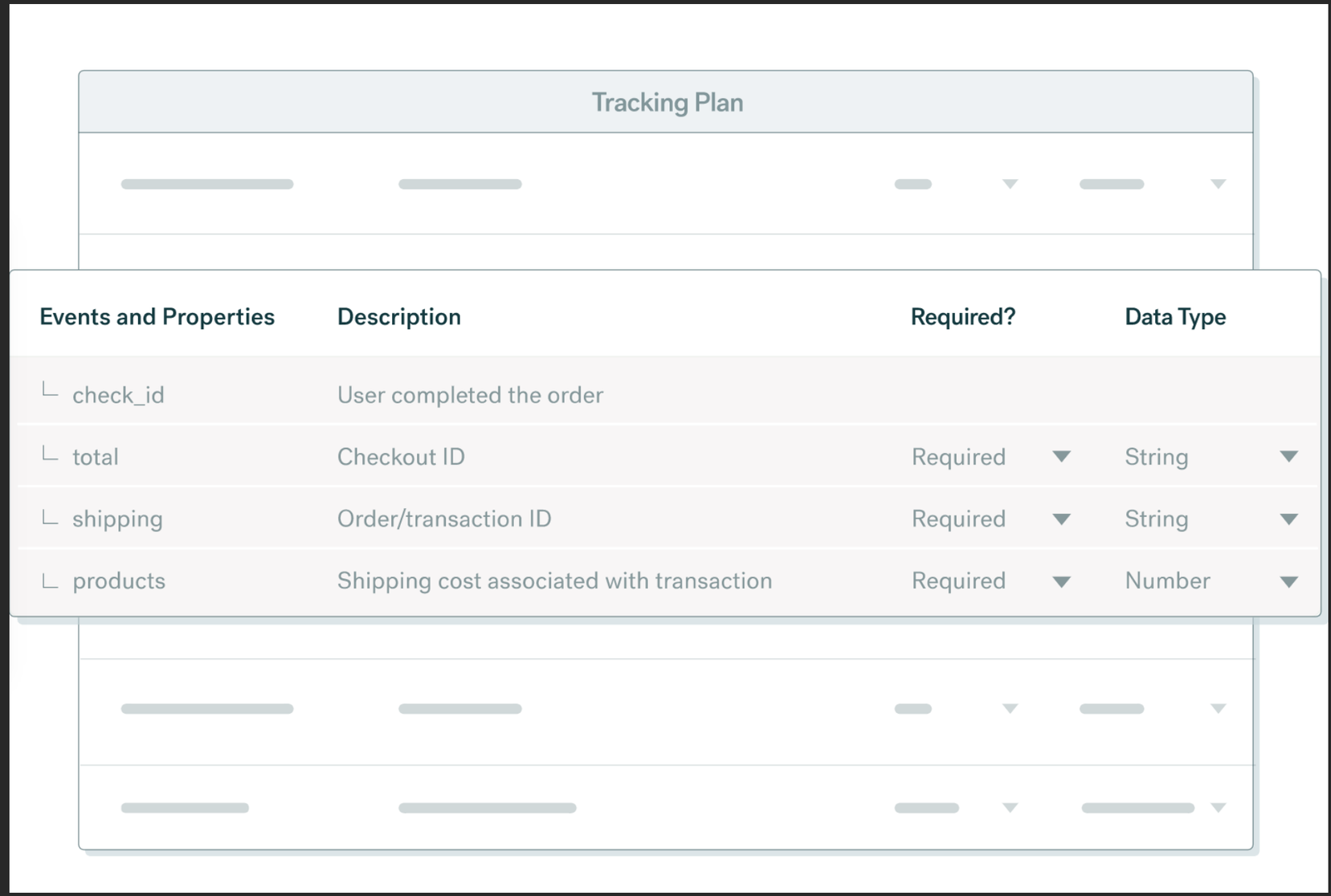


Activate

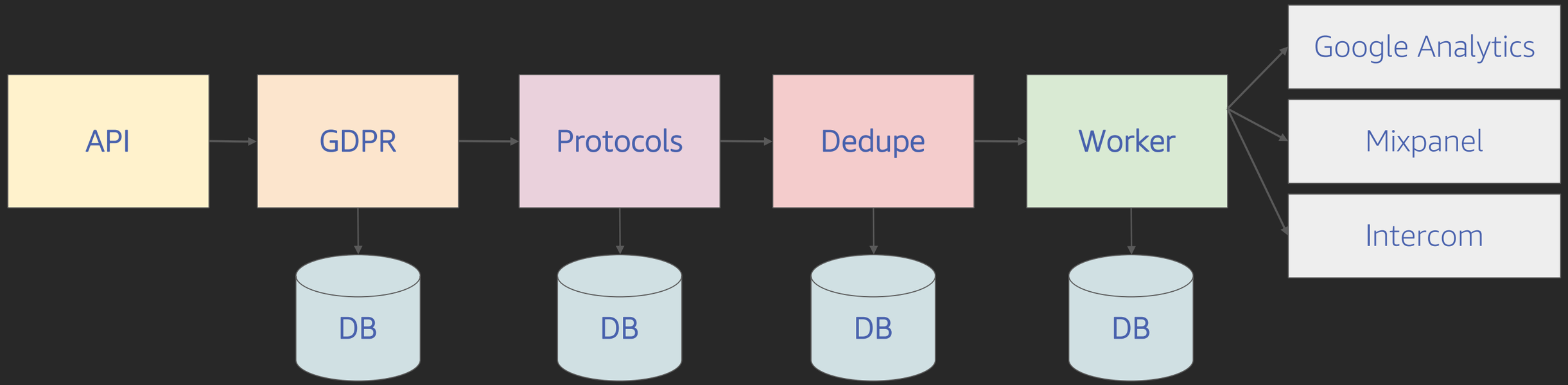
Act on the data

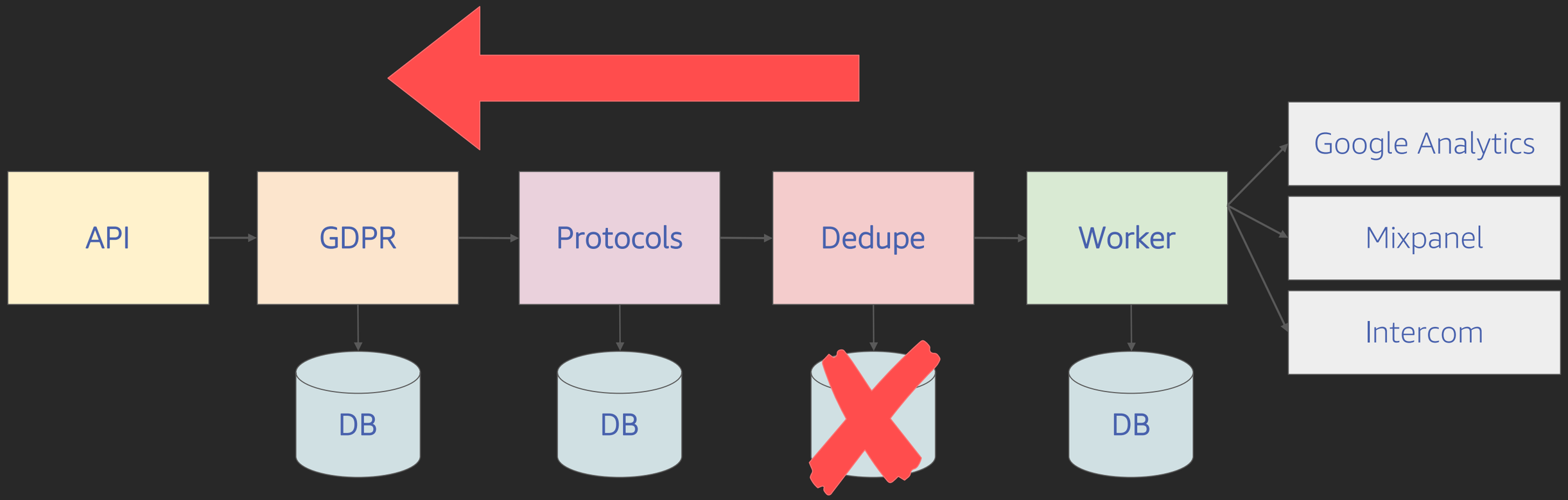
Processing

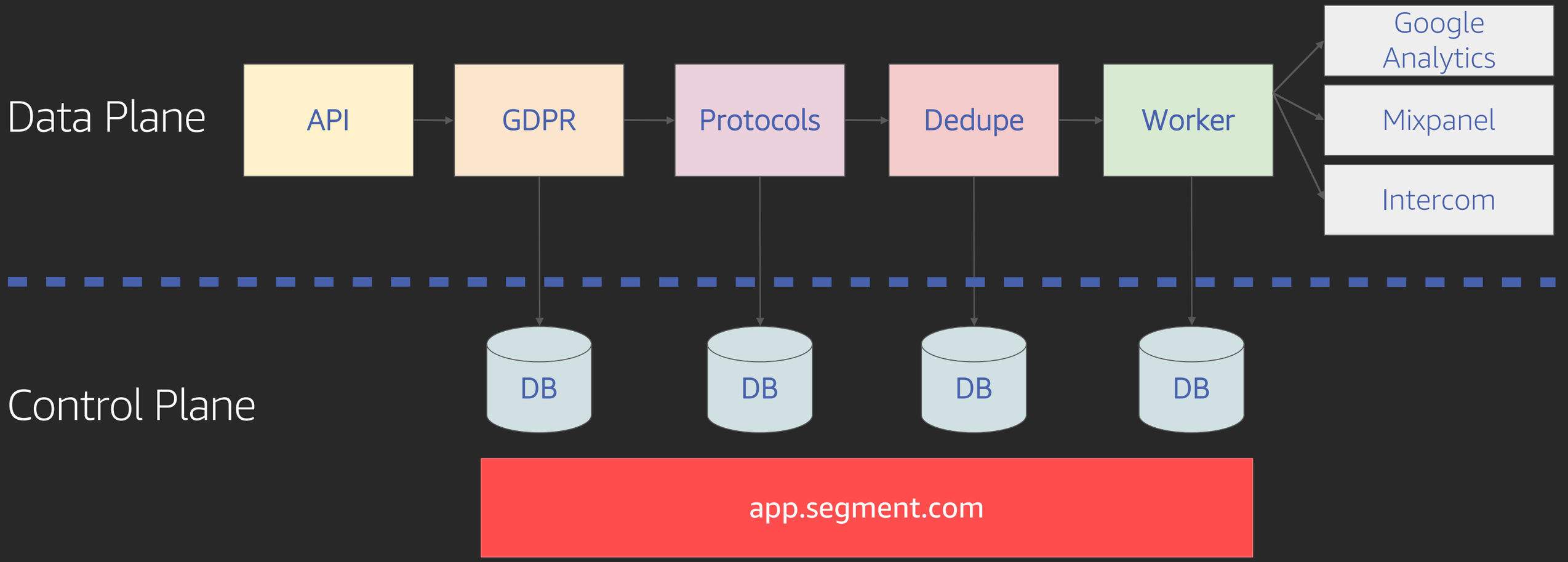
- Validation
- Enrichment
- Filtering
- Transformation

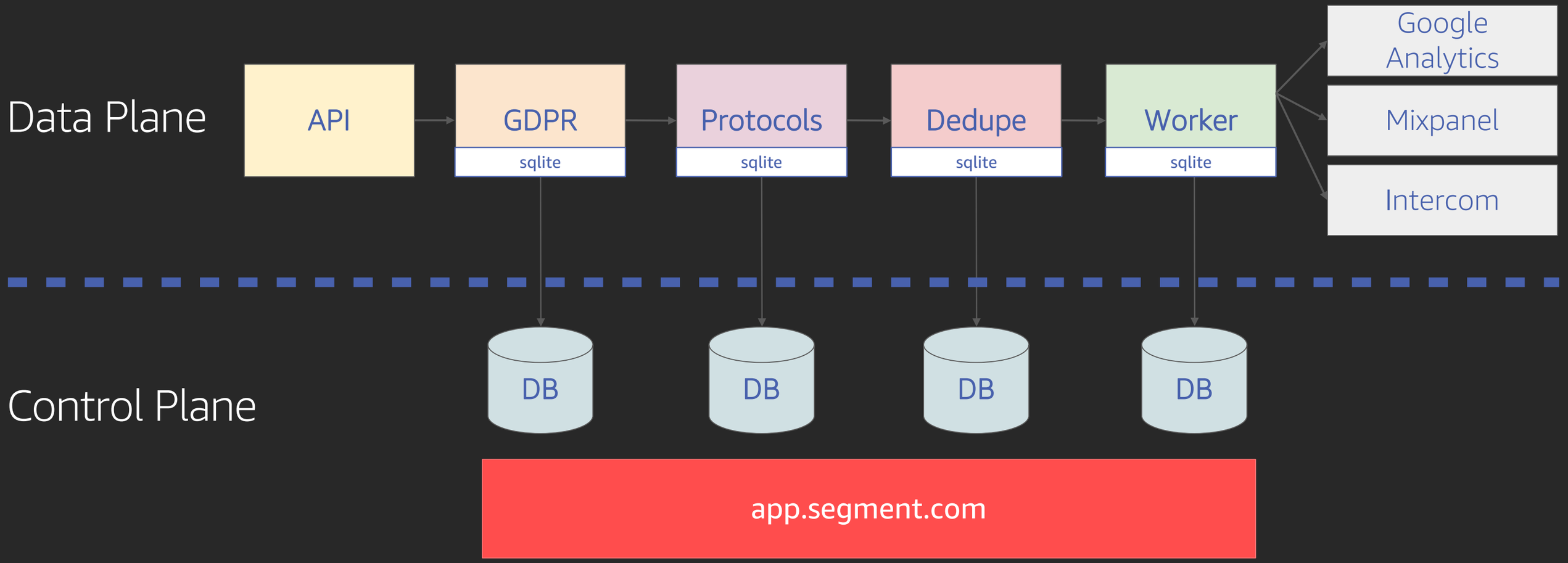


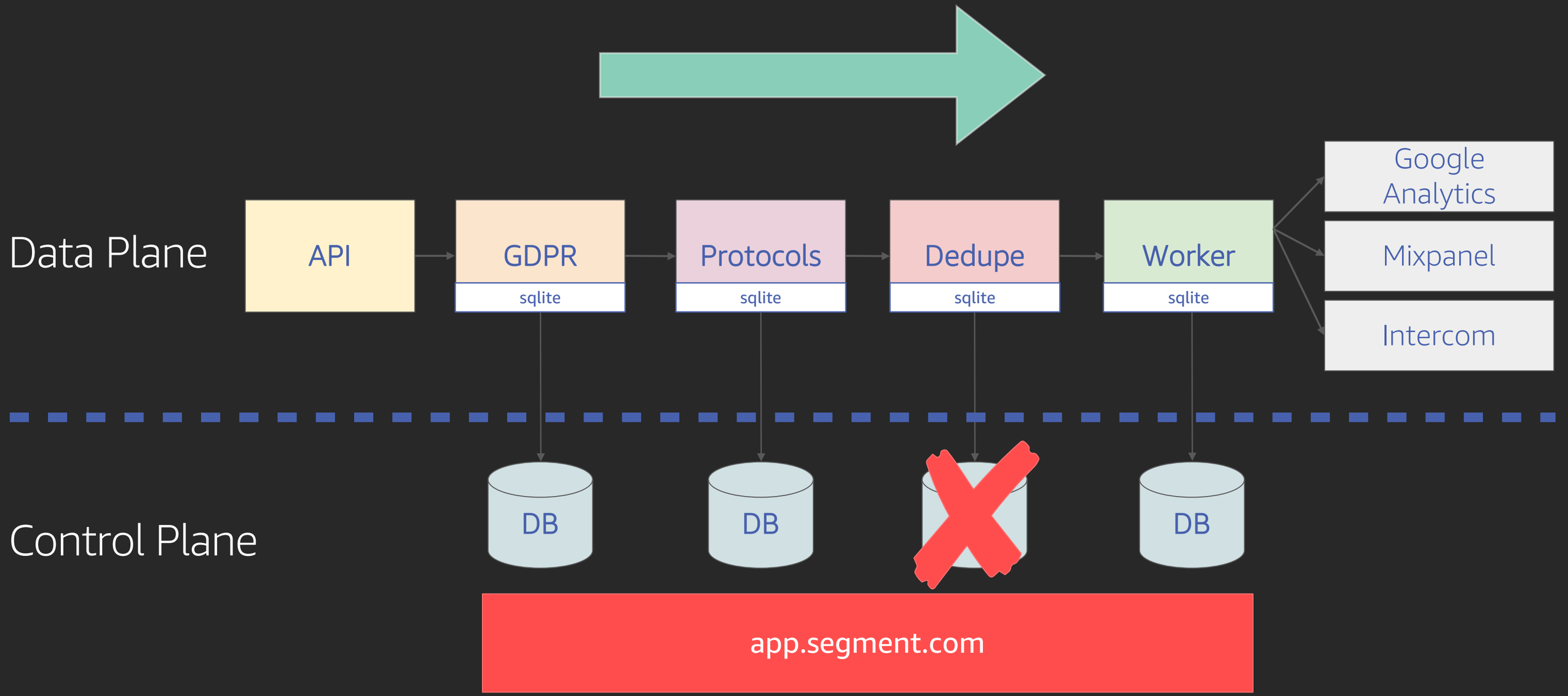
Foundation rule #3:
Separate control and data planes


API
GDPR
Protocols
Dedupe
Worker
Google Analytics
Mixpanel
Intercom
DB
DB
DB
DB


API
GDPR
Protocols
Dedupe
Worker
Google Analytics
Mixpanel
Intercom
DB
DB
DB


Data Plane
API
GDPR
Protocols
Dedupe
Worker
Google Analytics
Mixpanel
Intercom
Control Plane
DB
DB
DB
DB
app.segment.com


Data Plane
API
GDPR
sqlite
Protocols
sqlite
Dedupe
sqlite
Worker
sqlite
Google Analytics
Mixpanel
Intercom
Control Plane
DB
DB
DB
DB
app.segment.com


Data Plane
API
GDPR
sqlite
Protocols
sqlite
Dedupe
sqlite
Worker
sqlite
Google Analytics
Mixpanel
Intercom
Control Plane
DB
DB
DB
app.segment.com

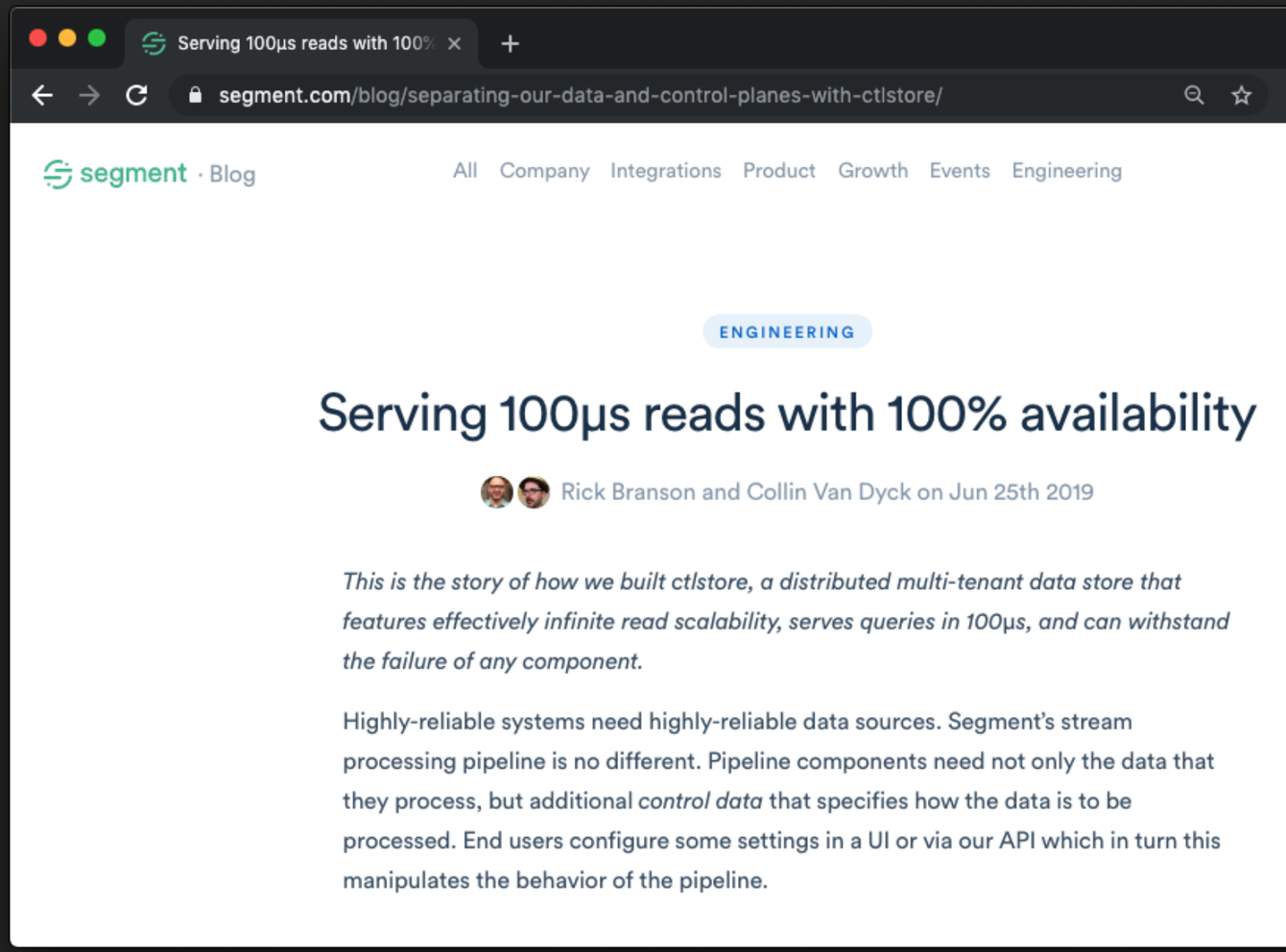
Processing: separate data and control planes

Keep a clear interface between your pipeline and controls

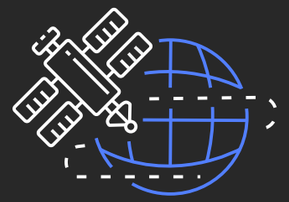
We use sqlite, reflected from Aurora

Emphasize availability over consistency

github.com/segmentio/ctlstore



The layers of your foundation



Collect

APIs, Libraries



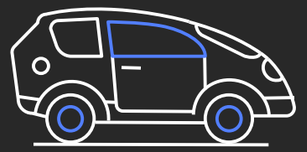
Process

Transforms, Filters



Archive

Data Storage

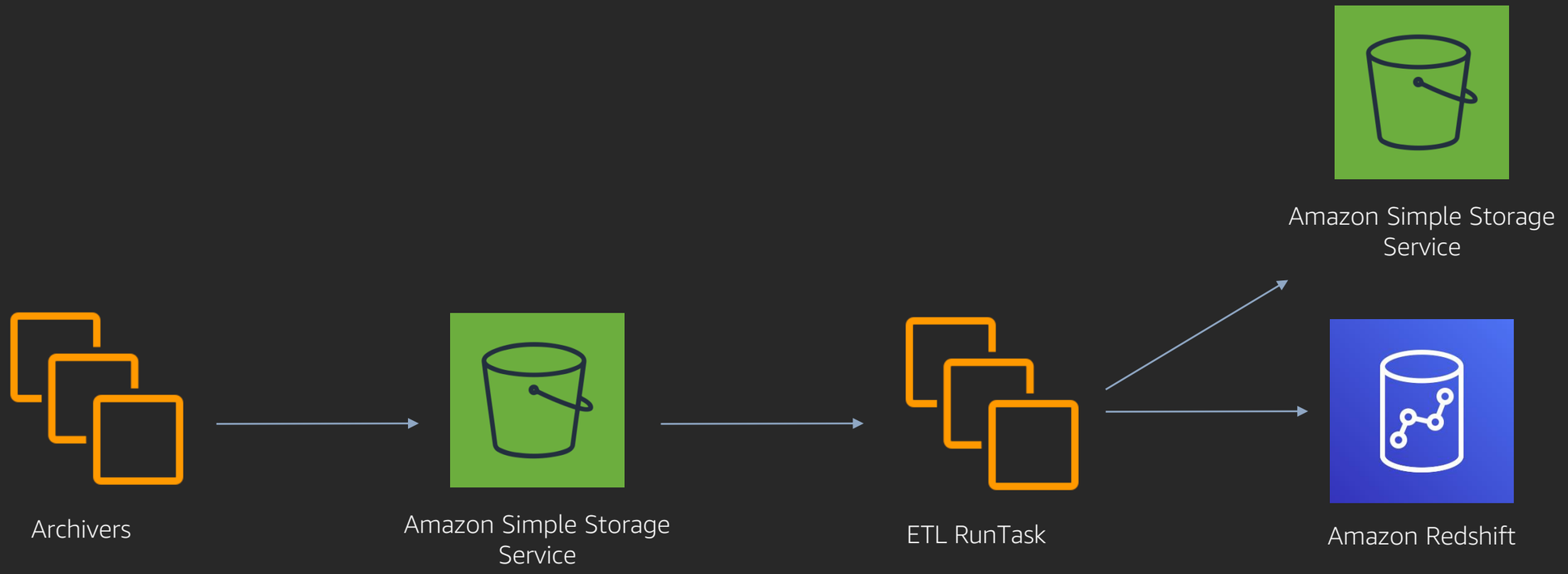


Activate

Act on the data

Foundation rule #4:
You always want an archive

Storage: you always want an archive



Storage: you always want an archive

Keep the raw data *somewhere*

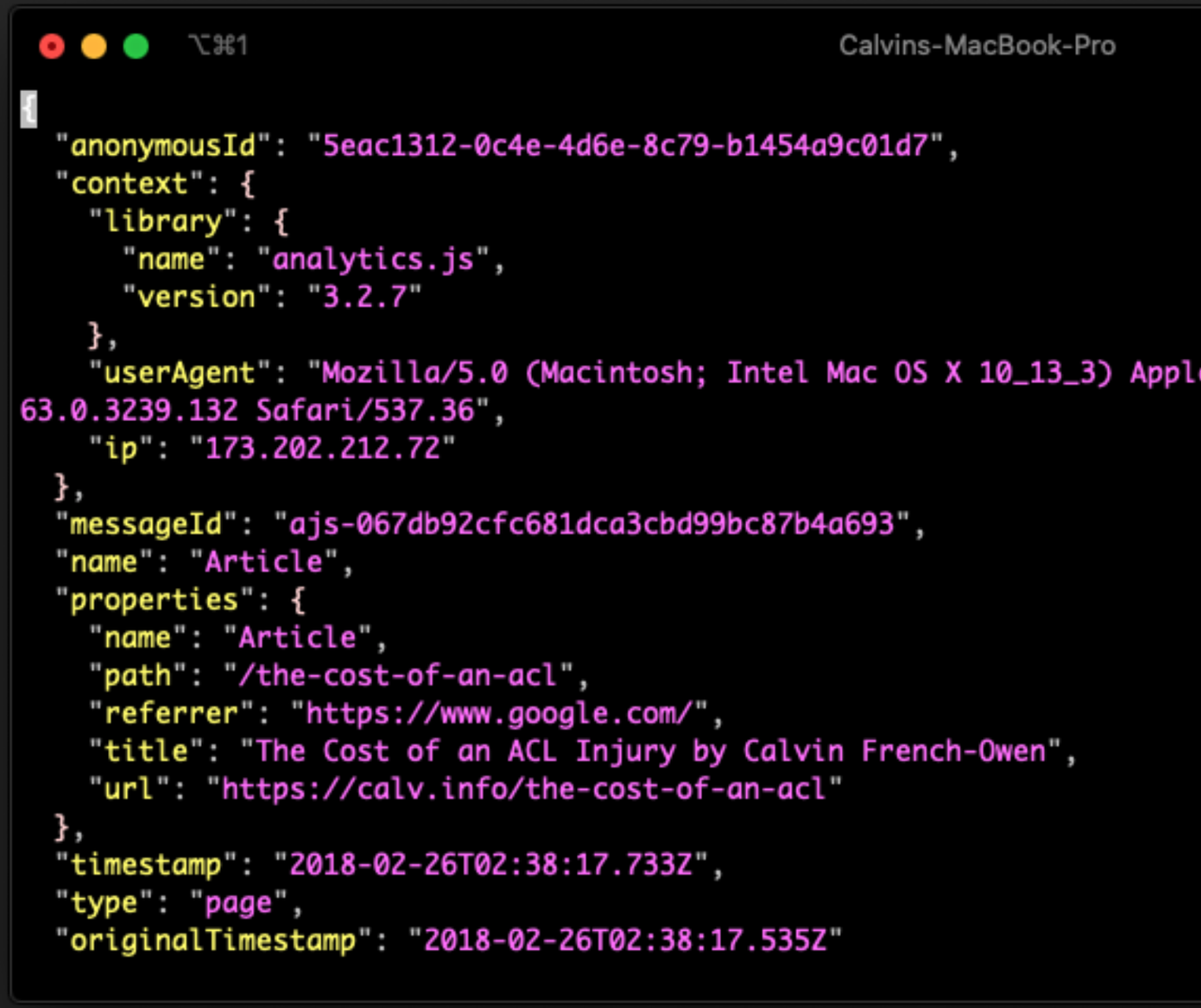
S3 is cheap, easy, and keeps a full log

Parquet encode

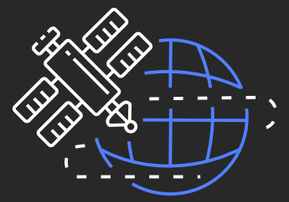
Partition YYYY/MM/DD

Athena for one-off queries

Can load to redshift



The layers of your foundation



Collect

APIs, Libraries



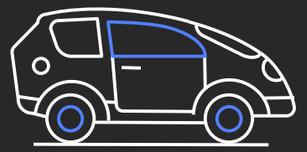
Process

Transforms, Filters



Archive

Data Storage



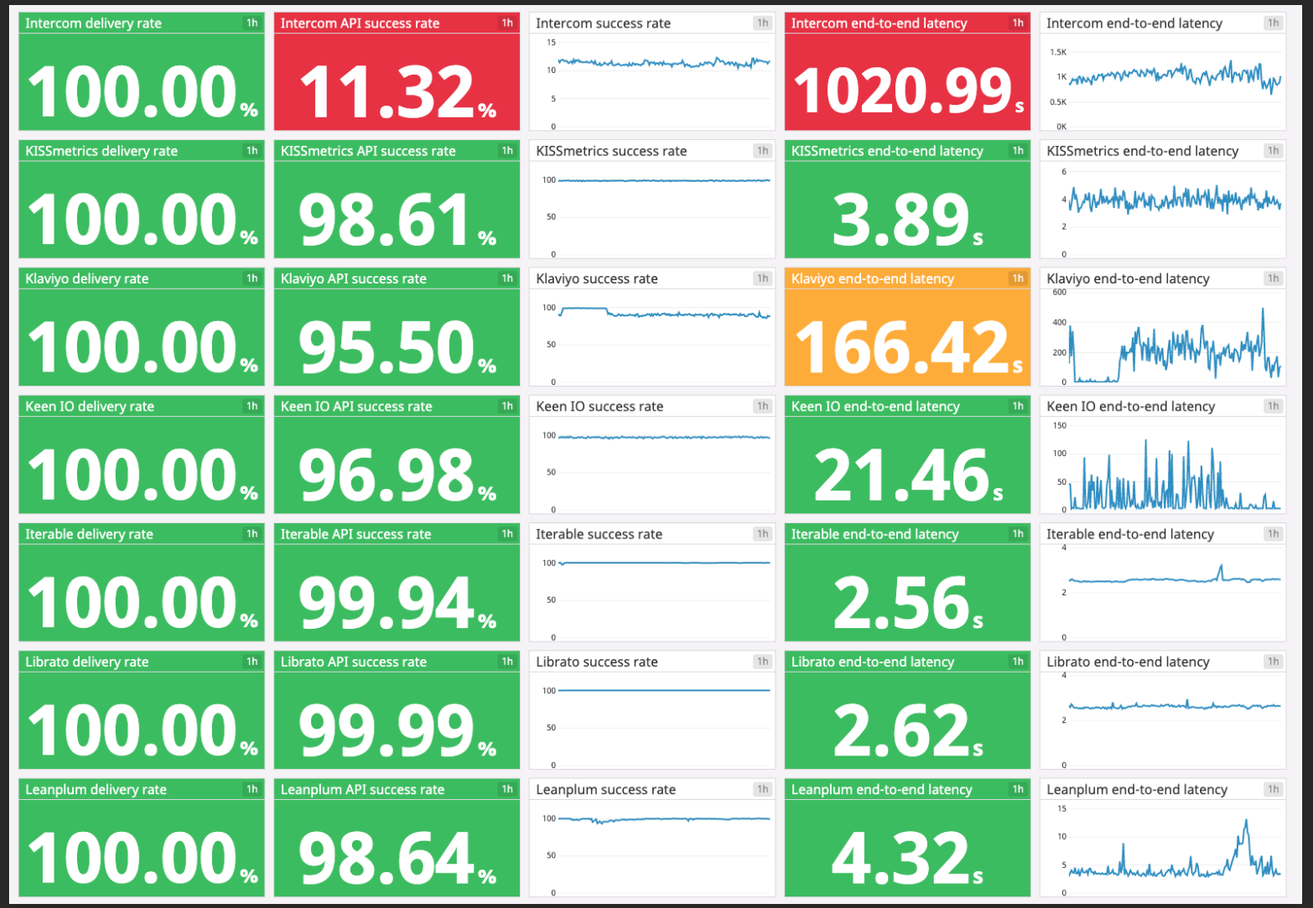
Activate

Act on the data

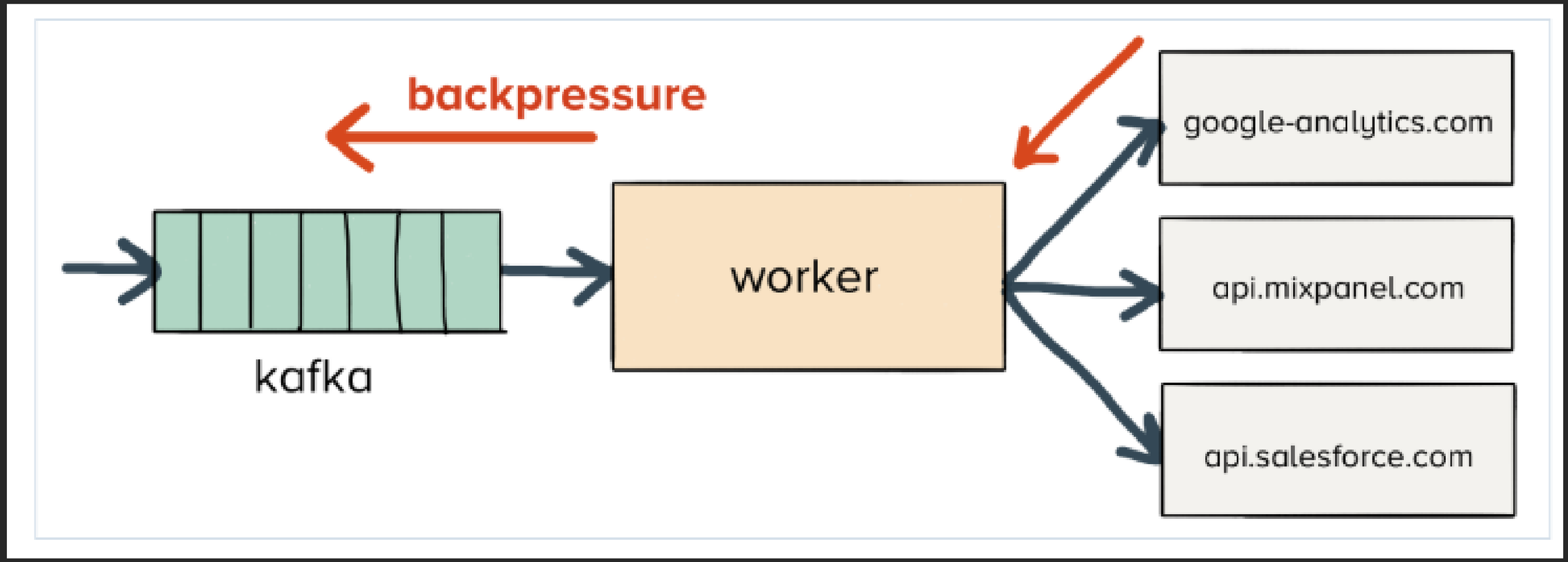
Foundation rule #5:
Retry, retry, retry

Activation: retry, retry, retry

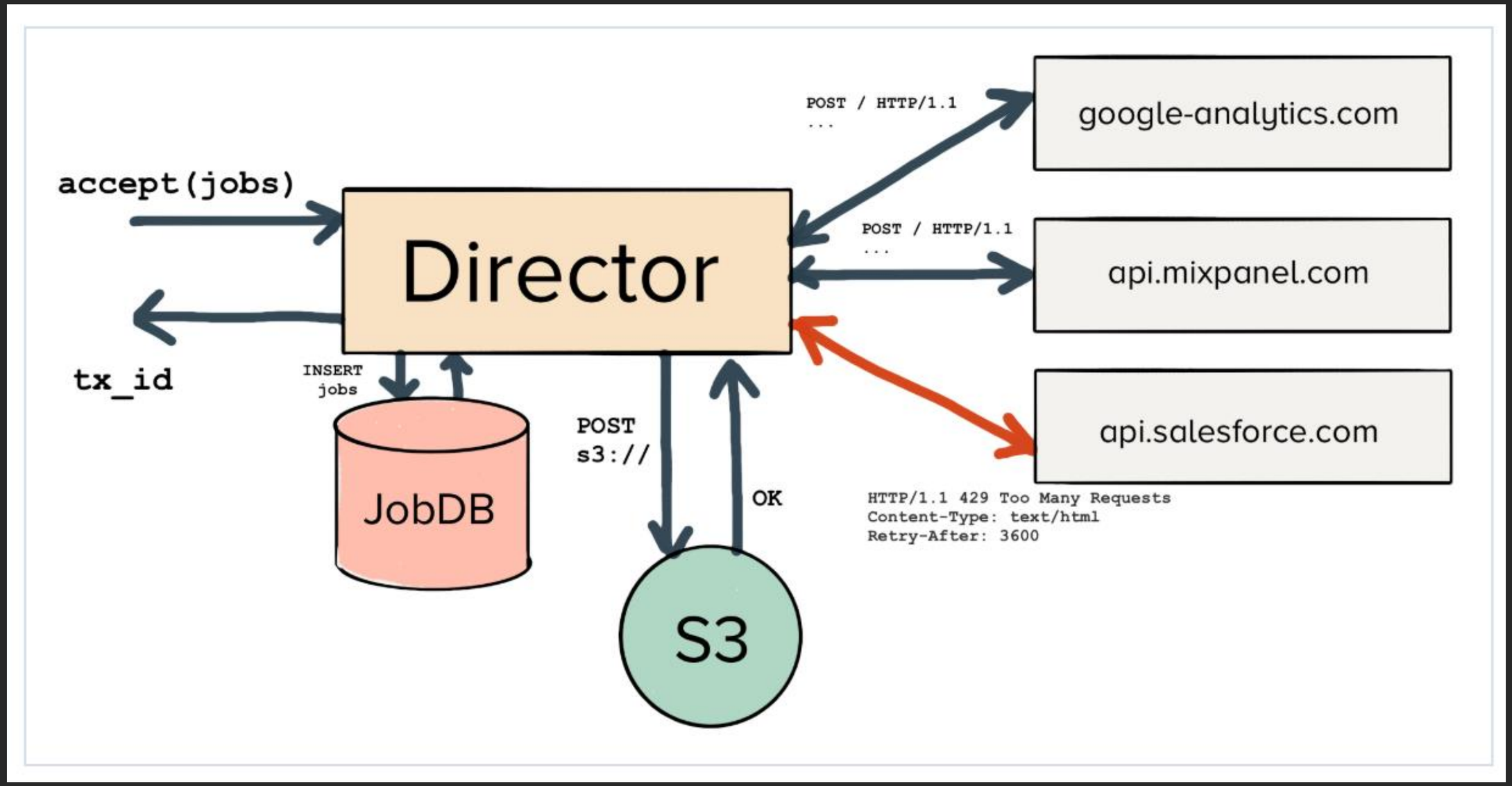
- Unfortunately… APIs fail
- You need retry logic, and visibility
- Our solution: Centrifuge https://segment.com/blog/introducing-centrifuge/



Activation: retry, retry, retry

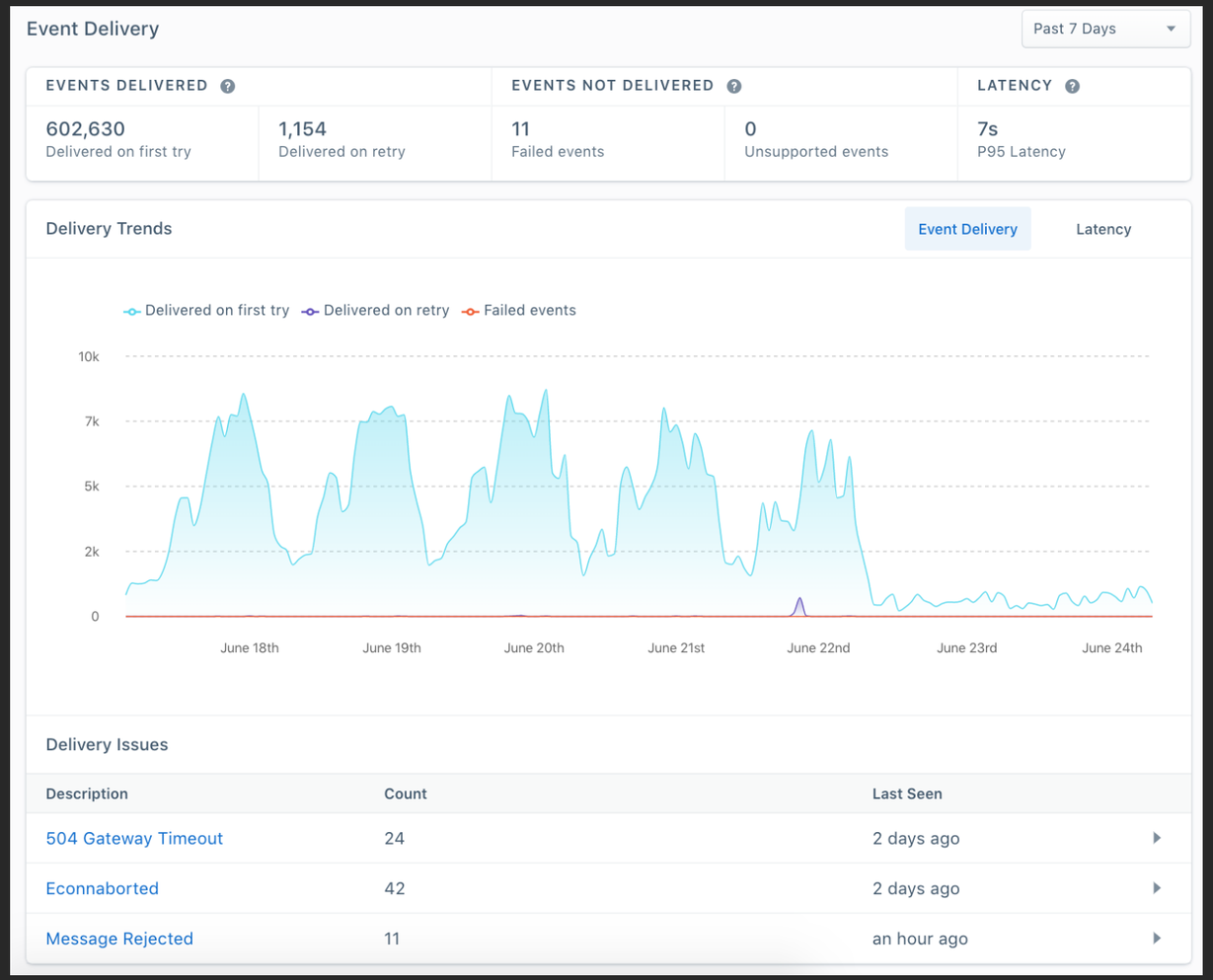


Activation: retry, retry, retry



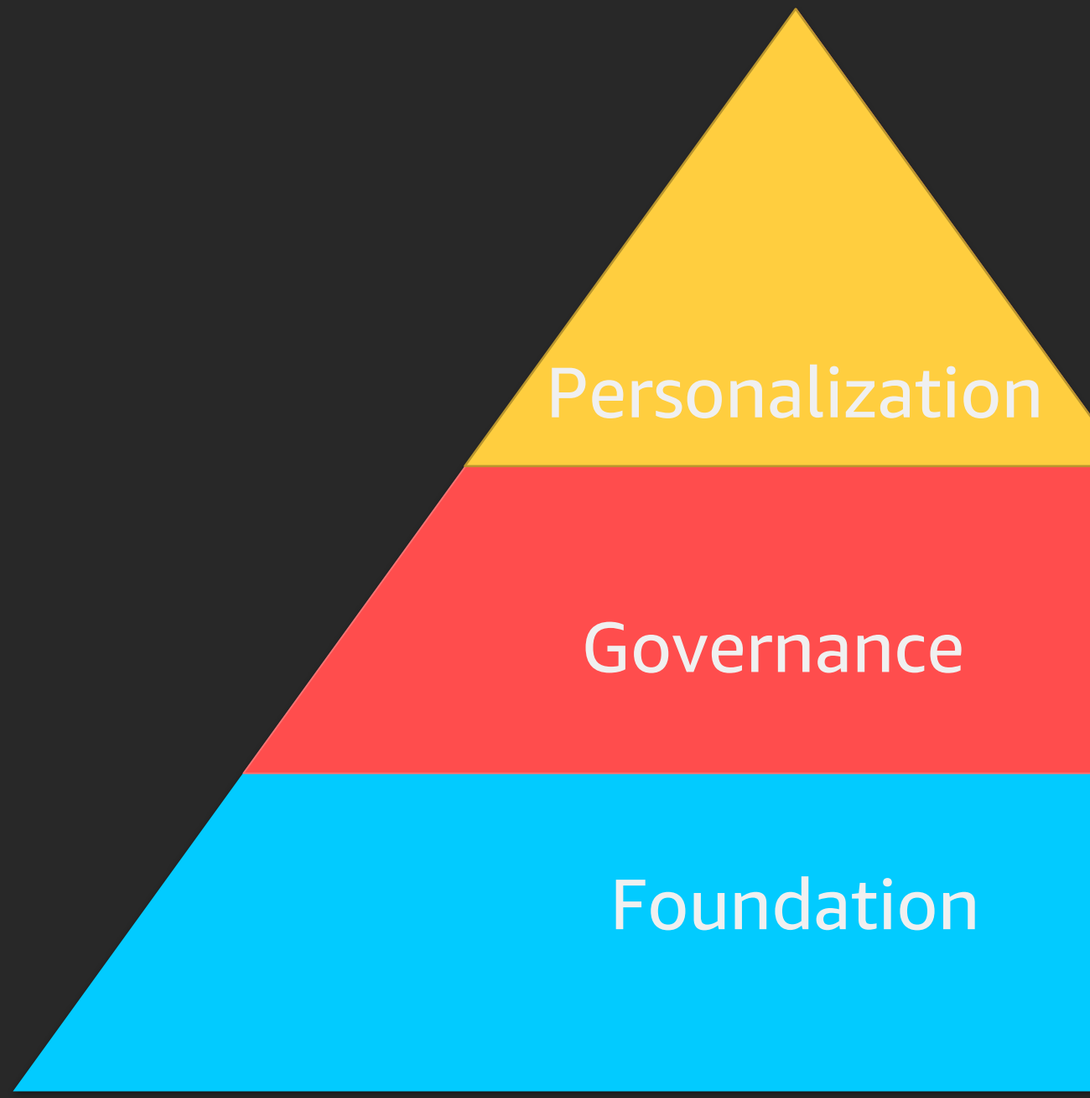
Activation: retry, retry, retry

- Archive any messages that fail
- Give your user a window into the reasons why



Establishing the data foundation

1. Meet the developer
2. Never lose data
3. Separate control + data
4. Always keep an archive
5. Retry, retry, retry

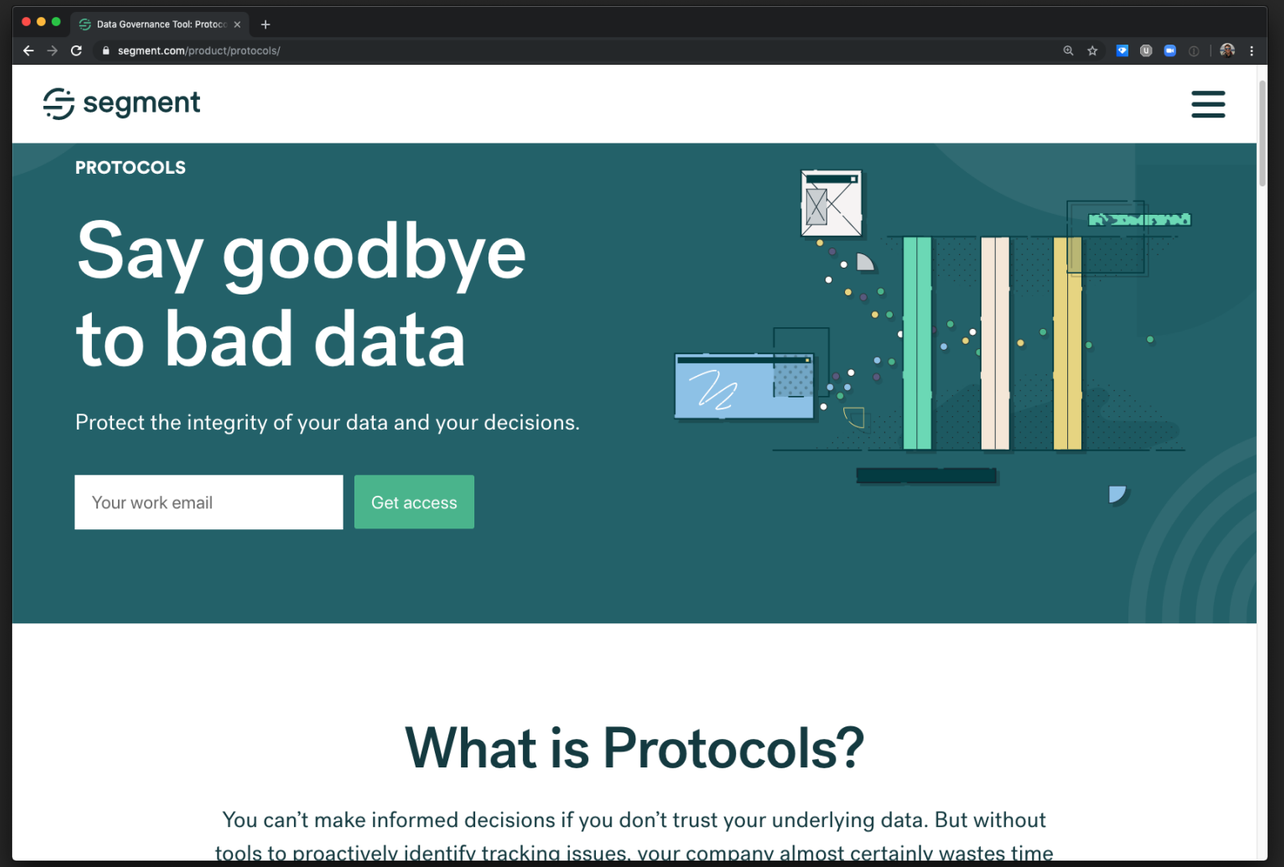


Governance

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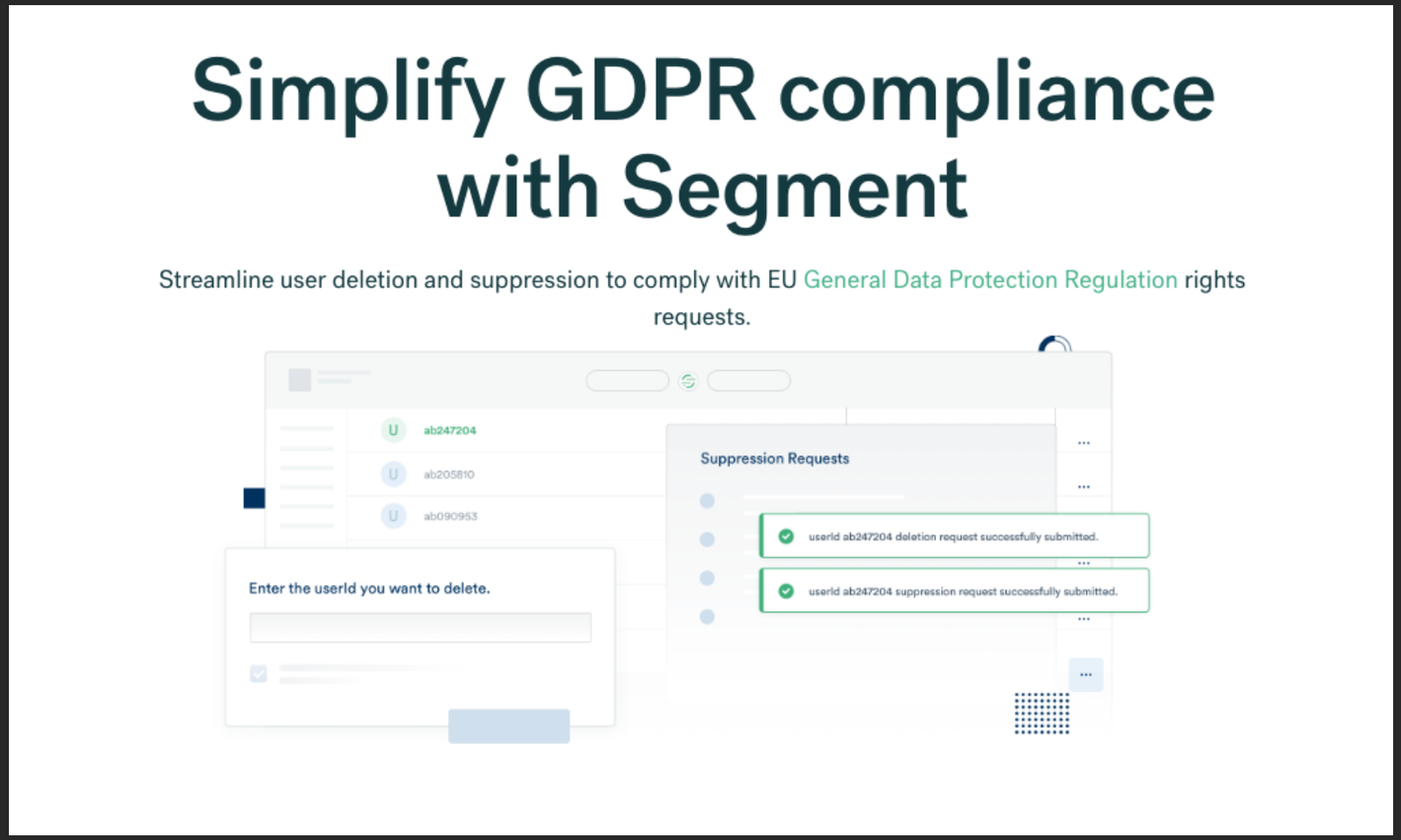
The flavors of governance: filtering

- Let teams enforce their own data strategy
- Make the right thing the easy thing
- Start with a tracking plan



The flavors of governance: privacy

- Legislation (GDPR, CCPA)
- Build with deletion in mind
- Use privacy to drive organizational change

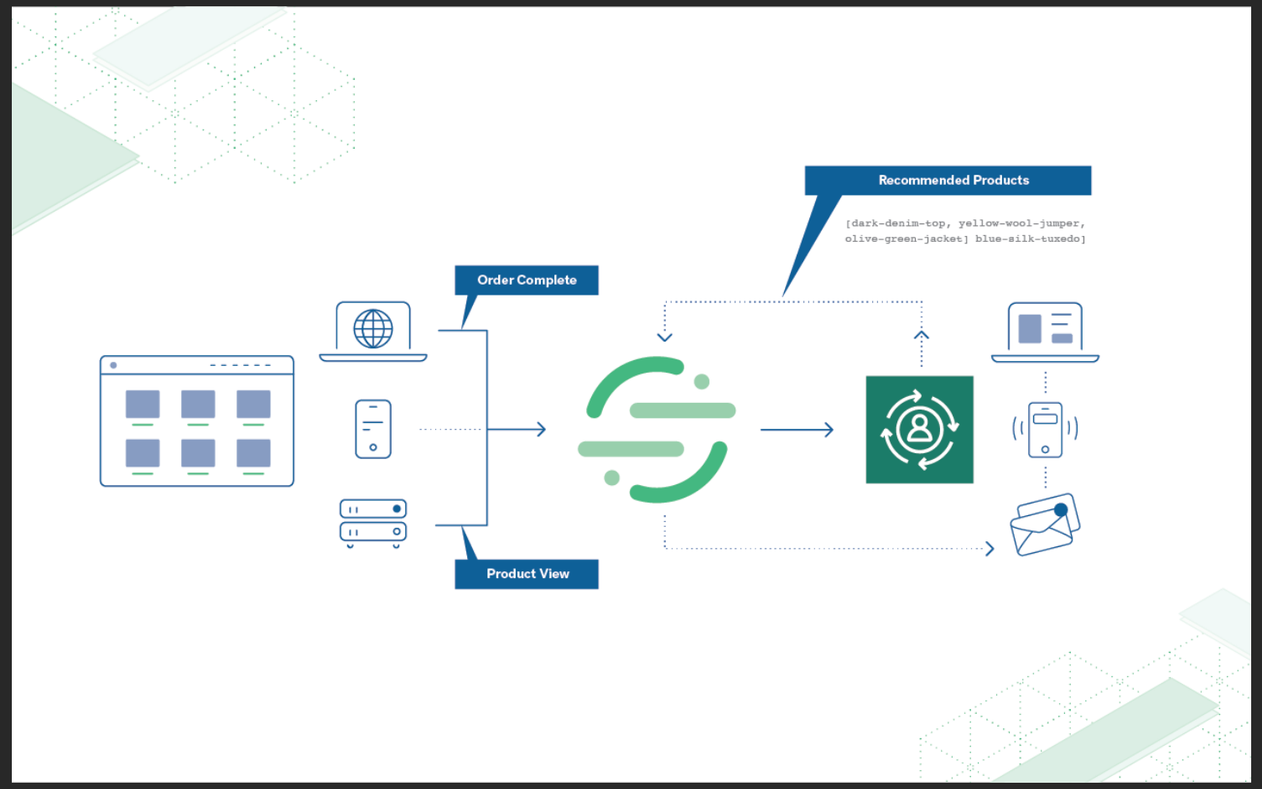


Achieving personalization

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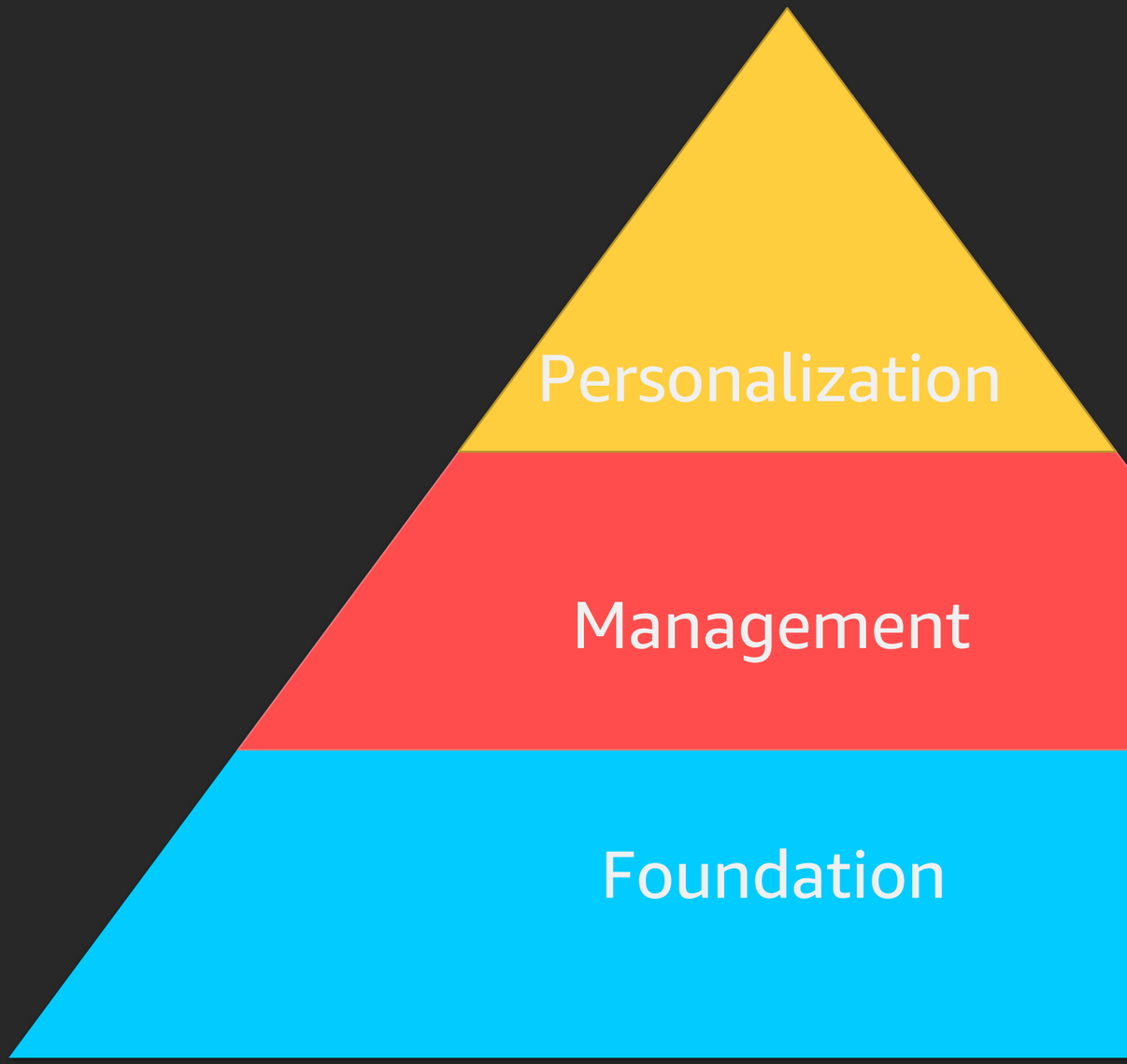
Achieving personalization

- Never been easier
- **Amazon Personalize**
- Segment Personas
- You need the data foundation first

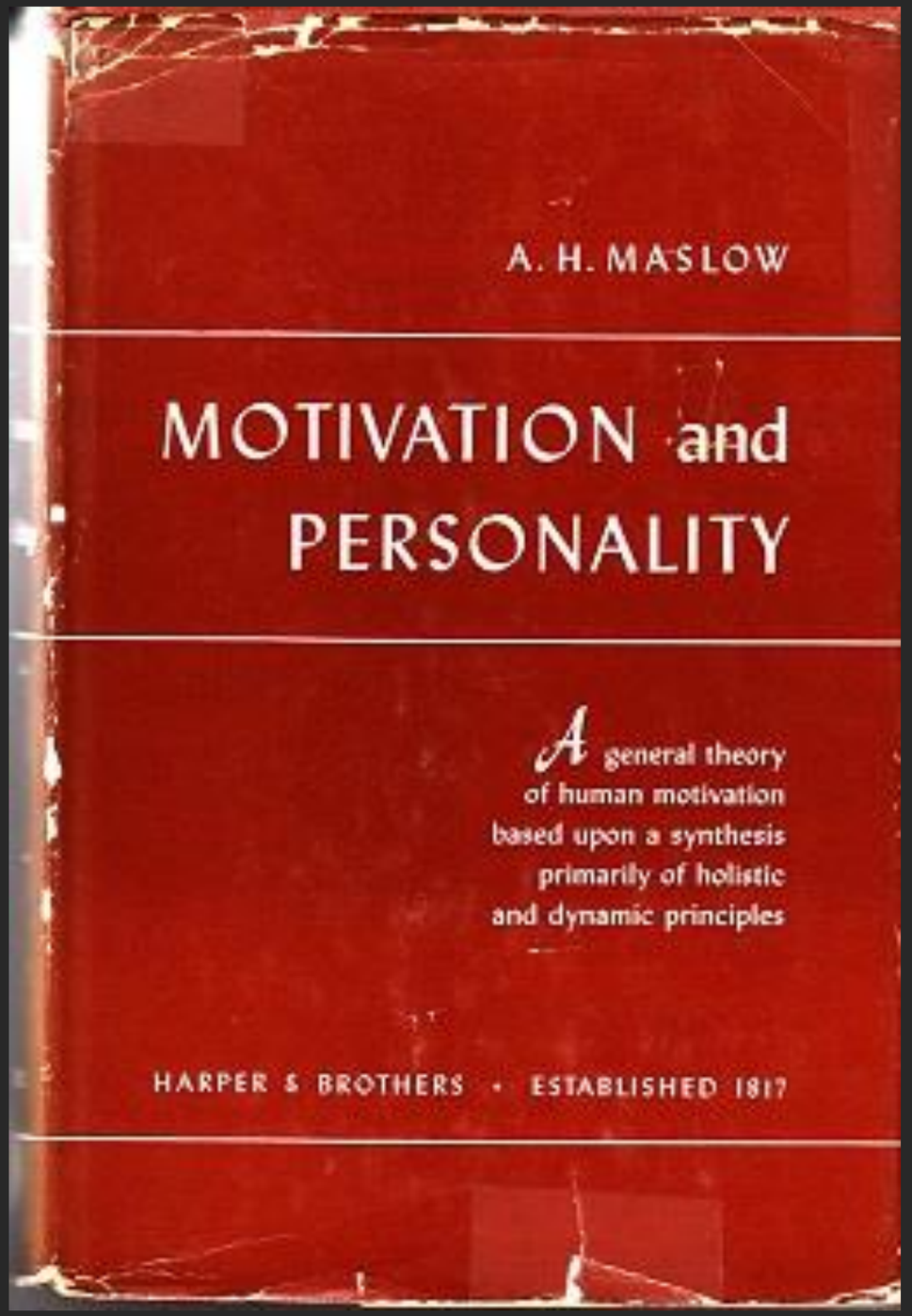


Achieving data nirvana

- Focus on the foundation
- Decouple data and control planes
- Add governance controls to decouple your organization
- Good data == good personalization






A. H. MASLOW
MOTIVATION and PERSONALITY
A general theory of human motivation based upon a synthesis primarily of holistic and dynamic principles
HARPER & BROTHERS · ESTABLISHED 1817

ADM201-L

Digital marketing and ad technology
Bidding at Scale in the Cloud

Zak Stengel

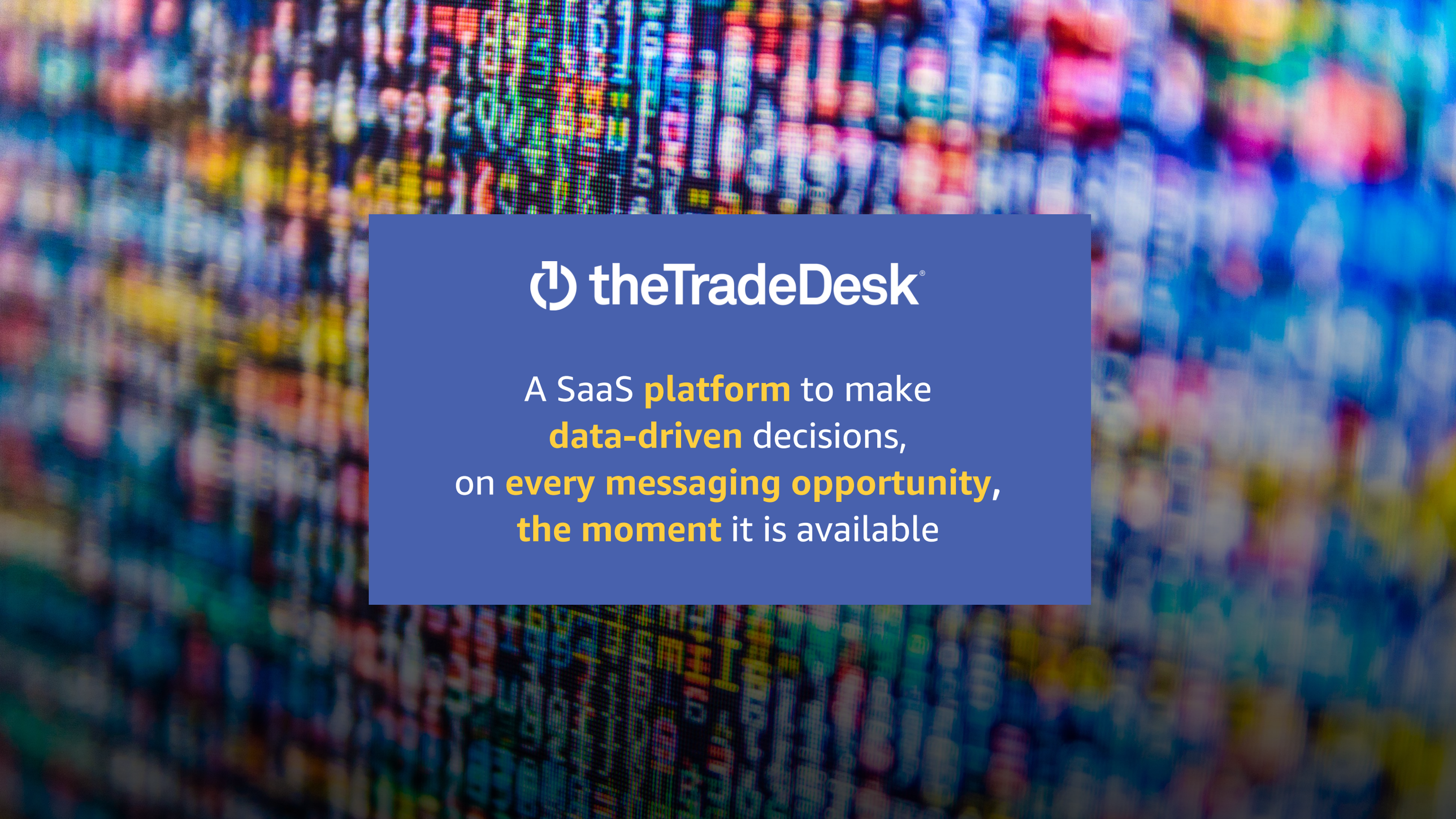
SVP, Engineering

The Trade Desk

AWS re:Invent

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theTradeDesk aws


theTradeDesk
A SaaS platform to make
data-driven decisions,
on every messaging opportunity,
the moment it is available


The future of media depends on the quality of advertising
theTradeDesk

1.5 Billion

people will enter the global middle class by 2030

theTradeDesk

DSP: A search platform for audiences



"how do I track a package"

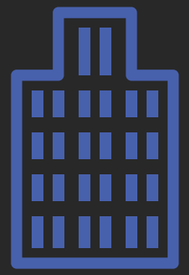
"win at texas hold 'em"

"where is area 51"

"las vegas grasshoppers"





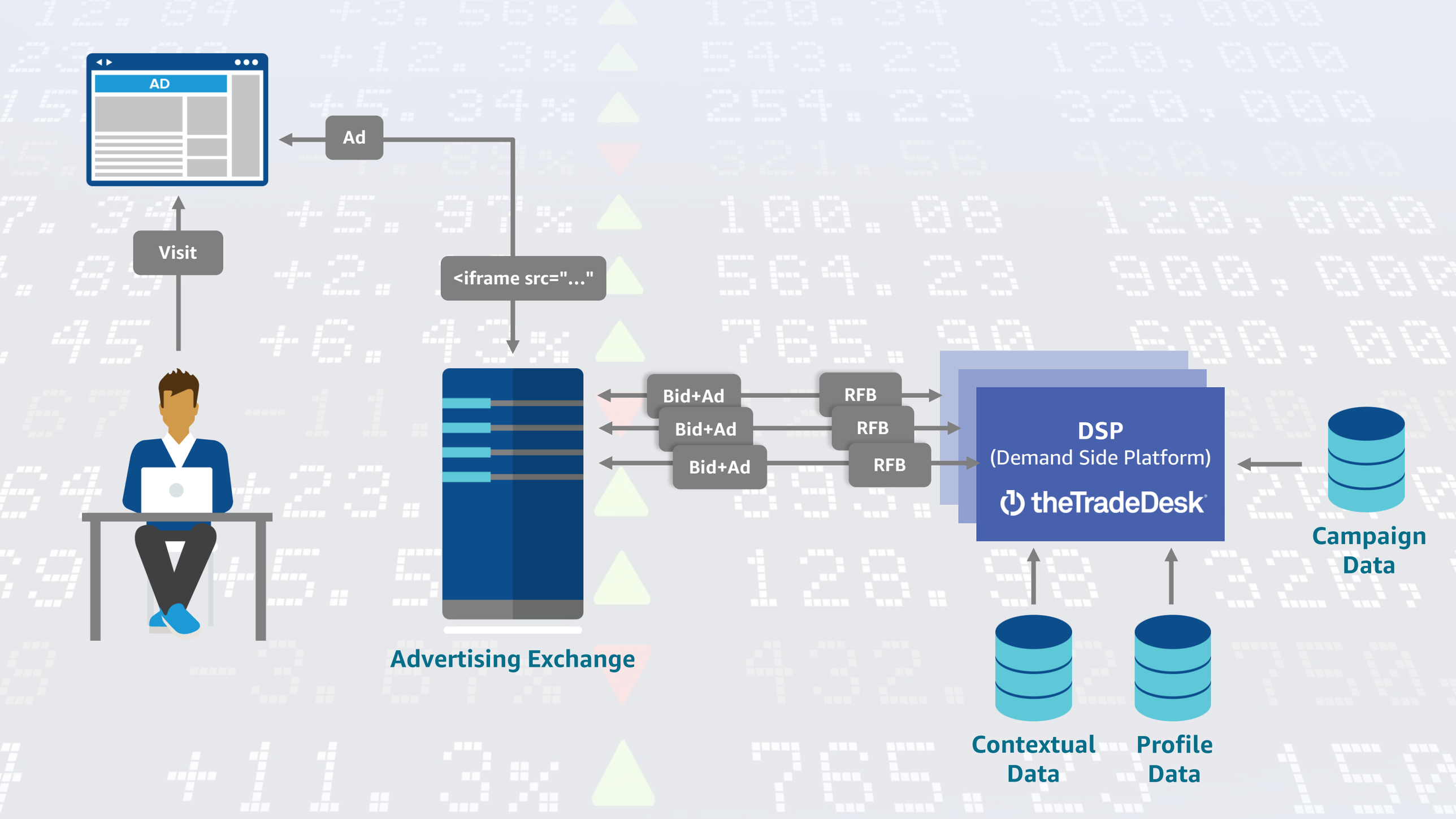


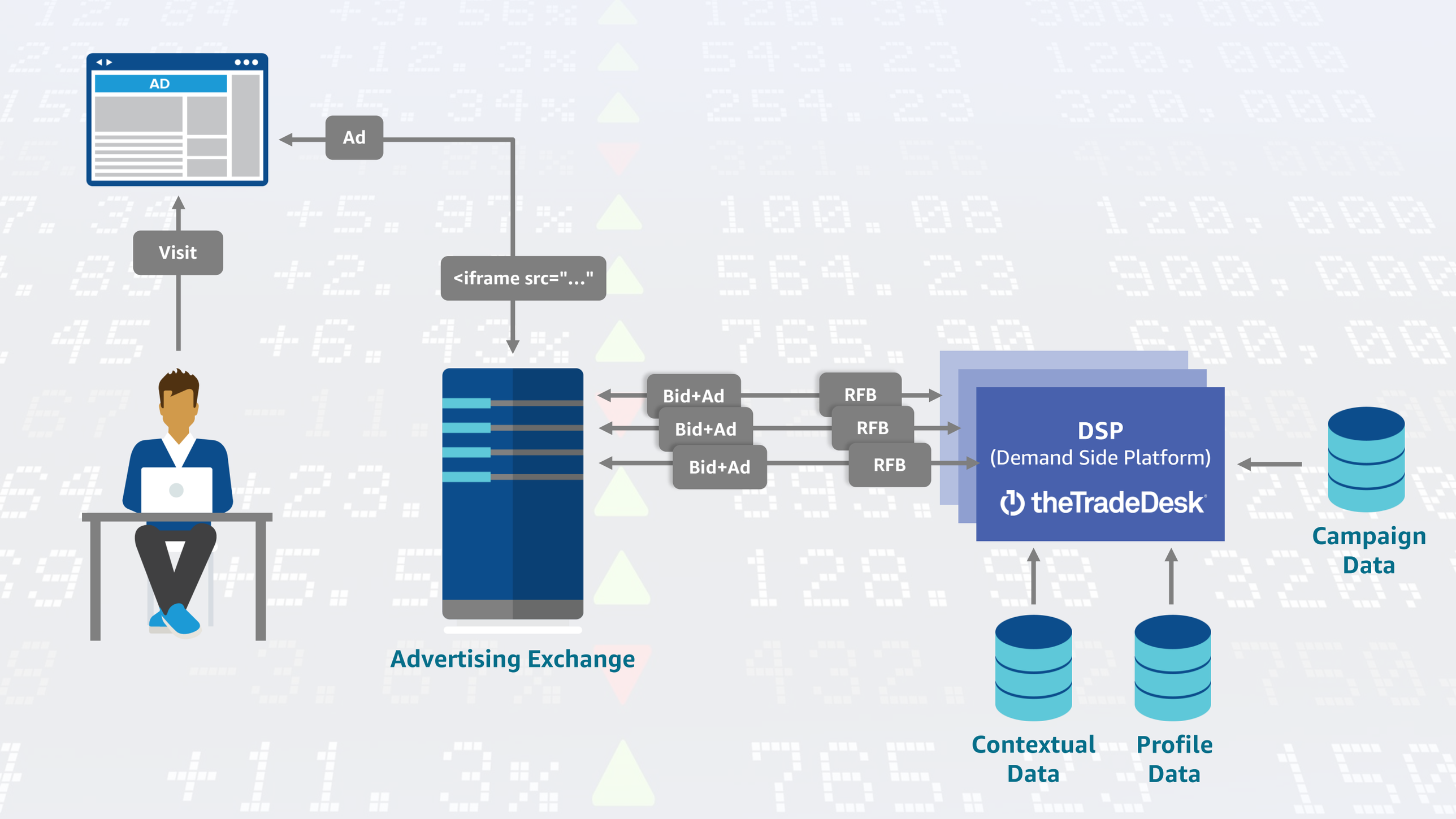
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  [Age18_22, 1.3],
  [DrivesUsedCar, 1],
  [ChainRestaurants, 1.4]
],
TOD:[[[2000,2359],1], [*,0]],
Loc:
  [RestaurantLocations,
  [[0.5,2],[1,1.5],[2,1]]] },
...
```





theTradeDesk

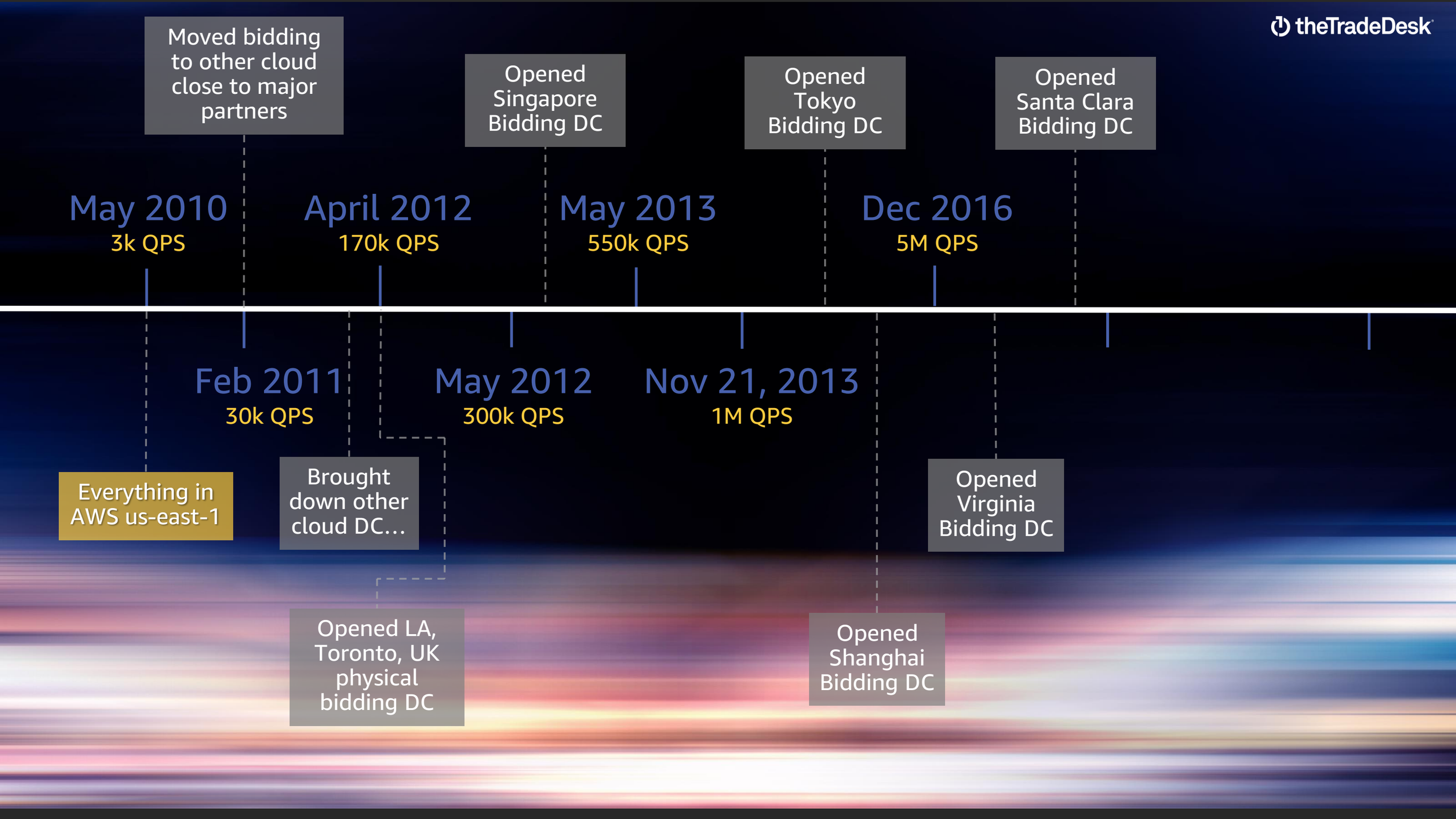

AD
Ad
Visit
<iframe src="..."
Bid+Ad
Bid+Ad
Bid+Ad
RFB
RFB
RFB
DSP
(Demand Side Platform)
theTradeDesk
Campaign Data
Advertising Exchange
Contextual Data
Profile Data

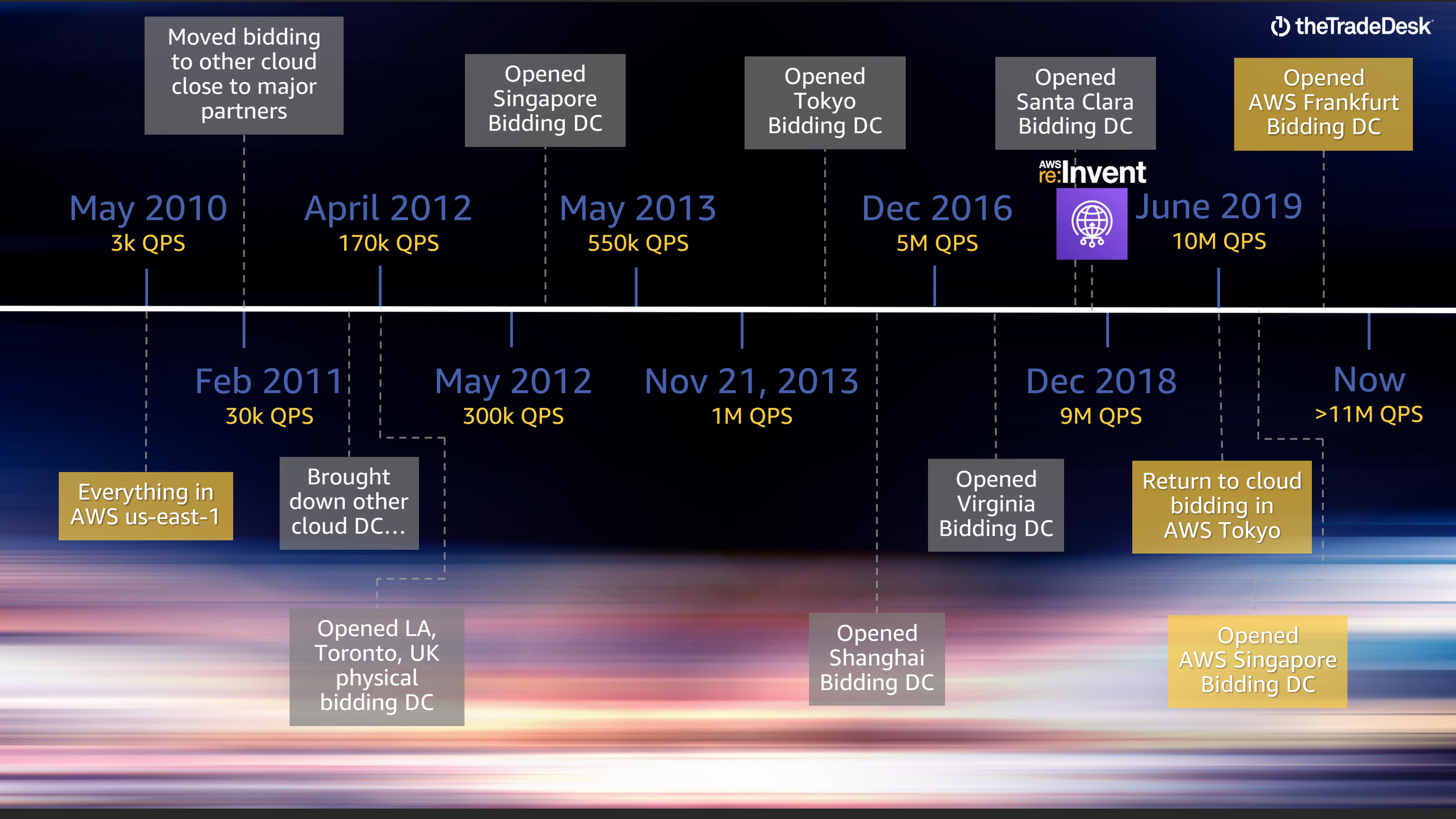

AD
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Visit
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Bid+Ad
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RFB
RFB
RFB
DSP
(Demand Side Platform)
theTradeDesk
Campaign Data
Advertising Exchange
Contextual Data
Profile Data

800,000,000,000+ queries per day

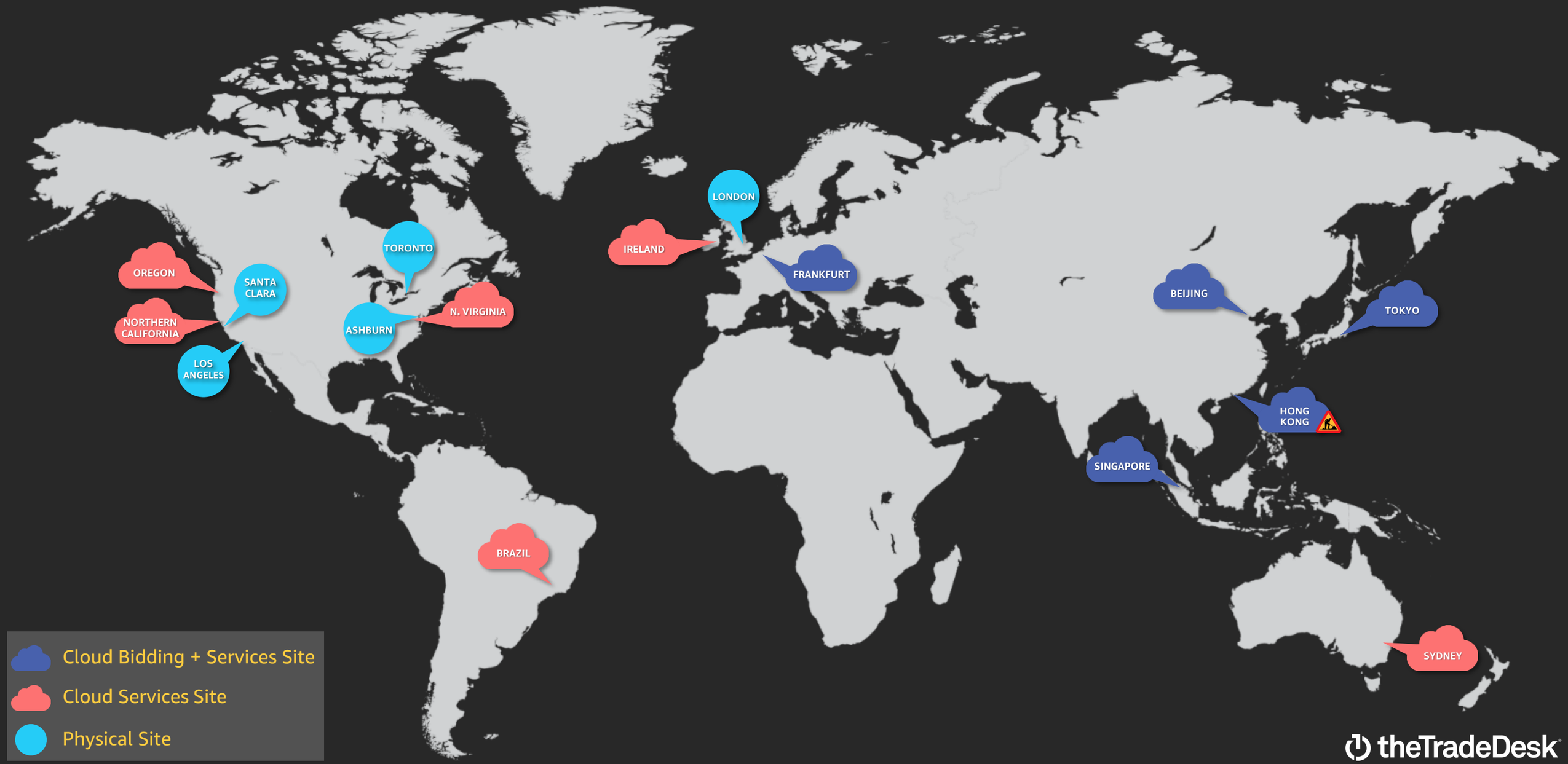
Over 100X the volume of global search

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Moved bidding to other cloud close to major partners
Opened Singapore Bidding DC
Opened Tokyo Bidding DC
Opened Santa Clara Bidding DC
May 2010
3k QPS
April 2012
170k QPS
May 2013
550k QPS
Dec 2016
5M QPS
Feb 2011
30k QPS
May 2012
300k QPS
Nov 21, 2013
1M QPS
Everything in AWS us-east-1
Brought down other cloud DC…
Opened LA, Toronto, UK physical bidding DC
Opened Shanghai Bidding DC
Opened Virginia Bidding DC

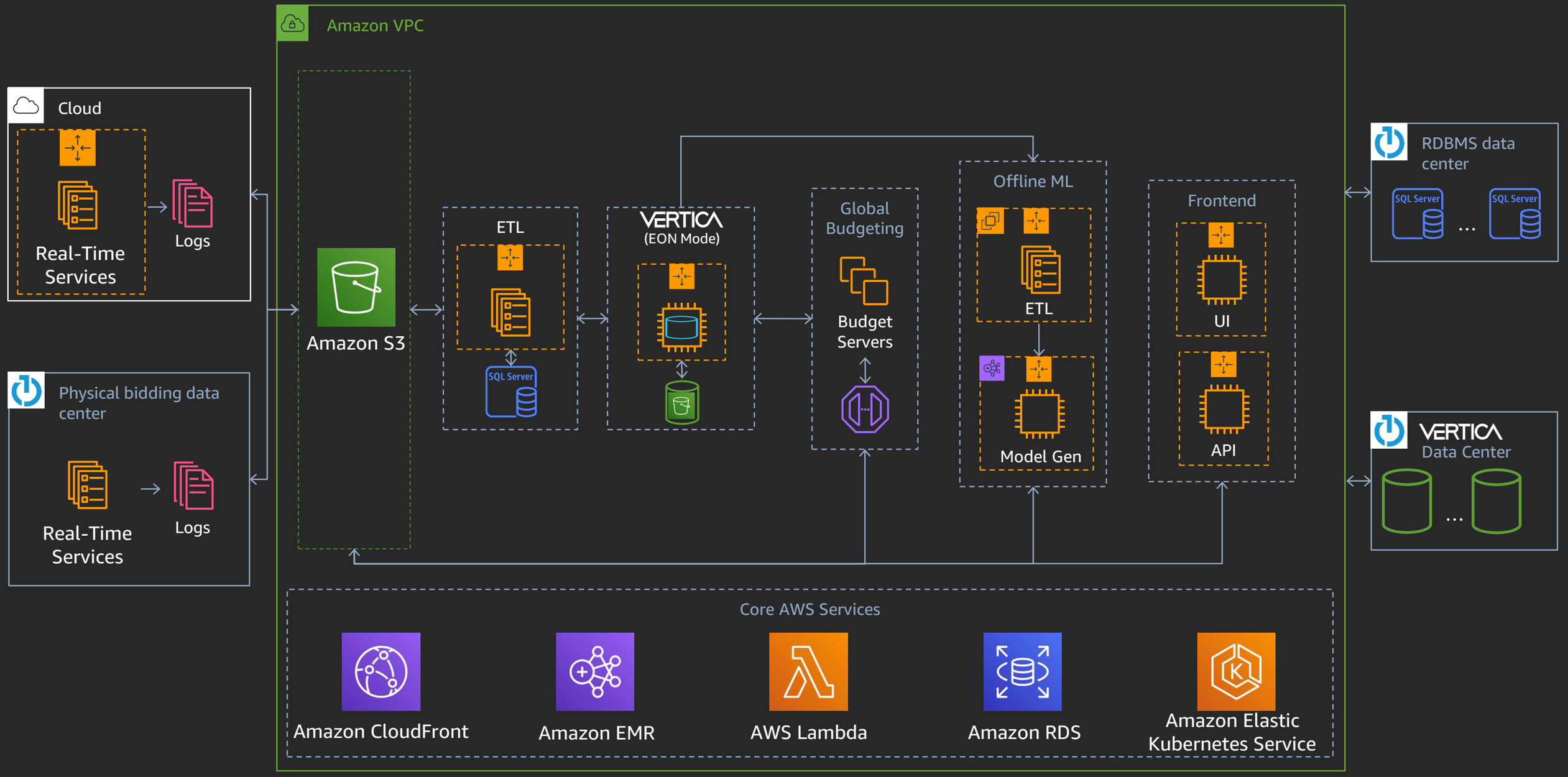

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Moved bidding to other cloud close to major partners
Opened Singapore Bidding DC
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Opened AWS Frankfurt Bidding DC
AWS re:Invent
May 2010
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550k QPS
Dec 2016
5M QPS
June 2019
10M QPS
Feb 2011
30k QPS
May 2012
300k QPS
Nov 21, 2013
1M QPS
Dec 2018
9M QPS
Now
>11M QPS
Everything in AWS us-east-1
Brought down other cloud DC…
Opened LA, Toronto, UK physical bidding DC
Opened Shanghai Bidding DC
Opened Virginia Bidding DC
Return to cloud bidding in AWS Tokyo
Opened AWS Singapore Bidding DC

The Trade Desk global presence

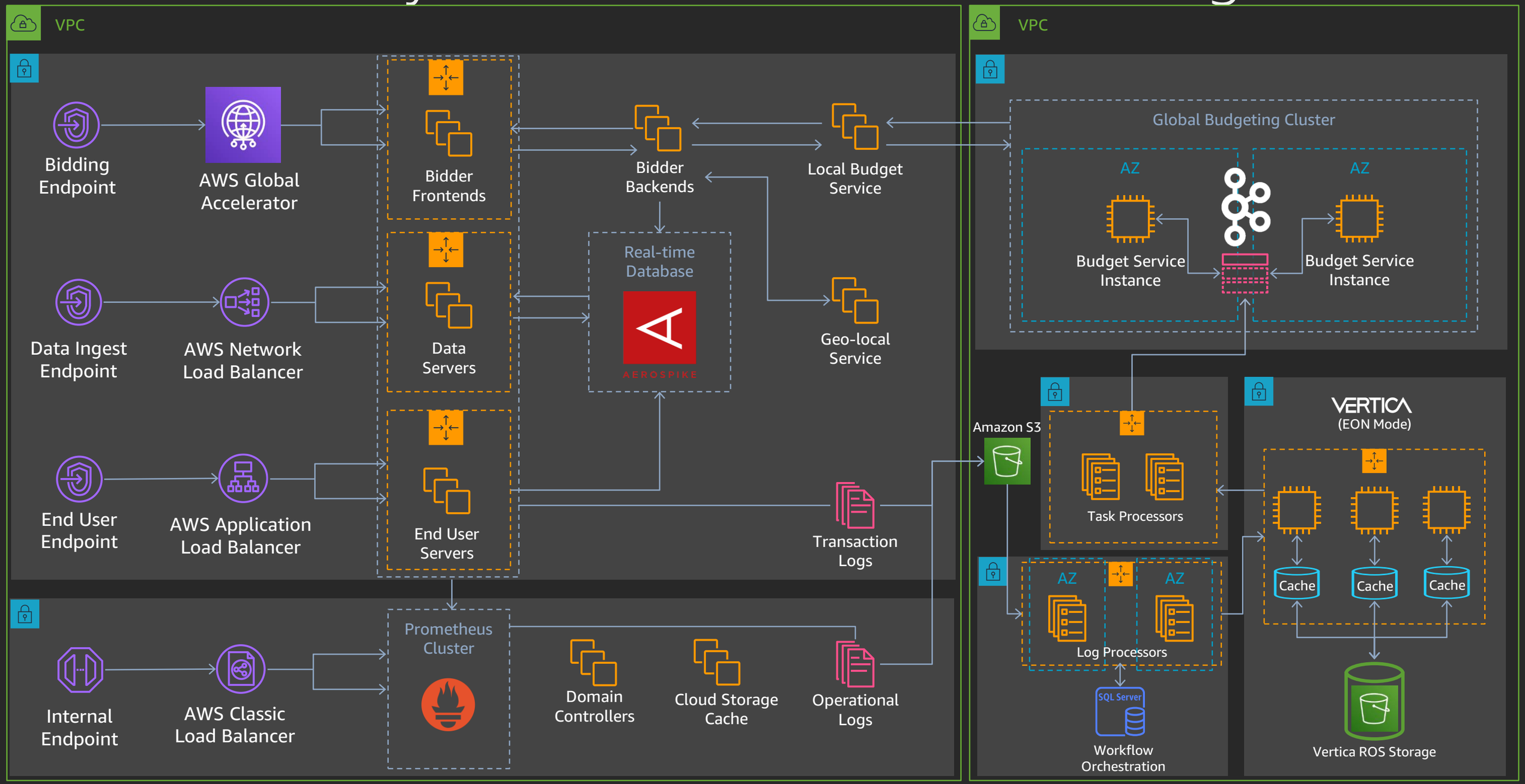


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The Trade Desk global architecture



Anatomy of a Trade Desk cloud bidding site



Cloud Bidding Wins

- Build time: 3–4 months to 2–3 weeks
- Agility: More iteration in 1 week than we would do in a year
- Better talent utilization
- Costs: Neutral to better

Thank you!

Zak Stengel

zak.stengel@thetradedesk.com

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theTradeDesk aws



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