Building an Enterprise Data & Analytics Platform on AWS – From 1 to 100 teams.

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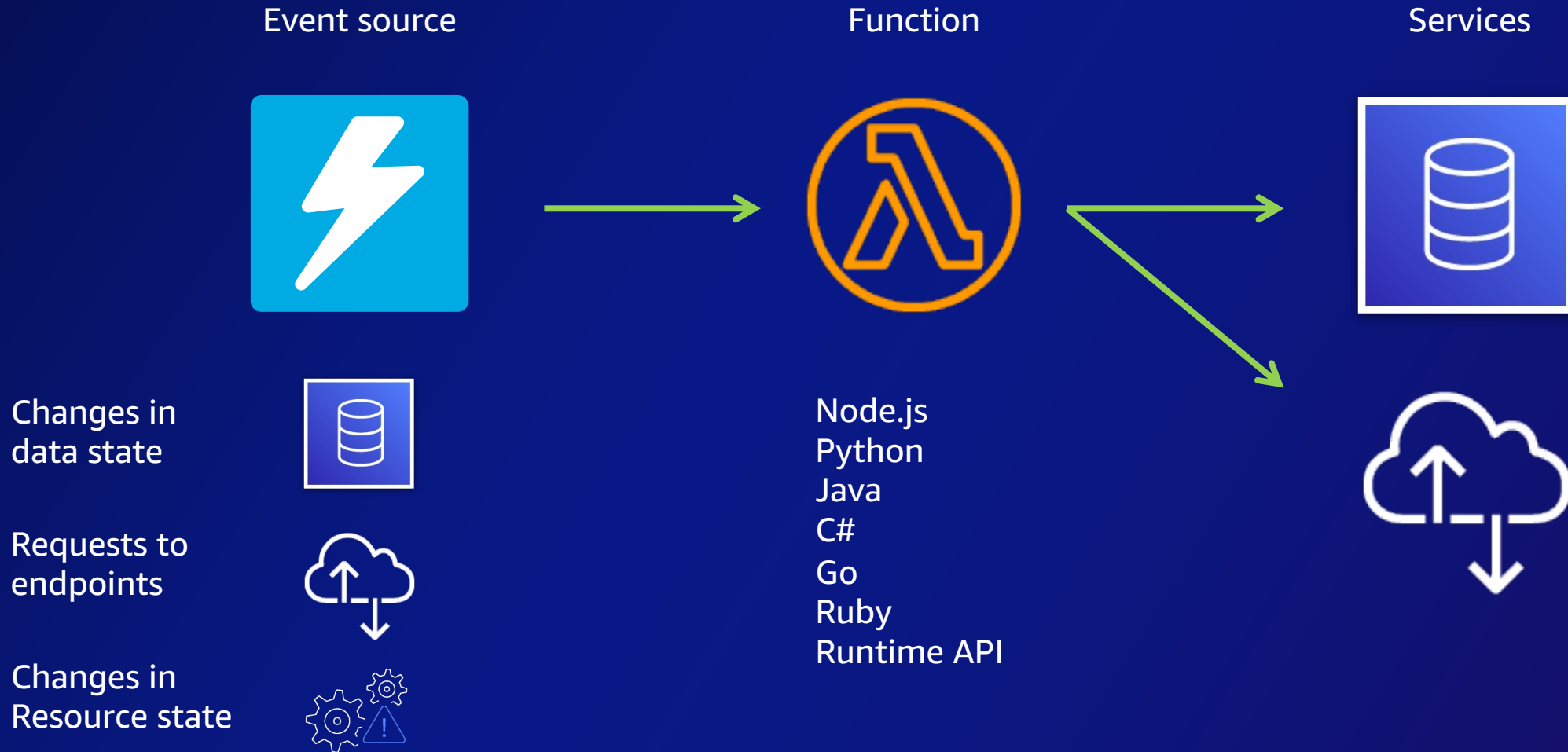# Why Serverless, Scalable Analytics ?

AWS Lambda

Amazon Managed Streaming for
Apache Kafka

Amazon Redshift

Serverless Applications

Event source

Function

Services

Changes in
data state

Requests to
endpoints

Changes in
Resource state

Node.js
Python
Java
C#
Go
Ruby
Runtime API

Amazon Comprehend

A fully managed and continuously trained service that discovers insights and relationships in text.

Amazon Comprehend

Discover insights and relationships in text

Documents

Email, chat, social, phone calls and more

→

Amazon Comprehend

Automatically extract insights from text

→

Entities
+ Custom Entities

Key Phrases

PII
(Personally Identifiable Information)
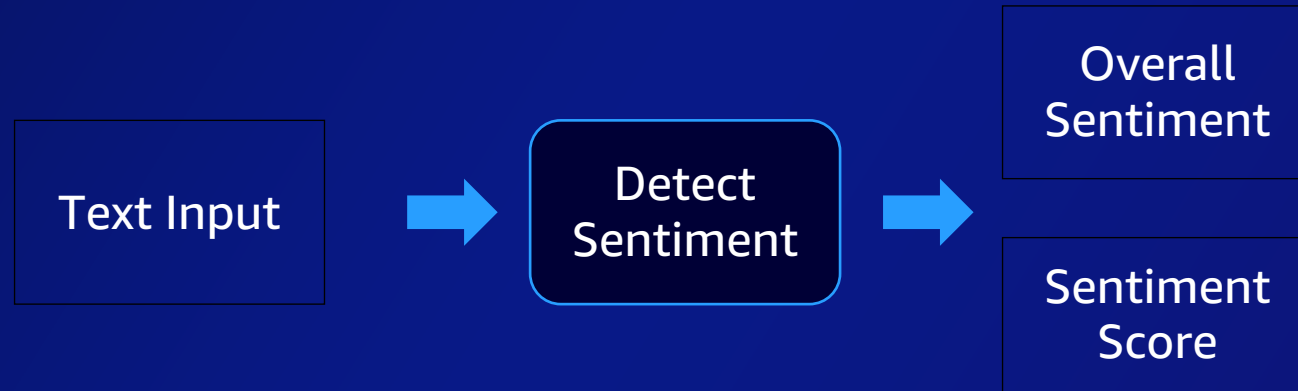
Sentiment

Document Classification

Topics

Language

Syntax

Events

How do we measure customer sentiment?

Text Input → Detect Sentiment → Overall Sentiment

Sentiment Score

"I love this service" →

Sentiment: POSITIVE

Sentiment Score

Positive: 0.999
Negative: 0.331
Neutral: 0.615
Mixed: 0.969

Detect Sentiment and Key Phrases

"They color coordinate all of your clothes: white undershirts, colored t-shirts, collared shirts, and even match all your socks together!"

Sentiment →

Sentiment: POSITIVE

Sentiment Score

Positive:	0.961
Negative:	0.000
Neutral:	0.038
Mixed:	0.000

Phrases →

your clothes
white undershirts
colored t-shirts
collared shirts
all your socks

Detect Sentiment and Key Phrases

```
sentiment = comprehend.detect_sentiment(Text=text, LanguageCode="en")


phrases   = comprehend.detect_key_phrases(Text=text, LanguageCode="en")
```

AI / ML Managed Services

Amazon Comprehend

Amazon Forecast

Amazon Lex

Amazon Fraud Detector

Amazon CodeWhisperer

Amazon Personalize

Amazon Polly

Amazon Rekognition

AWS DeepLens

Amazon SageMaker Studio Lab

Amazon Textract

Amazon Transcribe

Amazon Translate

Amazon Personalize

Amazon SageMaker

Karl Heery

VP of Technology, Digital Delivery Capabilities
Aon Technology

Aon is in the business of better decisions

Aon exists to shape decisions for the better — to protect and enrich the lives of people around the world. Our colleagues provide our clients in over 120 countries and sovereignties with advice and solutions that give them the clarity and confidence to make better decisions to protect and grow their business.

50,000
colleagues around the world

120+
countries and sovereignties with Aon clients

Through our experience, global reach and state-of-the-art analytics, we are better able to help clients meet rapidly changing, increasingly complex and interconnected challenges across four areas of need:

Navigating new forms of volatility	Building a resilient workforce
Rethinking access to capital	Addressing the underserved

Commercial Risk Solutions

Shifts in technology, economics and geopolitics are creating unprecedented volatility. We help clients identify, measure and manage their risk exposure.

$110B+ [1]
of bound premium placed annually

Health Solutions

Health is declining, costs are rising and workers have vastly different needs. We help companies improve employee health and wellbeing while managing costs.

$35B
of bound premium placed annually

Reinsurance Solutions

Businesses, governments and communities need to become more resilient. Our expertise and insight help (re)insurers navigate uncharted territories and create more relevant solutions.

$50B+
of bound premium placed annually

Wealth Solutions

Global business is becoming increasingly difficult to navigate. We help employers, fiduciaries and investment officers optimize results and provide a more secure future for their stakeholders.

$3.8T [2]
of assets under advisement

[1] Includes approximately $55B of captive premium.
[2] As of 6/30/2022, includes non-discretionary assets advised by Aon and its global affiliates which includes retainer clients and clients in which Aon and its global affiliates have performed project services for over the past 12 months. Project clients may not currently engage Aon at the time of the calculation of assets under advisement as the project may have concluded earlier during preceding 12-month period.

AON

Ensuring every Aon client is better informed, better advised and able to make better decisions

Better Informed >

- State-of-the art data & analytic capabilities
- Breadth and depth of industry expertise
- Proven methodology to discover client needs

Better Advised >

- Collaborative, hands-on approach
- Linking innovative insights to client needs
- Developing solutions in partnership

Better Decisions

- Delivery of integrated solutions
- Tailored client experience and service
- Practical execution for maximum impact

AON

The business case for shared Data & Analytics capabilities

The Opportunity

- Enable our data professionals to do their best work – modern tooling, lower hurdle to access cloud, collaboration options

- Leverage best of cloud-native services (PaaS) and commercial software (IaaS/SaaS)

- Workbench for early data exploration – avoid big bets and new infra projects

- Simplify pathways to production for commercialising solutions

Business Imperatives

- Security & Privacy by design and by default

- Raise the bar on Data Governance and **A**nalytics **D**evelopment **L**ife**C**ycle (ADLC)

- Achieve economies of scale through standard technology and patterns

- Ensure sustainable operating model for data-driven solutions

The value proposition for Aon data professionals…

It started with Persona-Driven Design

Data Engineer
Build our data supply chain to ensure solutions stay fresh

Data Scientist
Create points of differentiation through advanced analytical technique

Data Analyst
Derive data points of interest and create visual insights that drive customer action.
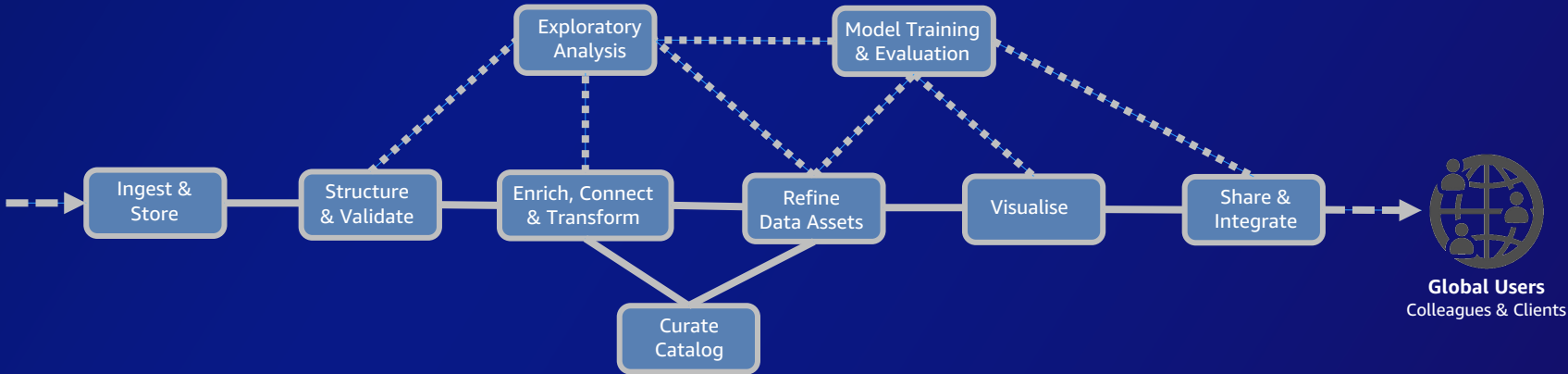
Application Dev
Creates the user experience that assists clients in navigating data and taking action
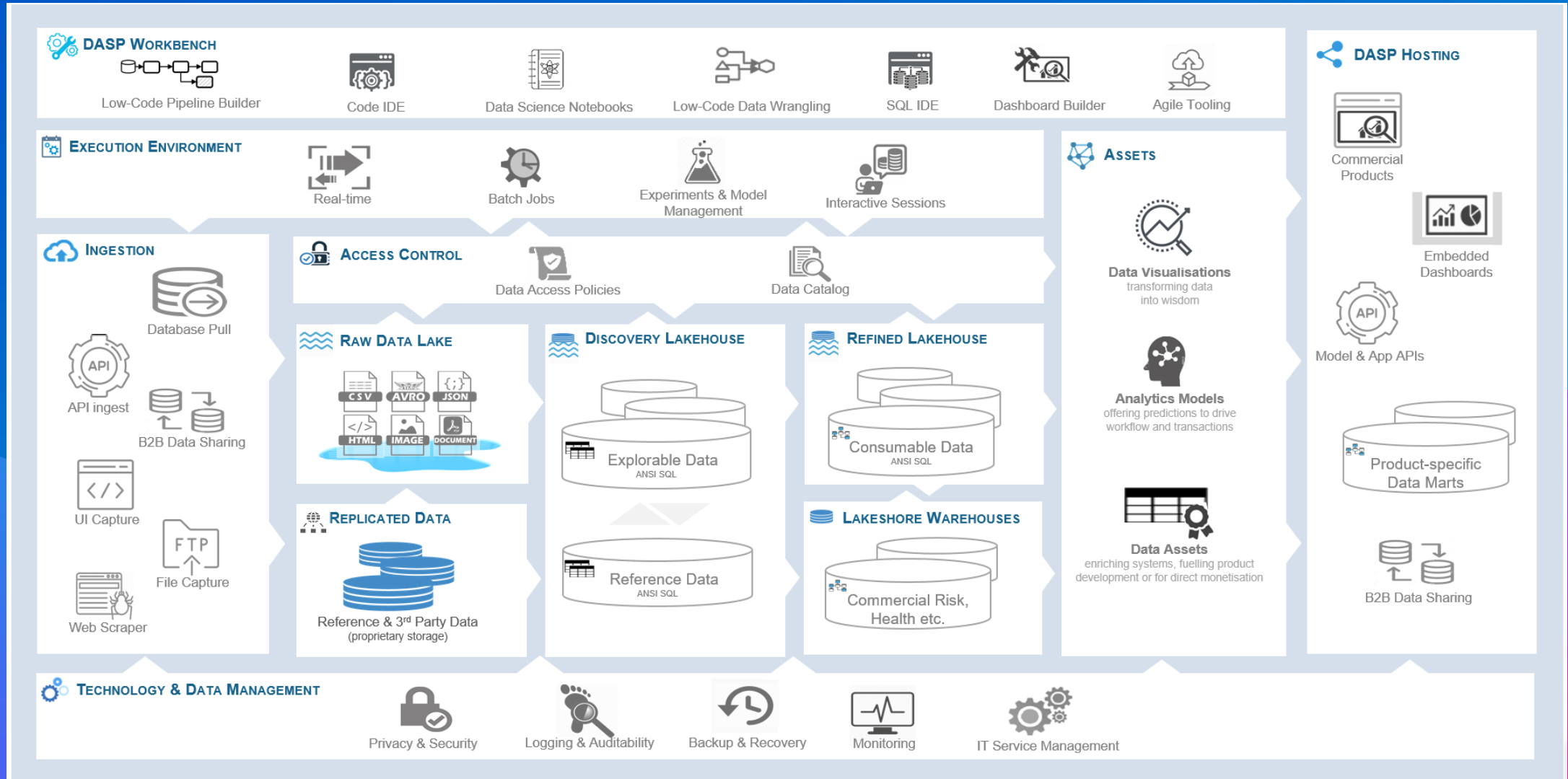
Data Steward
Oversee data assets for the firm, for understanding, governance and appropriate sharing

Generalised Analytics Development LifeCycle (ADLC)

Exploratory Analysis

Model Training & Evaluation

Ingest & Store → Structure & Validate → Enrich, Connect & Transform → Refine Data Assets → Visualise → Share & Integrate

Curate Catalog

Global Users
Colleagues & Clients

Aon's Global Data & Analytics Platform

2018

Added Data Ingestion, Data Catalog & Hadoop Data Lake capabilities

Opportunity assessment process & prioritisation forums for tenant onboarding. CoE and CoI models mature

Business case for seed funding, garner support from solution line CIOs. IT team from Aon Centre for Innovation & Analytics joins Global Aon Technology

Added website content management & dashboard embedding capabilities

Data Access Control tooling: Teams start sharing data, demonstrating value of joining the DASP network

- Continuous Onboarding
- How-To Guides
- Product Lifecycle Management Activities
- Standard Operating Procedures
- 'Public' Support Channel via MS Teams

Data Profiler enriches catalog with metrics on 100K+ data sets

Common Aon Reference Data shared via platform with all teams

DASP Console MVP launch, helping teams manage their membership, data & costs

Added Document Analytics workbench for OCR & Entity Extraction of unstructured data (CoE + Self-Service delivery model)

Analytics Hosting Service now powers 50+ data-driven business applications (⇧90% Web/API visits YoY)

- Continuous success stories "Powered by DASP"
- Webinars & Short-form Videos
- Tenant Healthchecks
- Promoting Data Reuse
- Embedding insights in global IT applications

Aon Enterprise Data Model standardises our Data Topics for classification in catalog

2023...

First B2B Direct Data Sharing with insurance carriers + first 3rd party data consumed from marketplace

Modernised the Data Stack, migrating Hadoop to Lakehouse & ephemeral data processing capabilities

Defining and enabling Data Accessibility framework, Data Quality and DCAM standards generally with Chief Data Office

Example Pattern: Unstructured Document Processing with Human Review

- A workbench for NLP model training using AWS S3, SageMaker, Textract, Comprehend etc.

- Orchestration through AWS Step Functions, Lambda, DynamoDB

- An API layer to route production requests to appropriate models

- Asynchronous or Synchronous to support real-time or batch

- Human-in-the-loop through integration with Aon standard workflow systems

- Structured output storage in Snowflake with job lineage
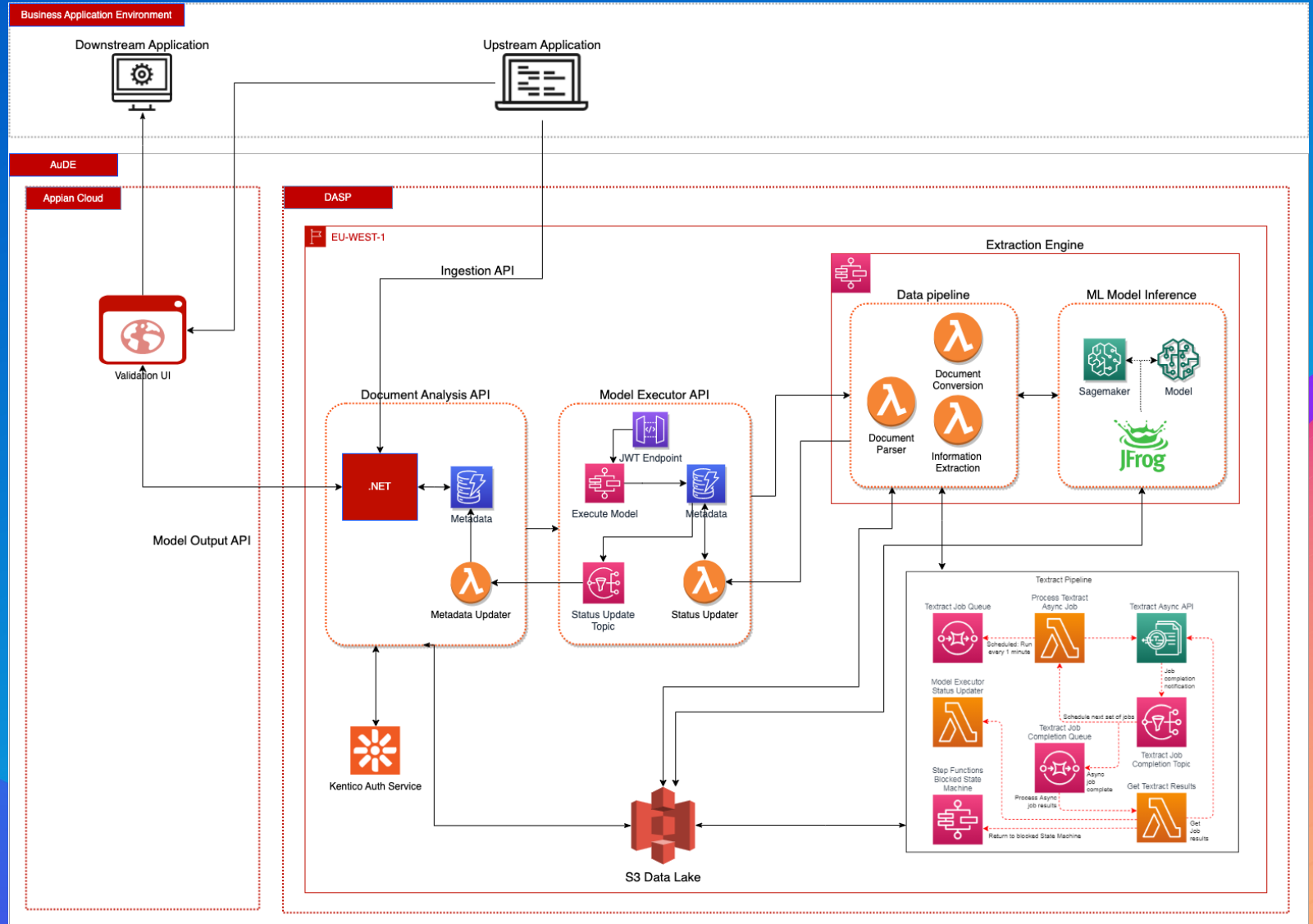
Learning #1: define Responsibility Model for multi-tenancy early

- Commercial software needs to support Enterprise IT overseeing multiple isolated tenants

- Role-Based Access Control (RBAC): find the governance sweet-spot of controls without sacrificing developer autonomy

- Evaluated software against our target controls, understanding where data processes cross into IT

- Isolation is the default, but need an 'easy button' for governed data/code sharing
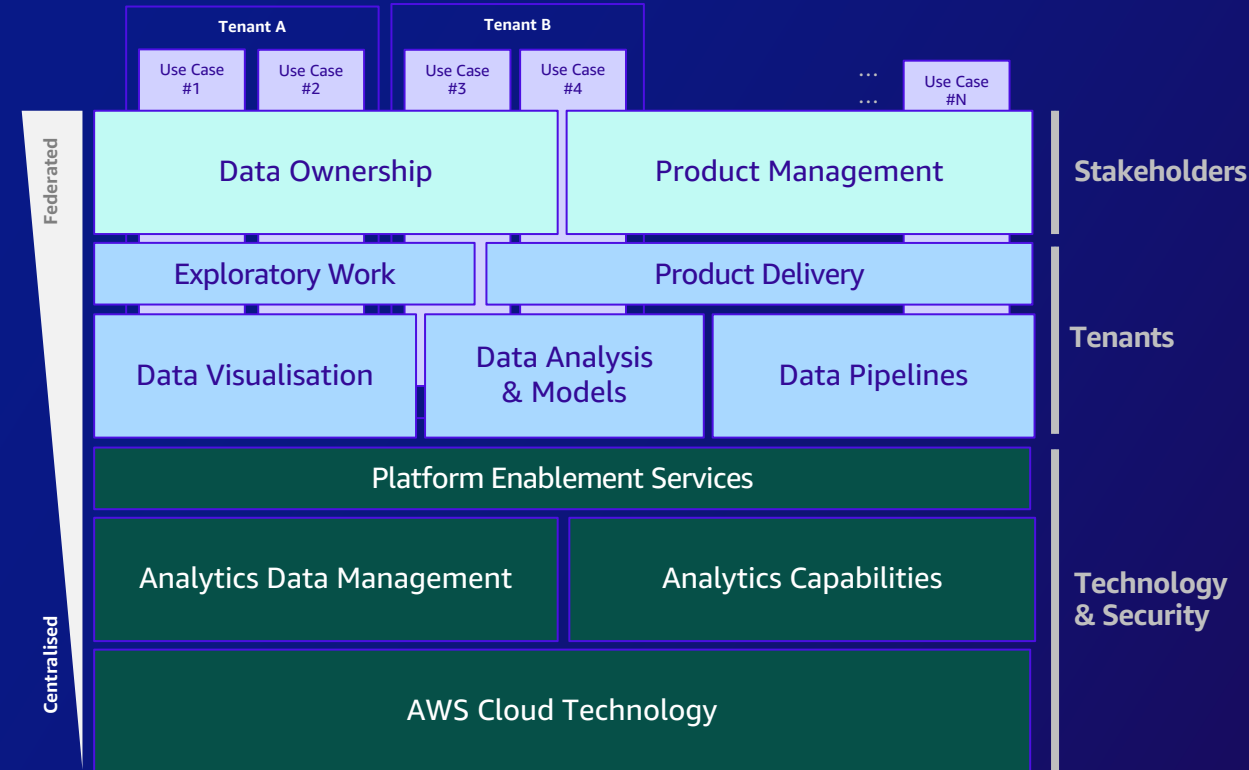
Learning #2: secure analytics development on a production workbench
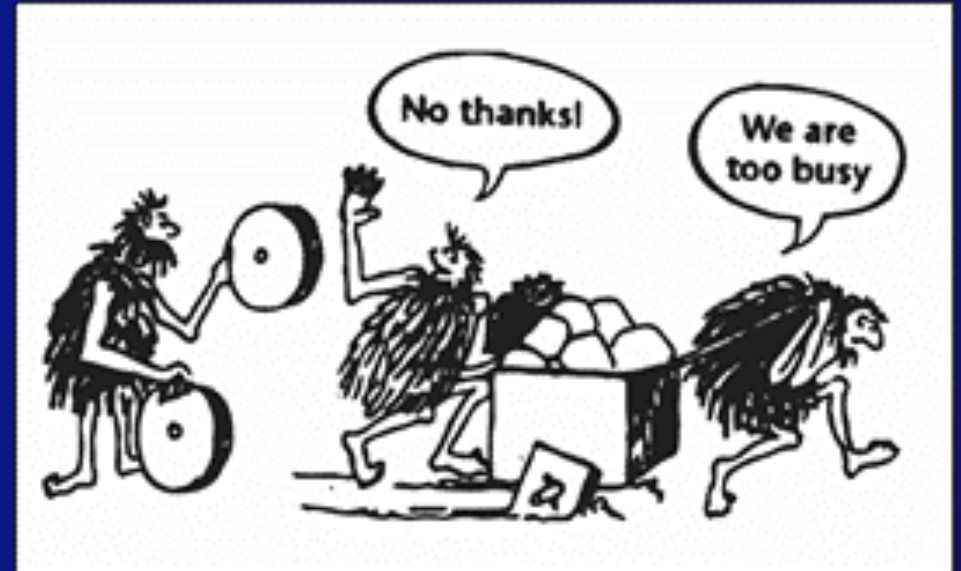
- Analytics solutions are a function of the data they process, not like most traditional software development.

- Mock data and data obfuscation help, to a point. Ultimately model testing & refinement requires real data.

- Lower lifecycle IT environments (DEV, TEST etc.) may have different controls not appropriate for real business data.

- We concluded analytics should be developed under protection of production controls to ensure data security.

- Our workbench is a production zone; whereas new software built/bought goes through lower lifecycles first.

UX → Software Development → Code
Requirements →

vs.

Data → Analytics Development → Model
Hypothesis →
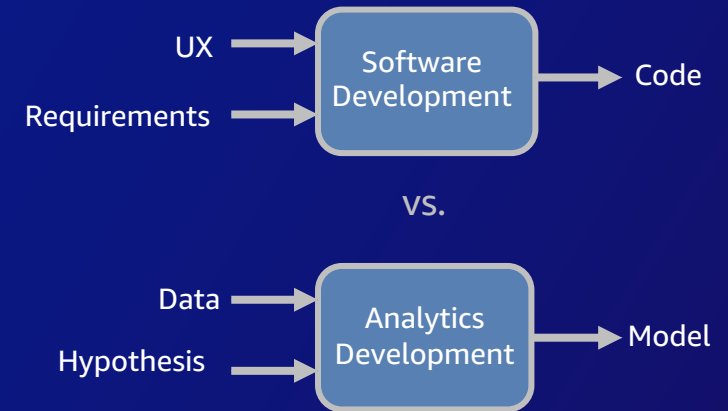
Learning #3: the tenant experience requires ongoing investment

- A smooth onboarding experience for our tenants was essential to the promise of shorter 'Idea-to-Launch'.

- There's a tradeoff in mixing best-of-breed commercial with cloud PaaS & SaaS offerings - investment in integration.

- Enterprise standards in identity and access management, secrets management, monitoring etc. adds dependencies.

- We focused on enabling the community through patterns and guides to strengthen our internal brand.

- At some point building a 'single landing page' for tenants was justified, but a 'single pane of glass' was not.
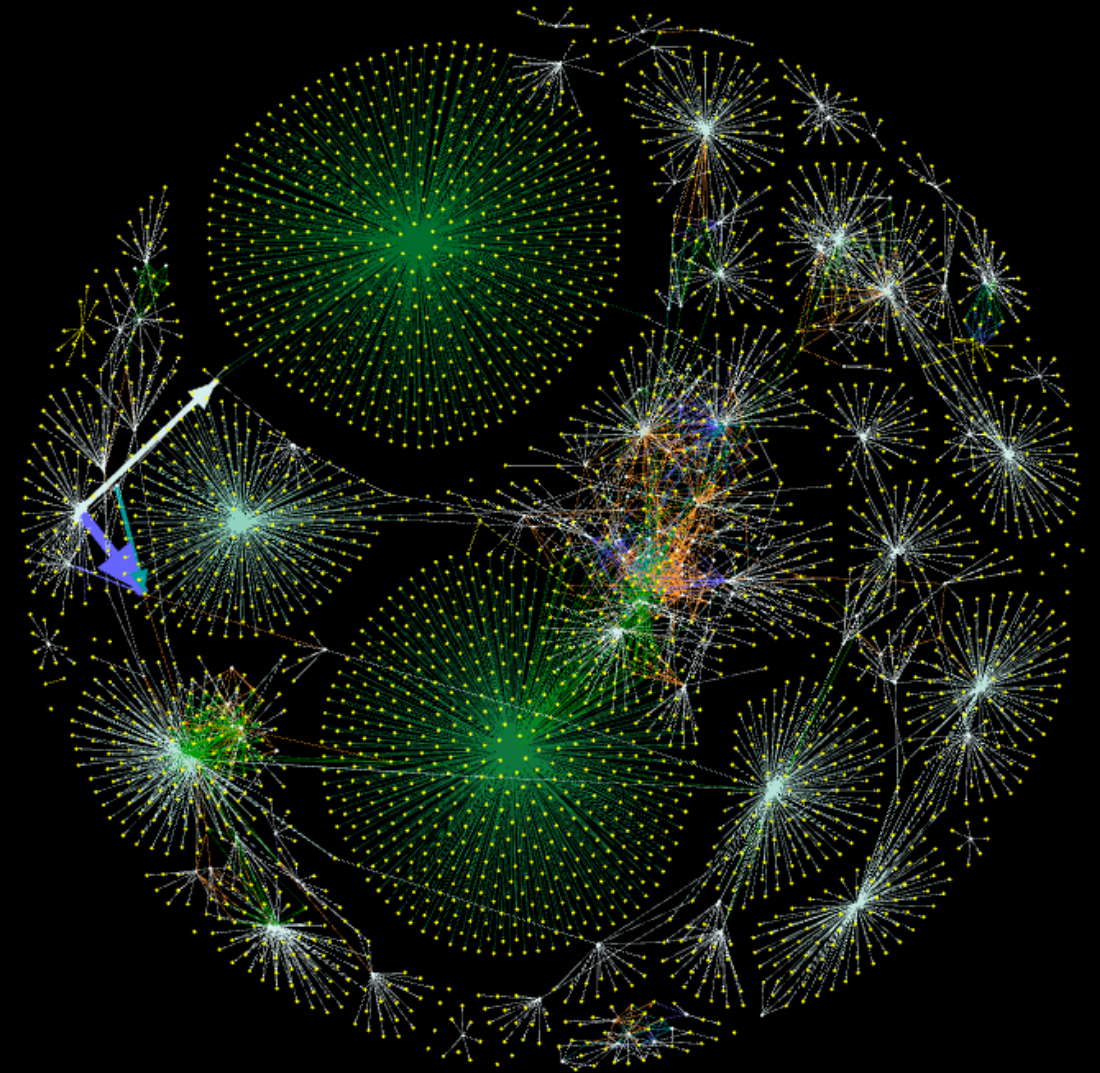
Shouldn't we integrate that?

Driving value for clients

100+
teams representing
1000+ Aon practitioners

120K+
data assets in
Aon Data Catalog

90%+
Increase in web/API hits
on analytics YoY

- Aon Human Capital Solutions delivers **AI-driven insights on technology talent globally**, including geography-based pay differentials which is "essential for finding the best technology talent and optimizing within the client's existing workforce"

- AWS cloud-native **Document Analytics workbench** and COE team processing ~4K documents per day, delivering >$2M of efficiencies, and avoiding $1M+ external software spend.

- Our Health **Actuarial and Analytics teams ingest data** on employee health, insurance and claims, workplace safety, absence and engagement, and external data on health trends to help a manufacturing client **meaningful improvement in selected health metrics at 24% lower cost** per person.

- Our **Climate Analytics teams insight report** citing global economic losses from natural catastrophes at $313Bn, with only 42% covered by insurance – **$190Bn protection gap.**

- Aon Innovation Olympics 2022: >25% of initiatives were built on our Aon's Data & Analytics Platform.

Green = system-to-system interaction
Yellow = databases held in platform
Other = colleagues running interactive analytics

Thank you!

Please complete the session survey in the mobile app

Karl Heery

in **Karl Heery**

Patrick Callaghan

in **Patrick Callaghan**