
AWS
re:Invent
NOV. 28 – DEC. 2, 2022 | LAS VEGAS, NV

MKT201

How Moderna and Takeda accelerate drug research using real-world data

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Agenda

AWS Data Exchange

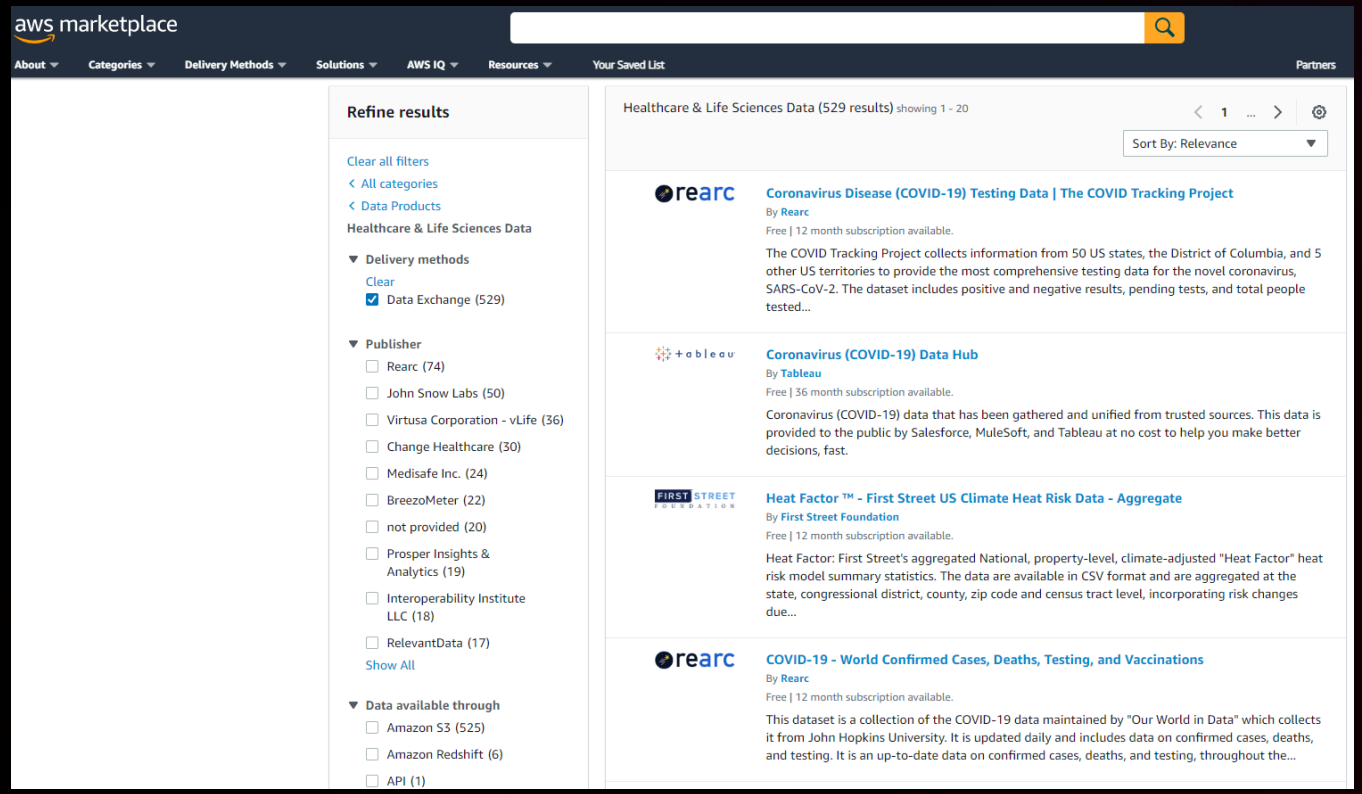
Takeda

Moderna

Getting started

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AWS Data Exchange enables customers to find, subscribe to, and use third-party data in the cloud



- 300+ data providers and 3,500+ public datasets
- Over 1,000 free public data products to easily evaluate the data you need
- Support for private products and private data trials
- Data delivery via files, tables, and APIs

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Features

Better technology

Multiple delivery methods for third-party data



Secure and compliant with **encrypted data** and **IAM** integration



Natively integrates into AWS and non-AWS services



AWS Data Exchange



Easier administration



One place to exchange data **publicly or privately**



Migrate existing subscriptions at **no additional cost**



Simplified contracts and consolidated, **secure billing**

aws

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Benefits

Subscriber benefits

Quickly find diverse data **in one place**



Easily analyze data as it's published



Spend less time and effort to use data in production



AWS Data Exchange



Provider benefits



Co-sell with AWS Partner Network (APN) to reach **millions of potential customers**



Reduce data engineering time and duplication

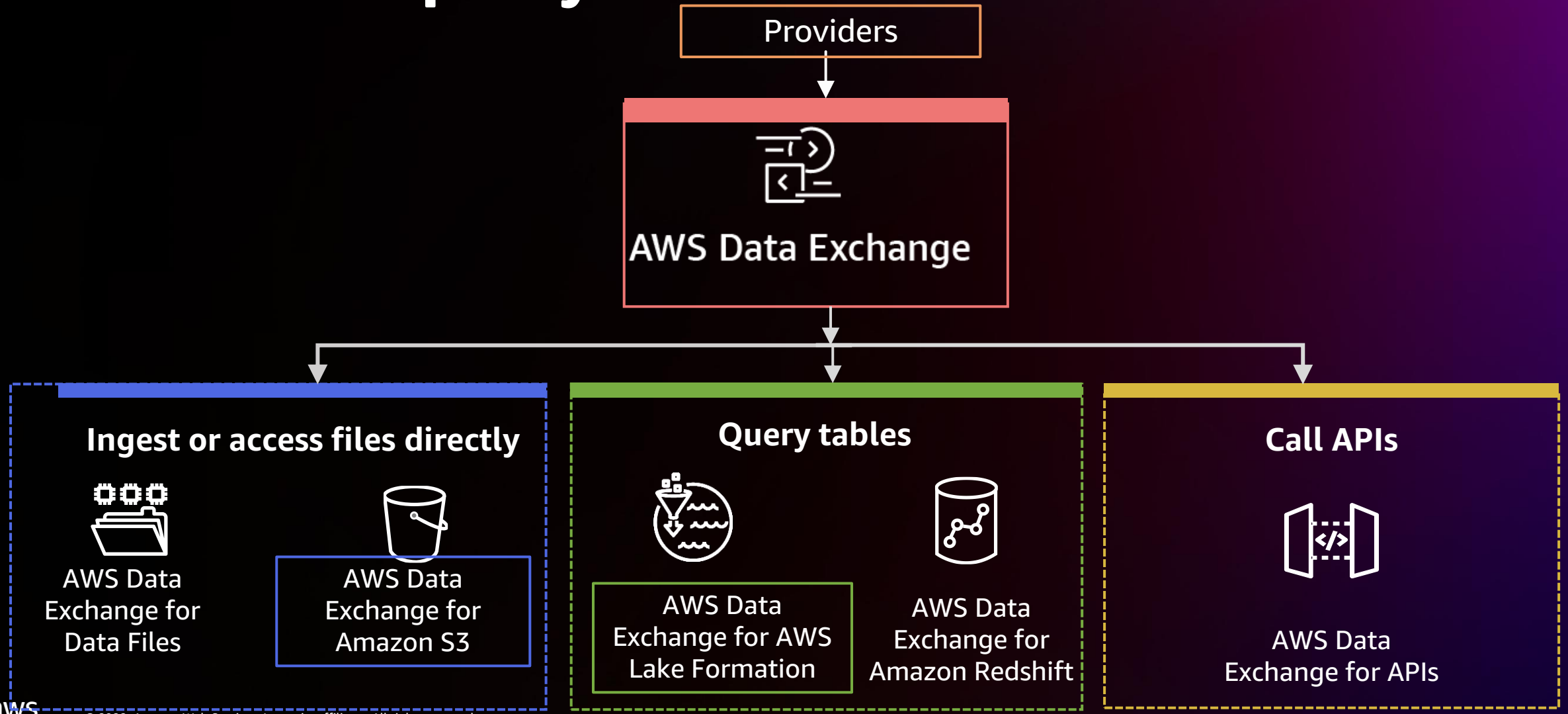


Automatic entitlement, billing, and **payment management**

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AWS Data Exchange now offers five ways to license third-party data faster and easier



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How AWS Data Exchange supports Takeda's external data strategy

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A Global biopharmaceutical company

HEADQUARTERS
TOKYO, JAPAN

GLOBAL HUB
CAMBRIDGE, MA, USA

40 NEW MOLECULAR ENTITY CLINICAL STAGE ASSETS

PRESENCE: APPROX. IN
80 COUNTRIES & REGIONS

30+ MANUFACTURING SITES

3 RESEARCH SITES

200+ PARTNERSHIPS TO HELP US BRING INNOVATION TO PATIENTS

FY21 REVENUE



* Convenience translation of reported JPY figures into USD at an average rate of 121.44 JPY/USD. FY2021 revenue amount as of March 31, 2022.

FOUNDED IN
1781
OSAKA, JAPAN

OUR PEOPLE

TOP EMPLOYER® IN
39
COUNTRIES & 4 REGIONS



ALL NUMBERS AS OF JUNE 2022

20+ conditions treated with our medicines and vaccines

NEUROSCIENCE

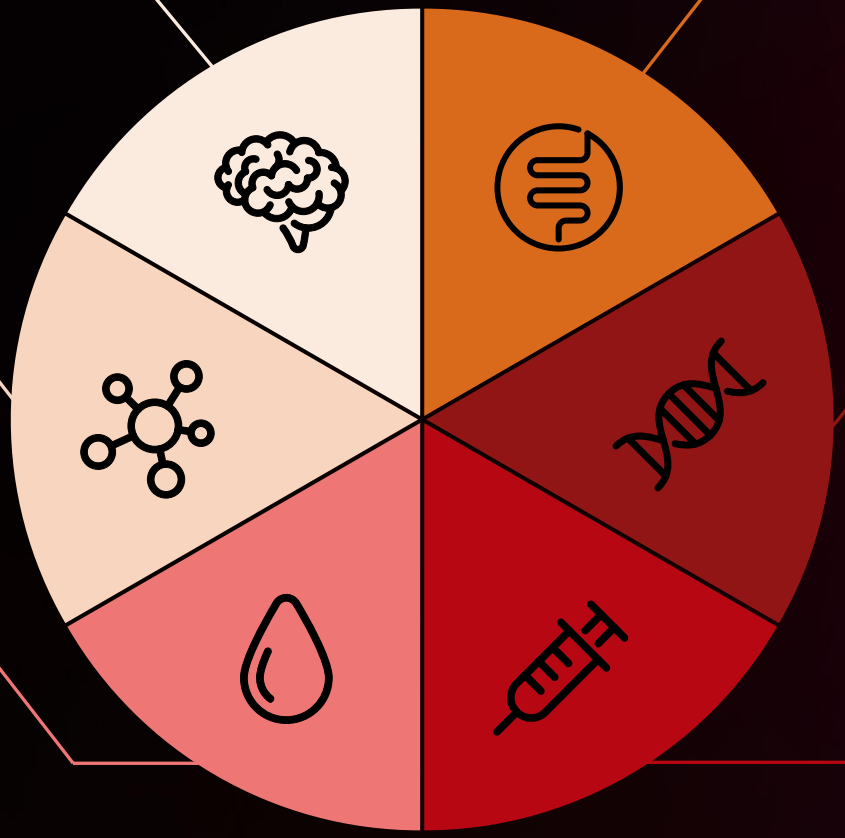
- Attention-Deficit Hyperactivity Disorder (ADHD)
- Major Depressive Disorder (MDD)

ONCOLOGY

- Multiple Myeloma
- Non-Small Cell Lung Cancer

PDT IMMUNOLOGY

- Immunodeficiency and autoimmune diseases
- Primary immunodeficiency (PI)
- Alpha-1 Antitrypsin Deficiency



GASTROENTEROLOGY

- Ulcerative Colitis
- Crohn’s Disease
- Crohn's Disease Complex Perianal Fistula
- Short Bowel Syndrome

RARE DISEASES

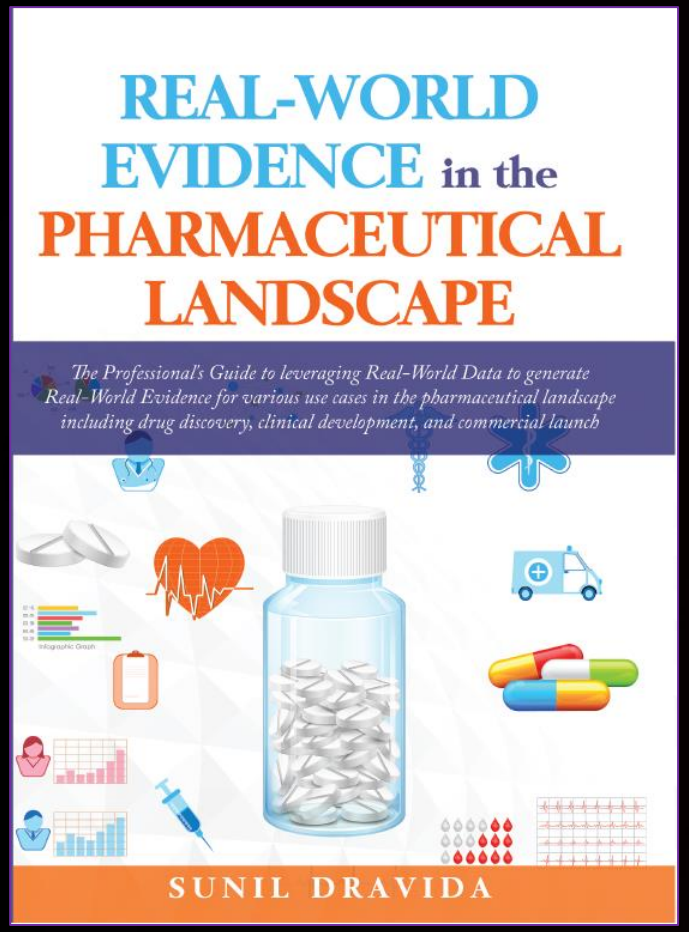
- Hunter Syndrome
- Type 1 Gaucher disease
- Fabry disease
- Hereditary Angioedema (HAE)
- Hemophilia A
- Von Willebrand disease
- Hypoparathyroidism
- Cytomegalovirus (CMV) infection

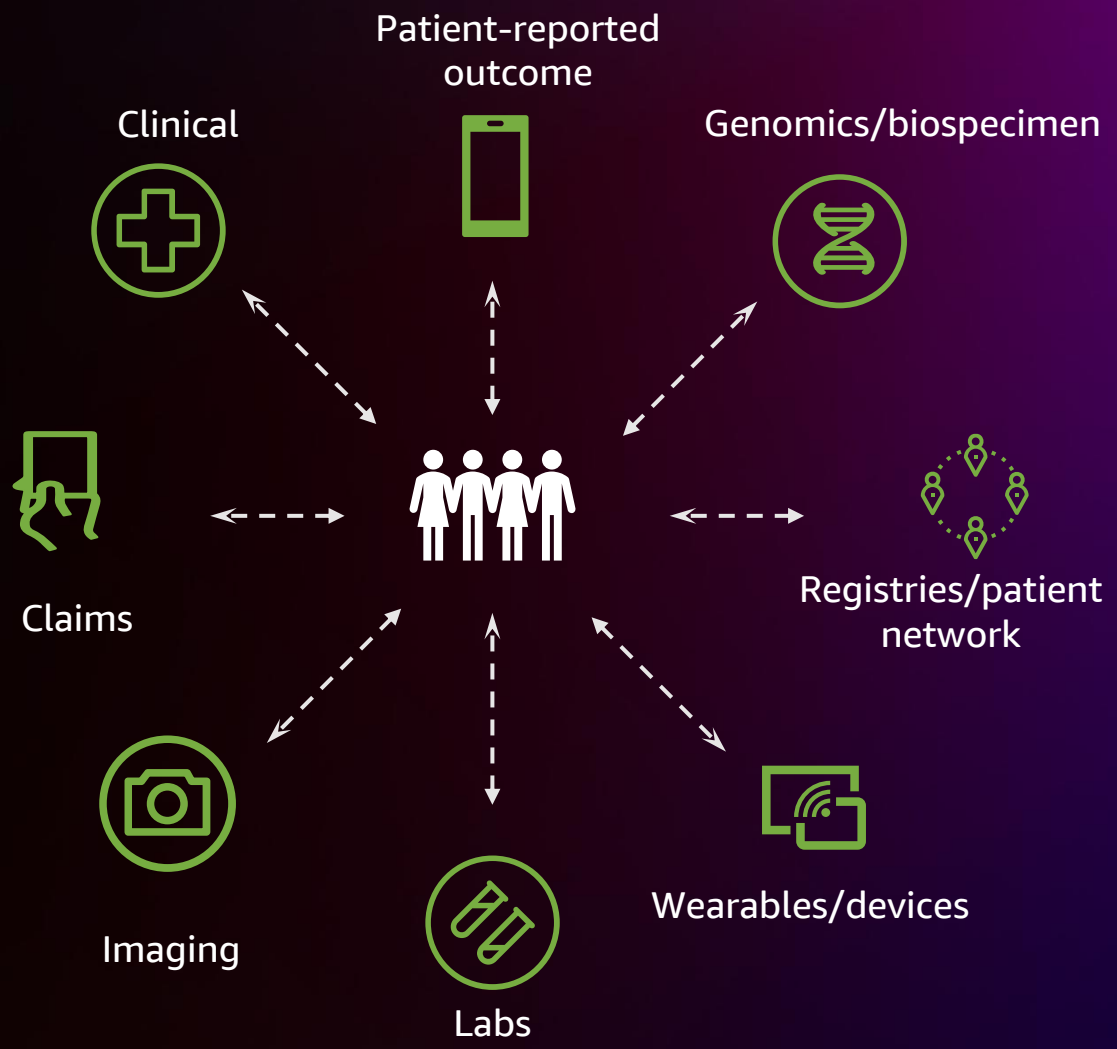
VACCINES

- Dengue
- COVID-19

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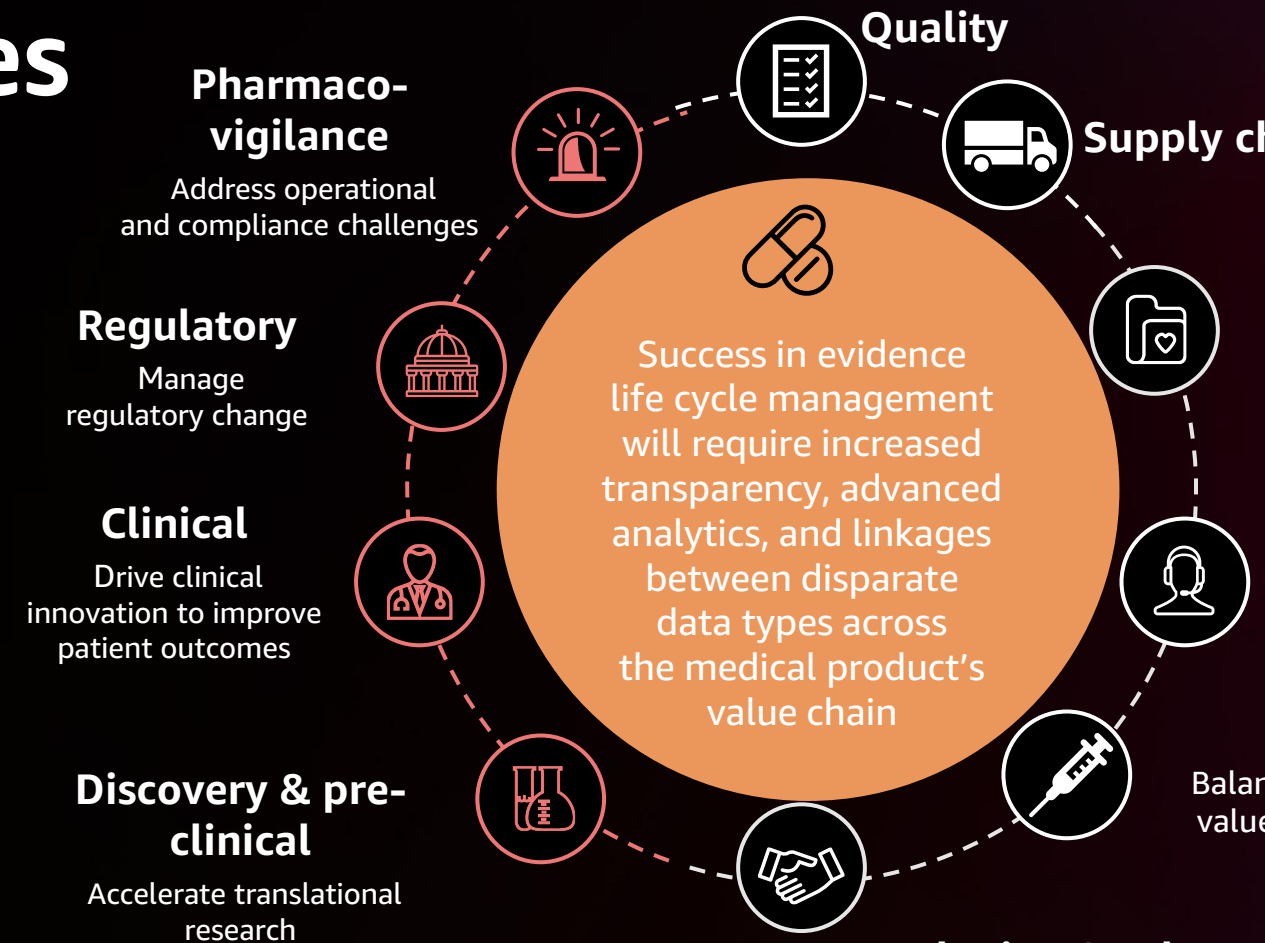
What is real-world data (RWD)?





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RWD is critical to accelerate R&D, clinical development, and launch new drugs and therapies



Research & development

Pharmaco-vigilance
Address operational and compliance challenges

Regulatory
Manage regulatory change

Clinical
Drive clinical innovation to improve patient outcomes

Discovery & pre-clinical
Accelerate translational research

Medical affairs
Demonstrate impact across a broader set of stakeholders

Patient services
Engage patients and care providers to elevate the patient experience

Market access
Balance clinical and economic value with payers, PBMs, and regulators

Marketing & sales
Stimulate market uptake and awareness

Commercial

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Key challenges

1. Timely access to “fit-for-purpose” data sets from global sources
2. Ability to evaluate complete data cohort before subscriptions
3. Establishing standard contracts
4. Duplicate subscriptions
5. Lead-time to access and analyze data sets due to integration challenges

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Fit-for-purpose data assessment example

Study Characteristics & considerations		Vendor A	Vendor B	Vendor C
Study population	• Multiple Myeloma (MM) • Non-Small Cell Lung Cancer (NSCLC)	5	4	2
Demographics	• Age • Race/Ethnicity	5	5	4
Biomarker endpoints	• Lowering CD4+ cell counts • Liver and Spleen volume change	5	2	5
Clinical endpoints	• Increased Mortality • Disease Free Survival	3	3	4
Secondary endpoints	• Development of Serious Adverse Reaction • Persistence of Fever	5	3	4
Procedures	• Office or other outpatient visits, new patient 99201 – 99205 • Radiation treatment delivery 77402, 77407, 77412	5	3	4
Labs	• Glucose • Hemoglobin A1c	5	2	3
Genetic tests	• NGS Test (EGFR exon 20 insertion) • CLL FISH Panel	3	1	2
HCRU-multiple care settings (Health care Resource Utilization)	• ER visits • Outpatient visits	3	1	3
Vitals	• BMI • Temperature	4	3	2
Linked data	• Tokenization	5	1	1

5: Almost all data requirements met	4: Several data requirements met	3: Some data requirements met but requires more details	2: Some data requirements met or unable to access at this time	1: No data requirements met

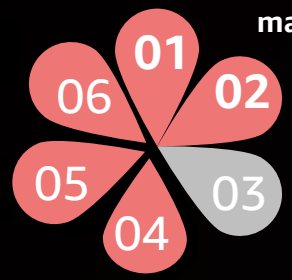
Data vendor selection criteria example

Study characteristics & considerations		Vendor A	Vendor B	Vendor C
Cohort size	• Multiple Myeloma (MM) • Non-Small Cell Lung Cancer (NSCLC)	36000	45000	29000
Data access considerations				
Timeline	• Time to fully executed contracts • Time to analyze • Time to data access	3 months	7 days	6 months
Contracting logistics	• Cost	High	Medium	Medium
Final data sources selected				

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Enterprise Data Platform on AWS

Implementing data products & services



- Analytics marketplace
- Machine learning/AI
- Digital data backbone
- Global integration platform
- Takeda enterprise data exchange
- Master data management

Data Lake

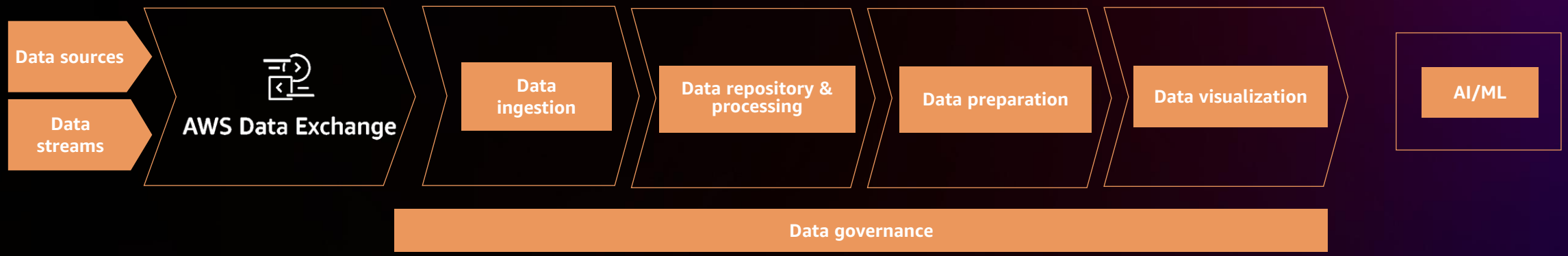
A single, enterprise-wide AWS cloud data platform

Enabling capabilities

Analytics marketplace and machine learning/AI

- Data integration services
- Data storage
- Data visualization
- Data science

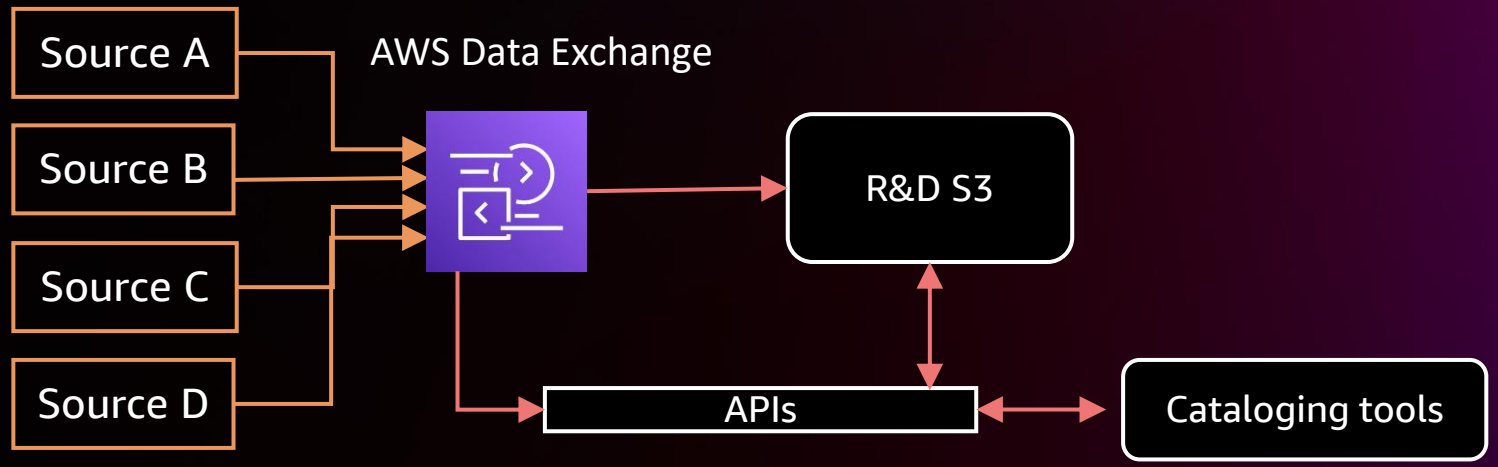
Architected to work together and be secure



Benefits to you

- Access to reliable, quality data
- Ability to leverage data practices and tools across the organization
- Self-service data analysis tools
- Rapid and agile development
- Ability to govern, integrate, store, model and analyze data throughout the enterprise (including external sources)

How Takeda is realizing benefits from AWS Data Exchange





1

Streamline acquisition and procurement



2

Economic incentives



3

IT efficiencies

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How Moderna is using AWS Data Exchange and Amazon Redshift to accelerate insights with real-world data

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Who is Moderna?

moderna

Pipeline

Commercial	Phase 3	Phase 2	46 development programs
Moderna COVID-19 Vaccine/Spikevax®	COVID boosters, Flu, RSV, CMV	Zika, PCV, VEGF-A	

Programs in development

Respiratory vaccines

- **COVID variant boosters (variant-specific and bivalents)** in Phase 2/3
- **Older adults RSV** in Phase 3; **Pediatric RSV** in Phase 1
- **Flu (mRNA-1010)** in Phase 3; **Flu (mRNA-1020/-30)** in Phase 1/2
- **Flu + COVID** in Phase 1/2
- **hMPV + PIV3** in Phase 1b age de-escalation study
- **Flu + COVID + RSV, RSV + hMPV, Endemic HCoV** in preclinical

Latent vaccines

- **CMV** in Phase 3
- **EBV, HIV** in Phase 1
- **HSV**, **VZV** in preclinical

Public health vaccines

- **Zika** in Phase 2
- **Nipah** in Phase 1

mRNA therapeutics

14 medicines in 4 therapeutic areas

- **5 Immuno-Oncology**: PCV in Phase 2; KRAS, Triplet, IL-12, checkpoint open IND
- **6 Rare Diseases**: PA, MMA, GSD1a in Phase 1/2; PKU, CN-1, CF in preclinical
- **2 Cardiovascular Diseases**: VEGF-A in Phase 2; Relaxin in preclinical
- **1 Autoimmune Diseases**: PD-L1 in preclinical

Foundations

3,400+
employees[1]

Science 2021 TOP EMPLOYER

7th
Consecutive year top employer by *Science*

11 commercial
subsidiaries across North America, Europe, and Asia Pacific

~$18.1B
of cash and investments (unaudited)

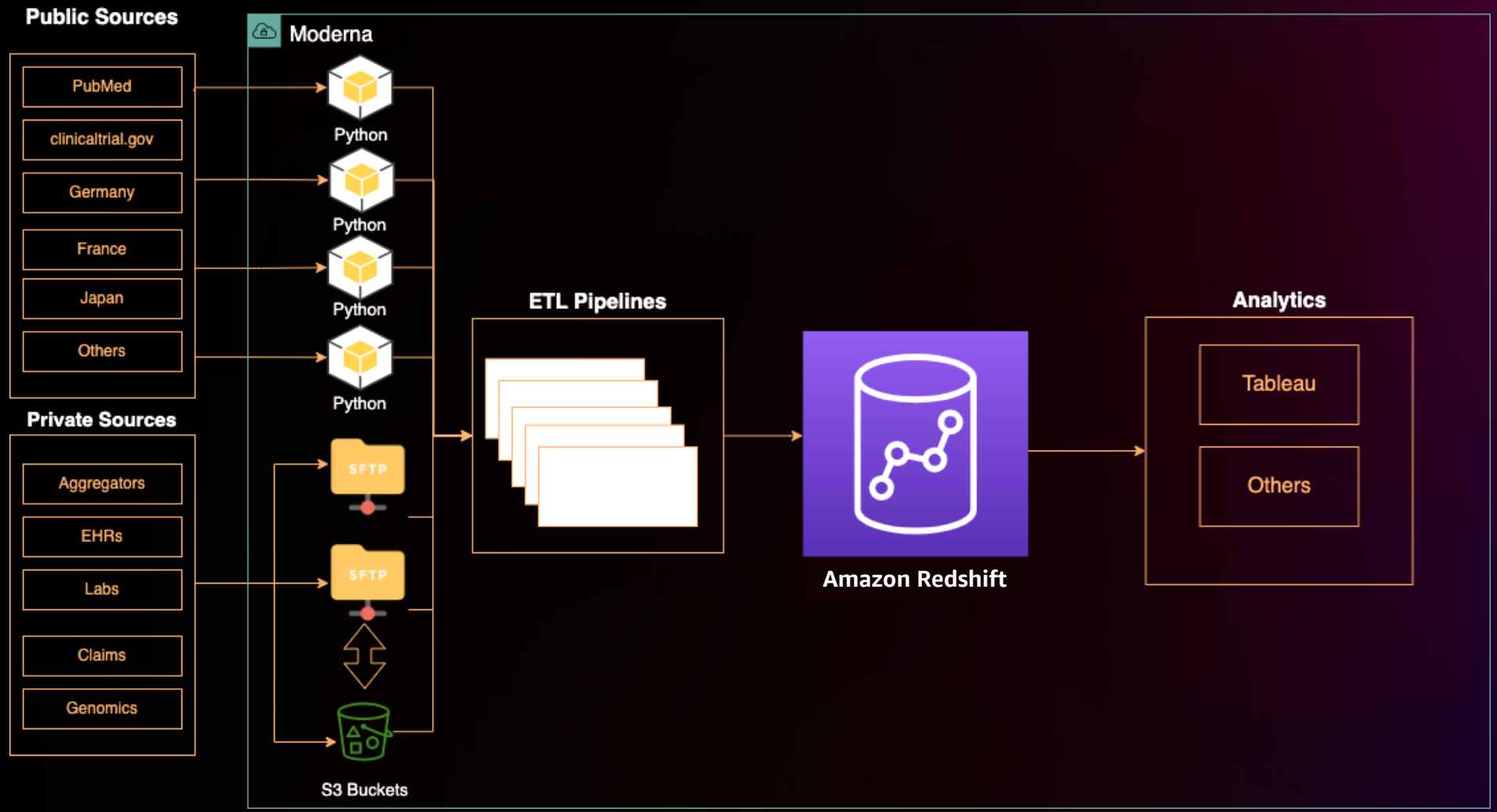
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June 30, 2022

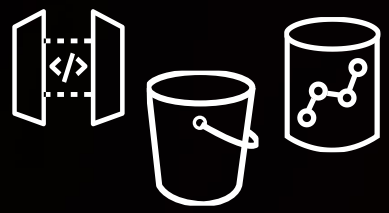
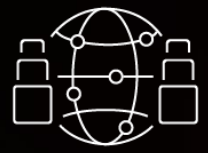
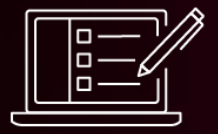
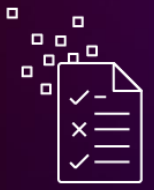
2. Cash and investments denotes cash, cash equivalents and investments

Moderna's real-world evidence infrastructure without AWS Data Exchange



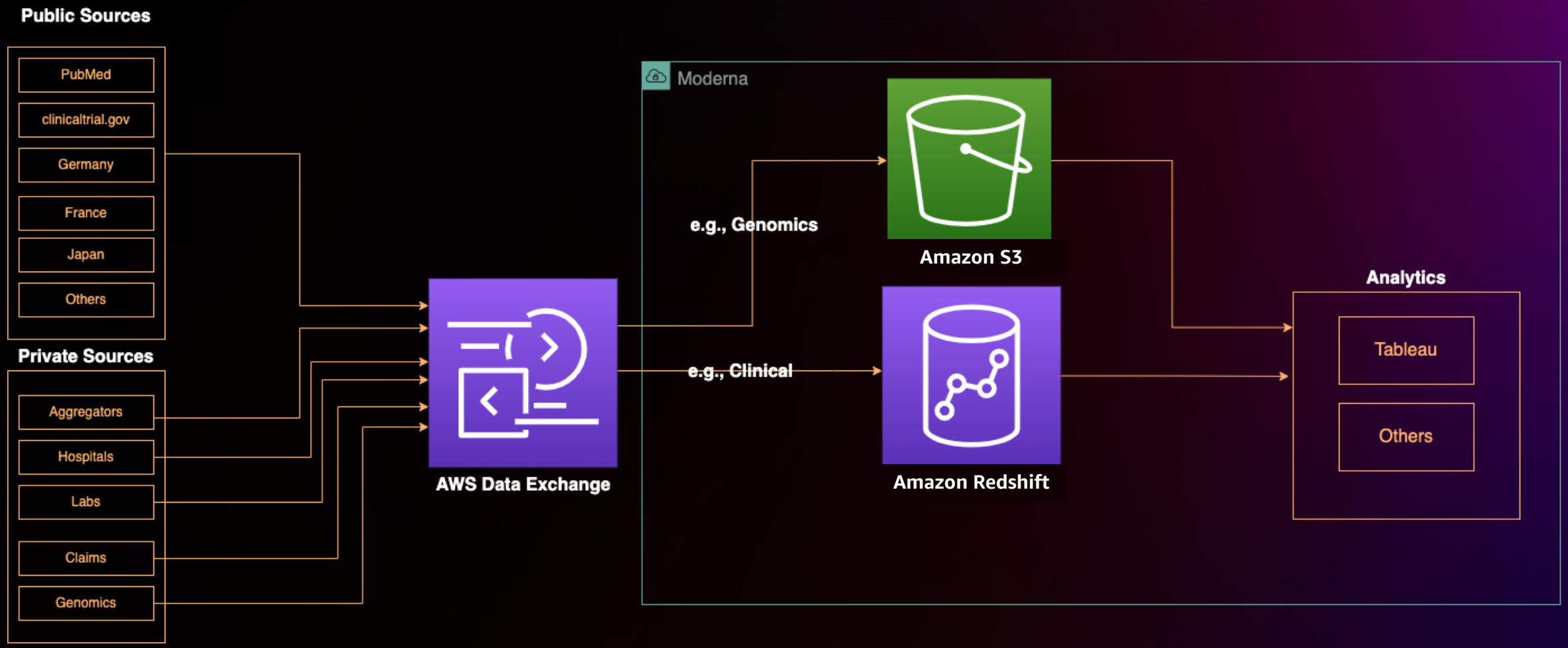
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Challenges

Find	Evaluate	Subscribe	Use
 Hundreds of vendors		 Delayed & complicated ETL processes	 Siloed acquired datasets
 No unified data strategy		 Cataloging across platforms	 Unreliable traceability of data usage
		 Tracking data acquisitions	

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Moderna's real-world evidence infrastructure with AWS Data Exchange



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How did AWS Data Exchange help us?

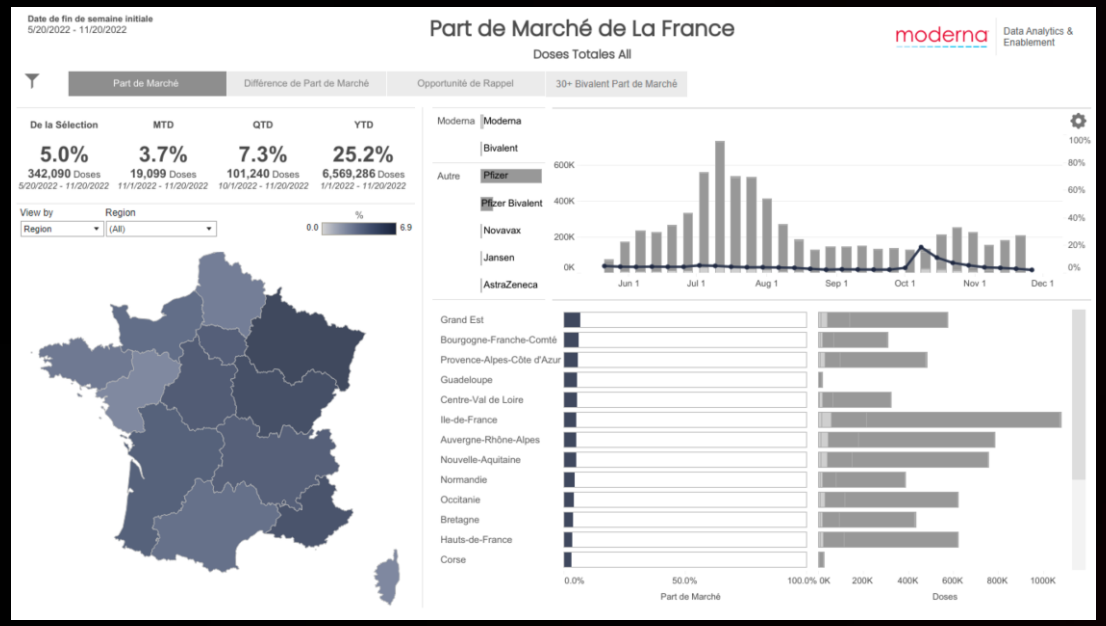
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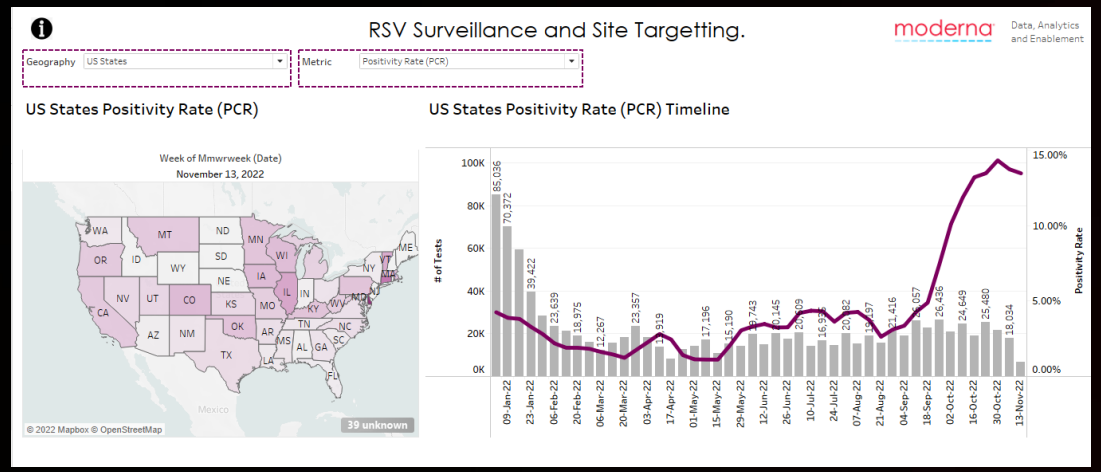
Find	Evaluate	Subscribe	Use
			
Identified right partners for key projects	Standard processes to evaluate and communicate with data providers	Centralized data acquisition, catalog, payments	Accelerated insight generation by removing ETLs/tools
			
Accelerated acquisition process		Increased visibility to stakeholders	Enabled the organization of data lakes and data warehouses

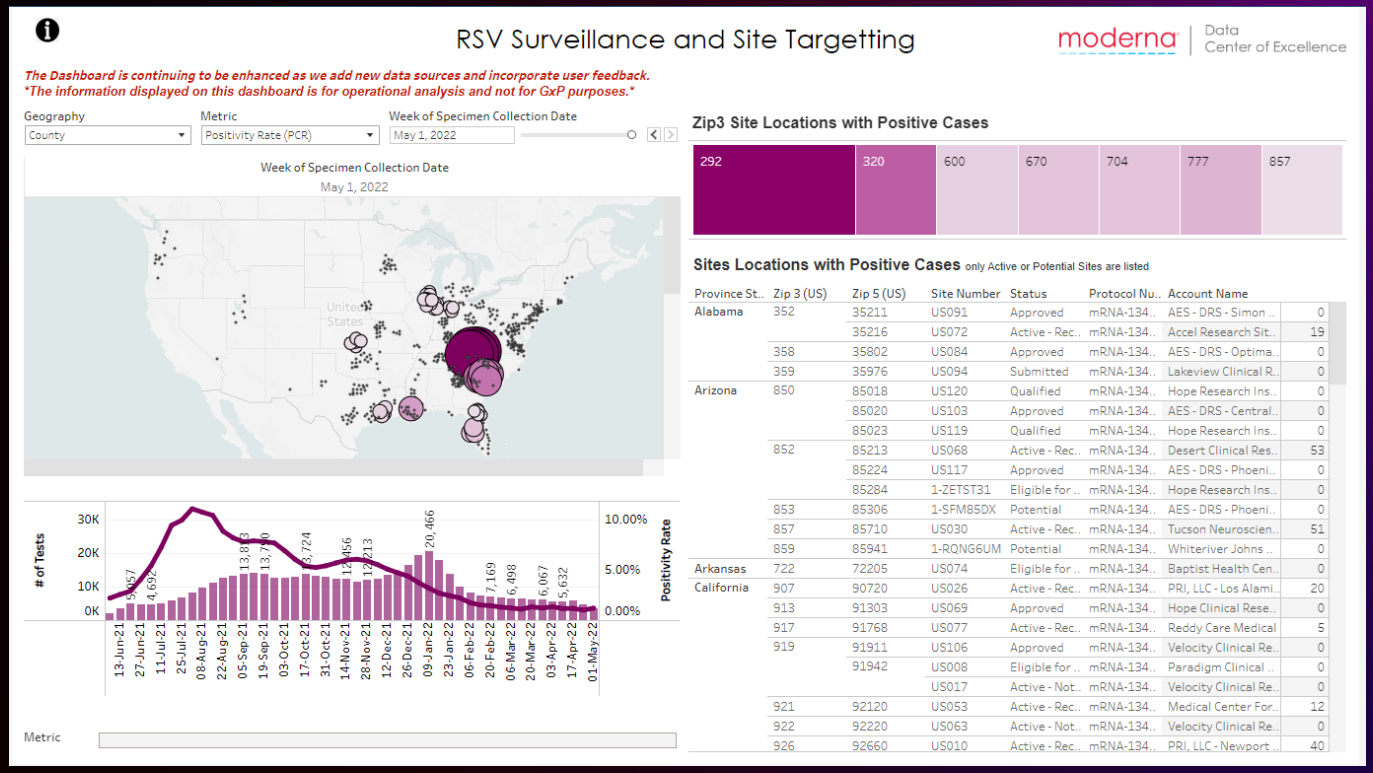
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Dashboard running on AWS Data Exchange + Amazon Redshift

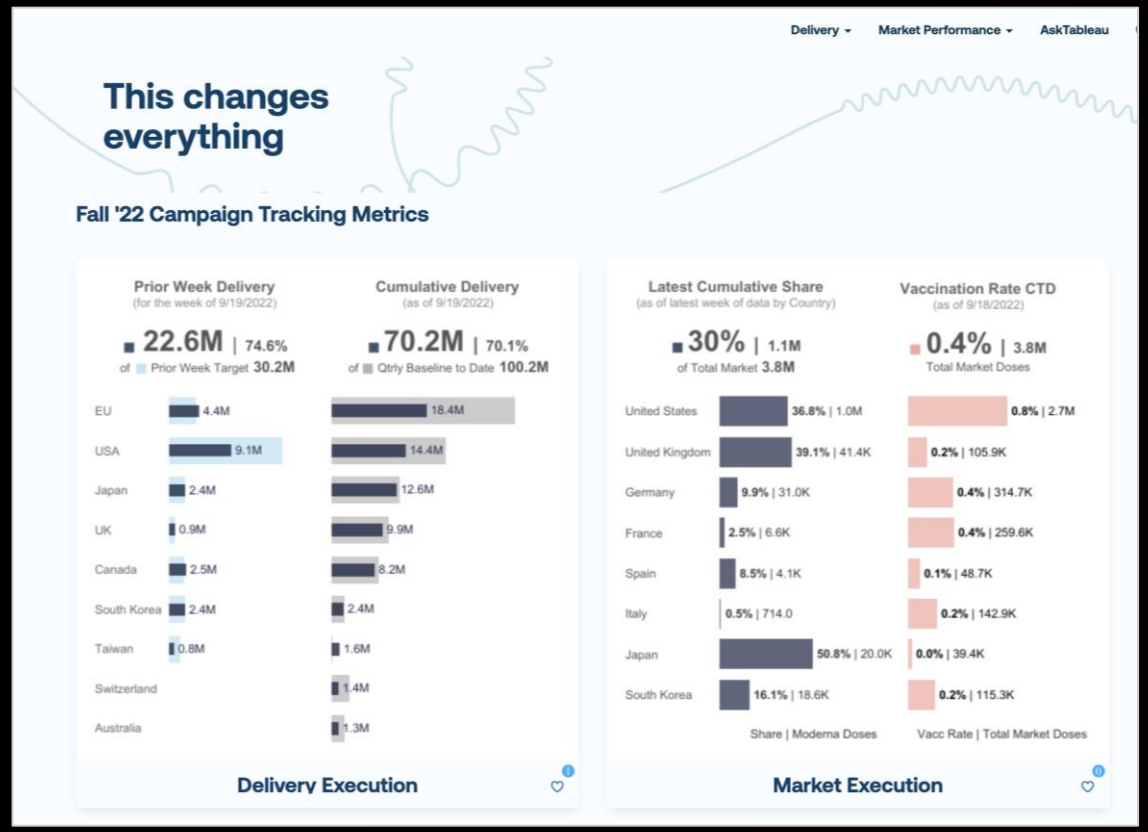


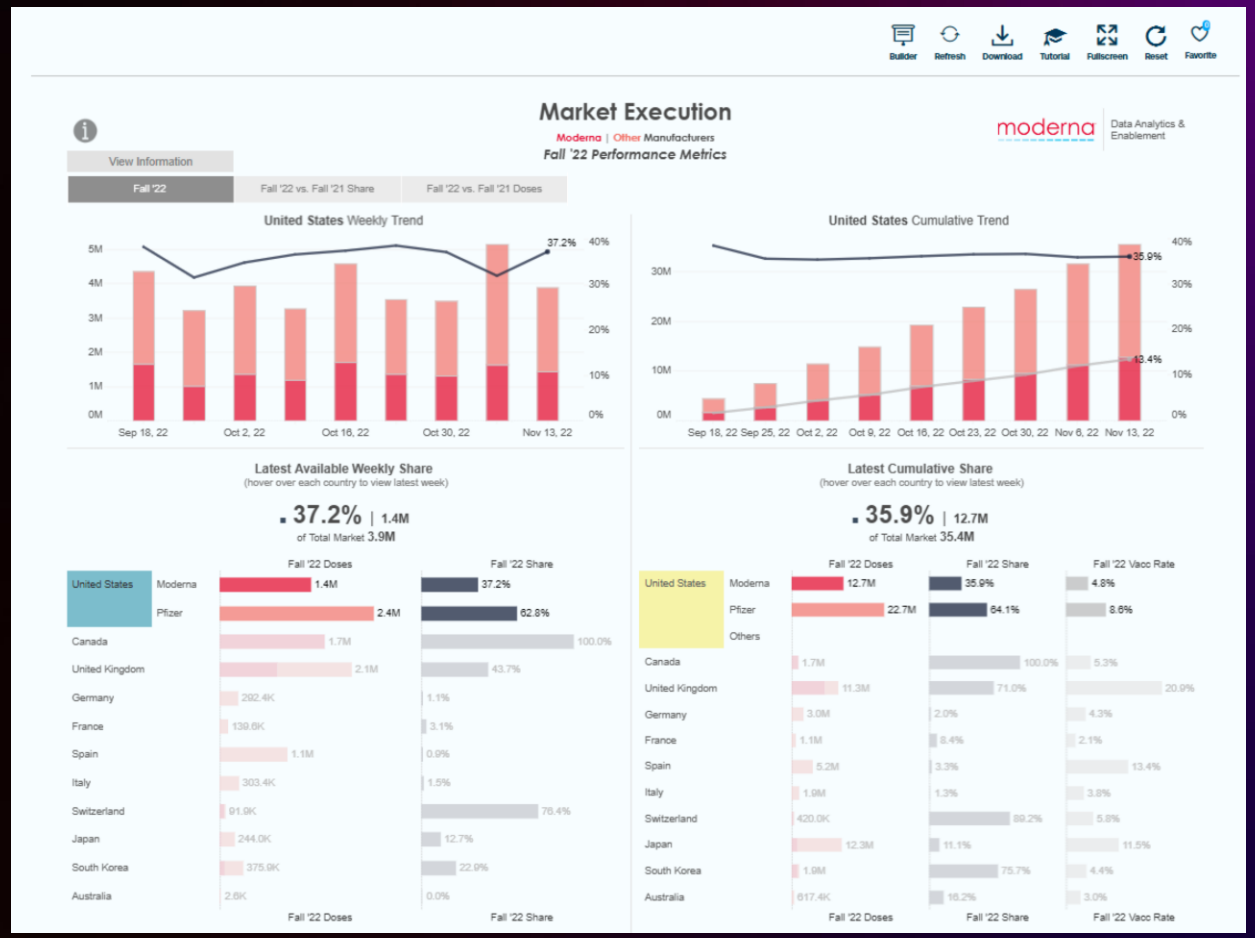




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Dashboard running on AWS Data Exchange + Amazon Redshift





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Getting started

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Getting started



Epidemiologist

How to find RWD to deny evidence on a hypothesis?



Data Engineer

How can you streamline your data pipeline across sources and centrally catalog RWD subscriptions?



Procurement Manager

How can you consolidate data purchases and entitlements across data providers on AWS?

aws

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Thank you!

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Visit the AWS Data Exchange website for more information





Please complete the session survey in the **mobile app**

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