AWS State, Local, and Education Miami Learning Days

Building a Modern Data Strategy

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Agenda

The data challenge

The opportunity

The modern data strategy journey

Modern data architectures on AWS

Sample reference architectures

How to get there

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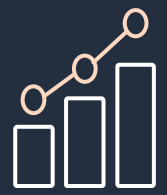
The data challenge



Availability of electronic data is growing exponentially

Data coming from new, disconnected sources

Increasingly diverse in file type and volume

Used by many people (e.g. policy makers, researchers, etc.)

Analyzed by many applications

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A data-driven organization means...

Data is an organizational asset

No longer kept in silos or as the property of individual departments

Data is accessible

Available easily and securely to anyone who needs access to it

Data is put to work

Used in analytics and ML to make better decisions, create efficiencies, and drive new innovations

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Create better business outcomes with data

Make better, faster decisions

Improve customer experience

Prepare for the future

Reduce costs and improve productivity

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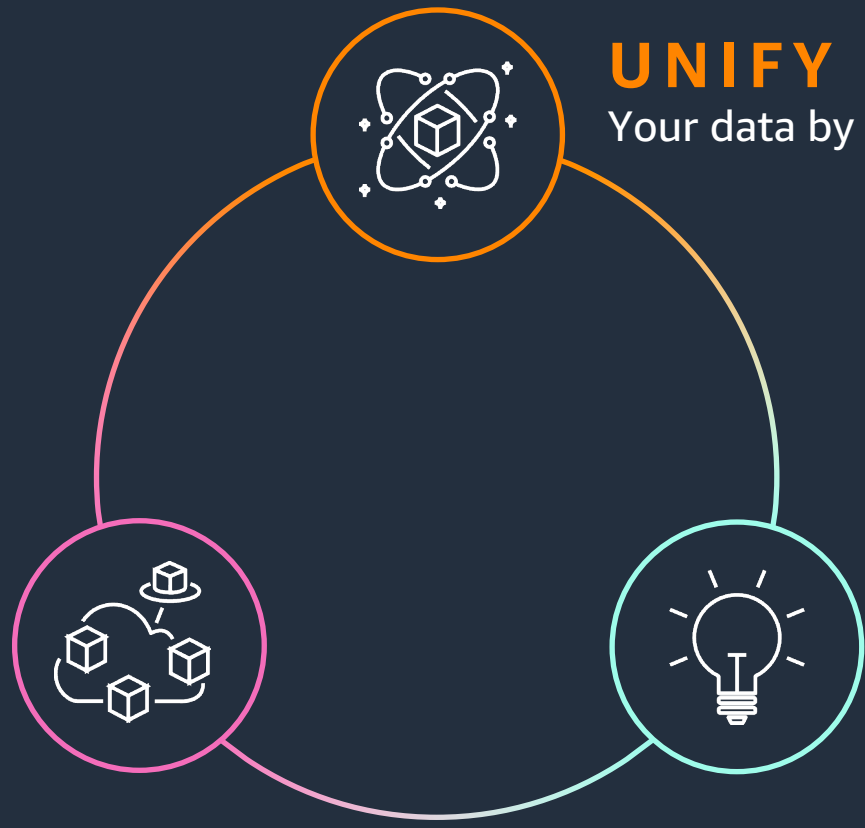
Modern data strategy for better business outcomes

Start anywhere



UNIFY
Your data by breaking down silos

INNOVATE
By inventing new experiences and reimagining existing processes

MODERNIZE
Your data infrastructure to a scalable, trusted, and secure cloud provider

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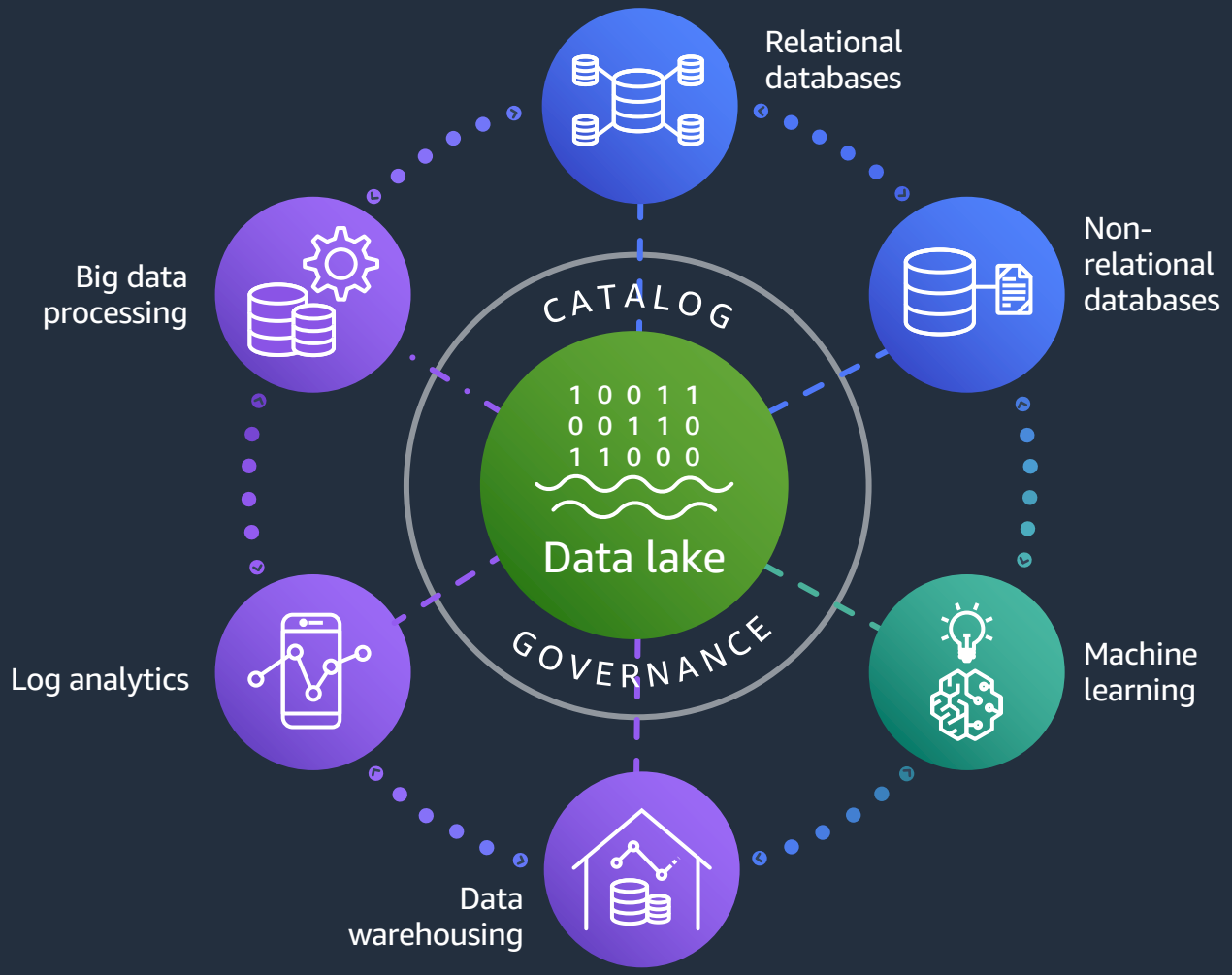
A modern data strategy



Data at any scale

The best price-performance

Seamless data access

Unified governance

Artificial Intelligence (AI) & Machine Learning(ML) to solve business challenges

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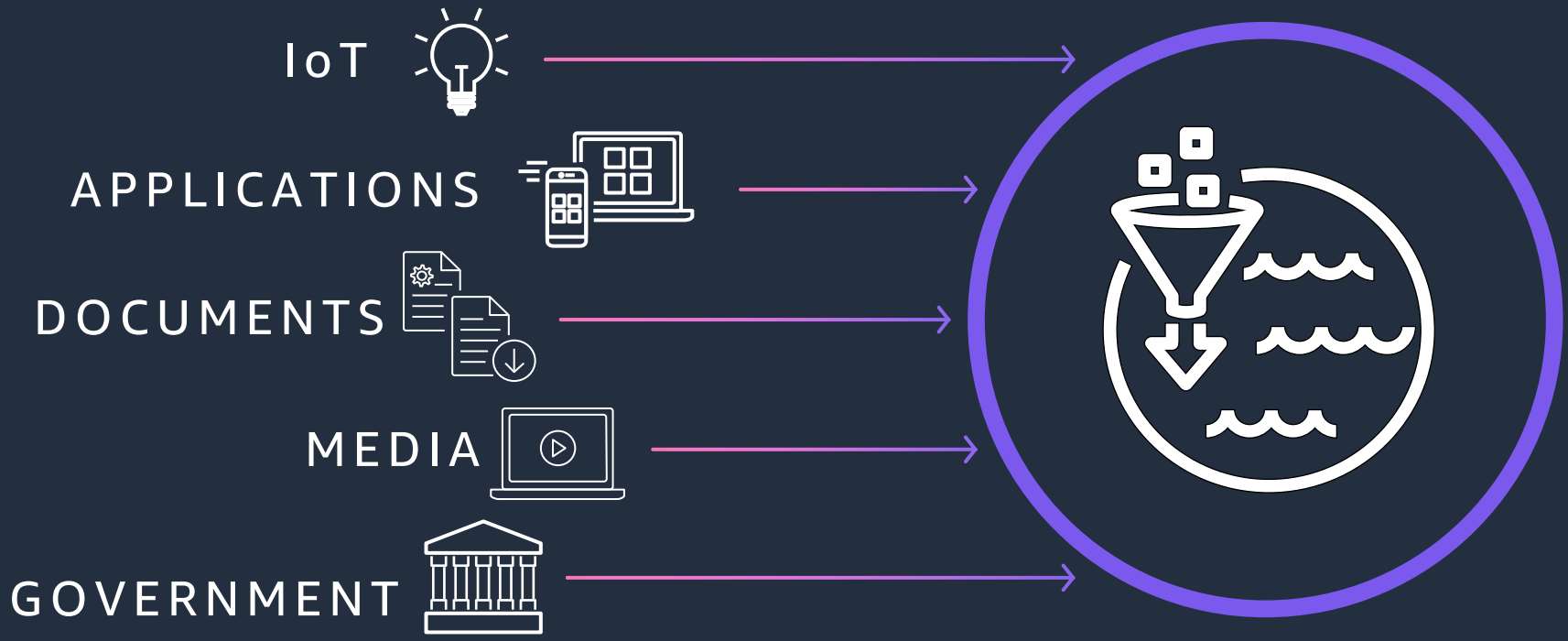
Data lakes are foundational for data unification



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To get more value from their data, customers are..

Breaking free from legacy databases

Moving to fully managed database and analytics services

Modernizing your data warehouse

Building modern applications with purpose-built databases

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Purpose-built data services

Optimize performance, cost, and scale for your use cases

Amazon Athena

Interactive query

Amazon EMR

Big data processing

Amazon OpenSearch Service

Log and search analytics

Amazon Kinesis and Amazon MSK

Real-time analytics

Amazon Redshift

Data warehousing

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Build new experiences and reimagine old processes with AI/ML

- Make accurate predictions, get deeper insights from your data, and improve customer experience
- Create ML predictions without any ML experience or writing any code
- Build applications with our pre-trained models
- Train and apply your own models
- Use your own algorithms by working directly with ML-optimized AWS infrastructure
- 100,000+ customers use AWS AI and ML services to make predictions from their data

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Putting it all together

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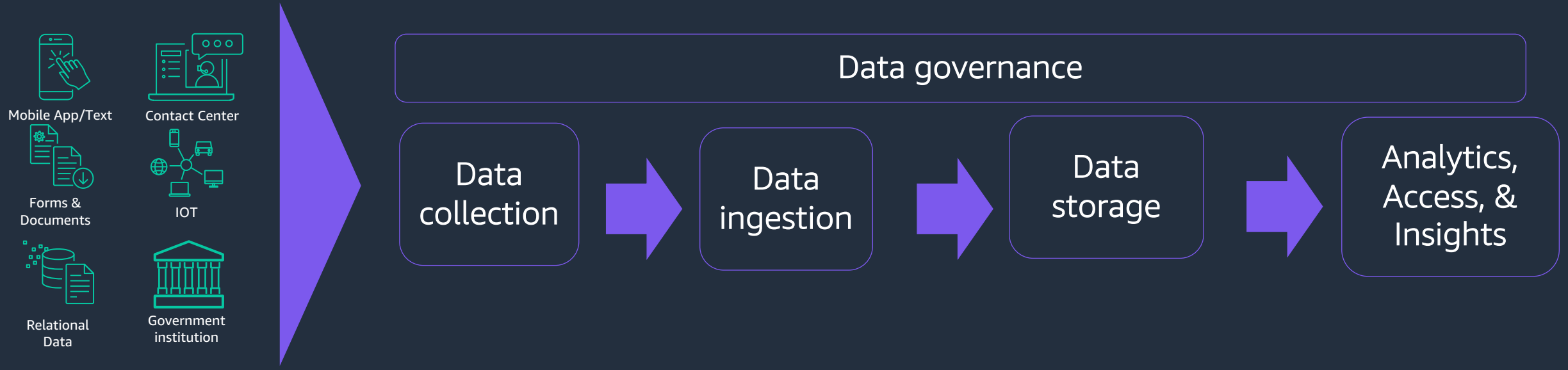
Key components of modern data architecture



Key considerations:

1. Ability to handle the increasing volume, velocity, and variety of data
2. Each component should be independently scalable
3. Make data easily accessible and sharable

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AWS data lakes provide a flexible foundation for analytics and innovation

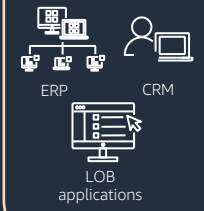
Data catalog
Crawls and catalogs your data; discover, prepare, and combine data for analytics and ML

AWS Glue

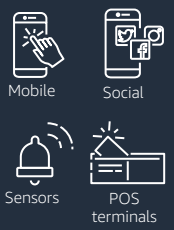
Data governance
Centralized authorization layer to define data sources and data access & security policies

AWS Lake Formation

Structured data
Data that are highly normalized with common schema and stored in relational databases, powering transactional line-of-business applications



Semistructured data
Data that contain identifiers without conforming to a predefined schema



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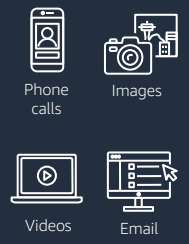
Data that do not conform to a data model and are typically stored as individual files



Data collection
Purpose built databases for different workloads

- RDS
- Aurora
- DynamoDB
- DocumentDB
- ElastiCache
- Neptune
- Timestream
- QLDB

Batch load
Extracts data from various data sources at periodic intervals and moves them to the data lake

- Amazon EMR
- AWS Glue
- AWS DMS
- AWS Transfer Family

Streaming
Ingests data that are generated from multiple sources such as log files, telemetry, mobile applications, and social networks

- Amazon Kinesis
- Amazon MSK

Amazon S3 data lake
Cloud-scale centralized and scalable architecture that enables enterprise data science

Amazon S3

Analytics
Leverage data warehouses, Spark, and graph databases to gain insights from your data

- Amazon Redshift
- Amazon EMR
- Amazon Neptune

And data stored in the data lake can also be made directly searchable and queryable

- Amazon Athena
- Amazon QuickSight

Machine Learning
Storing data in an Amazon S3 data lake enables customers to leverage predictive or prescriptive analytics; perform ad-hoc analyses; and use AI/ML for automation and efficiency

- Amazon SageMaker
- Amazon Comprehend
- Amazon Textract
- Amazon Transcribe
- Amazon Translate
- Amazon Personalize

Security – Reliability –Operational Excellence – Performance Efficiency – Cost Optimization

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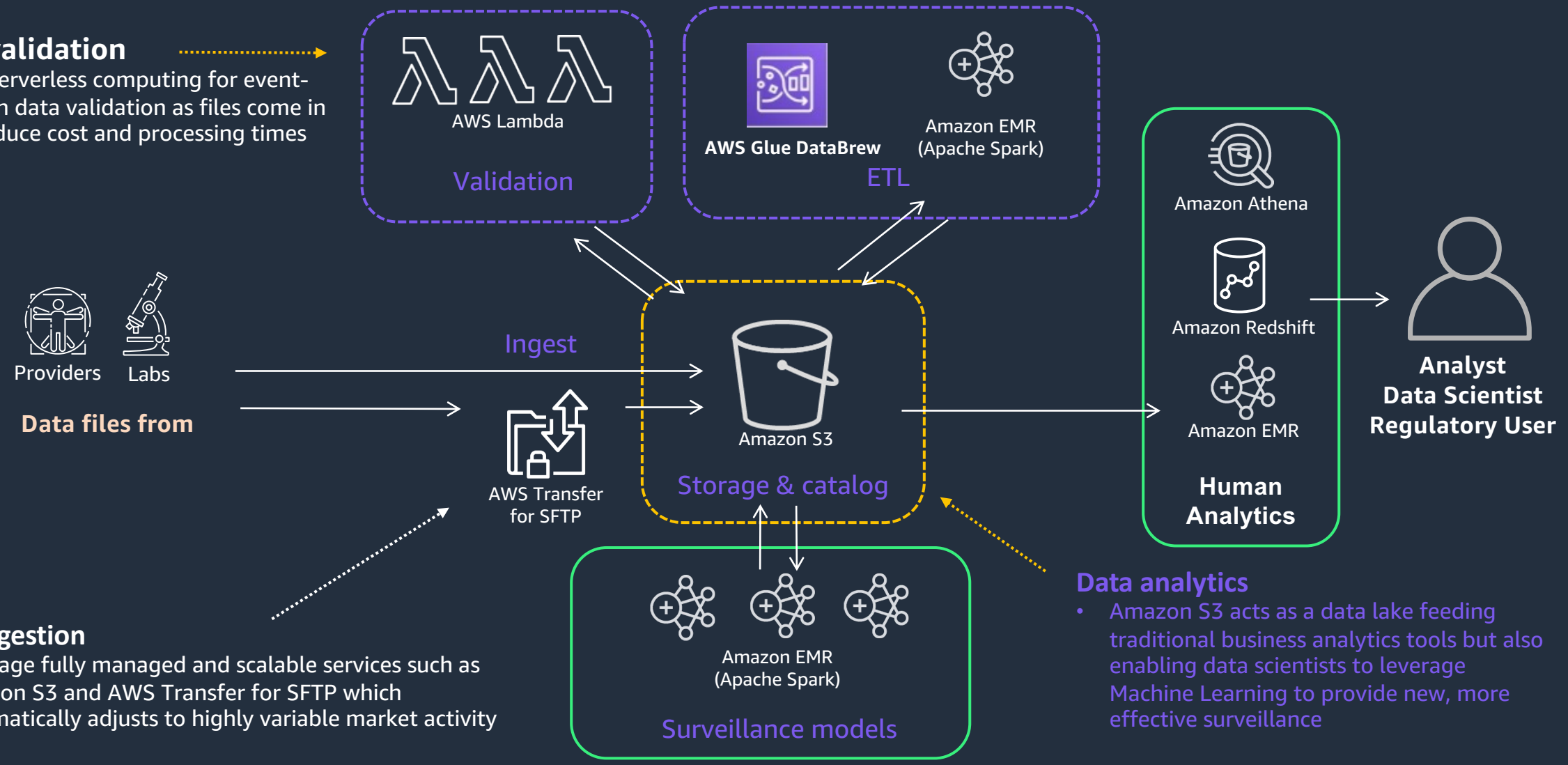
Sample reference architecture for disease surveillance



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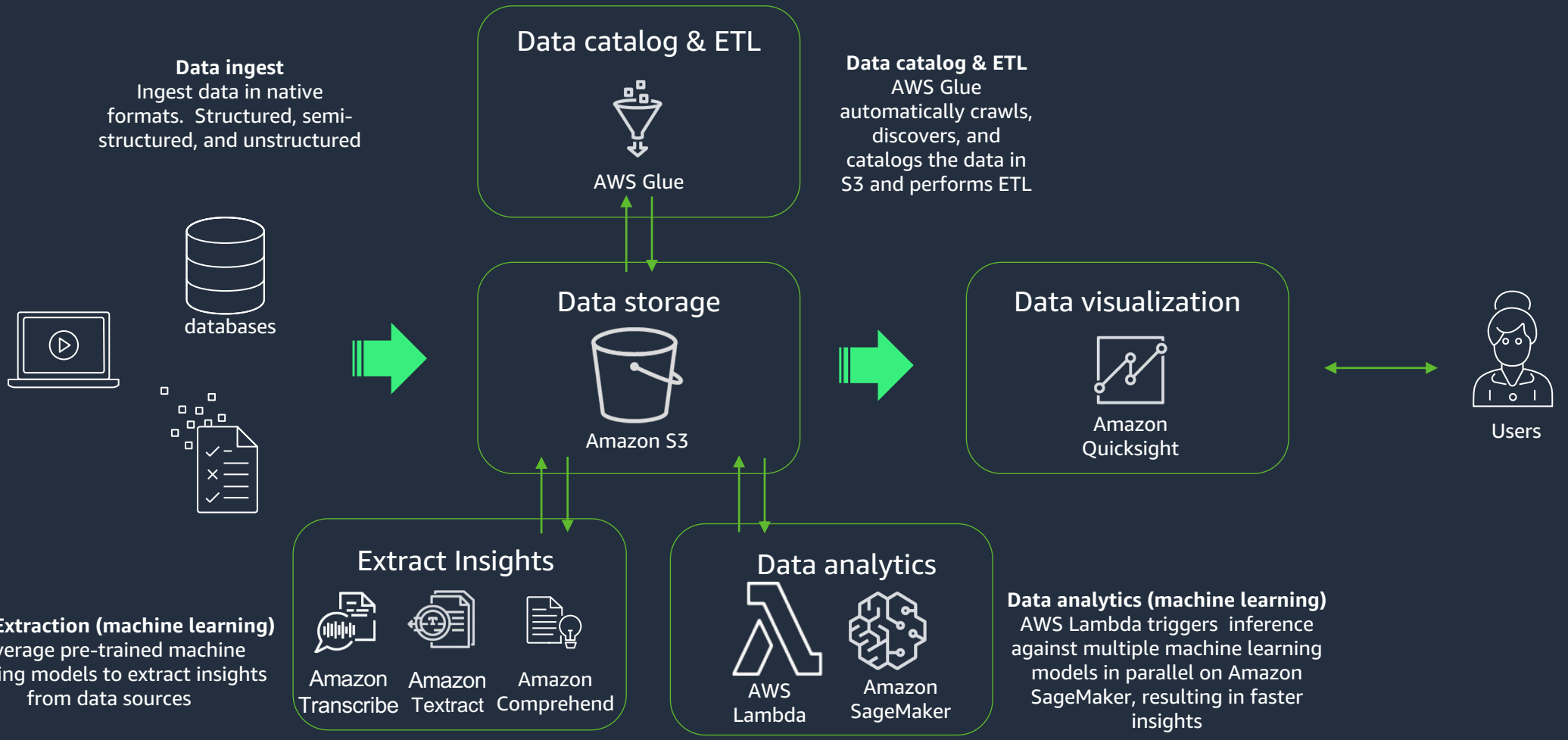
Sample architecture for AI/ML machine learning

Use serverless and event-driven architectures for automatic scale to enable faster insights without the need to manage infrastructure



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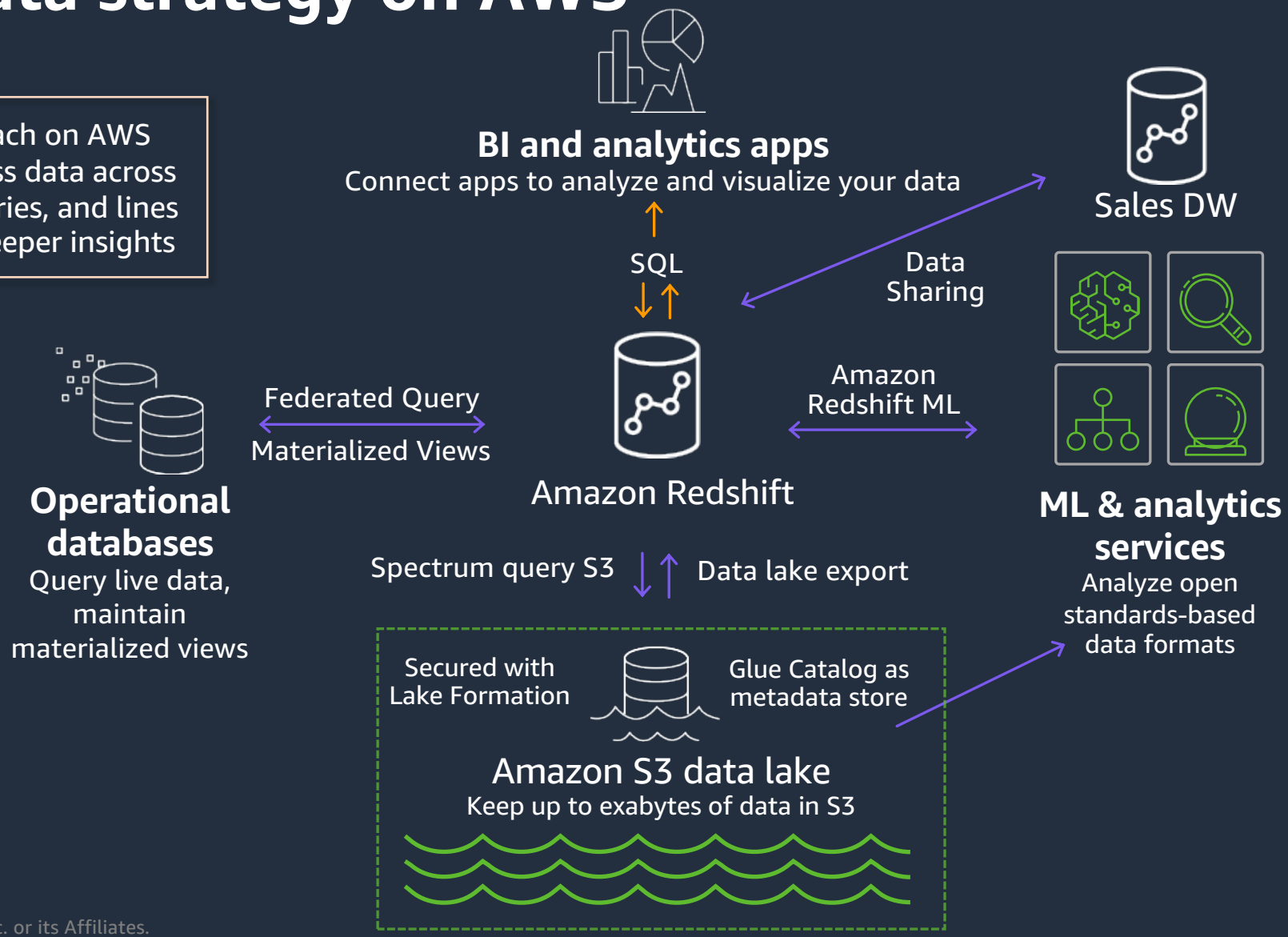
Extend the capabilities of your data warehouse with a modern data strategy on AWS

A lake house approach on AWS makes it easy to access data across applications, repositories, and lines of business to gain deeper insights



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Get started

BUILD WITH US

Data Lab

ML Solutions Lab

AWS Professional Services

AWS Immersion Day

Data-Driven Everything

Migration Assistance Program

BUILD WITH PARTNERS

AWS Partner Network—
100,000+ partners

AWS Marketplace (ISVs)

UPSKILL YOUR TEAMS

AWS Training and Certification

ML Embark Program

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Thank you!

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448 ZB

of data will be created, consumed, and stored in next three years

Statistic provided by Statista.com

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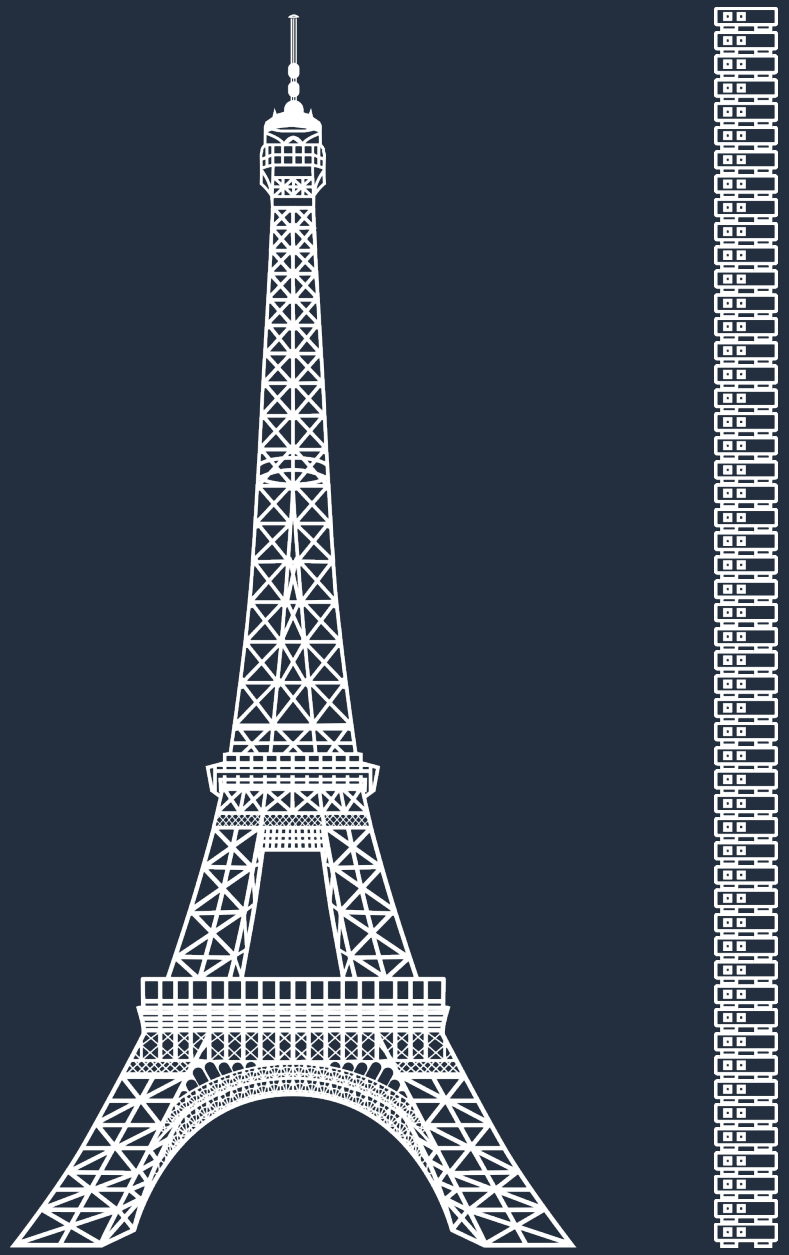

over

20 million

times

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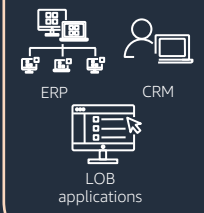

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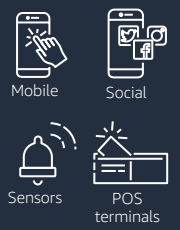

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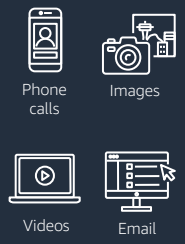

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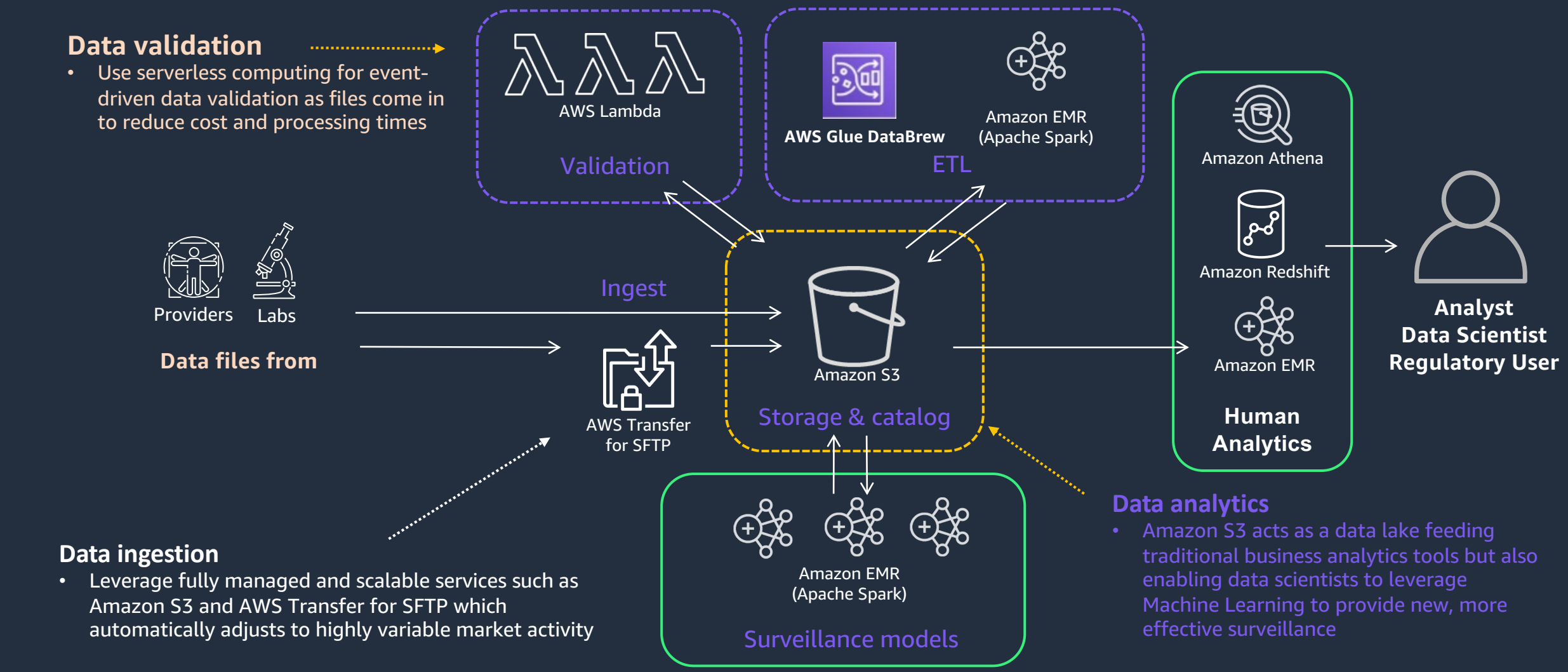
Sample reference architecture for Syndromic Surveillance



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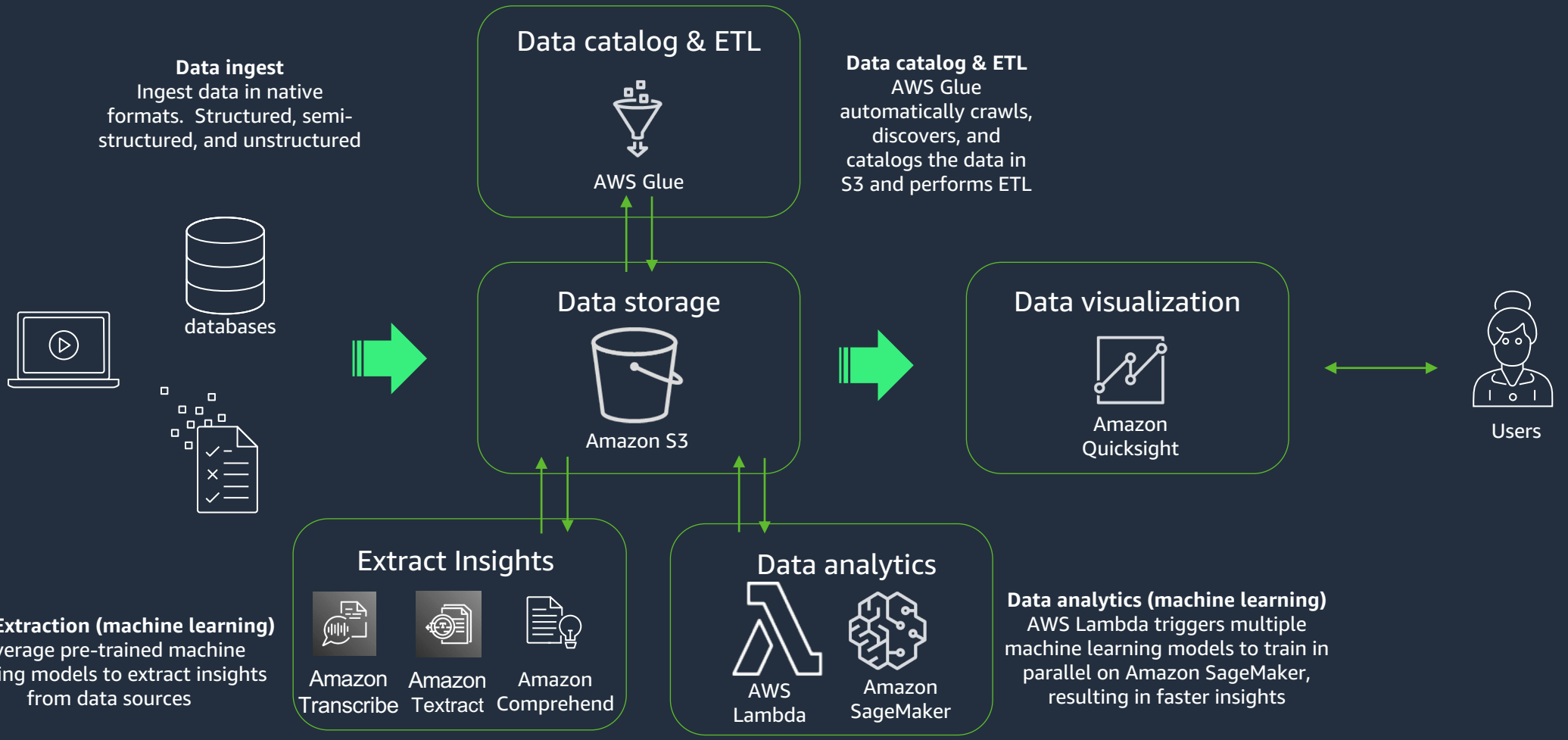

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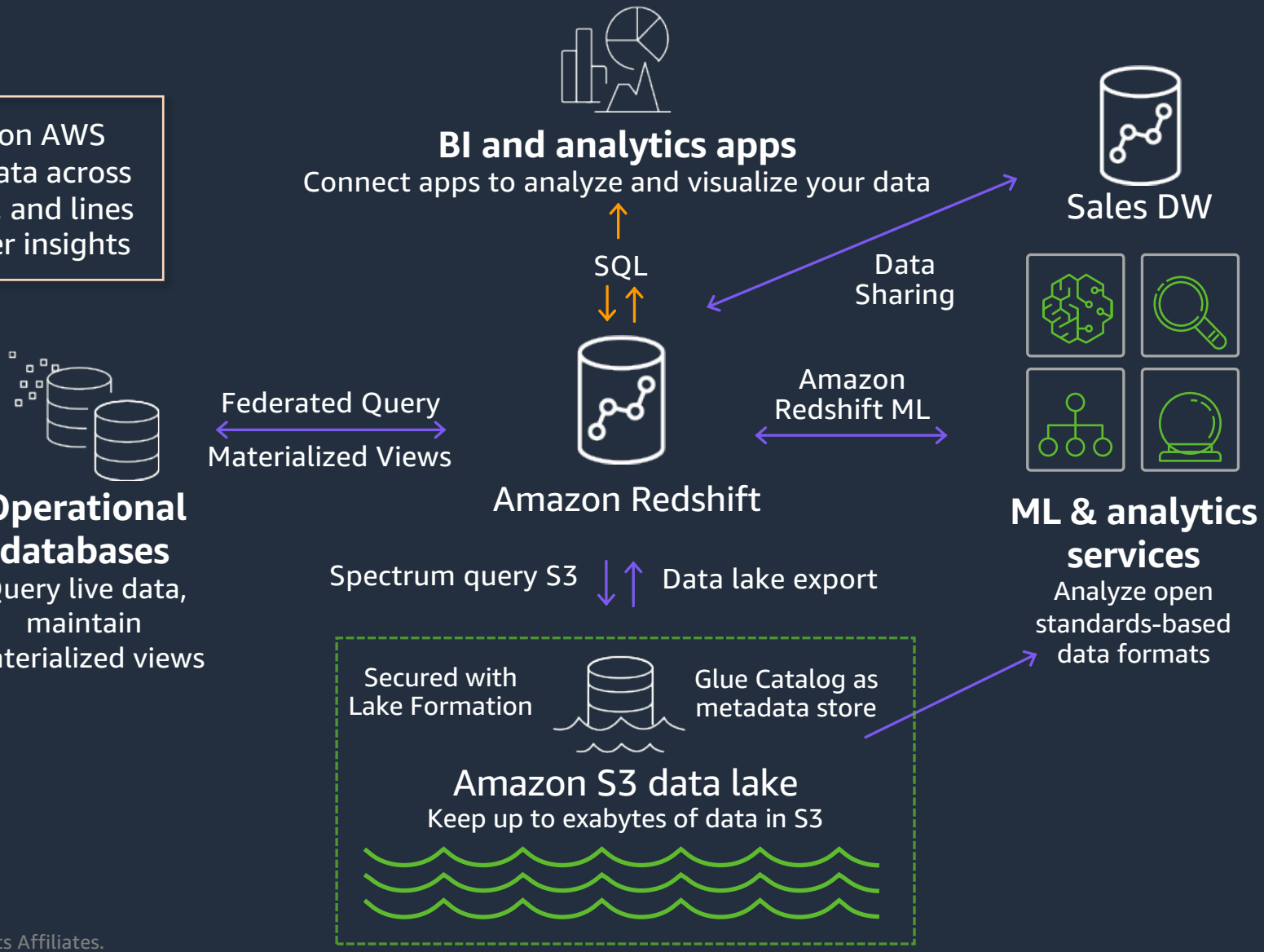

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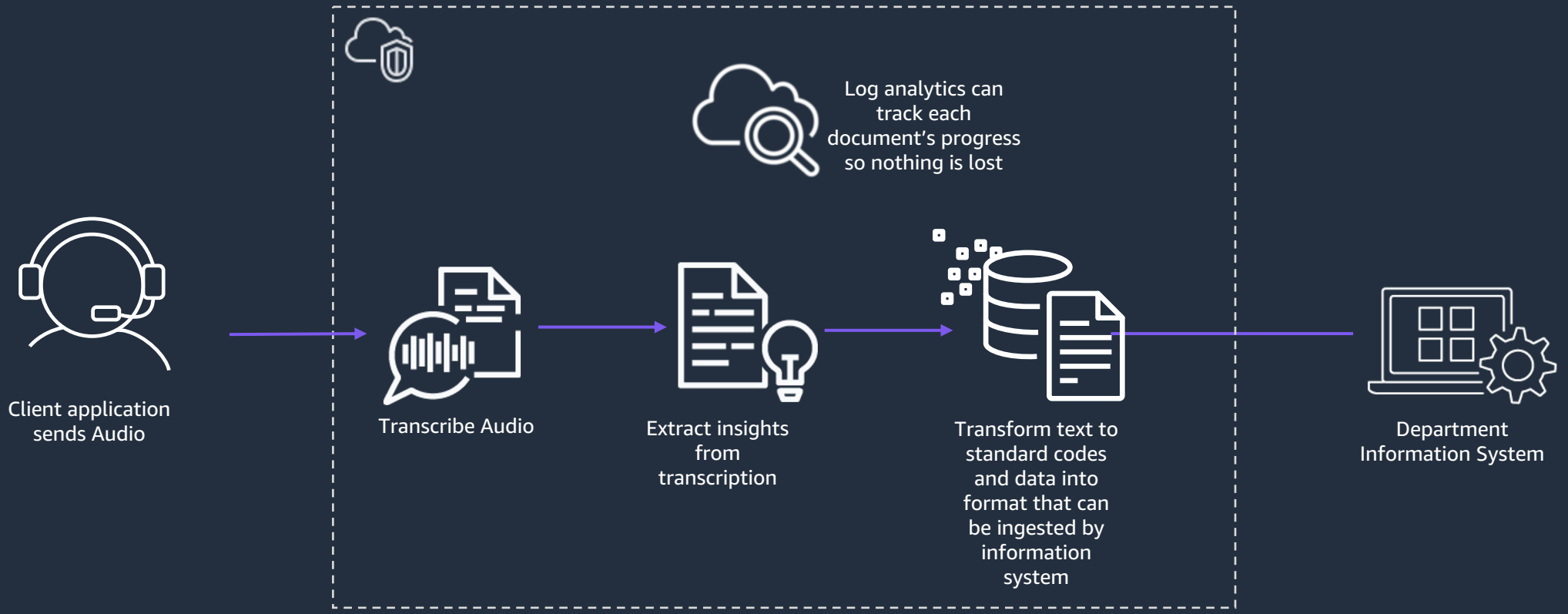
Insights from Audio - High Level Process



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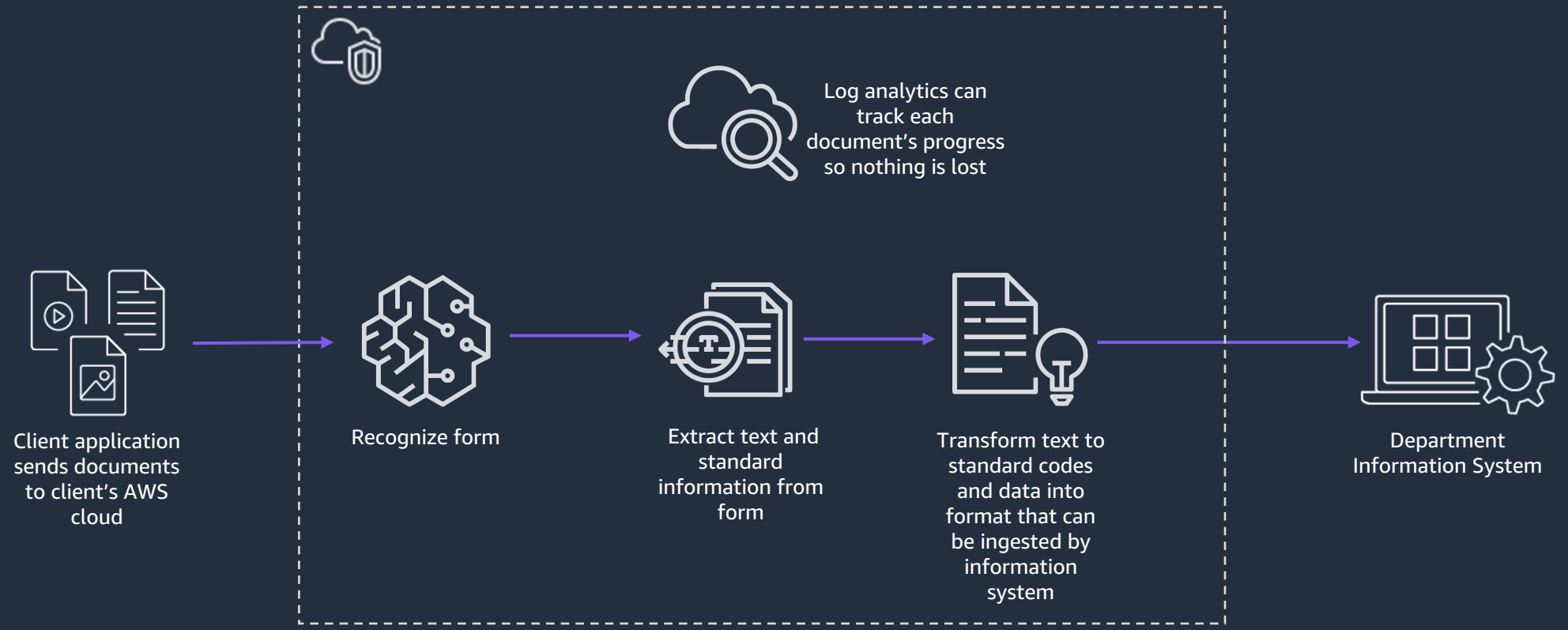
Text extraction - High Level Process



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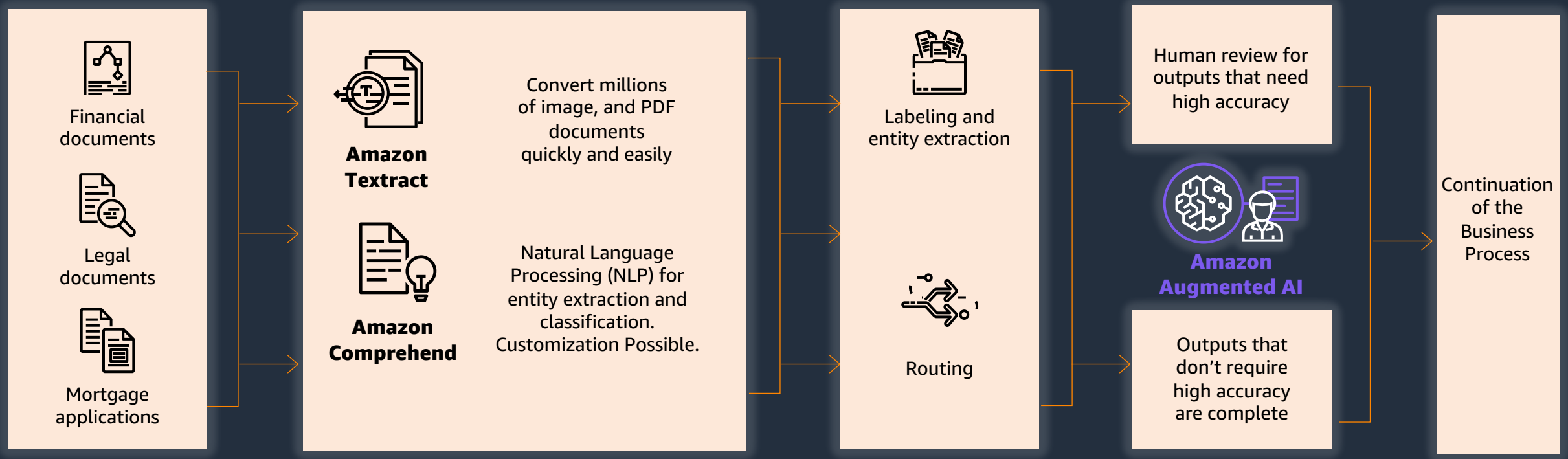
Extract and analyze data from documents

- **Amazon Textract, Amazon Comprehend, and Amazon Augmented AI**



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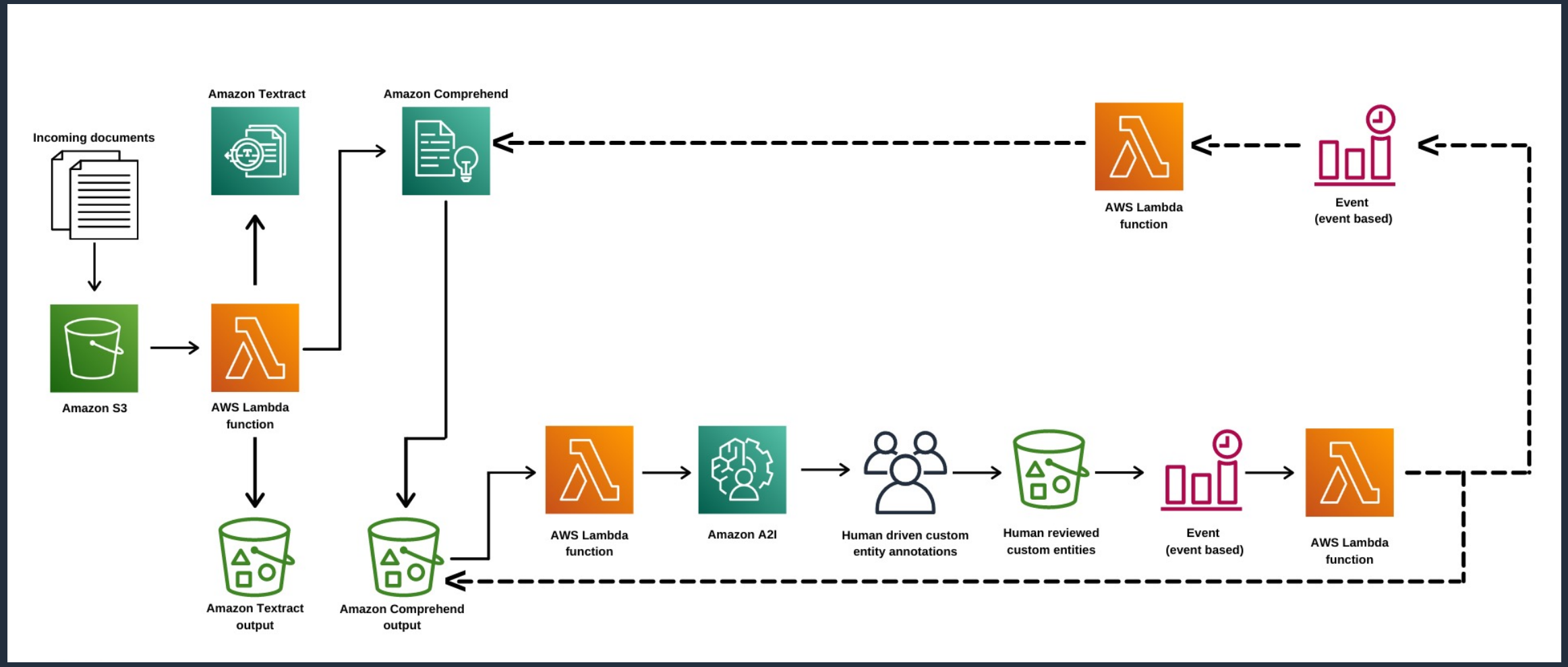
IDP reference architecture example



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Document management challenges

TONS OF DOCUMENTS

VARIED FORMATS

Invoices, receipts, contracts and many more…

DIVERSE CONTENT

Tables, paragraphs, logos, handwriting, and different languages

DOCUMENTS SOLVE DIFFERENT PROBLEMS

Text may be required for many reasons…

Uncovering insights

- ✓ Data Lakes
- ✓ Operational, data needs
- ✓ Chatbots
- ✓ Knowledge management

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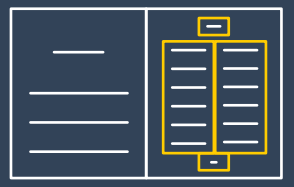
Document processing challenges



Extracting text manually is time-consuming, error prone, and expensive

Manual processes do not scale easily with document volume

Current rules-based systems are not intelligent and break with format changes

New documents = new OCR templates = intensive effort = long lead time

For most organizations, data in documents remains unstructured and unavailable to generate business insights

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AWS is the best place to extract value from data and turn it into insights

The most experience

The most reliable, scalable, secure

The most comprehensive set of services

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Additional References

Minnesota Department of Health– Data Lakes Video Case Study
Minnesota Department of Health – Public Sector Summit
A Healthier future for North Carolina - re:Invent
UDSA SNAP Case study
Utah Mainframe Modernization
Georgia Department of Community Health MMIS migration
Rhode Island Department of Labor - Citizen engagement
Utah Department of Health COVID response
Piedmont Healthcare – Epic Systems migration
Great Lakes Health Connect
State of Maryland transforming social service - MDThink
NYC COVID-19 Response Coalition
Minnesota Department of Human Services – PEBT program
UC Dan Diego - Using ML to detect pneumonia

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Mission Track
Modern Data Strategy

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