Building a Data Lake on AWS

Agenda

1. What is a Data Lake?
2. Why use a Data Lake?
3. Components of a Data Lake

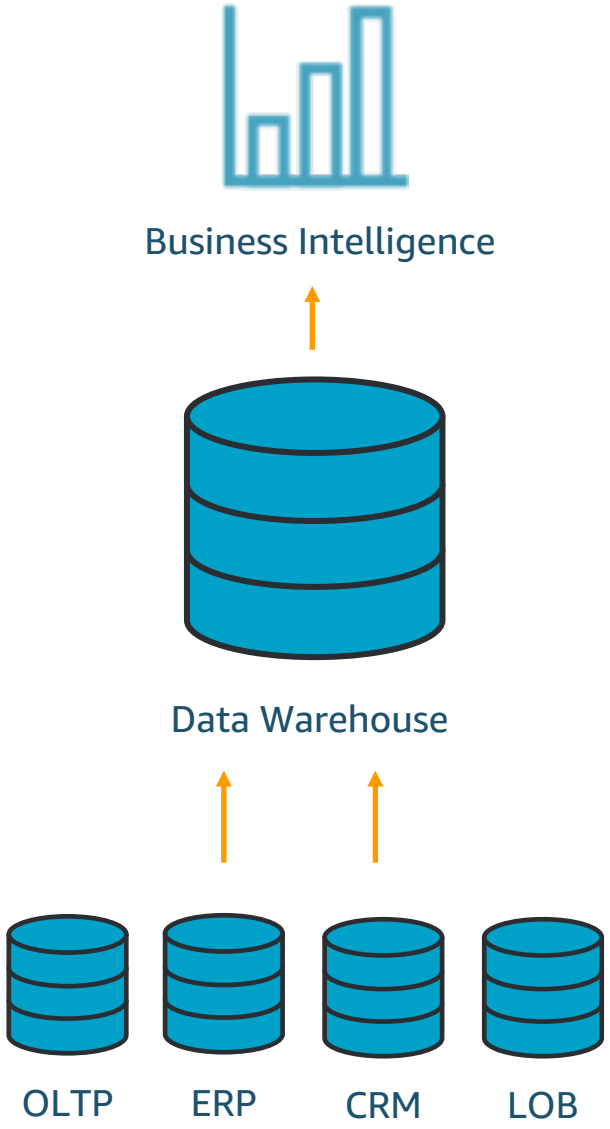
What is a Data Lake?

- A centralized repository for both structured and unstructured data
- Store data as-is in open-source file formats to enable direct analytics

Why a Data Lake?

- Decouple storage from compute, allowing you to scale
- Enable advanced analytics across all of your data sources
- Reduce complexity in ETL and operational overhead
- Future extensibility as new database and analytics technologies are invented

Traditionally, Analytics Looked Like This



Relational Data

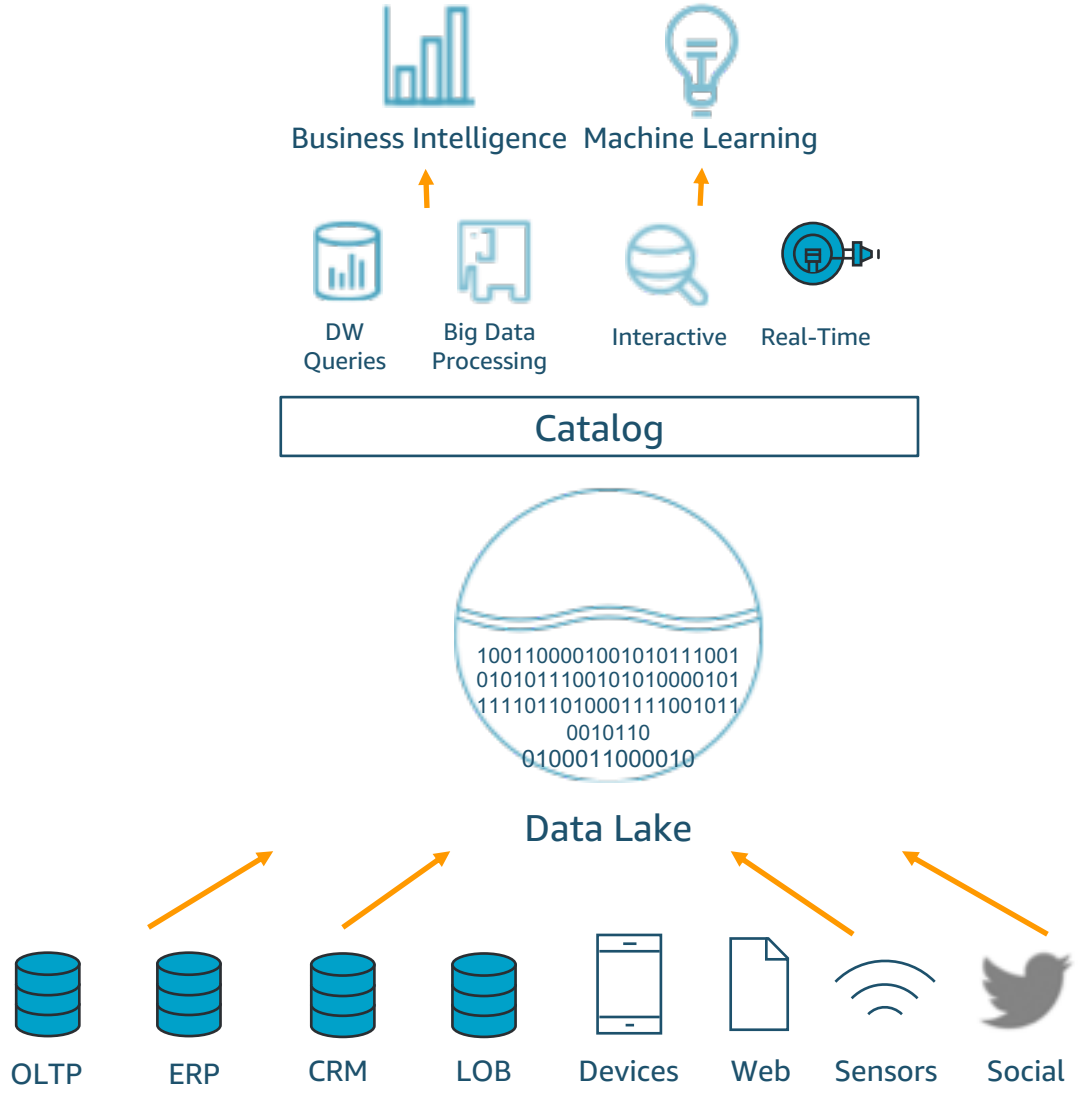
TBs-PBs Scale

Schema Defined Prior to Data Load

Operational and Ad Hoc Reporting

Large Initial Capex + $$K / TB/ Year

Data Lakes Extend the Traditional Approach



- Terabyte-Exabyte Scale
- All Data in one place, a Single Source of Truth
- Relational and Non-Relational Data
- Decouples (low cost) Storage and Compute
- Schema on Read
- Diverse Analytical Engines

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Benefits of a Data Lake – All Data in One Place

“Why is the data distributed in many locations? Where is the single source of truth ?”

Store and analyze all of your data, from all of your sources, in one centralized location.

Benefits of a Data Lake – Quick Ingest

"How can I collect data quickly from various sources and store it efficiently?"

Quickly ingest data without needing to force it into a pre-defined schema.

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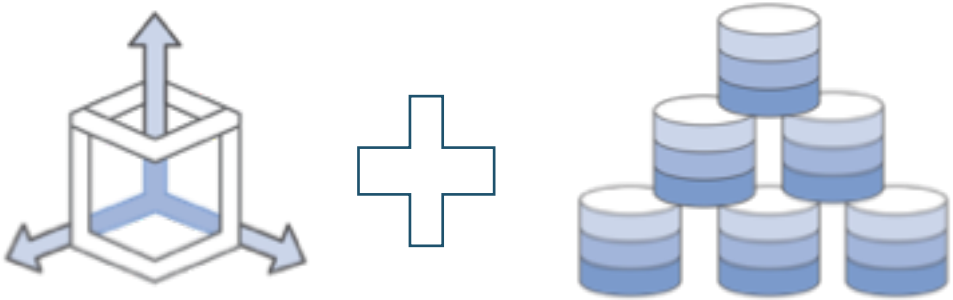
Benefits of a Data Lake – Storage vs Compute

"How can I scale up with the volume of data being generated?"



Separating your storage and compute allows you to scale each component as required

Benefits of a Data Lake – Schema on Read

“Is there a way I can apply multiple analytics and processing frameworks to the same data?”

A Data Lake enables ad-hoc analysis by applying schemas on read, not write.

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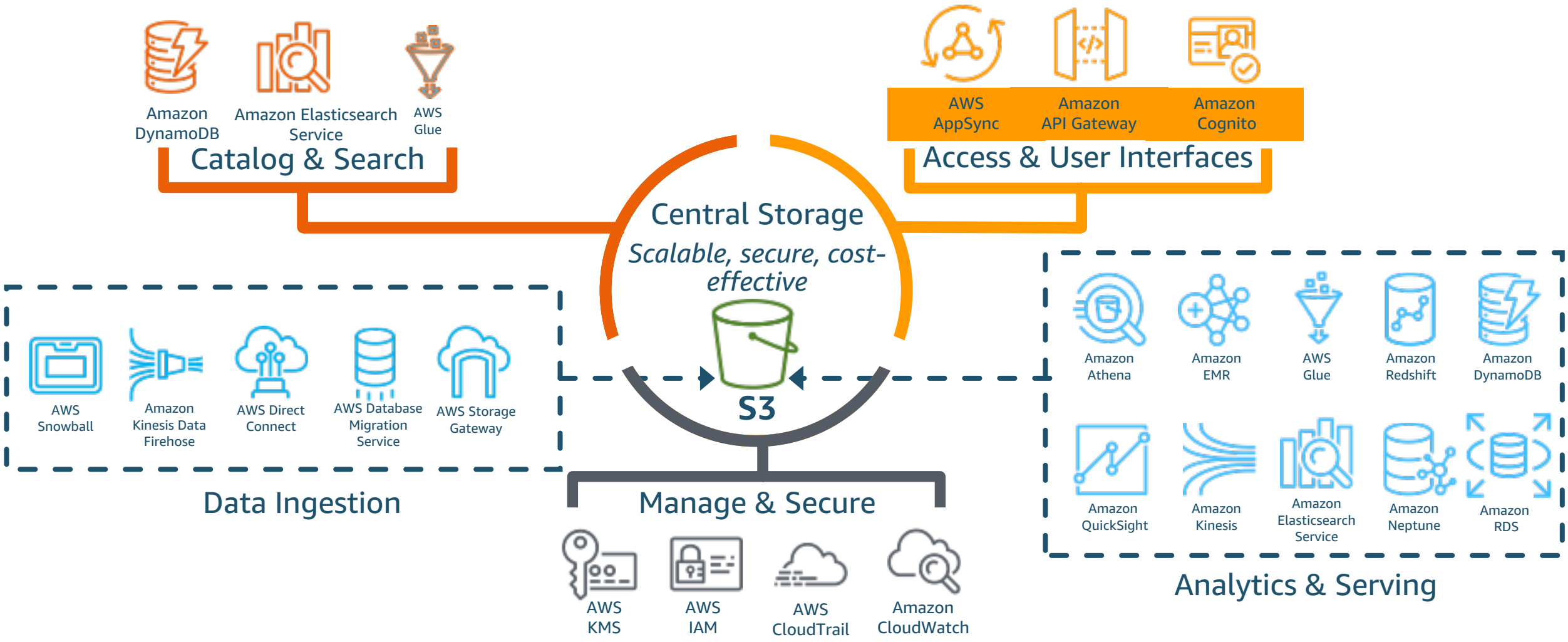
Building a Data Lake on AWS

Data Lake on AWS…in a nutshell



Processing & Analytics

Real-time

- Elasticsearch Service
- Kinesis Data Analytics, Kinesis Data Streams
- Spark Streaming on EMR
- Apache Flink on EMR
- AWS Lambda
- Apache Storm on EMR

Analytics

- EMR Hadoop, Spark, Presto
- Athena Query Service
- Redshift Data Warehouse

AI & Predictive

- Amazon Lex Speech recognition
- Amazon Polly Text to speech
- Amazon Rekognition
- Machine Learning Predictive analytics
- SageMaker

Transactional & RDBMS

- DynamoDB NoSQL DB
- Aurora Relational Database

BI & Data Visualization

- Amazon QuickSight
- tableau
- MicroStrategy
- kibana

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Why Amazon S3 for a Data Lake?

Durable

Designed for **11 9s** of durability

Available

Designed for **99.99**% availability

High performance

- Multiple upload
- 3,500 PUT/POST/DELETE
- 5,500 GET requests per second

Easy to use

- Simple REST API
- AWS SDKs
- Read-after-create consistency
- Event notification
- Lifecycle policies

Scalable

- Store as much as you need
- Scale storage and compute independently
- No minimum usage commitments

Integrated

- Amazon EMR
- Amazon Redshift
- Amazon DynamoDB

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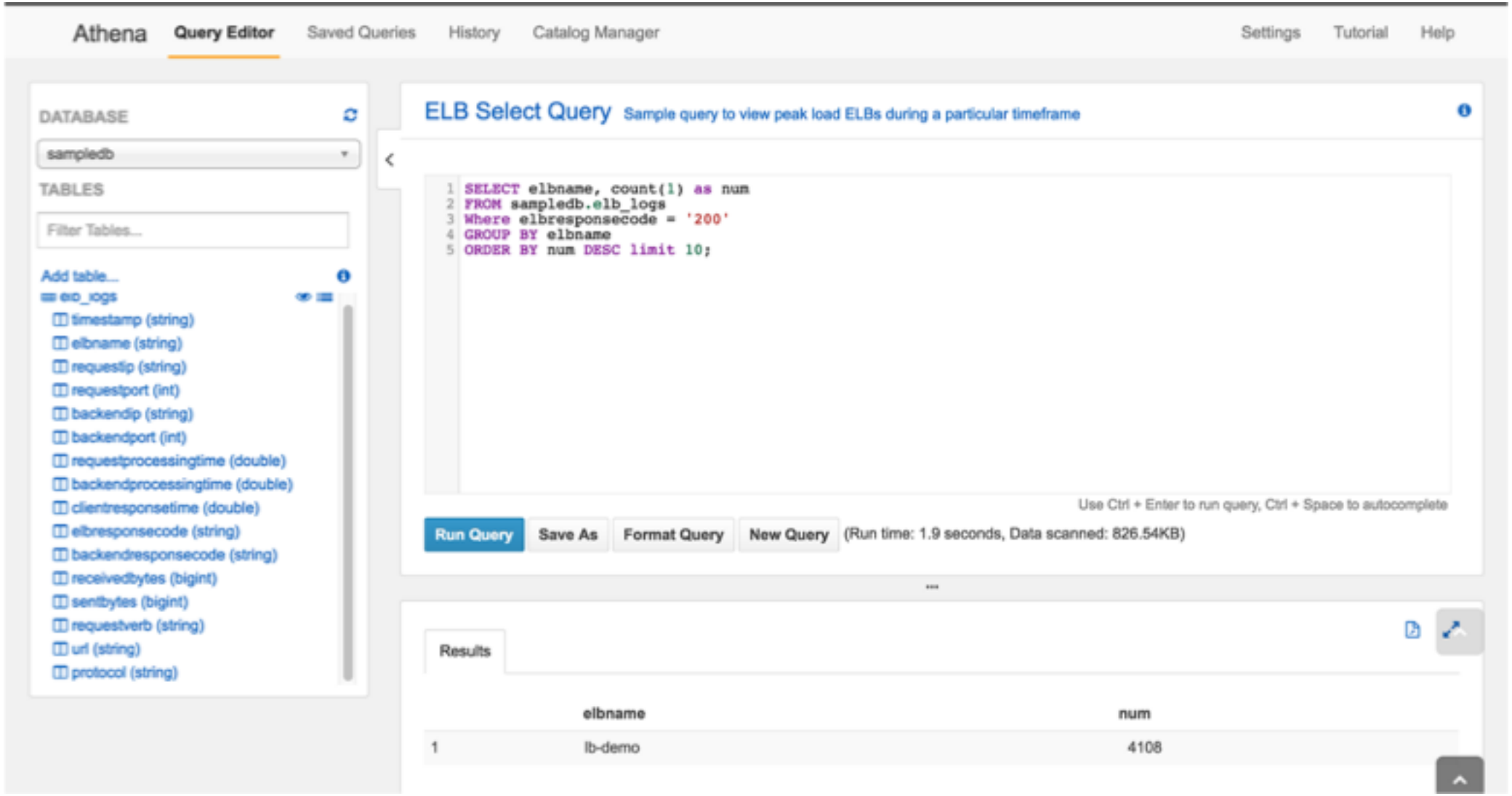
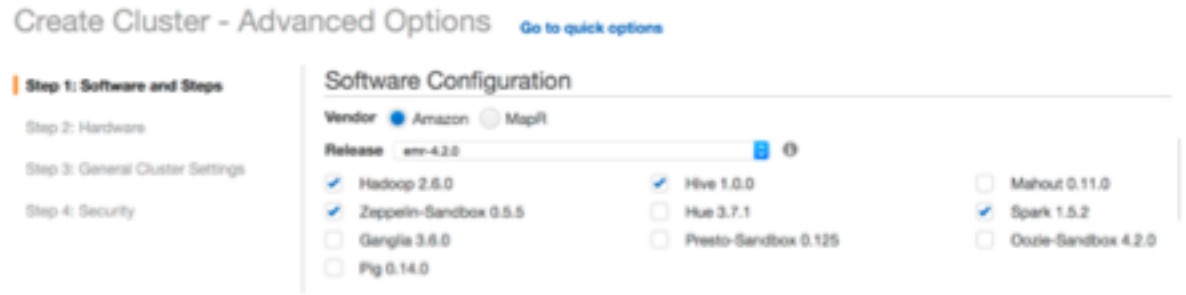
What can you do with a Data Lake?

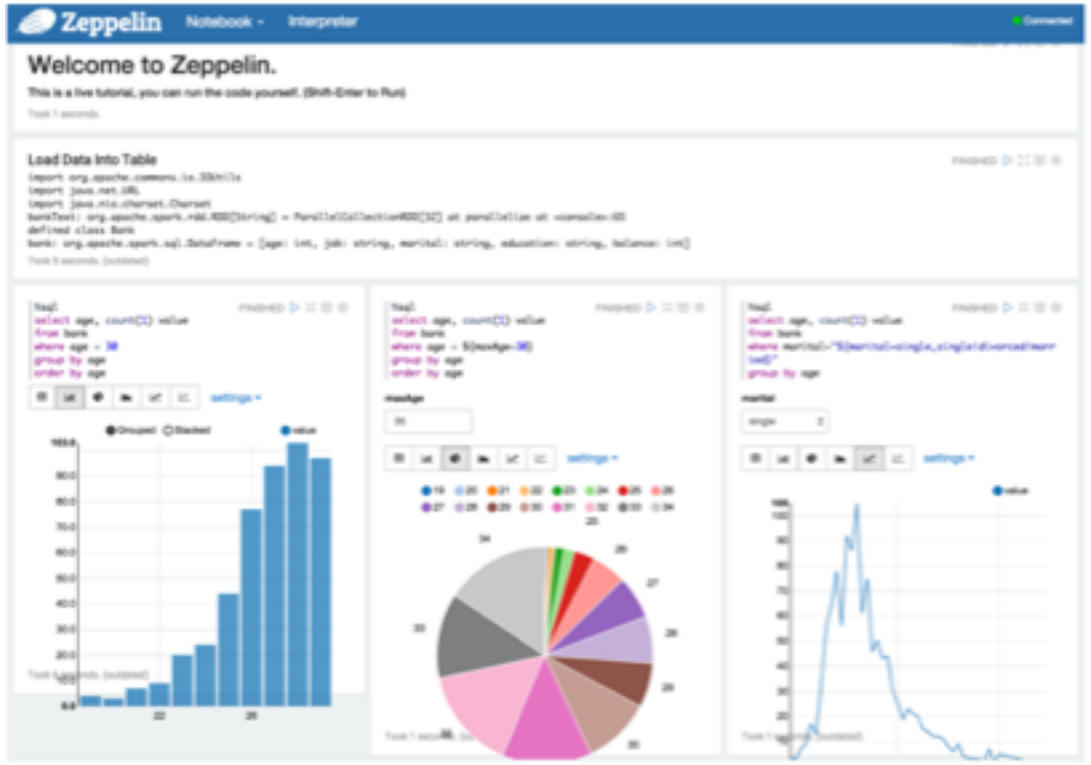
Query Directly with Amazon Athena



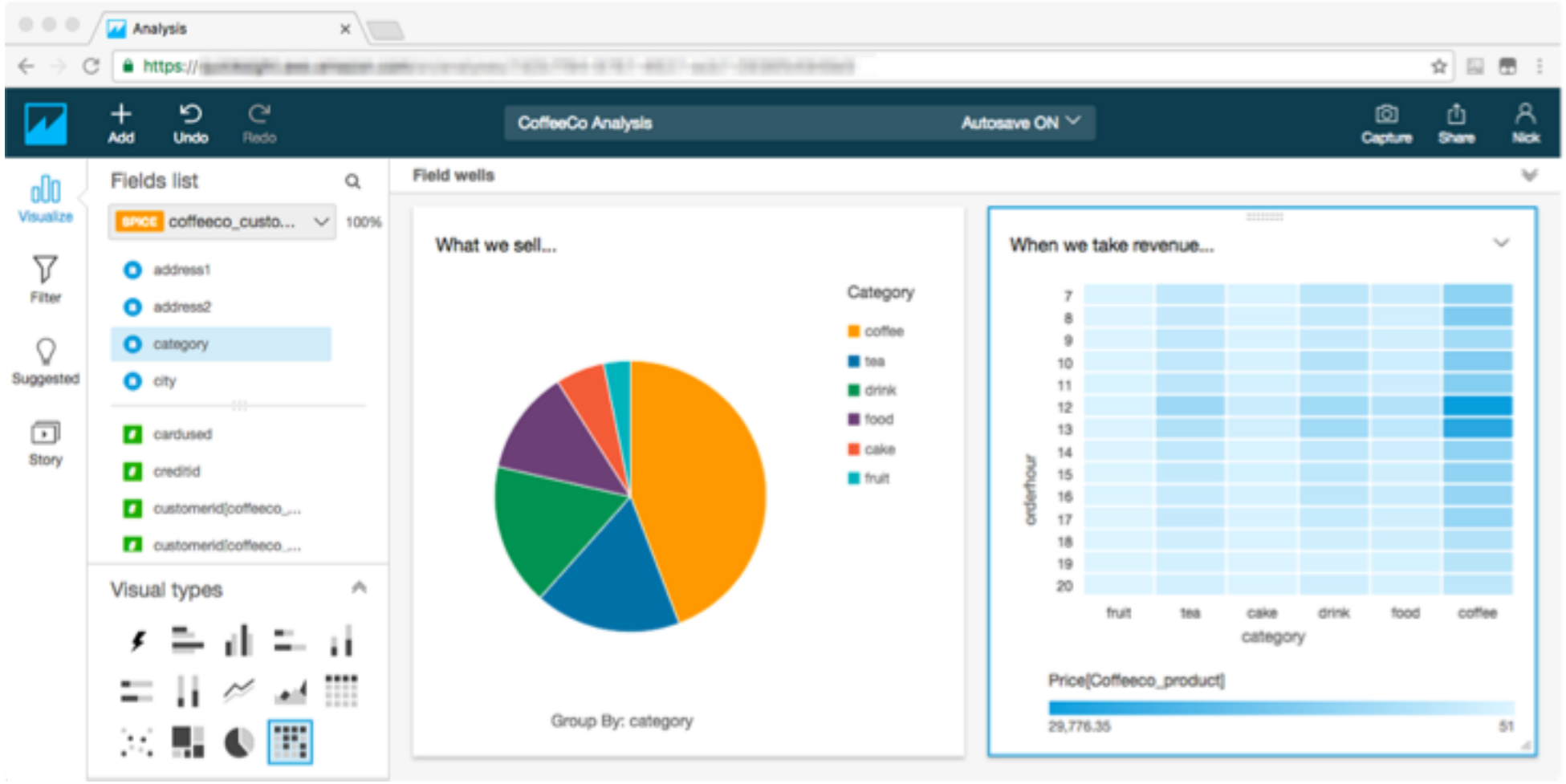
Analyze with Hadoop on Amazon EMR



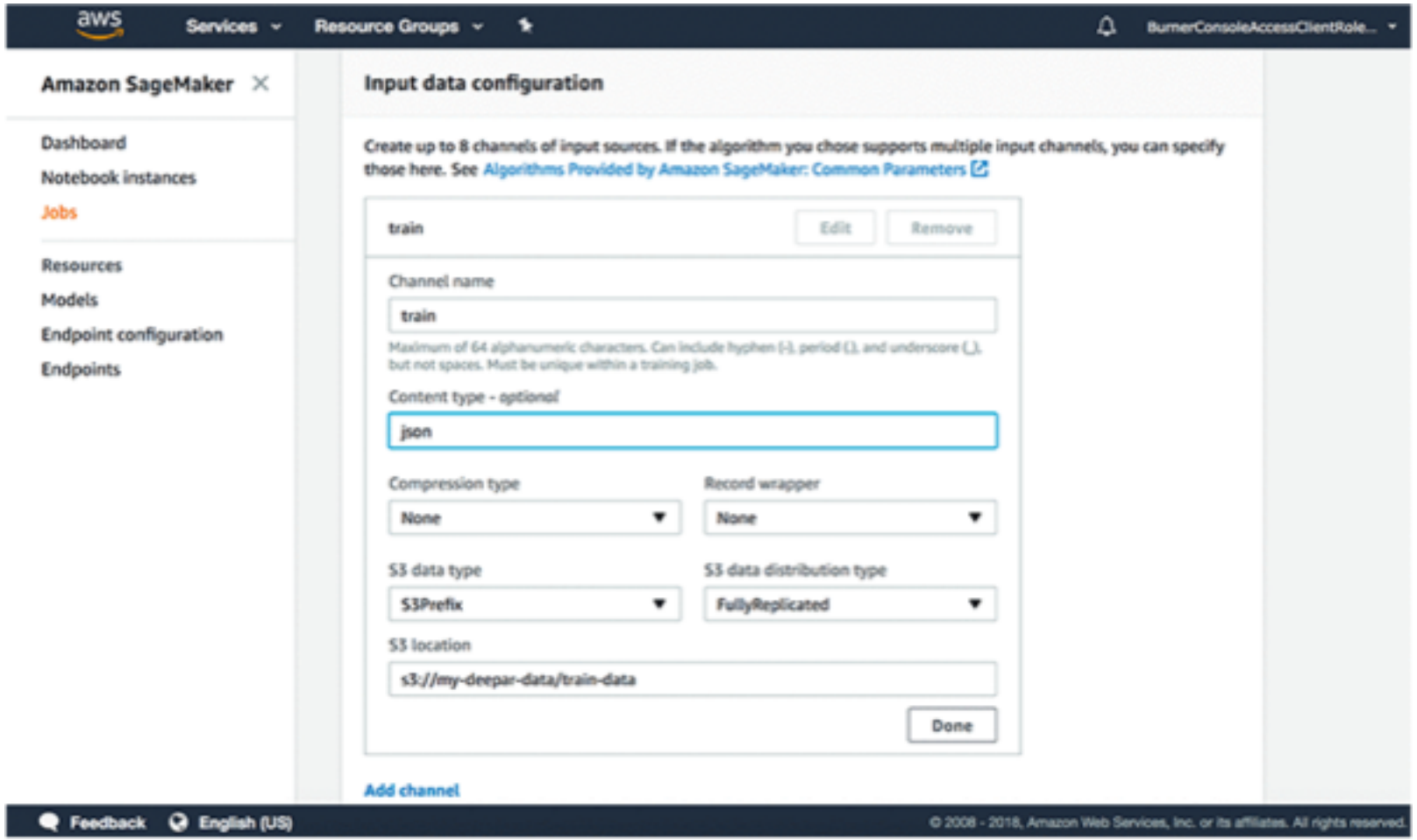

```scala
val movieLensHomeDir = "s3://emr.examples/movieLens/"

val movies = sc.textFile(movieLensHomeDir + "movies.dat").map { line =>
  val fields = line.split("::")
  // format: (movieId, movieName)
  (fields(0).toInt, fields(1))
}.collect.toMap

val ratings = sc.textFile(movieLensHomeDir + "ratings.dat").map { line =>
  val fields = line.split("::")
  // format: (timestamp % 10, Rating(userId, movieId, rating))
  (fields(3).toLong % 10, Rating(fields(0).toInt, fields(1).toInt, fields(2).toDouble))
}
```



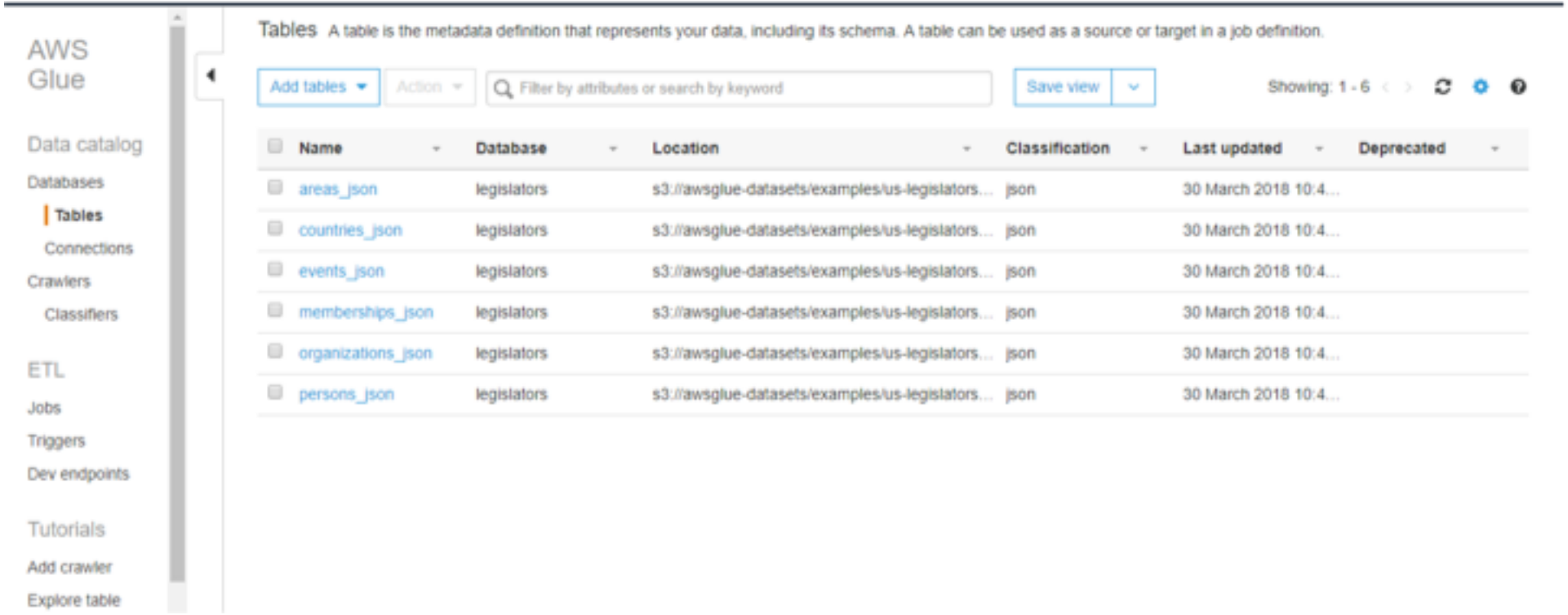
Create Visualizations with Amazon QuickSight



Train ML Models with Amazon SageMaker



Create a Central Data Catalog with AWS Glue



Load into Downstream Services

Amazon Redshift

Run complex analytic queries against petabytes of structured data

Amazon Aurora

A MySQL and PostgreSQL compatible relational database built for the cloud

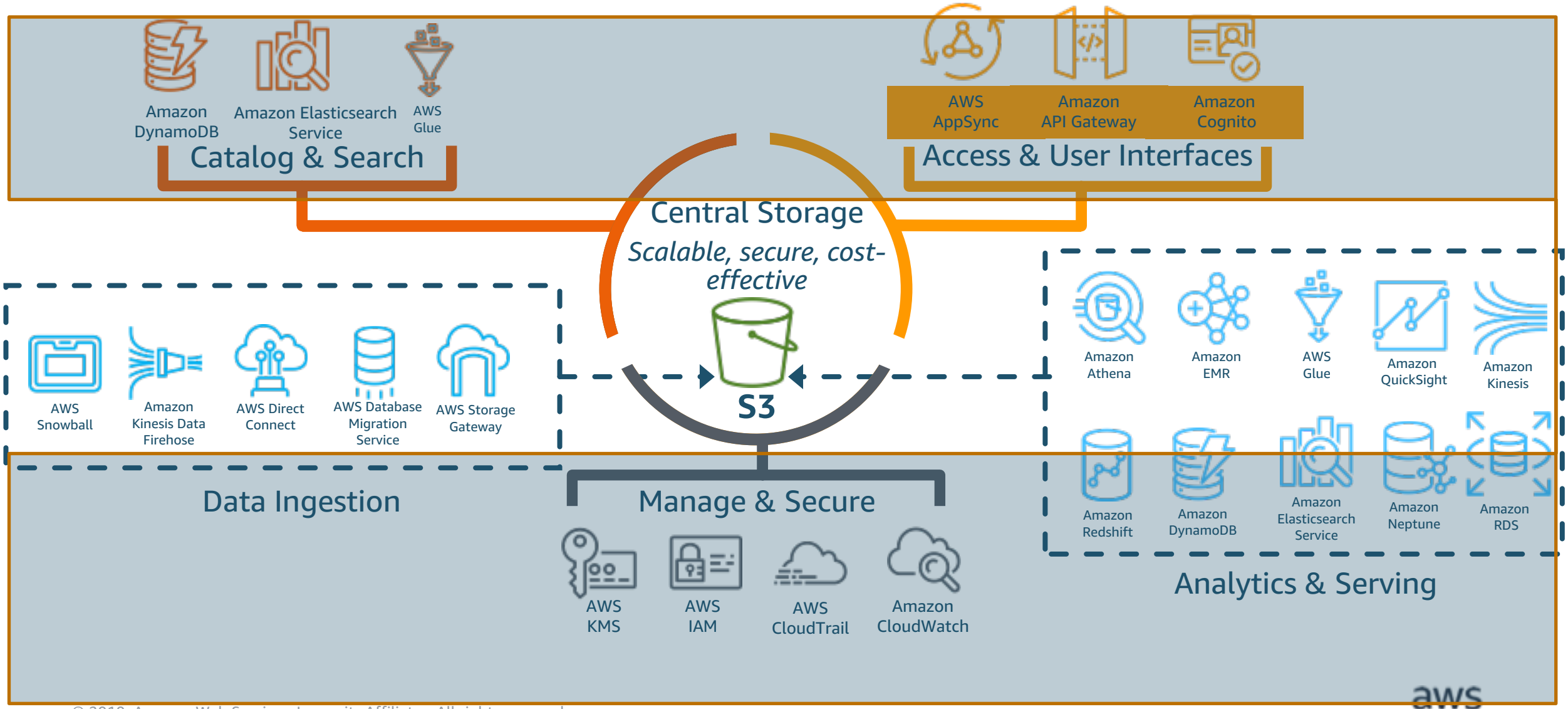
Amazon DynamoDB

A NoSQL database service that delivers consistent, single-digit millisecond latency at any scale.

Amazon Elasticsearch

Delivers Elasticsearch's real-time analytics capabilities alongside the availability, scalability, and security that production workloads require.

Data Lake on AWS



Thank You