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

ANT317

Self-service analytics with Amazon Redshift Serverless

Rajendra Badisa (he/him)
Senior Solution Architect
Broadridge Financial Solutions

Naresh Chainani (he/him)
Engineering Director
Amazon Redshift

aws

© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Agenda

Self-service analytics with Amazon Redshift

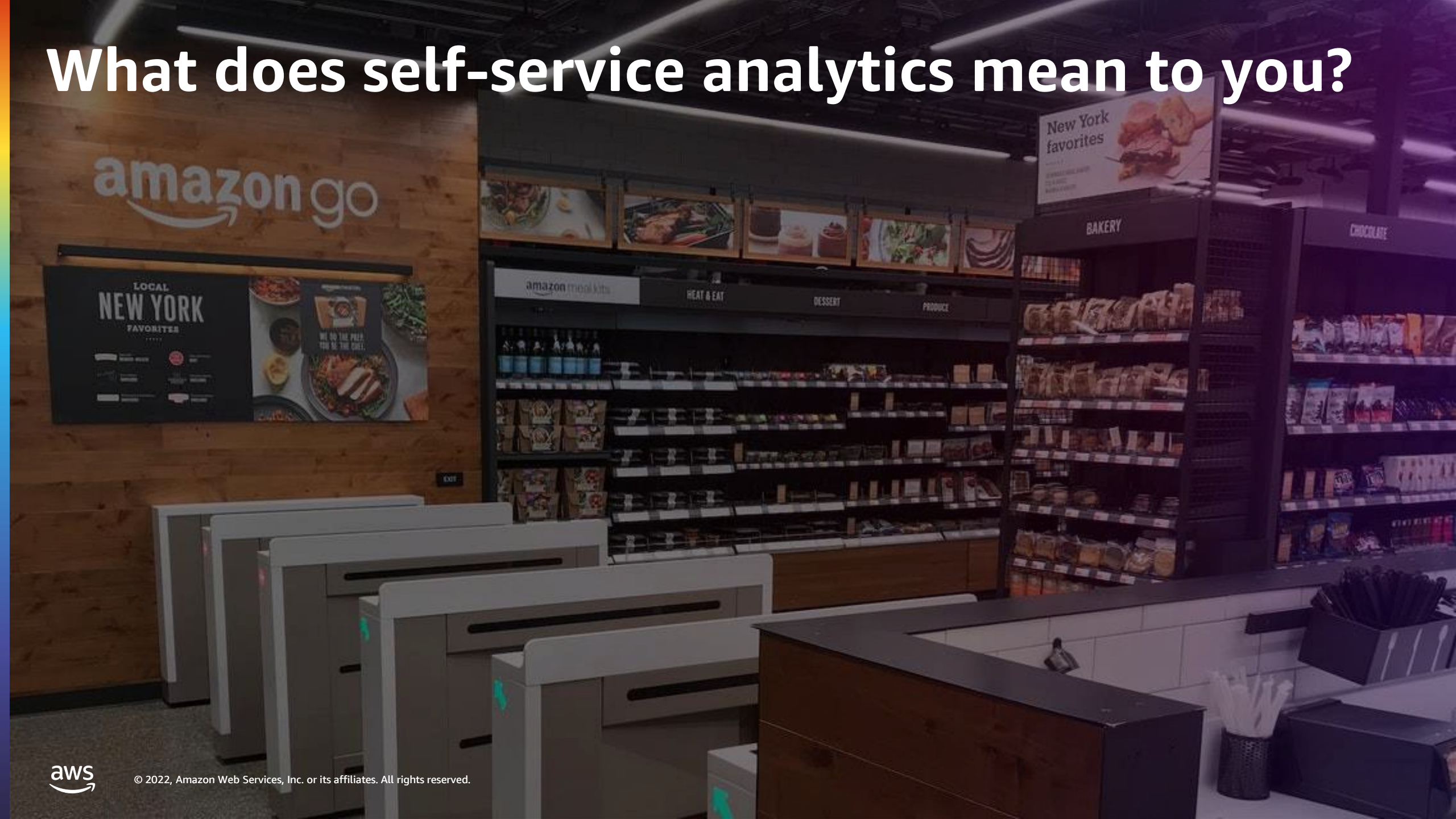
Simplifying analytics at Broadridge Financials

Low code/no code data pipelines for simpler builder experience

Autonomics for best out-of-the-box price performance

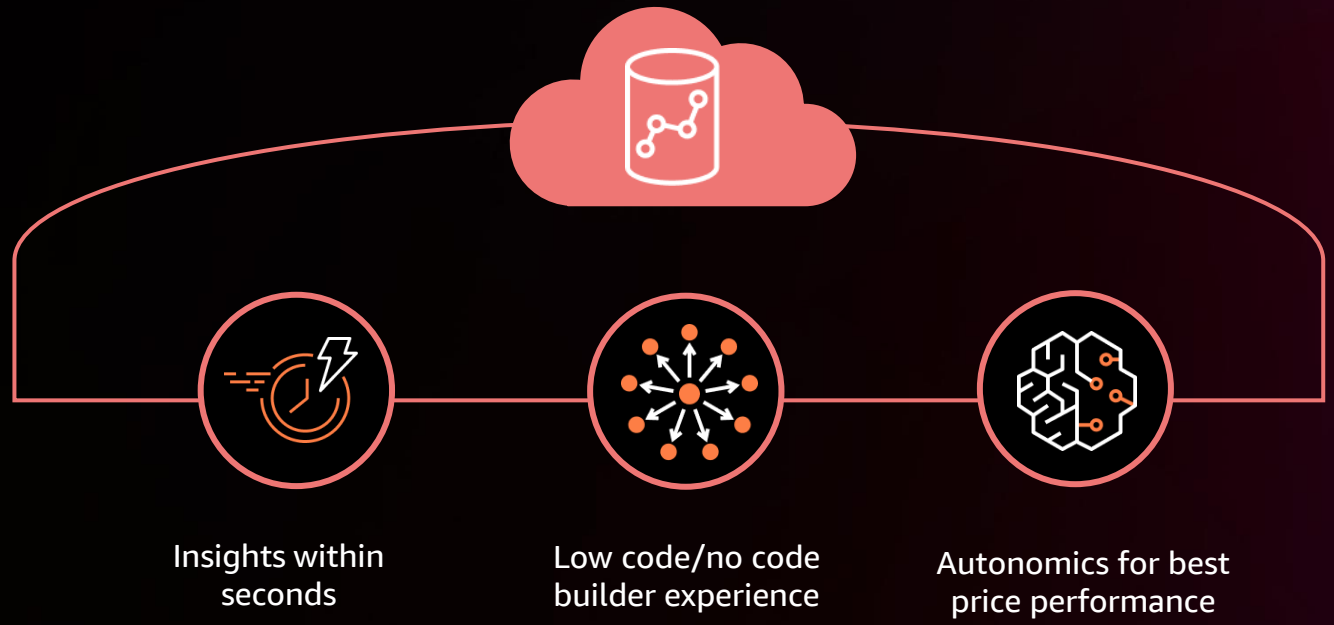
© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

What does self-service analytics mean to you?



© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

What does the best data warehouse for self-service analytics look like?

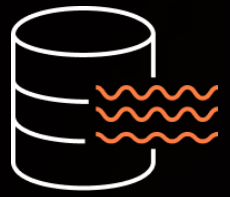


Improve operational efficiency **Make well-informed decisions** **Accelerate innovation**

aws
© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Amazon Redshift

FAST, EASY, AND SECURE CLOUD DATA WAREHOUSING AT SCALE



Analyze all your data

Gain real-time and predictive insights on all your data in a few clicks



Easy, secure, and reliable

No infrastructure management



Price-performance at any scale

Gain up to 3x better price performance vs. other cloud data warehouses

aws

© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

The scale of Amazon Redshift

WITH SIMPLICITY, EASE OF USE, AND AUTONOMICS



Tens of thousands of customers

Over 750 million queries processed daily

Exabytes of data queried daily

27 regions and 84 availability zones

Redshift Serverless is growing fast with thousands of customers

80 billion predictions each week using Redshift ML

Currently available

Coming soon

© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

1. Insights within seconds



© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.



Amazon Redshift Serverless

Get insights from data in seconds

Experience consistently high performance

Get started with no modifications

Pay for what you use

YOU

focus on insights

Automatic scaling

Compute provisioning

Automated patching

Automatic failover

Advanced monitoring

Backup and recovery

Routine maintenance

Security and industry compliance

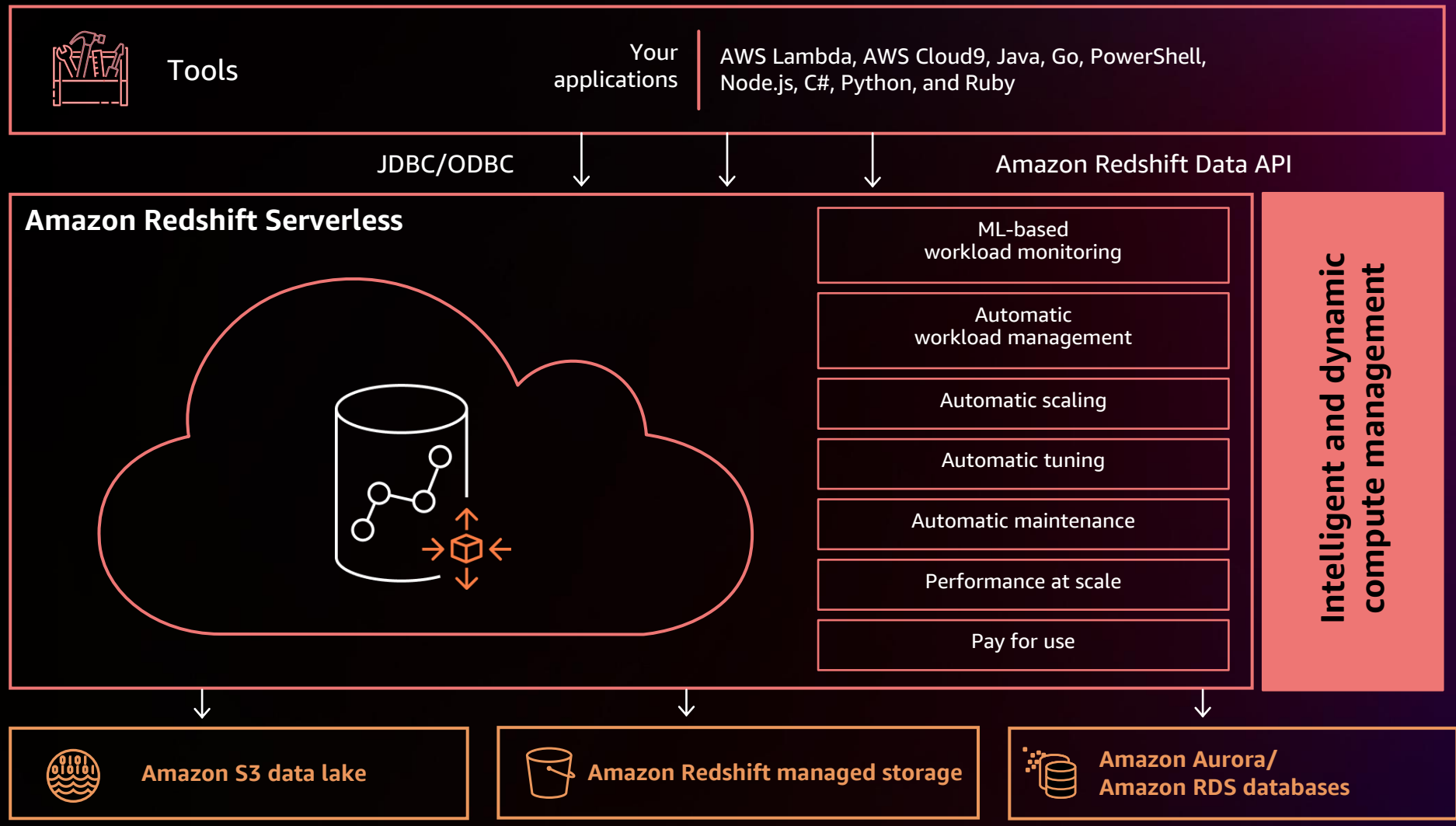
aws

takes care of the rest

aws

© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Amazon Redshift Serverless



© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.



Broadridge®

Simplifying analytics at Broadridge Financials with Amazon Redshift

© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Broadridge [NYSE:BR] at a glance

Broadridge, a global Fintech leader with more than $5 billion in revenue, provides the critical infrastructure that powers investing, corporate governance and communications to enable better financial lives. We deliver technology-driven solutions that drive digital transformation for our clients and help them get ahead of today's challenges to capitalize on what's next.

*Delivers **7+ billion** communications annually across print and 12+ digital channels*

*Process **$9+ trillion (USD) daily average** in fixed income and equity trades*

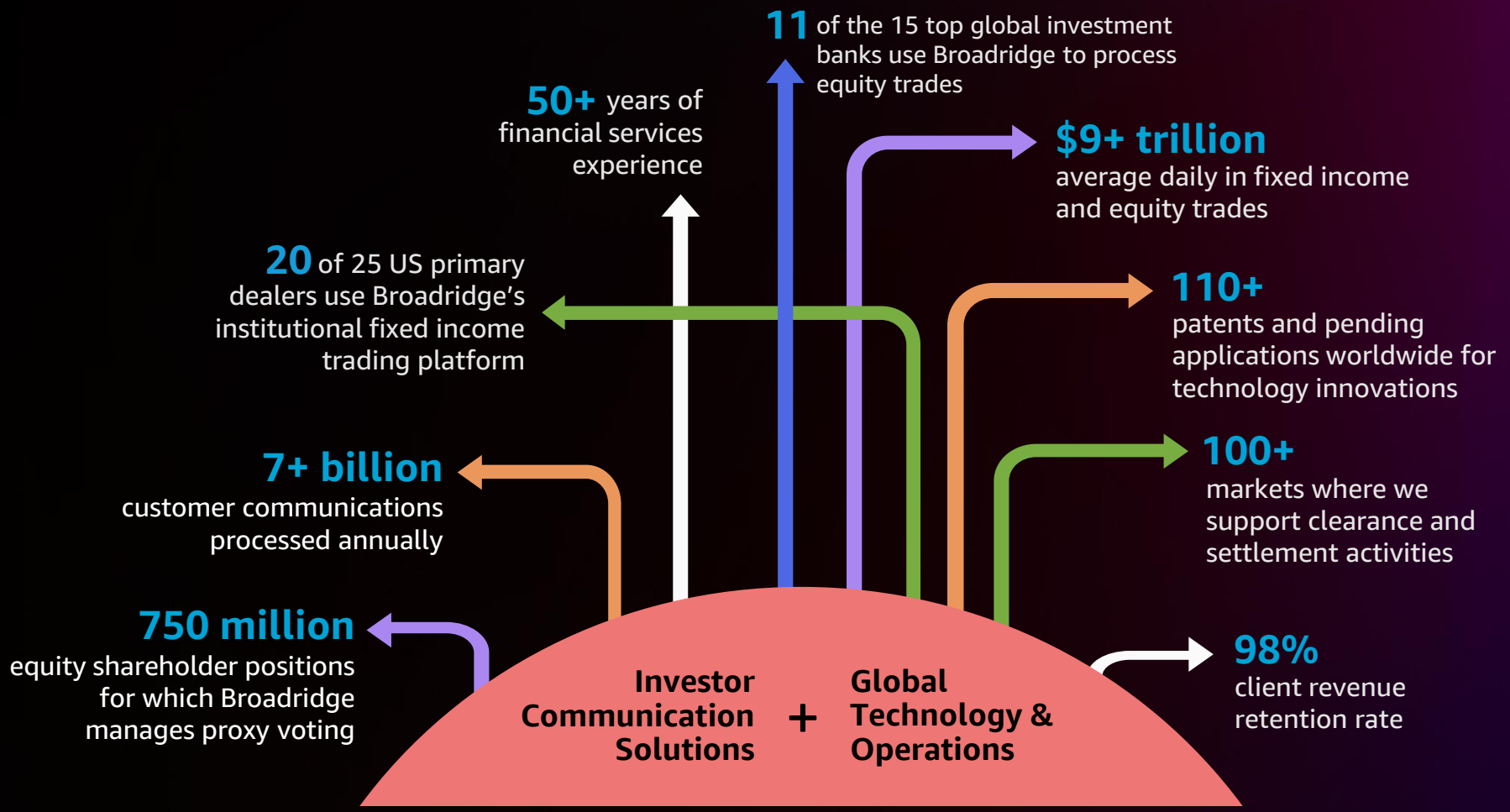
*Enables customers' multi-asset post-trade processing in over **100 countries** and delivers communications in 90 countries*



© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Broadridge expertise

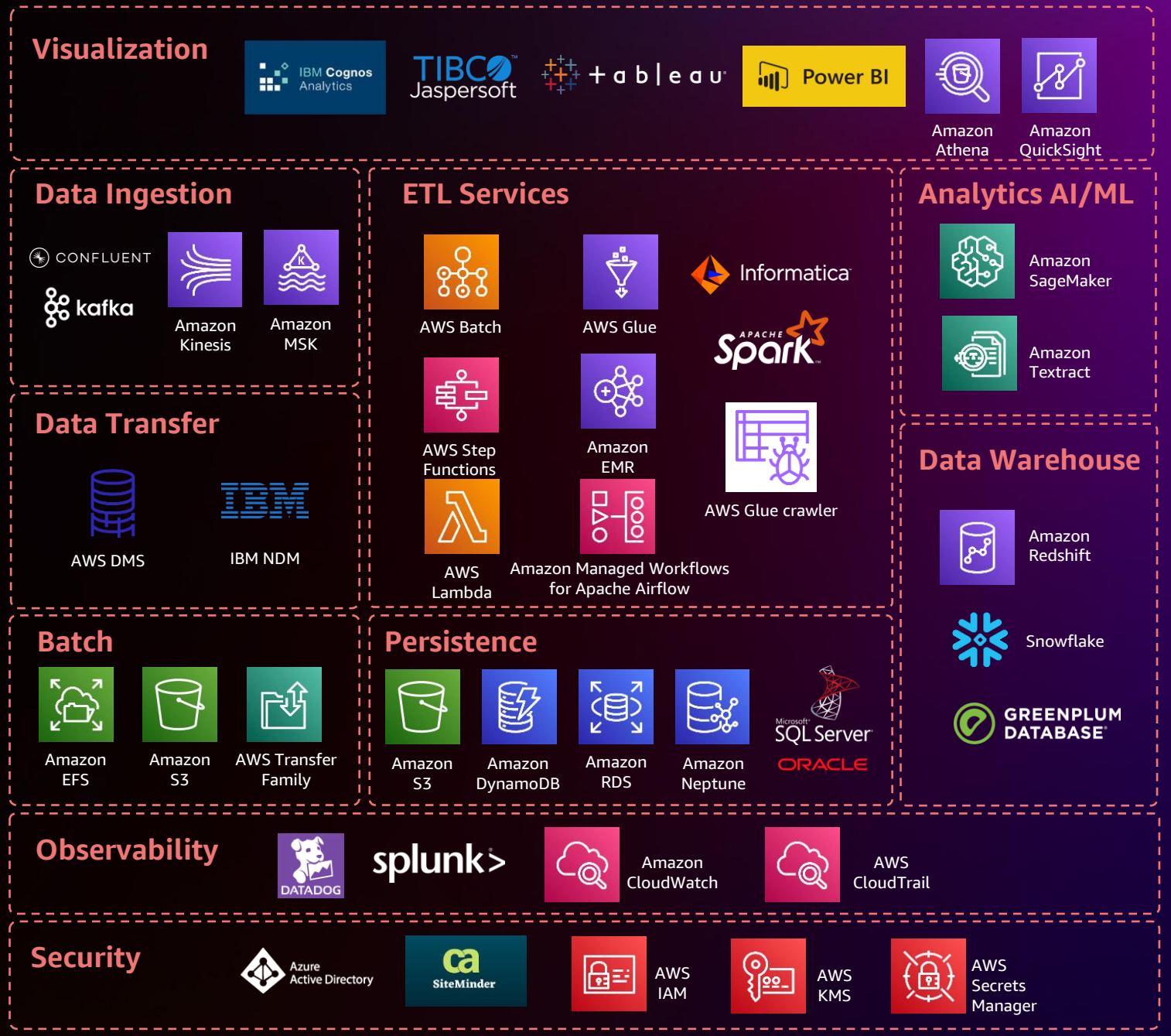
Our solutions range from hosted service bureau to customized managed services supporting full outsourcing



© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Data analytics at Broadridge

- Wealth and Asset Management
- Regulatory and Compliance
- Distributor Trends
- Investor Intelligence
- Proxy Communications



aws
© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

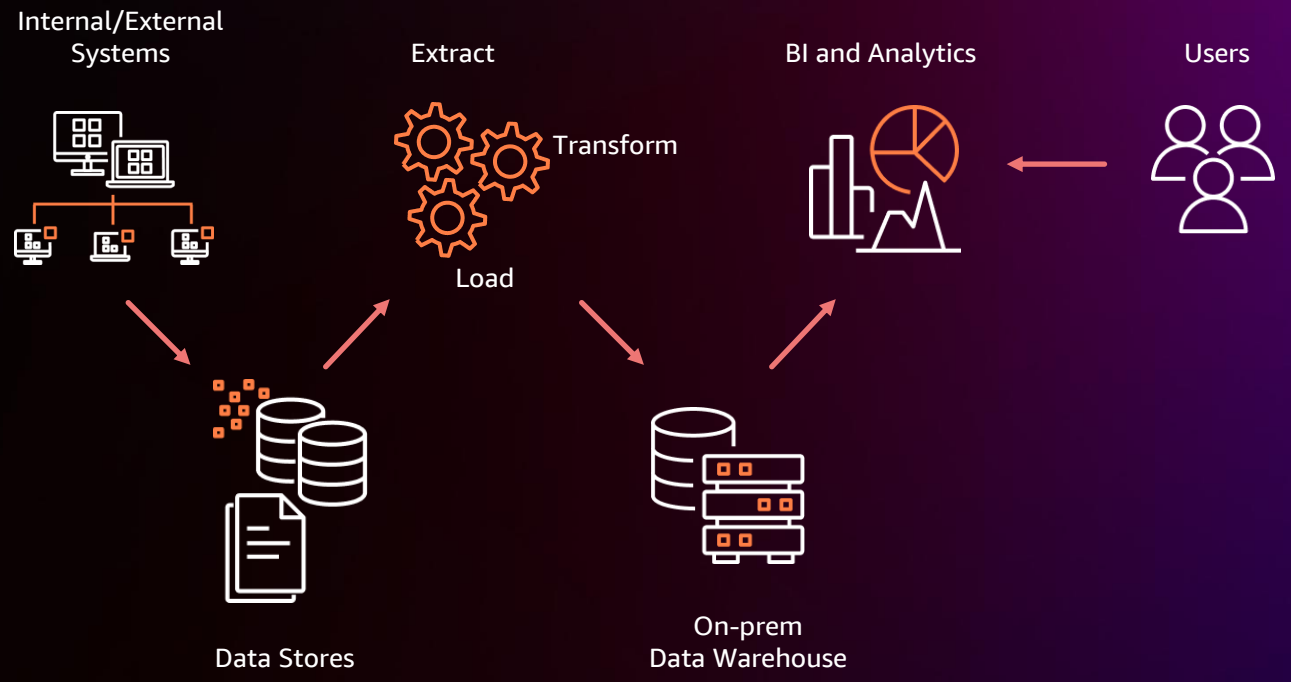
Self-service analytics at Broadridge

Financial regulatory platform with real time analytics

On-demand or periodic reporting on historical data

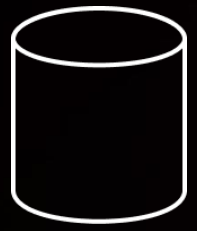
Specialized widgets, dashboards, reports, custom search, and filtering features

Financial data management team performs research and review of data for accuracy and readiness for submissions



© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

On-prem utilization



Fixed 40TB on-prem data
Fixed size and aging hardware



Low daily utilization ETL batch load
Heavy calculations and reporting



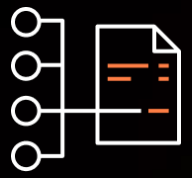
Highly variable intraday
user and application utilization



Users analyze historic data
during the day

aws
© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.
Broadridge®

Current challenges



Difficulty performing data-management operations



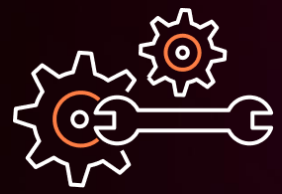
Difficulty processing data within SLA with increased volumes



Difficulty scaling for seasonal demands



Increasing costs with data growth



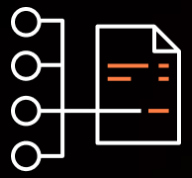
Operations overhead

aws

© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Broadridge®

Objectives



Reduce data processing times and meet SLAs



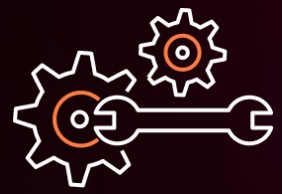
Support seasonal demands of up to 4x volume



Rapid provisioning of new environments for research and investigations



Static cost elimination (licensing, dedicated hardware)



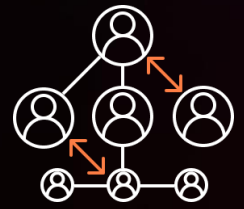
Reduce operations overhead and downtime for maintenance

© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Why Redshift Serverless?



New environments provisioned in minutes (vs months on-prem)



Auto-Concurrency: Enables more users and queries while maintaining performance



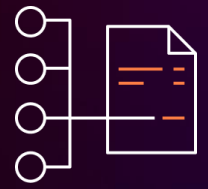
Auto WLM: Manages resource allocations, eliminates operations overhead



Auto-backup and recovery point every 30 minutes



Integrated query and database resource monitoring



Pay per query execution only with no cost for idle time

aws

© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Broadridge®

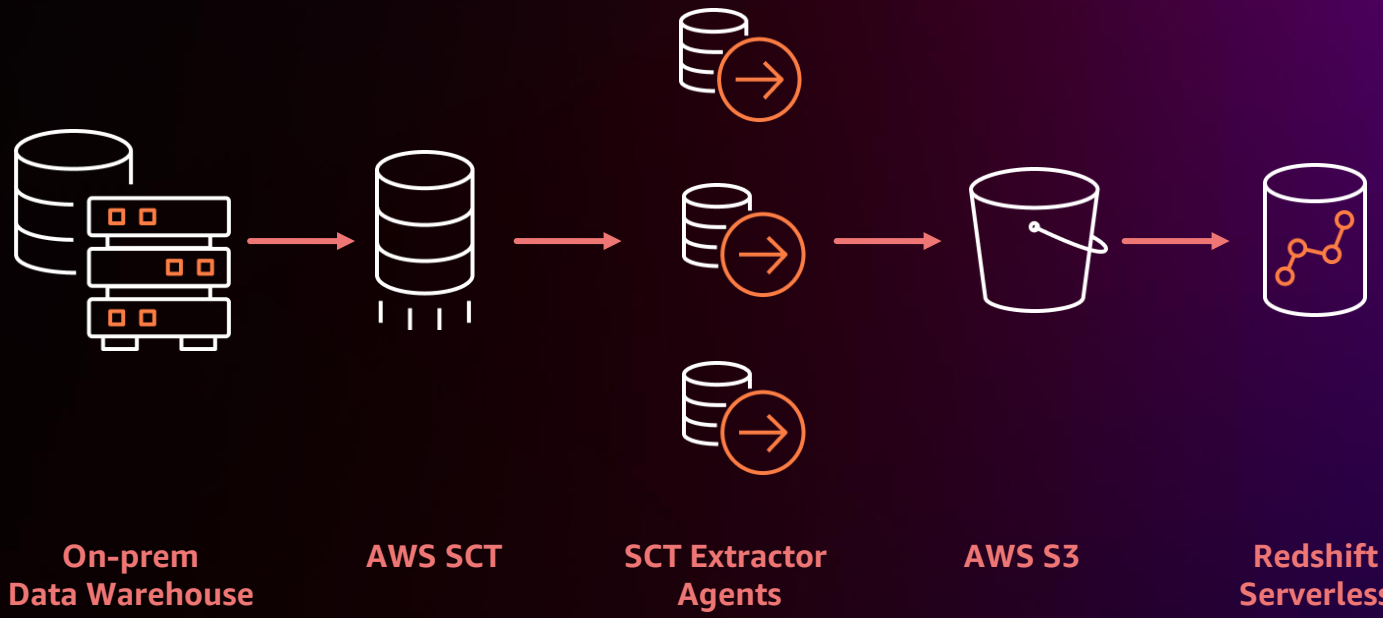
Migration process to Redshift Serverless

Migration Process:

- AWS SCT tool for one time data migration
- Easy setup and minimal configuration
- Generate assessment reports
- Convert schema between database platforms
- Migrate data between platforms using parallel workers

Learnings:

- Data type conversion (Array)
- Set column sizes on source tables to avoid AWS SCT treating them as LOB columns

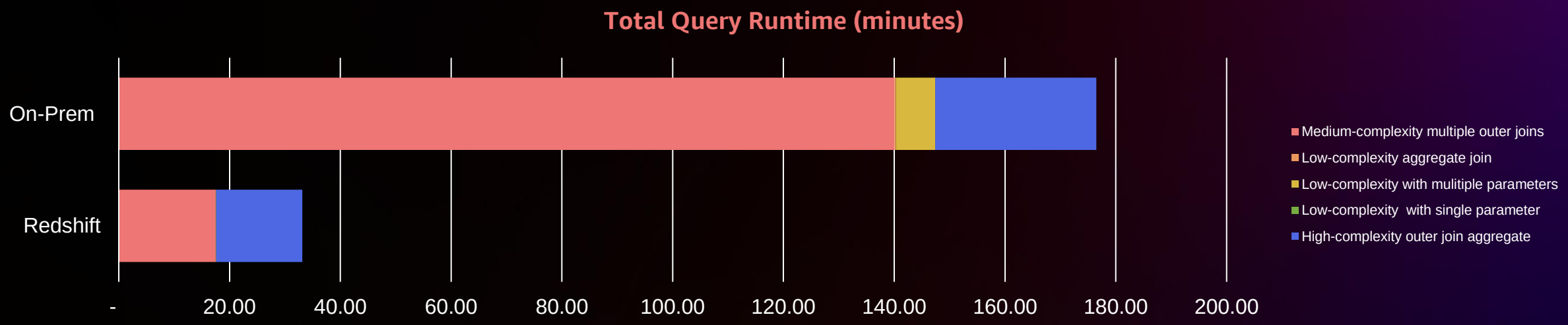


© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Performance test

Test Details:

- 20 Concurrent User Sessions
- ~5000 Query executions
- 1TB Data queried
- Redshift: 128 RPU Base Capacity
- On-Prem data warehouse: 768vCPU / 6TB Memory



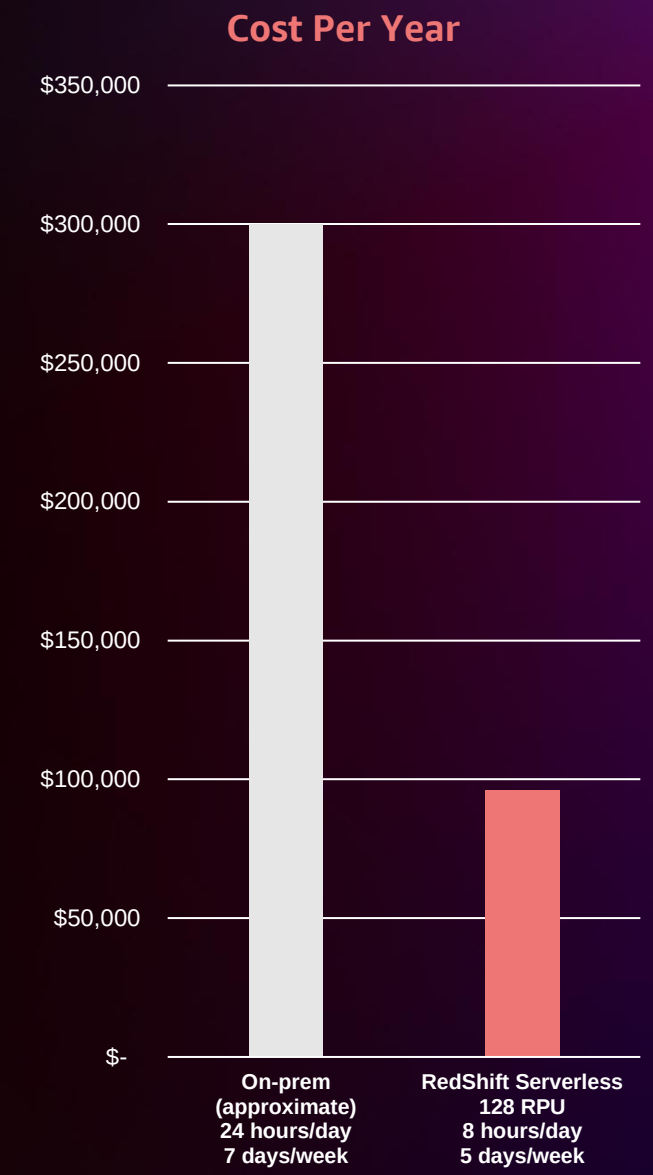
© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Performance test results

81% Total Query Time Reduction

2-75X Query speed increased

~$32 Cost of Redshift Serverless query execution time



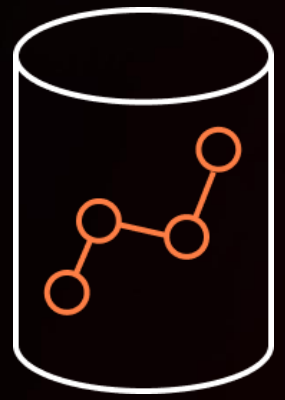
© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Summary of moving to Redshift Serverless

5X more data processing within same timeframe

2-75X query performance improvements

Cost savings during off-peak hours



~15 minutes to create new data warehouses from snapshots

Reduce operations overhead and downtime

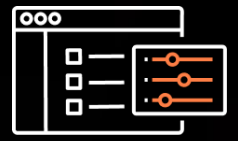
Improved monitoring, logging and audit support

aws

© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Broadridge

Next steps in Redshift Serverless journey



Detailed cost comparison to on-prem



Data Ingestion and Transformation use cases



Multi-tenancy and data sharing

aws

© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Broadridge®

2. Low code/no code data pipelines for simpler builder experience

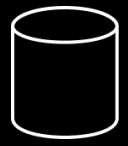


© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Complexity with ingesting data into analytics systems

SEPARATE SYSTEMS REQUIRE COMPLEX MANUAL DATA PIPELINES

Data Sources



Operational databases



Data lake



Streaming data



Manual data pipelines

Expensive and cumbersome to build and maintain ETL jobs

Complex reconstruction of the data especially with schema changes

Incomplete, inconsistent, and stale views of data, limiting insights

Analytics



aws

© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Analyze all your data across data stores, organizations, third-party data for powerful analytics

Query data where it lives

Data ingestion



BI and analytics apps

Connect apps to analyze and visualize your data

Operational databases

Amazon S3

Kinesis Data Streams, MSK

Data marketplaces for third-party data

Redshift producer and consumer clusters

Federated Queries

Amazon Aurora Zero-ETL to Amazon Redshift

Auto-copy from S3 / Informatica data loader

Streaming ingestion

Data sharing

SQL



Amazon Redshift

Amazon Redshift ML

Amazon Redshift integration for Apache Spark



ML and analytics services

Analyze open standards-based data formats

Amazon Redshift data lake queries



Data Lake export

Amazon S3 data lake

Keep up to in Amazon S3



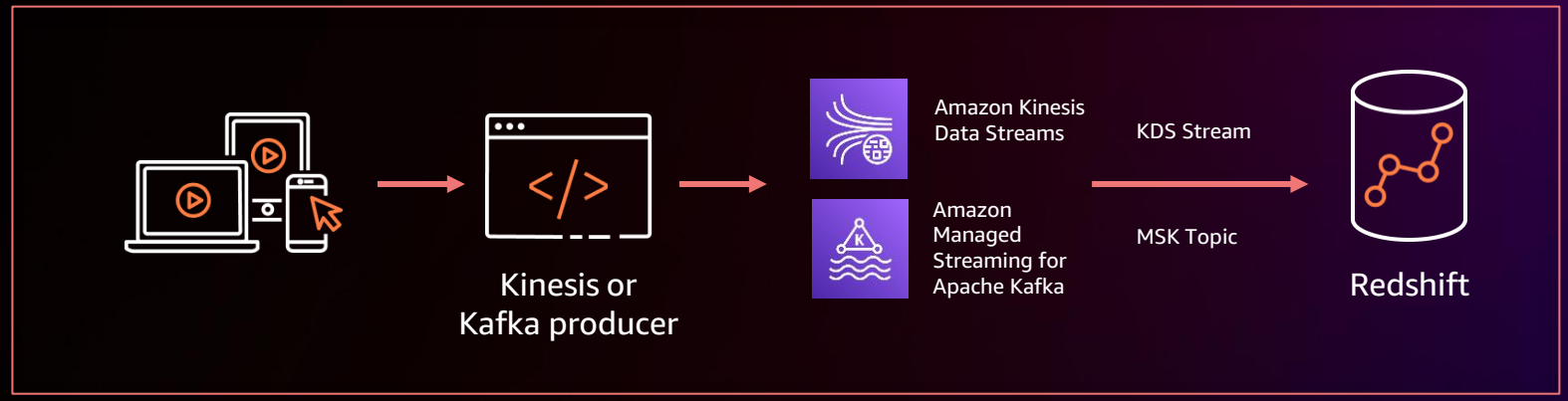
Zero ETL! | No data movement | Apache Spark app development | Secure and consistent data sharing | Data Lake analytics | Auto Ingestion of S3 files | Use your favorite BI tool | ML in SQL | No data duplication

NEW

Support for auto-copy from Amazon S3

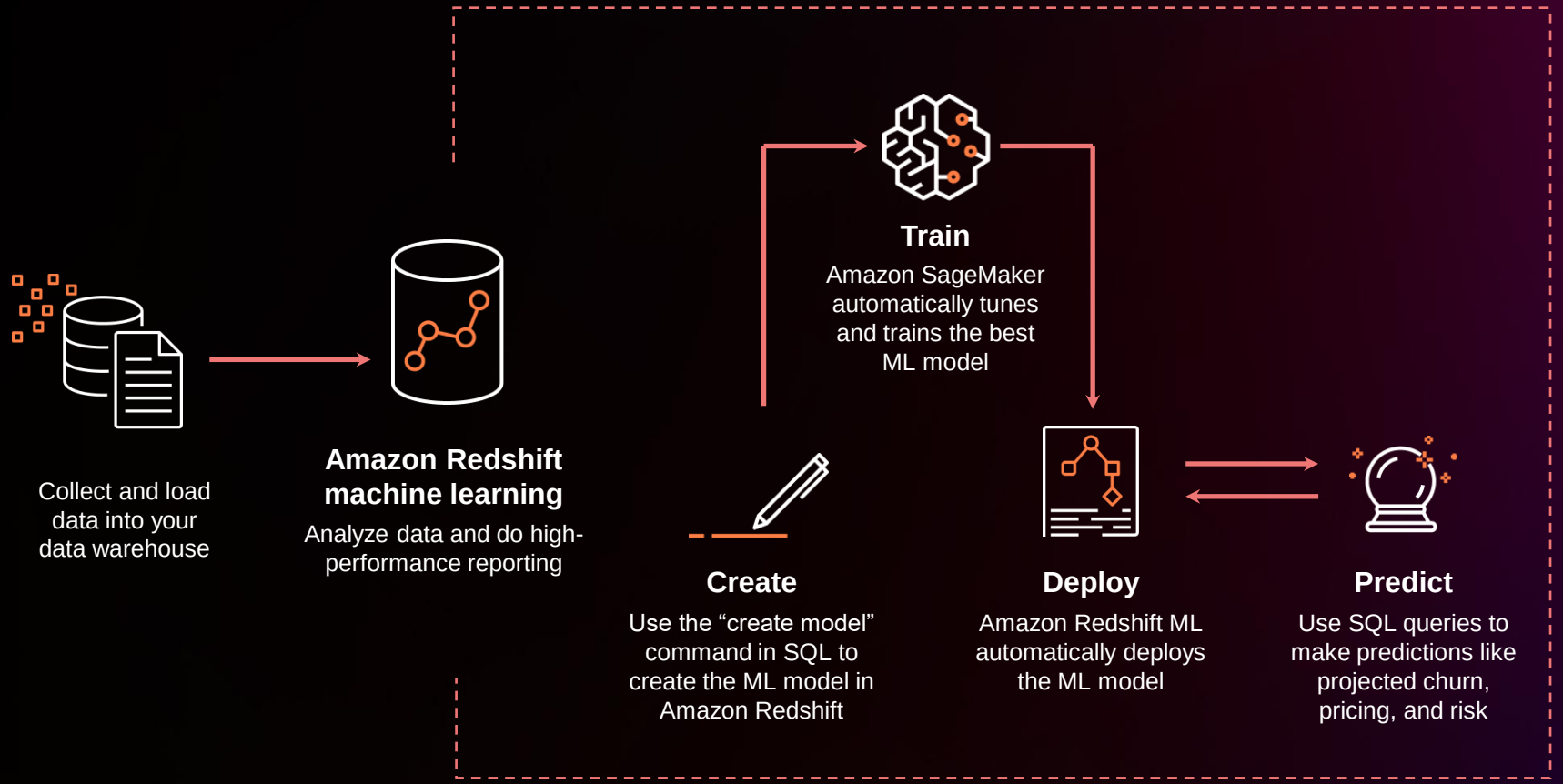


Amazon Redshift Streaming Ingestion



aws
© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Amazon Redshift ML: Infer and train



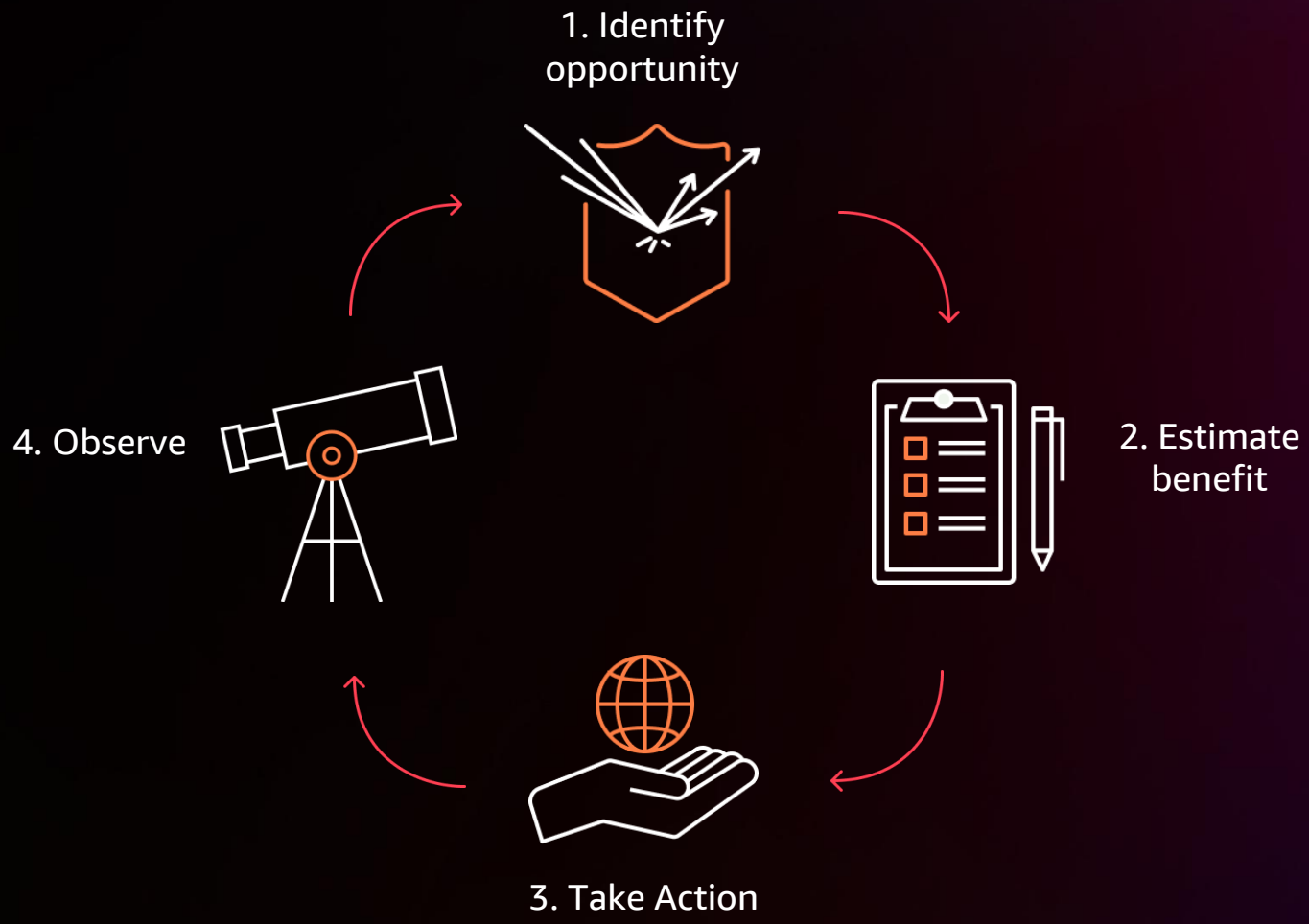
© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

3. Autonomics for best out-of-the-box price performance



© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Our approach to Autonomics



© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Autonomics in the data warehouse

ML-BASED OPTIMIZATIONS TO GET STARTED EASILY AND GET THE FASTEST PERFORMANCE QUICKLY



Automatic Table Optimization

Automates physical data design and optimization



Automatic Workload Manager

Optimizes for peak performance as data and workloads scale



Auto MVs, Auto refresh &
Auto rewrite MVs

Leverages machine learning to adapt to shifting workloads

aws

© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

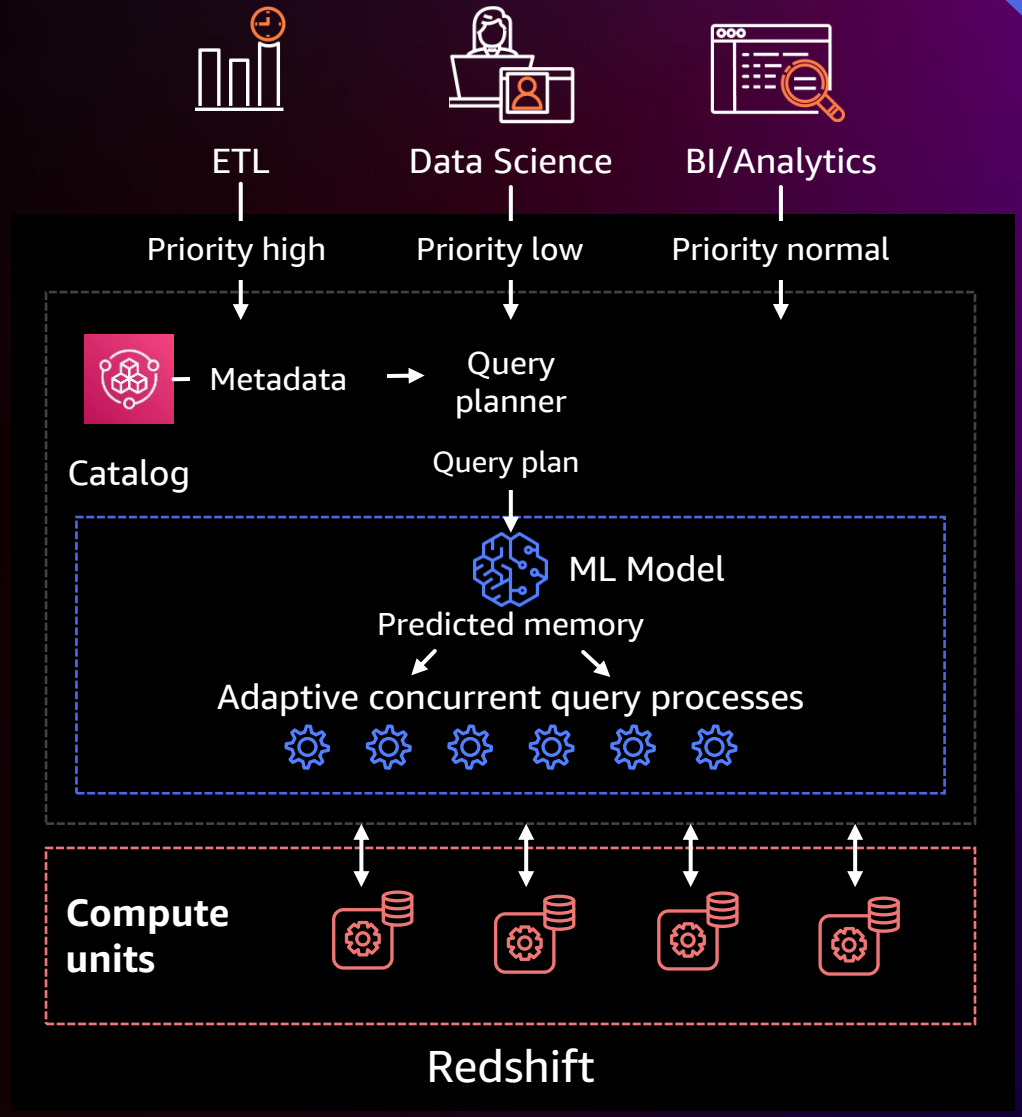
Enhanced Auto WLM: adaptive concurrency

UPDATED

Optimize query throughput
by auto-determining number of concurrent queries

Create user or query group queues
based on business function, priority, and SLA

Concurrency scaling with scale-out and scale-in
based on **business priority and cost** to meet SLAs



© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Materialized views

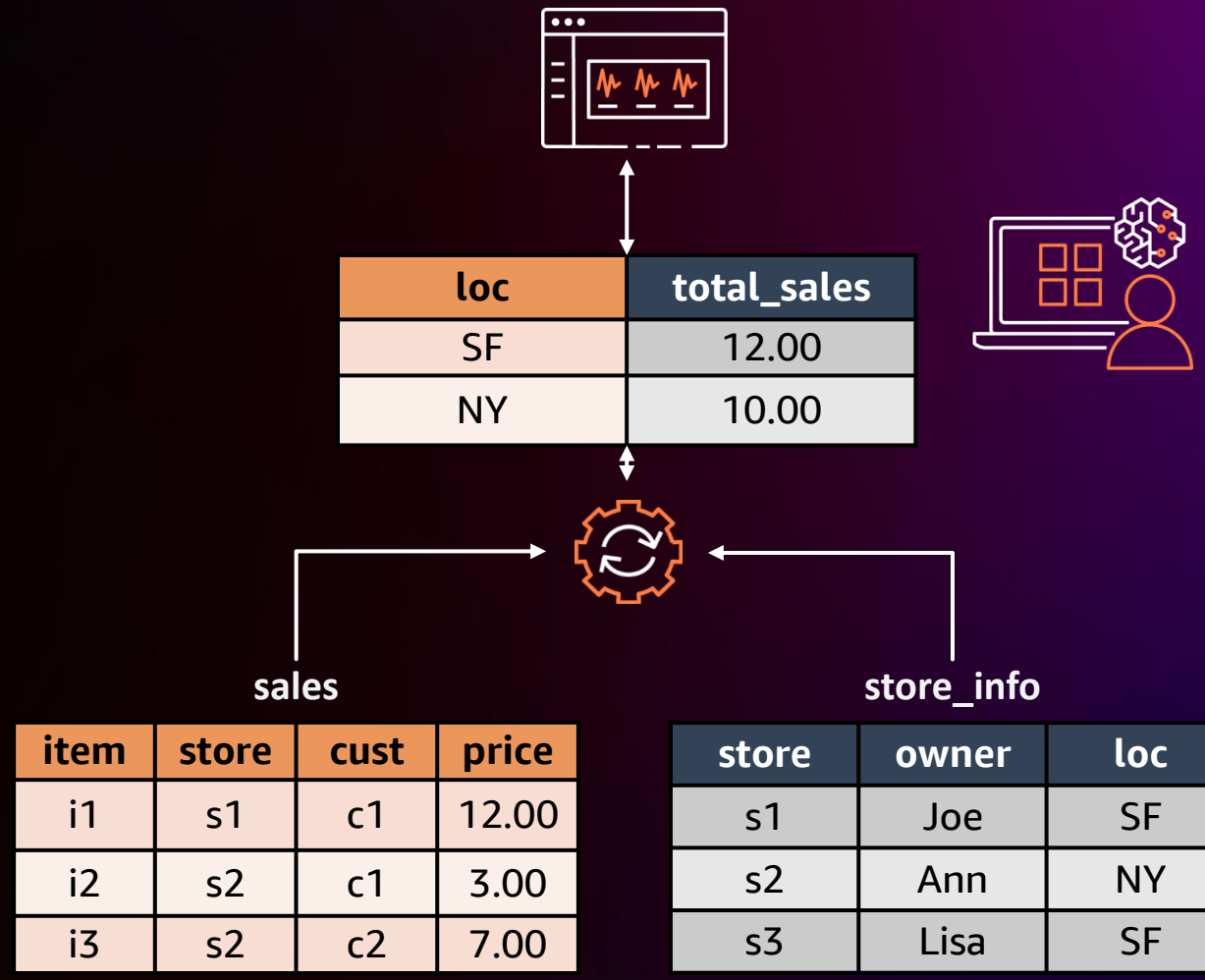
SPEED UP QUERY PERFORMANCE BY ORDERS OF MAGNITUDE WITH PRECOMPUTED RESULTS

Accelerate predictable workloads like BI, reports, and dashboards with precomputed results

MVs can be based on one or more Redshift tables or external tables (Spectrum, Federated Query)

Incremental updates, auto refresh, auto query rewrite

Automated MVs: Automatically create or delete MVs with incremental refresh



loc	total_sales
SF	12.00
NY	10.00

sales

item	store	cust	price
i1	s1	c1	12.00
i2	s2	c1	3.00
i3	s2	c2	7.00

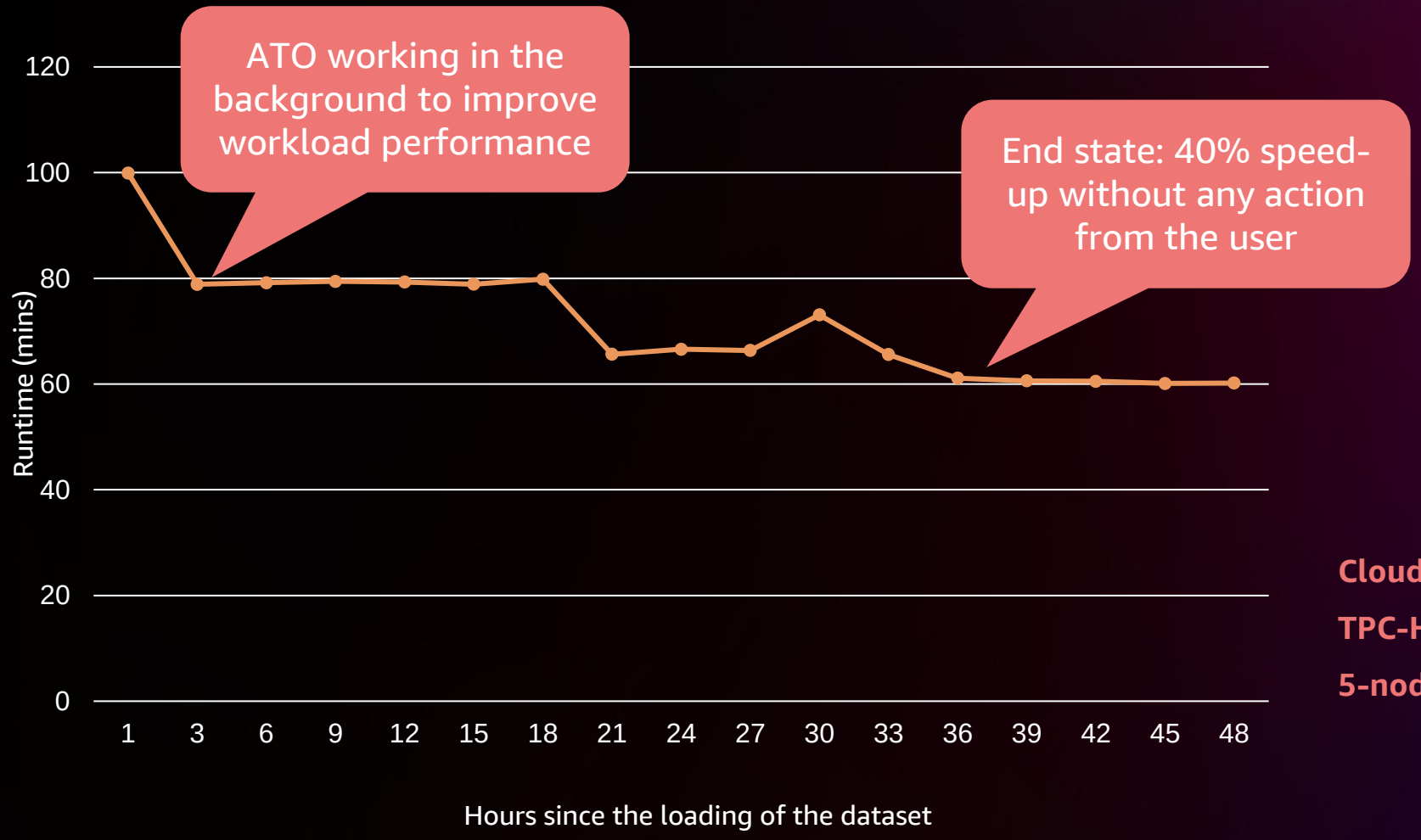
store_info

store	owner	loc
s1	Joe	SF
s2	Ann	NY
s3	Lisa	SF

aws

© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Automatic Table Optimization



Cloud DW derived from

TPC-H 30TB

5-node RA3.16XL

© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Get started

Try Amazon Redshift Serverless today for free with $300 credit!

LEARN AND SHARE



https://aws.amazon.com/redshift/redshift-serverless

Or visit the Amazon Redshift page to learn more: aws.amazon.com/redshift



© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Thank you!

Rajendra Badisa
Rajendrda.Badisa@broadridge.com
linkedin.com/in/rajendra-badisa-0bb1aa12

Naresh Chainani
nareshkc@amazon.com
linkedin.com/in/nareshchainani



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

© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.