aws
INNOVATE
DATA AND AI/ML EDITION
22 February 2023

aws INNOVATE
DATA AND AI/ML EDITION

Putting machine learning in the hands of every builder with AWS database and analytics services

Tom McMeekin
Enterprise Solutions Architect
Amazon Web Services

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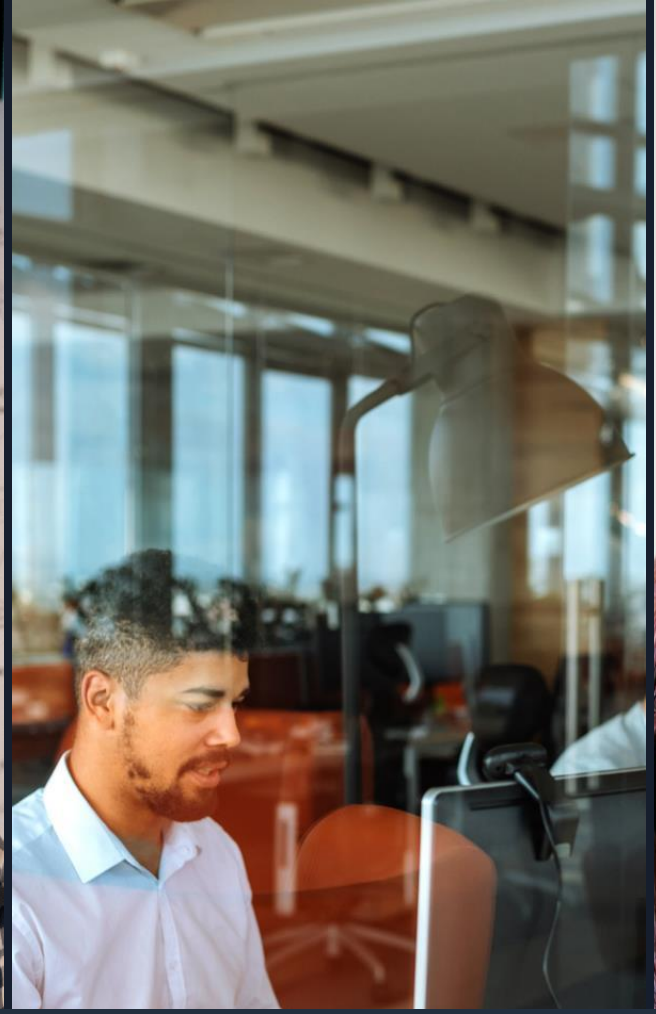
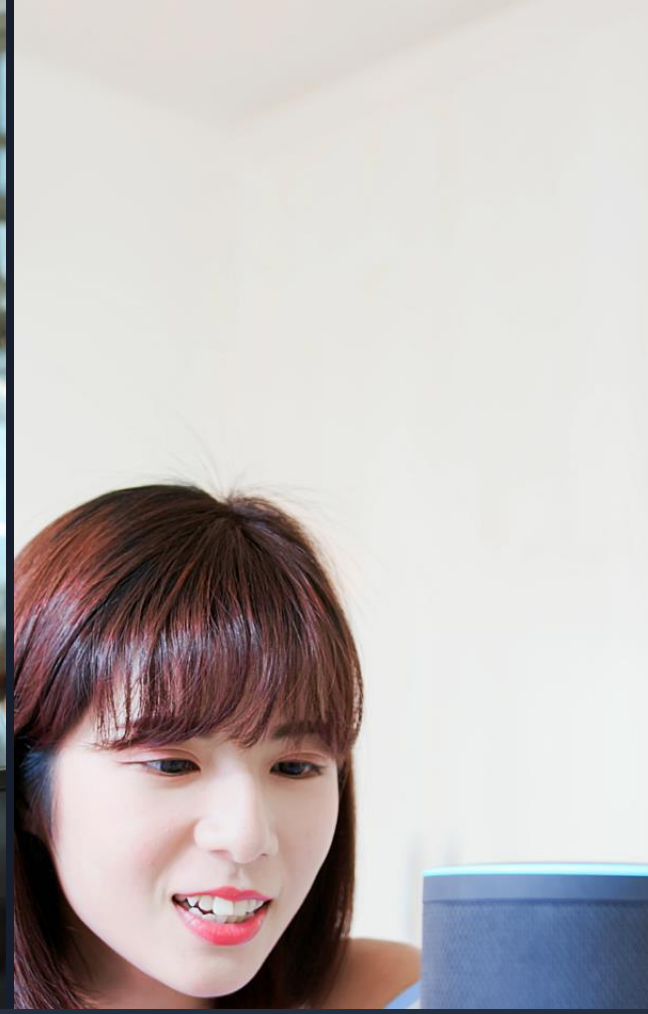
Transform customer experience

Improve business operations



Better and faster decision-making



Innovation

NEXT GEN STATS

powered by aws

"…AWS allows both data experts and novices to have a more seamless and intuitive experience within Next Gen Stats…"

Michael Chi, Director of NFL Next Gen Stats

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Modern data strategy

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Modern data strategy

MODERNIZE

UNIFY

INNOVATE

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Modern data strategy

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Purpose-built data services

Business Intelligence & Machine Learning

Analytics | Databases | Blockchain

Data Lake

Data Movement

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Purpose-built data services | the most complete family

Business Intelligence & Machine Learning

- **Amazon QuickSight** — Visualizations
- **AWS Data Exchange** — Data exchange
- **Amazon SageMaker** — ML
- **Amazon Comprehend** — NLP
- **Amazon Transcribe** — Speech-to-text
- **Amazon Textract** — Extract text
- **Amazon Personalize** — Recommendation
- **Amazon Forecast** — Forecasts
- **Amazon Translate** — Translation
- **Amazon CodeGuru** — Code reviews
- **Amazon Kendra** — Enterprise search
- **+Many more**

Analytics

- **Amazon Redshift** — Data warehousing
- **Amazon EMR** — Hadoop + Spark
- **Amazon Athena** — Interactive analytics
- **Amazon OpenSearch Service** — Operational Analytics
- **Amazon Kinesis Data Analytics** — Real time

Databases

- **Amazon Aurora** — MySQL, PostgreSQL
- **Amazon RDS** — MySQL, PostgreSQL, MariaDB, Oracle, SQL Server,
- **Amazon DynamoDB** — Key value, Document
- **Amazon DocumentDB** — Document
- **Amazon ElastiCache** — Redis, Memcached
- **Amazon Keyspaces (For Apache Cassandra)** — Wide column
- **Amazon Neptune** — Graph
- **Amazon QLDB** — Ledger Database
- **Amazon Timestream** — Time Series

Blockchain

- **Amazon Managed Blockchain**
- **Amazon Blockchain Templates**

Data Lake

- **Amazon S3/Glacier**
- **AWS Lake Formation** — Data Lakes
- **AWS Glue** — ETL & Data Catalog

Data Movement

AWS Database Migration Service | AWS Snowball | AWS Snowmobile | Amazon Kinesis Data Firehose | Amazon Kinesis Data Streams | Amazon Managed Streaming for Kafka

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Machine learning development is complex

Label data

Data collection prep

Store features

Detect bias and explain predictions

Visualize in notebooks

Pick algorithm

Train models faster

Tune parameters

Deploy in production

Manage & monitor

aws

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The AWS ML stack

ML FRAMEWORKS & INFRASTRUCTURE	PyTorch, Apache MXNet, Hugging Face, TensorFlow	Amazon EC2	CPUs	GPUs	AWS Inferentia	AWS Trainium	Habana Gaudi	FPGA	Elastic inference

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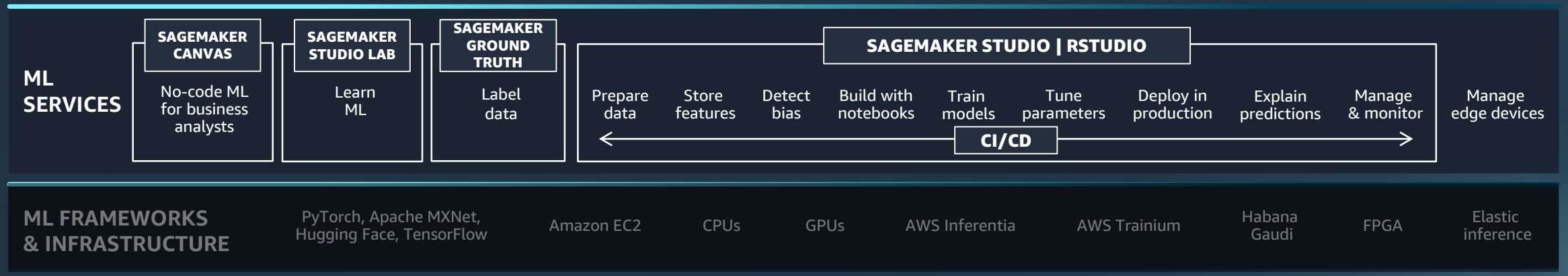
The AWS ML stack



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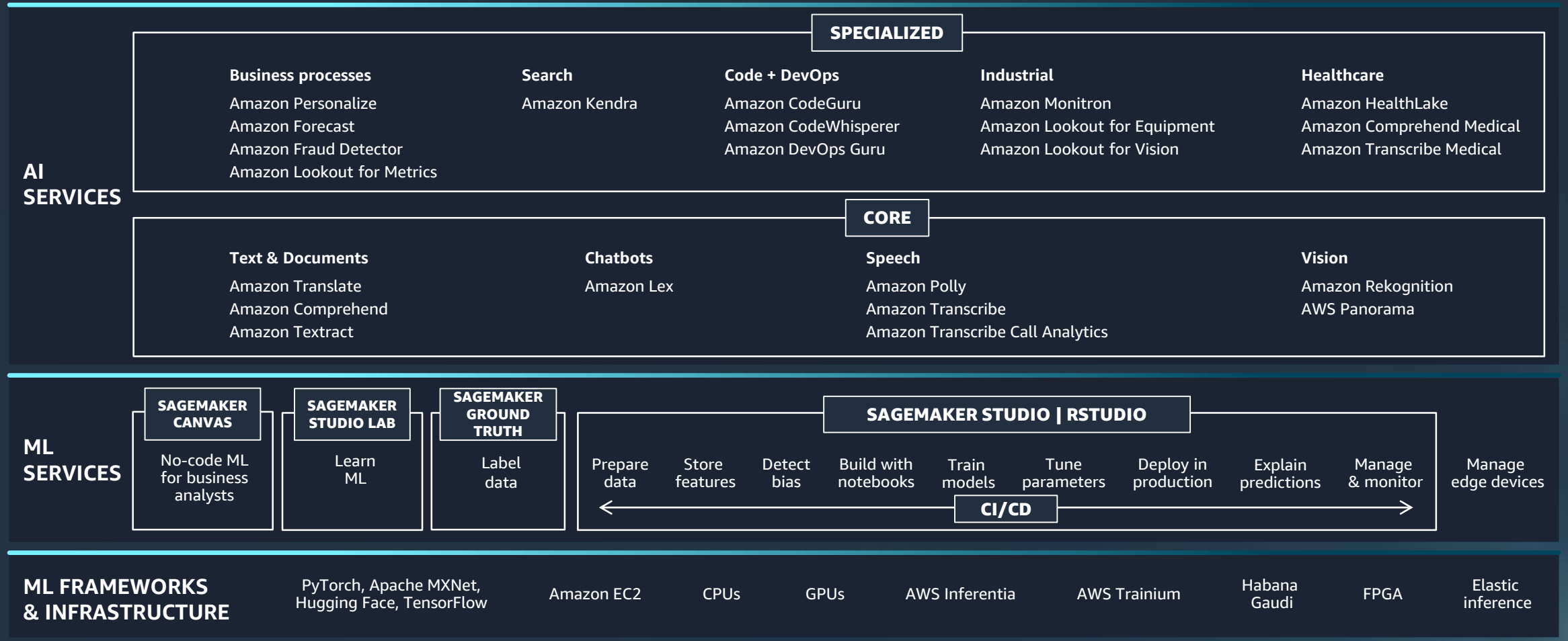
The AWS ML stack



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Machine learning is becoming accessible to all

Practitioner

Analyst

App Developer

Business User

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AWS brings ML closer to data

Databases

+

Data warehouses
+ data lakes

+

Business
intelligence tools

AMAZON
AURORA ML

AMAZON
NEPTUNE ML

AMAZON
REDSHIFT ML

AMAZON
ATHENA ML

AMAZON
QUICKSIGHT ML

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Analyst

Amazon Redshift ML

CREATE, TRAIN, AND DEPLOY ML MODELS USING FAMILIAR SQL COMMANDS

TRAIN

```
CREATE MODEL customer_churn
FROM (SELECT c.age, c.zip, c.monthly_spend,
c.monthly_cases, c.active AS label
FROM customer_info_table c)
TARGET label
FUNCTION predict_customer_churn
```

PREDICT

```
SELECT n.id, n.firstName, n.lastName,
predict_customer_churn(n.age,c.zip,..)
AS activity_prediction
FROM new_customers n
WHERE n.marital_status = 'single'
```

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"…We were immediately struck by the fact that Amazon Redshift ML makes fitting an XGBoost model or feed-forward neural network as easy as writing a SQL query…"

Analyst

Amazon Athena ML

INVOKE ML MODELS FOR INFERENCE DIRECTLY FROM A SQL QUERY

PREDICT

```
USING EXTERNAL FUNCTION
predict_customer_churn (age INTEGER)
    RETURNS DOUBLE
    SAGEMAKER 'xgboost-2019-09-20-04-49-29-
303'

SELECT n.id, n.firstName, n.lastName,
predict_customer_churn(n.age)
AS activity_prediction
FROM new_customers n
WHERE n.marital_status = ‘single’
```

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App Developer

Amazon Aurora ML

SIMPLE, OPTIMIZED, AND SECURE INTEGRATION BETWEEN AURORA AND AWS ML SERVICES USING SQL

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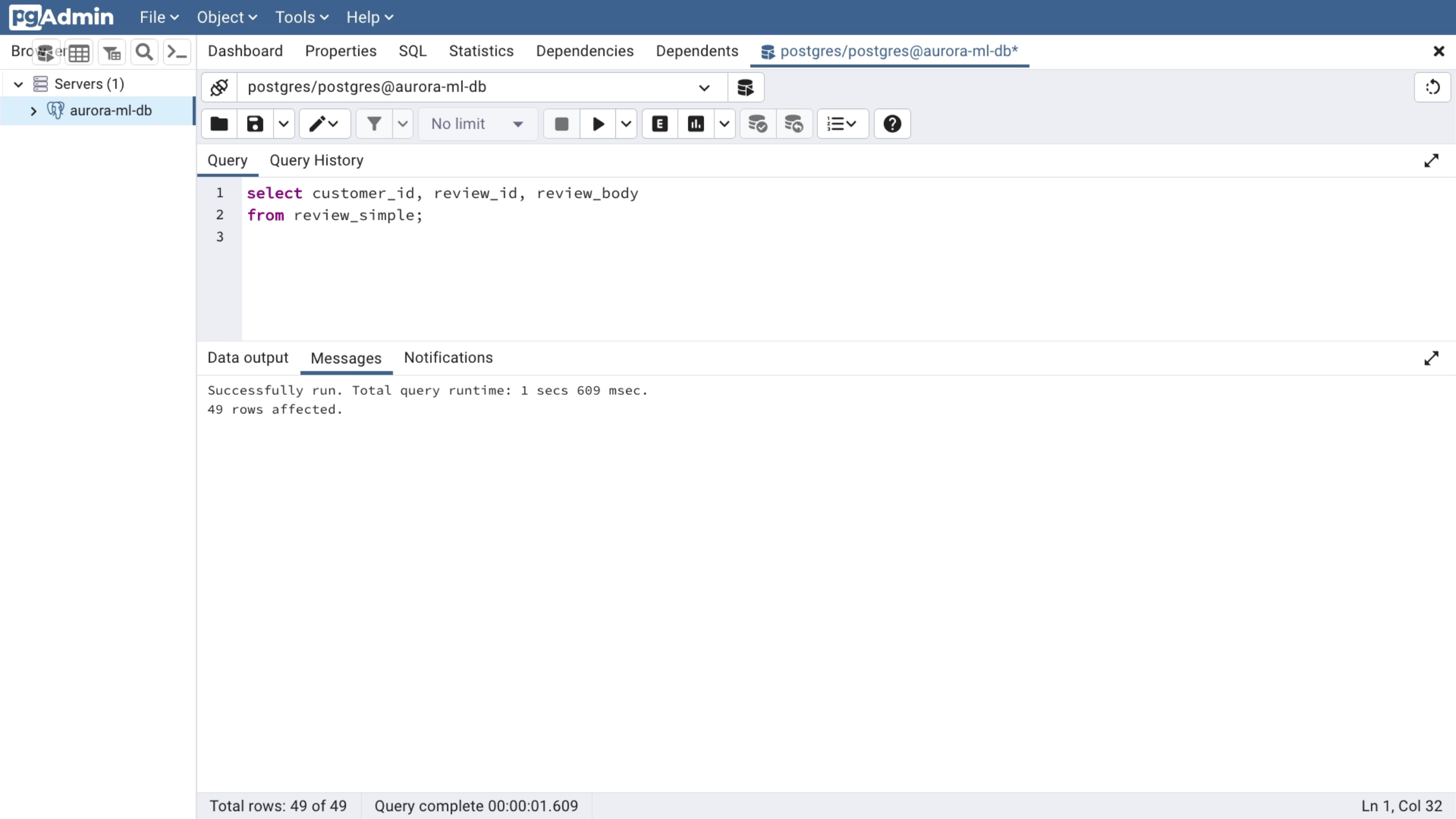
pgAdmin
File
Object
Tools
Help
Browser
Dashboard
Properties
SQL
Statistics
Dependencies
Dependents
postgres/postgres@aurora-ml-db*
Servers (1)
aurora-ml-db
postgres/postgres@aurora-ml-db
No limit
Query
Query History
1 select customer_id, review_id, review_body
2 from review_simple;
3
Data output
Messages
Notifications
Successfully run. Total query runtime: 1 secs 609 msec.
49 rows affected.
Total rows: 49 of 49
Query complete 00:00:01.609
Ln 1, Col 32

Practitioner

Amazon Neptune ML

MAKE PREDICTIONS ON GRAPH DATA WITHOUT ML EXPERTISE

TRAIN

```
neptune_ml.train_model (
                export_file_location,
                TRAINING_JOB_NAME,
                PROCESSING_PARAMS,
                TRAINING_PARAMS,
                ENDPOINT_PARAMS
)
```

PREDICT

```
%%gremlin

g.with (
    "Neptune#ml.endpoint","<ENDPOINT_NAME>").
    V().has('title', 'MOVIE_NAME(YEAR)').properties
    ("genre").with("Neptune#ml.classification").value()
```

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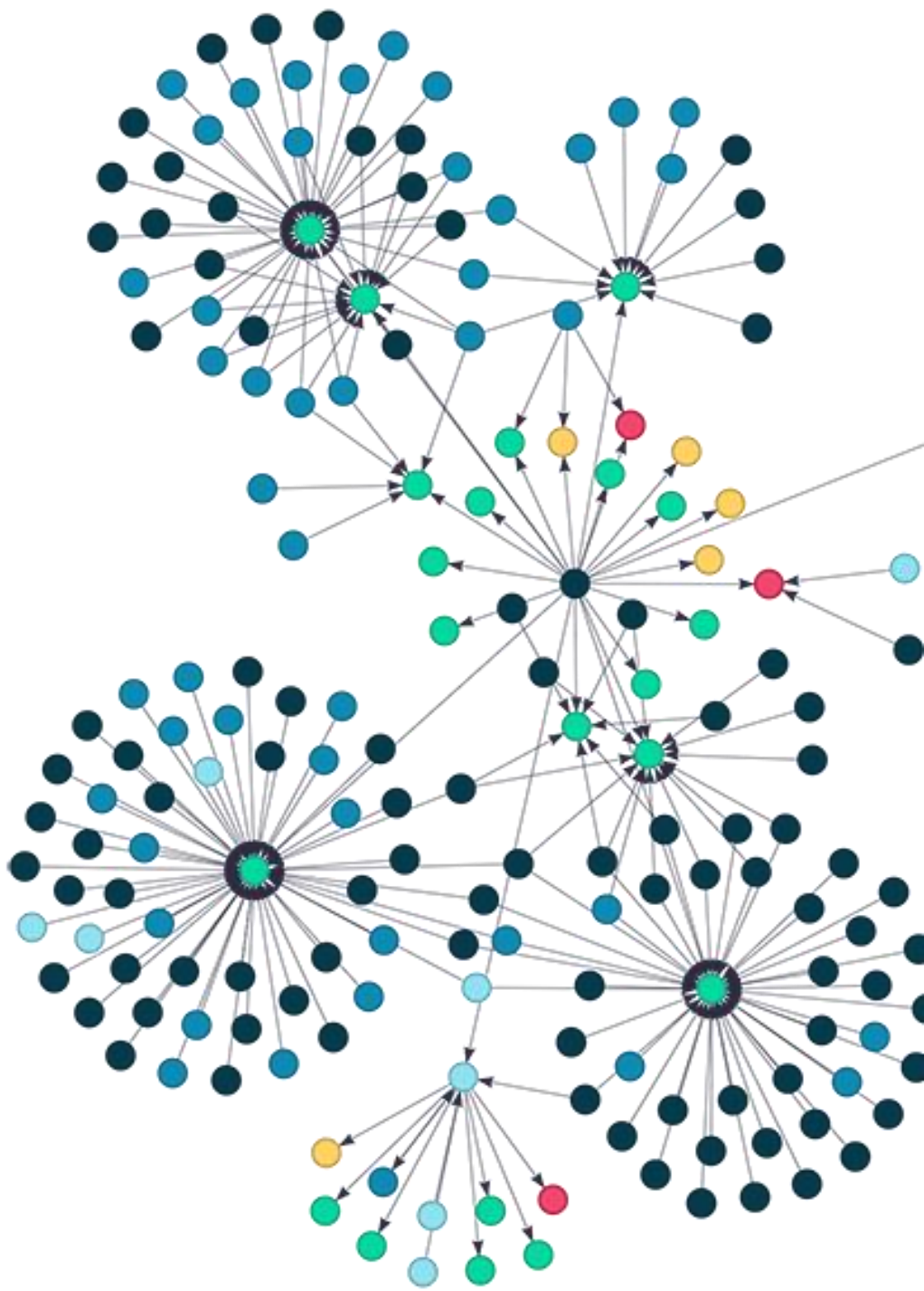
Careem

Detecting identity fraud using Amazon Neptune ML



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Business User

Amazon QuickSight ML

ML-POWERED INSIGHTS AND DATA VISUALIZATIONS

ML predictions

Machine learning powered insights

Natural language querying capability

Auto narrative

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Firefox File Edit View History Bookmarks Tools Window Help
Thu 9 Jun 5:38:57 pm
democentral.learnquicksight.online/
https://democentral.learnquicksight.online/#Dashboard-AskQ-Q-SaaS-Sales

WW Revenue | Type a question about your data

Exec Dashboard | Customer Sentiment | (Email Alert) | (Architecture) | Q Topic Dictionary

ambient technologies

MoM Sales

$2,609 ↑

MoM Customer Orders

-26 ↓

Anomalies Detected

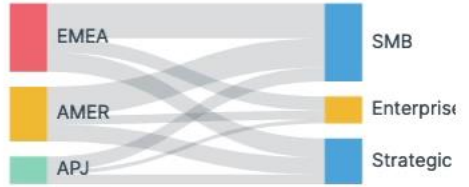
The top anomaly detected on Mar 2022 was:

- **Sales** for **Mondelez International** at $14,052, which was **higher** than the expected $505

Region

All

Customer Segmentation



Sales by Industry

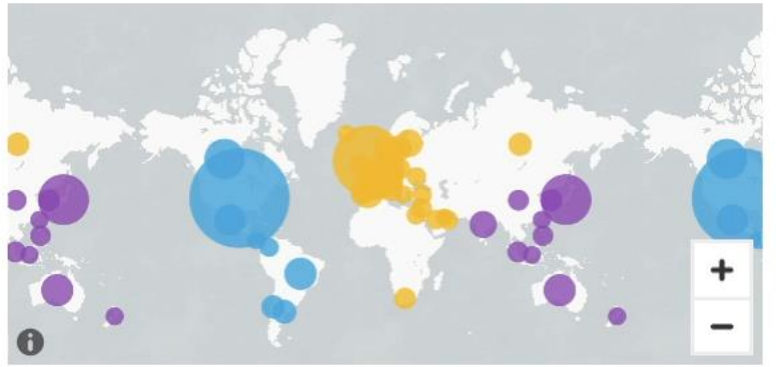
Forecast

Total sales is forecasted to be **$48,657** for Aug 2023

Period over period

Total sales for Jun 2022 **increased by 5.71%** **($2,609)** from $45,651 to $48,260.

SHOWING TOP 48 IN LONGITUDE, LATITUDE AND TOP 3 IN REGION



Quarter	Strategic	SMB	Enterprise
Q2' 2022	$51,000	$49,292	$33,731
Q1' 2022	$33,551	$63,530	$21,814
Q4' 2021	$94,031	$100,846	$41,016
Q3' 2021	$43,915	$79,942	$20,757
Q2' 2021	$42,418	$69,477	$23,475
Q1' 2021	$26,578	$46,031	$19,987

Top 25 Customers

Putting machine learning in the hands of every builder

Practitioner

Analyst

App Developer

Business User

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AWS brings **ML** closer **to the data**

AMAZON AURORA ML

AMAZON NEPTUNE ML

AMAZON REDSHIFT ML

AMAZON ATHENA ML

AMAZON QUICKSIGHT ML

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Dive deeper into these resources, get inspired and learn how you can use AI and machine learning to accelerate your business outcomes.

- 6 steps to machine learning success e-book
- 7 leading machine learning use cases e-book
- Machine learning at scale e-book
- Achieving transformative business results with machine learning e-book
- Tackling our world's hardest problems with machine learning e-book
- Accelerating machine learning innovation through security e-book
- … and more!

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https://bit.ly/3FnxDH7

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