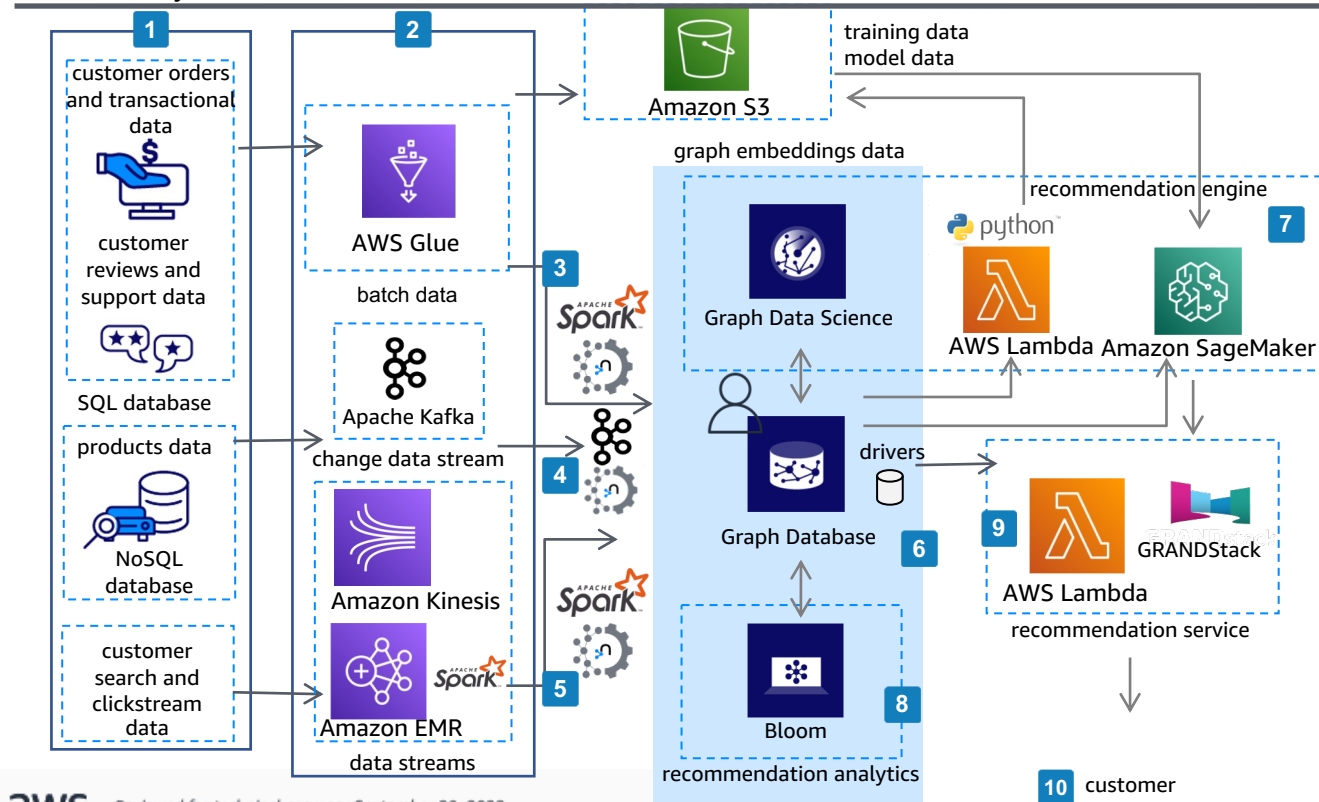


Product Recommendations Powered by Neo4j

Near real-time Personalized Product Recommendations With Neo4j Graph Technology on AWS

Personalized and intelligent recommendations of relevant products for shoppers in near real-time; mapping users to products, services, information, or other people based on their user profile, preferences, and past online activity.



- 1 Customer orders, product data and customer application clickstream data flow through **Amazon Redshift**, **Amazon Relational Database Service** (Amazon RDS), **Amazon EMR**, **Amazon Simple Storage Service** (Amazon S3), and **Amazon Kinesis**.
- 2 Data is ingested, transformed, and enriched using **AWS Glue**, **Apache Spark** on **Amazon EMR**, **AWS Lambda**, or any number of other means.
- 3 Bulk and batch data are loaded to Neo4j using the Neo4j Spark Connector for **Amazon EMR** or Neo4j APIs (including Cypher and Arrow) running in **Lambda**.
- 4 Near real-time data from **Apache Kafka** on AWS by Confluent flows through the Neo4j Kafka Connector to the Neo4j database. Transaction events from Neo4j can also be pushed to **Kafka**.
- 5 Clickstream data from **Amazon Kinesis** flows through the Neo4j Spark Connector running on **Amazon EMR** to the Neo4j database.
- 6 The Neo4j Graph Database (GDB) and Neo4j Graph Data Science (GDS) let you store, query, analyze, and manage highly-connected data. Neo4j Aura is deployed as a fully-managed service on AWS. Neo4j Enterprise runs on **Amazon Elastic Compute Cloud** (Amazon EC2) infrastructure instances.
- 7 Data scientists create features on Neo4j GDB and GDS. Embeddings are exported to **Amazon SageMaker** for smarter ML. Data scientists can also use the Spark and Python APIs to implement complex ML on Neo4j. Data scientists can push graph features back to relational source systems where they can be easily visualized or reanalyzed.
- 8 **Amazon QuickSight** and Neo4j Bloom visualization tools let analysts explore data and present findings plainly.
- 9 Developers use official and unofficial drivers to access Neo4j using Java, Node, Javascript, C#, Python, Go, Ruby, PHP, Erlang, and Perl from **AWS Lambda** or any application. Others choose a low-code approach using GraphQL API and the GRANDStack framework, using **Amazon API Gateway**, **AWS CodeDeploy**, and other development services.
- 10 The recommended services using Neo4j GDB and GDS run fast, at scale, in near real-time. This framework can be used to build similar recommendation engines for additional use cases.



Reviewed for technical accuracy September 20, 2022

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

AWS Reference Architecture