AWS Solution Architect Associate Certification Training – Module 29

29. Elastic Cache, DynamoDB and Redshift

Overview of Elastic Cache

Amazon ElastiCache offers fully managed Redis and Memcached. Can seamlessly deploy, run, and scale popular open source compatible in-memory data stores. Can build data-intensive apps or improve the performance of your existing apps by retrieving data from high throughput and low latency in-memory data stores. Amazon ElastiCache is a popular choice for Gaming, Ad-Tech, Financial Services, Healthcare, and IoT apps.

Benefits

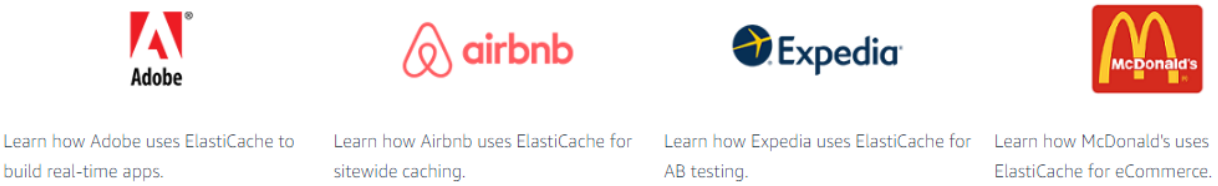
- Extreme performance.
- Fully managed.
- Scalable

There are 2 Elastic Cache Engines

- ✓ Amazon ElasticCache for Redis
- ✓ Amazon ElasticCache for Memcached

How it works

Customers



Choosing between Redis and Memcached

Redis and Memcached are popular, open-source, in-memory data stores. Although they are both easy to use and offer high performance, there are important differences to consider when choosing an engine. Memcached is designed for simplicity while Redis offers a rich set of features that make it effective for a wide range of use cases.

Features

- ✓ *Sub-millisecond latency:* Both Redis and Memcached support sub-millisecond response times. By storing data in-memory they can read data more quickly than disk based databases.
- ✓ *Developer ease of use:* Both Redis and Memcached are syntactically easy to use and require a minimal amount of code to integrate into your application.
- ✓ *Data partitioning:* Both Redis and Memcached allow you to distribute your data among multiple nodes. This allows you to scale out to better handle more data when demand grows.
- ✓ *Support for a broad set of programming languages:* Both Redis and Memcached have many open-source clients available for developers. Supported languages include Java, Python, PHP, C, C++, C#, JavaScript, Node.js, Ruby, Go and many others.

Advanced data structures: In addition to strings, Redis supports lists, sets, sorted sets, hashes, bit arrays, and hyperloglogs. Applications can use these more advanced data structures to support a variety of use cases. For example, you can use Redis Sorted Sets to easily implement a game leaderboard that keeps a list of players sorted by their rank.

Multithreaded architecture: Since Memcached is multithreaded, it can make use of multiple processing cores. This means that you can handle more operations by scaling up compute capacity.

Snapshots: With Redis you can keep your data on disk with a point in time snapshot which can be used for archiving or recovery.

Replication: Redis lets you create multiple replicas of a Redis primary. This allows you to scale database reads and to have highly available clusters.

Transactions: Redis supports transactions which let you execute a group of commands as an isolated and atomic operation.

Pub/Sub: Redis supports Pub/Sub messaging with pattern matching which you can use for high performance chat rooms, real-time comment streams, social media feeds, and server intercommunication.

And so on..

Overview of DynamoDB

It is a key-value and document database that delivers single-digit millisecond performance at any scale.It's a fully managed, multiregion, multimaster database with built-in security, backup and restore, and in-memory caching for internet-scale applications. Can handle more than 10 trillion requests per day and support peaks of more than 20 million requests per second.Many of the world's fastest growing businesses such as Lyft, Airbnb, and Redfin as well as enterprises such as Samsung, Toyota, and Capital One depend on the scale and performance of DynamoDB to support their mission-critical workloads.More than 100,000 AWS customers have chosen DynamoDB as their key-value and document database for mobile, web, gaming, ad tech, IoT, and other applications that need low-latency data access at any scale. Create a new table for your application and let DynamoDB handle the rest.

Benefits

- *Performance at scale:* DynamoDB supports some of the world's largest scale applications by providing consistent, single-digit millisecond response times at any scale.
  - ✓ *Serverless:* there are no servers to provision, patch, or manage and no software to install, maintain, or operate.
  - ✓ *Enterprise ready:* DynamoDB supports ACID transactions to enable you to build business-critical applications at scale.
  - ✓ DynamoDB encrypts all data by default and provides fine-grained identity and access control on all your tables.
  - ✓ Can create full backups of hundreds of terabytes of data instantly with no performance impact to your tables, and recover to any point in time in the preceding 35 days with no downtime.

Use cases

- Serverless Web Applications
- Microservices Data Store
- Moblile Backends

- Gaming
- IOT

Customers

- Nike
- Samsung
- Netflix

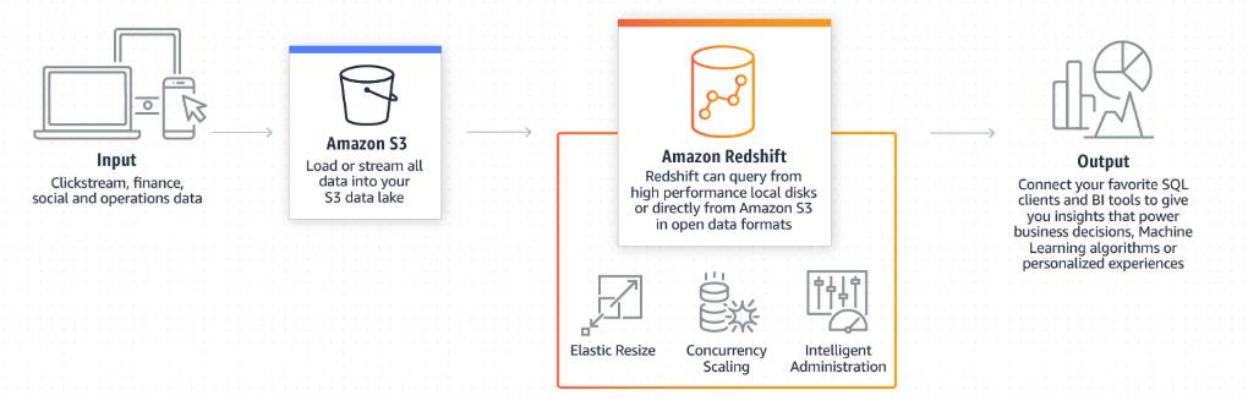
Overview of Redshift

Fast, scalable data warehouse that makes it simple and cost-effective to analyze all your data across your data warehouse and data lake. Delivers ten times faster performance than other data warehouses by using machine learning, massively parallel query execution, and columnar storage on high-performance disk.Can setup and deploy a new data warehouse in minutes, and run queries across petabytes of data in your Redshift data warehouse, and exabytes of data in your data lake built on Amazon S3. *Concurrency scaling* is a new feature that provides consistently fast query performance even with thousands of concurrent users and queries. Amazon Redshift automatically deploys and removes capacity as needed to serve your changing query workload.

Benefits

- Faster performance
- Easy to set-up, deploy and manage
- Cost-effective
- Scale quickly to meet your needs
- Query your Data Lake
- Secure

How it Works



Featured customers

- ✓ Finra
- ✓ Johnson & Johnson
- ✓ YelpEquinox
- ✓ Pinintrest

Overview of Kinesis

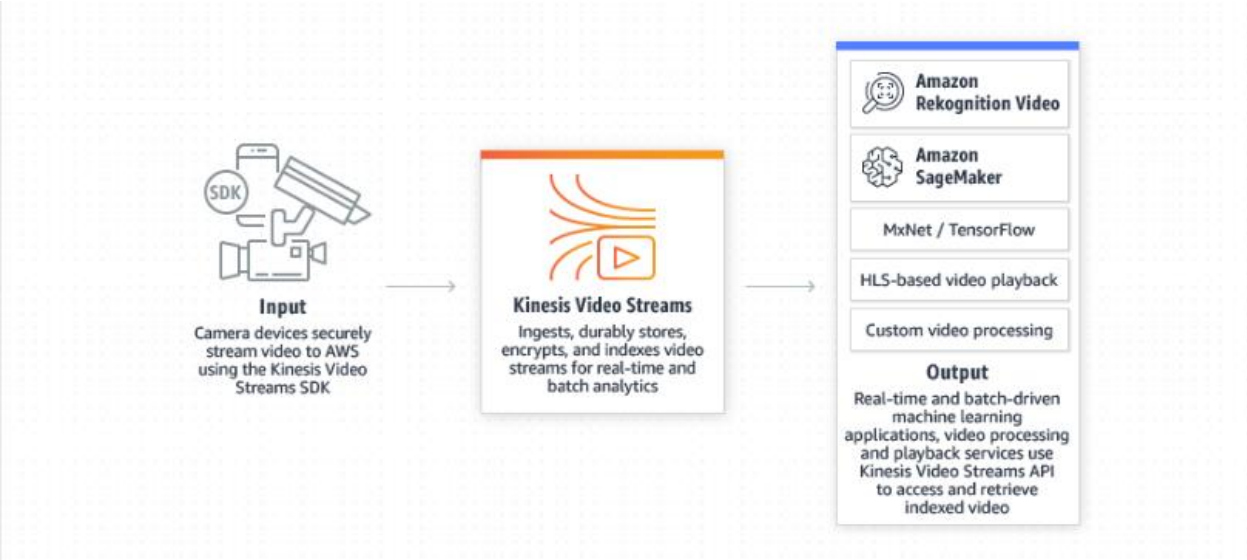
Amazon Kinesis makes it easy to collect, process, and analyze real-time, streaming data so you can get timely insights and react quickly to new information. Amazon Kinesis offers key capabilities to cost-effectively process streaming data at any scale, along with the flexibility to choose the tools that best suit the requirements of your application. With Amazon Kinesis, you can ingest real-time data such as video, audio, application logs, website clickstreams, and IoT telemetry data for machine learning, analytics, and other applications. Amazon Kinesis enables you to process and analyze data as it arrives and respond instantly instead of having to wait until all your data is collected before the processing can begin.

Benefits

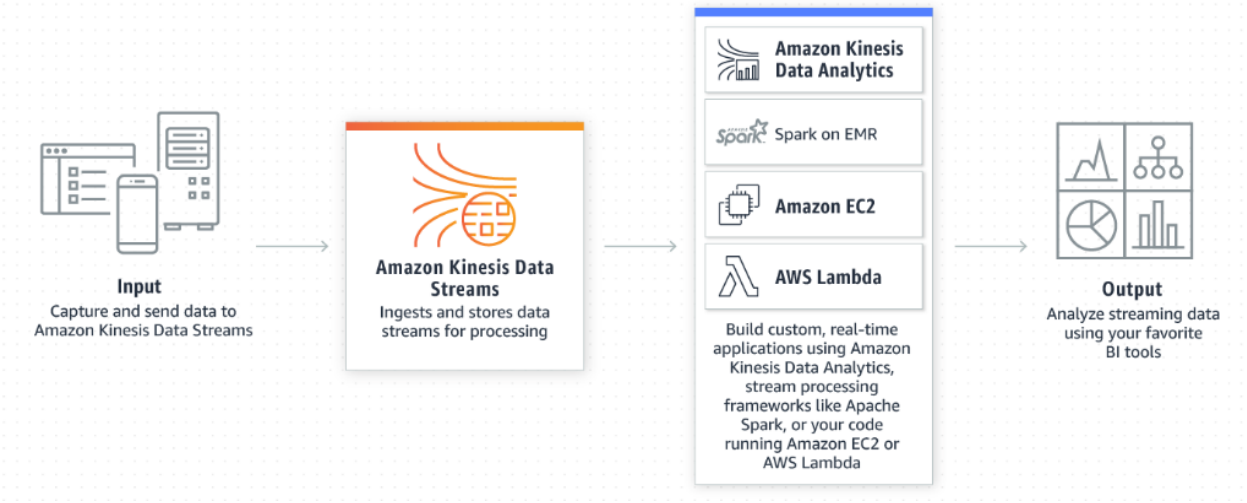
- ✓ Real time
- ✓ Fully managed
- ✓ Scalable

Amazon Kinesis Capabilities

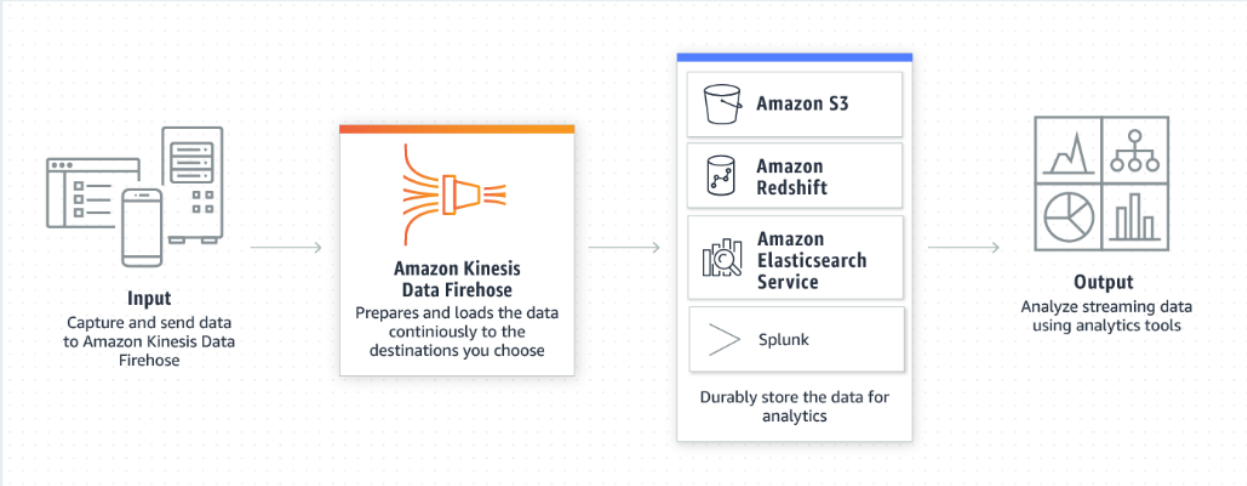
Kinesis Video Streams: Amazon Kinesis Video Streams makes it easy to securely stream video from connected devices to AWS for analytics, machine learning (ML), and other processing.



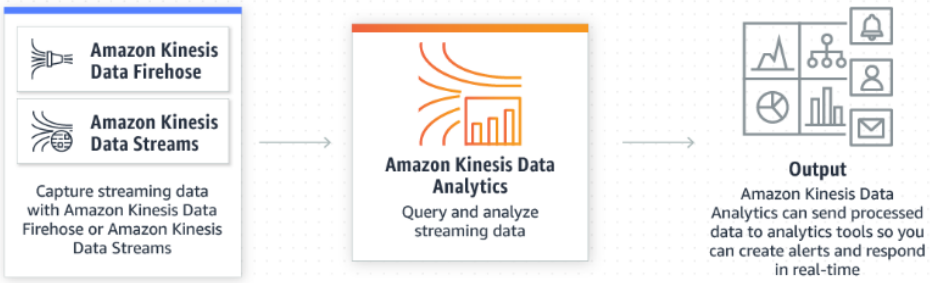
Kinesis Data Streams: Amazon Kinesis Data Streams is a scalable and durable real-time data streaming service that can continuously capture gigabytes of data per second from hundreds of thousands of sources.



Kinesis Data Firehose:Amazon Kinesis Data Firehose is the easiest way to capture, transform, and load data streams into AWS data stores for near real-time analytics with existing business intelligence tools.



Kinesis Data Analytics:Amazon Kinesis Data Analytics is the easiest way to process data streams in real time with SQL or Java without having to learn new programming languages or processing frameworks.


Amazon Kinesis Data Firehose
Amazon Kinesis Data Streams
Capture streaming data with Amazon Kinesis Data Firehose or Amazon Kinesis Data Streams
Amazon Kinesis Data Analytics
Query and analyze streaming data
Output
Amazon Kinesis Data Analytics can send processed data to analytics tools so you can create alerts and respond in real-time