AI & ML Services and Machine Learning Process

AWS CLOUD TECHNOLOGY AND SERVICES CONCEPTS
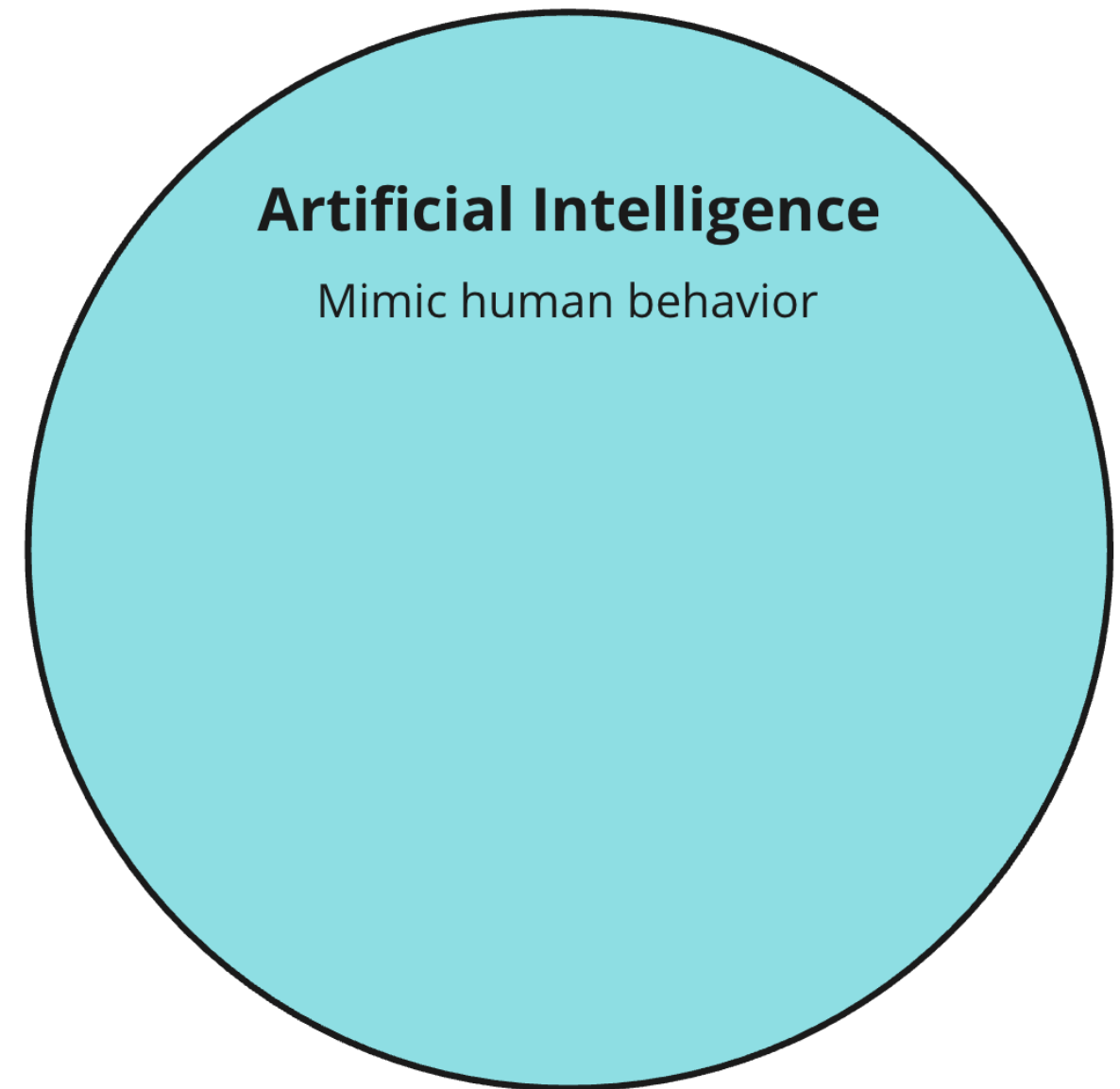
Rahulraj Singh
Technical Product Manager

datacamp

What is AI and ML?

Artificial intelligence

- Simulates human intelligence in machines

- Involves tasks like problem-solving, speech recognition, and learning

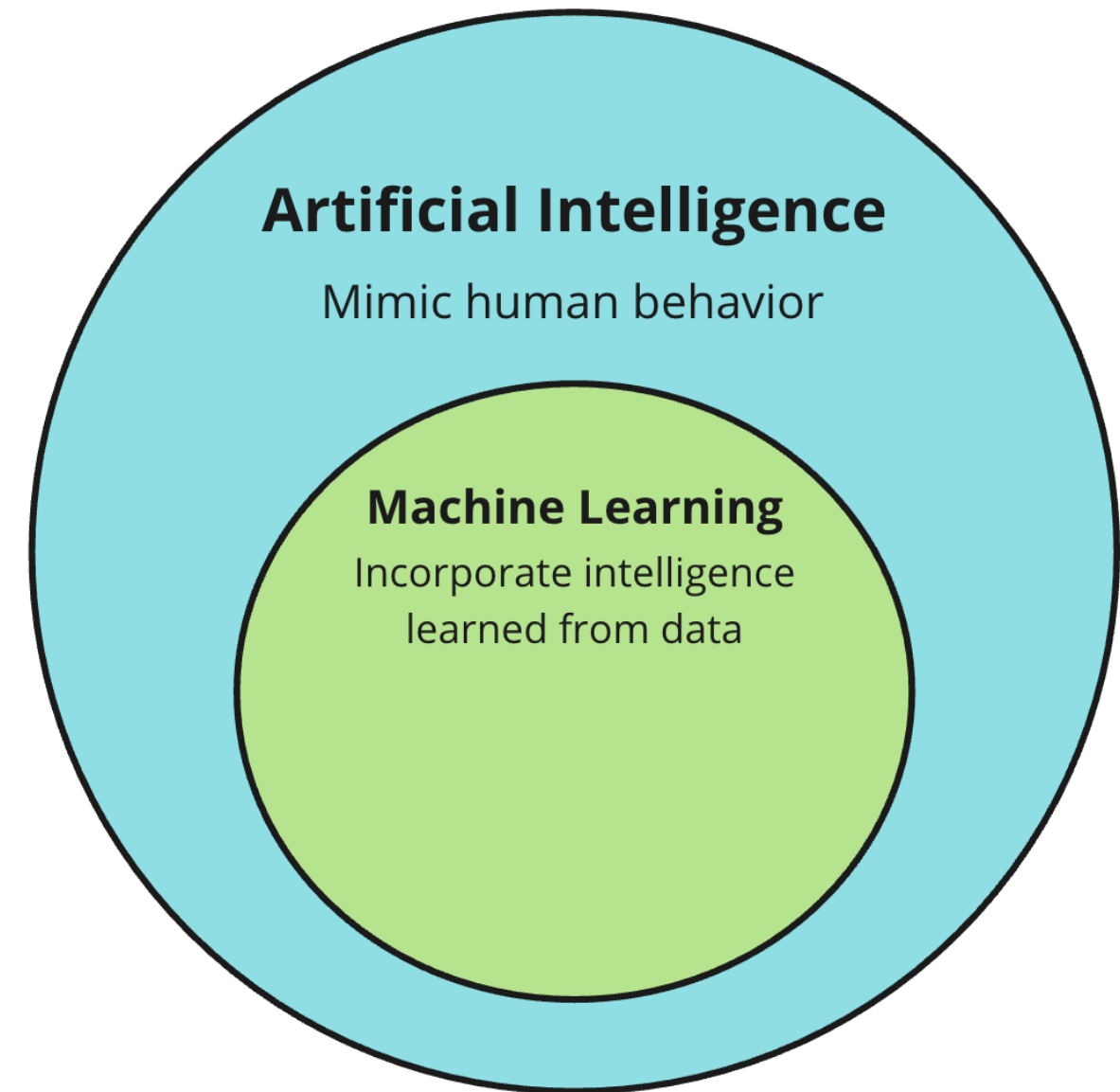**Artificial Intelligence**

Mimic human behavior

What is AI and ML?

Artificial intelligence

- Simulates human intelligence in machines
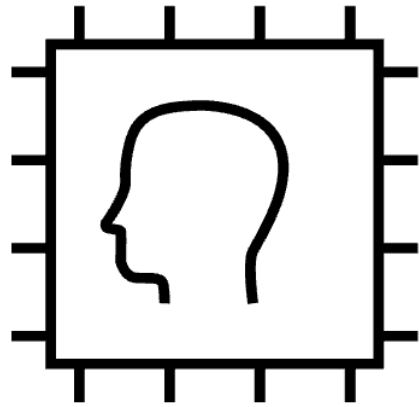- Involves tasks like problem-solving, speech recognition, and learning

Machine learning

- Subset of AI
- Focuses on systems that learn from data

Artificial Intelligence
Mimic human behavior

Machine Learning
Incorporate intelligence
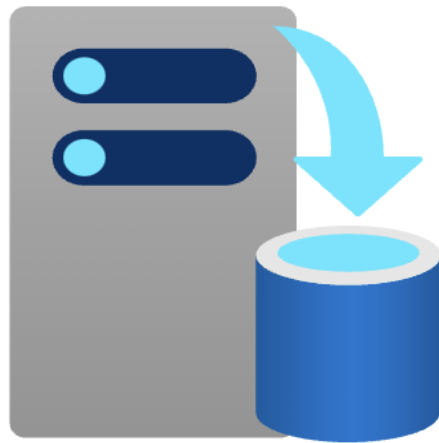learned from data

AWS AI and ML offerings

AI services

ML services

ML frameworks

ML workflow

AI & ML services

Artificial Intelligence services

Amazon Translate

Amazon Polly

Amazon Lex

Amazon Comprehend

Amazon Forecast

Amazon Rekognition

Amazon CodeGuru

Machine Learning services

Amazon SageMaker

Amazon CodeWhisperer

Introducing AWS AI services

- Pre-trained, auto-trained models

- No machine learning background needed

Artificial Intelligence services

Amazon Translate

Amazon Polly

Amazon Lex

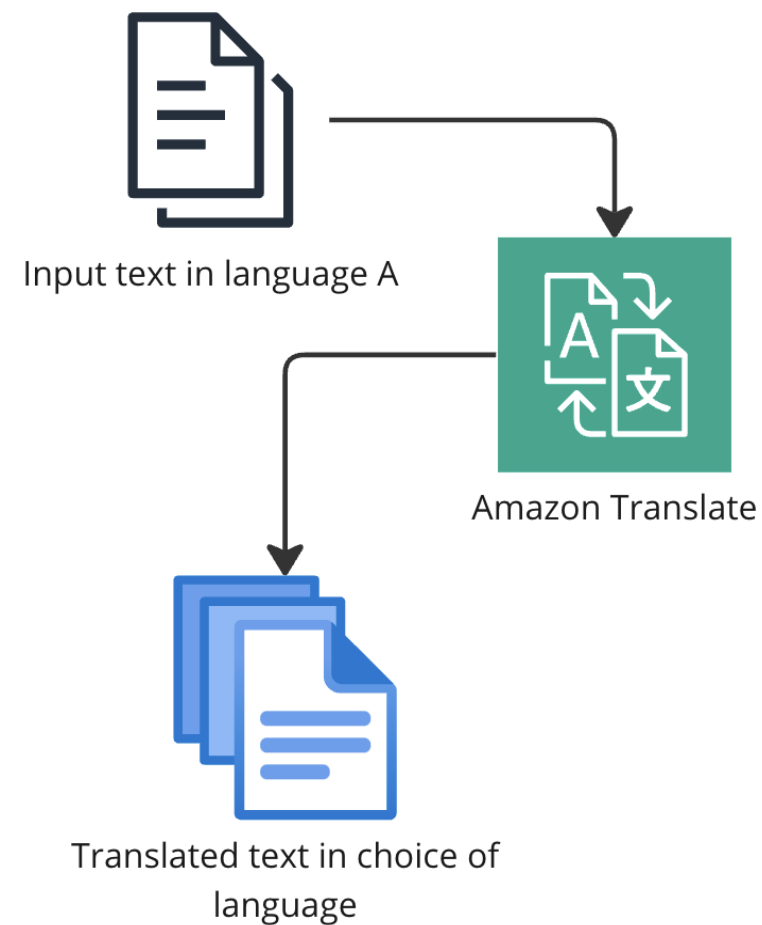Amazon Comprehend

Amazon Forecast

Amazon Rekognition

Amazon CodeGuru

AWS AI services

Amazon Translate

- Translate text between languages

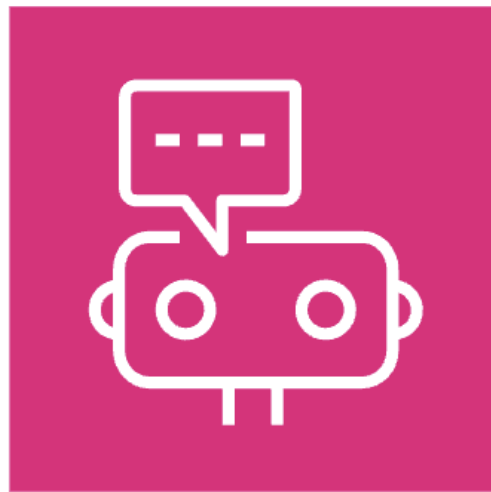Input text in language A

Amazon Translate

Translated text in choice of language

Amazon Polly

- Convert text into lifelike, natural-sounding speech

Input text in language A

Amazon Polly

Human-sound speech in choice of language
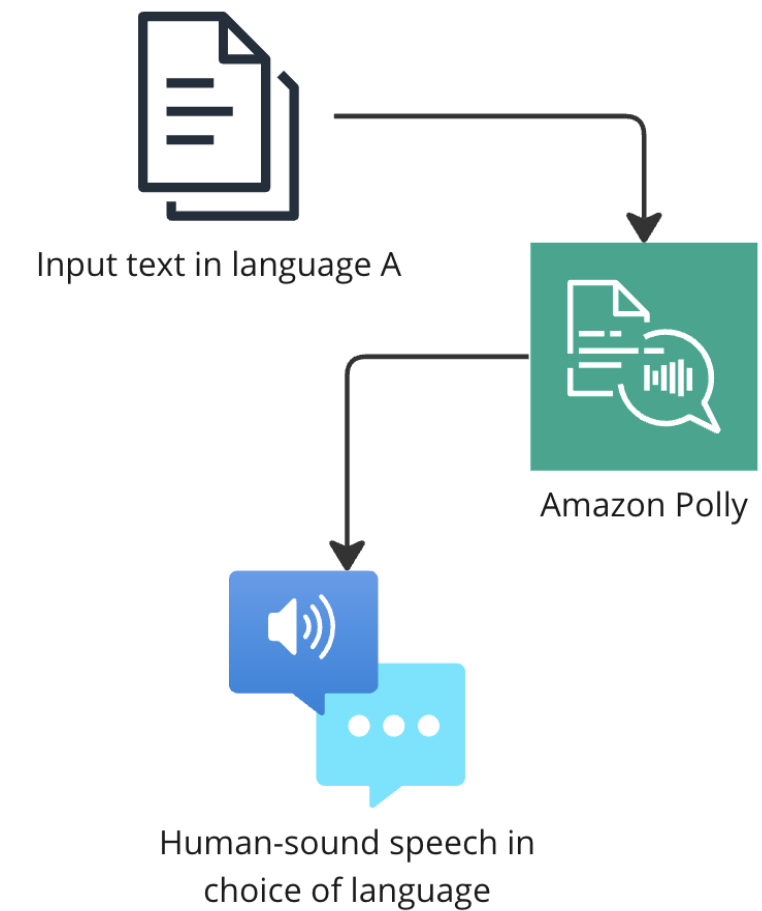
AWS AI services

Amazon Lex

- Create conversational interfaces

- Design and deploy chatbots

Create and deploy
conversational systems

Amazon Comprehend

- Extract insights from text

- Identify sentiments, entities, and language

Extract sentiments and
insigths from text

AWS AI services

Amazon Forecast

- Build accurate time-series predictions

Time series predictions

Amazon CodeGuru

- Automate code reviews

- Improve code quality with intelligent recommendations
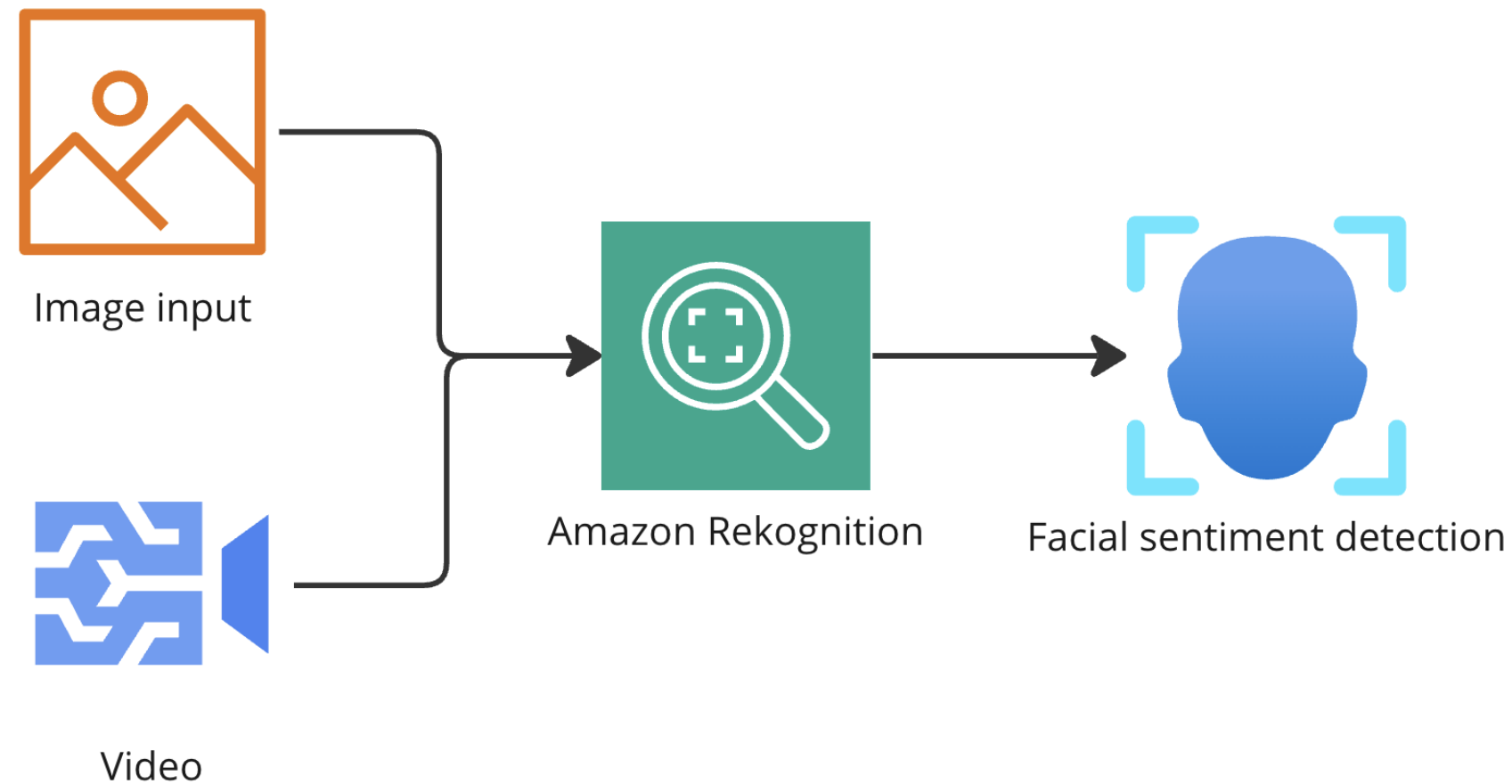

Intelligent code reviews

AWS AI services

Amazon Rekognition

- Analyze and recognize objects in images

- Perform facial analysis and sentiment detection in videos

Image input

Video

Amazon Rekognition

Facial sentiment detection

ML services in AWS

- Enable developers to build custom ML models

- Tailored for those with ML expertise and specific use cases

Machine Learning services

Amazon SageMaker   Amazon CodeWhisperer

Amazon SageMaker

Key features

- Fully managed service for end-to-end ML lifecycle

- Integrated Jupyter notebooks for model development

- One-click training and deployment

Predictive analytics

Amazon SageMaker

Key features

- Fully managed service for end-to-end ML lifecycle

- Integrated Jupyter notebooks for model development

- One-click training and deployment

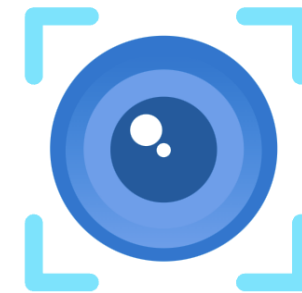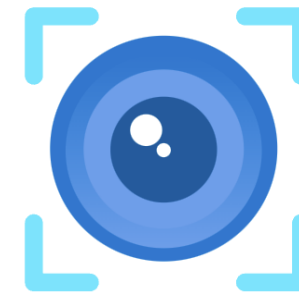Predictive analytics

Computer Vision

Amazon SageMaker

Key features

- Fully managed service for end-to-end ML lifecycle

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- One-click training and deployment

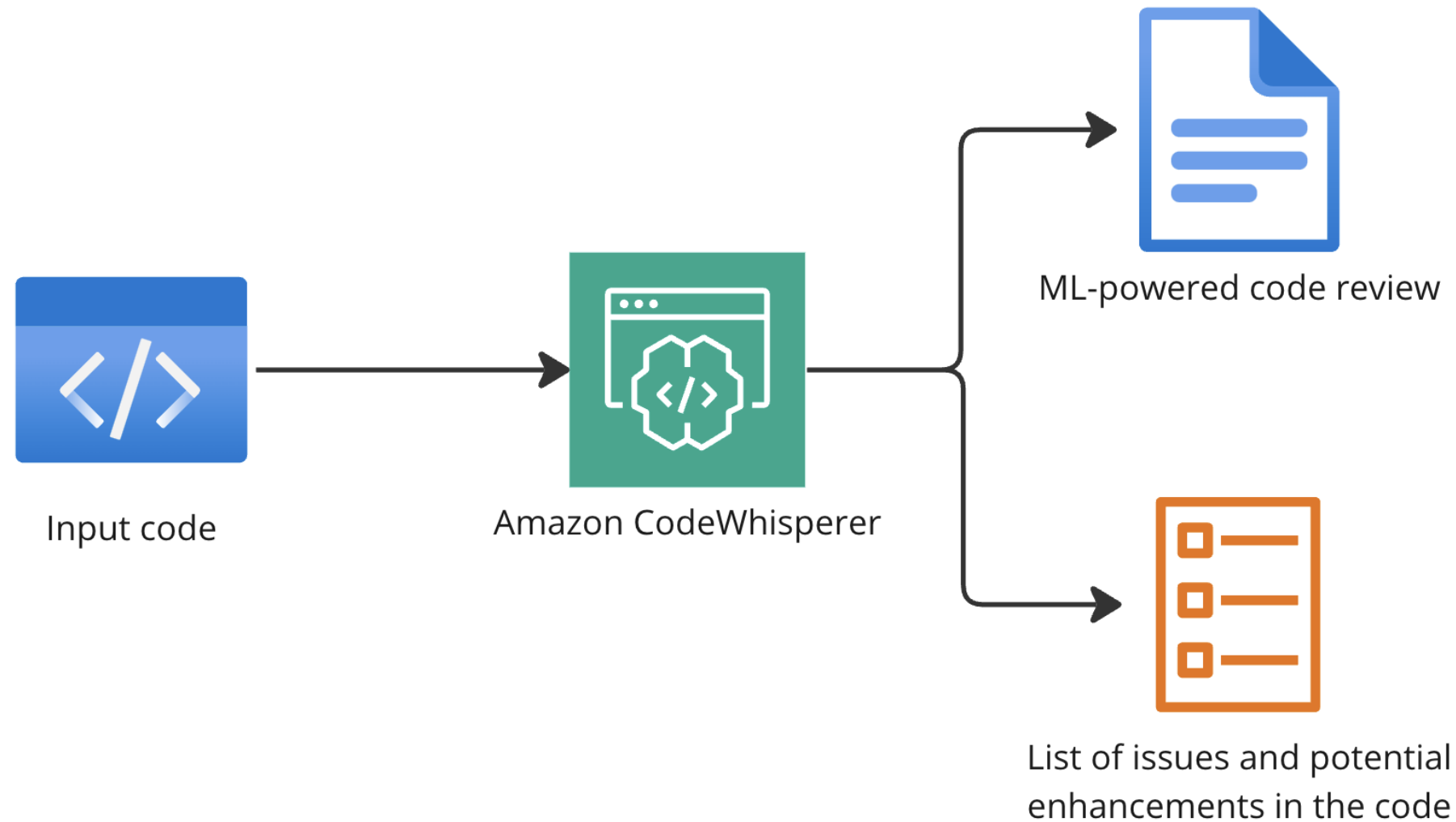Predictive analytics

Computer Vision

Natural language processing

Amazon CodeWhisperer

- Automated ML-powered and streamlined code review

- Enhances code quality and identifies issues

Input code

Amazon CodeWhisperer

ML-powered code review

List of issues and potential enhancements in the code

ML frameworks

- Open-source frameworks for diverse ML
  workflows

Open-source frameworks

ML frameworks

- Open-source frameworks for diverse ML workflows

- Enables robust, scalable, and seamless deployment
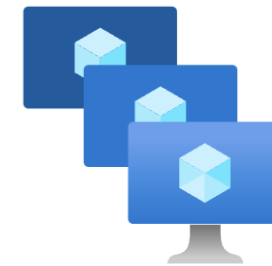
Open-source frameworks

Durability and scalability

ML frameworks

- Open-source frameworks for diverse ML workflows

- Enables robust, scalable, and seamless deployment

- Caters to a wide range of uses

Open-source frameworks
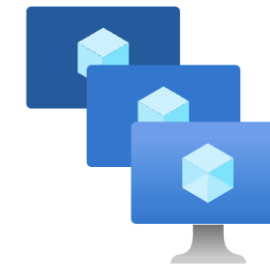
Durability and scalability

Flexibility and versatility

AWS CLOUD TECHNOLOGY AND SERVICES CONCEPTS

AWS services enabling ML frameworks

TensorFlow

Development and deployment of scalable ML models on AWS

AWS services enabling ML frameworks

TensorFlow

Development and deployment of scalable ML models on AWS

PyTorch

Execute machine learning and computational graph-based systems on-the-fly

AWS services enabling ML frameworks

TensorFlow

Development and deployment of scalable ML models on AWS

PyTorch

Execute machine learning and computational graph-based systems on-the-fly

MxNet

Large-scale, distributed training of deep neural networks

Sample ML pipeline

Data stored and maintained
in S3 bucket

Sample ML pipeline

Data stored and maintained in S3 bucket

SageMaker reads data from S3 to develop the ML model

Sample ML pipeline

Data stored and maintained
in S3 bucket

SageMaker reads data from
S3 to develop the ML model

Package code in an EKS
container for deployment

Sample ML pipeline

New data files

Data stored and maintained in S3 bucket

SageMaker reads data from S3 to develop the ML model

Triggers lambda

Re-train ML model with new data

AWS Lambda

Package code in an EKS container for deployment
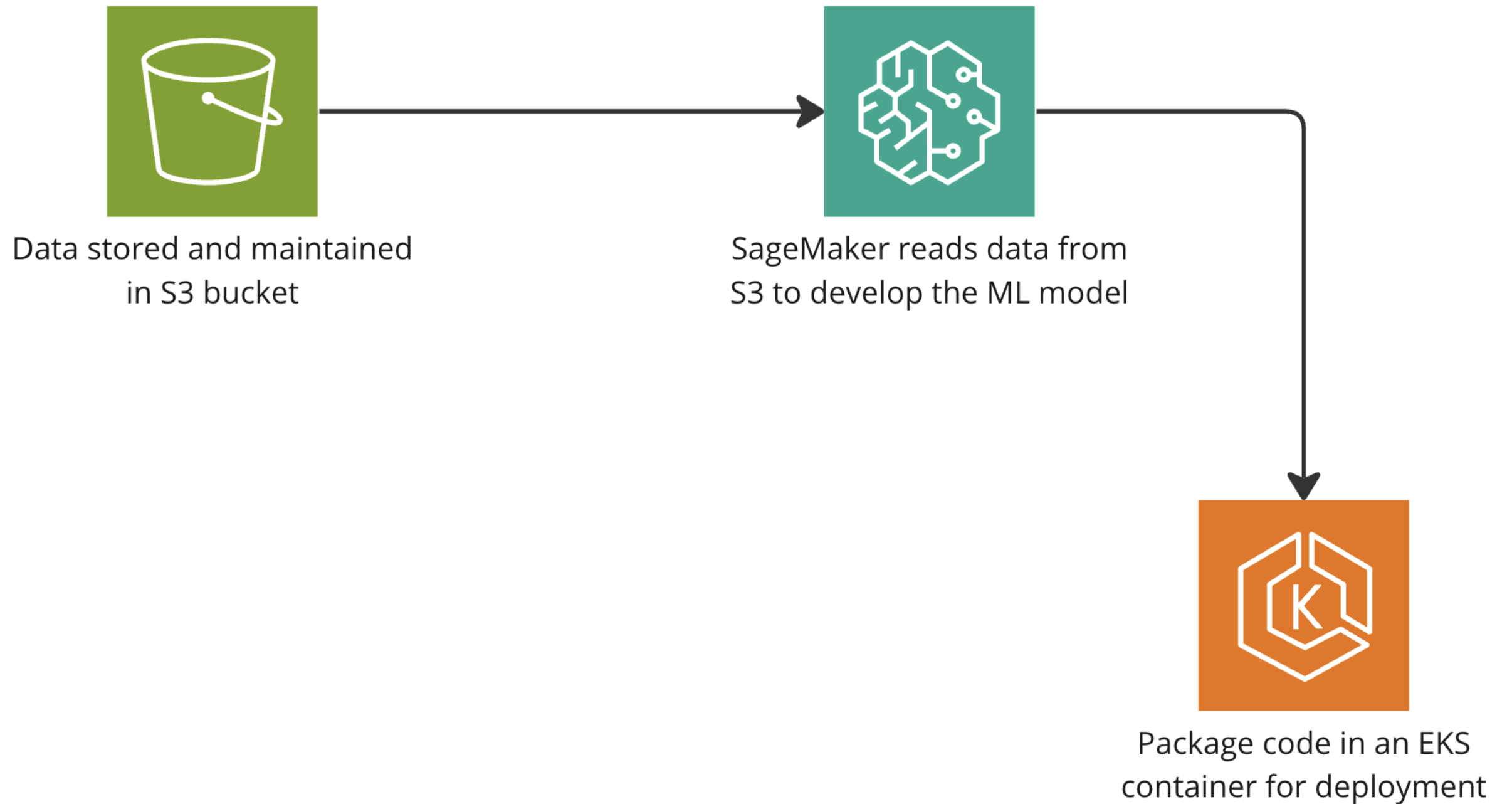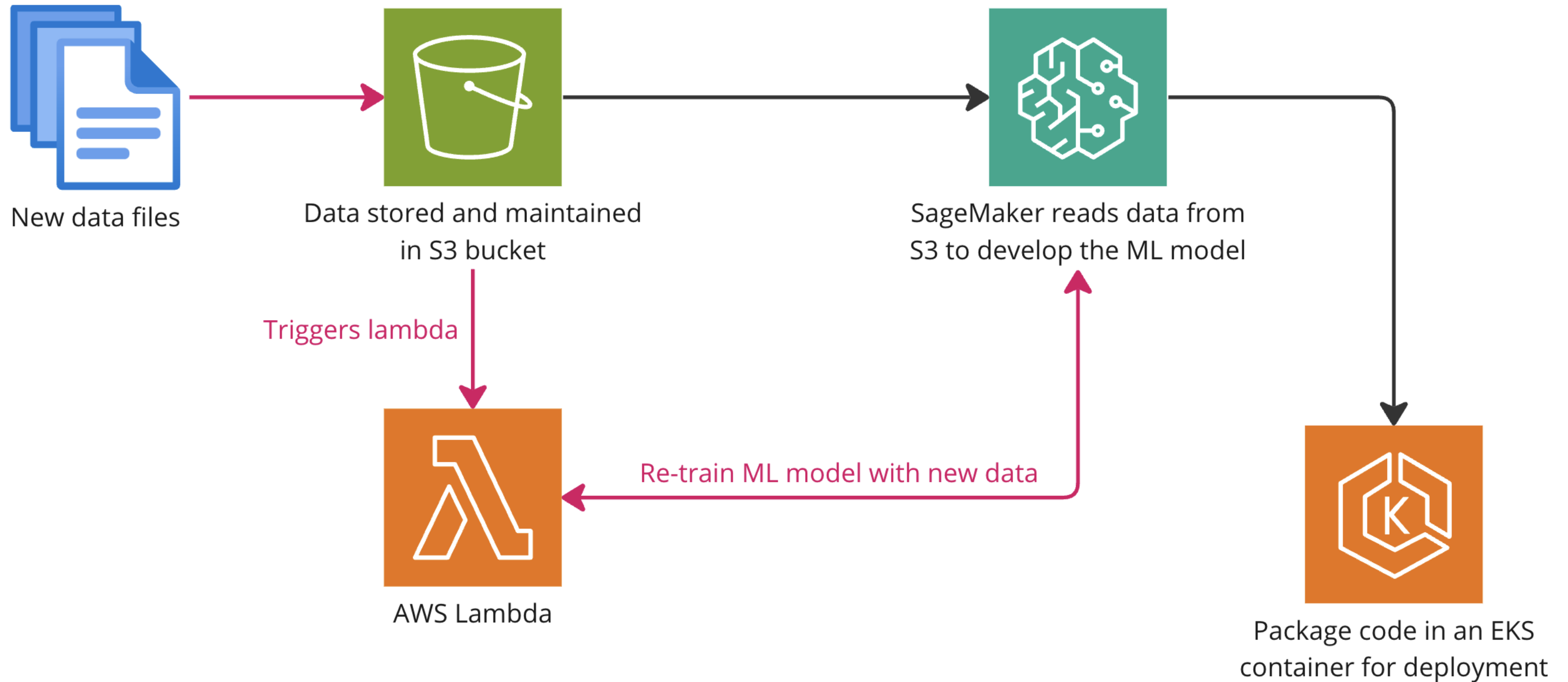
Let's practice!

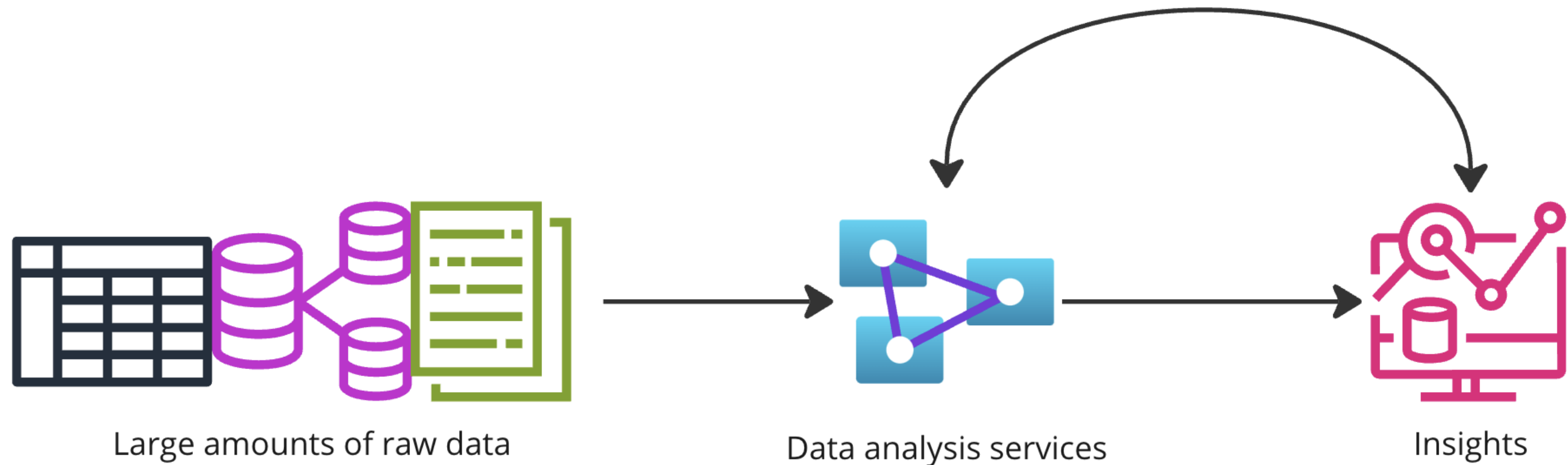## AWS CLOUD TECHNOLOGY AND SERVICES CONCEPTS

Analytics & BI Services

AWS CLOUD TECHNOLOGY AND SERVICES CONCEPTS

Alex Kuntz
Head of Cloud Curriculum, DataCamp

datacamp

Introduction to data analytics

Large amounts of raw data → Data analysis services → Insights

- Turning raw data into actionable insights

- Iterative process

Data analytics in AWS

Amazon Athena

Amazon QuickSight

Amazon Kinesis

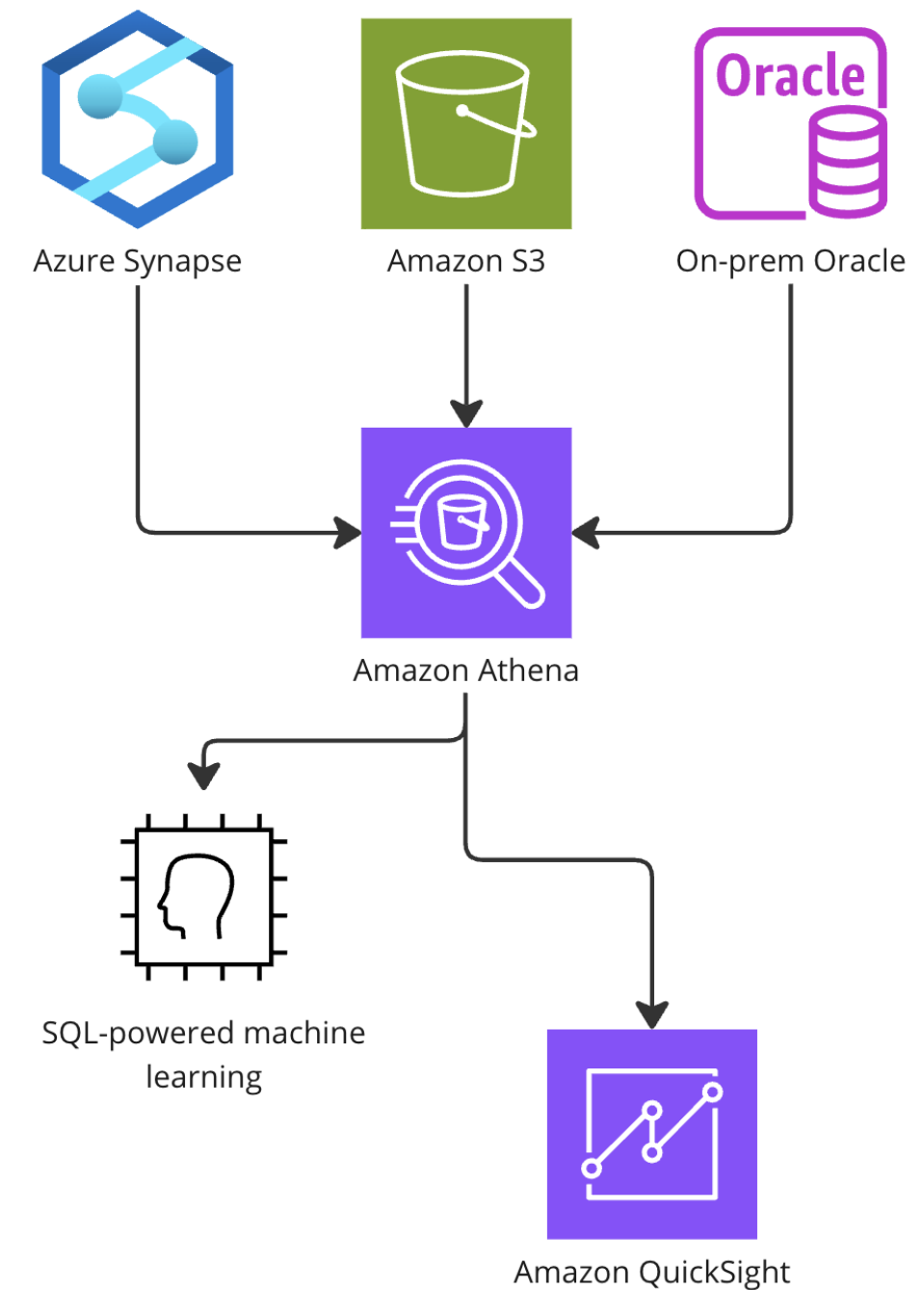Amazon Redshift

Amazon Macie

AWS Glue

Amazon Athena

Serverless, interactive analytics service for analyzing petabyte-scale data at source

Key features

- Versatile data integration

- Simplified pricing of paying per query

Azure Synapse

Amazon S3

On-prem Oracle

Amazon Athena

SQL-powered machine learning

Amazon QuickSight

Amazon QuickSight

Unified business intelligence service
supporting interactive dashboards

Amazon QuickSight

Amazon QuickSight

Unified business intelligence service supporting interactive dashboards

Key features

- Automatic scaling without server setup

S3

Databricks

Data Lake

Oracle

Athena

Aurora

Amazon QuickSight

Interactive visualizations

Amazon QuickSight

Unified business intelligence service
supporting interactive dashboards

Key features

- Automatic scaling without server setup

- Generative BI capabilities

S3   Databricks   Data Lake

Oracle   Athena   Aurora

Natural language instructions   Amazon QuickSight
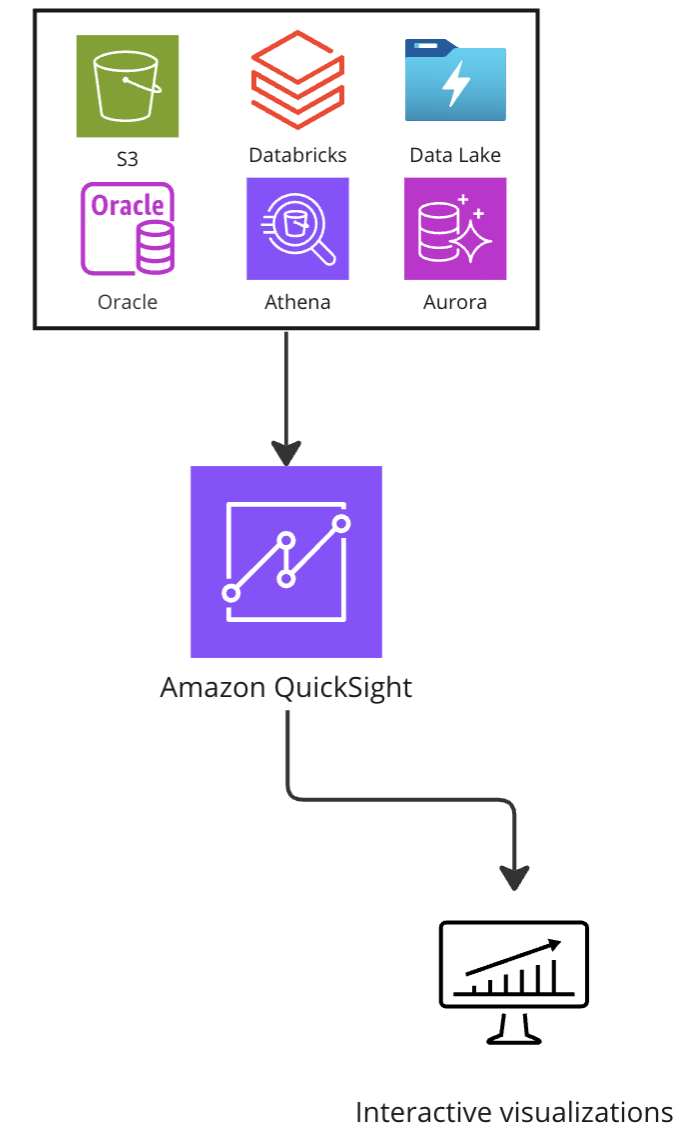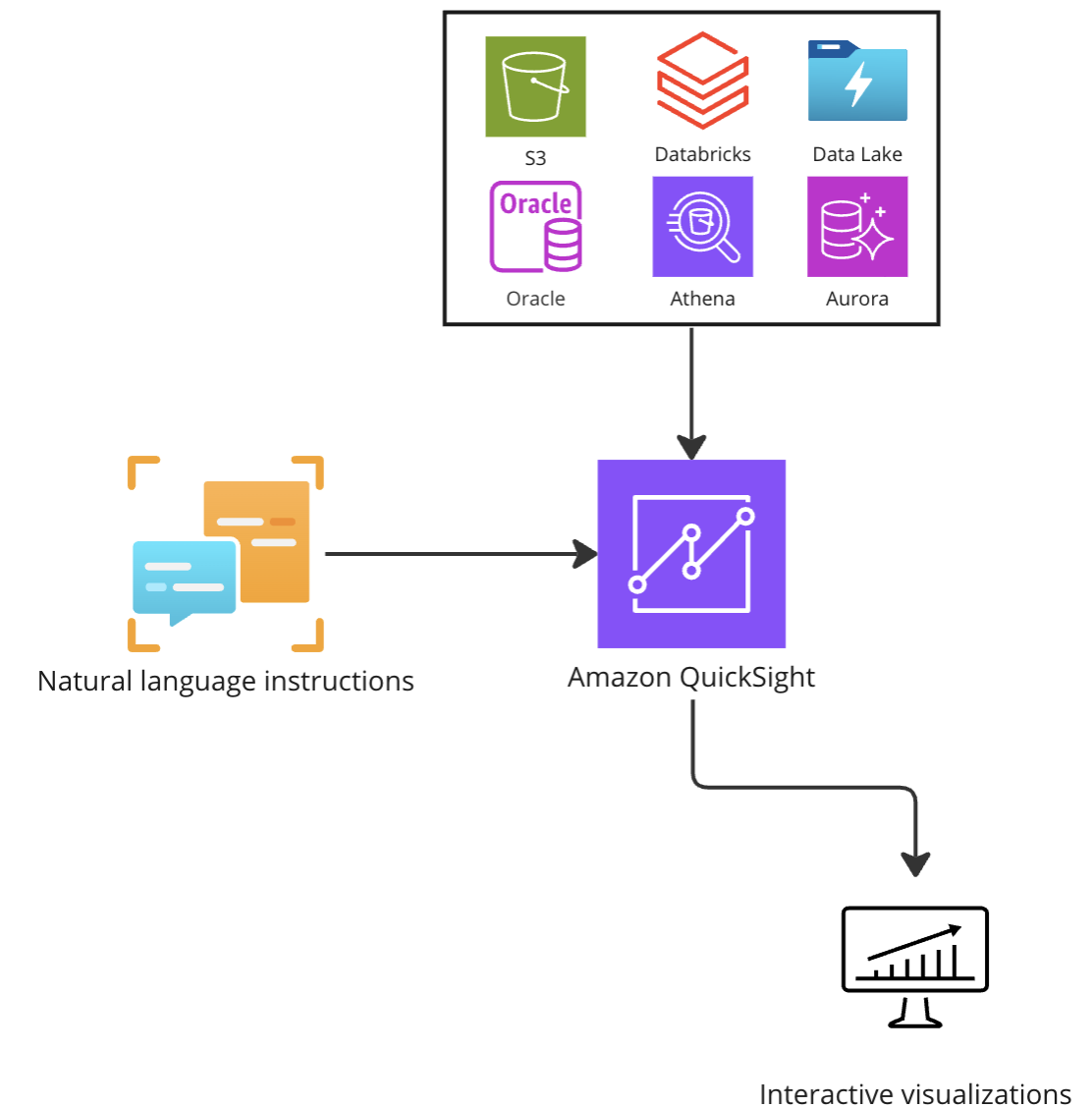
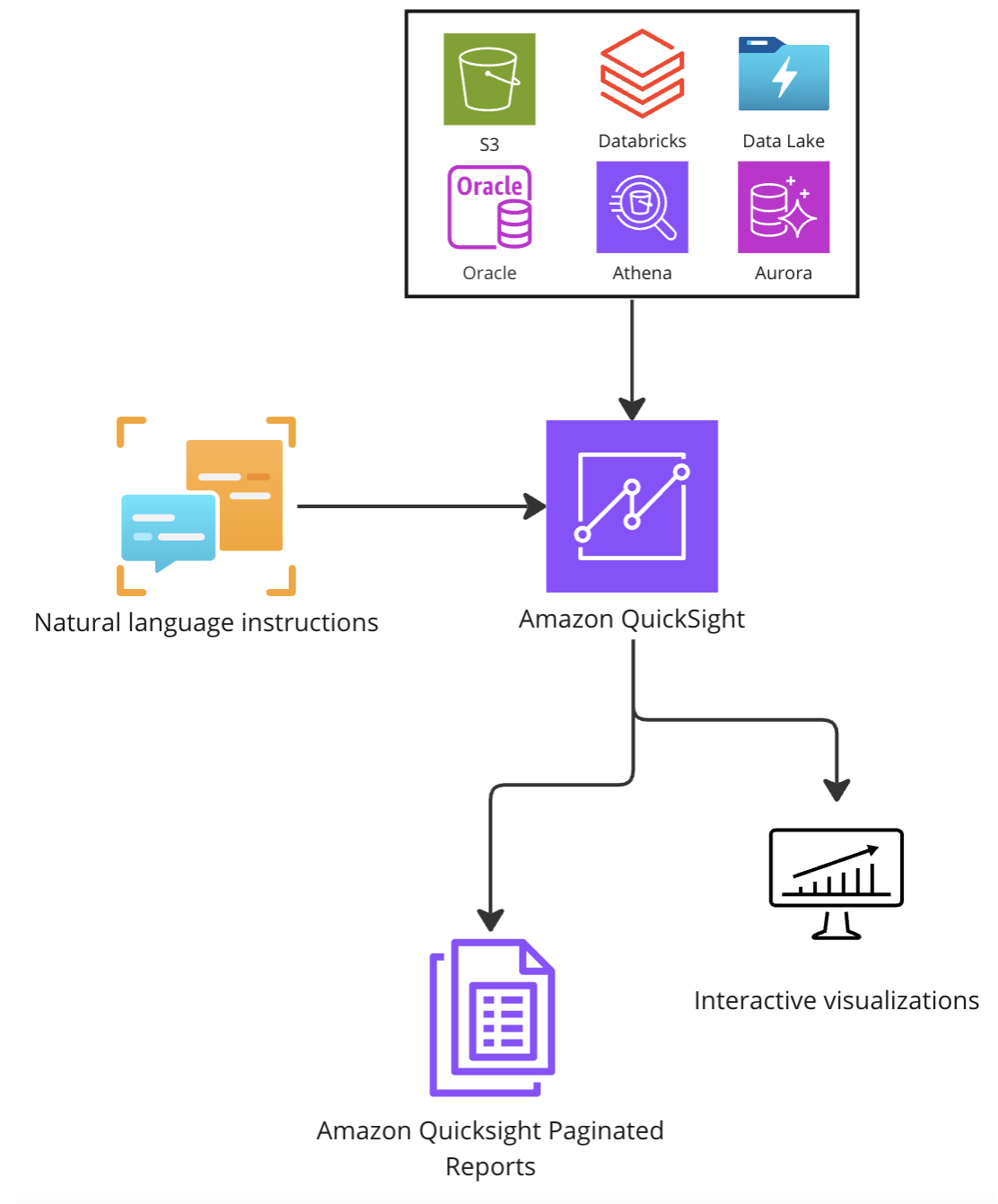Interactive visualizations

Amazon QuickSight

Unified business intelligence service
supporting interactive dashboards

Key features

- Automatic scaling without server setup

- Generative BI capabilities

- Paginated reports

S3   Databricks   Data Lake

Oracle   Athena   Aurora

Natural language instructions   Amazon QuickSight

Amazon Quicksight Paginated Reports

Interactive visualizations

Amazon Kinesis

Enables the collection, processing, and analysis of data streams at scale

Real-time live leaderboards

Key features

- Real-time processing

- Serverless infrastructure

- Scalability

Amazon Kinesis

Enables the collection, processing, and analysis of data streams at scale

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Real-time live leaderboards

IoT sensor data processing

Amazon Kinesis

Enables the collection, processing, and analysis of data streams at scale

Key features

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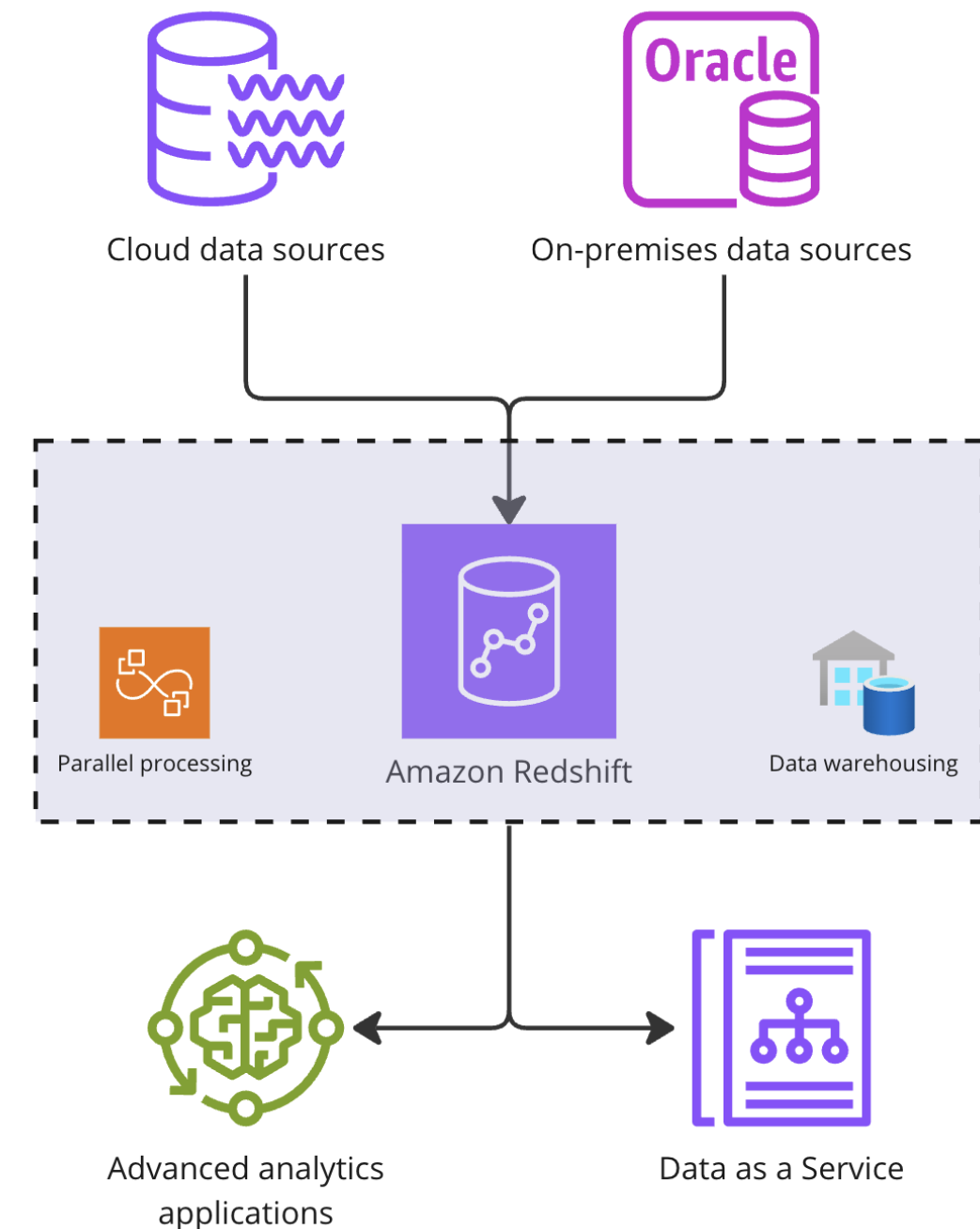Real-time live leaderboards

IoT sensor data processing

Improve data transfer speeds

Amazon Redshift

AI-powered, Massively Parallel Processing (MPP) cloud data warehouse for analytics

Key features

- Achieve up to 6x better price performance

- Zero-ETL approach

- Secure collaboration and governance

Securing data with Amazon Macie

ML-driven data security service to enable sensitive data[1] discovery and protection

Key features

- Automated discovery

- Cost-efficient visibility

- Reduce triage time with actionable reporting on sensitive data

Store PII data confidently

[1] PII: Personal Identifiable Information

Securing data with Amazon Macie

ML-driven data security service to enable sensitive data[1] discovery and protection

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Stay compliant

[1] PII: Personal Identifiable Information

Securing data with Amazon Macie

ML-driven data security service to enable sensitive data[1] discovery and protection

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Store PII data confidently

Stay compliant

Identify risks before migrating data to the cloud

AWS Glue

Serverless data integration service allowing the discovery, preparation and integration of data

Batch and streaming data integration

Key features

- Support both batch and streaming data

AWS Glue

Serverless data integration service allowing the discovery, preparation and integration of data

Key features

- Support both batch and streaming data

- Prepare data for machine learning and deep learning

Batch and streaming data integration

Prepare data for ML and DL tasks

AWS Glue

Serverless data integration service allowing the discovery, preparation and integration of data

Key features

- Support both batch and streaming data

- Prepare data for machine learning and deep learning

- Serverless petabyte-scale capacity

Batch and streaming data integration

Prepare data for ML and DL tasks

AWS Glue

Serverless data integration service allowing the discovery, preparation and integration of data
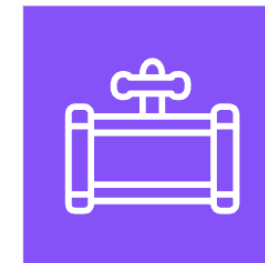
Key features

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- Serverless petabyte-scale capacity

Batch and streaming data integration
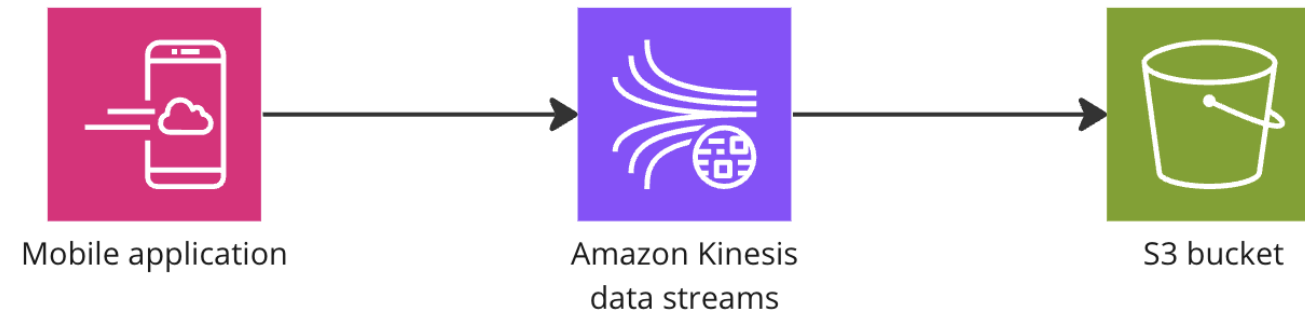

Prepare data for ML and DL tasks

Simplify ETL workflows
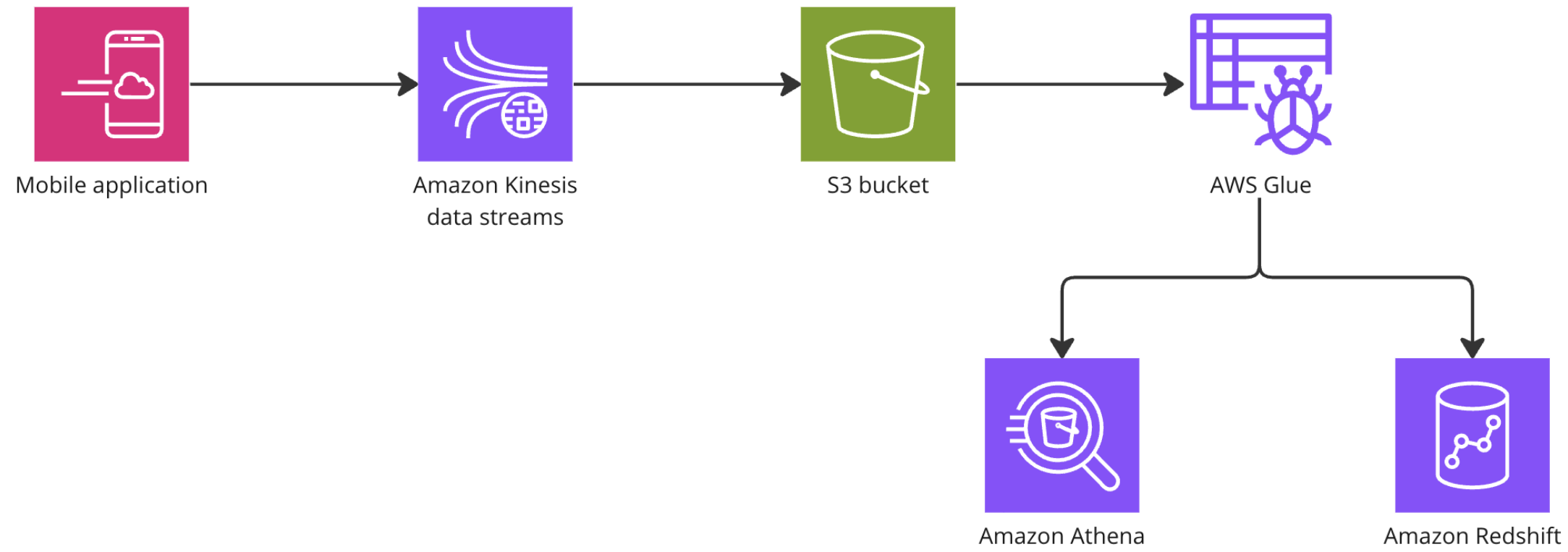
Creating an end-to-end data workflow

Mobile application

Creating an end-to-end data workflow

Creating an end-to-end data workflow

Creating an end-to-end data workflow

Mobile application → Amazon Kinesis data streams → S3 bucket → AWS Glue → Amazon Athena / Amazon Redshift

Amazon Macie

Creating an end-to-end data workflow

Mobile application → Amazon Kinesis data streams → S3 bucket → AWS Glue

AWS Glue → Amazon Athena

AWS Glue → Amazon Redshift → AWS IoT Greengrass Component Machine

Amazon Macie

Creating an end-to-end data workflow

Mobile application → Amazon Kinesis data streams → S3 bucket → AWS Glue

Amazon Macie

AWS Glue → Amazon Athena → Amazon QuickSight → Amazon QuickSight paginated reports

AWS Glue → Amazon Redshift → AWS IoT Greengrass Component Machine
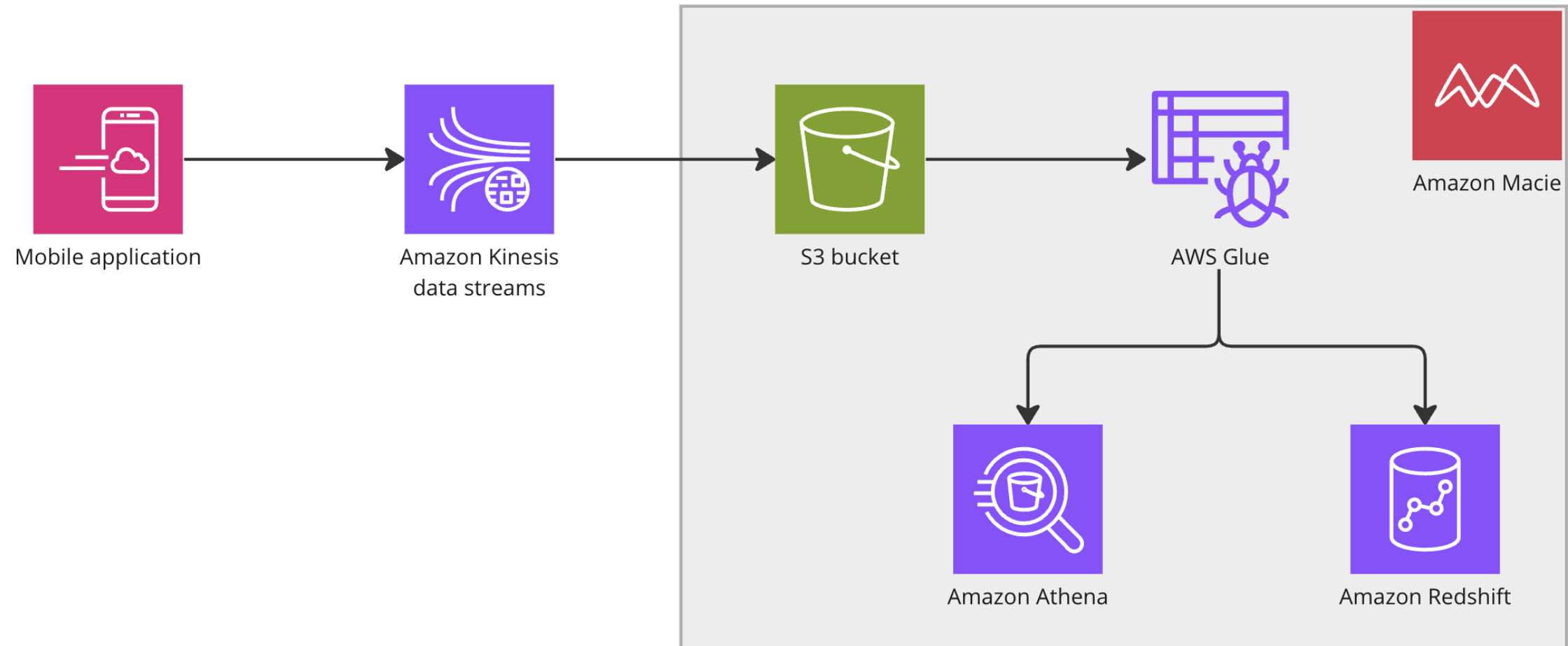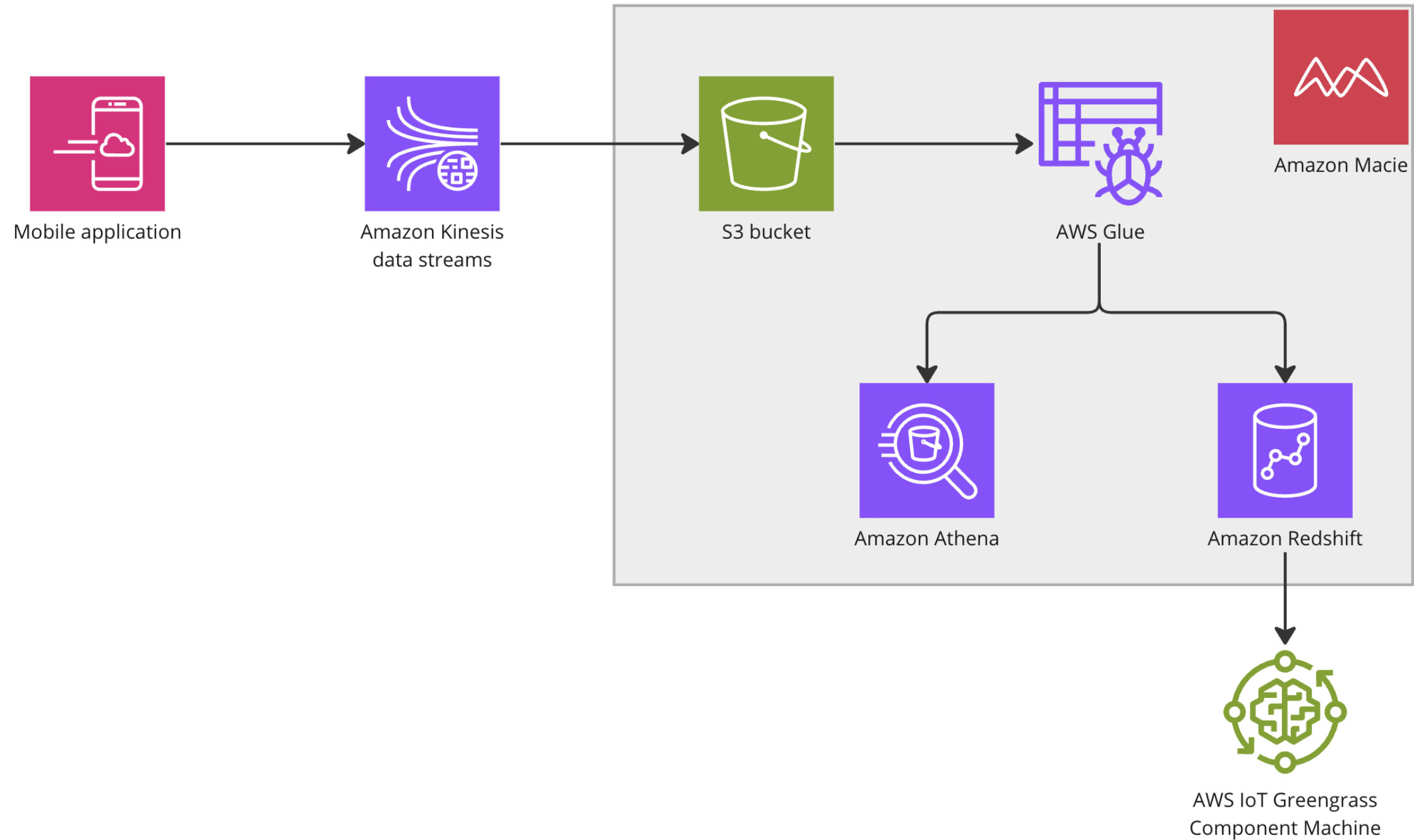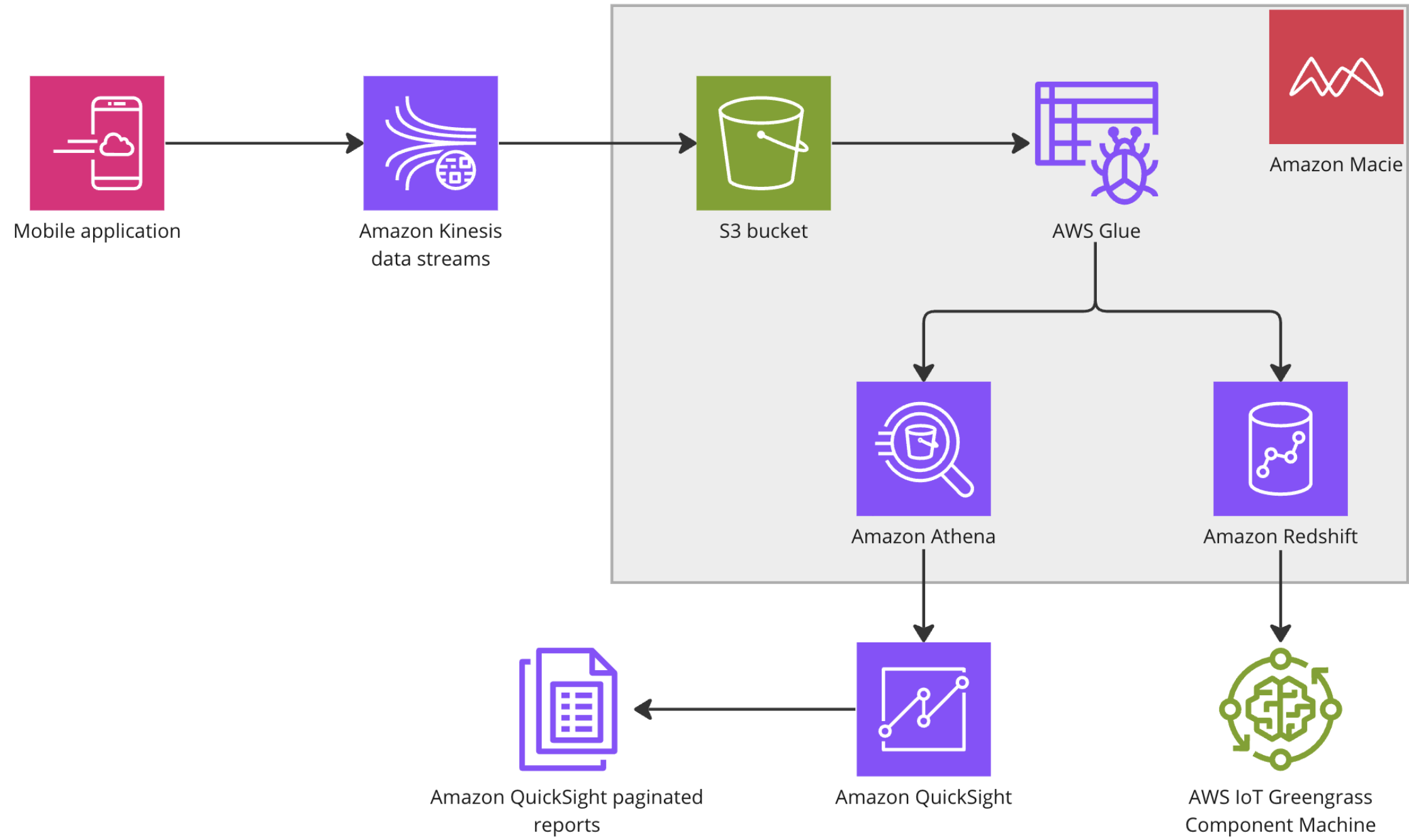
Let's practice!

AWS CLOUD TECHNOLOGY AND SERVICES CONCEPTS

Secondary AWS Service Categories

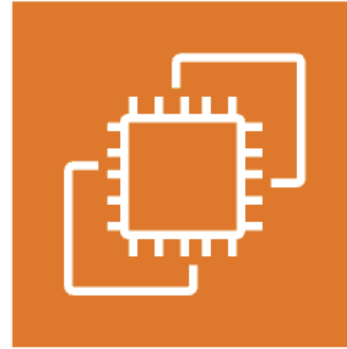## AWS CLOUD TECHNOLOGY AND SERVICES CONCEPTS

Rahulraj Singh
Technical Product Manager

datacamp

Overview of core AWS services

AWS Global Infrastructure

Compute

Storage

Databases

Networking

Analytics and AI

Secondary services introduction

Application integration

Secondary services introduction

Application integration

Business enhancement
services

Secondary services introduction

Application integration

Business enhancement services

Developer tools

Secondary services introduction

Application integration

Business enhancement services

Developer tools

Advanced intelligence services

Application integration services

- Enhance communication between diverse AWS applications

- Coordinate data and workflows for efficiency

- Crucial for scalable, flexible, interconnected architectures

Application integration services

Amazon EventBridge

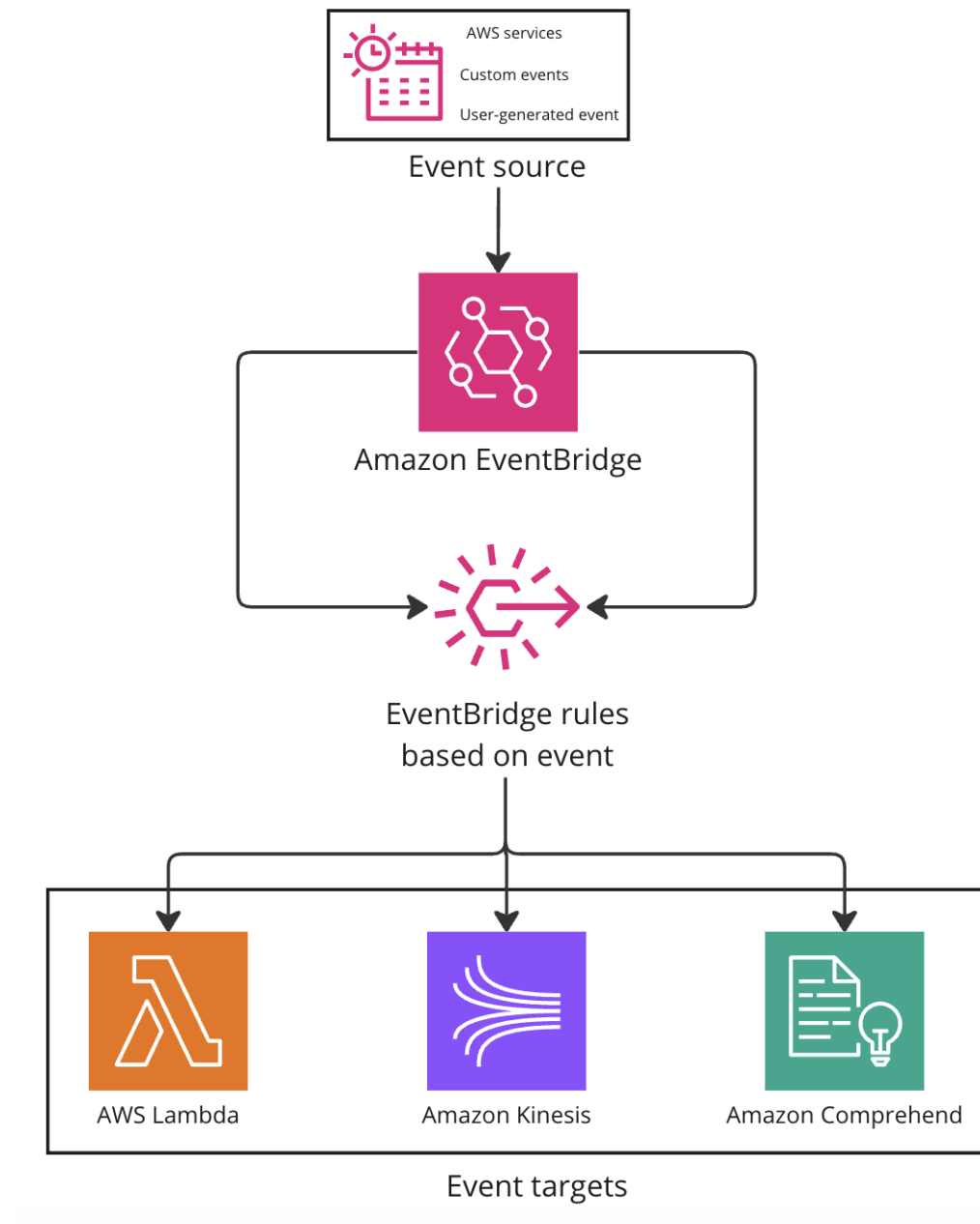Amazon Simple Notification Service

Amazon Simple Queue Service
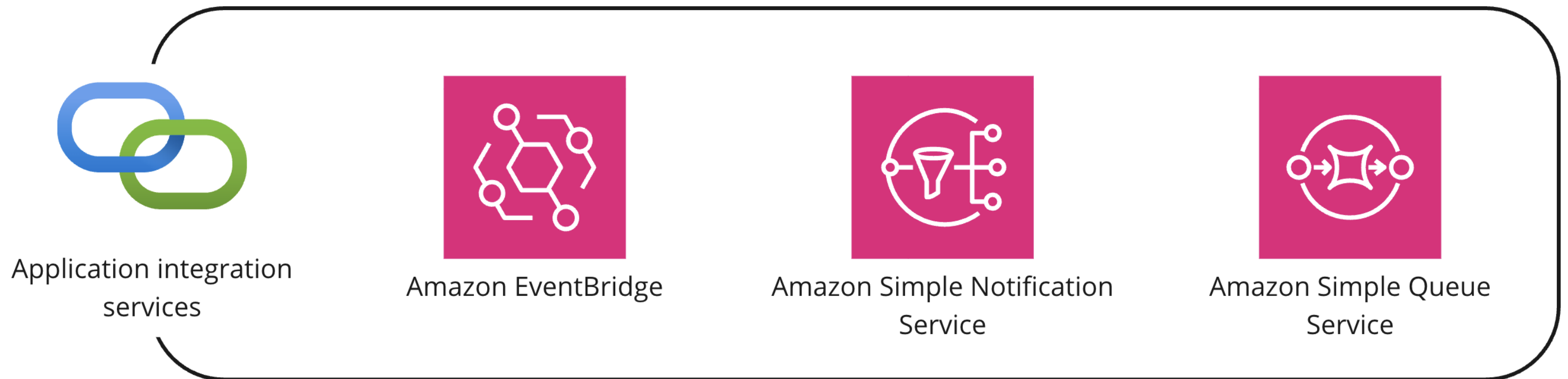
Amazon EventBridge

Key features

- Applications that respond to real-world events at any scale

- Connect different software and systems

Use cases

- Build software without explicit dependencies between systems
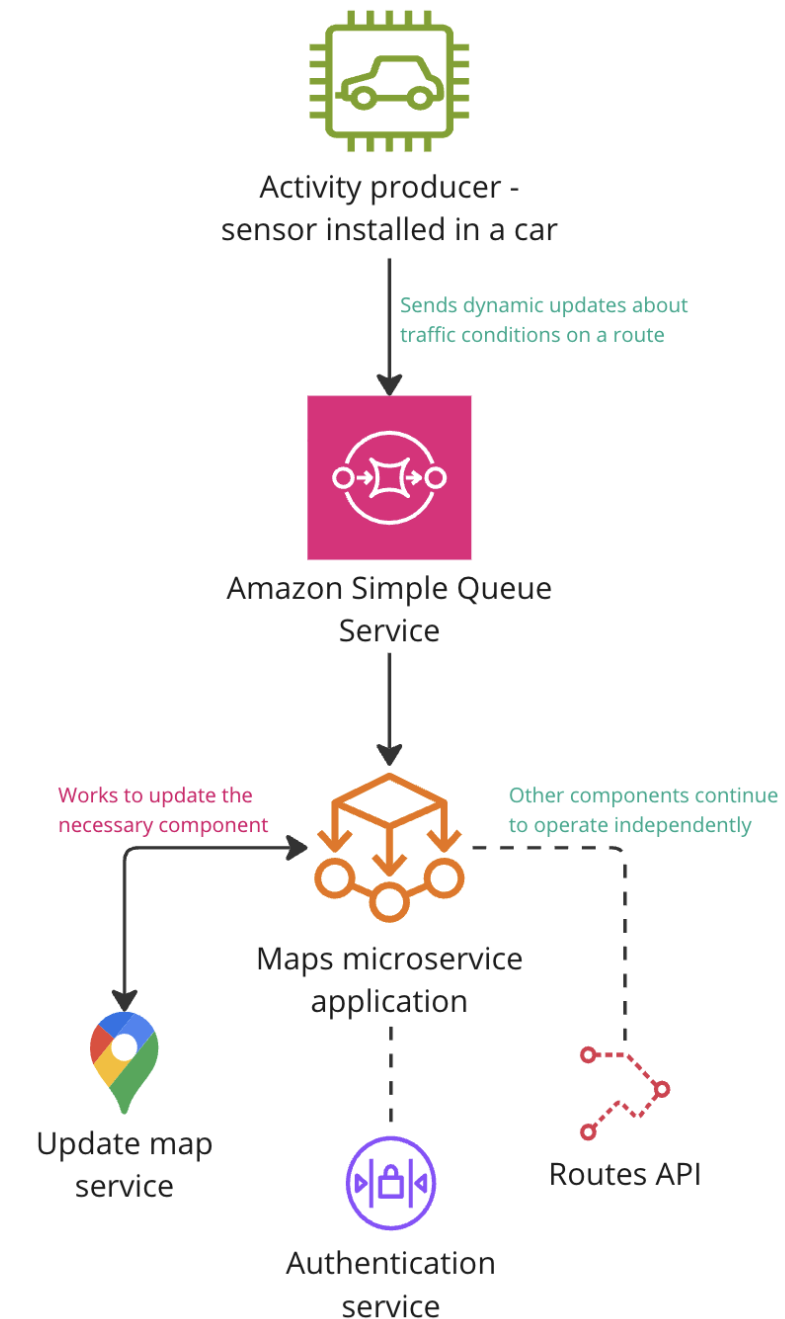
- Monitor and audit AWS environments

Amazon Simple Queue Service (SQS)

Messaging for software components, ensuring reliable communication at any volume

When is SQS used?

- Connect microservices for reliability and scale

- Decouple components for increased background efficiency

Activity producer - sensor installed in a car

Sends dynamic updates about traffic conditions on a route

Amazon Simple Queue Service

Works to update the necessary component

Other components continue to operate independently

Maps microservice application

Update map service
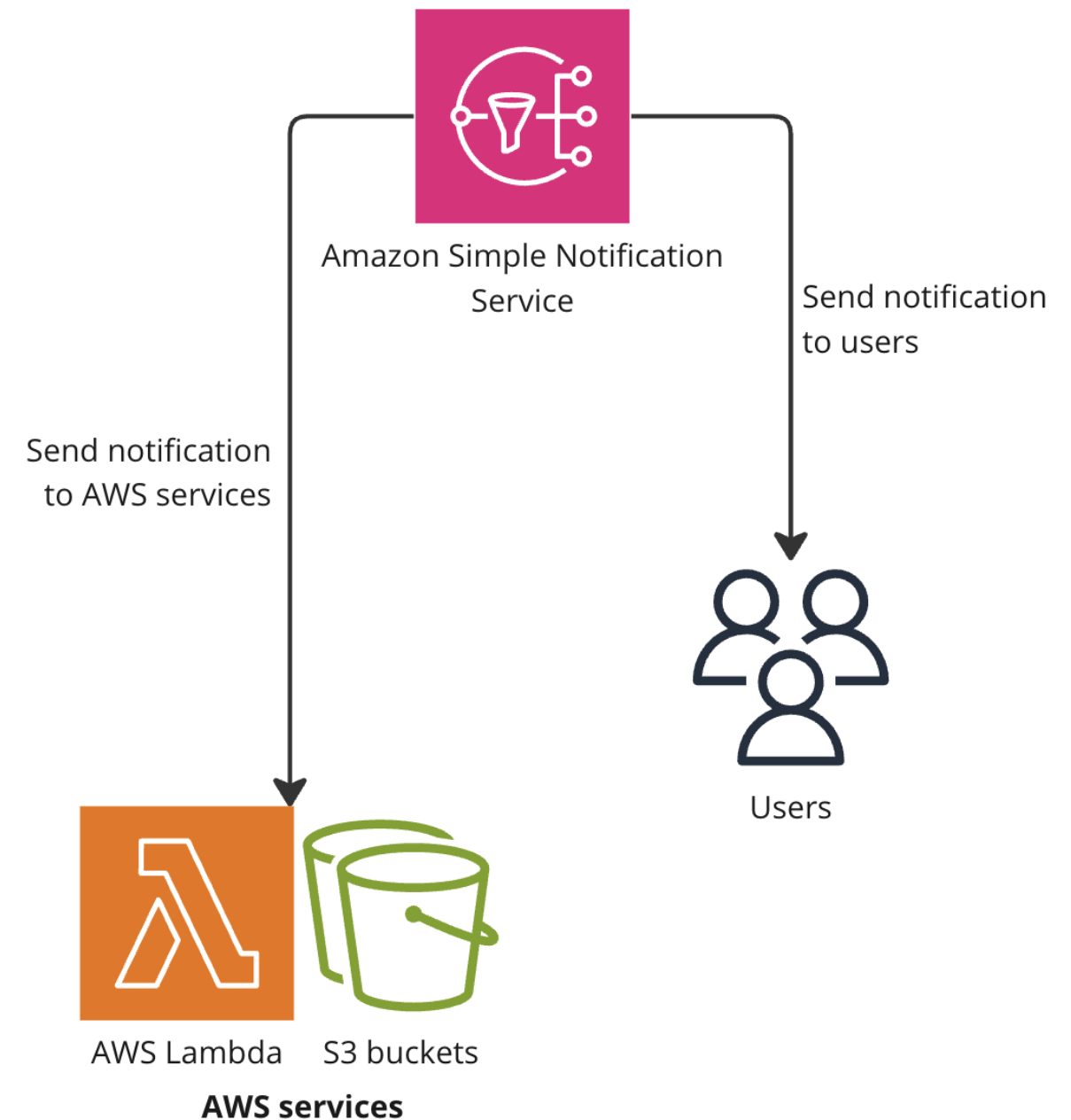
Authentication service

Routes API

Amazon Simple Notification Service (SNS)

Facilitating application-to-application (A2A) and application-to-person (A2P) messaging

Use cases

- Send push, SMS, email notifications to customers

- Integrate FIFO messaging between applications

Amazon Simple Notification Service

Send notification to users

Send notification to AWS services

Users

AWS Lambda   S3 buckets

AWS services

Business application services

- Streamline operations and enhance efficiency of business applications

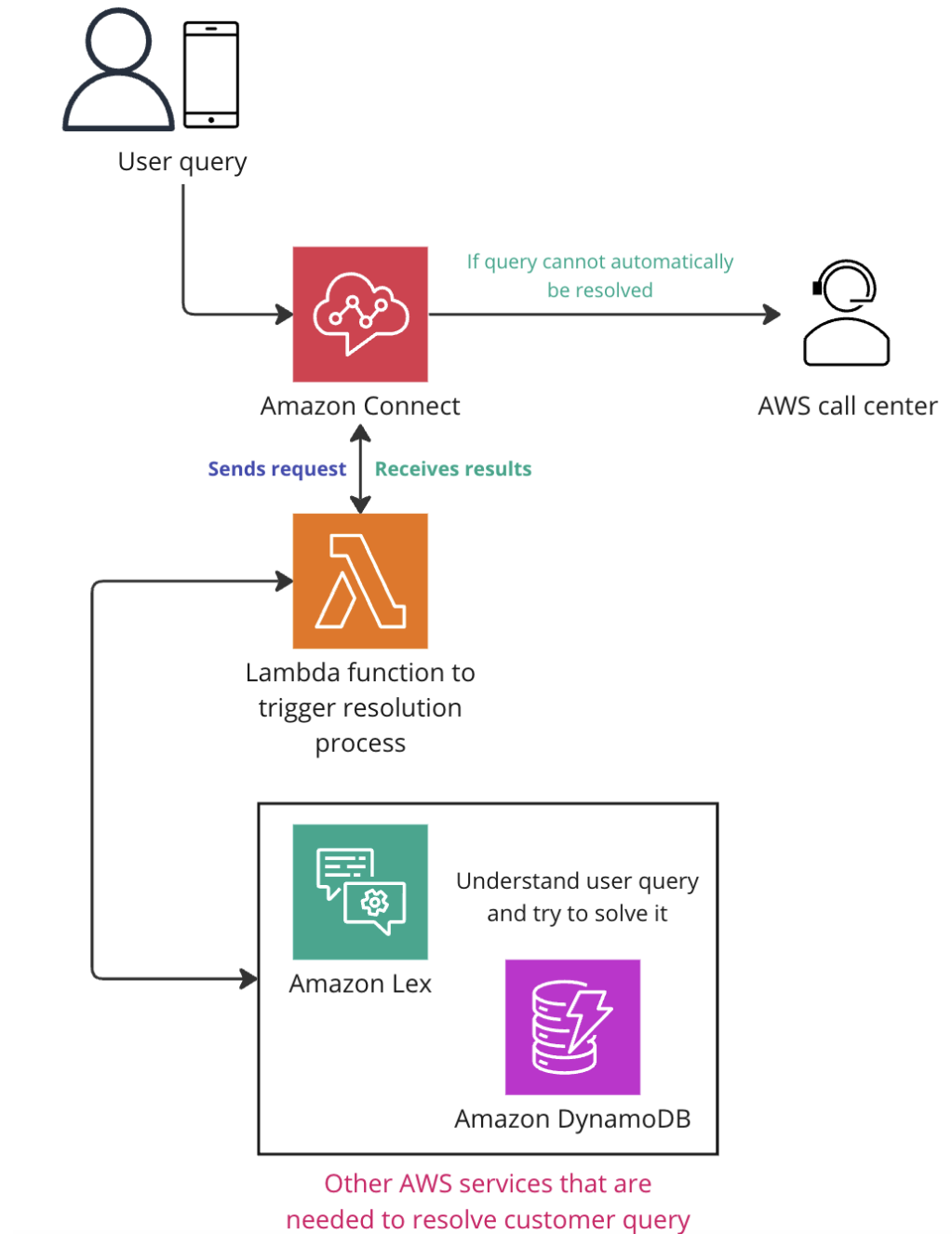- Seamless integration, automation, and improved productivity

Business application services

Amazon Connect

Amazon Simple Email Service
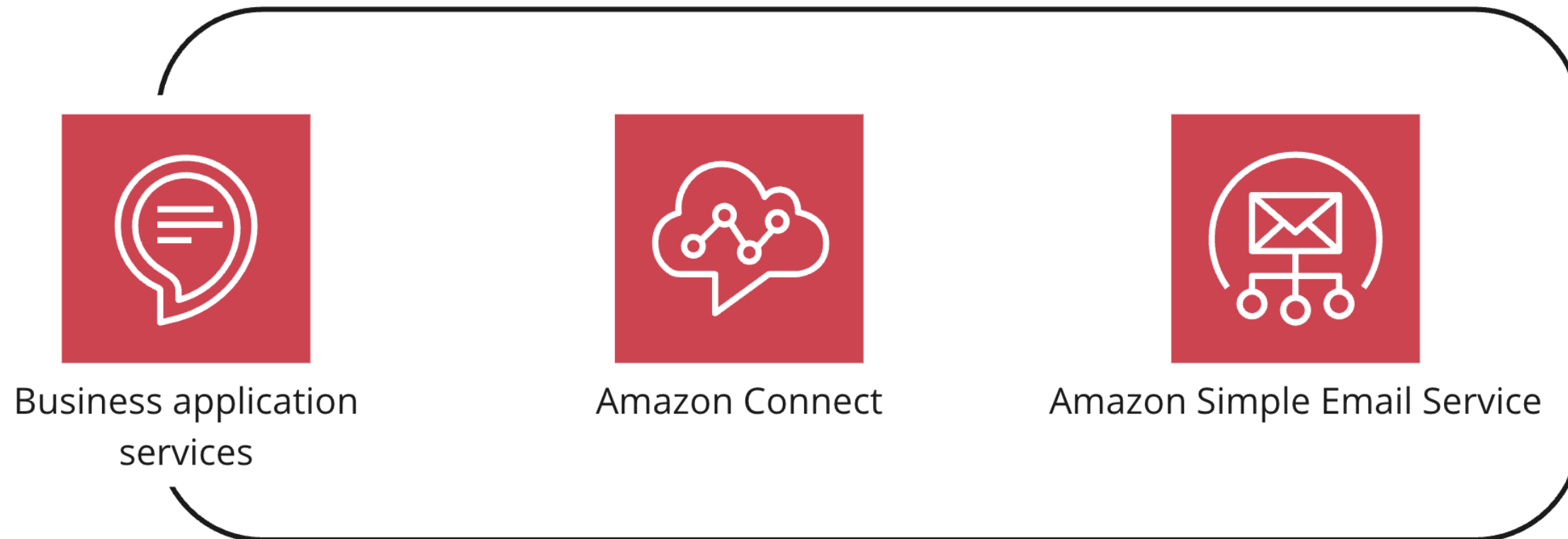
Stay connected with customers

Amazon Connect

Cloud-based customer contact center service

Use cases

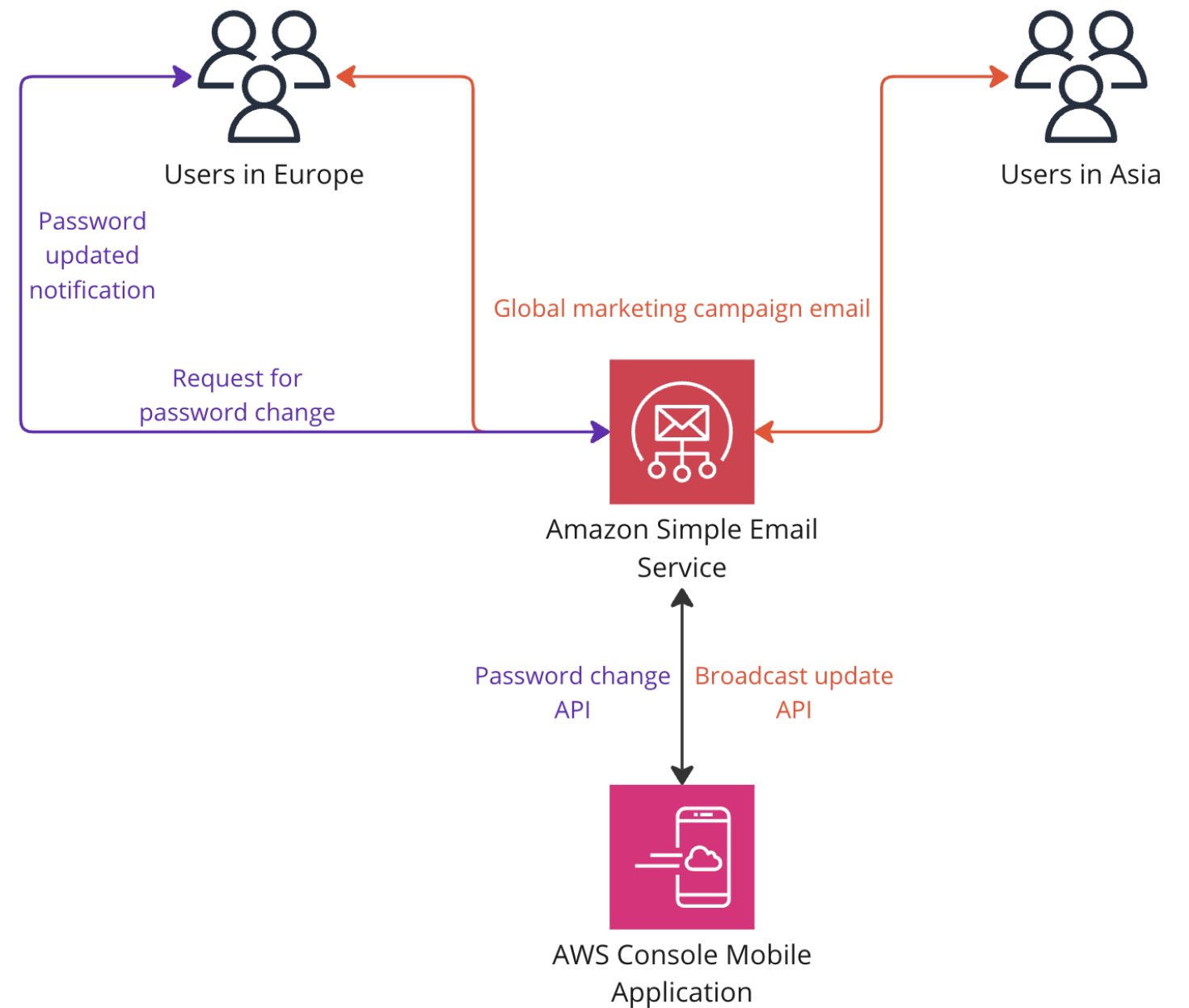- Scalable customer support

- Personalized customer interactions

Amazon Simple Email Service (SES)

Scalable and cost-effective email service supporting marketing and transactional communication

How is SES used?

- Bulk email sending

- Application-generated emails

Users in Europe

Users in Asia

Password updated notification

Global marketing campaign email

Request for password change

Amazon Simple Email Service

Password change API

Broadcast update API

AWS Console Mobile Application

Developer services

- Cohesive environment for simplifying and accelerating the development lifecycle

- Enable collaborative development within teams and tools

- Automated delivery and deployment using CI/CD

Developer services
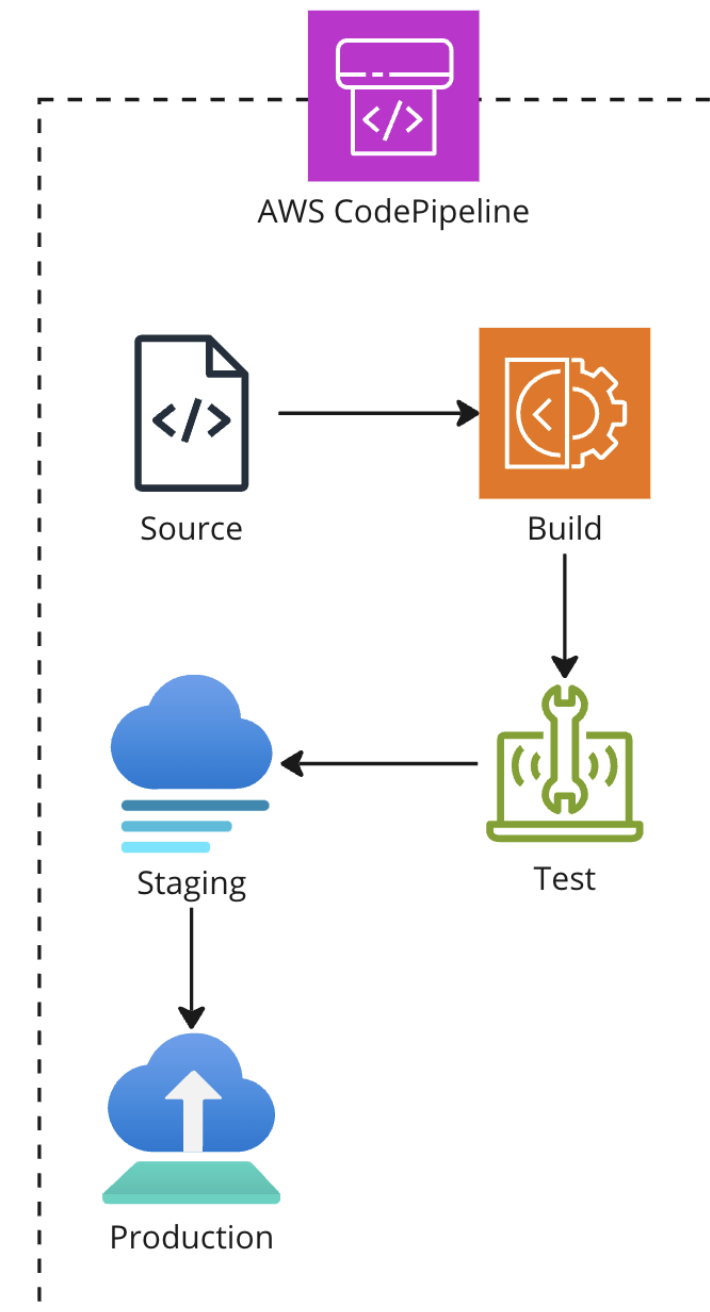
AWS CodePipeline

AWS CodeCommit

AWS CodePipeline

Automate continuous delivery pipelines and infrastructure updates

Use cases

- Update existing pipelines or create new ones with JSON templates

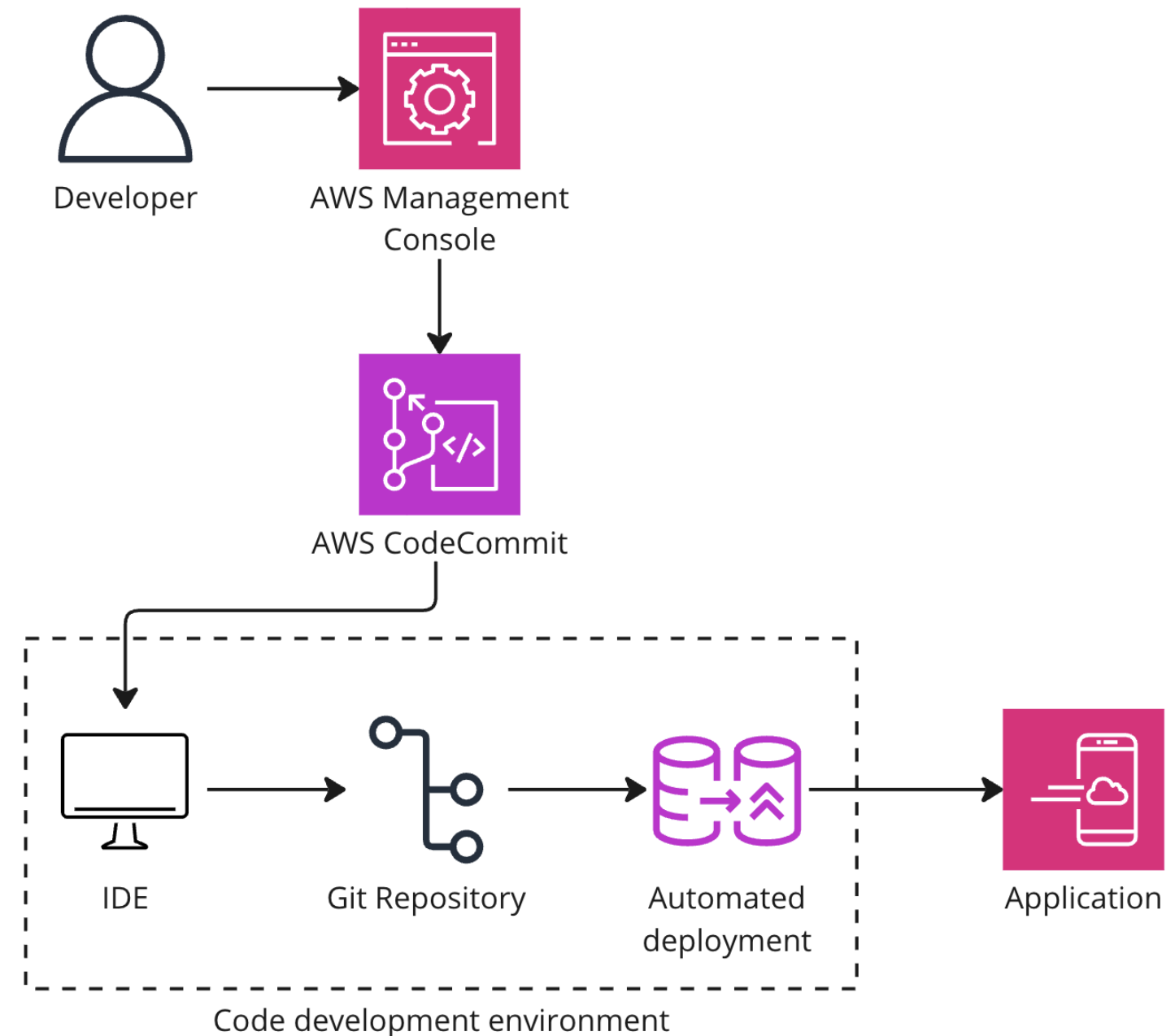- Real-time notifications on pipeline-affecting events

AWS CodePipeline

Source → Build

Staging ← Test

Production

AWS CodeCommit

Host private Git repositories with a fully managed, scalable source control service

When to use CodeCommit?

- Facilitate code collaboration with built-in code reviews

- Seamlessly use existing tools, plugins, CI/CD systems, and graphical clients

Developer → AWS Management Console

AWS CodeCommit

IDE → Git Repository → Automated deployment → Application

Code development environment

Advanced intelligence services

- Extend artificial intelligence reach by linking it to physical devices

- Expand computational capabilities with revolutionary quantum processing technology
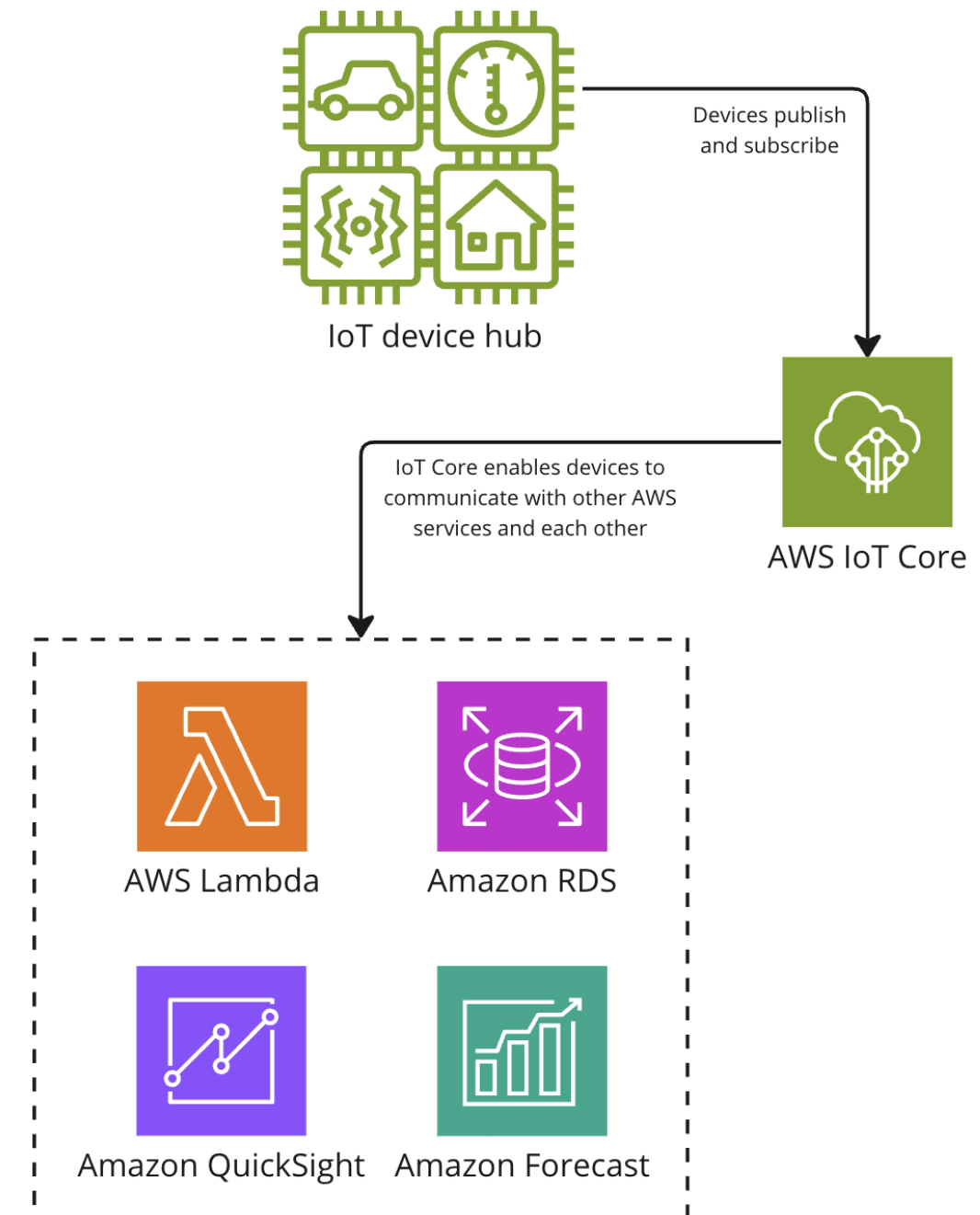
Advanced intelligence
services

AWS IoT Core

Amazon Braket
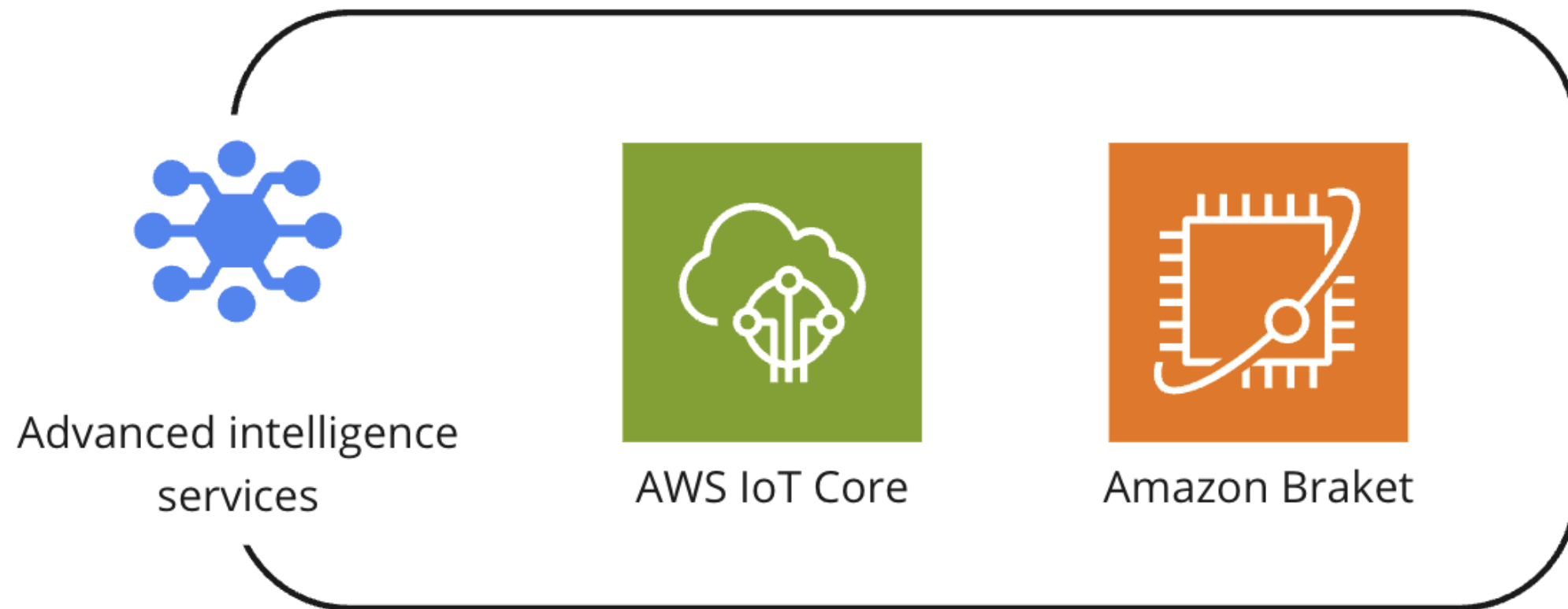
AWS IoT Core

Secure connections for IoT devices to the cloud, enabling easy device management and scalability

Use cases

- Develop industrial IoT applications for predictive maintenance and quality monitoring

- Build connected solutions for home automation

IoT device hub

Devices publish and subscribe

AWS IoT Core

IoT Core enables devices to communicate with other AWS services and each other

AWS Lambda

Amazon RDS

Amazon QuickSight

Amazon Forecast

Amazon Braket

Facilitate quantum computing research with tools, access, and support

What does Braket do?

- Gives tools for developing quantum algorithms

- Enables testing and exploration of various quantum hardware

Amazon Braket

Build

Test

Analyze

Run

Manage complete
Quantum Computing lifecycle
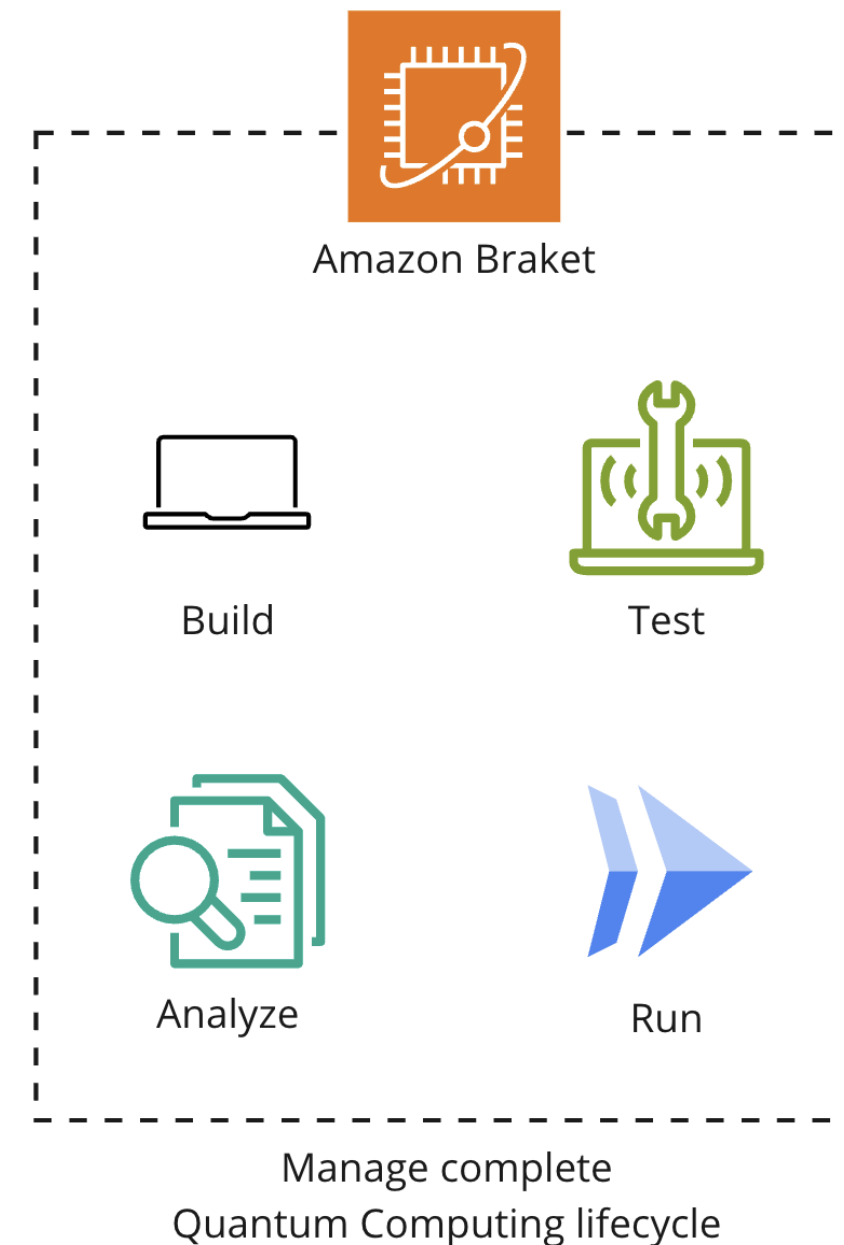
Let's practice!

AWS CLOUD TECHNOLOGY AND SERVICES CONCEPTS

Congratulations

AWS CLOUD TECHNOLOGY AND SERVICES CONCEPTS

Alex Kuntz
Head of Cloud Curriculum, DataCamp

datacamp

Recap

Core services:

- Compute

- Databases

- Storage

- Networking

- ML & AI

- Analytics

What's Next?

INTERACTIVE COURSE

AWS Security and Cost Management

Continue   🔖 Bookmark

● Beginner   🕐 3 hours   ▷ 12 videos   <> 37 exercises   👥 1,171 participants   2400 XP

- How do you ensure your cloud services are secure?

- How do you keep cloud costs low?

Congratulations

AWS CLOUD TECHNOLOGY AND SERVICES CONCEPTS