
AWS
re:Invent

AMZ301

How Amazon.com automates cash identification & matching with AWS AI/ML

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Amazon

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Amazon

AWS re:Invent

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Agenda

Who we are

What is cash application?

Challenges faced

How we solved the problem

Business impact

Learnings and best practices



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Who we are: Amazon FinTech cash services

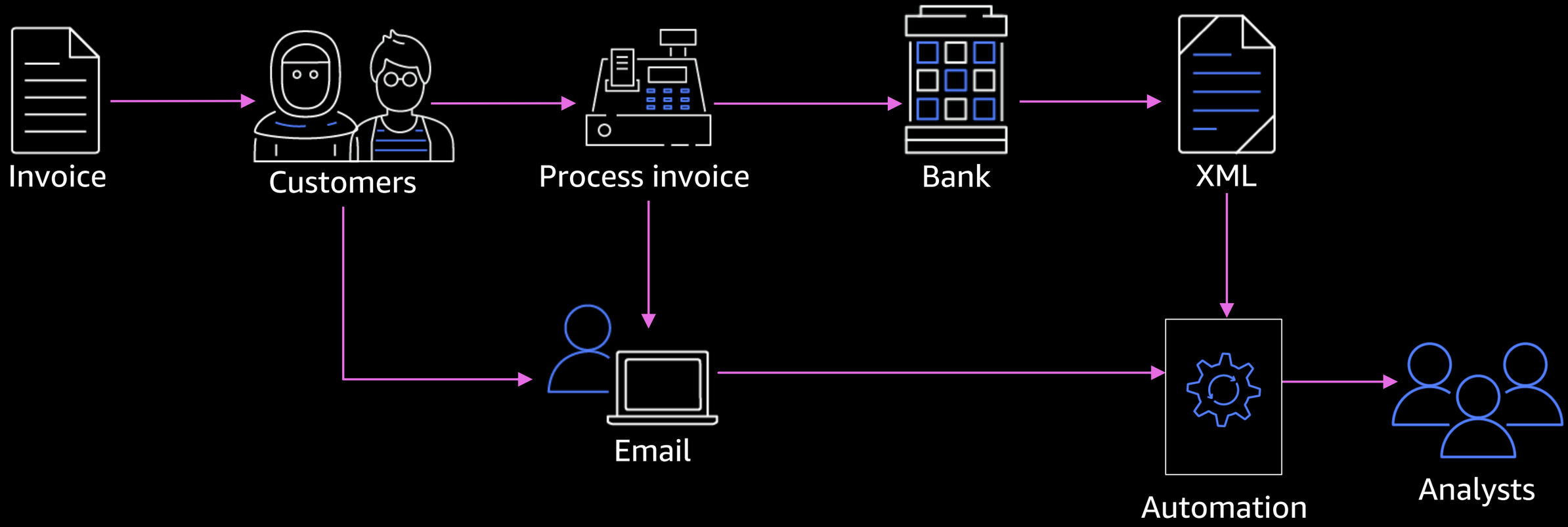


What is cash application?



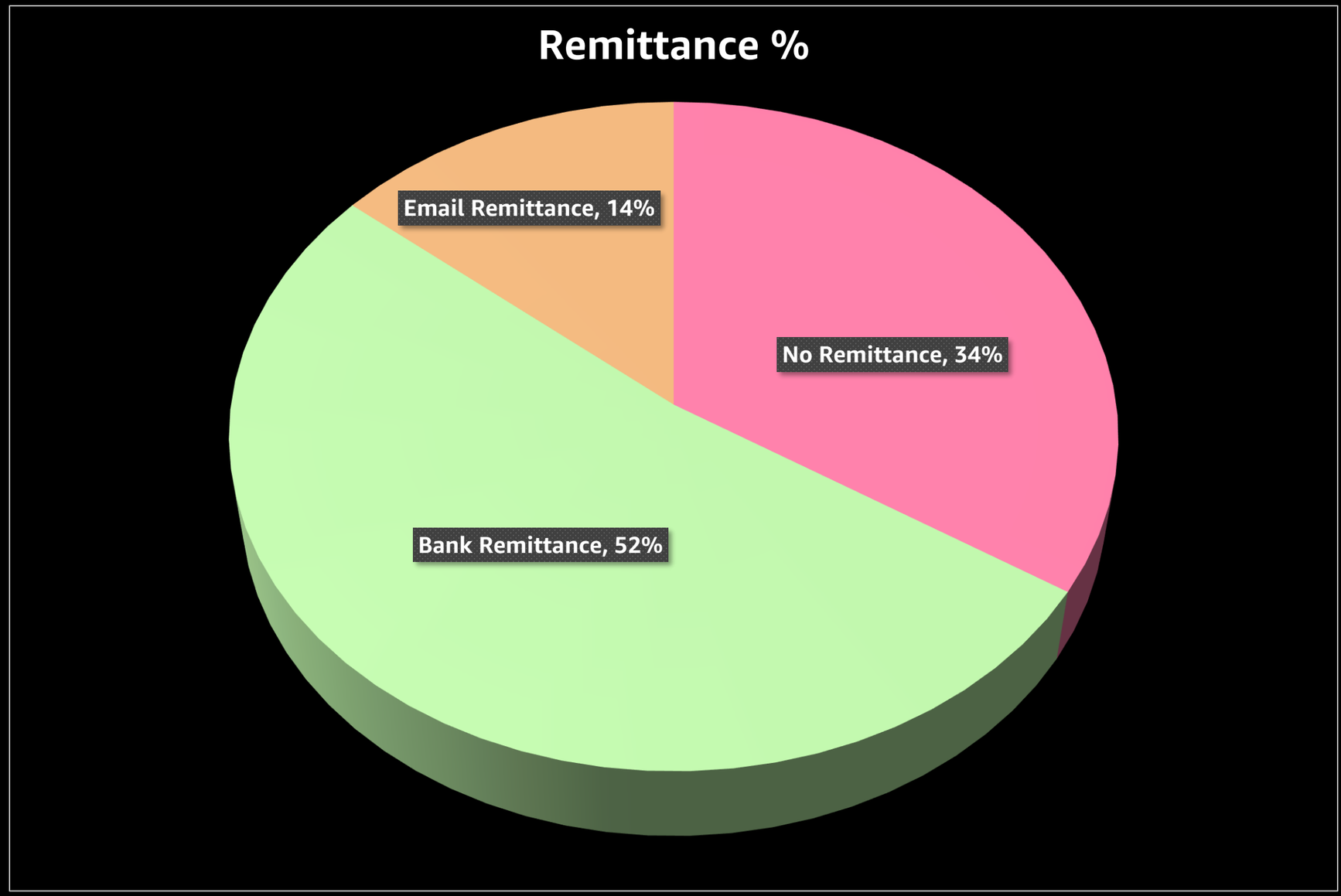
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What is cash application?




Challenges

What is the problem?



Why is this problem complex?



Amazon scale and YoY growth



New business launches



Multitenancy and

Business-specific functionality

Why is this problem complex?



Multiple stakeholders



Complex customer relations



Unstructured data

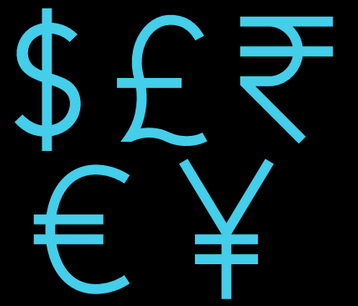
Why is this problem complex?



Multi-region



Country-specific laws

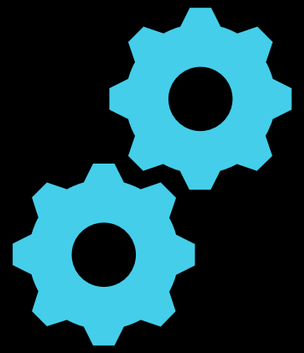


Multi-currency

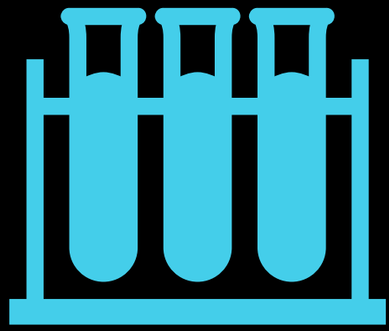
Technical challenges



Remittance in scanned images



Rule-based solutions are reactive



Validation is challenging

How did we solve it?



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How did we solve it? Tenets



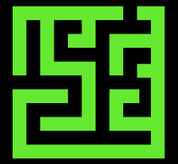
DRY (reuse)



Scalable



Flexible



Embrace complexity

Right tool for the right job

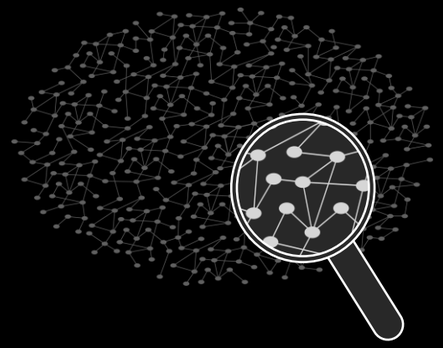


How did we solve it?



Serverless

AWS Lambda
AWS Step Functions



Purpose-built databases

Amazon Neptune
Amazon ES
Amazon DynamoDB



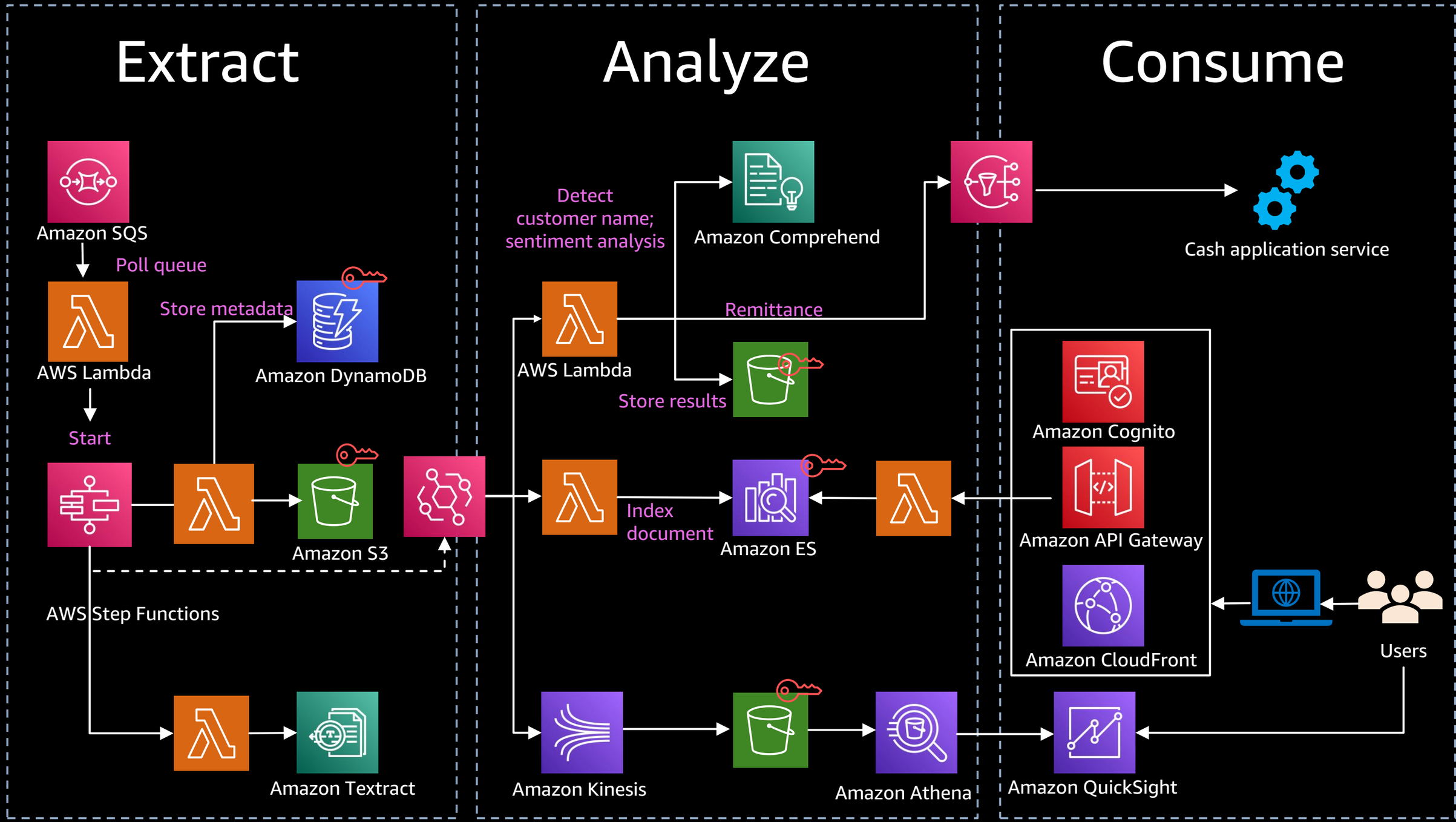
Machine learning

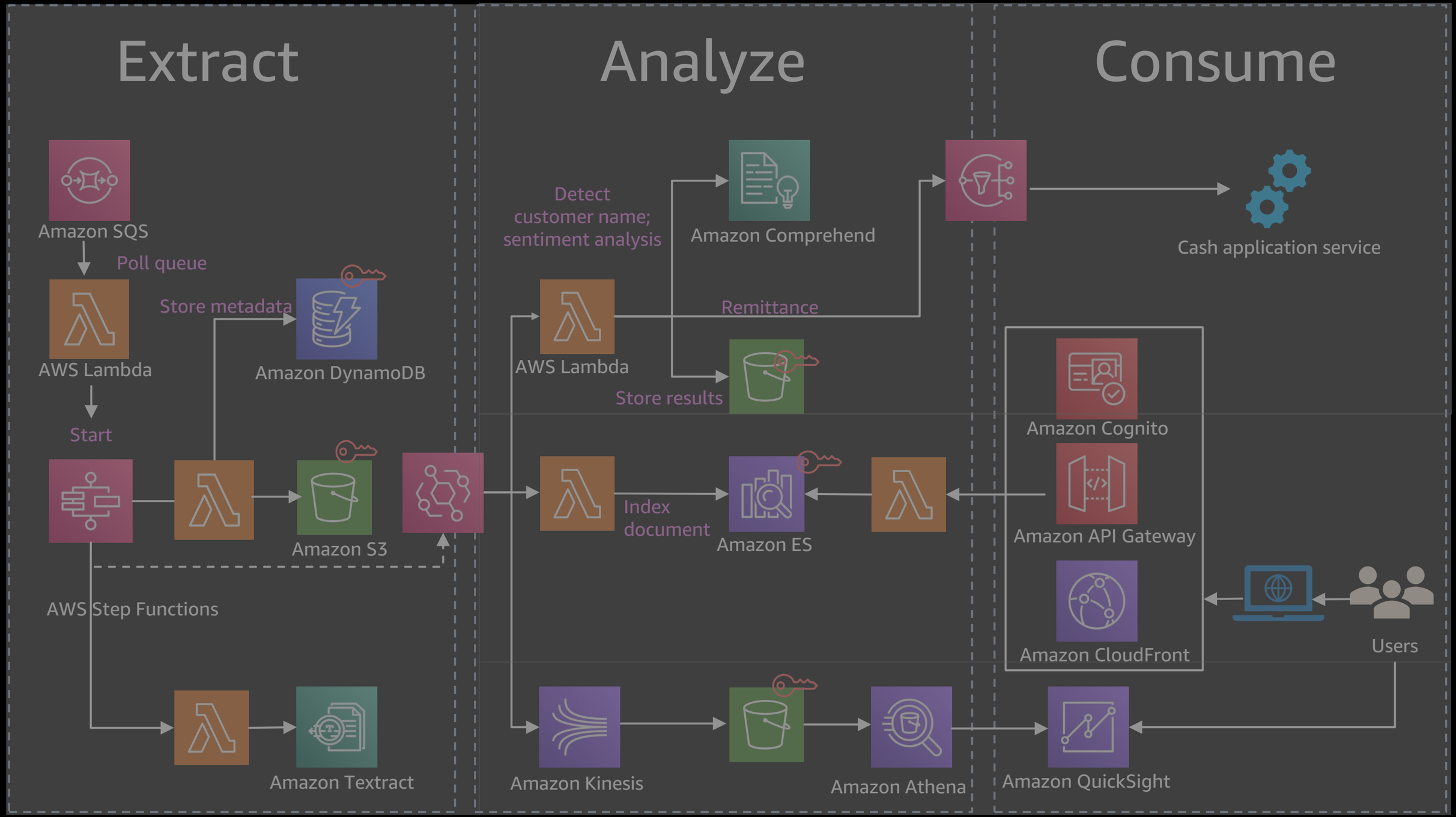
Amazon SageMaker
Amazon Comprehend
Amazon Textract

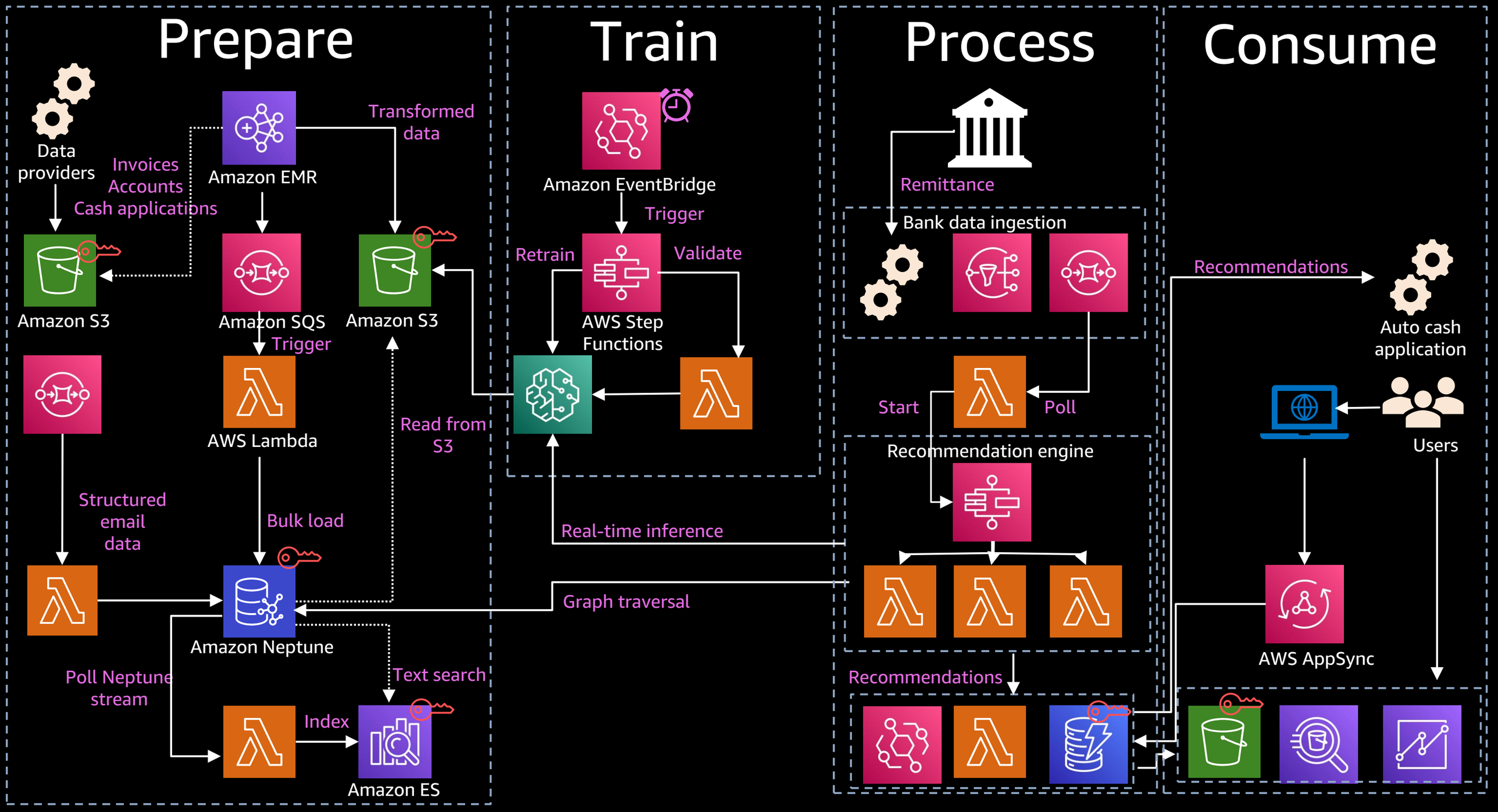


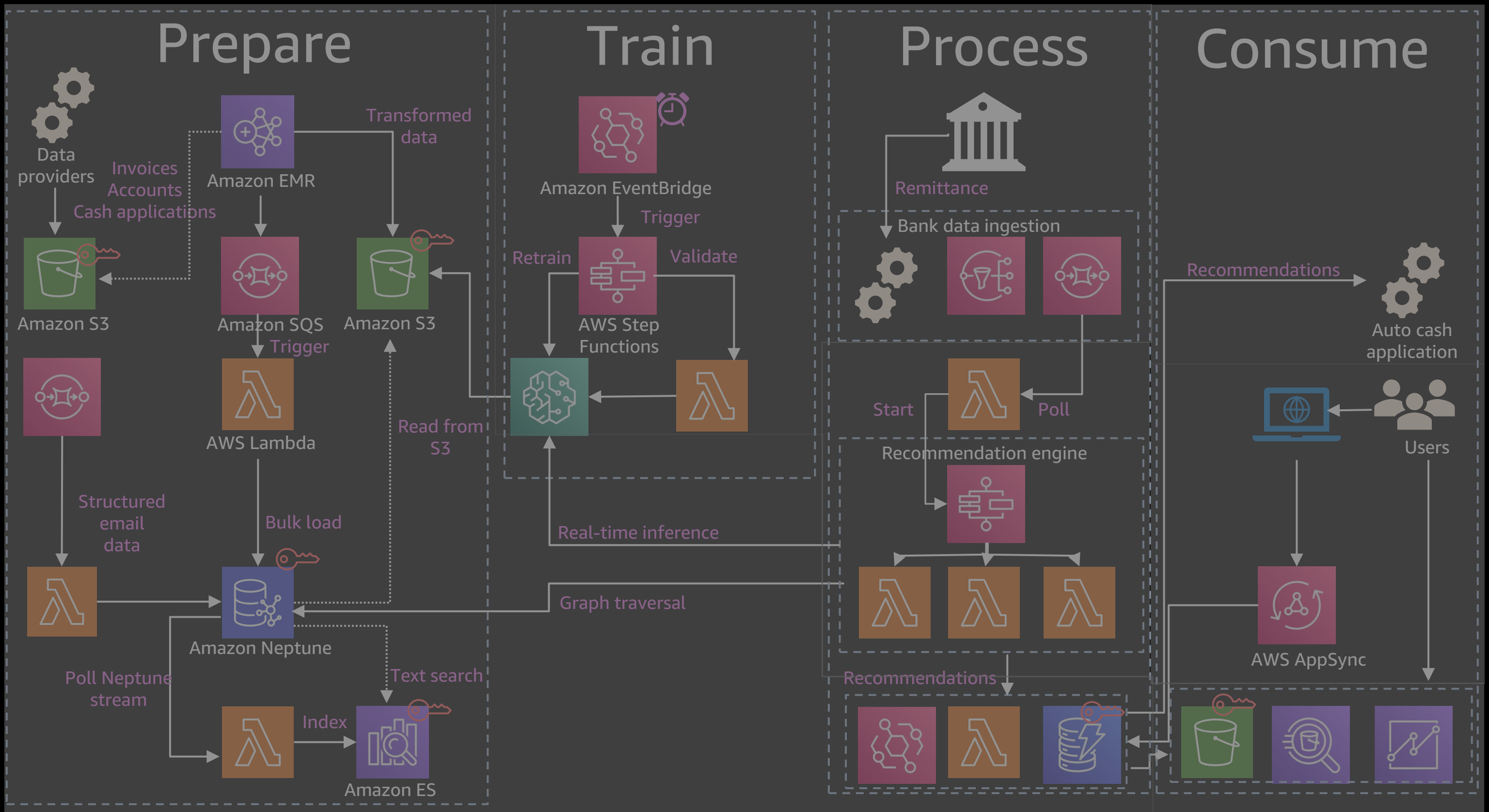
Best practices

Observability
Configurability
Insights


Extract
Analyze
Consume
Amazon SQS
Poll queue
AWS Lambda
Store metadata
Amazon DynamoDB
Start
Amazon S3
AWS Step Functions
Amazon Textract
Detect customer name; sentiment analysis
Amazon Comprehend
AWS Lambda
Remittance
Store results
Index document
Amazon ES
Amazon Kinesis
Amazon Athena
Cash application service
Amazon Cognito
Amazon API Gateway
Amazon CloudFront
Users
Amazon QuickSight


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Amazon Cognito
Amazon API Gateway
Amazon CloudFront
Users
Amazon QuickSight


Prepare
Train
Process
Consume
Data providers
Invoices
Accounts
Cash applications
Amazon EMR
Transformed data
Amazon S3
Amazon SQS
Trigger
Amazon S3
Amazon EventBridge
Trigger
Retrain
Validate
AWS Step Functions
AWS Lambda
Read from S3
Structured email data
Bulk load
Real-time inference
Amazon Neptune
Graph traversal
Poll Neptune stream
Text search
Index
Amazon ES
Remittance
Bank data ingestion
Start
Poll
Recommendation engine
Recommendations
Recommendations
Auto cash application
Users
AWS AppSync

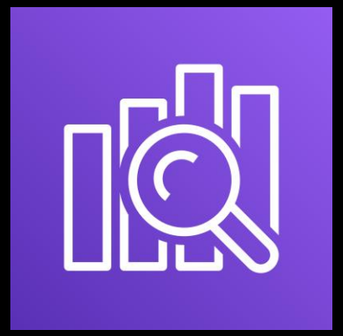

Prepare
Train
Process
Consume
Data providers
Invoices
Accounts
Cash applications
Amazon EMR
Transformed data
Amazon S3
Amazon SQS
Trigger
Amazon S3
Amazon EventBridge
Trigger
Retrain
Validate
AWS Step Functions
Remittance
Bank data ingestion
Recommendations
Auto cash application
AWS Lambda
Read from S3
Start
Poll
Recommendation engine
Users
Structured email data
Bulk load
Real-time inference
Graph traversal
Amazon Neptune
AWS AppSync
Poll Neptune stream
Text search
Index
Amazon ES
Recommendations

How did we solve it? Purpose-built databases



Amazon Neptune
graph database

Relations are first class



Amazon ES

Text search



Amazon
DynamoDB

Fast lookup

How did we solve it? AI/ML

AI/ML services

Custom models

Precision



Amazon Comprehend

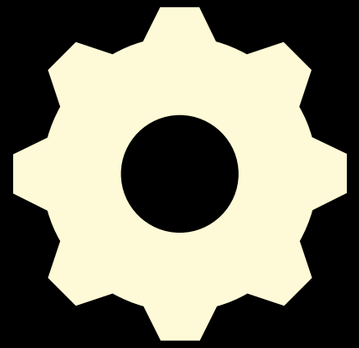


Amazon Textract

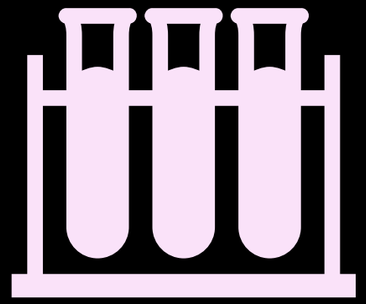


Amazon SageMaker

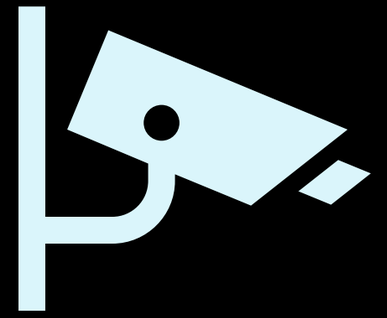
How did we solve it? Best practices



Configurability



Automated testing



Observability

Machine learning challenges

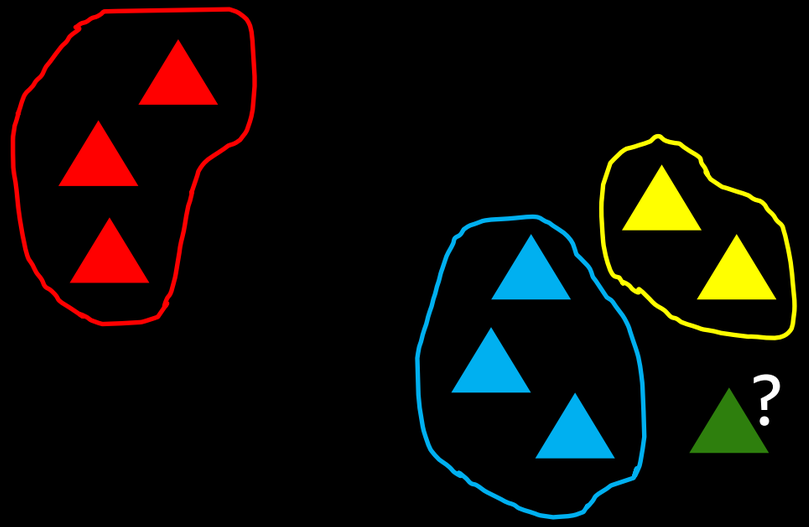
Extreme classification

High cardinality

High precision

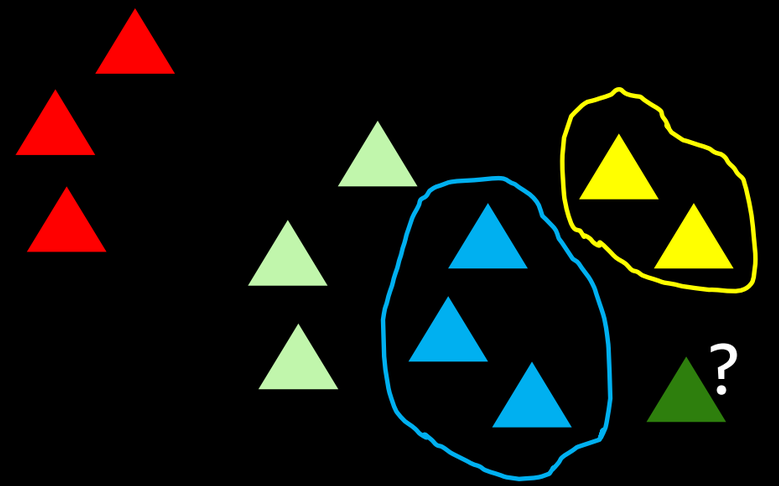
Real-time prediction – low latency

How did we solve it? KNN



False positives

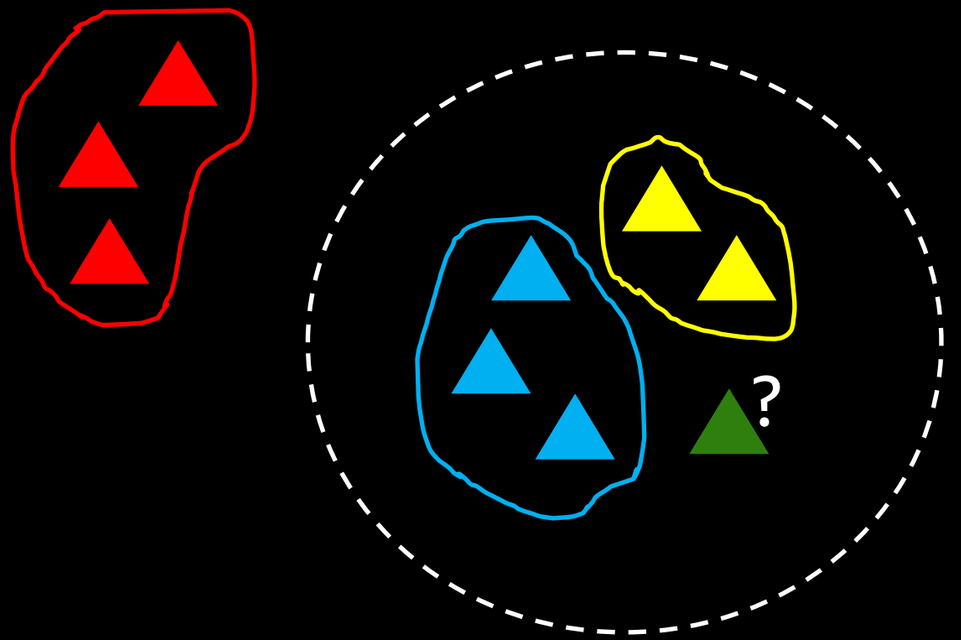
K = 3



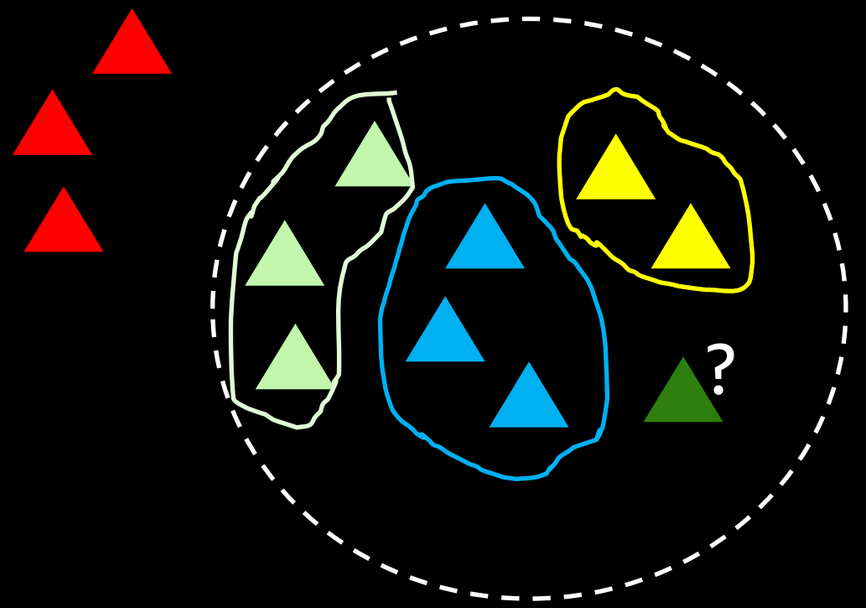
Missing positives

K = 2

How did we solve it? Distance threshold



K = 3

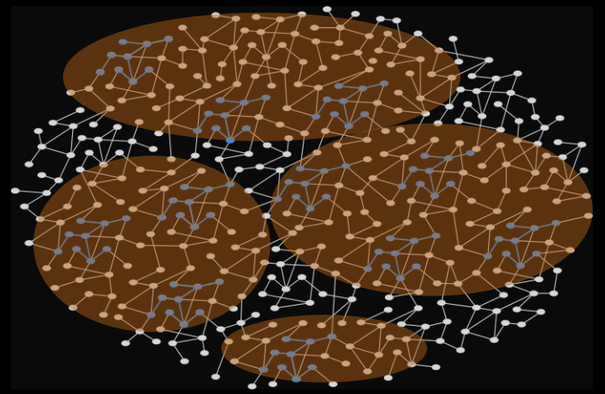


K = 3

How did we solve it? High precision



Recommend list of top K accounts

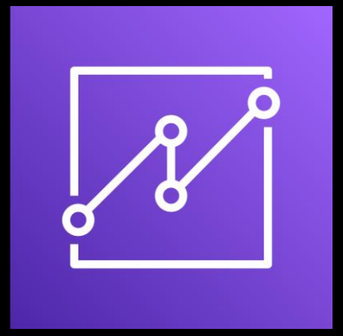


Run graph search for the accounts

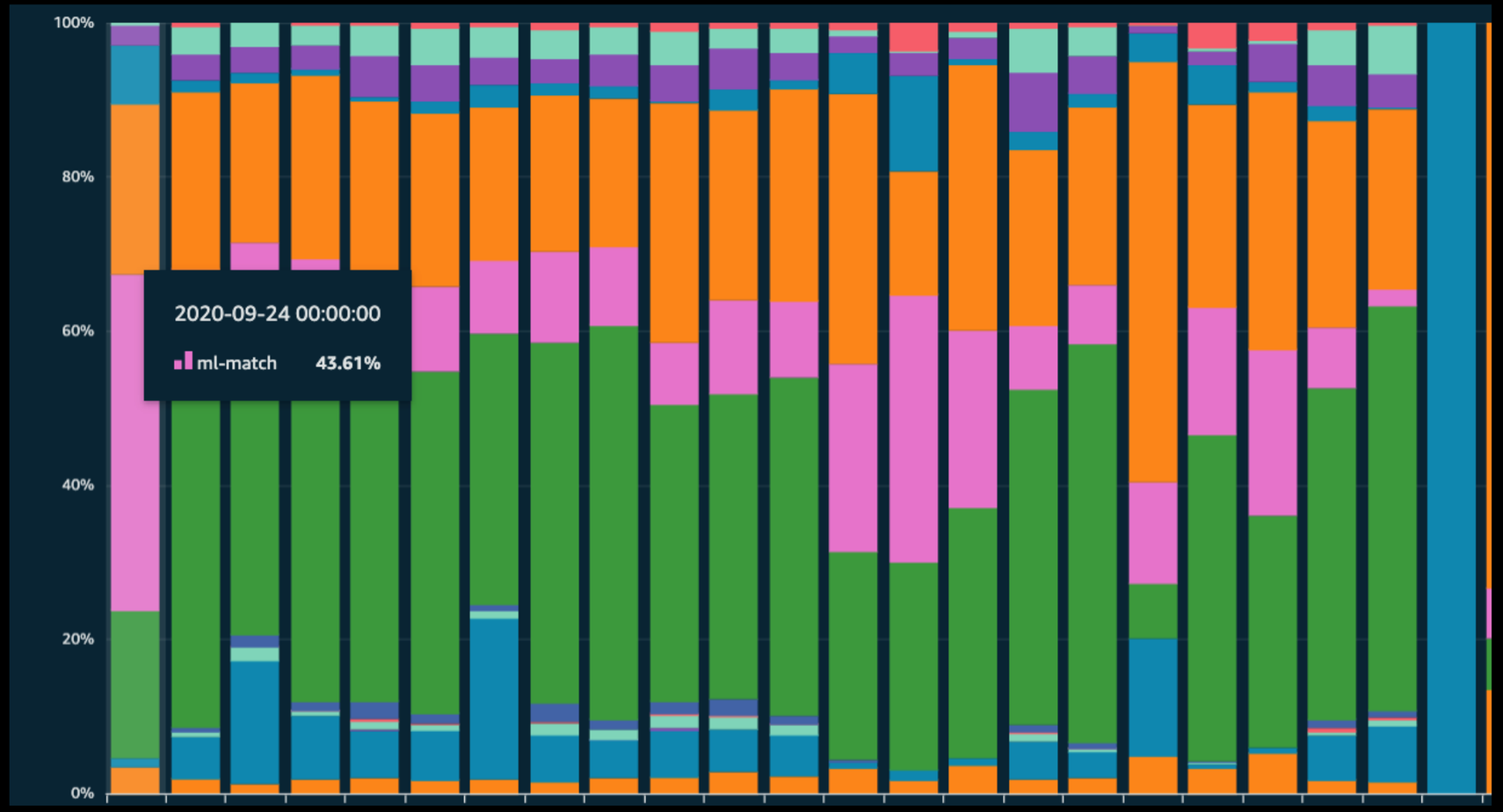
How did we solve it? Insights



Amazon Athena



Amazon QuickSight



Algorithm behavior

Business impact



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What is the impact?



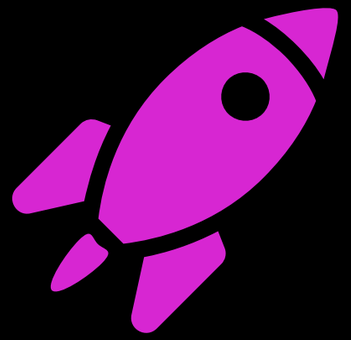
Automatically process millions of emails



Avoid hiring 1,000 people in 10 years through automation



Real-time insights and analytics



66% faster cash application to customers' open balance



Learnings and best practices

Learnings and best practices

Right tool for the job

Managed services

Experiment

Diverse skill set

Evolution is the key

val ConstantsInLife = ImmutableList.of(“Change”)

Heraclitus

Greek Philosopher



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