AWS Data / ML

@LynnLangit

Outline

D1 - Data

- S3 / SnowCone
- DynamoDB
- Aurora
- Redshift

D2 - ML

- Glue & Lake Formation (Athena?)
- Data Pipeline?? (ML APIs??)
- EMR & Spark
- Deep Learning AMI
- SageMaker

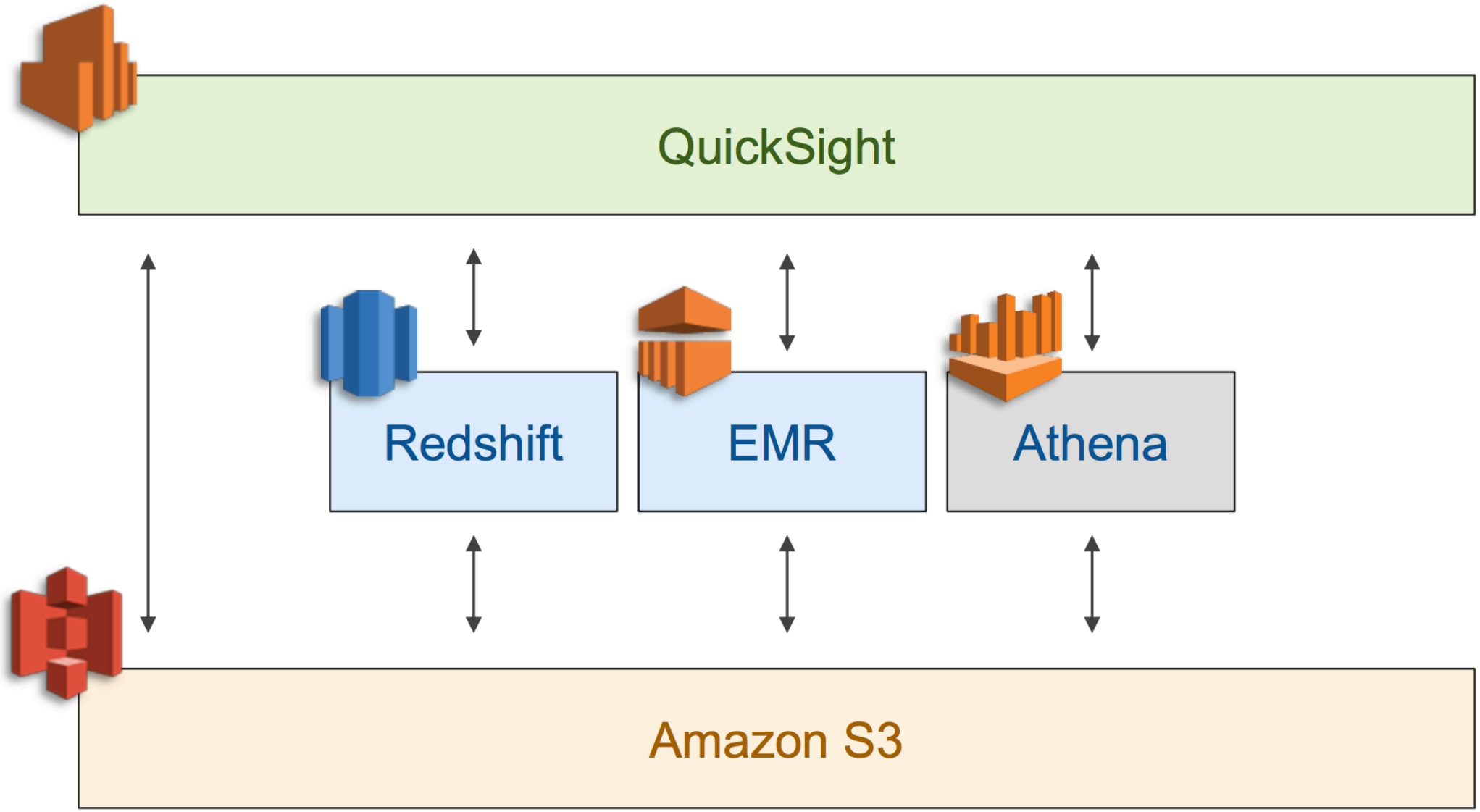
AWS SQL Choices

AWS Aurora - OLTP

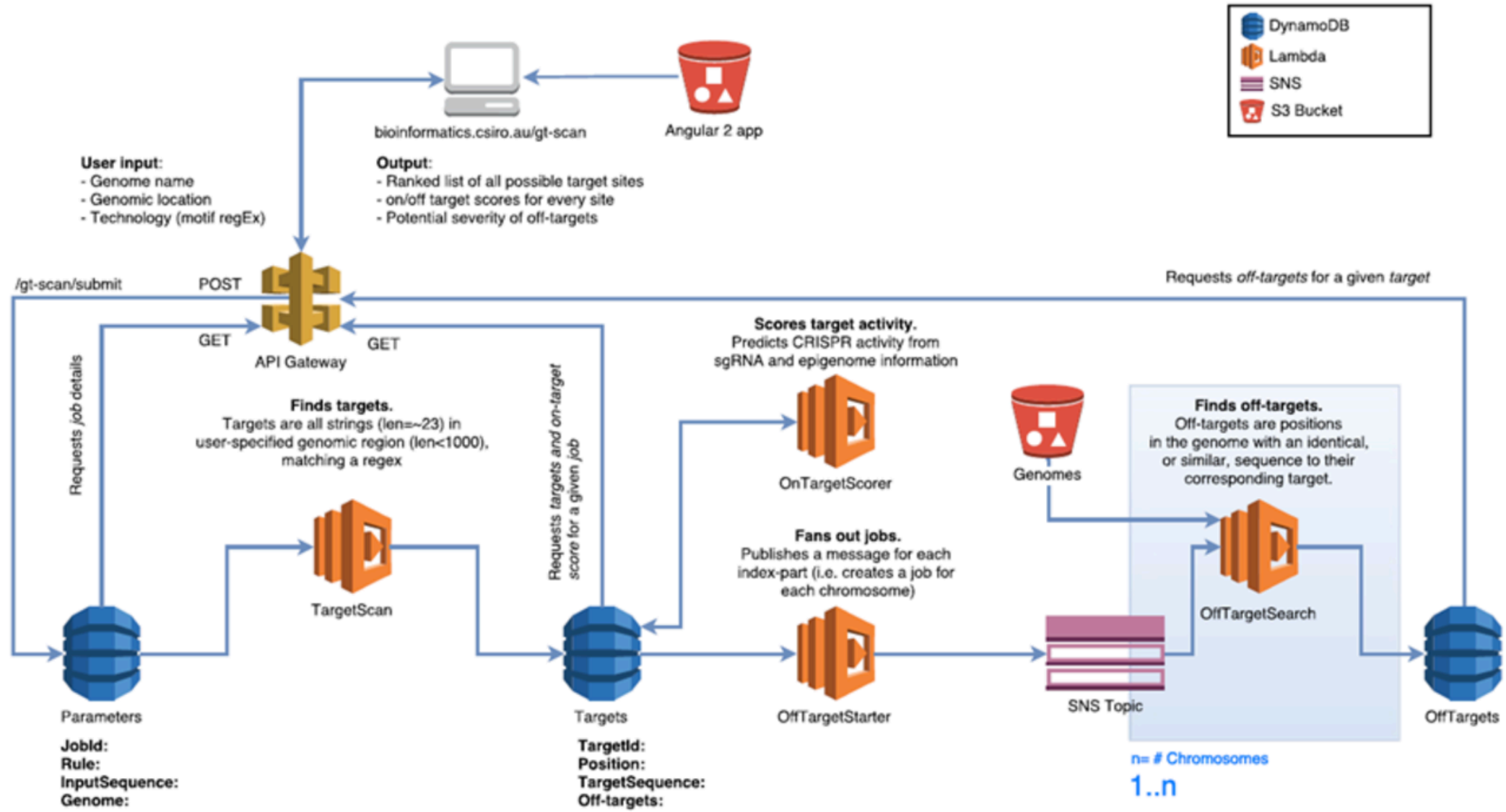
- Transactions
- App backends
- Frequent Access
- Fast Writes
- Row-based storage

AWS Redshift - OLAP

- Analytics
- Data feeds for BI and viz tools
- Massive volumes
- Fast Reads
- Column-based storage


QuickSight
Redshift
EMR
Athena
Amazon S3

GT-Scan2 Microservice-based target-finder for genome editing technologies



GT-Scan2 is served directly from S3 making it a static web app without server-side processing. It retrieves the dynamic content (such as job results and parameters) via API calls using API Gateway from a database (DynamoDB) using a JavaScript framework.

A Sample Pipeline

Upload data from multiple sources into S3

Use Amazon EMR to transform and cleanse the data (ETL)

Load formatted and cleansed data into S3

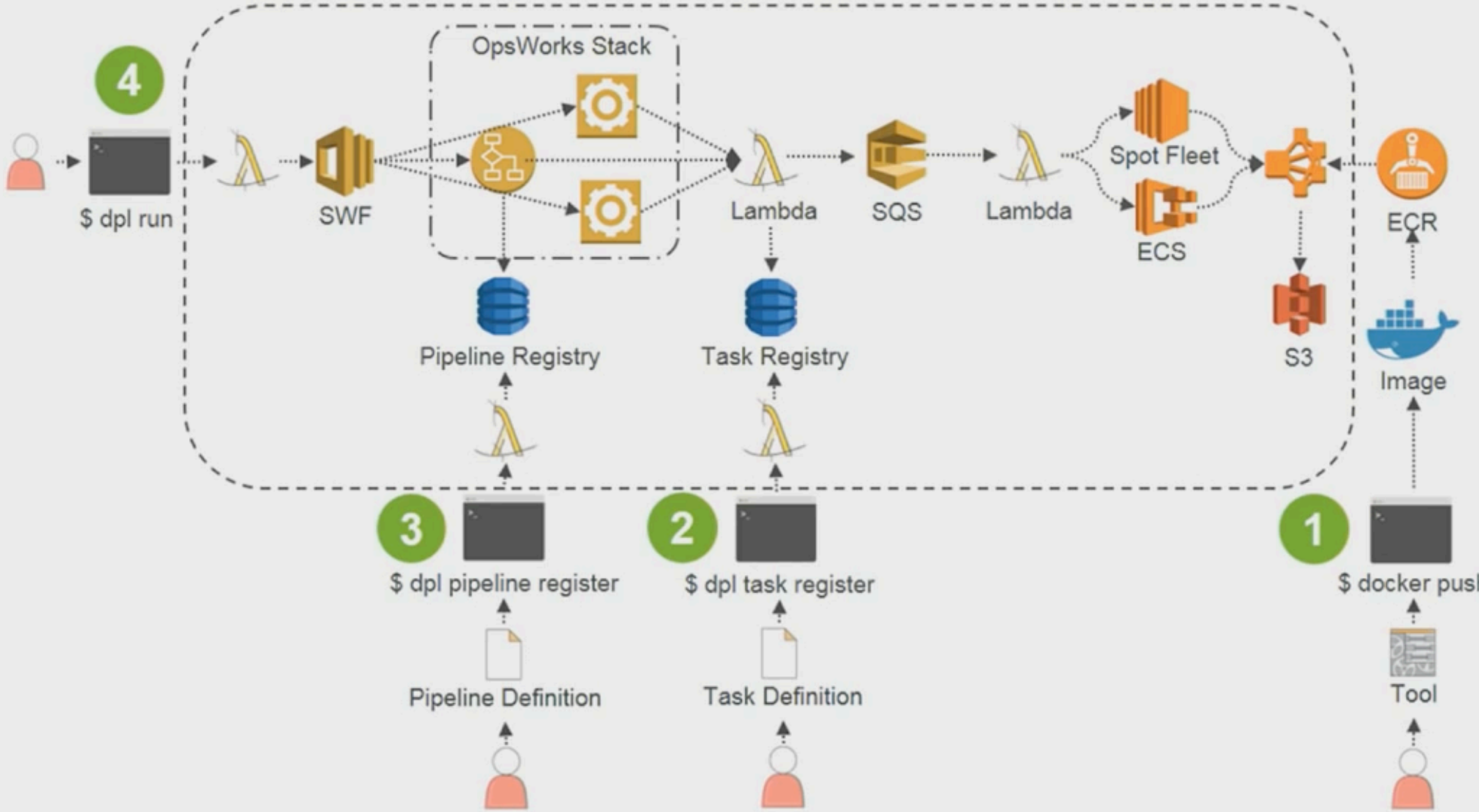
Redshift loads data in parallel optimizing it for fast analytics queries

Analyze and visualize data with Amazon Quicksight

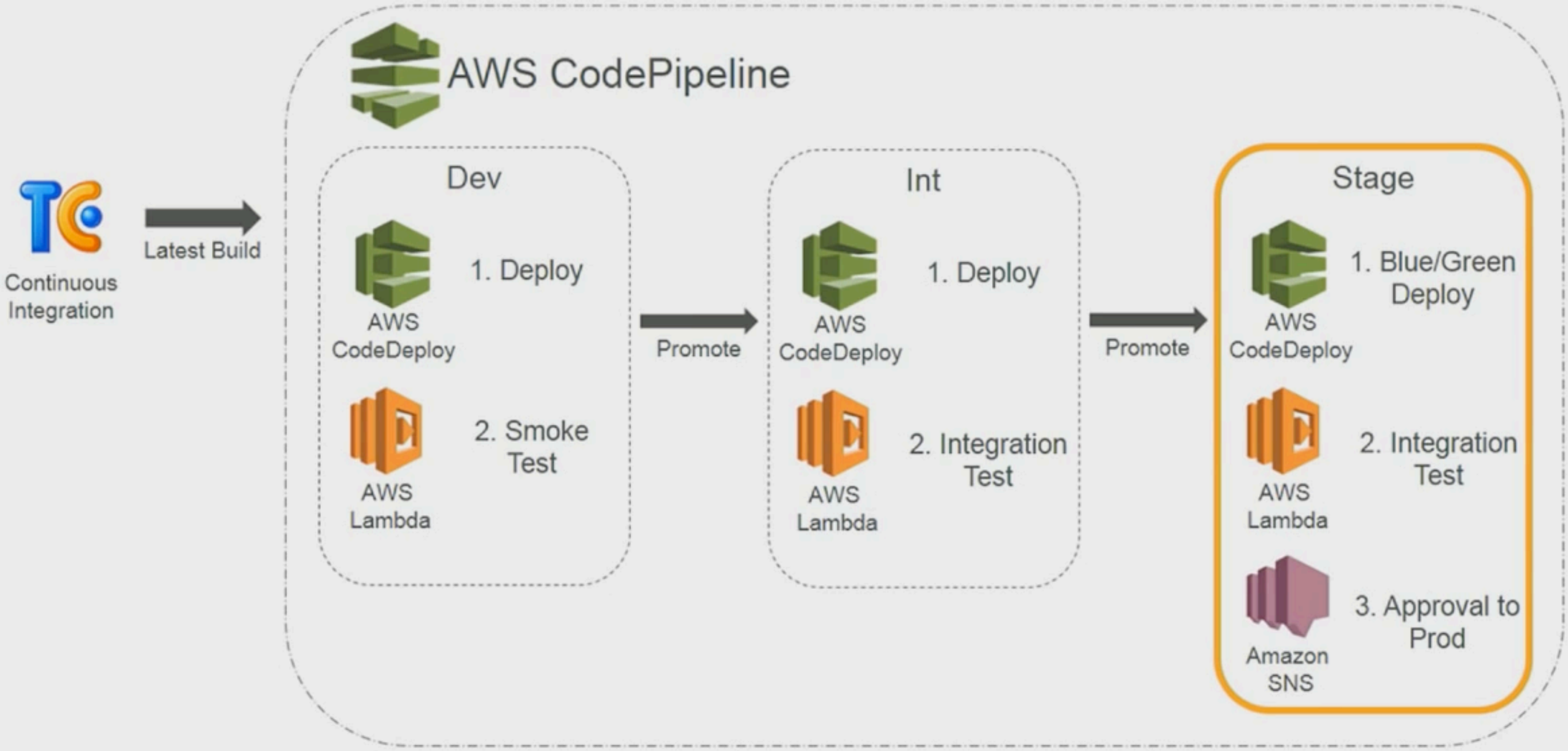
Ad-hoc access to data using Athena

Athena can query aggregated datasets as well

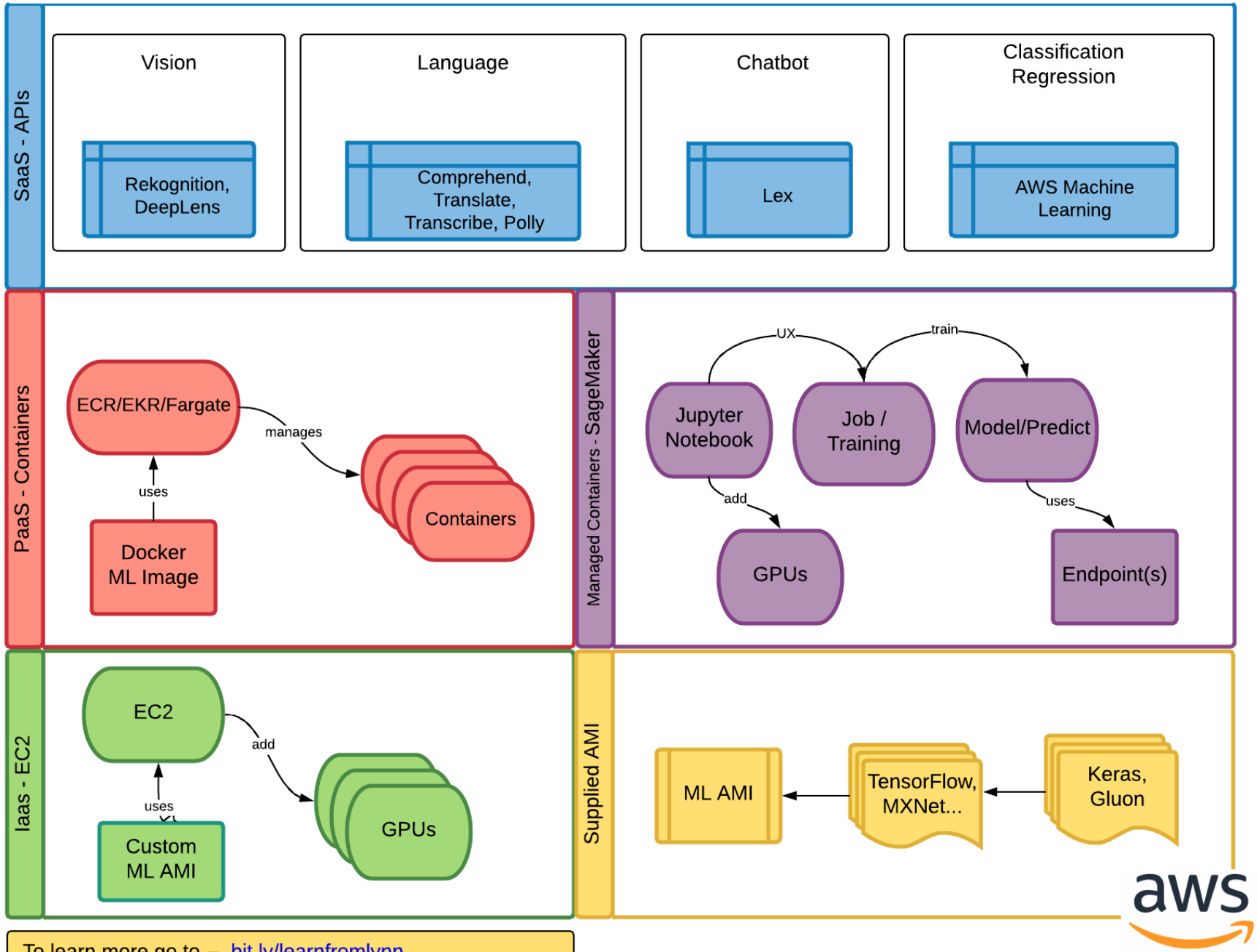
Docker Pipeline



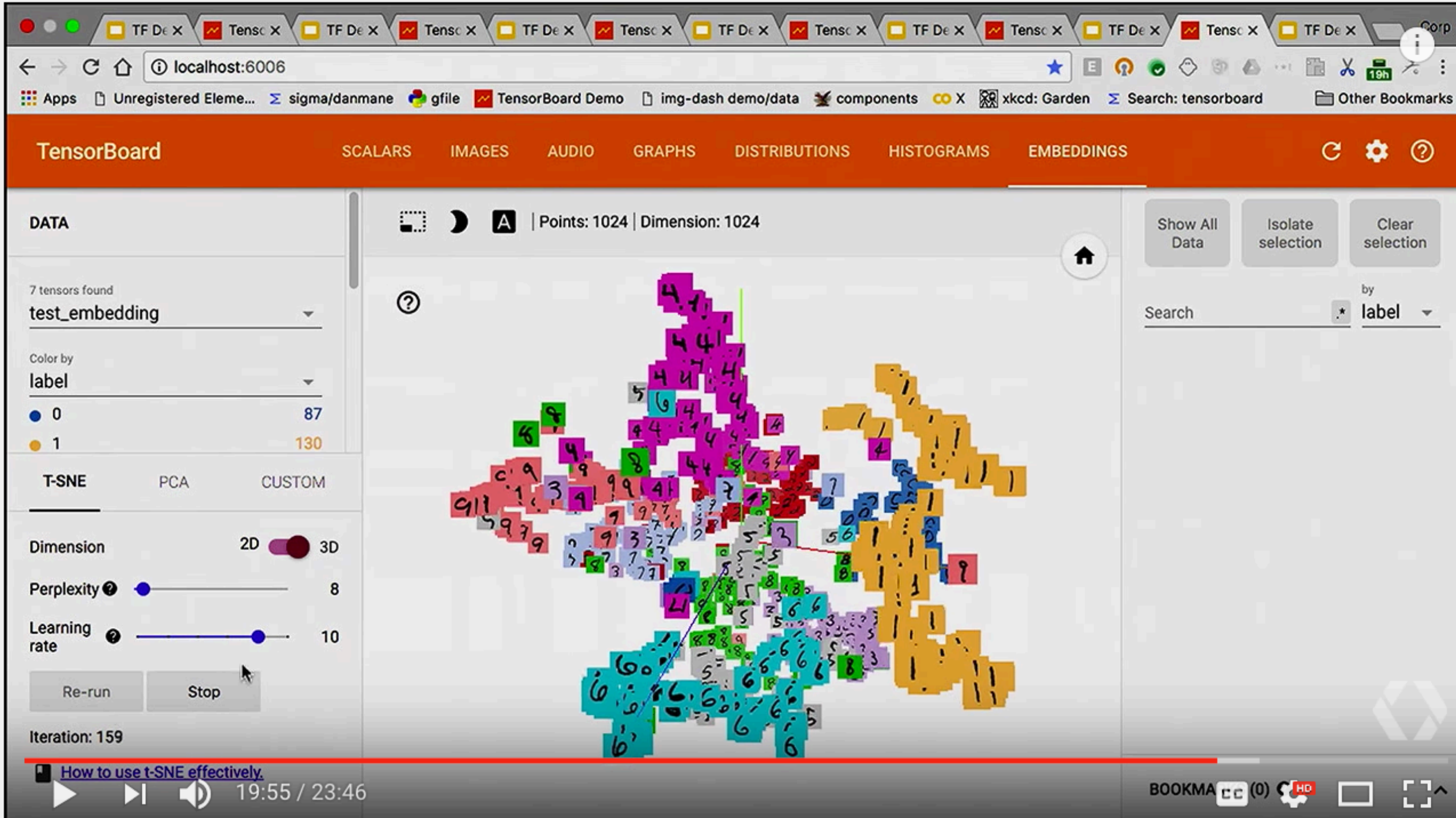
Go Faster with Continuous Delivery

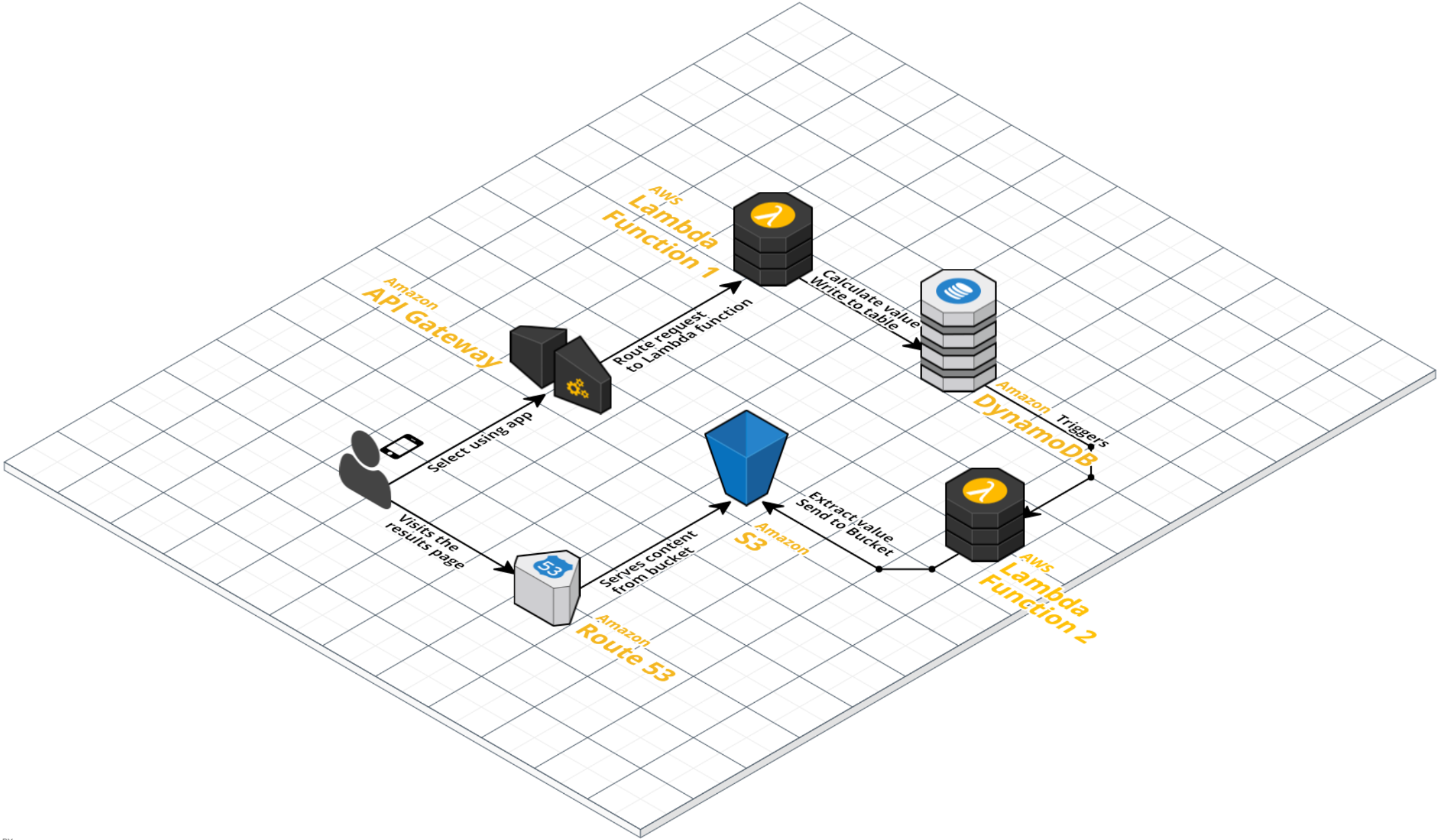


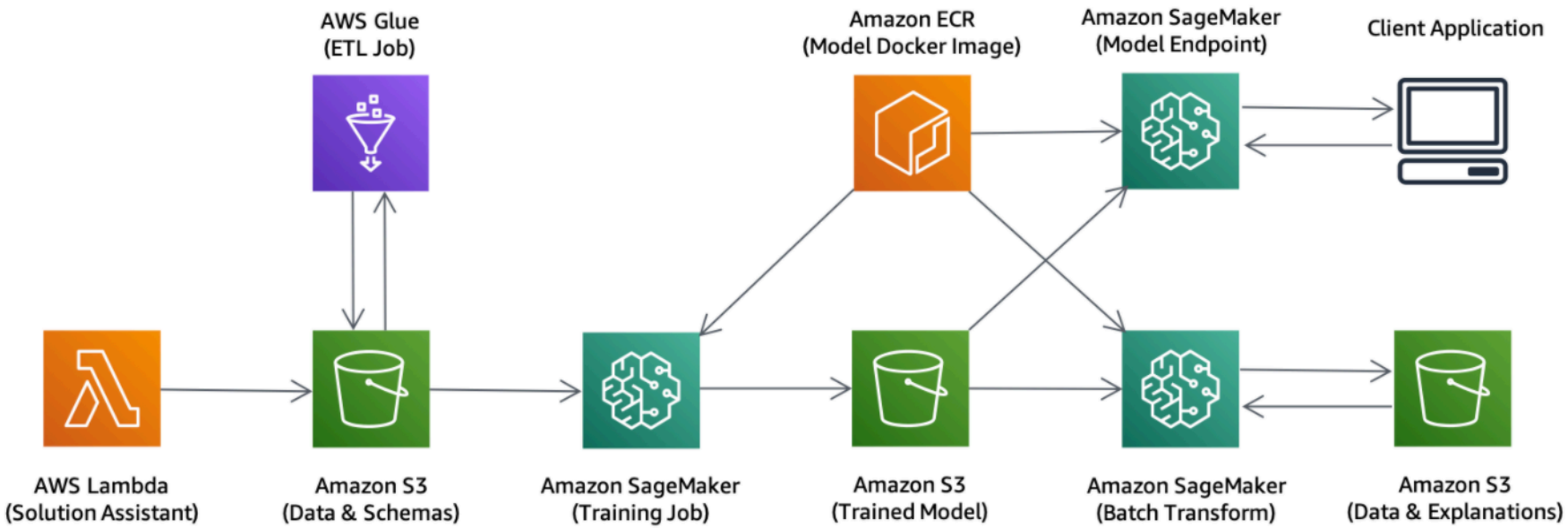
AWS Machine Learning Service Options



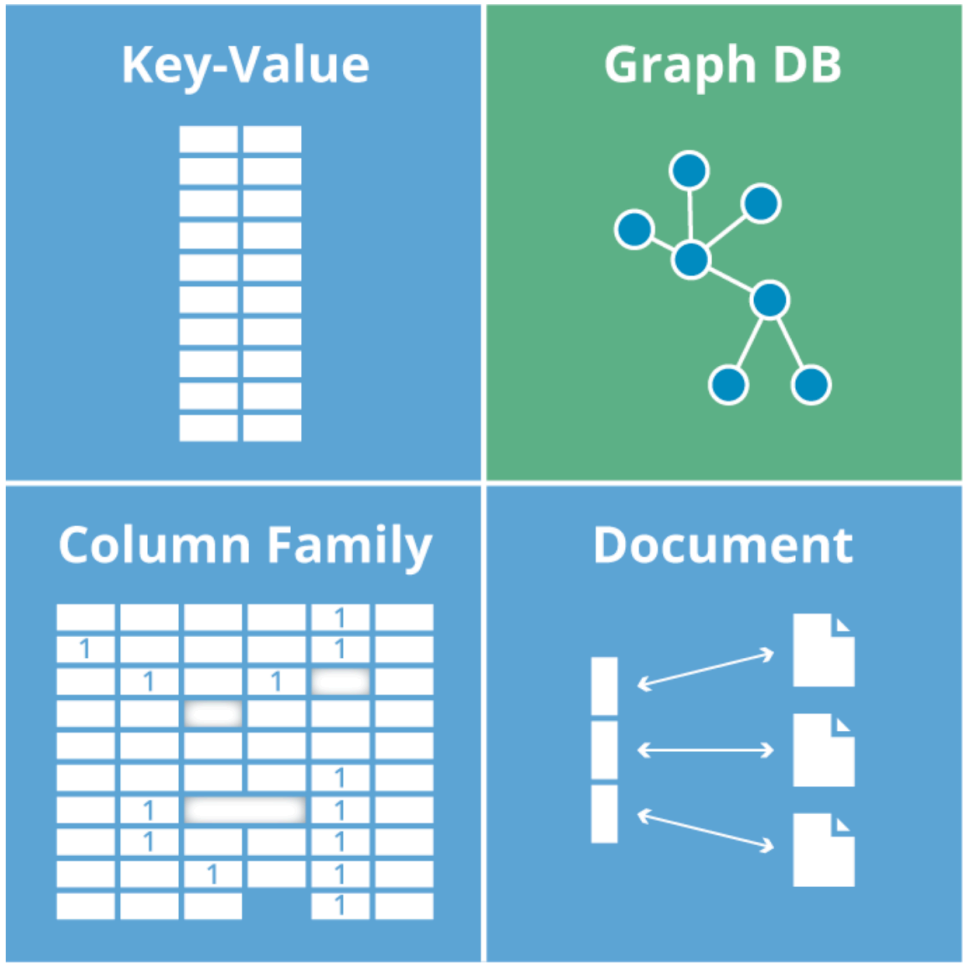
To learn more go to -- bit.ly/learnfromlynn


localhost:6006
Apps
Unregistered Eleme...
sigma/danmane
gfile
TensorBoard Demo
img-dash demo/data
components
X
xkcd: Garden
Search: tensorboard
Other Bookmarks
TensorBoard
SCALARS
IMAGES
AUDIO
GRAPHS
DISTRIBUTIONS
HISTOGRAMS
EMBEDDINGS
DATA
7 tensors found
test_embedding
Color by
label
0 87
1 130
T-SNE
PCA
CUSTOM
Dimension
2D
3D
Perplexity
8
Learning rate
10
Re-run
Stop
Iteration: 159
Points: 1024 | Dimension: 1024
Show All Data
Isolate selection
Clear selection
Search
by
label
How to use t-SNE effectively.
19:55 / 23:46




AWS Glue
(ETL Job)
Amazon ECR
(Model Docker Image)
Amazon SageMaker
(Model Endpoint)
Client Application
AWS Lambda
(Solution Assistant)
Amazon S3
(Data & Schemas)
Amazon SageMaker
(Training Job)
Amazon S3
(Trained Model)
Amazon SageMaker
(Batch Transform)
Amazon S3
(Data & Explanations)

Types of NoSQL Databases



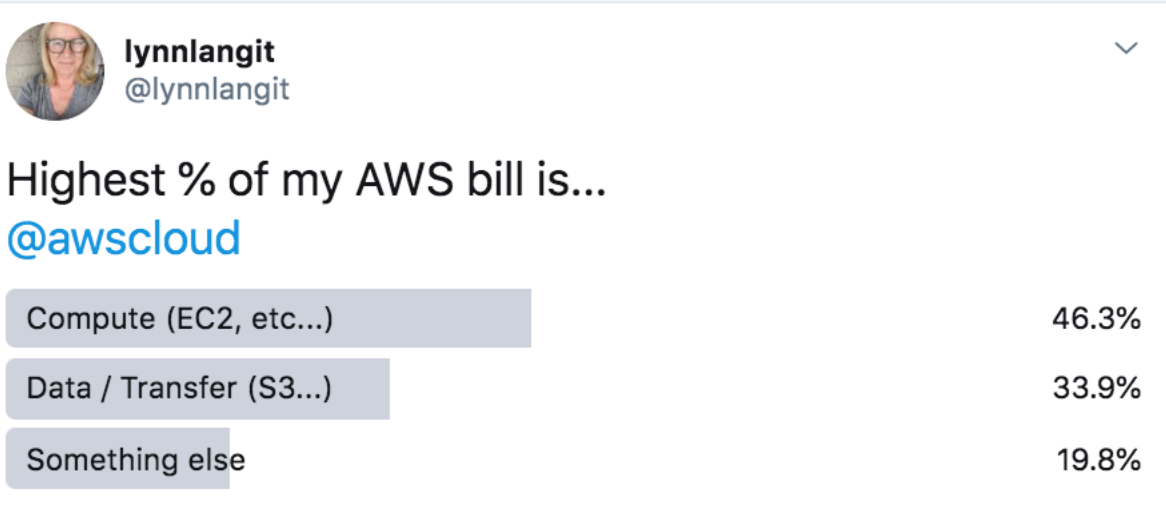
- Blended NoSQL
- Events
  - Time streams
  - Real time
  - IoT
- Ledger

- SQL-query layer

Cloud NoSQL Databases

Type	Open Source	AWS	AWS Managed Open Source
Key-Value	Redis	DynamoDB*	ElastiCache for Redis
Columnar	Cassandra	Redshift – Redshift Spectrum	Managed Cassandra
Document	MongoDB	DynamoDB*	DocumentDB for MongoDB
Graph	Neo4j	AWS Neptune	Marketplace Neo4j
Events/IoT	--	TimeStream, IoT Events*	IoT Core*
Ledger	Hyperledger	QLDB*	--

***Serverless**


lynnlangit
@lynnlangit
Highest % of my AWS bill is...
@awscloud
Compute (EC2, etc...)
46.3%
Data / Transfer (S3...)
33.9%
Something else
19.8%

Sheen Brisals @sheenbrisals · Jan 15

Heard at the sprint review-

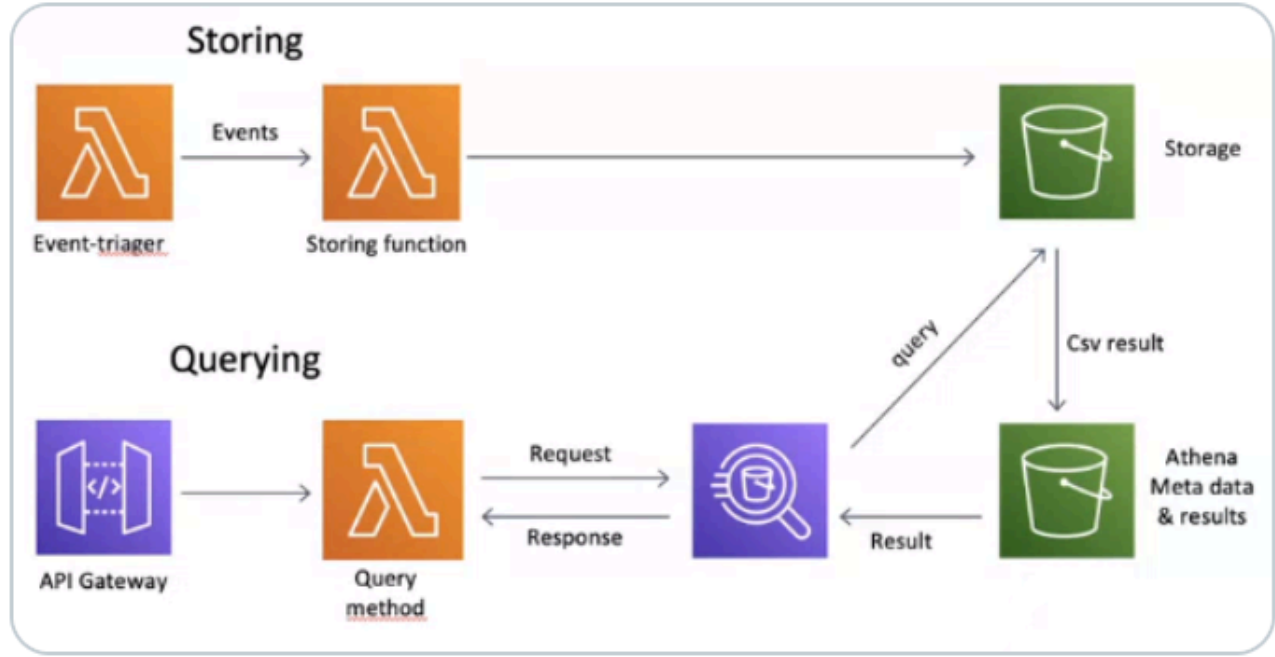
Use case: Extend event stream to store new events & run business queries

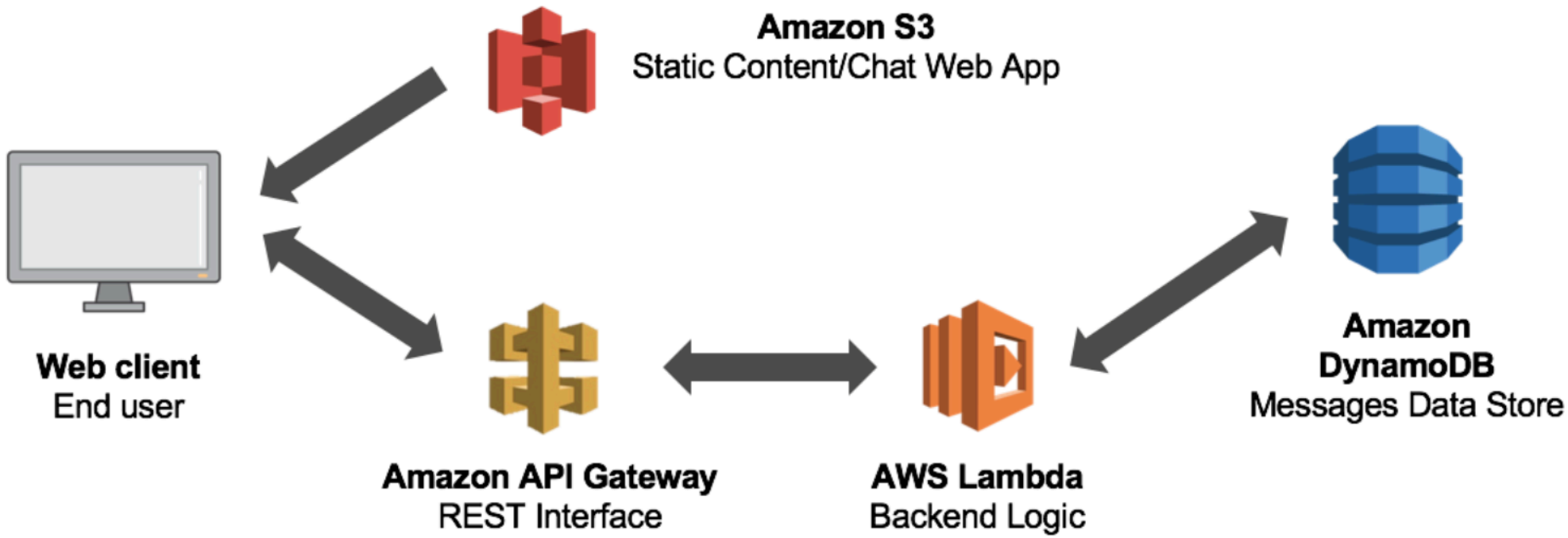
[existing flow]>lambda >S3
APIGW >lambda >Athena >S3

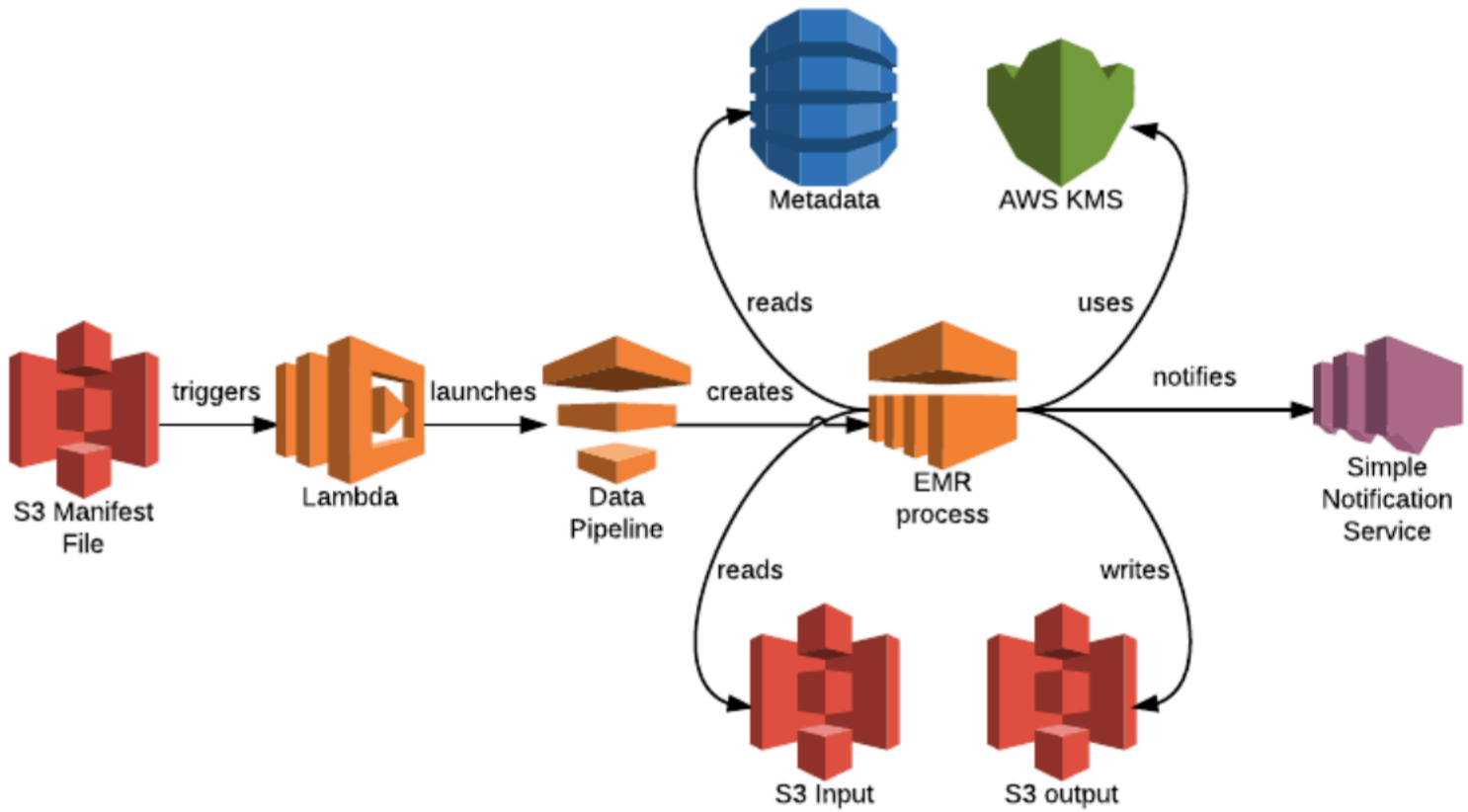
Tuesday: Design agreed
Friday: Solution in QA

That's the convenience of serverless🚀

#Serverless #AWS @awscloud




Amazon S3
Static Content/Chat Web App
Web client
End user
Amazon API Gateway
REST Interface
AWS Lambda
Backend Logic
Amazon
DynamoDB
Messages Data Store


Metadata
AWS KMS
reads
uses
S3 Manifest File
triggers
Lambda
launches
Data Pipeline
creates
EMR process
notifies
Simple Notification Service
reads
writes
S3 Input
S3 output

AI Solutions for Every Developer

AI SERVICES

AMAZON REKOGNITION
IMAGE RECOGNITION

AMAZON POLLY
TEXT-TO-SPEECH

AMAZON LEX
VOICE AND TEXT CHATBOTS

AI PLATFORMS

AMAZON MACHINE LEARNING

AMAZON EMR

SPARK & SPARKML

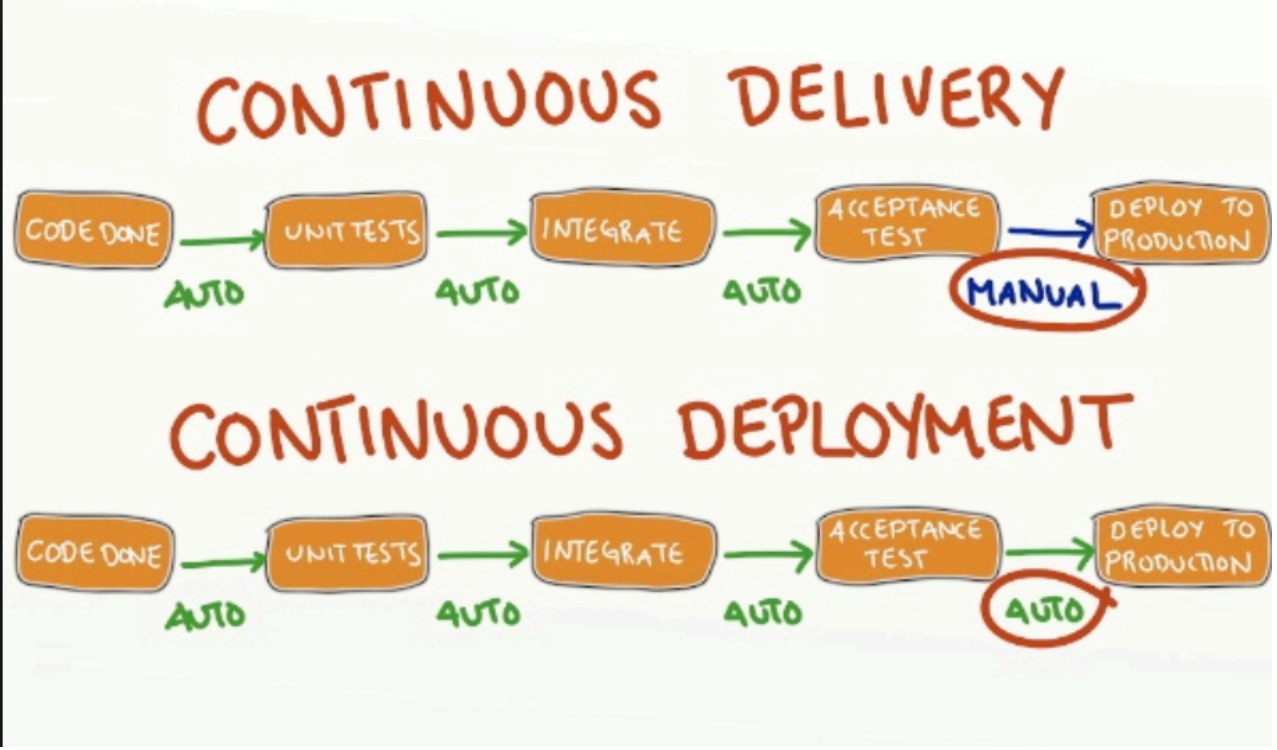
AI FRAMEWORKS

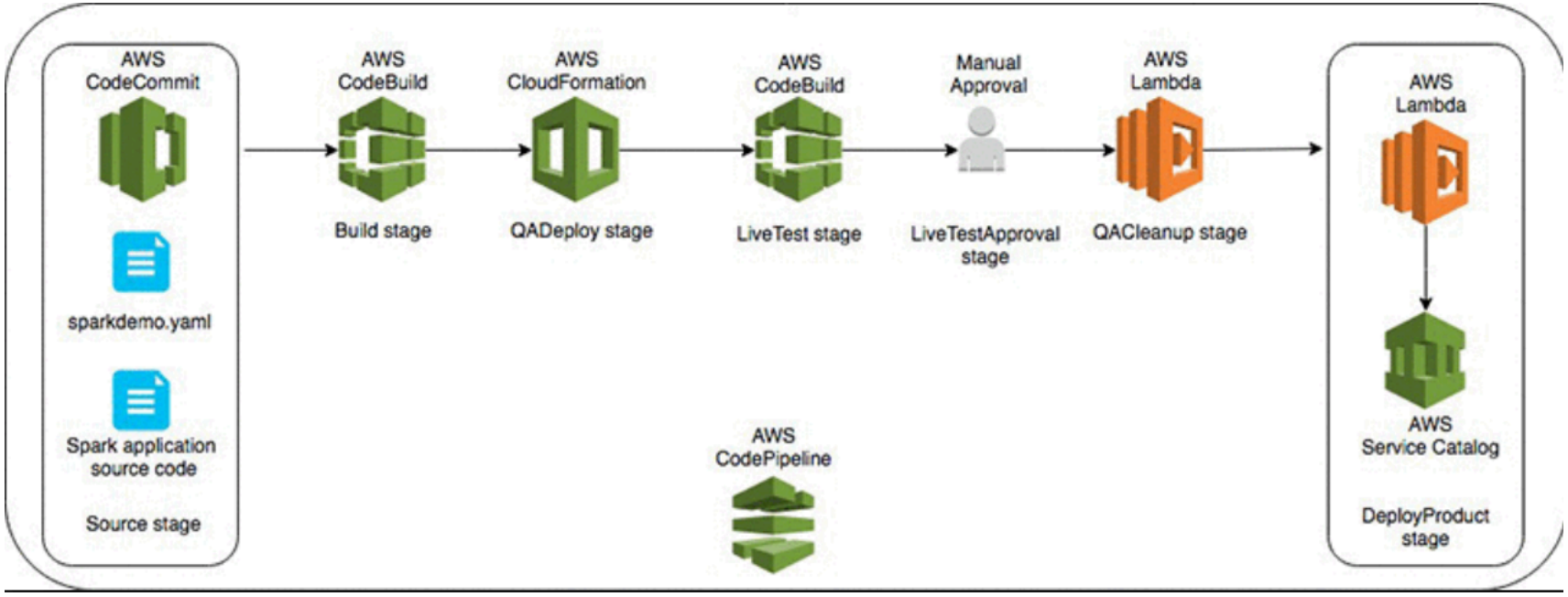
AWS DEEP LEARNING AMI

APACHE MXNET | TENSOR-FLOW | CAFFE | TORCH | THEANO | CNTK | KERAS

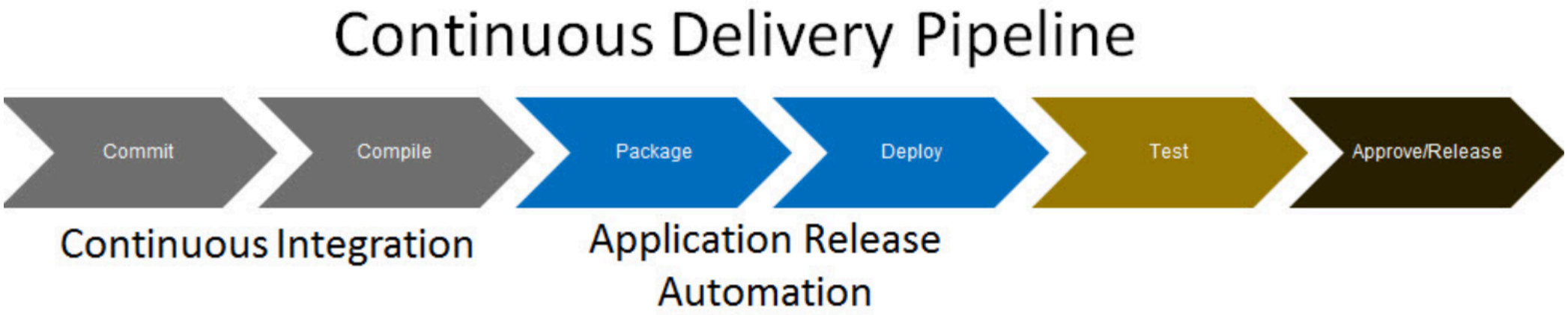
AI INFRASTRUCTURE

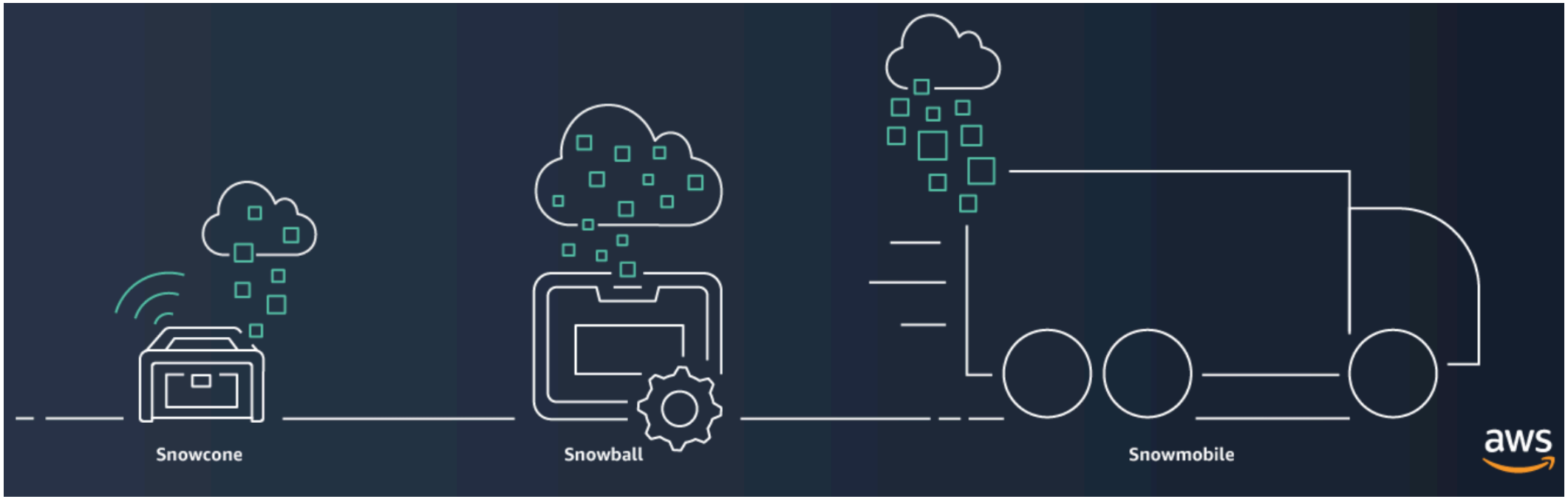
AMAZON EC2 P2 AND G2 GPUS | AMAZON EC2 CPUS | AWS LAMBDA | ENHANCED NETWORKING | AWS IOT AND AWS GREENGRASS


CONTINUOUS DELIVERY
CODE DONE
UNIT TESTS
INTEGRATE
ACCEPTANCE TEST
DEPLOY TO PRODUCTION
AUTO
AUTO
AUTO
MANUAL
CONTINUOUS DEPLOYMENT
CODE DONE
UNIT TESTS
INTEGRATE
ACCEPTANCE TEST
DEPLOY TO PRODUCTION
AUTO
AUTO
AUTO
AUTO


AWS CodeCommit
sparkdemo.yaml
Spark application source code
Source stage
AWS CodeBuild
Build stage
AWS CloudFormation
QADeploy stage
AWS CodeBuild
LiveTest stage
Manual Approval
LiveTestApproval stage
AWS Lambda
QACleanup stage
AWS CodePipeline
AWS Lambda
AWS Service Catalog
DeployProduct stage


DEV
TEST
LIVE
CODE
CONTENT


Continuous Delivery Pipeline
Commit
Compile
Package
Deploy
Test
Approve/Release
Continuous Integration
Application Release Automation



AWS Snow Family - https://aws.amazon.com/snow/

- Pick your device (size) – all are RUGGED
- Order a device and configure a transfer job via the AWS Console (Snow Series or OpsHub (local))
- Receive the device, plug it in, start the job, wait, unplug and send the device back

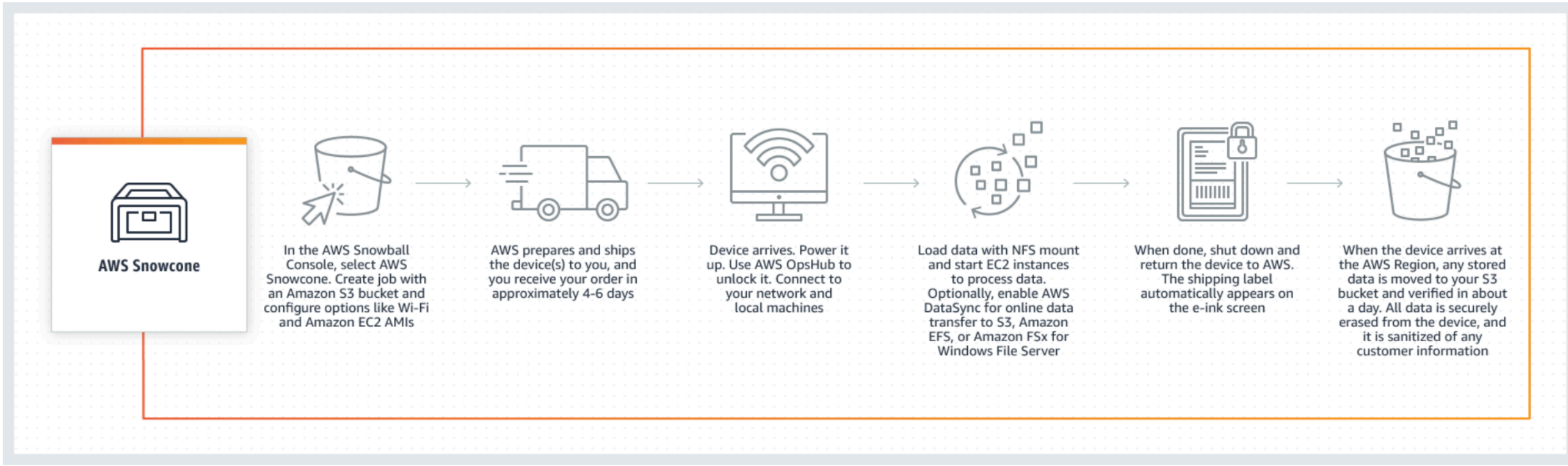
Learn more about Snowcone »

Learn more about Snowball »

Learn more about Snowmobile »

Snowcone – ~ 4 lbs., ~ 8 TB, in your backpack → Edge / IoT / Healthcare / Military
Snowball - ~ 50 lbs. – 42 TB storage, can be racked together → Data Migration, Distributed Storage
Snowmobile ~ 45 ft.-long container – 100 PB, on a semi truck → Data Center Migration (1,250 Snowballs)

	Device type	Storage (HDD)	Storage (SSD)	Compute	Memory
◉	AWS Snowcone	8 TB	-	2 vCPUs	4 GB
○	Snowball Edge Compute Optimized	42 TB	7.68 TB	52 vCPUs	208 GB
○	Snowball Edge Compute Optimized with GPU	42 TB	7.68 TB	52 vCPUs, GPU	208 GB
○	Snowball Edge Storage Optimized	100 TB	-	24 vCPUs	32 GB



- Order it / create job
- Wait for shipment
- Turn device on, unlock via AWS OpsHub, connect
  Load data (to S3, EFS or Amazon FSx for WFS)
- Shut down and verify label
- Verify data on AWS