AWS sketchbook

Content: awsgeek.com

Curated By: him431

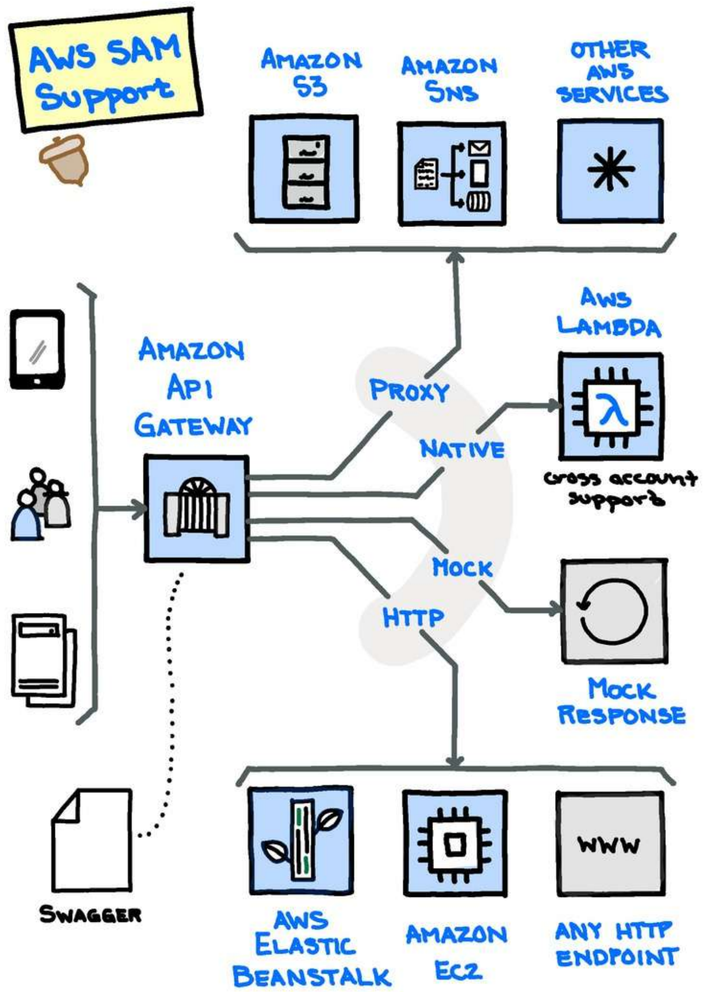
API Amazon Gateway

@awsgeek

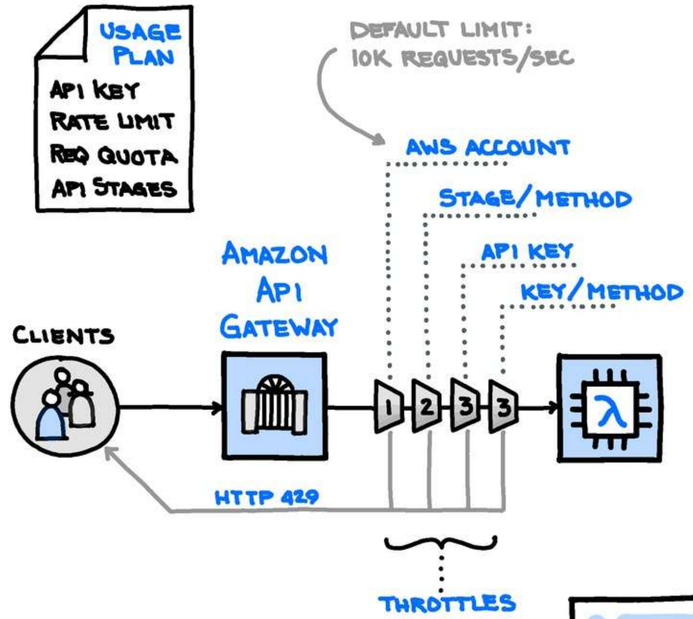
·notes·

11/7/18

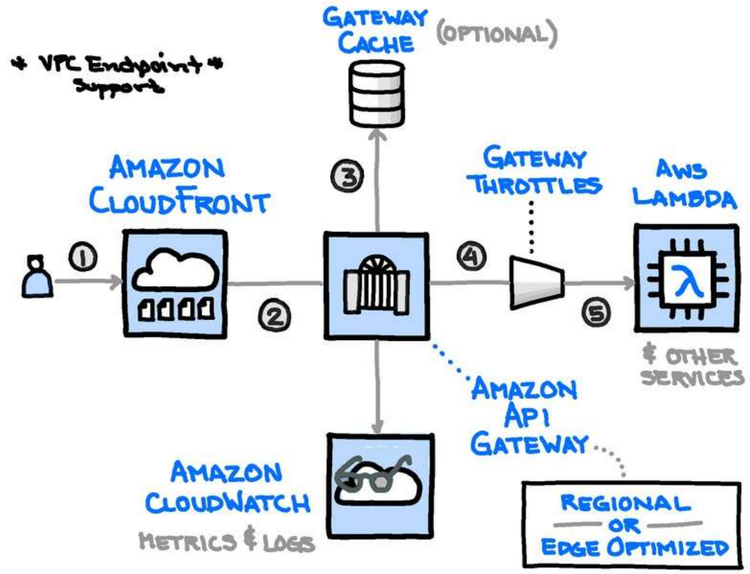
The Integrations



Throttling



Under the Hood



Pricing

Data Transfer: (per GB)

- First 10TB: 9¢
- Next 40TB: 8.5¢
- Next 100TB: 7¢
- Next 350TB: 5¢

API calls

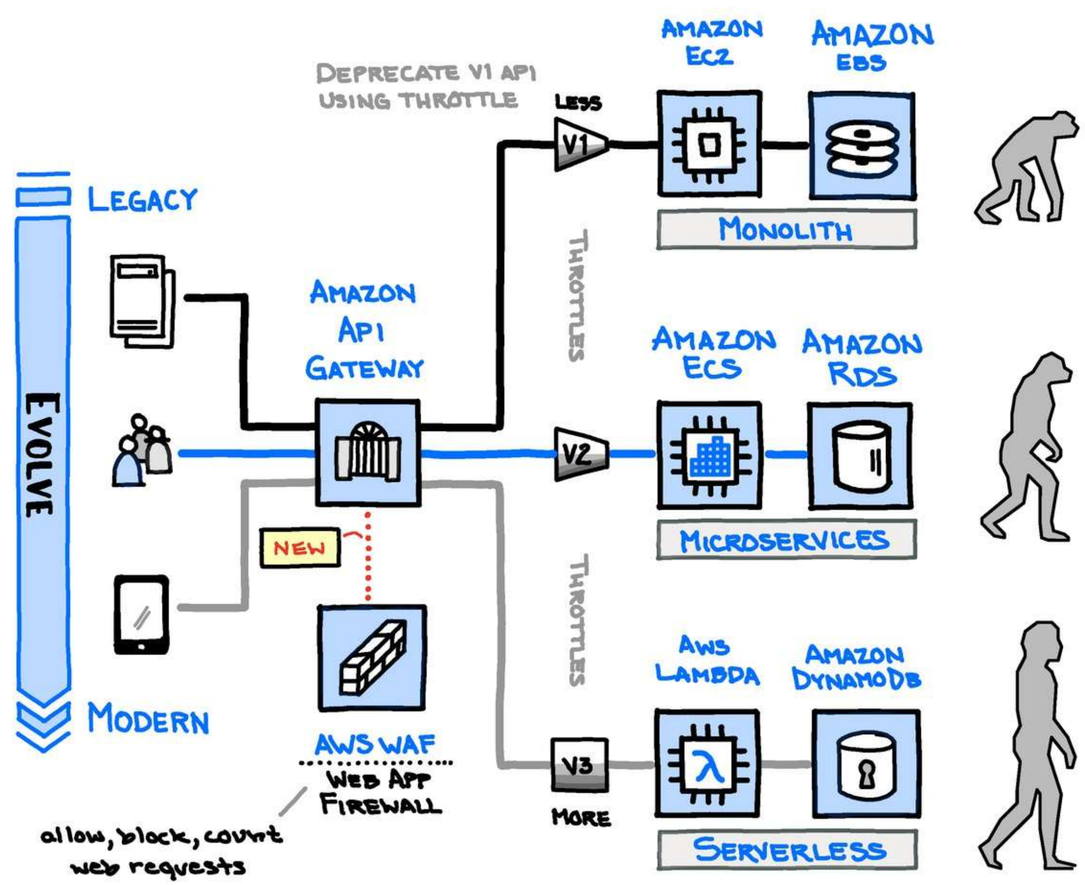
tiered from: $3.50/MM

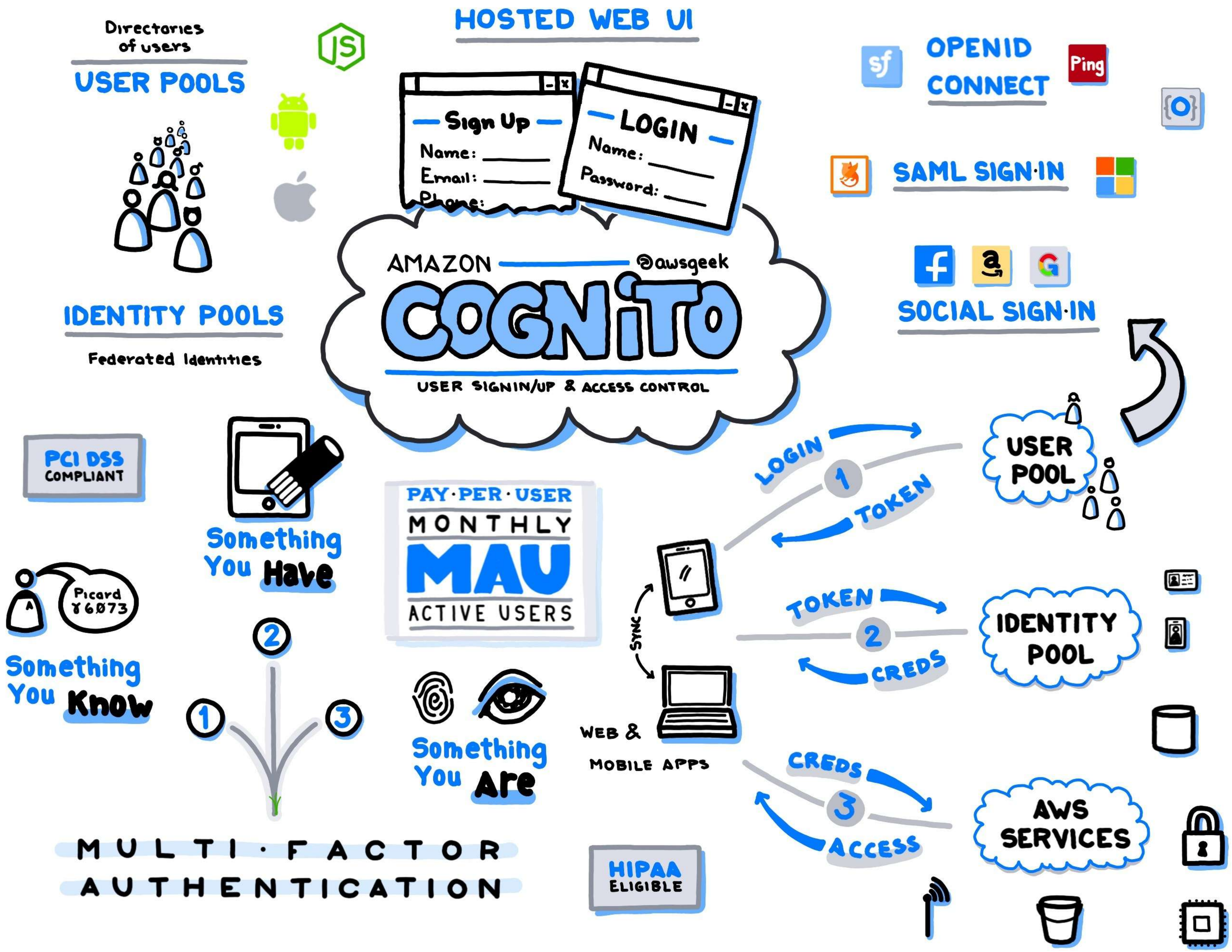
NEW to: $1.51/MM

Caching from: 2¢/0.5GB/HR

to: $3.80/237GB/HR

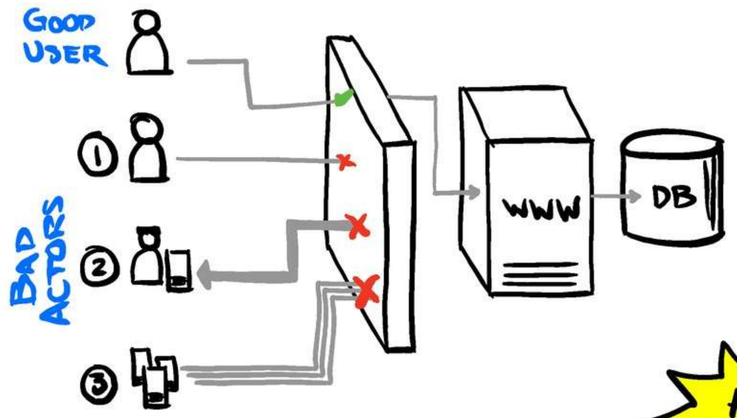
Evolution of an API

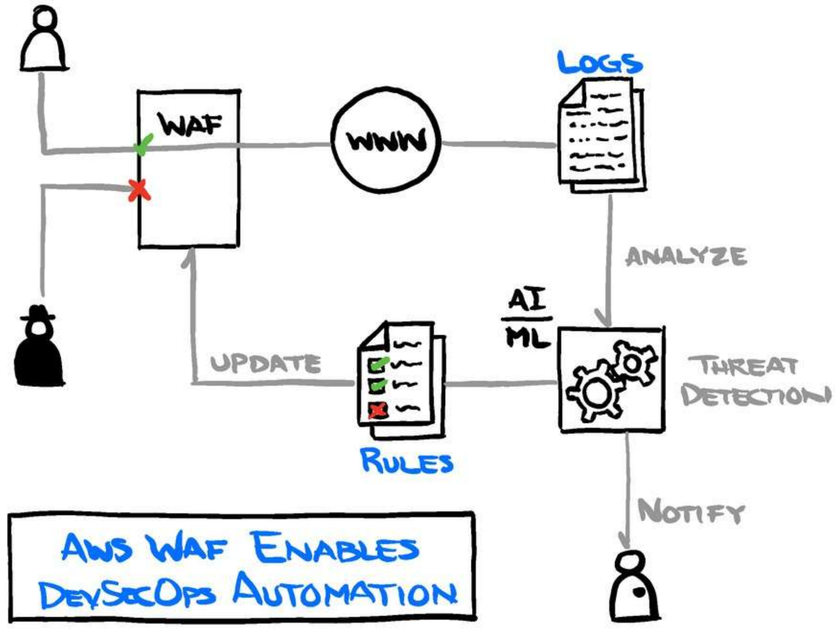



Directories of users
USER POOLS
HOSTED WEB UI
Sign Up
Name:
Email:
Phone:
LOGIN
Name:
Password:
OPENID CONNECT
SAML SIGN·IN
SOCIAL SIGN·IN
AMAZON
@awsgeek
COGNITO
USER SIGNIN/UP & ACCESS CONTROL
IDENTITY POOLS
Federated Identities
PCI DSS COMPLIANT
Something You Have
Picard
Y6Ø73
Something You Know
PAY·PER·USER
MONTHLY
MAU
ACTIVE USERS
Something You Are
MULTI·FACTOR AUTHENTICATION
HIPAA ELIGIBLE
LOGIN
1
TOKEN
USER POOL
SYNC
TOKEN
2
CREDS
IDENTITY POOL
WEB & MOBILE APPS
CREDS
3
ACCESS
AWS SERVICES

Common WAF Use Cases

Prevent
1. Malicious Users
2. Content Abuse
3. DDoS Attacks



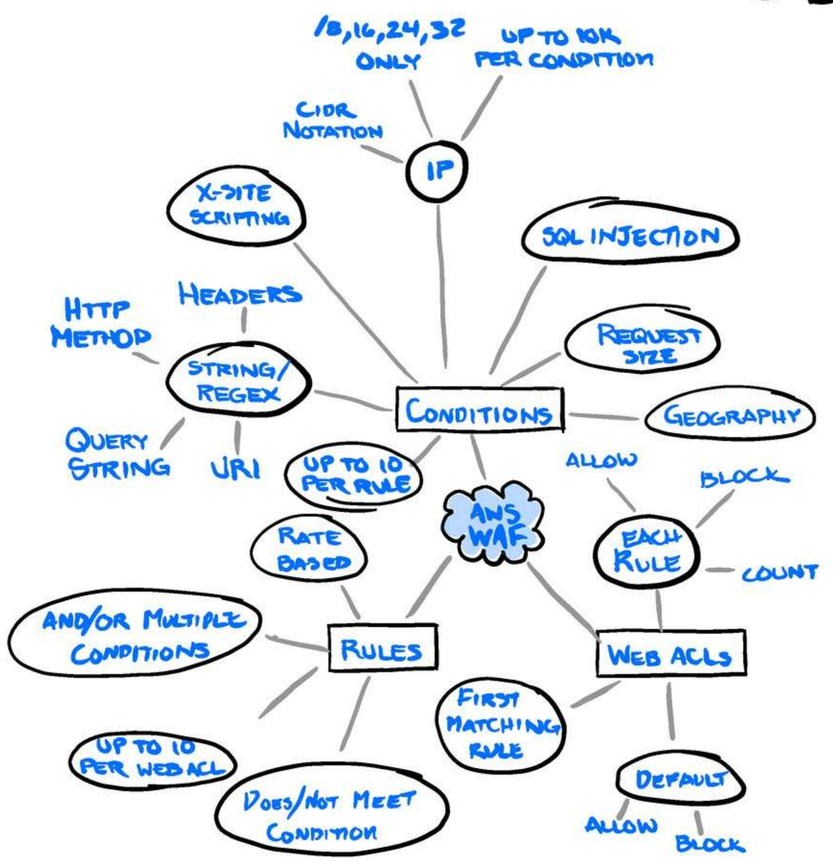


AWS Web Application Firewall WAF

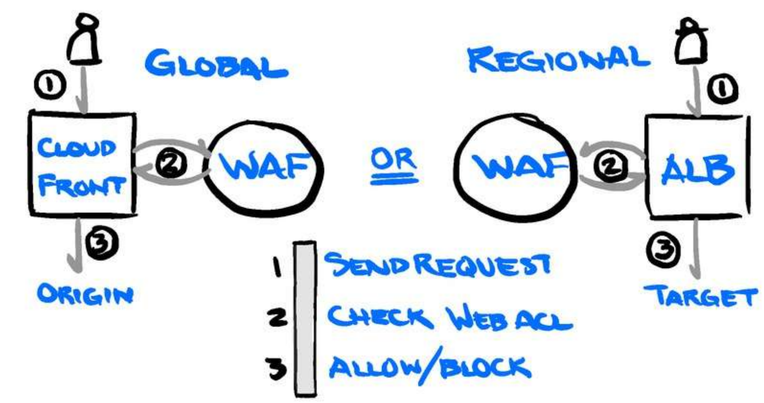
Since Reinvent '15 3/13/18

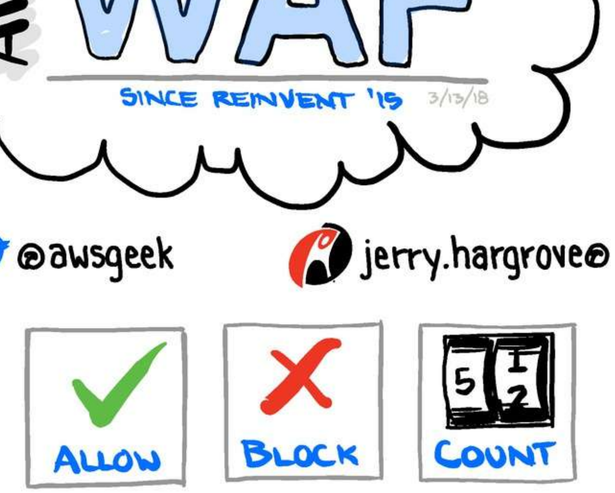
HIPAA Eligible

@awsgeek jerry.hargrove@



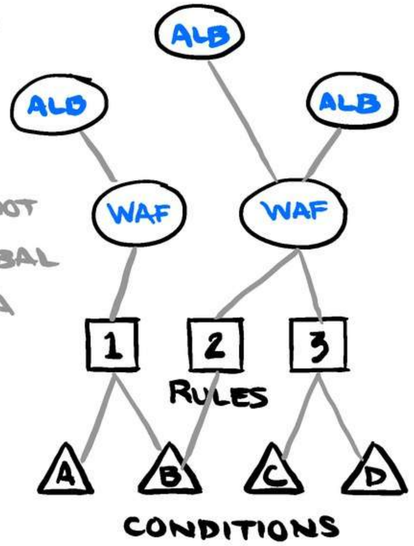
AWS WAF Enables DevSecOps Automation





* ACL, Rule, Condition are either Global or Region specific

* Regional may not be used by Global and vice-versa

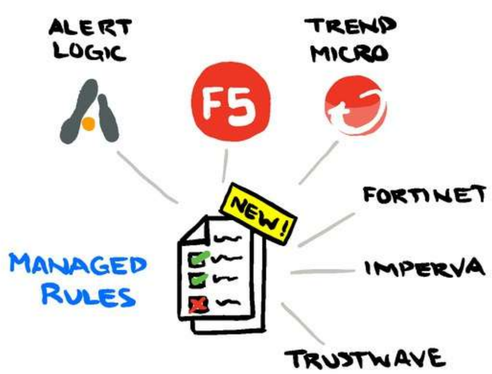


Preconfigured Protections

- Bad Bot/Scraper
- SQL Injection
- Cross-Site Scripting
- HTTP Flood, Scanner, Probe
- IP White/Black List
- Known Attacker

Via CloudFormation New or Existing WAF

$5/Web ACL/Mo
$1/Rule/Web ACL/Mo
60¢/MM Requests



Follow:
AWS Security Blog

APPLICATION LOAD BALANCER

A Visual Primer

HIPAA ELIGIBLE

Elastic Load Balancing

2009	2016	2017
Classic (CLB)	Application (ALB)	Network (NLB)
Layer 4 & 7	Layer 7	Layer 4
HTTP/S	HTTP/S	TCP
TCP/SSL		
EC2 Classic	VPC	VPC

Pricing

US West (Oregon) 2.3¢/HR + 0.8¢/LCU-HR

On-Demand

Load Balancer Capacity Unit

Highest determines # of LCUs:
- 25 new connections/sec
- 3k active connections/min
- 2.2 MbPs bandwidth
- 1k rule evals/sec

ELB | IAM | EC2 | S3 | RDS | VPC | EBS

Walk-Through

https://www.abc.com/api

1. Receive Request
2. Identify Listener
3. Find First Match
4. Forward Request

Listeners
- ✗ HTTP:80
- ✓ HTTPS:443
- ✗ HTTP:8080
- ✗ HTTPS:8443

Rules
- ✗ /auth
- ✓ /api
- *.abc.com
- Default

Target Group

High Availability

Elastic Load Balancing

Round Robin

A → B → C

Elastic Cloud Compute

DDoS Protection

SYN Flood

Web Traffic

Virtual Private Cloud

Public Subnet

Private Subnet

Content-Based Routing

ALB

www.host1.com/app2

www.host1.com/app1

www.host2.com/app3

App 1 | App 2 | App 3

Host 1 | Host 2

Listeners & Targets

Listeners

Protocol	[HTTP | HTTPS]
Port	[1-65535]
Rules	[Host | Path]

SSL Certificates
- 25 per ALB
- Server Name Indication (SNI)
- +1 default cert

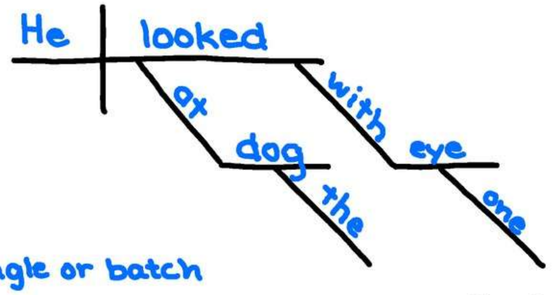
NEW!

Rules
- Host Rules: *.xyz.com
- Path Rules: /images/*
- Default

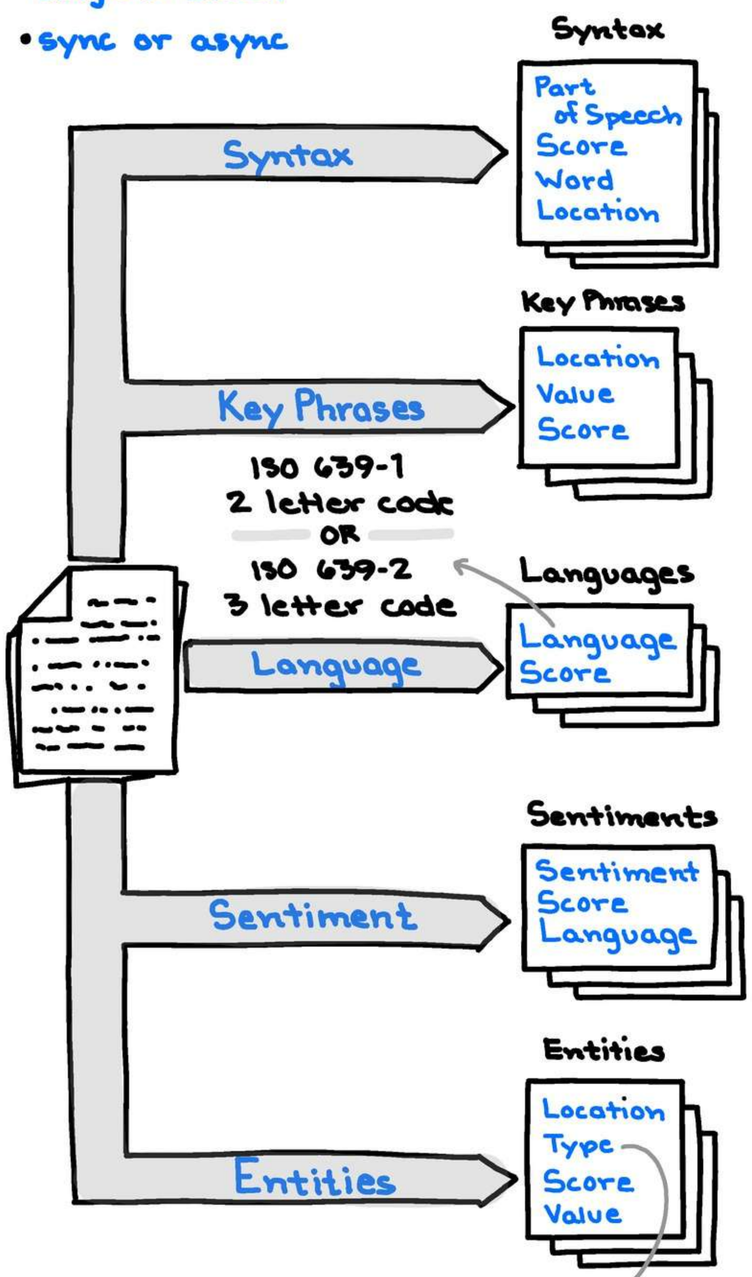
Targets
- EC2 Instances
- IP Addresses

Can't be publicly routable

@awsgeek 11/8/17



- single or batch
- sync or async



Entity Types

- Product
- Date/time
- Event
- Person
- Quantity
- Title
- Location
- Organization
- Other

Pricing

	<10M	10-50M	>50M	
Sentiment, Phrases, Entities, Language	$10	$5	$2.5	1 unit = 100 characters; per Million units; min charge: 300 chars
Syntax	$5	$2.5	$1.25	

Topics		
	<=100 MB	$1
	>100 MB	$1 + 4¢/10 MB

total doc size

amazon COMPREHEND

natural language processing

jerry@lucidchart @awsgeek

9/2/18

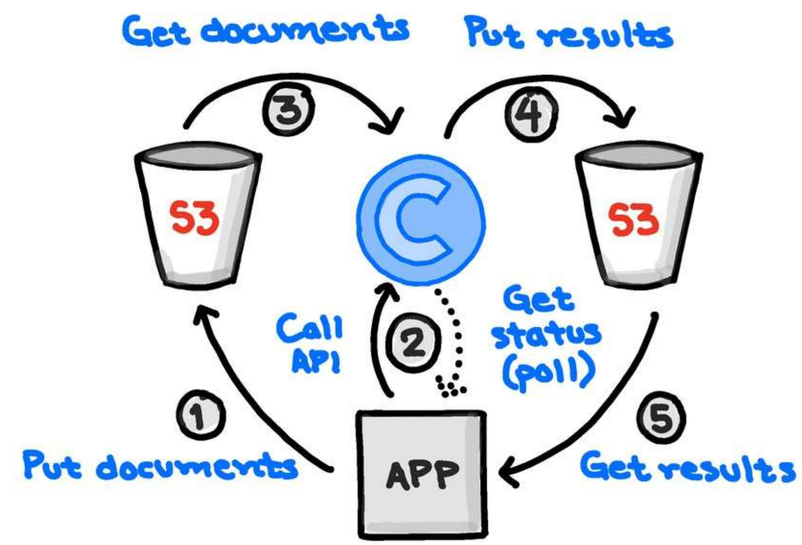
Data Privacy

Your Comprehend data:

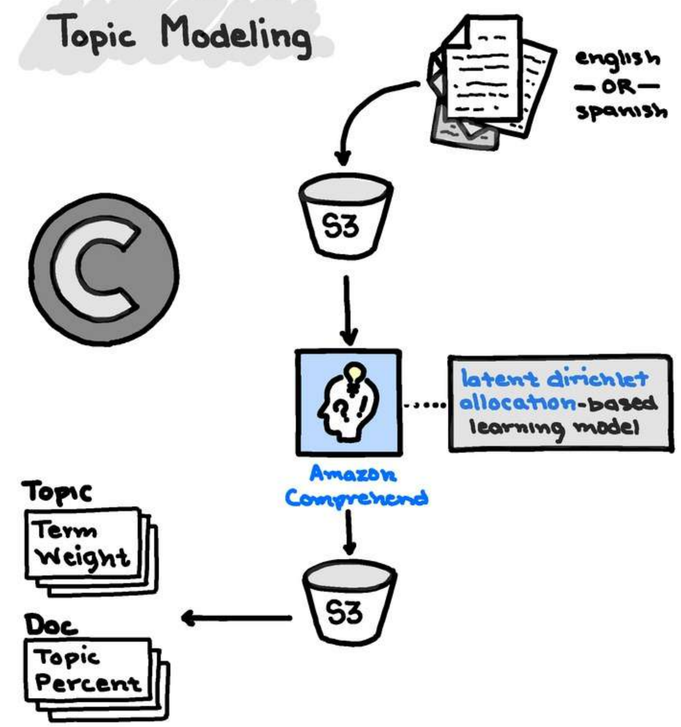
- may be used by Amazon for training
- may be accessed by Amazon employees
- may be moved to other regions

you must opt out to stop

Async Operations



Topic Modeling



Best Practices

- include 1000s of docs
- min 3 sentences per doc
- remove docs w/many numbers

Amazon EC2 Spot Instances

11/29/17

@awsgeek

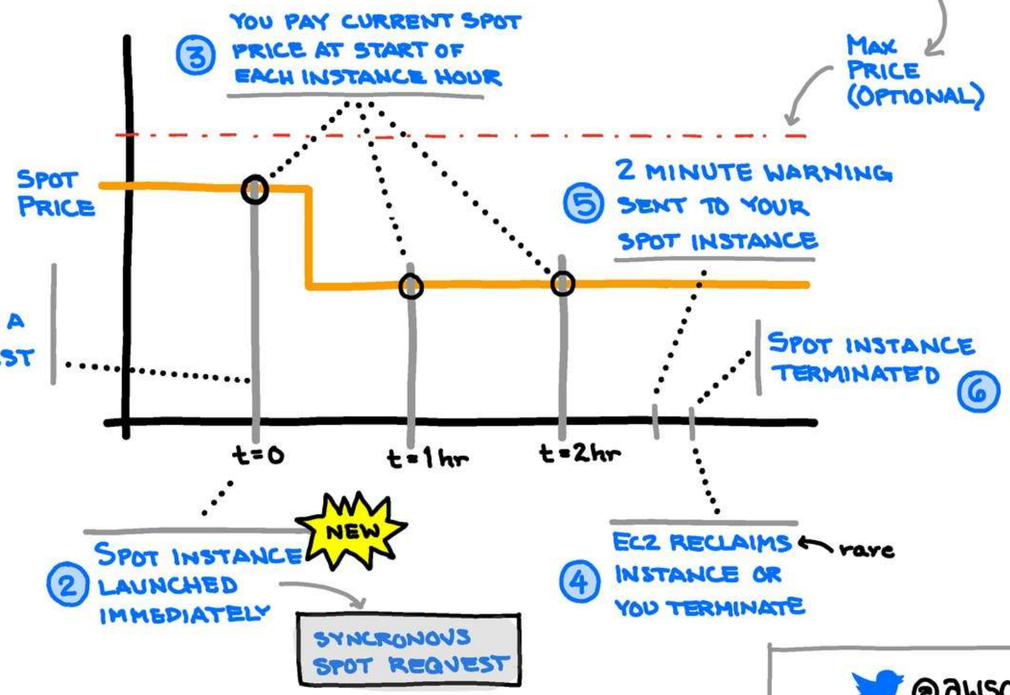
jerry.hargrove@

Spot Request

- Instance type
- Instances count
- Maximum price
- Availability zone

Spot Pool

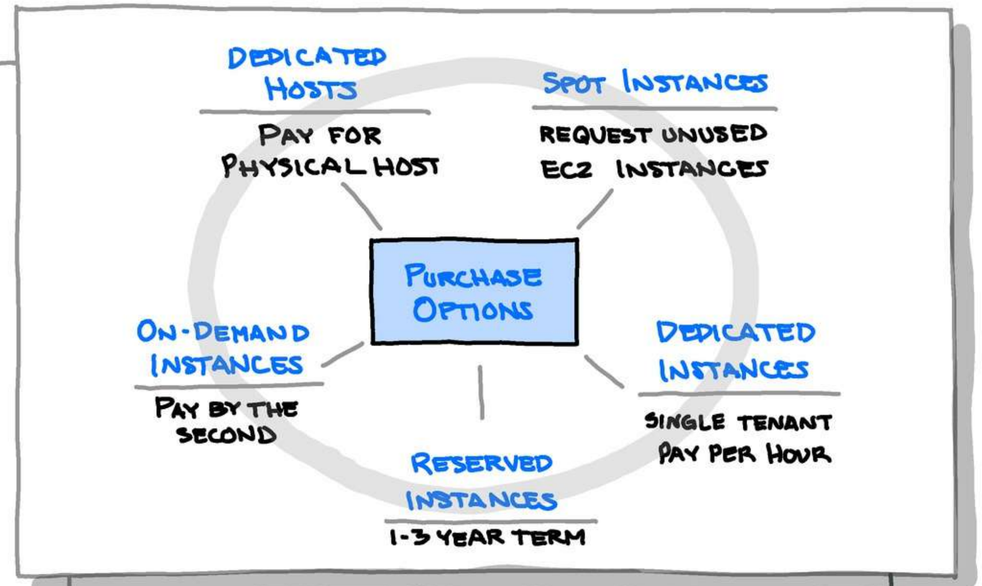
- Same Instance type
- Same Availability Zone
- Same Operating System



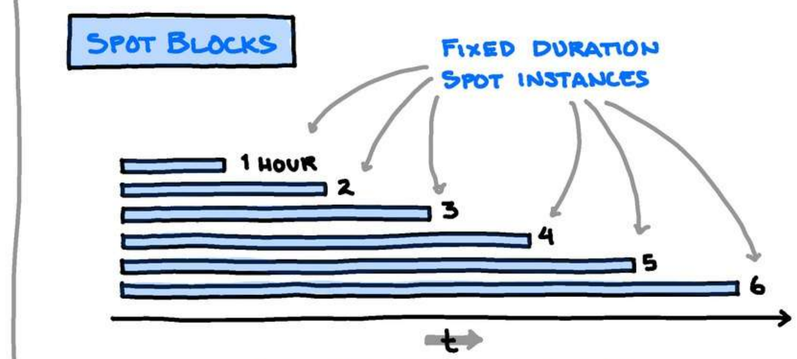
NEW

Hibernate spot instances

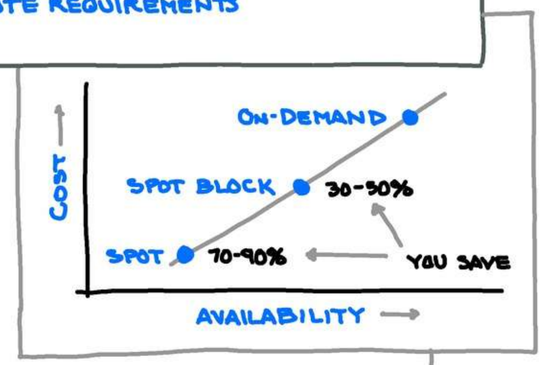
RAM & EBS volumes are saved for persistent requests & spot fleets set to maintain capacity



Spot Blocks

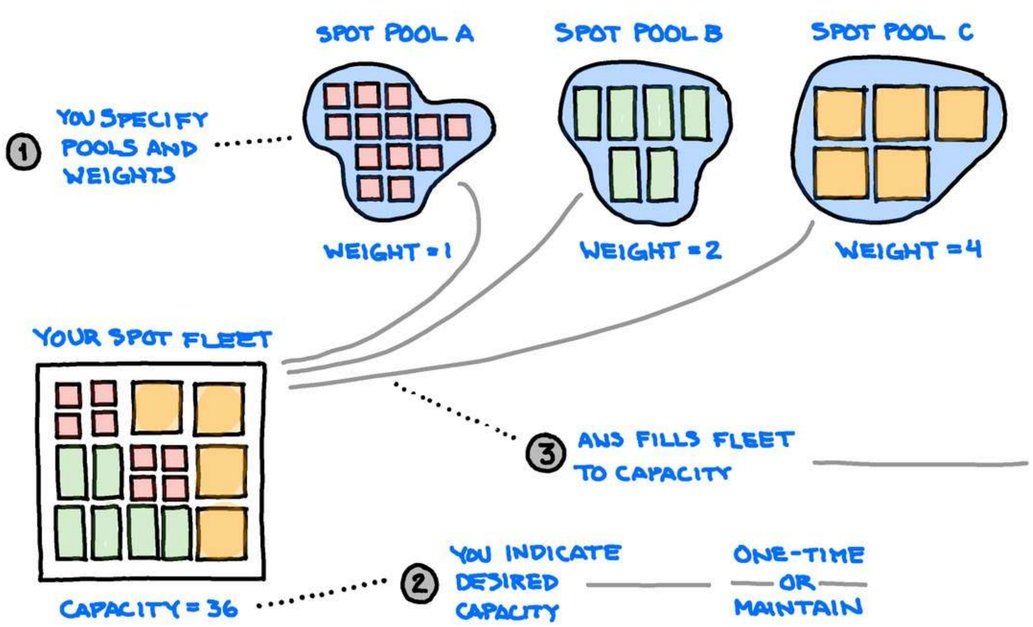


Ideal for jobs with finite compute requirements



Spot Fleet

A collection of spot instances



Allocation strategy

Use cheapest pool

— or —

Equally distribute

Amazon Elastic Container Service

@awsgeek

11/22/17

my day job

jerry.hargrove@

Container Services Platform

Amazon Ec2 Container Registry

- Private Docker Registry
- Store, Manage & Deploy images
- Integrated with Ecs
- Secured with IAM

Service
Task
Container

Ecs Task:

- Docker image
- CPU & memory needed
- Networking & ports
- Container linkage
- Storage volumes
- IAM roles

Point in Time Container Configuration

Ecs Service:

- Manage long running tasks
- Restart failed tasks
- Monitor running tasks
- Automate starting tasks

Point in Time Code and Dependencies

Tooling

- Cloudformation
- AWS Console
- Command line
- AWS SDKs

Cost

Pay for Ec2, Ebs, etc

No add'l cost for Ecs

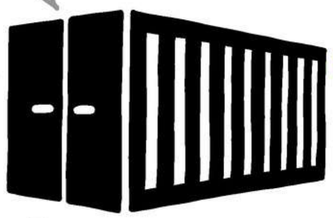
Docker Container

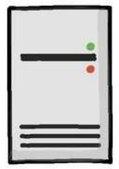
Code

Runtimes

System Tools

Libraries





Any machine that can run docker

Ecs Service Auto-scaling

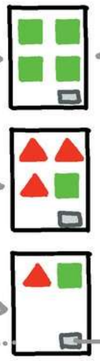
Ec2 Instance Auto-scaling

Cloudwatch

Ecs automates fleet of Ec2 instances to deploy & run Docker containers on

Container Types

ECS



Ec2 Instances

Ecs Agent

Manages instance containers

Comms between ecs & Docker daemon

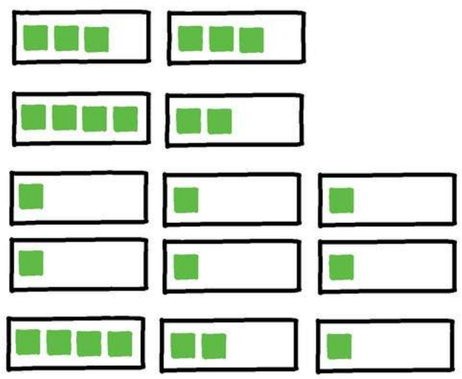
Task Placement Strategies

Balanced:

Packed:

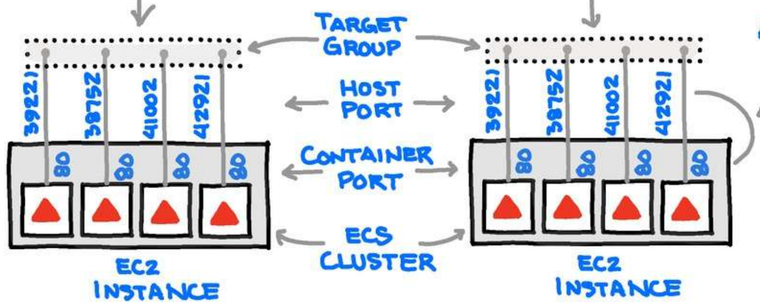
1 per instance:

Custom:



Application Load Balancer

Level 7
Host based routing
Path based routing



Target Group

Host Port

Container Port

Ecs Cluster

Ec2 Instance

Ec2 Instance

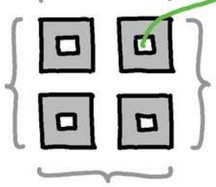
Auto Port Mapping

NEW!

VPC Networking for Containers

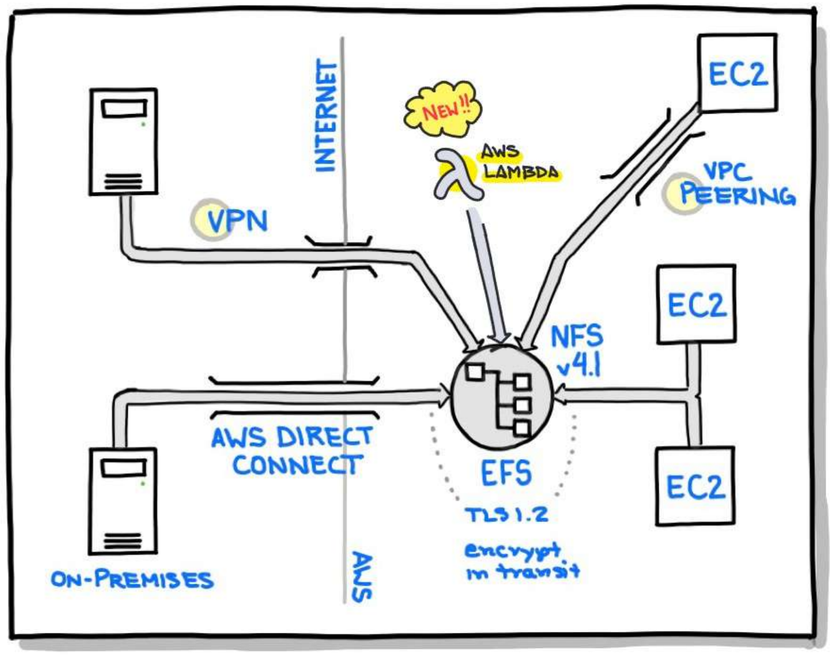
Ecs Cluster

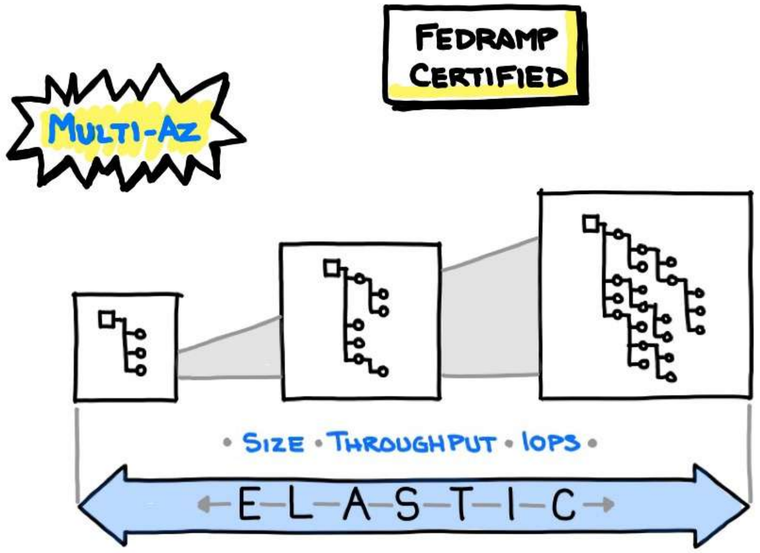
Different types/sizes allowed

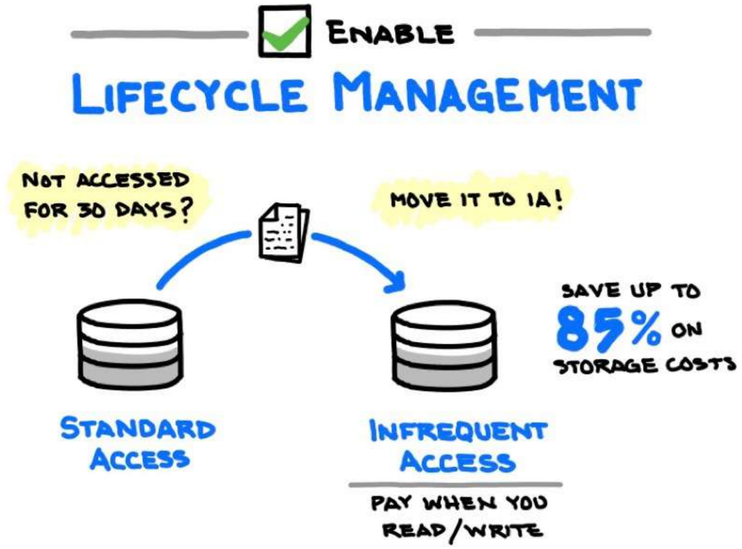


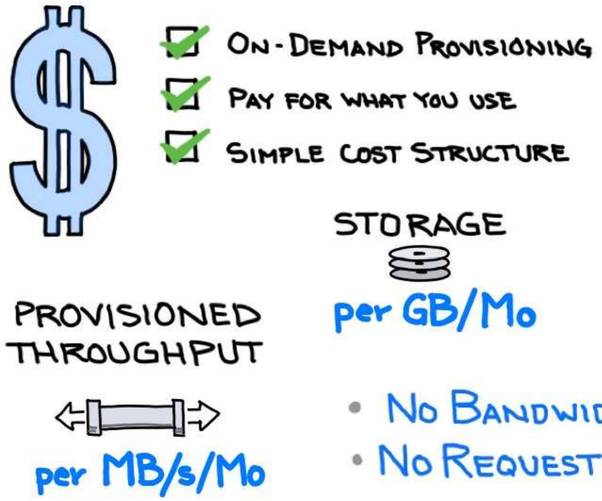
Ec2 Instances in VPC

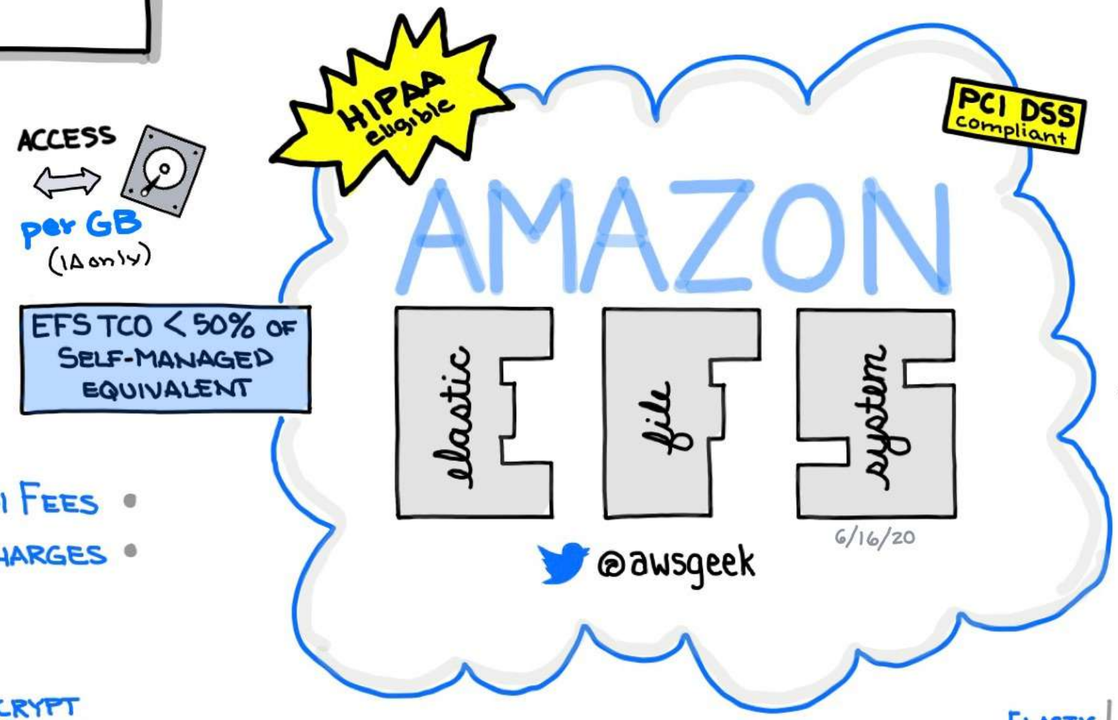
On demand
Spot and/or
Reserved

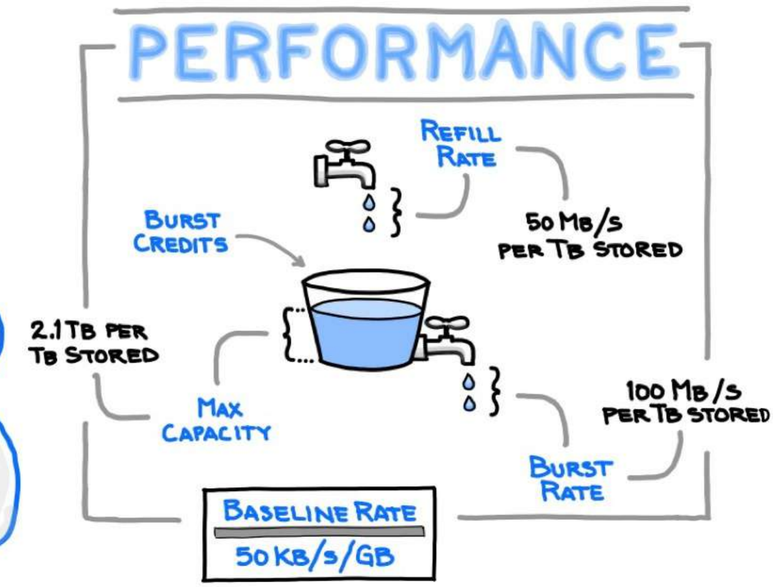

INTERNET
NEW!!
AWS LAMBDA
EC2
VPC PEERING
VPN
EC2
NFS v4.1
AWS DIRECT CONNECT
EFS
TLS 1.2
encrypt in transit
EC2
ON-PREMISES
AWS

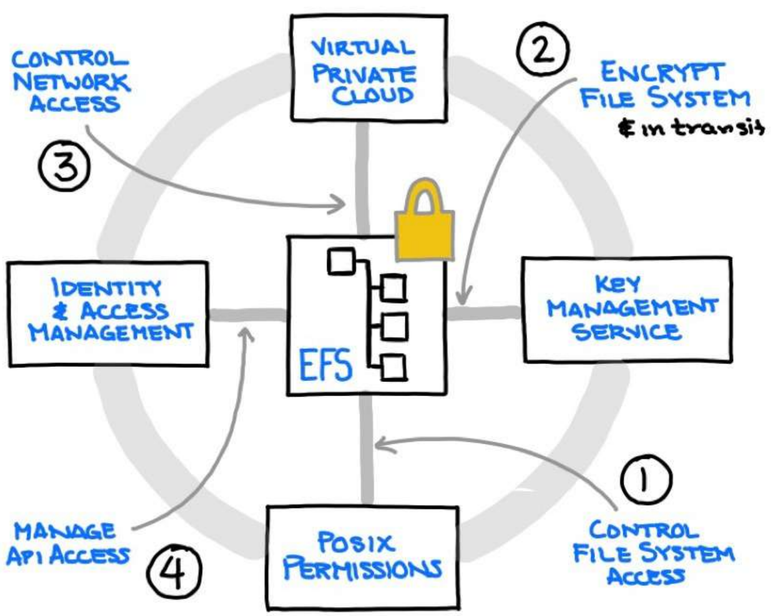

MULTI-AZ
FEDRAMP CERTIFIED
• SIZE • THROUGHPUT • IOPS •
ELASTIC

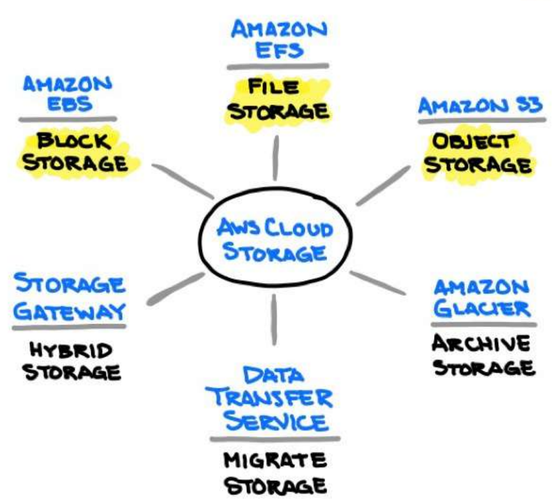

ENABLE
LIFECYCLE MANAGEMENT
NOT ACCESSED FOR 30 DAYS?
MOVE IT TO IA!
SAVE UP TO 85% ON STORAGE COSTS
STANDARD ACCESS
INFREQUENT ACCESS
PAY WHEN YOU READ/WRITE

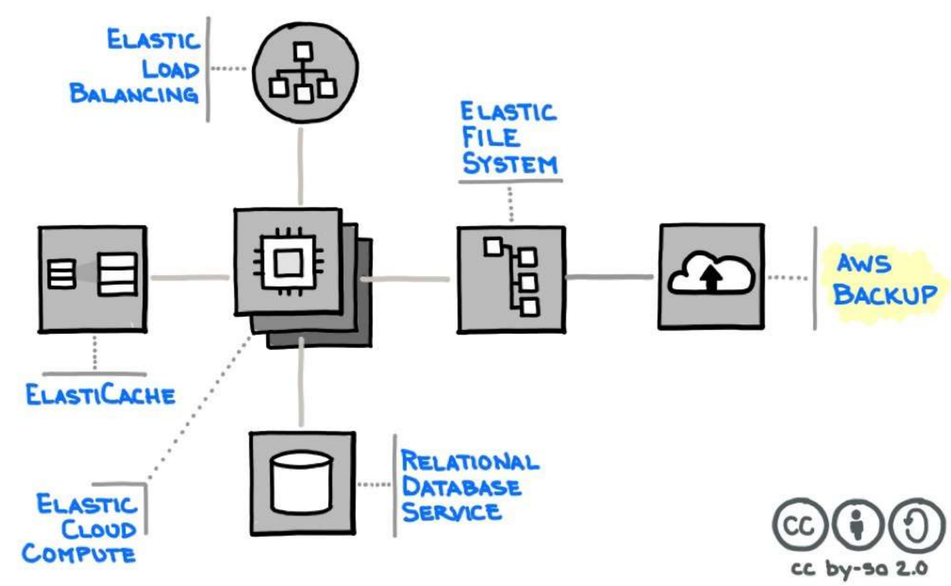

ON-DEMAND PROVISIONING
PAY FOR WHAT YOU USE
SIMPLE COST STRUCTURE
PROVISIONED THROUGHPUT
per MB/s/Mo
STORAGE
per GB/Mo
ACCESS
per GB
(IA only)
• NO BANDWIDTH FEES •
• NO REQUEST CHARGES •


HIPAA eligible
PCI DSS compliant
AMAZON
elastic file system
EFS
EFS TCO < 50% OF SELF-MANAGED EQUIVALENT
@awsgeek
6/16/20


PERFORMANCE
REFILL RATE
50 MB/s PER TB STORED
BURST CREDITS
2.1 TB PER TB STORED
MAX CAPACITY
100 MB/s PER TB STORED
BURST RATE
BASELINE RATE
50 KB/s/GB


CONTROL NETWORK ACCESS
VIRTUAL PRIVATE CLOUD
ENCRYPT FILE SYSTEM in transit
IDENTITY & ACCESS MANAGEMENT
EFS
KEY MANAGEMENT SERVICE
MANAGE API ACCESS
POSIX PERMISSIONS
CONTROL FILE SYSTEM ACCESS


AMAZON EFS
FILE STORAGE
AMAZON EBS
BLOCK STORAGE
AMAZON S3
OBJECT STORAGE
AWS CLOUD STORAGE
STORAGE GATEWAY
HYBRID STORAGE
AMAZON GLACIER
ARCHIVE STORAGE
DATA TRANSFER SERVICE
MIGRATE STORAGE


ELASTIC LOAD BALANCING
ELASTIC FILE SYSTEM
AWS BACKUP
ELASTICACHE
ELASTIC CLOUD COMPUTE
RELATIONAL DATABASE SERVICE

cc by-sa 2.0

Event Driven Apps

SOURCE → BUS → SINK

DYNAMODB

OR

S3

OR MANY OTHER EVENT SOURCES

EVENTBRIDGE

LAMBDA

#serverlessforeeveryone

@edjgeek

CODE more

func() {
}

SERVE less

AWS LAMBDA

4/6/2020

@awsgeek

JAVA

GO

RUBY

BE YOU

PYTHON

NODE.JS

POWERSHELL

C#

LAMBDA = CODE + CONFIG

def handler

- MEMORY
- TIMEOUT
- IAM ROLE

bring your own code

BYOC

LAMBDA FUNCTIONS

LAMBDA LAYERS

TIMELINE

(a subset of enhancements since launch)

- **2009** BETA LAUNCH
- PIG & HIVE
- **10** CC1/GPU INSTANCES
- BOOTSTRAP ACTIONS
- **11** SPOT INSTANCES
- CC2 INSTANCES
- **12** HBASE
- DATA PIPELINE
- **13** S3 SSE
- IMPALA
- **14** IAM ROLES
- HUNK
- **15** APACHE SPARK
- PRIVATE SUBNETS
- **16** CLOUDFORMATION
- FLINK
- **17** AUTO-SCALING
- MXNET
- **18** NOTEBOOKS
- TENSORFLOW
- **2019** 99.9% SLA

AMAZON EMR

Cloud Native

@awsgeek

BIG DATA PLATFORM

- MACHINE LEARNING
- REALTIME STREAMING
- CLICKSTREAM ANALYSIS
- GENOMICS
- ETL

HOSTED HADOOP PLATFORM

ELASTIC CLUSTERS

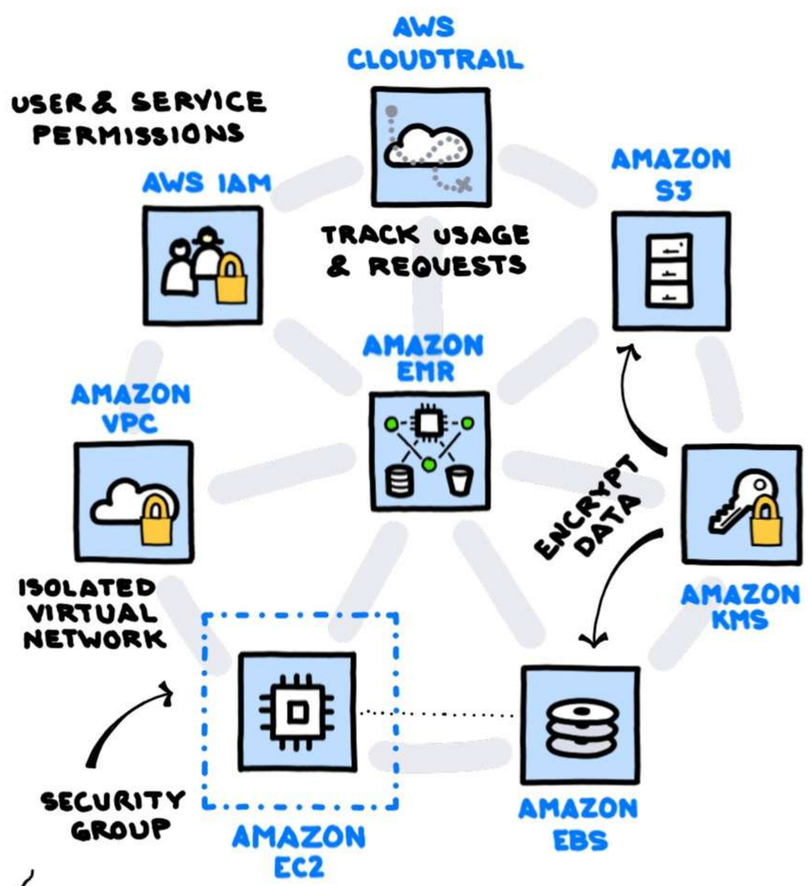
CONSOLE, CLI & SDK ACCESS

STORAGE OPTIONS
- S3, EBS, RDS
- DYNAMODB
- REDSHIFT
- GLACIER

LAYERS

MLLIB, SPARK SQL, ... HIVE, PIG, STREAMINGLIB	PROGRAMS
HADOOP MAPREDUCE / APACHE SPARK	FRAMEWORK
default YARN "yet another resource negotiator"	MANAGEMENT
HDFS / EMRFS (S3) / Local Disk (ephemeral)	STORAGE

SECURITY



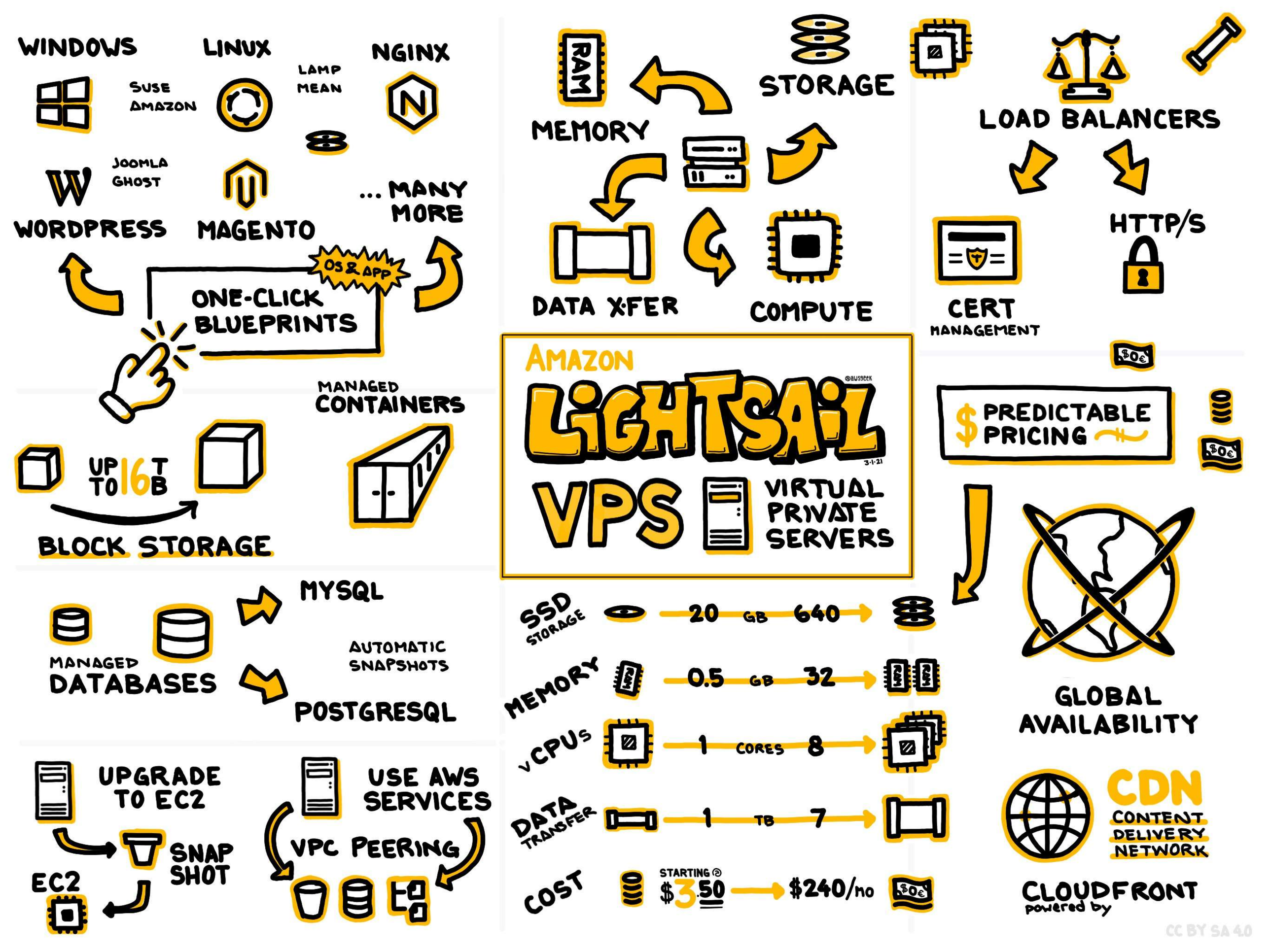
PAY·AS·YOU·GO PRICING

AMAZON EMR + AMAZON EC2 + AMAZON EBS + AMAZON S3

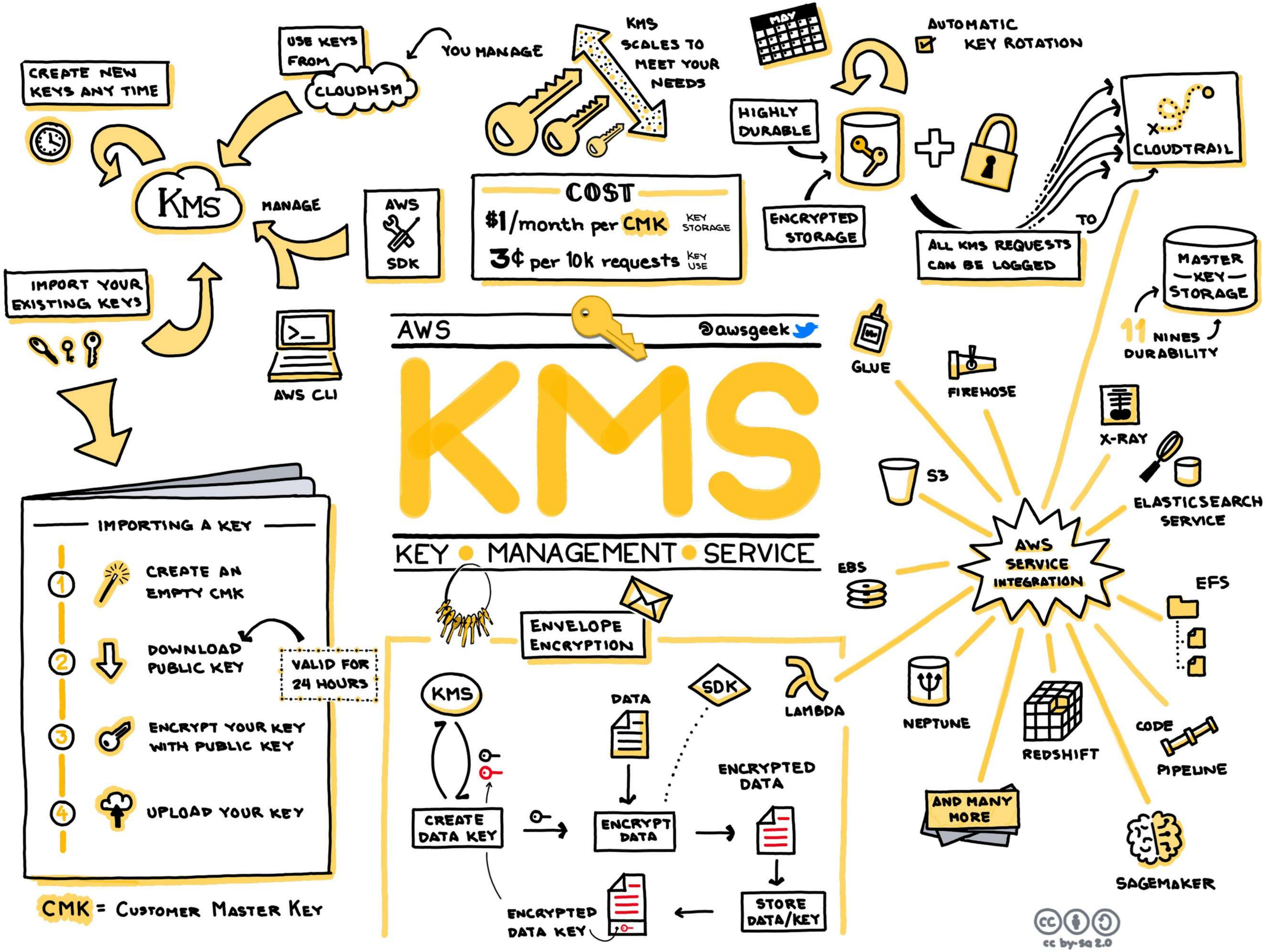
PER SECOND BILLING ONE MINUTE MINIMUM

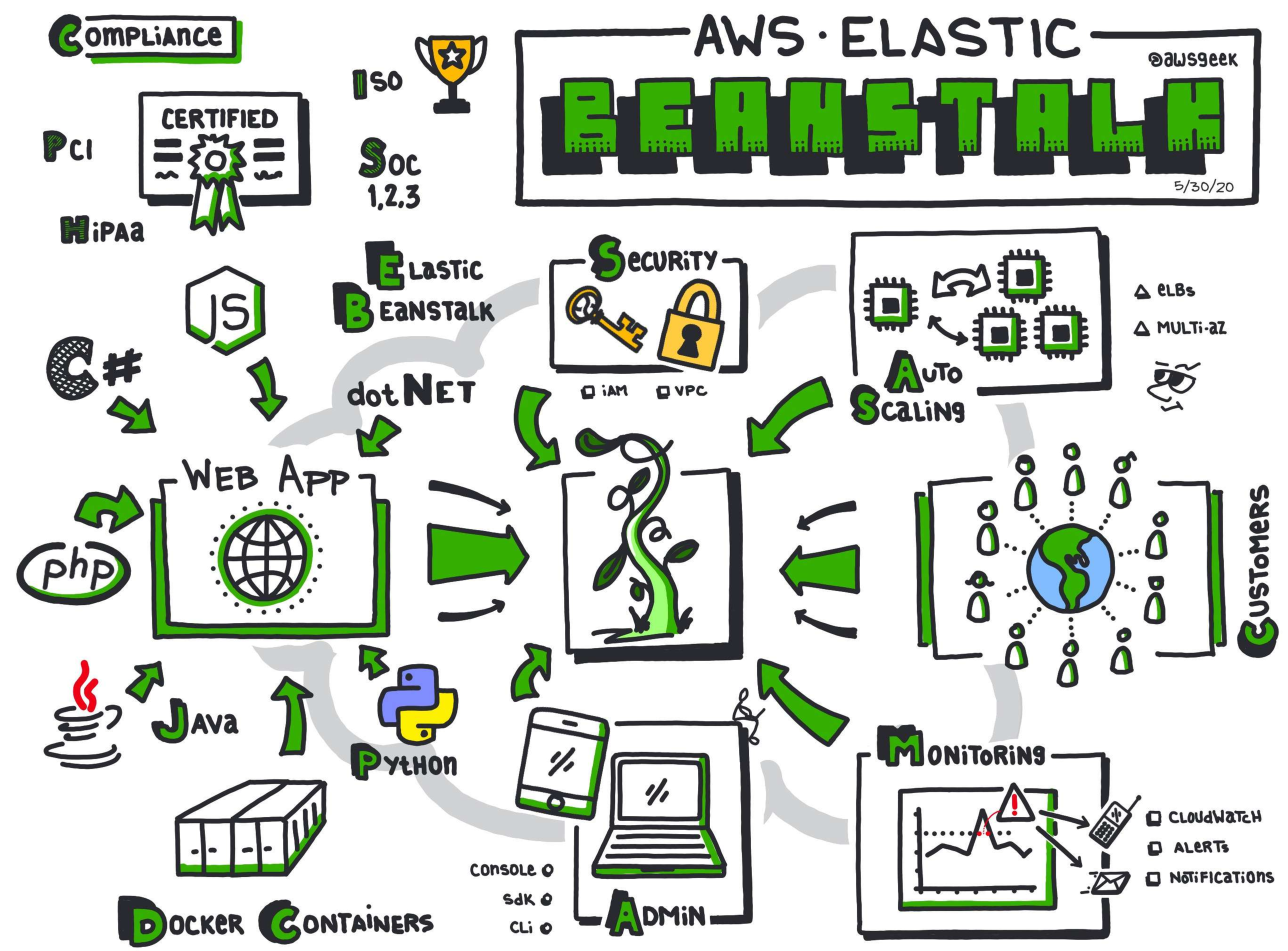
PER GB/MONTH

use EC2 SPOT for HADOOP TASK NODES up to 90% SAVINGS


WINDOWS
LINUX
NGINX
SUSE
AMAZON
LAMP
MEAN
JOOMLA
GHOST
WORDPRESS
MAGENTO
... MANY MORE
OS & APP
ONE-CLICK BLUEPRINTS
MANAGED CONTAINERS
UP TO 16 TB
BLOCK STORAGE
MYSQL
MANAGED DATABASES
AUTOMATIC SNAPSHOTS
POSTGRESQL
UPGRADE TO EC2
SNAP SHOT
EC2
USE AWS SERVICES
VPC PEERING
RAM
MEMORY
STORAGE
DATA X·FER
COMPUTE
LOAD BALANCERS
HTTP/S
CERT MANAGEMENT
AMAZON
LIGHTSAIL
@aussieck
3·1·21
VPS
VIRTUAL PRIVATE SERVERS
PREDICTABLE PRICING
SSD STORAGE
20 GB 640
MEMORY
0.5 GB 32
vCPUs
1 CORES 8
DATA TRANSFER
1 TB 7
COST
STARTING @
$3.50
$240/mo
GLOBAL AVAILABILITY
CDN
CONTENT DELIVERY NETWORK
CLOUDFRONT
powered by

CC BY SA 4.0


AWS
awsgeek
KMS
KEY • MANAGEMENT • SERVICE
CREATE NEW KEYS ANY TIME
USE KEYS FROM CLOUDHSM
YOU MANAGE
KMS SCALES TO MEET YOUR NEEDS
MAY
AUTOMATIC KEY ROTATION
HIGHLY DURABLE
ENCRYPTED STORAGE
ALL KMS REQUESTS CAN BE LOGGED
TO
CLOUDTRAIL
KMS
MANAGE
AWS SDK
COST
$1/month per CMK KEY STORAGE
3¢ per 10k requests KEY USE
IMPORT YOUR EXISTING KEYS
AWS CLI
MASTER KEY STORAGE
11 NINES DURABILITY
GLUE
FIREHOSE
X-RAY
S3
ELASTICSEARCH SERVICE
AWS SERVICE INTEGRATION
EBS
EFS
IMPORTING A KEY
1 CREATE AN EMPTY CMK
2 DOWNLOAD PUBLIC KEY
VALID FOR 24 HOURS
3 ENCRYPT YOUR KEY WITH PUBLIC KEY
4 UPLOAD YOUR KEY
CMK = CUSTOMER MASTER KEY
ENVELOPE ENCRYPTION
KMS
DATA
SDK
LAMBDA
NEPTUNE
REDSHIFT
CODE PIPELINE
ENCRYPTED DATA
CREATE DATA KEY
ENCRYPT DATA
AND MANY MORE
SAGEMAKER
ENCRYPTED DATA KEY
STORE DATA/KEY
cc by-sa 2.0

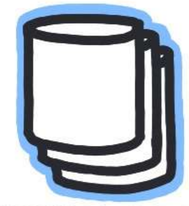

AWS · ELASTIC
BEANSTALK
@awsgeek
5/30/20
Compliance
ISO
PCI
CERTIFIED
SOC 1,2,3
HIPAA
Elastic Beanstalk
Security
IAM
VPC
Auto Scaling
ELBs
MULTI-AZ
JS
C#
dotNET
WEB APP
php
Customers
Java
Python
Monitoring
CloudWatch
Alerts
Notifications
Console
SDK
CLI
Admin
Docker Containers

aws CodeArtifact

• SOFTWARE • ARTIFACT • REPOSITORY •

SECURE, SCALABLE, & COST EFFECTIVE ARTIFACT MANAGEMENT FOR SOFTWARE DEVELOPMENT

DOMAIN



REPOSITORIES

PACKAGE STORAGE

REPOSITORY

PACKAGE VERSIONS

ENDPOINTS

PACKAGE

1. Name
2. Namespace
3. Versions
4. Metadata

ASSET

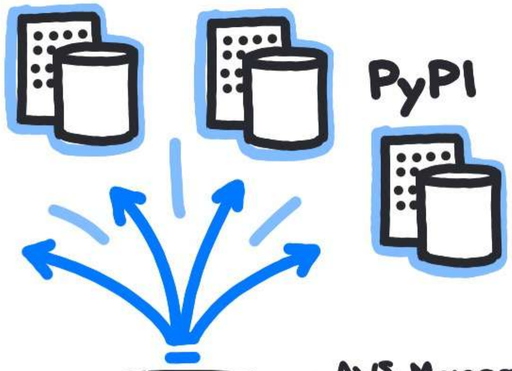
FILE

Maven Central

NuGet.org

npm

PyPI



Public Repos

AWS KMS

ENCRYPTION

AWS Code Artifact

— AWS Managed —

Centralized Repository

AWS IAM | RESOURCE PROTECTION

Maven

Gradle

Nuget

npm

twine

pip

Java

.Net

JavaScript

Python

Development Teams

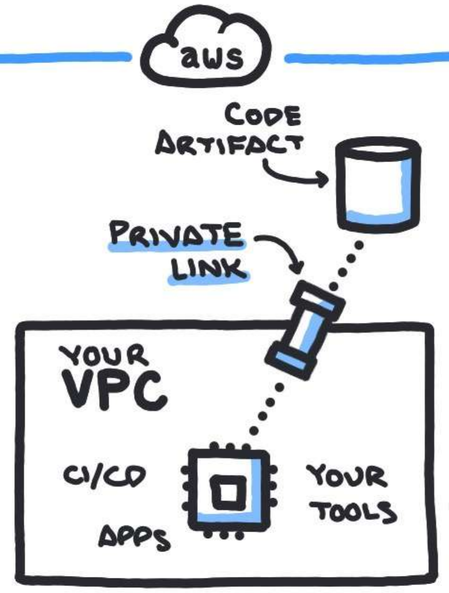
CI/CD Systems

PAY•PER•USE

BYTES STORED

DATA TRANSFER out of Region

API CALLS



cc by-sa 4.0

@awsgeek

9/29/21

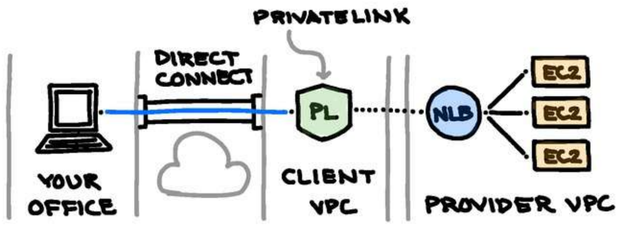
AWS PRIVATELINK

jerry@lucidchart
@awsgeek

9/5/18

PRIVATELINK ADDRESSES ARE PRIVATE

NO PUBLIC IP ADDRESSES!!



EXPOSED AS ENI IN CLIENT VPC
CAN APPLY SECURITY GROUPS TO ENI

NO CROSS-REGION SUPPORT

BOTH REGIONAL & ZONAL DNS NAMES

USE FOR BETTER AVALABILITY, LATENCY
(REMEMBER, ZONES DIFFER BY ACCOUNT)

MY 'A' MAY NOT BE YOUR 'A'

FOR CUSTOMERS & PARTNERS

EXPOSE YOUR SERVICE IN OTHER VPCS

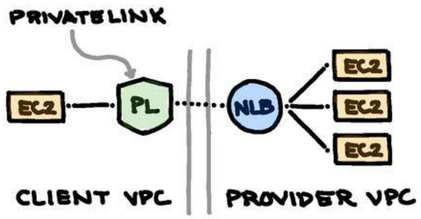
LIFECYCLE EVENTS VIA SNS

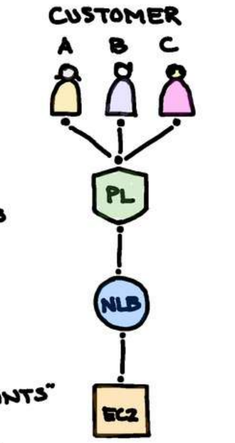
FOR AWS SERVICES

NOW CALLED "GATEWAY ENPOINTS"

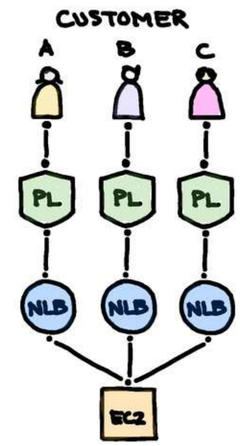
BUILDS ON ENDPOINTS: S3, DYNAMODB

CLOUDWATCH, SNS, SAGEMAKER
KINESIS, CODEBUILD, CONFIG
EC2, API GATEWAY, AWS SERVICE CATALOG
ELB, CLOUDFORMATION
EC2 SYSTEMS MANAGER





SINGLE-TENANT MODE



MULTI-TENANT MODE

HOW TO DIFFERENTIATE TRAFFIC?

1. USE ACCOUNTS/PASSWORDS/TOKENS
2. USE DIF LISTENER PORTS ON TARGETS
3. USE PROXY PROTOCOL V2 PREAMBLE

PREFERRED, BUT REQ'S CODE PATCH

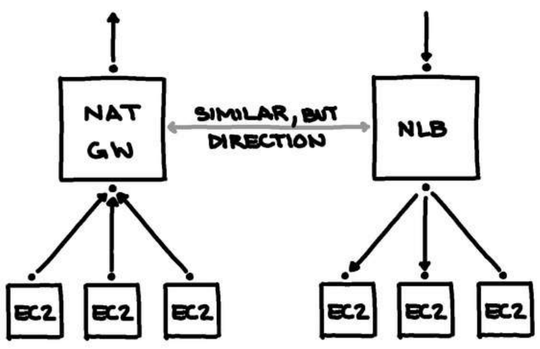
UNDER THE HOOD: AWS HYPERPLANE

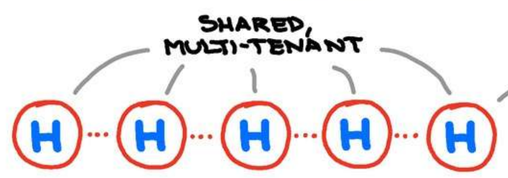
- NOT A PROXY!
- DOESN'T TERM CONNECTIONS
- S3 LOAD BALANCER EVOLVED
- USED BY EFS, NATGW, & NLB
- RUNS ON EC2 IN EC2
- DISTRIBUTED & TRANSACTIONAL

EFS — NAT GW — NLB — PRIVATELINK

HYPERPLANE NODES

- BASED ON S3 LOAD BALANCER ARCHITECTURE
- HYPERPLANE NODES ARE REALLY EC2 INSTANCES
- USED BY AWS TO MANAGE STATE & ROUTE PACKETS





DEFAULT 5GB/s CAPACITY
SCALABLE TO TB/s IN 5GB/s INCR

REAL TIME, DISTRIBUTED CONCENSUS PROBLEM

NAT GW MUST ENSURE ALL CONNECTIONS TO DEST IP/PORT COME FROM UNIQUE SOURCE PORT

NLBS MUST SELECT & ROUTE CONNECTIONS TO SAME TARGET

PRICING: (OREGON)
1¢/ENDPOINT/AZ/HR
1¢/GB DATA

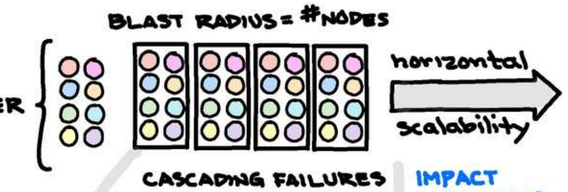
DEALING WITH NOISY NEIGHBORS? SHUFFLE SHARDING

- GIVE EACH CUSTOMER N RANDOM NODES AMONG MANY
- ONLY A SMALL PERCENTAGE WILL OVERLAP
- ISOLATE REALLY NOISY NEIGHBORS

GOOD

LOAD BALANCED

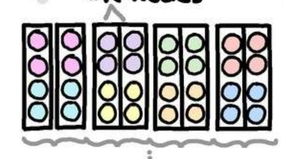
BLAST RADIUS = #NODES



CASCADING FAILURES or NOISY NEIGHBORS | IMPACT EVERYONE

BETTER

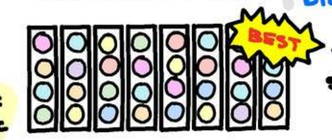
each shard has #N nodes | for redundancy



SIMPLE SHARDING

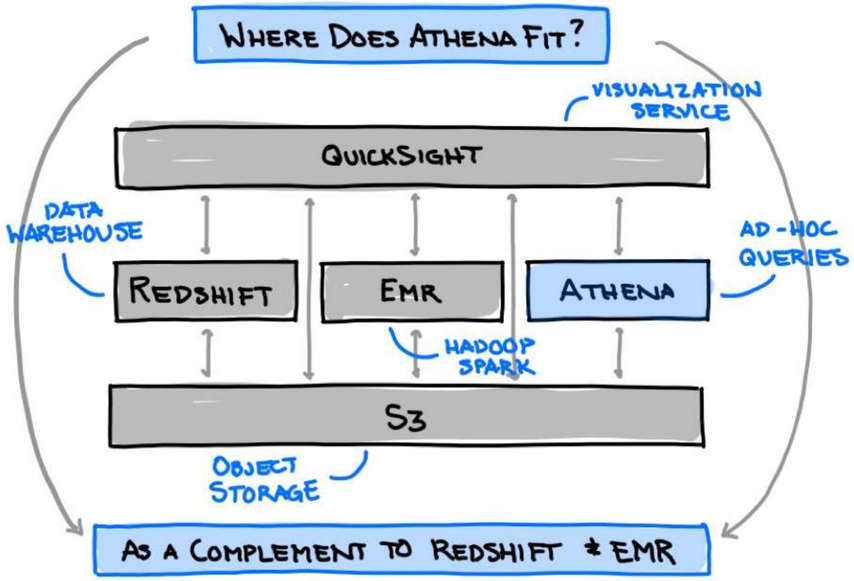
each shard has #C customers | reduces blast radius

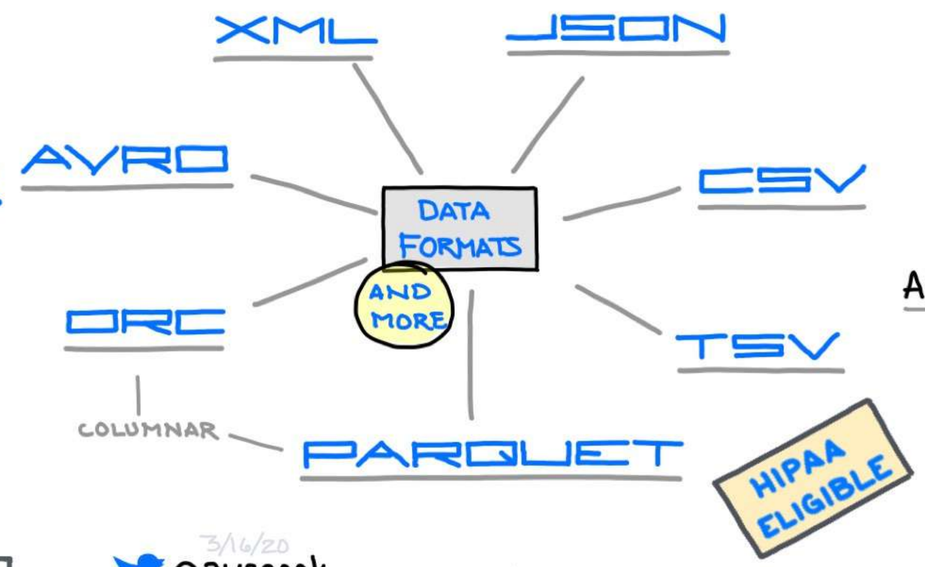
RANDOM PLACEMENT | minimize blast radius

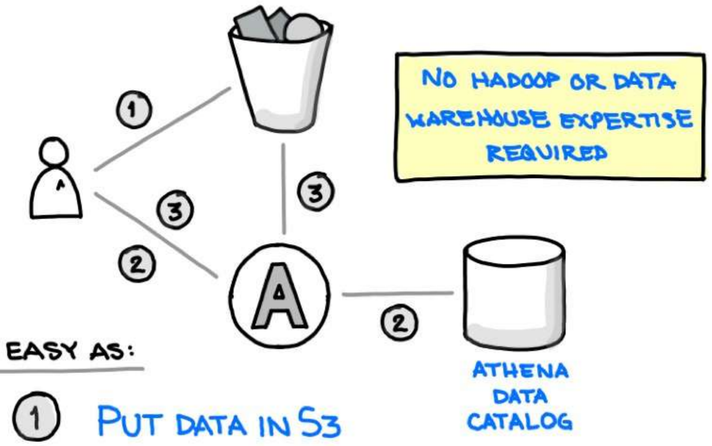


SHUFFLE SHARDING

requires fault tolerant client







AS EASY AS:

1. PUT DATA IN S3
2. DEFINE TABLE SCHEMA — HIVE DDL
3. QUERY DATA

SERVERLESS	HIGHLY AVAILABLE
NO INFRA OR ADMIN	WARM COMPUTE POOLS
NO SPIN UP TIME	DATA IN S3
NO MAINTENANCE	MULTIPLE AZ
CONVENIENT	**PERFORMANT**
NO DATA LOADING	AUTO PARALLELIZATION
NATIVE DATA FORMATS	STREAMING RESULTS
NO ETL INVOLVED	COMPRESS / COLUMNAR

3/16/20

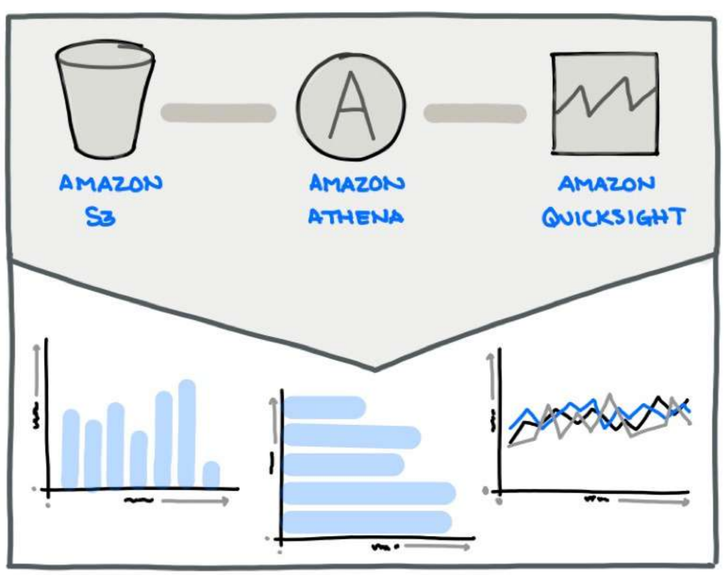
@awsgeek

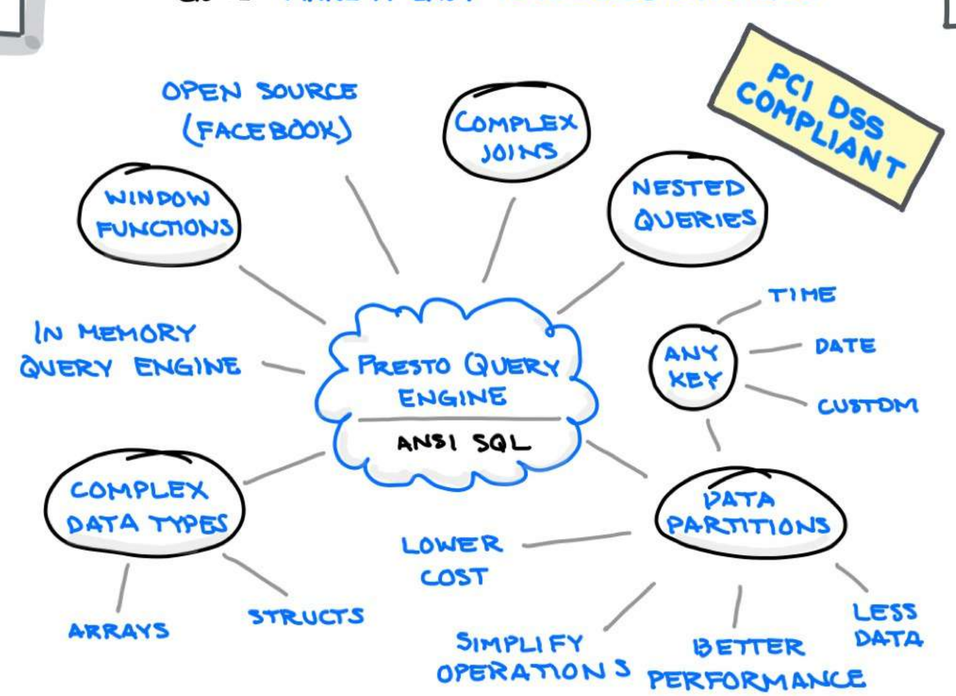
AMAZON athena

GOAL: MAKE IT EASY TO ANALYZE DATA IN S3

TABLES

- DDL IN HIVE
- SCHEMA ON READ
  - SCHEMA IS METADATA
  - PROJECTED ON DATA DURING QUERY
  - DIFFERENT SCHEMAS FOR SAME DATA
- EXTERNAL TABLES ONLY
- SERDES – SUPPORT FOR MANY DATA FORMATS
  - SERIALIZE
  - DESERIALIZER





$5/TB SCANNED PER QUERY

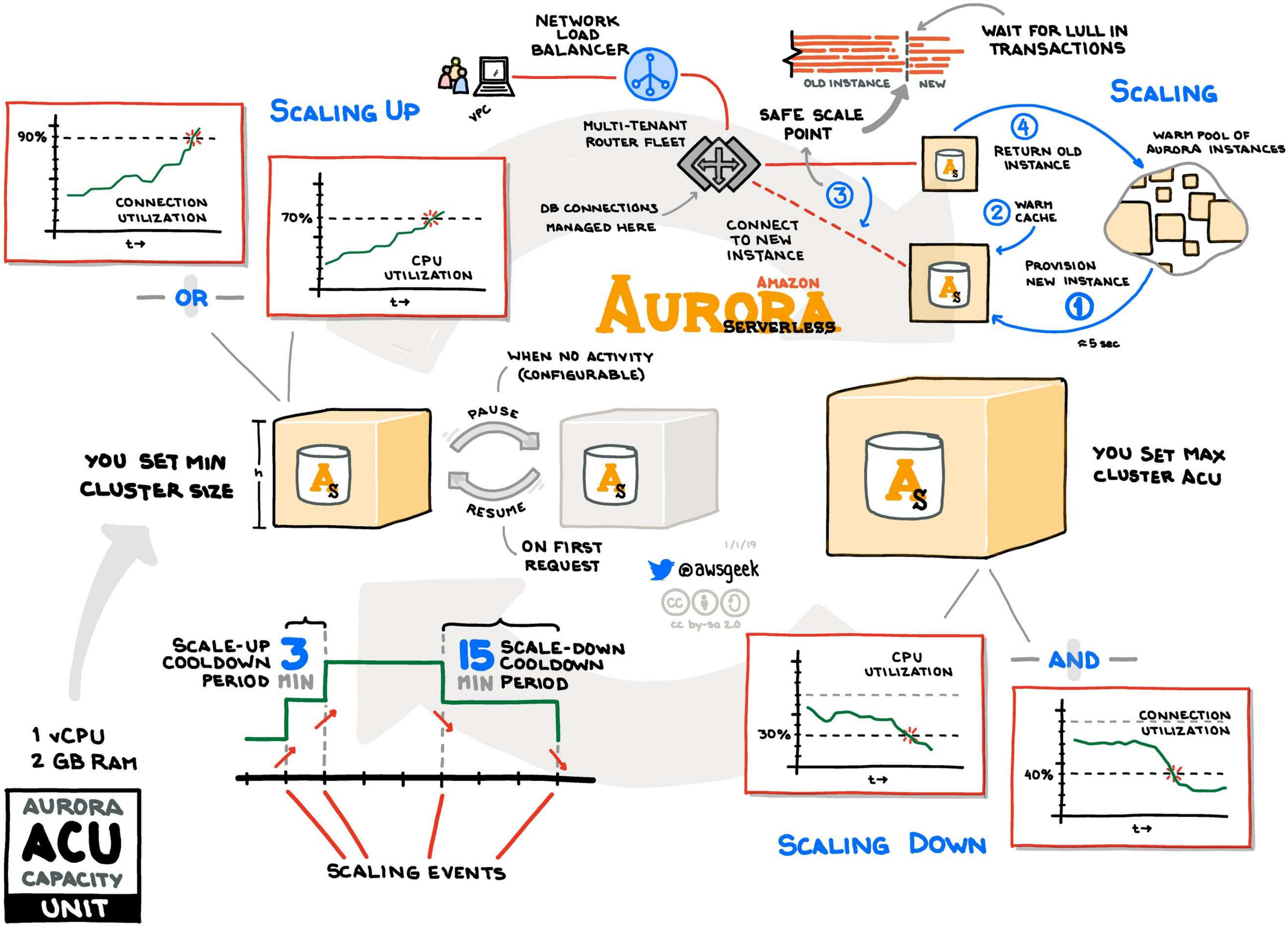
- ROUNDED UP TO NEAREST MB
- 10 MB MINIMUM COST

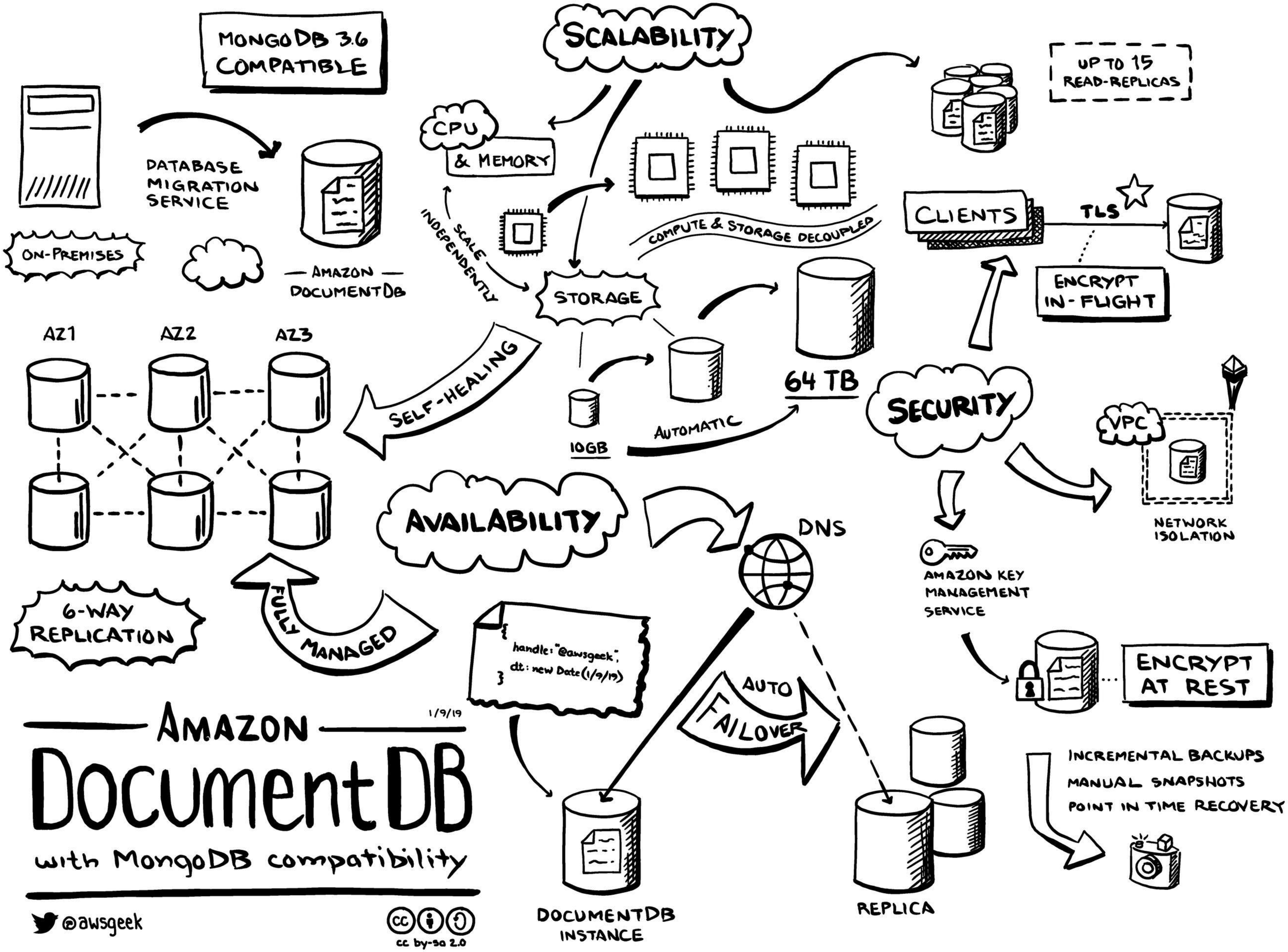
NO CHARGE:

- DDL QUERIES
- FAILED QUERIES

REDUCE COST BY:

- COMPRESSING DATA
- COLUMNS & PARTITIONS


NETWORK LOAD BALANCER
VPC
MULTI-TENANT ROUTER FLEET
DB CONNECTIONS MANAGED HERE
SAFE SCALE POINT
OLD INSTANCE
NEW
WAIT FOR LULL IN TRANSACTIONS
CONNECT TO NEW INSTANCE
SCALING
1 PROVISION NEW INSTANCE
2 WARM CACHE
3
4 RETURN OLD INSTANCE
WARM POOL OF AURORA INSTANCES
≈5 sec
AMAZON AURORA SERVERLESS
SCALING UP
90%
CONNECTION UTILIZATION
t→
70%
CPU UTILIZATION
t→
— OR —
YOU SET MIN CLUSTER SIZE
h
WHEN NO ACTIVITY (CONFIGURABLE)
PAUSE
RESUME
ON FIRST REQUEST
YOU SET MAX CLUSTER ACU
1/1/19
@awsgeek
cc by-sa 2.0
SCALE-UP COOLDOWN PERIOD 3 MIN
15 MIN SCALE-DOWN COOLDOWN PERIOD
SCALING EVENTS
1 vCPU
2 GB RAM
AURORA ACU CAPACITY UNIT
CPU UTILIZATION
30%
t→
— AND —
CONNECTION UTILIZATION
40%
t→
SCALING DOWN


MongoDB 3.6 COMPATIBLE
ON-PREMISES
DATABASE MIGRATION SERVICE
AMAZON DocumentDB
SCALABILITY
CPU & MEMORY
SCALE INDEPENDENTLY
STORAGE
COMPUTE & STORAGE DECOUPLED
UP TO 15 READ-REPLICAS
CLIENTS
TLS
ENCRYPT IN-FLIGHT
10GB
AUTOMATIC
64 TB
AZ1
AZ2
AZ3
SELF-HEALING
6-WAY REPLICATION
FULLY MANAGED
AVAILABILITY
DNS
AUTO FAILOVER
DOCUMENTDB INSTANCE
REPLICA
SECURITY
VPC
NETWORK ISOLATION
AMAZON KEY MANAGEMENT SERVICE
ENCRYPT AT REST
INCREMENTAL BACKUPS
MANUAL SNAPSHOTS
POINT IN TIME RECOVERY
AMAZON
DocumentDB
with MongoDB compatibility
1/9/19
@awsgeek
cc by-sa 2.0

amazon DynamoDB

a fast, flexible no-sql database

2/10/18

SCALABILITY

TABLE

PARTITIONS: A B

MAX 10 GB PER PARTITION

1) PARTITION B REACHES STORAGE CAPACITY

2) PARTITION B SPLIT, DATA DIVIDED EQUALLY

B_1 B_2

PROVISIONED THROUGPUT ALLOCATED TO EACH PARTITION

ADAPTIVE CAPACITY HELPS WITH THROUGHPUT DILUTION

	A	B	B_1	B_2
BEFORE SPLIT	1/2	1/2		
AFTER SPLIT	1/2		1/4	1/4

PRICING

STORAGE	$0.25/GB/MO
READS	$0.00013/RCU/HOUR
WRITES	$0.00065/WCU/HOUR
BACKUPS	$0.10/GB/MO
RESTORES	$0.15/GB

PROVISIONED THROUGPUT

RESERVED CAPACITY PRICING AVAILABLE

1 WRITE CAPACITY UNIT — 1 WRITE PER SECOND, UP TO 1 KB

1 READ CAPACITY UNIT — 1 READ PER SECOND, UP TO 4 KB (2x IF INCONSISTENT)

ESSENTIALS

KEY-VALUE OR DOCUMENT STORE

PARTITIONS HOLD UP TO 10 GB

UP TO 1000 WCU -OR- 3000 RCU THROUGHPUT

HASH(PK) = PARTITION

PARTITION KEY

+ LOCAL & GLOBAL SECONDARY INDICES

ITEMS

400 KB MAX PER ITEM

A TABLE

SORT KEY (OPTIONAL)

ATTRIBUTES

SECURITY

ISOLATED CLOUD INFRASTRUCTURE

AMAZON VPC

VPC ENDPOINT

ACCESS DYNAMODB FROM VPC WITHOUT LEAVING THE AWS NETWORK

AWS CLOUDTRAIL

LOG DYNAMO API CALLS

AMAZON DYNAMODB

AMAZON KMS

ENCRYPT TABLE DATA AT REST

DYNAMODB IS INSIDE THE AWS NETWORK BUT OUTSIDE THE VPC

AMAZON CLOUDWATCH

MONITOR AND ALERT

AWS IAM

FINE GRAINED ACCESS CONTROL TO TABLES AND ATTRIBUTES

AMAZON S3

SERVER-SIDE ENCRYPTION FOR BACKUPS

my day job

@awsgeek

jerry.hargrove

where to find me

AVAILABILITY

REGION 1

DYNAMO DB

DYNAMODB STREAMS

NEAR REAL-TIME CROSS-REGION REPLICATION

REGION 2

DYNAMO DB

INSERT ITEM

ASYNC REPLICATION

GLOBAL TABLES

MASTER MASTER BEHAVIOR

3 COPIES OF DATA

A PARTITION

copy copy

SYNCHRONOUS REPLICATION

HIGH SPEED SSD DRIVES

SSD SSD SSD

A B C

INDEPENDENT FAILURE DOMAINS

HOUSED IN 3 "FACILITIES" WITHIN A REGION

FACILITY != AVAILABILITY ZONE

PyongChang 2018

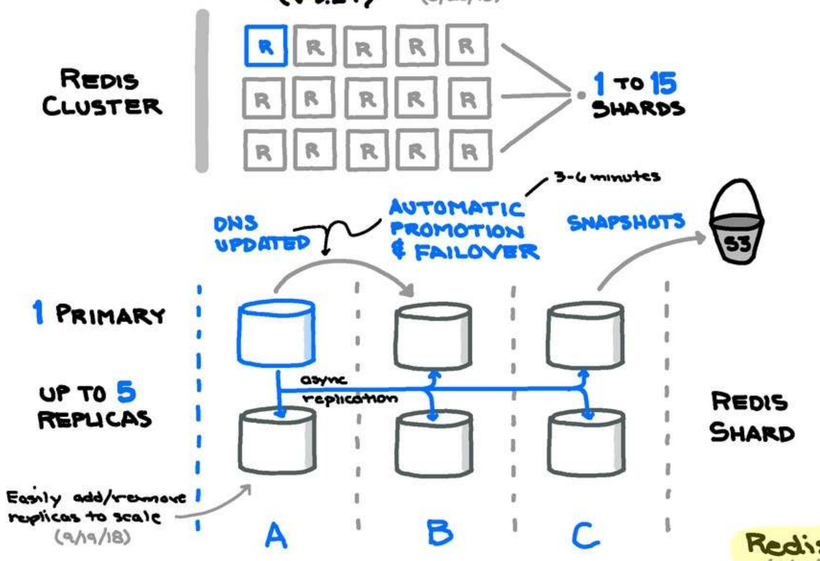
Amazon ElastiCache

Fully Managed, In-Memory Data Store

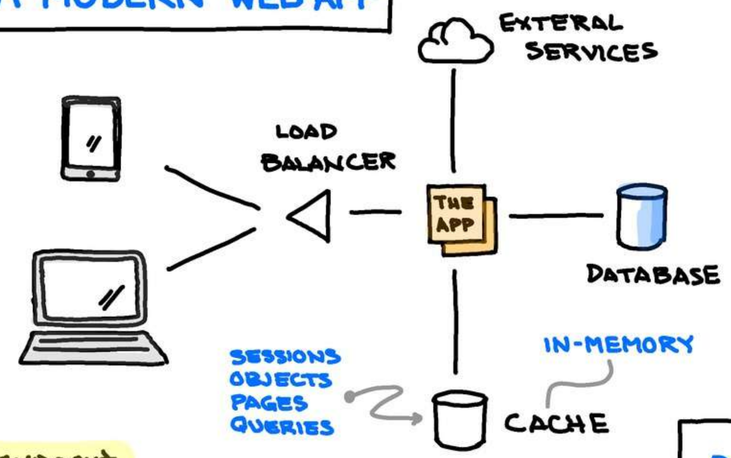
HIPAA Eligible

9/24/18

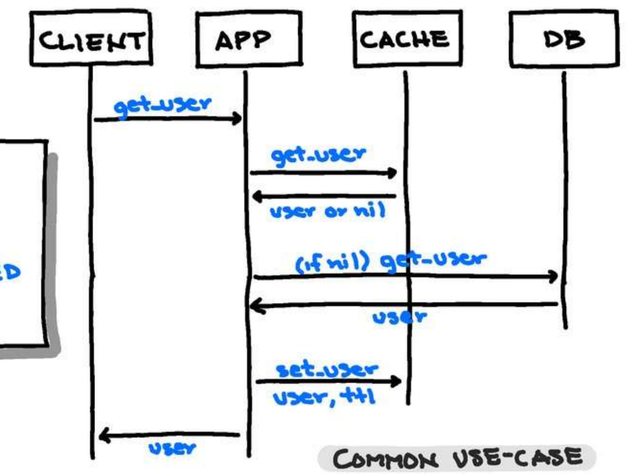
In-place version upgrades (v3.2+) (8/20/18)



A Modern Web App



Memcached	vs.	Redis
Multi threaded		Single threaded
No persistence		Persistence
Flat string cache		Data structure store
Easy horz scalability		Read replicas/failover

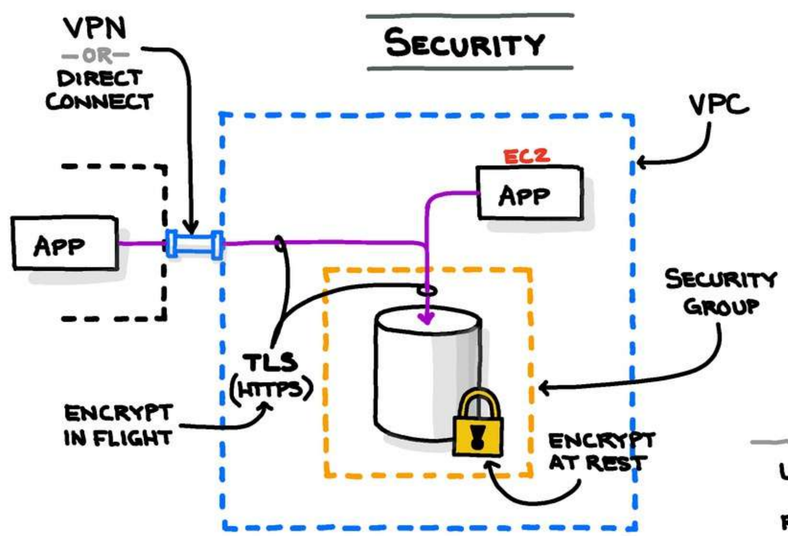


PCI DSS Compliant 7/5/18

FedRamp Authorized 9/5/18

Redis 4.0 support (6/19/18)

Security



Popular Redis use cases

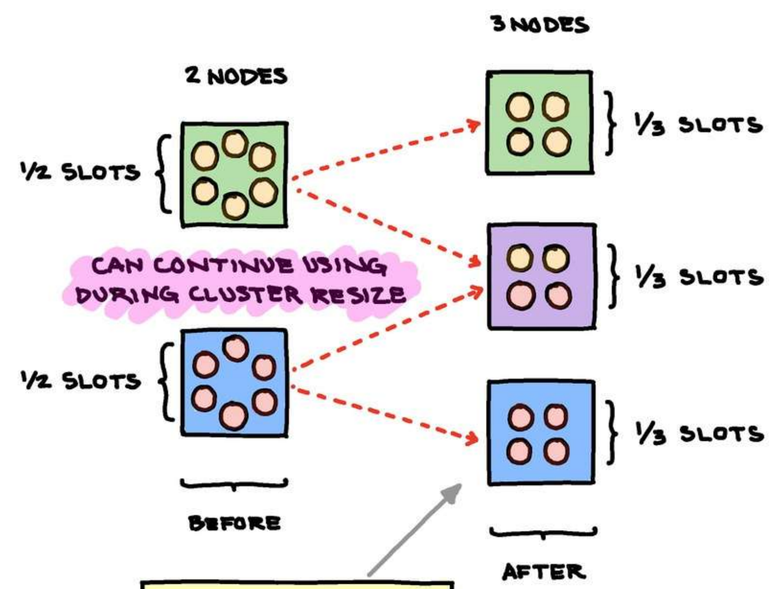
- Leaderboards - sorted sets
- Recommendations - incr, decr
- Chat - pub/sub

@awsgeek

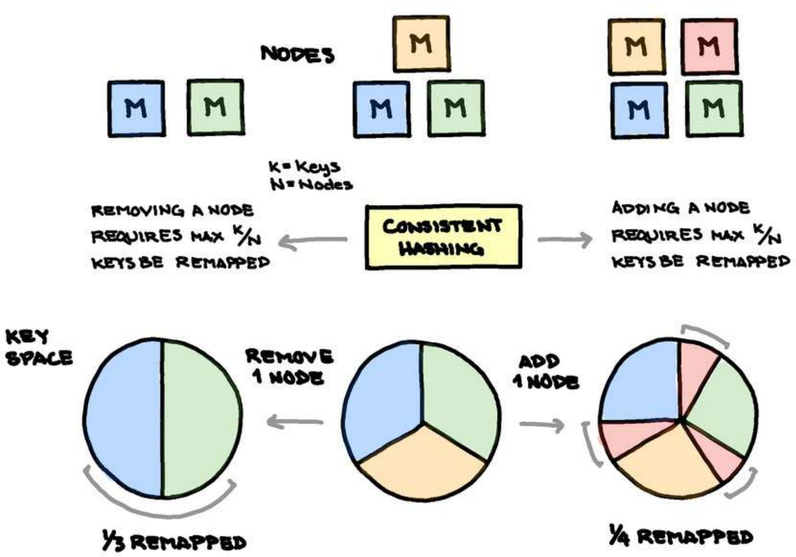
jerry@lucidchart

Can create Redis cluster from existing RDS file

Online Cluster Resizing for Redis



Slots are evenly distributed across all nodes after resizing



Pricing

Storage: Cost includes storage for 1 snapshot. Additional @ 8.5¢/GB/mo

I used to work at Rackspace

SOCIAL NETWORKING
GROUP FRIENDS WHO LIKE OR DISLIKE SIMILAR THINGS

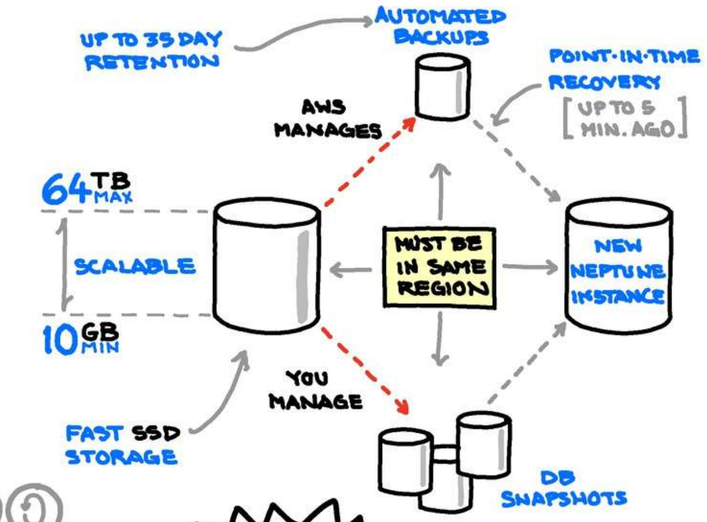
RECOMENDATION ENGINE
MAKE PURCHASE SUGGESTIONS BASED ON OTHER USERS WITH SIMILAR INTERESTS

FRAUD DETECTION
DETECT CONNECTIONS TO KNOWN FRAUD SCENARIOS

KNOWLEDGE GRAPHS
STORE AND QUERY INFO & RELATIONSHIPS BETWEEN USERS

LIFE SCIENCES
SECURELY STORE AND PROCESS PATIENT & HEALTHCARE DATA

NETWORK/IT OPS
STORE NETWORK TOPOLOGY & DISCOVER RELATIONSHIPS BETWEEN HOSTS



PRICING

STARTING AT 35¢/HR FOR R4.LG

ON-DEMAND	PRIMARY – PER HOUR REPLICAS – SAME
STORAGE	10¢/GB/MO
IO	20¢/MILLION REQUESTS (per 16KB read, 4KB write)
BACKUPS	UP TO DB SIZE, FREE S3 RATES AFTER
DATA TRANSFER	IN .. FREE OUT .. 2¢/GB TO OTHER REGION .. 9¢/GB TO INTERNET

cc by-sa 2.0

PCI-DSS COMPLIANT

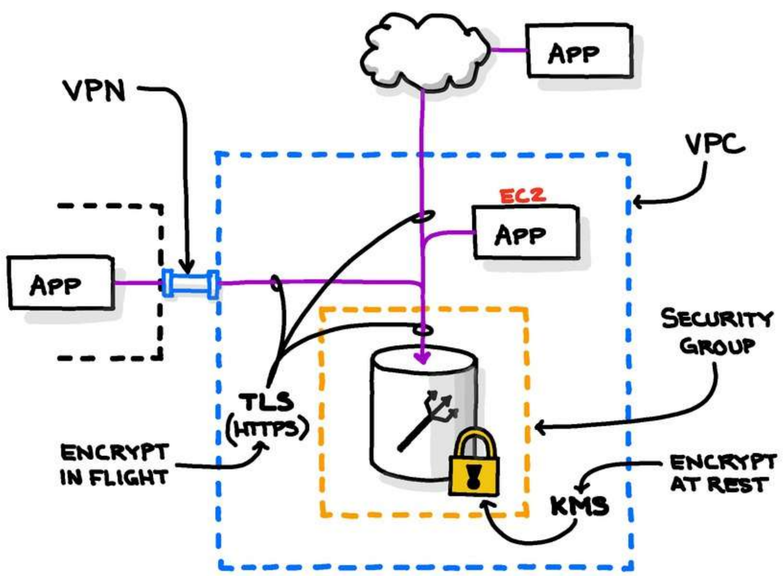
HIPAA ELIGIBLE

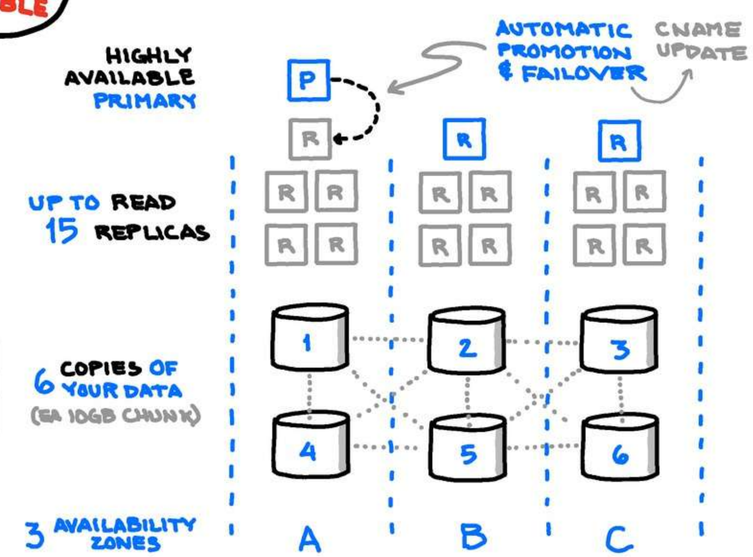
AMAZON NEPTUNE

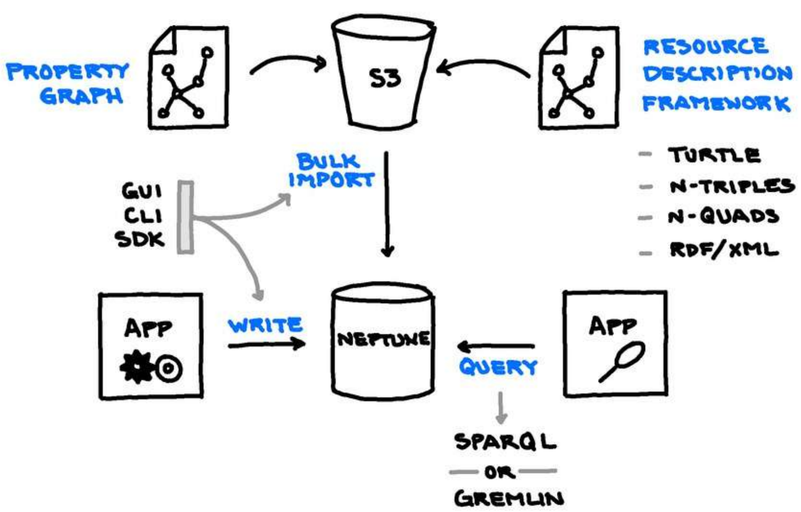
GRAPH·DB

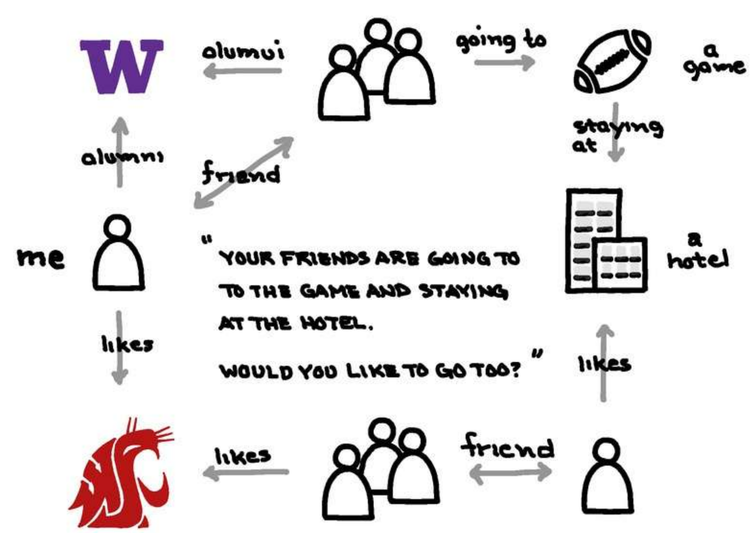
@awsgeek

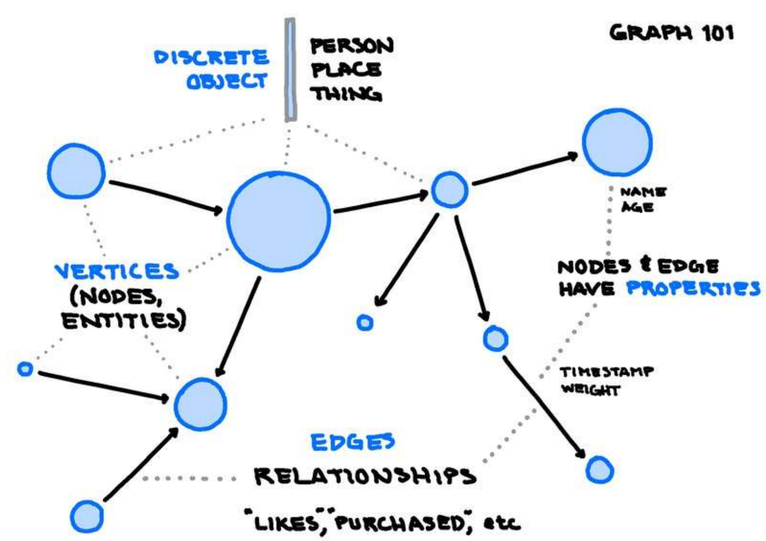
12/21/18









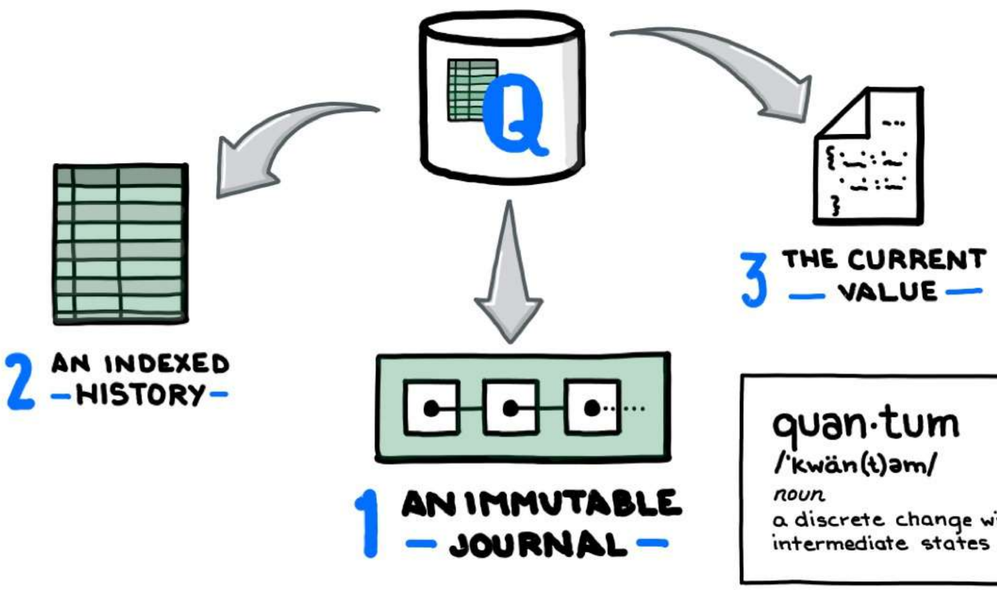


AMAZON QUANTUM LEDGER D·A·T·A·B·A·S·E

5/20/20

@awsgeek

What is a Quantum Ledger Db?



quan·tum
/ˈkwän(t)əm/
noun
a discrete change with no intermediate states

Database

- FULLY TRANSACTIONAL
- ACID FUNCTIONALITY
- DOCUMENT DATA MODEL
- UN/STRUCTURED DATA

Streaming

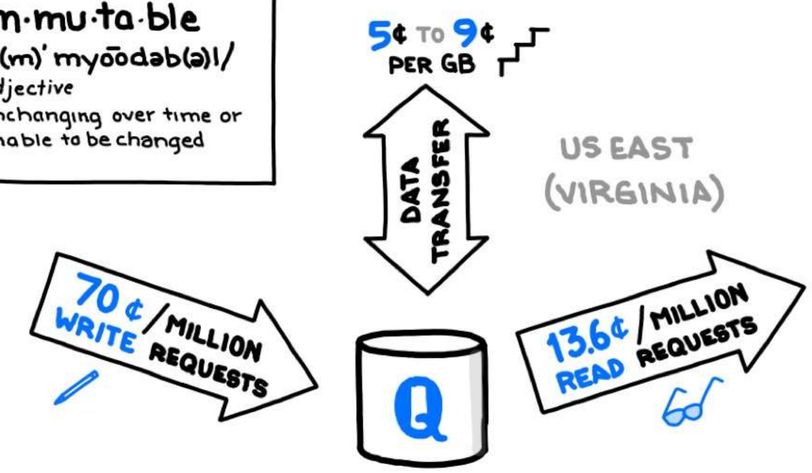
- NEAR REAL TIME
- KINESIS DATA STREAMS

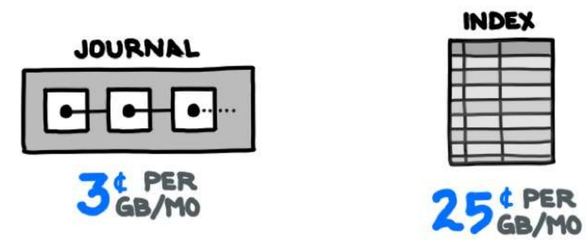
Serverless

- NO NODE PROVISIONING
- NO IO PROVISIONING

How Much Does QLDB Cost?

im·mu·ta·ble
/i(m)ˈmyōōdəb(ə)l/
adjective
unchanging over time or unable to be changed





What is an Immutable Journal?

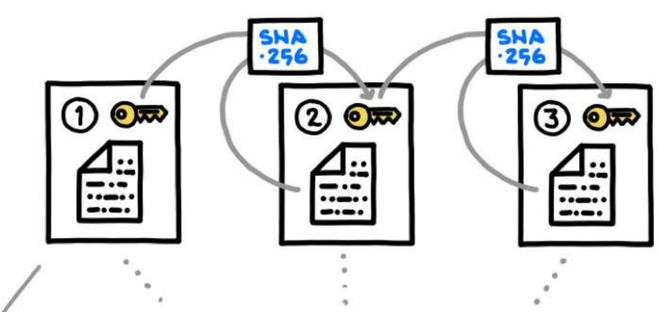
A RECORD OF EVERY DATA CHANGE, EVER

A COHERENT TRANSACTION

TRANSACTIONS ARE HASH-CHAINED TOGETHER

AN APPEND-ONLY TRANSACTION LOG

What is Hash Chaining?



TRANSACTIONS RECORDS ARE CRYPTOGRAPHICALLY VERIFIABLE

CHANGES IMMEDIATELY DETECTABLE

How is Data Stored/Queried?

DOCUMENT DATA MODEL

```
'order' : {
    ...
    'address' : {
        ...
        'state' : 'WA'
    ...
}
```

NESTED DOCS LIKE JOINED TABLES

QUERY

```
SELECT *
FROM orders AS o
WHERE o.address.state = 'WA'
```

For System of Record Apps

- MANUFACTURING
- HR
- INSURANCE
- FINANCE
- SUPPLY CHAIN
- PAYROLL

cc by-sa 2.0

AMAZON RDS

HIPAA ELIGIBLE

9/18/18

jerry@lucidchart @awsgeek

ENGINES

EBS BASED

- ORACLE
- SQL SERVER

} commercial

- MYSQL
- MARIADB
- POSTGRESQL

} open source

- AURORA
  - MySQL
  - PostgreSQL

} cloud native — by Amazon

major versions supported for **3** years

minor versions supported for **1** year

PRICING

COSTS: (Oregon)

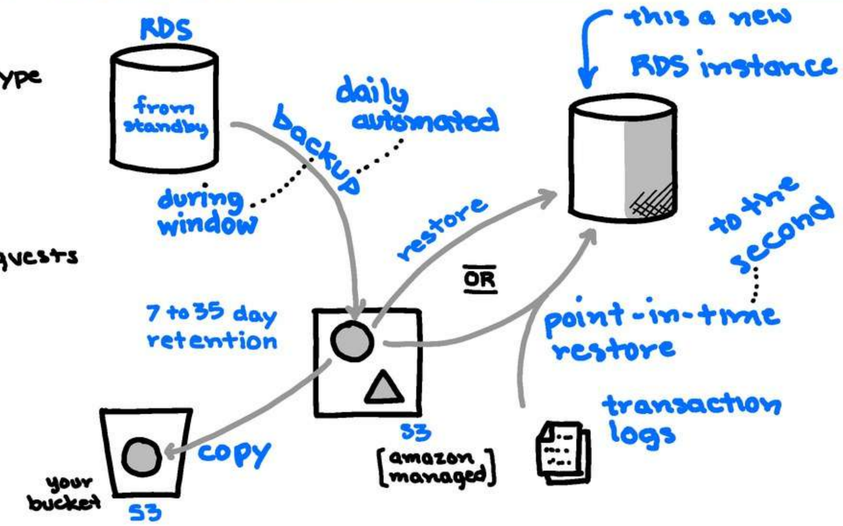
DB INSTANCE HOURS — per engine/instance type; billed hourly, round up

STORAGE
- GP2 ... 11.5¢/GB/Mo
- IO1 ... 12.5¢/GB/Mo + 10¢/10/Mo
- Mag ... 10¢/GB/Mo + 10¢/MM Requests

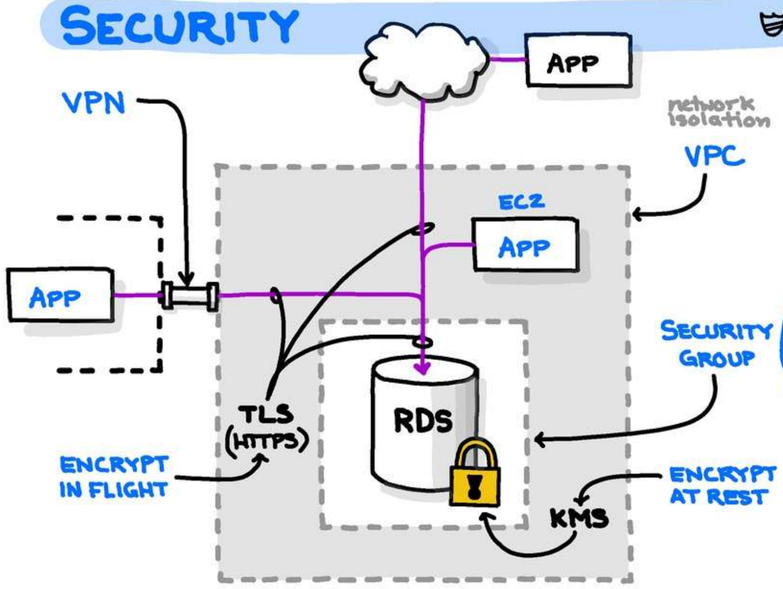
BACKUP STORAGE — 100% of DB size free; 9.5¢/GB/Mo after

DATA TRANSFER — varies by destination

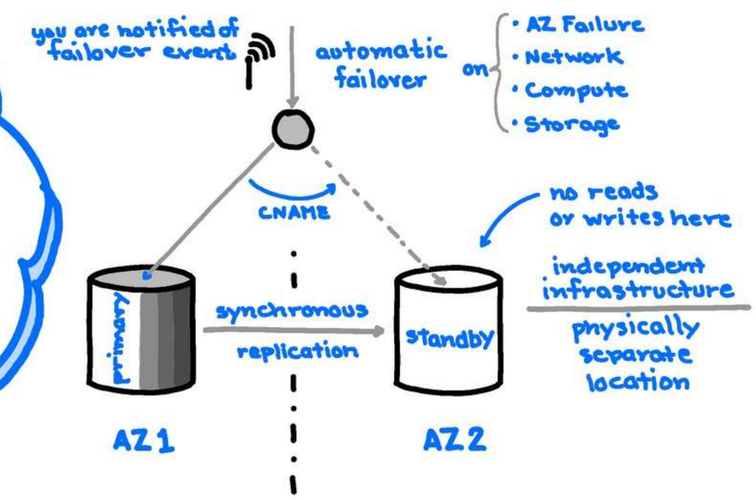
BACKUPS



SECURITY

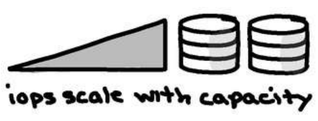


MULTI-AZ



STORAGE

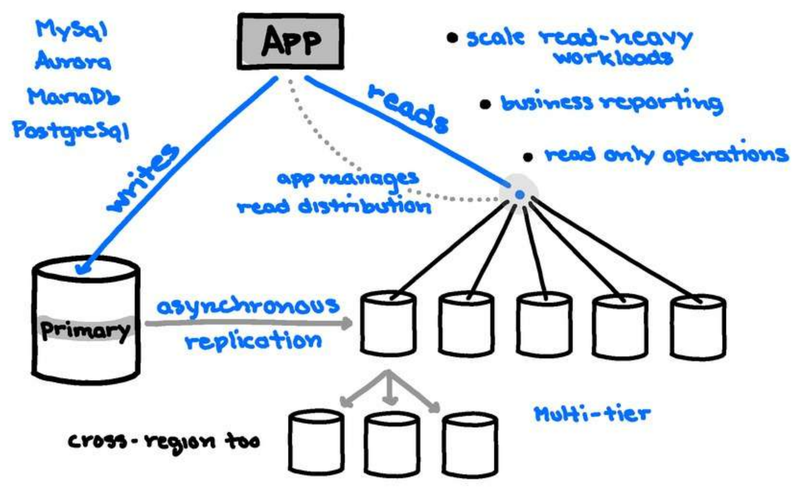
GP2 General Purpose — SSD 16TB Max



IO1 Provisioned IOPS — SSD 16TB Max — 30K IOPS

Magnetic Legacy 1TB Max

READ REPLICAS



INSTANCES

SMALL WORKLOADS

T2 burst — 1 vCPU, 1 GB RAM — 8 vCPU, 32 GB RAM

CPU INTENSIVE WORKLOADS

M3/M4 general purpose — 2 vCPU, 8 GB RAM — 64 vCPU, 256 GB RAM

QUERY INTENSIVE WORKLOADS

R3/R4/X1(e) mem optimized — 2 vCPU, 16 GB RAM — 128 vCPU, 3904 GB RAM

Amazon S3 — Simple Storage Service

HIPAA ELIGIBLE

11/27/2018

Storage Classes

Standard and Infrequent Access

11 Nines Durability

Avalability Zones

1	2	3 or more
✓	✓	✗

Resilient to 1 AZ failure

1-Zone Infrequent Access

11 Nines Durability

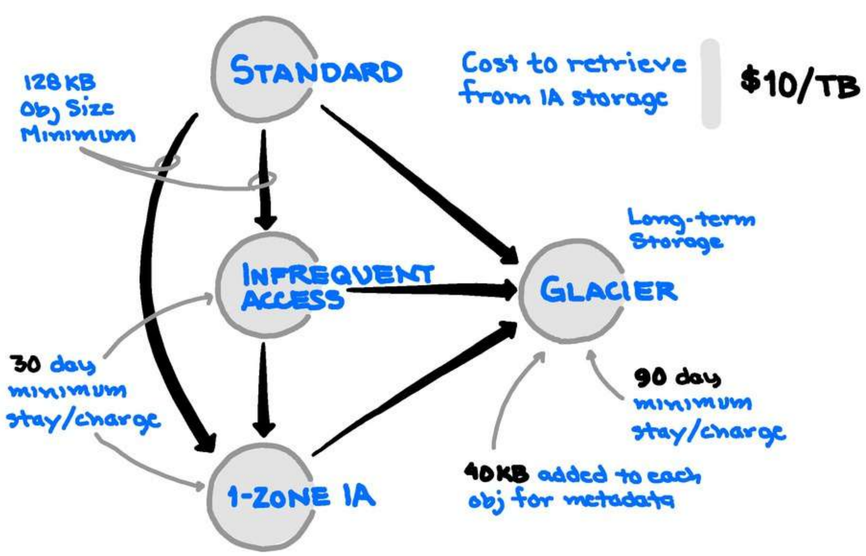
99.5% /yr Availability

Avalability Zones

1	2	3
✓	✗	✗

Not resilient to AZ failure

Storage Class Transitions



Server Side Encryption

AES-256 master key rotation — **AWS** managed KEYS

audit trail — **KMS** managed KEYS — more security controls

SELF managed KEYS — you own it!

Query in Place

Amazon S3 Object Storage

S3 Select

Retrieve subset of data

Use simple SQL

Cost:

- $2/TB scanned, 70¢/TB returned — Standard Storage
- $10/TB scanned or returned — IA Storage

Object Locking

NEW

Prevent object deletion

Governance	Can't delete til date
Compliance	Never delete (ever)

jerry@lucidchart @awsgeek

[all pricing from US West (Oregon)]

Requests ($USD per 1,000,000 requests)

API CALLS

	GET	POST	PUT	COPY	LIST	SELECT	other
Standard	0.4	5.0	5.0	5.0	5.0	0.4	0.4
Infrequent Access	1.0	10.0	10.0	10.0		1.0	1.0
1-Zone IA	1.0	10.0	10.0	10.0		1.0	1.0

Storage class transitions : 1¢ per 1,000 objects

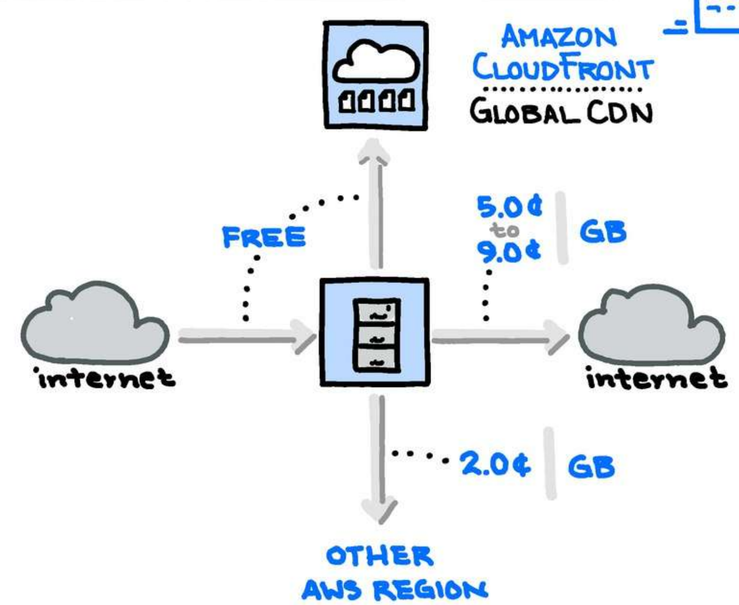
Transition to Glacier : 5¢ per 1,000 objects

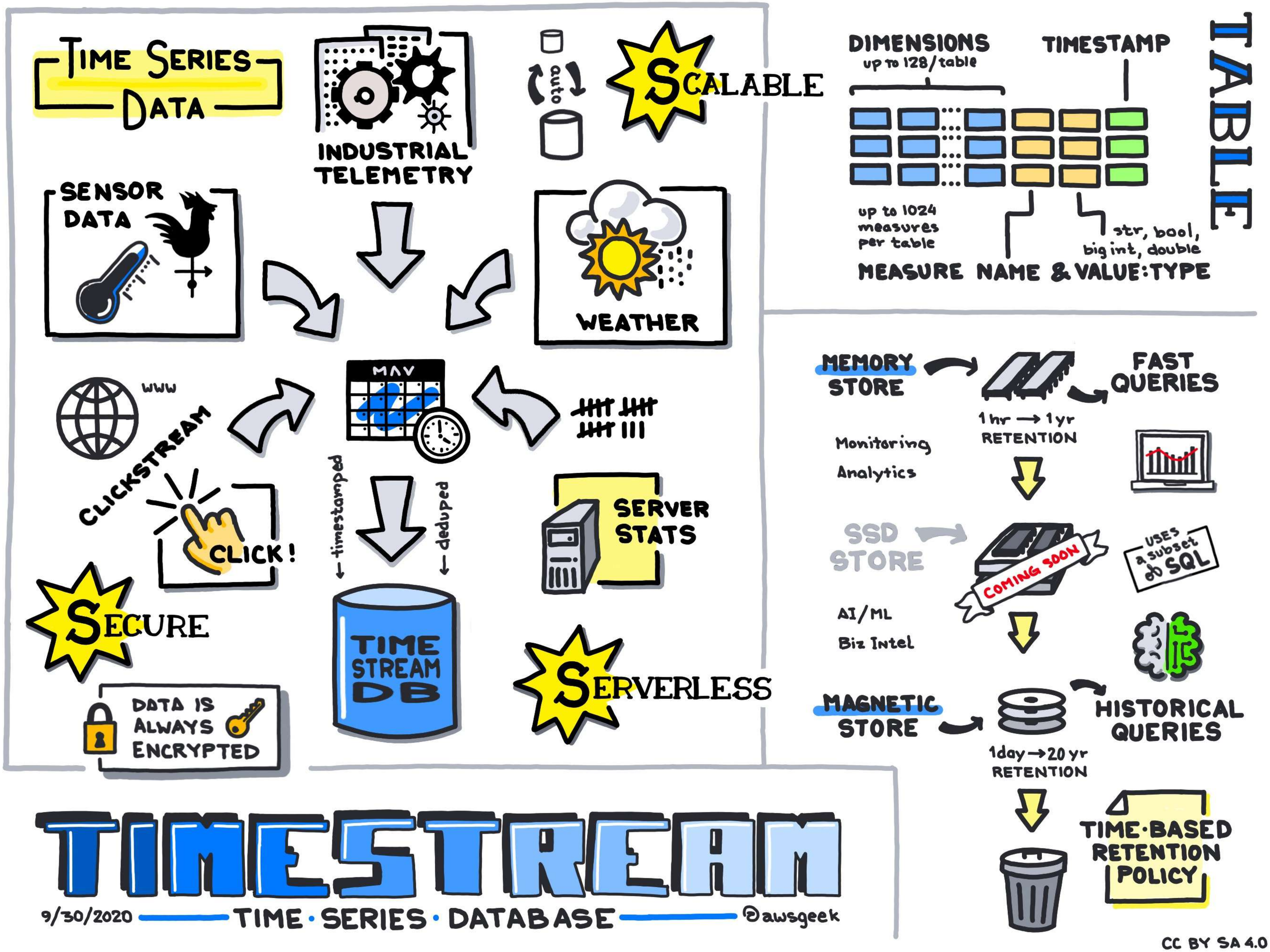
Storage

	TB	$
	[0, 50]	2.3¢
	[51, 500]	2.2¢
	[501, ∞)	2.1¢
Infrequent Access	STD	1.25¢
	1-Zone	1.0¢
	Glacier	0.4¢

per GB/Mo

Data Transfer




TIME SERIES DATA
INDUSTRIAL TELEMETRY
auto
SCALABLE
SENSOR DATA
WEATHER
MAY
WWW
CLICKSTREAM
CLICK!
timestamped
deduped
SERVER STATS
SECURE
TIME STREAM DB
SERVERLESS
DATA IS ALWAYS ENCRYPTED
TIMESTREAM
9/30/2020
TIME · SERIES · DATABASE
@awsgeek
DIMENSIONS
up to 128/table
TIMESTAMP
TABLE
up to 1024 measures per table
str, bool, big int, double
MEASURE NAME & VALUE:TYPE
MEMORY STORE
FAST QUERIES
1 hr → 1 yr RETENTION
Monitoring
Analytics
SSD STORE
COMING SOON
USES a subset of SQL
AI/ML
Biz Intel
MAGNETIC STORE
HISTORICAL QUERIES
1day → 20 yr RETENTION
TIME-BASED RETENTION POLICY

CC BY SA 4.0

CLOUDFORMATION SUPPORT

C12N

TEMPLATE

10/7/19

AMAZON

EVENTBRIDGE

SERVERLESS EVENT BUS

awsgeek

THE SERVICE FORMERLY KNOWN AS

CLOUDWATCH EVENTS

EVENT S·O·U·R·C·E·S

SaaS Partners

pd SFx ... and more

Your Apps

... yes, more

AWS Services

... many more

90+ AWS SERVICES

EVENT B·U·S·E·S

SaaS EVENTS → PARTNER

YOUR APP EVENTS ⇄ CUSTOM

AWS SERVICE EVENTS → DEFAULT

multiple

single

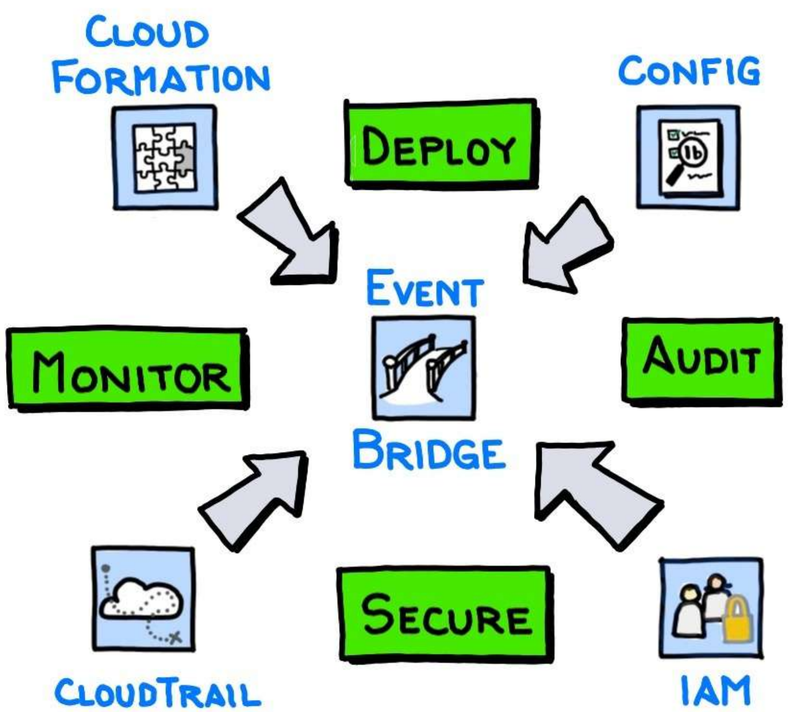
EVENT T·A·R·G·E·T·S

LAMBDA, STEP FUNCTIONS, SNS, SQS, KINESIS, EC2, CODE PIPELINE, CODE BUILD

& MORE

DEFAULT — EVENT BUS — different account

OVER 15 TARGETS



EVENT C·O·S·T

CUSTOM & SaaS EVENTS

$1 Million Published

AWS EVENTS

free

E·V·E·N·T DETAILS

SOURCE
TIME
ACCOUNT
DETAIL
...

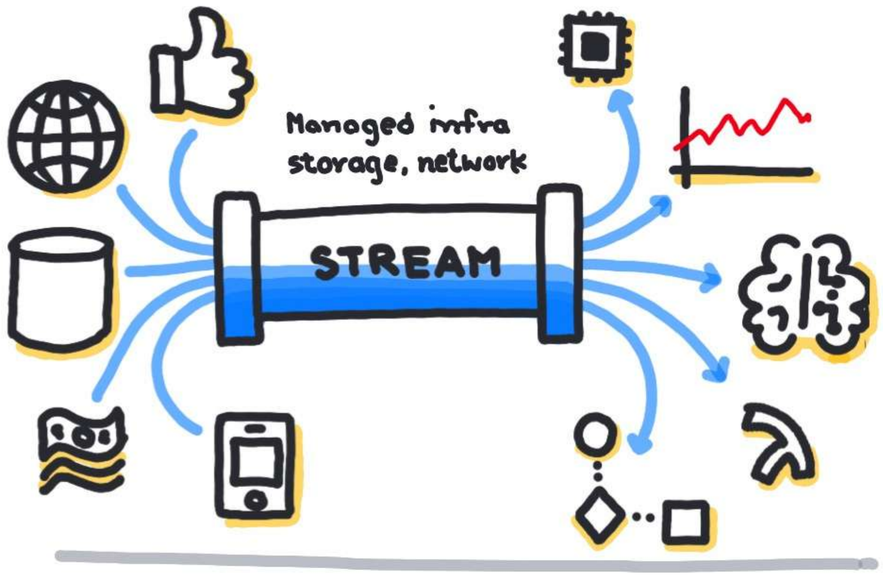
→ JSON

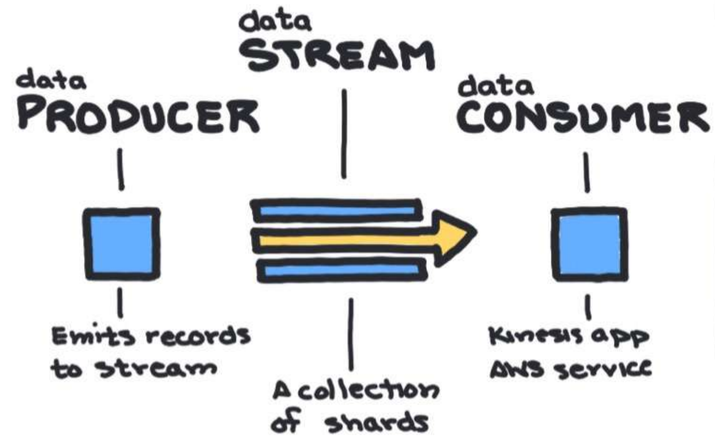
COMPLIANT

- GDPR
- SOC
- ISO
- DoD
- FedRamp

HIPAA Eligible

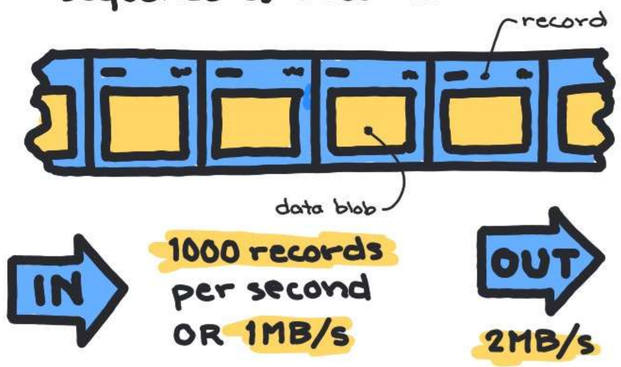
cc by-sa 2.0





SHARD

an append-only, time orded sequence of records



Shard # determines Stream throughput

DATA KINESIS STREAMS

STREAM • DATA • AT • SCALE

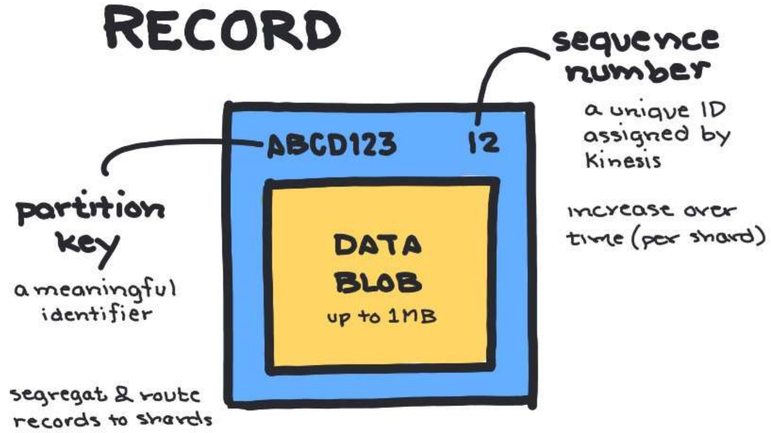
PRICING

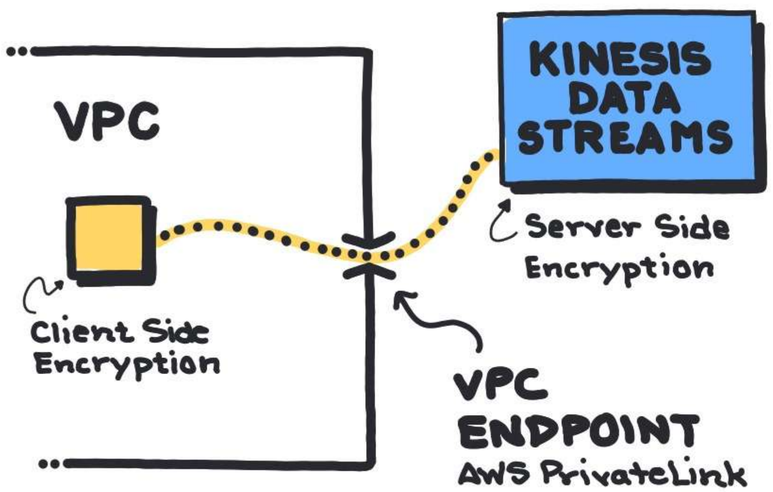
SHARD HOURS

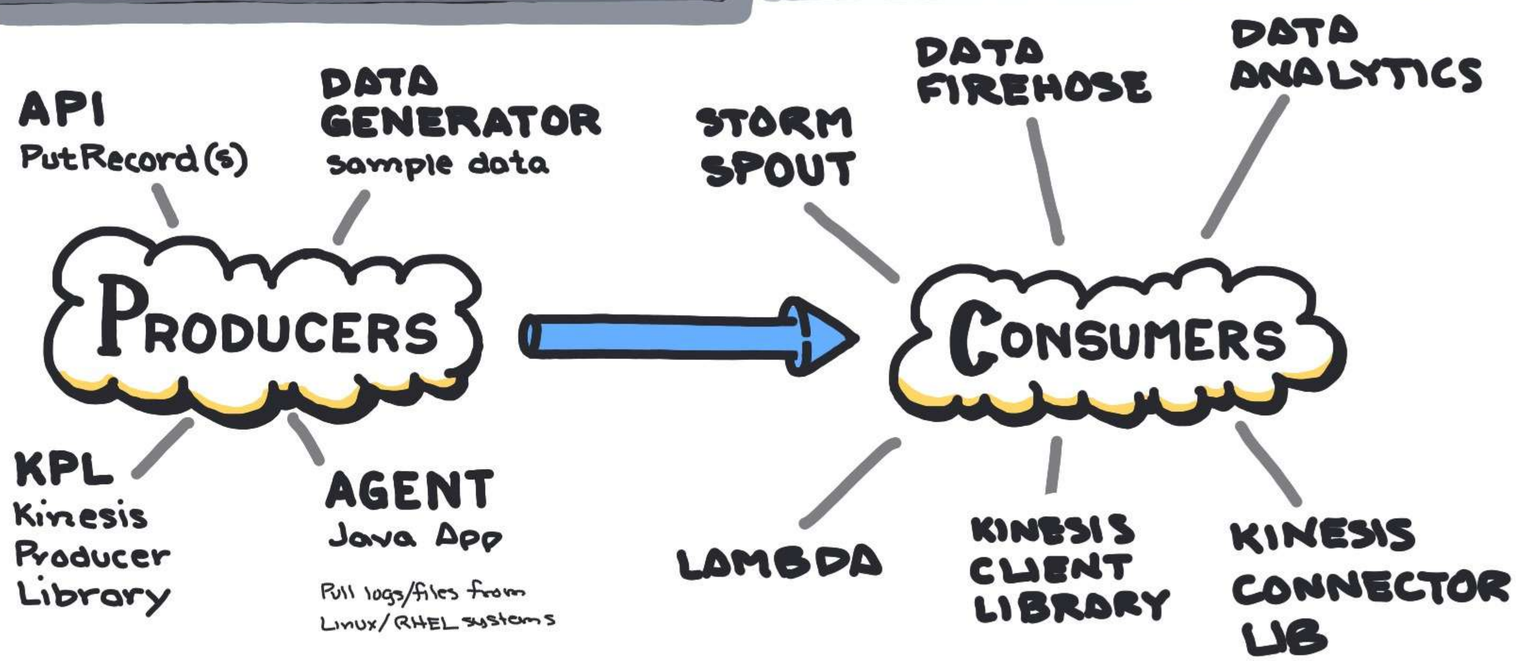
25 KB PUTS

DATA RETENTION

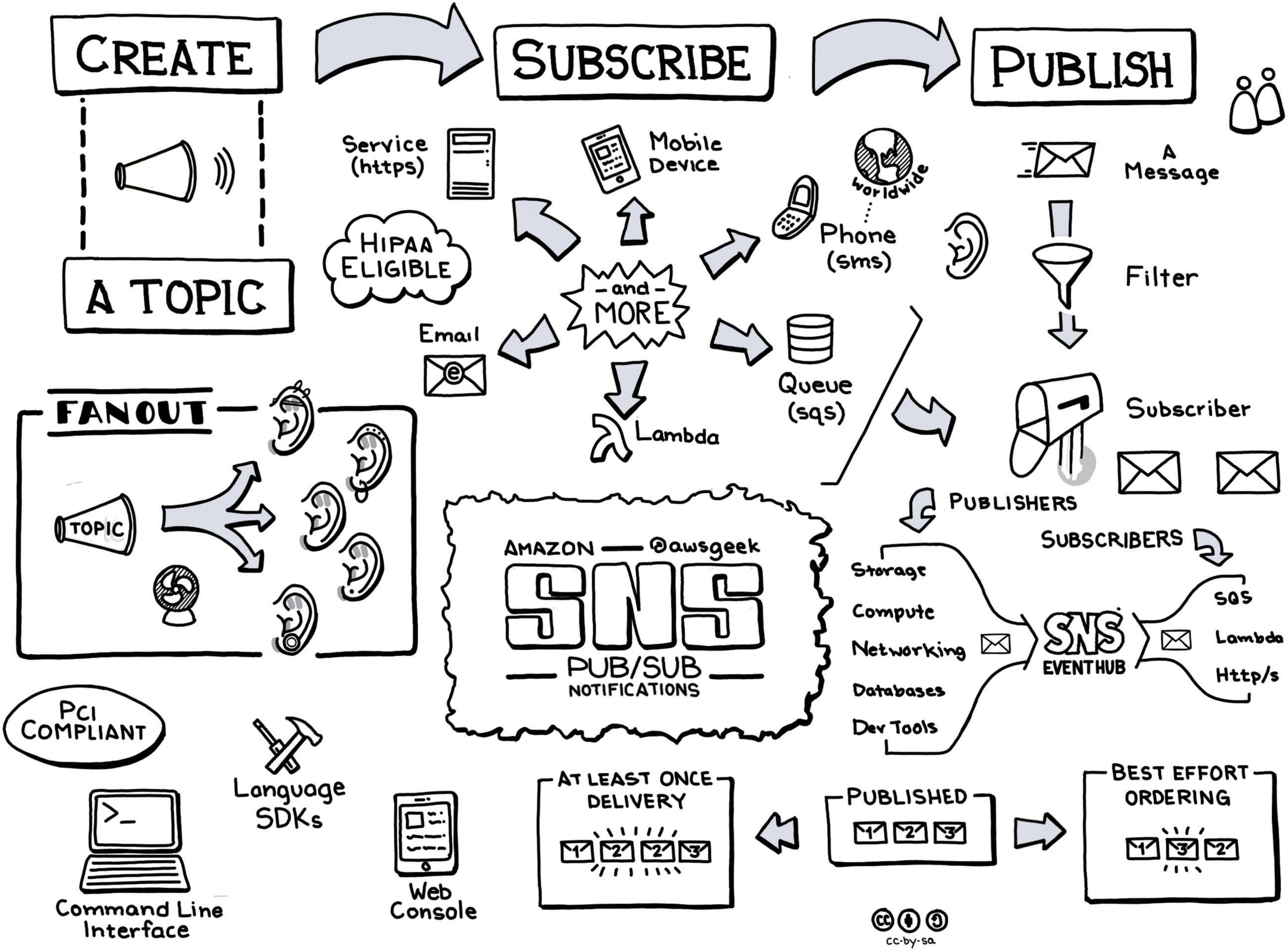
RECORD



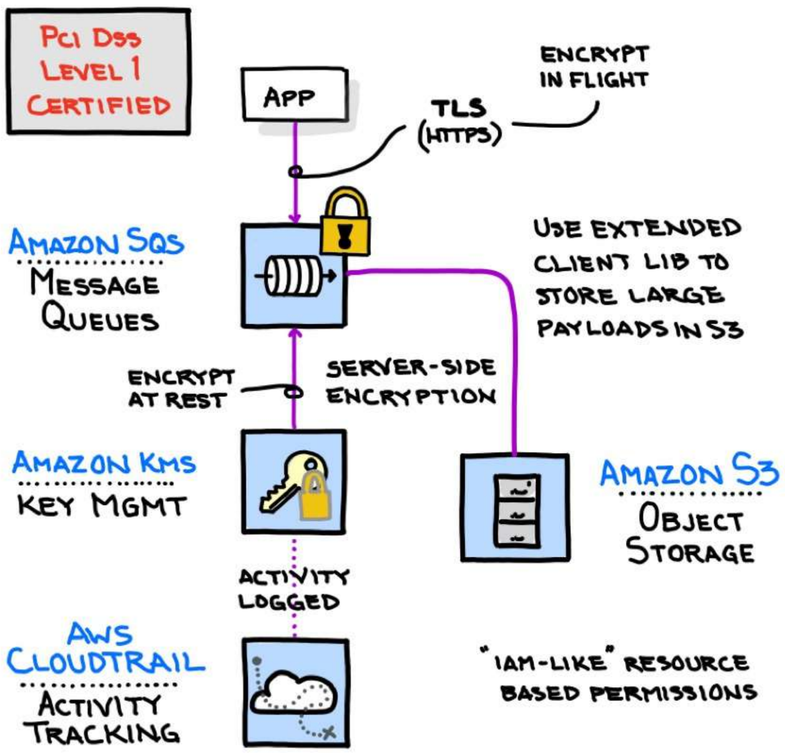


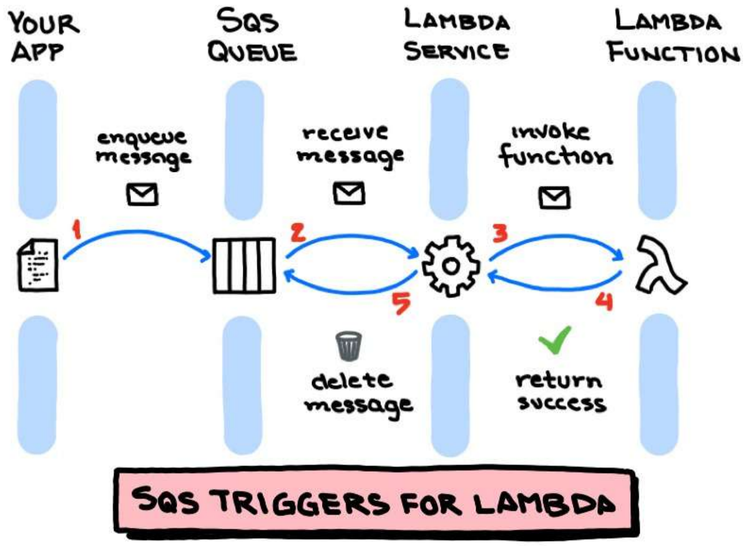


12/3/20 - @awsgeek - CC BY SA 4.0


CREATE
A TOPIC
SUBSCRIBE
PUBLISH
Service (https)
Mobile Device
HIPAA ELIGIBLE
-and- MORE
Email
Lambda
Phone (sms)
worldwide
Queue (sqs)
A Message
Filter
Subscriber
FANOUT
TOPIC
AMAZON — @awsgeek
SNS
PUB/SUB
NOTIFICATIONS
PUBLISHERS
SUBSCRIBERS
Storage
Compute
Networking
Databases
Dev Tools
SNS EVENTHUB
SQS
Lambda
Http/s
PCI COMPLIANT
Language SDKs
Command Line Interface
Web Console
AT LEAST ONCE DELIVERY
PUBLISHED
BEST EFFORT ORDERING
cc-by-sa

Security





Pricing

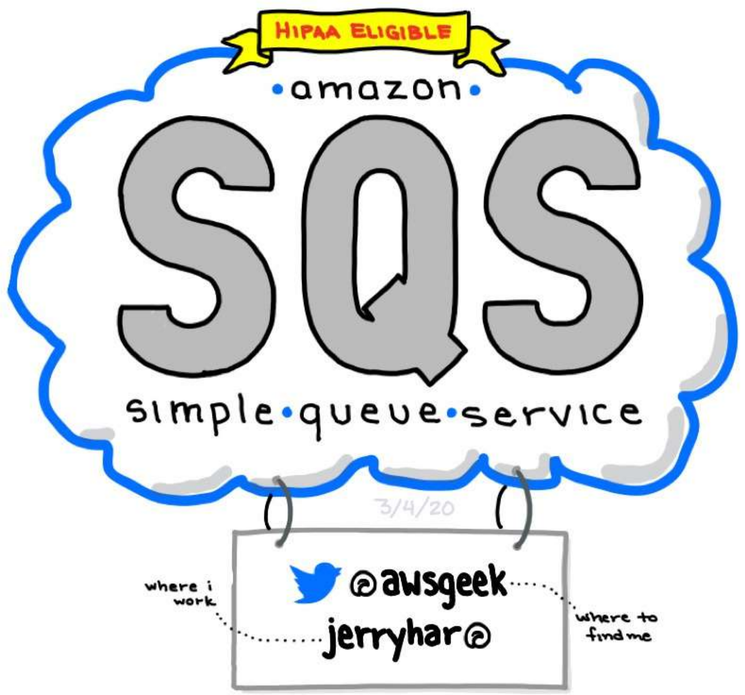
each 64K chunk of payload counts as 1 request

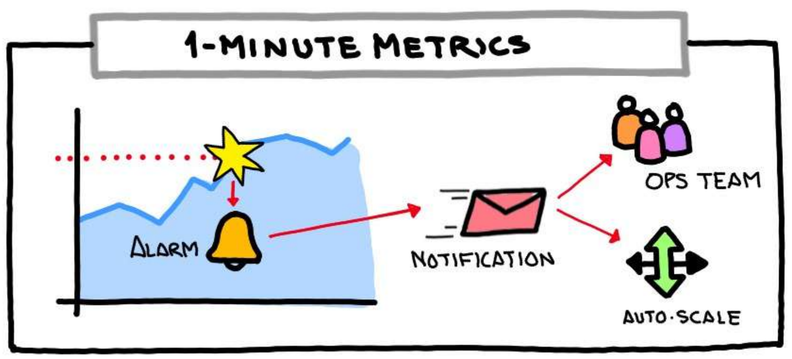
Standard ..... 40¢
FIFO ..... 50¢
per MM requests

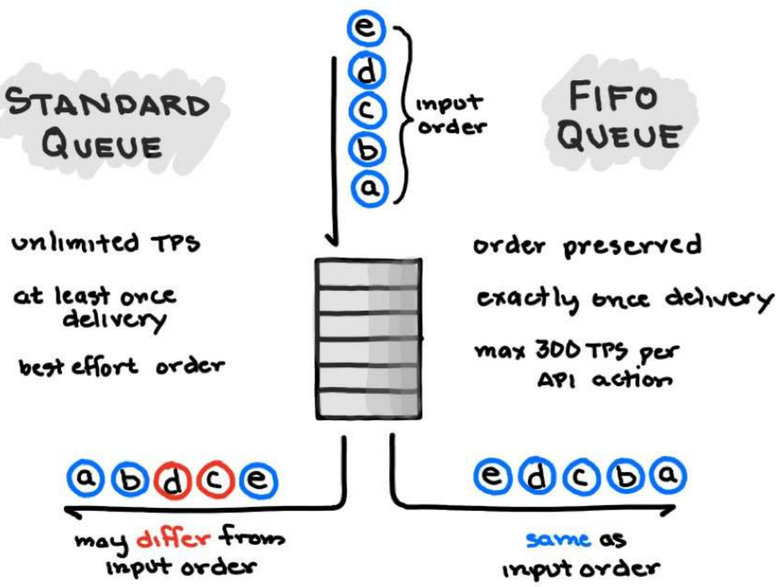
additional costs for S3 & KMS

Send, receive, delete, visibility APIs at FIFO rates, others at standard rate

data transfer starts at 90¢/GB

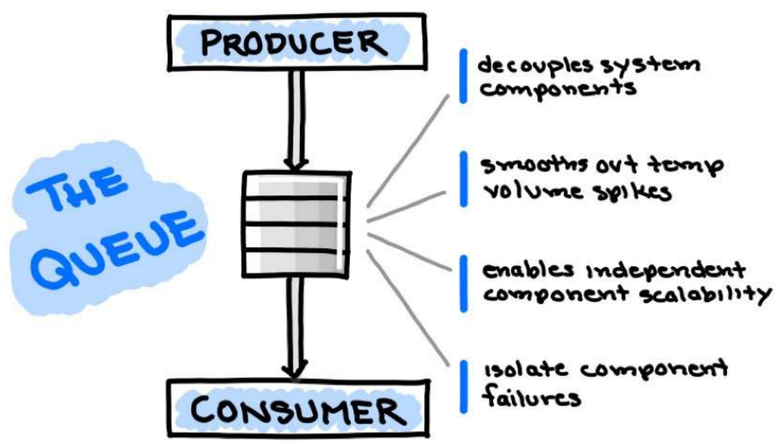






APP INTEGRATION FAMILY

AMAZON SQS	AMAZON SNS	AMAZON MQ	AWS functions STEP
managed message queues	pub-sub, SMS, mobile push	managed ActiveMQ broker	coordinate distributed apps

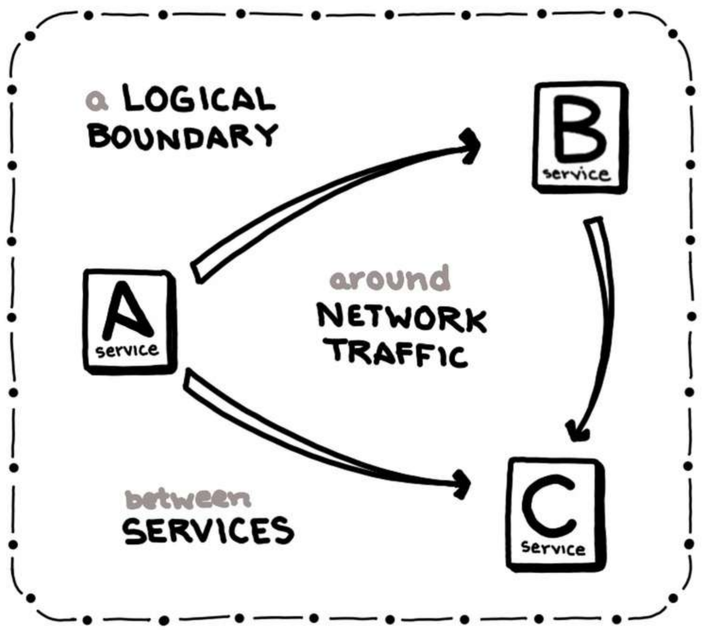


Limits

MESSAGE RETENTION PERIOD
MIN: 1 MIN MAX: 14 DAYS

MAXIMUM MESSAGE SIZE
MIN: 1 KB MAX: 256 KB

MAXIMIMUM INFLIGHT MESSAGES
STD: 120K FIFO: 20K



SERVICE MESH

VIRTUAL SERVICE

ABSTRACTION of REAL SERVICE

PATH BASED
WEIGHTED

VIRTUAL ROUTER

TRAFFIC DIRECTOR

VIRTUAL NODE

LOGICAL POINTER

K8s DEPLOYMENT

ECS SERVICE

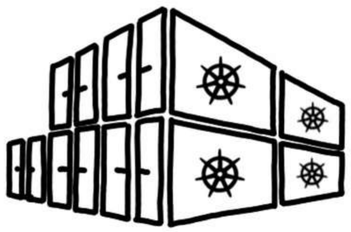
AWS @awsgeek

APP MESH

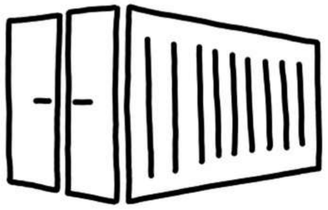
SERVICE MONITORING & CONTROL

COMPATIBLE *with*

EKS —

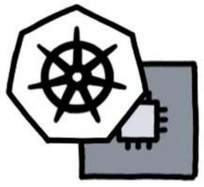


ECS —



and FARGATE

on K8s / AWS —



Web Console

Command Line Interface

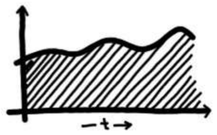
Language SDKs

uses

ENVOY PROXY

APP MESH

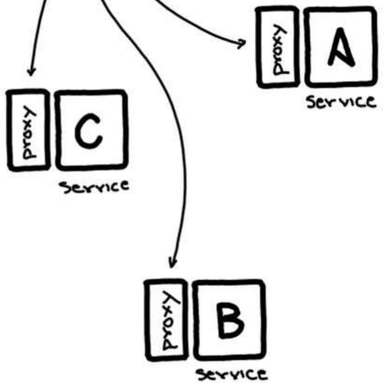
METRICS

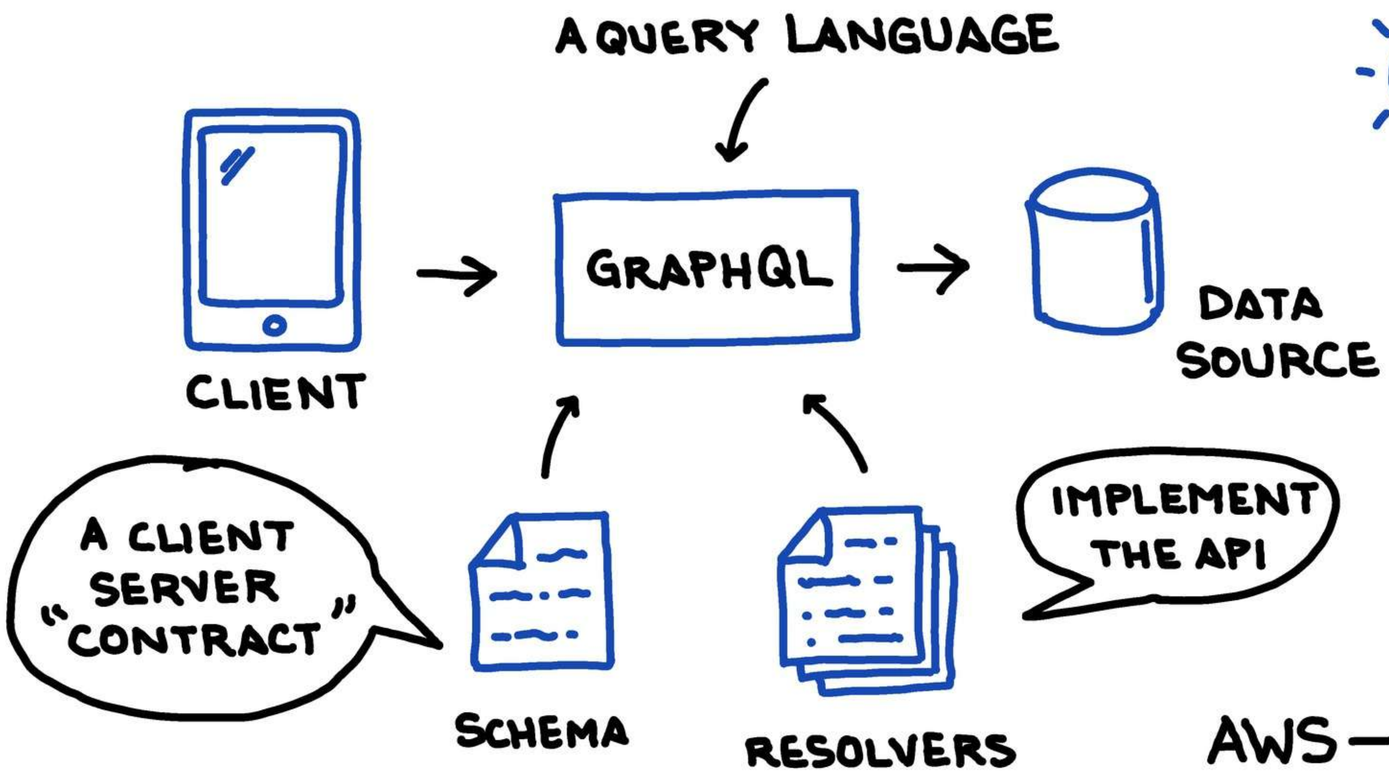


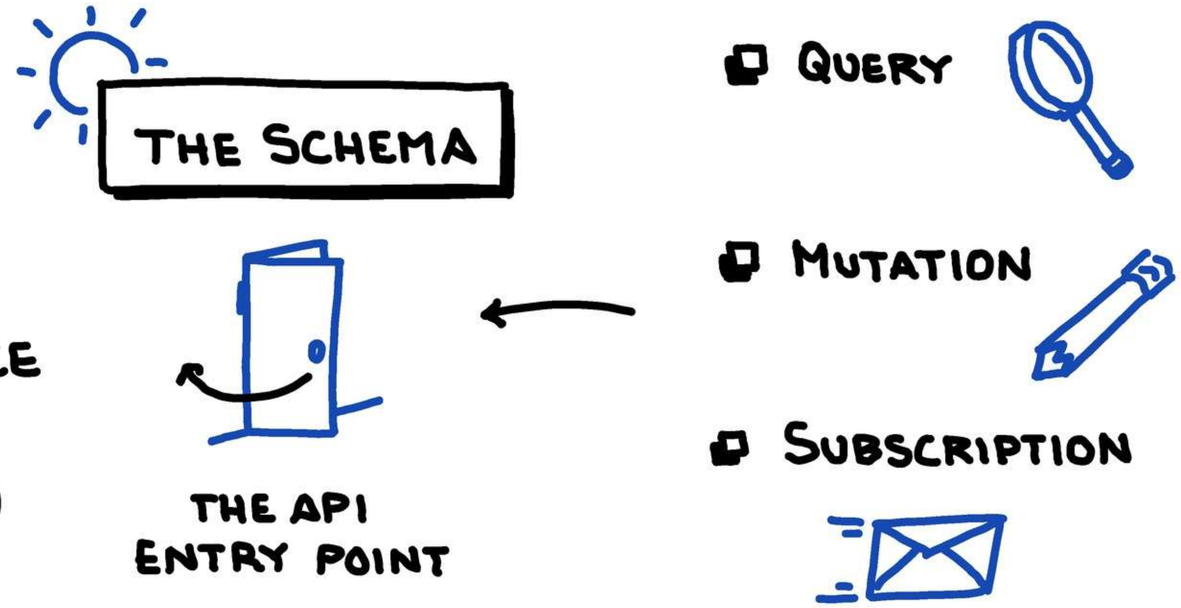
CLOUDWATCH

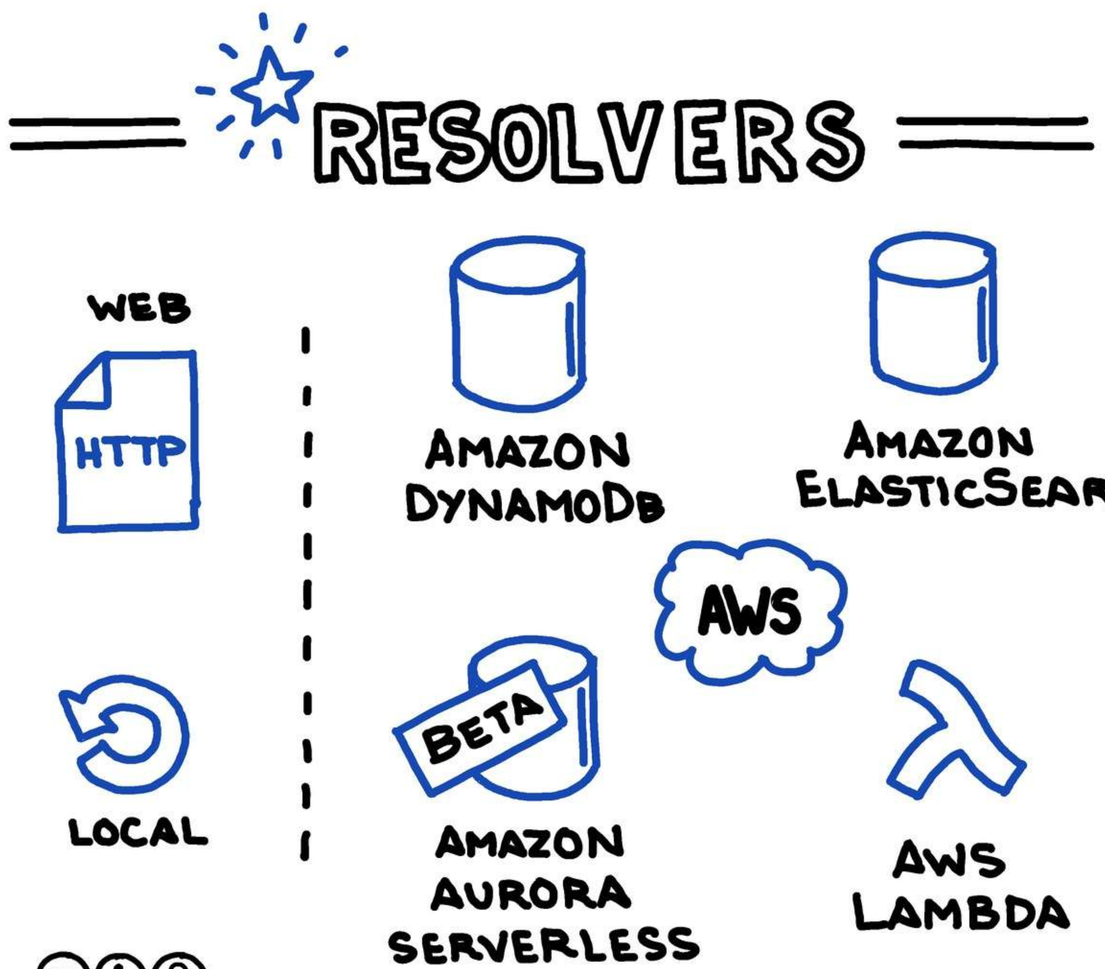
LOGS & TRACES

X-RAY









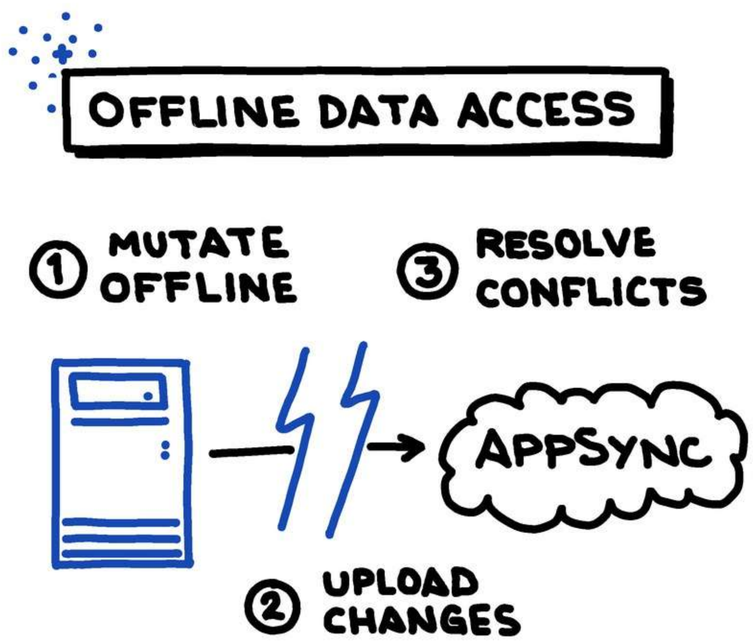
AWS

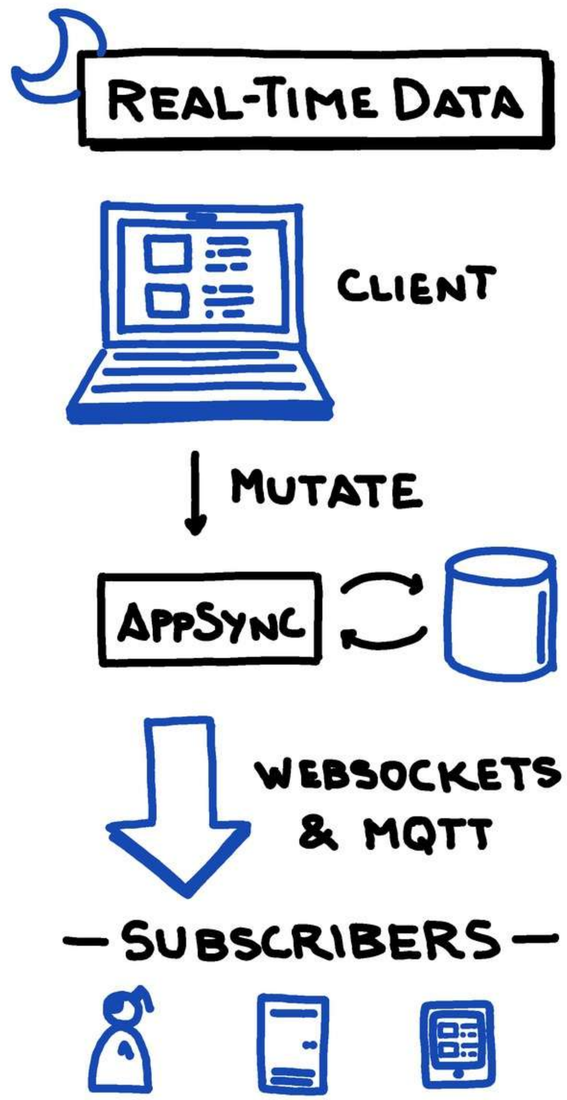
APPSYNC

MANAGED · GRAPHQL

@awsgeek

1/23/19



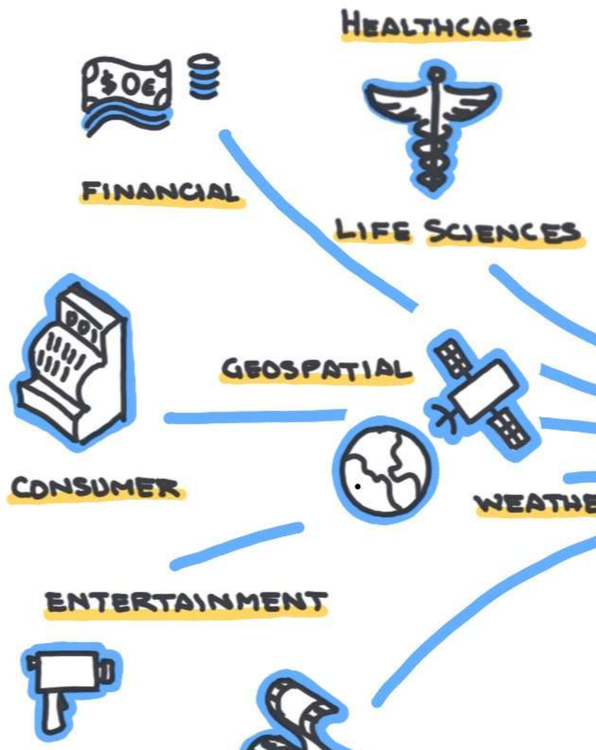


cc by-sa 2.0

AWS DATA EXCHANGE

@awsgeek
9/3/20

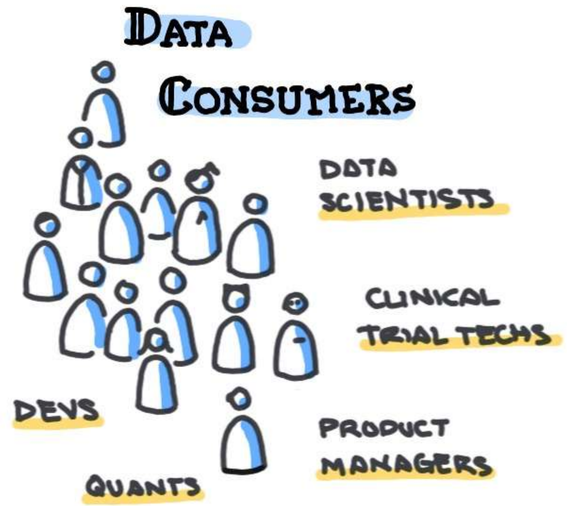
Data transforms Business innovation

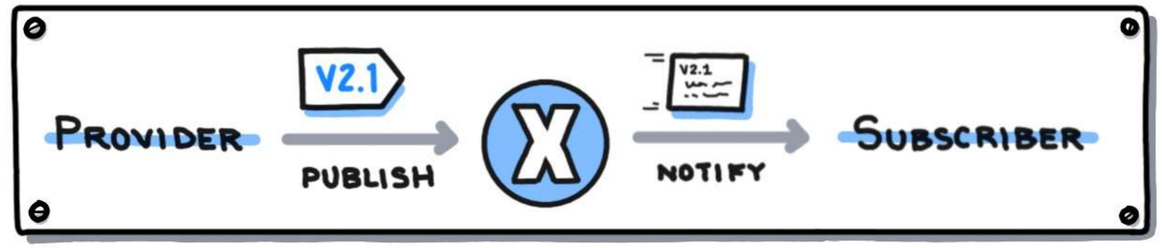


PUBLISH

DATA EXCHANGE

SUBSCRIBE





2400+ Products

- Consistent
  - Delivery
  - Security
  - Access

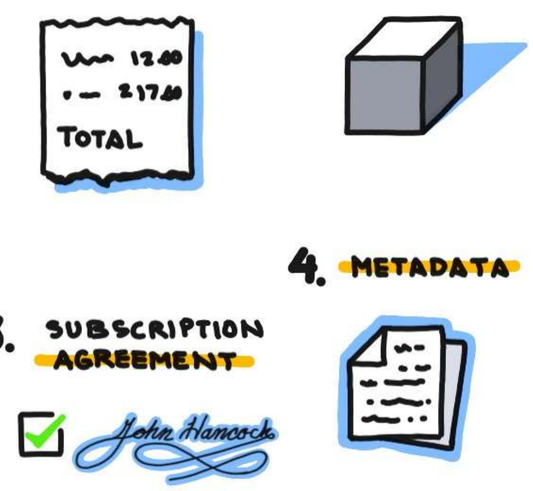
Subscription
1 to 36 months

Auto-Renew

Up to 10GB each

Product

1. Pricing
2. Data Sets
3. Subscription Agreement
4. Metadata



logical grouping of data

point in time view

Asset
any file that can be stored on S3

Complete
or
Incremental

cc by-sa 4.0

AWS DATASYNC

6/18/20

@awsgeek

Sources

EC2 — NFS or SMB — self managed

EFS

NEW!! AWS SNOWCONE

DATASYNC AGENT

Can saturate 10 Gbs link

PARALLEL

TLS

MULTI THREADED

NFS —or— SMB

NAS — Network Attached Storage

ON-PREMISES

In The Cloud Targets

ELASTIC FILE SYSTEM — directory structure preserved

FSx for WINDOWS file server — file metadata included / preserved

S3 BUCKET

FEDRAMP COMPLIANT

HIPAA ELIGIBLE

Management

- Console
- AWS CLI
- Language SDKs

SCHEDULED TRANSFERS

Filter Source Files

Adjust Bandwidth

Throttle

DATASYNC AGENT

10 Gbps

Performance

- Incremental xfer
- Sparse file detection
- Inline compression

or EFS

PCI-DSS COMPLIANT

Transferring data to S3? Which service to use?

AWS DATASYNC

migrate active datasets

timely, accelerated transfer

backup and disaster recovery

AWS SNOWBALL

bandwidth constrained or disconnected environments

AWS STORAGE GATEWAY

low latency access to transferred files

file gateway

S3

cross-region replication (optional)

all storage classes supported

GLACIER

AMAZON VPC — ISOLATED RESOURCES

DATA ENCRYPTED IN TRANSIT — TLS

AWS DATASYNC — ONLINE DATA TRANSFER

SOC COMPLIANT

AMAZON S3 — OBJECT STORAGE

AMAZON EFS — ELASTIC FILE SYSTEM

DATA ENCRYPTED AT REST

AMAZON KMS — KEY MGMT

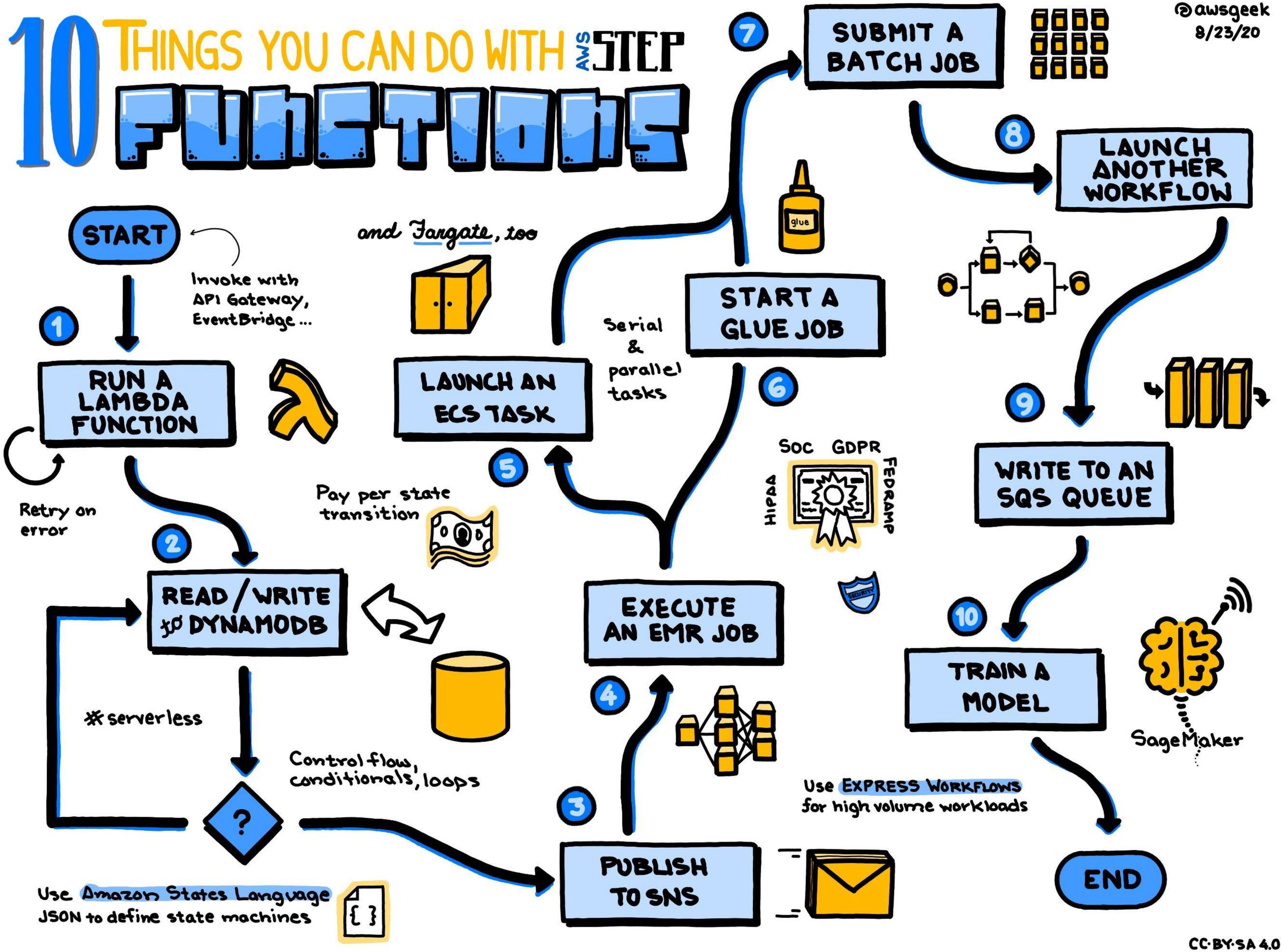
Sync Options

- Post-copy file validation?
- File metadata choices
- Remove deleted files?
- Set bandwidth limit

cc by-sa 4.0

10 Things you can do with AWS Step Functions

@awsgeek
8/23/20



CC·BY·SA 4.0

AWS LAKE FORMATION

DATA LAKE · SERVICE ·

@awsgeek

1 INGEST

ELB

S3

CloudTrail

Kinesis

CloudFront

DynamoDB

MySQL

Postgres

SQL Server

MariaDB

Oracle

RDS

OR

EC2

DB

On Premises

JDBC

DB

AWS GLUE

ETL Jobs

2 CLEAN

Find Matches

"Y/N"

Learn

you

fuzzy matching

123 Main Street

123 Main

Are these the same?

ML Transform

Incorporate into ETL

DATA

tabular, relational

STRUCTURED DATA

logs, csv, json, metadata, events, social

UNSTRUCTURED DATA

NOT JUST TABULAR DATA

the "lake"

ANY SCALE

S3 BUCKET

3 TRANSFORM

Aws Glue Transforms

A B C

1 2 3

row format

A 1

B 2

C 3

columnar format

analytics friendly

data format conversions

4 CATALOG

① Crawl data sources

② Create searchable catalog

③ Text based search

5 SECURE

Your Policies

Centrally Managed

LAKE Formation

Admins

Database Creators

Users

IAM

KMS

S3

Athena

Redshift

EMR

AD users & groups

cc by-sa 2.0

Amazon SageMaker

PCI DSS COMPLIANT

11/6/18

@awsgeek • jerry©

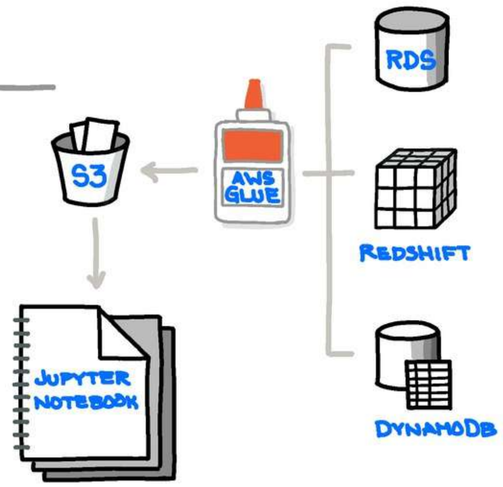
Build

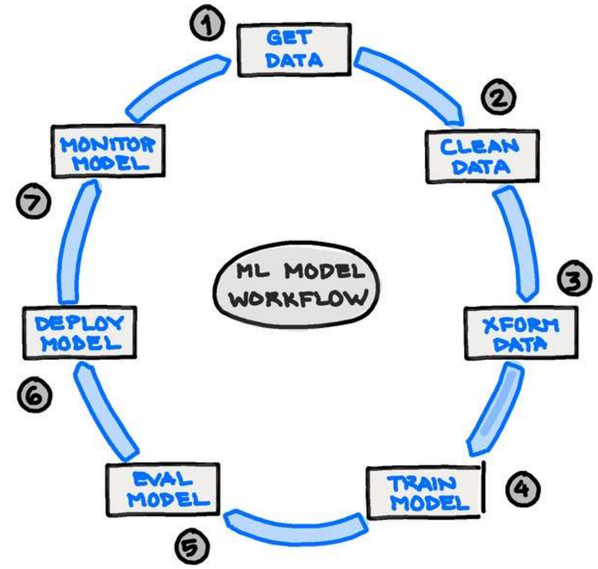
Common Templates

- Time series forecast
- Direct marketing targets
- Predict customer churn

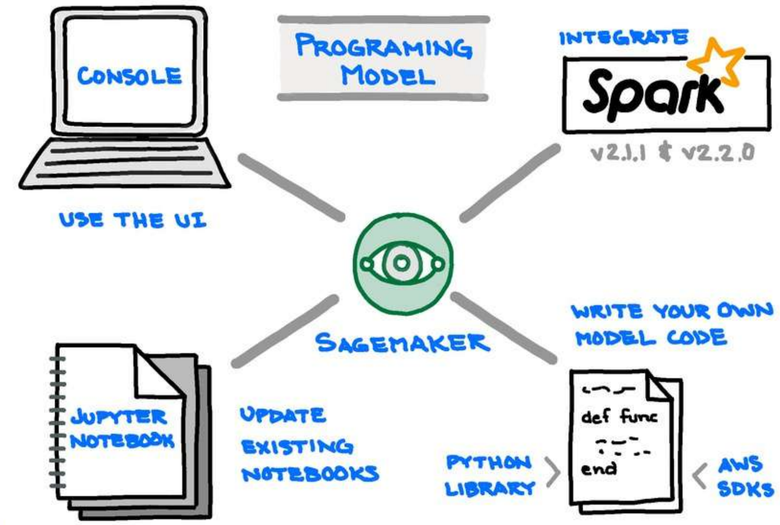
Adv. Templates

- BYO TensorFlow & MXNet containers
- BYO scikit or R-algo

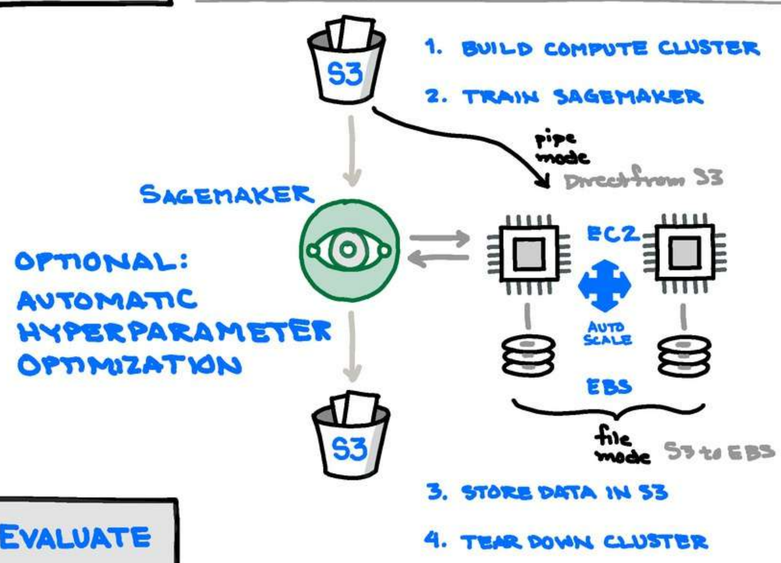




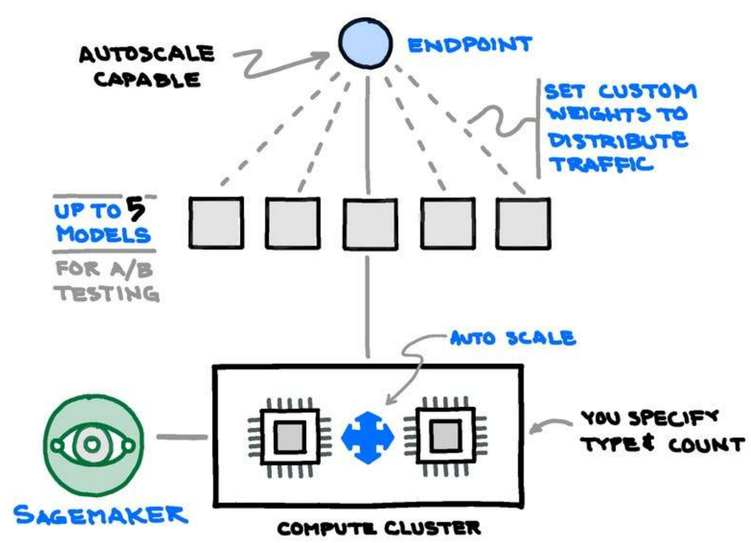
Programing Model



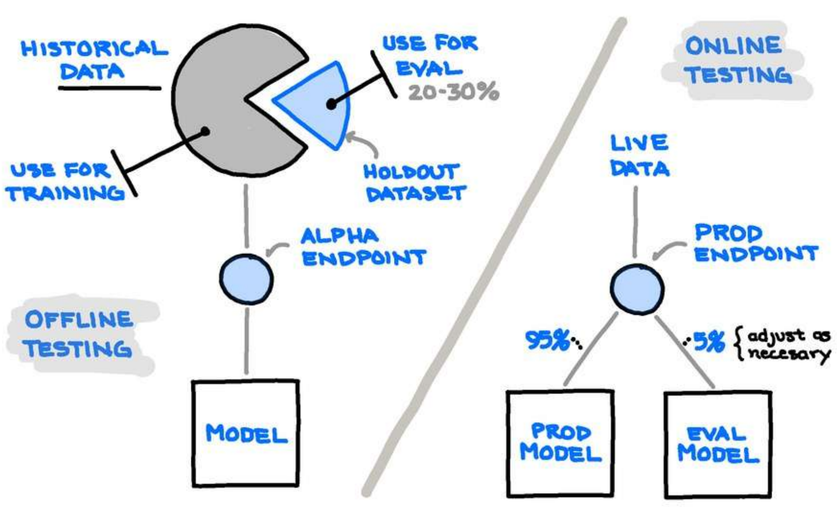
Train



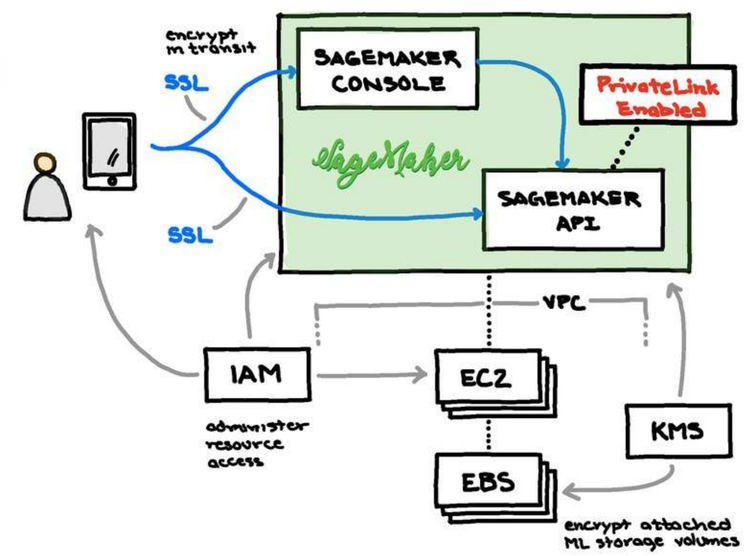
Deploy



Evaluate

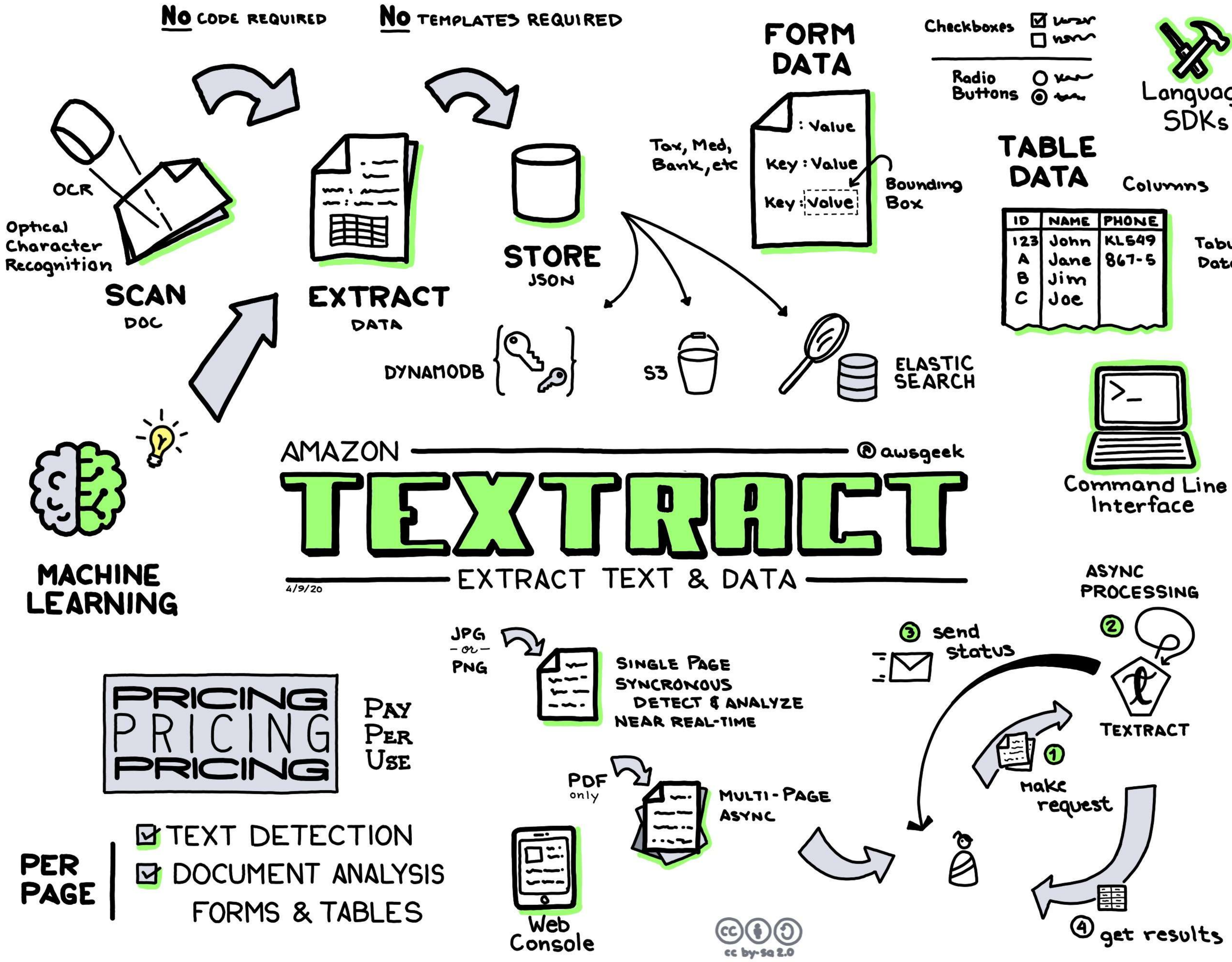


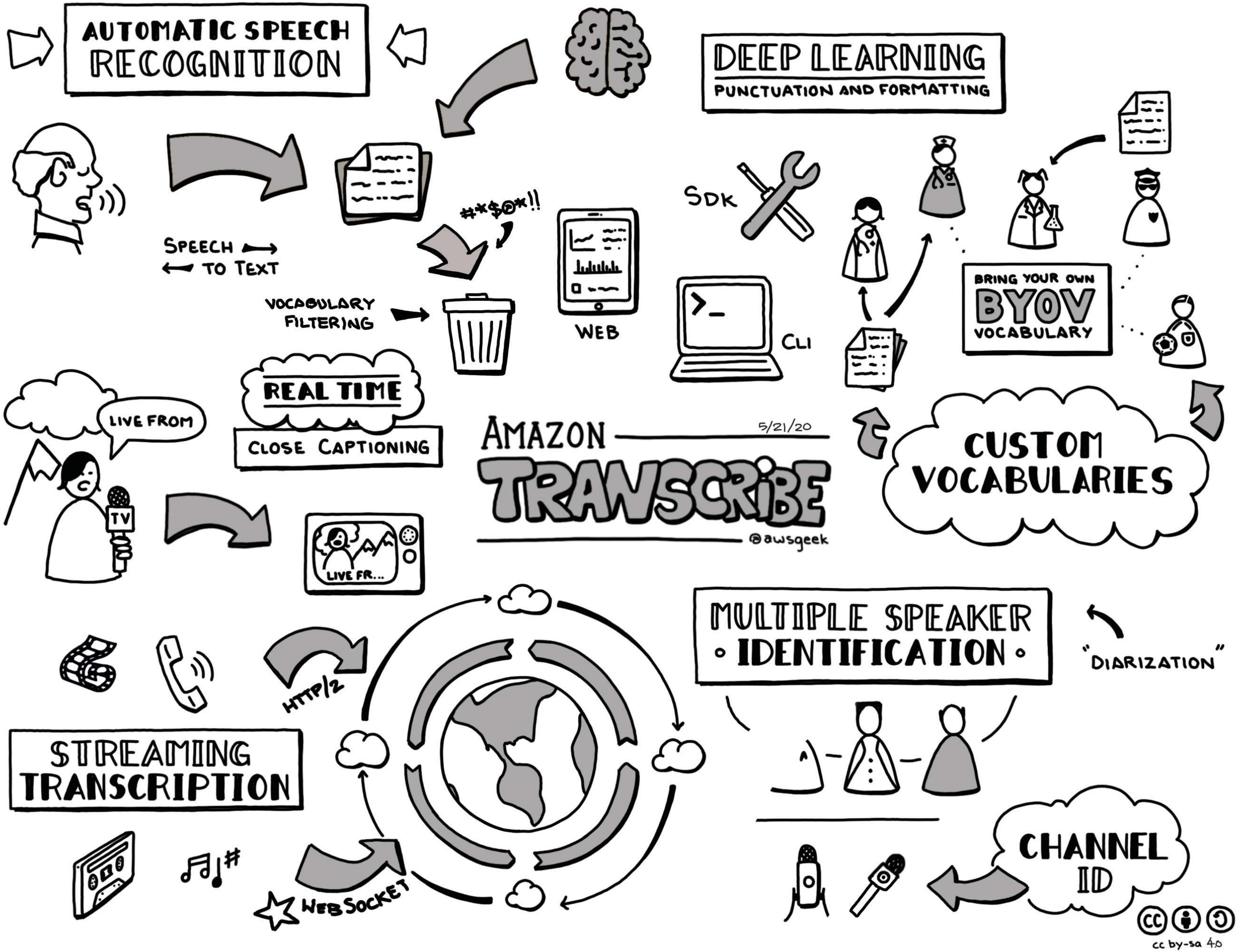
Security

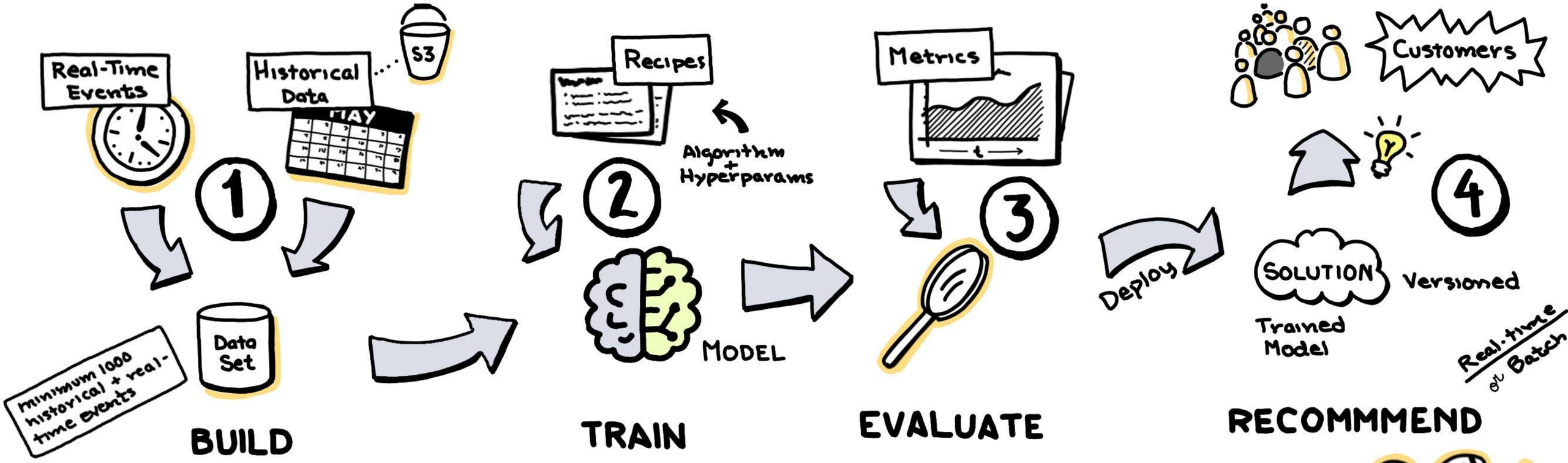


Pricing

INSTANCE FEES:	ON DEMAND, HOURLY RATE, 1 MINUTE MINIMUM, PER SECOND	
STORAGE FEES:	14¢/GB/Mo	(UP TO 6TB FOR TRAINING)
PROCESSING FEES:	1.6¢/GB	(IN/OUT)


No CODE REQUIRED
No TEMPLATES REQUIRED
OCR
Optical Character Recognition
SCAN
DOC
EXTRACT
DATA
STORE
JSON
DYNAMODB
S3
ELASTIC SEARCH
FORM DATA
Tax, Med, Bank, etc
: Value
Key : Value
Key : Value
Bounding Box
Checkboxes
Radio Buttons
Language SDKs
TABLE DATA
Columns
ID NAME PHONE
123 John KL549
A Jane 867-5
B Jim
C Joe
Tabular Data
Command Line Interface
MACHINE LEARNING
AMAZON
@awsgeek
TEXTRACT
EXTRACT TEXT & DATA
4/9/20
ASYNC PROCESSING
JPG -or- PNG
SINGLE PAGE
SYNCRONOUS
DETECT & ANALYZE
NEAR REAL-TIME
PDF only
MULTI-PAGE
ASYNC
③ send status
② TEXTRACT
① make request
④ get results
PRICING
PRICING
PRICING
PAY PER USE
PER PAGE
TEXT DETECTION
DOCUMENT ANALYSIS
FORMS & TABLES
Web Console
cc by-sa 2.0


AUTOMATIC SPEECH RECOGNITION
DEEP LEARNING
PUNCTUATION AND FORMATTING
SPEECH TO TEXT
#*$@*!!
VOCABULARY FILTERING
WEB
SDK
CLI
BRING YOUR OWN BYOV VOCABULARY
REAL TIME
CLOSE CAPTIONING
LIVE FROM
TV
LIVE FR...
AMAZON TRANSCRIBE
5/21/20
@awsgeek
CUSTOM VOCABULARIES
HTTP/2
STREAMING TRANSCRIPTION
WEBSOCKET
MULTIPLE SPEAKER IDENTIFICATION
"DIARIZATION"
CHANNEL ID
cc by-sa 4.0



AMAZON @awsgeek

PERSONALIZE

MACHINE LEARNING

REAL-TIME RECOMMENDATIONS

— Personalized —
• Search Results •
• Notifications •
• Lists •

USERS
- Age
- Gender
- Locations
- ... etc

ITEMS
- SKU
- Price
- Count
- ... more

INTERACTIONS
- User
- Item
- Timestamp
- Action
- ...

HISTORICAL DATA (csv)

PERSONALIZE
Create Solutions

PERSONALIZE · EVENTS ·
Record Events

PERSONALIZE · RUNTIME ·
Make Predictions

cc by-sa 2.0

RECIPES

- ☐ PERSONALIZATION (4)
- ☐ RELATED ITEMS
- ☐ ITEM RANKING

CHOOSING A RECIPE

A YOU CHOOSE
— OR —
B PERSONALIZE

AUTOML

AMAZON MACHINE LEARNING

NO PHD REQUIRED

BINARY CLASSIFICATION

"IS IT SPAM OR NOT"

TRUE -OR- FALSE

MORE DATA
BETTER MODEL

MODELS

REGRESSION

"WHEN WILL IT HAPPEN AGAIN?"

MULTI-CLASS CLASSIFICATION

"WHICH ORG SHOULD HANDLE THIS TWEET?"

ML TRAINING DATA IS KEY DIFFERENTIATOR

GARBAGE IN → ML → GARBAGE OUT (BAD)

GARBAGE IN → FEATURE X-FORM "RECIPE" → ML → DATA OUT (GOOD)

TWITTER API → KINESIS → LAMBDA → MACHINE LEARNING

FIND TWEETS | INGEST TWEETS | ANALYZE TWEETS | CATEGORIZE TWEETS

EXAMPLE: CATEGORIZE TWEETS

COST: PAY AS YOU GO

US EAST (N. VIRGINIA)

COMPUTE FEES	
DATA ANALYSIS & MODEL BUILDING	42¢/HR

PREDICTION FEES		
BATCH	OR	REAL-TIME
10¢/1K		$\frac{1}{100}$¢/EA + $\frac{1}{10}$¢/HR/10 MB MEMORY

USE CASES

- FRAUD DETECTION
- DOC CLASSIFICATION
- SENTIMENT ANALYSIS
- DEMAND FORCASTING
- CLICK PREDICTION
- CUSTOMER CHURN
- MARKETING INTEL

SUPERVISED LEARNING

- HISTORICAL DATA
- KNOWN INPUTS
- KNOWN OUTCOMES

UNSEEN INPUT → ML → SAME OUTCOME

WHAT IS COST OF FALSE POSITIVE?

WHAT IS COST OF FALSE NEGATIVE?

S3 | RDS | REDSHIFT

DATASET: TRAINING (70%) | EVAL (30%)

PREVENT MODEL "OVERFIT"

@awsgeek 9/22/17

amazon Rekognition

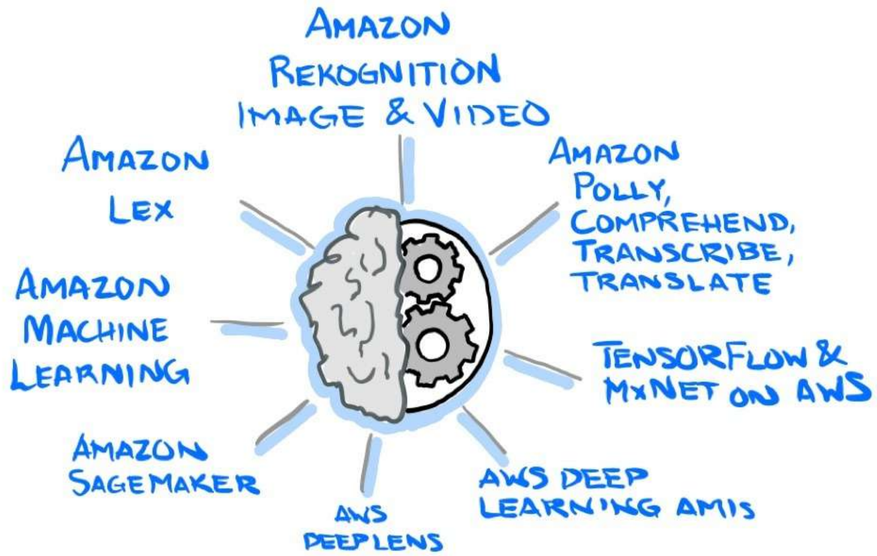
11/2/19

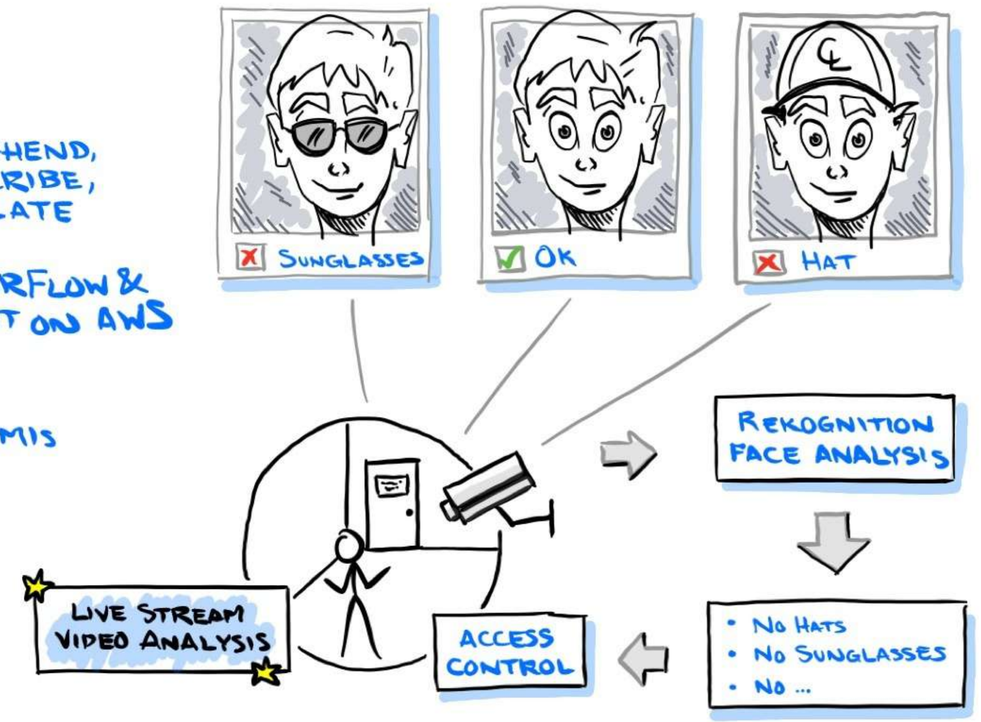
@awsgeek

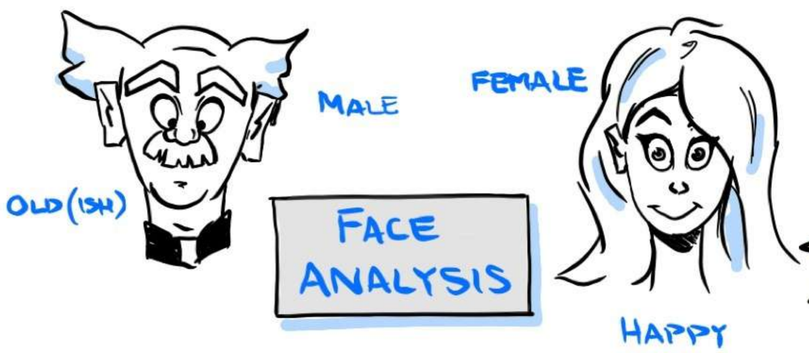
Common Use Cases

- Detect Object/Scene
- Detect Faces
- Recognize Faces
- Analyze Faces
- Detect Explicit Content

Amazon AI Family

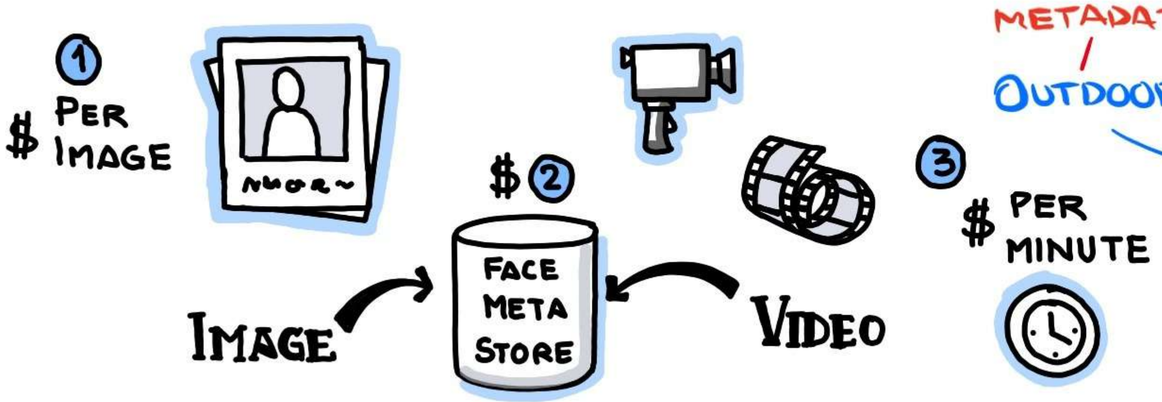


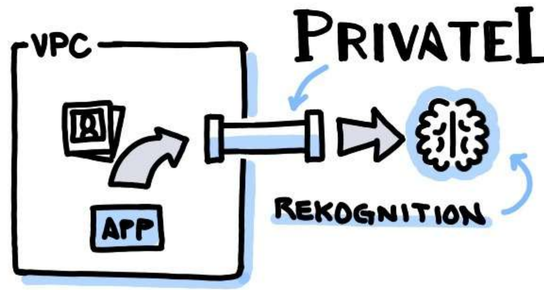


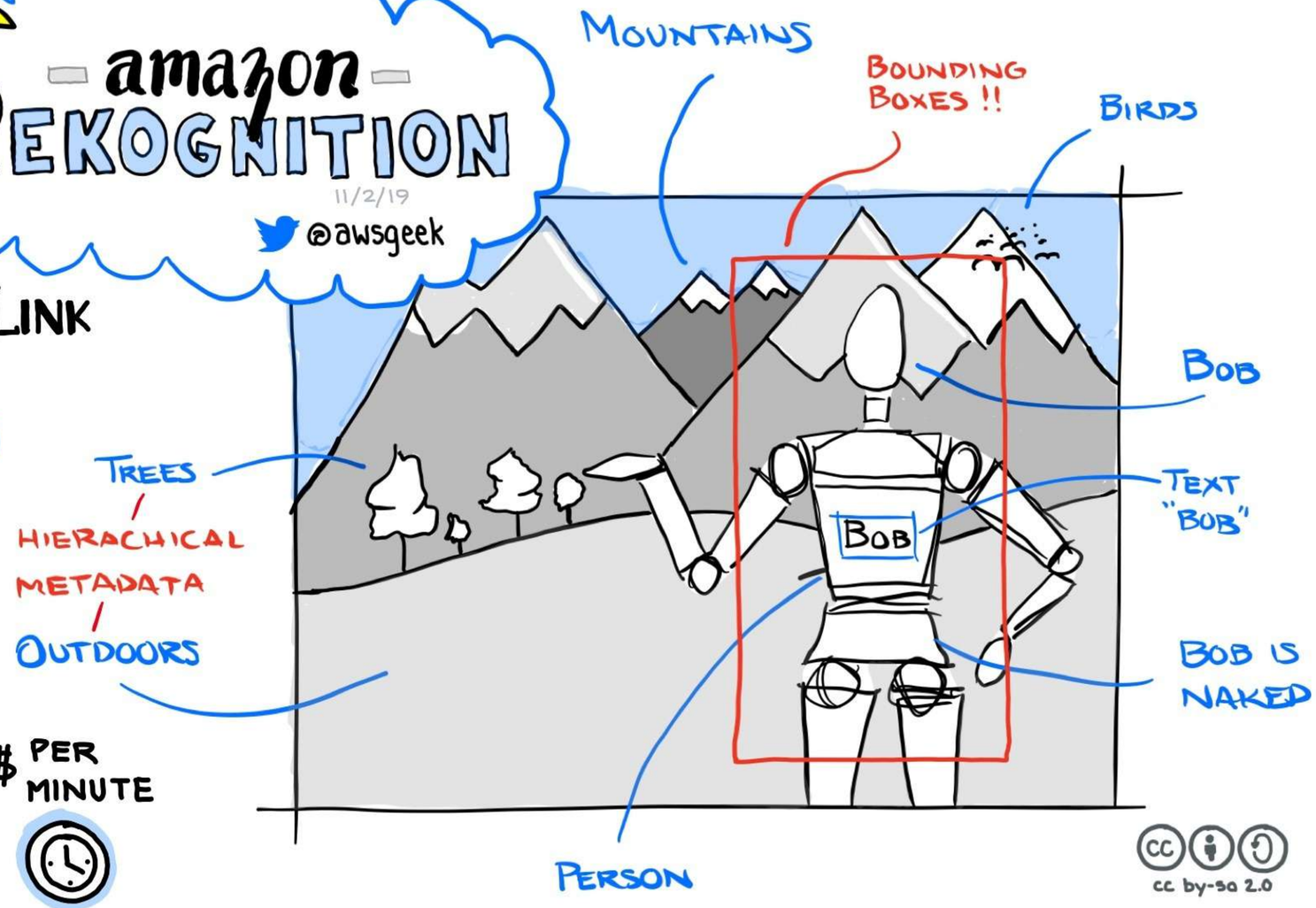


HIPAA Eligible

Pricing





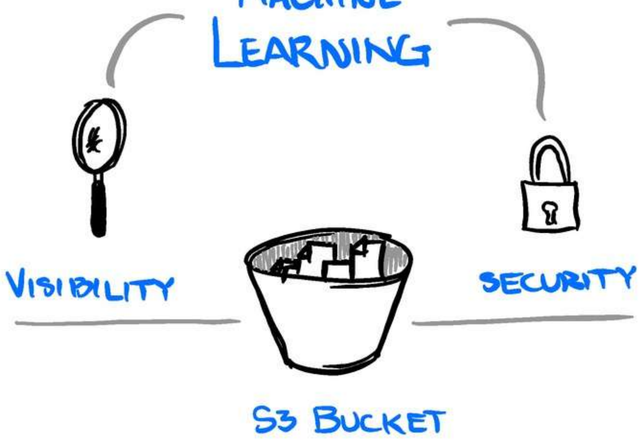


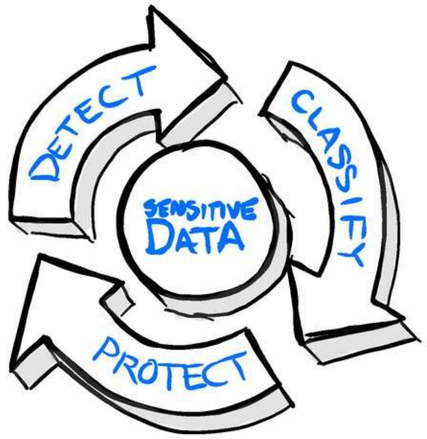
cc by-sa 2.0

amazon MACIE

@awsgeek

Machine Learning



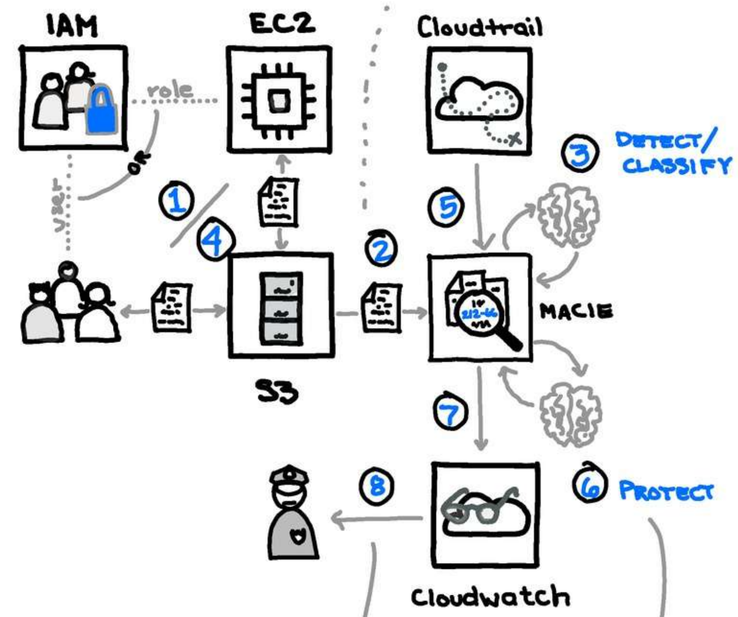


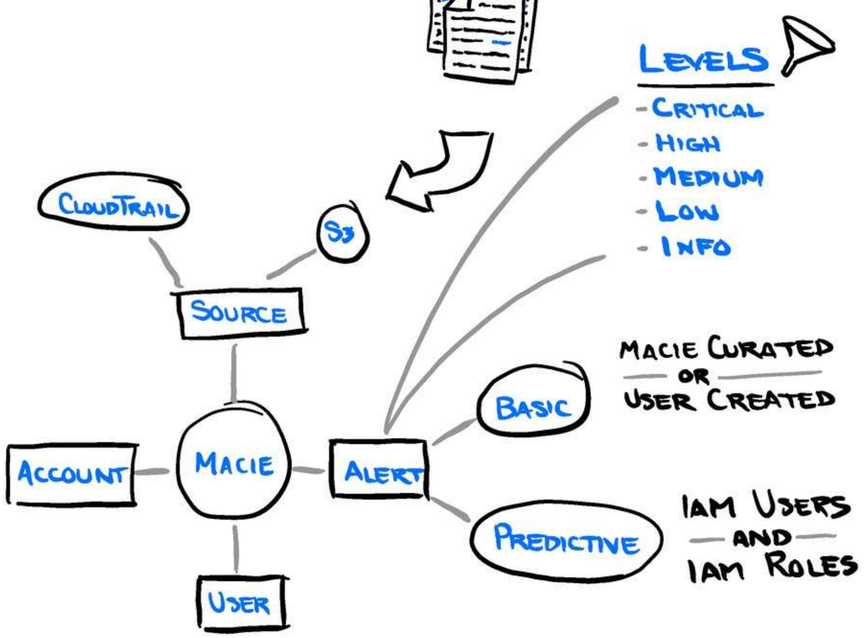
As Easy As:

1. Enable Macie
2. Select S3 Buckets
3. Review Alerts

Encrypted S3 Objects

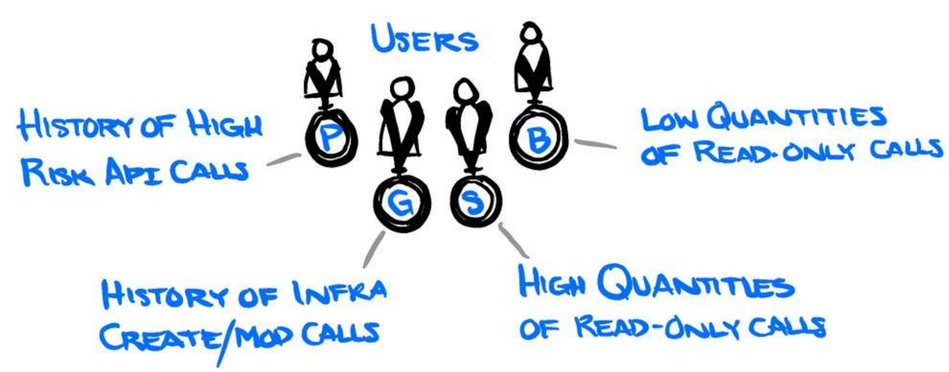
Server Side Encryption	✓
KMS Keys	✓ with IAM Permission
Client Encrypted	✗





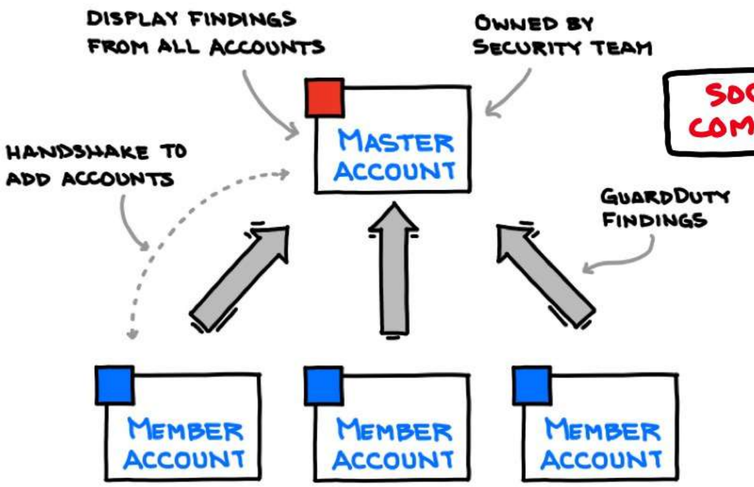
An Alert:

- Severity
- Timestamp
- Category
- S3 Bucket/ Object
- Comments
- # Views
- AWS Region
- # Results



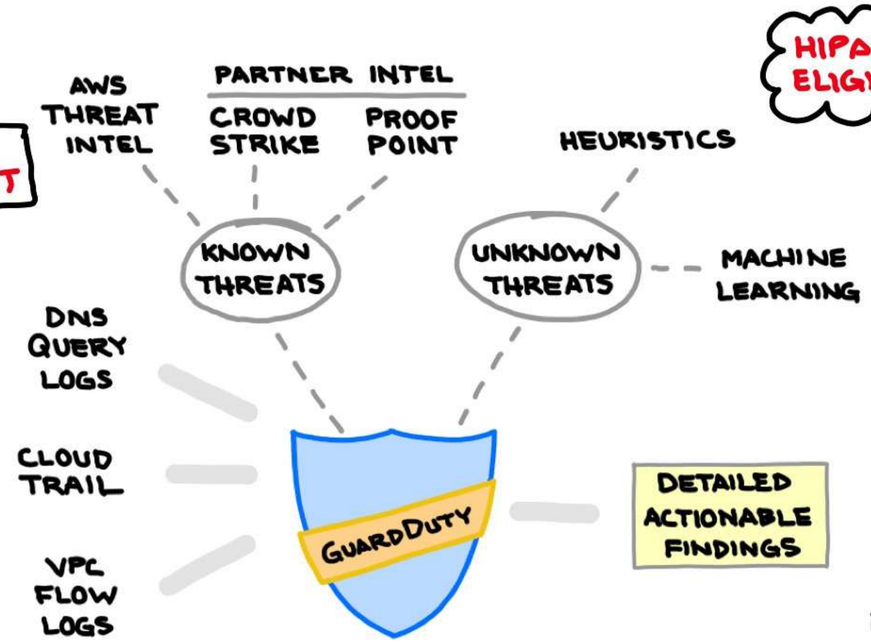
Data Access • Pattern • Recognition

cc by-sa 2.0



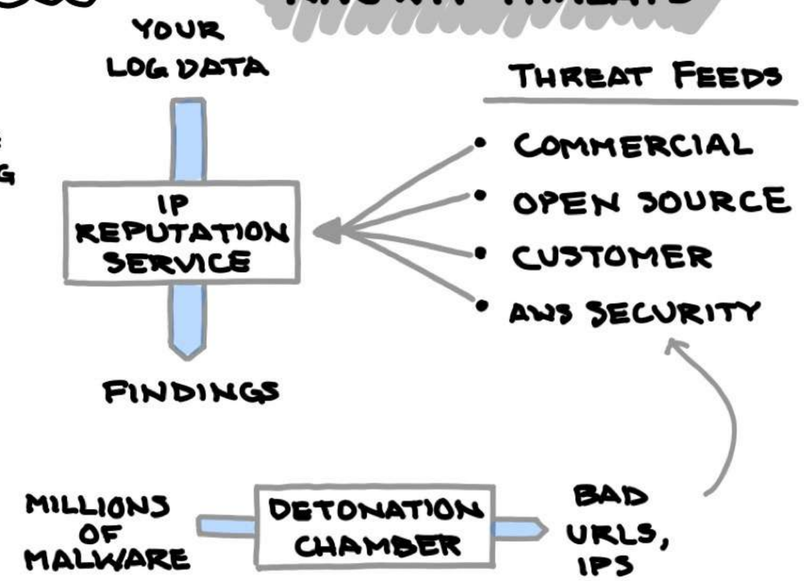
CENTRALIZED THREAT DETECTION

SOC COMPLIANT



HIPAA ELIGIBLE

KNOWN THREATS



ONE CLICK

ENABLE GUARDDUTY

"JUST TURN IT ON"

GIVES AWS ACCESS TO YOUR CLOUDTRAIL, VPC FLOW, & DNS QUERY LOGS

AMAZON GUARD DUTY

THREAT DETECTION SERVICE

@awsgeek

3-18-20

UNKNOWN THREATS

SIGNAL PATTERNS
DETECT DEVIATIONS
MACHINE LEARNING
} MUCH RED

DETECTION TIMES

EC2 – C5 FAST, 30 SEC - 2 MIN
T2 SLOW, 5 - 10 MIN

CLOUDTRAIL - 5-15 MIN

DNS - BEHIND CLOUDTRAIL

PRICING (US WEST - OREGON)

CLOUDTRAIL LOGS $4/MO/MM

VPC FLOW LOGS & DNS QUERY LOGS

$1/GB/MO	FIRST 500 GB
50¢/GB/MO	NEXT 2000 GB
25¢/GB/MO	NEXT 7500 GB
15¢/GB/MO	OVER 10K GB

GUARDDUTY IS A REGIONAL SERVICE
YOU MUST ENABLE IN ALL REGIONS

AUTOMATION FRAMEWORK

DETECTION CATEGORIES

- RECON
- BACKDOOR
- TROJAN
- UNAUTH ACCESS
- STEALTH
- CRYPTOCURRENCE
- PEN TESTING*

cc by-sa 4.0

amazon pinpoint

@awsgeek

3/5/20

PAY • AS • YOU • GO PRICING

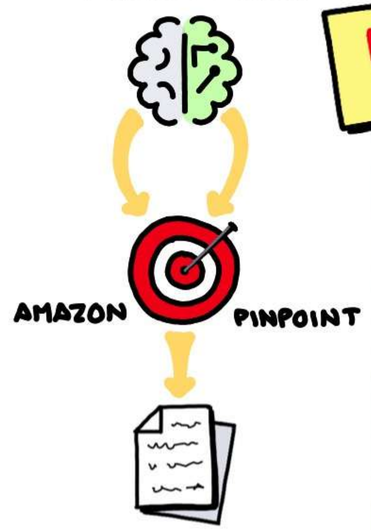
OPTIONAL:
- phone # verification
- dedicated short codes

EMAIL	$1 per 10 K
MOBILE PUSH	$1 per 1M over 1M
SMS	per message varies by destination

+ $1.20 per 1k endpoints (over 5k)

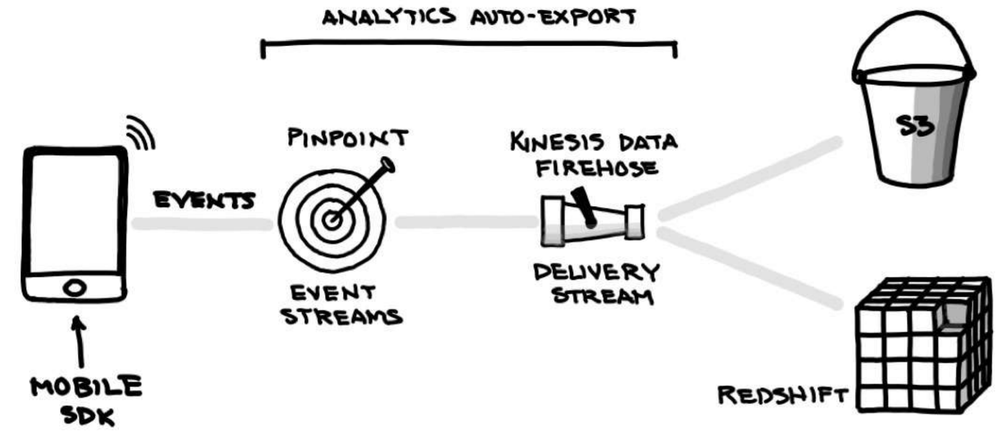
EVENTS: $1 per 1M collected via mobile SDK

AMAZON PERSONALIZE



HIPAA ELIGIBLE

REPLACES MOBILE ANALYTICS AUTO-EXPORT



PINPOINT — CUSTOMER ENGAGEMENT

1. CUSTOMER ANALYTICS
2. CUSTOMER SEGMENTATION
3. MULTI-CHANNEL MESSAGING

AMAZON PINPOINT

CAMPAIGN MANAGEMENT

CUSTOMER ENGAGEMENT FAMILY of SERVICES

AMAZON SIMPLE EMAIL SERVICE — SCALABLE EMAIL PLATFORM

AMAZON CONNECT — CUSTOMER CONTACT CENTER

1 CUSTOMER ANALYTICS

- DEMOGRAPHIC DATA
- INTEREST DATA
- ENGAGEMENT DATA

METRICS		
	ACTIVATION	DAILY USERS
	RETENTION	CHURN RATE
	CONVERSION	RETENTION RATE
		AVG REVENUE
		LIFETIME VALUE
		...

2 CUSTOMER SEGMENTATION

- DEMOGRAPHICS.... age, gender, location...
- INTERESTS..... sports, hobbies, likes...
- ENGAGEMENT..... sessions, purchases...

3 MULTI-CHANNEL MESSAGING

- MOBILE PUSH
  - APPLE PUSH NOTIFICATION
  - FIREBASE CLOUD MESSAGING
  - GOOGLE CLOUD MESSAGING
- EMAIL
  - HTML or PLAIN TEXT
- SMS

AMAZON MANAGED

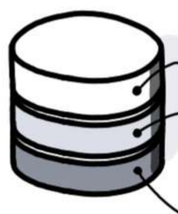
@awsgeek

BLOCKCHAIN

SCALABLE BLOCKCHAIN NETWORKS

23 AUG 2019

THE BLOCKCHAIN "LAYER CAKE"

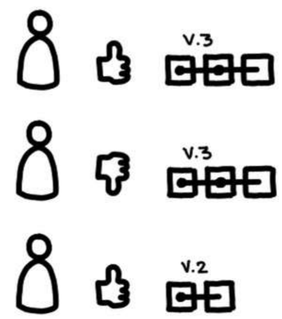


SMART CONTRACTS

CONSENSUS MECHANISM

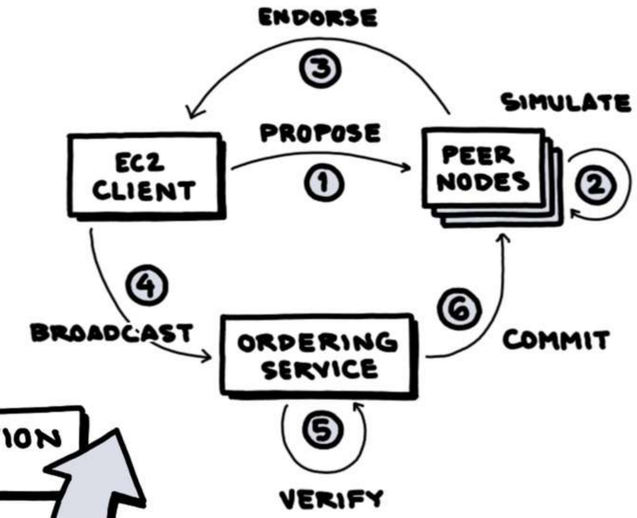
LEDGER

CONSENSUS
mechanism



- Do the right members endorse the transaction?
- Does everyone have the right ledger?
- etc, ...

TRANSACTION FLOW



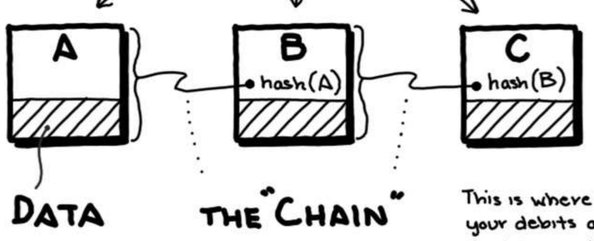
HYPERLEDGER FABRIC

NETWORK

the LEDGER

1 AN IMMUTABLE LOG OF TRANSACTIONS

THE "BLOCKS"



This is where all your debits and credits are stored

2 A DATABASE OF CURRENT VALUES

banking example

This is where your balance is stored

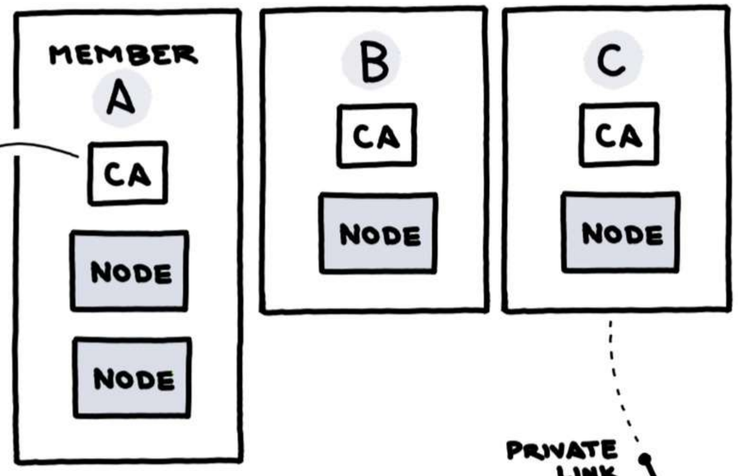
SMART CONTRACT

CODE

EXECUTABLE LOGIC USED BY APPS TO INTERACT WITH LEDGER

chaincode

ORDERING SERVICE (uses QLDB tech)



CERTIFICATE AUTHORITY

USES KMS

PRIVATE LINK

VPC ENDPOINT

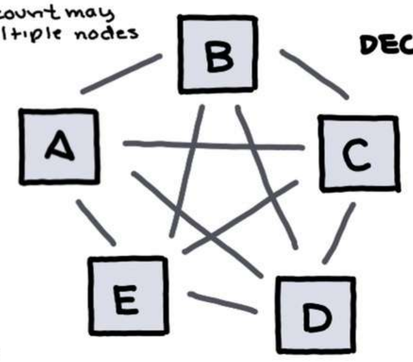
EC2

Account C

A CREATES BUT DOESN'T OWN NETWORK

AMAZON MANAGED BLOCKCHAIN

One account may have multiple nodes



DECENTRALIZED NETWORK

HYPERLEDGER or ETHEREUM (coming soon)

EACH NODE HAS A COPY OF THE LEDGER

cc-by-sa

Thanks

Content: awsgeek.com

Curated By: him431