

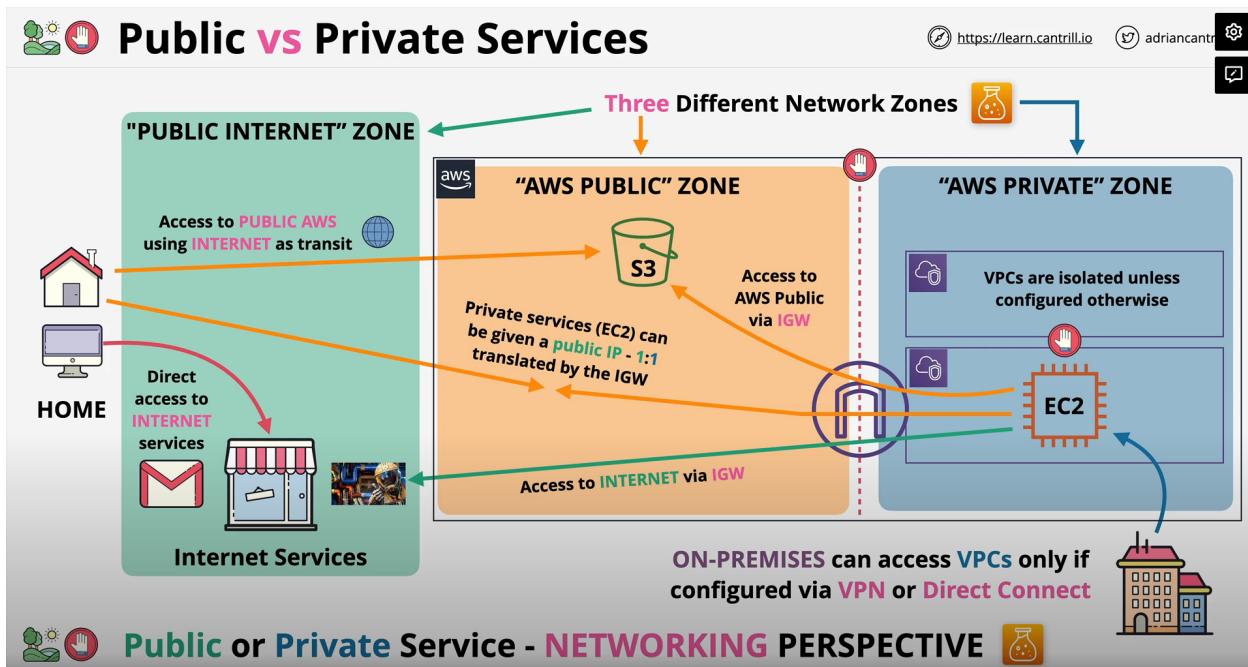
4. AWS Fundamentals

⌚ Created	@June 23, 2022 4:19 AM
➕ Class	
➕ Type	
📎 Materials	
✓ Reviewed	<input type="checkbox"/>
☰ Property	
📅 Date	

Public and Private AWS services

Public service example: S3 bucket(by default its set to private)

Private: VPC(virtual private cloud) service



AWS global infrastructure

global services example IAM, Route53

Aws Region: Full compute, storage, DB, AI, Analytics



Edge Location: much smaller and mostly cdn only

ex use netflix just for lower latency for fast efficient data transfer

region:

Region Can have multiple availability zones and AZ are logic so you cannot distinguish them physically like region



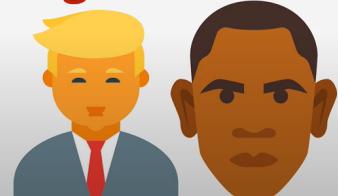
AWS Regions

<https://learn.cantrill.io>

@adriancantrill



- **Geographic Separation** - Isolated **Fault Domain**
- **Geopolitical Separation** - Different **governance**
- **Location Control** - Performance

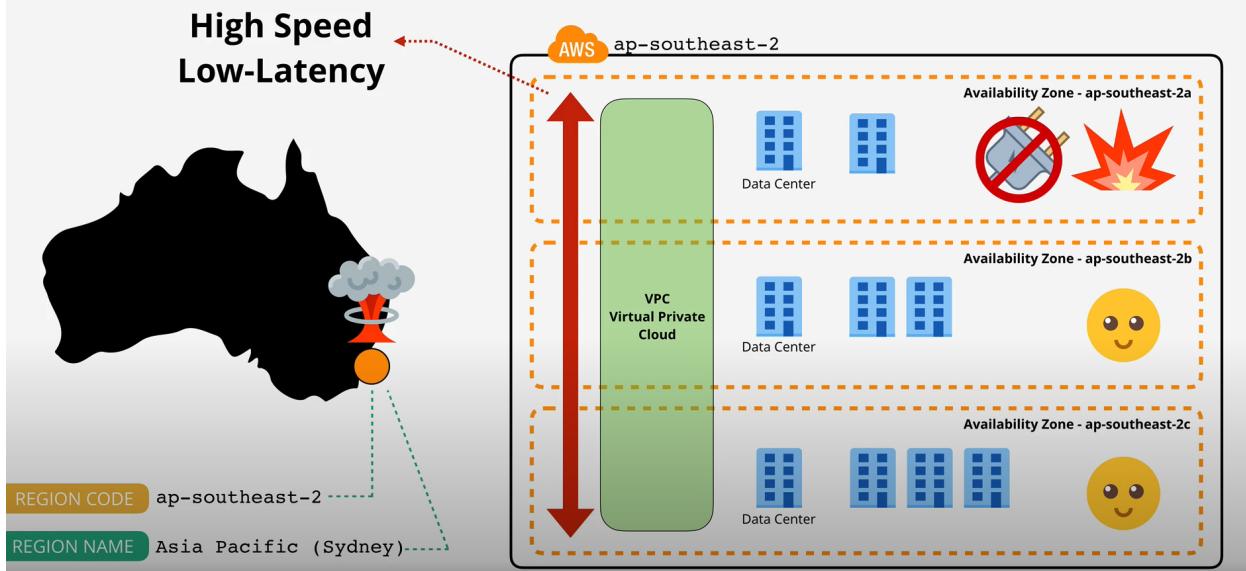


Regions and AZs

Press Esc to exit full screen

<https://learn.cantrill.io>

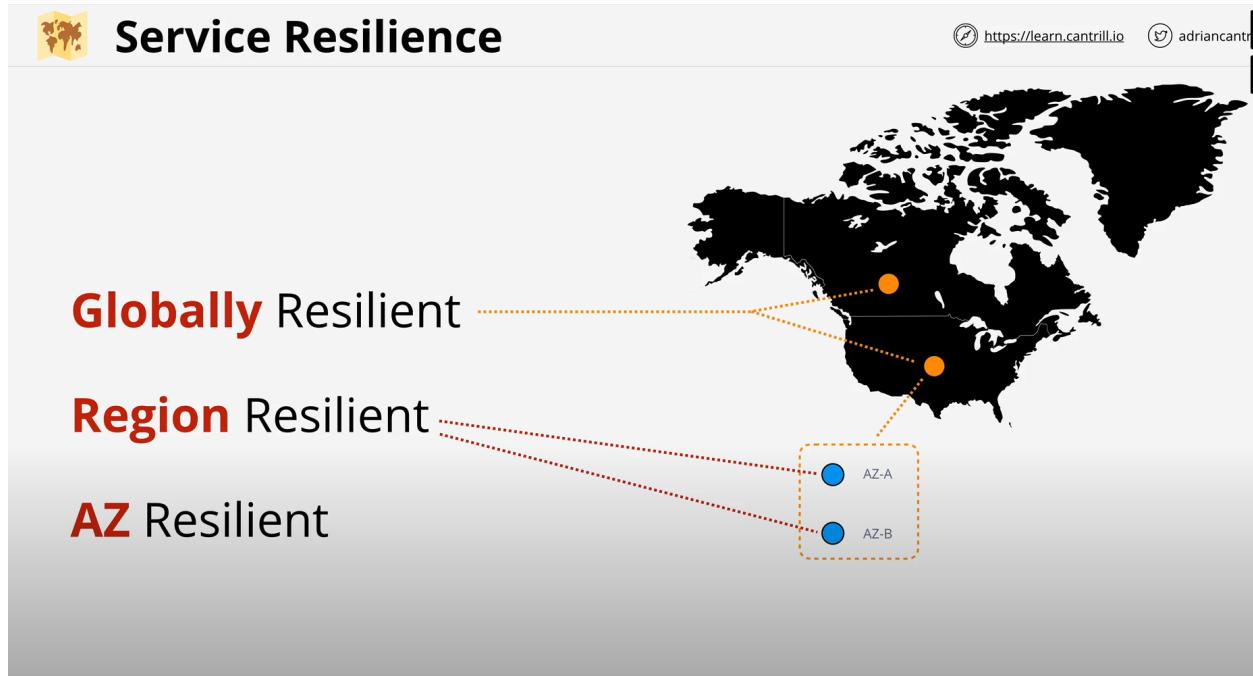
@adriancantrill



Server Resilience:

There are three types of resilience

1. Global Resilience: Very hard to fail as data is **replicated at multiple region**
2. Region Resilience: Hard to fail and **replicated data on multiple AZ**
3. AZ Resilience: Availability zones are easier to fail than other two



VPC: Virtual Private Cloud

- ▼ **There is only One default VPC per region**

Default VPC's comes with Public ipv4 address



Default VPC Facts

<https://learn.cantrill.io>

adriancantrill

- **One** per region - can be removed & recreated
- **Default VPC CIDR** is always **172.31.0.0/16**
- **/20** Subnet in **each AZ** in the region
- Internet Gateway (**IGW**), Security Group (**SG**) & NACL
- **Subnets assign public IPv4 addresses**

EC2:



EC2 Key Facts & Features

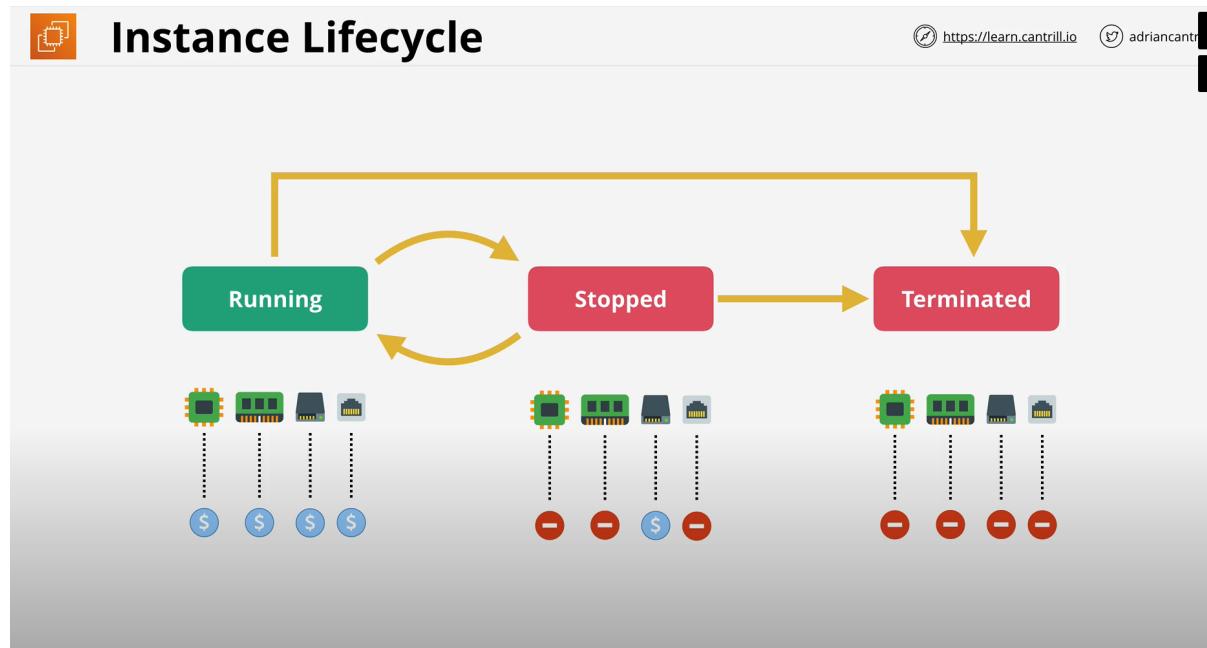
<https://learn.cantrill.io>

adriancantrill



- **IAAS** - Provides Virtual Machines => **Instances**
- **Private** service by-default - uses **VPC** networking
- **AZ** Resilient - Instance fails if AZ fails
- Different instance **sizes** and **capabilities**
- On-Demand Billing - **Per second**
- Local on-host storage or Elastic Block Store (**EBS**)

even if instance is stopped there will be still cost for storage on ec2



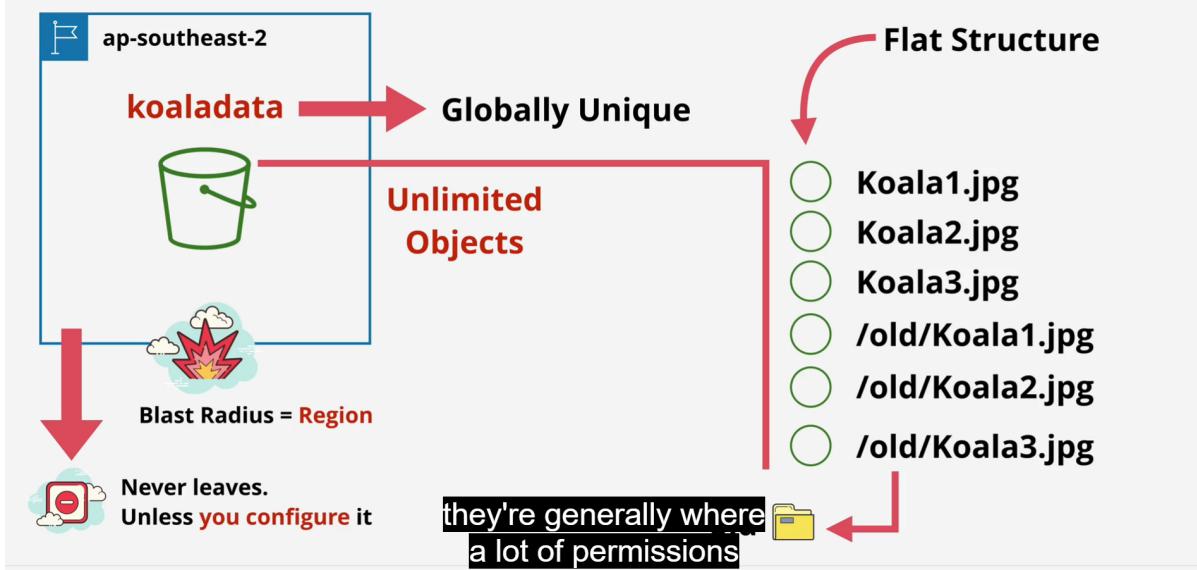
S3



S3 Buckets

<https://learn.cantrill.io>

@adriancantrill



Summary

<https://learn.cantrill.io>

@adriancantrill

- Bucket names are **globally unique**
- 3 - 63 characters, all lower case, no underscores
- Start with a lowercase letter or a number
- Can't be IP formatted e.g. 1.1.1.1
- Buckets - **100 soft limit, 1000 hard per account**
- Unlimited objects in bucket, **0 bytes to 5TB**
- Key = Name, Value = Data

CloudFormation

cfn

CloudFormation Basics

YAML

```
AWSTemplateFormatVersion: "version date"
Description: String
Metadata: template metadata
Parameters: set of parameters
Mappings: set of mappings
Conditions: set of conditions
Transform: set of transforms
Resources: set of resources
Outputs: set of outputs
```

Must directly follow ...

Description: >
This template deploys the app allowing cats to take over the world.

Now, the metadata in the template is the next part

CloudFormation Basics

YAML

```
AWSTemplateFormatVersion: "version date"
Description: String
Metadata: template metadata
Parameters: set of parameters
Mappings: set of mappings
Conditions: set of conditions
Transform: set of transforms
Resources: set of resources
Outputs: set of outputs
```

```
Parameters:
  InstanceTypeParameter:
    Type: String
    Default: t2.micro
    AllowedValues:
      - t2.micro
      - m1.small
      - m1.large
    Description: Enter t2.micro, m1.small, or m1.large. Default is t2.micro.
```

is where you can add fields



CloudFormation Basics

<https://learn.cantrill.io>

adriancantrill



YAML

```
AWSTemplateFormatVersion: "version date"
Description: String
Metadata: template metadata
Parameters: set of parameters
Mappings: set of mappings
Conditions: set of conditions
Transform: set of transforms
Resources: set of resources
Outputs: set of outputs
```



Key/Value pairs which can be used for lookups

```
Parameters:
  EnvironmentType:
    Description: The environment type
    Type: String
    Default: test
    AllowedValues:
      - prod
      - test
    ConstraintDescription: must be a prod or test
Mappings:
  RegionAndInstanceTypeToAMIID:
    us-east-1:
      test: "ami-8ff710e2"
      prod: "ami-f5f41398"
    us-west-2:
      test: "ami-eff1028f"
      prod: "ami-d0f506b0"
```

especially when you just get started with CloudFormation

CloudWatch

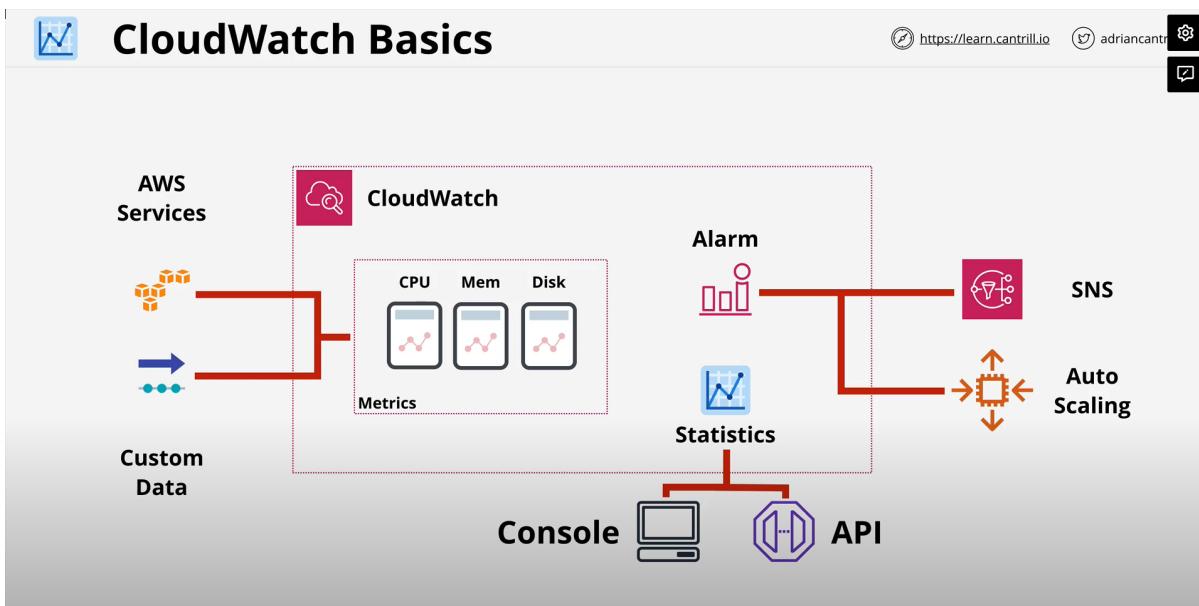


CloudWatch Basics

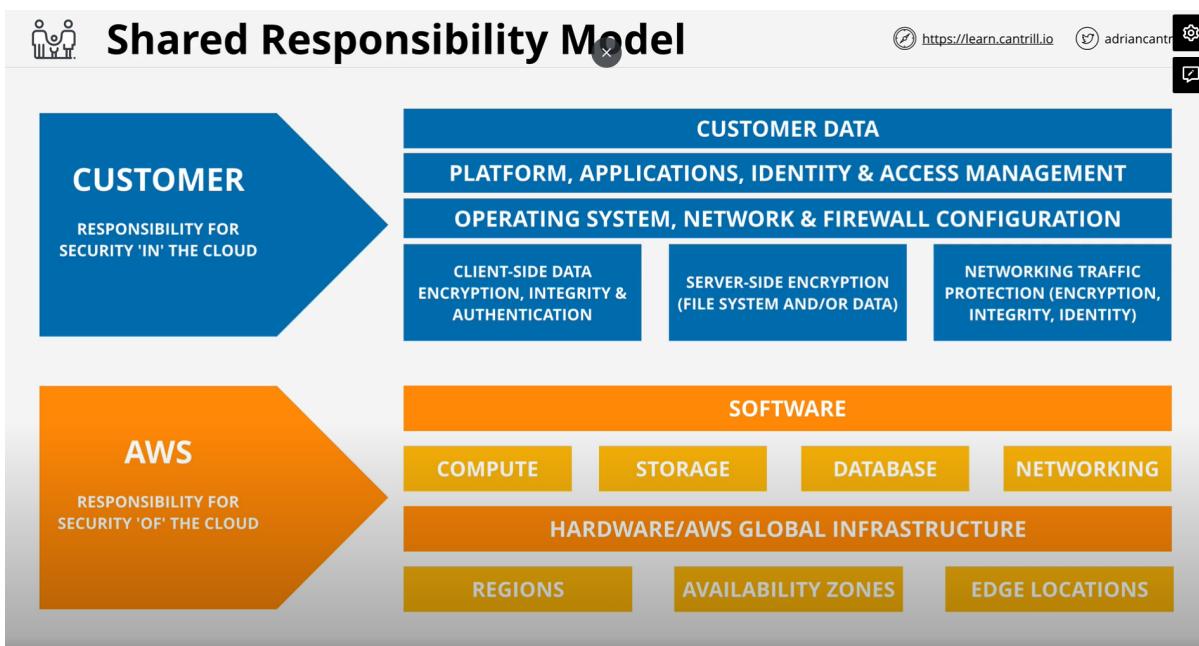
<https://learn.cantrill.io>

adriancantrill

- Collects and manages operational data
- **Metrics** - AWS Products, Apps, on-premises
- CloudWatch **Logs** - AWS Products, Apps, on-premises
- CloudWatch **Events** - AWS Services & Schedules



Shared responsibility model



High Availability: HA

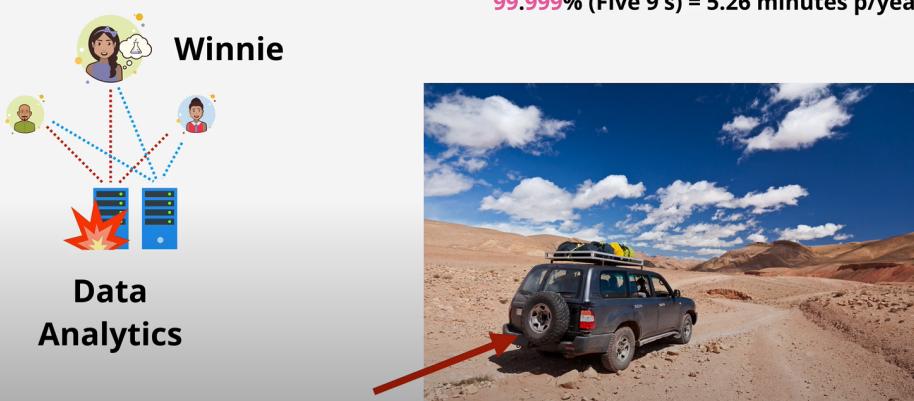
Maximizing systems online time

its okay if system is offline for few sec

High-Availability (HA)

aims to ensure an agreed level of operational performance, usually uptime, for a higher than normal period.

99.9% (Three 9's) = 8.77 hours p/year downtime
99.999% (Five 9's) = 5.26 minutes p/year downtime



The diagram illustrates the concept of High Availability (HA). It shows a central 'Data Analytics' icon with two blue server racks, connected by dashed lines to three user icons labeled 'Winnie', 'Sam', and 'Tom'. A red arrow points from the bottom right towards a photograph of a grey SUV driving on a dirt road in a desert landscape.

Fault Tolerance



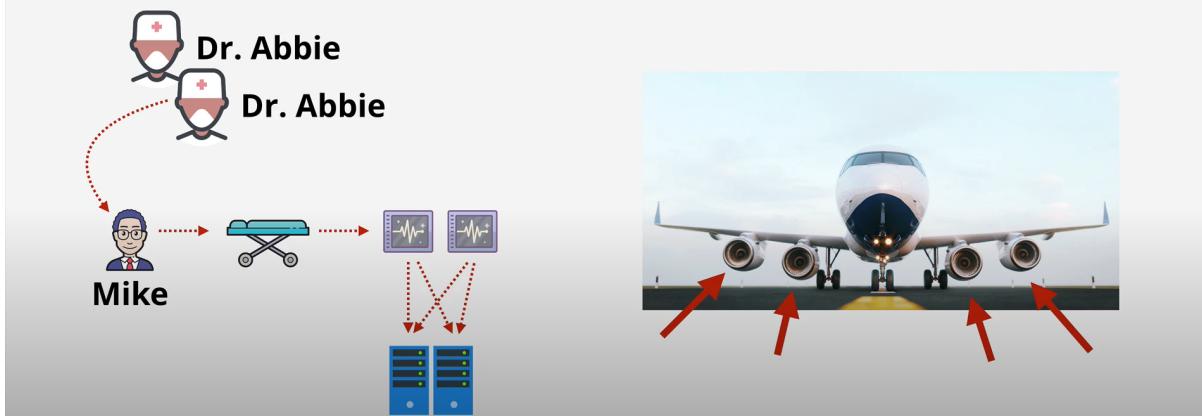
Fault-Tolerance (FT)

<https://learn.cantrill.io>

@adriancantrill



is the property that enables a system to **continue operating properly** in the event of the **failure of some (one or more faults within) of its components**.



understand the example of airplane

highly available plane means ready to fly but plane which is flying needs to have higher fault tolerance so it can land safely even in the case of fault

Disaster recovery



Disaster Recovery (DR)

<https://learn.cantrill.io>

@adriancantrill



a set of policies, tools and procedures to **enable the recovery or continuation of vital technology infrastructure and systems following a natural or human-induced disaster**



- High-Availability - **Minimise** any **outages**
- Fault-Tolerance - Operate **Through Faults**
- Disaster Recover - Used when **these** don't work

DNS:

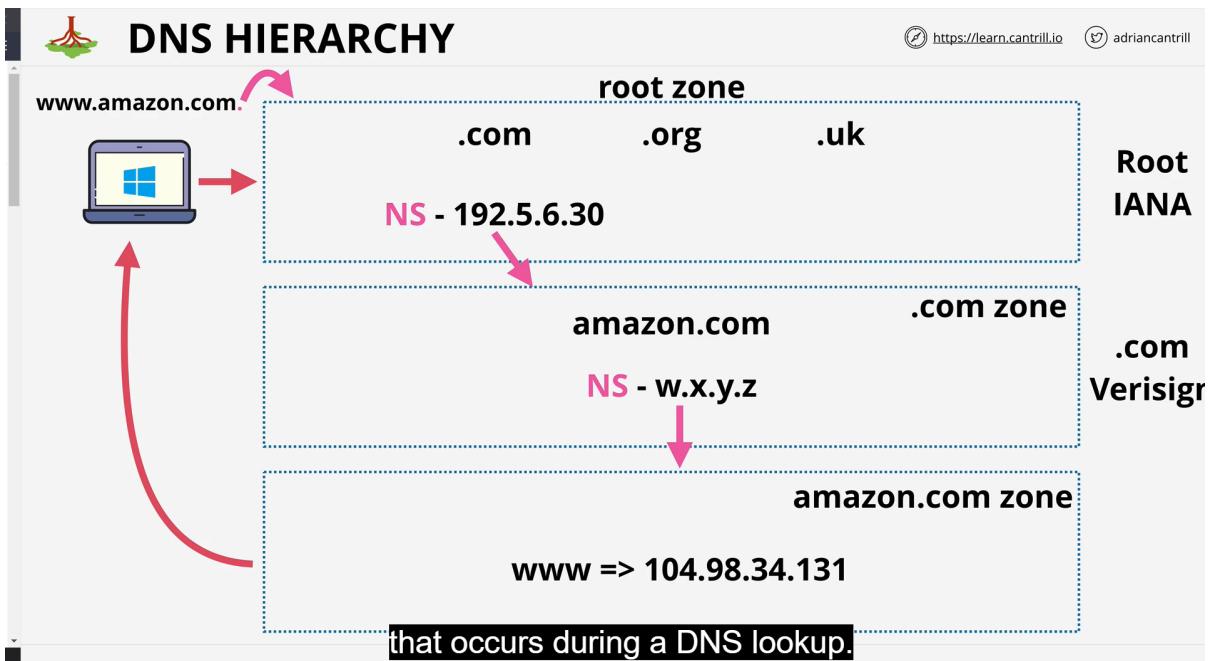
Domain name system



Remember these !

 <https://learn.cantrill.io>  adriancant

- **DNS Client** => your laptop, phone, tablet, PC
- **Resolver** => software on your device, or a server which queries DNS on your behalf
- **Zone** => A part of the DNS database (e.g. **amazon.com**)
- **Zonefile** => physical database for a zone
- **Nameserver** => where zonefiles are hosted

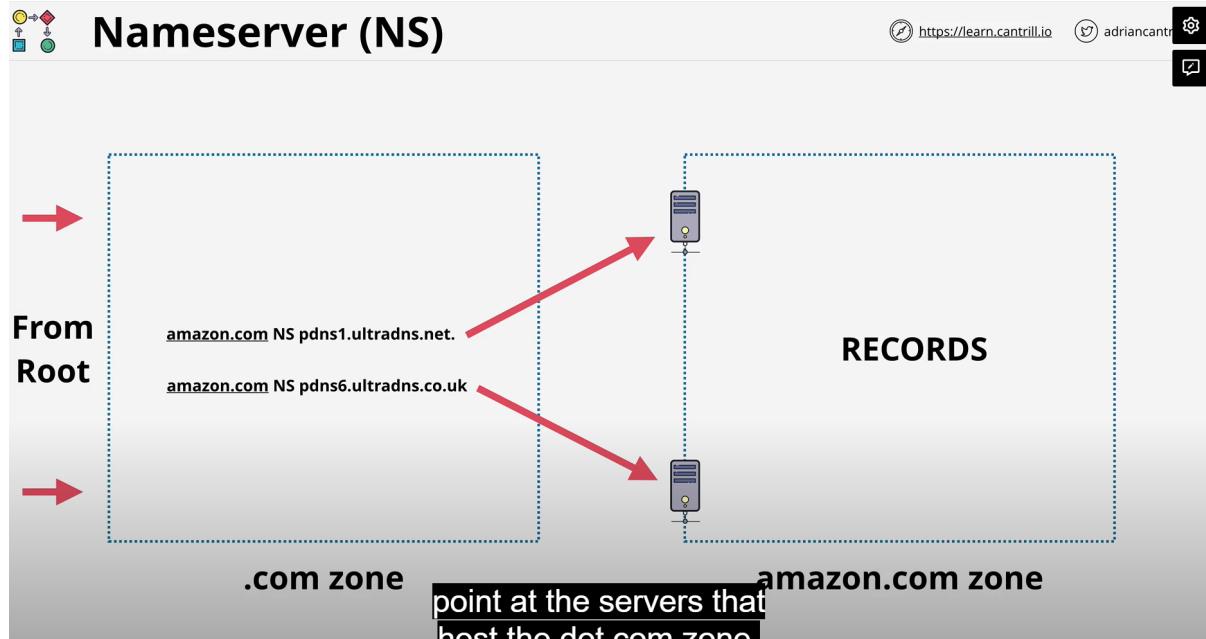


- ### Remember these !
- **Root Hints** => config points at the root servers IPs and addresses
 - **Root Server** => hosts the DNS root zone
 - **Root Zone** => points at TLD authoritative servers
 - **gTLD** => generic top level domain (.com .org)
 - **ccTLD** => country-code top level domain (.uk .eu etc)

Records types in DNS

Nameserver record:

host to ip



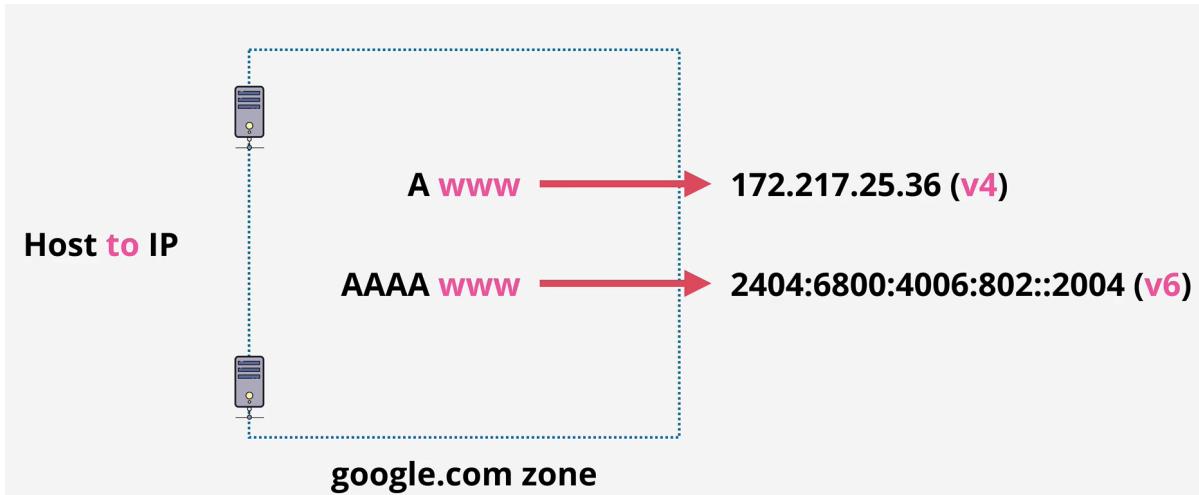
A or AAAA Records:

host to ip

used for mapping records

A is for ipv4 mapping record and

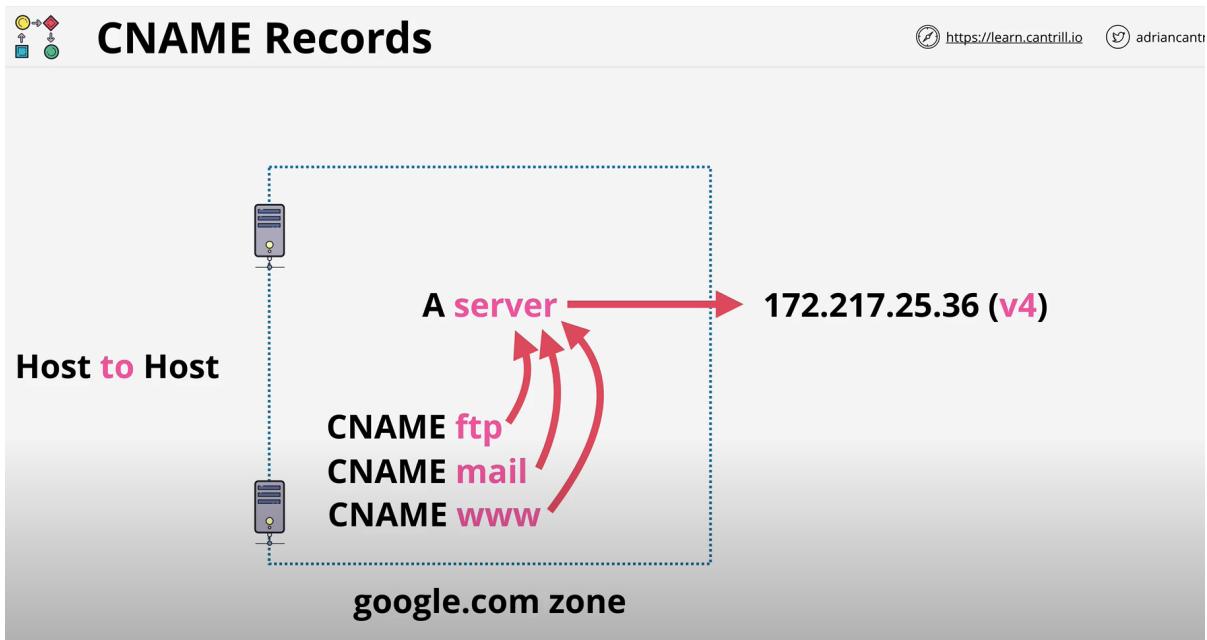
AAAA is for ipv6 mapping



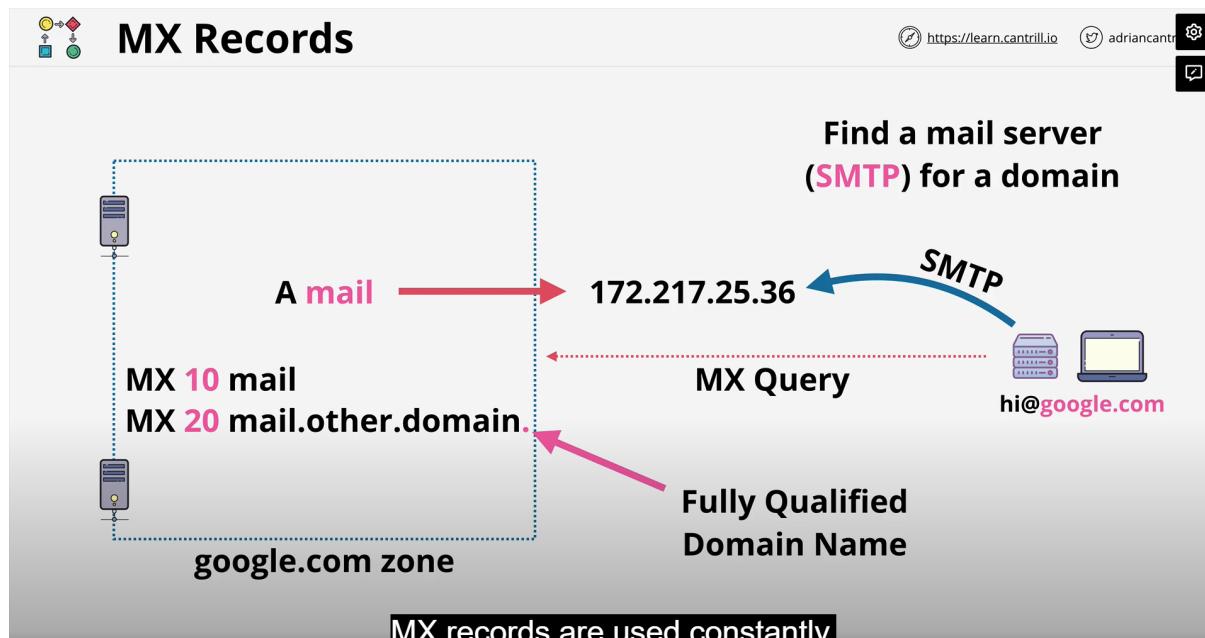
CNAME Record

Host to host record

CNAME cannot directly point to IP address it can only point to name



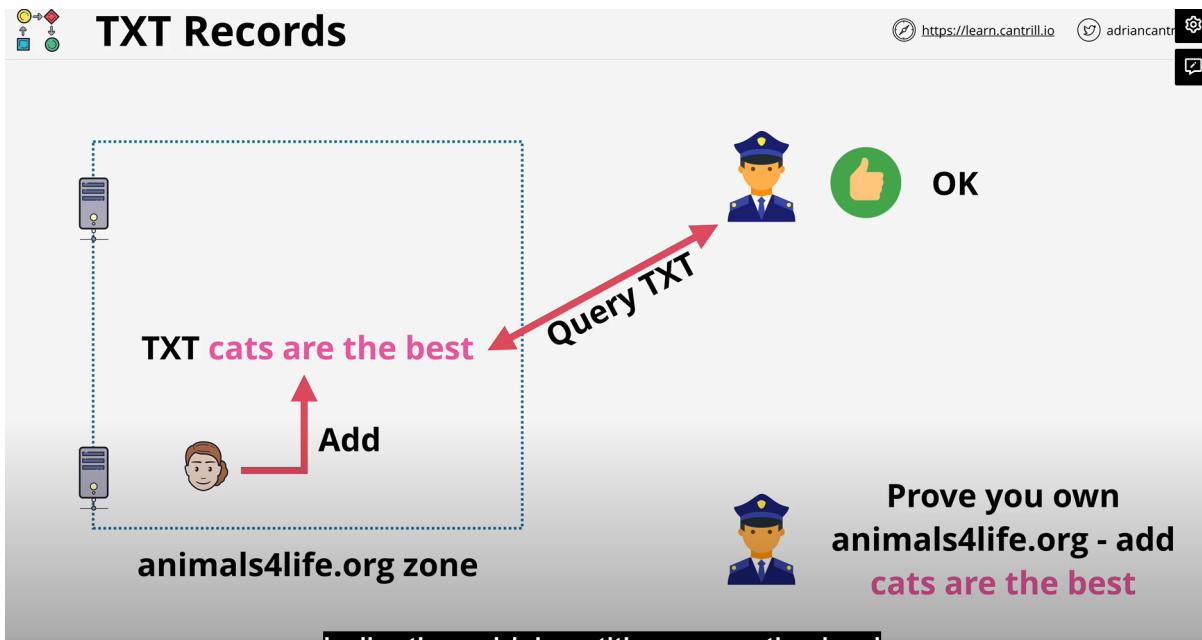
MX Record: Email



TXT record:

mostly used to prove the ownership of the domain

ex. when you add different ads on site you usually add the verification text at beginning into txt record to prove ownership



DNS TTL(Time to live):

usually set in sec 127000 i think

which is basically storing the information of DNS into cache for that period of seconds to reduce the connection time.

first time use it authoritative and using same site 2nd time means using info stored in cache is non authoritative

If you are doing any work on DNS changing or any project related to DNS it is always recommended to lower the TTL value in advance to reduce any bugs = will reduce caching issue

