How

ted system

Distributed system

What is it?

Its a group of informatic programs that uses computer resources in different nodes to accomplish one shared goal

Why?

Eliminate the bottlenecks or errors of a central system

Background

- Netflix has more than 110 million subscribers.
- Netflix operates in more than 200 countries.
- Netflix adds more than 5 million new subscribers per quarter.
- Netflix played 250 million hours of video on a single day in 2017.
- Netflix accounts for over 37% of peak internet traffic in the United States.

NETFLIX

streams 1 billion hours of video each week.

YouTube

streams 1 billion hours of video every day

facebook

110 million hours of video every day.

History

- Netflix launched in 1998. At first, they rented DVDs through the US Postal Service, but they saw the future was on-demand streaming video
- In 2007 Netflix introduced their streaming video-on-demand service that allowed subscribers to stream television series and films
- Netflix began by running their own datacenters. The problem here was they were growing so fast, and they realized they were bad at building datacenters, but they were great delivering video to their members.
- They move to AWS, it offered highly reliable databases, storage and redundant datacenters

Netflix and the cloud

They key to success of Netflix is using two different clouds:

- AWS
- Open Connect

Both clouds work seamlessly to deliver endless hours of customer-pleasing

Netflix and the cloud

We can divide Netflix in three parts:

- Client
- Backend
- Content delivery network

Netflix and the cloud

Client

The client is the user interface on any device used to browse and play Netflix videos. It could be an app, website on your computer or an app on a Smart TV

Backend

Everything that happens in the backend, which runs in AWS, like preparing all new incoming videos and handling request from all aps/websites

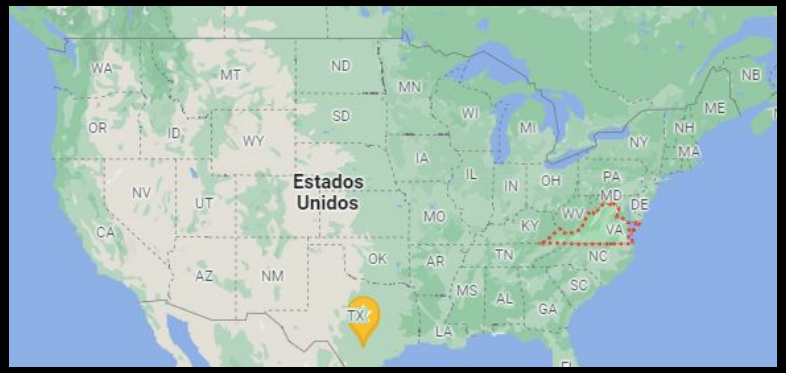
Content delivery network

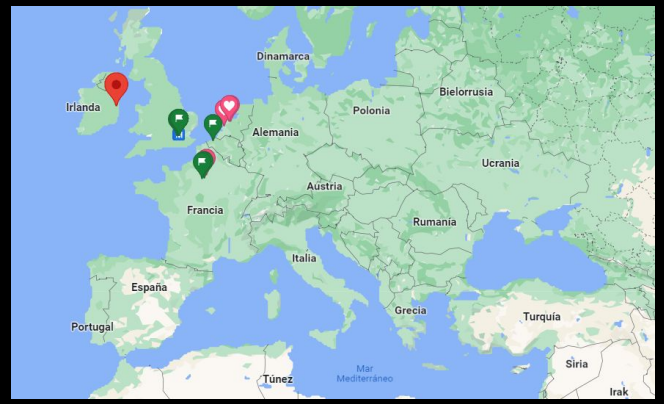
Everything that happens after you hit play is handled by Open Connect. Open Connect stores Netflix video in different locations throughout the world, the videos streams from Open Connect

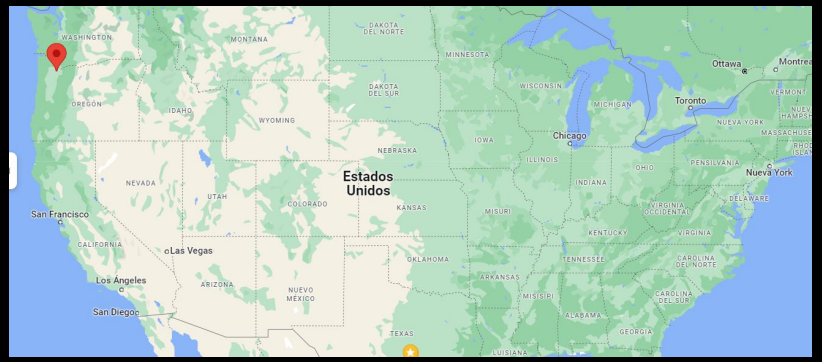
Netflix and AWS

Netflix operates out of three AWS regions:

- North Virginia
- Portland Oregon
- Dublin Ireland







Netflix and AWS

The advantage of having three regions is that any one region can fail, and the other regions will step in handle all the members in the failed region.

If you are watching House of Cards in England. The chances are your Netflix device is connected to the Dublin region.

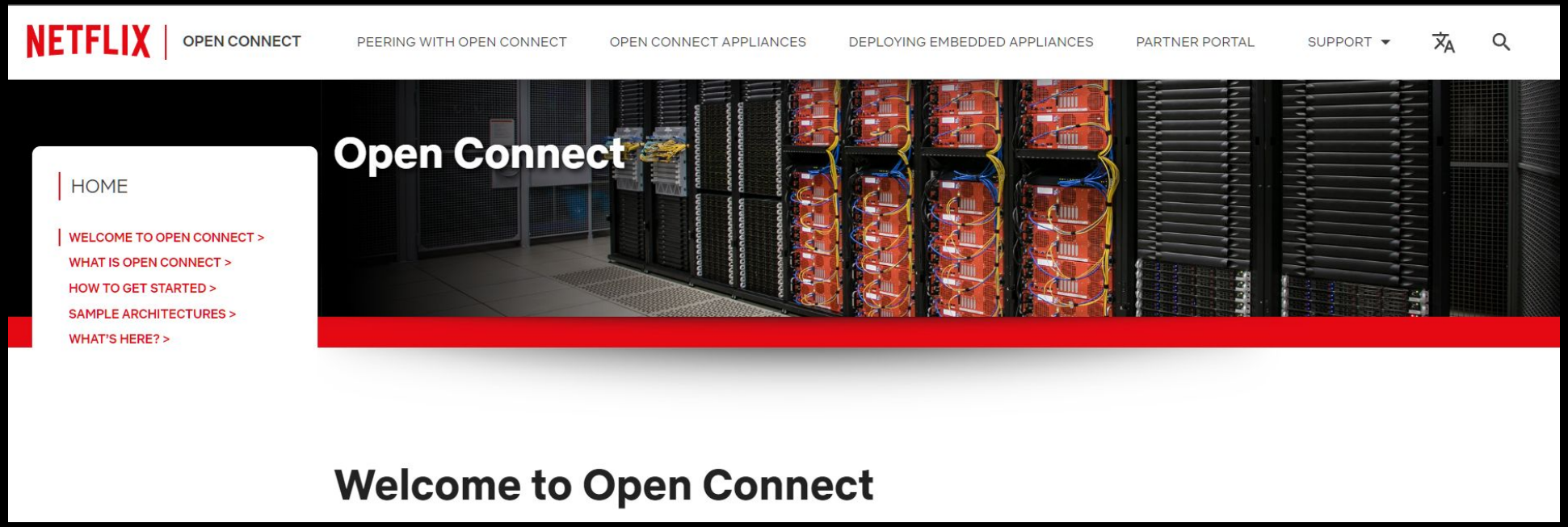
What happens if the entire Dublin region fails?

Netflix, after detecting the failure, redirects you to Virginia. Your device would now talk to the Virginia region instead of Dublin. You might not even notice there was a failure.

When a region fails, Netflix call this an evacuating region. Netflix runs monthly tests. Netflix causes a region fail on purpose to make sure its system can handle region level failures. A region can be evacuated in six minutes

Netflix and Open Connect

The goal of the Netflix Open Connect program is to provide our millions of Netflix subscribers the highest-quality viewing experience possible. We achieve this goal by partnering with Internet Service Providers (ISPs) to deliver our content more efficiently



Netflix and Open Connect

In 2011 Netflix realized it needed a dedicated CDN (Content delivery network) to maximize network efficiency

Advantages:

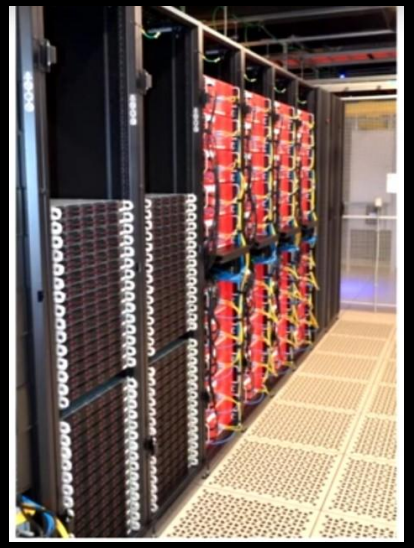
- Less expensive, 3rd party CDN are expensive, doing it themselves save them a lot of money
- Better quality, by controlling the entire video full path they can deliver a superior video experience
- More scalable, Netflix wants to provide services all around the world, so it needed to build their own system

Netflix knows exactly who its users are because they must subscribe to Netflix, it knows exactly which videos it needs to serve, this make smart optimization that others CDN can't make.

Open Connect Appliances (OCAs)

Netflix developed its own computer system for video storage. Netflix calls them Open Connect Appliances or OCAs.

Each OCA is a fast server, highly optimized for delivering large files, with lots and lots of hard disks or flash drives for storing video.

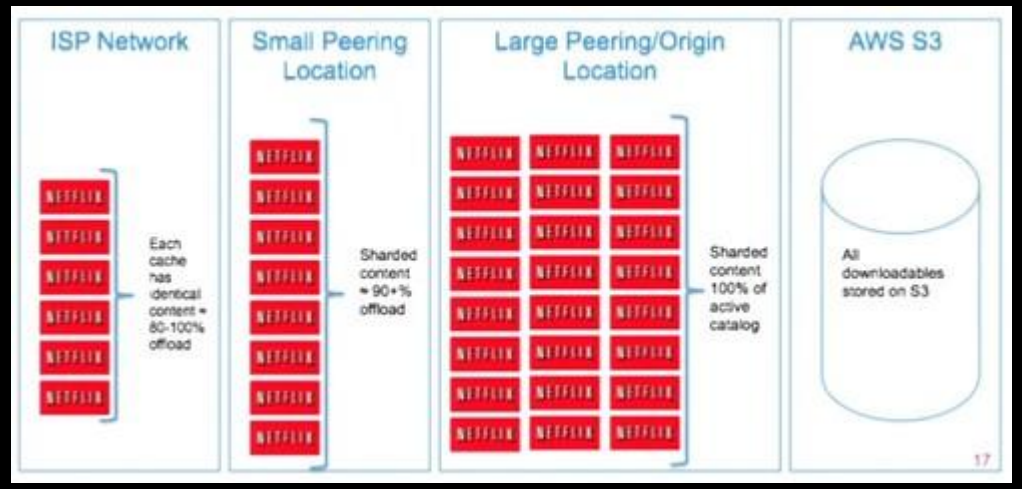


Open Connect Appliances (OCAs)

Netflix uses its popularity data to predict which videos members probably will want to watch tomorrow in each location.

Netflix copies the predicted videos to one or more OCAs at each location.

This gives great service to members. The video they want to watch is already close to them, ready and available for streaming.



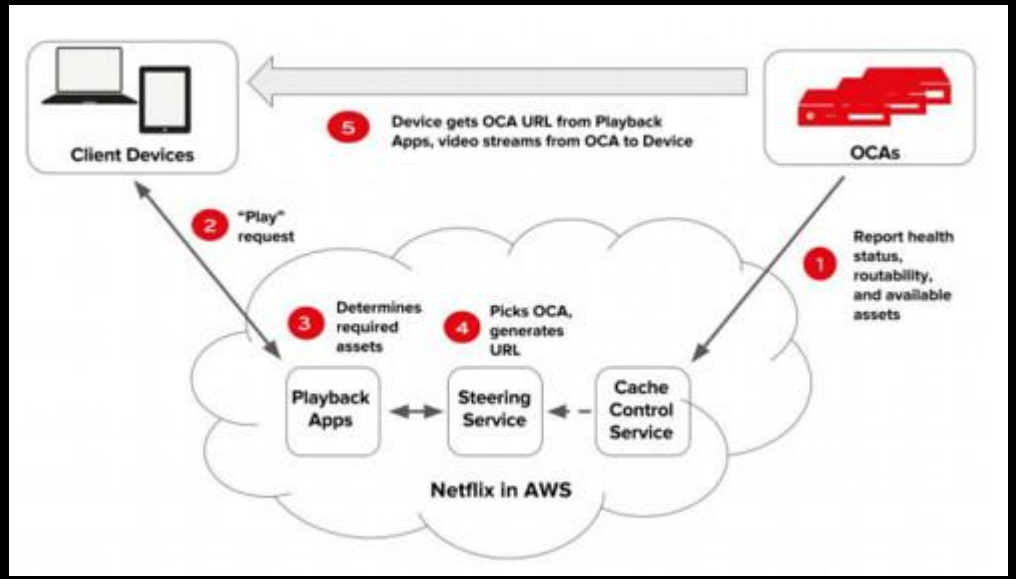
Every night, each OCA wakes up and asks a service in AWS which videos it should have. The service in AWS sends the OCA a list of videos it's supposed to have.

Open Connect Appliances (OCAs)

Just like Netflix uses three different AWS regions. The architecture of Open Connect works the same way.

If an OCA fails, the Netflix client you're using immediately switches to another OCA and resumes streaming.

If there is too many people in one location, The Netflix client will find a more lightly loaded OCA to use.



Fun fact


SERENDIPITY
Eternal Sunshine
GOOD WILL HUNTING
NETFLIX
ARRESTED DEVELOPMENT
BEN STILLER
ZOOLANDER
ANGER MANAGEMENT
GOOD WILL HUNTING


KILL BILL
VOLUME 2
prime
PAYCHECK
PULP FICTION
KILLING SEASON
GREASE
PULP FICTION