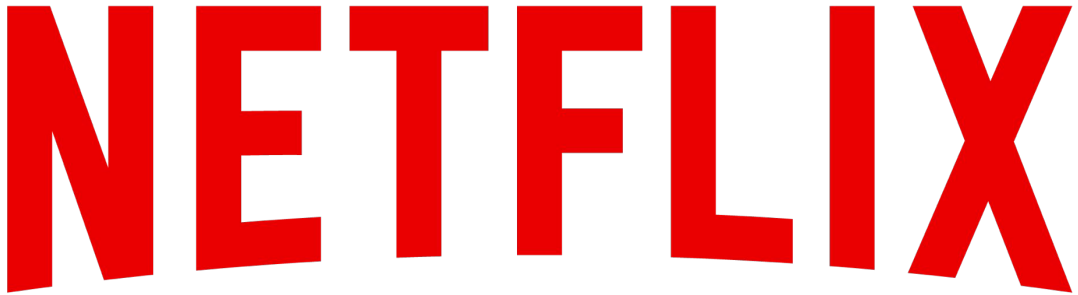


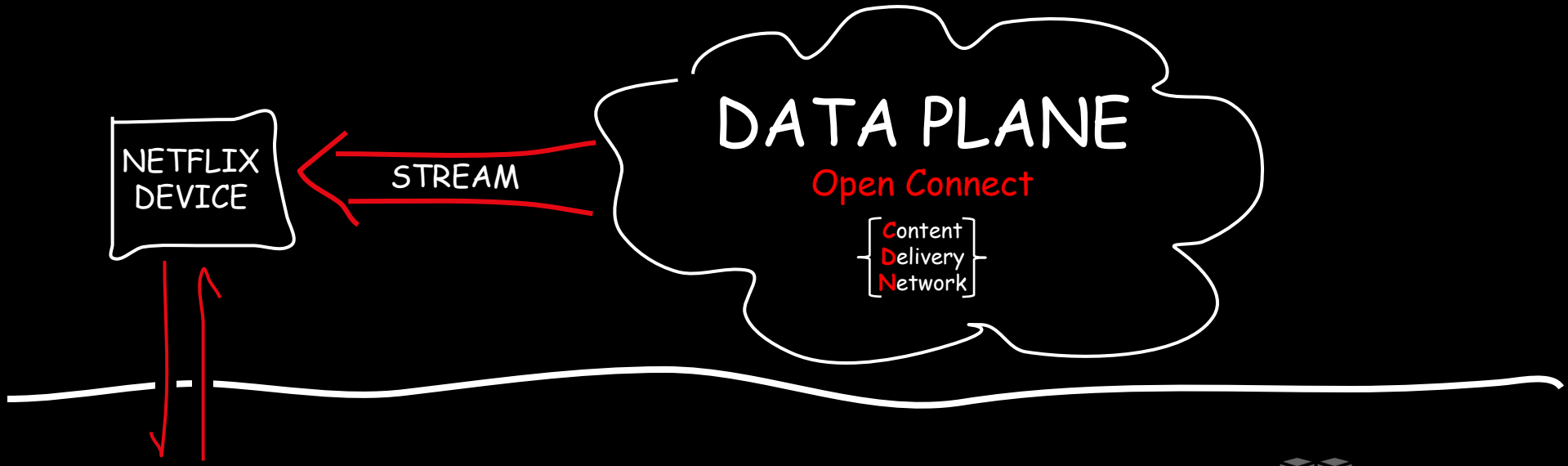
Nina Bargisen

August 2018

NETFLIX

- >130 million members
- 190 countries
- Available in all countries in Africa

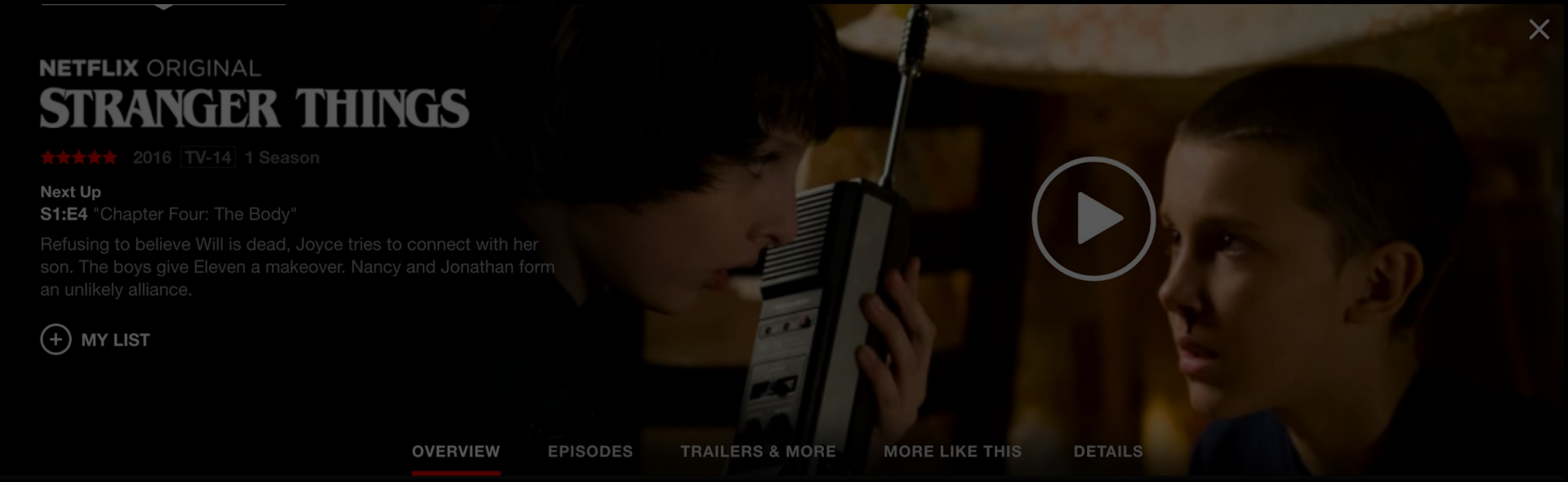
How
NETFLIX
Works

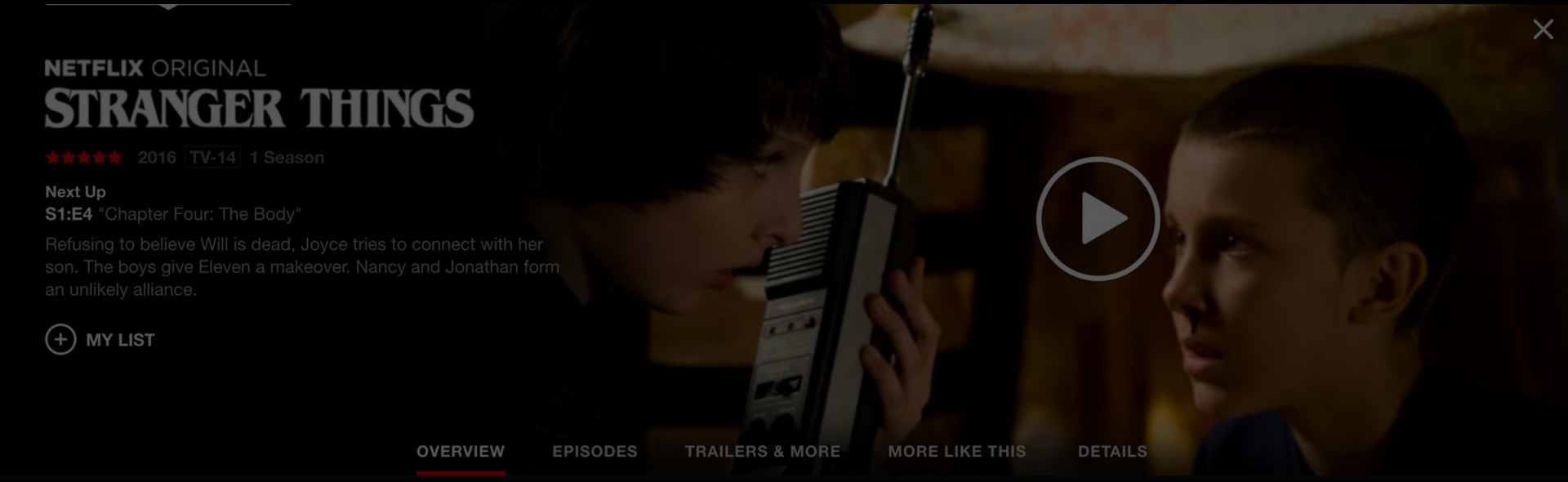


amazon web services™

CONTROL PLANE

before streaming starts = control plane = AWS





streaming = data plane = Open Connect

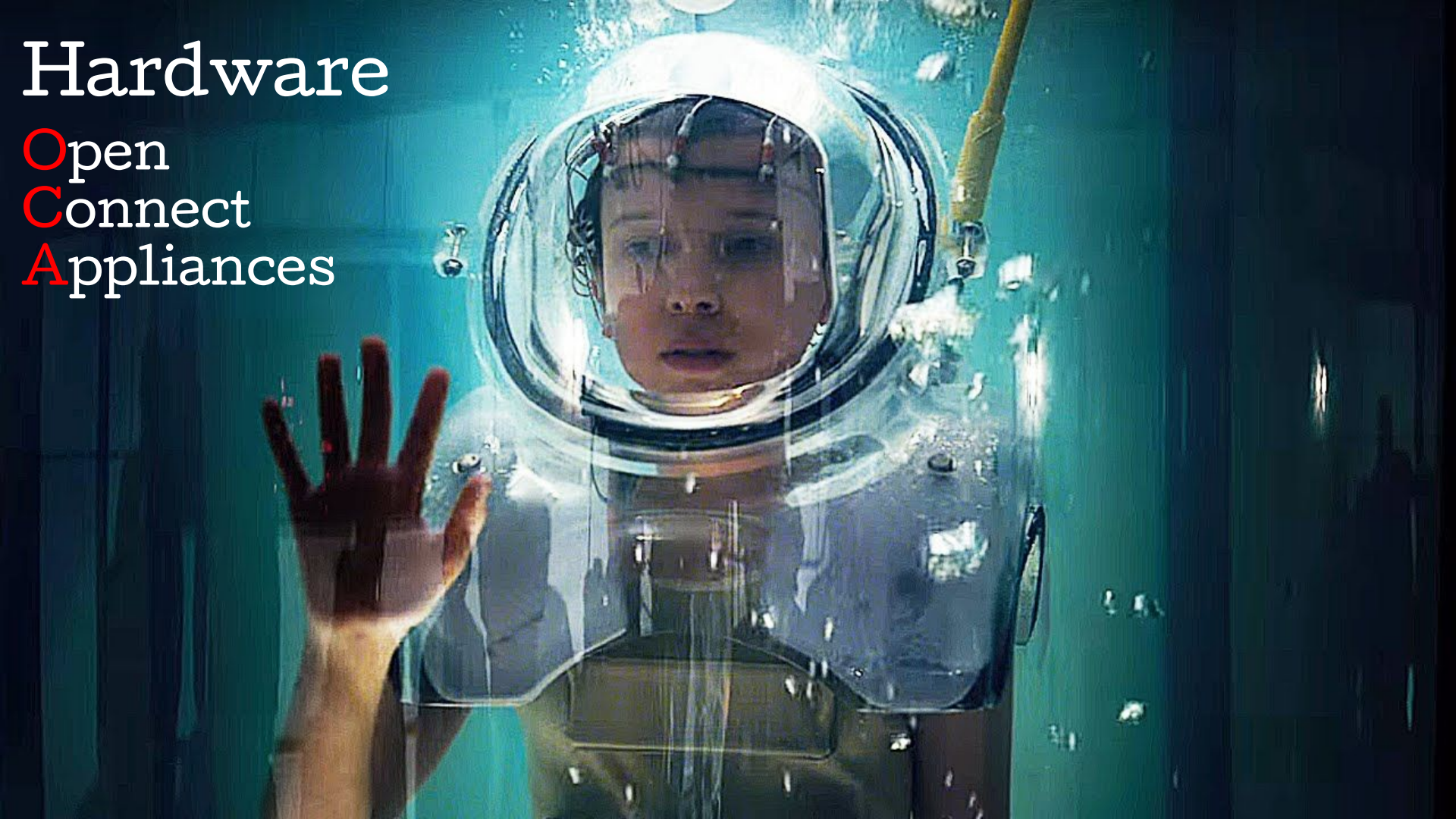
Open
Connect
A NETFLIX
ORIGINAL

Q: What is a Content Delivery Network?

A: Geographically distributed content servers attached to networks
+
a way of routing requests to the closest (and/or best performing)
server / network path

Hardware

Open
Connect
Appliances

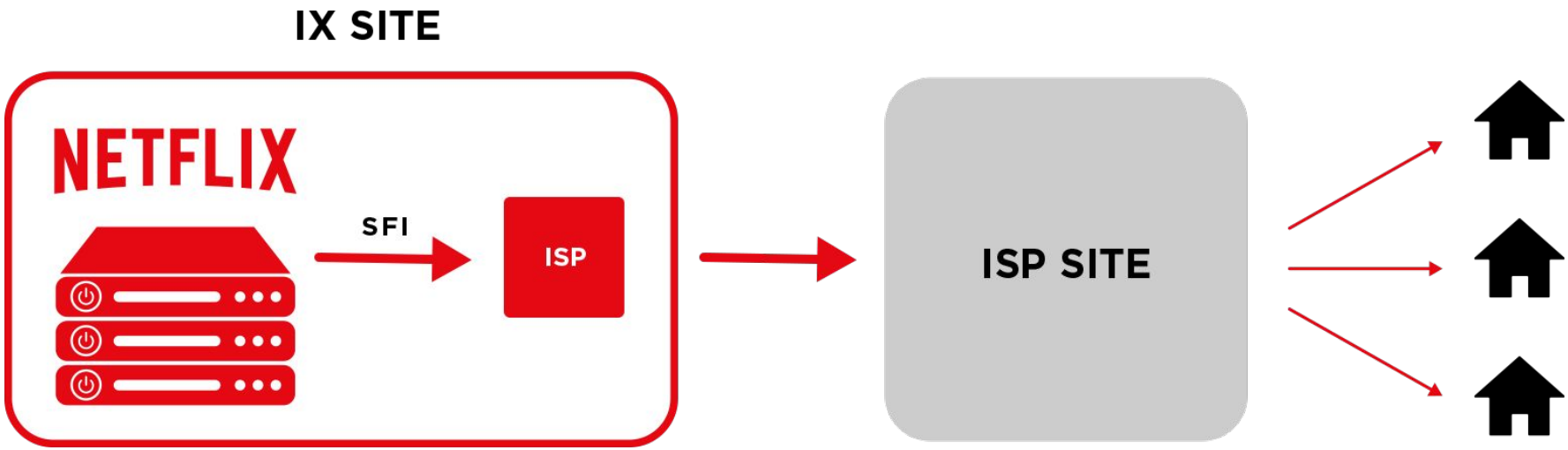


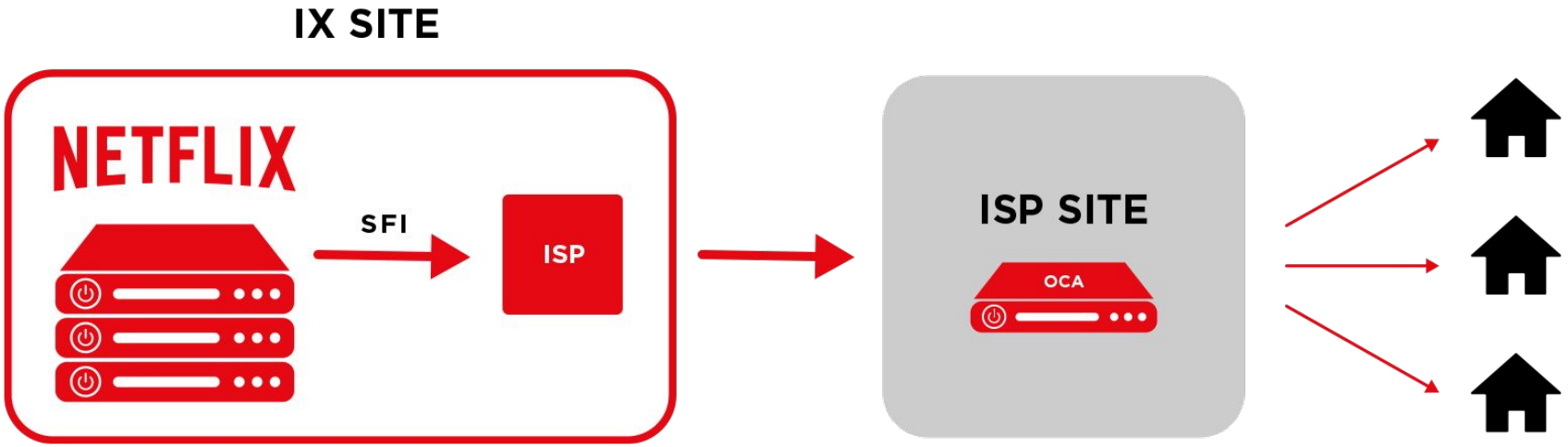
“Storage” appliance

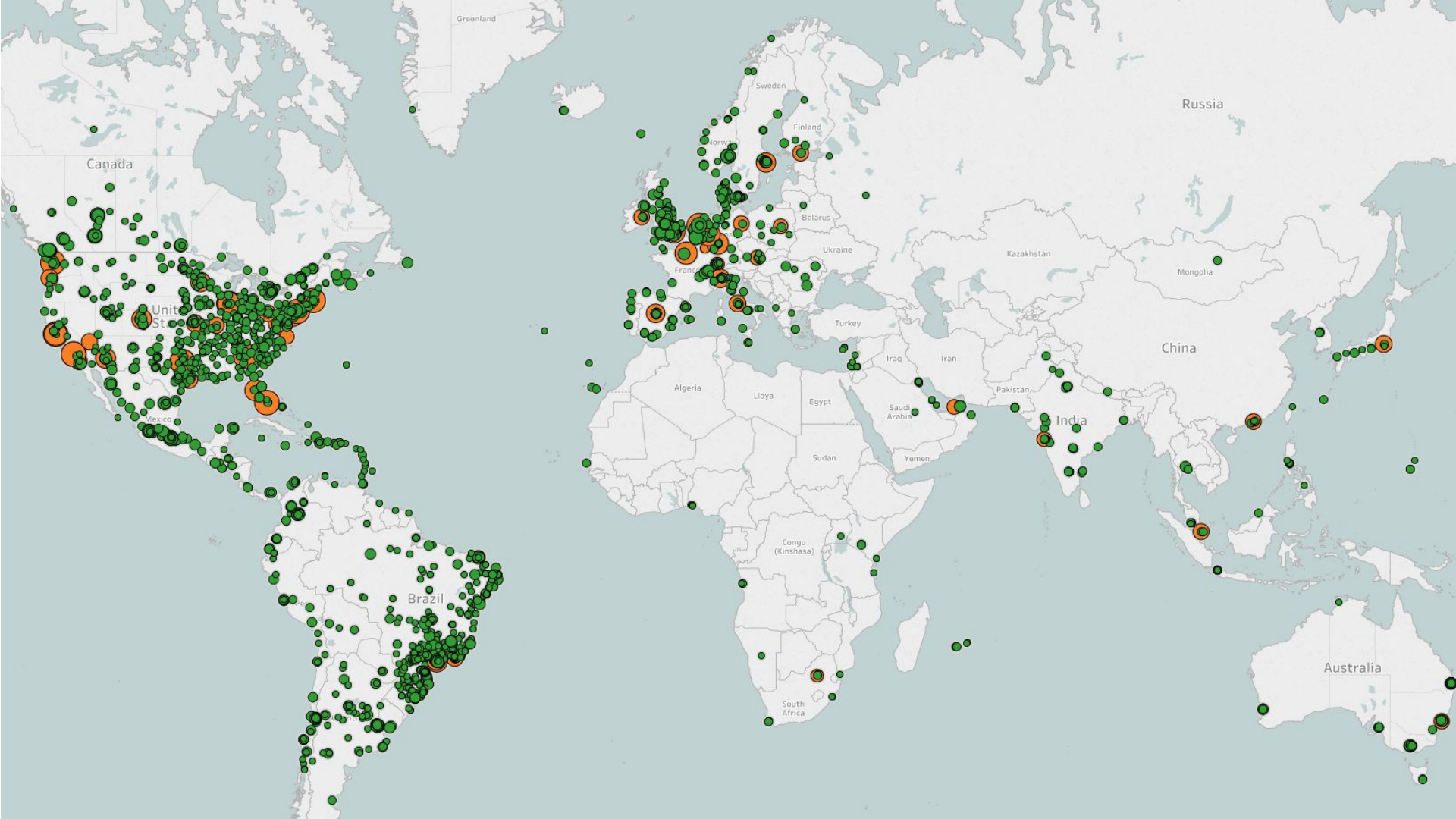
Designed for bulk storage of the entire large regional content catalogs

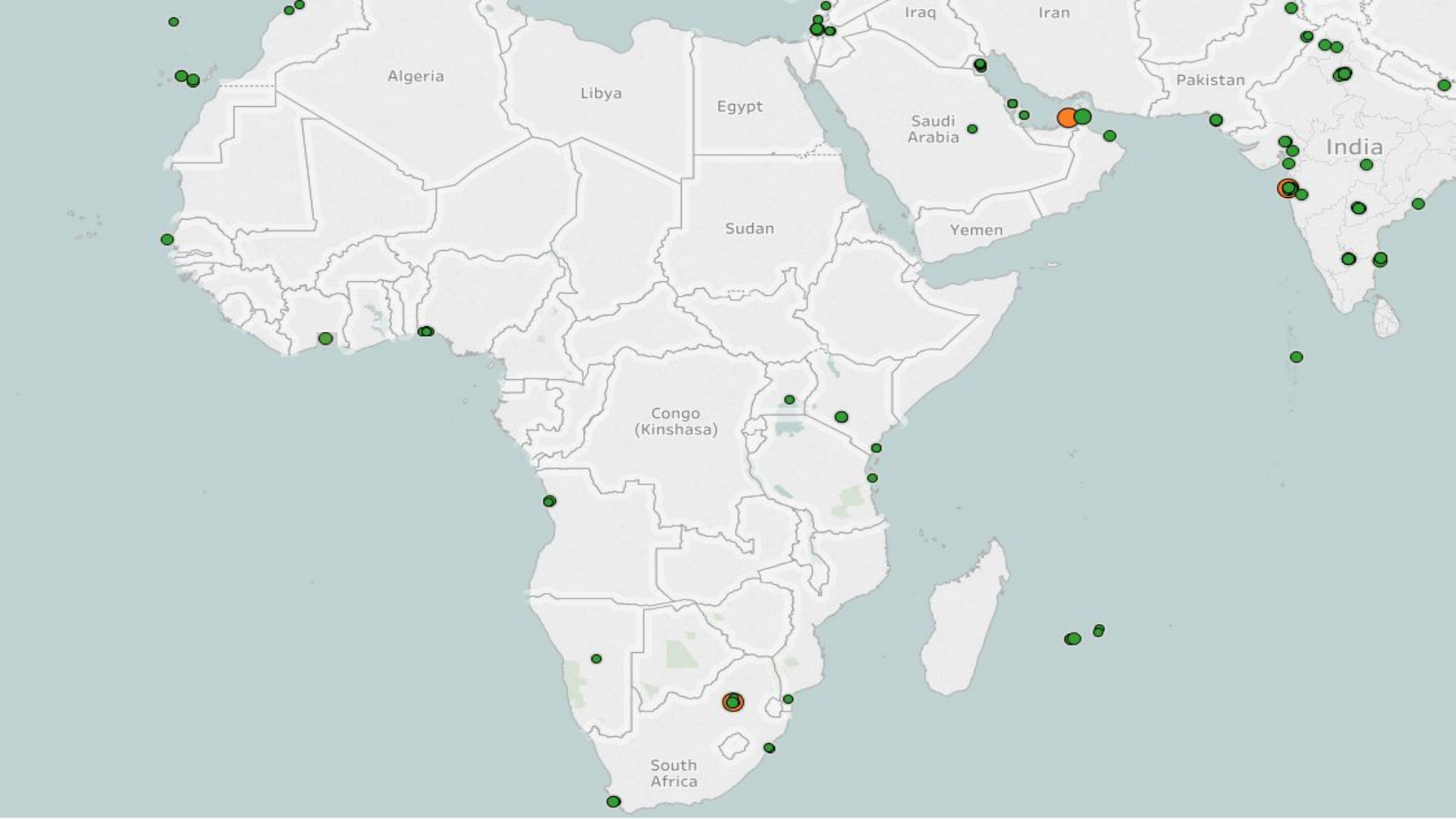
High-throughput servers, used to serve very popular content

Open Connect
connects directly to residential ISP networks. 95% of our traffic is directly connected.

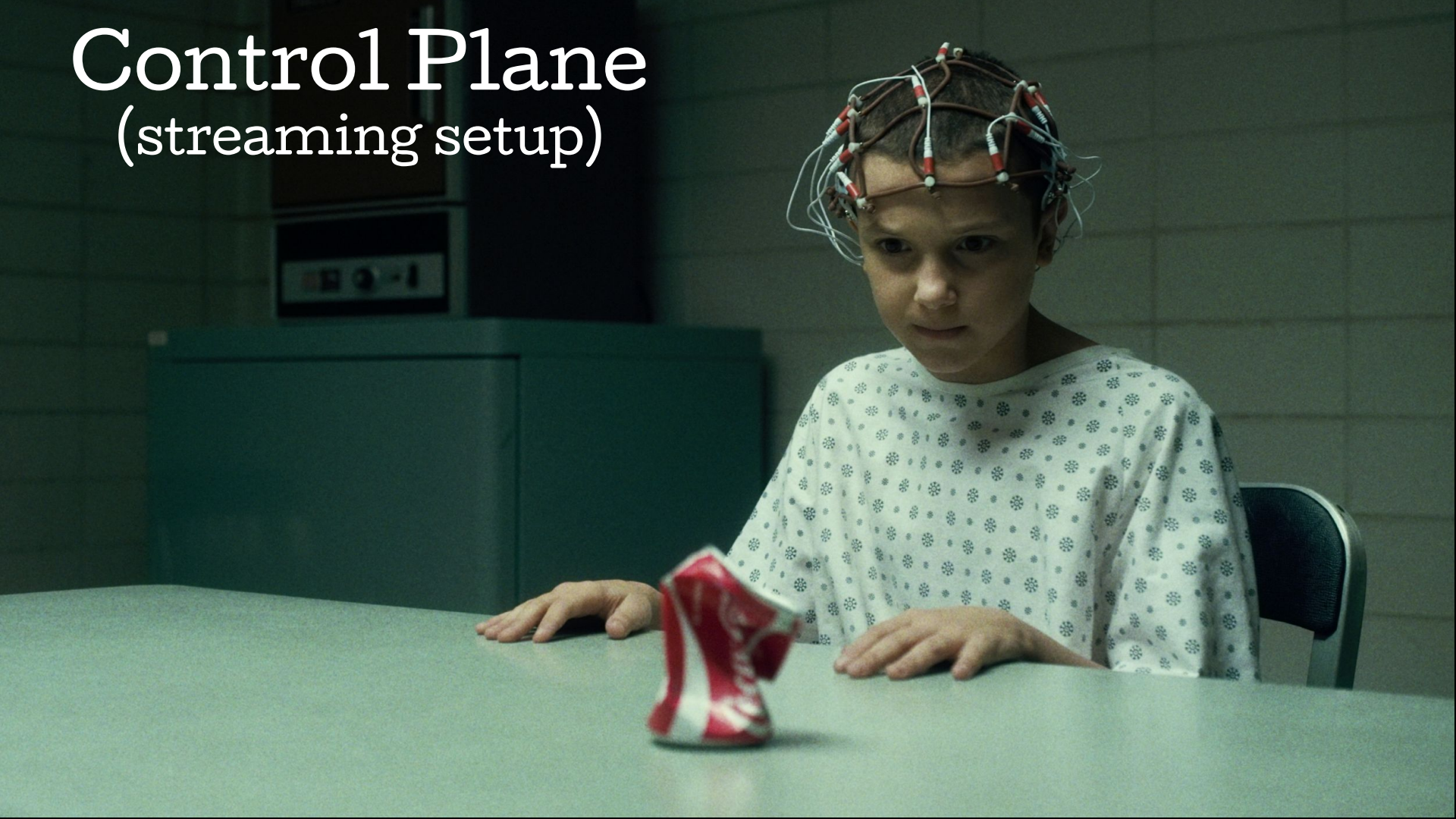

IX SITE
NETFLIX
SFI
ISP
ISP SITE


IX SITE
NETFLIX
SFI
ISP
ISP SITE
OCA


Greenland
Canada
Sweden
Finland
Russia
Belarus
Ukraine
Kazakhstan
Mongolia
Turkey
China
Iraq
Iran
Algeria
Libya
Egypt
Pakistan
Saudi Arabia
India
Mexico
Sudan
Yemen
Congo (Kinshasa)
Brazil
Australia
South Africa


Iraq
Iran
Algeria
Libya
Egypt
Saudi Arabia
Pakistan
India
Sudan
Yemen
Congo (Kinshasa)
South Africa

Control Plane
(streaming setup)



NETFLIX Browse Kids DVD Search 9+ Emily

NETFLIX ORIGINAL

STRANGER THINGS

★★★★★ 2016 TV-14 1 Season

Resume
S1:E8 "Chapter Eight: The Upside Down"

52 of 54m

Dr. Brenner holds Hopper and Joyce for questioning while the boys wait with Eleven in the gym. Back at Will's, Nancy and Jonathan prepare for battle.

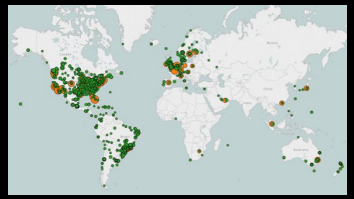
⊕ MY LIST

OVERVIEW EPISODES TRAILERS & MORE MORE LIKE THIS DETAILS

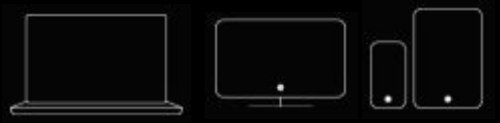
Determine the preferred experience

TITLE

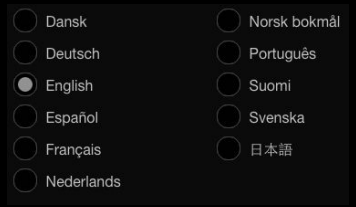
LOCATION



DEVICE



LANGUAGE



NETWORK

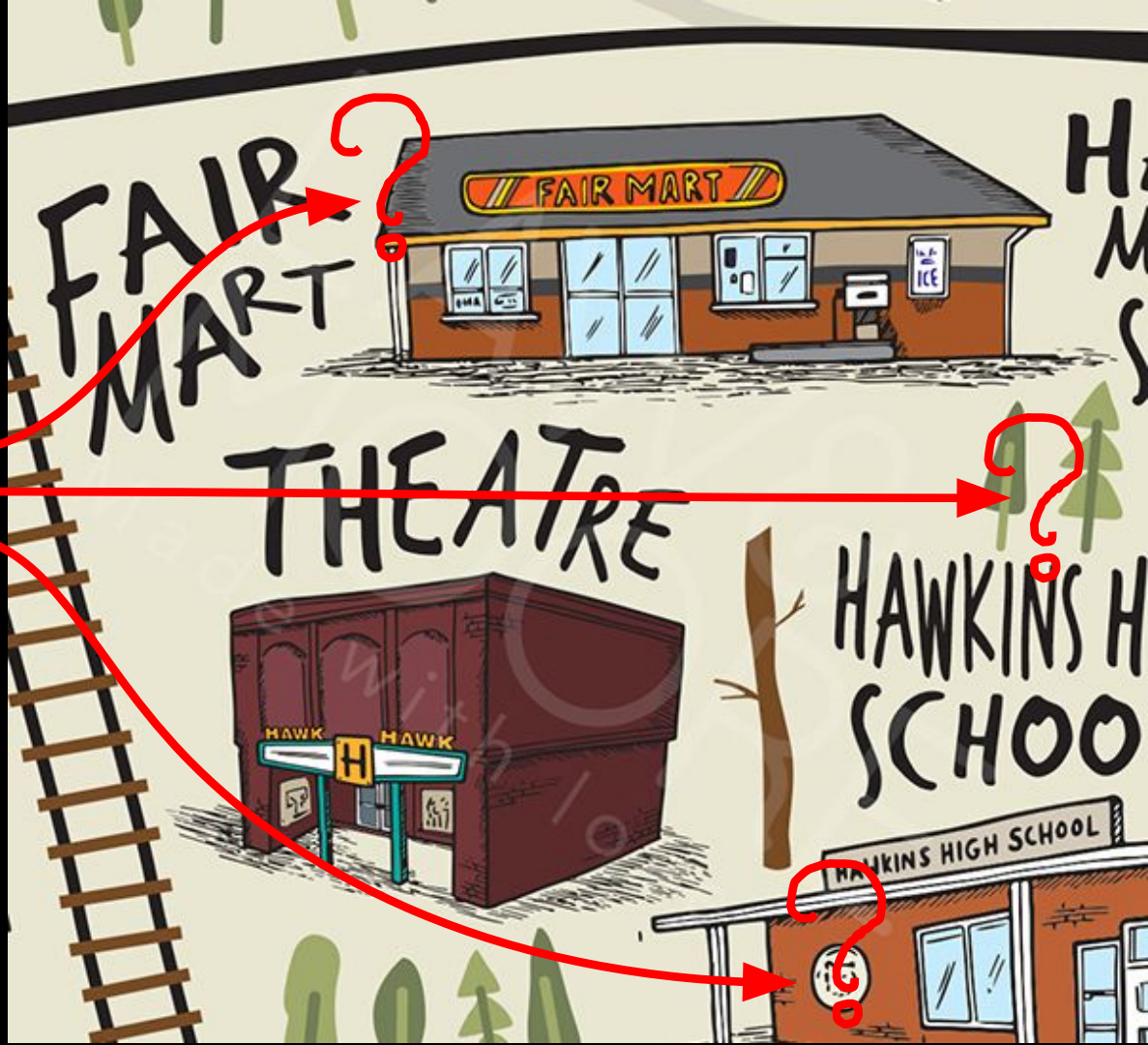
Broadband - wired or wifi
Cellular - Edge, 3G, LTE, ...

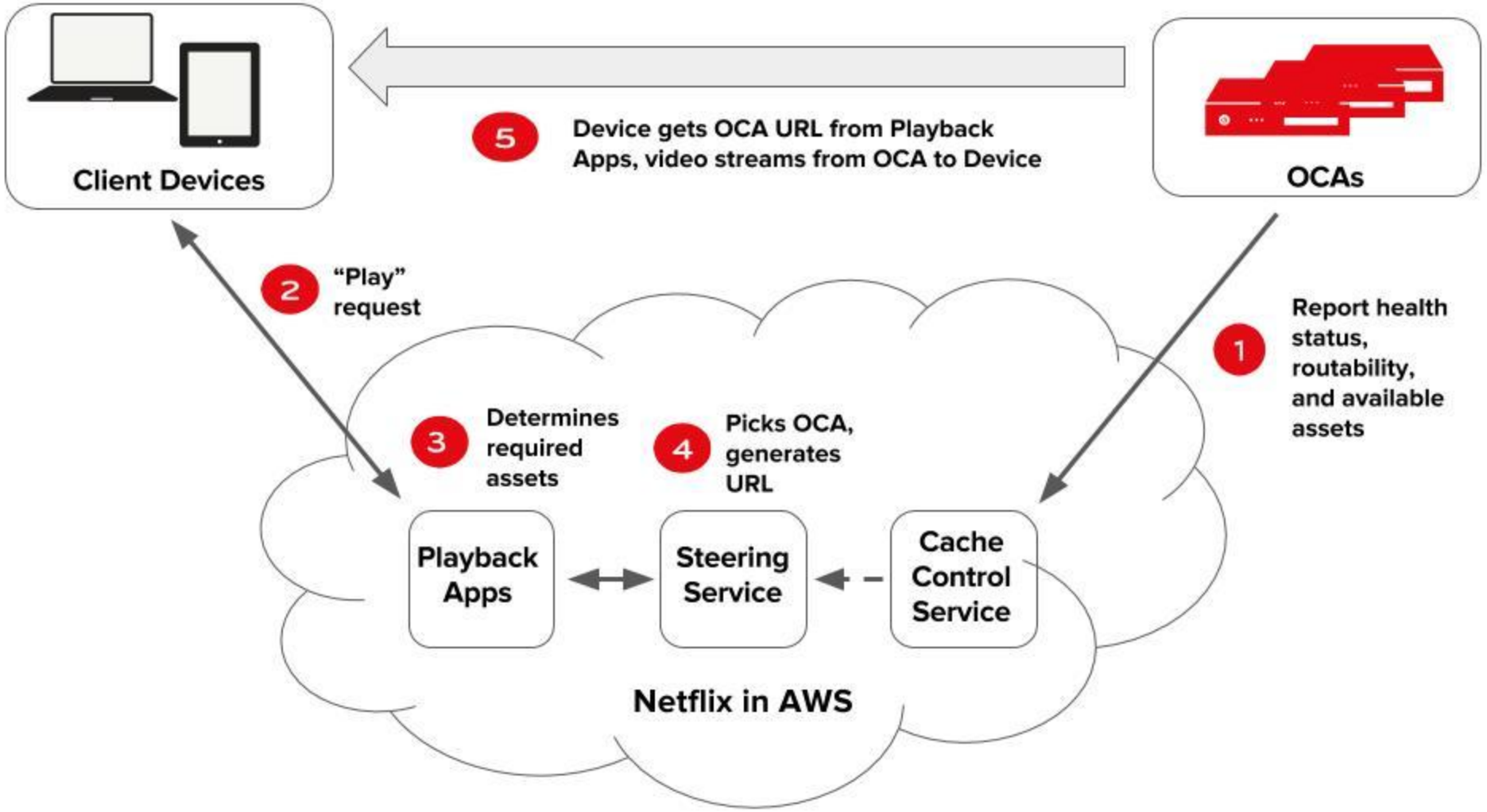
CONNECTIONS

HDCP support, etc.

That’s exactly what I want

…now where can I get it?




Client Devices
OCAs
5
Device gets OCA URL from Playback Apps, video streams from OCA to Device
2
"Play" request
1
Report health status, routability, and available assets
3
Determines required assets
4
Picks OCA, generates URL
Playback Apps
Steering Service
Cache Control Service
Netflix in AWS

STRANGER THINGS
39:13
Stranger Things
Season 1: Ep. 1 Chapter One: The Vanishing Of Will Byers

Wait,
“Closest”
what does
that mean?

BGP

We use what you know

The nitty details

The BGP decision tree

- Longest match
- Local Pref
- AS PATH
- Origin
- MED
- eBGP over iBGP
- Router ID
- Age

Netflix Steering

- Longest match
- Local Pref
- AS PATH
- Origin
- MED
- eBGP over iBGP
- Router ID
- Age
- Geo

Our
Default
Preferences

1. Embedded
2. PNI peering
3. Public peering

1. Prefixes are collected from Open Connect Servers - both those that are present at our POPs and embedded servers
2. Open Connect Servers belong to AS 40027
3. Netflix peering are with AS 2906

The same prefix announced both to a private or public peering session (using AS2906) and to an OCA (using AS40027) will always be preferred on the appliance over peering, because the Open Connect control plane will have two BGP entries for that prefix:

- one with an AS PATH LENGTH of 1 (<AS_NUMBER>) from the appliance itself
- one with an AS PATH LENGTH of 2 (2906 <AS_NUMBER>) from an IX location

When OCAs and Open Connect SFI peering is combined, OCAs are nominal and peering is used primarily for backup, for filling, and for serving long-tail titles.

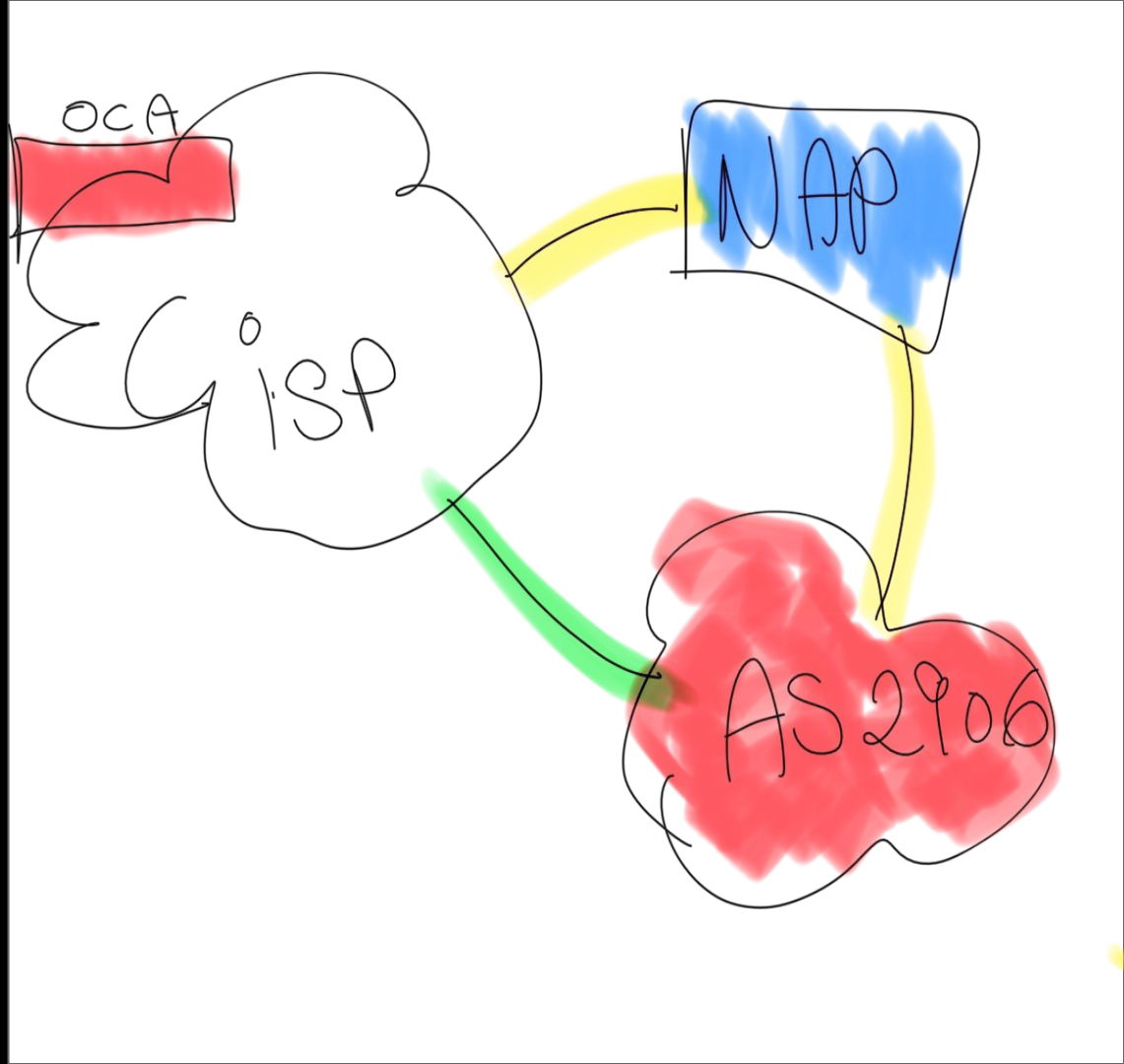
We use MED to boost the preference of the embedded OCAs and to prefer Private Interconnections over Public peering.

- We do not add MED on prefixes learnt from an OCA
- We add MED 50 to the existing MED for prefixes learnt on a private peering
- We add MED 100 to the existing MED for prefixes learnt on a public peering.

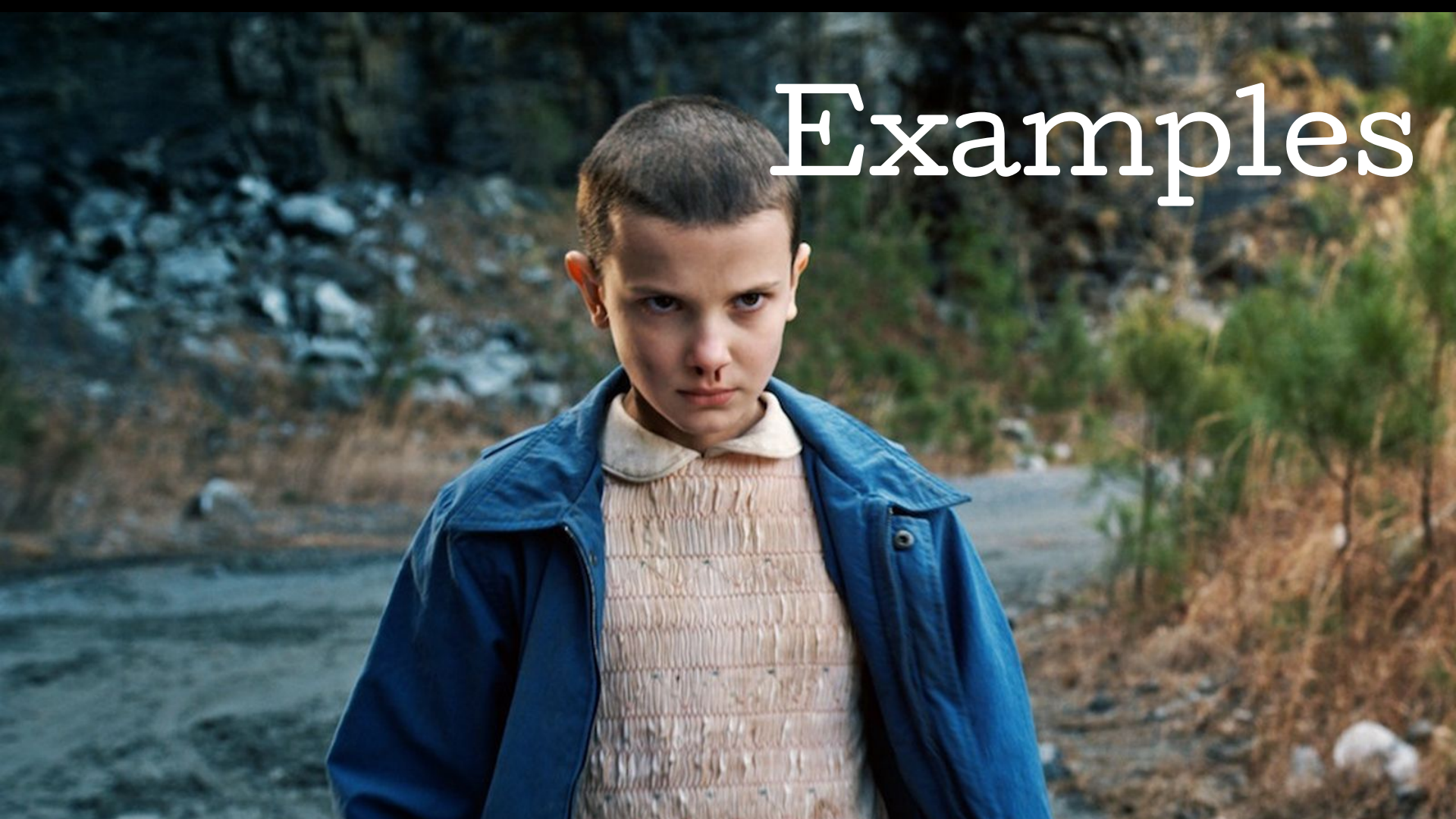
OCA:
med=0
as_path ISP_ASN

NAP:
med=100
as_path 2906 ISP_ASN

PNI:
med=50
as_path 2906 ISP-ASN



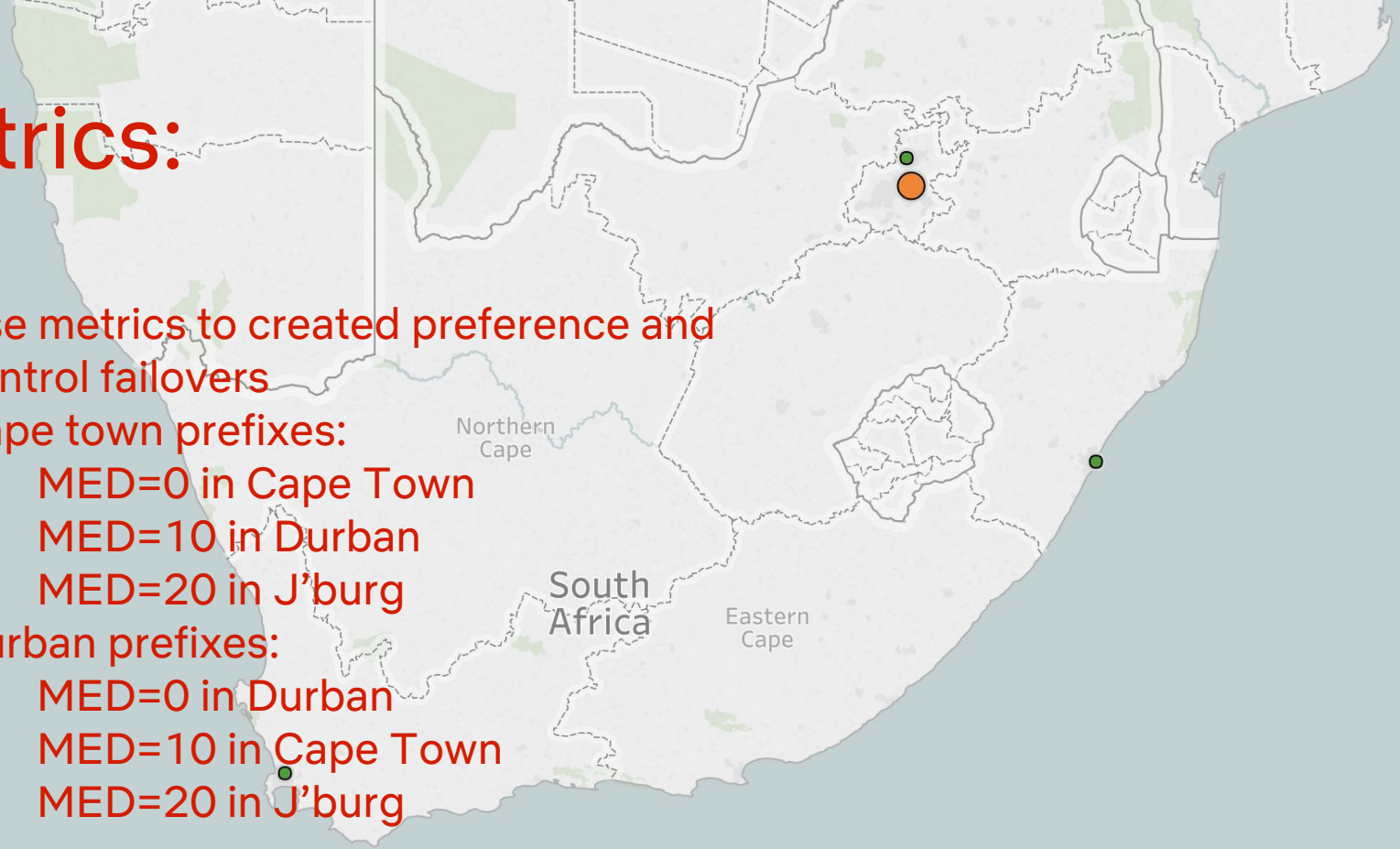
You can
implement
your
preferences by
using BGP


Examples

Geolocation:

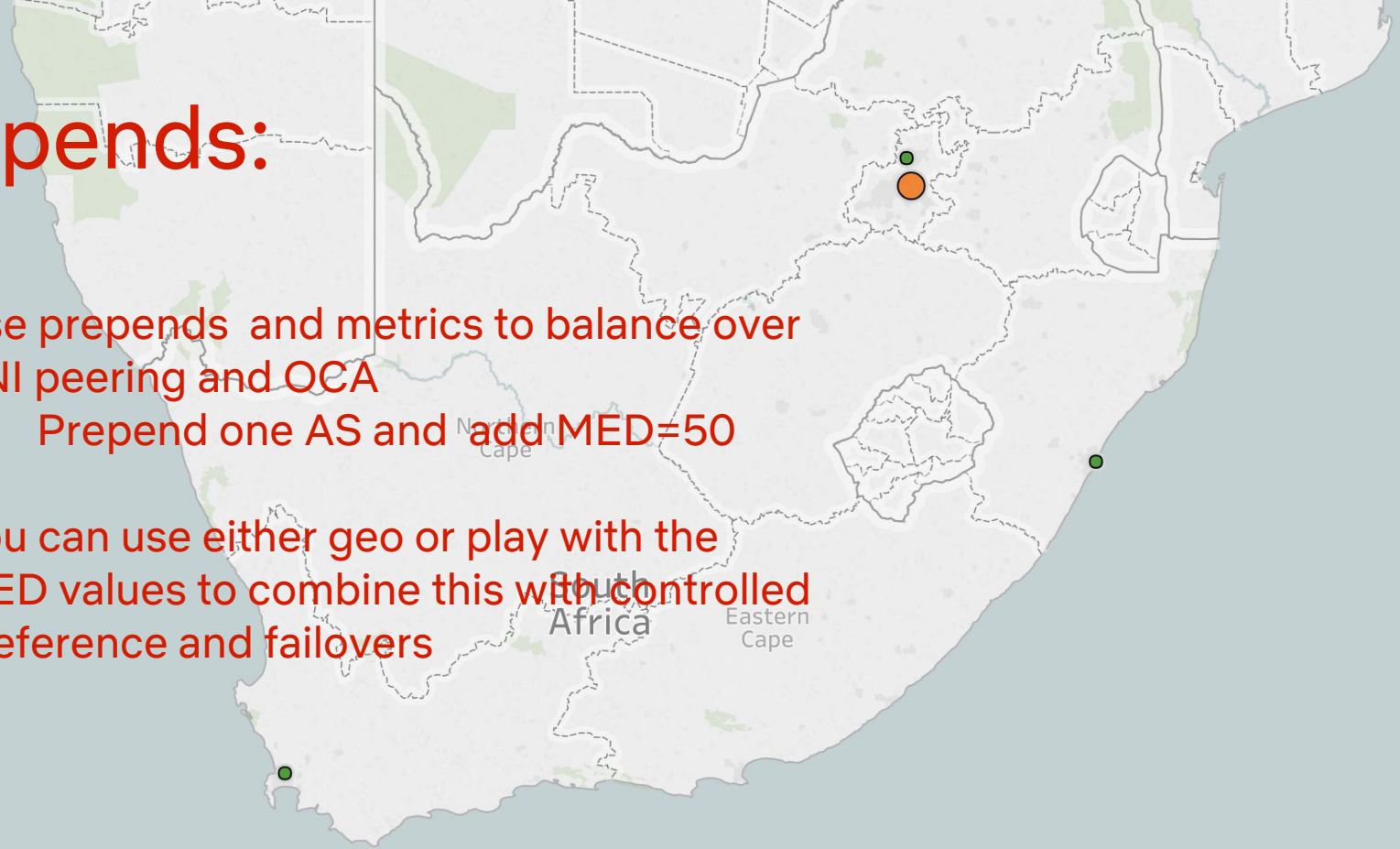
- Clients will be directed to the geographically closest green dot

Metrics:



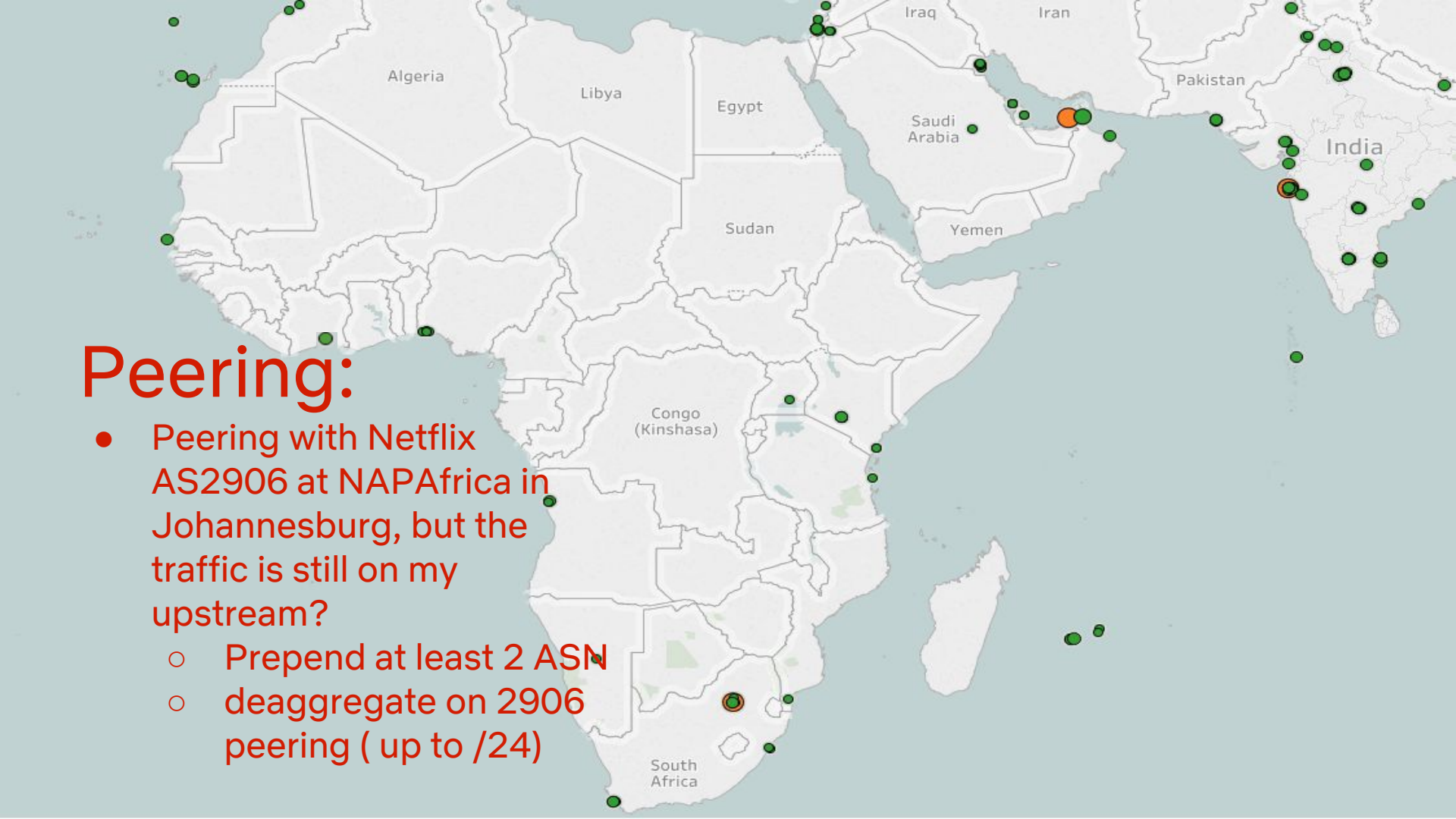
- Use metrics to created preference and control failovers
- Cape town prefixes:
  - MED=0 in Cape Town
  - MED=10 in Durban
  - MED=20 in J’burg
- Durban prefixes:
  - MED=0 in Durban
  - MED=10 in Cape Town
  - MED=20 in J’burg
- …

Prepends:



- Use prepends and metrics to balance over PNI peering and OCA
  - Prepend one AS and add MED=50

- You can use either geo or play with the MED values to combine this with controlled preference and failovers



Peering:

- Peering with Netflix AS2906 at NAPAfrica in Johannesburg, but the traffic is still on my upstream?
  - Prepend at least 2 ASN
  - deaggregate on 2906 peering (up to /24)

Transit Provider selection

For optimizing your Netflix experience

Sikker | https://fast.com/en/#

English (US)

FAST

Your Internet speed is

29 Mbps

Show more info

POWERED BY NETFLIX

Sikker | https://fast.com/en/#

English (US)

FAST

Your Internet speed is

29 Mbps

Latency

Unloaded	Loaded
21 ms	154 ms

Upload

Speed

5.1 Mbps

Client Milnerton, ZA 105.28.119.59
Server(s) Johannesburg, ZA | MOMBASA, KE | KAMPALA, UG

Settings | 30MB | 20MB

Sikker | https://fast.com/en/#

English (US)

FAST

Your Internet speed is

29 Mbps

Latency

Unloaded: 21 ms

Loaded: 154 ms

Upload

Speed: 5.1 Mbps

Client Milnerton, ZA - 105.28.119.59
Server(s) Johannesburg, ZA | MOMBASA, KE | KAMPALA, UG

Settings | 30MB | 20MB

- Do the test on each potential provider
- Choose what is important to you
- Talk to your provider about the options.

BGP keeps you in control

Questions?