NETFLIX

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• >130 million members
• 190 countries
• Available in all countries in Africa
How NETFLIX Works
DATA PLANE
Open Connect

Content
Delivery
Network

STREAM

NETFLIX DEVICE

CONTROL PLANE
before streaming starts = control plane = AWS
streaming = data plane = Open Connect
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
Designed for bulk storage of the entire large regional content catalogs
“Flash” or “Offload” appliance

High-throughput servers, used to serve very popular content
Open Connect connects directly to residential ISP networks. 95% of our traffic is directly connected.
Control Plane
(streaming setup)
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.
Determine the preferred experience

**TITLE**

- Stranger Things

**LOCATION**

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

**DEVICE**

- Laptop
- Monitor
- Phone

**LANGUAGE**

- Dansk
- Deutsch
- English
- Español
- Français
- Nederlands
- Norsk bokmål
- Português
- Suomi
- Svenska

**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?
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.
Geolocation:

- Clients will be directed to the geographically closest green dot.
Metrics:

- Use metrics to create 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
Your Internet speed is 29 Mbps
Your Internet speed is 29 Mbps.
Your Internet speed is 29 Mbps.
- 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?