

How Netflix Works

CS144

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#netflixeverywhere

No ads | Uninterrupted entertainment | All episodes at once

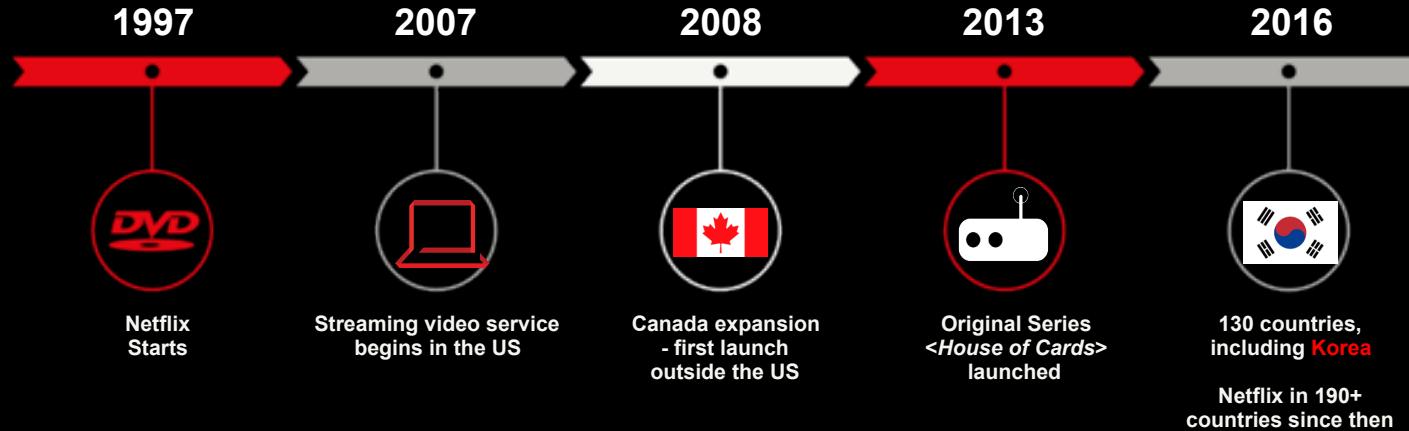
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원하는 시간에
원하는 방식으로
원하는 장소에서 시청

Watch When You Want.
How You Want.
Where You Want.

The Netflix journey



A close-up, low-angle shot of a man in traditional Korean clothing. He is wearing a dark purple robe over a white inner garment and a tall, black, wide-brimmed hat with a distinctive blue and white feathered plume. His head is bowed, and he appears to be looking down at something in his hands. The background is a soft-focus landscape with a mix of blue and orange hues, suggesting either dawn or dusk.

What about today?

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A nighttime satellite view of Earth from space, showing city lights and clouds.

More Than
190 Countries

Over 151 Million
Paid Memberships

60+% from
Outside of the U.S.

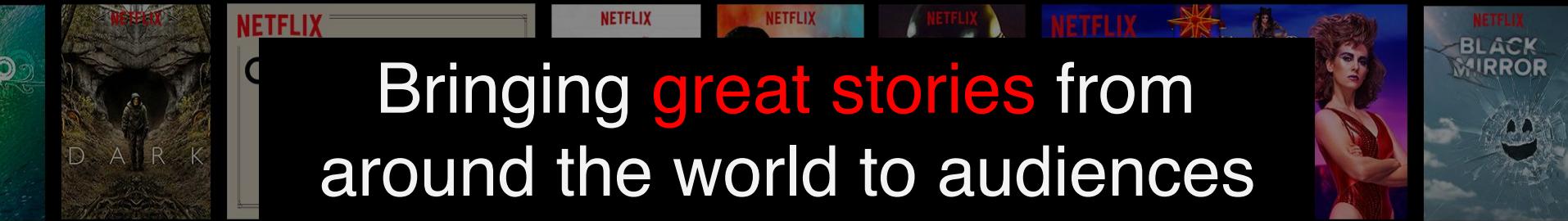
1,700+ 넷플릭스 지원 기기 Different types of devices



518M+ 글로벌 회원이
넷플릭스를 시청하는 기
기 Unique devices globally

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Bringing great stories from
around the world to audiences
the world over.



How Do We Deliver
a Great
Netflix
Experience
to Everyone?

What makes a great streaming



- Start quickly
- Great quality
- No interruptions

Diverse networks and devices

3G

LTE

5G

4K

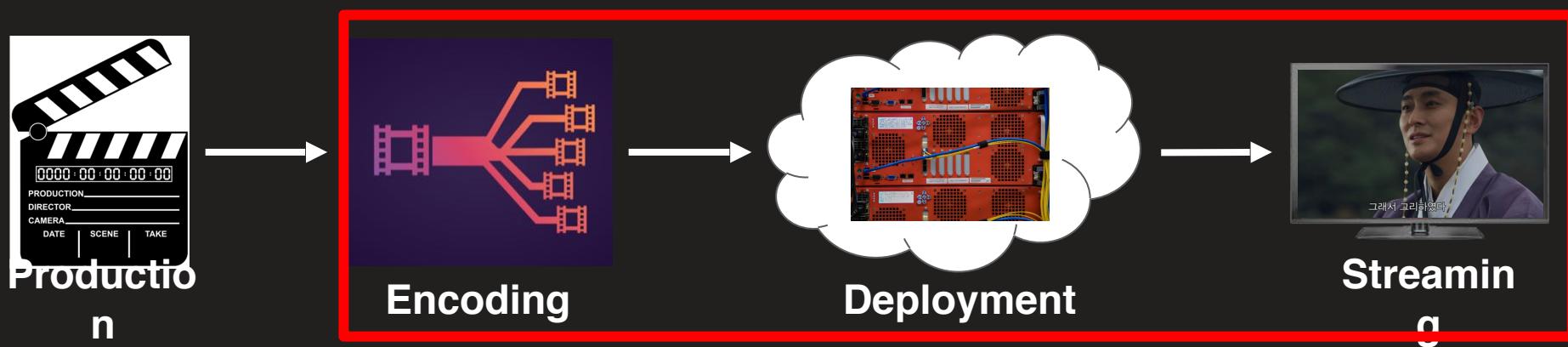
HD

Cable
Satellite
Fibre
Wi-Fi

HDR
SD

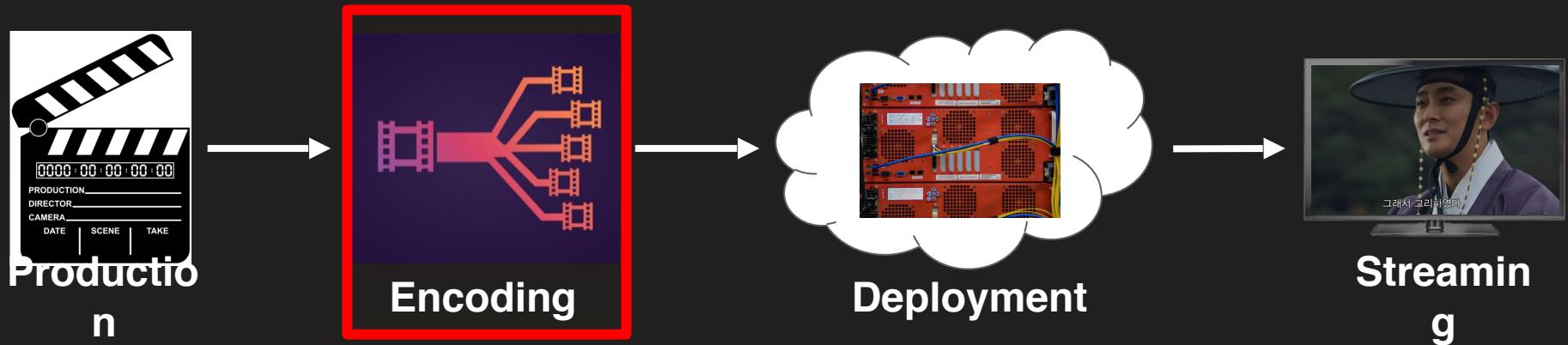


The building blocks of the Netflix streaming experience



All of these are continually optimized to improve user experience

The building blocks of the Netflix streaming experience



통합 인코딩 방식 적용

One-size-fits-all encoding

1050kbps 스탠다드 화질(SD)

Standard Definition (SD) at 1050 kbps



2011년

2012

2013

2014

2015

2016

2017

2018

타이틀 별 인코딩 방식 구분

Per-title encoding



640 kbps

710 kbps

910 kbps

2011

2012

2013

2014

2015년

2016

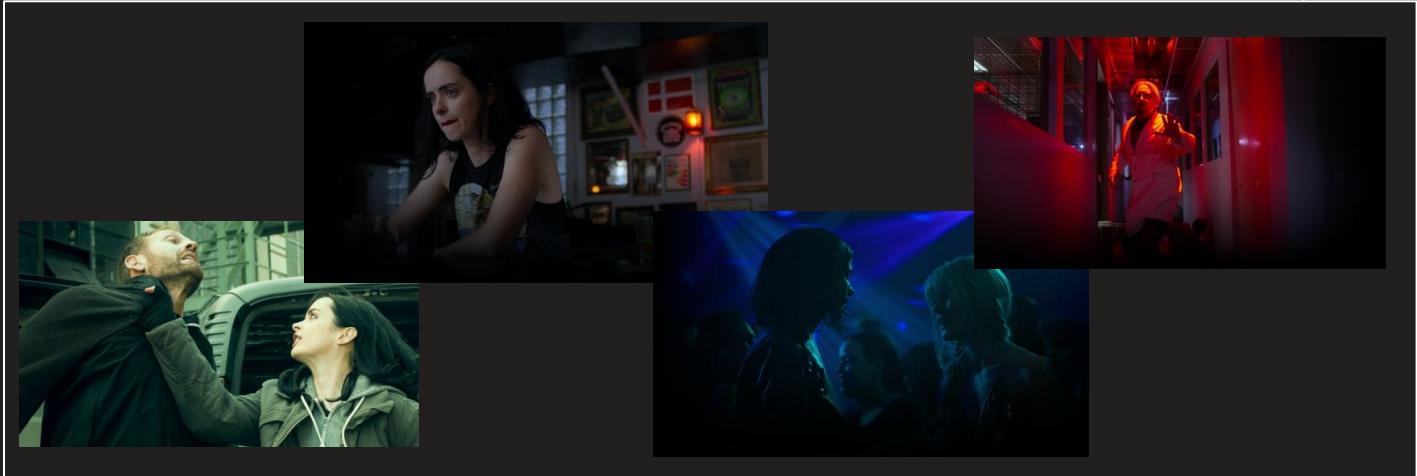
2017

2018



장면당 인코딩 구분

Per-shot encoding



2011

2012

2013

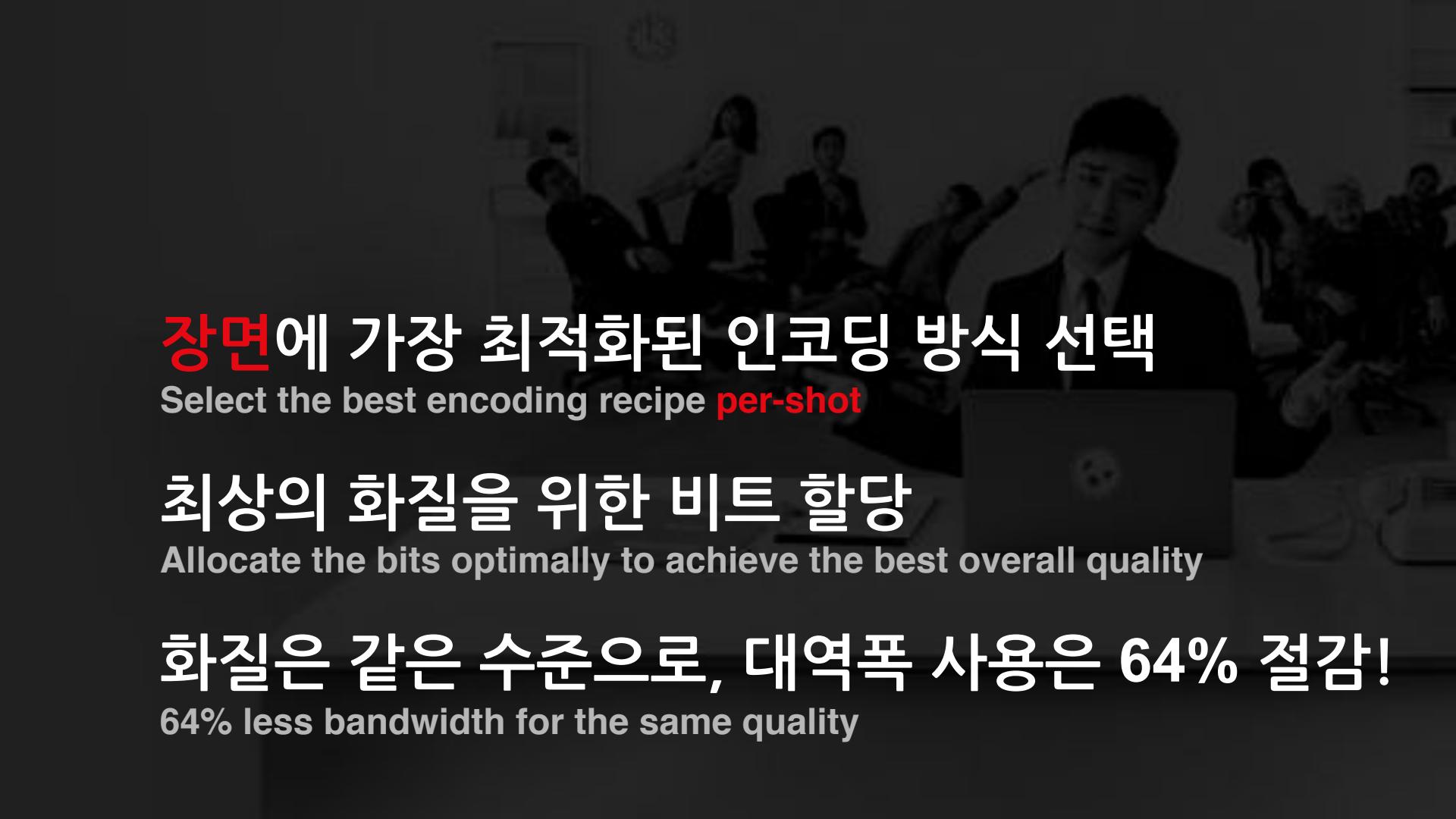
2014

2015

2016

2017

2018년



장면에 가장 최적화된 인코딩 방식 선택

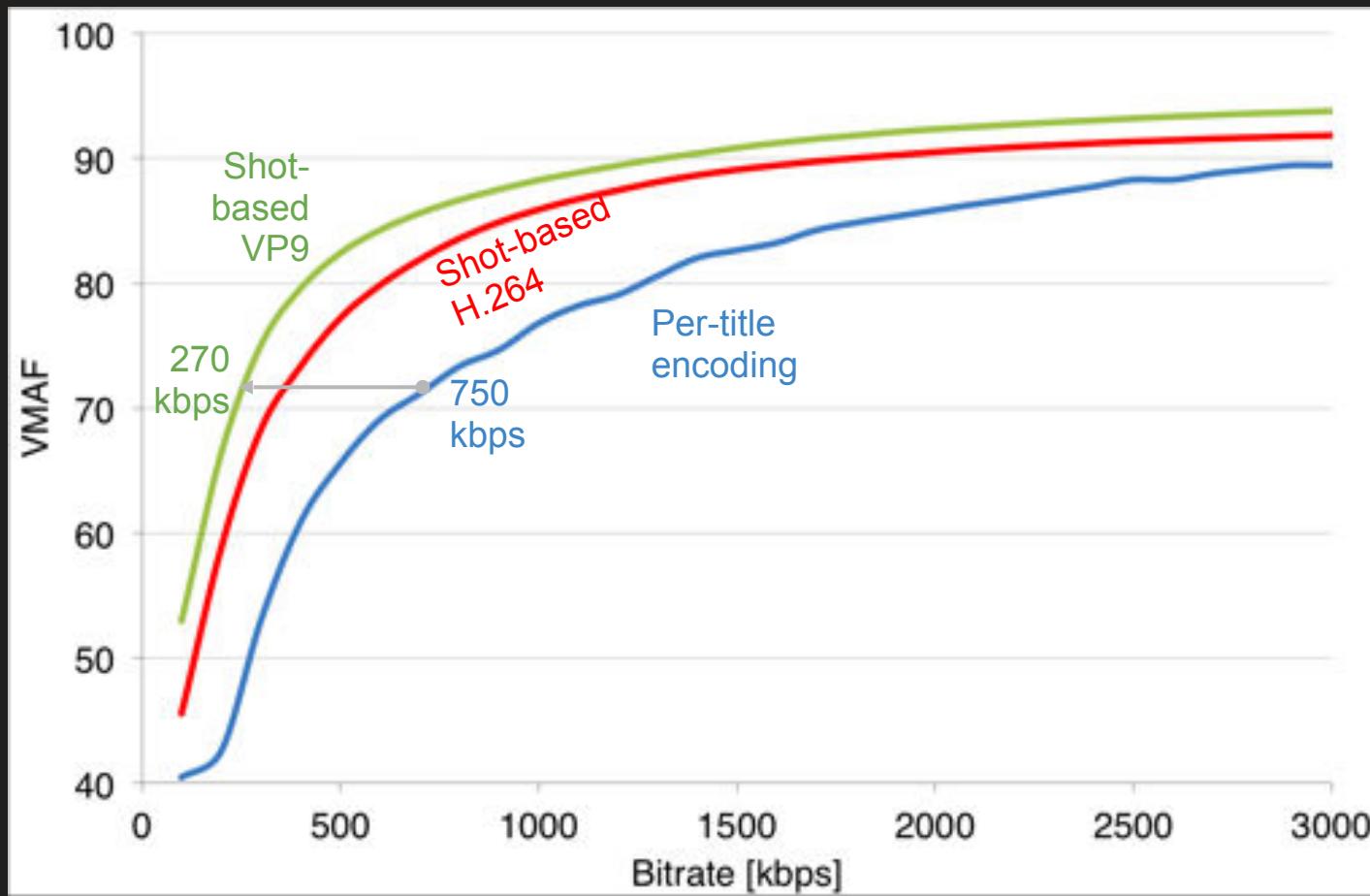
Select the best encoding recipe **per-shot**

최상의 화질을 위한 비트 할당

Allocate the bits optimally to achieve the best overall quality

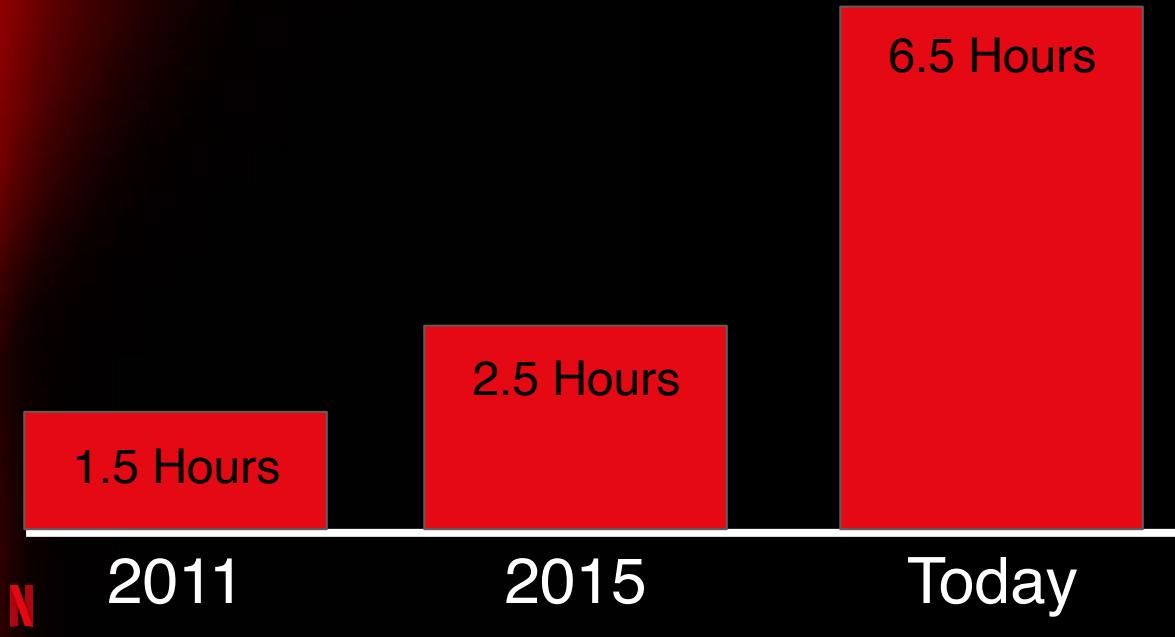
화질은 같은 수준으로, 대역폭 사용은 64% 절감!

64% less bandwidth for the same quality



64% less bits for the same quality

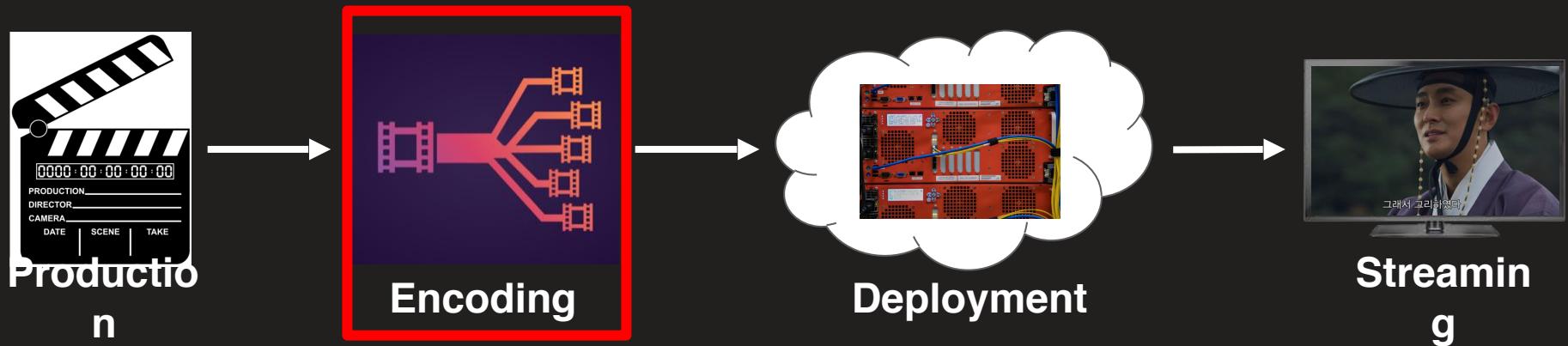
Hours of Netflix content in 1GB of data



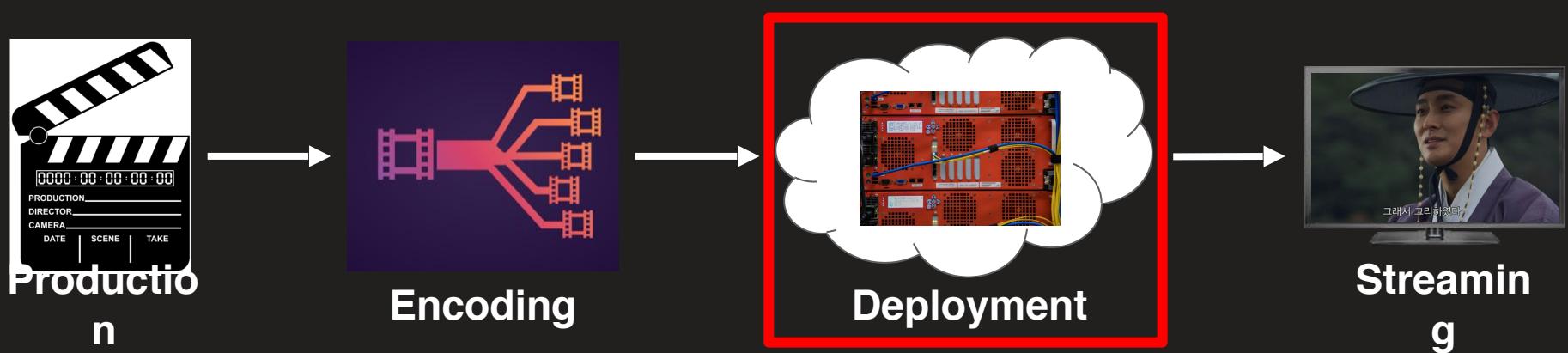
8 episodes !



The building blocks of the Netflix streaming experience



The building blocks of the Netflix streaming experience

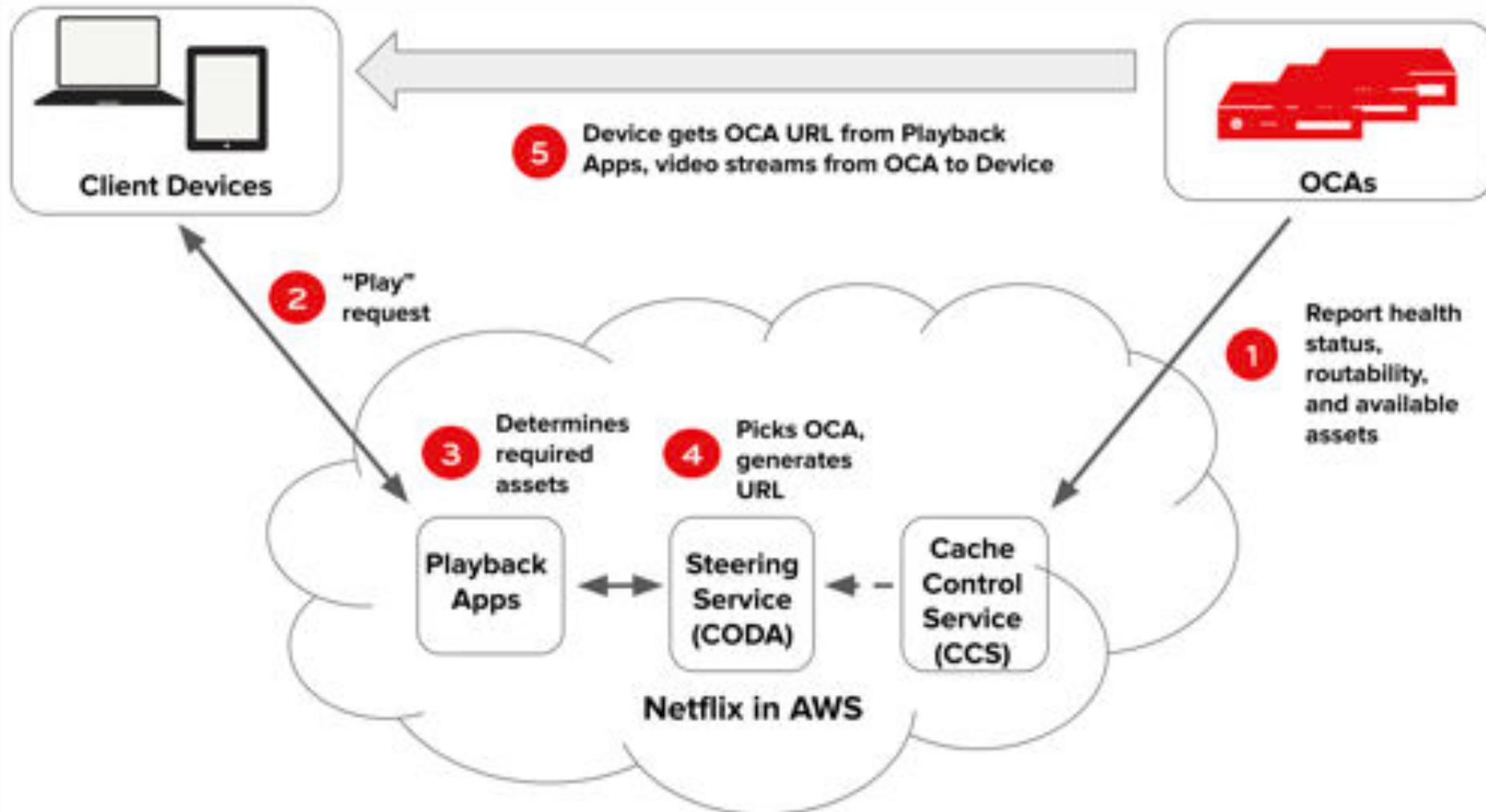


Global Netflix Delivery Architecture



NETFLIX

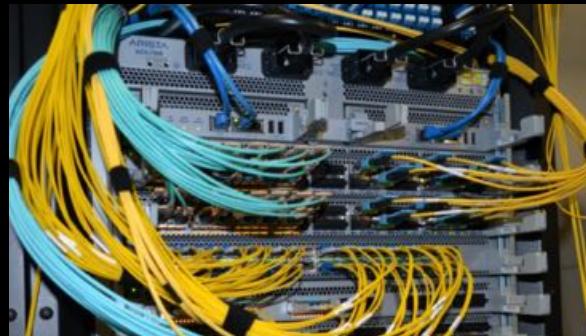
Open Connect

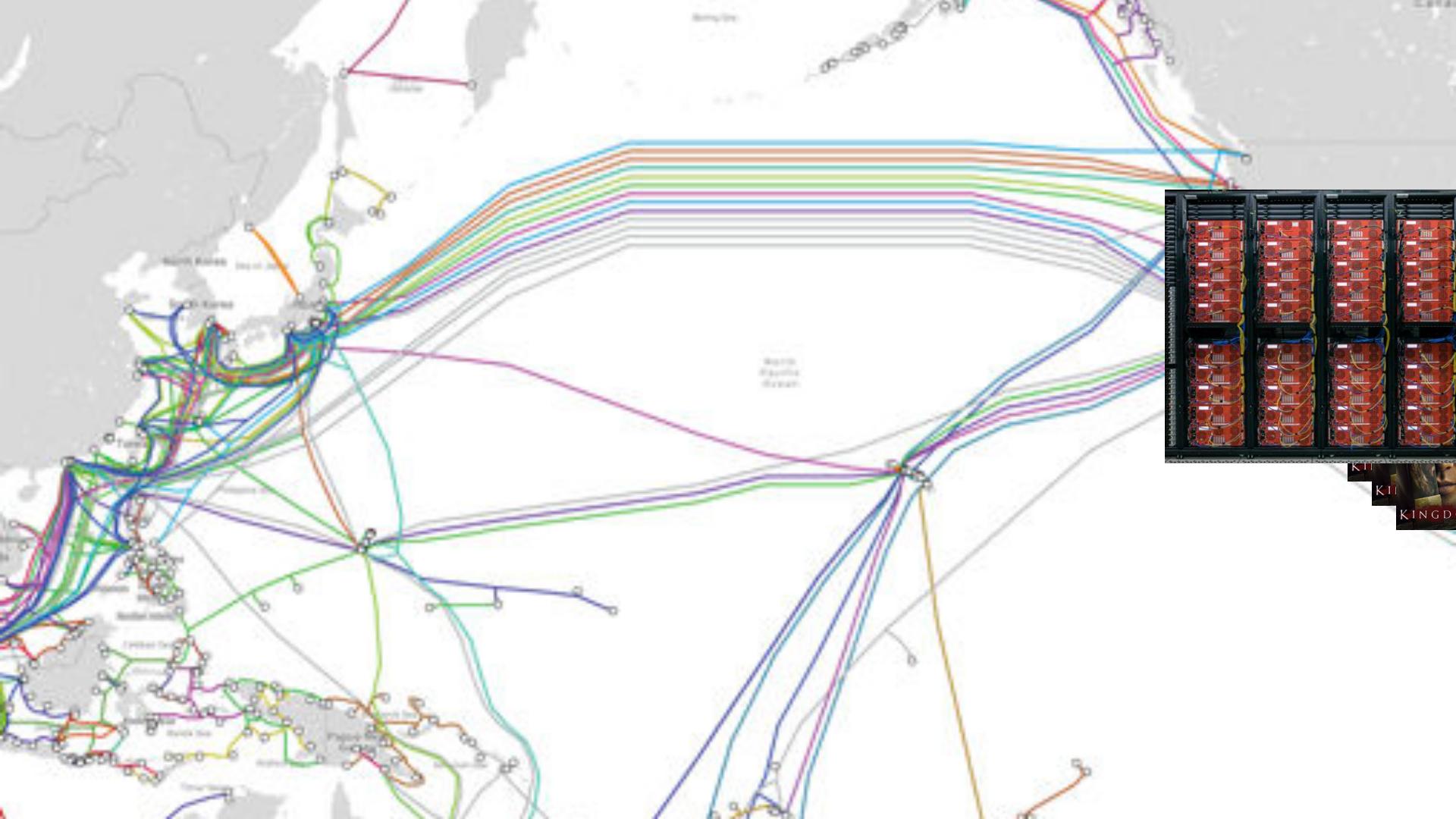


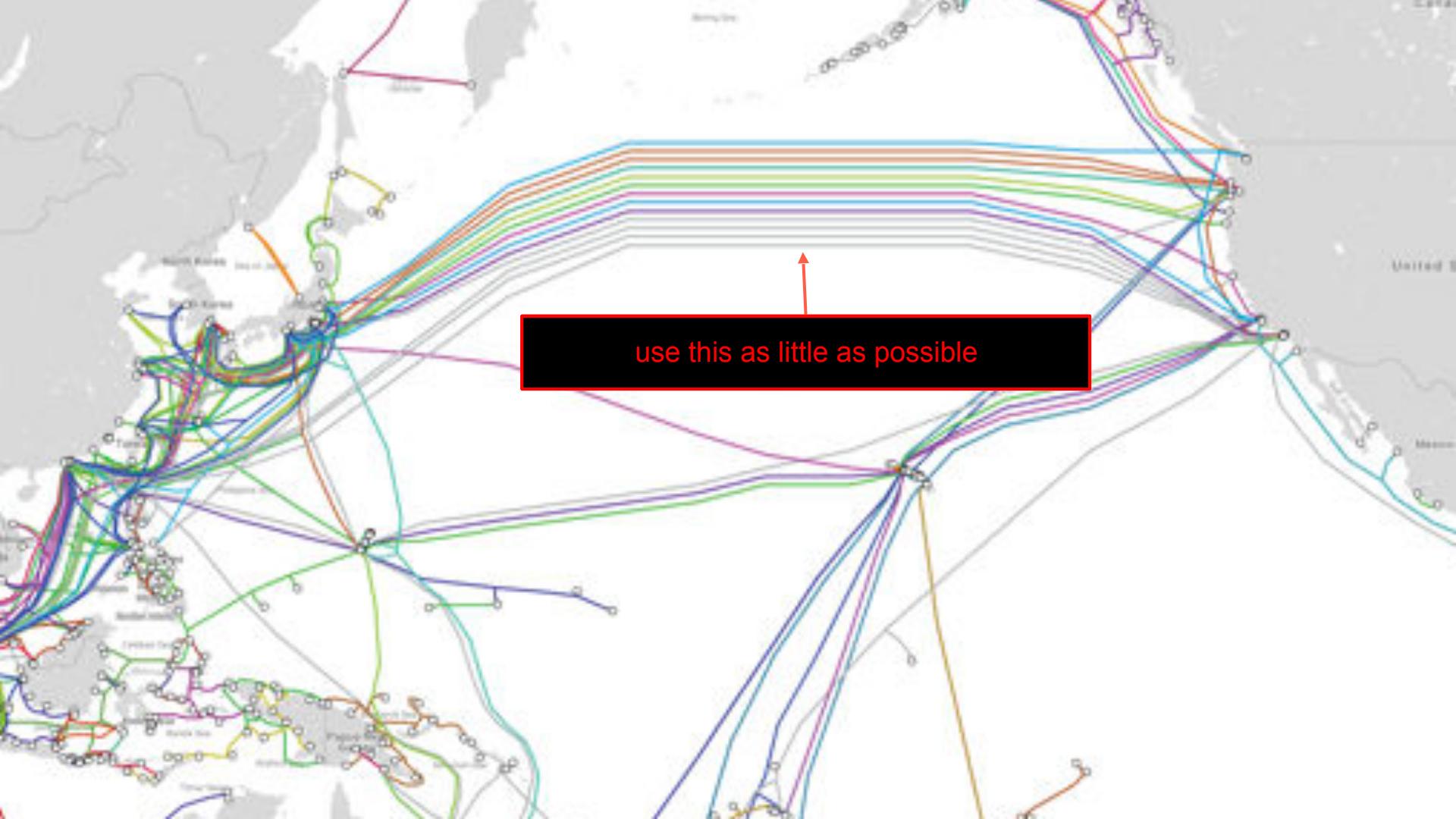
servers (OCA)



networks







use this as little as possible





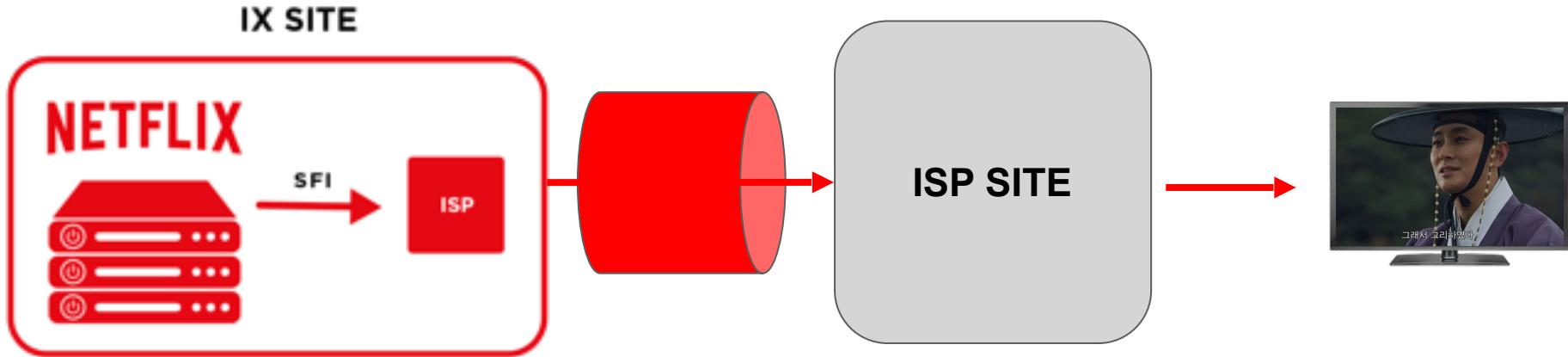
Order of 100 globally



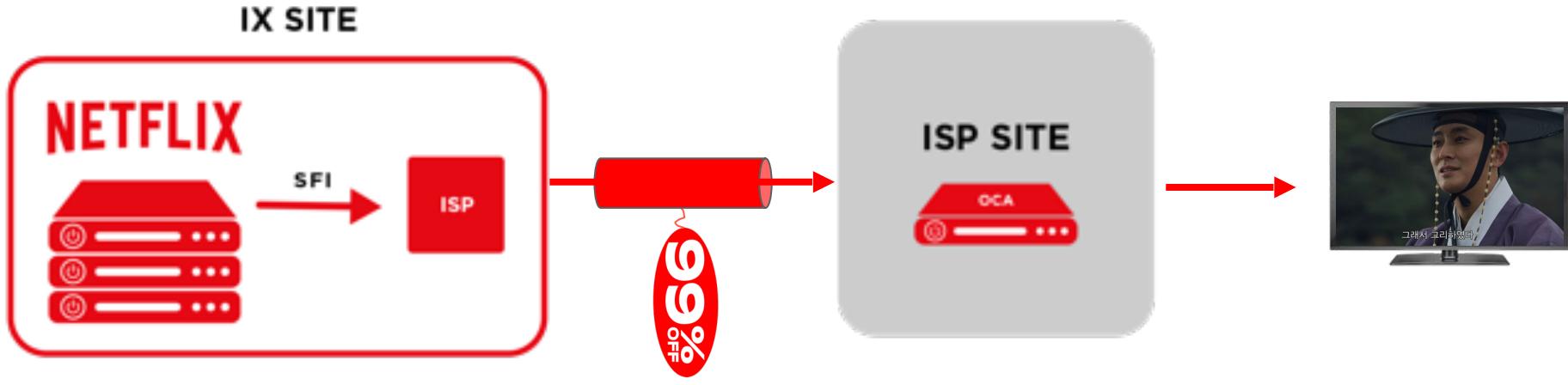
Order of 10,000 globally



NETFLIX



NETFLIX

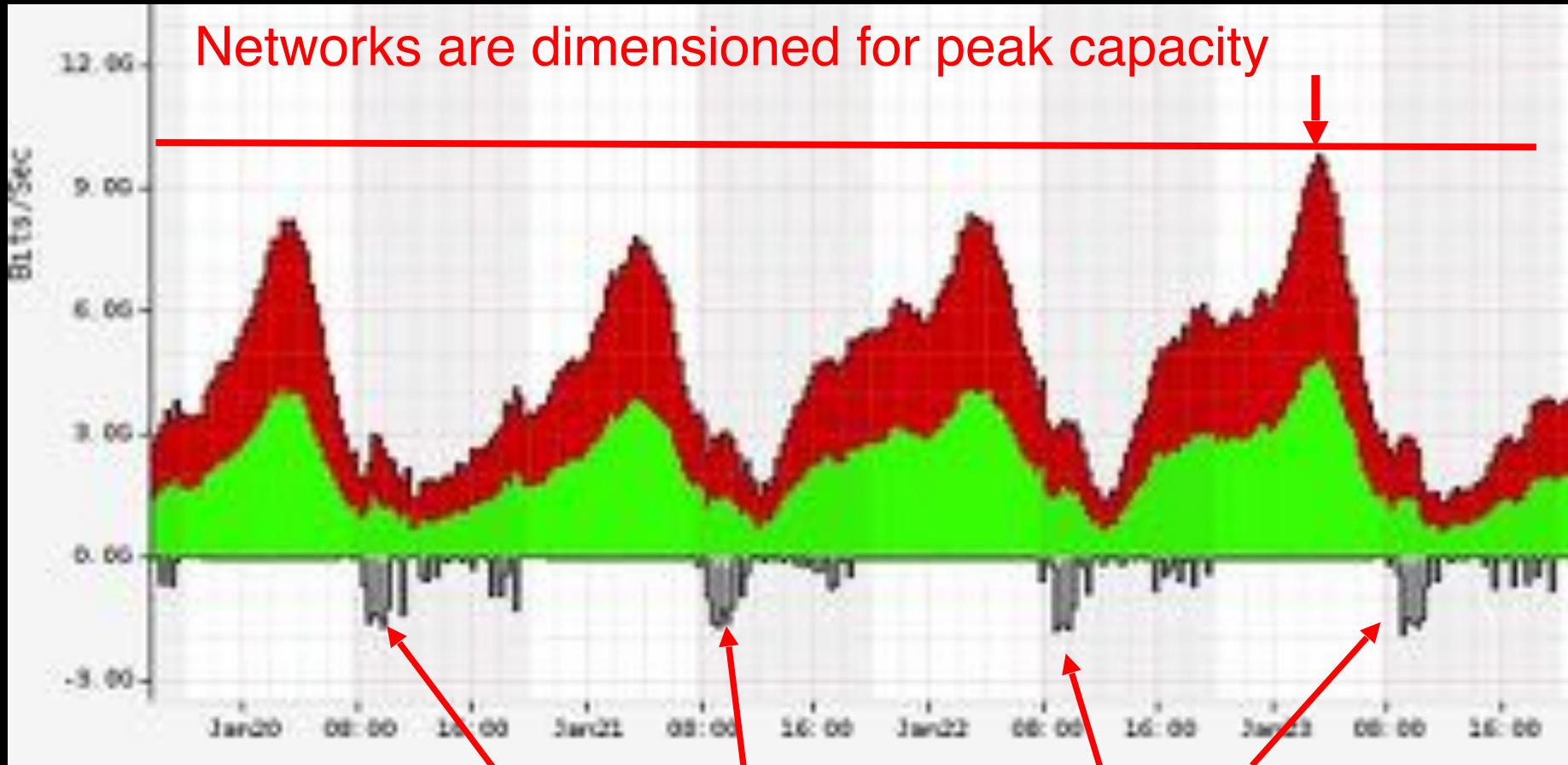


NETFLIX



caches fill while you sleep

Networks are dimensioned for peak capacity



Off-peak cache fill means no need for additional



85 internet exchange locations in **26** countries

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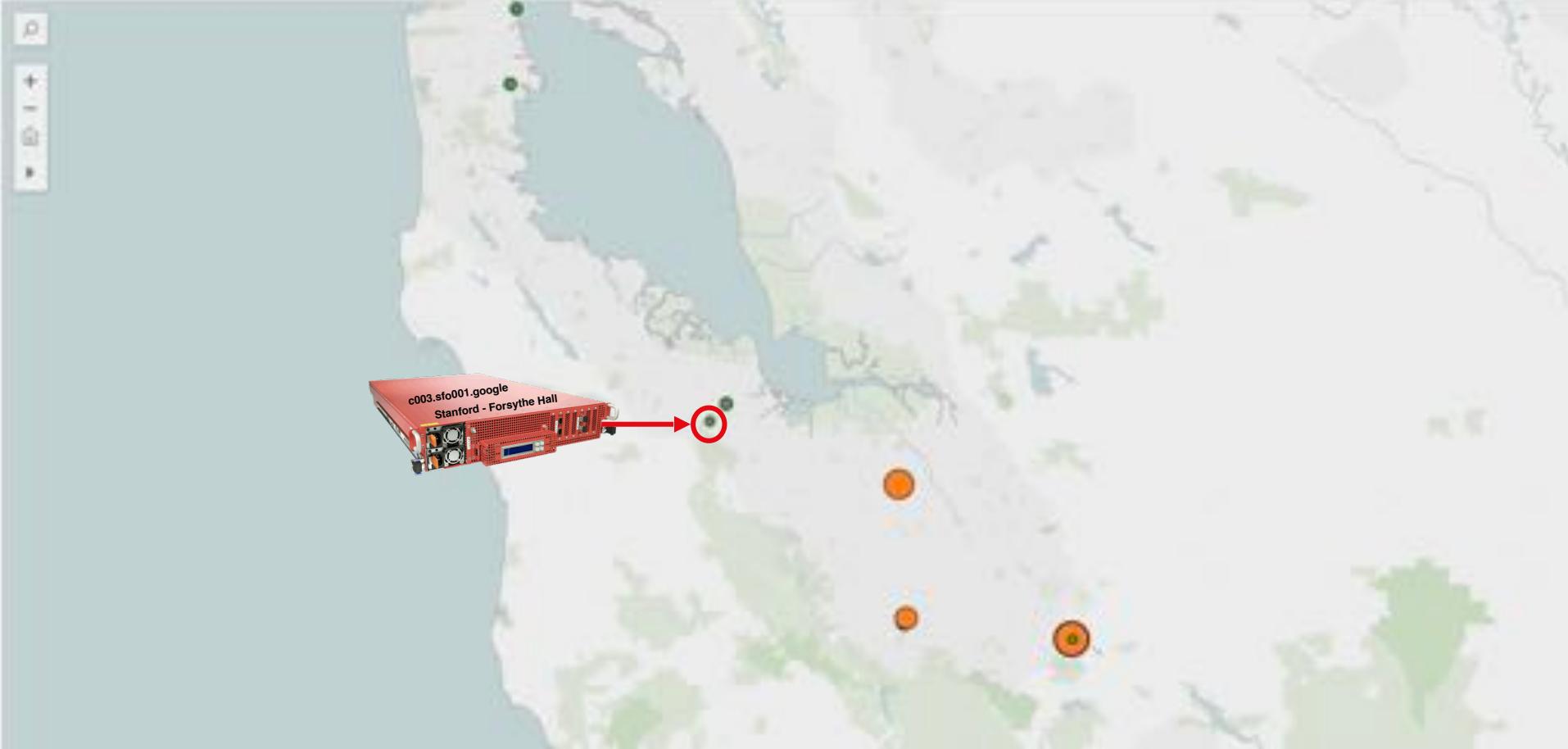
3,546 ISP locations in **140** countries

N

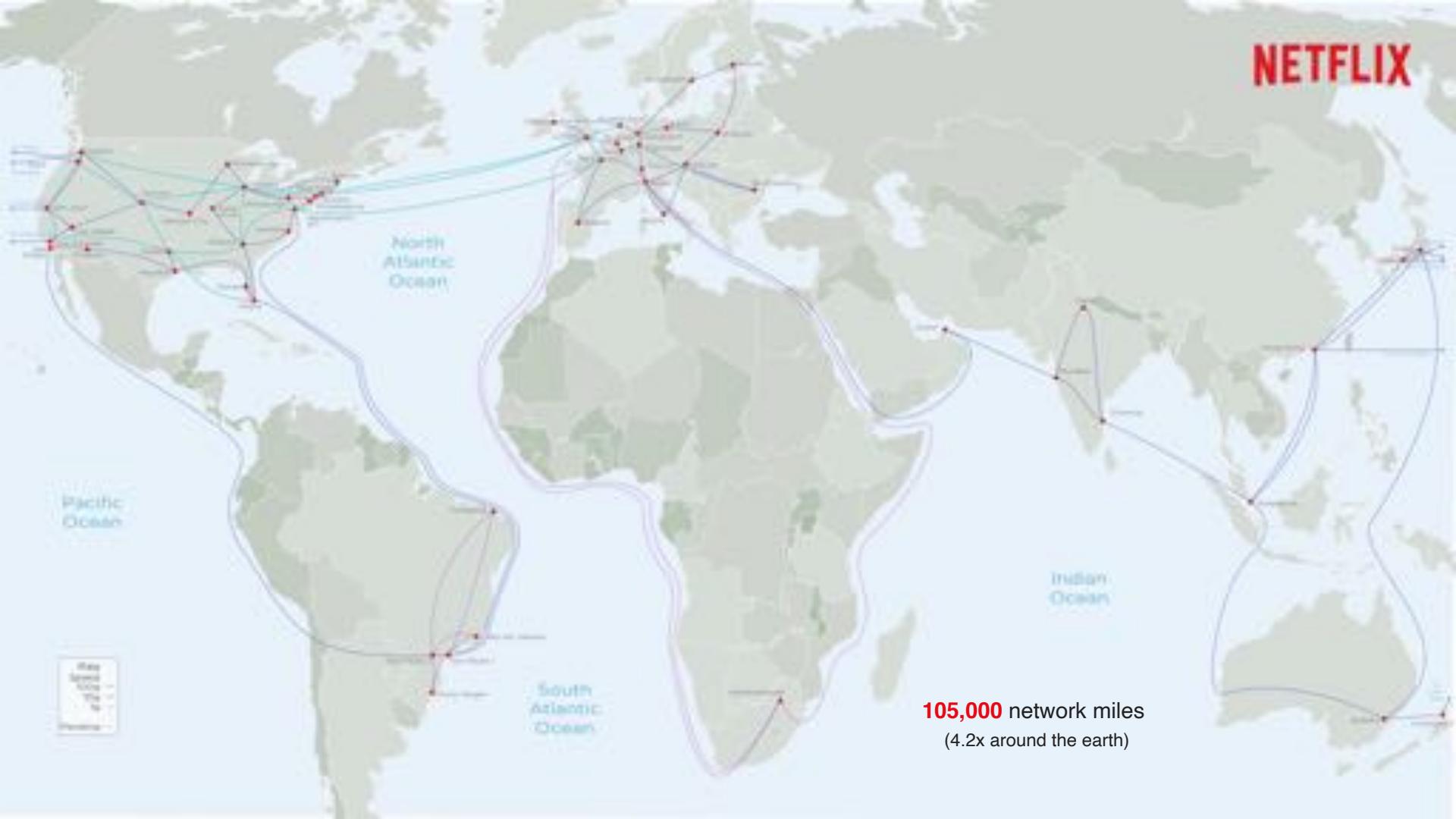


13,263 servers in production

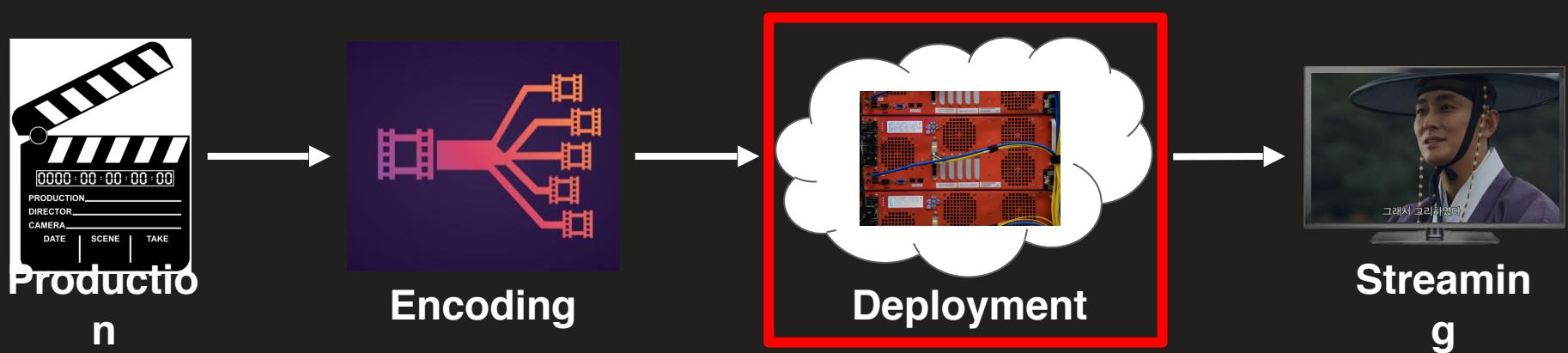
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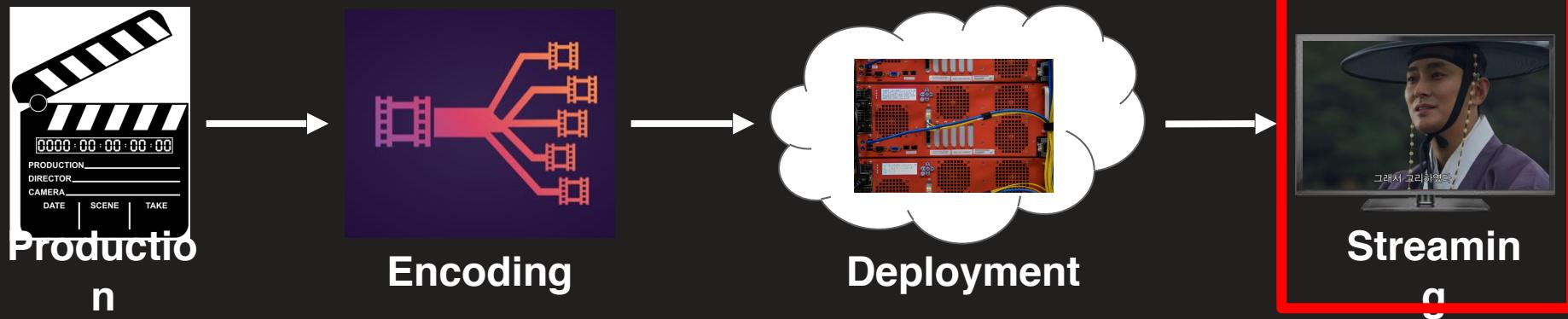
NETFLIX



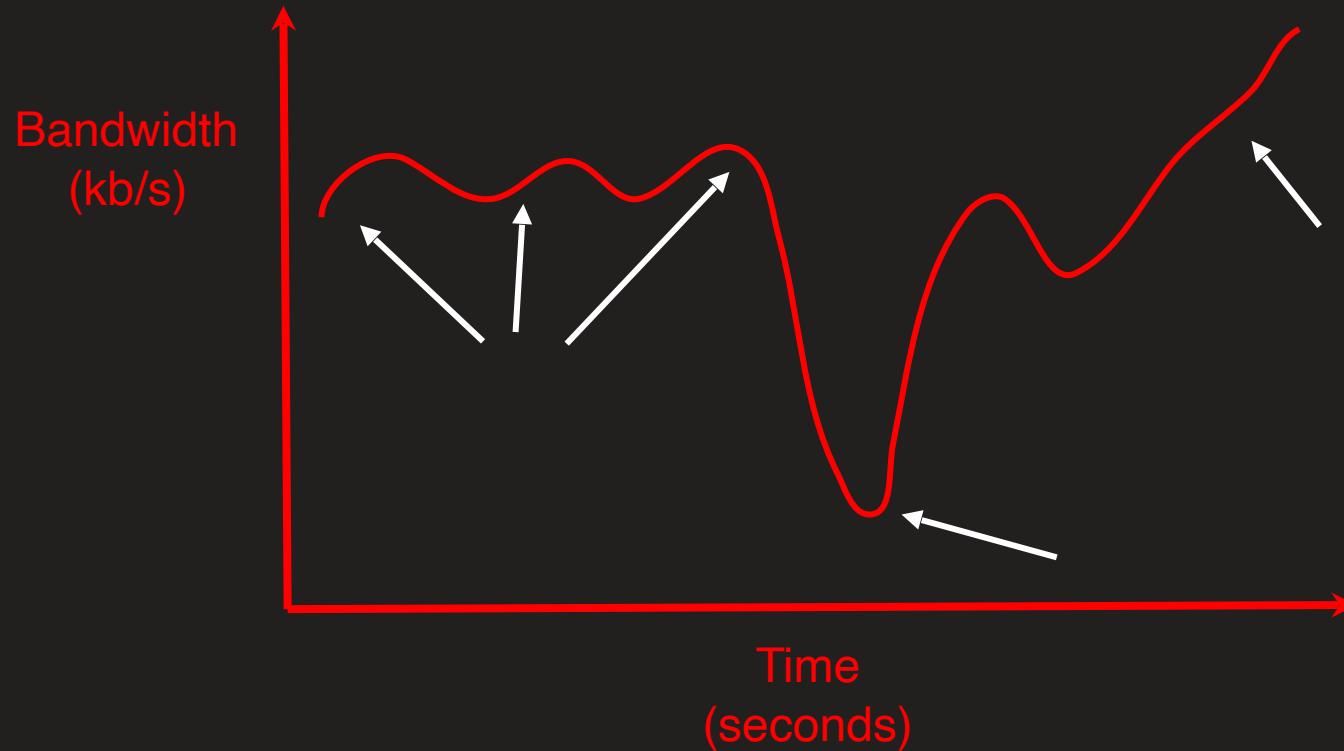
The building blocks of the Netflix streaming experience



The building blocks of the Netflix streaming experience



Network conditions change



playdelay

adaptive
streaming
engine

video quality

rebuffer risk

Adapt video quality based on changing conditions

High quality



Mid quality



Low quality



Time

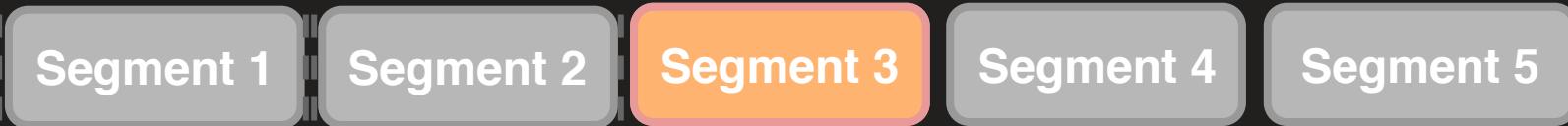


Adapt video quality based on changing conditions

High quality



Mid quality

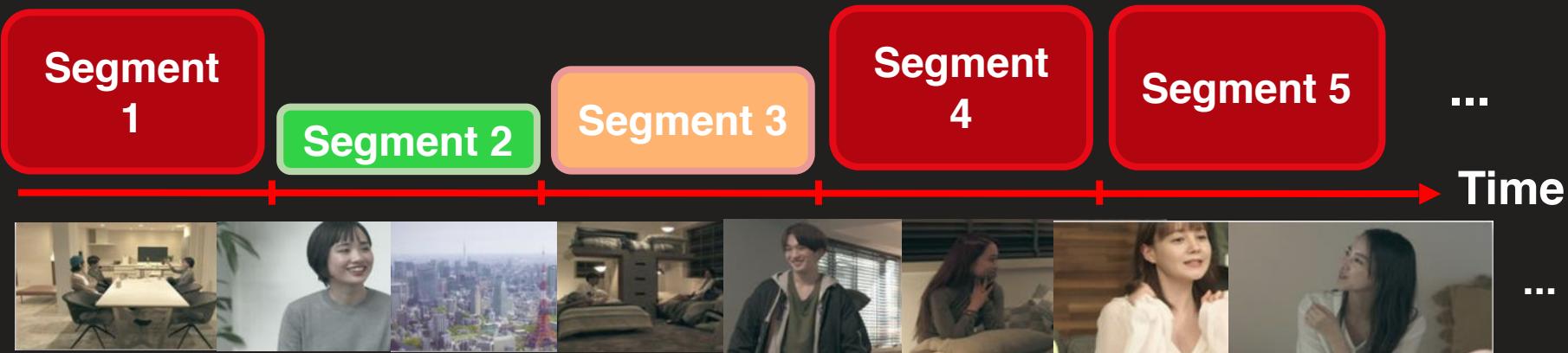


Low quality



Adapt video quality based on changing conditions

Resulting experience



tips and tricks



Version: 6.0612.638.011
Ext: NFCDDH-MC-ET2VTXKGXUCT3YU
PBCID: 6.JNjWkUswyeyPf8g7PgoJz241-k
UserAgent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_10_5) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/51.0.2704.106 Safari/537.36
MovieId: 80212130
TrackingId: 13752289
Xid: 15510496084593 (15510496084593)
Position: 121433
Duration: 1872.000
Volume: 100%

Player state: Normal
Buffering state: Normal
Rendering state: Playing

Playing bitrate (av: 96 / 2360 (1280x720))
Playing/Buffering vmaf: 91/91
Buffering bitrate (av: 96 / 2360)
Buffer size in Bytes (av: 3187888 / 63528369)
Buffer size in Bytes: 66969037
Buffer size in Seconds (av: 246.951 / 226.915)
Current CDN (av: c032-4c005.lx.mboxvideo.net)

Audio Track: en, Id: A/1:1.2.en.1., Channels: 2
Video Track: Codec: video/mp4, codecpar: 1.6
Timed Text Track: en, Profile: dti-sp-idx, id: T-
en-idx-1

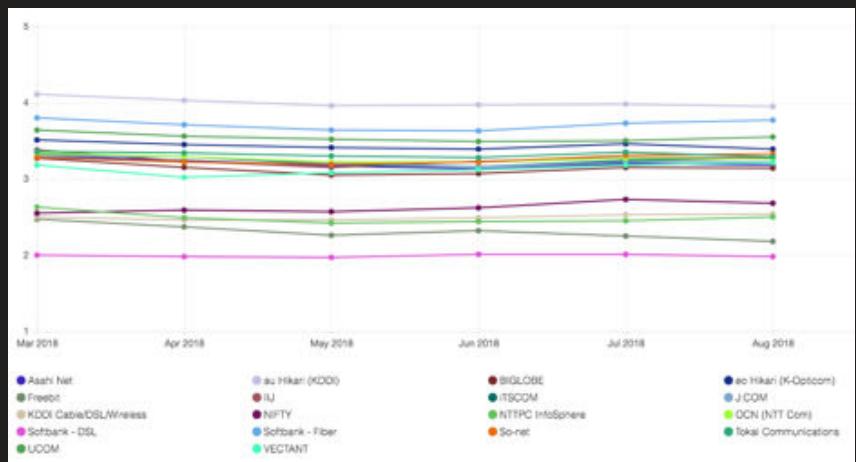
FrameRate: 23.977
Current Dropped Frames: 0
Total Frames: 1335
Total Dropped Frames: 5
Total Corrupted Frames: undefined
Total Frame Delay: undefined
Main Thread stat/sec: DISABL
VideoDiag: readyState=4, current
140.138999, duration=1672.192

Throughput: 163835 kbps

[View Details](#) | [Edit](#) | [Delete](#)



Ctrl+Alt+Shift+D



EXPAND YOUR REGION FOR A PERFORMANCE OVERVIEW

EUROPE - MIDDLE EAST - AFRICA +

AMERICAS +

ASIA-PACIFIC +

[VIEW GLOBAL AVERAGES >](#)

CSV
DOWNLOAD



JPG
DOWNLOAD



fast.com

English (US) ▾
Your Internet speed is
210 Mbps 

| Latency | Upload |
|--------------------------|-------------------------|
| Unloaded 18 ms | Loaded 190 ms |
| Speed 9.3 Mbps | |

Client Ben Lomond, US 24.5.146.38 Comcast Server(s) Santa Clara, US

Settings 500MB 10MB

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Twitter icon

POWERED BY NETFLIX

questions?



A dark, grainy photograph of a city skyline at night. In the foreground, two people are visible: a person on the left holding a large, light-colored object, and a smaller figure on the right. The city skyline features several tall buildings and industrial structures with lit chimneys.

고맙습니다!
Thank you!