



Story Delivery Network

Open Connect

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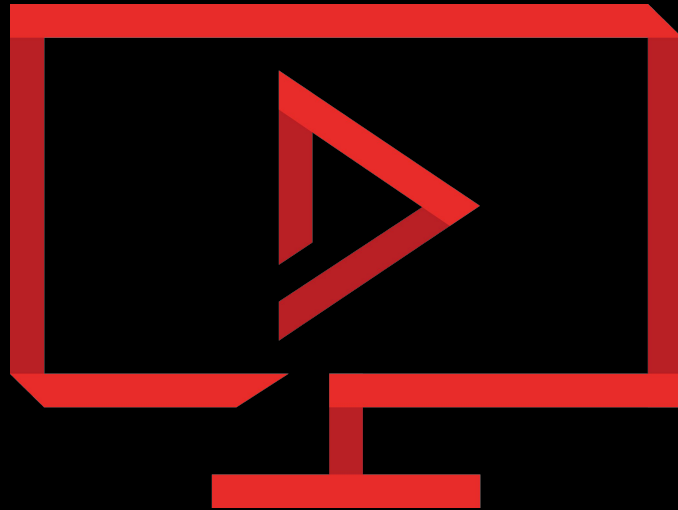
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Complementary Partnerships

Every bit starts with a member pressing “Play”



\$12.5B

Spent on content in 2020

How Netflix drives shared value for ISPs

High-quality content drives demand for broadband. That's why Netflix's big investments have big benefits for Internet Service Providers (ISPs).

Netflix spends billions on high-quality movies and TV series each year

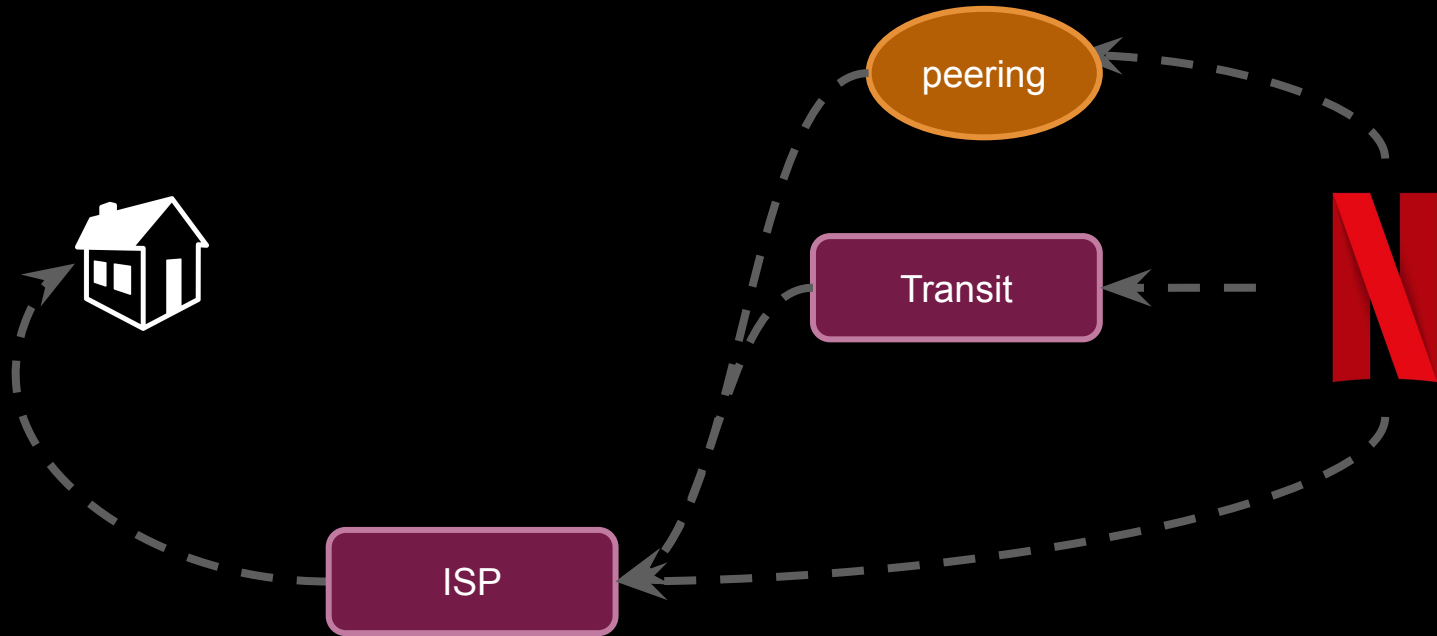


Which drives consumers to purchase faster broadband plans from their ISP

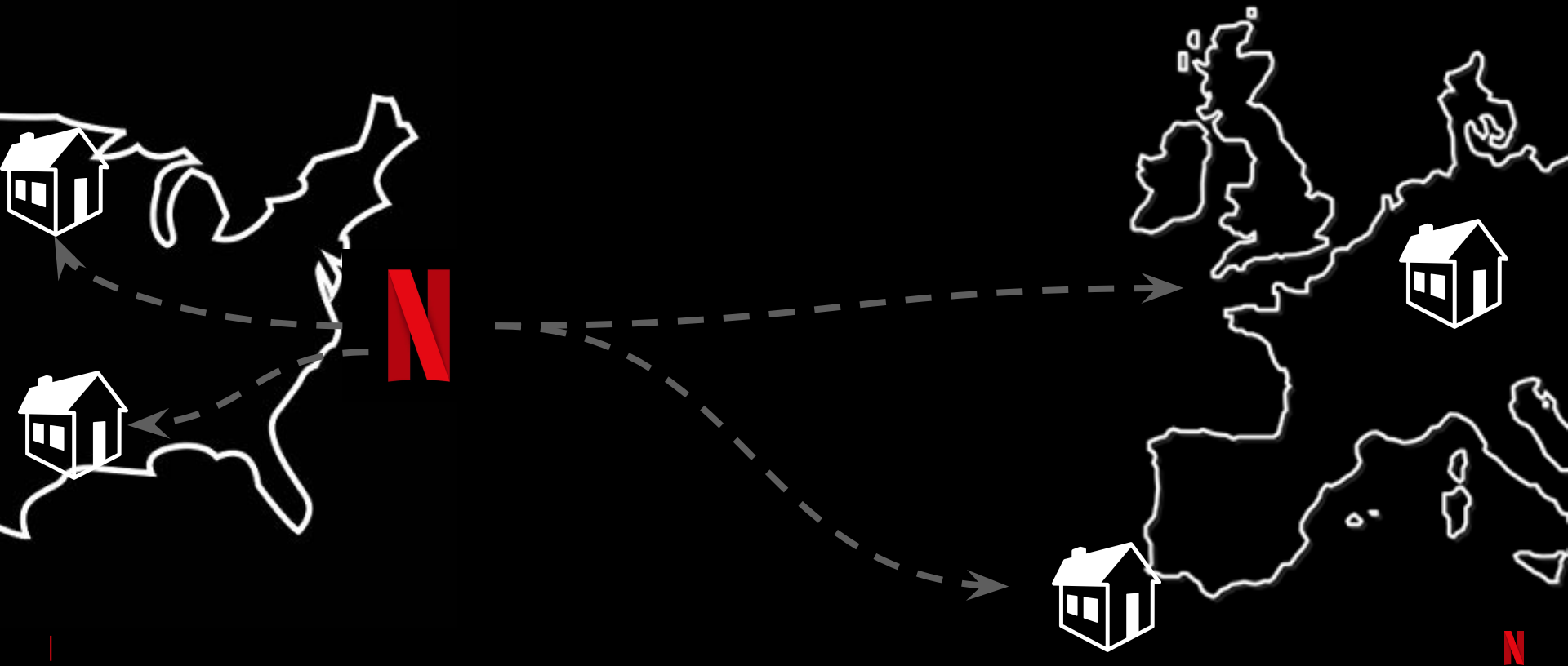
This increases customer demand for video streaming



We work together with ISPs as partners



Serving Traffic over Long Distances

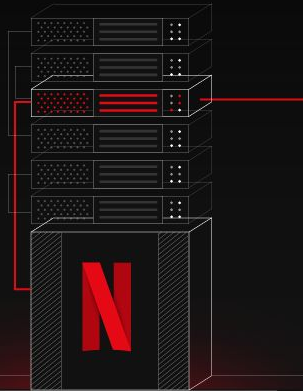


The long haul

Why the early structure of the internet could not scale to meet the demands of today's internet usage

SINGLE SOURCE

When a user requested video content, it was stored on a single server



CONGESTED DELIVERY

This server may have been a huge geographical distance from the user and traffic growth would mean expanding this long distance capacity



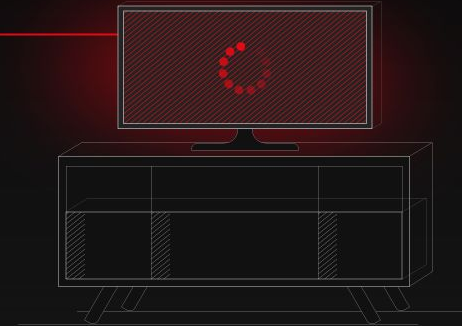
Long way round
Data would be forced to travel through many routers and networks

Traffic jams
Each router could be congested by high traffic volumes

Lost in transit
Congestion would lead to 'packet loss', causing quality to degrade

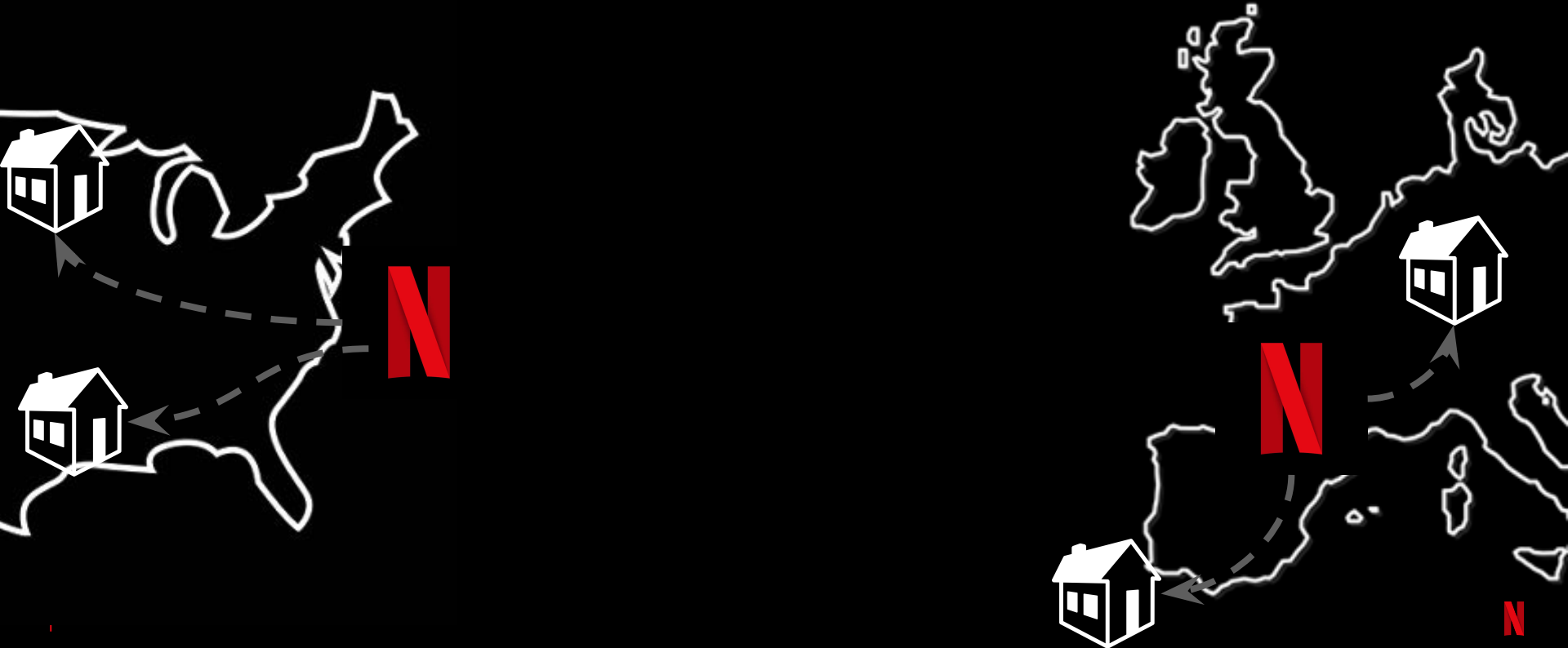
HUGE EXPENSE

Securing global connectivity would come at a high cost to ISPs (Internet Service Providers) who would have to purchase or build these backhaul connections



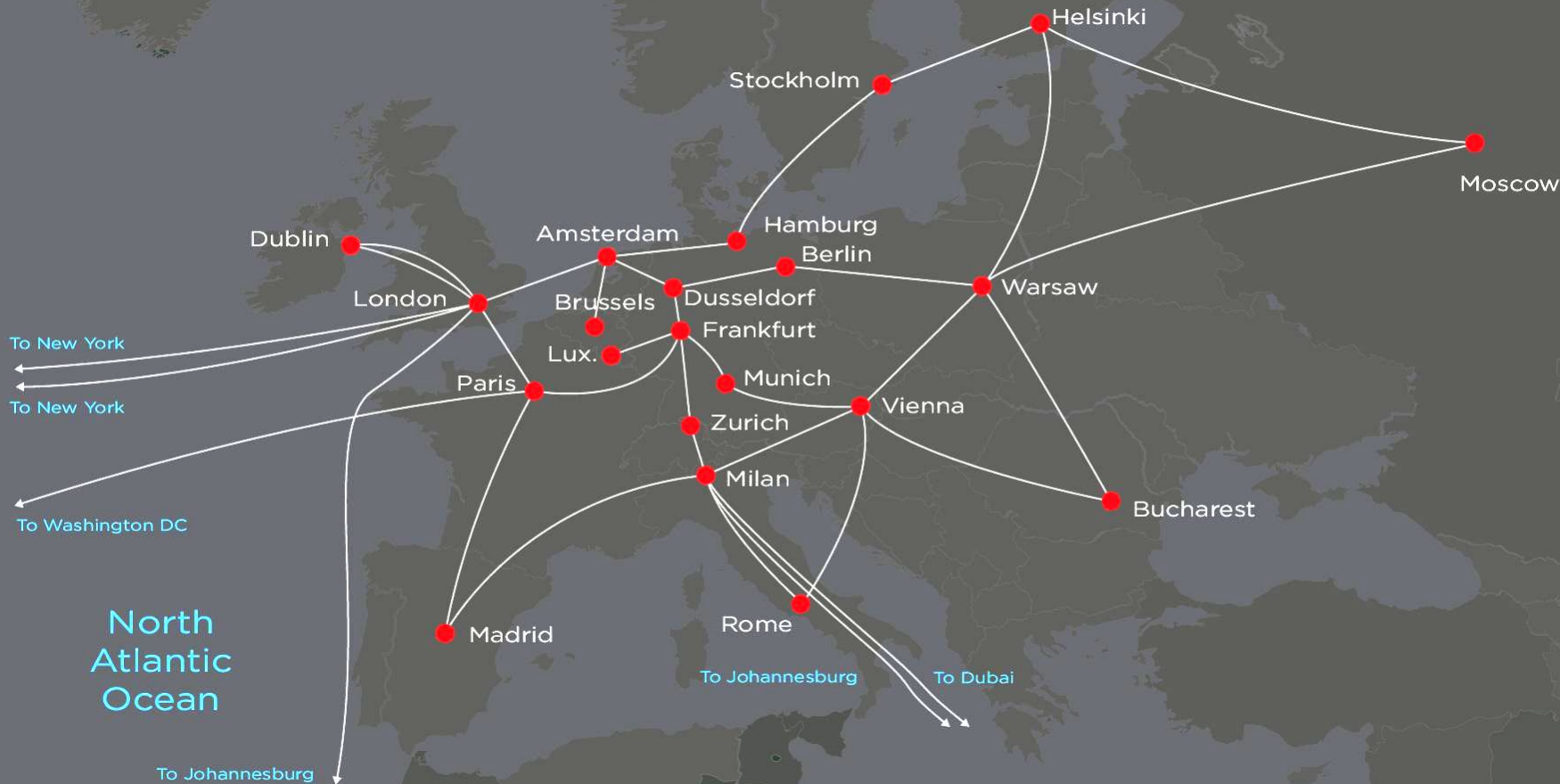
Open Connect Architecture

Netflix provides Open Connect Appliances for free to qualifying ISPs and will directly connect with any ISP at a mutually present interconnection point.



Netflix POPs and backbone

NETFLIX



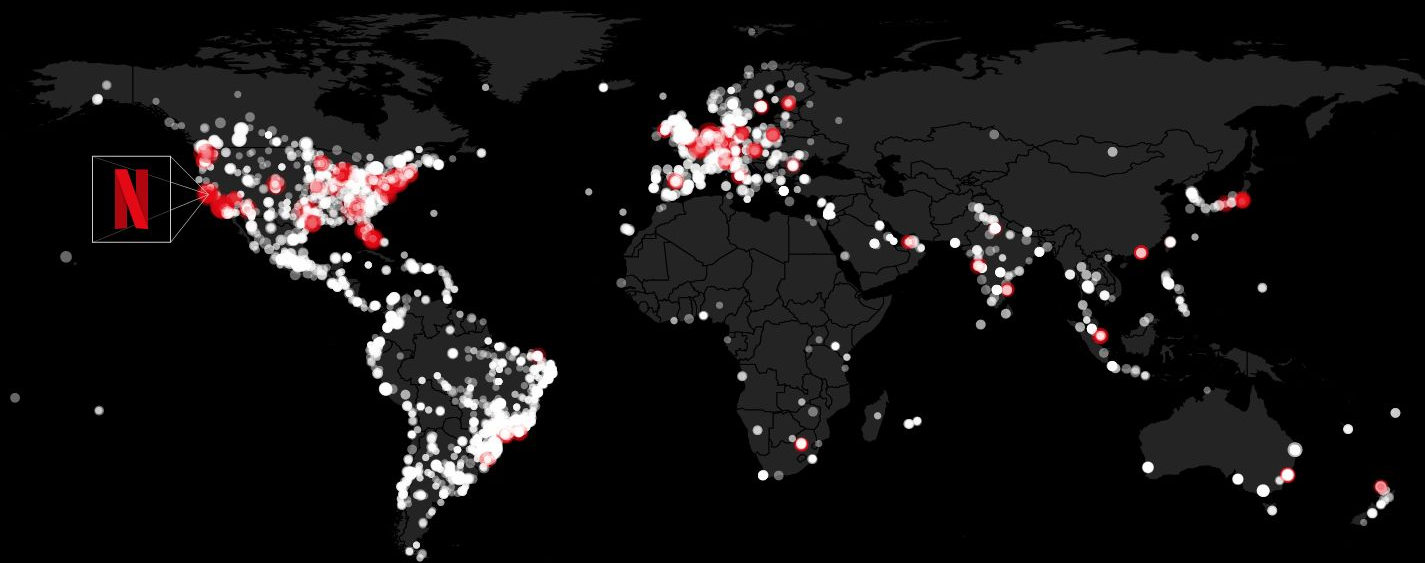
Bringing content closer

Netflix's investment in a new world of content delivery

OPEN CONNECT

Netflix now stores its content close to every member - no matter where in the world they are.

Open Connect is Netflix's content delivery network. It's made of more than **14,000 Open Connect Appliances (OCAs)** spread across **142 countries**.



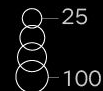
KEY

N Netflix headquarters
in California, USA

● Netflix OCAs
Located within public
internet exchange points

● OCAs gifted to ISPs
(Internet Service
Providers)

Number of content
caches per server



Note: Data as of 2020

We **work with ISPs** to **deliver efficiently**

Netflix engineers work together with an ISP's engineers to deliver customised OCAs deployment solutions that can **localize up to 100% of an ISP's Netflix traffic.**

Over one thousand ISPs globally have received free OCAs from Netflix to place in their networks and received these benefits.

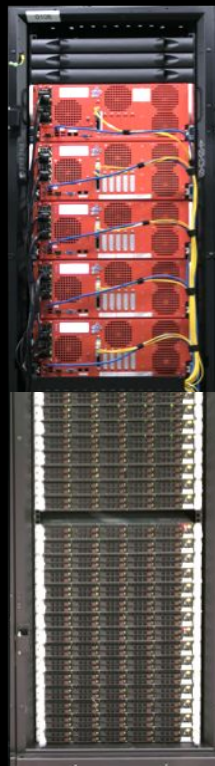
Predictability with a **finite catalog** allows us to **update content in advance**

- We **proactively cache content** during **off-peak** user viewing hours
- ISP partners prefer we not **fill** during **peak hours** because it's **the most costly for them**

We **optimize hardware** to **deliver efficiently**

The amount of throughput per watt of each OCA is capable of has grown over **100%** while the hardware has become smaller.

This allows operators to get considerably higher throughput over time relative to the footprint demands.



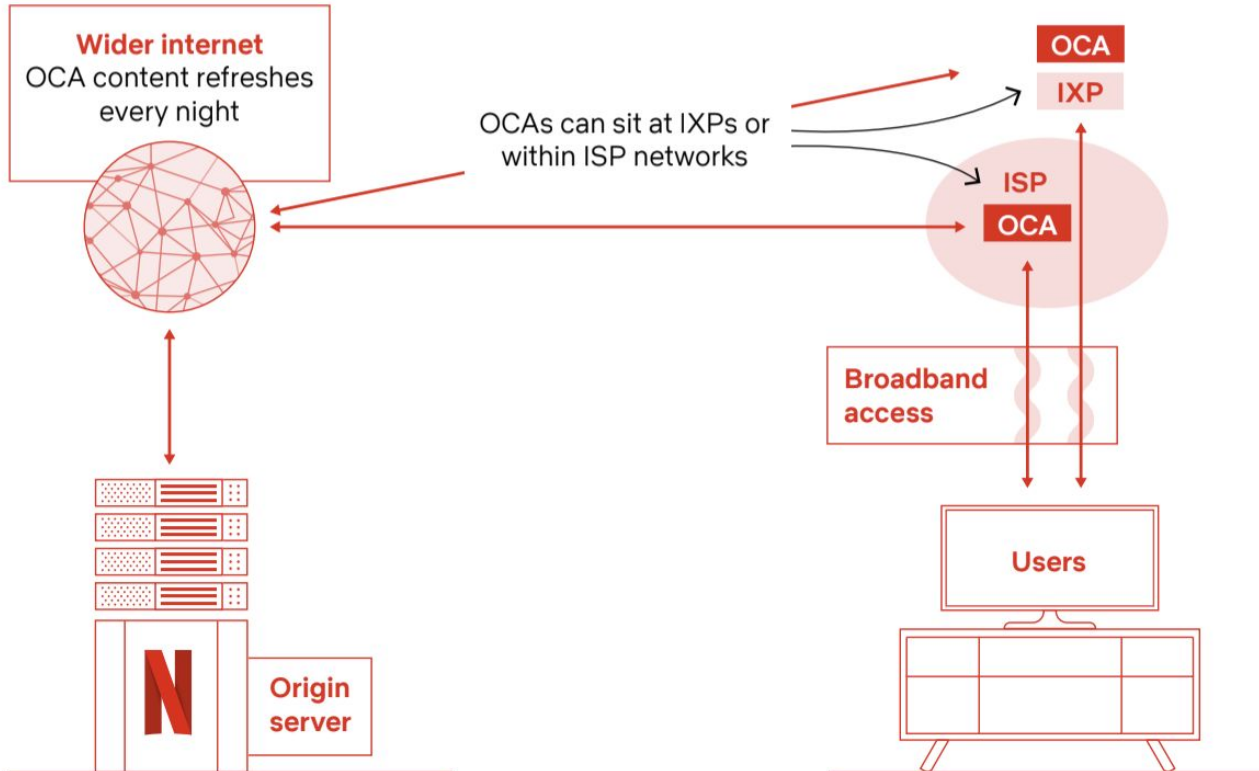
Storage OCAs that hold a large portion of catalog

Flash OCAs hold the more **popular content** and **serve a large portion of the traffic**

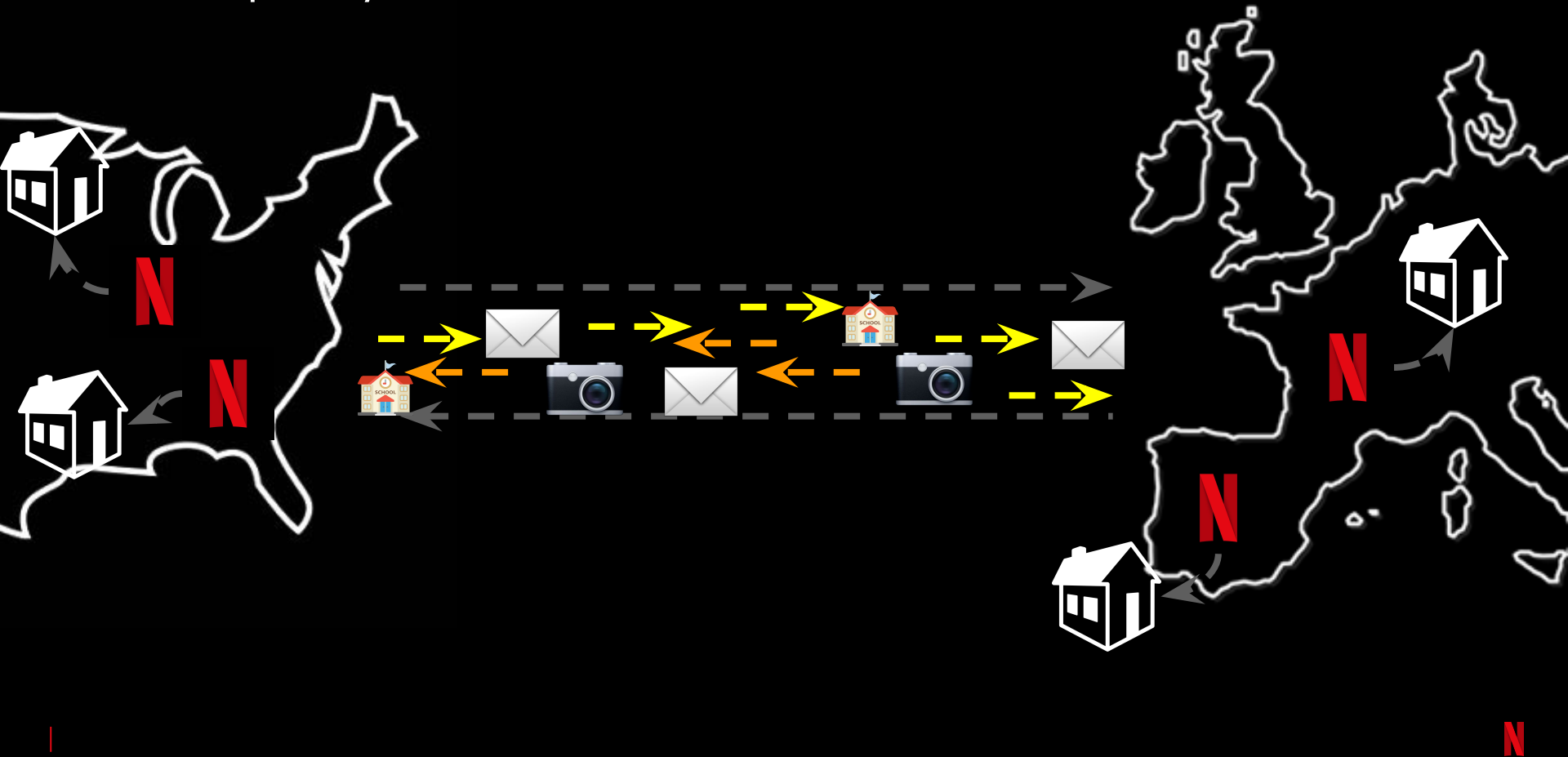
Benefits

1. Reduce congestion for all internet traffic
2. Reduce ISP costs from transit

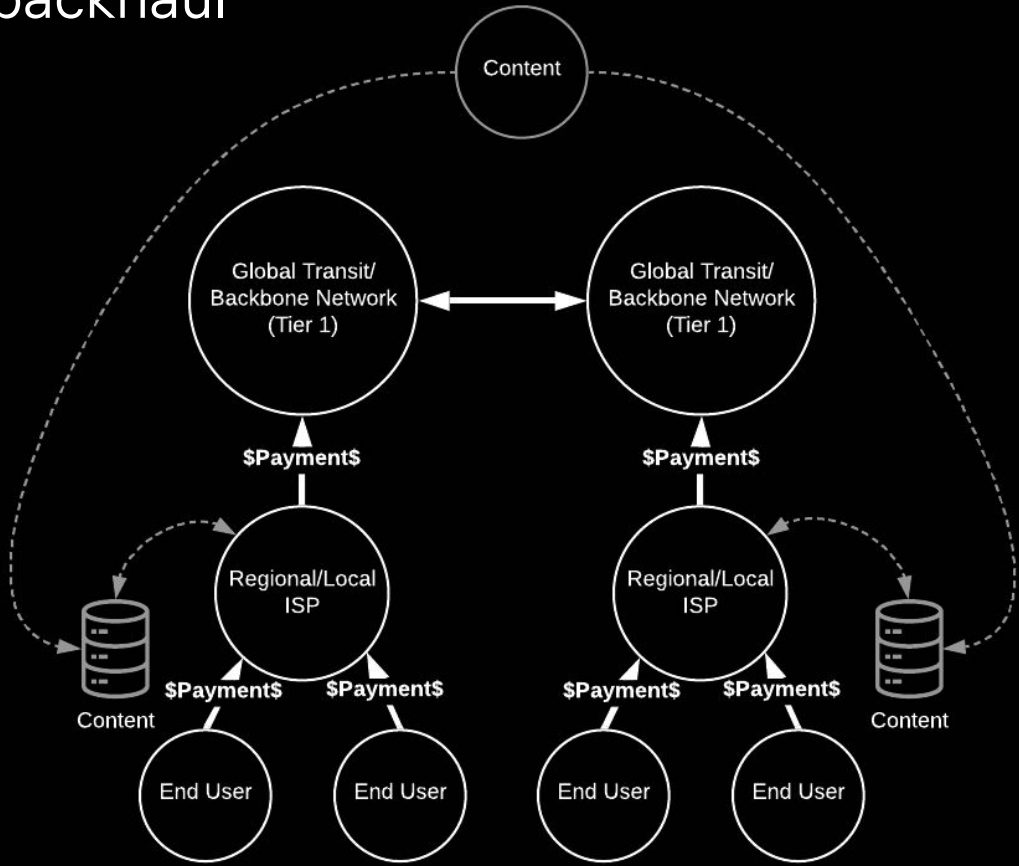
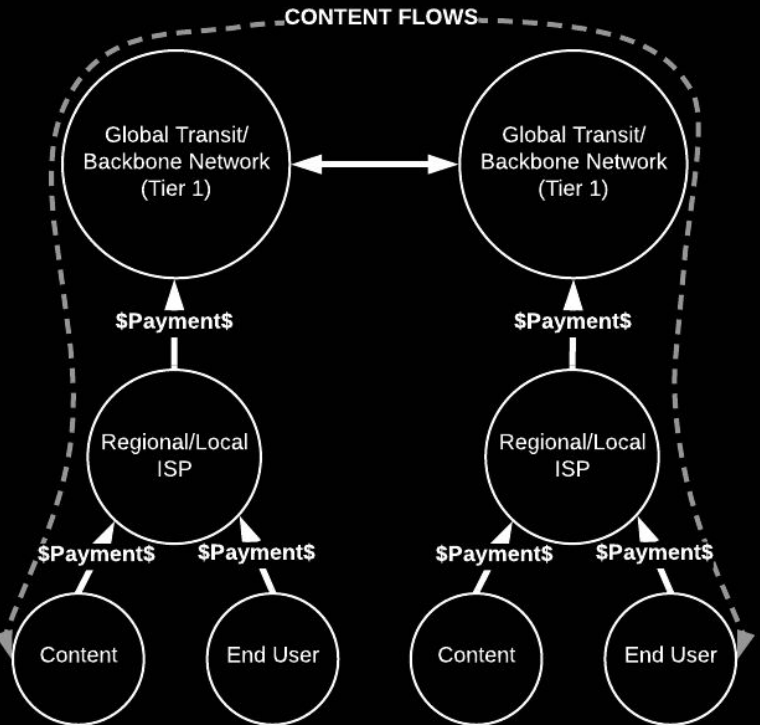
Reduce Congestion



Stabilize quality



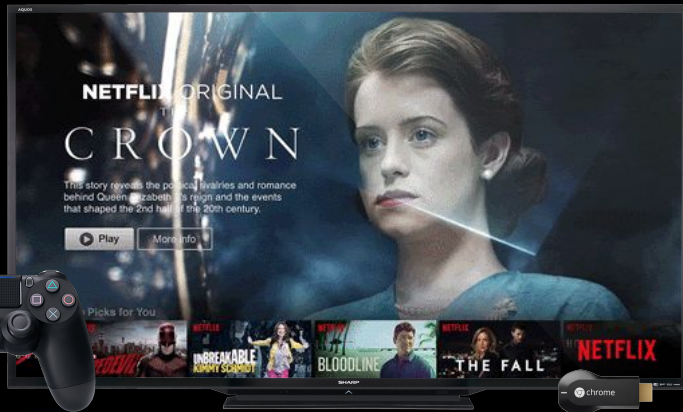
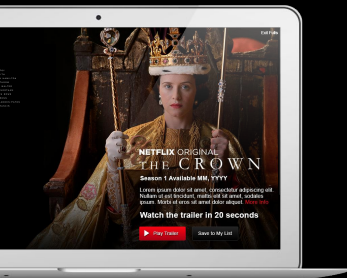
Reduce ISP costs from transit or backhaul



\$1.2B

The amount ISP partners that have opted to deploy servers within their own networks have saved in 2020.

Encoding



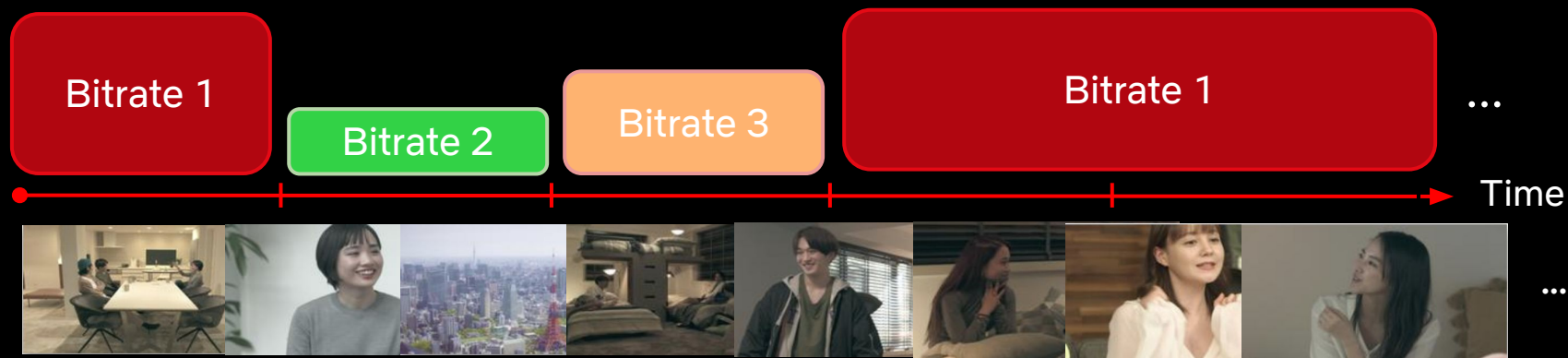
2000%

The number of hours a Netflix member can stream per GB of data has increased over the last five years

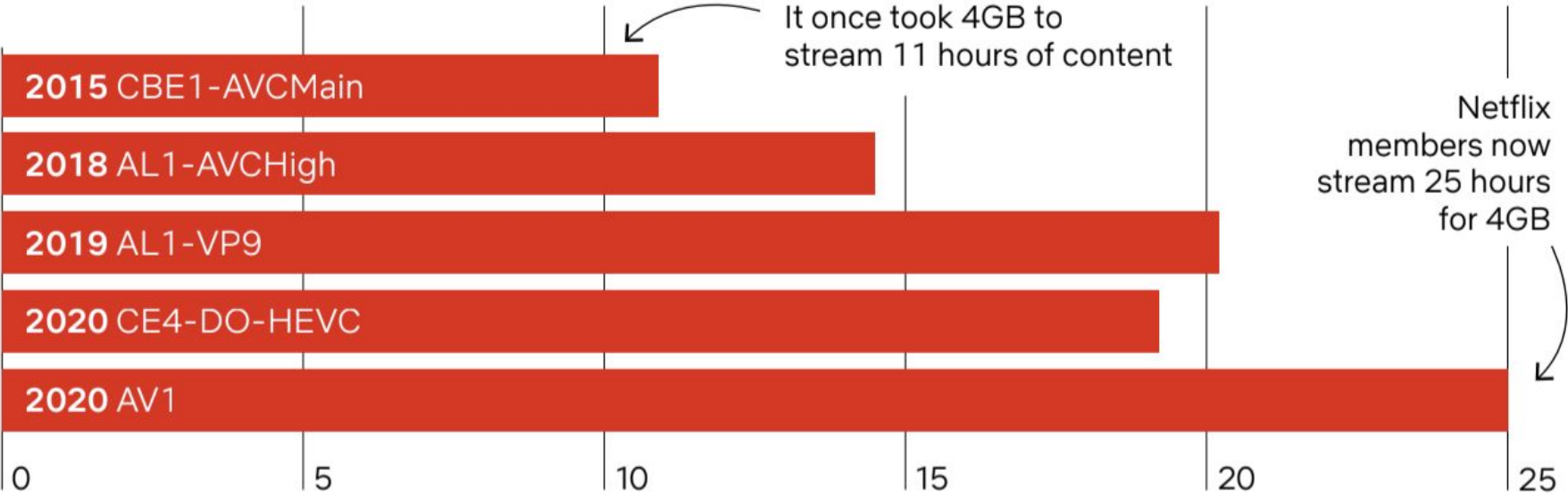
Complexity Encoding



Adaptive Streaming




In the past five years, Netflix's encoding has more than doubled the data efficiency of streaming



Hours of streaming per 4GB of data

Fast times

Netflix recommends just 5Mb per second to stream  a high definition movie on Netflix on a fixed line. That means a Netflix member with a modern broadband connection has enough bandwidth to stream multiple HD videos at the same time.

How many could you watch at once?



25Mbps

5 films



100Mbps

20 films

1,000Mbps

200 films

