The evolution of Internet traffic

Profiles and volumes in the era of Big Content

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About me

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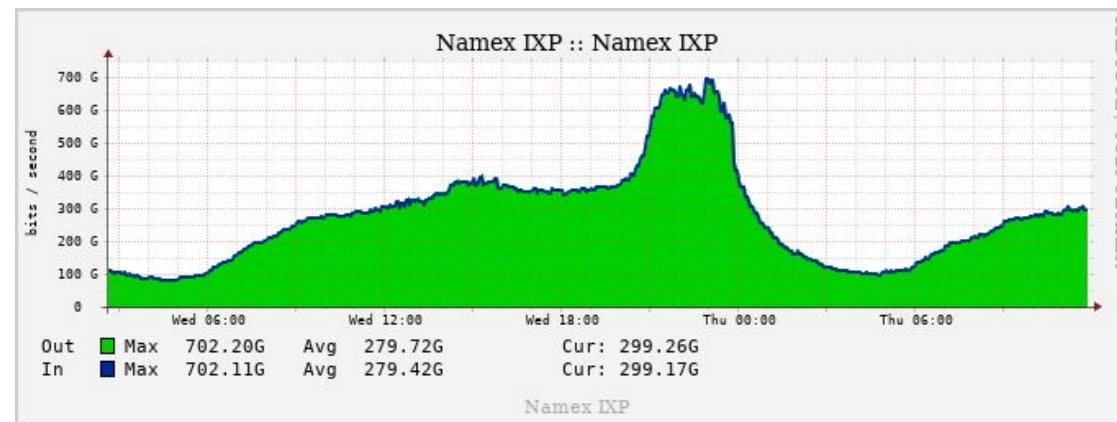
Routing security supporter

Co-author of the book:
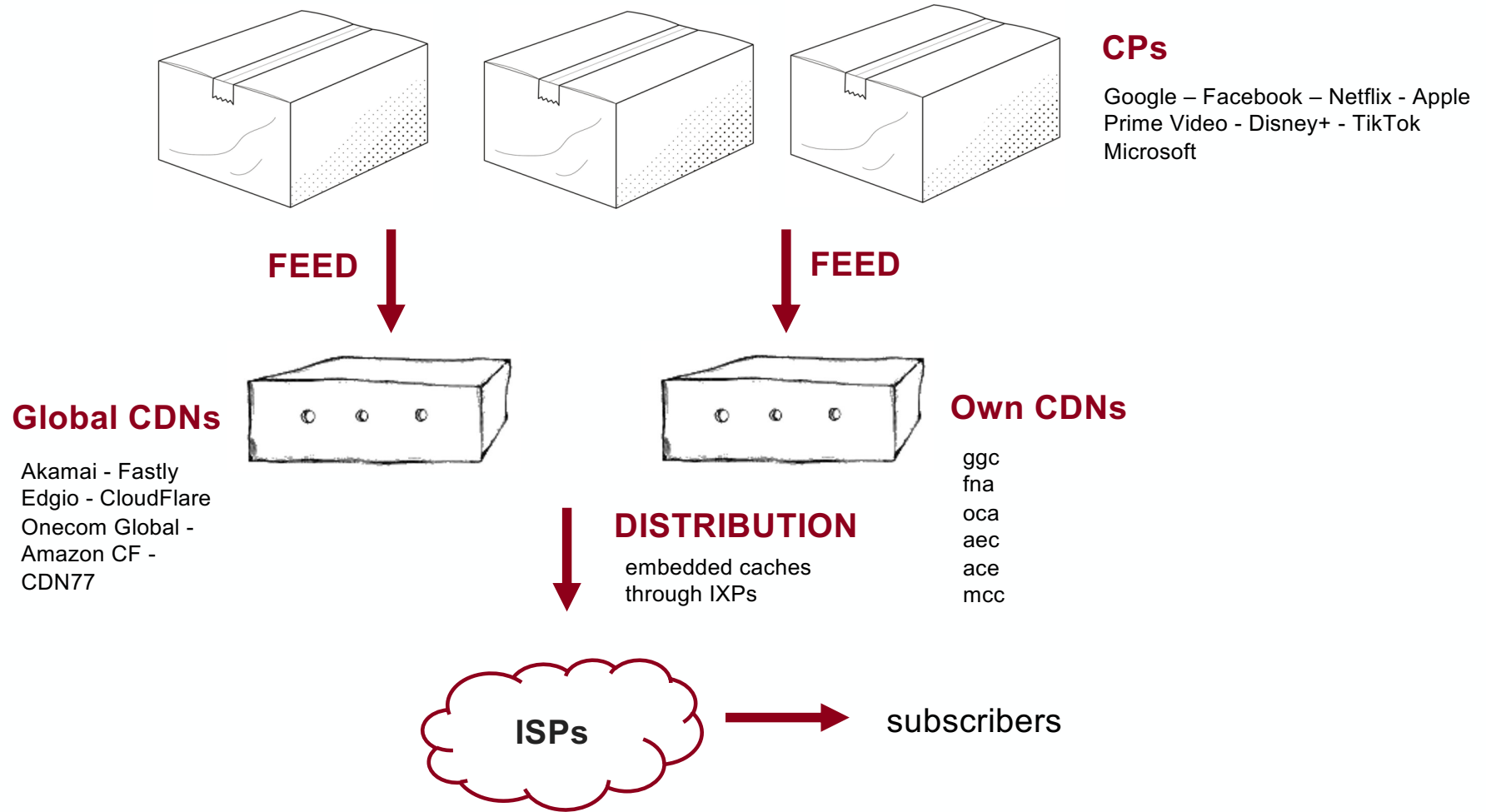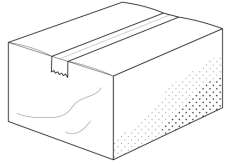BGP from Theory to practice

Definitions

- **An Internet Exchange Point (IXP) is a network facility that enables the interconnection of more than two independent Autonomous Systems (AS), primarily for the purpose of facilitating the exchange of Internet traffic**
  - Born in the late 1990s early 2000s
  - Drive costs down, improve performances
  - https://www.internetexchangemap.com

- **The Internet traffic data in this presentation refer (mostly) to Namex**
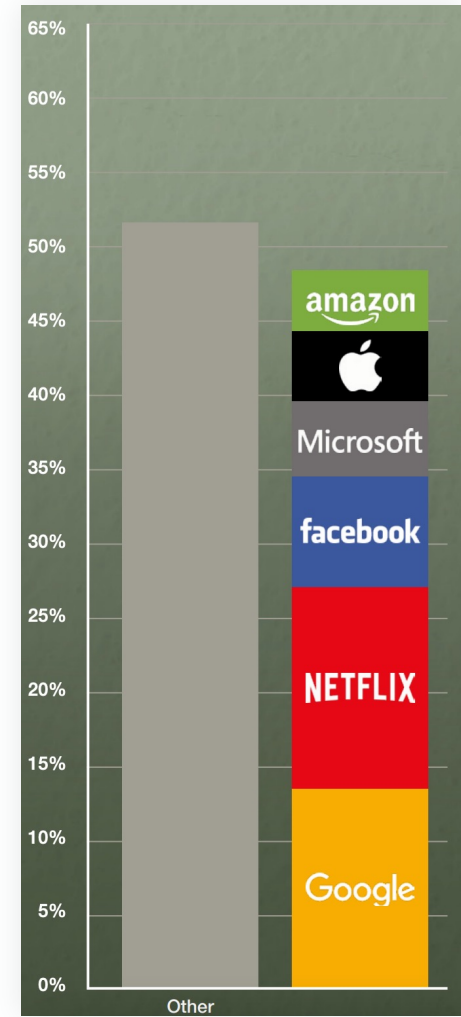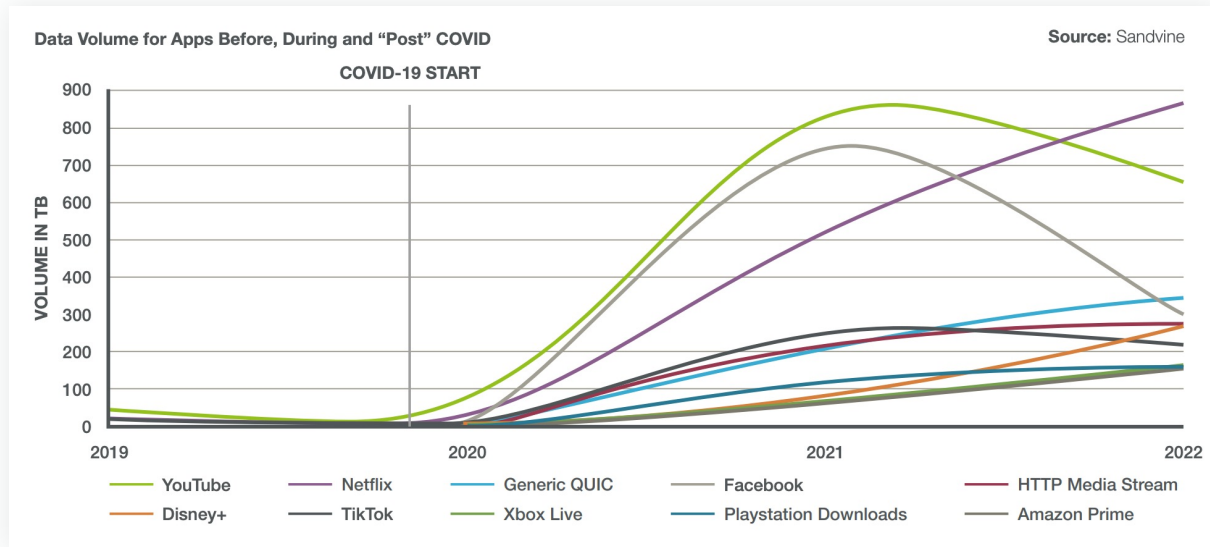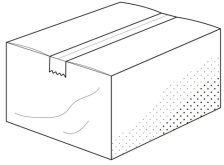 - public traffic passing through the peering platforms of the IXP is usually measured

Namex IXP :: Namex IXP

		Max	Avg	Cur
Out		702.20G	279.72G	299.26G
In		702.11G	279.42G	299.17G

The distribution of content

CPs

Google – Facebook – Netflix - Apple
Prime Video - Disney+ - TikTok
Microsoft

FEED

FEED

Global CDNs

Akamai - Fastly
Edgio - CloudFlare
Onecom Global -
Amazon CF -
CDN77

Own CDNs

ggc
fna
oca
aec
ace
mcc

DISTRIBUTION

embedded caches
through IXPs

ISPs

subscribers

4

Content Providers volumes

Data Volume for Apps Before, During and "Post" COVID

Source: Sandvine

COVID-19 START

VOLUME IN TB

- YouTube
- Disney+
- Netflix
- TikTok
- Generic QUIC
- Xbox Live
- Facebook
- Playstation Downloads
- HTTP Media Stream
- Amazon Prime

The BIG 6

Content Providers volumes

Application	Total Volume
1 Netflix	13.74%
2 YouTube	10.51%
3 Generic QUIC	5.41%
4 HTTP Media Stream	4.33%
5 Disney+	4.20%
6 Tik Tok	3.55%
7 Facebook	2.83%
8 Xbox Live	2.71%
9 Playstation Downloads	2.70%
10 Amazon Prime	2.67%

2022 Categories	Total Volume
1 Video	65.93%
2 Marketplace	5.83%
3 Gaming	5.58%
4 Social Networking	5.26%
5 Cloud	4.98%
6 Web Browsing	4.63%
7 File Sharing	3.39%
8 Messaging	2.30%
9 VPN	1.13%
10 Audio	0.95%
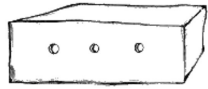
CDNs in-network caching in numbers

hypergiants that deploy servers inside other networks improve the fundamental challenges of the Internet — **capacity**, **latency** and **congestion** — and they reduce the amount of traffic traversing peering interconnections

over 3,500 ASNs globally have embedded servers
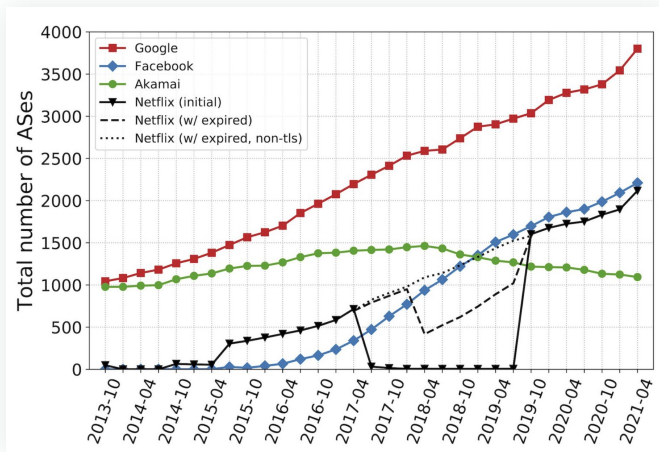
expansion of off-nets by major hypergiants

Legend:
- Globo
- Amazon
- Qwilt
- Apple
- CDN77
- Cloudflare
- Akamai
- Facebook
- Google
- Netflix
- Other
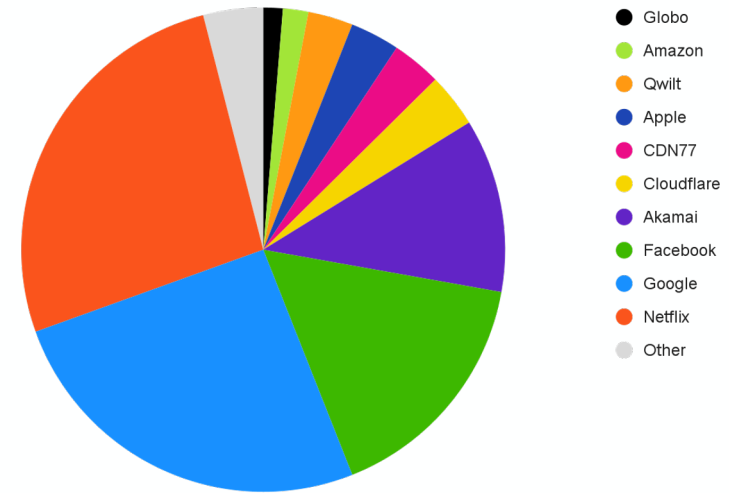
Google **(25.5%)**   Netflix **(26.5%)**

Facebook **(16.2%)**   Akamai **(11.6%)**

Apple **(3.3%)**   CDN77 **(3.3%)**

percentages of the ISPs in the sample that have embedded servers from the CDN
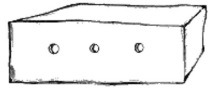
CDNs in-network caching in numbers

Total distribution of CDN traffic

Google
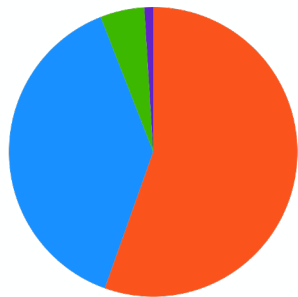
- Outside to end-users **(39%)**
- Embedded to end-users **(56%)**
- Outside to embedded **(5%)**
- Embedded to embedded **(1%)**

Facebook
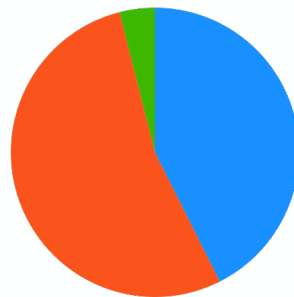
- Outside to end-users **(43%)**
- Embedded to end-users **(54%)**
- Outside to embedded **(4%)**
- Embedded to embedded **(0%)**

Akamai
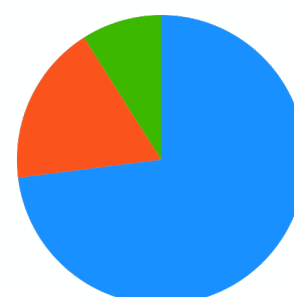
- Outside to end-users **(73%)**
- Embedded to end-users **(18%)**
- Outside to embedded **(9%)**
- Embedded to embedded **(0%)**
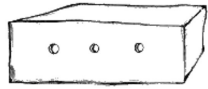
CDNs in-network caching in numbers

Blue line is the delivery inside the ISP

Green line is the delivery to the long tail (IXP)
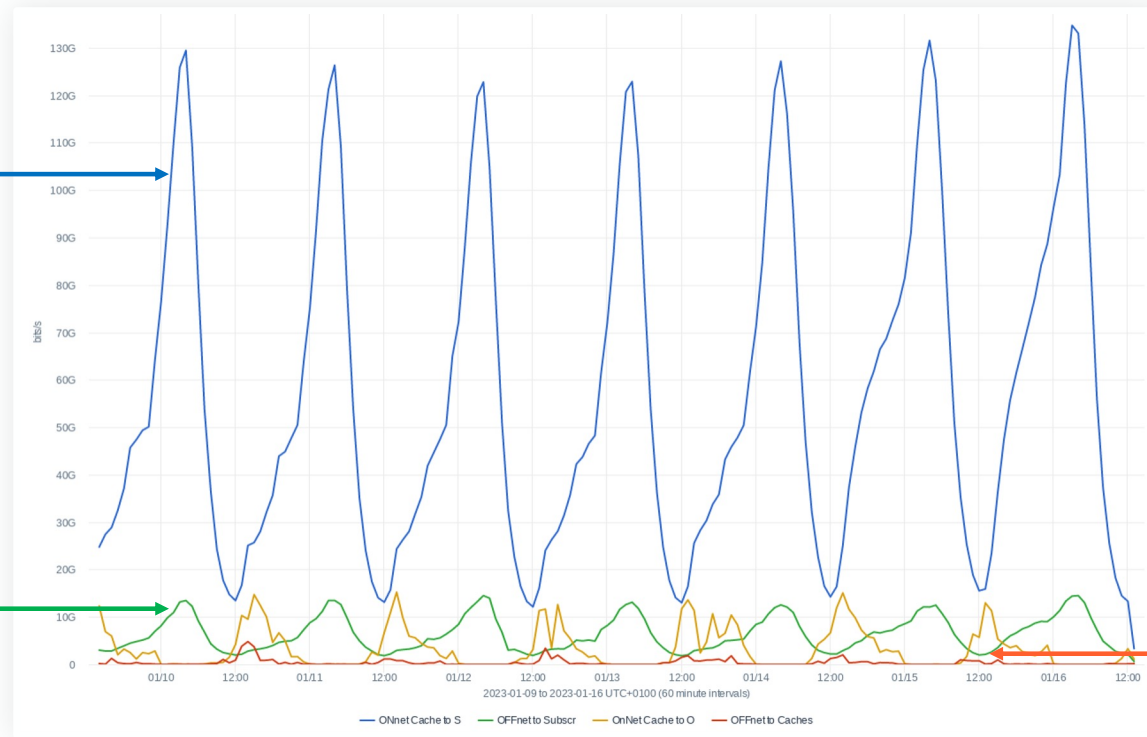
Red line is the filling caches traffic

Typical Netflix traffic profile in well dimensioned deployment
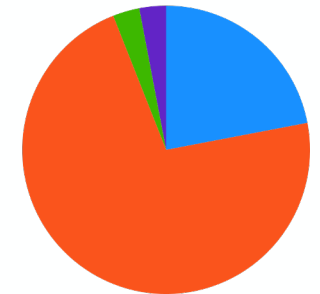
Netflix

- Outside to end-users **(22%)**
- Embedded to end-users **(72%)**
- Outside to embedded **(3%)**
- Embedded to embedded **(3%)**

CDNs – On-Net VS Off-Net
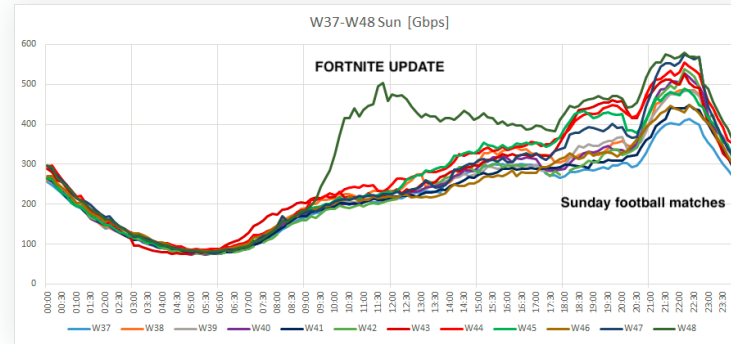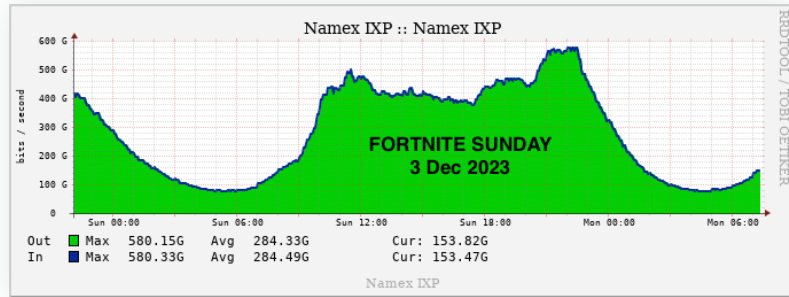
DAZN edge (Football) + Akamai (Fortnite)

CDNs – IXPs
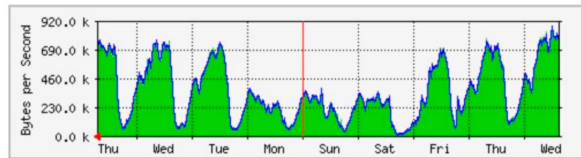
The first bits of Namex late 90s

Namex today

11

CDNs – IXPs

16:00   00:00

Until 2012

16:00   00:00

Then

CDNs – IXPs

Wed 12:00   Thu 00:00
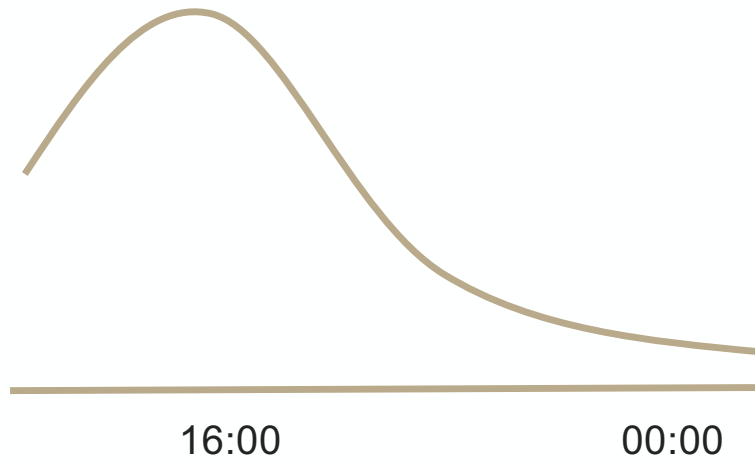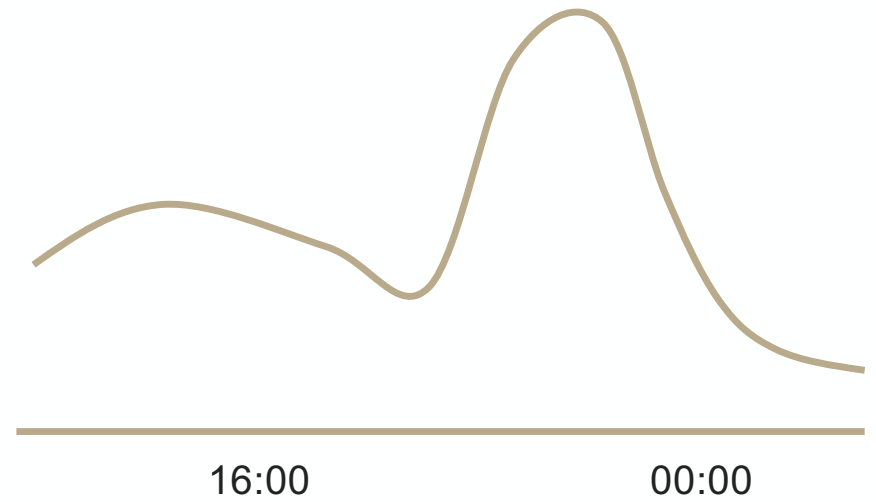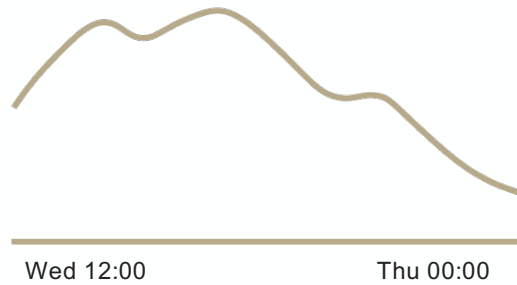
Prehistory
No series and movies on internet
(Until 2012)

Tue 12:00   Tue 18:00   Wed 00:00
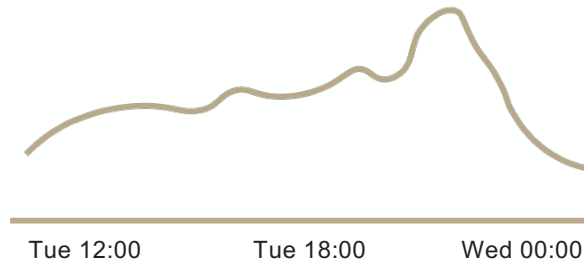
Entertainment services #ondemand
(2012 until today)

Wed 06:00   Wed 12:00   Wed 18:00   Thu 00:00
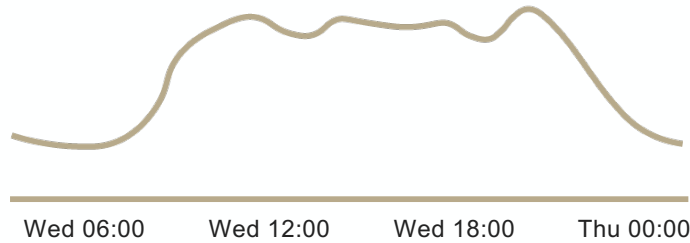
Health Emergency #covid
(2020)

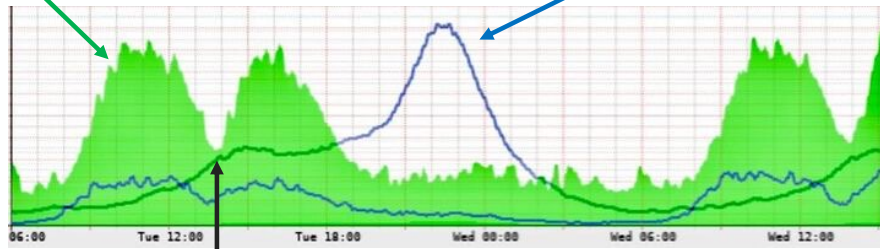Sun 06:00   Sun 12:00   Sun 18:00   Mon 00:00
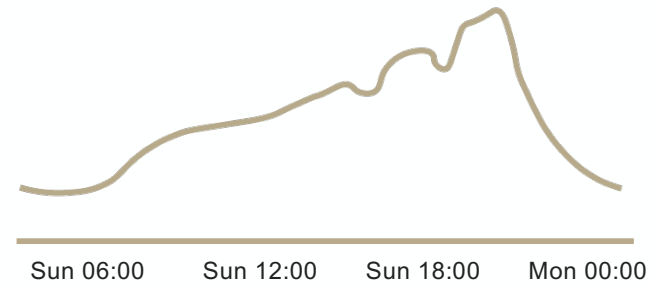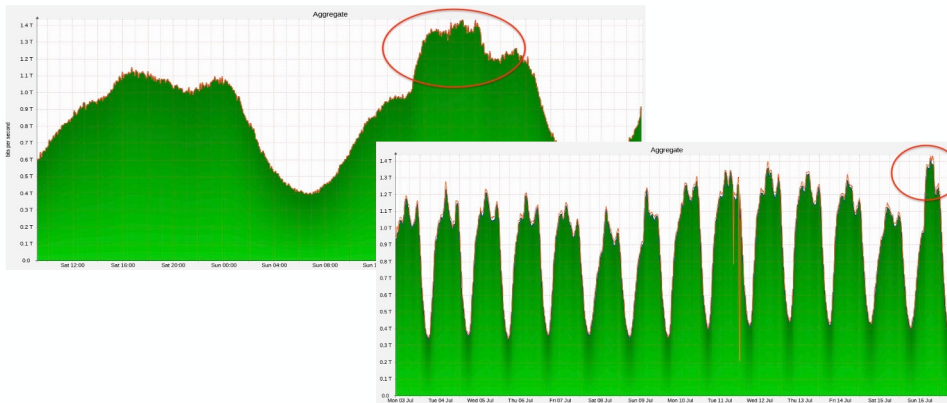
Entertainment services + live streaming
(2021)

CDNs – IXPs

Green line is Microsoft

Blue line is Netflix

Lunch break

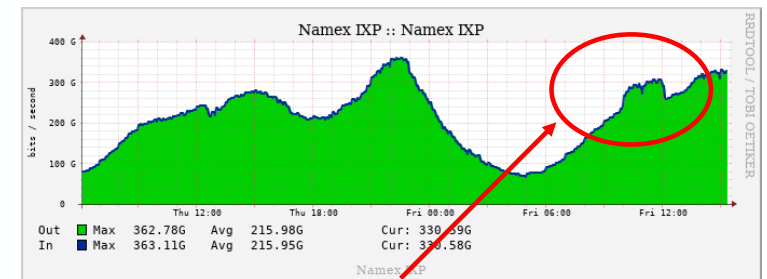A Sunday with DAZN / Italian Serie A. Three matches
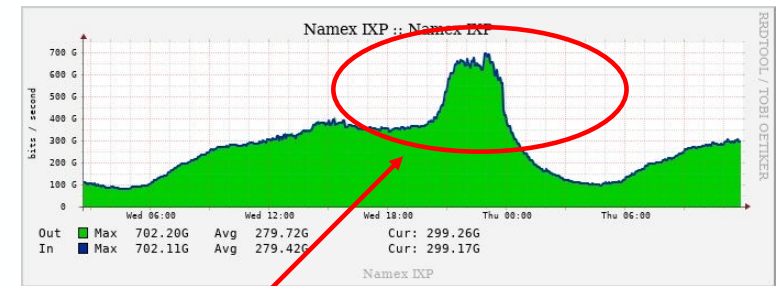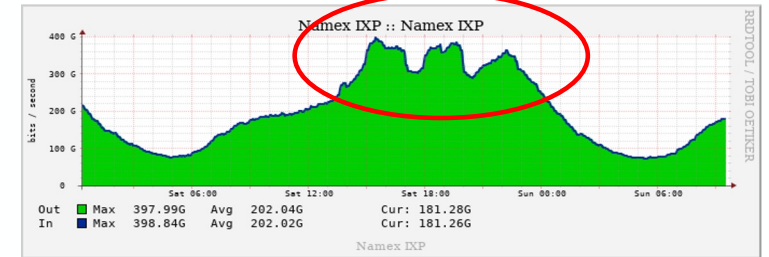
UEFA – Man City – Real Madrid (Apr 2024)

(Basket) Italy – Serbia broadcasts by RAIPLAY (midday)

Wimbledon Final – Graph from Barcelona IXP

CDNs – IXPs

01/05/24

1st MAY CONCERT

UEFA LEAGUE

DAZN

SANREMO

03/02/24
10/02/24

Pandemic 2020

NAMEX Roma IXP :: NAMEX Roma IXP

		Max	Avg	Cur:
Out		143.00G	83.12G	77.28G
In		143.17G	83.15G	77.26G

NAMEX Roma IXP

Sunday 28/01

Australian Open Final

Monza VS Sassuolo

Lazio VS Napoli

Fiorentina VS Inter

28/01/24
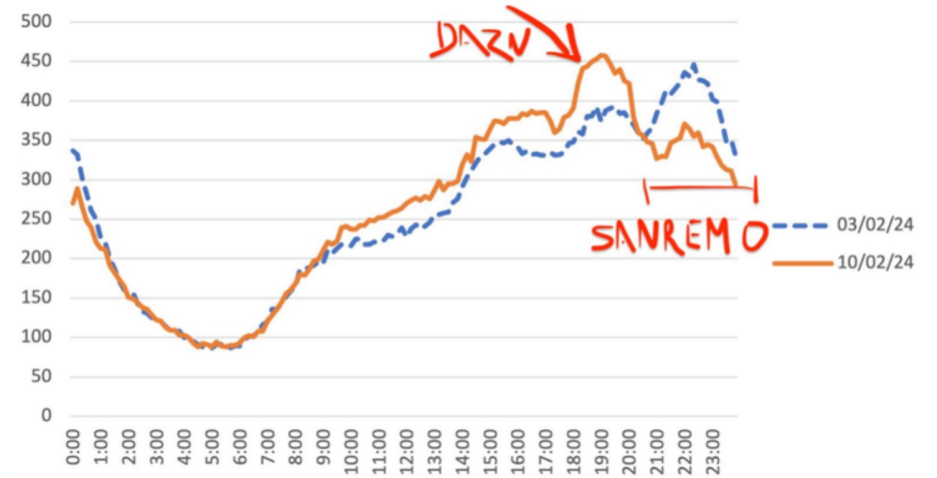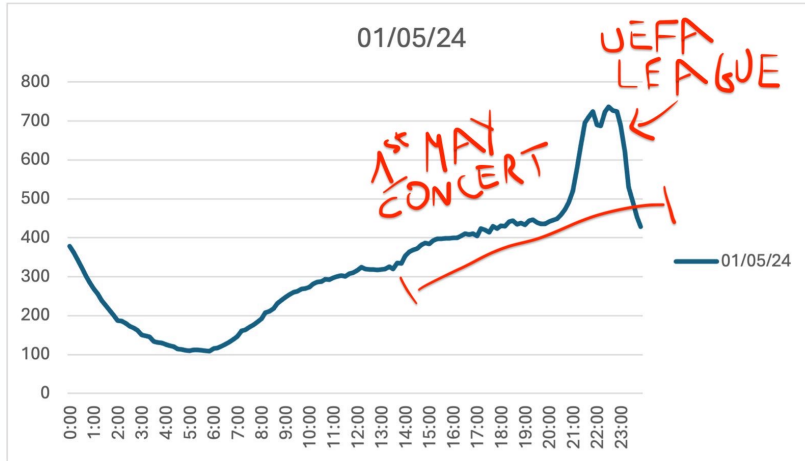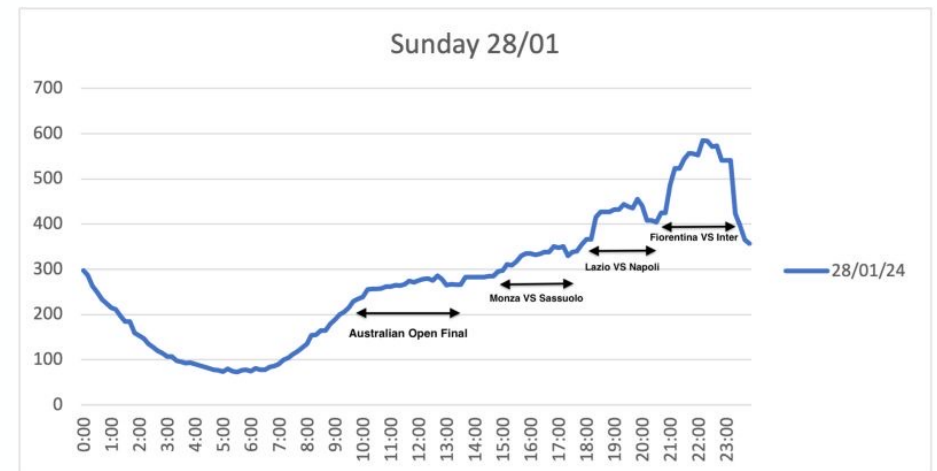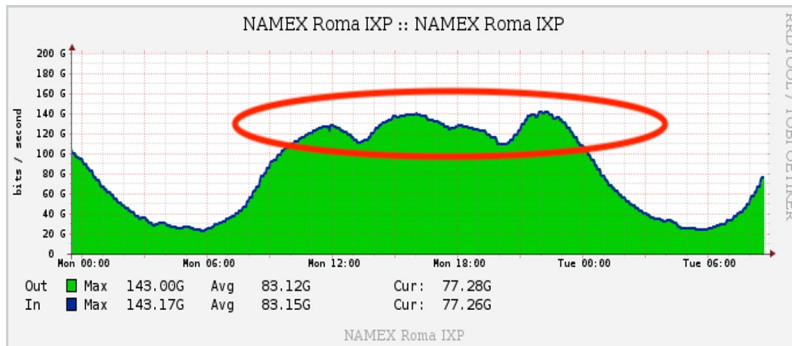
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https://labs.ripe.net/author/flavio_luciani_1/sanremo-and-internet-traffic-in-italy/

THANKS.

Questions?

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