Planificar, operar y proteger la red en la época de Netflix

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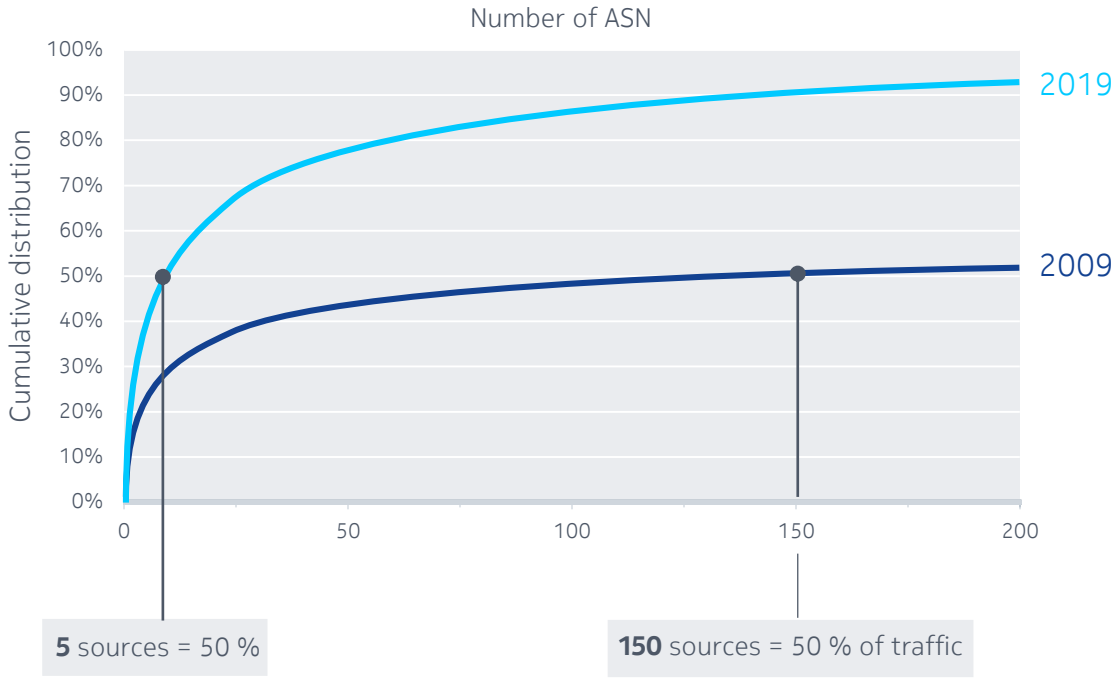
Netflix Era Trend #1

Traffic concentrates in a small amount of big sources

2009 → 2019

From web browsing to social media, video streaming and online gaming

NETFLIX YouTube Google Spotify twitch hulu amazon pandora facebook



Source: Data from SIGCOMM 2010 "Internet Traffic" and ongoing Nokia Deepfield research

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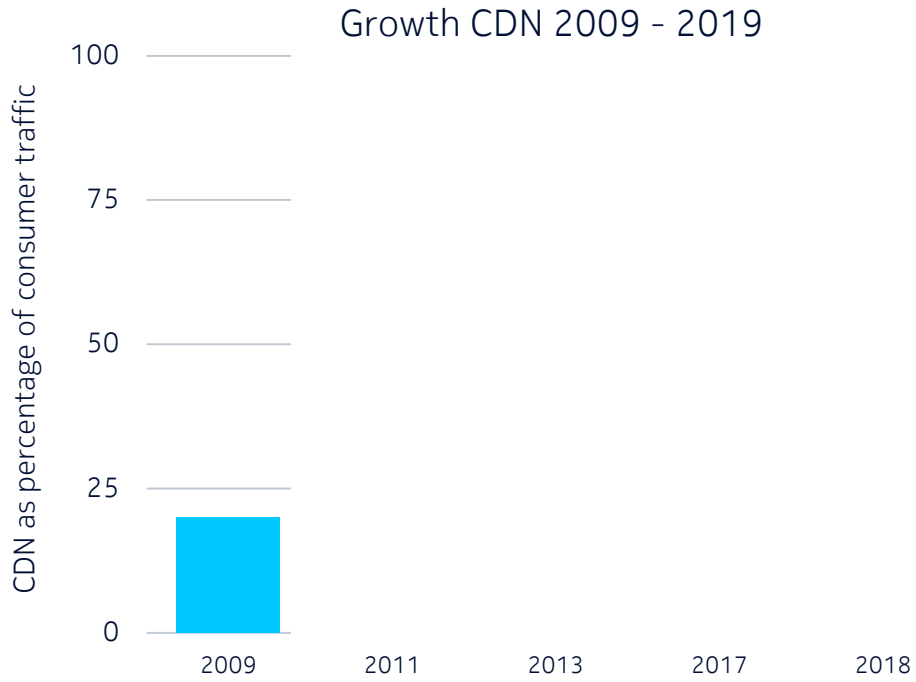
Netflix Era Trend #2

Traffic moves to CDNs



Source: Data from SIGCOMM 2010 “Internet Traffic” and ongoing Nokia Deepfield research

(Mix of off-net and local on-net caches)

Typically > 80% of consumer traffic sourced from CDNs

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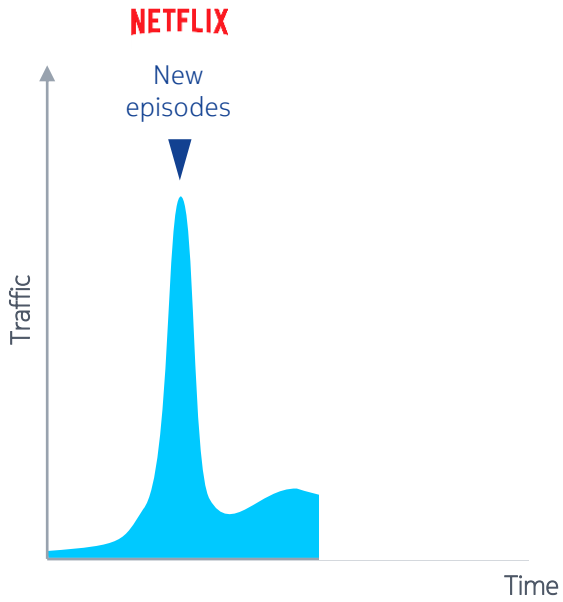
Netflix Era Trend #3

Traffic is far more difficult to predict



Small number of players (or incidents)

- trigger HUGE traffic bursts…
- shift vast volumes of content between PoPs/CDNs…

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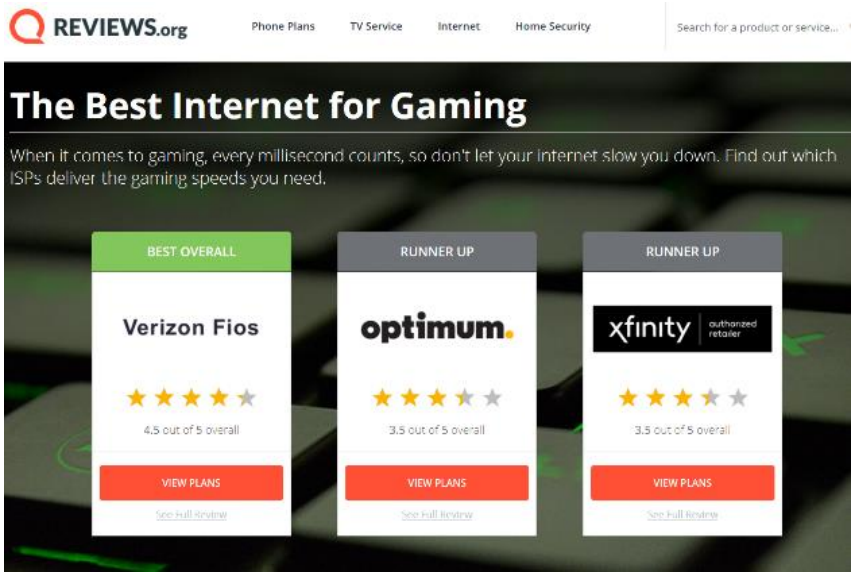
Netflix Era Trend #4

Speed and latency matter: Performance emerges as key driver over cost

ISP LEADERBOARD - JANUARY 2019 SHOW SMALLER ISPS

RANK	ISP	SPEED Mbps	PREVIOUS Mbps	RANK CHANGE	TYPE (Fiber / Cable / DSL / Satellite / Wireless)
1	Comcast	4.46	4.51	+1	
2	Verizon - FiOS	4.46	4.51	-1	
3	Cox	4.46	4.51		
4	Spectrum	4.43	4.48		
5	Optimum	4.39	4.45		
6	Mediacom	4.31	4.35		
7	Suddenlink	4.26	4.30		
8	AT&T - U-verse	4.15	4.30		

Source: https://ispspeedindex.netflix.com/country/us/



Source: https://www.reviews.org/internet-service/best-internet-gaming/

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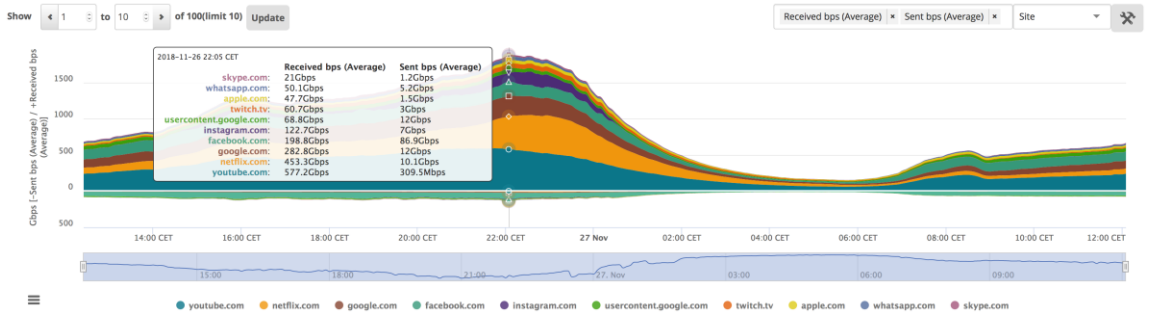
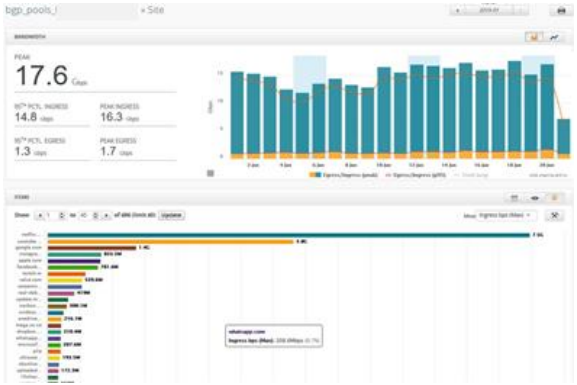
For planning you need to understand the nature of the content running over the network

Get a DPI-like view of applications running over your network…

…with either a complete network view…



…or just a particular region / node



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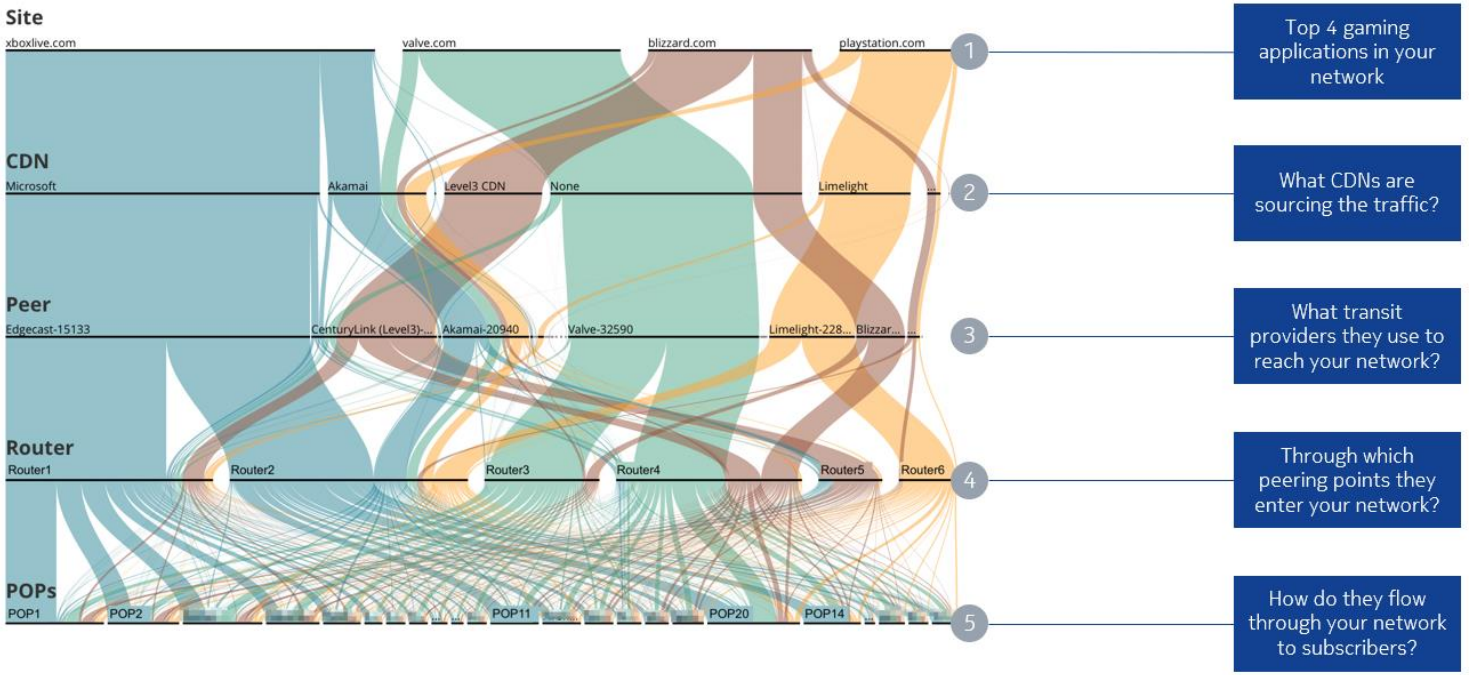
Internet-wide view

Traffic delivery chain for Top 4 gaming applications



And through the entire delivery chain: origin, CDN, Peer, Core, Edge

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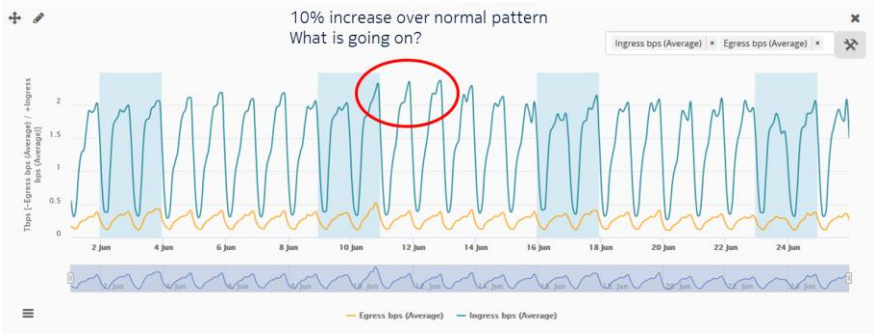
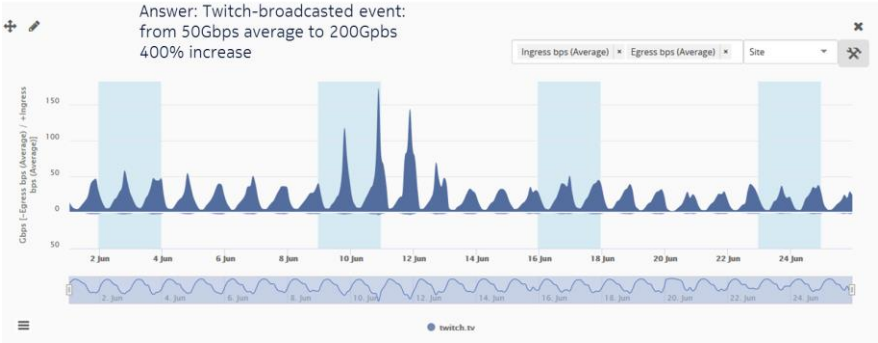
Shared under NDA

For planning you need to understand the impact of new services in the network

The traditional view: bulk traffic measurements on a link or node level does not tell you **what's driving events.**



You need visibility **at Service level**: traffic levels per application (and additionally segmented by other dimensions such as region, node, peer…)



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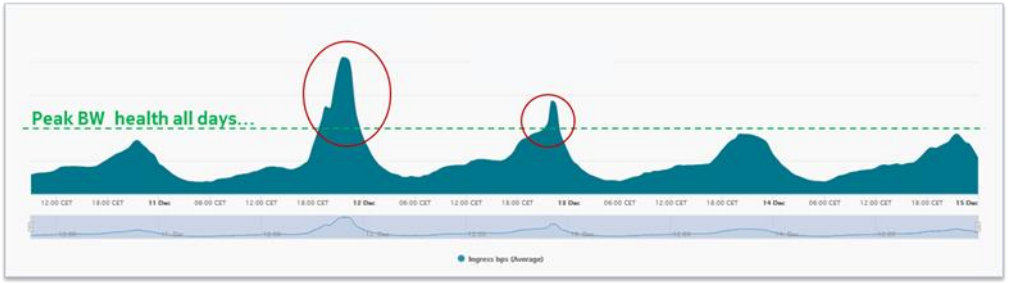
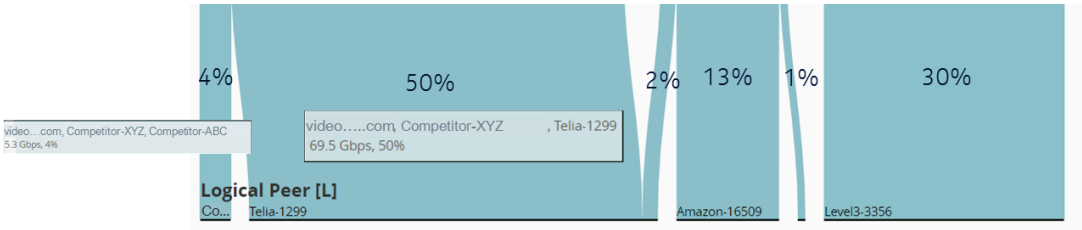
For planning you need to understand the impact of the Internet supply chain (origin / CDN / peer) in the network

The traditional view: overcapacity on peering links. But what is causing it?



The Internet Chain view: caused by sports video traffic from competitor source through 3 different CDNs and 5 different peers



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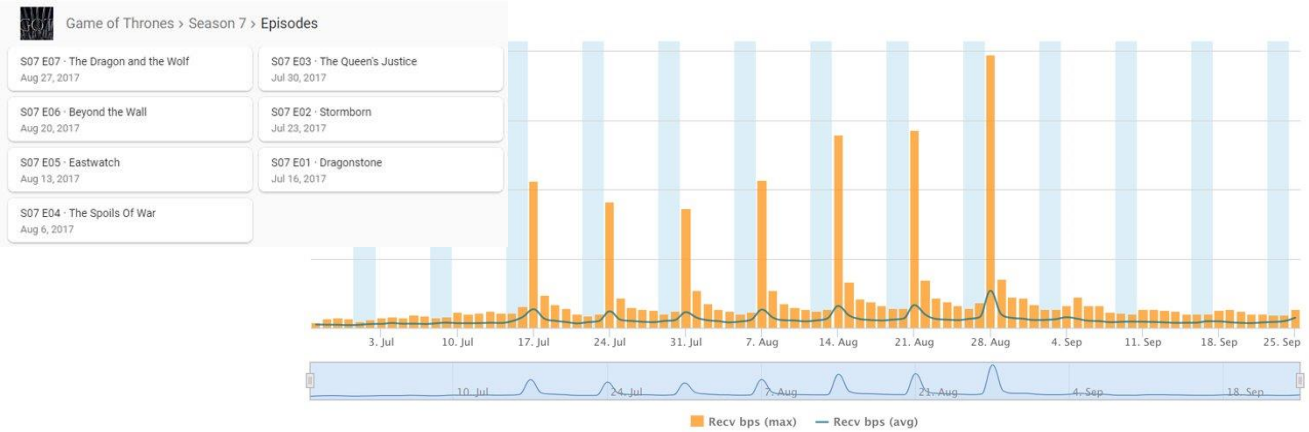
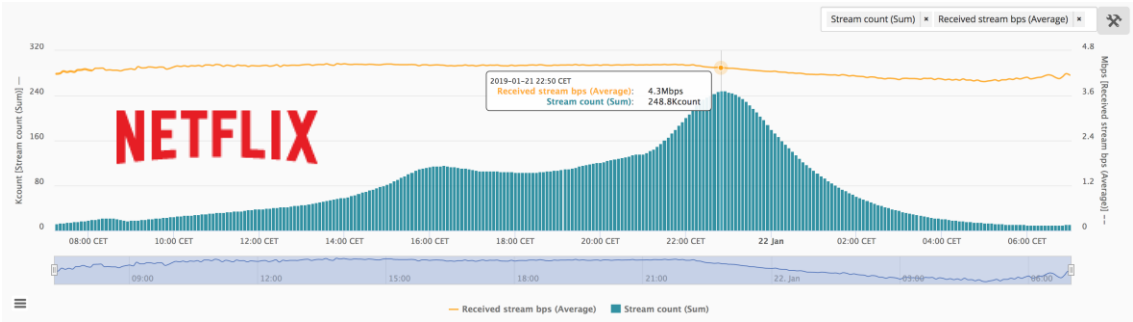
Need to be aware on OTT perceived quality for network subscribers

Get detailed reports on **bandwidth** consumed for each service (and additionally segmented by other dimensions such as region, node, peer…)



Augment **with QoE information** for each service: how many subscribers are using it, what is the **ABR** per subscriber



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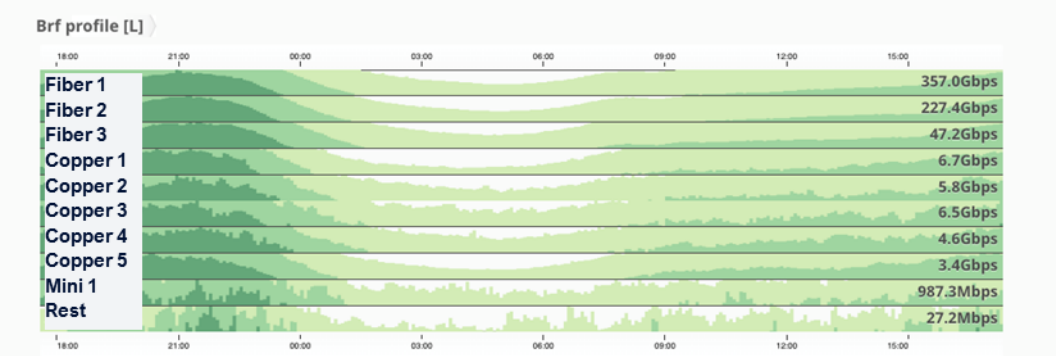
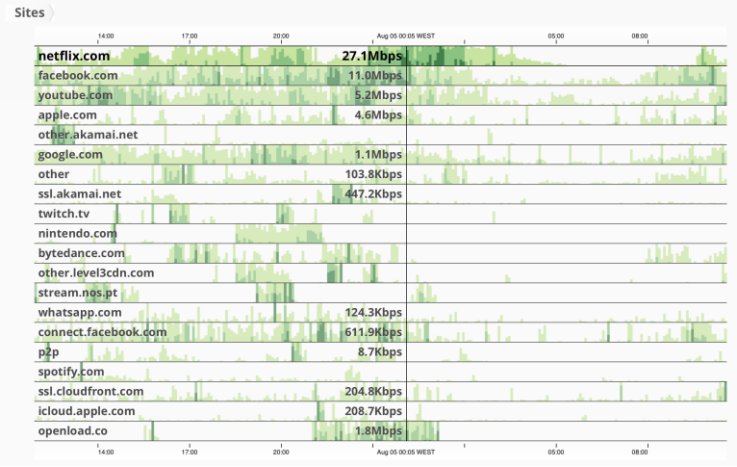
Need to be aware also per-subscriber or per-subscriber profile basis

Get detailed reports on **bandwidth** consumed for each subscriber-profile (and additionally segmented by other dimensions such as service, application, region, node, peer…)



Drill down to individual subscriber level (with compliant GDPR) to help your operations team quickly identify performance issues



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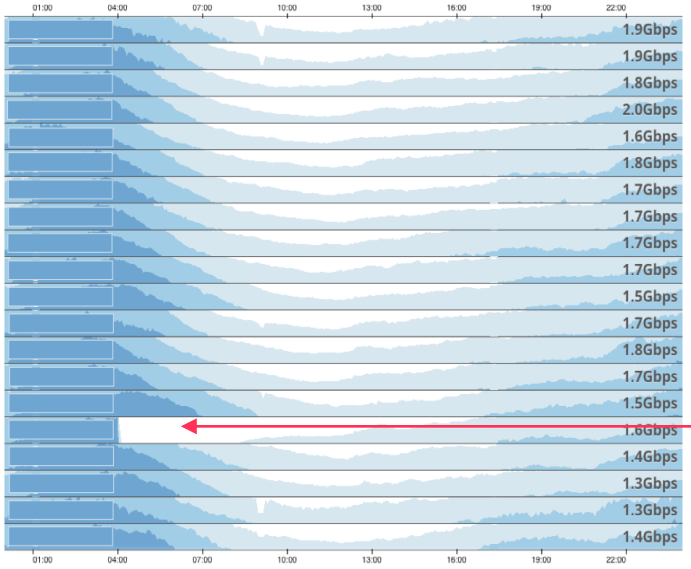
Need to understand how does a Video services are affected from network outage

Get information about the impact of a network outage on specific services and areas of the network – either in real-time or as part of a forensic analysis



CMTS-01 affected

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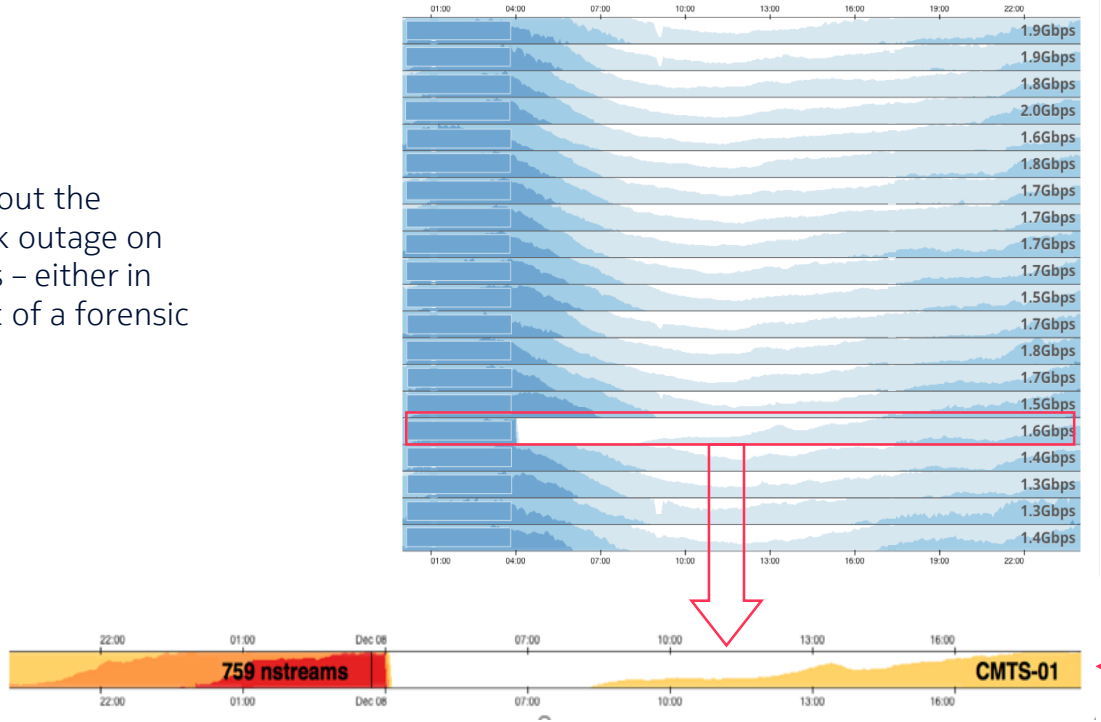
Need to know impact on particular subscribers

Get information about the impact of a network outage on specific subscribers – either in real-time or as part of a forensic analysis



759 Netflix streams from users in CMTS-01 affected

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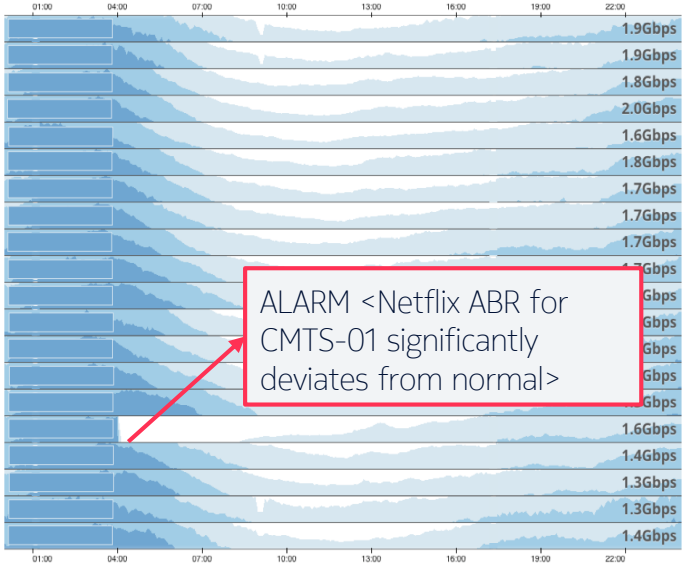
Need to react accordingly

Traditional alarms focus on network element failure, but what about service impact?

Trigger an alarm when traffic deviates from normal conditions

For any dimension: network, region, node, application, ABR



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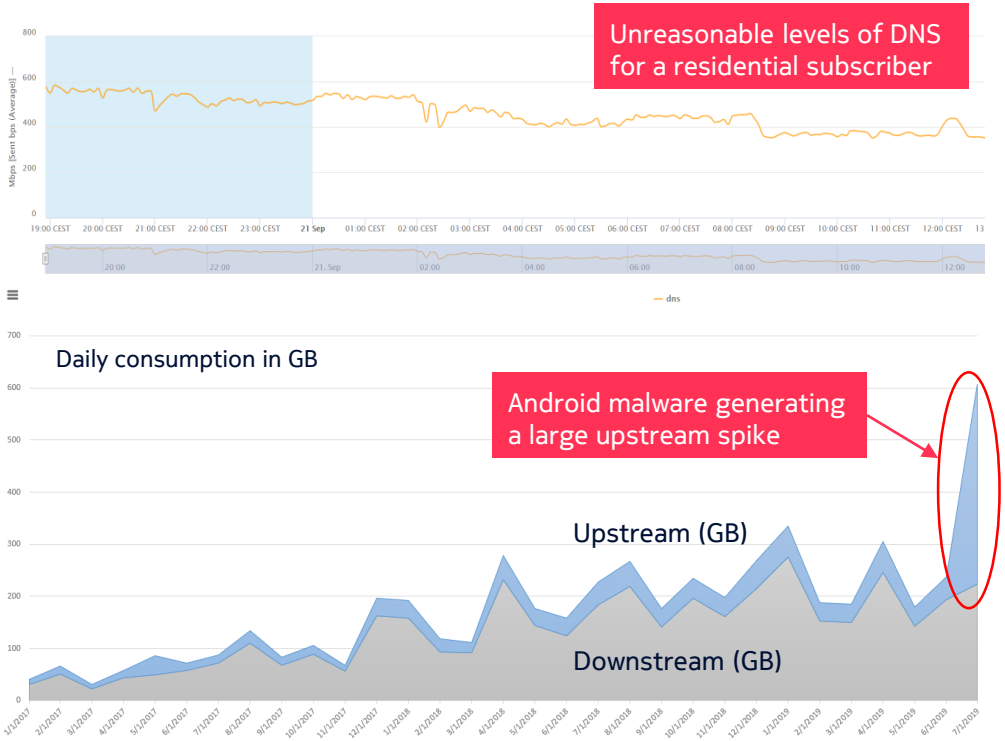
For protecting you need to identify potentially infected customers
Who are (unwillingly) attacking the network and other customers

- Residential IoT devices have weak security
- Can be used by malicious players to launch very large attacks from within the network
- Service providers use Deepfield to track DDoS traffic sourced from their customers
- And mitigate DDoS at the lowest cost/bit

- Users frequently download malware embedded in applications
- These can generate abnormal upstream / downstream traffic which can lead to revenue loss, increased customer care costs and churn, if not handled properly
- Service providers use Deepfield Subscriber Intelligence data to identify unexpected traffic patterns and serve their customers better



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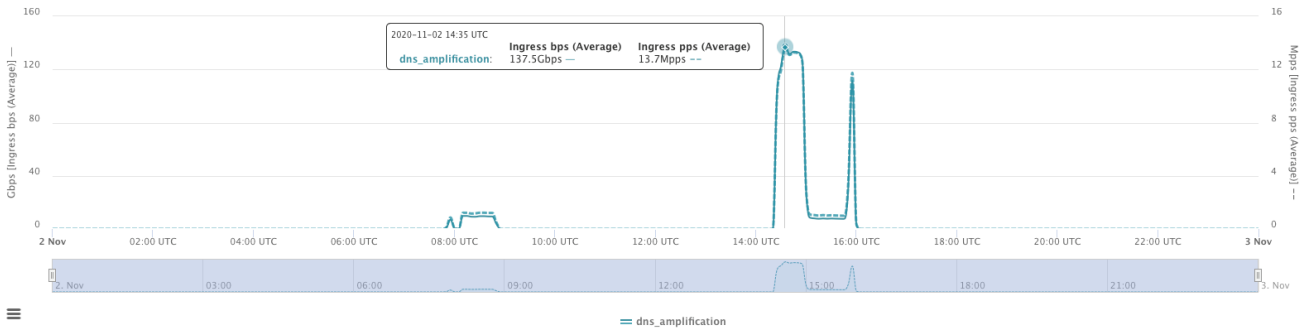
Protect the network infrastructure and customers
From direct attacks and collateral damage

- Large-scale volumetric DDoS attacks hit hard
- Without the proper measures, SLAs to business customers can be breached and result in penalties



- With the rise of online gaming comes the ”opportunity”
- DDoS as a service is available from many booters, to easily kick out your opponents

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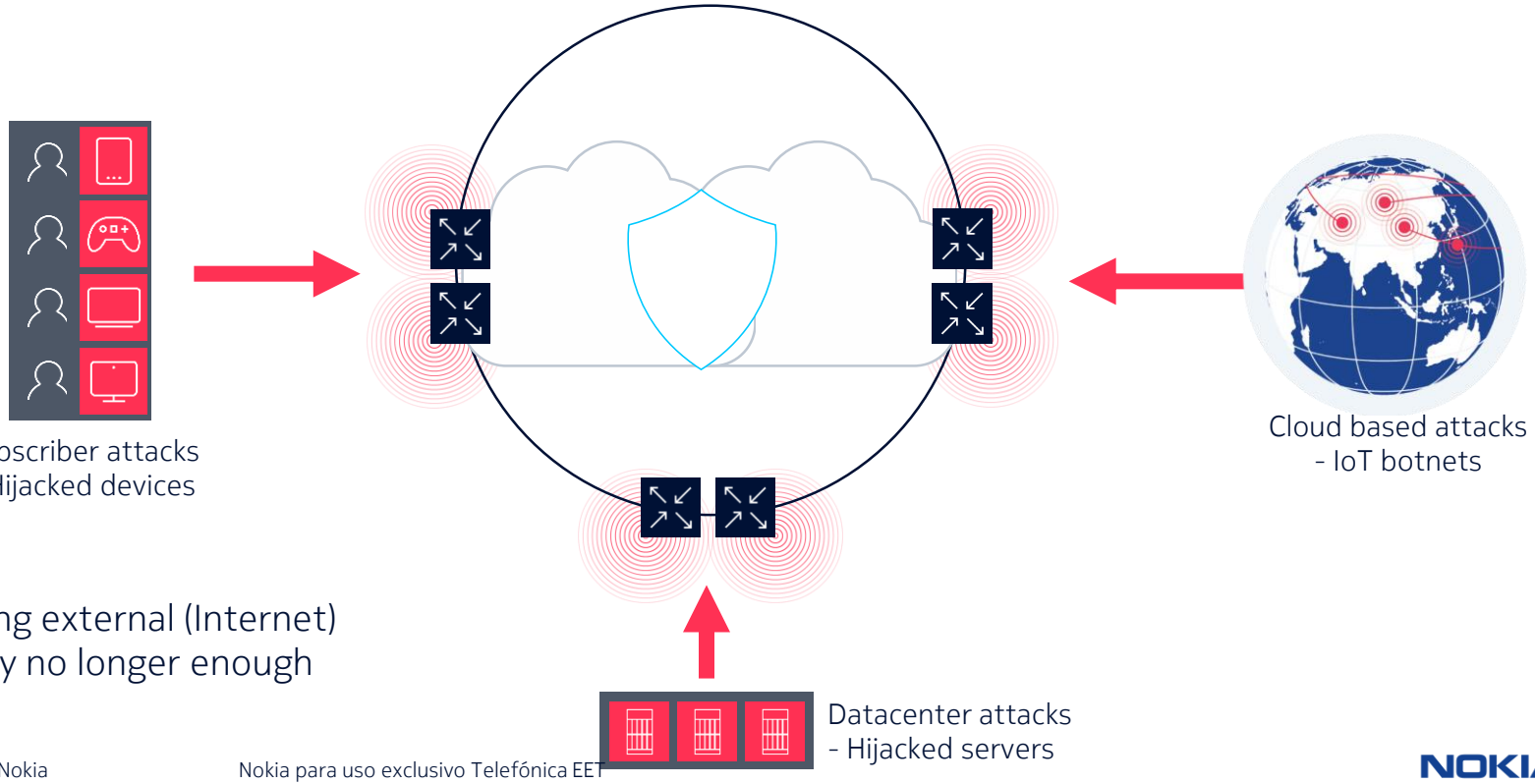
Attacks coming from within as well



Protecting external (Internet) boundary no longer enough

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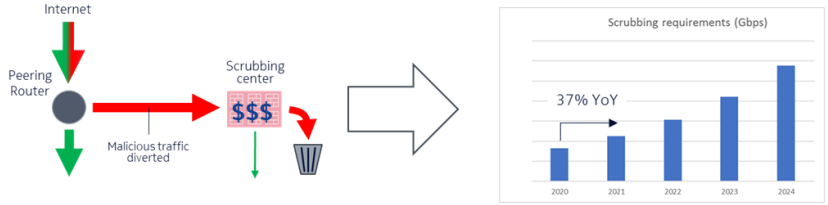
Cost-effective DDoS protection

Leverage IP network for volumetric DDoS protection

- Multi-layer security with volumetric DDoS attacks filtered at the IP Edge
- Advanced DDoS detection and automated filter instantiation on IP Routers (BGP Flowspec/Netconf)
- Interworks with any existing scrubbing center, while capping future investments
- Works best with very high filter scale routers (e.g., Nokia FP4)

Tier-1 Global Provider

Traditional DDoS attack mitigation via off-line scrubbing appliances is **too costly to scale** as attacks keep growing



Deepfield detects DDoS attacks and leverages IP routers to perform **efficient mitigation at the network edge**

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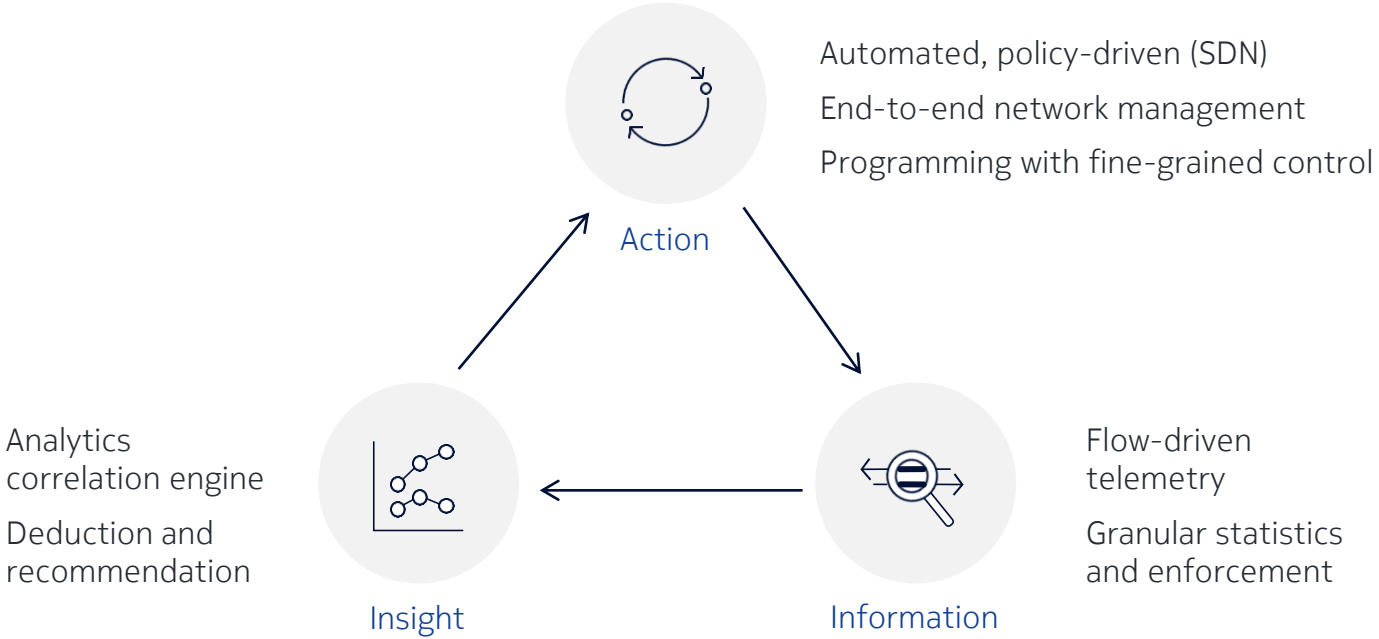
A new approach is needed

Powering a virtuous cycle in the modern network



End goal: Insight-driven, automated, high-performance networking…

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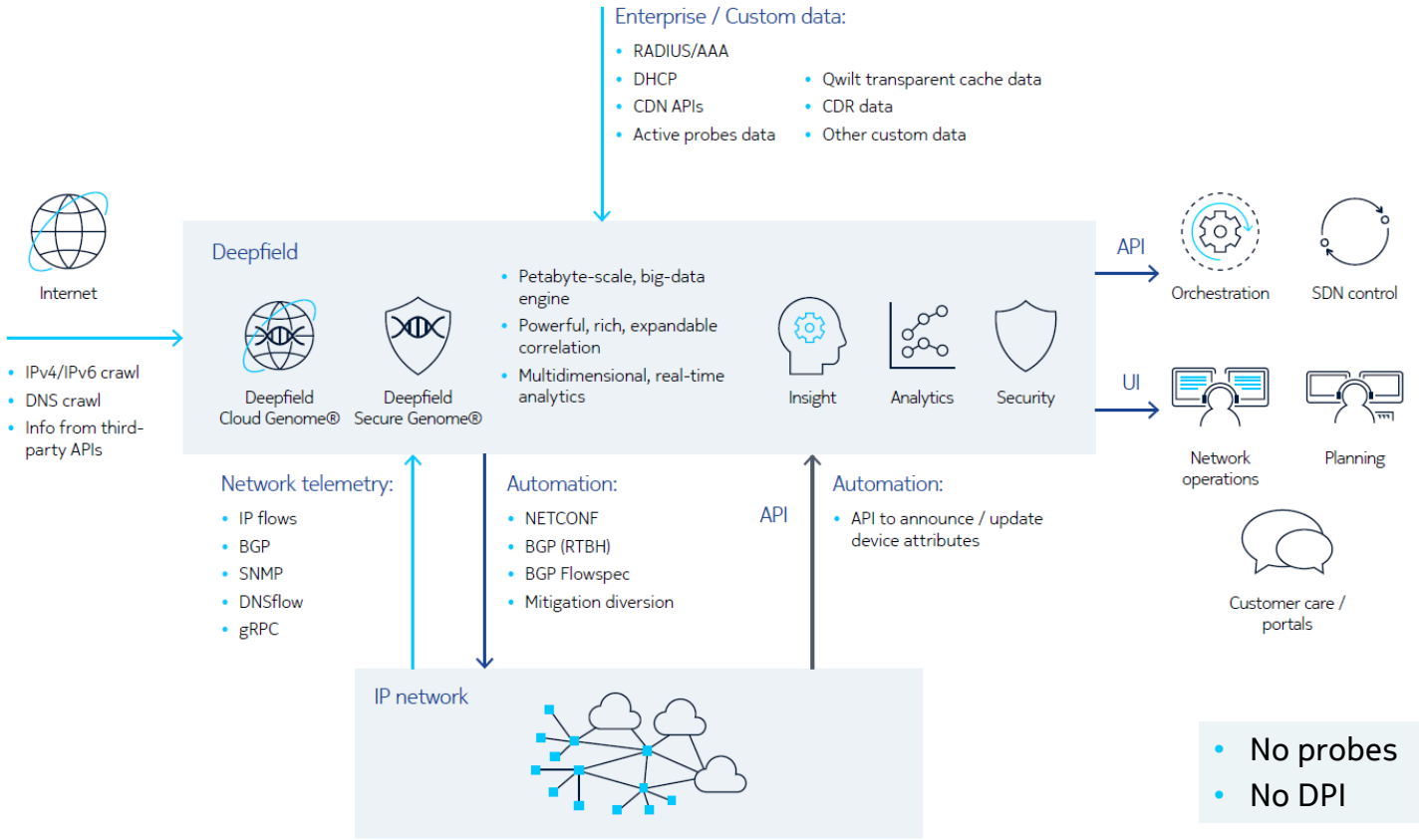
Nokia Deepfield: Turning network information into actionable insight



- No probes
- No DPI

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