deepfield

security | performance | control

The Operational Intelligence Company

From Peak Time to Prime Time Availability

Stefan Meinders (stefan@deepfield.net)

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How to measure QoE without DPI?

What does SLOW mean?
Is SLOW still different from DOWN?
How to detect Slowness?

OTT Industry defined the method

- Key Performance Indicator [KPI] for (Video) Over-The-Top [OTT] Services is

  Average Bitrate [ABR] per stream

- Netflix = Speed Index (ISP Ranking)
- Google (Youtube) = Video Quality Report
- Cable Labs = Video Streaming Score (Deepfield Technology)
  - Cable Operators (ISPs) like to understand their network performance and compare themselves to others

Why does this matter?

- If there is not enough capacity available, OTT Services will stop working.
  - Slow is not an option for streaming video
  - Streaming video has “soft” realtime requirements
- Networks and OTT delivery techniques are more complex
  - How is the content reaching my network and transported to my subscribers?
  - Do I have on-net caches? Effectiveness / Utilization?
  - Is there a direct peering connection to the OTT providers?
    - Private peering or IX?
  - Is a CDN delivering the content or any part / component of the service?
    - Catalogue, Login, …
    - Understanding the “Cyber Supply Chain” is an important aspect
- Today’s tools do not provide sufficient information to maintain KPIs network wide

Understand and Manage Video Distribution

High Speed Scaling?

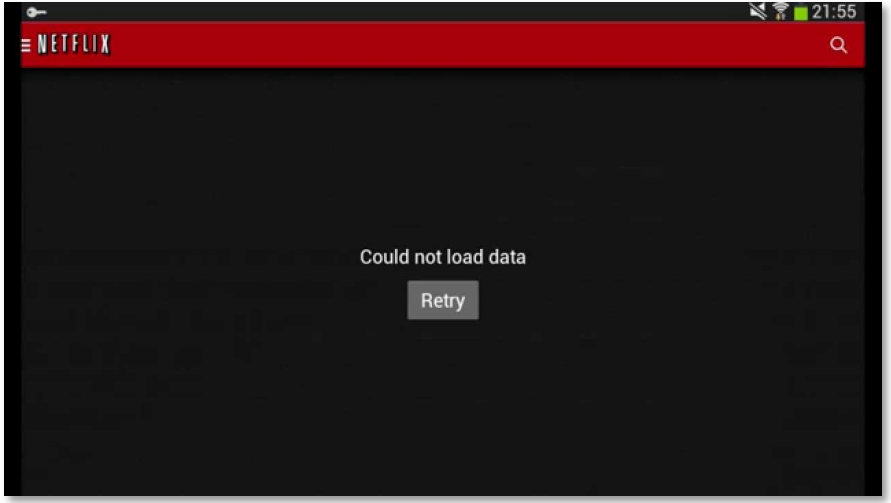
50-60% of all traffic is video.

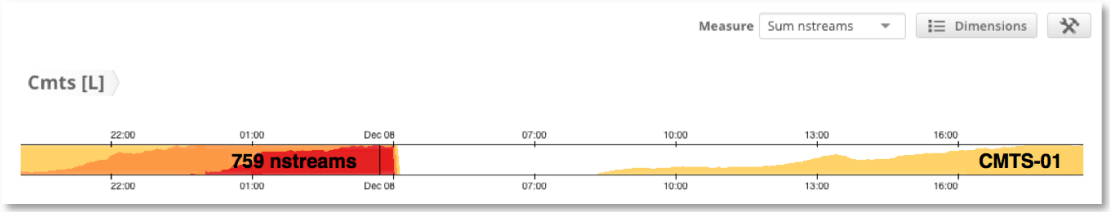
Are you providing the best quality?

Supporting Adaptive Bitrate?

Sites	Avg nstreams	Recv bps (avg)	bps/stream (avg)
netflix.com	39.2 Knstreams	138.7 Gbps	3.7 Mbps
youtube.com	29.1 Knstreams	52.9 Gbps	2.1 Mbps
hulu.com	5.1 Knstreams	12.2 Gbps	2.5 Mbps
streaming.amazon.com	1.9 Knstreams	8.7 Gbps	4.7 Mbps
vudu.com	701.52 nstreams	7.2 Gbps	9.8 Mbps
ads.google.com	4.1 Knstreams	6.6 Gbps	2 Mbps
twitch.tv	1.3 Knstreams	4.2 Gbps	3.3 Mbps

Quantify the Impact



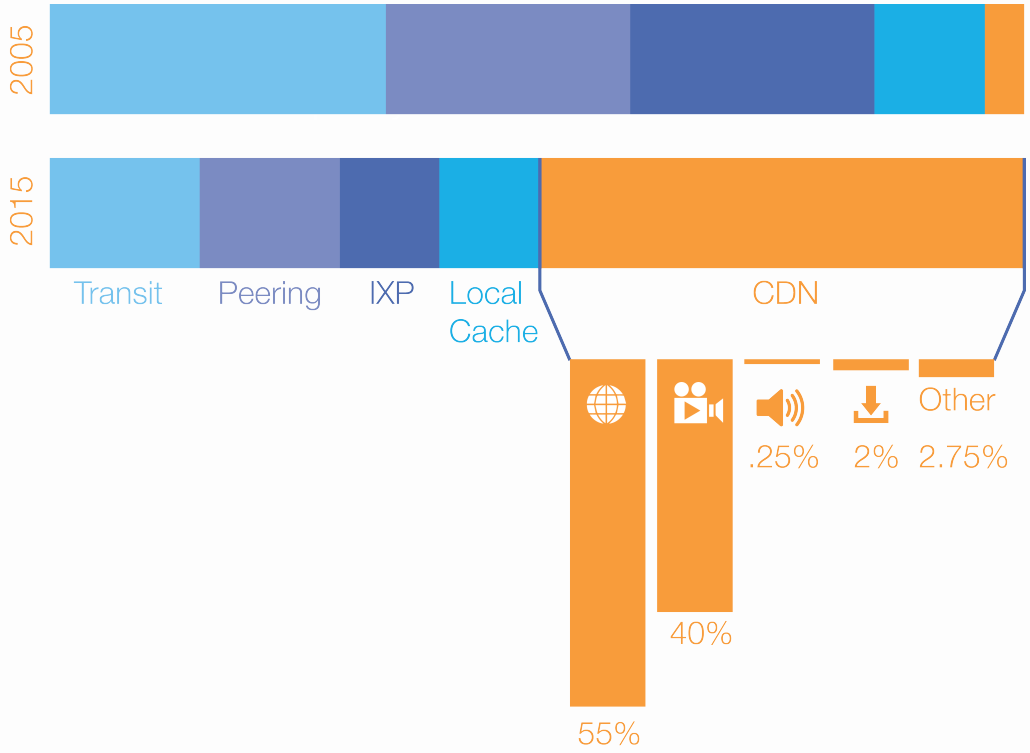


Quantify the exact impact in terms of subscribers affected by outage.

How many calls did your call center review for this CMTS? 759 users on this CMTS lost Netflix for 4.5 hours!

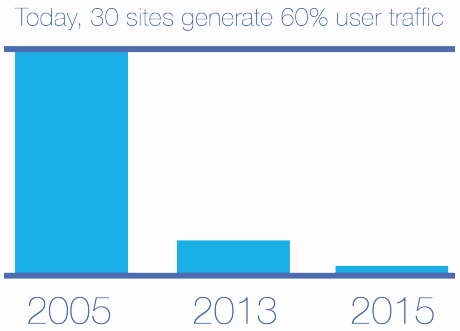
Understanding OTT Services in Your Network

Where is the content coming from?



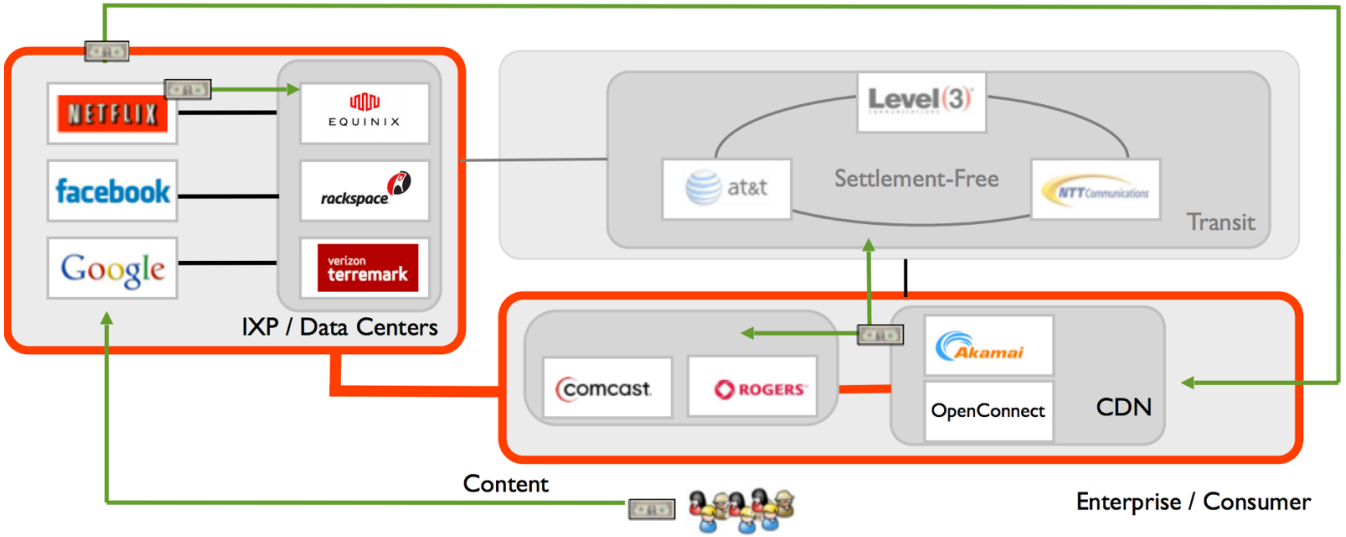
Internet Usage Evolution
and how content is delivered

- Today 30 sites generate 60% user traffic
- High Value Traffic is delivered from CDNs
- IXPs are Game-Publishers choice
- Transits deliver “Other”
- Adult Content



Internet Trends – "The New Internet"

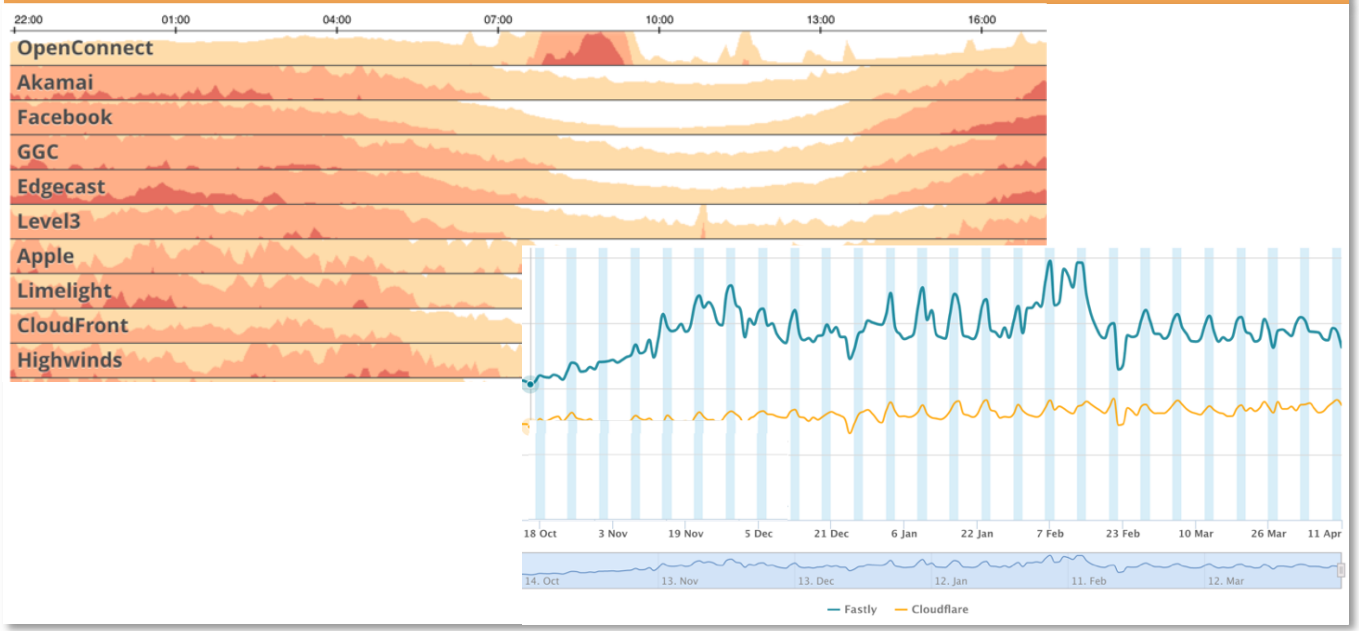
New Interconnections



- Increasing volumes of peering at IXP and edge data centers. Significant growth in secondary markets. Growing consolidation in content delivery and sources.

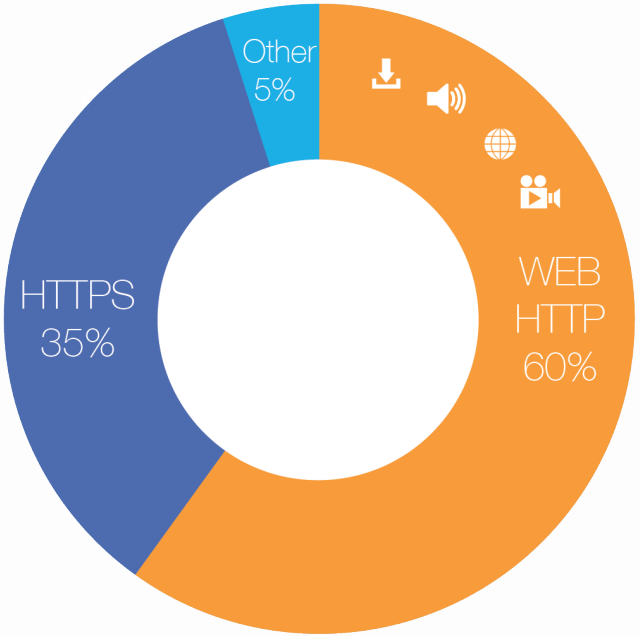
CDN Traffic 2016

2016 CDN Observations



- CDN is the network
- Most traffic is adaptive bitrate
- Coordinating cache fill times becomes important and cache placement a growing issue
- Growing commercial agreements around CDN delivery and efficacy (e.g. locality)
- New CDN entrants (e.g. Fastly, CloudFlare, CloudFront) gaining market

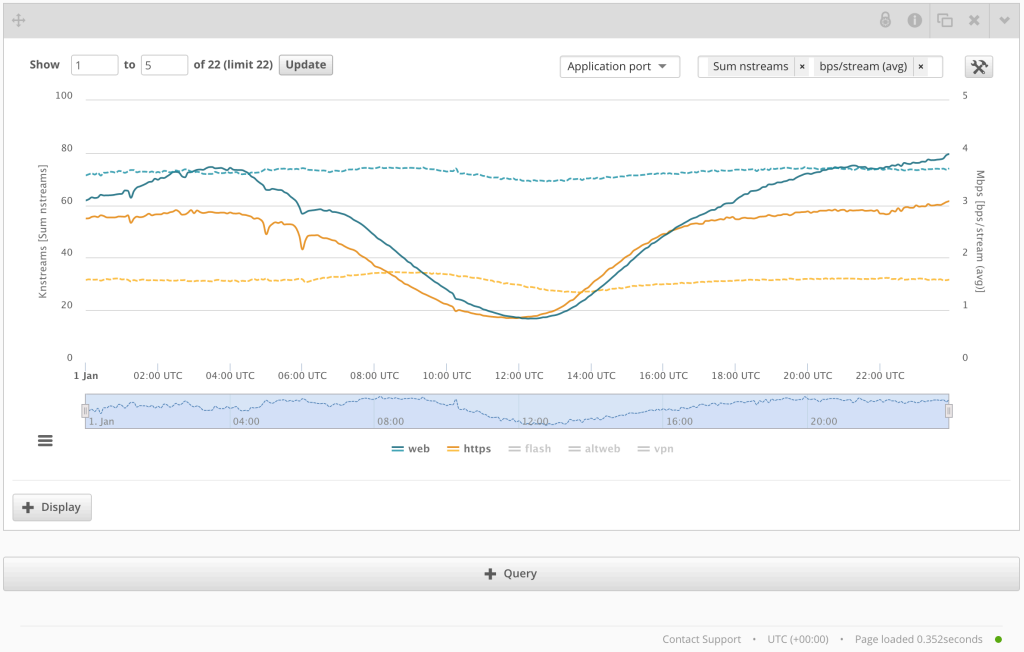
How is the content transported? Hidden in http[s]?



Legacy tools provide insufficient visibility by flow collection

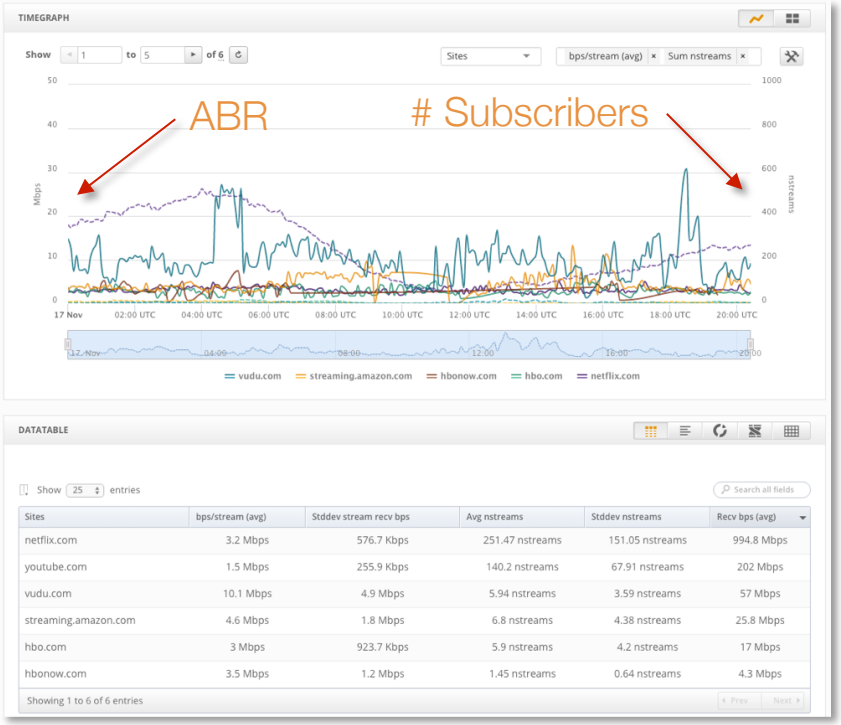
Can DPI answer the question:
WHO IS ENCRYPTING VIDEO TRAFFIC?

Encrypted vs Un-Encrypted - Netflix Delivery Comparison



Compare performance and usage of encrypted vs. unencrypted Netflix traffic

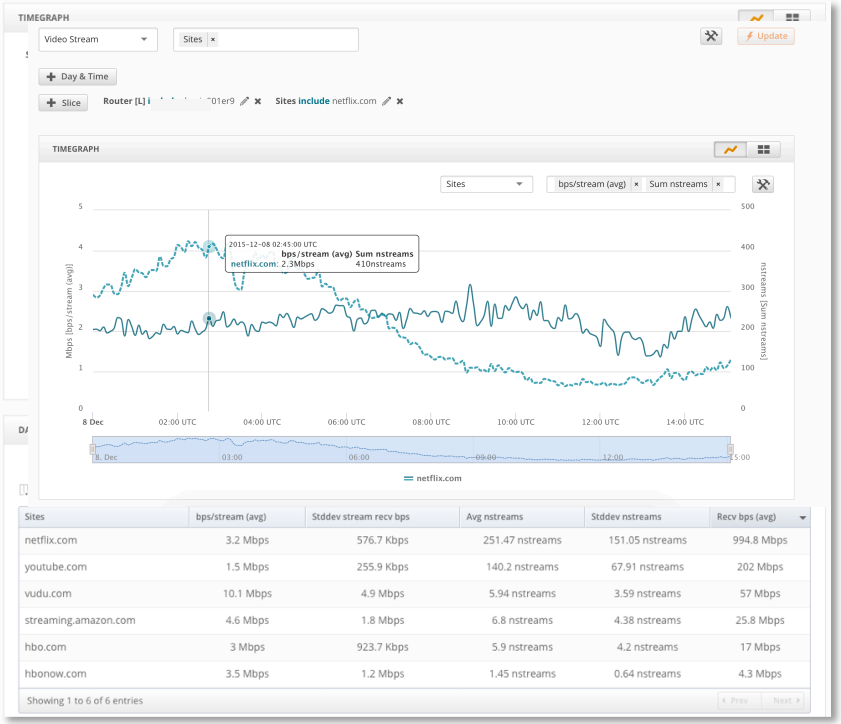
QoE Reporting



Sites	bps/stream (avg)	Stddev stream recv bps	Avg nstreams	Stddev nstreams	Recv bps (avg)
netflix.com	3.2 Mbps	576.7 Kbps	251.47 nstreams	151.05 nstreams	994.8 Mbps
youtube.com	1.5 Mbps	255.9 Kbps	140.2 nstreams	67.91 nstreams	202 Mbps
vudu.com	10.1 Mbps	4.9 Mbps	5.94 nstreams	3.59 nstreams	57 Mbps
streaming.amazon.com	4.6 Mbps	1.8 Mbps	6.8 nstreams	4.38 nstreams	25.8 Mbps
hbo.com	3 Mbps	923.7 Kbps	5.9 nstreams	4.2 nstreams	17 Mbps
hbonow.com	3.5 Mbps	1.2 Mbps	1.45 nstreams	0.64 nstreams	4.3 Mbps

- Deepfield's patented Network Service Map enables a major advance in QoE service assurance measurement: DPI measurements without the hardware or probe infrastructure.
- New OTT QoE metrics like ABR and number of instantaneous subscribers and streams in any slice of the network.
- Visualize the performance of all major OTT video sites in a segment of the network

QoE Reporting



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Showing 1 to 6 of 6 entries

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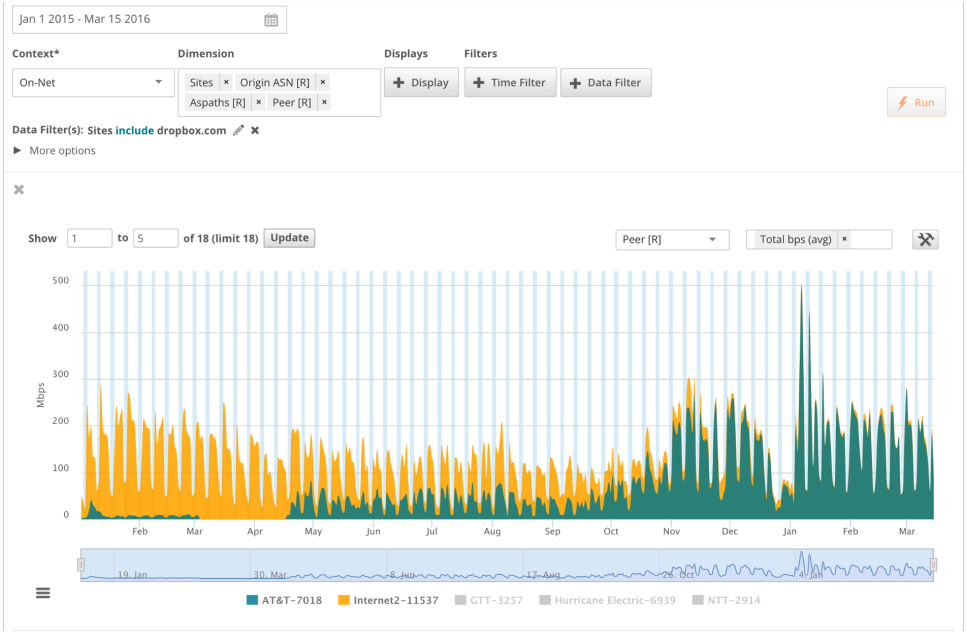
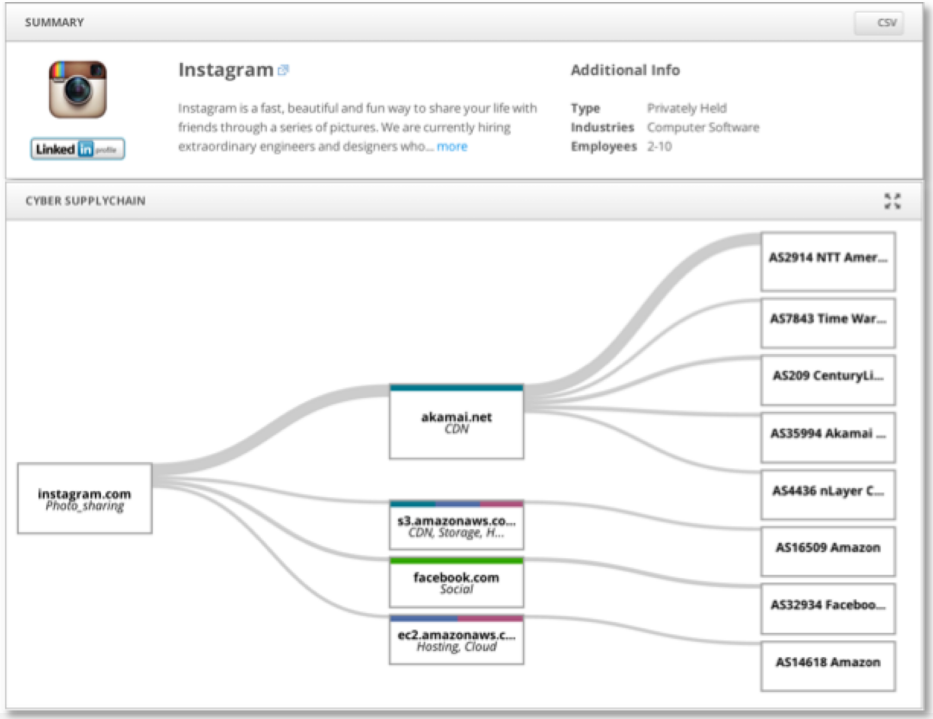
Traffic Engineering and Analysis



- This Example shows Dropbox moving away from Amazon using their own AS and Datacenters
- It results in increasing transit traffic / costs

Cloud Genome Logic Engines

Our patented service map logic discovers the supply chain of every OTT service on the Internet

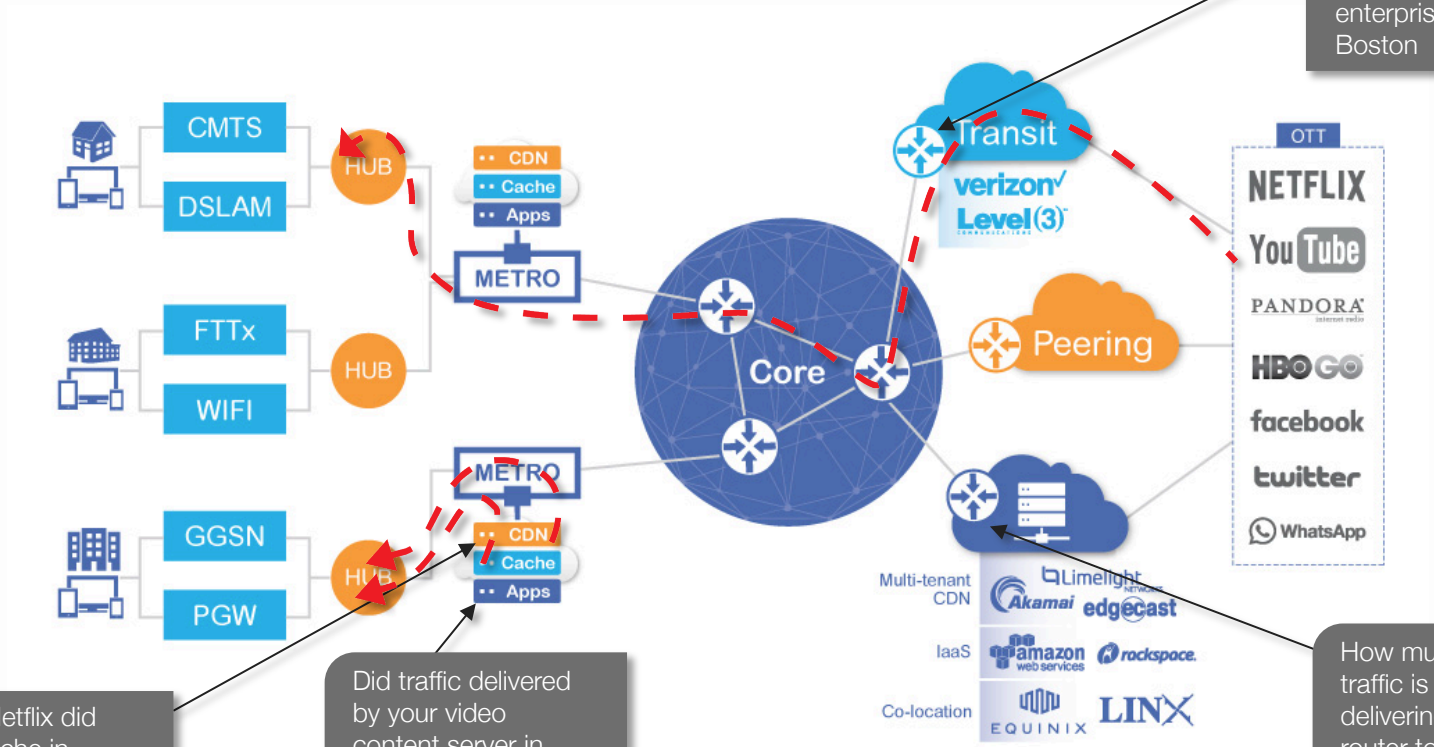


- Provides DPI+ visibility by providing not just services but also CDN awareness
- QoE performance management without the need for new hardware. Say goodbye to specialized DPI and probe appliances
- Service Map discovers end points, and discovers encrypted services

Use Cases

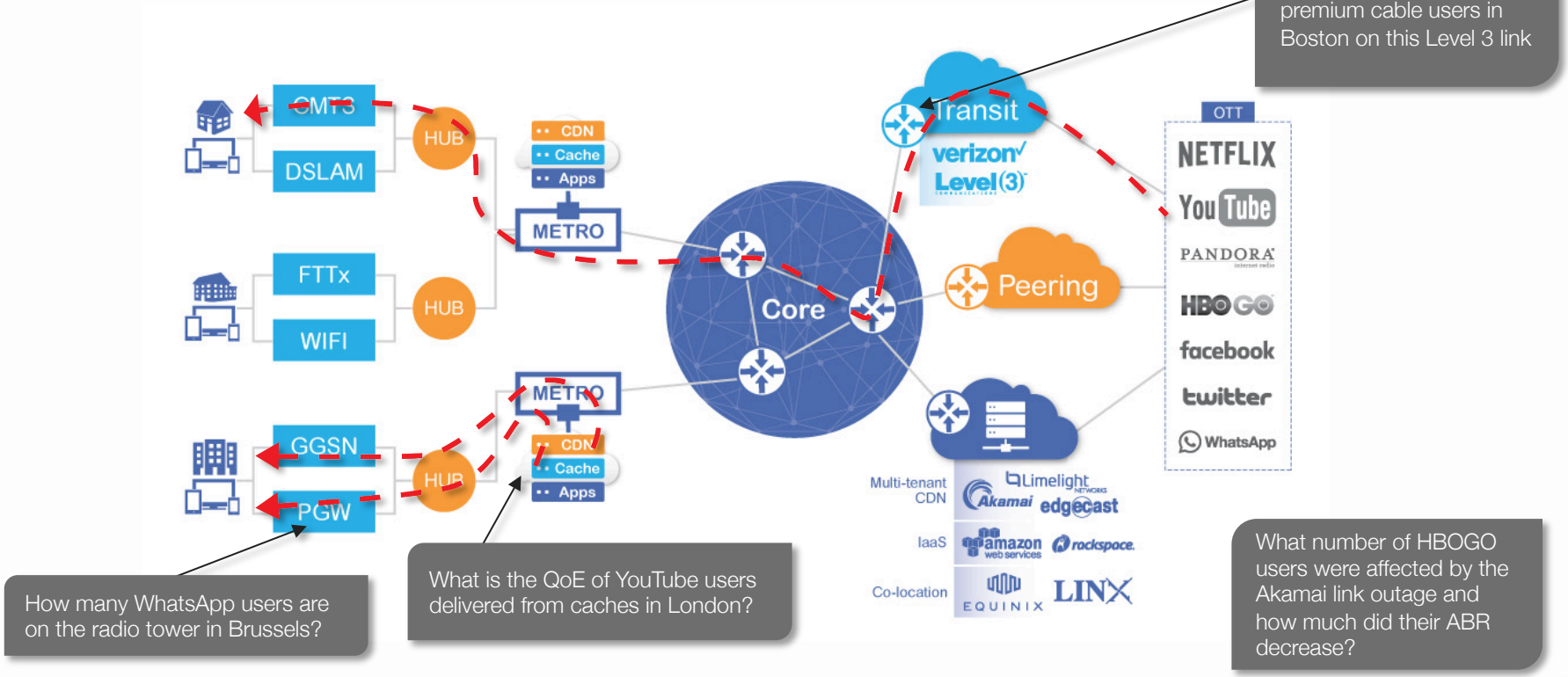
Traffic Engineering / Cloud Intelligence

Correlate per service tonnage with any network component



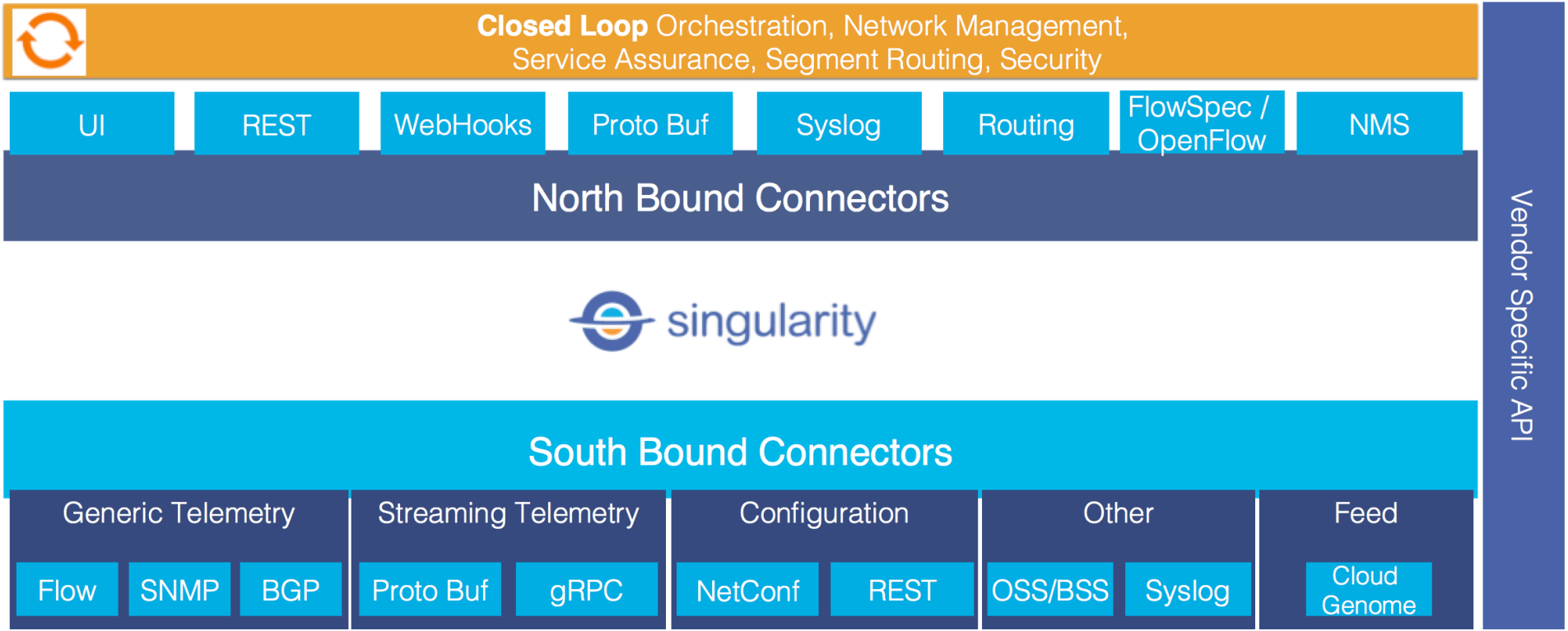
Service Assurance

Performance - Correlate per-service Average Bit Rate (ABR) or Latency with any network component
Business Impact - Correlate per-service stream counts with any network component



How it basically works

Deepfield Connectors & APIs



Combining Data

Netflow — Netflow provides Layer 3/4 data on network traffic

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SNMP **Netflow** — SNMP adds interface and router

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BGP **SNMP** **Netflow** — BGP adds AS information and community

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DNSFlow **BGP** **SNMP** **Netflow** — DNSFlow resolves IP to domain and host

\+

Cloud Genome **DNSFlow** **BGP** **SNMP** **Netflow** — Cloud Genome maps IPs to cloud services

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Your data **Cloud Genome** **DNSFlow** **BGP** **SNMP** **Netflow** — Custom data with IP as key

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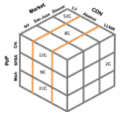


N-Dimensional data cube containing your data

Deepfield Platform

Horizontally scalable, fully self-contained software architecture.
Download and run on your servers or use Deepfield SaaS.

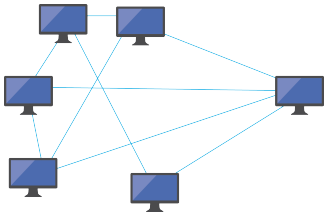
Connectors	Network Logic	Service Map Logic	Real-Time Streaming
Query Language	Machine Learning	Alerting	Visualization

Deepfield Logic Engines

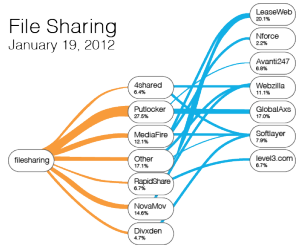
Correlate and Measure Data Sets with Network

Performance

Topology Map



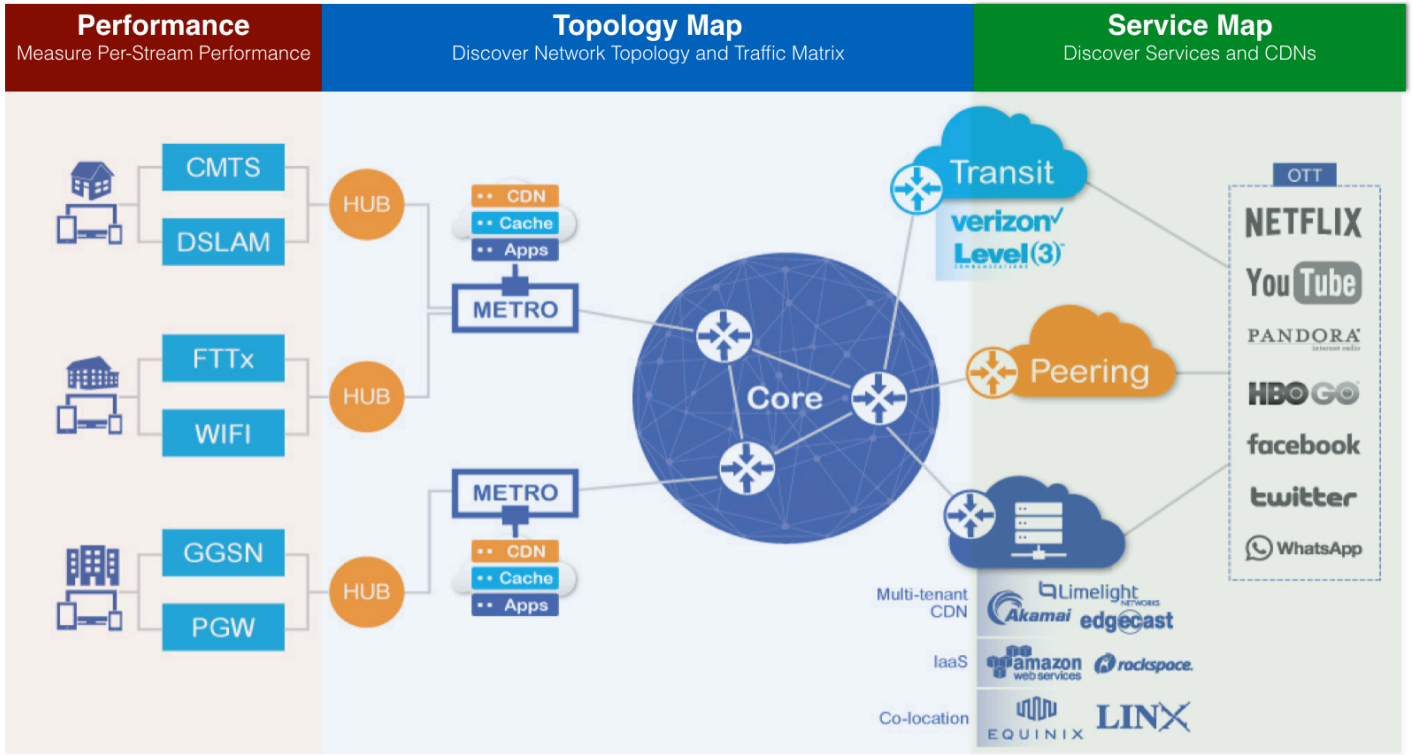
Service Map



Deepfield logic engines automatically correlate complex datasets across multiple heterogeneous real-time connectors. From understanding traffic across thousands of router interfaces to tracking the complex server-side interactions of a single gamer, Deepfield simplifies network management with easily understood reports and synthesized, actionable data at the business level.

Deepfield Network Wide Monitoring

Correlate and Measure Data Sets with Network



Questions?

Thank You

Find more information about the evolving internet:

https://www.youtube.com/watch?v=GGUtoGOsxko