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Deepfield: Real-time, Big Data Network Analytics

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Craig Labovitz, GM Nokia Deepfield Business line

Deepfield Joins Nokia (February 1, 2017)

Nokia Internal Use	Cutting edge technology	Rapid growth
5 year old startup with 20 years technology leadership • Big data and Internet pioneers • Top DDoS prevention specialists in industry (founded Arbor Networks)	Unique offering in industry • Big data IP network analytics, petabyte scale • Global cloud awareness • Multi-dimensional • Leverage **existing** hardware	• 90% of cable (USA) • Largest EU CSP • Top global video, content, CDN and hosting providers

Deepfield provides the IP network intelligence our customers need to drive greater network efficiency, quality and security - in real time

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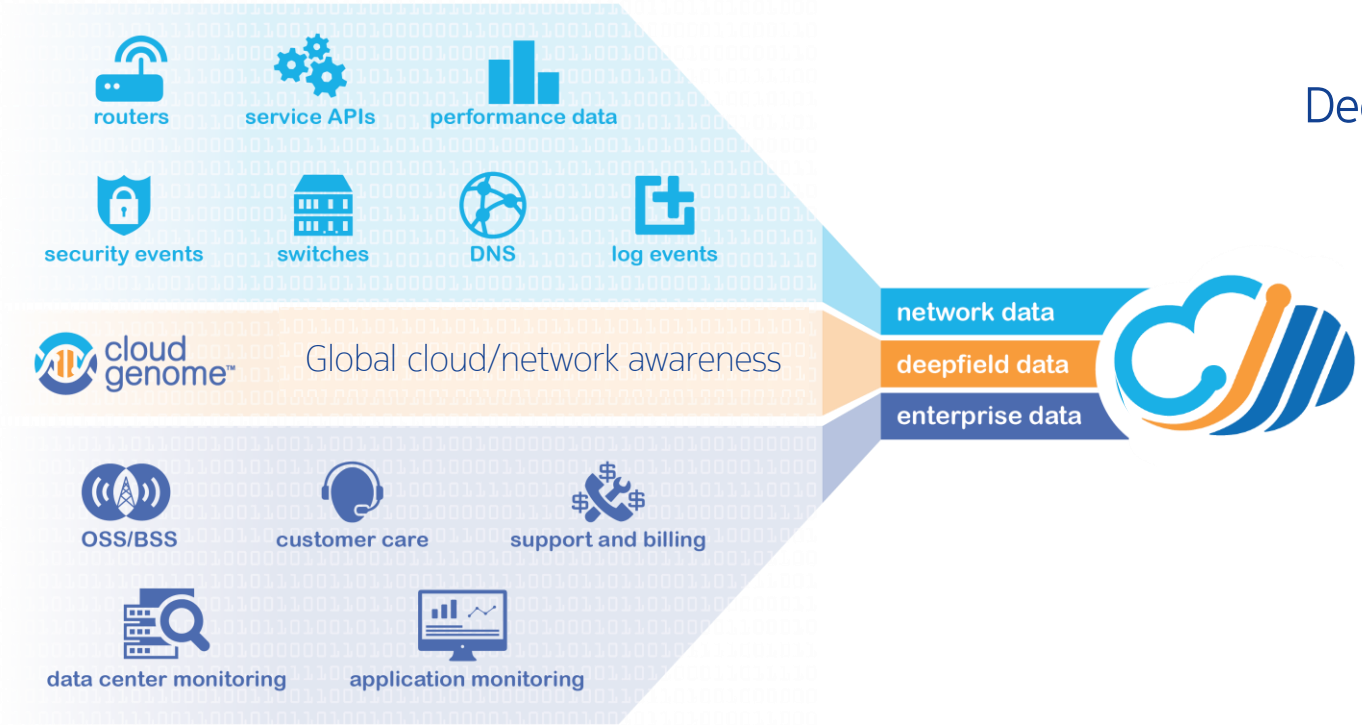
Nokia Deepfield architecture: the evolution of IP network analytics



Deepfield Core Platform

Petabyte scale
big data engine

Multi-dimensional,
real-time analytics

Rich, expandable
telemetry sources

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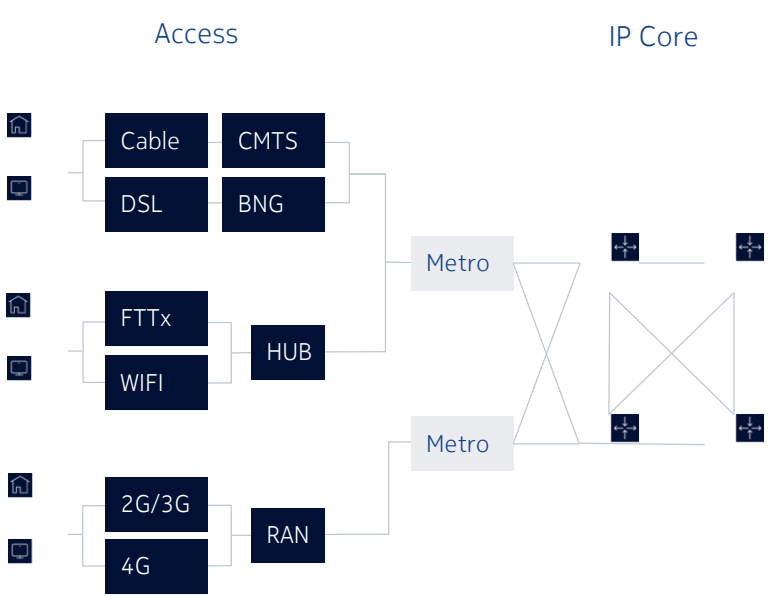
The need for multi-dimensional, cloud+network visibility, in real-time



I need to understand cloud services and their topology.

I need to overlay this information over the network topology of the Internet, and…

… the network topology of my own network.

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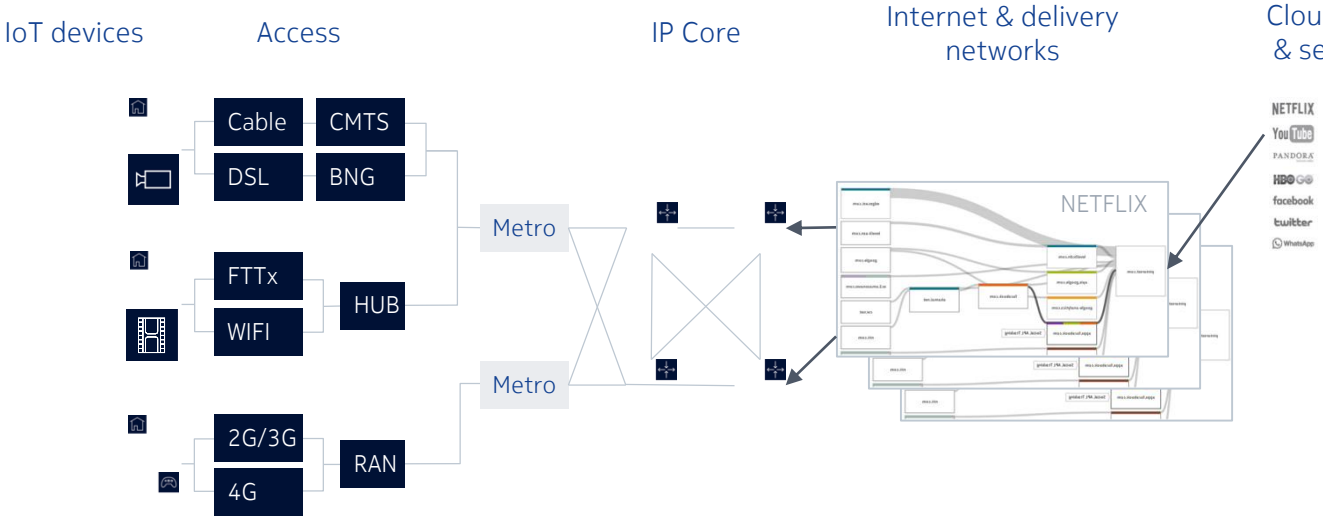
Cloud Genome®: deliver the quality experience your customers want, with the economics you need



- Do I need a cache for Netflix?
- Where do I place it?
- How is it performing?

- How many Netflix sessions on this link?
- What is their ABR / Stream?
- Per subscriber?

- Do I have the best peering, transit & CDN relationships?
- Where do problems really lie?
- How do I walk armed to any negotiation?

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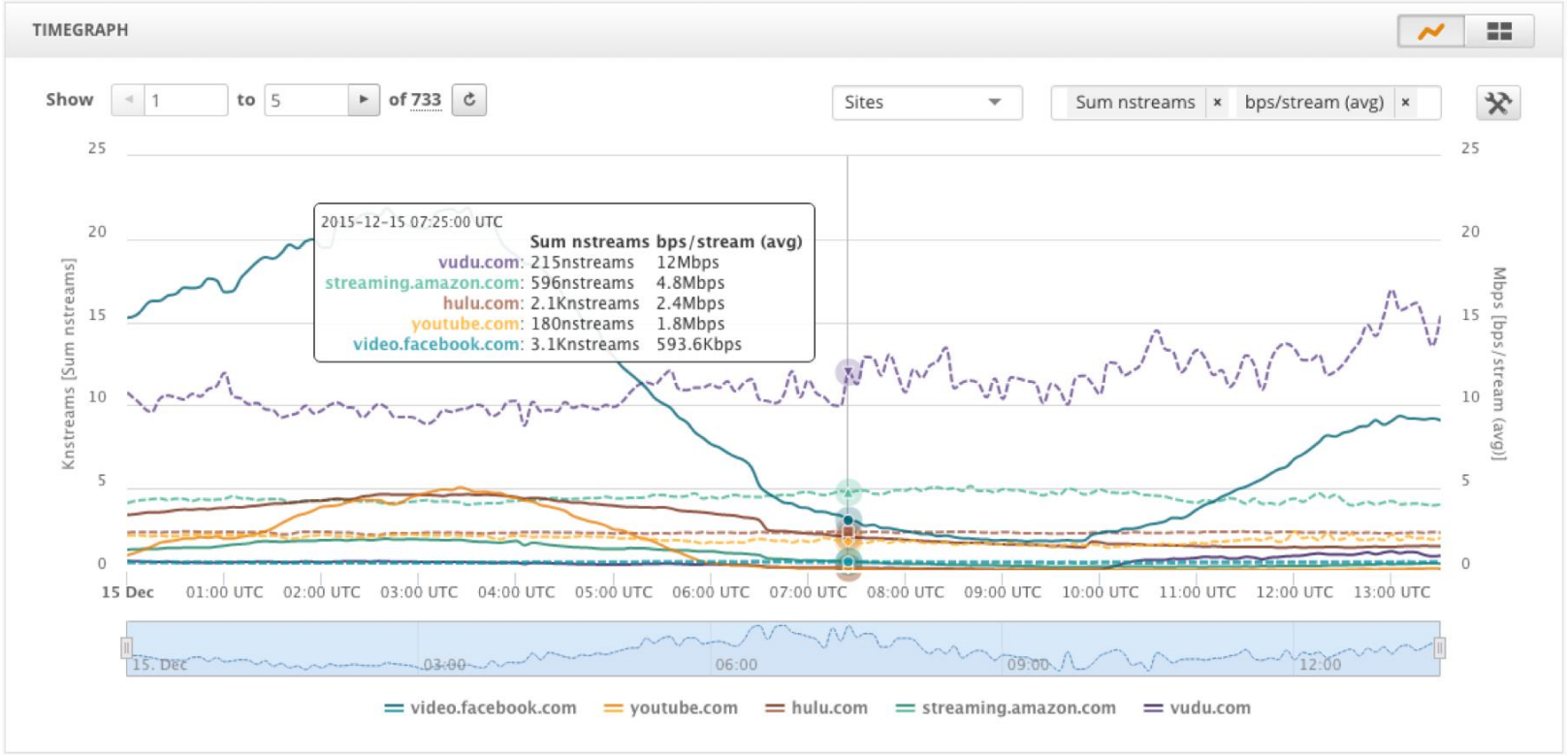
Analytics at Peer

Track Performance all the way to the Edge



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Analytics at Service Group

How Congested is SG/Port?

- Estimate when node/port should be split.
- Tonnage and Quality metrics over time.

What is Customer Quality/Performance?

- Is there a need to split node?
- When does the OTT Video ABR reach critical threshold?
- What is the impact of node split? ***Before/After*** Quality comparison.

What is my Application Traffic Breakdown?

- What traffic types are utilized by customers in SG?
- Are the customers using applications that are sensitive to congestion?
- Are they using tolerant protocols?

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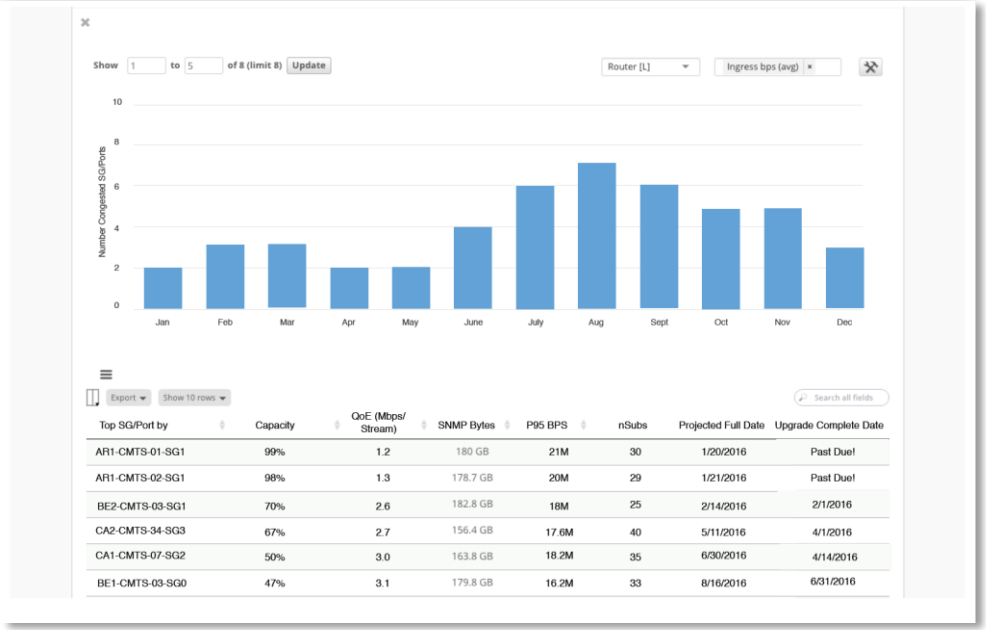
Analytics at Service Group
Track Performance all the way to the Edge



Top SG/Port by	Capacity	QoE (Mbps/ Stream)	SNMP Bytes	P95 BPS	nSubs	Projected Full Date	Upgrade Complete Date
AR1-CMTS-01-SG1	99%	1.2	180 GB	21M	30	1/20/2016	Past Due!
AR1-CMTS-02-SG1	98%	1.3	178.7 GB	20M	29	1/21/2016	Past Due!
BE2-CMTS-03-SG1	70%	2.6	182.8 GB	18M	25	2/14/2016	2/1/2016
CA2-CMTS-34-SG3	67%	2.7	156.4 GB	17.6M	40	5/11/2016	4/1/2016
CA1-CMTS-07-SG2	50%	3.0	163.8 GB	18.2M	35	6/30/2016	4/14/2016
BE1-CMTS-03-SG0	47%	3.1	179.8 GB	16.2M	33	8/16/2016	6/31/2016

Which SG/Ports are reaching critical level? When are they about to degrade? Forecast and give lead time to split.

Single point to manage Service Group/Port capacity planning.

Before and after node split.
Even though node is full, what is the quality?
Did split take node/port from full and bad QoE, to full and good QoE with adaptive bit rate?

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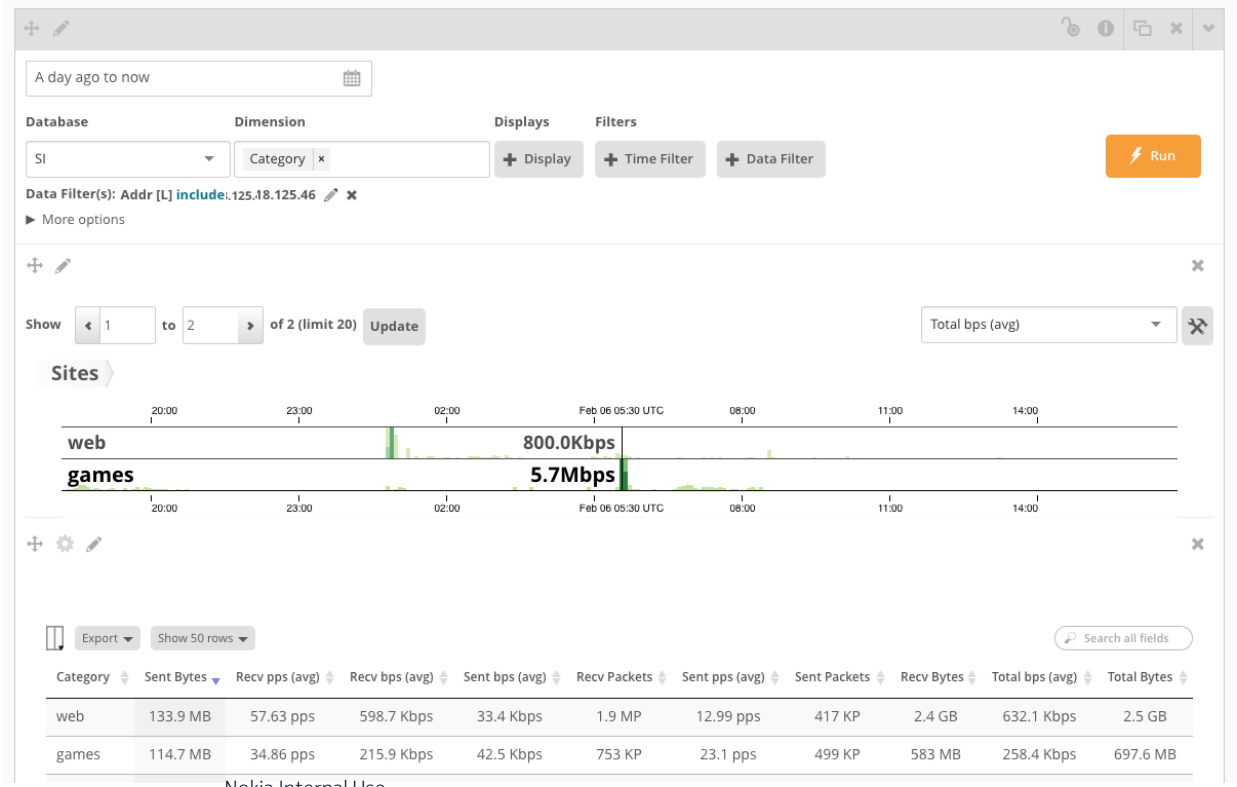
Analytics at Subscriber

Track Performance all the way to the Edge



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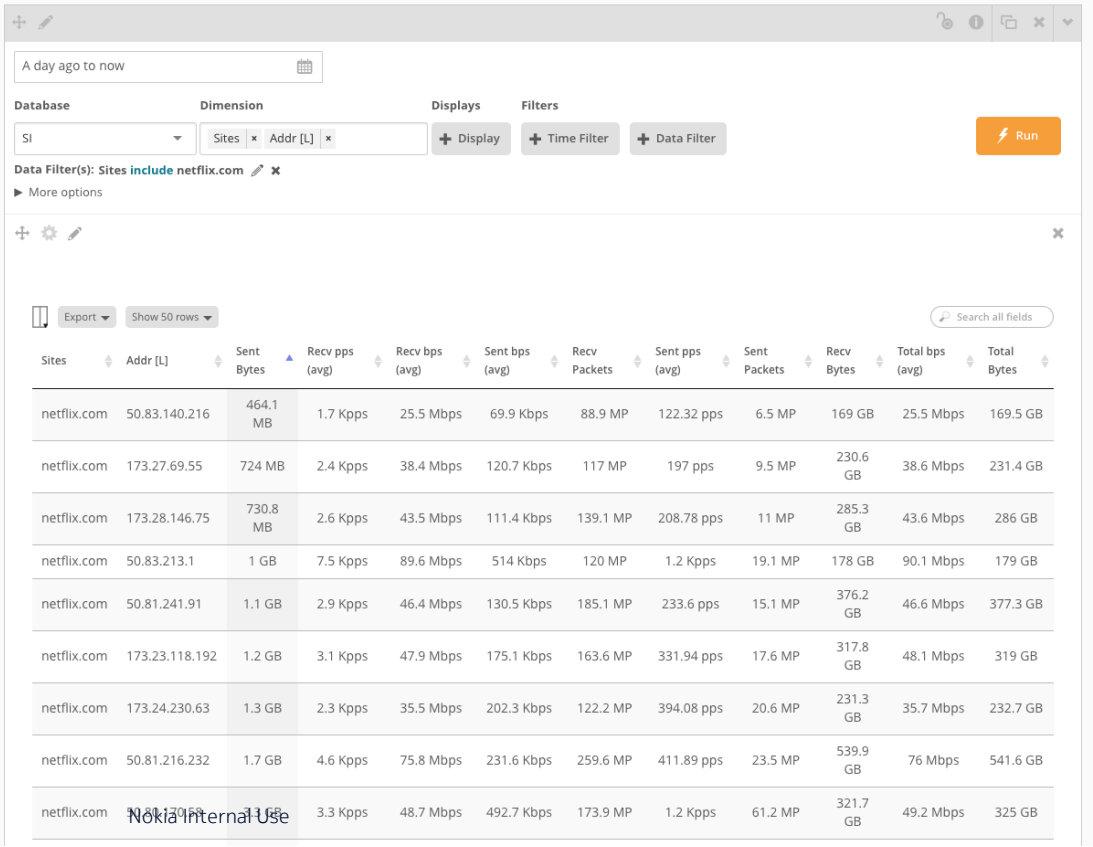
Analytics at Subscriber Application

Track Performance all the way to the Edge



Sites	Addr [L]	Sent Bytes	Recv pps (avg)	Recv bps (avg)	Sent bps (avg)	Recv Packets	Sent pps (avg)	Sent Packets	Recv Bytes	Total bps (avg)	Total Bytes
netflix.com	50.83.140.216	464.1 MB	1.7 Kpps	25.5 Mbps	69.9 Kbps	88.9 MP	122.32 pps	6.5 MP	169 GB	25.5 Mbps	169.5 GB
netflix.com	173.27.69.55	724 MB	2.4 Kpps	38.4 Mbps	120.7 Kbps	117 MP	197 pps	9.5 MP	230.6 GB	38.6 Mbps	231.4 GB
netflix.com	173.28.146.75	730.8 MB	2.6 Kpps	43.5 Mbps	111.4 Kbps	139.1 MP	208.78 pps	11 MP	285.3 GB	43.6 Mbps	286 GB
netflix.com	50.83.213.1	1 GB	7.5 Kpps	89.6 Mbps	514 Kbps	120 MP	1.2 Kpps	19.1 MP	178 GB	90.1 Mbps	179 GB
netflix.com	50.81.241.91	1.1 GB	2.9 Kpps	46.4 Mbps	130.5 Kbps	185.1 MP	233.6 pps	15.1 MP	376.2 GB	46.6 Mbps	377.3 GB
netflix.com	173.23.118.192	1.2 GB	3.1 Kpps	47.9 Mbps	175.1 Kbps	163.6 MP	331.94 pps	17.6 MP	317.8 GB	48.1 Mbps	319 GB
netflix.com	173.24.230.63	1.3 GB	2.3 Kpps	35.5 Mbps	202.3 Kbps	122.2 MP	394.08 pps	20.6 MP	231.3 GB	35.7 Mbps	232.7 GB
netflix.com	50.81.216.232	1.7 GB	4.6 Kpps	75.8 Mbps	231.6 Kbps	259.6 MP	411.89 pps	23.5 MP	539.9 GB	76 Mbps	541.6 GB
netflix.com	50.81.170.58	3.3 GB	3.3 Kpps	48.7 Mbps	492.7 Kbps	173.9 MP	1.2 Kpps	61.2 MP	321.7 GB	49.2 Mbps	325 GB

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