Sept 24th 2014

ılıılıı cısco

IPv6 adoption

Alain Fiocco, Sr. Director CTO Office, Head of "IPv6 High Impact Project"



"When a tree falls, we can hear it. When the forest grows, not a sound"

Gandhí

© 2014 Cisco and/or its affiliates. All rights reserved.

6lab.cisco.com

@cisco6lab



Measuring on-going IPv6 adoption is the best way to foster deployment, monitor success and spot trouble areas, and in the end, make better (data driven) business decision.

IPv6 deployment phases – The associated metrics







3 – Content enablement Alexa top sites / country + 6lab http probes Sources: Alexa.com, 6lab.cisco

Cisco Public

The Internet Core is ready for IPv6 !



Call for Action: Enable the long tail, the AS's at the periphery

© 2014 Cisco and/or its affiliates. All rights reserved.

Per country IPv6 Transit readiness





Forget the past, IPv6 to end users is rolling out FAST !



Actual % IPv6 usage measured and reported by Akamai, Facebook, Google, and Yahoo!

From: http://www.worldipv6launch.org/measurements (as of July 15, 2014)

IPv6: One Year from Today



© 2014 Cisco and/or its affiliates. All rights reserved.

Core networks and Content are IPv6 enabled... Users coming on line

How does it feel to be on IPV6 Internet ?

© 2014 Cisco and/or its affiliates. All rights reserved.



In over 90%, RTT over IPv6 is identical to IPv4 (+/-100ms)

Let's do a deep dive on the anomalies !



Are other research finding the same results ? => Yes



© 2014 Cisco and/or its affiliates. All rights reserved.

2.7% are broken, but

most are IPv6-only test AAAA

0.4%

First type of Anomaly Consistently shorter IPv6 RTT fm Singapore toward Europe



Anomalies analysis: The Hurricane Electric effect

HE: AS6939 in 44,8% of IPv6 routes, 16,9% of IPv4 routes (source routeview.org) Many AS's are peering with HE for IPv6 (but not necessarily for IPv4) => non-congruent Path



Second type of Anomaly: RTT fm Rackspace to many WEB sites within US is shorter on IPv4



IPv4 is 200-400ms faster than IPv6 between my Probe in Virginia and a .gov web site in DC

IPv6 path within AS6453 (TATA communication) Fm Rackspace (Va) to .gov (DC) via Dallas !

ennessee

Missour

Arkansa

Mississipp

Good News and Lessons learnt

- IPv6 and IPv4 Performance are identical (+/- 100ms) in most cases
- Most performance anomalies are due to non-congruent paths
 - Peering must be done dual-stack to <u>avoid path divergence</u>
 - <u>Monitor Performance for both protocol</u> is a MUST DO
- BUT Happy Eyeballs (RFC6555) hides performance discrepancies.
 <u>Users do NOT complain</u>

IPv4: Limitations due to scaling beyond original design



© 2014 Cisco and/or its affiliates. All rights reserved.

IPv6: Application-Centric, Programmable, IP Networking



IPv6: Application-Centric, Programmable, IP Networking



IPv6: The Internet Protocol for the Internet of Everything



People + Processes + Data + Things

Questions ?

Thank : Hugo Kazmareck Marcel Enghenard Guilaume Ladhuie Eric Vyncke

© 2014 Cisco and/or its affiliates. All rights reserved.

Thank You

email: afiocco@cisco.com Twitter: @alainfiocco @cisco6lab

All of our devices, applications and services...



100s of IPv6 features

Engineering Process changes – Test and Hardening – broadest USGv6 certified Portfolio





- 95% WEB properties/apps ~5% of cisco.com users ~\$2B business is over v6
- 100% Core/WAN and iPOP
- DC : 100%
- DNS: 90%, DHCP: 100%,
- 84% user VLANs (304 of 361 bldg)
- 38% Voice VLANs (138 of 362)
- 91% LABs (634 of 693)