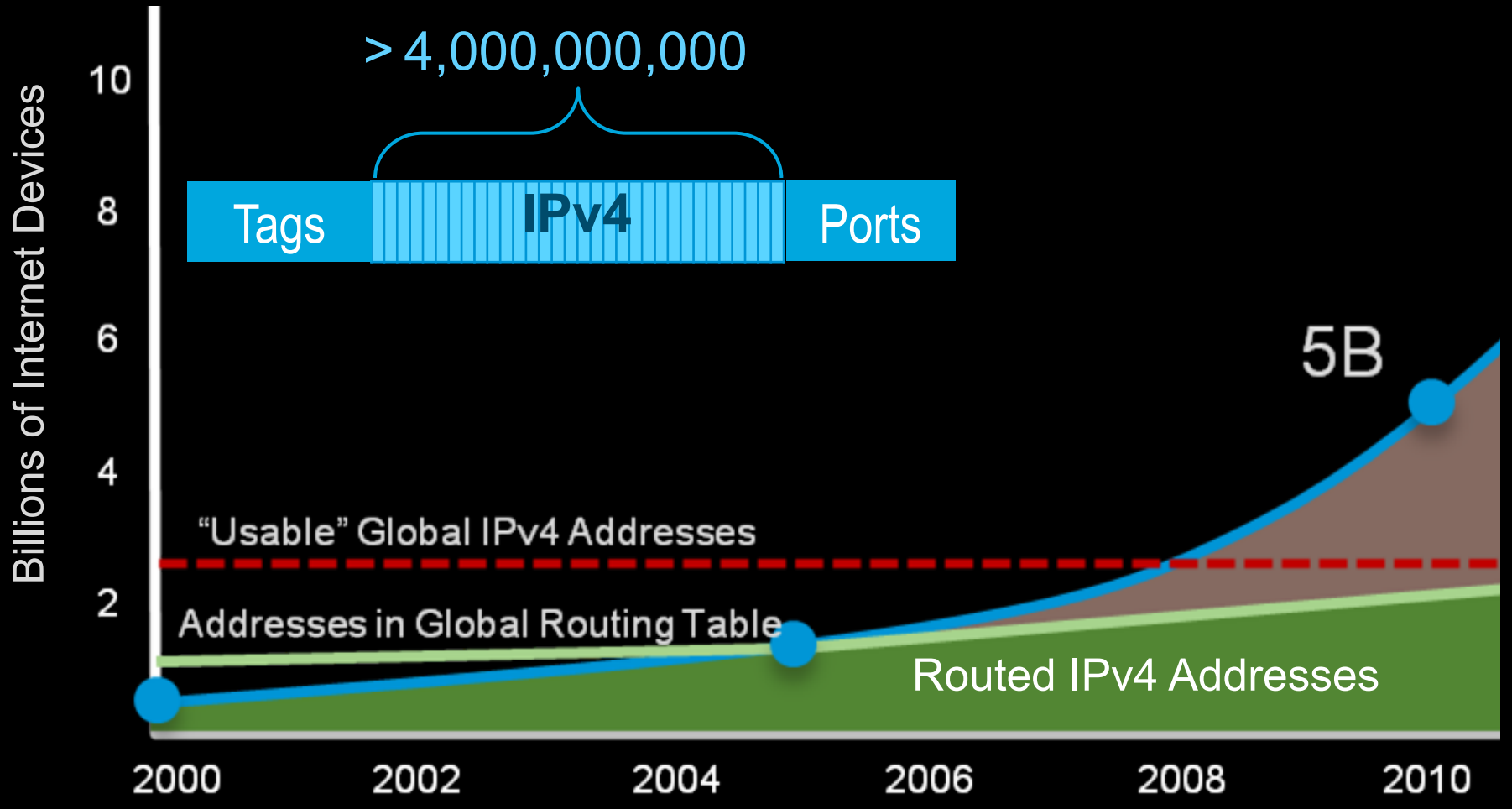
The Business Case for IPv6

Mark Townsley

Cisco Fellow

APNIC, August 2013

Past Internet Growth Challenges With IPv4



Sources: IMS Research, Intel, Ericsson, Cisco

SFR
19:22
72%
My Stocks
CISCO SYSTEMS
20
18
16
14
High 21.3
Low 13.3
P/E 11.6531
Return 16.44%
Mkt Cap 91.76B
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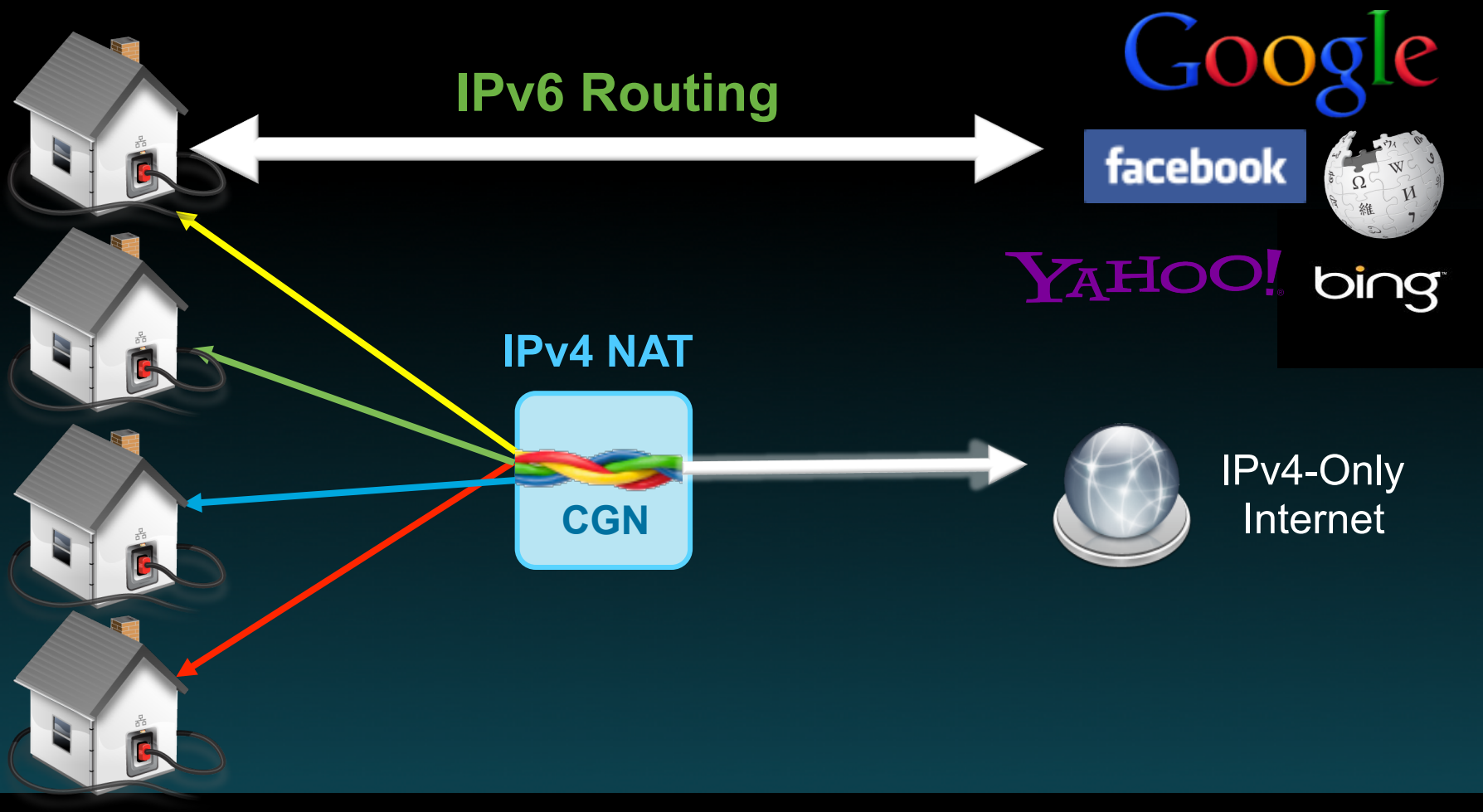
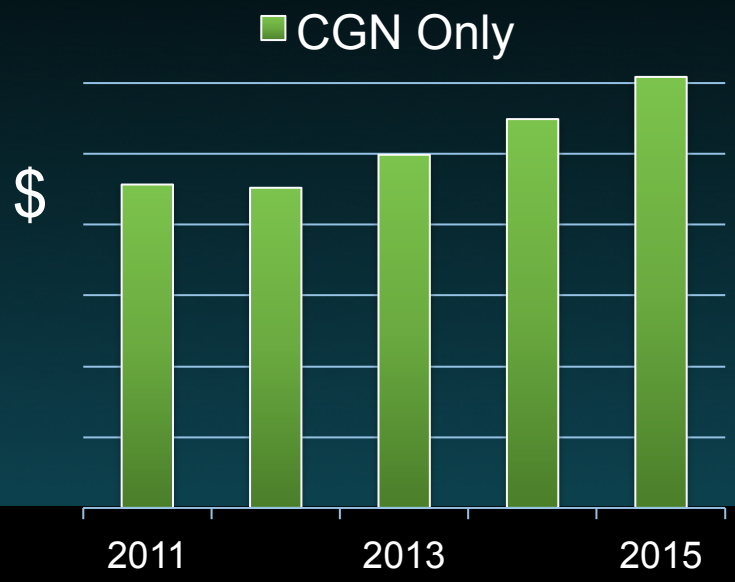
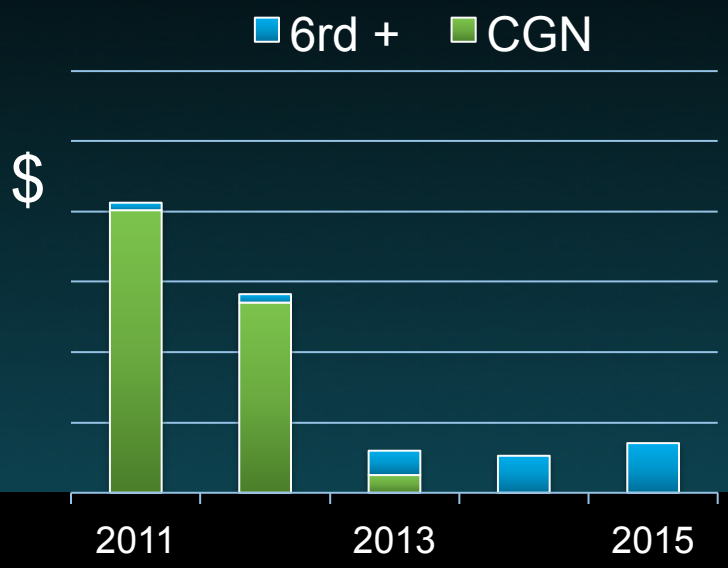
IPv6 Traffic Bypasses CGN Path



Business Case #1: Wireline CGN Bypass





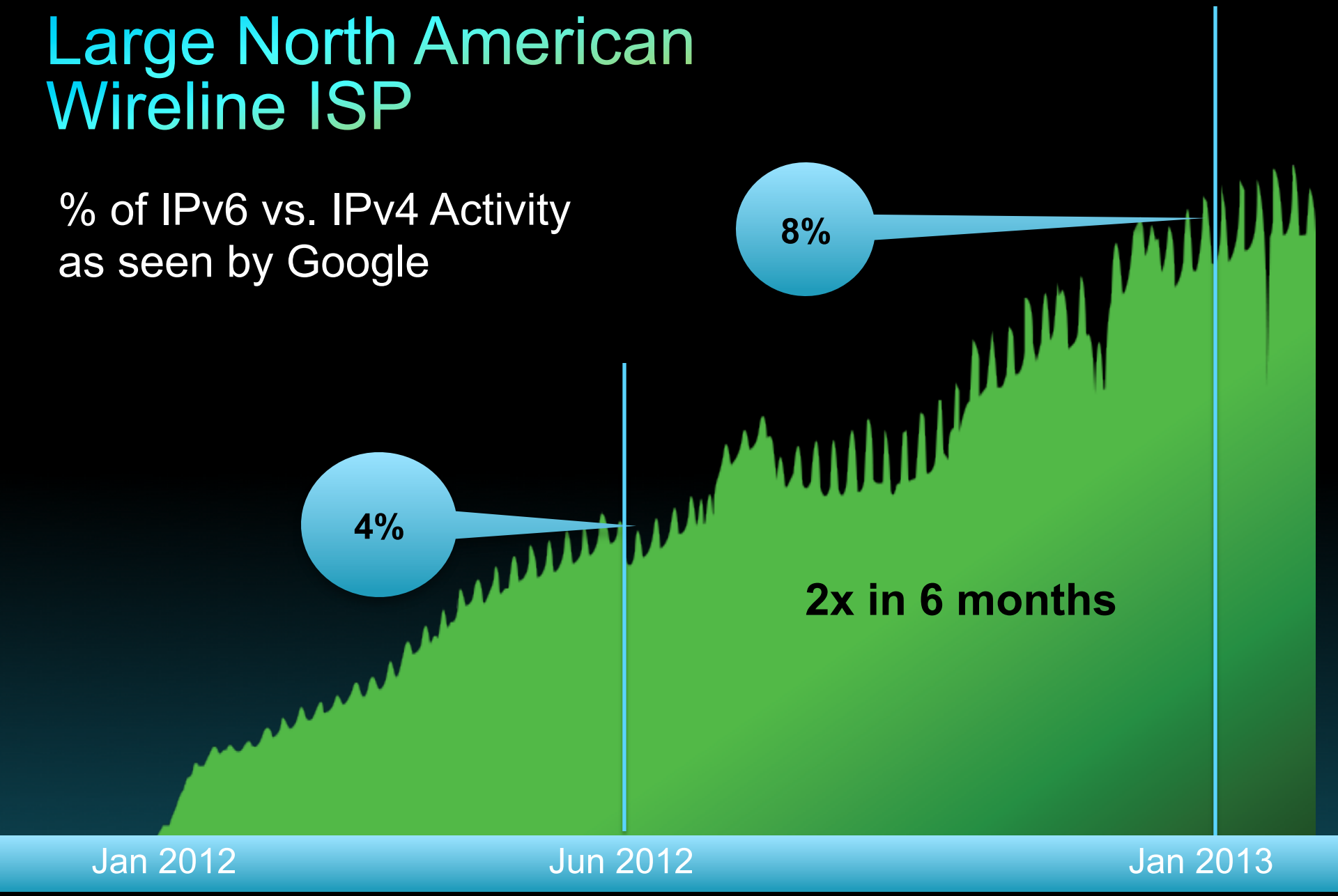
May, 2012, IDC Study
"The Business Case for Delivering IPv6 Service Now"

http://tinyurl.com/cgn-bypass-business-case

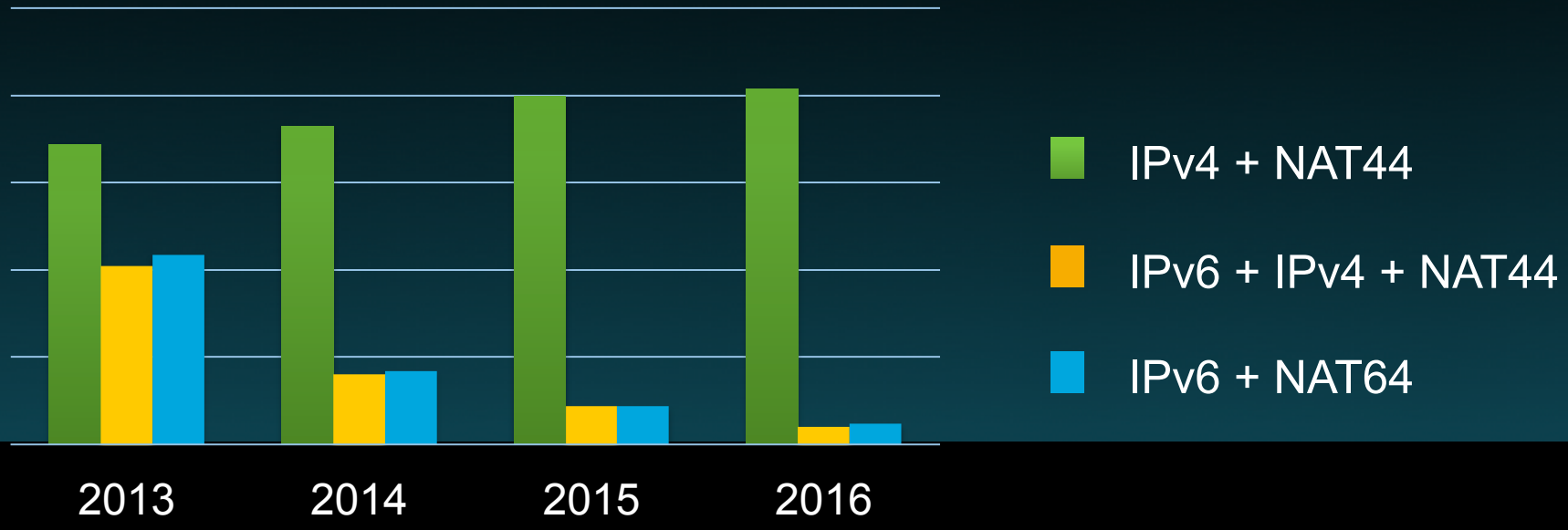
6rd – IPv6 Rapid Deployment, RFC 5969

Large North American Wireline ISP

% of IPv6 vs. IPv4 Activity as seen by Google



Business Case #2:
Mobile CGN Bypass and IPv6-only

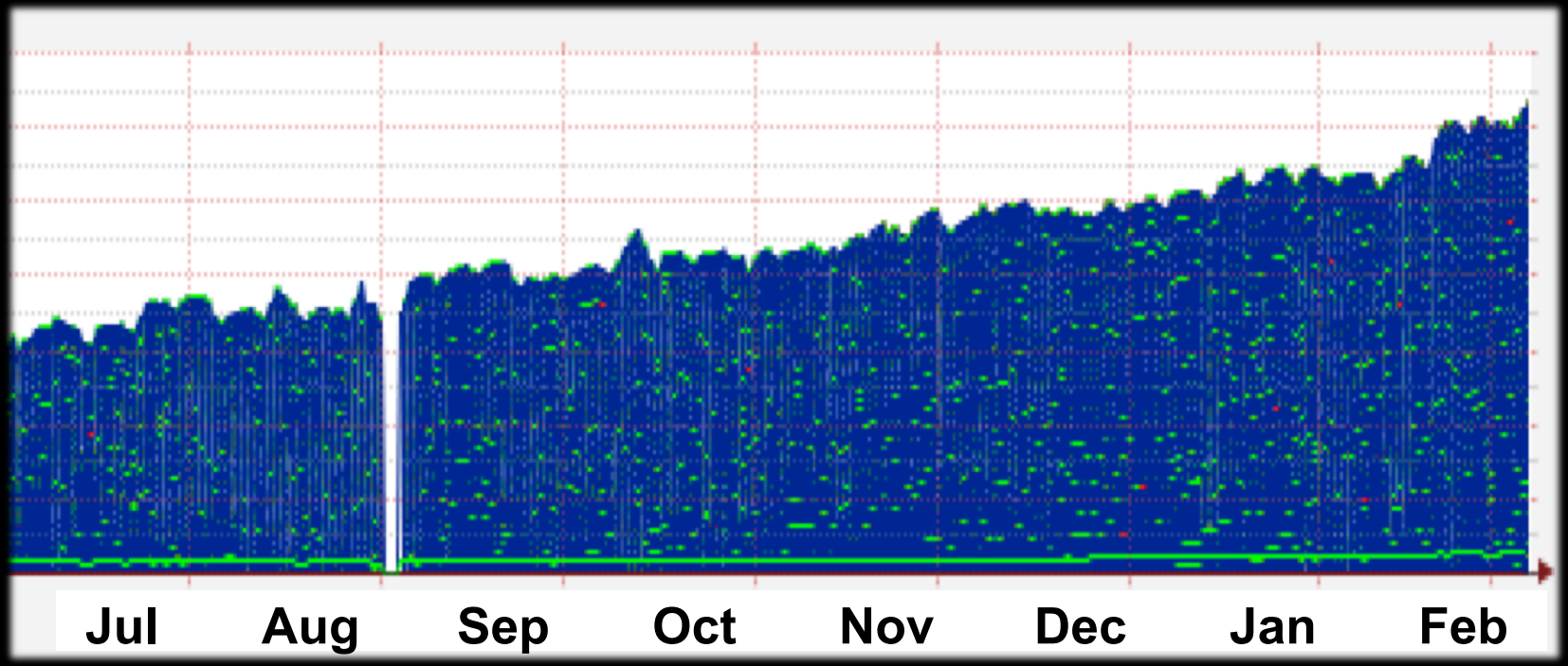


March, 2013, Cisco/IDC Study

“The Business Case for IPv6 in Mobile Networks“

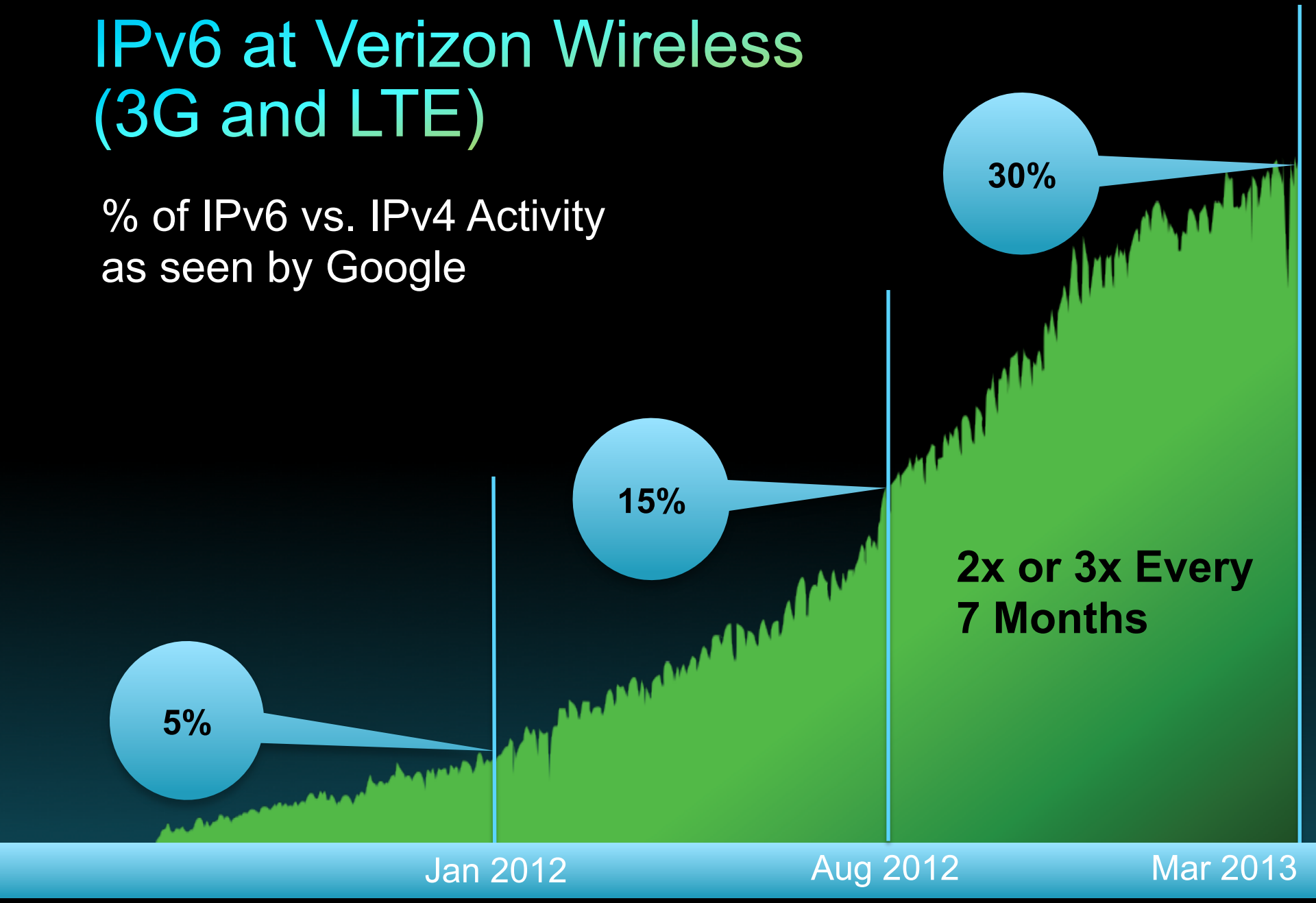
http://tinyurl.com/cgn-mobile-bypass-case

Consolidated NAT44 Session State in a Mobile Network (12 month period)

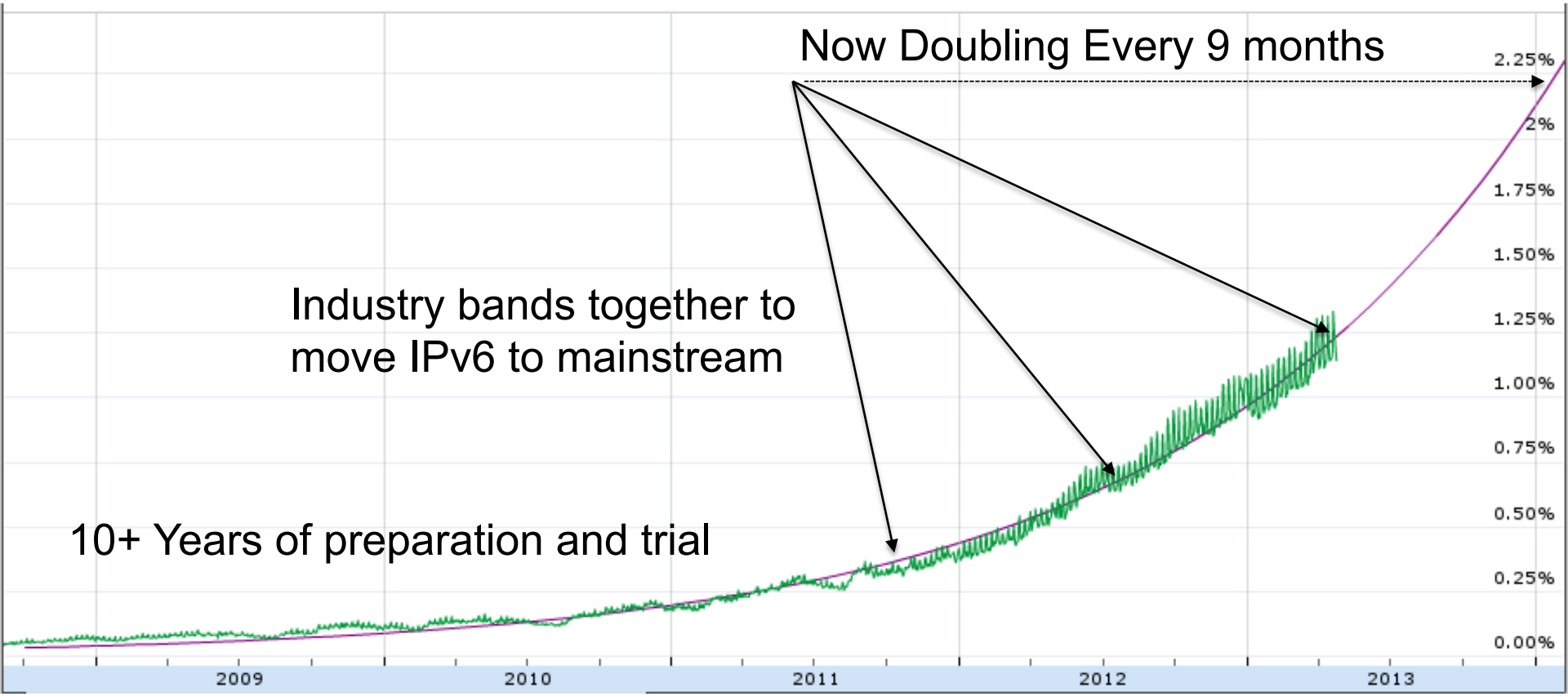


IPv6 at Verizon Wireless (3G and LTE)

% of IPv6 vs. IPv4 Activity
as seen by Google



IPv6 Deployment to Google Users

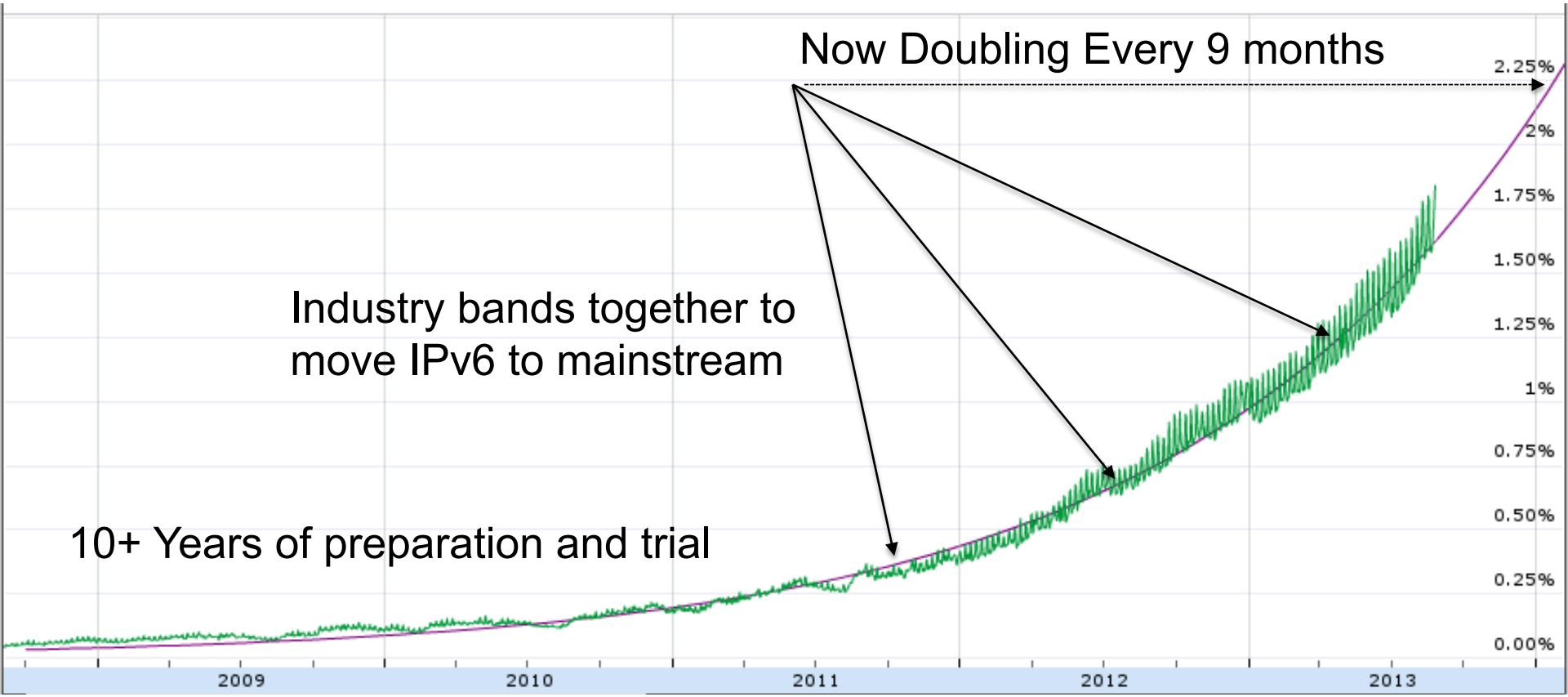


"World IPv6 Day" June, 2011

"World IPv6 Launch" June, 2012

Based upon publicly available data at http://www.google.com/ipv6/statistics.html
Thanks to our friends and Google for this

IPv6 Deployment to Google Users



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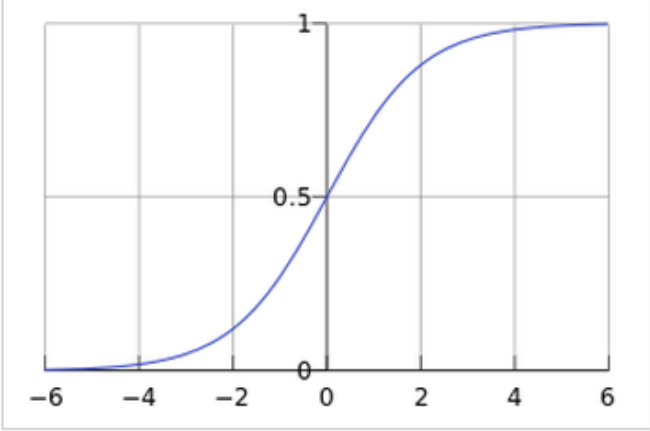
Logistic function

From Wikipedia, the free encyclopedia

For the recurrence relation, see Logistic map.

A **logistic function** or **logistic curve** is a common sigmoid function, given its name (in reference to its S-shape) in 1844 or 1845 by Pierre François Verhulst who studied it in relation to population growth. A generalized logistic curve can model the "S-shaped" behaviour (abbreviated S-curve) of growth of some population *P*. The initial stage of growth is approximately exponential; then, as saturation begins, the growth slows, and at maturity, growth stops.



Standard logistic sigmoid function

The logistic function is the sigmoid curve with equation:

$$f(x) = \frac{1}{1 + \mathrm{e}^{-x}}$$

where *e* is Euler's number.[1] For values of *x* in the range of real numbers from −∞ to +∞, the S-curve shown is obtained. In practice, due to the nature of the exponential function e^{-x}, it is often sufficient to compute *x* over a small range of real numbers such as [−6, +6].

The logistic function finds applications in a range of fields, including artificial neural networks, biology, biomathematics, demography, economics, chemistry, mathematical psychology, probability, sociology, political science, and statistics. It has an easily calculated derivative:

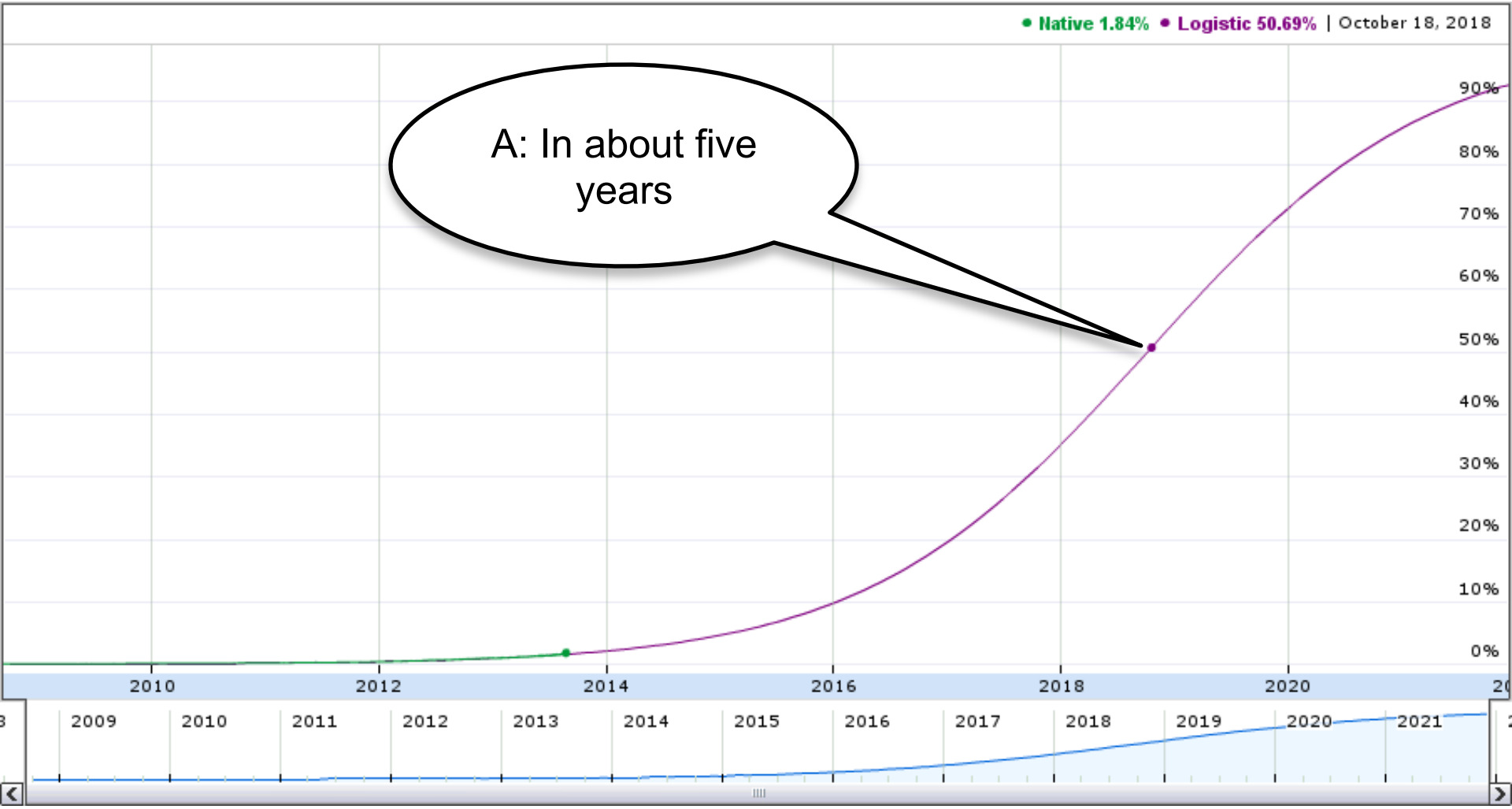
$$\frac{d}{dx} f(x) = f(x) \cdot (1 - f(x)).$$

It also has the property that

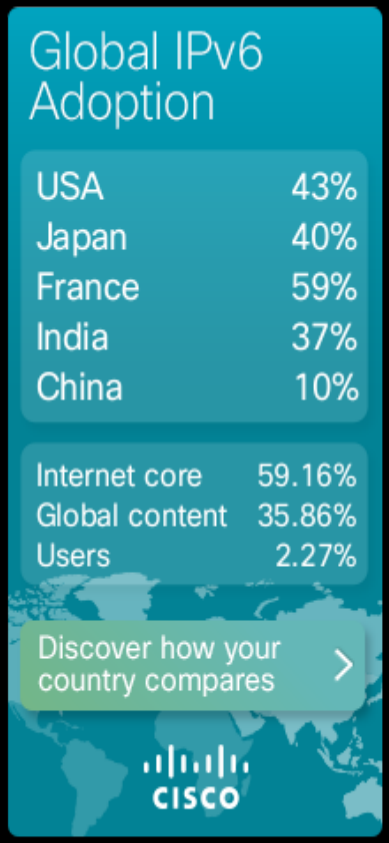
$$1 - f(x) = f(-x).$$

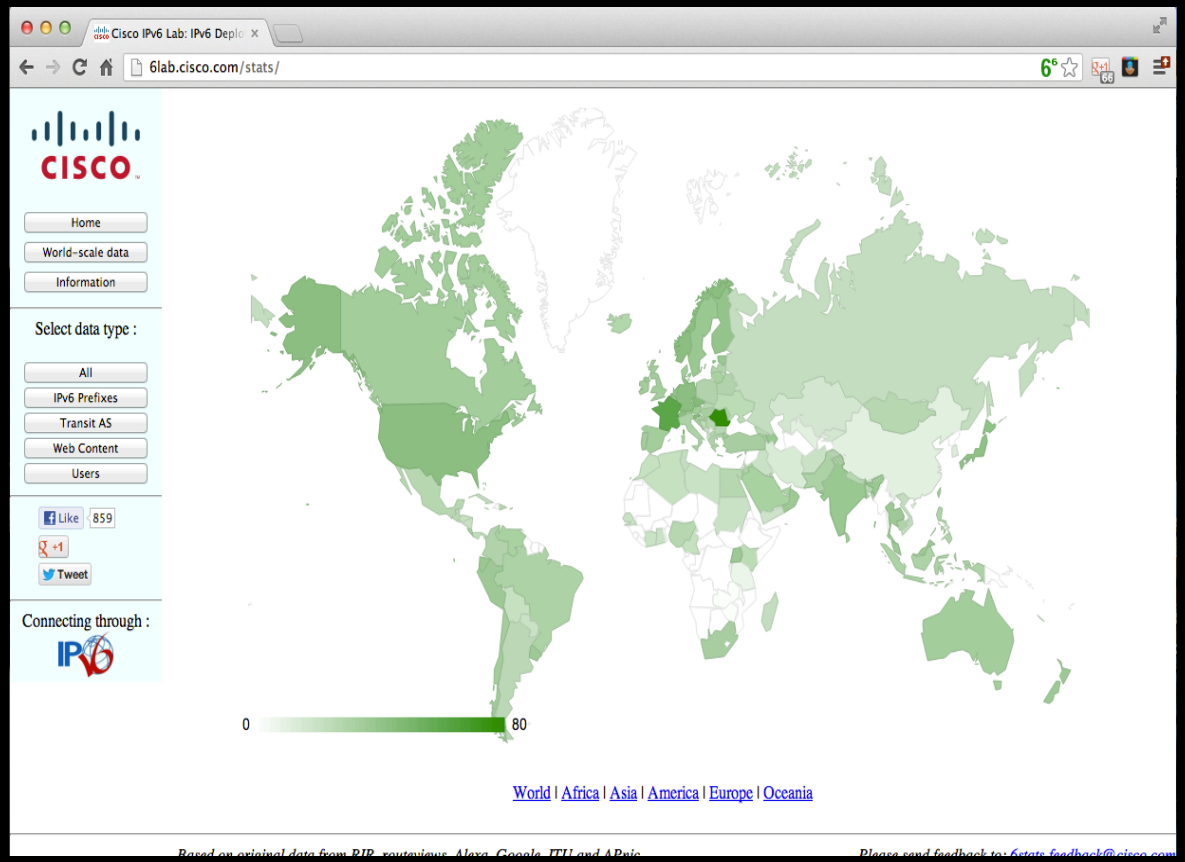
Thus, the function $x \mapsto f(x) - 1/2$ is odd.

Q: When do we reach the half-way point?

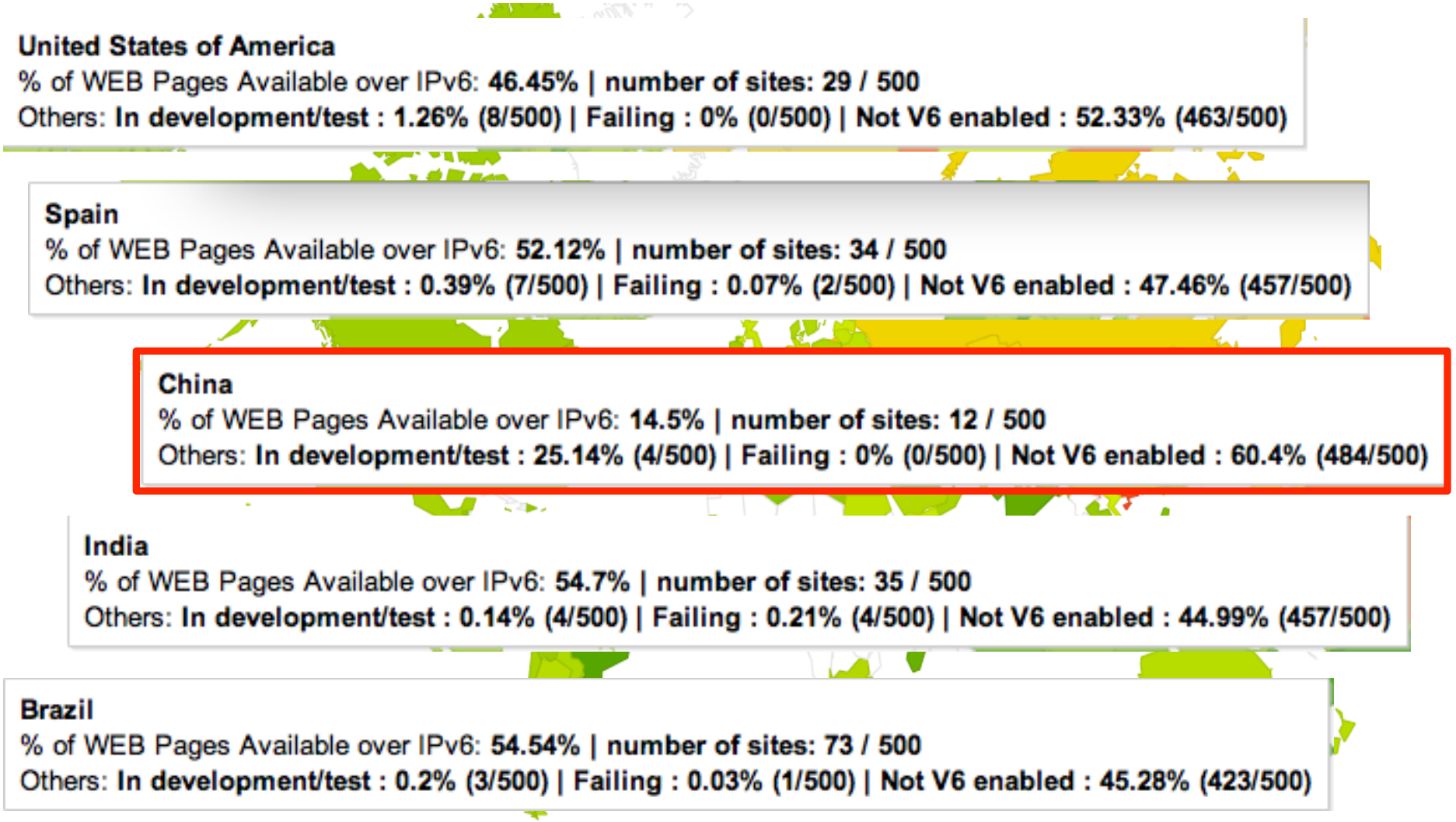


http://6lab.cisco.com/stats/





Content reachable over IPv6



Arriving Now:
All-IPv6 ISP Networks and Data Centers

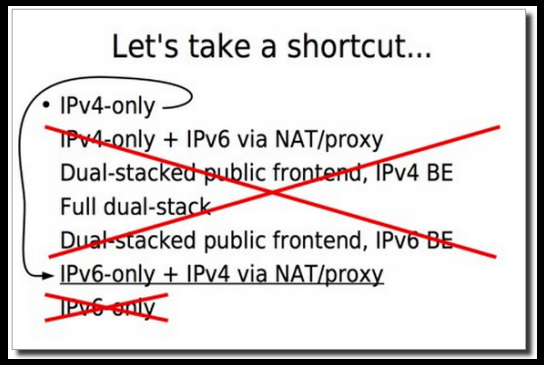
Ian Farrer on the All **IPv6 TeraStream** Network - YouTube

www.youtube.com/watch?v=QRR5ewjmxxE

Mar 22, 2013 - Uploaded by Cisco

Ian Farrer of Deustche Telekom talks about the challenges of working on one of the first all v6 projects to be ...

More videos for **ipv6 terastream** »

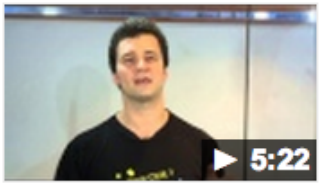


17.10 The Killer App is Automation in the Cloud

The pace of change in IT infrastructure and services has never been greater. New opportunities abound with the shift to cloud computing and the explosion of mobility. Organizations must automate infrastructure and workload provisioning to remain relevant and compete in the new economy, yet much of the opportunity is only available using IPv6. Thoughts on where the biggest opportunities are and some practical advice will be presented.

Paul Zawacki | Enterprise Architect | ORACLE

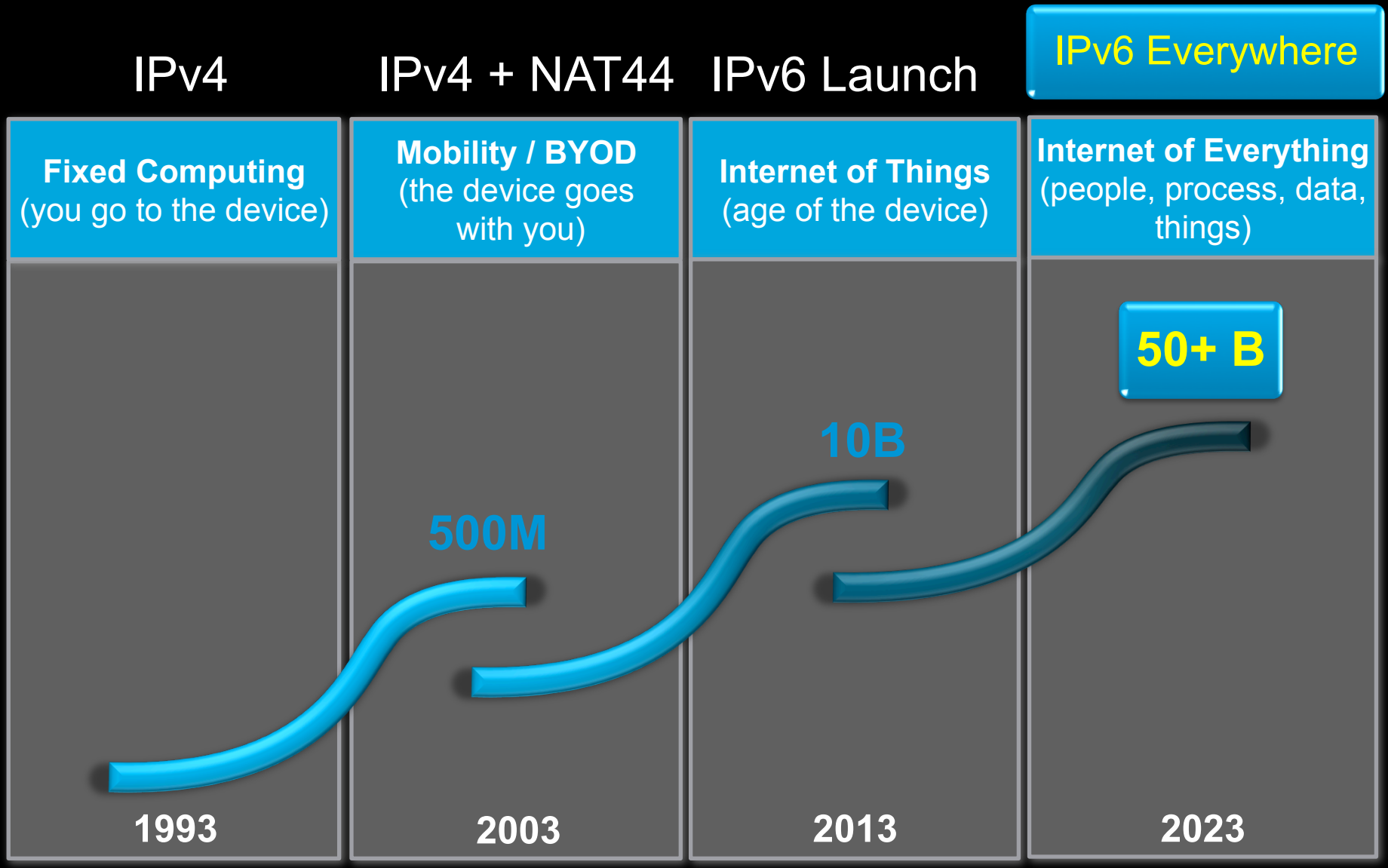
Cisco Demonstrates **Mapping** Address and Port (**MAP**) Technology f…



www.youtube.com/watch?v=He681zqeUJU

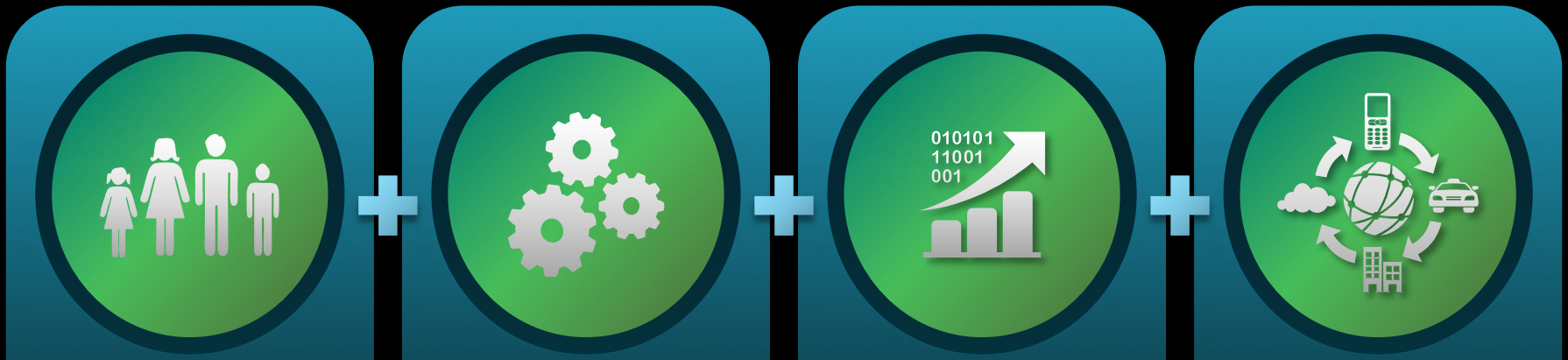
Apr 10, 2013 - Uploaded by Cisco

During V6 World Congress 2013 at the EANTC public multi-vendor interoperability event, Andrew Yourtchenko ...



Source: Cisco IBSG, 2013

The Internet of Everything



People

Connecting people in more relevant and valuable ways.

Process

Delivering the right information to the right person (or machine) at the right time.

Data

Leveraging data into more useful information for decision making.

Things

Physical devices and objects connected to the Internet and each other for intelligent decision making.

Source: Cisco Internet Business Solutions Group, 2012

Business Case #3
Real World IoE Potential

- 21 use cases to determine the amount of Value at Stake over a 10 year period
- Both industry-specific and cross-industry use cases

Smart Factories **$1.95 T**

Smart Buildings **$349B**

Smart Grid **$787B**

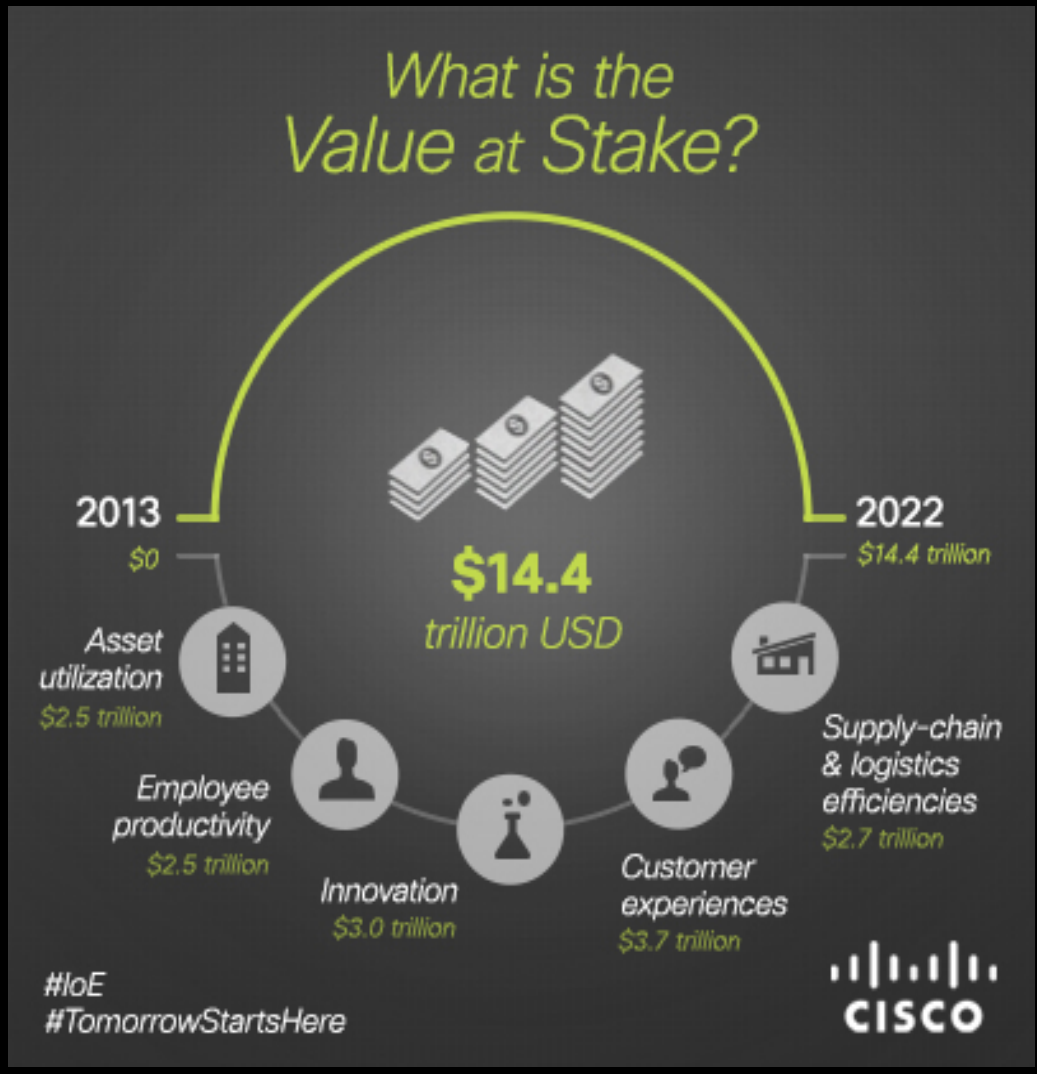
"The World is Moving to IP"

http://tinyurl.com/IoE-Economy

Source: Cisco IBSG, 2013

Q:
How Much Value Is at Stake in the IoE Economy?

A:
14.4 Trillion USD*



* $ 88.15 Trillion RMB

"Trying to determine the market size for the Internet of Things is like trying to calculate the market for plastics, circa 1940. At that time, it was difficult to imagine that plastics could be in everything."

Prof. Michael Nelson, Georgetown University

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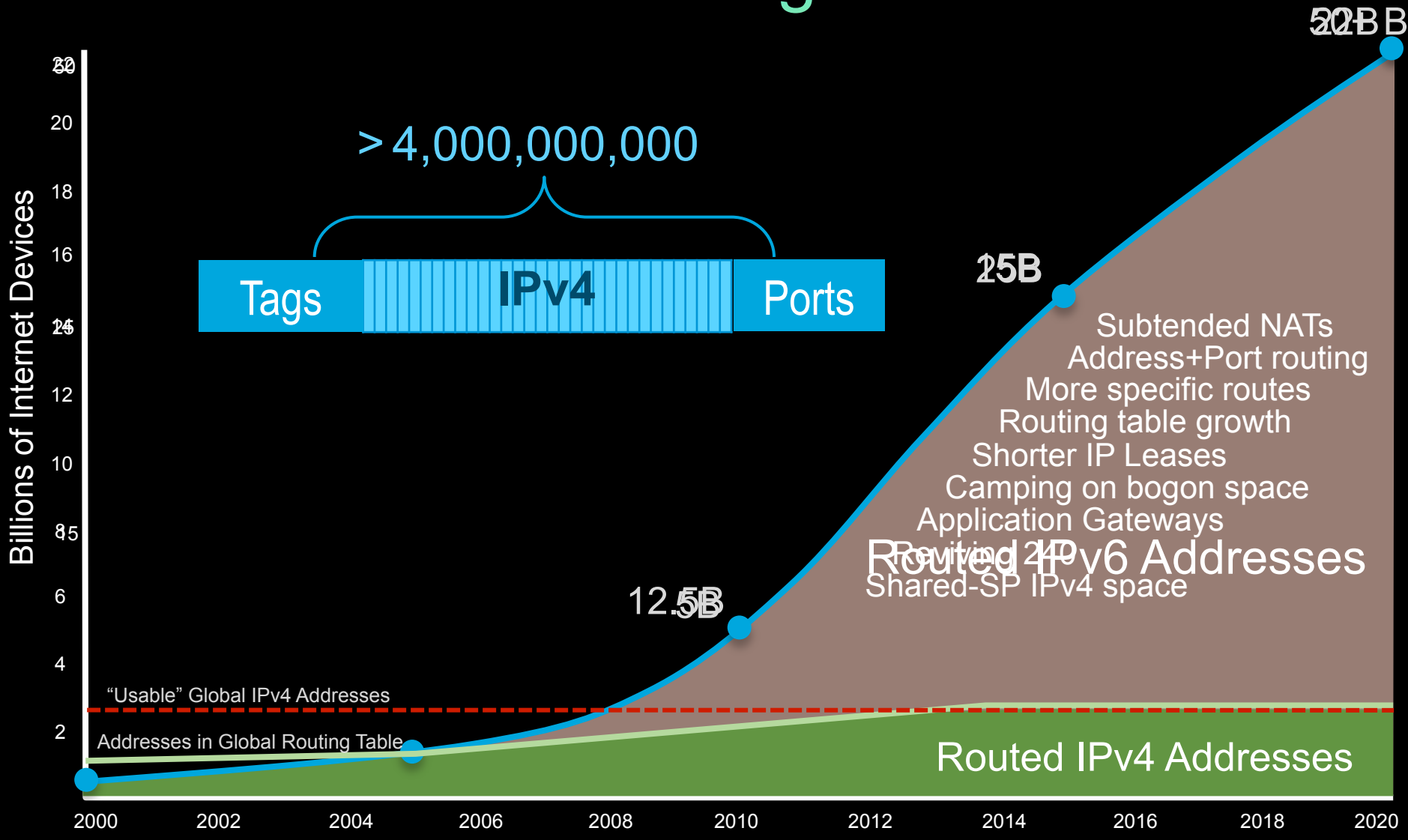
Future Growth Challenges With IPv4



Sources: IMS Research, Intel, Ericsson, Cisco

Business Case Summary

1. Carrier Grade NAT Bypass
   - Production deployments today show significant shift of user traffic from IPv4 to IPv6
   - Real world capex reduction vs. CGN investment alone
2. All IPv6 Networks
   - IPv6-only Data Centers and Greenfield SP Networks
   - IPv4 being treated as a service, not as infrastructure
3. Internet of Everything
   - 50+ Billion Devices - people, process data and things
   - $14.4 Trillion of Value at Stake over the next 10 years

Thank You
Mark Townsley