IPv6 in Japan

Lorenzo Colitti, Erik Kline
IPv6 Summit 2013

Google

World IPv6 Launch

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Real impact on whole ecosystem

- World IPv6 Launch participants
  - 3000+ websites
  - 60+ ISPs
  - 4 home router vendors
- Real traffic
  - Comcast: "IPv6 enabled users see up to 40% of traffic on IPv6"
- Real deployments
  - everywhere around the world
  - on every access technology
- IPv6 content now widely available
  - Global: 23% of Alexa top 500, 30% page views IPv6-ready
  - Japan: 8% of Alexa top 500, 24% of page views IPv6-ready
    - Sources: Cisco [1, 2], Lars Eggert

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IPv6 worldwide

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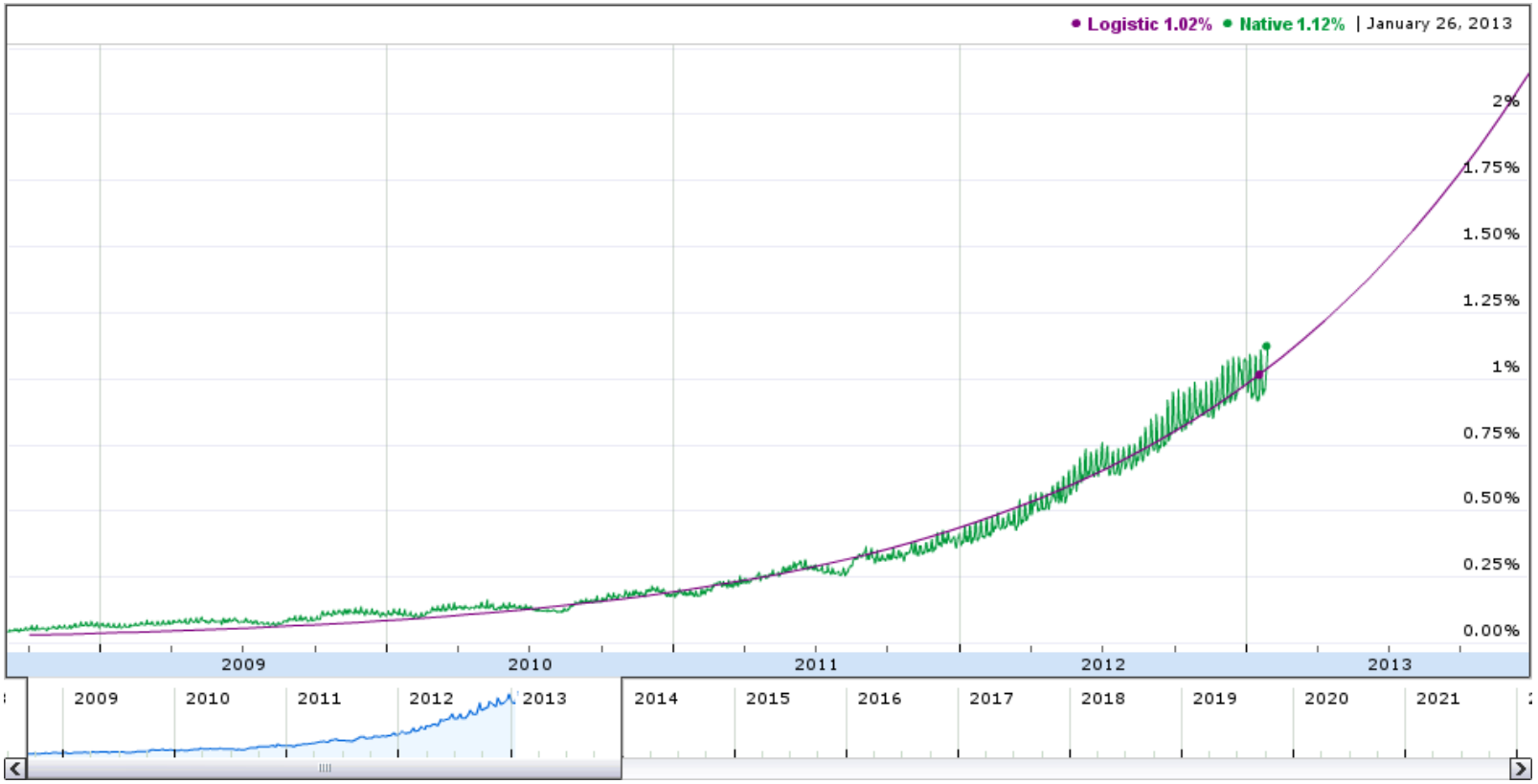
Global IPv6 growth



- **> 1%** of Google users has IPv6 today
- Growth: **2.8x** per year in 2012 (above IPv4 growth)
- S-curve projection: **10% in ~3 years**, **50% in 6 years**

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IPv6 around the world

IPv6 works | IPv6 impacted, few users | IPv6 impacted, many users

- Most IPv6 deployments in the US and Europe
- Some countries have issues with IPv6 reliability
- Google publishes a list of networks we do not enable IPv6 for
  - Allows website operators to avoid enabling IPv6 in impacted networks

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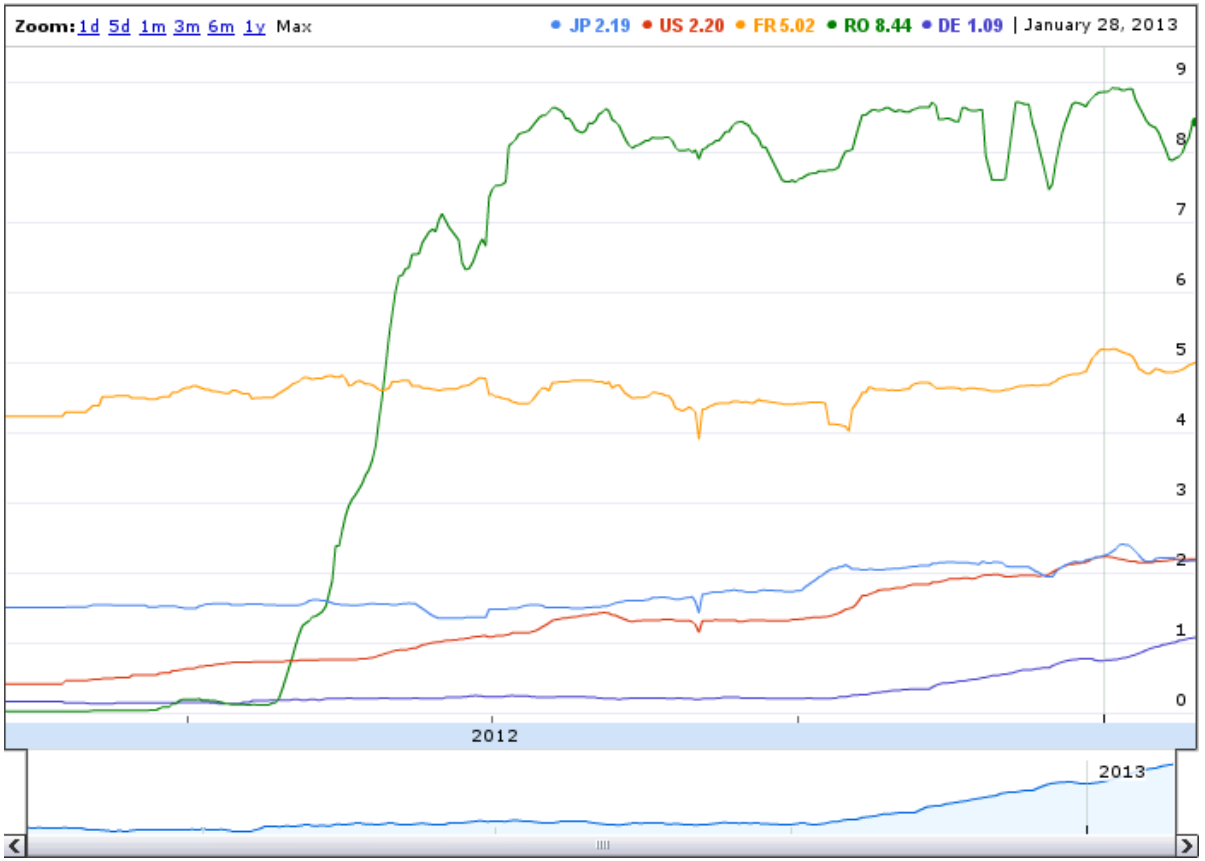
Top 5 countries by IPv6 deployment



Romania
France
Japan
USA
Germany

Japan currently #3 with USA, but USA and Germany growing faster

Source: Eric Vyncke

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IPv6 in Japan

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IPv6 adoption in Japan

- Adoption depends on market segment
- Each market segment faces a different set of challenges
- Will look at each segment individually
- Data comes from measurements on various Google properties
  - Methodology published at www.worldipv6launch.org/measurements

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Wireline, FLETS Hikari

Technically supported, but challenging

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IPv6 on FLETS Hikari

- Very large IPv6 deployment, but closed network
- Fallback problem is a challenge, even with workarounds
- IPv6 on NGN technically possible, but unattractive to ISPs
  - IPv6 IPoE
    - Reduced competition opportunities
      - May be fixed by increasing number of VNEs
    - Cost issues
      - Not yet addressed
  - IPv6 PPPoE
    - Requires implementation of adapter functionality
    - Cost issues
- Currently, no options for IPv6 on B-FLETS (~60% of users)

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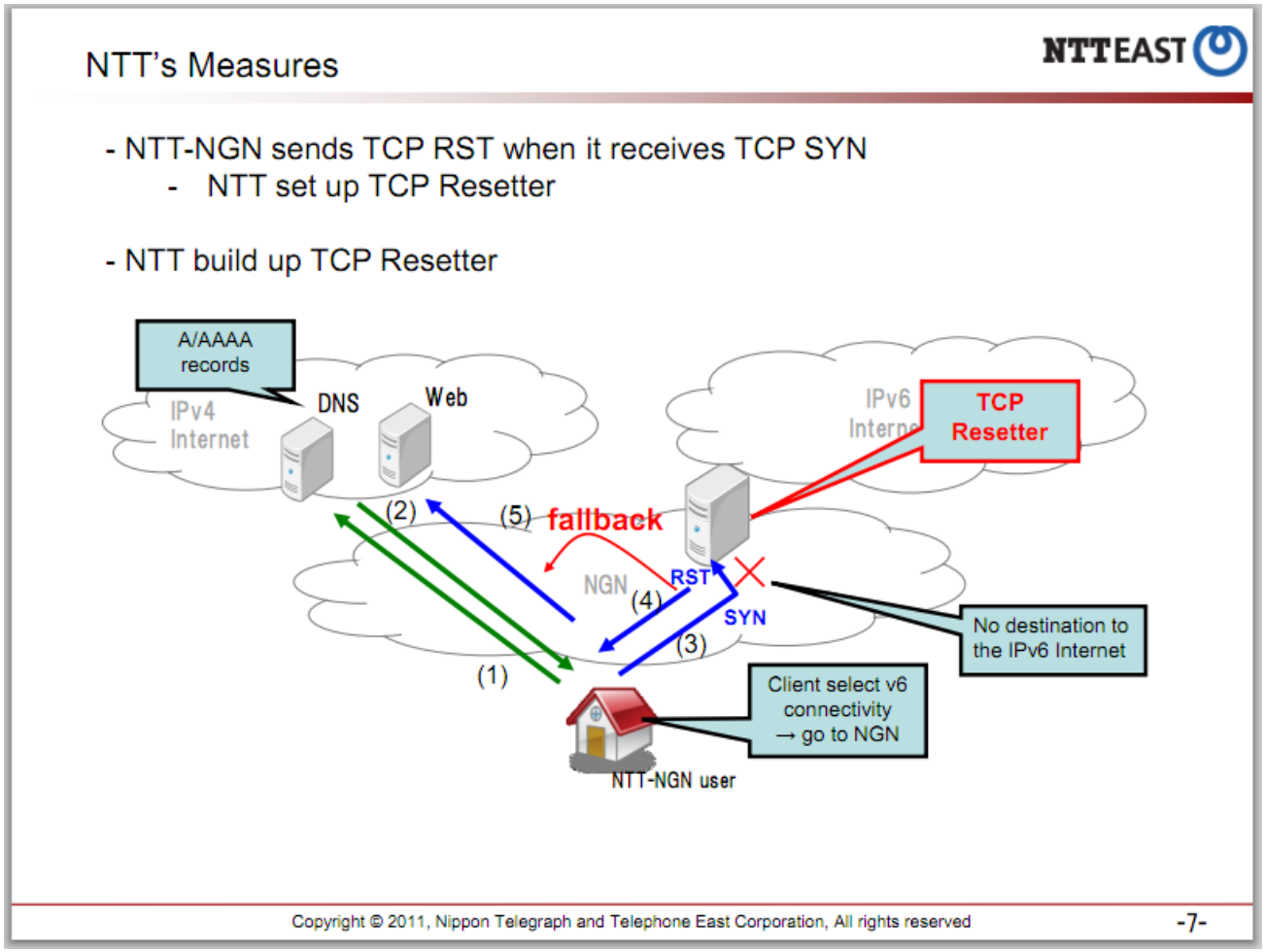
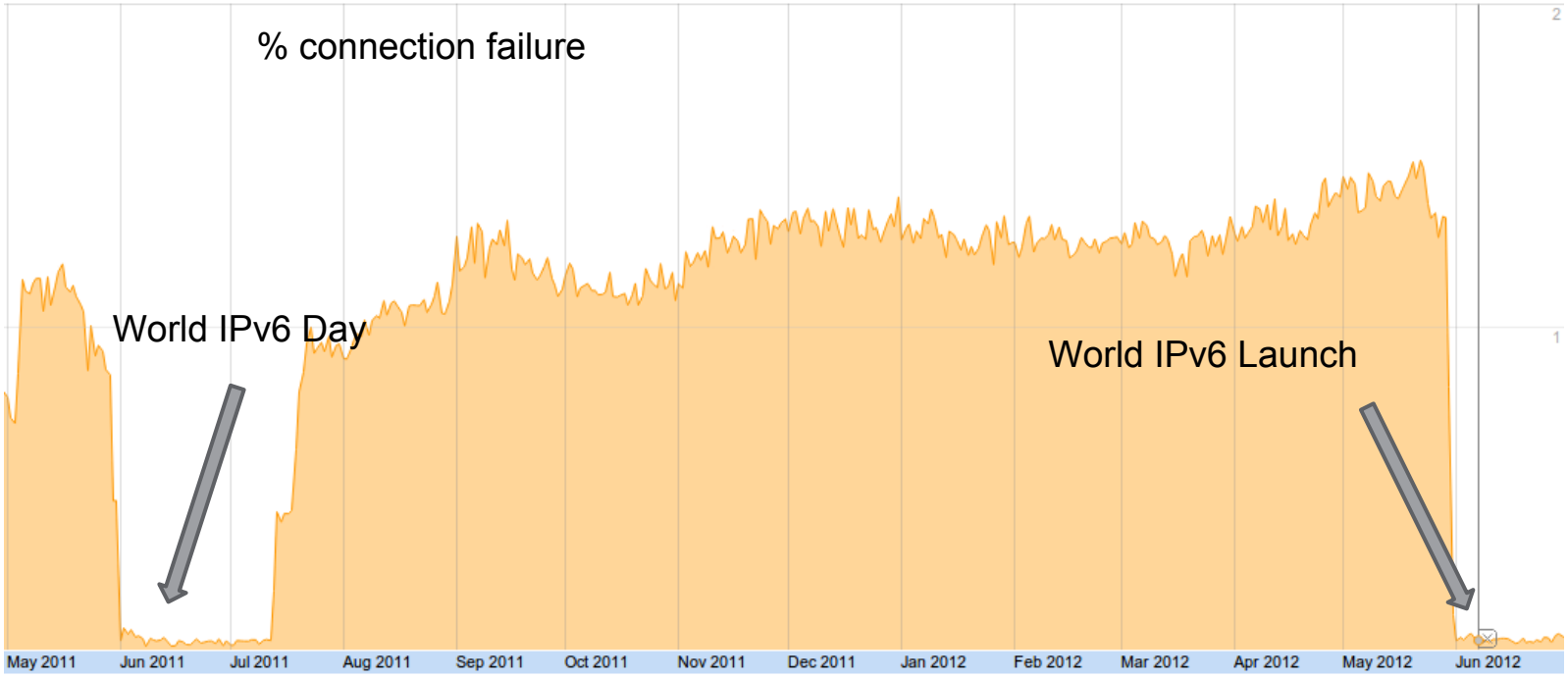
Fallback problem



Source: APNIC 32 meeting, 2011-08 [slides]

Workaround: AAAA filtering

- The majority of FLETS ISPs now filter out AAAA records
  - Doesn't solve the underlying problem
  - Blocks DNSSEC deployment
  - Disables measurements, so impossible to know when to stop filtering



A major Japanese FLETS ISP

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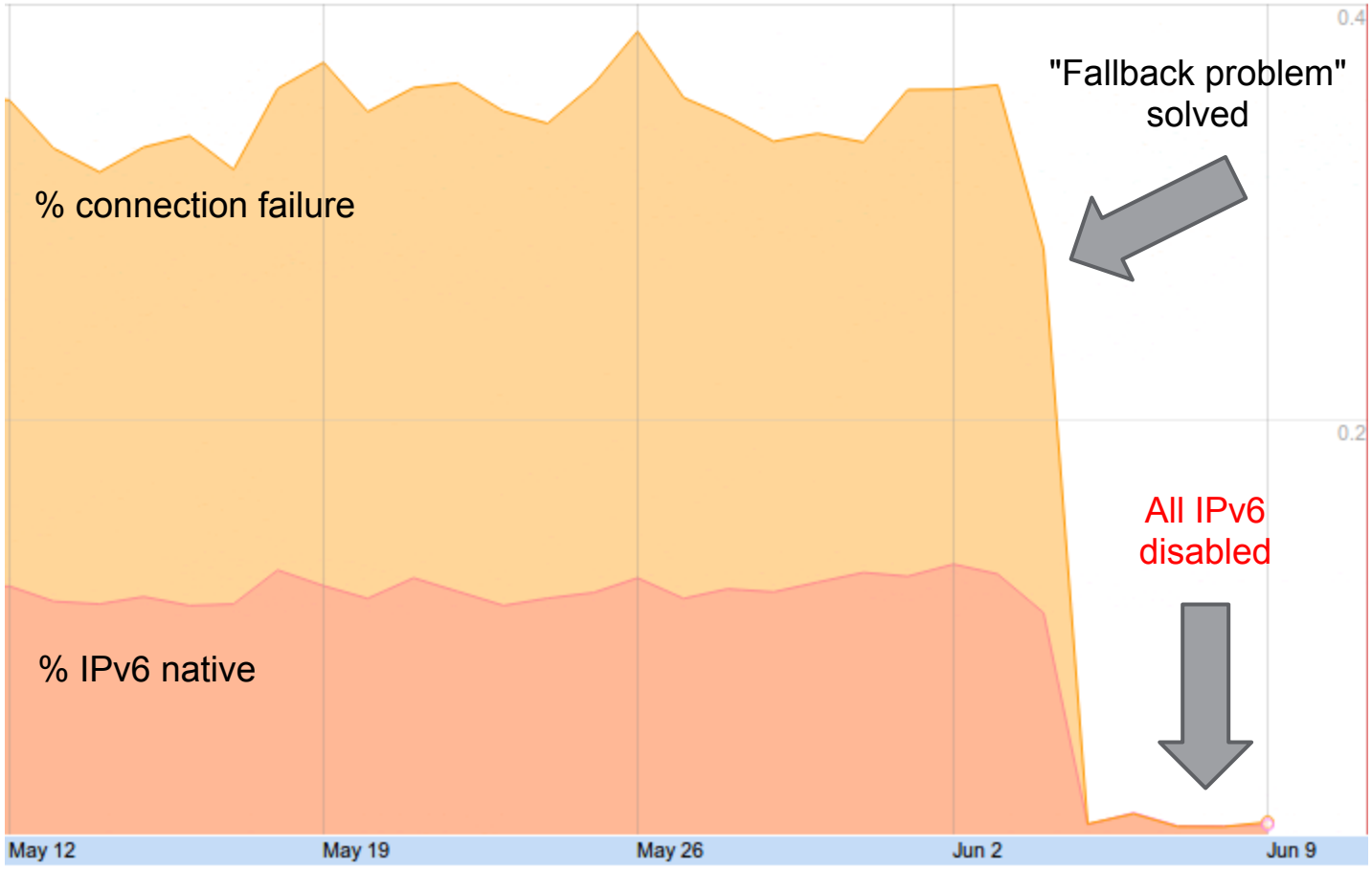
Can cause collateral damage



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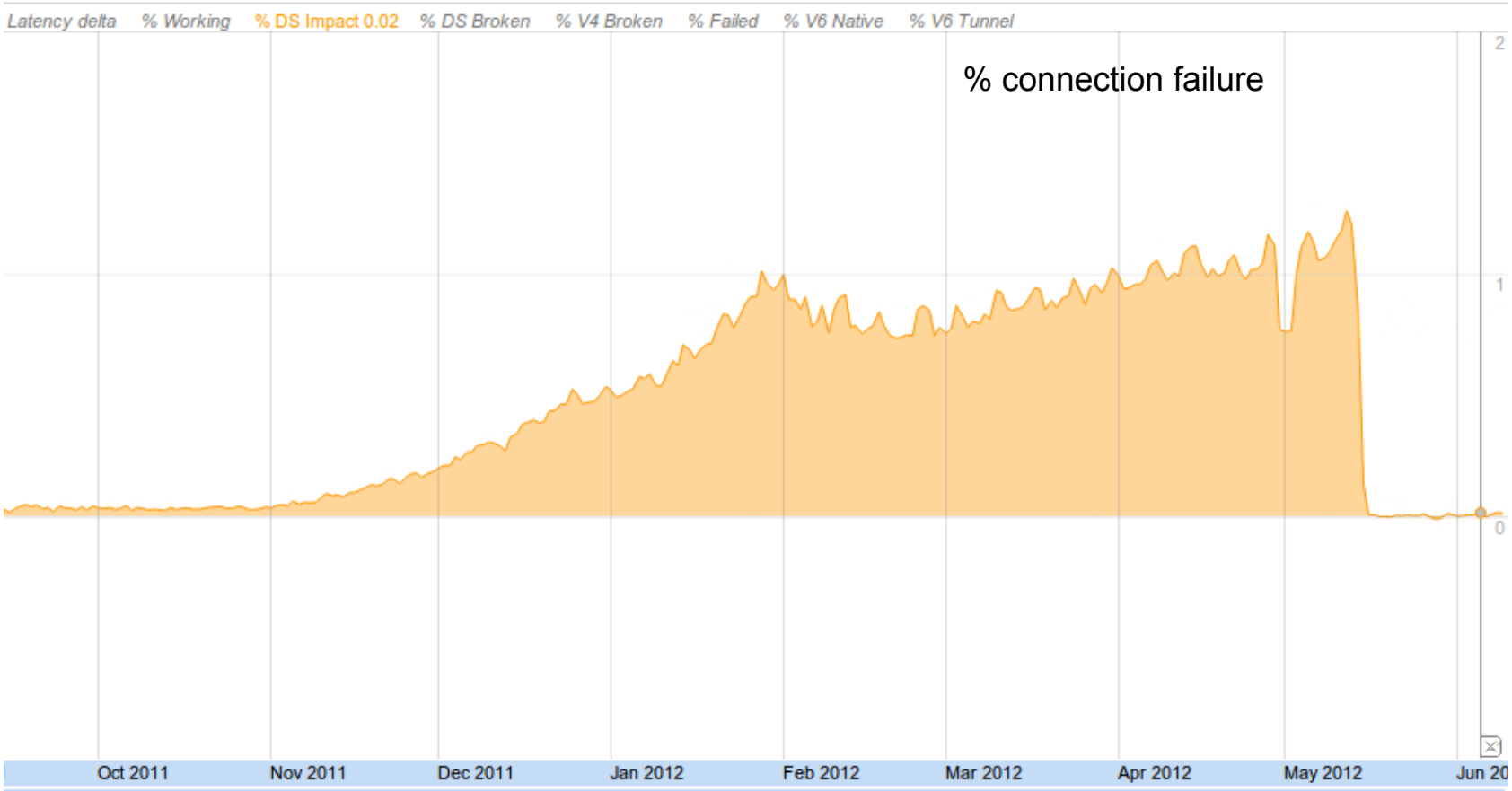
Not just Japan



A major ISP in Greece

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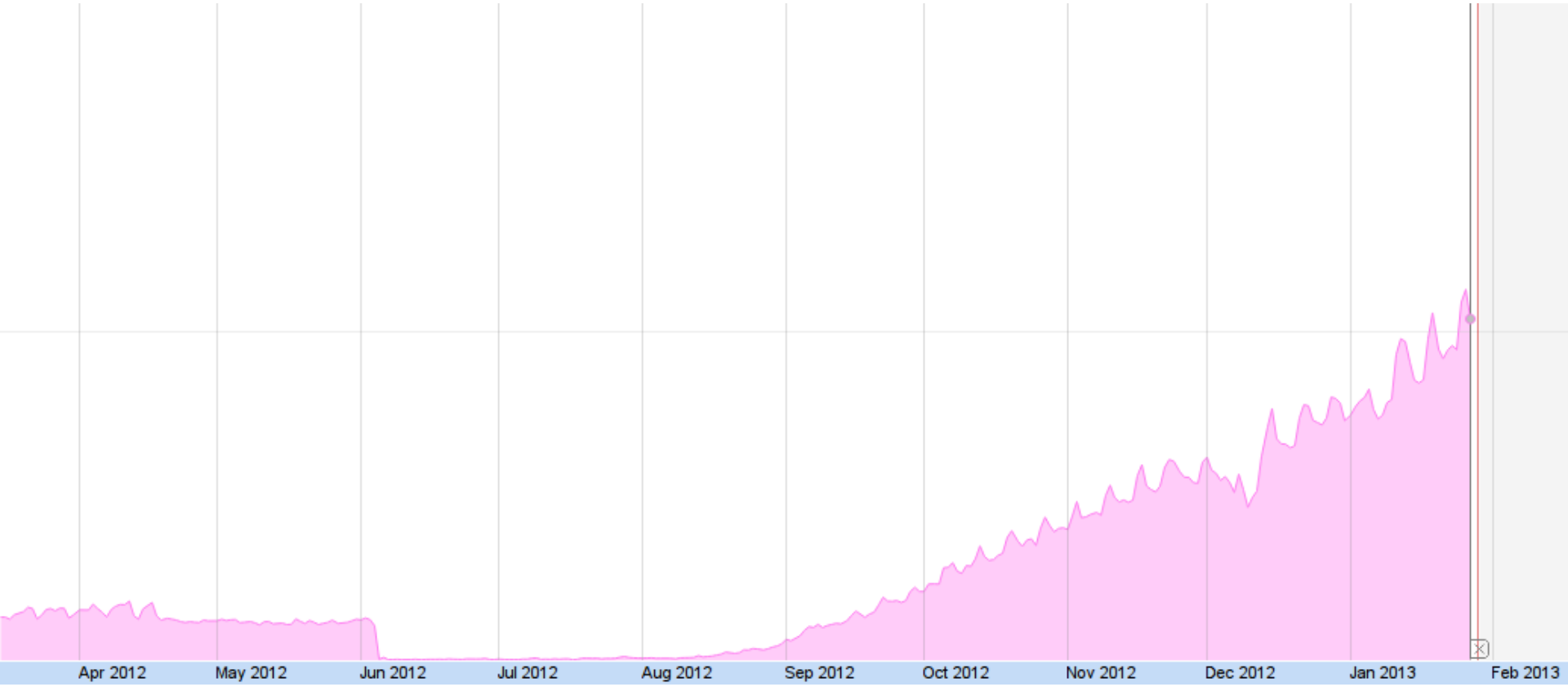
IPv6 on FLETS Hikari: SoftBank BB (IPoE)



Joined World IPv6 Launch in late 2012
> 1% IPv6
Mitigates cost issue by tunneling IPv4 over IPv6 (provides CPE)

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Wireline, non-FLETS Hikari

Substantial IPv6 adoption

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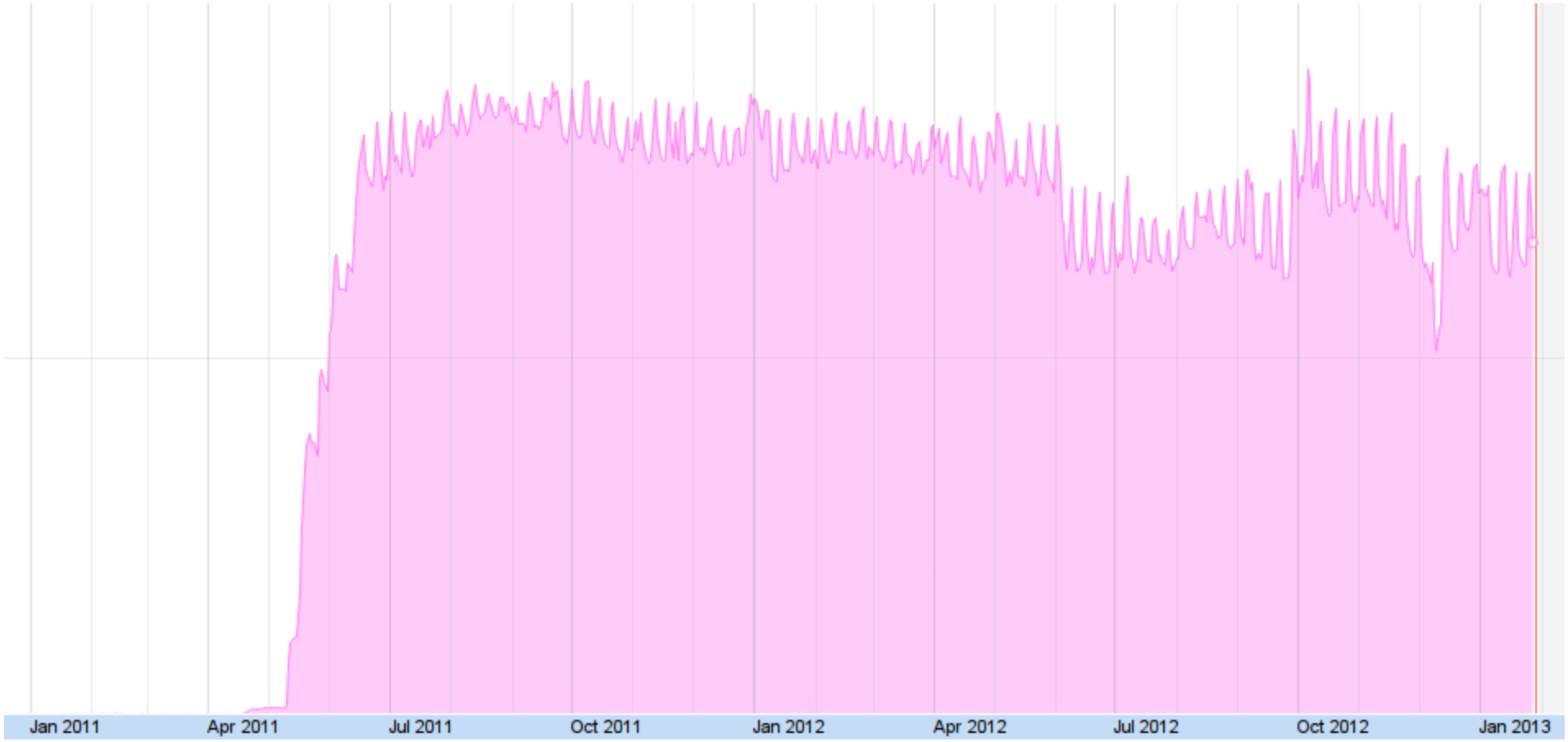
Non-NTT FTTH: KDDI



Joined World IPv6 Day in 2011
10-15% IPv6

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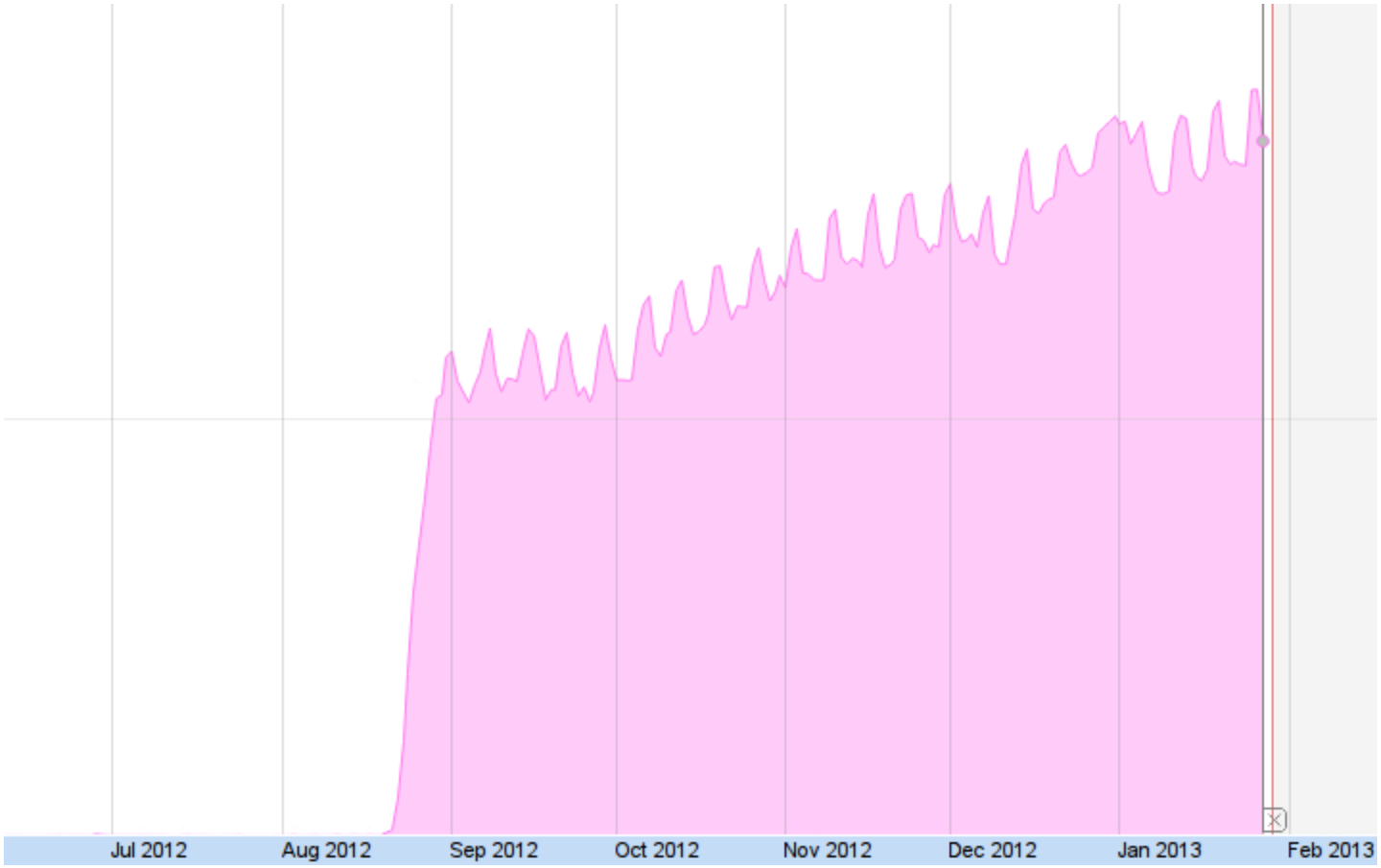
Non-NTT FTTH: Chubu Telecommunications



Joined World IPv6 Launch in 2012
10-15% IPv6 and growing

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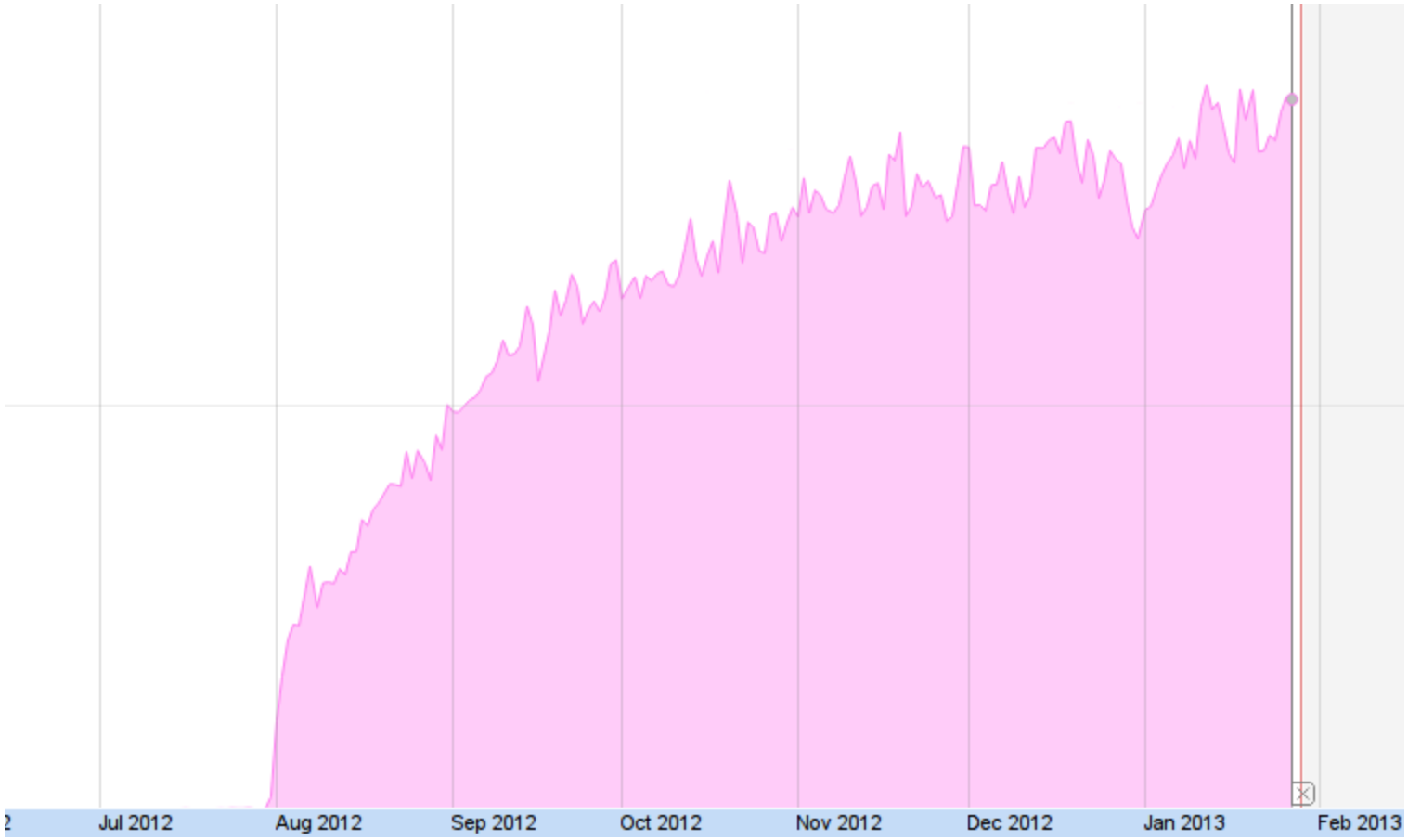
Cable: MediaCat (CNCi)



Joined World IPv6 Launch in 2012
10-15% IPv6 and growing

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Mobile networks (3G/4G)

Technically supported, but very little usage

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IPv6 on Mobile

- LTE networks support IPv6, but very little adoption in Japan
- NTT docomo
  - Supports IPv6 on LTE network, but opt-in
  - Official support only on three devices
  - No support on phones
- au
  - Supports IPv6 on LTE, but not on iPhone/iPad
  - Very little adoption
- SoftBank
  - Not supported by network?
- eAccess
  - Not supported by network?

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Android IPv6 support depends on carrier

Verizon Wireless (USA)
Samsung Galaxy S III
(SCH-I535)
IPv6 on LTE (~95%)

NTT docomo
Samsung Galaxy S III
(SC-06D)
No IPv6 on LTE

au KDDI
Samsung Galaxy S III
(SCL21)
No IPv6 on LTE

...

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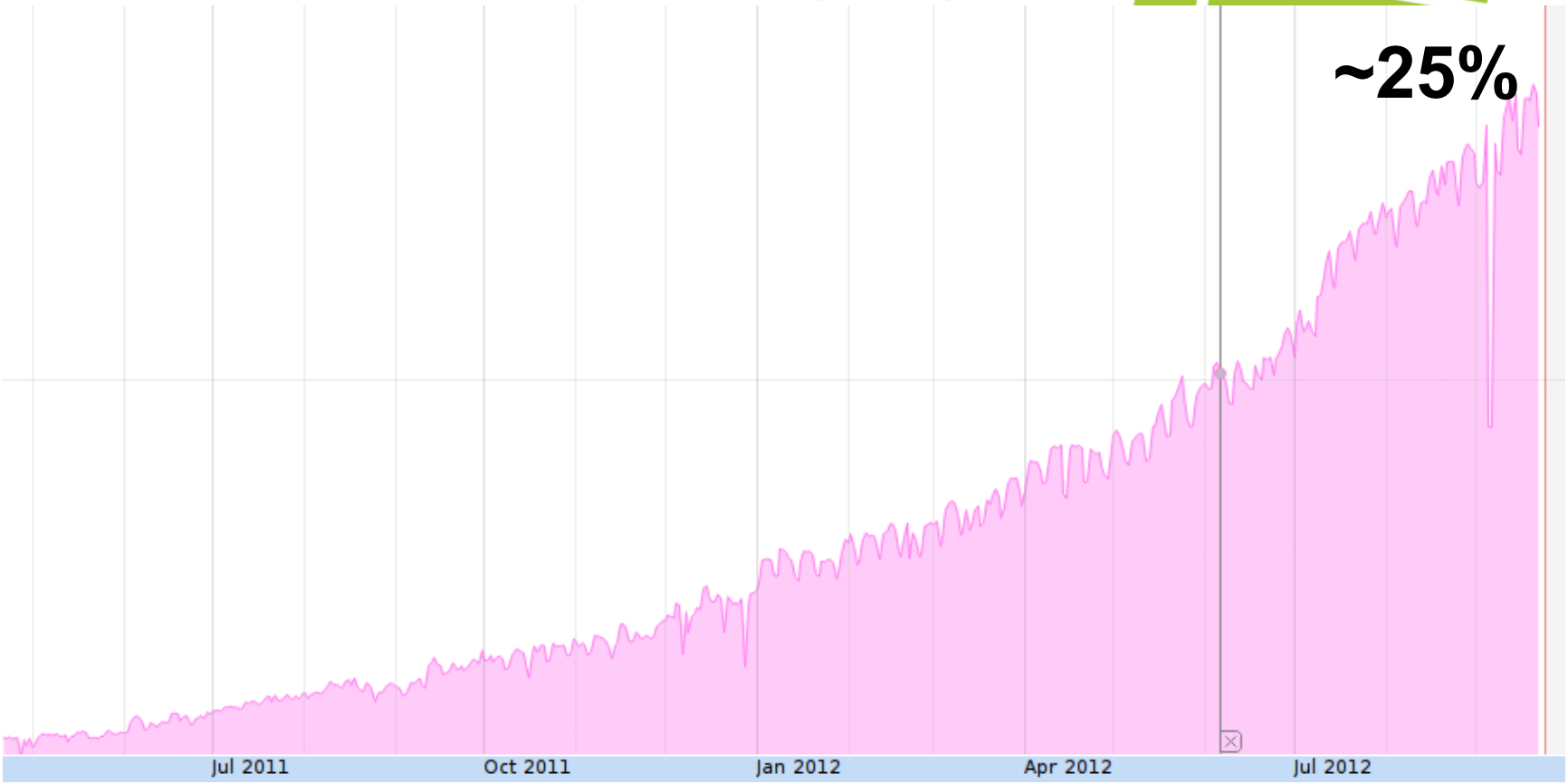
IPv6 on LTE: Verizon Wireless (USA)



- **>90% of Android 4.x** traffic over IPv6
- **~40% of Youtube videos** streamed over IPv6
- **~70% of IPv6 traffic** is from Android

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Japan IPv6 Launch?

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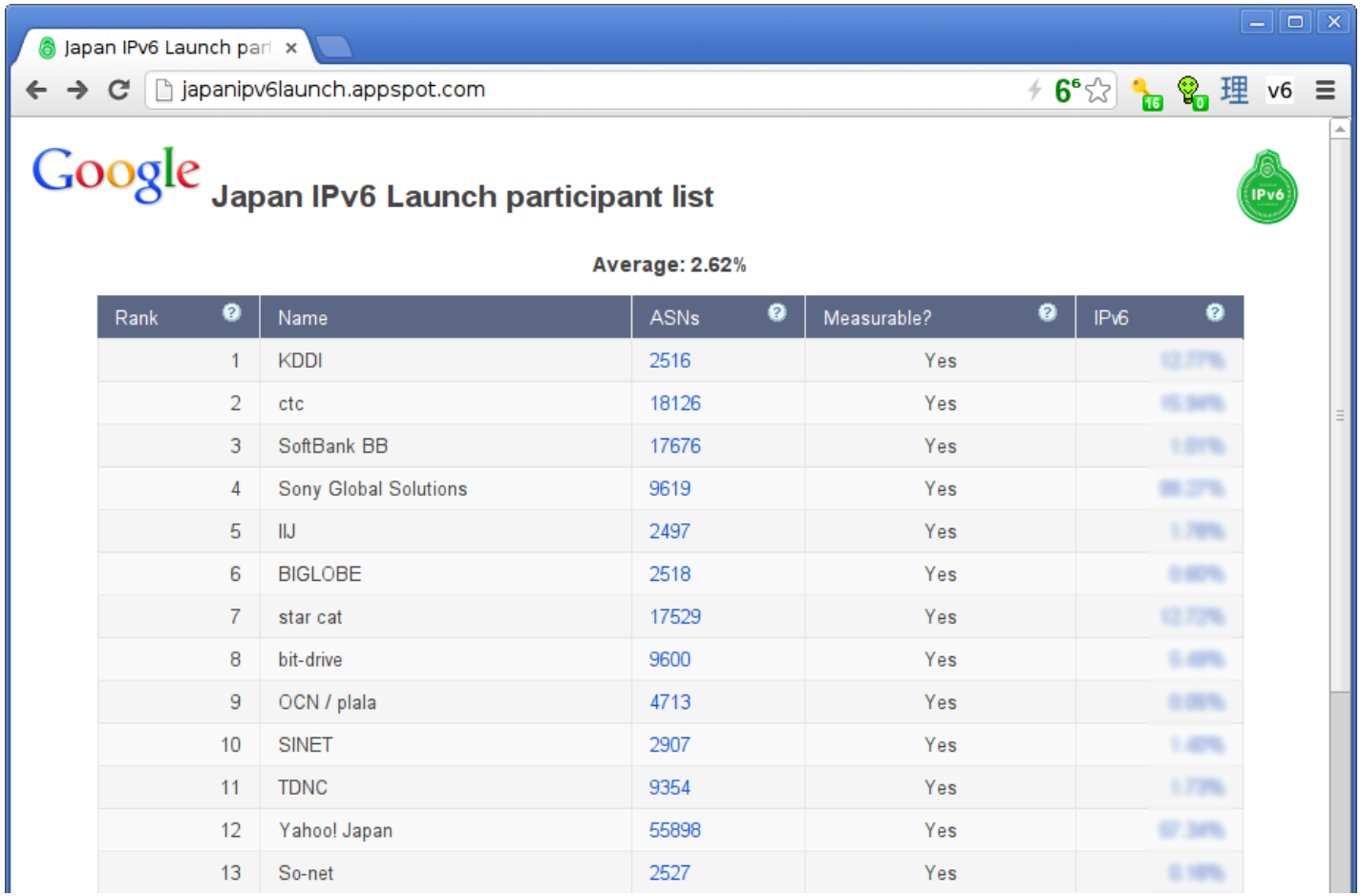
Providing data to IPv6 adoption SWG to help organize



Google **Japan IPv6 Launch participant list**

Average: 2.62%

Rank	Name	ASNs	Measurable?	IPv6
1	KDDI	2516	Yes	
2	ctc	18126	Yes	
3	SoftBank BB	17676	Yes	
4	Sony Global Solutions	9619	Yes	
5	IIJ	2497	Yes	
6	BIGLOBE	2518	Yes	
7	star cat	17529	Yes	
8	bit-drive	9600	Yes	
9	OCN / plala	4713	Yes	
10	SINET	2907	Yes	
11	TDNC	9354	Yes	
12	Yahoo! Japan	55898	Yes	
13	So-net	2527	Yes	

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