

IPv6 Deployment at XS4ALL



First Class Internet

TECH

Coming This Summer: U.S. Will Run Out of Internet Addresses

With supply nearly gone, Microsoft and Amazon scramble to buy up spares

3:37 pm ET
May 14, 2015

COMPANIES

Microsoft Execs Expressed 'Shock and Disbelief' at Internet Address Shortage

Watch Out for Next Big Shortage: Internet Addresses

By Dan Well | Thursday, 14 May 2015 07:00 AM

XS4ALL?

- ★ One of the first dutch internet providers
- ★ Established on May 1st 1993
- ★ Acquired by KPN in 1998
- ★ Approximately 250k subscribers
- ★ FTTH since October 2011
- ★ TV and VoIP
- ★ Personal website, e-mail
- ★ Hosting services, shared and dedicated
- ★ Colocation

A little XS4ALL IPv6 history

- ★ 6bone space in Oct 2001
- ★ Two RIPE /32 prefixes in 2002 (now 2x /29)
- ★ Tunnel server
- ★ Free read-only IPv6 usenet server since 2002

Native IPv6 for DSL subscribers

Technology used

- ★ Juniper MX960 BRAS and AVM Fritz!Box CPE
- ★ ATM and Ethernet (VPLS) transport layer
- ★ PPPoA and PPPoE
- ★ Single session, dual stack
 - ★ IPCP and IPv6CP
 - ★ DHCPv6 PD
 - ★ DNS resolvers via DHCPv6
- ★ /48 prefix per subscriber

CPE

- ★ First IPv6 capable model (7270) announced by AVM at CEBIT 2009
- ★ Followed by 7570, 7340, 7390, 7360, 7490



Pilot

XS4ALL native IPv6 pilot starts on April 1 2010

- ★ Approximately 300 subscribers active
- ★ Provisioning tool: vi
- ★ Available CPE options
 - ★ Cisco 87x and 88x
 - ★ AVM Fritz!Box 7270 and 7570 with beta firmware
 - ★ Draytek Vigor 2130 (with Vigor 120)
- ★ Feedback very positive

Production

**XS4ALL native IPv6 on xDSL since
August 26 2010**

- ★ IPv6 option available in customer portal
- ★ Provisioning automatic
- ★ Native IPv6 support available in Fritz!Box 7340
release firmware

Production

- ★ Default enabled for new subscribers since may 2012
- ★ Enabled for all subscribers since june 2014
- ★ Currently ~175.000 active IPv6 connections

IPv6 enabled services

- ★ DNS
- ★ Colocation
- ★ Dedicated web hosting
- ★ Shared web hosting
- ★ IMAP
- ★ Webmail
- ★ All new services need to be available over IPv4 and IPv6

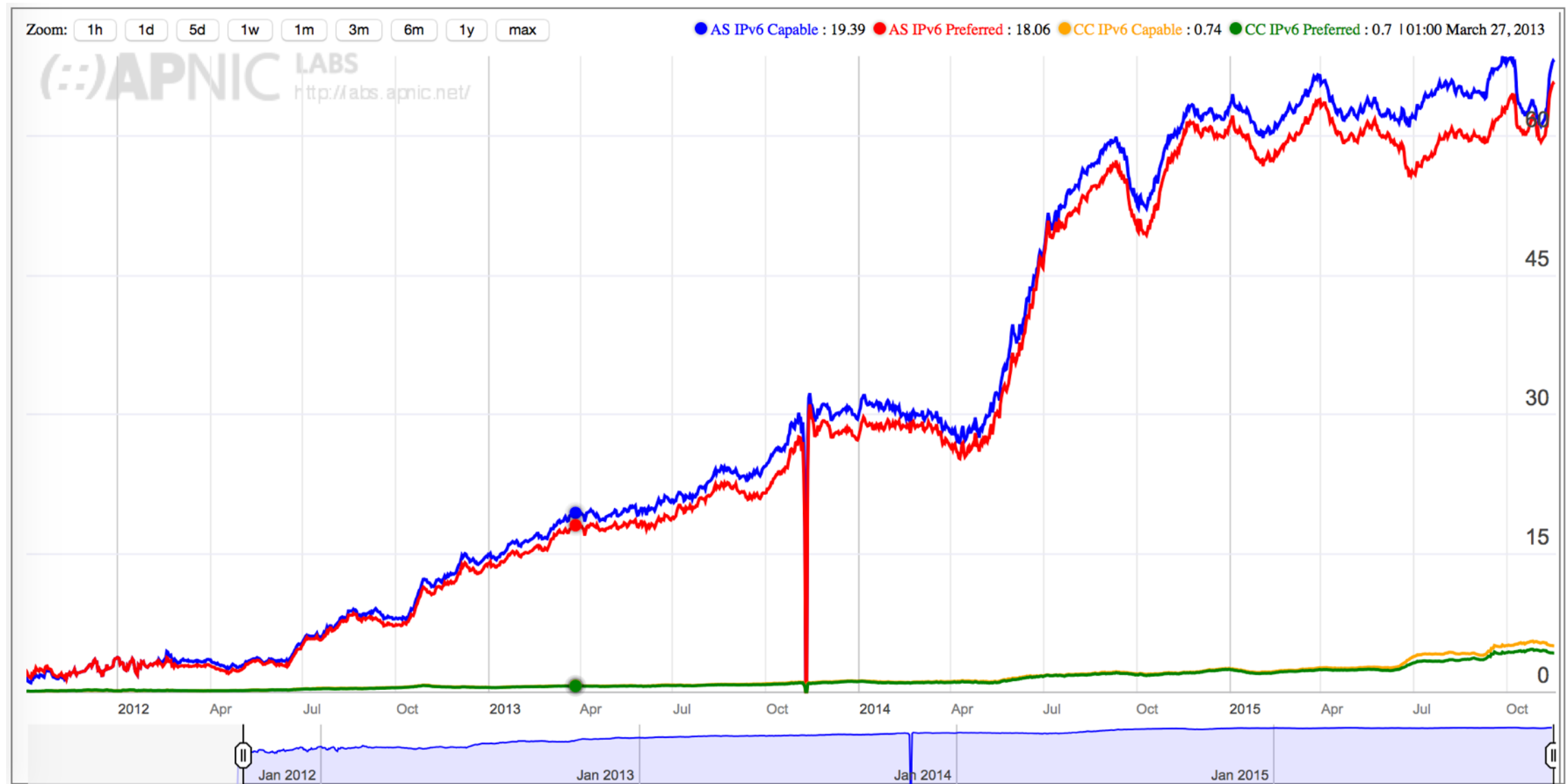
Statistics

IPv6 in The Netherlands

ASN	AS Name	IPv6 Capable	IPv6 Preferred	Samples
AS59939	WIBO-AS WIBO International s.r.o.	100.00%	99.65%	855
AS48635	PCEXTREME PCextreme B.V.	97.64%	97.11%	381
AS20857	TRANSIP-AS TransIP B.V.	96.34%	95.70%	8650
AS197219	TWEEAT 2AT B.V.	92.00%	92.00%	50
AS3265	XS4ALL-NL XS4ALL Internet BV	66.19%	63.18%	75838
AS196752	TILAA Tilaa B.V.	65.55%	63.87%	238
AS48972	BETTER-BE Better.be B.V.	55.17%	55.17%	58
AS1837	NCIA NATO Communications and Information Agency	52.24%	0.00%	245
AS1133	UTWENTE-AS University Twente	42.04%	41.72%	1896
AS35415	WEBZILLA Webzilla B.V.	40.58%	40.53%	1942
AS202018	DIGITALOCEAN-ASN-3 Digital Ocean, Inc.	37.30%	4.18%	32647

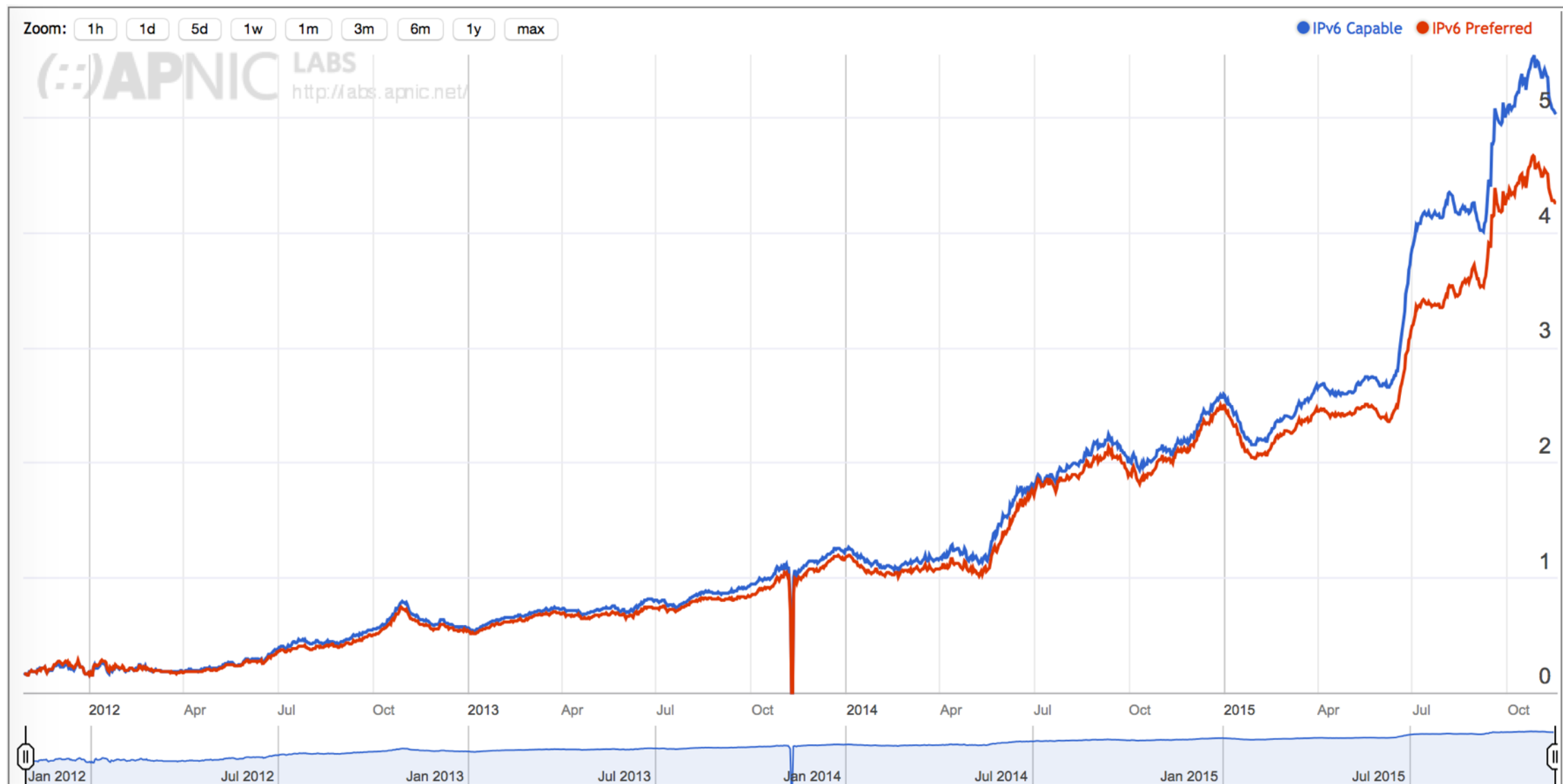
Statistics

IPv6 at XS4ALL



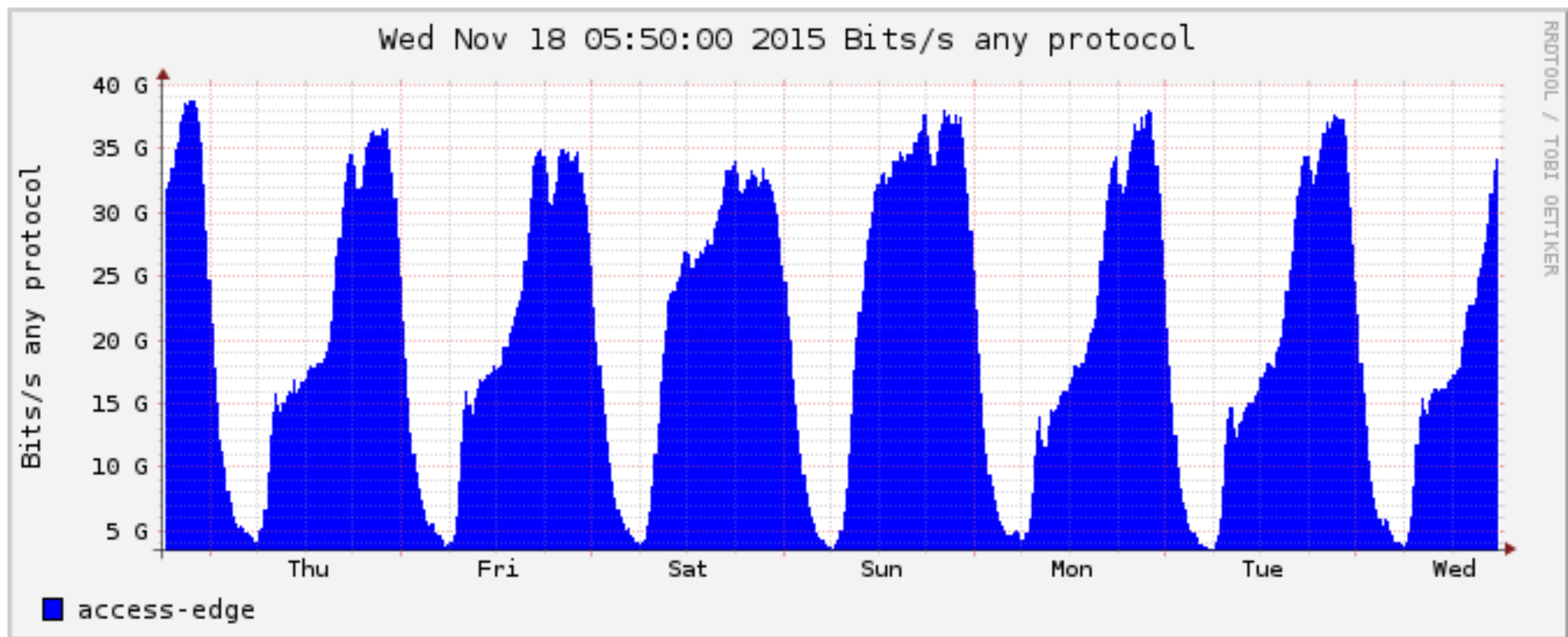
Statistics

IPv6 in The Netherlands



“Having all those IPv6 customers is nice, but do people actually use it?”

IPv6 traffic

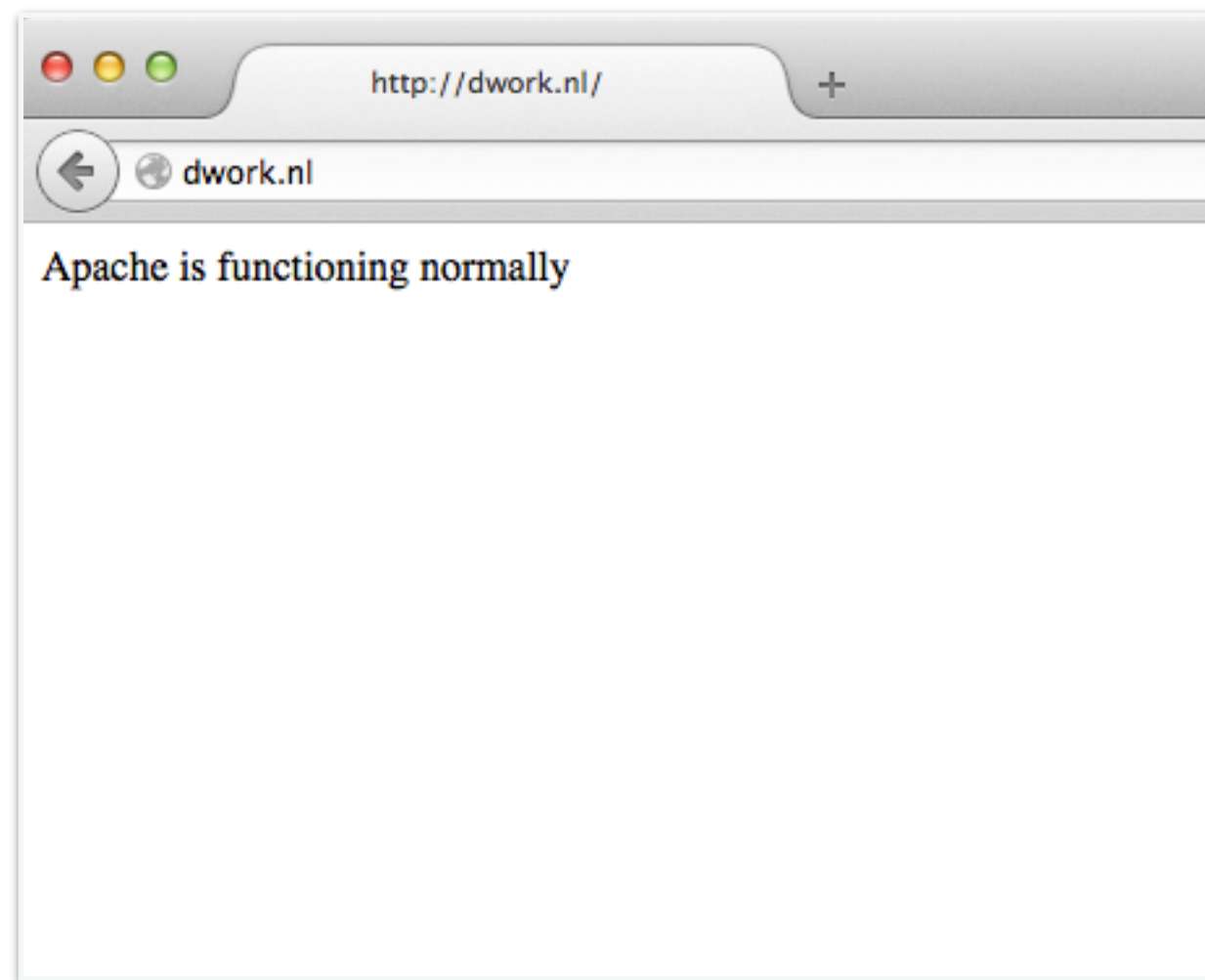


IPv6 traffic

- ★ Make sure you know how your traffic flows
- ★ IPv6 routing policies can be very different from IPv4 policies!
- ★ Do your peers have good IPv6 connectivity?
- ★ Transit providers?
- ★ CDN?

Most common customer issues

- ★ 3rd party web sites not correctly configured for IPv6



Most common customer issues

The page cannot be displayed

Explanation: The Web server refused the connection, possibly because a service on the upstream server is inactive.

Try the following:

- **Refresh page:** Search for the page again by clicking the Refresh button. The timeout may have occurred due to Internet congestion.
 - **Check spelling:** Check that you typed the Web page address correctly. The address may have been mistyped.
 - **Access from a link:** If there is a link to the page you are looking for, try accessing the page from that link.
 - **Contact website:** You may want to contact the website administrator to make sure the Web page still exists. You can do this by using the e-mail address or phone number listed on the website home page.
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Technical Information (for support personnel)

- Error Code 10061: Connection refused
- Background: When the gateway or proxy server contacted the upstream (Web) server, the connection was refused. This usually results from trying to connect to a service that is inactive on the upstream server.

Most common customer issues

- ★ 3rd party web sites not correctly configured for IPv6
- ★ MS Outlook 2003 can't handle dual stack server addresses
- ★ Intermittent connectivity issues with MS Outlook365

Lessons learned

- ★ Start with creating an address plan
- ★ Involve your vendors during deployment
- ★ Create a “friendly user group”
- ★ Take plenty of time to deploy, small steps at a time
- ★ Educate colleagues and management
- ★ Train your support department
- ★ Review your transit and peering agreements

XS6ALL