16 years of IPv6 at XS4ALL

XS4ALL

First Class Internet

Timo Hilbrink, June 2018

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
- ★ Colocation

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A little XS4ALL IPv6 history

- ★ 6bone space in Oct 2001
- ★ Two RIPE /32 prefixes in 2002 (now 2x /29)
- ★ Tunnel server in 2002
- ★ Free read-only IPv6 usenet server since 2002
- ★ Friendly user pilot april 2010
- ★ Enabled for new subscribers may 2012
- ★ Enabled for total customer base june 2014

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Native IPv6 for DSL subscribers

Technology used

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

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CPE

- ★ First IPv6 capable model (7270) announced by AVM at CEBIT 2009
- ★ Followed by 7570, 7340 and many more, all current models support IPv6

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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
- ★ 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

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Production

★ Default enabled for new subscribers since may 2012

★ Enabled for all subscribers since june 2014

★ Currently ~200.000 active IPv6 subscribers

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IPv6 enabled services

- ★ DNS
- ★ Colocation
- ★ Web hosting
- ★ VoIP
- ★ IMAP
- ★ Webmail
- ★ Customer portal
- ★ All new services need to be available over IPv4 and IPv6

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Statistics

IPv6 in The Netherlands

Visible ASes in Netherlands

ASN	AS Name	IPv6 Capable	IPv6 Preferred ▼	Samples
AS1133	UTWENTE-AS University Twente	89.57%	88.89%	882
AS3265	XS4ALL-NL Amsterdam	77.69%	75.79%	39,100
AS34305	BASEIP	62.69%	62.69%	134
AS20857	TRANSIP-AS Amsterdam, the Netherlands	57.14%	57.14%	70
AS16074	CAPGEMINIOUTSOURCING	55.20%	54.40%	250
AS3333	RIPE-NCC-AS Reseaux IP Europeens Network Coordination Centre (RIPE NCC)	0.00%	42.00%	46
AS1136	KPN This macro reflects our filtering-policy on	28.58%	27.92%	421,162
AS21155	ASN-PROSERVE Amsterdam	0.00%	14.00%	32
AS12414	NL-SOLCON SOLCON	12.39%	12.07%	6,960
AS200429	HOSTSLIM	15.38%	11.54%	52

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

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YES!

About 30% of our total traffic is IPv6

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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?

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Most common customer issues

★ 3rd party web sites not correctly configured for IPv6

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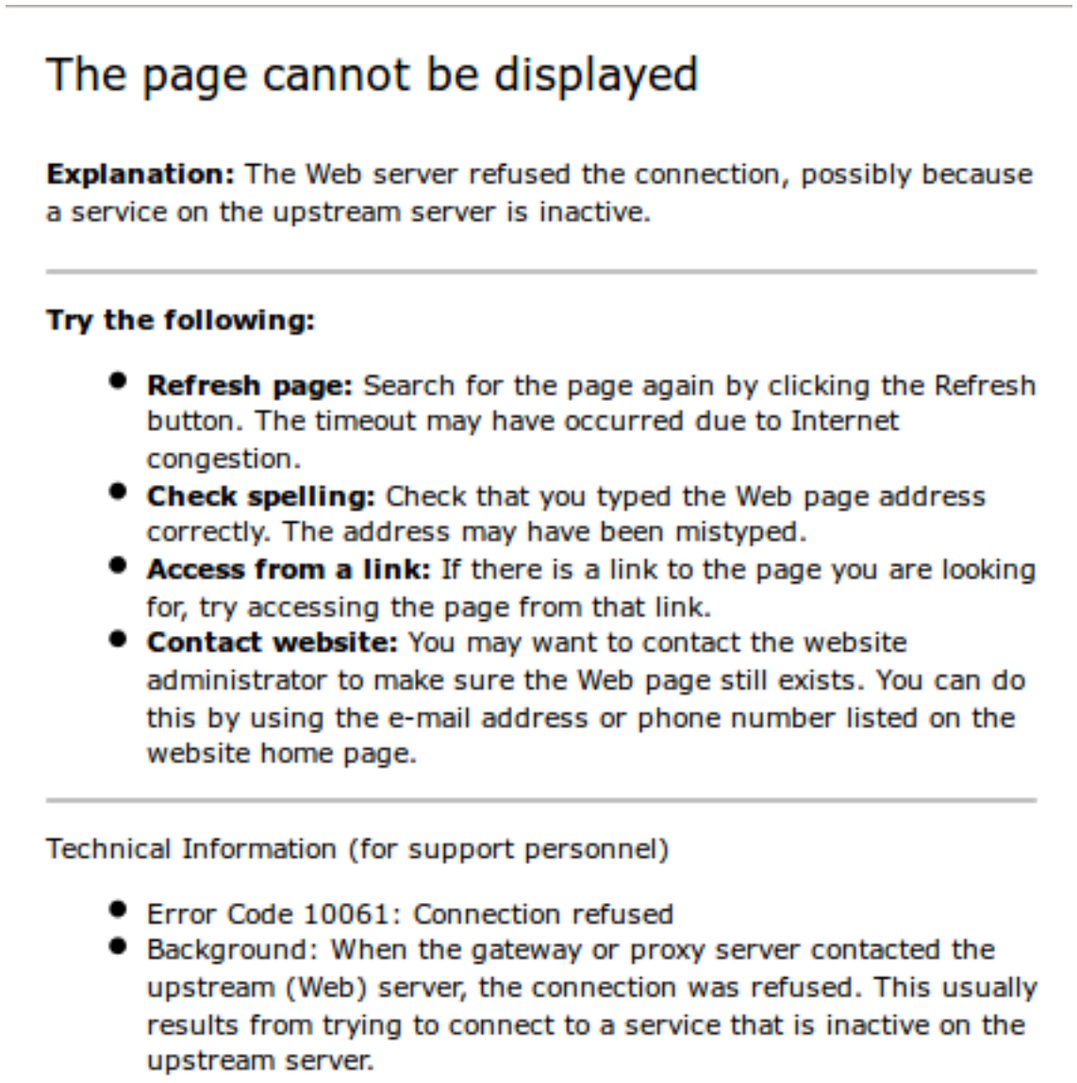
Most common customer issues



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.

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.

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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

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XS6ALL

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