

Internetdagarna 2008

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Folkets Hus, Stockholm

SixXS – A Meetingplace for tunnels



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SixXS



SixXS

- **Service for providing ISPs with a quick way of enabling their user base with IPv6.**
- **Tunnel Broker PoPs in Belgium, Estonia, Finland, Germany, Ireland, Italy, The Netherlands, New Zealand, Norway, Poland, Portugal, Slovenia, Sweden, Switzerland, United Kingdom and the United States.**

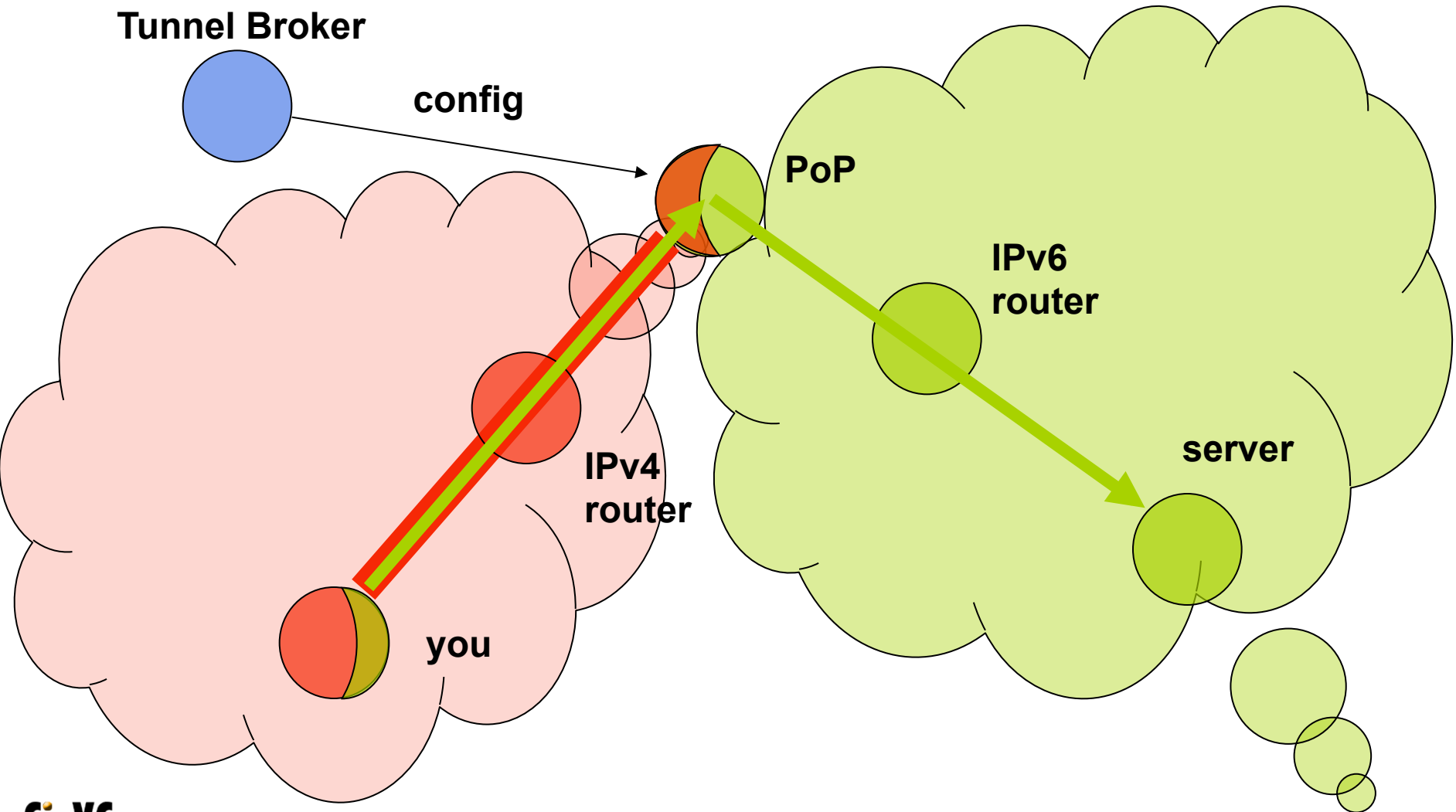
Thanks to all the ISPs who are providing these PoPs, as without them it would not be possible to do this!

- **FAQ, Wiki and Forum.**
- **11.000++ *active* users and tunnels.**
- **4700++ *active* subnets (/48's).**

Short History

- **2000: Started in as IPng.nl with 1 PoP.**
- **2002: Became SixXS as we provided the service for multiple ISPs, GRH launched.**
- **2003: Heartbeat, TIC, IPv6Gate.**
- **2004: AICCU, IPv4Gate.**
- **2005: USA, GRH Distributed Traceroute.**
- **2006: AYIYA support, 6bone shutdown.**
- **2007: New Zealand, Wiki, BitTorrent.**
- **2008: IPv6 DNS Glue, new AICCU (soon)**

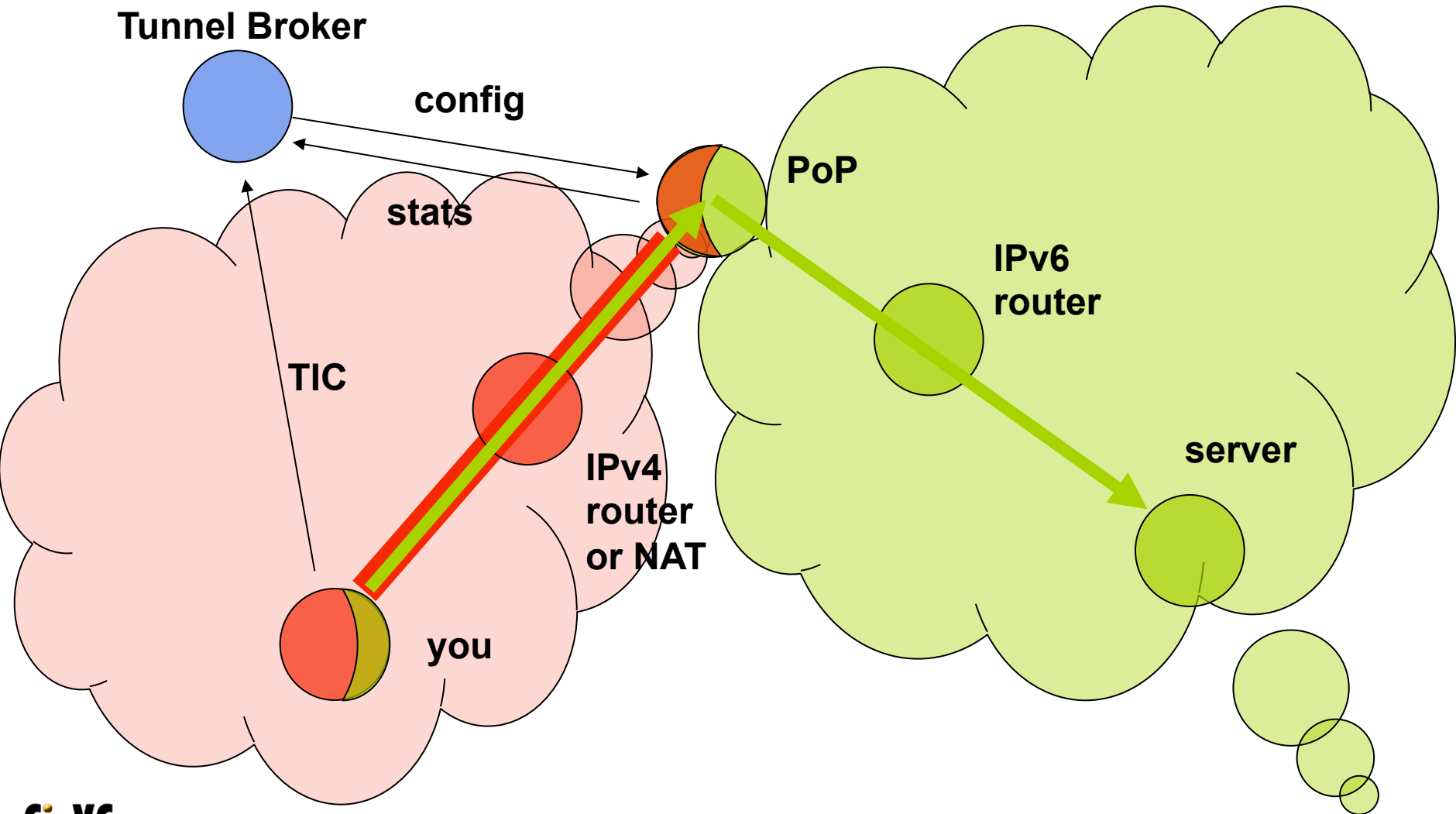
RFC3053 – IPv6 Tunnel Broker



Protocol 41

- **Protocol 41 = IPv6**
- **It specifies how to put an IPv6 packet inside IPv4.**
- **Protocol 41 is static only.**
- **Protocol 41 doesn't cross NATs.**

SixXS Tunnel Broker



Heartbeat

- **Dynamic/non-24/7 IPv4 endpoints.**
- **Proto-41 is static. The moment the user unplugs, another user can get that IPv4 address. That user then gets proto-41 packets and the firewall tool beeps with warnings, which sometimes results in abuse reports because we are attacking them.**
- **Allows one to move around proto-41 tunnels automatically or enable/disable them on the fly.**

AYIYA – Anything in Anything

- **Proto-41 tunnels can't cross NATs.**
- **Proto-41 tunnels are not authenticated.**
(read: one can spoof them easily)
- **Heartbeat runs next-to the proto-41 tunnel.**
Heartbeat might work, proto-41 might not.

AYIYA solves these issues by tunneling IPv6 inside IPv4/UDP and signing these packets.

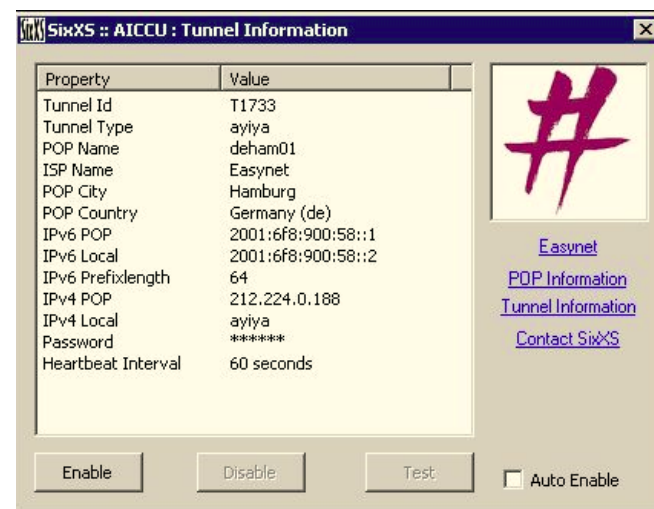
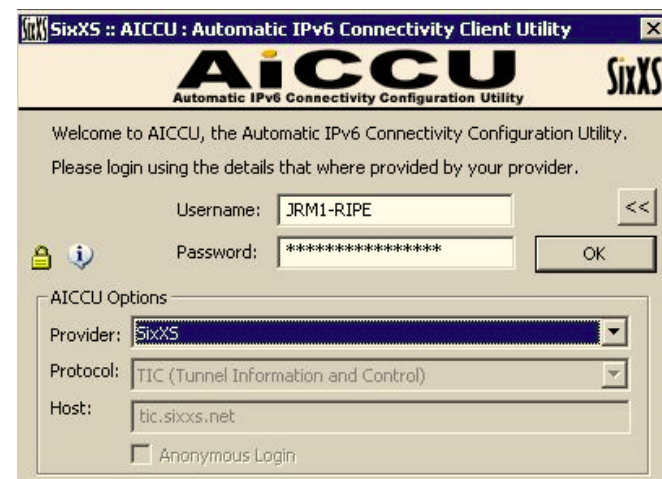
AICCU

Automatic IPv6 Connectivity Client Utility

- Proto-41, heartbeat and AYIYA tunnels.
- Windows GUI, Debian Debconf, CLI.
- Currently a small “Test” mode for diagnosing common issues, testing at least that the basics work.

Soon:

- Public AYIYA/DNS support.
- Comprehensive “test” mode.
- GUI for all platforms.



Getting Connectivity

- Go to <http://www.sixxs.net/signup/create/>
- Fill in your true details.
- State in the reason box that you came to Internetdagarna and hit signup.
- You'll get a mail which you have to verify that the mail address you specified works.
- When verified wait a bit and you'll get approved and get bonus credits
- Request a tunnel + subnet
- Thank the Port80 AB people for the great sesto01 and noosl01 PoPs!



IPv6Gate

Allows access to any IPv4 website over IPv6 from IPv6-only hosts.

<http://www.internetdagarna.se.sixxs.org>

Also allows the reverse: IPv6-only site from IPv4-only host:

<http://www.kame.net.ipv4.sixxs.org>

GRH – Ghost Route Hunter

- **Peers actively with over 150 ISPs around the world.**
- **A tool for detecting and hunting down Ghost Routes in the IPv6 routing tables and displaying DFP availability.**
- **Distributed Looking Glass**
- **Missing Prefixes**
- **Prefix Comparison**

RFC4193 - ULA

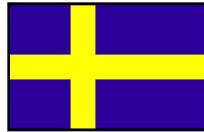
IPv6 ULA (Unique Local Address)

RFC4193 Registration

- **fd00::/8 ULA Locally Assigned.**
It is Unique, but maybe not Unique enough as it has a chance that it is not.
- **fc00::/8 ULA “Registered” – not specified and thus can’t be used.**
- **Nearly 200 registrations**
- **Of course not guaranteed, when people don’t check this list it can’t be.**

GRH - Sweden

Sweden (.se) has:



- 52 IPv6 DFPs.
- 2 (3.85%) reclaimed (6BONE).
- 2 (3.85%) returned (6BONE).
- 26 (50.00%) unannounced.
- 22 (42.31%) announced.
- Contains I.root-server.net prefix
- First RIR prefixes allocated in 2000 to SWIPNET and SUNET.

<http://www.sixxs.net/tools/grh/dfp/all/?country=se>

LG Prefix	ld	NetName	Owner	AS	S	Allocated	First seen	Seen by	Last seen (*)
LG 2001:498::/32	SE-SWIPNET-20000828	TELE2-SWIPNET	TELE2 SWIPNET	A	2000-08-28			87%	2008-10-17 16:17:32
LG 2001:490::/32	SE-SUNET-20001218	SUNET	SUNET	A	2000-12-18			100%	2008-10-17 16:17:32
LG 2001:490::/32	SE-TELE2-20010321	TDC Song AB	TDC Song AB	A	2001-03-21			0%	never 2003-06-12 08:28:03
LG 2001:760::/32	SE-PERSPEKTIV-20060217	Perspektiv Broadband AB	Perspektiv Broadband AB	A	2006-02-17	2006-02-18 10:30:58		100%	2008-10-17 16:17:32
LG 2001:760::/32	SE-NETMODIX-20021108	Netnod Internet Exchange	Netnod Internet Exchange	A	2002-11-08			0%	never
LG 2001:760::/32	RIX-GH-20030314	Regional Internet Exchange	Regional Internet Exchange	A	2003-03-14			0%	never
LG 2001:760::/32	BOL-IX-IPv6-20030915	BOL-IX	BOL-IX	A	2003-09-15			0%	never
LG 2001:760::/32	RIX-UA-IPv6	RIX-UA	RIX-UA	A	2006-09-11			0%	never
LG 2001:760::/32	GIX-SE-20060923	Göteborgs Internet-exchange	Göteborgs Internet-exchange	A	2006-09-23			0%	never
LG 2001:760::/32	STHIX-IPv6-REERING-N	STHIX	STHIX	A	2007-07-25			0%	never
LG 2001:760::/32	JIXP-20080927	Jönköping IXP	Jönköping IXP	A	2008-09-27			0%	never
LG 2001:760::/32	Irootserver-net-200	Special net for DNS I.root	Special net for DNS I.root	A	2003-09-16	2003-09-17 02:51:14		100%	2008-10-17 16:17:32
LG 2001:948::/32	SE-NO-RUNET-20021016	Nordultra	Nordultra	A	2002-10-16			100%	2008-10-17 16:17:32
LG 2001:900::/32	SE-BAHNHOF-20021031	Bahnhof	Bahnhof	A	2002-10-31			100%	2008-10-17 16:17:32
LG 2001:900::/32	SE-DCS-20021104	DCS	DCS	A	2002-11-04	2003-11-13 16:30:51		100%	2004-11-26 16:17:17
LG 2001:048::/32	SE-GAVLENET-20030225	GävleNet	GävleNet	A	2003-02-25	2007-10-26 10:02:31		100%	2008-10-17 16:17:32
LG 2001:080::/32	SE-BITNET-20030227	Bitnet	Bitnet	A	2003-02-27			0%	never
LG 2001:088::/32	SE-SANDNET-20030228	Sandnet	Sandnet	A	2003-02-28			0%	never
LG 2001:060::/32	SE-SEVENEYES-20030303	SevenEyes	SevenEyes	A	2003-03-03			0%	2007-08-02 09:32:23
LG 2001:068::/32	SE-LIDEN-20030506	Lidén Network AB	Lidén Network AB	A	2003-05-06	2003-04-21 22:02:17		100%	2008-10-17 16:17:32
LG 2001:1400::/32	SE-FMV-20030508	FMV	FMV	A	2003-05-08	2003-10-23 00:33:59		100%	2008-10-17 16:17:32
LG 2001:1980::/32	SE-DATAPHONE-20030915	Dataphone Sweden AB	Dataphone Sweden AB	A	2003-09-15			0%	never
LG 2001:1630::/32	SE-TEKNIKPARK-20031106	Teknikpark Söderhamn	Teknikpark Söderhamn	A	2003-11-06			0%	never
LG 2001:1660::/32	SE-LJUSNET-20031128	Ljusöla Enät AB	Ljusöla Enät AB	A	2003-11-28			0%	never
LG 2001:1608::/32	SE-PORT80-20040115	Port80 AB	Port80 AB	A	2004-01-15	2003-01-04 02:47:17		100%	2008-10-17 16:17:32
LG 2001:1070::/32	SE-ERICSSON-20040510	Ericsson	Ericsson	A	2004-05-10	2004-08-27 14:47:14		100%	2008-10-17 16:17:32
LG 2001:040::/32	SE-STADSNAT-20040830	Varnamo Energy AB	Varnamo Energy AB	A	2004-08-30			0%	never
LG 2001:408::/32	SE-NAO-20051108	Net at Once AB	Net at Once AB	A	2005-11-08	2003-12-19 02:17:22		100%	2008-10-17 16:17:32
LG 2001:800::/25	SE-SWIPNET-20080128	Tele2/SWIPnet	Tele2/SWIPnet	A	2008-01-28	2008-06-12 16:32:37		100%	2008-10-17 16:17:32
LG 2001:580::/32	SE-SUNET-20060301	Carelink AB	Carelink AB	A	2006-03-01			0%	never
LG 2001:080::/32	SE-SYSTEM-20060509	SYStem Net AB	SYStem Net AB	A	2006-05-09	2006-09-15 07:47:20		100%	2008-10-17 16:17:32
LG 2001:280::/32	SE-KTHNOC-20070103	Kungliga Tekniska Högskolan	Kungliga Tekniska Högskolan	A	2007-01-03	2007-02-09 15:32:23		0%	2008-05-08 12:47:29
LG 2001:298::/32	SE-SPACECUMIP-20070113	Spacecum Networks	Spacecum Networks	A	2007-01-13	2007-08-24 16:02:47		100%	2008-10-17 16:17:32
LG 2001:200::/32	SE-IP-ONLY-20070216	IP-Only Tele Communicatio	IP-Only Tele Communicatio	A	2007-02-16			0%	never
LG 2001:308::/32	SE-OZWIT-20070614	Ozwin Broadband AB	Ozwin Broadband AB	A	2007-06-14	2008-02-27 11:47:27		100%	2008-10-17 16:17:32
LG 2001:300::/32	SE-NETMOD-20070709	NetMod	NetMod	A	2007-07-09	2008-02-15 13:32:31		100%	2008-10-17 16:17:32
LG 2001:690::/32	SE-INTRON-20071129	BRS-Inttron AB	BRS-Inttron AB	A	2007-11-29	2007-12-11 22:17:31		100%	2008-10-17 16:17:32
LG 2001:600::/32	SE-ARSTB-20071212	Nocom Networks AB	Nocom Networks AB	A	2007-12-12			0%	never
LG 2002:30::/32	SE-NETT-20080213	Net IT Internet Solutions	Net IT Internet Solutions	A	2008-02-13			0%	never
LG 2002:80::/32	SE-TELSEK-20080222	Teleseks Broadband Svan	Teleseks Broadband Svan	A	2008-02-22	2008-06-20 00:02:34		89%	2008-10-17 16:17:32
LG 2002:160::/32	SE-TEKNIKMERLET-20080311	Teknikmerlet AB	Teknikmerlet AB	A	2008-03-11	2008-06-23 13:32:35		87%	2008-10-17 16:17:32
LG 2002:190::/32	SE-TERACOM-20080318	Teracom AB	Teracom AB	A	2008-03-18			0%	never
LG 2002:290::/32	SE-LOOPA-20080407	Loopa AB	Loopa AB	A	2008-04-07	2008-04-16 23:47:29		99%	2008-10-17 16:17:32
LG 2002:470::/32	SE-FD-20080604	Fiber Direkt i Sverige AB	Fiber Direkt i Sverige AB	A	2008-06-04			0%	never
LG 2002:508::/32	SE-TYFON-20080623	Tyfon	Tyfon	A	2008-06-23			0%	never
LG 2002:490::/32	SE-Oxiesaraboln-20080826	Oxiesaraboln AB	Oxiesaraboln AB	A	2008-08-26			0%	never
LG 2002:750::/32	SE-GLE-IFE-20080903	GleSYS Internet Services	GleSYS Internet Services	A	2008-09-03	2008-09-09 15:02:40		99%	2008-10-17 16:17:32
LG 2002:790::/32	SE-RIN-20080905	Rin Sweden AB	Rin Sweden AB	A	2008-09-05			0%	never
LG 2002:708::/32	SE-ALLTEL-20080917	AllTel Allmanna Svenska	AllTel Allmanna Svenska	A	2008-09-17			0%	never
LG 99e:200::/24	SIXS/SE	SixXS	SixXS	A	1997-08-14			0%	2006-06-06 16:17:21
LG 99e:2700::/24	BRA/SE	Swedish Institute of Comp	Swedish Institute of Comp	A	1997-09-22	2003-06-13 10:55:25		0%	2003-06-13 10:55:25
LG 99e:4008::/32	SEVL/SE	SEVL	SEVL	A	2002-05-03			0%	2005-06-20 21:03:58

The database currently holds 52 IPv6 DFPs:
 Of which 2 (3.85%) are reclaimed, 2 (3.85%) are returned to the pool and 26 (50.00%) IPv6 DFPs didn't have a routing entry.
 Thus 22 (42.31%) networks are currently correctly announced.
 0 (0.00%) only announced a /32 while they have been allocated a /32.
 0 (0.00%) announce both their /32 and their /32.

Future / Wish list

- **Multicast**
 - **Most PoPs already in the SixXS Multicast cloud, but need more testing/experiments**
- **AYIYA/DNS and AYIYA/HTTP(S)**
- **New AICCU client**
- **DNSSEC support**
- **BGP Support / Multi-PoP Tunnels**
- **Community Edition**

<http://www.sixxs.net/about/technology/>

Questions?

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