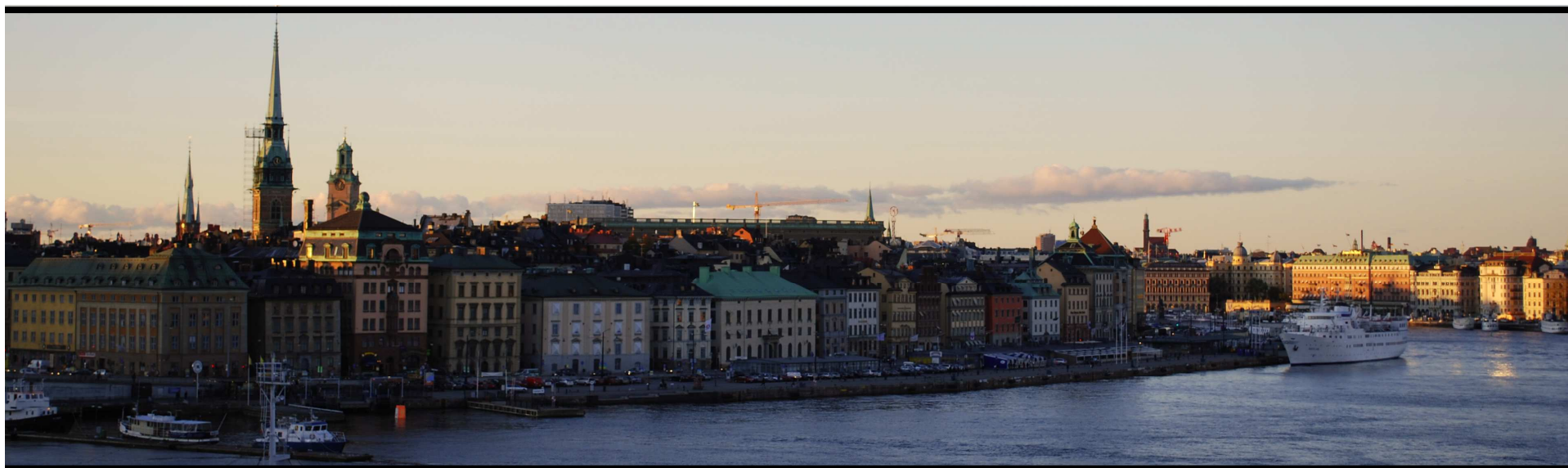


Internetdagarna 2008

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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!

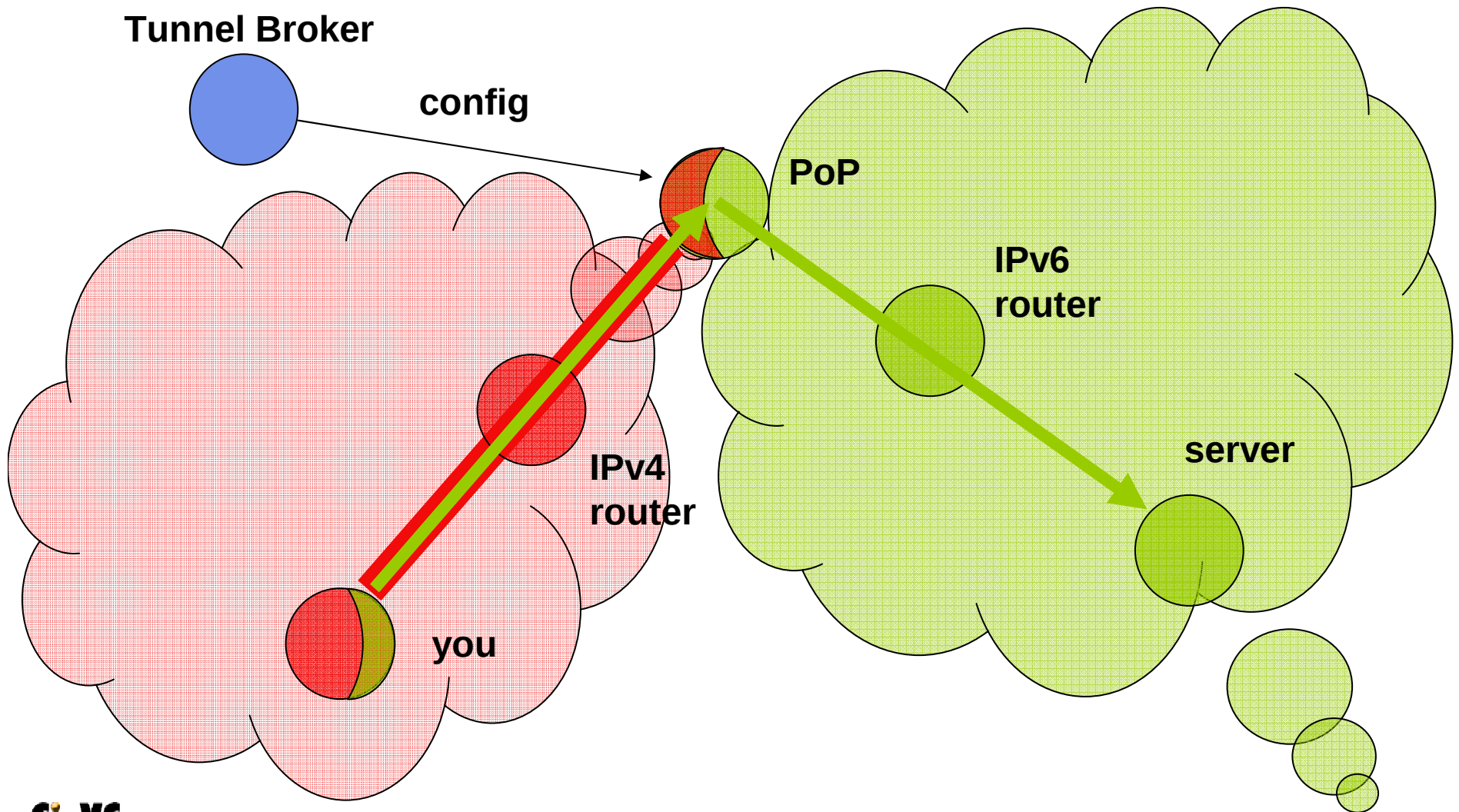
- FAQ, Wiki and Forum.
- 11.000++ *active* users and tunnels.
- 4700++ *active* subnets (/48's).



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

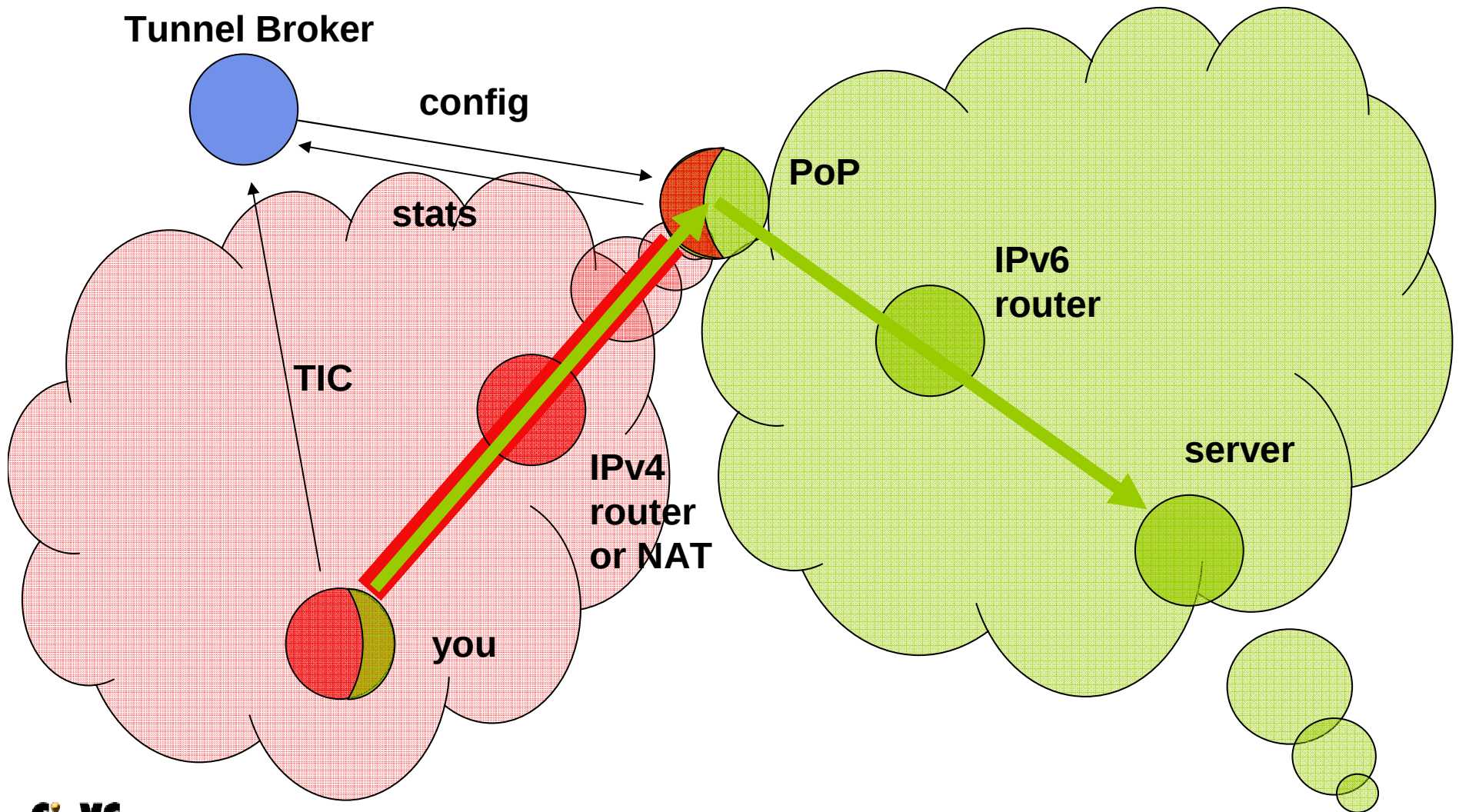




Protocol 41

- **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.

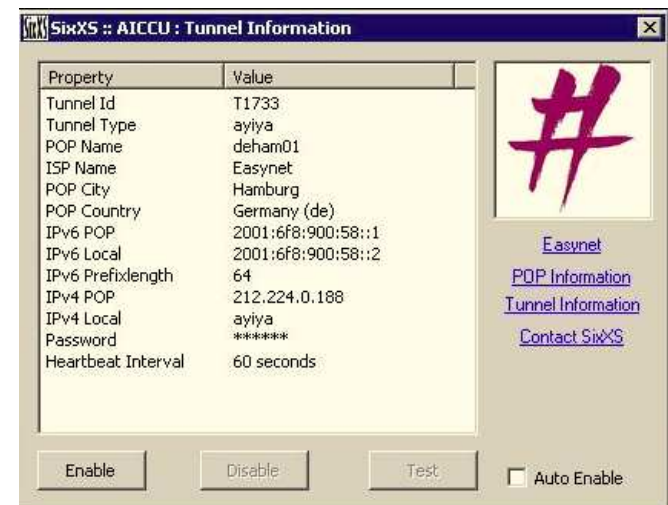
AICCU

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

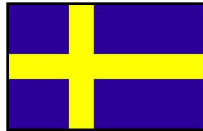
IPv6 ULA (Unique Local Address)

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 2001:698::/32	SE-SWIPNET-20000828	TELE2/SWIPNET		A	2000-08-28			87%	2008-10-17 16:17:32
LG 2001:690::/32	SE-SUNET-20001218	SUNET		A	2000-12-18			100%	2008-10-17 16:17:32
LG 2001:690::/32	SE-TELE2-20010321	TDC Seng AB		A	2001-03-21			0%	never 2003-06-12 08:28:03
LG 2001:760::/32	SE-PERSPECTIV-20060217	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-NETNO-DIX-20021108	Netnod Internet Exchange		A	2002-11-08			0%	never
LG 2001:760::/32	RIX-GH-20030314	Regional Internet Exchange		A	2003-03-14			0%	never
LG 2001:760::/32	SOL-DIX-IPv6-20030915	SOL-DIX		A	2003-09-15			0%	never
LG 2001:760::/32	RIX-IA-IPv6	RIX-IA		A	2006-09-11			0%	never
LG 2001:760::/32	GIX-SE-20060923	Gothenburg Internet Exchange		A	2006-09-23			0%	never
LG 2001:760::/32	STHIX-IPv6-PEERING-N	STHIX		A	2007-07-25			0%	never
LG 2001:760::/32	JIXP-20080927	Jönköping IXP		A	2008-09-27			0%	never
LG 2001:760::/32	I-rootserver-net-200	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-NORDUNET-20021016	Nordunet		A	2002-10-16			100%	2008-10-17 16:17:32
LG 2001:960::/32	SE-BAHNHOF-20021031	Bahnhof		A	2002-10-31			100%	2008-10-17 16:17:32
LG 2001:968::/32	SE-DCE-20021104	DCE		A	2002-11-04	2003-11-13 16:30:52		0%	2004-11-26 16:17:17
LG 2001:948::/32	SE-GAVLENET-20030225	GävleNet		A	2003-02-25	2007-10-26 10:02:31		100%	2008-10-17 16:17:32
LG 2001:680::/32	SE-BITNET-20030227	Bitnet		A	2003-02-27			0%	never
LG 2001:688::/32	SE-SANDNET-20030228	Sandnet		A	2003-02-28			0%	never
LG 2001:680::/32	SE-SEVENIS-20030303	Sevenis		A	2003-03-03			0%	2007-08-02 09:32:23
LG 2001:688::/32	SE-LIDEN-20030506	Lidens Network AB		A	2003-05-06	2005-04-21 22:02:17		100%	2008-10-17 16:17:32
LG 2001:1400::/32	SE-FMV-20030508	FMV		A	2003-05-08	2005-10-23 00:33:59		100%	2008-10-17 16:17:32
LG 2001:1980::/32	SE-DATAPHONE-20030915	Dataphone Sweden AB		A	2003-09-15			0%	never
LG 2001:1630::/32	SE-TEKNIKPARK-20031106	Teknikpark Bodenhamn		A	2003-11-06			0%	never
LG 2001:1660::/32	SE-LJUSNET-20031128	Ljusdal Elnet AB		A	2003-11-28			0%	never
LG 2001:1608::/32	SE-PORTBO-20040115	Portbo AB		A	2004-01-15	2005-01-04 02:47:17		100%	2008-10-17 16:17:32
LG 2001:1670::/32	SE-ERICSSON-20040910	Ericsson		A	2004-09-10	2004-08-27 14:47:14		100%	2008-10-17 16:17:32
LG 2001:4040::/32	SE-STADSNAT-20040630	Värmdö Energy AB		A	2004-06-30			0%	never
LG 2001:4068::/32	SE-NAD-20051108	Net at Once AB		A	2005-11-08	2005-12-19 02:17:22		100%	2008-10-17 16:17:33
LG 2001:800::/28	SE-SWIPNET-20080128	Tele2/SWIPnet		A	2008-01-28	2008-06-12 16:32:37		100%	2008-10-17 16:17:33
LG 2001:58::/32	SE-SUNET-20060301	Carelink AB		A	2006-03-01			0%	never
LG 2001:68::/32	SE-SYSTEM-20060509	SVStem Net AB		A	2006-05-09	2006-09-15 07:47:20		100%	2008-10-17 16:17:33
LG 2001:280::/32	SE-KTHINC-20070103	Kungliga Tekniska Hogskola		A	2007-01-03	2007-02-09 15:32:23		0%	2008-08-08 12:47:29
LG 2001:298::/32	SE-SPACEDUMP-20070131	Spacedump Networks		A	2007-01-31	2007-08-24 16:02:47		100%	2008-10-17 16:17:33
LG 2001:260::/32	SE-IP-ONLY-20070216	IP-Only Tele Communicatio		A	2007-02-16			0%	never
LG 2001:368::/32	SE-OWNET-20070614	Ornit Broadband AB		A	2007-06-14	2008-02-27 11:47:27		100%	2008-10-17 16:17:33
LG 2001:390::/32	SE-NETNO-D-20070709	Netnod		A	2007-07-09	2008-02-15 13:32:31		100%	2008-10-17 16:17:33
LG 2001:690::/32	SE-INTRON-20071129	BRS-Intron AB		A	2007-11-29	2007-12-11 22:17:31		100%	2008-10-17 16:17:33
LG 2001:600::/32	SE-ARETE-20071212	Nodum Networks AB		A	2007-12-12			0%	never
LG 2002:30::/32	SE-NETST-20080213	Net.IT Internet Solutions		A	2008-02-13			0%	never
LG 2002:80::/32	SE-TELESERVICE-20080222	Teleservice Broadband Svan		A	2008-02-22	2008-06-20 00:02:34		88%	2008-10-17 16:17:33
LG 2002:160::/32	SE-TEKNIKBERJET-20	Teknikberjet AB		A	2008-03-11	2008-06-23 13:32:35		87%	2008-10-17 16:17:33
LG 2002:180::/32	SE-TERACOM-20080318	Teracom AB		A	2008-03-18			0%	never
LG 2002:280::/32	SE-LOOPA-20080407	Loopa AB		A	2008-04-07	2008-04-16 23:47:29		99%	2008-10-17 16:17:33
LG 2002:470::/32	SE-FC-20080604	Fiber Direkt i Sverige AB		A	2008-06-04			0%	never
LG 2002:508::/32	SE-TYFON-20080623	Tyfon		A	2008-06-23			0%	never
LG 2002:695::/32	SE-OVERSTADEN-20080826	Overstaden AB		A	2008-08-26			0%	never
LG 2002:750::/32	SE-GLS-IP-20080903	GlaSYS Internet Services		A	2008-09-03	2008-09-09 15:02:40		99%	2008-10-17 16:17:33
LG 2002:760::/32	SE-RIN-20080905	RIN Sweden AB		A	2008-09-05			0%	never
LG 2002:768::/32	SE-ALLTEL-20080917	AllTel Aktiemeta Svenska		A	2008-09-17			0%	never
LG 396:200::/24	SICS/SE	Swedish Institute of Comp		A	1997-08-14			0%	2006-06-06 16:17:21
LG 396:2700::/24	ERA/SE			A	1997-09-22	2003-06-13 10:55:25		0%	2003-06-13 10:55:25
LG 396:4008::/32	SEVL/SE			A	2002-09-03			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 don't have a routing entry.
Thus 22 (42.31%) networks are currently correctly announced.
0 (0.00%) only announced & 25 while they have been allocated & /32.
0 (0.00%) announce both their /32 and their /35.



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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