

Welcome to

IPv6 Status Denmark

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Slides are available as PDF

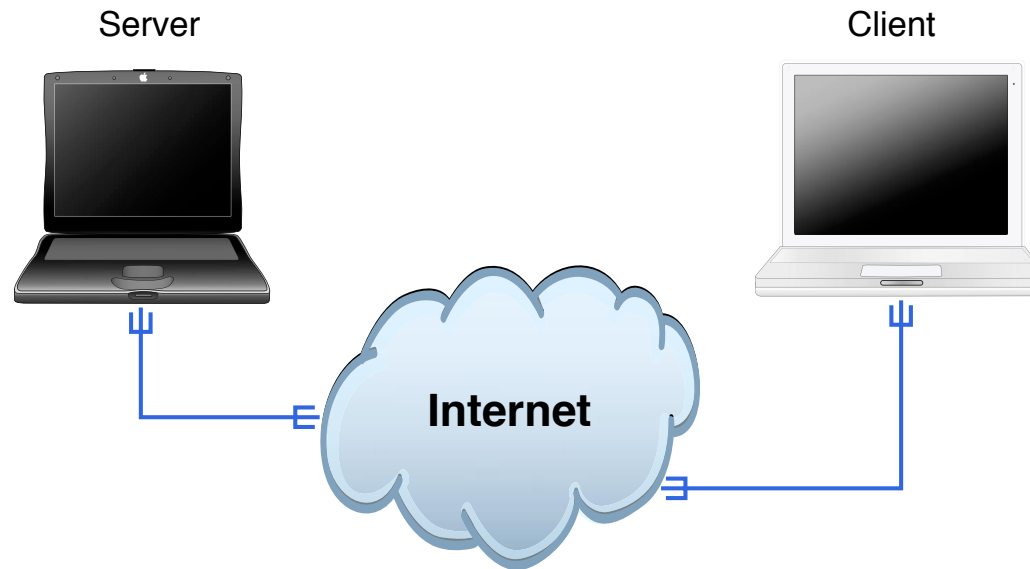


Introduce IPv6 - facts and features

IPv6 Status Denmark

Enabled providers and sites

How to get your site on IPv6



Clients and servers

Rooted in academic networks

Protocols which are more than 20 years old, moved to TCP/IP in 1981

1960s L. Kleinrock, MIT packet-switching theory, J. C. R. Licklider, MIT - notes Paul Baran: On Distributed Communications

1969 ARPANET 4 nodes

1971 14 nodes

1974 TCP/IP: Cerf/Kahn: A protocol for Packet Network Interconnection

1983 Switching from NCP to IP/TCP

1983 EUUG → DKUUG/DIKU forbindelse

1988 About 60.000 systems on the internet - The Morris Worm hits about 10%

2010 IANA reserved blocks 7% (Maj 2010) - <http://www.potaroo.net/tools/ipv4/>

2011 February 3 IANA pool ran out - last 5 /8 allocated to RIRs

2011 April 15 APNIC ran into their last /8 and started a more restrictive policy

The Mobile Network in 2010 and 2011

Global mobile data traffic grew 2.6-fold in 2010, nearly tripling for the third year in a row. The 2010 mobile data traffic growth rate was higher than anticipated. Last year's forecast projected that the growth rate would be 149 percent. This year's estimate is that global mobile data traffic grew 159 percent in 2010.

...

Last year's mobile data traffic was three times the size of the entire global Internet in 2000. Global mobile data traffic in 2010 (237 petabytes per month) was over three times greater than the total global Internet traffic in 2000 (75 petabytes per month).

...

There will be 788 million mobile-only Internet users by 2015. The mobile-only Internet population will grow 56-fold from 14 million at the end of 2010 to 788 million by the end of 2015.

Kilde: *Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2010 - 2015*

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Really how to use IPv6?

Get IPv6 address and routing

Add AAAA (quad A) records to your DNS

Done

www.solidonetworks.com

WWW	IN A	91.102.95.20
	IN AAAA	2a02:9d0:10::9

IT- og Telestyrelsen are becoming more active

Unofficial IPv6 task force at <http://www.ipv6tf.dk/>

Other initiatives <http://world-ipv6-day.dk/>

Major providers are ready on back bones

Internet Providers are increasingly becoming ready

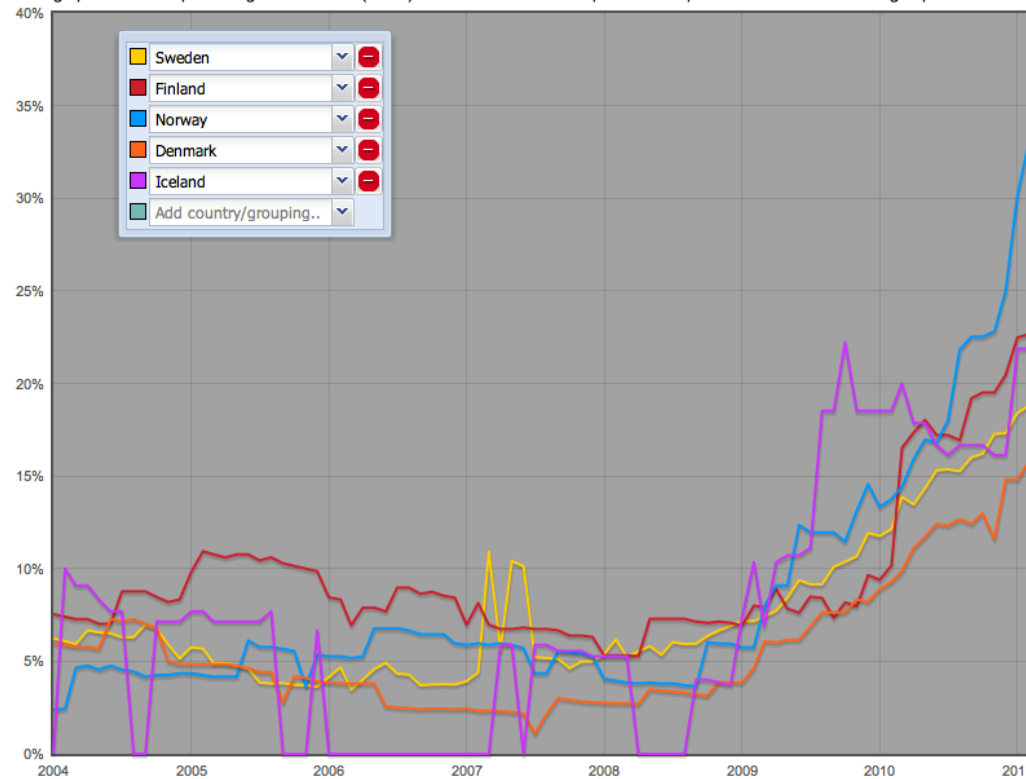
IPv6 in the Nordic region



IPv6 Enabled Networks

permalink: <http://v6asns.ripe.net/v/6?s=SE;s=FI;s=NO;s=DK;s=IS>

This graph shows the percentage of networks (ASes) that announce an IPv6 prefix for a specified list of countries or groups of countries



http://v6asns.ripe.net/v/6?s=_ALL;s=DK;s=SE;s=NO;s=NL

Too little interest - less than 100 people thinking about IPv6?

Some providers have some IPv6 connectivity

Perceived NO NEEDED



Free, a major French ISP rolled-out IPv6 at end of year 2007

XS4All As of August 2010 native IPv6 DSL connections became available to almost all their customers.

Source: http://en.wikipedia.org/wiki/IPv6_deployment

The ones we know of who support IPv6:

Nianet, TDC, Netgroup, Lynero, Solido, Gratisdns, DK-hostmaster

The missing in action - what are they doing?

Telenor, Telia

The ones we think are ignoring IPv6: Jaynet,

Enabled sites: `http://www.tdc.dk`, `http://www.lynero.dk`,
`http://www.solidohosting.com`, `www.feriebolig-spanien.dk`,
`http://www.dk-hostmaster.dk`, `http://mirrors.dotsrc.org`

Practical information for your network

Strategy and actions points

- Collect information about IPv6
- Collect information about your network
- Collect information about your hosts and services
- Ask your providers for IPv6 plans
- Experiment with IPv6 - today
- Implement small proof of concept, in production!
- Expand coverage



For an IPv4 enterprise network, the existence of an IPv6 overlay network has several of implications:

- The IPv4 firewalls can be bypassed by the IPv6 traffic, and leave the security door wide open.
- Intrusion detection mechanisms not expecting IPv6 traffic may be confused and allow intrusion
- In some cases (for example, with the IPv6 transition technology known as 6to4), an internal PC can communicate directly with another internal PC and evade all intrusion protection and detection systems (IPS/IDS). Botnet command and control channels are known to use these kind of tunnels.

Kilde:

http://www.cisco.com/en/US/prod/collateral/iosswrel/ps6537/ps6553/white_paper_c11-629391.html

Guidelines for the Secure Deployment of IPv6, SP800-119, NIST

<http://csrc.nist.gov/publications/nistpubs/800-119/sp800-119.pdf>

The Second Internet: Reinventing Computer Networks with IPv6, Lawrence E. Hughes,
October 2010,

<http://www.secondinternet.org/>

IPv6 Network Administration af David Malone og Niall Richard Murphy

<http://www.ripe.net>

This presentation ☺

You have plenty!

Providers and LIRs will typically get /32

Providers will typically give organisations /48 or /56

Your /48 can be used for:

- 65536 subnets - all host subnets are /64
- Each subnet has 2^{64} addresses

Preparing an IPv6 Addressing Plan Manual

December 2010: Original text

March 2011: Translation provided by RIPE NCC

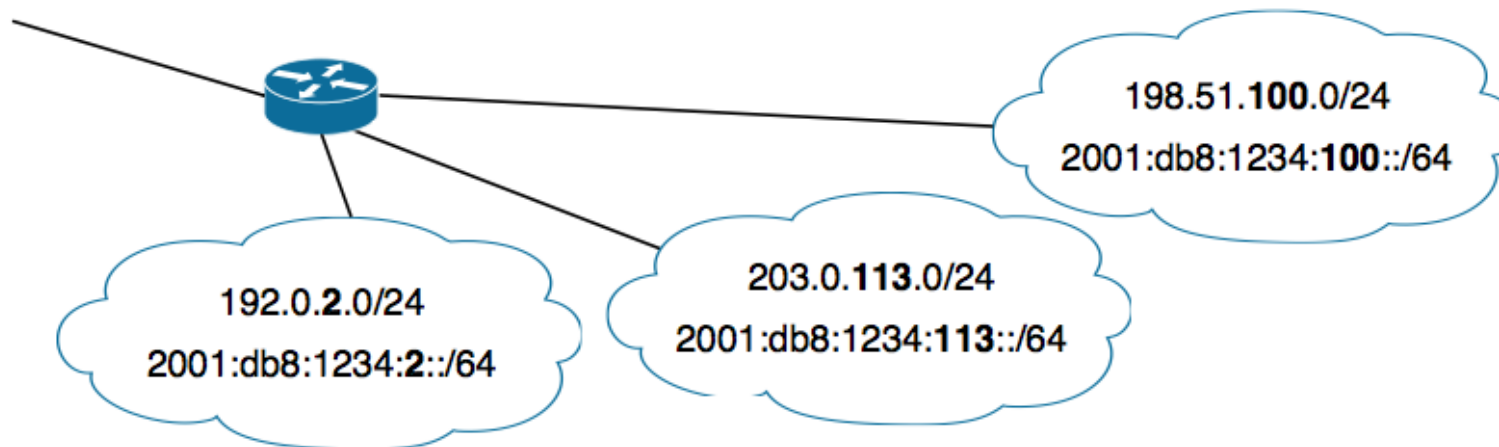


http://www.ripe.net/training/material/IPv6-for-LIRs-Training-Course/IPv6_addr_plan4.pdf

3.2 Direct Link Between IPv4 and IPv6 Addresses

If the existing IPv4 networks use only /24 subnets (for example, from 203.0.113.0 to 203.0.113.255), a direct link can be established between IPv4 addresses and the new IPv6 addresses. In this case, you can include the penultimate number of the IPv4 address (113 in 203.0.113.0/24, for example) in the IPv6 subnet. The IPv6 address will then be 2001:db8:1234:113::/64.

Such an IPv4-to-IPv6 transition could appear as follows:



Easy and coupled with VLAN IDs it will work 😊

Make sure you establish IPv6 in **production**

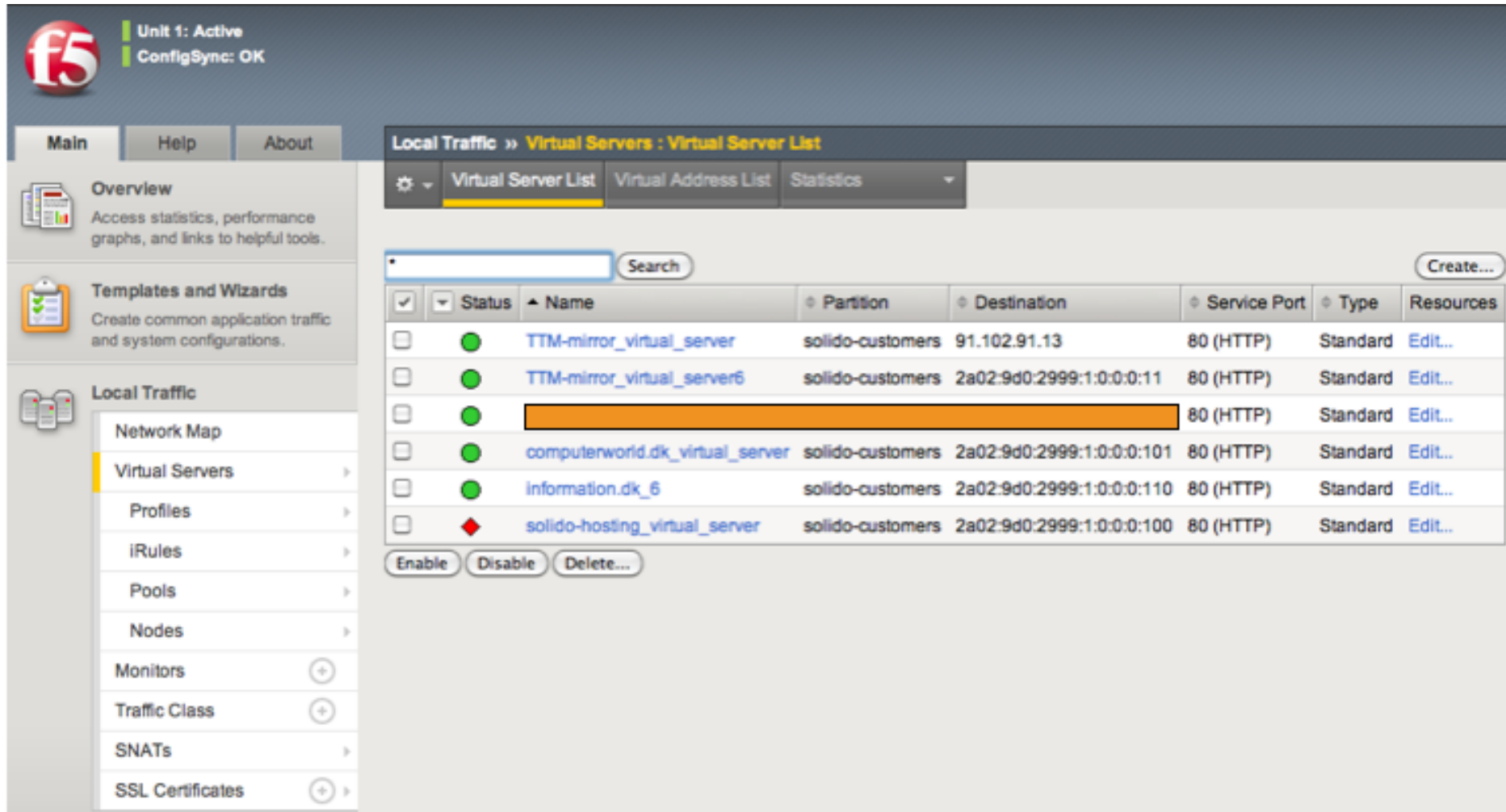
Enabling service on IPv6 without production - bad experience for users

Start by enabling your DNS servers for IPv6 - and DNSSEC - and DNS over TCP
Remember that your firewall might have problems with large DNS packets

Add a production IPv6 router - hardware device or generic server

Tunnels are OK, and SixXS consider their service production

F5 load balancer example



The screenshot shows the F5 load balancer GUI. At the top left is the F5 logo and status: "Unit 1: Active" and "ConfigSync: OK". Below this are tabs for "Main", "Help", and "About". The main content area is titled "Local Traffic >> Virtual Servers : Virtual Server List". It includes a search bar and a "Create..." button. A table lists the virtual servers with columns for checkboxes, status, name, partition, destination, service port, type, and resources. The table contains six entries, with the third one highlighted in orange. Below the table are "Enable", "Disable", and "Delete..." buttons. On the left sidebar, there are sections for "Overview", "Templates and Wizards", and "Local Traffic". The "Local Traffic" section is expanded, showing a list of items: Network Map, Virtual Servers (selected), Profiles, iRules, Pools, Nodes, Monitors, Traffic Class, SNATs, and SSL Certificates.

<input type="checkbox"/>	Status	Name	Partition	Destination	Service Port	Type	Resources
<input type="checkbox"/>	●	TTM-mirror_virtual_server	solido-customers	91.102.91.13	80 (HTTP)	Standard	Edit...
<input type="checkbox"/>	●	TTM-mirror_virtual_server6	solido-customers	2a02:9d0:2999:1:0:0:0:11	80 (HTTP)	Standard	Edit...
<input type="checkbox"/>	●				80 (HTTP)	Standard	Edit...
<input type="checkbox"/>	●	computerworld.dk_virtual_server	solido-customers	2a02:9d0:2999:1:0:0:0:101	80 (HTTP)	Standard	Edit...
<input type="checkbox"/>	●	information.dk_6	solido-customers	2a02:9d0:2999:1:0:0:0:110	80 (HTTP)	Standard	Edit...
<input type="checkbox"/>	◆	solido-hosting_virtual_server	solido-customers	2a02:9d0:2999:1:0:0:0:100	80 (HTTP)	Standard	Edit...

About World IPv6 Day

On 8 June, 2011, Google, Facebook, Yahoo!, Akamai and Limelight Networks will be amongst some of the major organisations that will offer their content over IPv6 for a 24-hour "test flight". The goal of the Test Flight Day is to motivate organizations across the industry - Internet service providers, hardware makers, operating system vendors and web companies - to prepare their services for IPv6 to ensure a successful transition as IPv4 addresses run out.

Please join us for this test drive and help accelerate the momentum of IPv6 deployment.

<http://isoc.org/wp/worldipv6day/> **and** <http://test-ipv6.com/>

- An almost unlimited scalability with a very large IPv6 address space (2^{128} addresses), enabling IP addresses to each and every device.
- Address self-configuration mechanisms, easing the deployment.
- Improved security and authentication features, such as mandatory IPSec capacities and the possibility to use of the address space to include encryption keys.
- Peer-to-peer connectivity, solving the NAT barrier with specific and permanent IP addresses for any device and/or user of the Internet.
- Mobility features, enabling a seamless connexion when moving from one access point to another access point on the Internet.
- Multi cast and any cast functionalities.
- IPv6 will provide an easier remote interaction with each and every device with a **direct integration to the Internet**. In other words, IPv6 will make possible to move from a network of servers, to a network of things.

Business case for IPv6 is **continuity**

Partial quote from <http://www.smartipv6building.org/index.php/en/ipv6-potential>

IPv6 is here already - use it

`http://www.ipv6actnow.org/`

`http://digitaliser.dk/group/374895`

`http://www.ipv6tf.dk`

Use ping/ping6 and traceroute to test connectivity

Try in your browser:

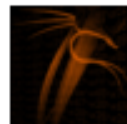
- <http://www.kame.net> Dancing turtle
- <http://www.ripe.net> RIPE, look for address up right corner
- <http://loopsofzen.co.uk/> Play a game
- <https://www.sixxs.net/> Apply for IPv6 tunnel

Done 😊

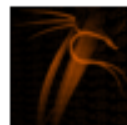
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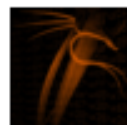
You are always welcome to send me questions later via email



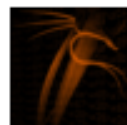
exploitdb [webapps] – BPAffiliate Affiliate Tracking
Authentication Bypass Vulnerability: <http://bit.ly/9LOC3K>
about 5 hours ago via twitterfeed



exploitdb [webapps] – BPDIRECTORY Business Directory
Authentication Bypass Vulnerability: <http://bit.ly/c4TeLz>
about 5 hours ago via twitterfeed



exploitdb [webapps] – BPCONFERENCEReporting Web Reporting
Authentication Bypass Vulnerability: <http://bit.ly/cM61AK>
about 5 hours ago via twitterfeed



exploitdb [webapps] – BPREALESTATE Real Estate
Authentication Bypass Vulnerability: <http://bit.ly/bYx2aY>
about 5 hours ago via twitterfeed



sans_isc [Diary] Mac OS X Server v10.6.5 (10H575) Security
Update: <http://support.apple.com/kb/HT4452>, (Tue, Nov
16th): <http://bit.ly/azBrso>
about 7 hours ago via twitterfeed

Twitter has become an important new resource for lots of stuff

Twitter has replaced RSS for me

Guidelines for the Secure Deployment of IPv6, SP800-119, NIST

<http://csrc.nist.gov/publications/nistpubs/800-119/sp800-119.pdf>

The Second Internet: Reinventing Computer Networks with IPv6, Lawrence E. Hughes, October 2010,

<http://www.secondinternet.org/>

IPv6 Network Administration af David Malone og Niall Richard Murphy - god til real-life admins, typisk O'Reilly bog

IPv6 Essentials af Silvia Hagen, O'Reilly 2nd edition (May 17, 2006) god reference om emnet

IPv6 Core Protocols Implementation af Qing Li, Tatuya Jinmei og Keiichi Shima

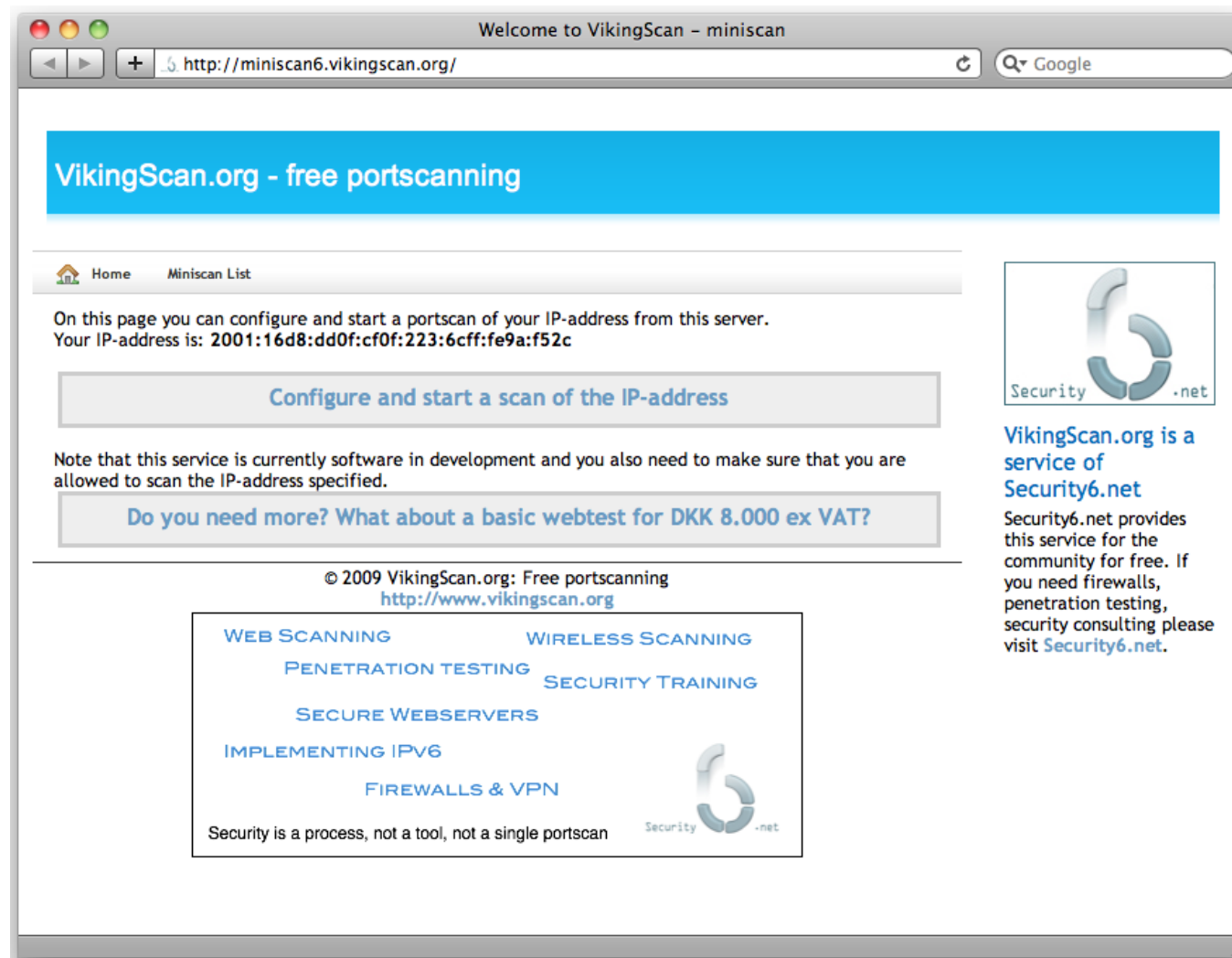
IPv6 Advanced Protocols Implementation af Qing Li, Jinmei Tatuya og Keiichi Shima

- flere andre



Danish IPv6 Task Force

Danish IPv6 task force - unofficial <http://www.ipv6tf.dk>





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- 2010 - owner and partner in Solido Networks ApS