Welcome to

Er dit netværk klar til IPv6?

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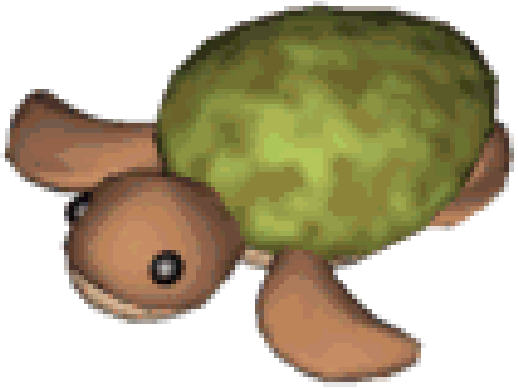
http://www.solidonetworks.com

Slides are available as PDF

Goal



Introduce IPv6

The future is here

Denmark is falling behind on IPv6

Why you should implement IPv6

Ressources

Internetworking: history

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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

1973 Design of Internet Protocols started

1973 Email is about 75% of all ARPANET traffic

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

1983 EUUG $\rightarrow$ DKUUG/DIKU forbindelse

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

2010 IANA reserved blocks 8% (March 2010) - `http://www.potaroo.net/tools/ipv4/`

2011 IANA Unallocated Address Pool Exhaustion (February 3)

Status idag på internet

IPv4 Address Report

This report generated at 24-Jan-2012 07:59 UTC.

IANA Unallocated Address Pool Exhaustion:

03-Feb-2011

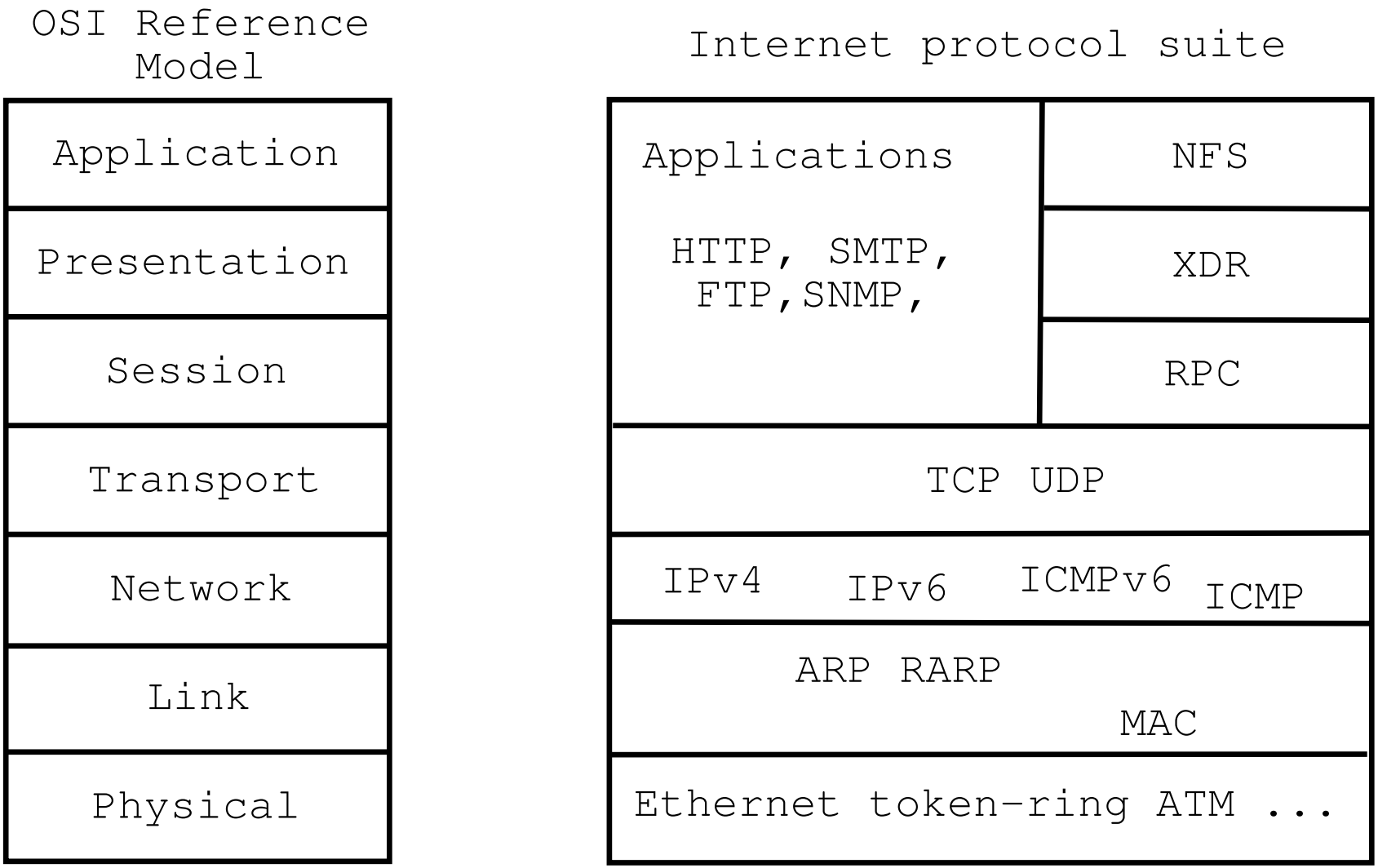
Projected RIR Address Pool Exhaustion Dates:

RIR	Projected Exhaustion Date	Remaining Addresses in RIR Pool (/8s)
APNIC:	**19-Apr-2011**	1.1990
RIPENCC:	**27-Jul-2012**	3.1711
ARIN:	**19-Jul-2013**	5.6671
LACNIC:	**29-Jan-2014**	3.8810
AFRINIC:	**20-Oct-2014**	4.3524

Kilde: `http://www.potaroo.net/tools/ipv4/`

Why IPv6

OSI & Internet Protocols



IPv6: Internet redesigned? - no!

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Preserve the good stuff

back to basics, internet as it used to be!

fate sharing - connection rely on end points, not intermediary NAT boxes

end-to-end transparency - you have an address and I have an address

Wants: bandwidth +10G, low latency/predictable latency, Quality of Service, Security

IPv6 is evolution, not revolution

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Really how to use IPv6?

Get IPv6 address and routing

Add AAAA (quad A) records to your DNS

Done

```
www         IN A        91.102.95.20
            IN AAAA     2a02:9d0:10::9
```

Allocating IPv6 addresses

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You have plenty!

Providers will typically get /32

Providers will typically give you /48 or /56

Your /48 can be used for:

- 65536 subnets
- Each subnet has 2^{64} addresses

Notice: you probably already have IPv6 traffic in your network!

The future is here

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What can we use IPv6 for?

Connectivity - no address conflicts

End to end transparency - logging is easier, no NAT

Fate sharing - connection rely on end points

Two way communication - think chat protocols, file transfer, p2p services

Easier redundancy, no NAT and less state in the network

Easier security - flat networks, simpler rulesets

High performance - bigger packets, and NO carrier grade NAT

New applications

Who would have guessed the applications?

World Wide Web

World Wide chatting - MSN, IRC, Jabber etc.

Distribution of software - peer to peer

Facebook

Twittter

Foursquare

Whats next?

Smart internet devices + GPS + video + users = fun and business!

Sometimes named the Internet of Things

Interxion clients

Now we can connect

We can make things happen that would be harder before

Peer to multiple peers

Use services directly at each others cages

Peer using IPv6 at Interxion via DIX

Restructure our networks

Use IPv6 for testing network changes ;-)

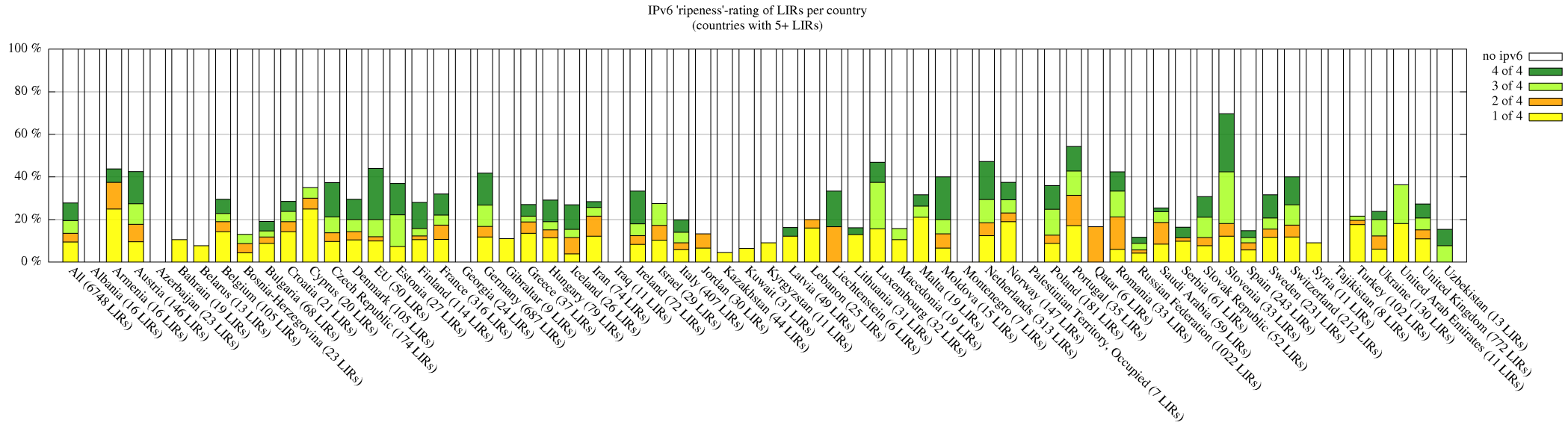
IPv6 business case

- 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 ripeness



IPv6 ripeness from `http://labs.ripe.net/`

Curent status Denmark

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

Some providers have some IPv6 connectivity

NO ISPs have IPv6 to consumers

NO ISPs market IPv6 as a product, except me perhaps :-)

Perceived NO NEEED

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`

Danish sites with IPv6

Name servers for .dk
p.nic.dk has IPv6 address 2001:500:14:6036:ad::1
s.nic.dk has IPv6 address 2a01:3f0:0:303::53
b.nic.dk has IPv6 address 2a01:630:0:80::53

ns1.gratisdns.dk has IPv6 address 2a02:9d0:3002:1::2

ns1.censurfridns.dk has IPv6 address 2002:d596:2a92:1:71:53::

www.solidonetworks.com has IPv6 address 2a02:9d0:10::9

Most others have no IPv6 address

Danish resources - get involved

Danish IPv6 task force - unofficial

http://www.ipv6tf.dk

Questions?

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You are always welcome to send me questions later via email

Books on IPv6

The Second Internet: Reinventing Computer Networks with IPv6
`http://www.secondinternet.org/`

Preparing an IPv6 Addressing Plan
`https://labs.ripe.net/Members/steffann/preparing-an-ipv6-addressing-plan`

Guidelines for the Secure Deployment of IPv6 NIST SP 800-119
`http://csrc.nist.gov/publications/nistpubs/800-119/sp800-119.pdf`

IPv6 Network Administration David Malone and Niall Richard Murphy

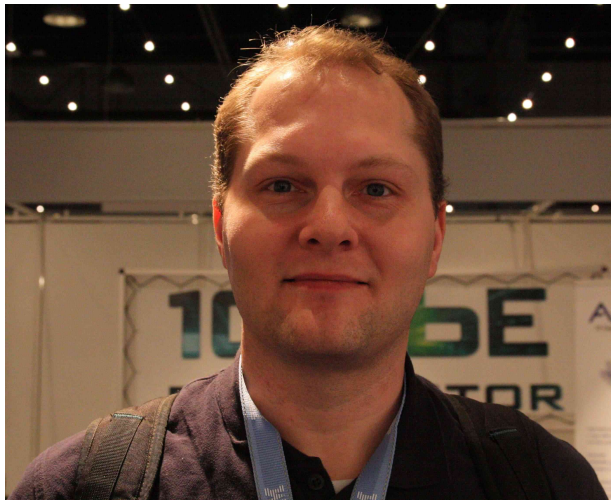
IPv6 Core Protocols Implementation af Qing Li, Tatuya Jinmei og Keiichi Shima

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

- flere andre se reviews på `http://getipv6.info/index.php/Book_Reviews`

IPv6 Essentials Silvia Hagen, O'Reilly 2nd edition (May 17, 2006)

Contact information



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