

The top half of the slide features a light gray background with a faint world map. White lines connect various points on the map, representing a global network. The Tiscali logo, consisting of the word "tiscali" in a lowercase, sans-serif font with a small green square at the end, is centered. Below the logo is a dark blue horizontal bar containing the text "Tiscali International Network" in white. To the right of the logo is a large, dark blue, glossy globe showing the continents, which is reflected on the surface below it.

tiscali.

Tiscali International Network

A long anticipated upgrade
IPv7
October 2008

A talk on IPv6:

It's difficult to still talk about IPv6 as a brand new technology.

It is a mature technology!!!!

I say this because it has been tested, proven, debugged for over ten years, it is supported by major Network Equipment and OS Suppliers.

It is furthermore available on various server platforms (e.g. sendmail, apache, ftp servers, irc (yes, irc ;), databases etc.

It is indeed, not widely deployed. I can tell you that less than the 25% of our customers, that are in general regional carriers, have asked to be configured dual-stack on our network.

Giving the good example: I personally think that less than the 20% of the Internet leading websites are available over native v6 connections.

tiscali.

Tiscali International Network



```
C:\> ipv6 install
```

Proprietary and confidential

Some dates (really, it is not exhaustive...) :

1992: discussion started over next generation IP Protocols (IPng)

1995: RFC1752 highlights the candidates for IPng. Robert Hinden and Stephen Deering (Editors) publish on December the RFC 1884, “IPv6 Specifications”

1996: NTT Labs started first large IPv6 research network
(http://www.6journal.org/archive/00000056/01/Kazu_Gomi.pdf)

1997: Nortel Networks, “the first” to deliver IPv6.
(<http://www.twnic.net.tw/file/2003seminar/23c.pdf>)

1998: RFC 2460 - Internet Protocol, Version 6 (IPv6) Specifications formalized
(this spec will be obsolete by RFC3513, subsequently obsolete by RFC4291 of February 2006, today in force)

1998: Project Kame starts. It will deliver the first IPv6 stack for *Nixes
(www.kame.net)

tiscali.

Tiscali International Network



Some dates, con't:

2000: (June) Cisco Systems announces its three phases roadmap towards IPv6

(http://www.cisco.com/en/US/products/ps6553/products_ios_technology_home.html)

2001: (November) “Juniper Networks delivers Industry’s first production-ready IPv6 solution” (<http://www.juniper.net/company/presscenter/pr/2001/pr-011128.html>)

2001: Tiscali International Network goes IPv6 dual stack.

2005: (February) Presidential Office, U.S.: “[...] we have set June 2008 as the date by which all agencies’ infrastructure (network backbones) must be using IPv6 and agency networks must interface with this infrastructure.”

2008: (February) “Feds: We will meet June IPv6 deadline”

(<http://www.networkworld.com/news/2008/040208-ipv6-feds.html>)

tiscali.

Tiscali International Network



Some other dates:

1998: FreeBSD (Kame) and Linux (USAGI et al.) supporting IPv6

1998: Sun releases Solaris7, which incorporates IPv6 support.

1999: UMTS release '99 starts mentioning the need for IPv6 transport
(requirement relaxed in subsequent releases)

2002: Apple releases Jaguar, supporting IPv6 (the OSX core is Darwin, a
“variant” under the FreeBSD umbrella)

2004: Microsoft aligns to global IPv6 stack deployment
([http://technet.microsoft.com/it-it/library/bb726954\(en-us\).aspx](http://technet.microsoft.com/it-it/library/bb726954(en-us).aspx))

v6 Dates – End Users

tiscali.

Tiscali International Network



Proprietary and confidential

Coming to our days...

2006: Project Kame ends having reached its goals in March



2008: (February) Root DNS are reachable via IPv6

2008: (March) Google IPv6 Conference (speech of **Bob Hinden**, Nokia.
<http://www.youtube.com/watch?v=o5RbyK0m5OY>).

2008: on March 12th `ipv6.google.com` goes live.



(yes, the animation is the ipv6 google logo and yes, I did not mention 6bone, apologies.)

tiscali.

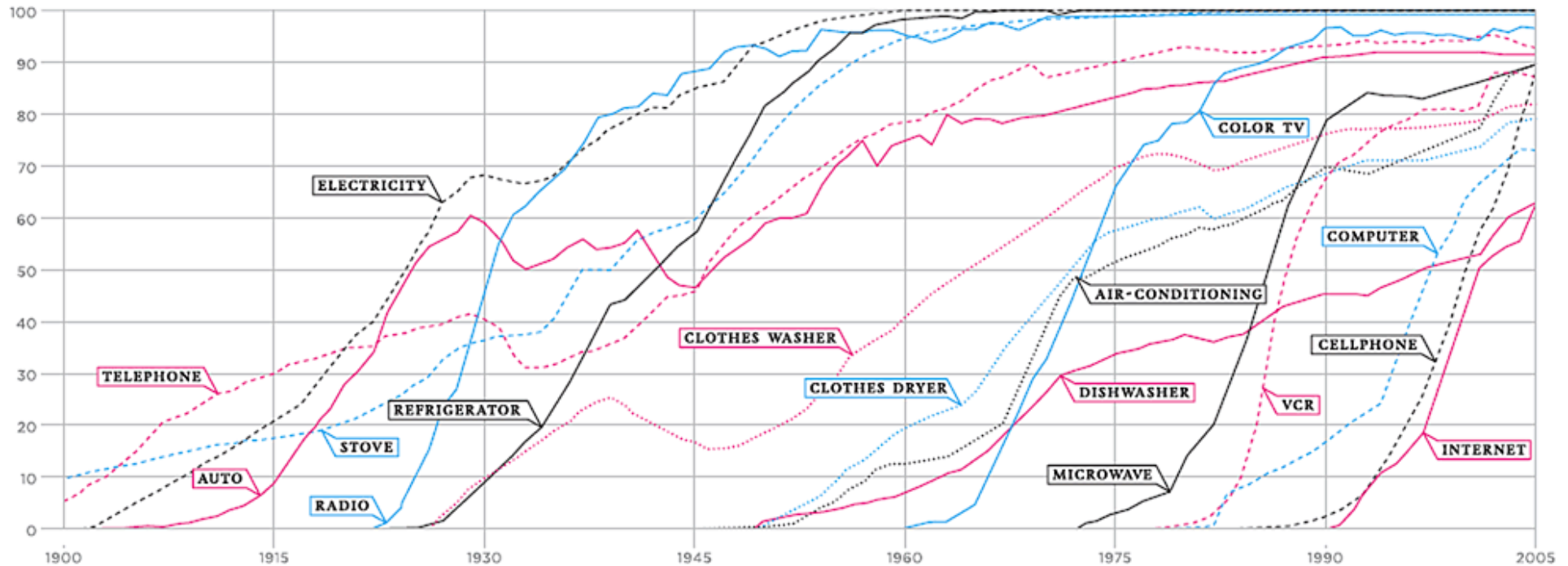
Tiscali International Network



v6 Dates – End Users

PERCENT OF
J.S. HOUSEHOLDS

CONSUMPTION SPREADS FASTER TODAY



More than 10 years have passed since IPv6 first proposals. We went through the Internet Bubble in the meanwhile. Is this similar to the 1900's new technologies take off?

Source: <http://www.visualizingeconomics.com/2008/02/18/adoption-of-new-technology-since-1900/>

tiscali.
Tiscali International Network



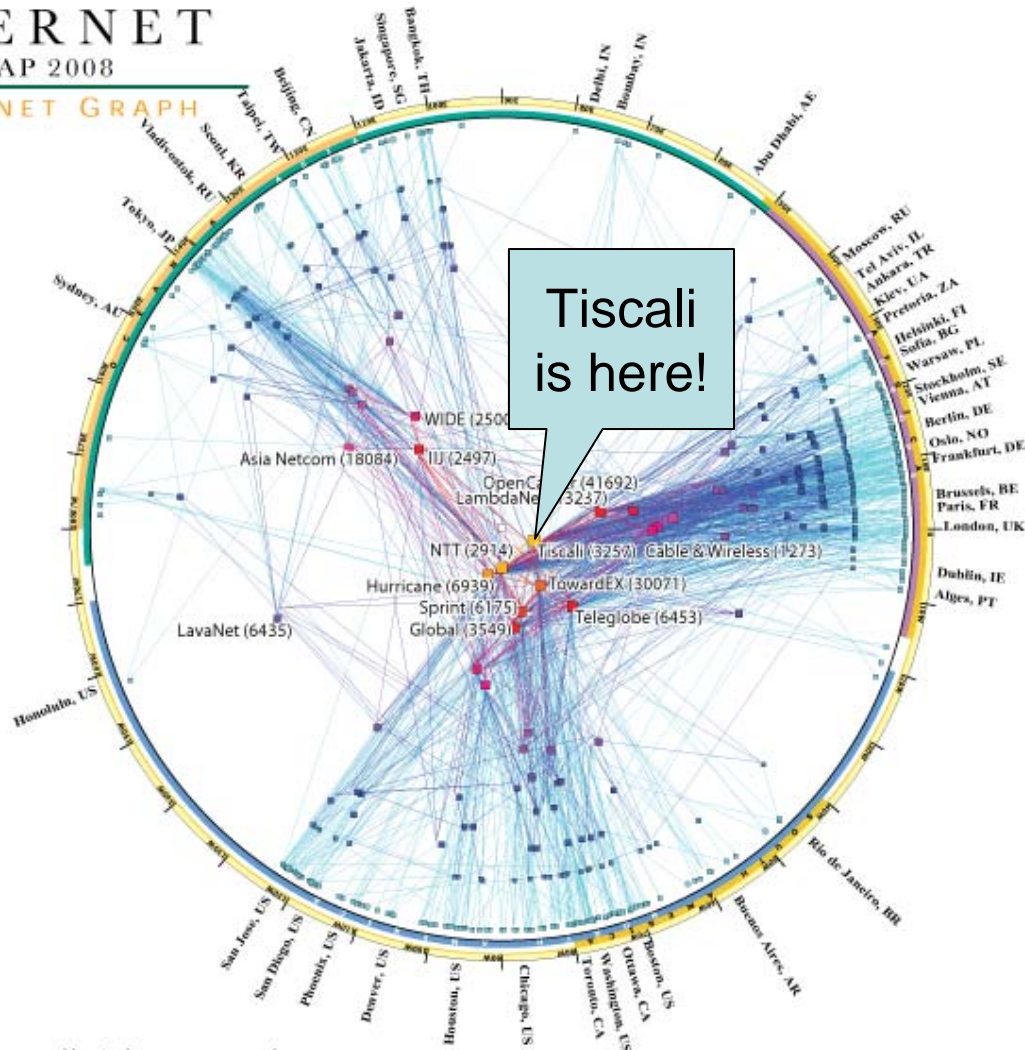
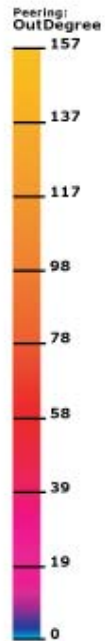
Technologies ramp-up

Proprietary and confidential

IPv6 INTERNET

TOPOLOGY MAP 2008

AS-level INTERNET GRAPH



copyright ©2008 UC Regents. all rights reserved.

Source: San Diego Supercomputing Centre, CAIDA. <http://www.caida.org>

Caida IPv6 AS-Map

tiscali.

Tiscali International Network

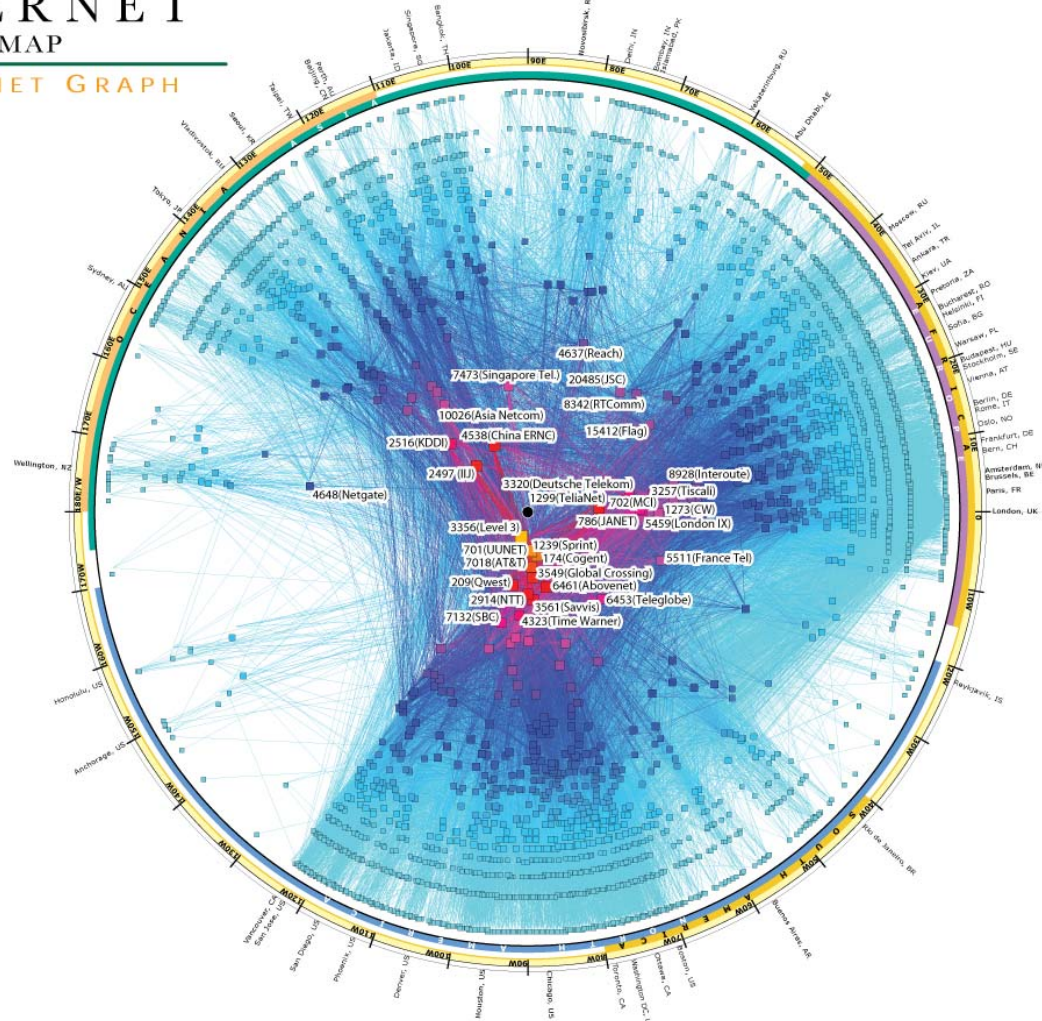
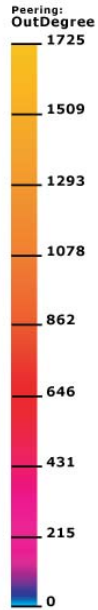


Proprietary and confidential

IPv4 INTERNET TOPOLOGY MAP

AS-level INTERNET GRAPH

copyright ©2007 UC Regents. all rights reserved.



Source: San Diego Supercomputing Centre, CAIDA. <http://www.caida.org>

And the IPv4 AS-Map...

tiscali.
Tiscali International Network



Proprietary and confidential

All evangelists say:

“Do IPv6 because the IPv4 address space is depleting (has depleted, will be shortly depleted, whatever”).

Sorry but it's a difficult subject to exploit commercially. I'd rather say “do IPv6 because it can simplify things and because everybody now agrees it's really the future, so better be prepared”.

IPv6 has nice features, for sure, but it is in its inherent simplicity and possibilities that it opens that it can successfully be integrated in your networks.

Up to today's recommendations:

1. An host is in a LAN with $2^{64}-1$ addresses available for it (well, apart the other hosts present) -> Security? Global Host reaching with a public IP address for anyone?
2. Addresses are scoped. So creating backend and front-end networks is a trivial task.

tiscali.

Tiscali International Network



Key points for v6

Proprietary and confidential

Transition is relatively easy (to make your network dual-stack):

1. You just need to get a block and start addressing the router interfaces (as odd it may sound a subnet /64 has its reasoning and it is not a waste of space. Just do the calculations)
2. You need to configure your IGP to support v6 routes (please read first Cisco's implementation of shortest path for v6 and their multi-topology support in Integrated IS-IS)
3. You can then safely advertise your newly globally scoped IPv6 block via BGP to your upstream provider

Interesting that all the access methods support v6:

1. PPPoX in most implementations does (as opposed to CPEs unfortunately)
2. RFC2684 (former route-bridge encaps.) works as a breeze. From our experience with end users it should be actually preferred over PPPoX technologies.

Changes you must do

tiscali.
Tiscali International Network



Proprietary and confidential

- **Giorgio Lembo**
 - R&D Manager
 - Tiscali International Network

Thanks

tiscali.

Tiscali International Network



Proprietary and confidential