# ๑๗๕

# ปีกไม้ไผ่

# ๕๒

# *From the Cave …*

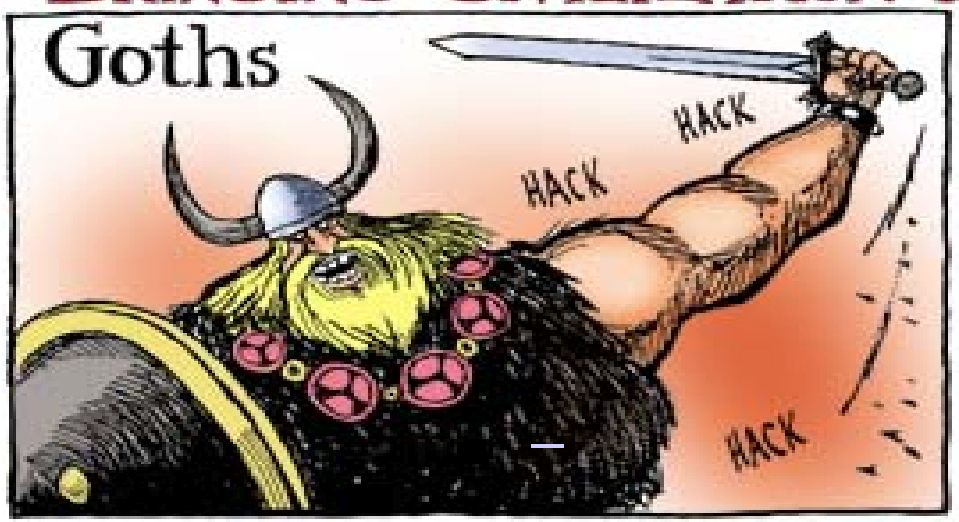
## *Well My Cave is wireless !*

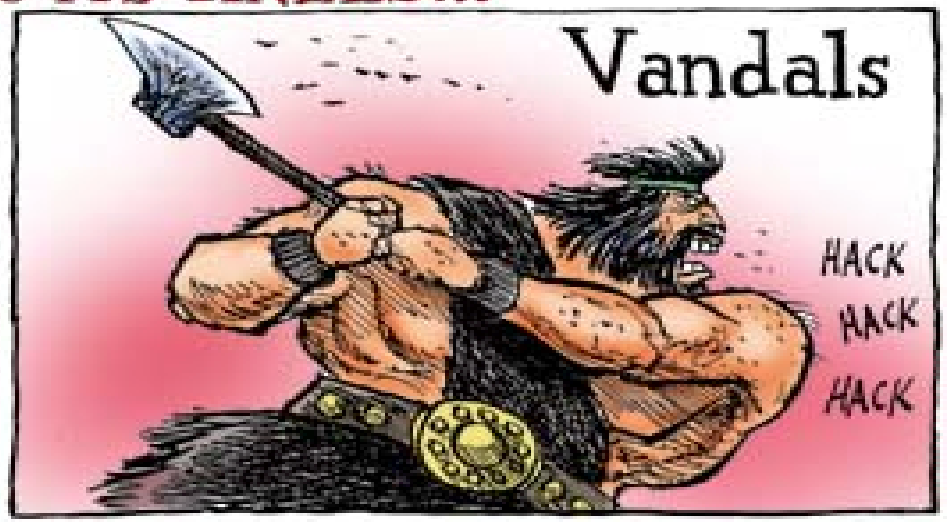
IPv6 FORUM

# Real Planning Started in Egypt!

# TAMING THE WORLD

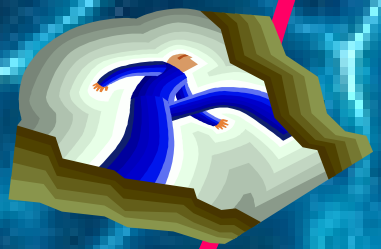
## BRINGING CIVILIZATION TO ITS KNEES...

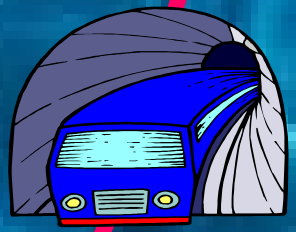


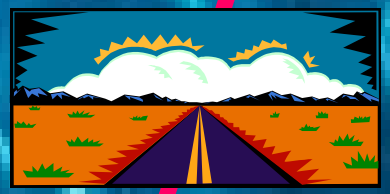



# Technology & Progress Waves

Canals Railways Highways Telecommunications







1750 1800 1850 1900 1950 2000 2050

GOODS

PEOPLE

INFORMATION

FORUM

# Internet Generations

| 1G | 2G | 3G |
|---|---|---|
| 10*4 | 10*9 | 10*38 |
| Pioneers | Innovators | EveryOne,-thing |
| Email, FTP | WWW | Wireless, Streaming Media, Peer-2-Peer |
| DIAL-UP | INTERNET | ALWAYS-ON |
| Gov. Internet | Public Internet | Global Internet |
| ARPANET | INTERNET | NEW INTERNET |

# Internet TimeLine

- NCP Conception
- NCP Roll-Out

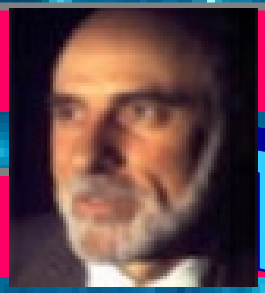
1961 NCP 1969

1969 ARPANET 1982

IP Conception

IPv4 Roll-Out

1972



IPv4 INTERNET

1983

w!

*IPv6 Conception*

*IPv6 Roll-Out*

1991

IPv6

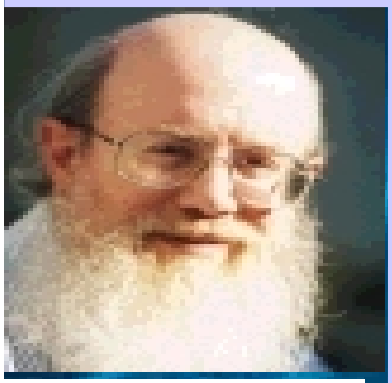
2000

NEW INTERNET

IPv6 FORUM

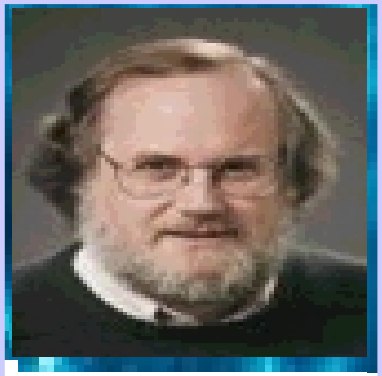
# IPv6 Technical Directorate

## Chair: Jim Bound



Scott Bradner

Brian Carpenter



Steve Deering

Christian Huitema

Allison Mankin

Yanick Pouffary

Charlie Perkins

Thomas Narten

Erik Nordmark

Thomas Ecklund

# IPv6 Technical Directorate

Francis Dupont

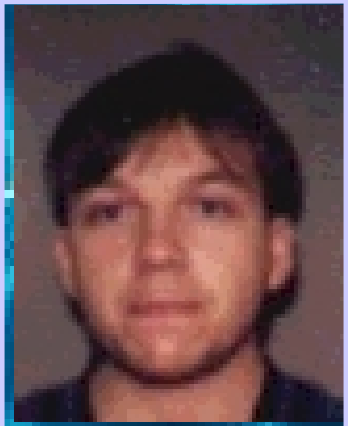
Alain Durand

Jack McCann

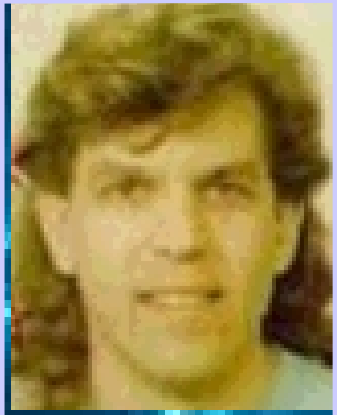
Henk Steenman

Stephen Hayes

Stig Venas



Carl Williams



Brian Zill

Matt Crawford

Dale Finkelson

Cyndi Jung

Peter Tattam

Brian Haberman

Now that's FUNNY

**Watch with a sense of humour**
**Some pictures can be shocking!**

IPv6 FORUM

# The Future of the Internet

**The IETF was divided on**

**the Future of the Internet !**

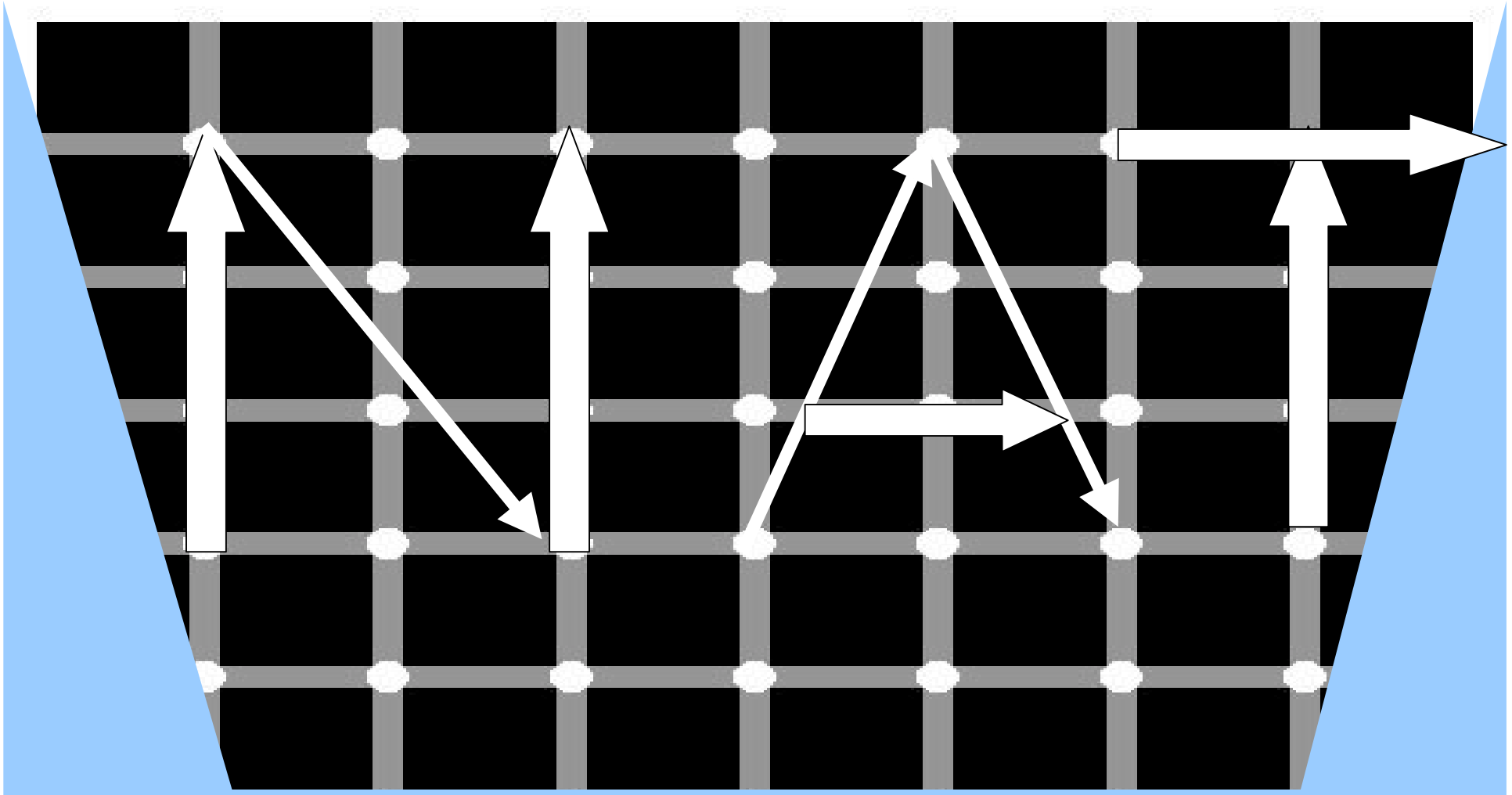
# The Future of the Internet

# The Future of the Internet

## NATs: Peeping Holes

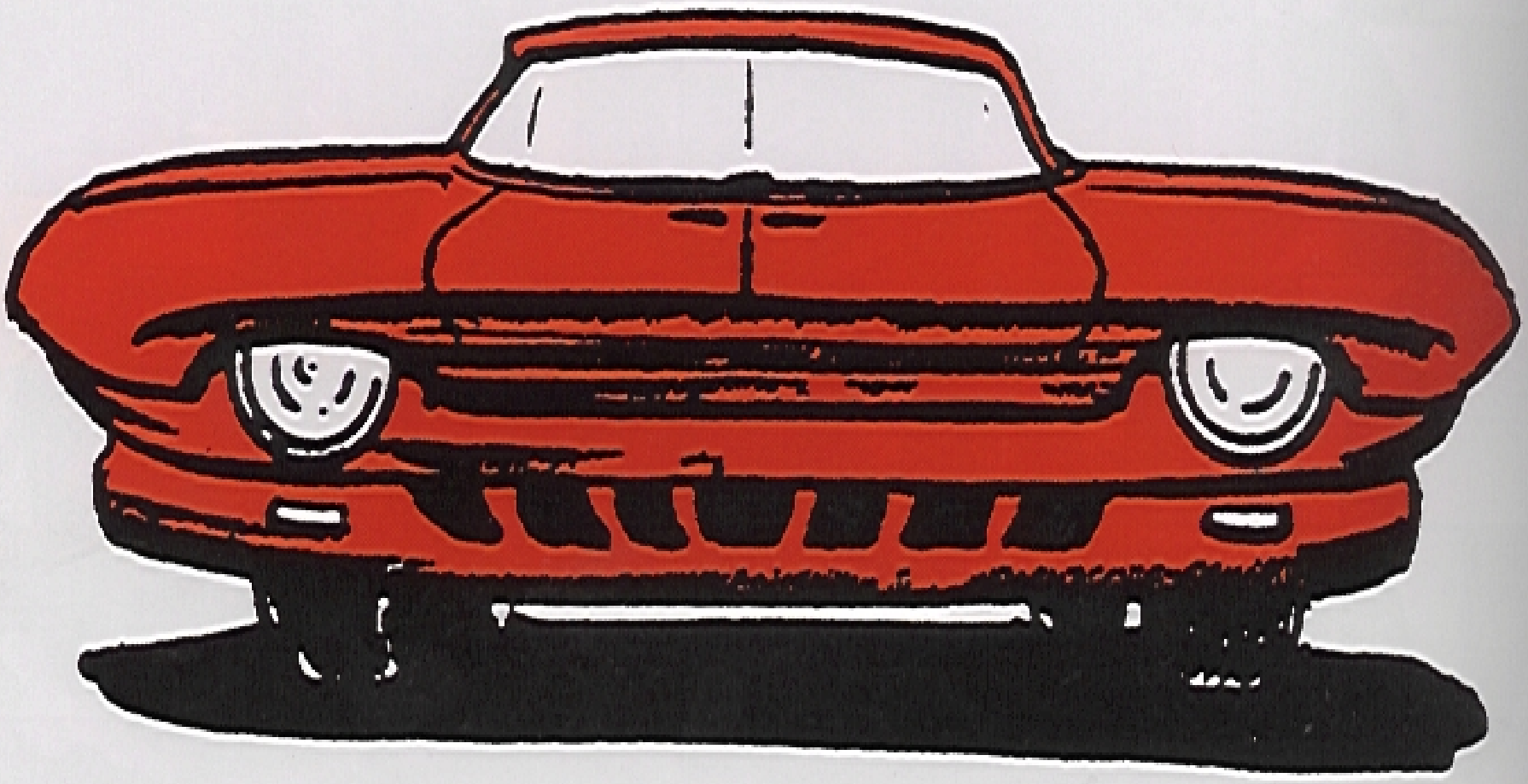
# The Future of the Internet

## NATs: Holes for Shipworm Culture



# The Future of the Internet

## NAT over NAT



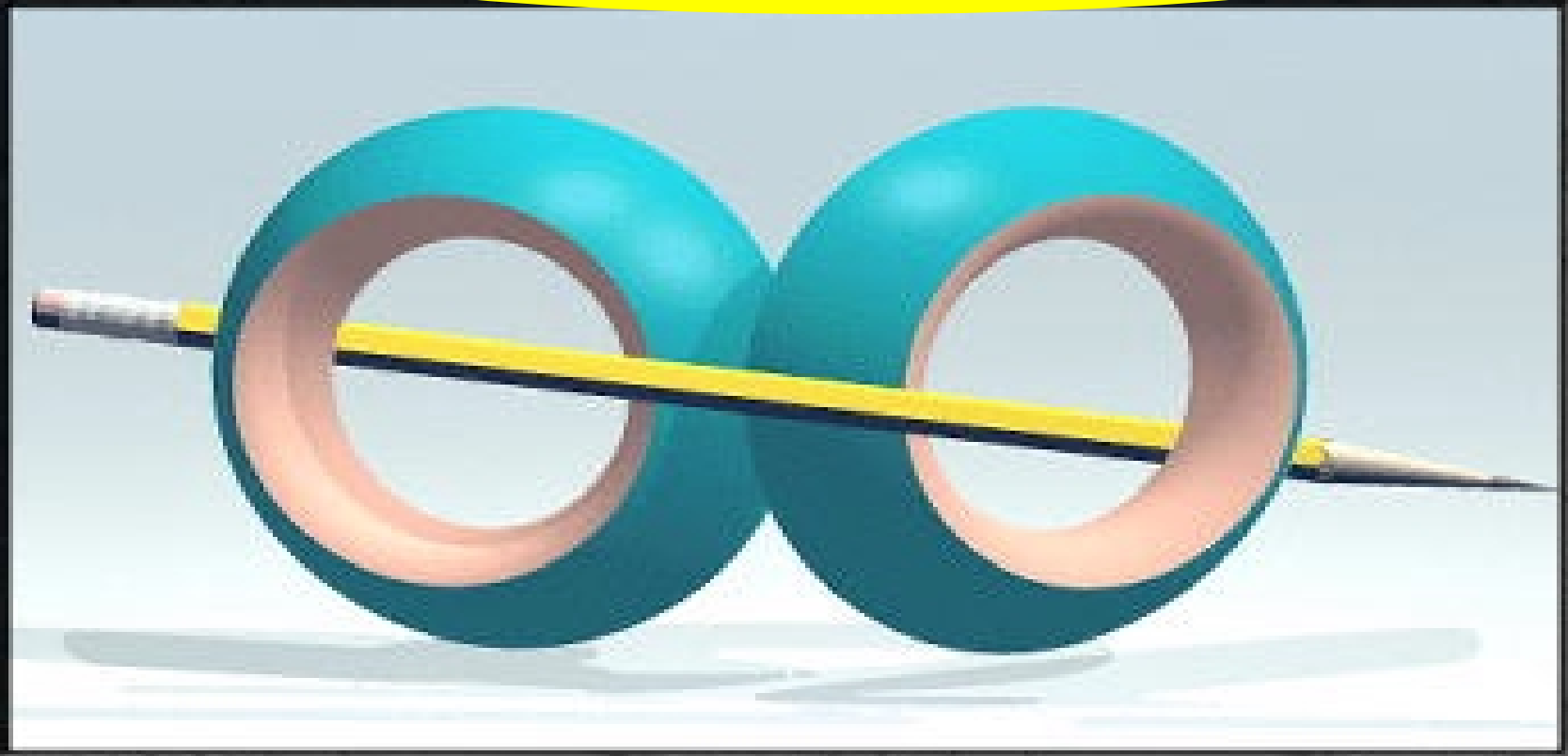
# The Future of the Internet

## Unique Addresses?

# The Future of the Internet

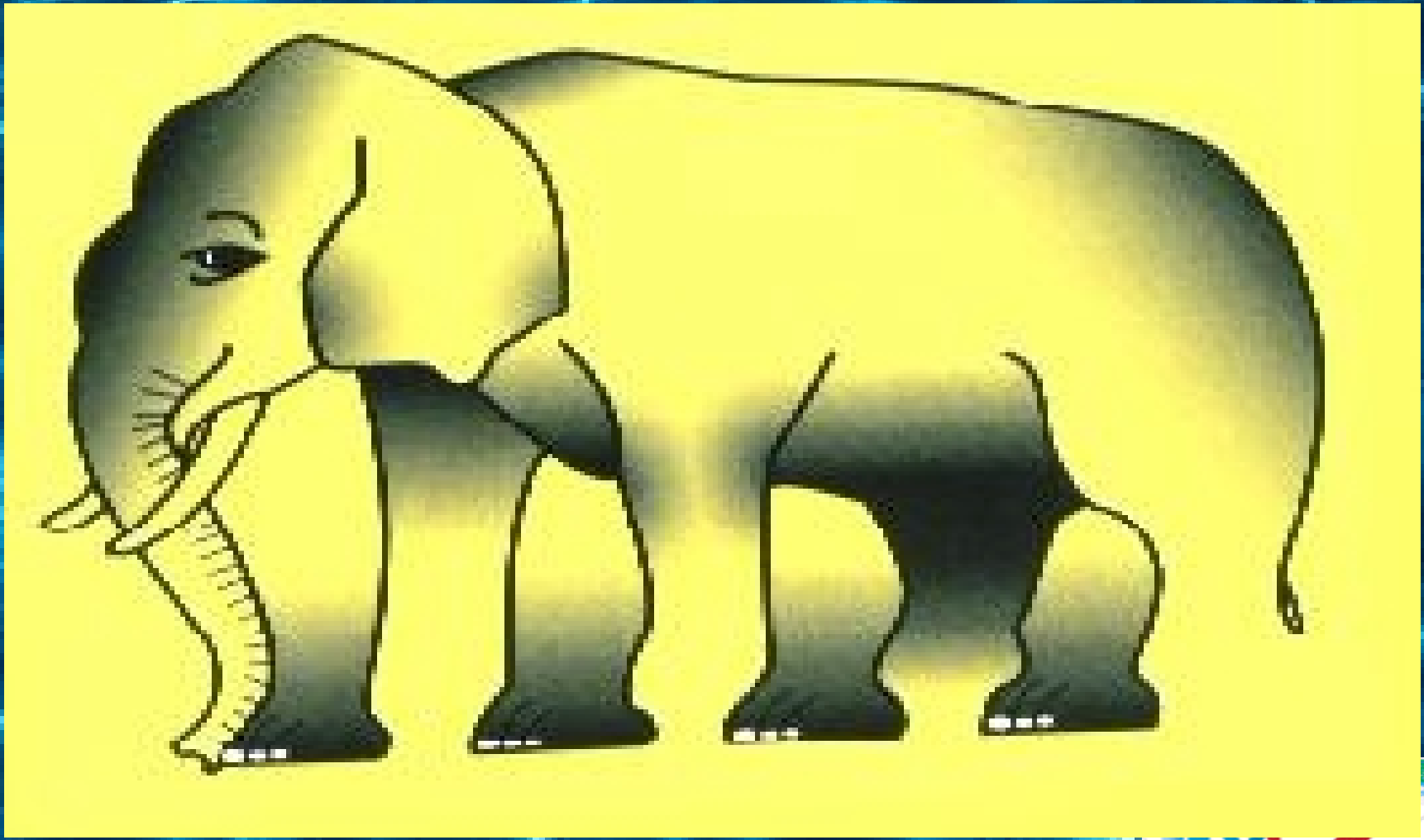
**Peer-to-peer Model?**

**Peer-to-peer Traversal Model?**



# The Future of the Internet

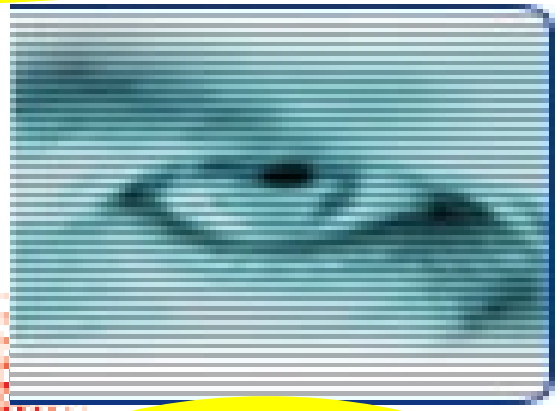
## Always-On Service



# The Future of the Internet

## Is Internet Security Desired by Governments?

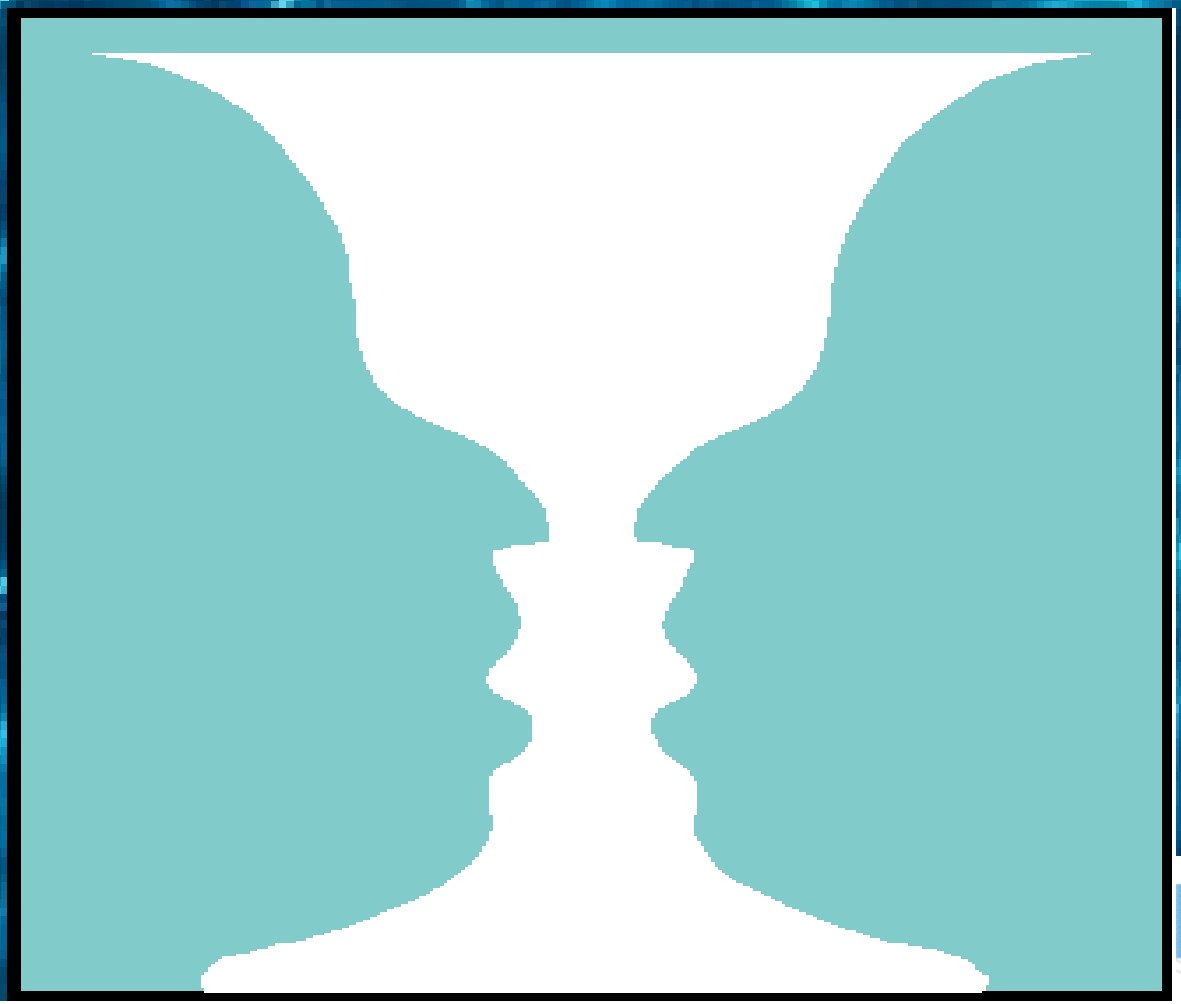
**Big Brother Is WatchingYou!**



**Hackers Too!**

# The Future of the Internet

## Deering ´s Peering Hitchcocks?



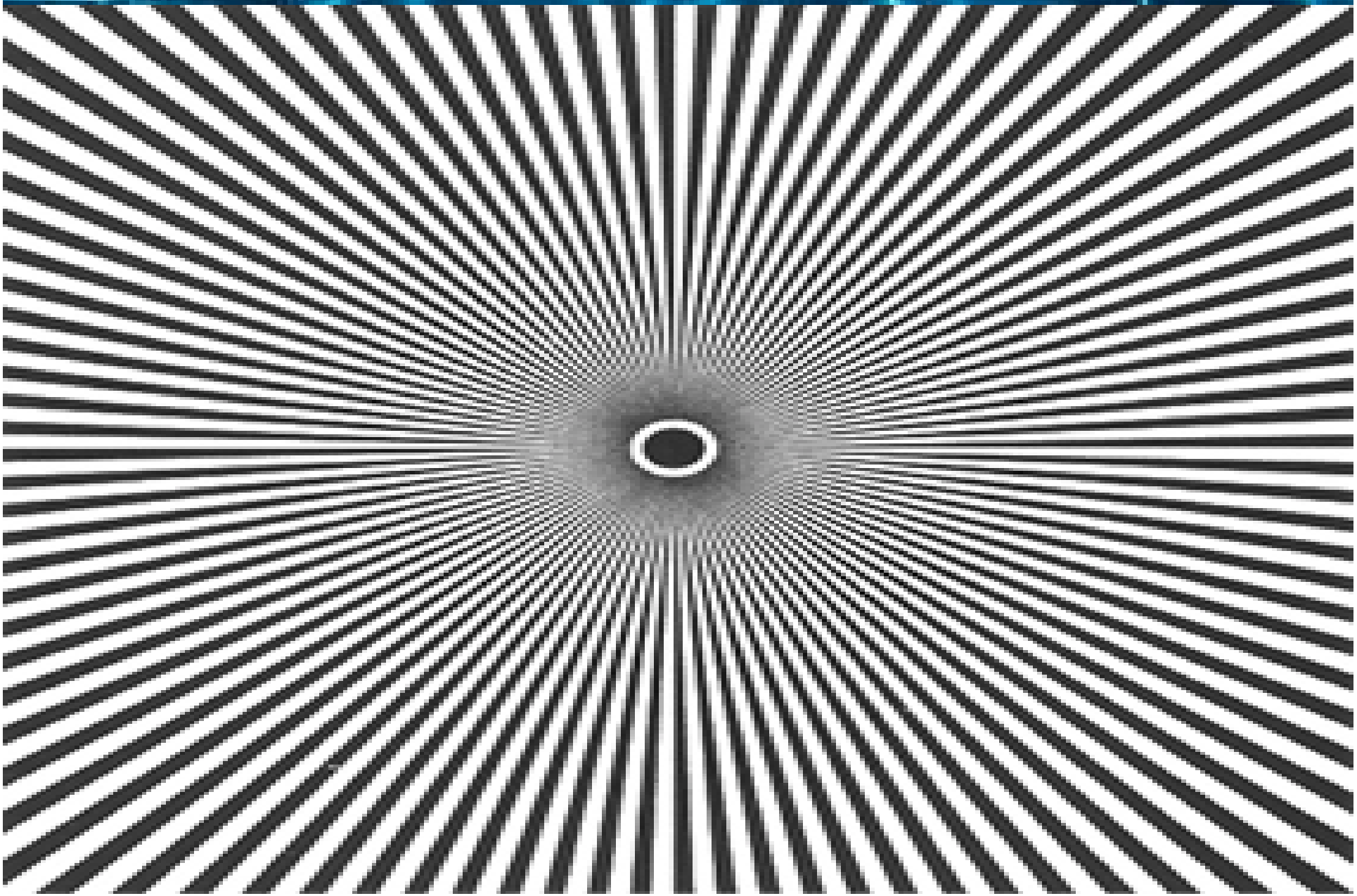
IPv6 FORUM

# The Future of the Internet

## Application Independence

# Peer-2-Peer Species work better together!

# IMAGINE !



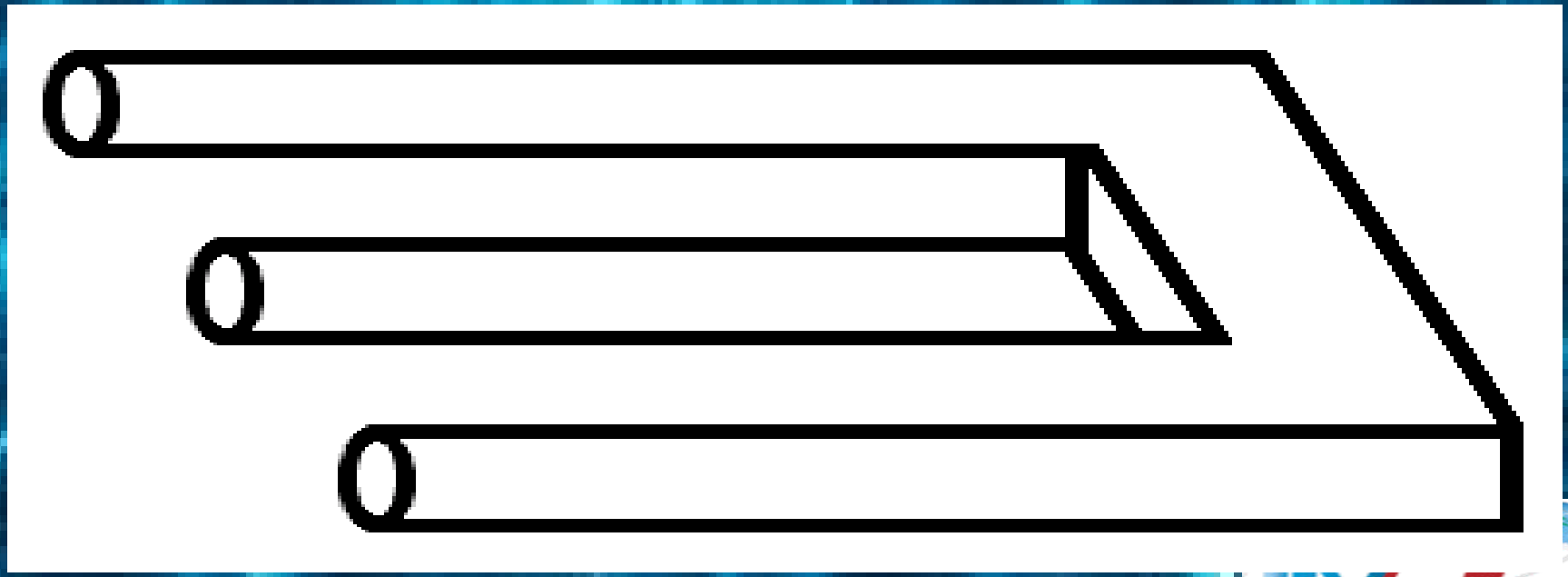
# Moving from InterNET to InterNAT !

# Can you do 3 things in ONE GO?

e2e Communication

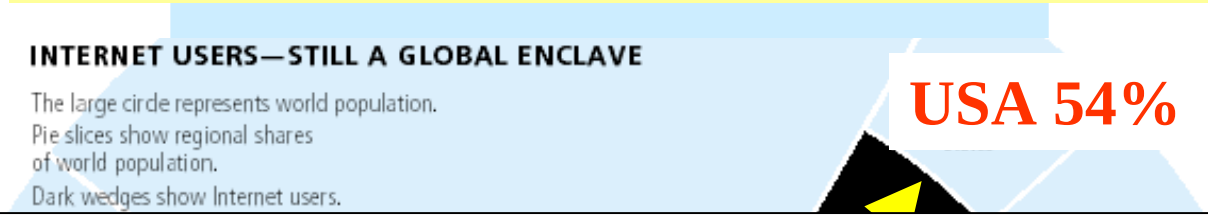
e2e Security

Mobility



# The Internet Has Met Its Enemy!

# UNEVEN DIFFUSION OF TECHNOLOGY




WORLD
8 %

**PHONE NETWORK: 1.2 Billion -> 20%**

**INTERNET USERS: 0.5 Billion -> 8%**

**INTERNET HOSTS: 137 M Hosts -> 2%**

**NO e2e : NOBODY KNOWS !**

*Source:* Human Development Report Office calculations based on data supplied by Nua Publish 2001 and UN 2001c.

# Moore's law, Gilder's law, Metcalfe's law, Reed's law

G. Moore's law:

$P = P^2$

G. Gilder's law:

$B = B^3$

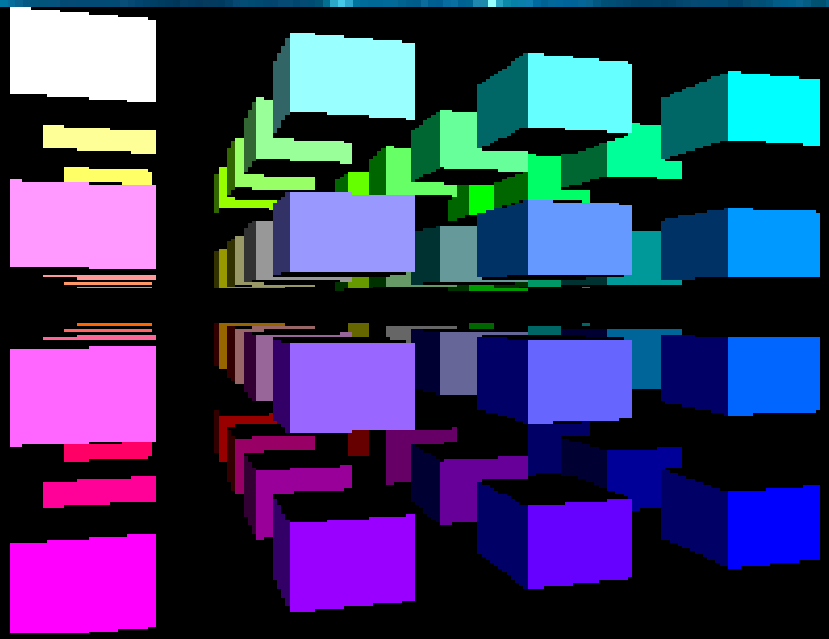
R. Metcalfe's law:

$V = V^2$

D. Reed's law:

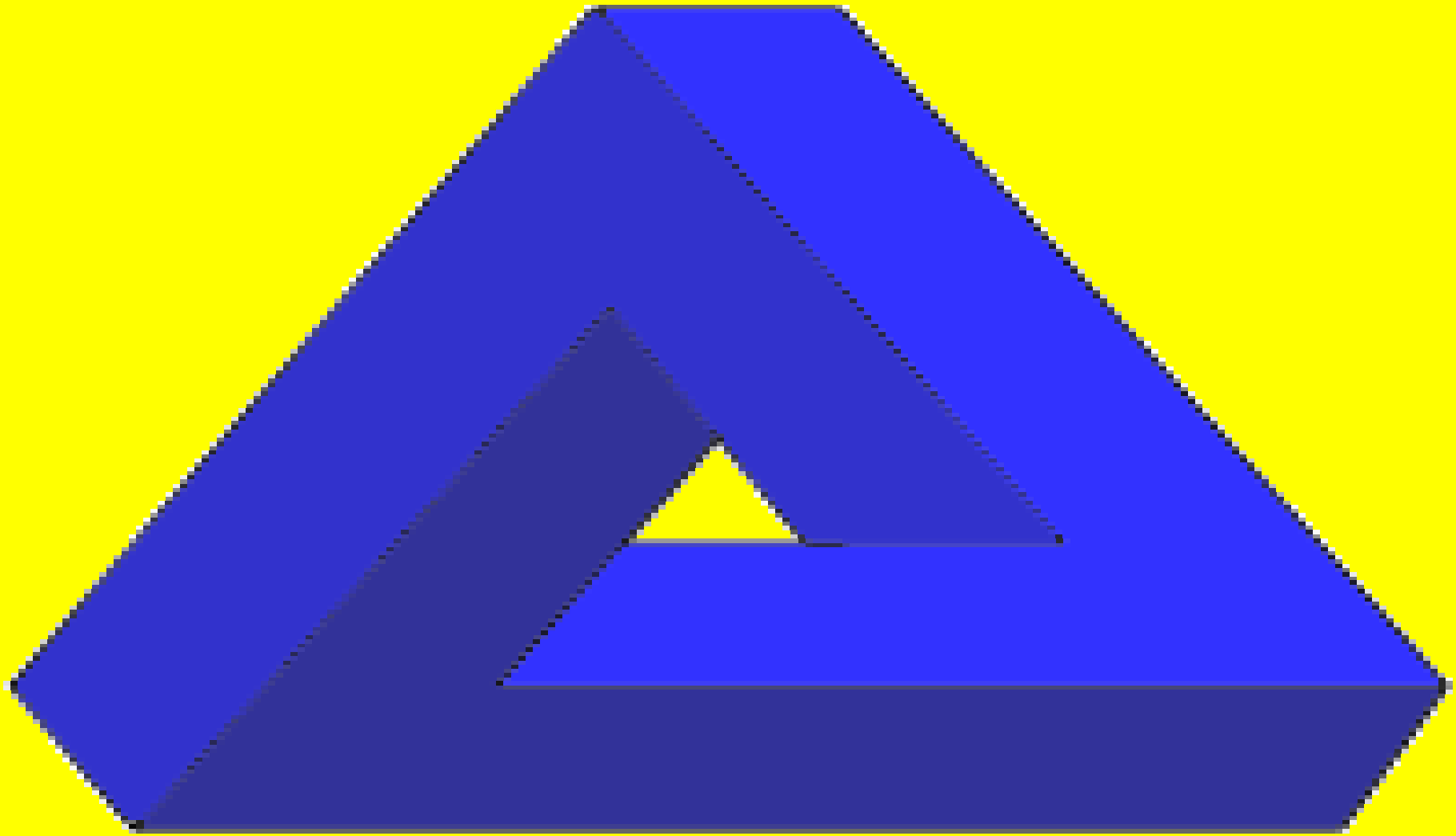
$U = V^3 = U^3 \times \sqrt{U}$

# The Internet is falling apart



# Future of the Internet

## Chicken & Egg ?
## Impossible Triangle ?



# Rejuvenating the Decaying Internet

## IPv6 is a young lady?

# IPv6 Is Not Only Unlimited Address Space

## STRING of Technology PERLS

QoS

Flow Bits?

...

...

Reliability

Simplicity

Flexible

Renumbering

Dynamic Routing

Transition

Tool Box

Multicast v6

e2e Security

Mobile IPv6

Autoconfiguration

Plug & Ping

End-2-end

Transparency

IPv6 FORUM

# IPv6 Expected Benefits

...

...

May be QoS?

Return to Simplicity

Hierachy

M&A

NEW Generation Apps

Push v6

No Flag Day

e-Money

Seamless Mobility

Low Cost Admin & Manage

VoIP, P2P, 3G Phase-Out NATs

IPv6 FORUM

# Homo-Computiens

**Homo-Coms** **Homo-Holes** **Homo-Ambiants**

## Bell-Head

2G

## NAT-Head

## NET-Head

Legacy

*3G*

*P2P/Push*

# 100% IPv6 readiness by 2005

- Prime Mister of Japan Yoshiro Mori

- Korean MIC followed Japan Feb 23, 2001

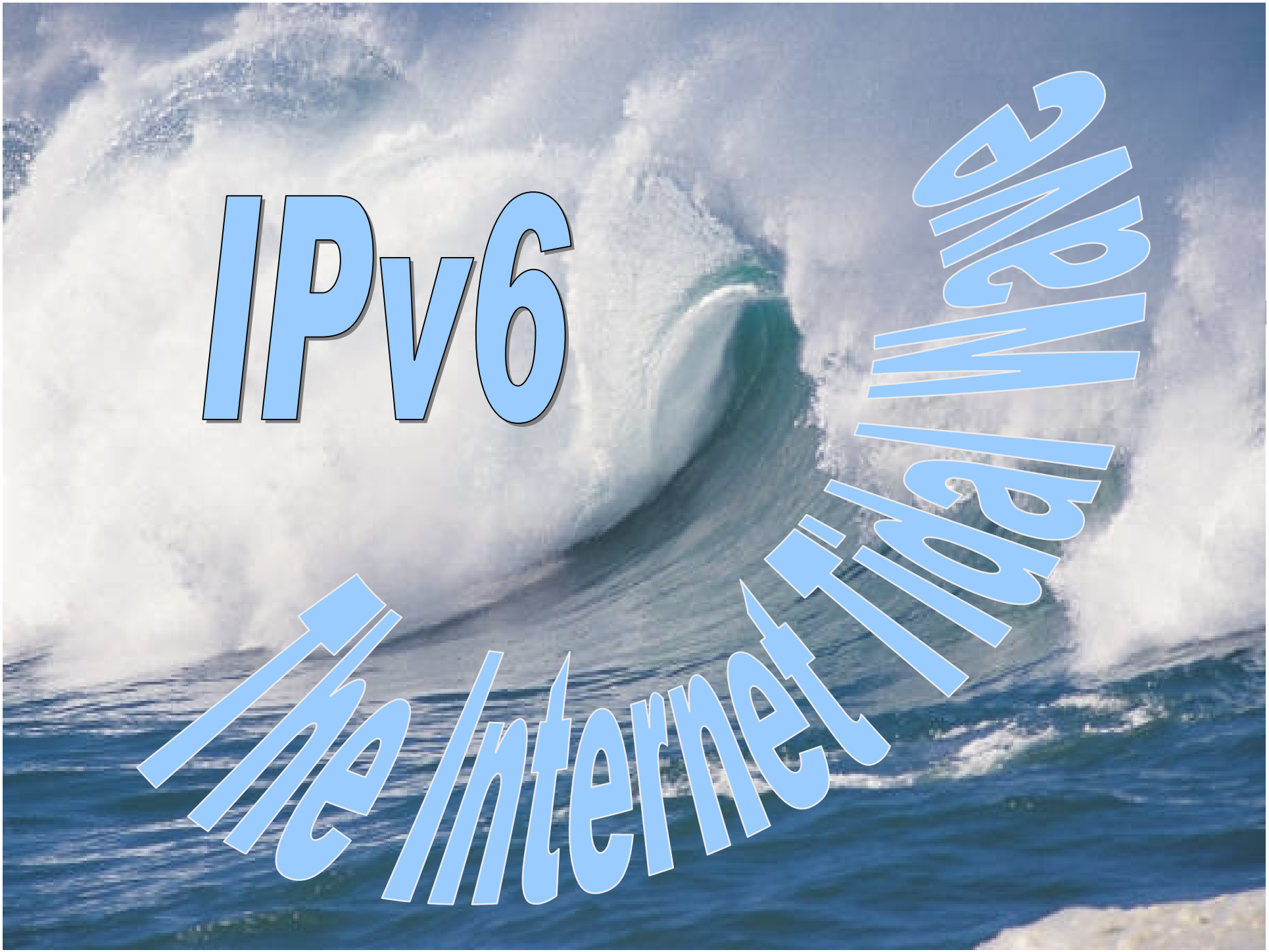
- The 7th Japan-China Regular Bilateral Consultation Dec 2001

# The European Commission Formed an IPv6 Task Force in March 2001

- Commissioner Erkki Liikanen
- Recommendations Reports Jan 2002 www.ipv6tf.org
- 6NET & Euro6IX Large.Scale Testbeds 34 M€

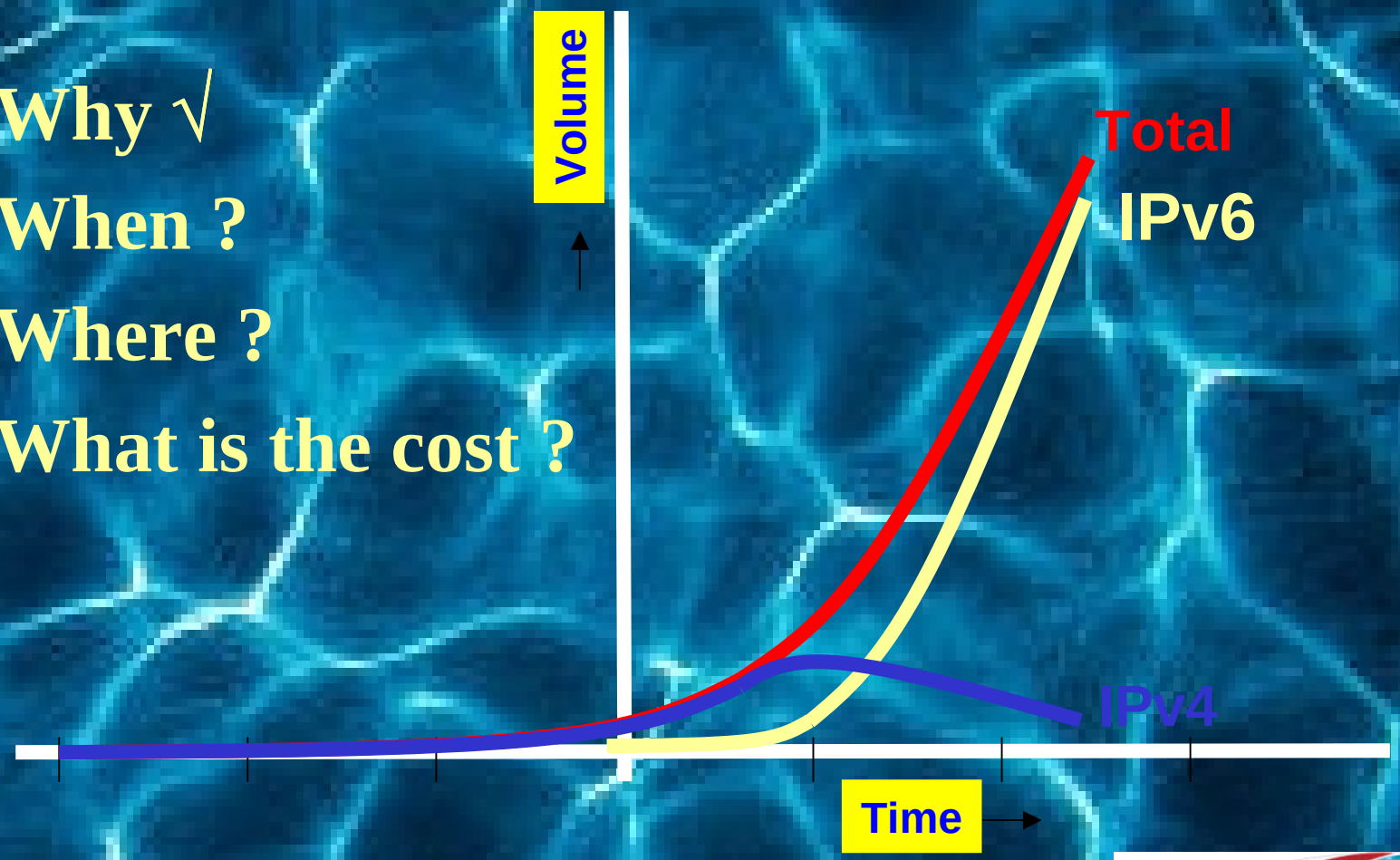
# v6 Roadmap Scenaria

| | Scenario 1 | Scenario 2 | |
|---|---|---|---|
| IPv6 Deployment | Successful | Complete Failure | |
| Address Transparency | Restored e-2-e | Recycling IP Addresses | Exhaustion NAT-over-NAT |
| IPsec | e-2-e works | Limited | Broken |
| FOG | Clears! | Noticeable Fog | Permanet Thick Fog |
| Issues | Intranet, Proxies & Firewalls may remain | Generalised use of NAPT, RSIP? | NATs between even ISPs |


IPv6
The Internet Tidal Wave

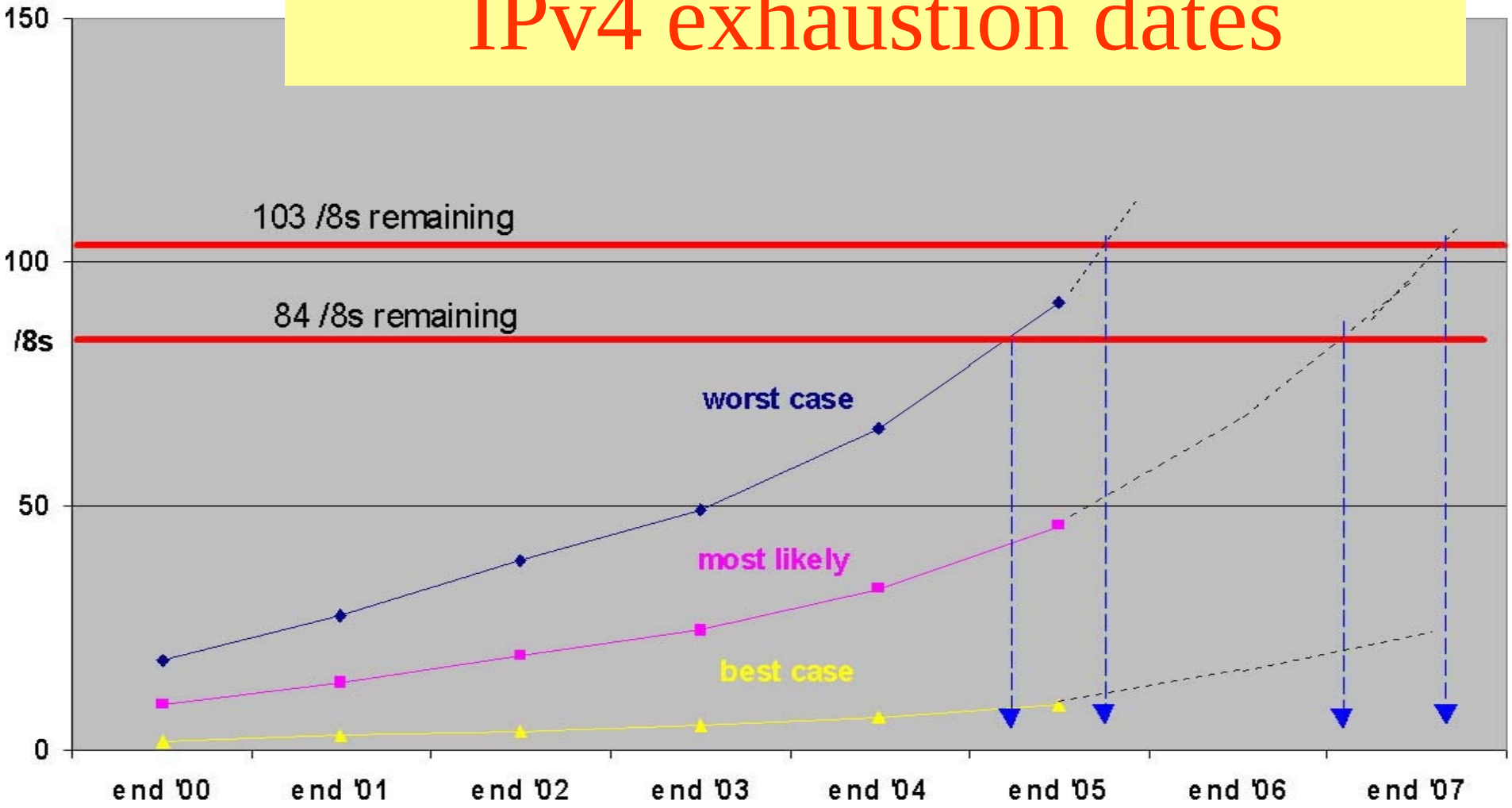
# The BIG Questions!

- Why √
- When ?
- Where ?
- What is the cost ?



# IPv6 should be in operation before 2004

## IPv4 exhaustion dates




Global demand for Cellular and ADSL/Cable modem - exhaustion dates (ICANNのAdhoc )

# *IPv6 AdoptionTimeline - WORLD*

## *(A pragmatic projection)*

| 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|

**Early adopters**

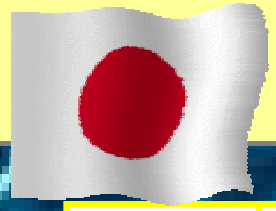
**Appl. Porting -> Duration 3+ yrs.**

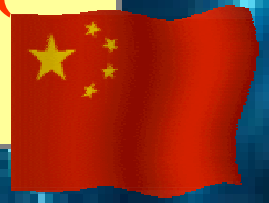
**ISP adoption -> Dur. 3+ yrs.**

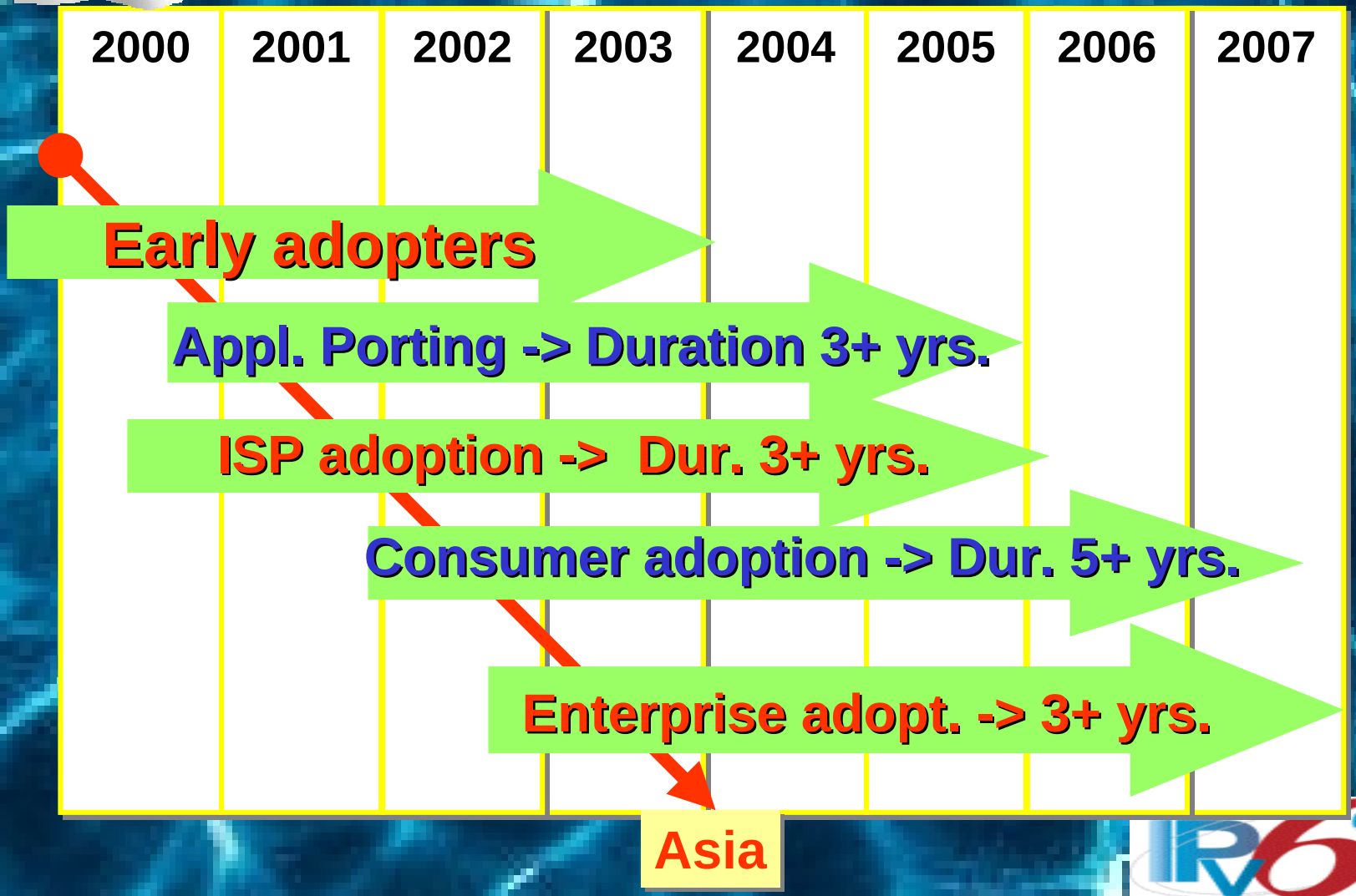
**Consumer adoption -> Dur. 5+ yrs.**

**Enterprise adopt. -> 3+ yrs.**

# IPv6 AdoptionTimeline - ASIA(A pragmatic projection)

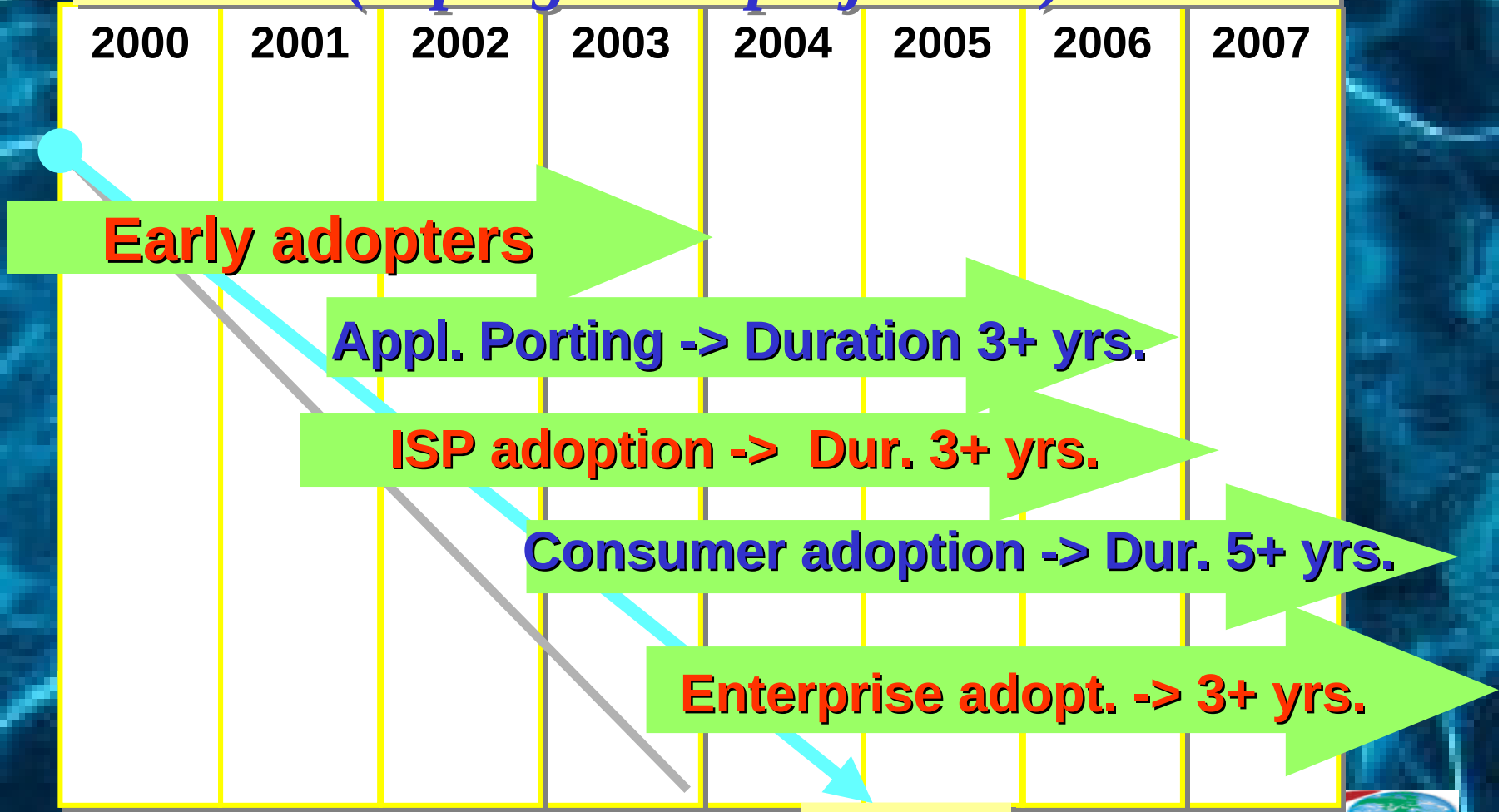






# *IPv6 Adoption Timeline - EUROPE*

## *(A pragmatic projection)*



# *IPv6 Adoption Timeline - AMERICAS*

## *(A pragmatic projection)*

| 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|

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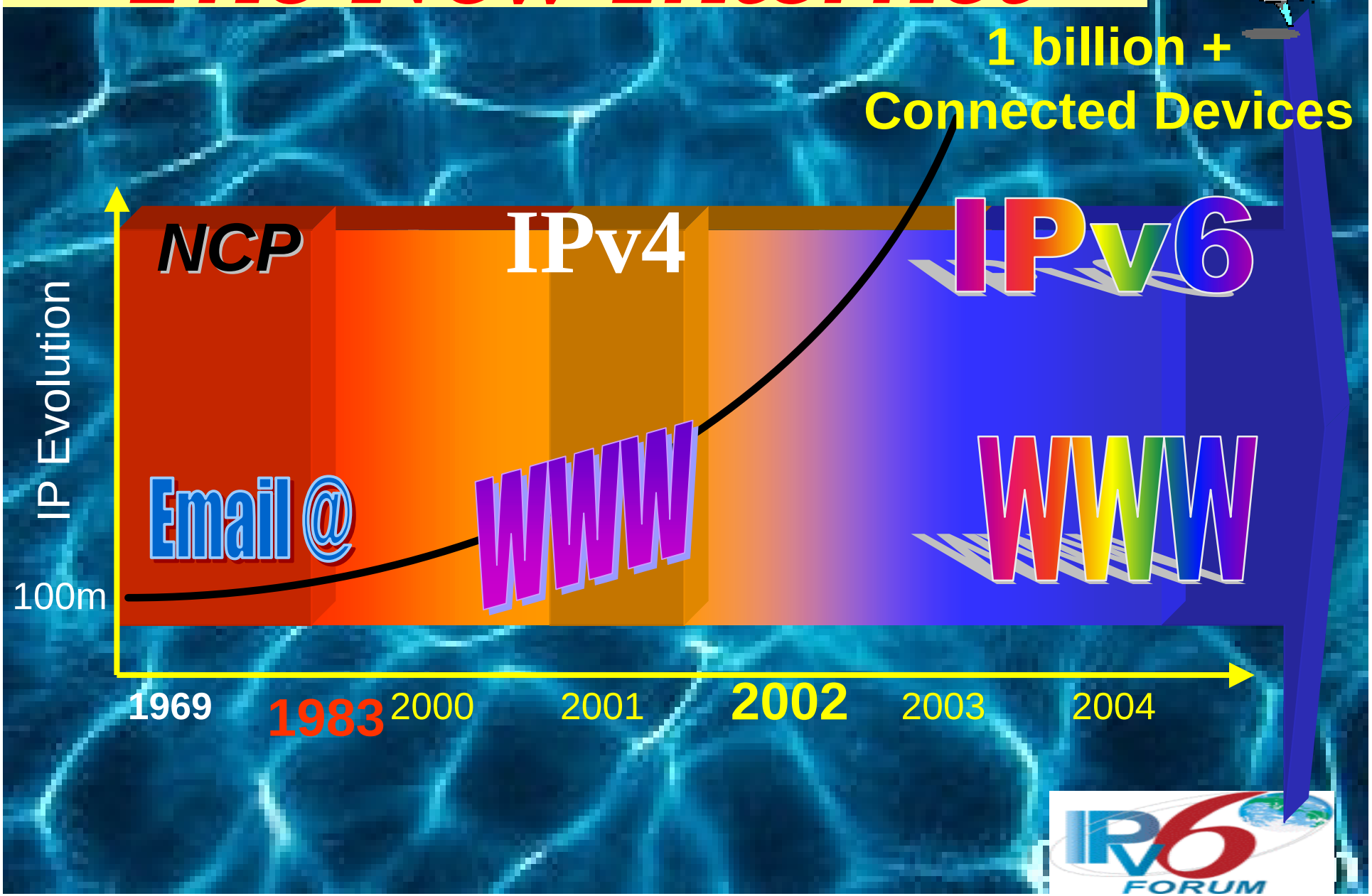
Asia Europe **Americas**

FORUM

# The New Internet



# Putting The Internet Back Together!