IPv6
BEYOND THE WEB
What’s NEXT? Is it This?
Everyone on the Net!
Internet Scaling & Extensibility

The Internet is becoming the Incumbent
Power to the Edge!
Power to Everyone!
Changing Engines While Flying!

Incremental Upgrade!
Breaking the Sound Wall on the Net!
The WEB is Dead! Long Live File Sharing!

File Sharing (P2P)

WEB

John Montross
Vice President, Managed Network Operations
Sprint Corporation
Shoplifting On The Net!

All the fun of shoplifting, but with a fraction of the guilt.
Conclusions
at US IPv6 Summit
Washington Oct 2000

- IPv6 is under hyped (for what it really will do)
- Industry cannot make it happen
- DOD must return to leadership
Ethernet & TCP/IP invented in Palo Alto in 1973

CSMA/CD LAN Ethernet at Xerox Parc

TCP/IP WAN Internet at Stanford.

Ethernet has evolved
- from 2.94Mbps over shared coaxial cable, to 100Mbps over switched twisted pairs
- to 100Gbps over fiber
- to 11Mbps over radio at 2.4GHz, and beyond.

Meanwhile, TCP/IP has evolved to IPv4, where it has been sitting for too long.

Time for IPv6!

Quote - June 12, 2003 for IPv6 Summit in San Diego
Small Fixes For Big Problem!
G. Moor’s law:
\[ P = P^2 \]

G. Gilder’s law:
\[ B = B^3 \]

R. Metcalfe’s law:
\[ V = V^2 \]

L. Ladid’s Law
IPv4 vs. IPv6:
\[ V = V^n \]
Addressing Divide Terminated!

percentage of metric controlled by a country/continent

IPv4
- US 53%
- North America 56%
- Europe 22%
- Asia 13%

IPv6
- US 14%
- North America 19%
- Europe 42%
- Asia 34%

- AR BR
- South America 35%
- Africa Middle East 37%
- Oceania 21%
The Power of IP

• Layering of Protocols

• IP decouples application from transmission/transport
  – IP does not care what transport is used
    (satellite, fiber, twisted pair, radio, ATM…)
  – IP does not care what application it is carrying
    (video, audio, web, email…)

• Profound impact on regulatory models
Watching the Waist of the Protocol Hourglass

Deering’s Hour Glass Model
Putting on Weight

• requires more functionality from underlying networks
Oops! An Accident

- NATs & ALGs used to glue the broken pieces
- lots of kinds of new glue being invented—ruins predictability
- some apps remain broken, since repairs are incomplete
Threatened by Youths

- danger: creeping dependencies on specific link-layers inhibit flexibility and evolution
- will never fully supplant IP, so end up with complicated hybrid & more address plans
But Still
Supple

- IP-over-IP tunneling has become more and more common
- this is not so bad: retains benefits of hourglass model
Mid-Life Crisis

- doubles number of service interfaces
- requires changes above & below
- creates interoperability problems
A Fitness Goal

- perhaps we can trim down from an hourglass to a wineglass
- promising signs: IP-over-SONET, IP-over-WDM
- IPv6 to restore simplicity and functionality
Crossing the Chasm

IPv6 R&D
IPv6 Test Beds
IPv6 Wireless and Wireline Integration
Peer-to-Peer Secure Mobile Gaming, E-Business, Etc....

Early Market
Innovators
Early Majority
Main Street

We are here today

Bowling Alley

investment for the internet in Asia and Europe.

Global IPv6 Internet
Pervasive Mobile IPv6 Telephony

U.S. Projection Today
Late Majority

Asia and Europe Projection

Today

We are here today

Commercial IPv6 Products Exist Today

Peer-to-Peer Secure Mobile Gaming, E-Business, Etc....

Internet in Asia and Europe.

We are here today
Causing Major Worldwide Investments in IPv6 R&D + Infrastructure

- EU: 180 M€ (90ME - EC)
- Japan: 100 M$ 
- Korea: 40 M$ 
- Taiwan: 10 M$ 
- China: 170 M$ 
- DOD (Potential): 30 B$/Y

Leadership in Research Governments Are Our Most Powerful Backers
The IPv6 Task Force
A Key & Instrumental Model

www.ec.IPv6Tf.org

IPv6 TF in Europe

Erkki Liikanen
"Our objective is to ensure that Europe's competitiveness in wireless technology is not jeopardised by the lack of a clear road map towards IPv6," European Enterprise Commissioner Erkki Liikanen said in his opening speech to the IPv6 Task Force.

Leadership In Awareness
The National IPv6 Task Forces

The National IPv6 Task Forces...
The value of IPv6 can be realized only if the deployment effort is broadly based on a global scale. Part of the IPv6 Task Force effort needs to be devoted to fostering IPv6 understanding wherever the Internet has gone, and beyond that to places where it can go with the help of the much-expanded IPv6 address space.

I encourage your initiative and support your efforts to create a receptive environment for the development, delivery and use of IPv6 in the global Internet.
Welcome to China IPv6 Council

Global IPv6 Summit in China
Non-Stop Education – v6 Summits

- China IPv6 Summit 2003
- US Global IPv6 SUMMIT
- Tokyo Global IPv6 SUMMIT
- Australia IPv6 Conference
- BANGALORE Global IPv6 SUMMIT
- Tokyo IPv6 Business Summit 2004
- Global IPv6 Summit in Brazil 2004
- Global IPv6 Summit in China 2004
- US Global IPv6 SUMMIT
- IPv6 Day at Consumer Electronics Show, Las Vegas (110,000 attendees at entire event)
IPv6 Ready Logo Initiative

- a unique logo programme has been defined.

- The IPv6 logo will give confidence to users that IPv6 is currently operational.
Apps Promotion Activities

GALLERIA v6

Next-generation internet is now available!!
IPV6普及・推進協議会では、
次世代のインターネットを
直接見て、さわって、体験していただくため、
全国5ヶ所に
ショールームをオープンしました。

・札幌／ピックピーカン札幌店 (3F)
・東京／ダウンロードステーション千代田本店
・東京／ピックピーカン 有楽町店 (5F)
・大阪／ダウンロードステーション大阪本店
・大阪／ピックピーカンなんば店 (5F)
Taking Down Barriers

- Infrastructure Investments
- 3G Disaster (Most visible IPv6 App)
- ISP ROI (Tough to demonstrate)
- No Visible & Clear Cut IPv6 Apps
- Showstoppers: CEO - CTO
- Industry Won’t Make it Happen
- Consultants and Press Not enthused by IPv6

Pushing for the Big Success Story
Releasing The Hand Brakes!
Causing Some ISPs To Launch IPv6 Service

- Japan ★★★ ★★ ★ 50% (NTT Com)
- EU ★★★★ France Telecom
- Korea ★★★
- Taiwan
- China ★★★ CNGI
- USA

Prime Resource Coming on Board
Metcalf’s Law: The value of a network increases exponentially with the number of nodes on the network.
IPv4 Internet
IPv6 Internet
10 Killer Apps bigger than the Web!!

WP/Email

Deployment Rate

VoIP
P2P
GRID
HN3G
ITS

Don't Wait For Killer Apps! Cause Them To Happen!
Only Time Will Tell…

Finally an email that walks!
The Internet Tornado