NTT Communications
IPv6 Strategies and the New World of the Internet

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History of NTT/VERIO IPv6 Activities

1996  NTT Labs started one of the world’s largest global IPv6 research networks.

1997  CICNet and NWNet (later acquired by Verio) started operating major nodes of 6bone.

1999  NTT Communications (NTT Com) obtained sTLA from APNIC.
       NTT Com started IPv6 tunneling trial service for its domestic ISP “OCN” customers in Japan (over 200 trial customers).

2000  NTT MCL started the world’s first commercial IPv6 IX (s-IX) in San Jose, US.
       NTT Europe started IPv6 trial service (over 400 trial customers).

2001  NTT Com started the world’s first commercial IPv6 services, “IPv6 Gateway Service” and “OCN IPv6 Tunnel Service”.
       HKNet started commercial IPv6 services in Hong Kong.
       NTT Com played a key role in Japan National Project “IPv6 Home Appliance Trials”.
       NTT Com participated in European Communities’ “6NET/ Large-Scale International IPv6 Test bed” Project.
       NTT Com participated in Chinese IPv6 Telecom Trial Network “6TNET” Project.
History of NTT/VERIO IPv6 Activities

2002  NTT Com started IPv6/IPv4 dual stack ADSL access service with Plug and Play feature (site auto-configuration).

        NTT MSC started commercial IPv6 services in Malaysia.

        NTT Australia IP started commercial IPv6 services in Australia.

        NTT Com won the World Communication Awards 2002, “Best Technology Foresight – IPv6” and “Best carrier – AP Region”.

2/2003  NTT Europe started commercial IPv6 services in Europe.


        NTT’s Asia/Pacific Region subsidiaries started commercial IPv6 services in Korea and Taiwan

10/2003  IP-TV multicasting service for broadband users in Japan.
NTT/VERIO’s Evolution in IPv6

**Research Phase**
- NTT Labs started global IPv6 research network
- Verio joined 6bone in the U.S.

**Trial Phase**
- NTT/VERIO started the world’s first commercial IPv6 service in Japan
- NTT Com obtained sTLA address
  - OCN Tunneling Trial (200 users)

**Commercial Service Phase**
- NTT MCL started commercial IPv6-IX service in the U.S.
- NTT Europe IPv6 Trial (400 users)

Services in Japan
Services in Europe
Service in Hong Kong
Services in Malaysia / Australia
Services in Korea, Taiwan, and U.S.
**NTT/VERIO Global IPv6 Backbone and Services**

**OCN in Japan**
- IPv6&IPv4 DUAL ADSL
- IPv6 over IPv4 TUNNEL
- IPv6 NATIVE transit

**Our Strengths**
- Global IPv6 networks covering Asia, Australia, the United States and Europe
- Providing commercial IPv6 transit services:
  - Since April 2001 in Japan
  - Since February 2003 in Europe
  - Since June 2003 in the United States and many of the Asia Pacific countries.
- More than 3 years of operational experience
- 24x7 monitoring and operations by NTT/VERIO dual NOC in Japan and the United States
- Optimal IPv6 routes
NTT/VERIO Global Backbone Transition

Before 2000
Only IPv4

• World wide global IP network
• Global tier1 network as one AS;2914
• Only IPv4 available

NTT/VERIO IPv4 Backbone

Q1 2000 ~ Q2 2003
IPv4 and IPv6 separately

• Setup global IPv6 backbone covering Asia, the U.S. and Europe
• IPv4 and IPv6 network are separate
• Routing control and peering policies are independent between IPv4 and IPv6

<<IPv6 Backbone>>
• Use Tunneling-link, where appropriate, to save cost
• Provide Native service and tunneling service, not dual service

<<IPv4 Backbone>>
• No effect for existing IPv4 backbone from IPv6 side
• IPv6 traffic are transferred as IPv4 traffic on the tunneling-link

Current
IPv4/IPv6 Dual stack

• All of backbone routers handle both IPv4 and IPv6 traffic
• Routing control and peering policies are independent between IPv4 and IPv6
• Basically trouble on one protocol is isolated from the ones in another protocol

NTT/VERIO runs more than 100 dual stack backbone routers now!
IPv6 Creates New Internet Business Areas

The merits of IPv6:
- Non-PC connection
- Remote access to the home
- P2P application
- End-end security
- Plug and play

Freedom from “address saving costs”
IPv6 expands Internet business market
IPv4: Client & server type of business on PCs.
IPv6: Information Appliance, P2P Communication, Remote Maintenance, Personal Security

IPv4
IPv6

IPv4
Global addresses
IPv6
Mobile terminals
Mobile phone network
Data exchange
Real-time delivery
Remote control
Secure communications between terminals on an end-to-end basis
Home networks
Home appliances
Remote maintenance
LAN
OA equipment

IPv6 expands Internet business market
IPv4: Client & server type of business on PCs.
IPv6: Information Appliance, P2P Communication, Remote Maintenance, Personal Security

Freedom from “address saving costs”
IPv4
Global addresses
IPv6
Private addresses
NAT

The merits of IPv6:
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IPv4
IPv6
NTT Communications:

✓ Believes that IPv6 is one of the key technologies in expanding the horizon of network applications. Ubiquitous networking will enrich the potential of network-based IT applications. (No difference from many other players)

✓ Has been taking the initiative in pioneering network service offerings globally to encourage application development (someone needs to start something).

✓ Has seen a certain level of application developments that show the possibility of new market. But, has also seen the needs of middleware/platform offerings to accelerate such application developments.
IPv6 End-to-End Management

at Net.Liferium 2002 Exhibition

SANYO (Camera)  SHARP (PDA)

End-to-End VPN

Toshiba (Fridge)  NTT Com (Platform)

IPsec Policy Management
Secure voice communication over IPv6/IPsec

You can communicate securely from everywhere using **IPsec** on NAT-free global IPv6 network.
IPv6 P2P VPN (MyNetManager) Trial

IPsec policy server to provide IPsec policy file to each peer on demand
- Effortless setup: No or low skill requirements
  Just register your communication partner on the web
- Adaptable to all communication modes: Client-Server, Peer-to-Peer, Mobile
- Secure instant communication: Connect instantly, while achieving end-to-end security
"MyNetManager" enables secure remote access for IPv6 appliances.

SANYO
Home Server
in Japan

SANYO
IPv6 Digital Camera

SHARP
IPv6 PDA

Access/Policy Management

IPsec Policy Server

CA

End-End VPN

NTT/VERIO Global IPv6 Backbone

IPsec Policy Server
"MyNetManager" enables secure IPv6 streaming

Example of Applications Enabled by “MyNetManager” (2)
"MyNetManager" enables secure VoIP via IPv6

Example of Applications Enabled by “MyNetManager”(3)
Further Enhancement on the Platform

Accommodate non-PC devices (Lite protocol for authentication)

Ubiquitous Open Platform

MyNetManager

Firewall control
Ubiquitous Open Platform / New Architecture of the Internet

- mobile/nomadic access
- always-on wired access

Contents Access
- Remote Access to the Home
- Real-time Communication

IPv6/IPv4

Digital TV
- Security Sensor
- Home Server
- Visual Phone

Browser/Phone
- PDA
- PC

Contents

UOPF
- Plug & Play
- Security
- Peer to Peer
- Billing
- Customer ID
- CDN
- DRM

Management for Secure & Quality Communications

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Ubiquitous Open Platform / New Architecture of Security

- Anyone can know the presence and address of your home server
- Tricky Firewall configuration
- Services are always open for anyone
- Complex ID/pass management

LAN

WAN

Firewall

Home Server

Access List

PDA

Attacker /Worm

Access List

✔ Only you will know the presence and address of your home server

✔ Automatic and real-time access security control

✔ Automatic encryption management

UOPF

Home Server

Attacker /Worm

PDA

Access List

™

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Thank you!