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IPv6 Deployment Status in Japan: Commercialization, Real Operation & New Applications

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Agenda

Commercial services

New IPv6 applications

Promotive activities

- Government
- Industry
- Publications

Lesson learned

- How to promote IPv6
- Technical issues identified

Perspective of 2002

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Commercial services have started

Router vendors are providing commercial versions

- Hitachi, NEC, Fujitsu, Furukawa, Yamaha, more..

Some ISPs are providing commercial IPv6 connectivity services

- Native and tunnels
- NTT Communications have already got **more than 100 paying customers**
- Not only large national providers, although they are controlled introduction
  - Local small ISPs: Chita CATV
  - Global challenge: Global Crossing
- Peak: **180M bps** (10min average) observed in NSPIXP6

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Applications are emerging


IPv6Car(Wide Project)


PlayStation Game(SONY)


IPv6 Refrigerator (Toshiba)


IPv6 VoIP


IPv6 Toy Train (TOMY)

Pictures provided by Kame project, NTT and RIIS

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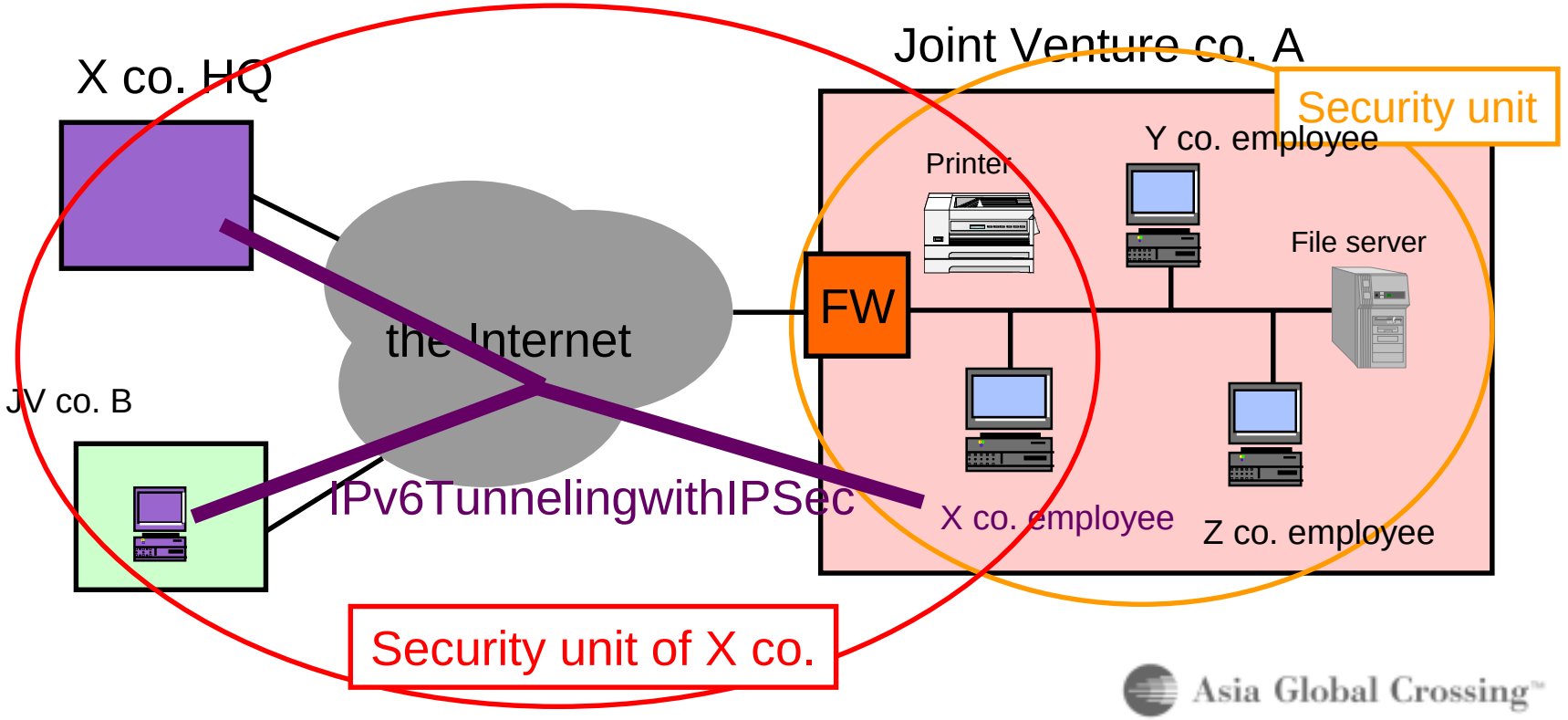
Another Application in Enterprise Network

Experiment for IPv6-VPN with constructing company.



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Government has been supporting IPv6

Formal announce to support IPv6 in the “eJapan Initiative” plan, 2000

IPv6 Promotion Council of Japan has been established based on the fund of 8B Yen (=80M Euro) for IPv6 R&D and experiments., 2001-

Tax incentive program, 2002-3

- **ISP can get reduction of corporate tax and fixed property tax for newly acquired IPv6 ready routers.**

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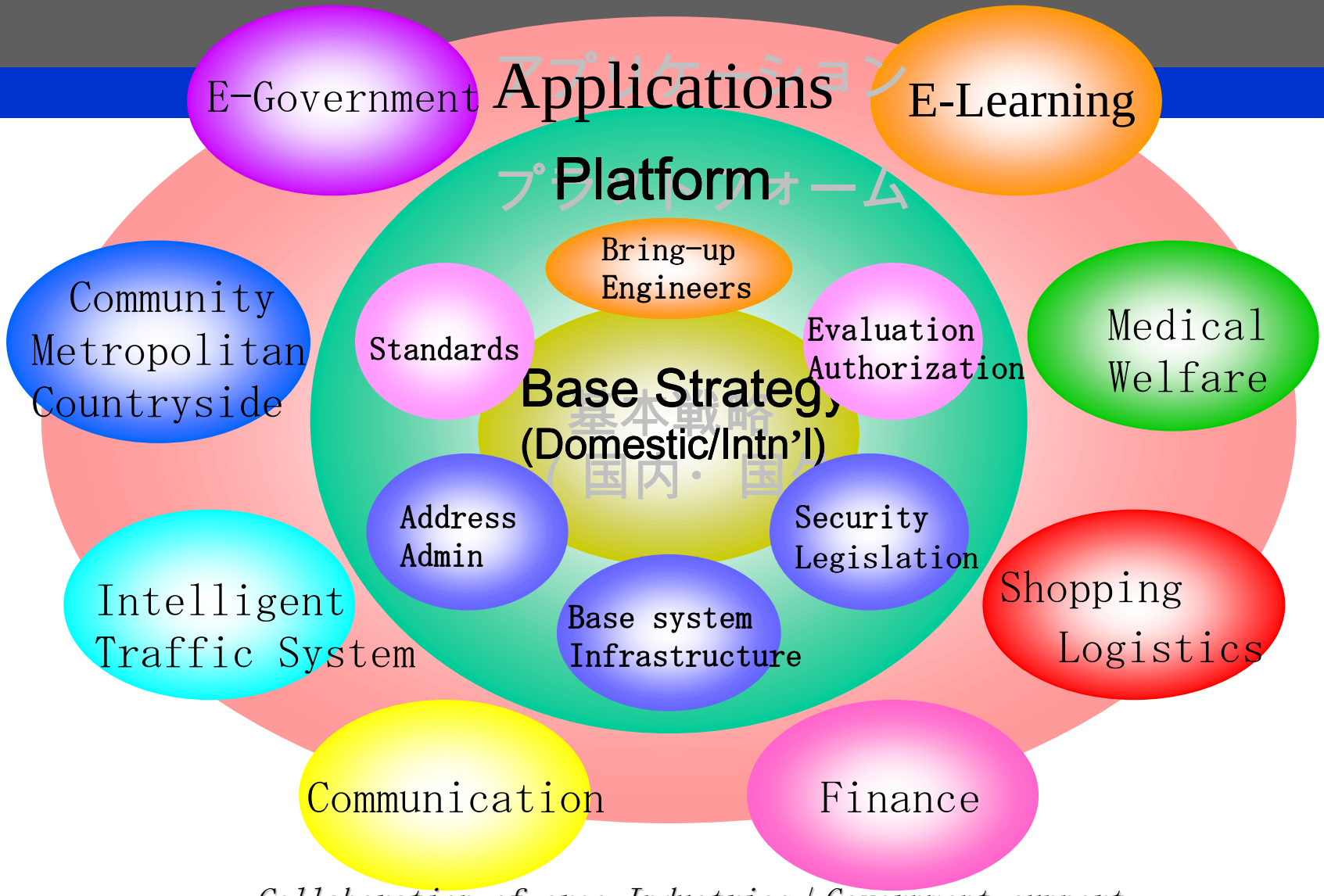
Scope of IPv6 Promotion Council of Japan



Collaboration of cros-Industries+Government support

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Government and IPv6

IPv6 declaration of the government has helped

- people **start recognizing** IPv6. As a result, more discussion occur
- mass communications deal with IPv6
- your boss allow you to start IPv6 more likely.

8 Billion Yen of subsidization has helped

- devise new applications
- more importantly **collaboration among many industries**, not only networking but home electronics, car industry, etc.
- However, there may be **risks** that some of subsidized companies tend to rely on the government too much and lose their enterprise spirits.
  - This should be a problem of the enterprise side, though.

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Deployment Efforts in Industry

IPv6 Deployment Committee

- **Established in Apr.2001 under Internet Association Japan**
- **Promote Japanese IPv6 Deployment in Industry**
  - hold IPv6 conferences for enlightenment and education such as "IPv6 Summits"
  - study issues which need to be solved for deployment; IPv6 Operation Study Group
  - publish IPv6-related articles in IAJapan Review, etc.
  - Play a role of a liaison to IPv6 organization and conferences in other countries such as IPv6 Forum
- **In a more bottom-up fashion than IPv6 PC/J**

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Global IPv6 Summit in Yokohama, 2001

2nd IPv6 Summit in Japan

750 participants, 100 more than the last Summit

Discussed more real issues, while the last Summit focused on how to make people recognize IPv6

- **Keynotes from Jun Murai (WIDE) and Jawad Khaki (VP, MS)**
- **Three successful panels**
  - Enterprise Network, Home Network, Societal Impact

More than 60 IPv6 PCs observed in the conference site network

See http://www.jp.ipv6forum.com/

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Publications

IPv6 Journal

- **First Journal in the world regarding IPv6**
  - Four issues were already published.
- **Issued by RIIS (Research Institutes for Internet Strategies)**
  - http://www.riis.ad.jp/ipv6/
- **IPv6 experts from both industry and academy plan each issue.**
- **Examples of contents:**
  - NAT: Pros and Cons
  - All about Global Address (address policy tutorial, why we need global address, current situation of IPv4 allocation, etc.)
  - Recent Discussion regarding DNS
  - Internet Car Research
  - European activities (Euro6IX, etc.)
  - Company & Product Status Reports
  - Conference reports (Summits, IETF, APNIC, IPv6 TF meeting)

v6start

- **Nikkei-BP, one of major publishers, is providing educational web pages**
- **http://v6start.net/**

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How did we persuade unconcerned people towards IPv6 in Japan?

Persuade **the government** first.

- It may be almost the cases in Asia.

Persuade **the mass media** and let them talk autonomously.

Don't tell them only what IPv6 can do. People would believe in you if you could tell them **what IPv6 can't do as well**.

- What IPv6 can't do is not a problem but an issue to be solved.

Points for persuasion

- Why IPv6?

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Why IPv6 ?

IPv6 is not functionally different in principle, but practically different

- **"Quantity" changes "quality"**
  - Only by sufficiency of addresses, every equipments can be assigned a global address and be accessible from the world.
- **Built-in IP-sec encourages its use, but not separate IP-sec module does.**

Two reasons for IPv6

- **Limitation of IPv4**
  - IPv4 addresses might run out in 2008-2010 (my personal estimation)
  - Address scarcity leads to costly operation.
- **Opportunity for new applications/business**

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IPv6 gives you a chance to

utilize information which would be otherwise discarded

- **Example of information**
  - Frequency of functions used in a car audio
  - Contents in a refrigerator
  - Healthiness of fax machine components
- **Who needs such information?**
  - Users themselves
  - Home electronic vendors
  - Third parties such as food industry
  - Grocery stores in the neighborhood
- **Purpose**
  - Market research
  - One-to-one marketing and sales
  - Remote maintenance….more

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IPv6 = Information Exchange Platform

IPv6 will grow to be a platform for Information Exchange

- **Win-Win situation for all**
  - Sell information to those who need this for their business
  - Pay money to users who give their information
- **Information exchanges occur not only between home electronic vendors and their users, but among heterogeneous industry sectors, home users and equipments, various sensors in public, etc.**
- **Authentication & authorization and privacy protection mechanism should be included in the platform.**

A lot of opportunities for new applications and your business!

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Key technical issues identified

More standardization

- Plug and Play (IETF)
- **Address Policy (RIRs)**
- Minimum specification, etc…

DNS deployment

Operation experiences & technologies

- ISP
- Enterprise network

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IPv6 Operation Study Group

Over 70 ISP operators and/or JANOG members are discussing from a "real operational" point of view

Subsidized by IPv6 Deployment Committee

Example topics to be discussed

- **Address Policy**
- **Routing**
- **Enterprise Network**
- **Any missing pieces to deploy IPv6 just like IPv4?**
  - Network monitoring, DNS, Renumbering, Transition tools …

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Routing Issues

Much Much bigger address spaces

- Potential number of external routes in future

Transition from 6bone-type routing to commercial-type one

Multi-homing

> **No PI(Provider Independent) address for enterprises**

> **Punching hole allowed? Any criteria?**

Aggregation

> **/48 static assignment per a customer needs special design consideration about aggregation in ISP internal networks.**

> **How can address policy supports this?**

Traffic engineering

> **Less external routes to be announced make TE harder.**

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Enterprise Network Design & Operation

A new firewall model should be established.

- **Network manager v.s. end user who uses IPSec**
  - Managers want to know users' behaviors
  - IPSec hides users' behaviors even for network managers.
- **How to reconcile between traditional IPv4 firewall model and end-to-end model which IPv6 supports with IPSEC.**
  - Protection function against attacks from the outside is always necessary
  - Do IPv6 firewall need transparency and bi-directional communication?
- **The receiver can know the PC vendor the sender is using by EUI-64.**
- **Needs more security for each individual PC if every PC has a global address. Some central management system would be useful.**

Perspective of 2002

Windows XP will let people feel IPv6 near at hand

More real IPv6 applications emerging

More commercial activities in Japan, and maybe in Asia and Europe as well

Collaboration among various countries in Asia, Europe and US

More constructive and practical discussion will be progressed, although some criticism will be shown

- **More collaborative discussion among R&D, operations, business sectors are expected.**

IPv6/IPv4 ratio will not still be high, maybe, below 1% at the end of 2002

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Why still IPv6 in Japan?

People are expecting **opportunity for IPv6** and seeking for **business possibility.**

Getting **experiences** is essential for the next step!

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