

Deployment Status and Current Business Strategies in Japan

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Agenda

◆ Deployment Status

- ❖ Commercial/Trial Services in ISPs
- ❖ Promotion activities
- ❖ Emerging applications

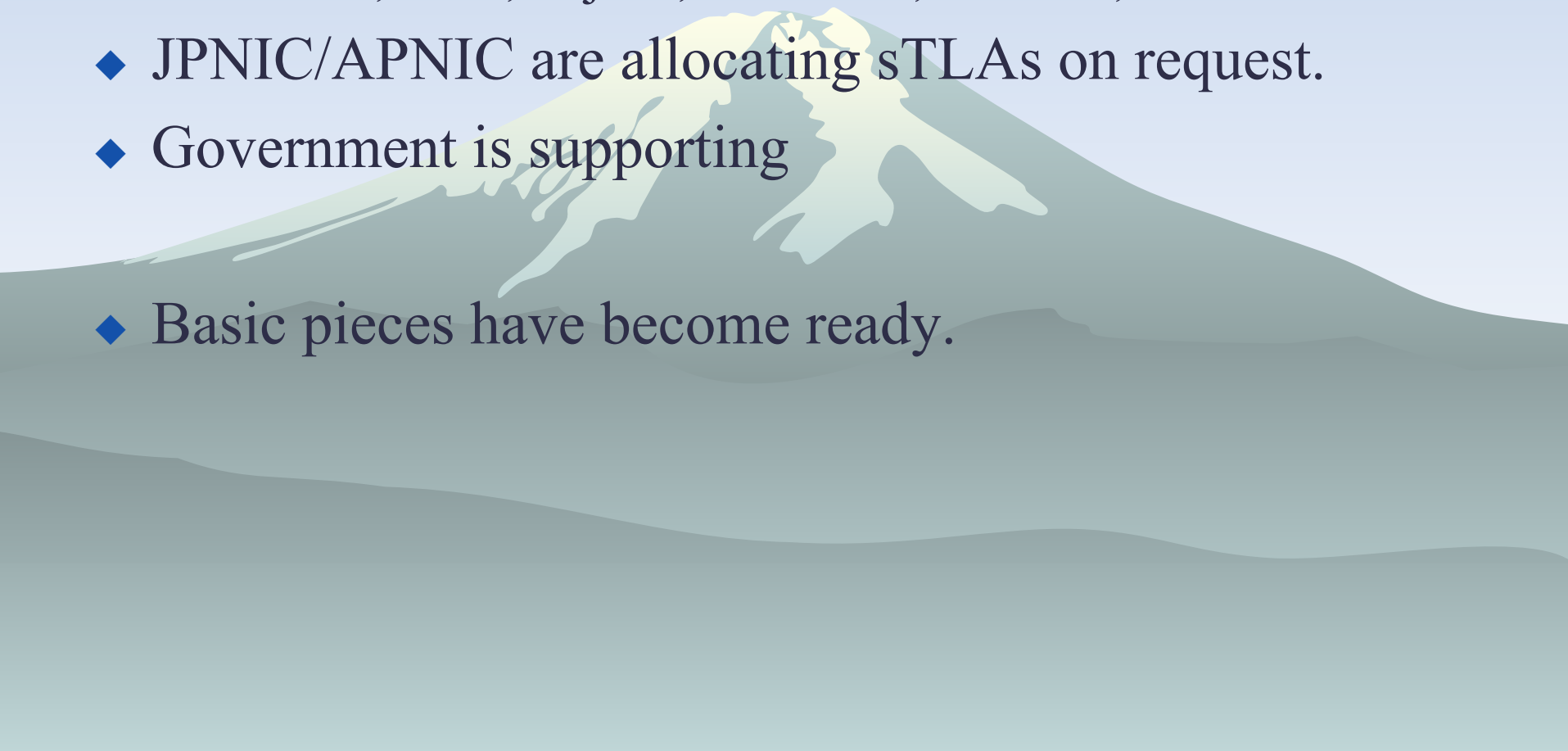
◆ Lesson Learned

- ❖ Transition cost model
- ❖ Government involvement
- ❖ Business motivation
- ❖ From Operational experiences

Commercial/Trial Services in ISPs

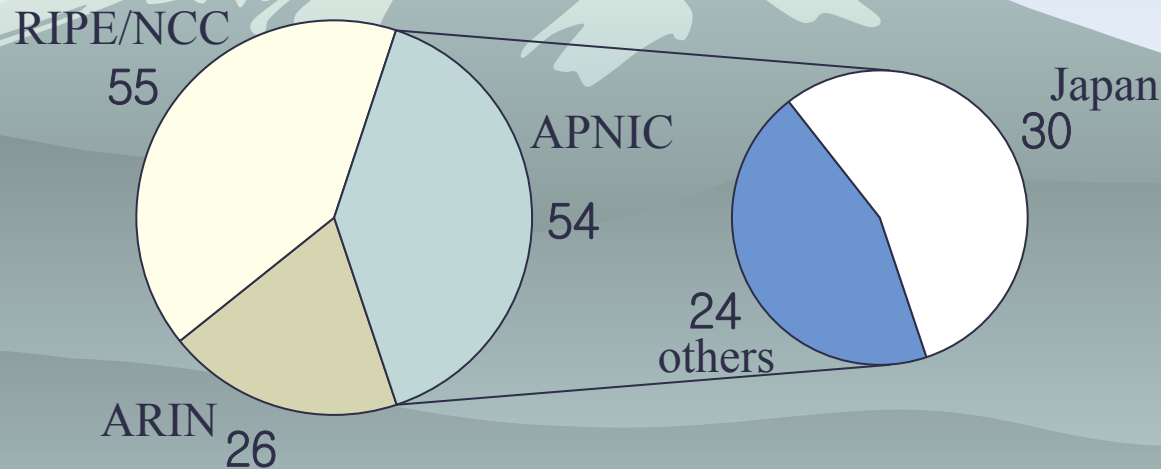


Basic Pieces Ready!

- ◆ Router vendors are providing commercial versions
 - ❖ Hitachi, NEC, Fujitsu, Furukawa, Yamaha, more..
 - ◆ JPNIC/APNIC are allocating sTLAs on request.
 - ◆ Government is supporting
 - ◆ Basic pieces have become ready.
- 

JPNIC

- ◆ JPNIC has provided IPv6 allocation service since Jan. 2000. (agent service from APNIC)



Number of sTLA allocated (4th April, 2002)

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 (=US\$ 70M) for IPv6 R&D and experiments
- ◆ Tax incentive program, 2002-3
 - ❖ ISP can get reduction of corporate tax and fixed property tax for newly acquired IPv6 ready routers.

IIJ

- ◆ 1999.8: first IPv6 service (tunnel)
- ◆ Services
 - ❖ over-v4 Tunnel, Native: Free of charge
 - ◆ Access line charged by local carrier
 - ❖ Dual stack: 117k Yen/mo for T1
 - ❖ Data Center service: estimation basis
 - ❖ Solution Service: estimation basis
 - ◆ Consultation
 - ❖ Total number of customers: more than 100

NTT Communications

- ◆ 2001.4: first charged commercial IPv6 service
- ◆ Services
 - ❖ over-v4 Tunnel: 2,500 Yen/mo on 128k IPv4 service
 - ◆ More than 200 customers who pays (at least) 2,500 Yen
 - ❖ Native: 980k Yen/mo for T1
- ◆ Global activities
 - ❖ global backbone with Verio, Inc.
 - ❖ Commercial/trial service in Europe, Hong Kong and Australia

Major Nation-wide ISPs Follow

- ◆ Powered Com: commercial
 - ❖ Tunnel: 23,000 Yen (option to IPv4 service)
 - ❖ Hybrid over Ether: 97,000 Yen including v4 and v6



- ◆ Japan Telecom: Tunneling service quite similar to NTT Com's
- ◆ KDDI, NEC, Fujitsu, Sony, Panasonic, Cannon, Mitsubishi, DTI, MEX, ...

Other Commercial ISPs

◆ Global Crossing

- ❖ Announced global IPv6 services within 2002 and started the initial trial in Japan in Dec. 2001.

◆ Chita Medias (Local CATV network in Aichi pref.)

- ❖ Started trial IPv6 service in Oct. 2001
- ❖ Live streaming experiment for H-IIA rocket launch

◆ MIS

- ❖ IPv6 hot spot trial in Kyoto

JGN (Japan Gigabit Network)

- ◆ Research network funded by the government
- ◆ Native IPv6 network
 - ❖ cf.) All Commercial ISPs are using IPv6-over-IPv4 tunnel for their backbones
- ◆ IPv6 over ATM
- ◆ 622Mbps (MAX)
- ◆ 45 Access Point in Japan

IXs

◆ NSPIXP6

- ❖ Around 40 ISPs and organizations there
 - ◆ sTLA, pTLA, NLA...
- ❖ Operated by WIDE project
- ❖ 180Mbps recorded as a peak of 10min-average

◆ JPIX

- ❖ Commercial IX started providing IPv6 IX trial.

Promotional Activities

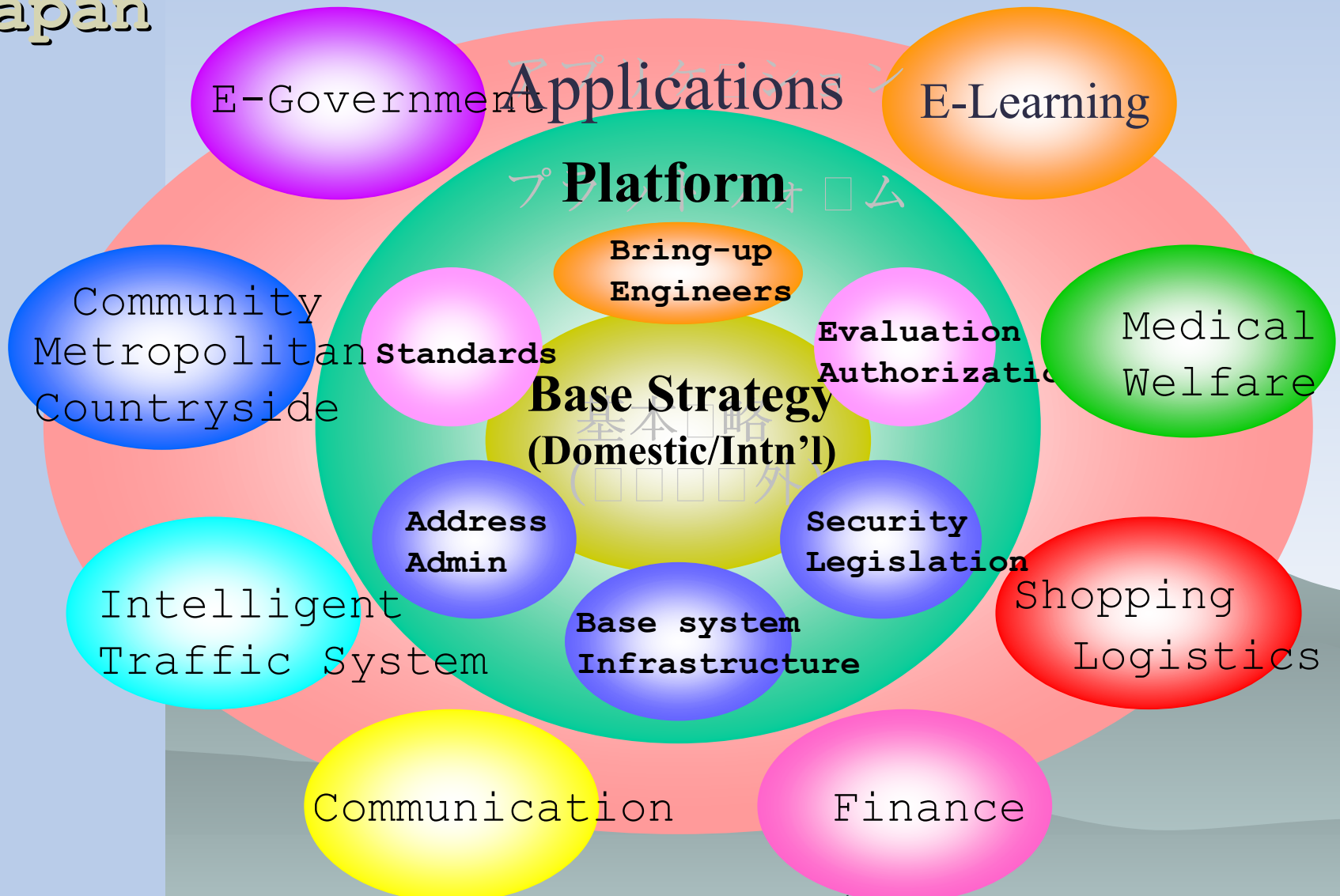


IPv6 Promotion Council of Japan



- ◆ Initiated by Ministry of Public Management, Home Affairs, Posts and Telecommunications
- ◆ Over 250 members from various industries such as home appliance developers, broadcasting companies.
- ◆ <http://www.v6pc.jp/>

Scope of IPv6 Promotion Council of Japan



Collaboration of cros-Industries+Government support

International Collaboration (IPv6 PC/J)

◆ Korea-Japan coordination

- ❖ Adhoc deployment meeting, this week and the next week between Korean and Japanese IPv6 companies.

◆ China-Japan projects

- ❖ Agreement in the government level
- ❖ ex.) collaboration in 6TNET project
 - ◆ Network design and operation experiences and know-hows
 - ◆ Application sharing

◆ EU-Japan projects

- ❖ Also making progress now

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

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
- ◆ See <http://www.jp.ipv6forum.com/>

IPv6 Summits in Japan

◆ Important Policy

- ❖ Summits should not be controlled by a particular group.
 - ◆ More people from wider area are invited.
 - ◆ Steering/PC chairs are changed every time.
 - ◆ Two reasons
 - ❖ Neutrality & New idea
 - ◆ Necessary in such a stage of IPv6 deployment that many people get involved in IPv6
- ❖ Summits will be terminated when IPv6 is not special any more.
 - ◆ hopefully no more IPv6 Summit Japan in 2003
- ◆ Next Global Summit will be held in Dec. 2002 at Yokohama. Please join us!

Publications

◆ IPv6 magazine (ex-IPv6 Journal)

- ❖ First Journal in the world regarding IPv6
 - ◆ Six issues were already published.
- ❖ Was issued by RIIS and now transferred to Impress.
 - ◆ <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/>

Emerging Applications



Applications are emerging



IPv6 Car (Wide Project)



PlayStation Game (SONY)



IPv6 Refrigerator (Toshiba)



IPv6 VoIP



IPv6 Toy Train (TOMY)

Pictures provided by Kame project, NTT and RIIS

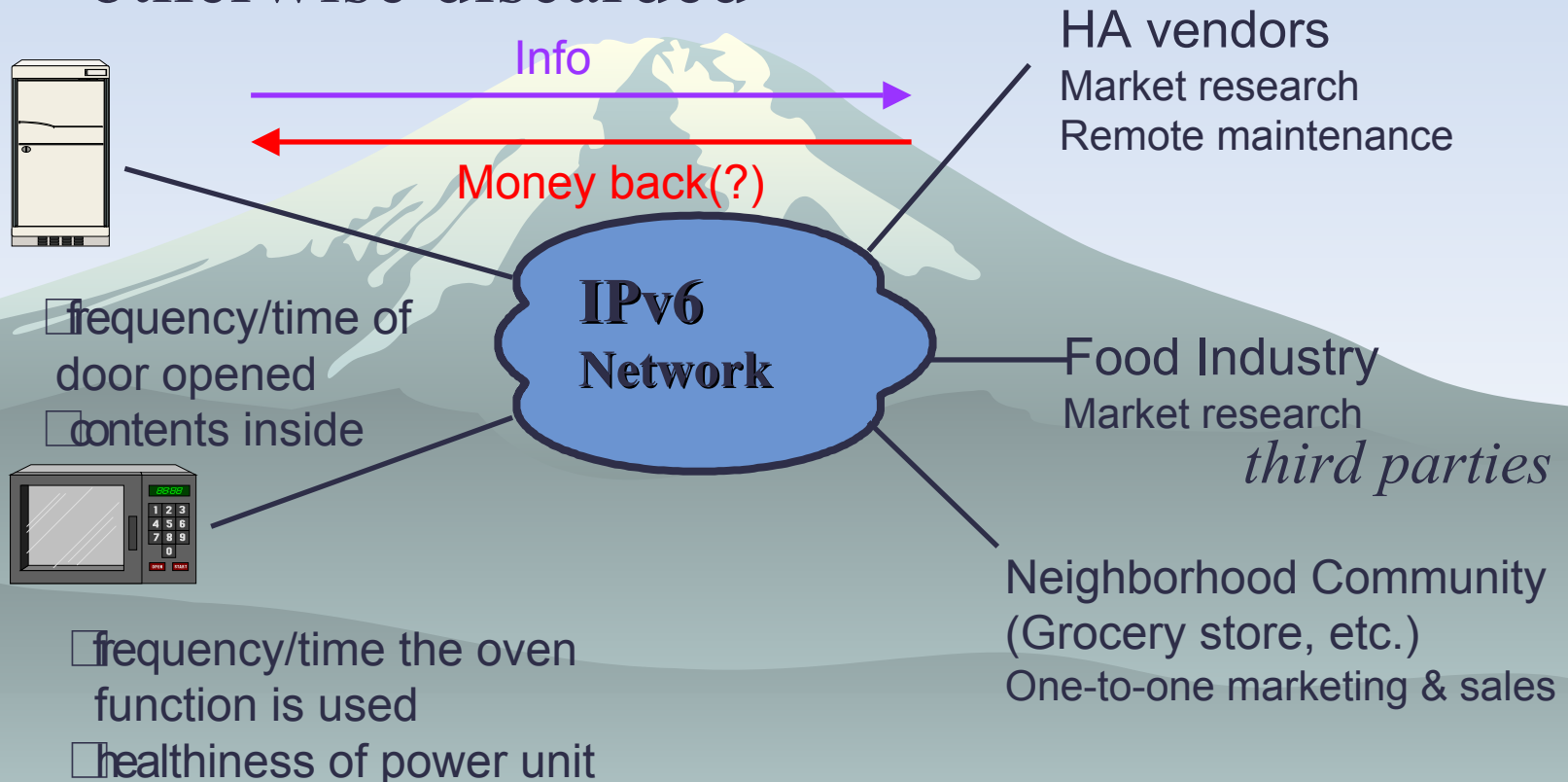
See more details for Kosuke Ito's presentation

Application Types

- ◆ More capabilities added to home appliances and other equipments
 - ❖ refrigerator + web
 - ❖ Upgradable equipments
- ◆ Extending human's eyes and hands
 - ❖ Remote camera and remote manipulation
- ◆ Information Exchanges

Example of Home Appliances Applications

- ◆ utilize information which would be otherwise discarded



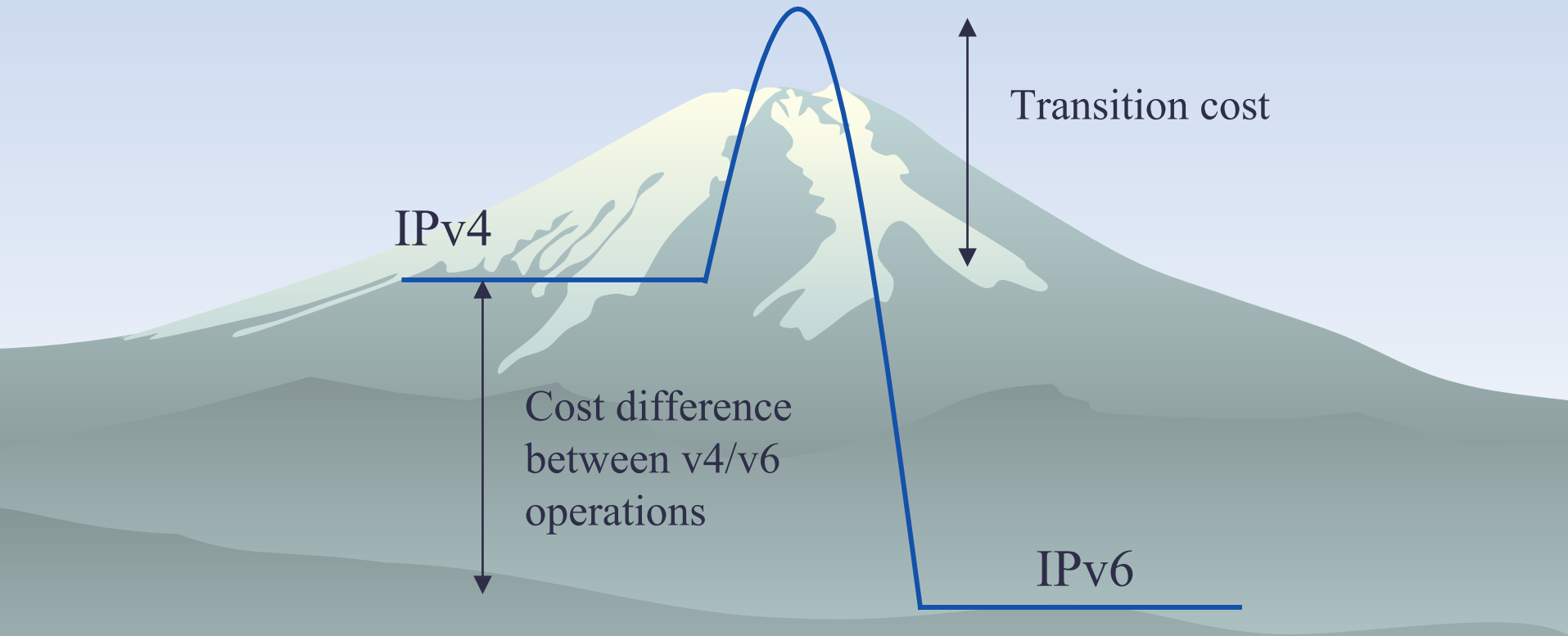
IPv6 = Information Exchange Platform

- ◆ 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!

Transition Cost Model



IPv4-IPv6 transition cost

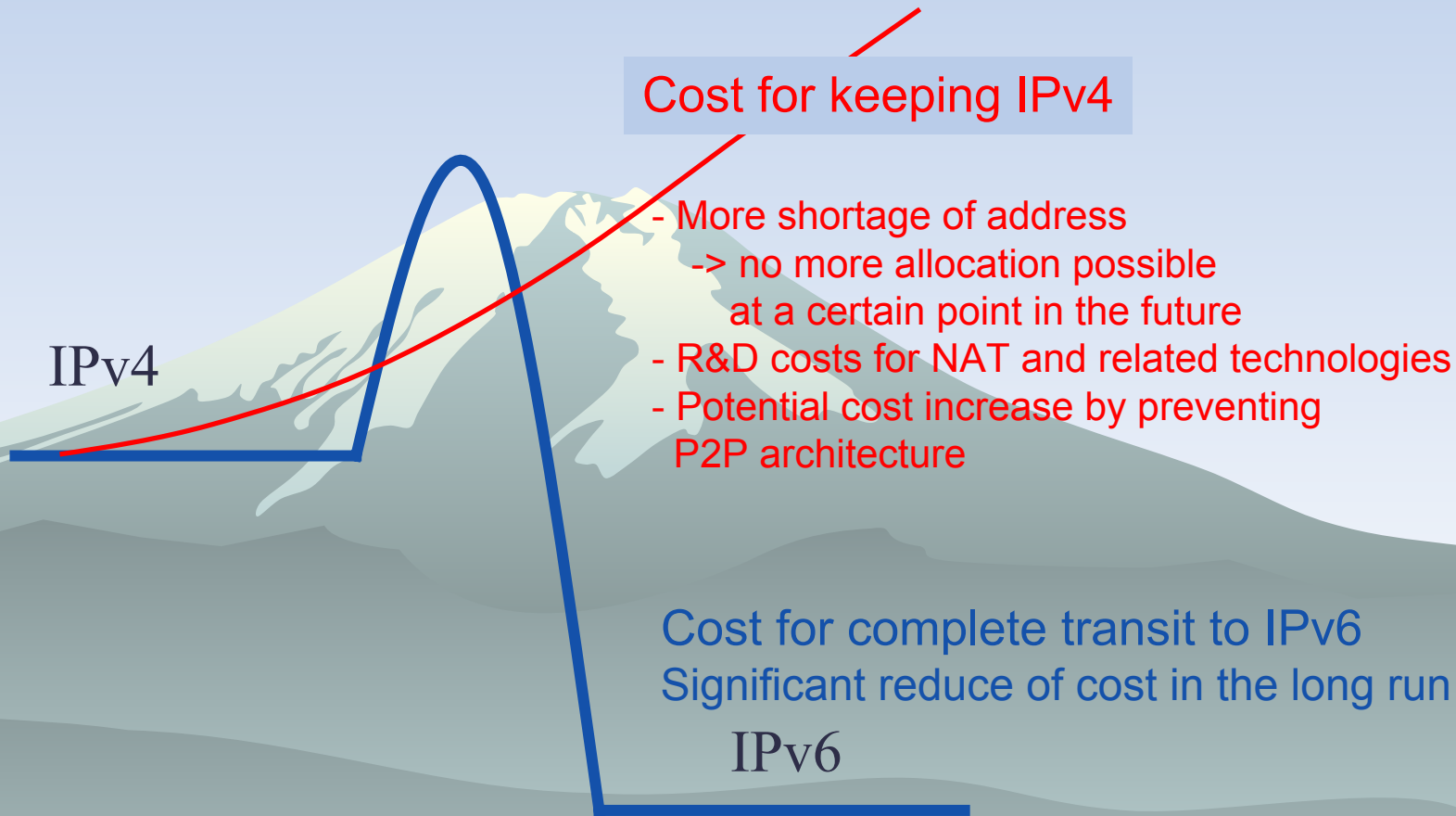


It's like energy level transition in chemical reactions.

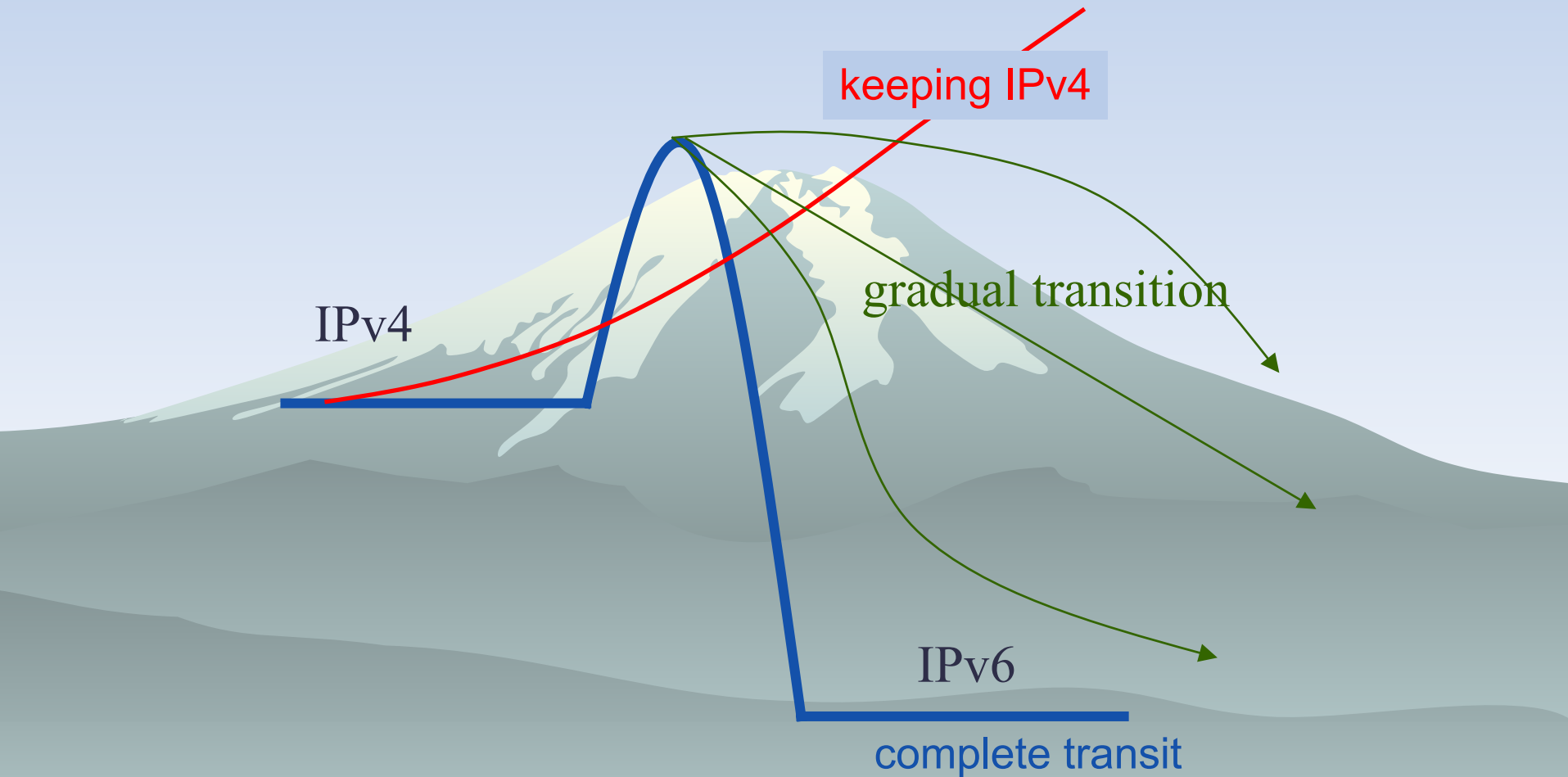
Cost Breakdown

- ◆ Why IPv4 operation is costly
 - ❖ Address shortage increases operation costs
 - ◆ More complicated network design and operation
 - ❖ NAT and private address
 - ❖ Design constraint caused by insufficient global addresses assigned
 - ❖ Clash (?) of private address in case of integration of intranets.
 - ◆ Complicated address request process and procedure, etc.
- ◆ Transition costs (example)
 - ❖ Duplicated routers, servers and other equipments
 - ❖ Operational overhead
 - ◆ Headcount, operators' skill, education, management systems
 - ❖ Almost all activities in ISP operations including service planning and development, billing system and databases, etc.
 - ❖ Note: Actual costs vary depending on ISP/enterprise/home, network configuration, and other conditions.

Cost Comparison



Cost Comparison (Reality)

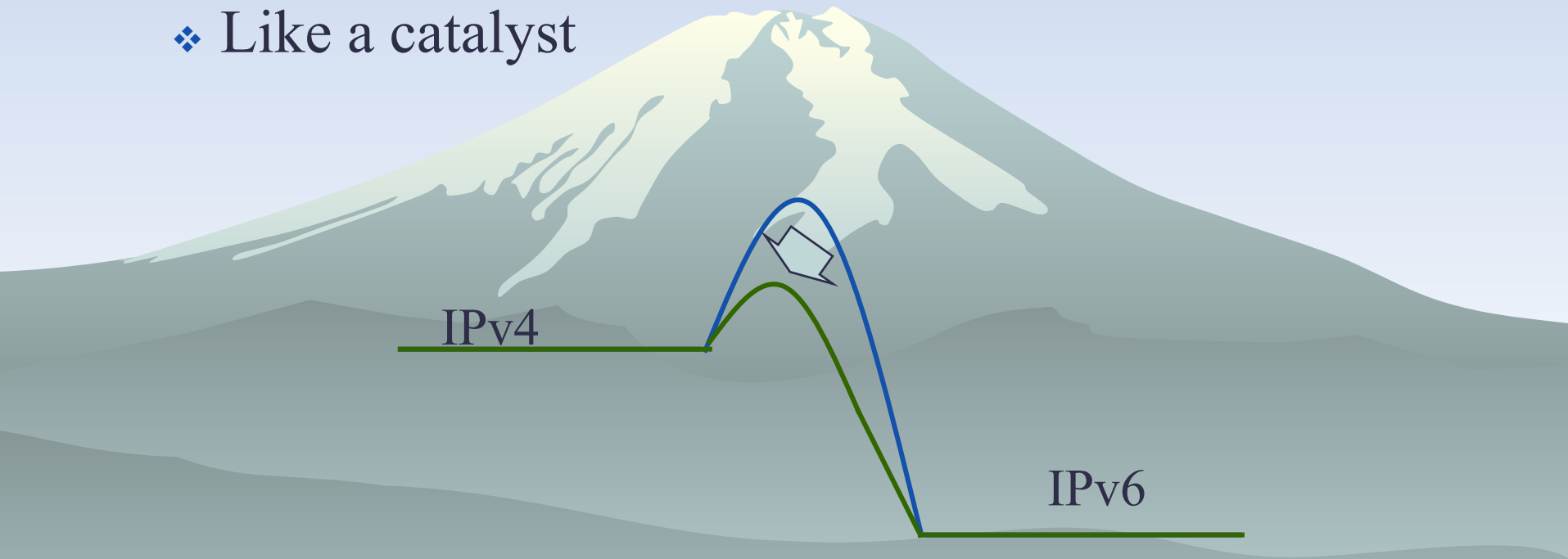


Government Involvement



Government involvement

- ◆ Government should not force people to move to IPv6, but help people move more smoothly.
 - ❖ Like a catalyst



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.

Business Motivation



Business motivation in ISP

- ◆ Now People start wondering what IPv6 is and want to try IPv6.
- ◆ IPv6 connectivity service on tunnel over IPv4 is an attractive opportunity to these people
 - ❖ It's cheap
 - ❖ Better performance than 6to4
- ◆ IPv6 option is a good sales pitch to sell IPv4 services

Business motivation in Enterprise Network

◆ System renewal

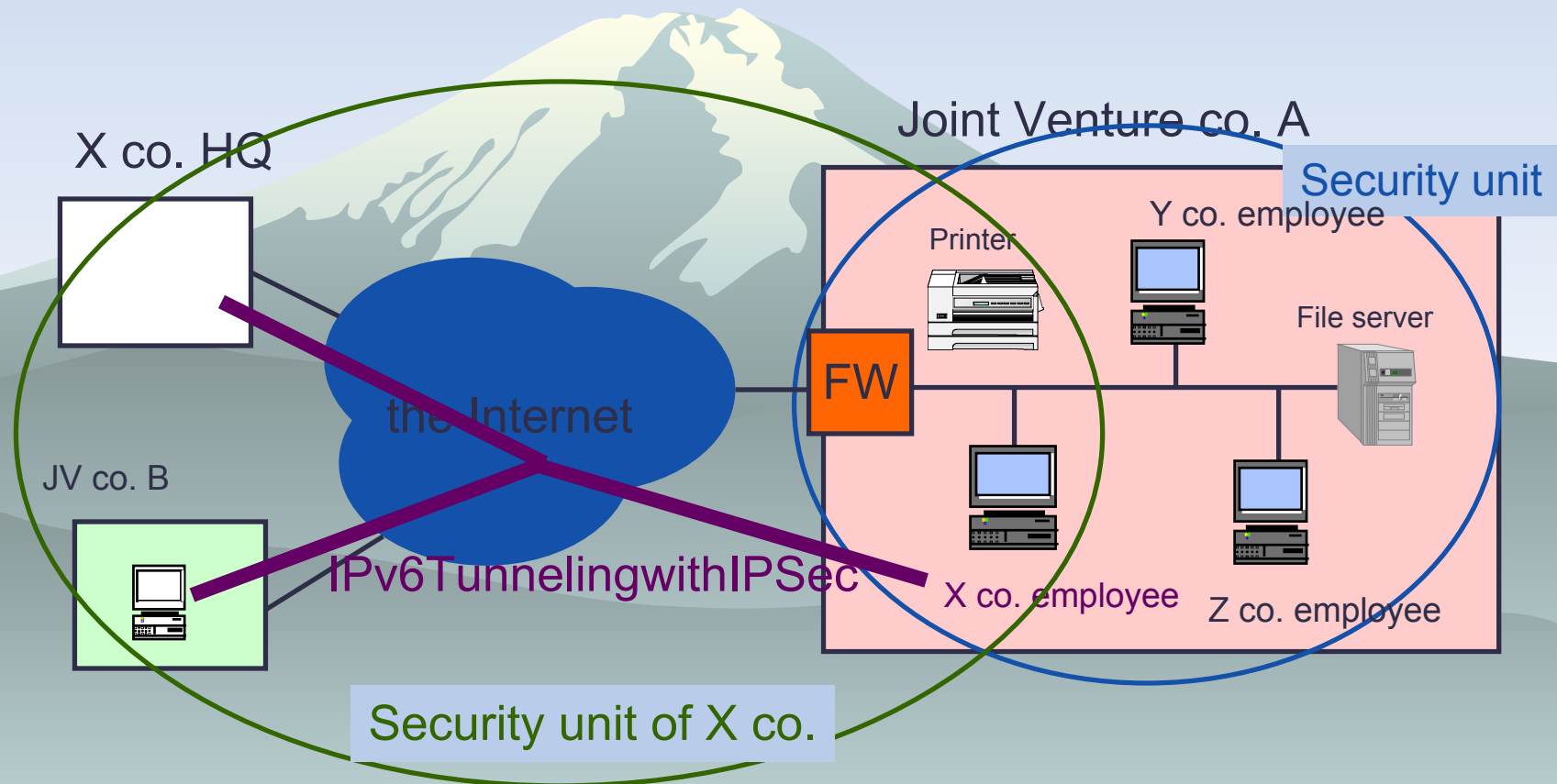
- ❖ System and network in enterprises are renewed periodically, usually every 5 years, in Japan.
- ❖ It is a smart way to choose IPv6 ready equipments even if you don't use IPv6 now.
- ❖ Maybe it is also smart to get enough knowledge and experiences for IPv6 before planning system renewal

◆ Security

- ❖ Combination of firewall model and IPSec model would give more powerful solutions to enterprise networks.
- ❖ 2 examples

An Application example in Enterprise Network

- ◆ Experiment for IPv6-VPN with constructing company.



P2P and Security

- ◆ ORCA (Online Receipt Computer Advantage), a medical information network, employs IPv6, connecting doctors, patients and medical information DB.
 - ❖ More than 100 IPv6 sites are operated at this moment
- ◆ P2P increases the level of security
 - ❖ Private address and NAT of IPv4 hides who send information.
 - ❖ P2P ensures identity of the sender. Only IPv6 can do this.

Motivation in Home Users

- ◆ Little until new applications in home appliances will be provided over IPv6, except some needs for P2P in more than one PCs
 - ❖ Voice chat / VoIP
 - ❖ File transfer and file sharing
 - ◆ MS Messenger
 - ◆ Napstar/Gnutella
 - ❖ other P2P applications
- ◆ Price and cost performance is critical

From Operational Experiences



Issues Identified

- ◆ More standardization
 - ❖ Plug and Play for DSL services to end customers (IETF)
 - ❖ Address Policy (RIRs)
 - ❖ Minimum specification for home appliances
 - ❖ and more ...
- ◆ DNS deployment
- ◆ Operation technologies
 - ❖ Routing in ISPs
 - ❖ Enterprise network

Routing Issues in ISPs

- ◆ Routing architecture itself is not so different from IPv4's.
- ◆ Much Much bigger address spaces
 - ◆ Potential number of external routes in future
- ◆ Transition from 6bone-type routing to commercial-type
- ◆ 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.

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.

Summary in Japanese Situation

- ◆ We have already overcome some barriers
 - ❖ People already recognize IPv6, thanks to the government and mass media.
 - ❖ Commercial activities found in vendors and ISPs
 - ❖ Some advanced users have started trying IPv6
 - ❖ New applications emerge
 - ❖ Some operational experience reveals some issues to be solved.
- ◆ We are now going into the second stage!
 - ❖ More operational experiences
 - ❖ More sound IPv6 business, possibly with more new applications
 - ❖ More global collaboration