



# ***IPv6 and New Security Paradigm***

2<sup>nd</sup> December 2003

NTT Communications

IPv6 project

**Yasuki SAITO**

- 1. Introduction to IPv6**
- 2. Security Myth**
- 3. IPv6's security merit and demerit**
- 4. New security paradigm**
- 5. New mechanisms (P2P VPN and PIA)**

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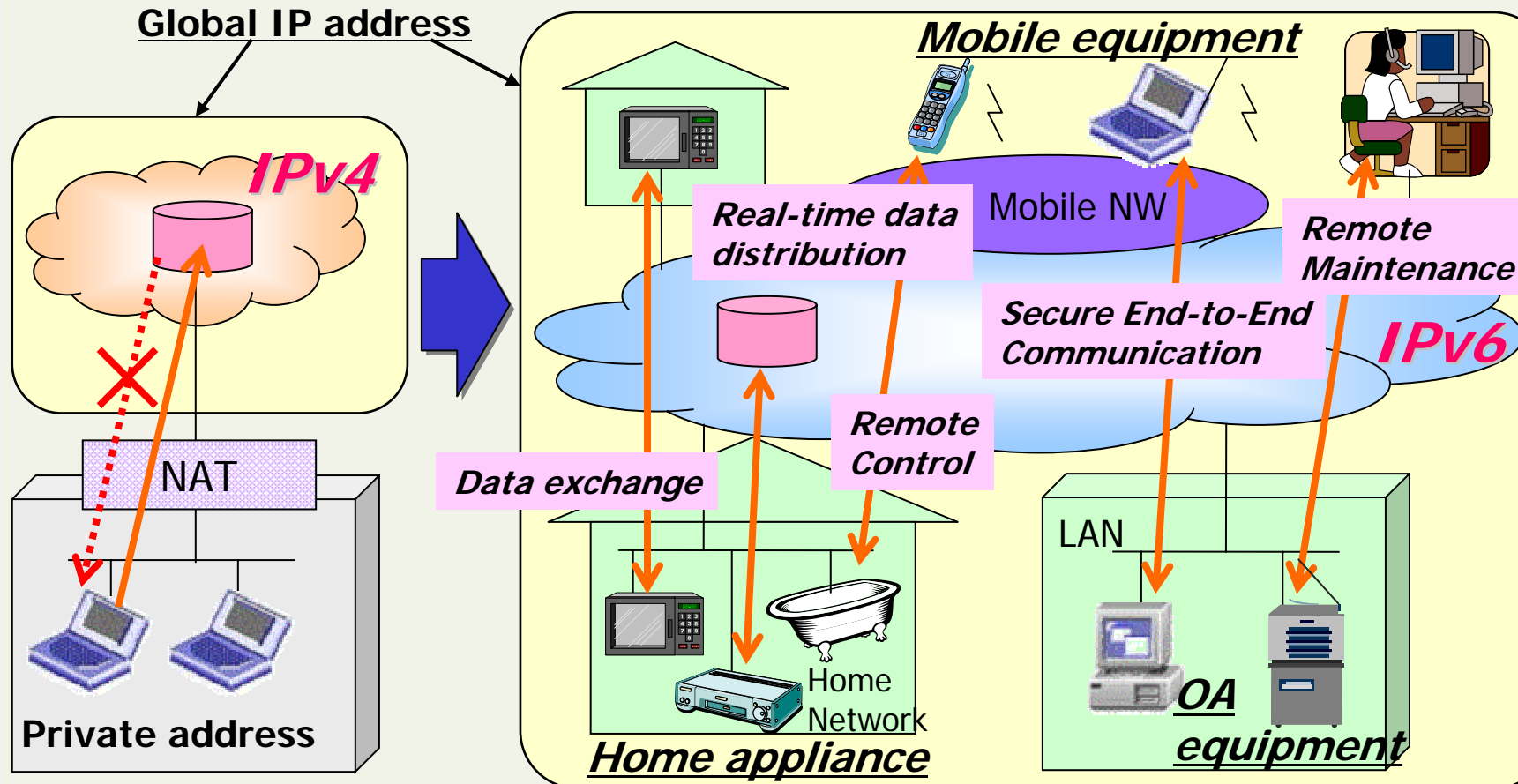
# Characteristics of IPv6 protocol

- **Expansion of address space ( $2^{32} \rightarrow 2^{128}$ ).**
- **Equipped with Security functions (IPsec).**
- **QoS (Quality of Service) functions.**
- **Plug and Play.**
- **Systematic address structure (routing becomes easy).**

# Characteristics of IPv6 Internet

- **Free from NAT (Network Address Translation) Problem.**
- **Realization of true Peer to Peer model.**
- **Networking Non-PCs (Home appliances, cars, any products, environmental sensors and information itself!).**
- **Security and QoS.**
- **Broadband?**

# New Internet Model



## IPv4 : one-way communication

- due to NAT
- the business model is client & server.

## IPv6: two-way communication

- two-way communications between appliance and mobile
- **new internet business models will be created**

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# "Internet is insecure" myth

1. Internet is full of malicious crackers.
2. Open system is dangerous, closed system is safe.
3. Open source software is dangerous.
4. If you use cryptography, you can get safety.
5. It is always safe or dangerous (all or nothing argument).
6. You cannot avoid intrusion of viruses.
7. There is no escape from SPAM mails.
8. You cannot avoid port attack (such as DoS attack).



## **Myth 2: Open system is dangerous, closed system is safe.**

- **It is true that you do not get attacked from outside if your network is closed.**
- **But people inside often cause trouble. American statistics says 80% of information leak is from inside.**
- **Security awareness will be paralyzed if you think you are safe because your network is closed.**

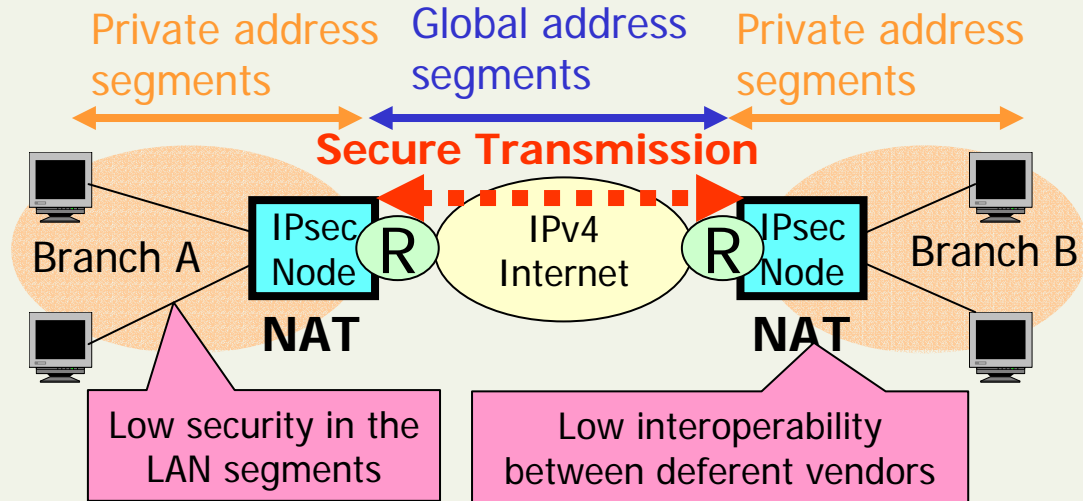
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# End-to-End secure communication (merit)

## Easy to setup IP-VPN between End-to-End terminals with IPv6

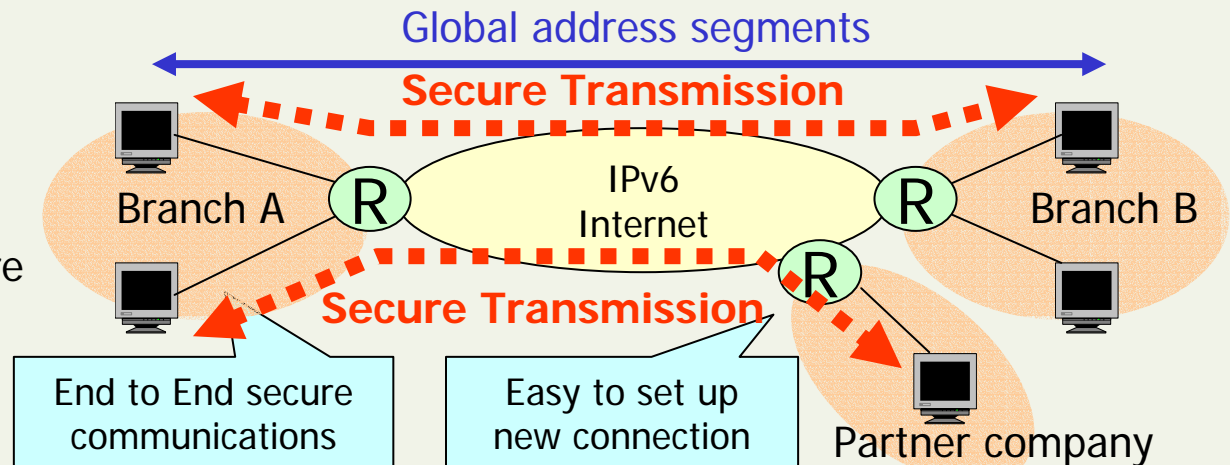
IPv4

Site to Site secure communications



IPv6

End to End secure communications



## IPv6's security threat (demerit)

- Crackers does not distinguish IPv4 and IPv6, so certain type of Internet threats continue even in IPv6 Internet World.
- Everything becomes reachable from anywhere.

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## **“Closed is safe” to “Open yet safe”**

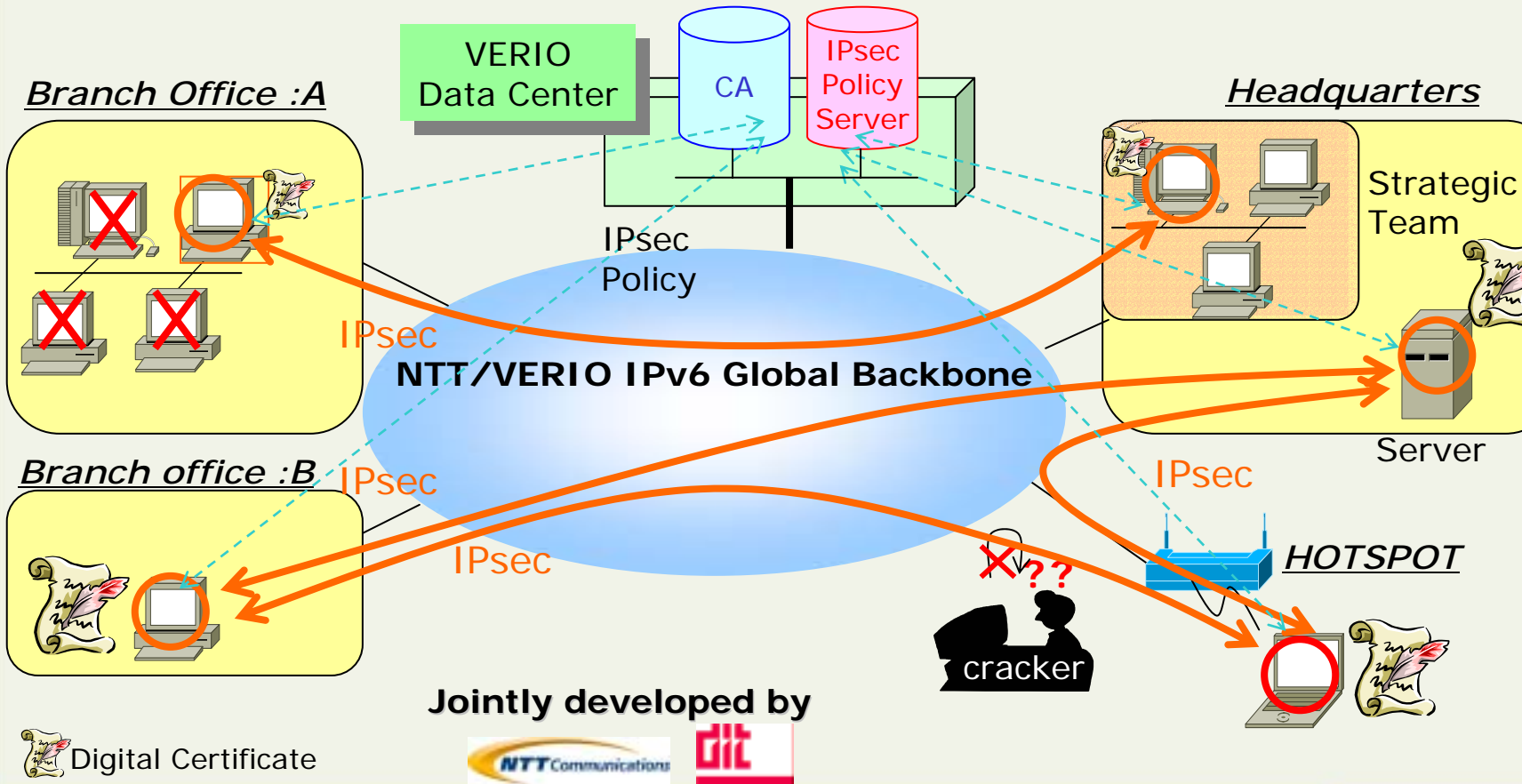
- **IPv6's benefit is only appreciated when IPv6 network is open.**
- **If you stick to closeness, you may be safe, but you cannot enjoy many new features of IPv6 Internet.**
- **But open network is not completely safe without certain precautions and security assuring mechanisms.**

1. Introduction to IPv6 and NTT Communications' IPv6 activities
2. Security Myth
3. IPv6's security merit and demerit
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# IPv6 P2P VPN (MyNet Manager)

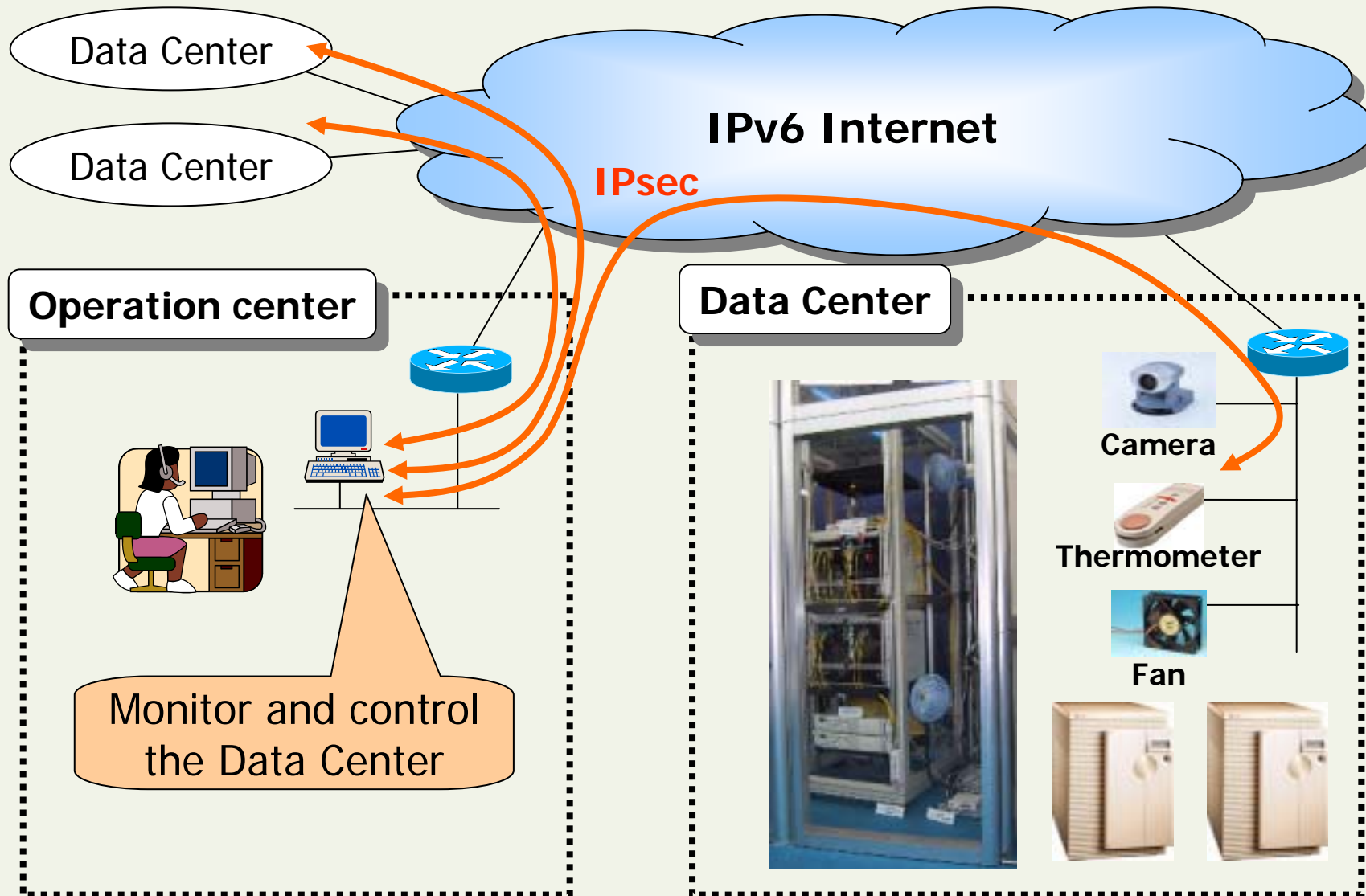
IPsec policy server to provide IPsec policy file to each peer on demand

- Effortless setup: No or low skill requirements
  - Just register your communication partner on the web
- Adaptable to all communication mode : Client-Server, Peer-to-Peer, **Mobile**
- Secure instant communication : Connect instantly, while achieving end-to-end security



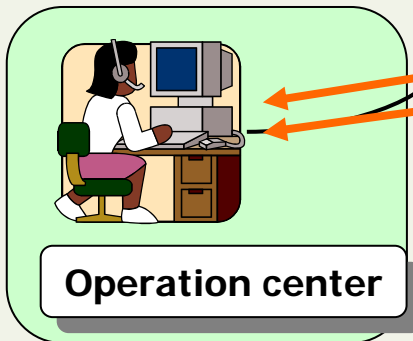


# Case study : Remote control for Data Center

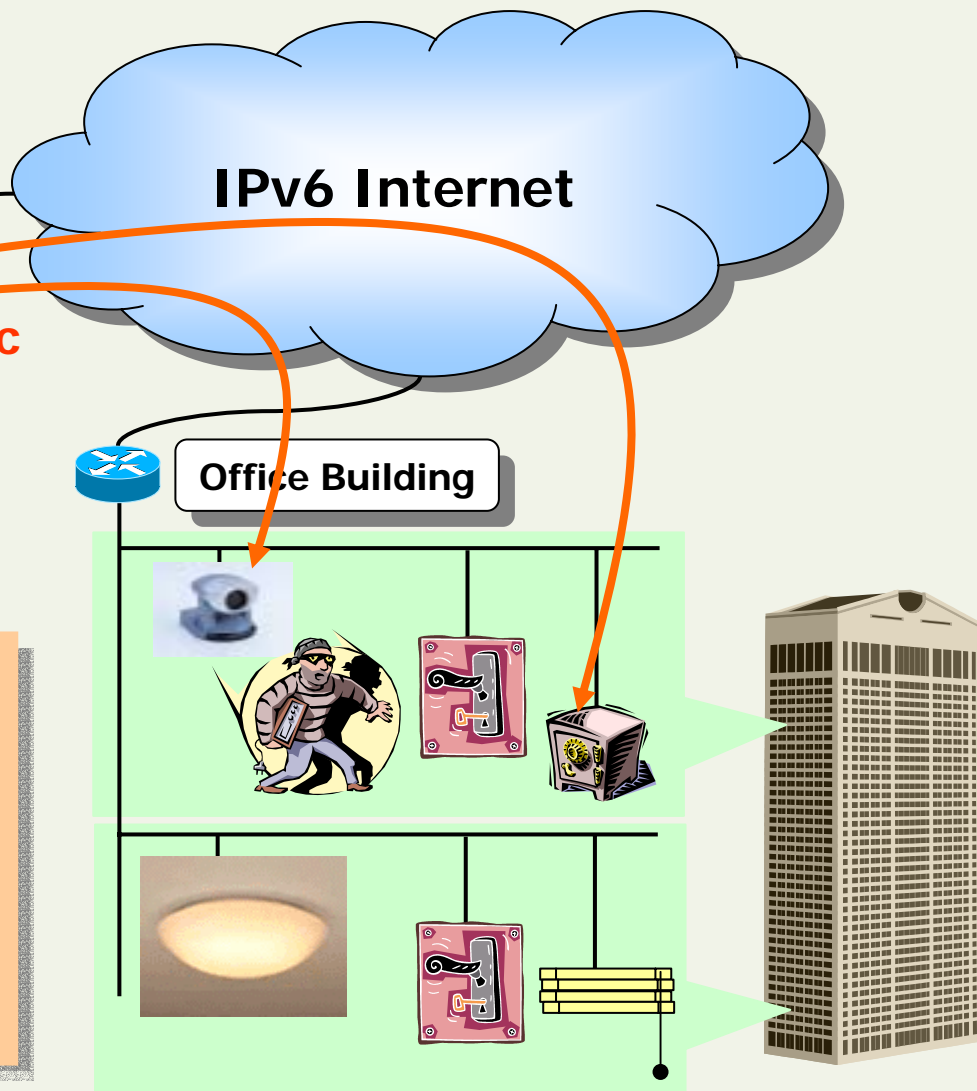


# Case study : Building Monitoring Solution

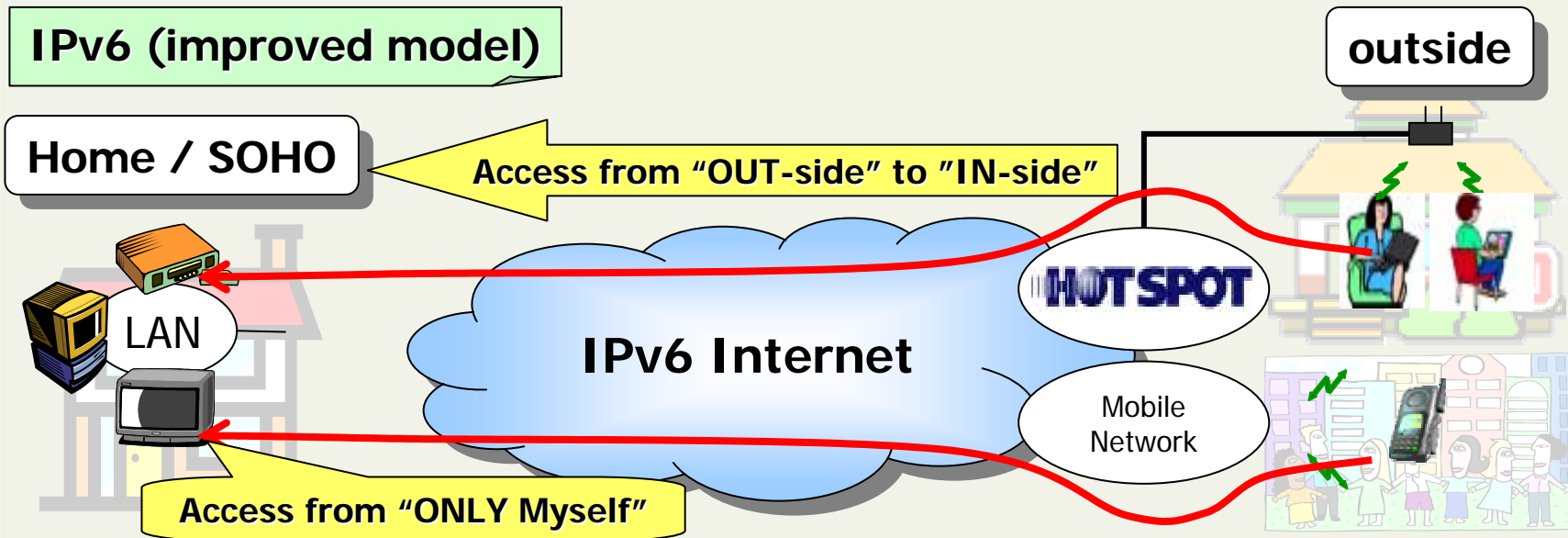
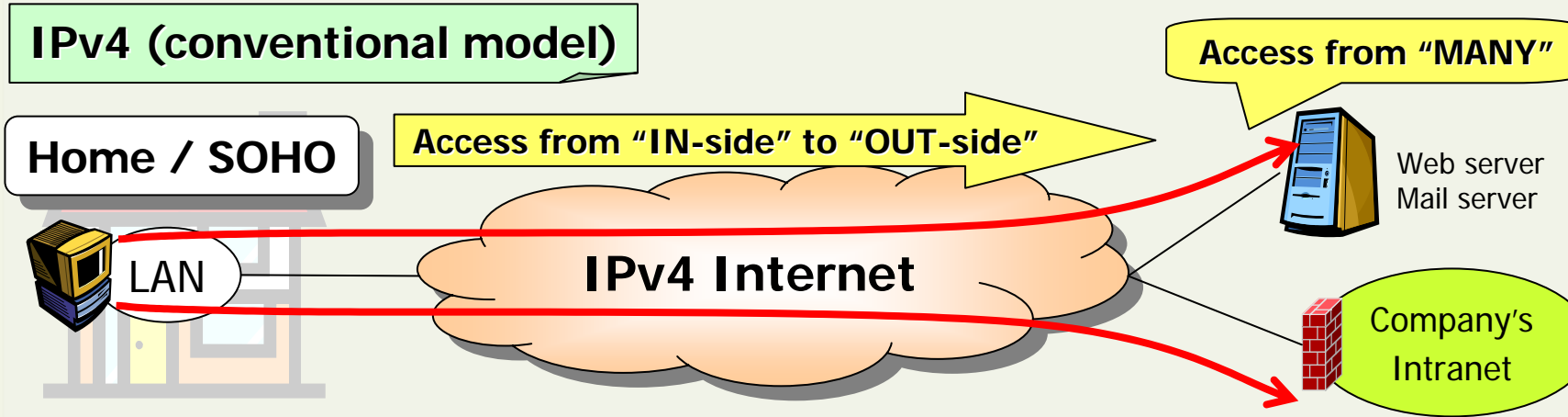
Monitoring solution provider controls devices over secure channel



Camera, door key, safe are controlled by IPv6 IPsec. Also, air conditioning, lighting can be controlled remotely to save energy consumption.



# Case Study: Personal Remote Access

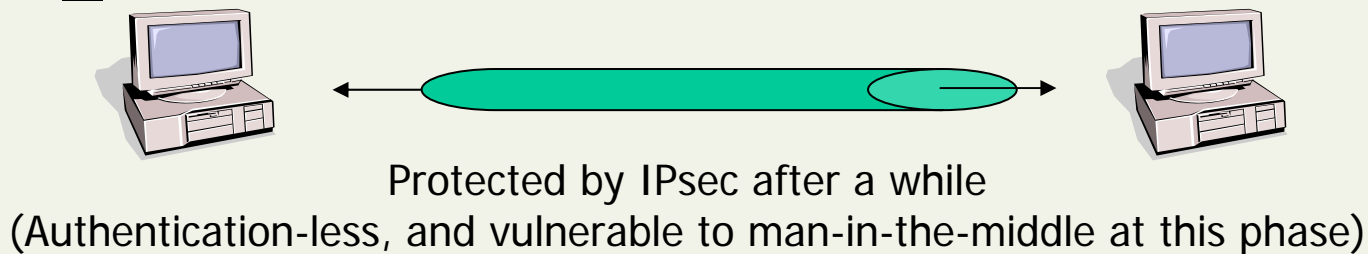


# PIA (Plug-and-Play IPsec Architecture)

**1.**

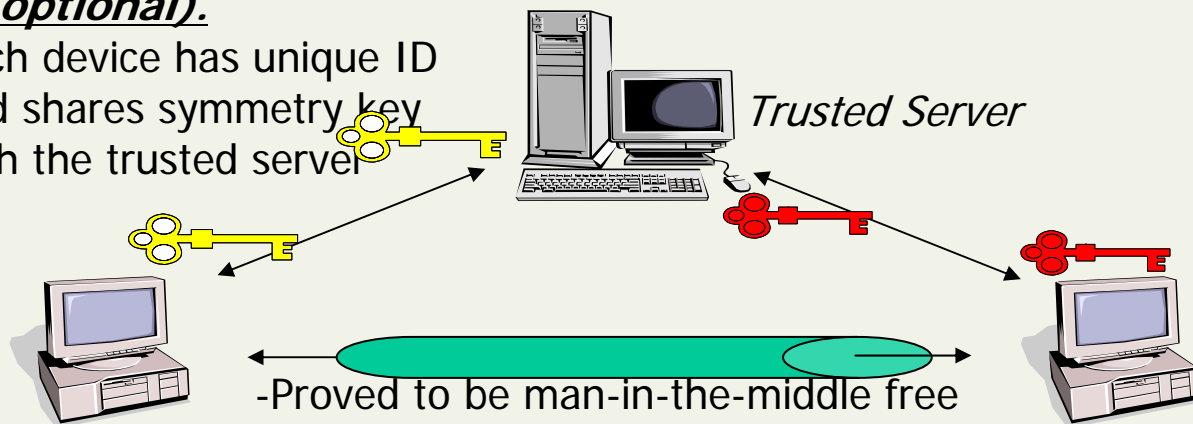


**2.**



**3 (optional).**

Each device has unique ID and shares symmetry key with the trusted server

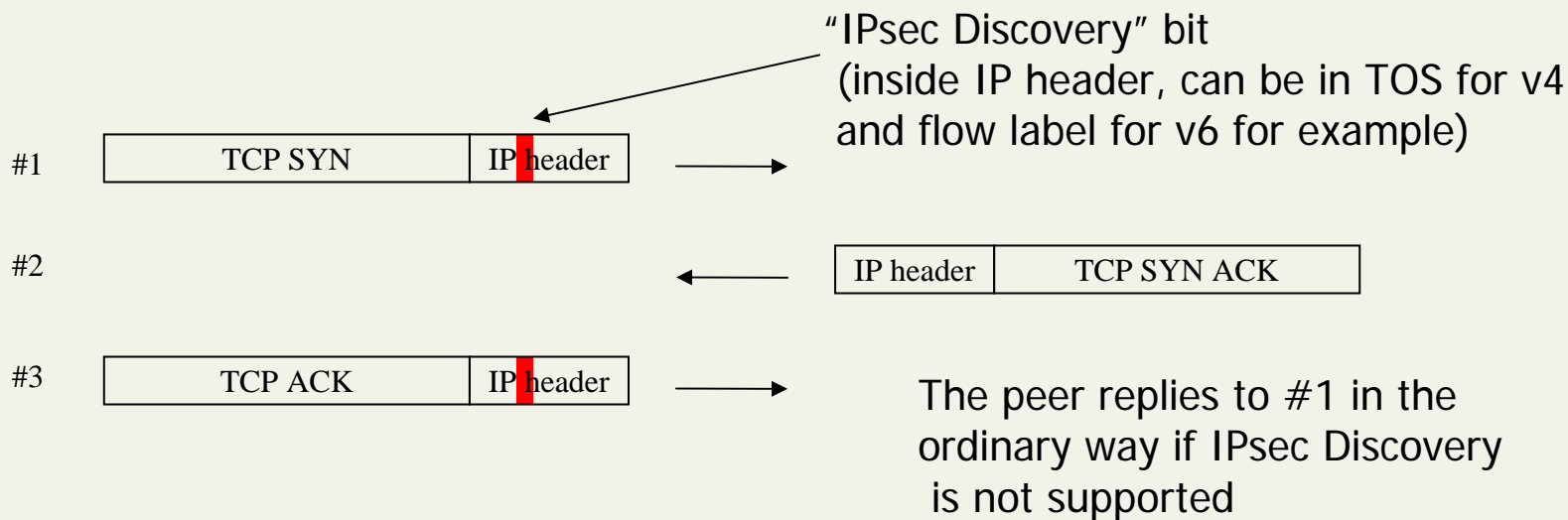


# IPsec Discovery 1/2

- **IPsec Discovery does not affect communications with legacy systems**

IPsec Discovery supported host

Legacy host

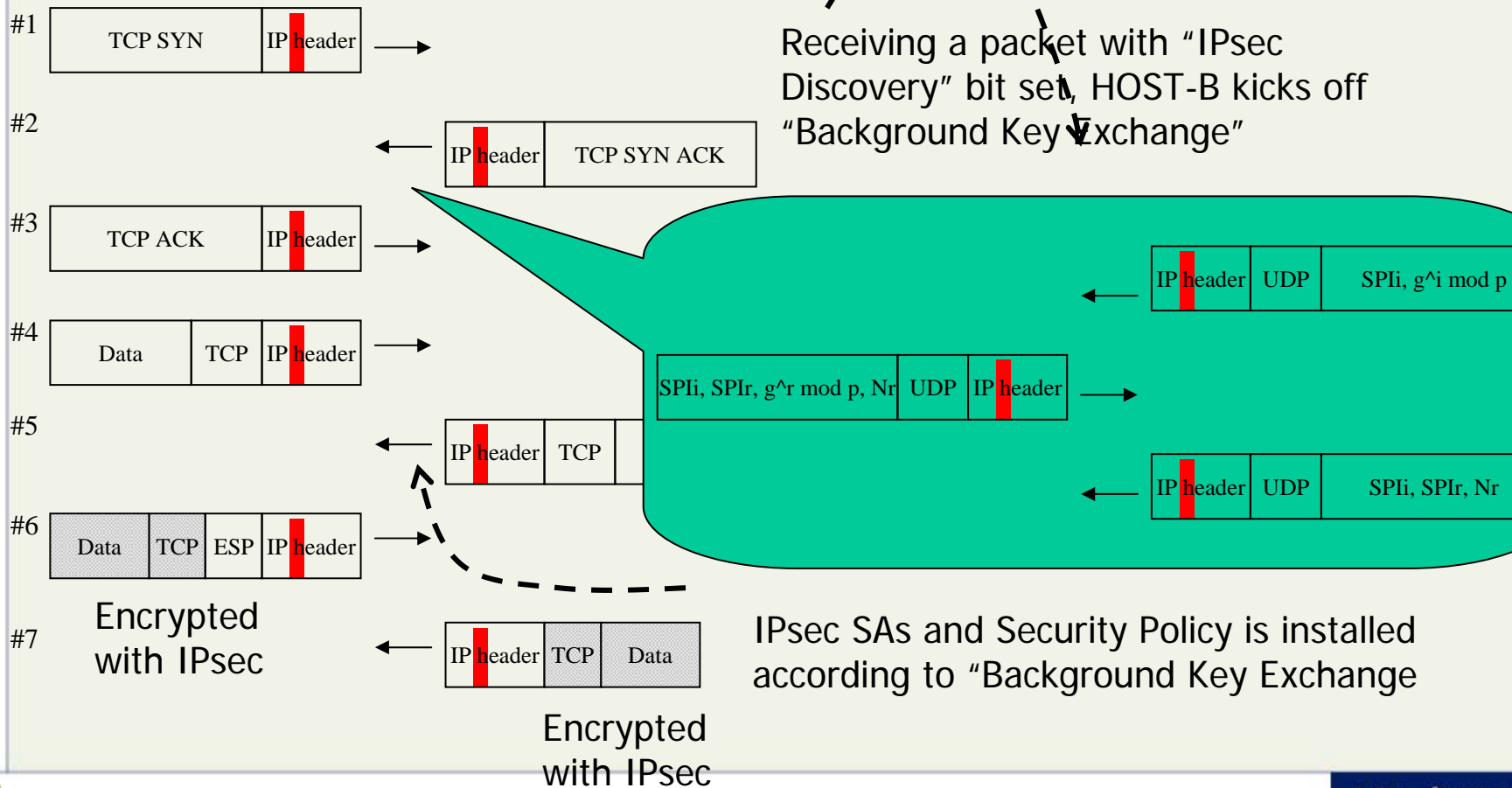


# IPsec Discovery 2/2

- Key Exchange triggered by IPsec Discovery

IPsec Discovery supported **HOST-A**

IPsec Discovery supported **HOST-B**



# Conclusions

- **IPv6 movement is a shift from current Internet practice to completely new way of thinking about security.**
- **IPv6 Internet is inherently open network, and you must consider security in this open context.**
- **Even within open network, if you use various mechanisms, you can guarantee security.**
- **So, let's stop thinking "closed is safe", and seek for a new paradigm "open yet safe"!**

***Thank you very much  
for your attention!***

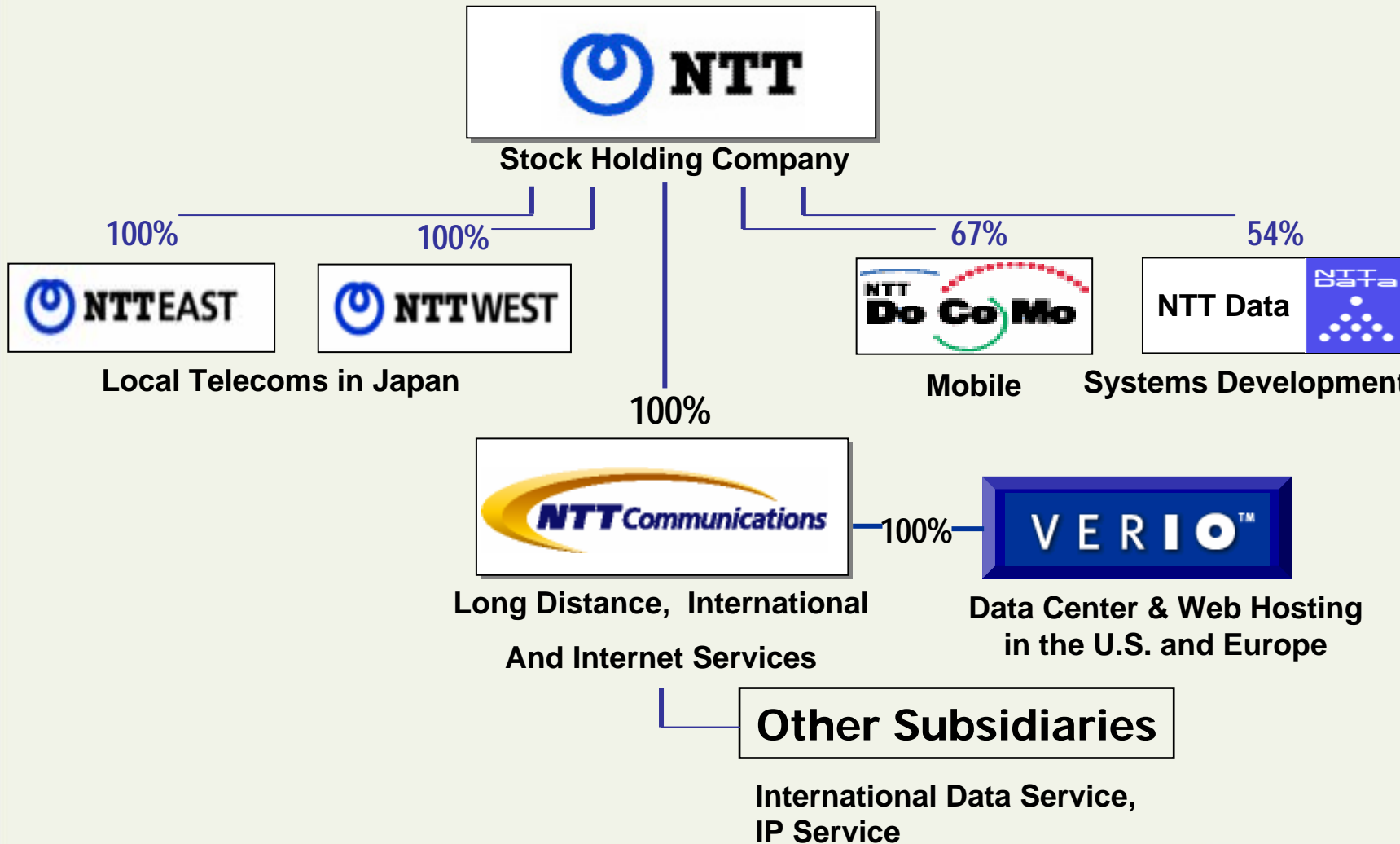
URL : [www.v6.ntt.net](http://www.v6.ntt.net)

Mail : [ipv6@ntt.com](mailto:ipv6@ntt.com)

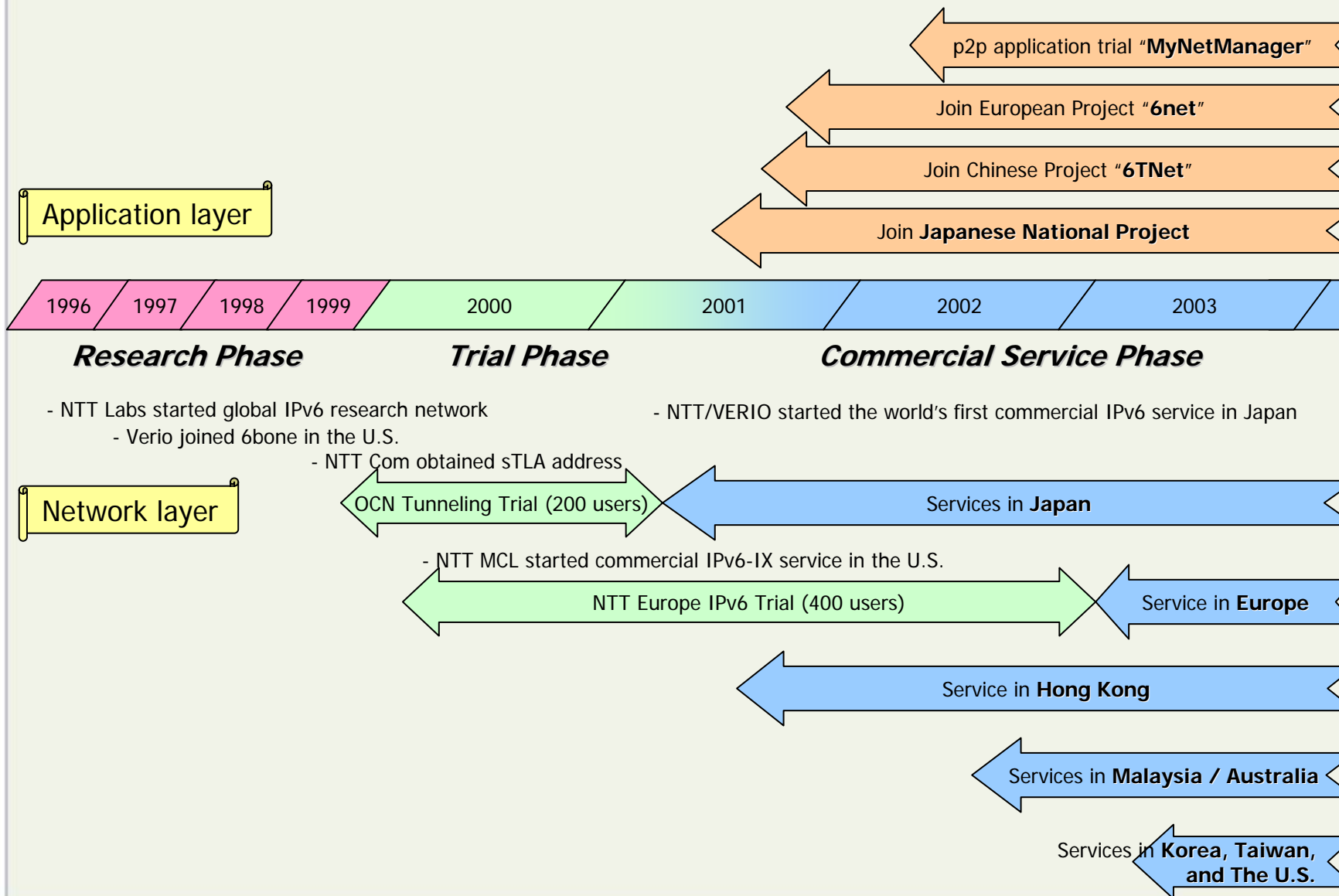


# About NTT Group and NTT Communications

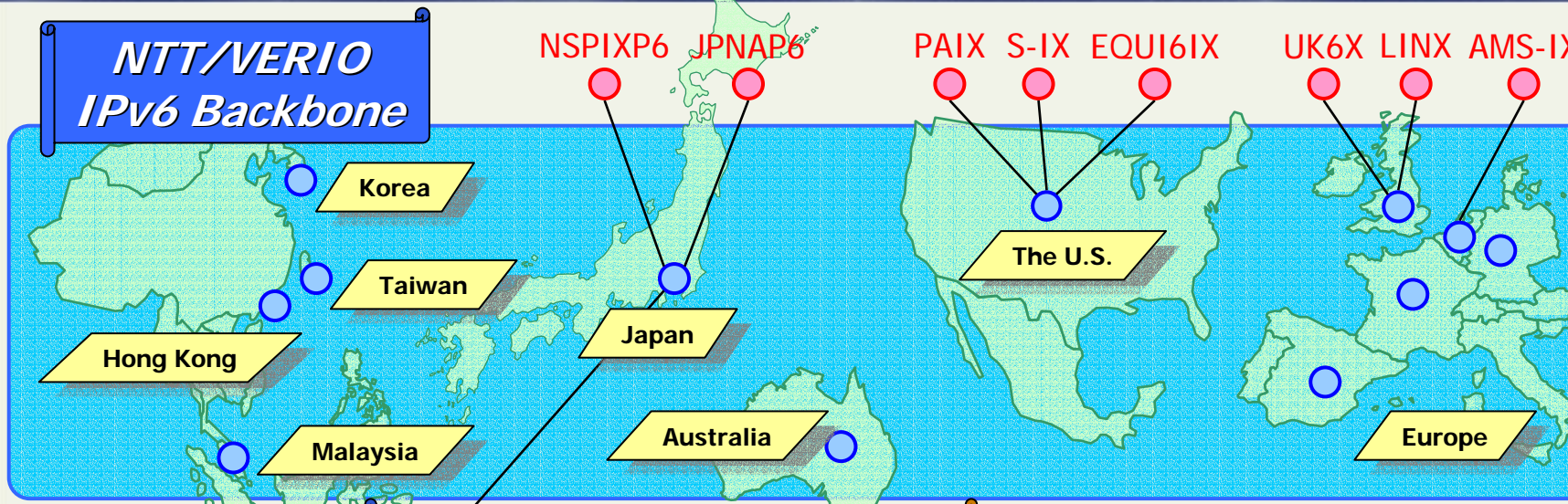
- *Group Total Operating Revenues 2002 : \$86 Billion*



# NTT/VERIO's Evolution in IPv6 activities



# NTT/VERIO Global IPv6 Backbone and services



**NTT/VERIO  
IPv6 Backbone**

**OCN in Japan**

OCN ADSLサービス  
IPv6デュアル(A)

IPv6&IPv4 **DUAL** ADSL

OCN IPv6  
トンネル接続サービス

IPv6 over IPv4 **TUNNEL**

IPv6ゲートウェイサービス

IPv6 **NATIVE** transit

## Our Strength

- Global IPv6 networks covering Asia, US, Europe
- Providing commercial IPv6 transit services in Japan (Apr '01-) , in Europe (Feb '03-) in U.S. (June '03-) and many Asia-Pacific countries (June '03-)
- More than 3 year's experience in running
- 24x7 monitoring and operations by NTT/VERIO dual NOC in Japan and U.S.
- Main IPv6-IX Connection
- Optimal IPv6 routes

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- [How-to] A Discussion on IPv6 Transition Mechanisms Part2 Teredo, NAT-PT, BIS and MPLS [8/22]
- [How-to] A Discussion on IPv6 Transition Mechanisms Part1: From Dual Stack to 6to4 and ISATAP [8/20]
- [Reference] IPv6 ready network management/testing products [8/6]
- [Special] How to upgrade WinSock application to support IPv6 [7/23]

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### PICK-UP

#### Frontline Interviews



#### Canon When images get connected, They will eventually find IPv6

Canon is introducing a new, evolved networking functionality in its digital copier and other products. We asked Ichiro Endo, Chief Technology Officer, on its networking strategy and the role of IPv6. [8/27]

### ▼ Latest Articles by Date

Canon  
When images get connected,  
They will eventually find IPv6 [8/27]

### IPv6 Ready! Project Going On Now >>>

### IPv6 TOPICS

- ▶ Toshiba launches IPv6-capable new home server product [8/15]
- ▶ NEC and Oracle Japan jointly provide IPv6-based CDN solution [8/5]
- ▶ NEC's streaming distribution product supports IPv6 and Windows Server 2003 [7/11]

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### IT NEWS

- ▶ Plala, BIGLOBE and @nifty announce multi channel and VOD video distribution service - Recruiting 1,300 trial users from FLET'S users (BroadBand Watch) [8/19]
- ▶ Yamaha announces a home music system with wireless LAN (BroadBand Watch) [8/15]
- ▶ So-net distributes contents for "VEGA" with wireless LAN (BroadBand Watch) [8/5]

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### IPv6 Ready! Project

- How to upgrade WinSock