

IPv6 Deployment Models and IPv6 Solutions - from real deployment cases in Japan -

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Deployment Principles

Observation from several deployment cases

IPv6 is being deployed and will be deployed where its deployment is effective

- All the past field trials until 2003 have not successfully lead to real deployment
 - Technically interesting, but
 - Not cost efficient
 - Not operationally feasible
- In 2004-5 more real and practical deployment cases have appeared.
 - Recognizes that IPv6 is almost same as IPv4 but has a small difference
 - Focuses on the difference
 - Tries to deploy in applications where the difference is effective

- Smooth Transition
- Forced Deployment
- Solution-Oriented Deployment

Smooth Transition

- To enable IPv6 at system renovation time
 - No extra cost needed
 - Will take 5-7 years to transit to IPv6 gradually
 - Some enterprise networks, especially IPv6 companies, do this.

Forced Deployment

- Japanese government mandates IPv6 for governmental networks by the end of FY2008.

- System is introduced as a solution which solves a problem users have, **regardless of the version of IP.**
- There, IPv6 is chosen because IPv6 **implementation has some advantage over IPv4.**
 - Cheap
 - Easy
 - Fast
 - Extensible and flexible
 - Especially so In the long run
- Deploy IPv6 as better protocol in a new system.

- Building Facility Management System
 - 30% energy consumption reduced by managing air-conditioners, lightings, elevators etc.
 - IPv4 is not a good choice, considering **long lifetime** of buildings
 - Matsushita's Shiodome Building, NTT's Saitama Building
- VoIP systems in Dormitories
 - needs to construct 20,000 nodes in a short term
 - IPv6 **reduces time and cost** of design, installation and maintenance
 - Kyoritsu maintenance/Freebit
- Carrier's Infrastructure
 - NTT West have deployed IPv6 for their new "Premium" service because of **manageability and future extensibility**.
 - KDDI, too.



- Live Lesson Services to remote sites in prep-schools
 - High quality streaming with low cost.
 - Just by using NTT's multicast service, they can reduce cost compared to using satellite.
- International VPN
 - P2P applications such as TV conference and web cam can facilitate collaborations between remote offices
 - IPv6's end-to-end security adds more features
- Public solutions
 - 15 cases in different area are now being examined in real fields in a governmental project
 - Crime prevention, disaster recovery, medical and welfare, sightseeing, education, environmental monitoring, tele-metering, etc.

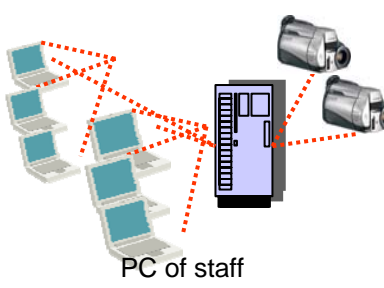
FY2005 IPv6 Deployment Field Trial Overview (No.1)

Various experiments for practical use of IPv6 will be widely carried out and evaluated for the benefit in addition to the implementation of technical verifications related to IPv6. The result of the experiments will be publicly announced through something like a guideline to promote expansion and transition of IPv6 utilization.



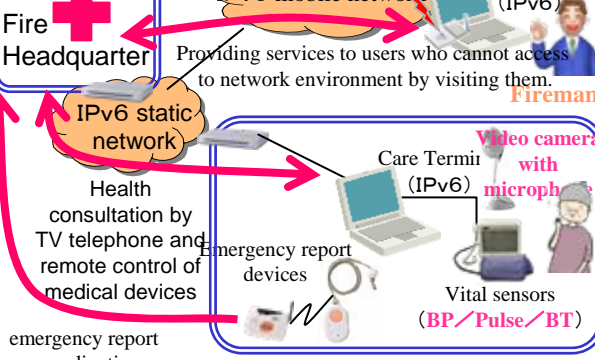
Office Staff (remote) !
Kiosk Terminal For Residents Consultation

■ Consultation services for residents (Taito, Tokyo)
Constructing a remote consultation service system for residents by utilizing IPv6's security system.



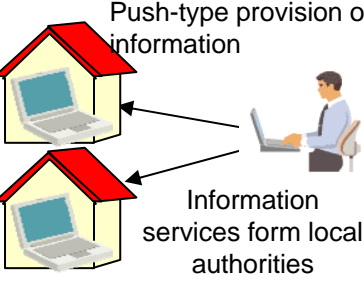
PC of staff

■ Taito City Assembly streaming live video relay services (Taito, Tokyo)
Implementing a high-definition City Assembly video relay distribution system by multicast distribution functions of IPv6



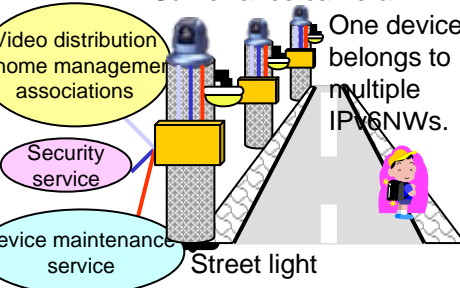
Fire Headquarters
IPv6 mobile network
Care Terminal (IPv6)
Providing services to users who cannot access to network environment by visiting them. Fireman
IPv6 static network
Health consultation by TV telephone and remote control of medical devices
Emergency report devices
Care Terminal (IPv6)
Video camera with microphone
Vital sensors (BP/Pulse/BT)
emergency report coordination

■ Health care at home support services (Asahikawa, Hokkaido)
Realizing a health-care-at-home support service by means of IPv6-ready mobile terminals by the "push functions" of IPv6.



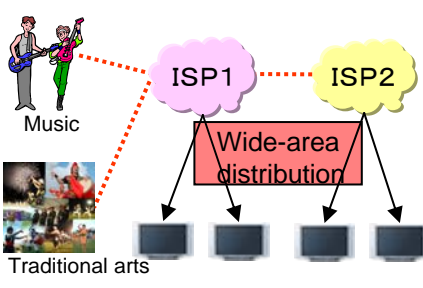
Push-type provision of information
Information services from local authorities

■ Push-type information provision services for residents (Osaka)
Constructing information provision services by the information push function of IPv6.



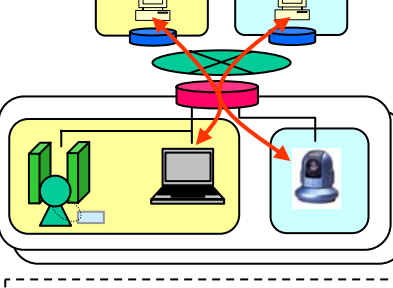
Surveillance camera
One device belongs to multiple IPv6NWs.
Video distribution home management associations
Security service
Device maintenance service
Street light

■ IPv6 multi-services in Security-Town (Kawasaki, Kanagawa)
Implementing a security town service system by simultaneous control functions of multiple connections and automatic setting functions of IPv6.

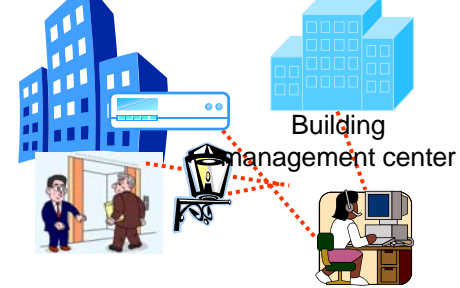


ISP1
ISP2
Wide-area distribution
Music
Traditional arts

■ Music Town services (Okinawa)
Realizing a video multicasting system via multiple ISPs by using IPv6.



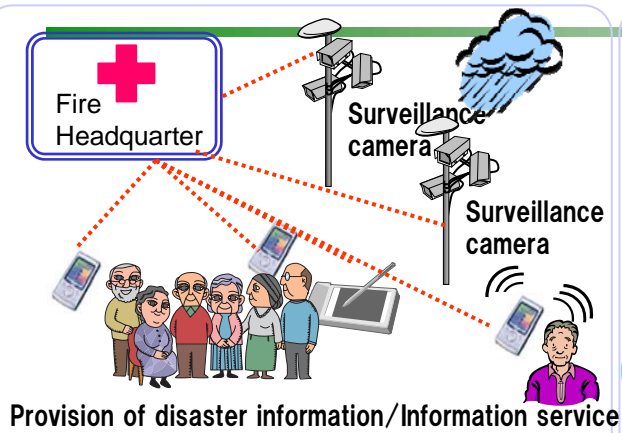
■ IPv6 multi-service in school security solutions (Tokyo)
Implementing a security service system for schools by using the functions that control the multiple connections of IPv6 at the same time.



Building management center

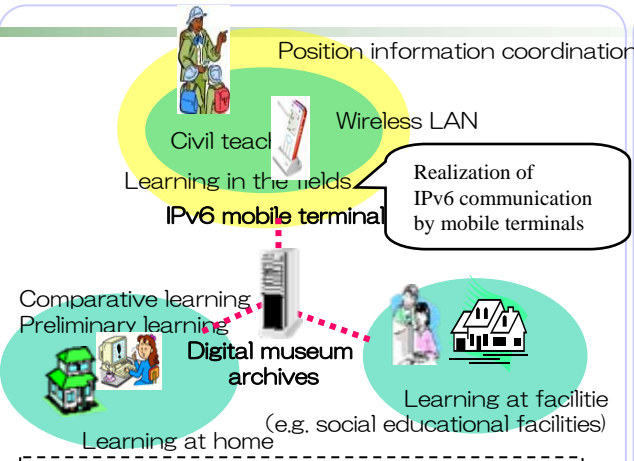
■ Office building automation services (Tokyo)
Implementing a total building management system by using abundant IPv6 addresses in some cultural facilities.

※The place-names in the figure above are not responsible organizations but the places where the experiments are planned.

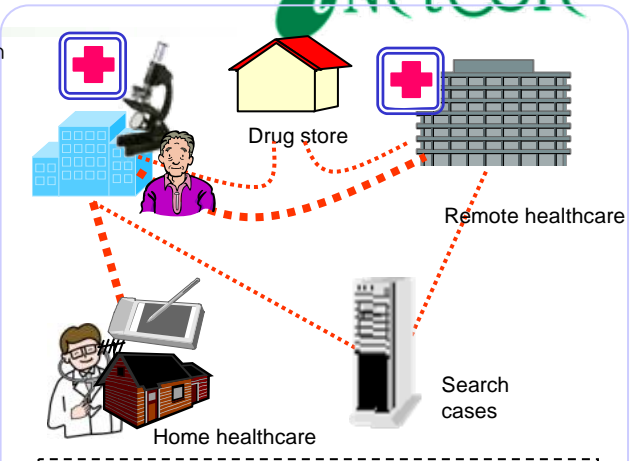


Provision of disaster information/Information service

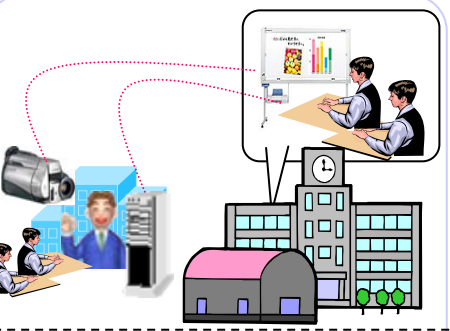
Information gathering service for disaster prevention (Niikappu, Hokkaido)
 Constructing an image processing stationary measurement system, the mobile terminal information service and the telephony service system by IPv6's connectivity and manageability.



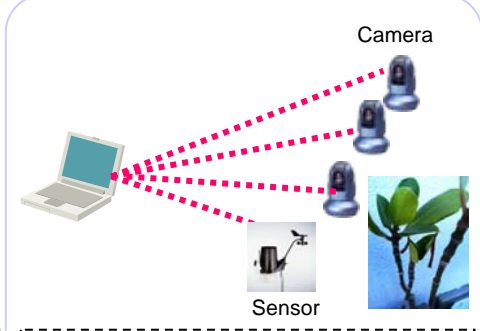
Local digital museum (Tateyama, Toyama)
 Constructing a learning-aided system which archives the learning materials from many wireless LAN spots and provides to cellular phone type mobile terminal of IPv6.



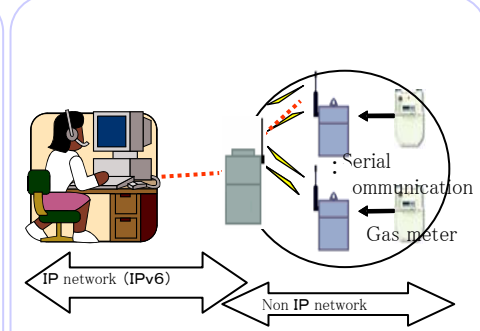
Local medical network service (Wakayama)
 Constructing a medical collaboration service system with high quality protection for personal data by end-to-end communication function of IPv6.



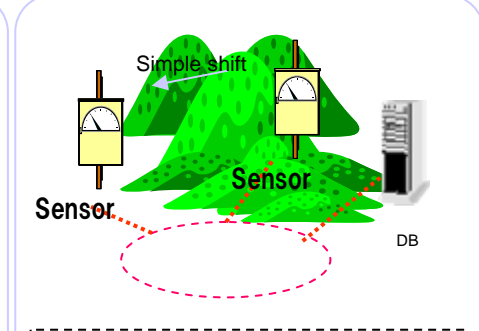
Video distribution service between educational facilities (Hiroshima)
 Constructing an educational network system which delivers educational contents to multiple places and supports remote schooling by using direct connectivity of IPv6.



Nature regeneration monitoring service (Taira)
 Constructing a continuous monitoring system for nature regeneration process by using abundant addresses and the plug & play function of IPv6.

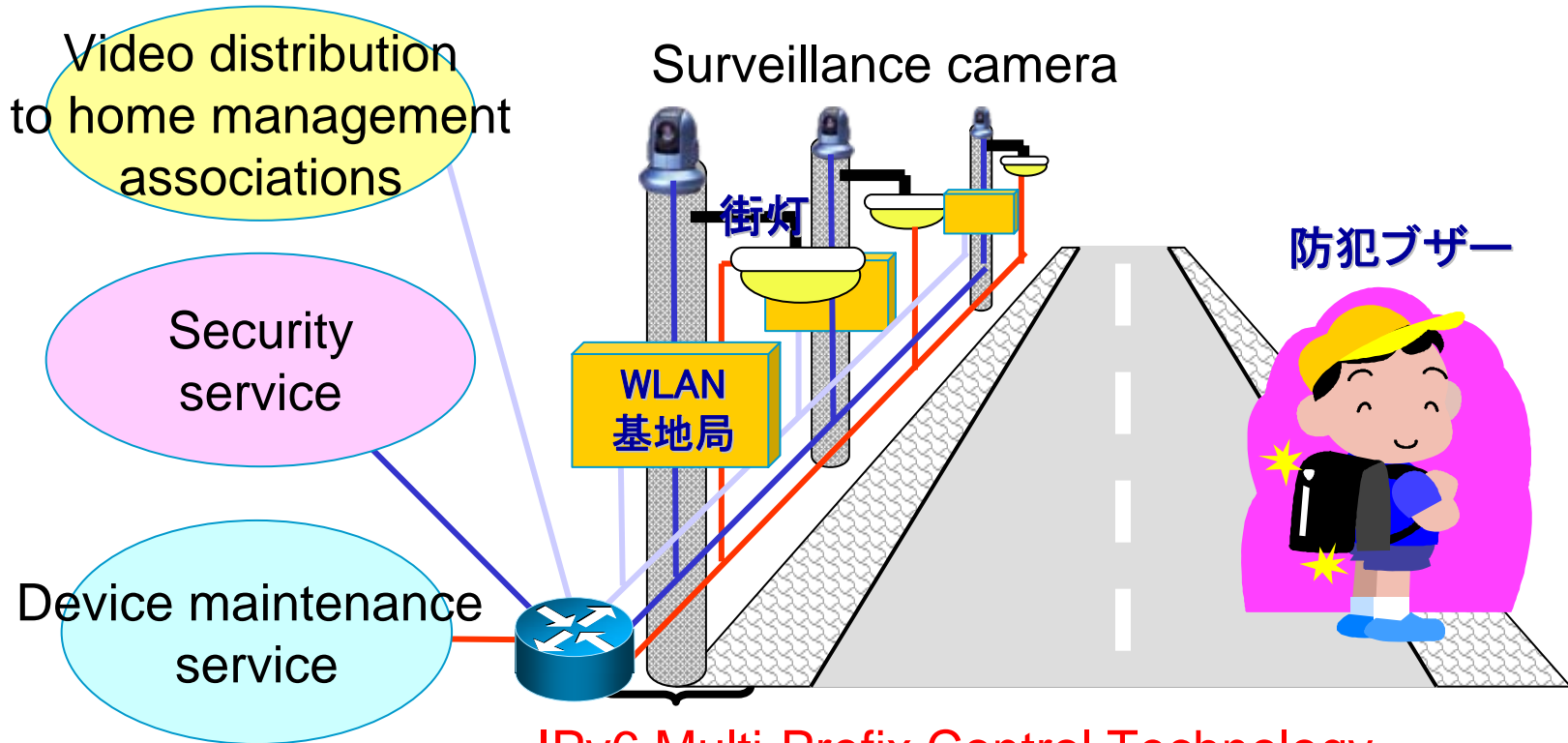


LP gas tele-metering (Kochi)
 Constructing a remote gas meter surveillance system by using the plug & play function and unchanging terminal IP address of IPv6.



Environment monitoring (Tottori)
 Realizing an environment monitoring system for effective usage of limited sensors by using the plug & play function of IPv6.

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IPv6 Multi-Prefix Control Technology

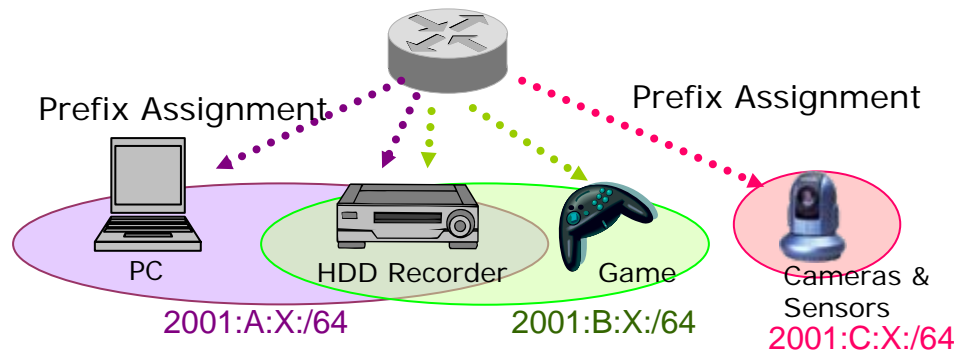
One device belongs to multiple IPv6 networks.



Implementing a security town service system by simultaneous control functions of multiple connections and automatic setting functions of IPv6.

Multi-Prefix Control Technology

- Controls multi address prefixes and provides multi logical networks in a single LAN
 - Address Prefix per a service and/or per a security level
 - Terminal with an address prefix can't access another with different one unless prefixes are routed
 - No implementation necessary in terminals
 - Assumes IPv6 because the way to use IPv4 address is limited
 - IPv6 global unique address brings various advantages such as
 - Plenty of addresses for plenty of terminals/devices
 - Address-based service management/terminal management
 - Multi-address/services for a single terminal



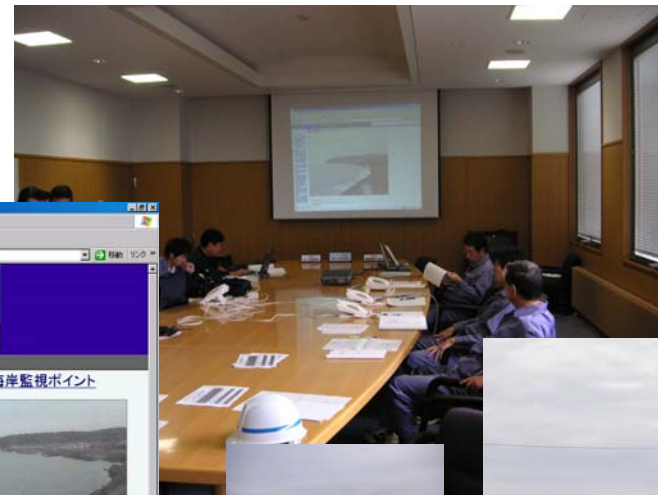
Before the system

Sending persons to disaster (dangerous) spots with special wireless equipments



IPv6 Information system

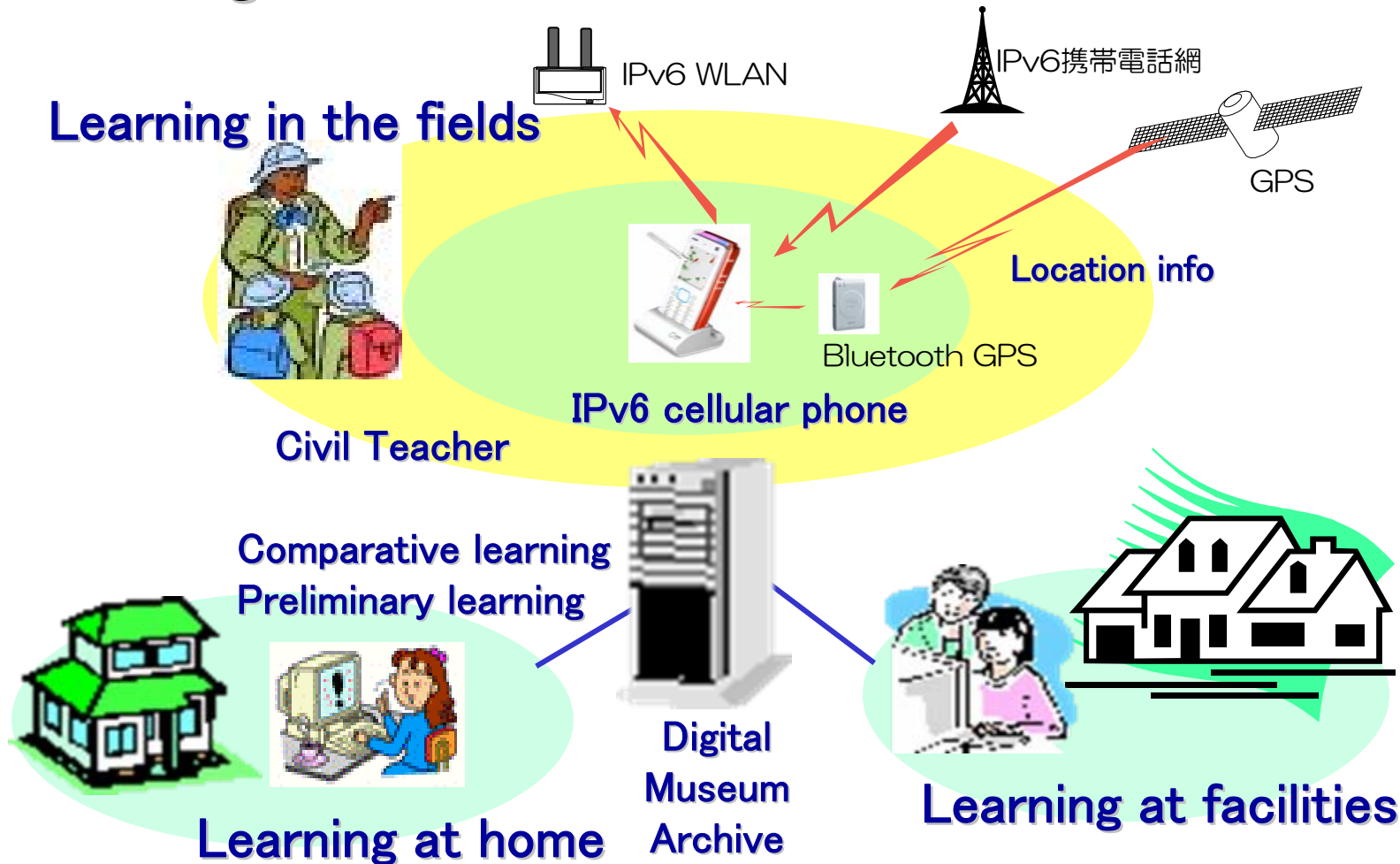
Headquarter can directly view what's happening from surveillance cameras and PDAs given to residents



Surveillance camera

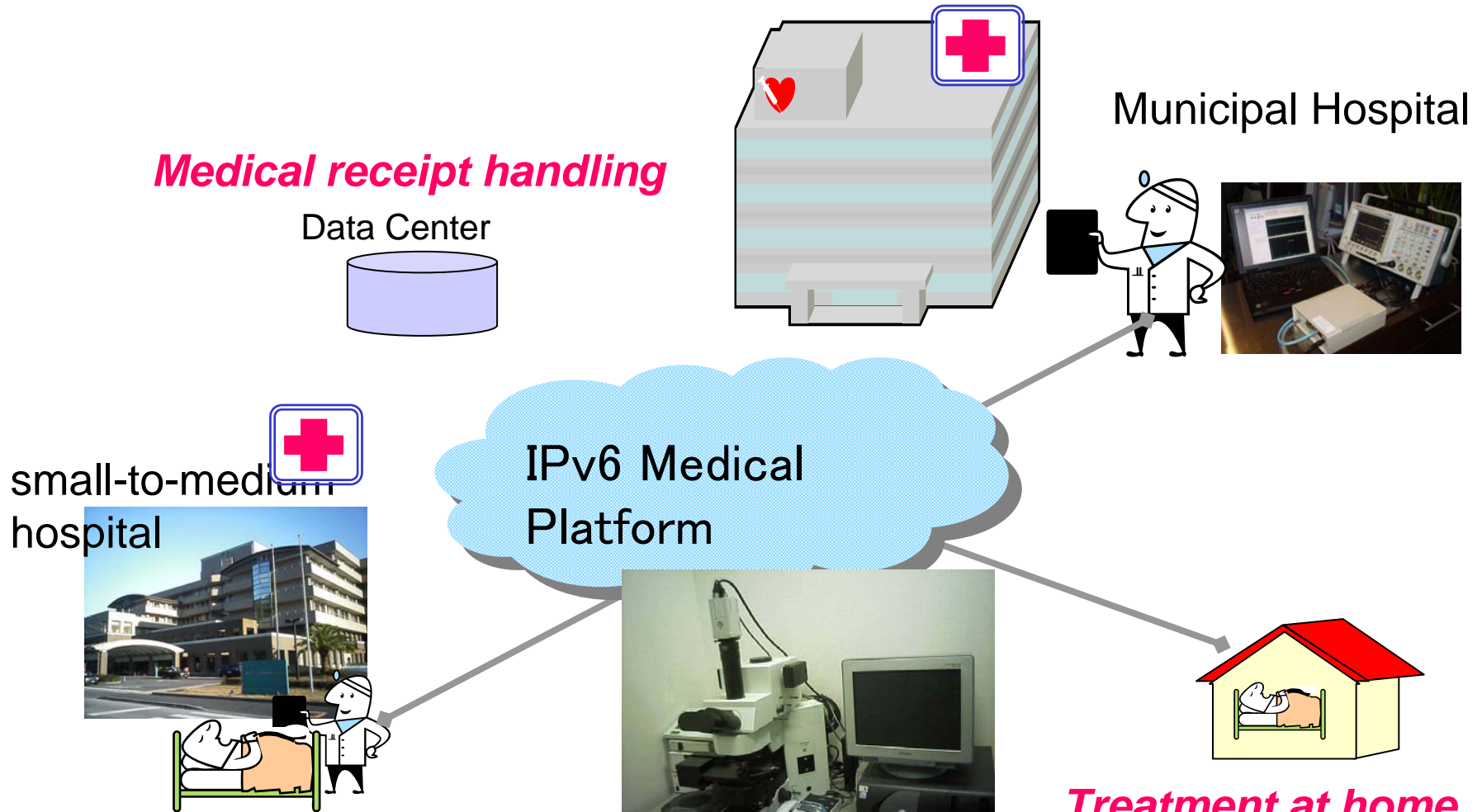


右のカメラ／電柱は海岸脇に設置



Preserving local cultural resources and heritage

Constructing a learning-aided system which archives the learning materials from many wireless LAN spots and provides to cellular phone type mobile terminal of IPv6.



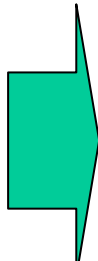
Remote surgery support
existing ISDN → more efficient /
real-time support by broadband and
IP communication

Treatment at home

IPv6 Environmental Monitoring

- Sensors for professionals cost more than US\$20,000-30,000, which a city can buy just a few of them.
 - A lot of needs for measuring data everywhere in the city
-
- Realizing a portable environment monitoring system for effective usage of limited sensors by using the plug & play function of IPv6.
 - Connecting existing sensors via IP

Existing sensors
was connected
via phone



**IPv6 environment
monitoring system**

Portable sensor



IPv6 Portable Sensor

Local IP infrastructure

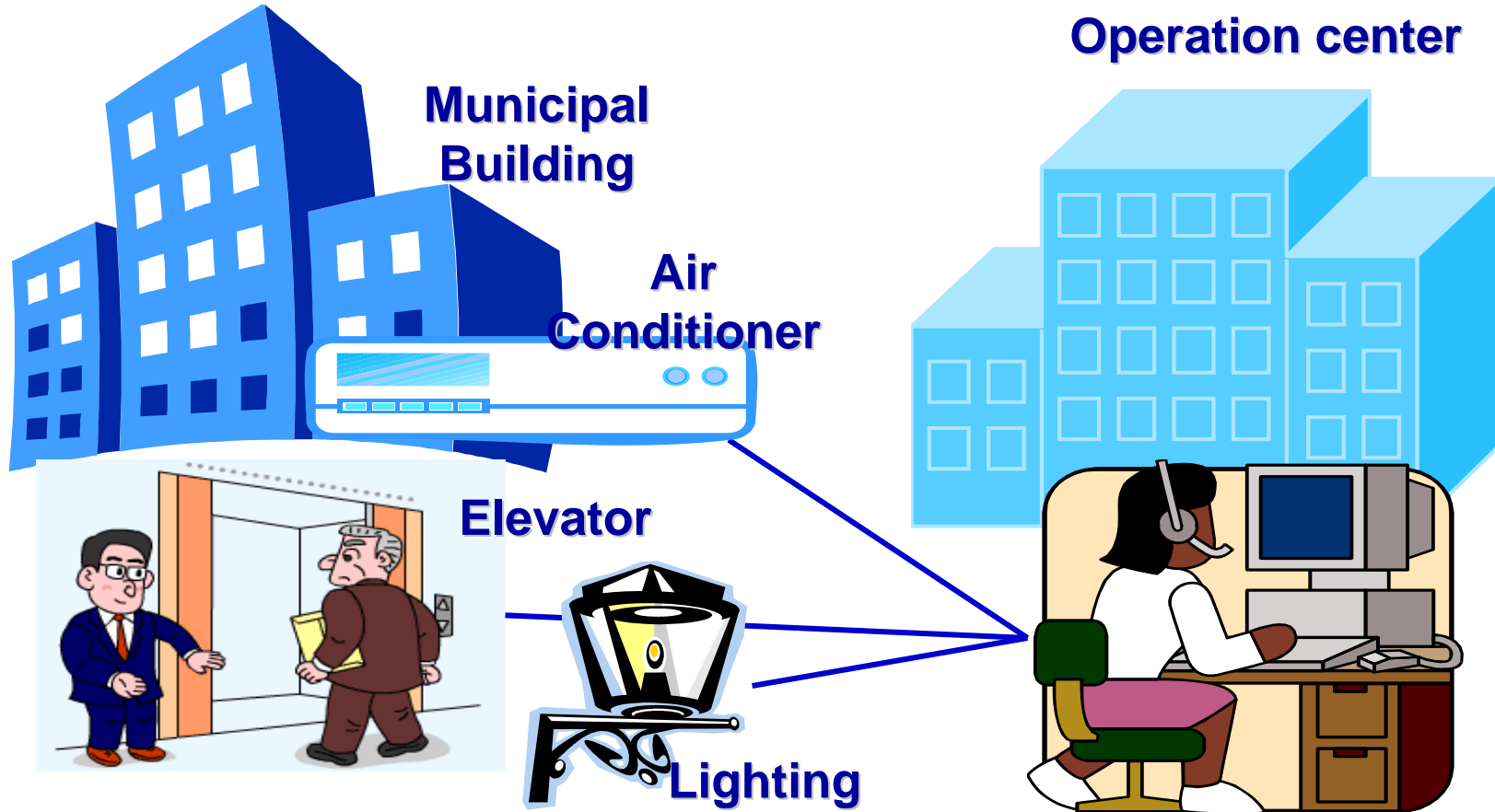


Database

Existing sensors
are also
connected via
IPv6

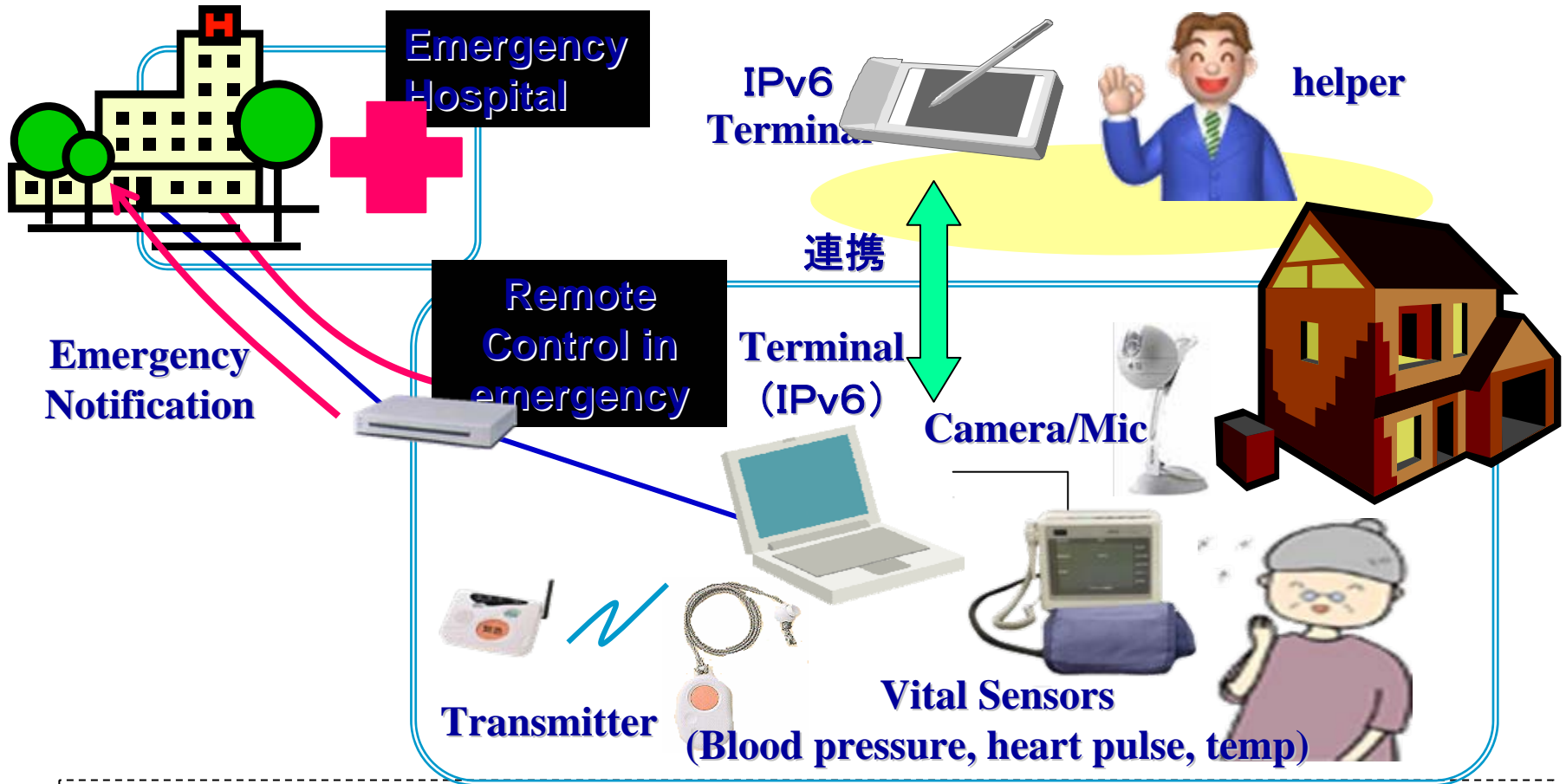


Environmental Labs



Implementing a total building management system by using abundant IPv6 addresses in some cultural facilities.

IPv6 Healthcare Support System

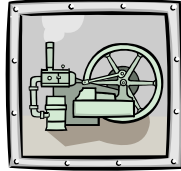


Realizing a health-care-at-home support service by means of IPv6-ready mobile terminals by the "push functions" of IPv6.

Implication of 3 models

- Who gets merits from IPv6?
 - End users don't care about IPv6.
 - Implementers can get advantages of IPv6 in some situations.
- Stop looking for what IPv6 only can do.
- Stop commenting “this can be done by IPv4”
- **Look for where IPv6 can do better, instead.**

- Watt's steam engines triggered a lot of innovations and changed the worlds.



- How?

- Horses could do the same things as steam engines did.
- There were many other engines what could do the same things. In a sense, Watt's was an improved technology.
- But, Watt's could do the same things much better.

- Tens of years later, big innovation happened with invention of locomotive as an application of steam engines.

- Then IPv6?



Thank you very much!

Any questions and comments to
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