



Facility and Sensor Network Development for Smart City Design with IPv6

Hiroshi Esaki, Ph.D.
 Professor, The University of Tokyo
 Chair, IPv6 Ready Logo Program, IPv6 Forum
 Executive Director, IPv6 Promotion Council of Japan
 Chair, Task Force on IPv4 Address Exhaustion
 Director, WIDE Project

Innovation of Metropolitan Design Principle

Past requirements :

- Agriculture (river, canal)
- Manufacturing (logistics=train, road)

Future:

Control of "Energy and information flow" with ubiquitous energy sources

→ SCM of energy flow


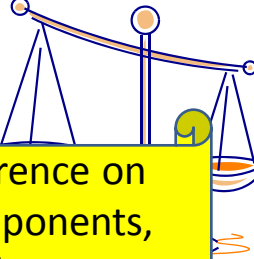


JDCC
日本データセンター協会
Japan Data Center Council

Design of "Smart" City

人(Human-being)	都市(City)
脳+頭骸骨(Brain)	Cloud Computing
頭骸骨(Skull), 血管(Blood vessels)	Data Center
神経(Brain nerves)	Servers, switches
神経(Nerves)	Internet
各器官(Organs)	Facilities (i.e., Things)
骨等(Bone)	Building(構造体)
センシング器官(Sensor)	Sensor
筋肉(Muscle)	Actuator

"100 meter sprint"

Usain Bolt, Jamaica
Height = 183cm
Weight = 75kg
9.58 seconds

Small difference on assets/components,
But large difference on **"efficiency"**

Hiroshi Esaki, Japan
Born in 1963.
Height = 168cm
Weight = 105kg
 ∞ seconds (50 sec?)

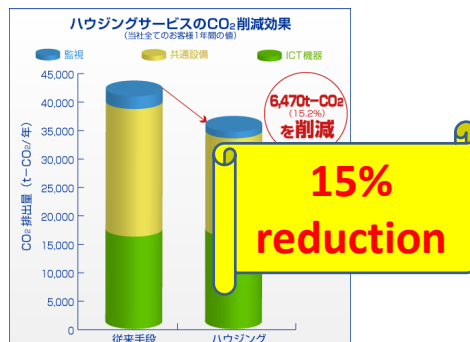
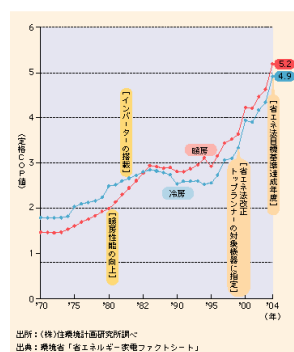
Δ 14.3%
+ 10%
 Δ ∞ (500%?)

Strategic use of Internet Data Center for smart city

Contribution **by hosting** service

- Many offices install old and in-efficient HVAC systems. When we move the servers in these offices to iDC, we will be able to improve the HVAC bill. Current HVAC systems improves 30-40% energy efficiency, compared with existing systems.

図3-4-7 エアコンの冷暖房COP推移(販売ベース)

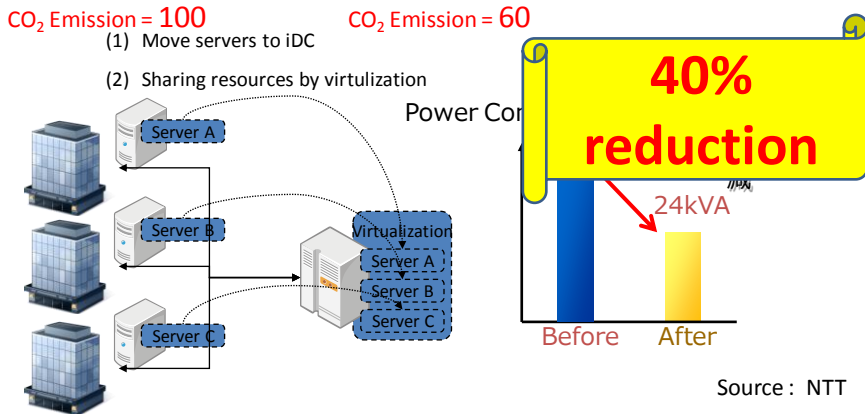


NTTビズリンクHP

http://www.nttbiz.com/eco_act/housing.htm

Contribution **by Virtualization**, i.e., **Cloud Computing**

- Servers in the offices with old hardware platform can be accommodated in iDC with virtualization, i.e., cloud computing.
- Large energy saving by sharing the computing resources and HVAC resources.

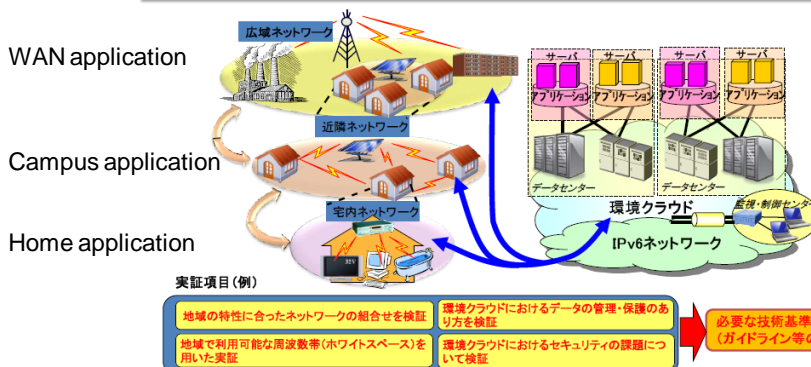


MIC Japan will promote cloud computing with IPv6 for smart city

IPv6を用いた環境分野のクラウドサービスの実現に向けた実証実験

環境負荷軽減型地域ICTシステム基盤確立事業 (21年度第2次補正予算額20億円)

環境にやさしいまちづくりを支援するため、最先端のICT技術を利用し、各地域特性に合わせたICTシステム基盤を構築・実証する。これによって環境負荷軽減のために必要な技術基準を確立し、地域資源の生産と消費の最適化を推進する。





Green university of Tokyo Project

グリーン東大工学部プロジェクト

<http://www.gutp.jp/>



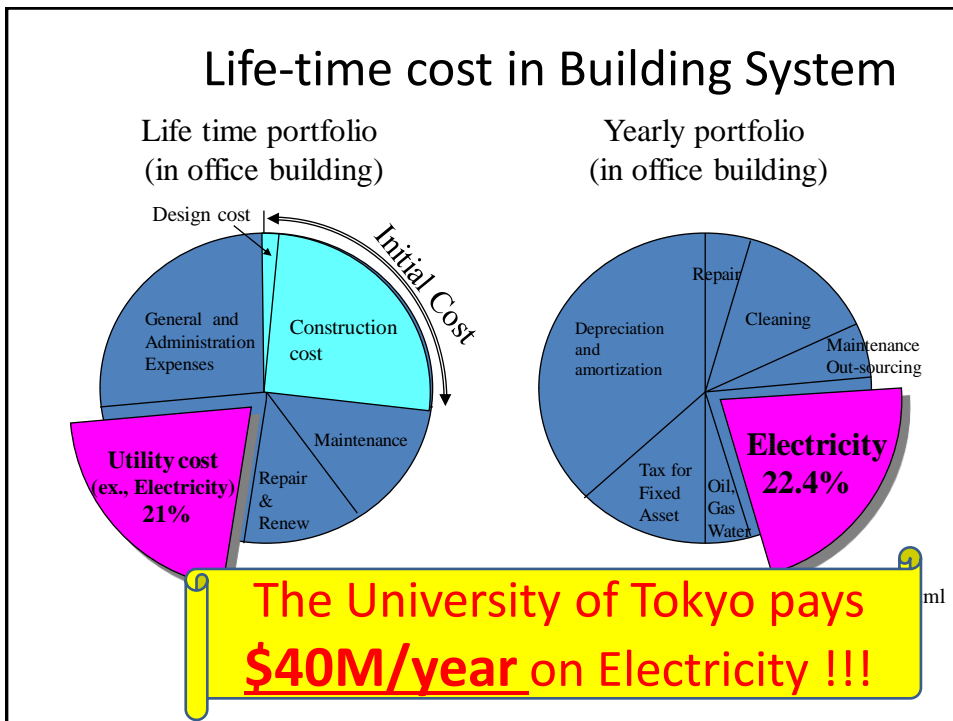
Back ground



- Proprietary technologies in Facility Networks
 - More than 200K monitoring and controlling points in a large complex
 - Each systems use different technologies, sometimes proprietary technologies

- They tend to adapt IP and XML technology
 - But, still, there are many non-IP systems, due to various reasons
 - **BACnet by ASHREA adopts IPv6**







Green Univ. of Tokyo Project

- Building No.2, Hongo Campus
 - Established in June 2008.
 - Targeted reduction;
 - 15%=\$4M USD (in 2012), 50%=\$30M USD (in 2030)
 - 12 floor high, R&D and R&E activities
 - Established October 2005, Start of Operation in March of 2006
 - More than saving energy
 - Forming R&D consortium



東京大学
THE UNIVERSITY OF TOKYO



Member organizations

【Companies】

- Cimx Corporation.
- Cisco Systems, Inc
- Citrix Systems Japan K.K.
- Daikin Industries, Ltd.
- Digital Electronics Corporation
- DSI, Inc.
- Fuji Xerox Co., Ltd.
- Fujitsu Limited
- ITOCHU Corporation
- Japan Agiletech Co., Ltd.
- KAJIMA CORPORATION
- Kantokowa Co., Ltd.
- KOKUYO Co.,Ltd.
- NEC Corporation
- Mitsubishi Corporation
- Mitsubishi Research Institute,Inc.
- Mitsui Knowledge Industry Co.Ltd.
- NTT Corporation
- NTT FACILITIES, INC
- OMRON Corporation
- Panasonic Corporation
- Panasonic Electric Works Co., Ltd.
- WILLCOM, Inc
- SHIMIZU CORPORATION

- Takenaka Corporation
- Toshiba Corporation
- Ubiteq Inc.
- Watanabe Electric Industry Co., Ltd.
- Yamatake Corporation
- Yokogawa Electric Corporation

【Organizations/Universities】

- Facility Networking Interoperability Consortium
- Green IT Promotion Council.
- IPv6 Promotion Council.
- The Institute of Electrical Engineers of Japan
- The Institute of Electrical Installation Engineers of Japan
- LONMARK JAPAN
- OKAYAMA IPv6 CONSORTIUM.
- WIDE Project.
- Tokyo Metropolitan Research Institute for Environmental Protection
- Keio University.
- Nagoya University
- Ritsumeikan University
- Shizuoka University.
- The University of Tokyo

Member organizations

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- Cimx
- Cisco
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- Daikin
- Digital
- DSL
- Fuji
- Fuji
- ITO
- Jap
- KA
- Ka
- KC
- NE
- Mi
- Mi
- Mi
- NT
- NT
- OM
- Pa
- Pa
- WI
- SH

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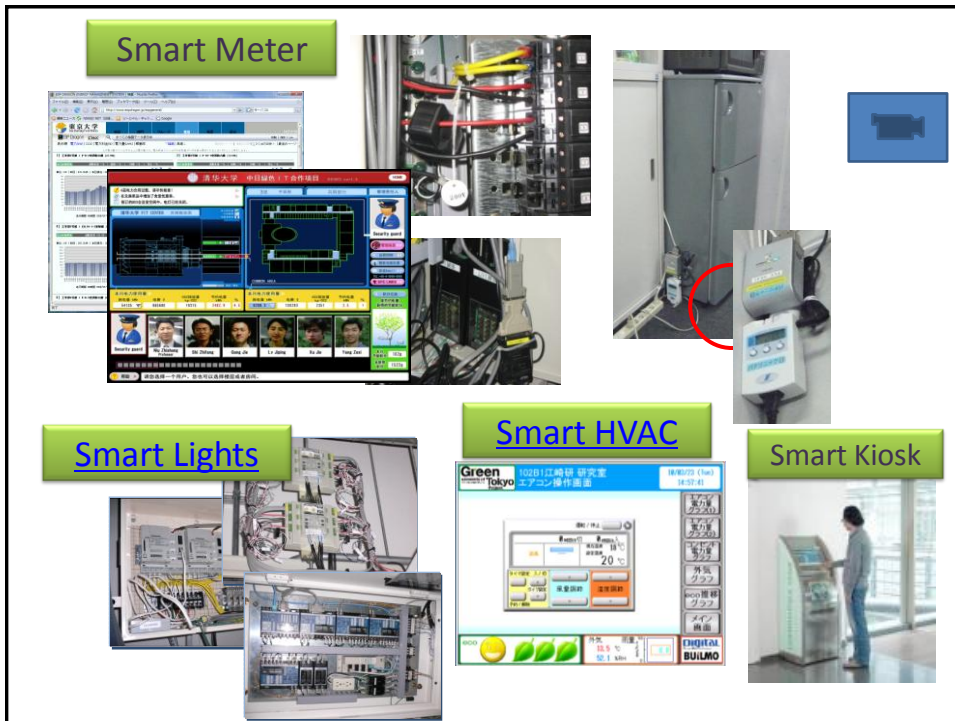
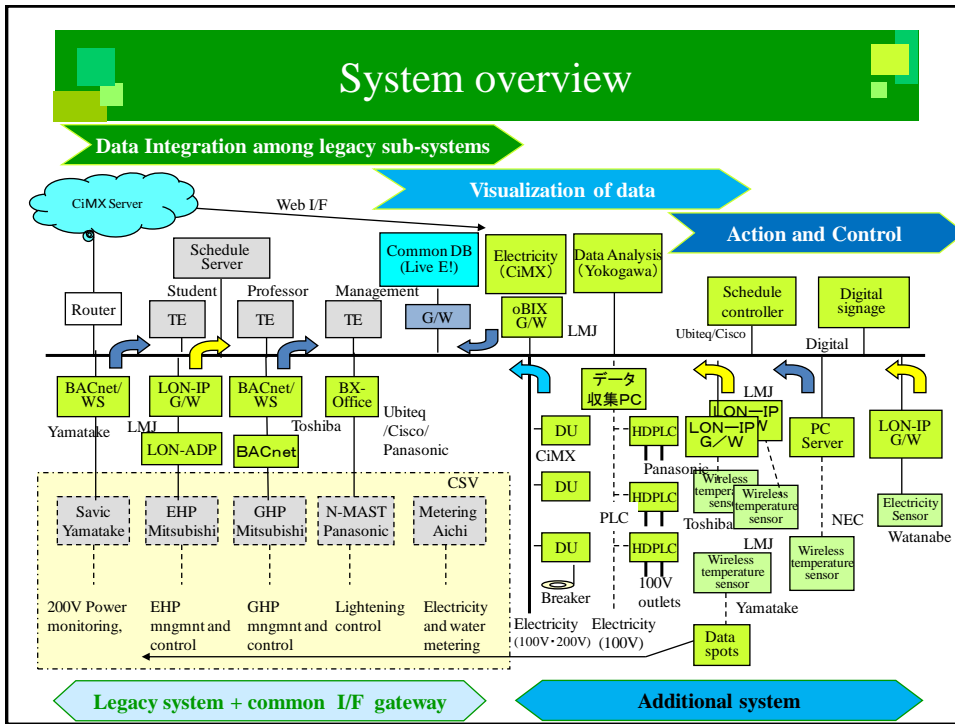
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- Keio University.
- Nagoya University
- Ritsumeikan University
- Shizuoka University.
- The University of Tokyo

43 Members

28 Companies 15 NPOs

Stakeholders on Facility Business;

- Developer, e.g., landlord
- General Contractor/Con's's'tractor
- System Integrator
- System Designer
- ICT Vendor
- Component vendor, e.g., sensor
- Standardization Body
- R&D organization, e.g., University
- Local government, e.g., Tokyo



中日綠色IT合同 清華大學FIT ゲームニクス画面



中日綠色IT合同 清華大學 設置風景



清華大學 FITロビー 歡迎垂れ幕



Same consortium has been established by Tsinghua (清華大學) University in Beijing (China)

大型ディスプレイ東芝REGZA 52'

大型ディスプレイとタッチパネル

Green Society by IT

Smartway



Smart Building

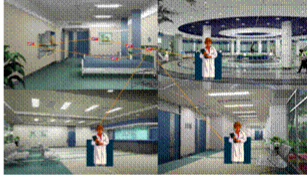


Smart Agriculture





Remote Healthcare



Smart Home



Smart factory



China-Japan Joint Green IT Project

湖南精密農業 Agriculture (「兩型社会」建設)	清華大学FIT Green Campus/Building) (グリーンキャンパス)	中関村ソフトパーク Green Industrial Park (イノベーションハイテクパーク)
		
<p>実施場所: 湖南省長沙市百果園農業ハウス</p>	<p>実施場所: 会議室、共用エリア、廊下、配電室</p>	<p>実施場所: IDCマシンルーム、共用エリア、廊下、駐車場</p>
<ul style="list-style-type: none"> ・センサー(温度、湿度、日照、CO2、土壌の監視測定) ・農作物成長リアルタイムビデオ監視制御システム ・灌漑自動化制御システム ・天窓、遮光ネット、ファン……自動制御システム ・農業知能制御プラットフォーム 	<ul style="list-style-type: none"> ・灯光照明、LED照明制御システム ・共用エリアビデオ監視制御システム ・センサー(人感、温度湿度、照度) ・空調改造 ・配電室改造 ・可視化集中制御監視測定(遠隔) 	<ul style="list-style-type: none"> ・灯光照明、LED照明制御システム ・共用エリアビデオ監視制御システム ・センサー(人感、温度湿度、防犯照明) ・IDCマシンルーム空調改造 ・電力システム改造(スマートメーター) ・可視化集中制御監視測定 ・駐車場管理

Activities toward global standard

1. Not domestic, but global
2. Practical; implementable, interoperable, deployable
3. Sustainability, i.e., Eco-System

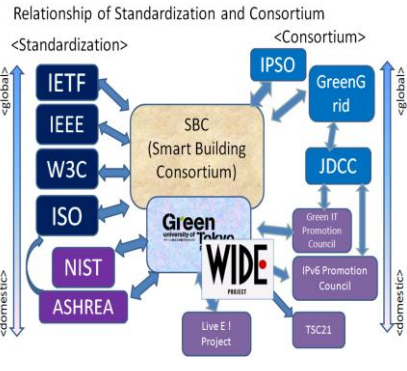


Invitation of stakeholders (new faces for us)

Testbed operation

Interoperability of IoT/SO

- ① China-Japan Green IT
- ② NIST B2G
- ③ IEEE P1888
- ④ IETF/W3C
- ⑤ ASHREA BACnet (ISO/IEC)
- ⑥ IPSO
- ⑦ IPv6 Forum
- ⑧ The Green Grid
- ⑨ ETSI INT, IoT
- ⑩ SBC(Smart Building Consortium)



The IP for Smart Objects Alliance <http://www.ipso-alliance.org/>

IPSO概要

- 2008年8月に25メンバーとともに設立
- 平成21年10月現在: 約50社のメンバーに拡大

目的

- Smart Objects(モノ)へのIP適用を推進
- IETF、IEEEと連携、標準化活動を補完
- 相互接続の確立を支援(based on IPv6 Forum)
- 実利用事例の紹介、技術普及と教育活動

TIME's Best Inventions of 2008

The Other 49 Best Inventions

30. The Internet Of Things

In September, a group of high-tech companies that includes Cisco and Sun, formed the IP for Smart Objects Alliance. Simply put, the organization intends to create a new kind of network that will allow remote-enabled physical objects — appliances in your home, products in a factory, cars in a city — to talk to one another, like never before, people communicate over the Internet.



Top Stories

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- Did a Book Star



Source: Mr.Kinoshita of Cisco Systems Japan



Thank you



IPv6 Promotion Council of Japan:
<http://www.v6pc.jp/en/index.html>
e-mail: info@v6pc.jp



Task Force on IPv4 Address Exhaustion:
<http://kokatsu.jp/>

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