

## **Building Communications System: Takenaka's M2M Platform for Building Management & Application Interface**

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### **Abstract**

In this presentation, we will introduce Takenaka Corporation's Machine to Machine (M2M) communications platform for building management. With its system architecture and some implementation case studies, including energy data visualization, demand response, and utilization of building information modeling (BIM) data at building operation.

While conventional buildings have been practicing various energy saving and building management measures by each building individually, the recent innovation of Information and Communication Technologies (ICT) proposes valuable solutions by enabling interconnection between building systems and miscellaneous devices, such as end-use appliances, mobile phones, automotive, and power grid.

To enhance synergy of state-of-the-art ICT and building engineering, Takenaka Corporation has developed an open-source, multi-connection, extensible information and control platform, called "Building Communications System".

Takenaka Corporation is one of the largest planners, architects, engineers and contractors firm in Japan, with yearly sales of \$9 billion, 20 overseas offices, the largest construction R&D laboratory in the world. One of the fields of researches is building environment and energy management, including building control systems and strategies, net-zero energy buildings, and smart community.

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## Today's Agenda

1. The Next Step of Building Energy Saving and Management
2. Takenaka's M2M Platform
3. Case Studies
4. Conclusion

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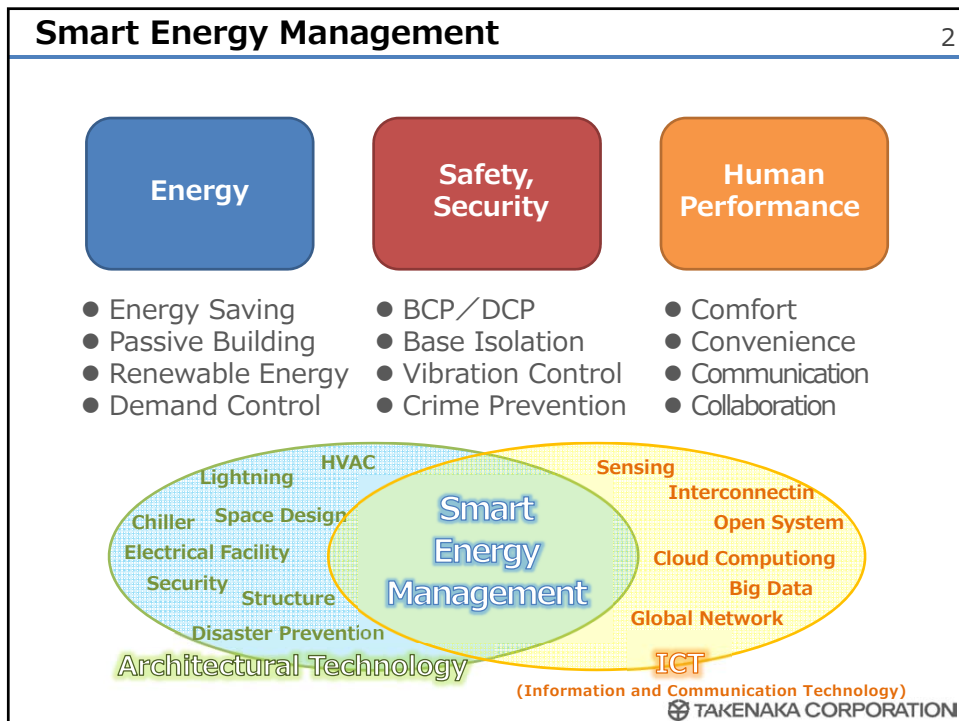
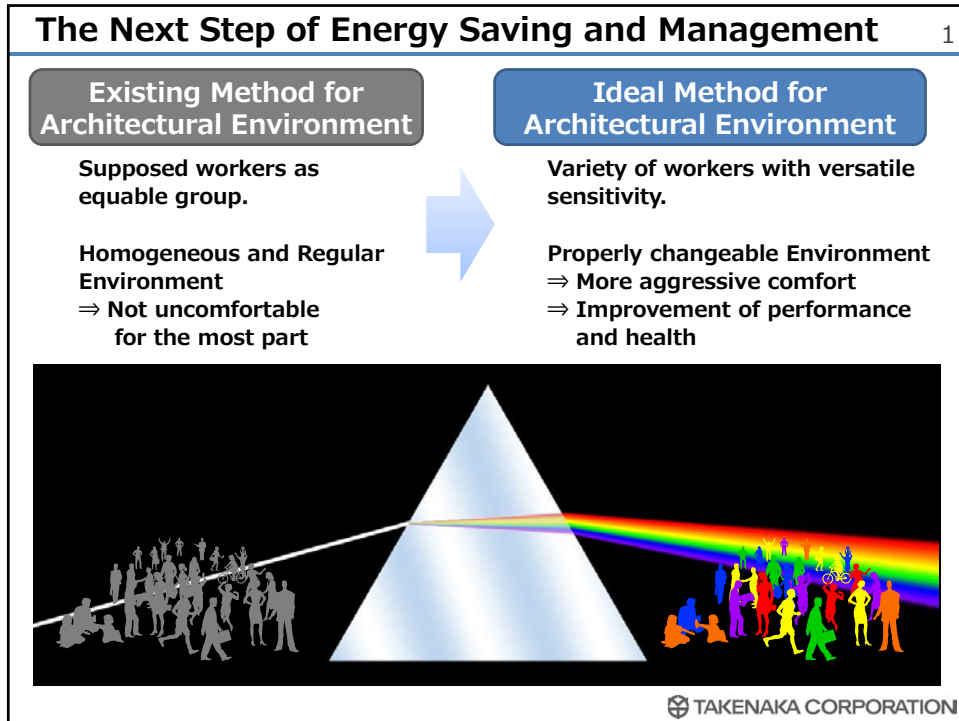
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# 1. The Next Step of Building Energy Saving and Management

## 2. Takenaka's M2M Platform

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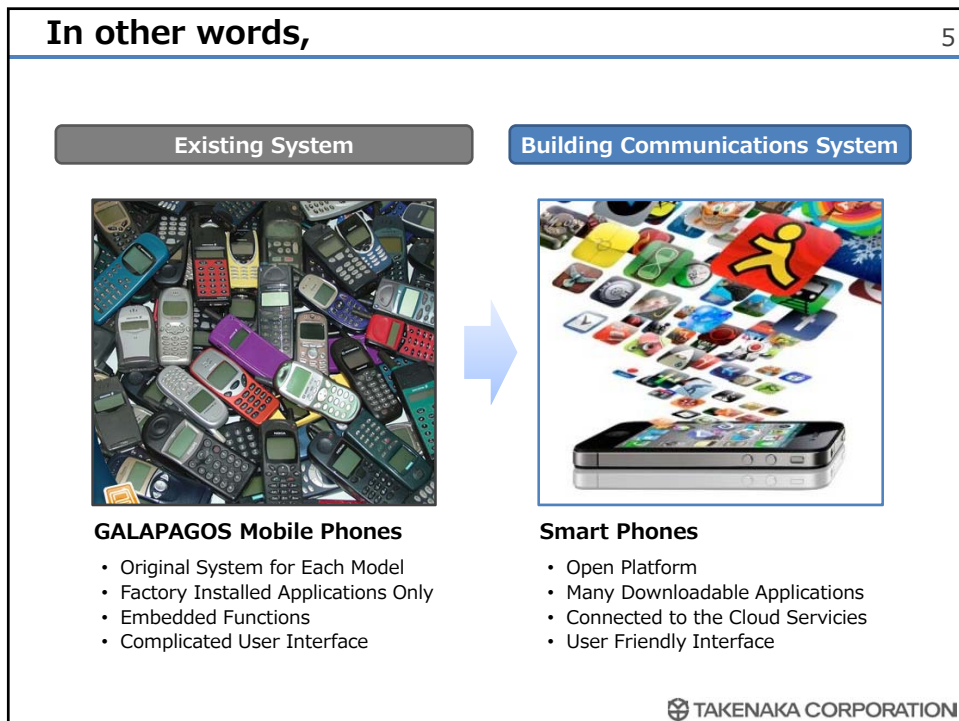
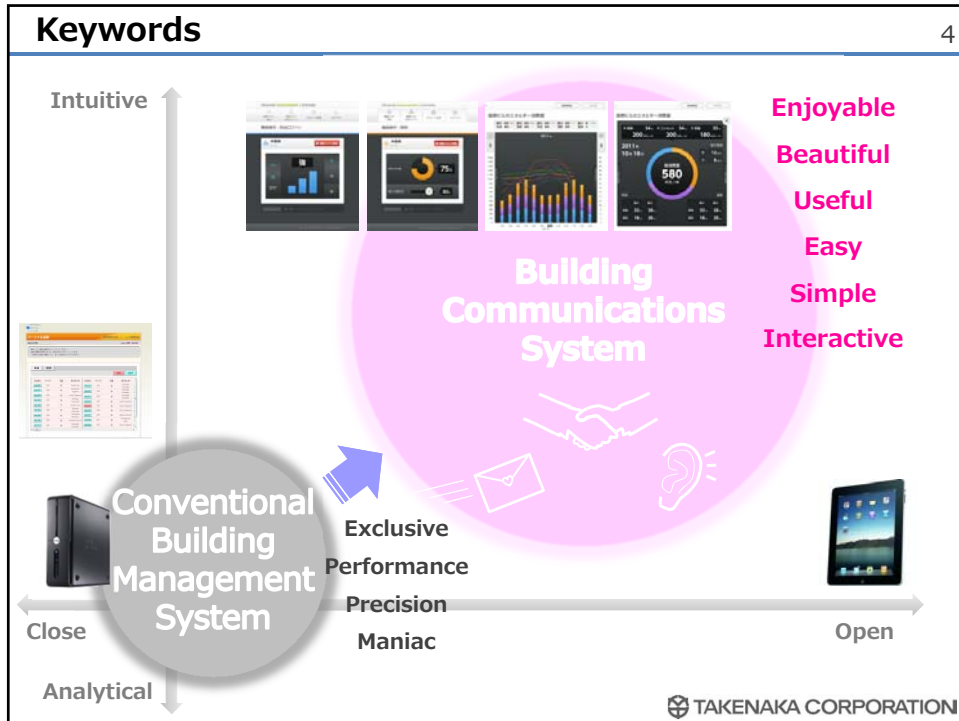
## Takenaka's Machine to Machine Platform

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Interconnect various systems and users inside and outside of the buildings.



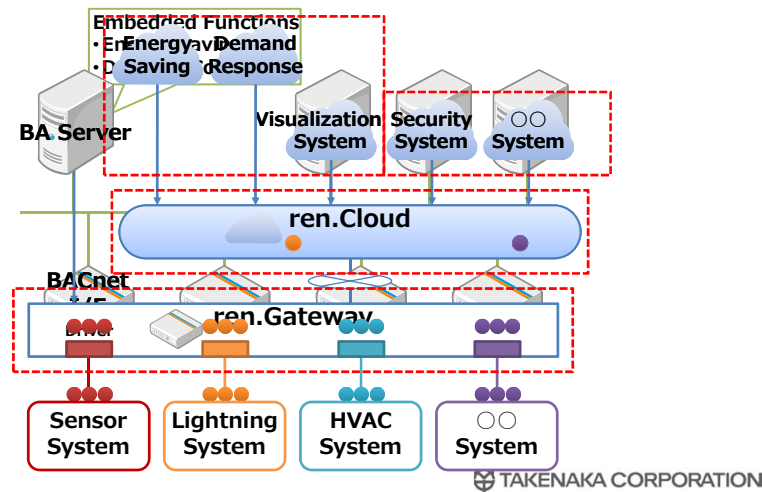
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## Building Communications System Architecture

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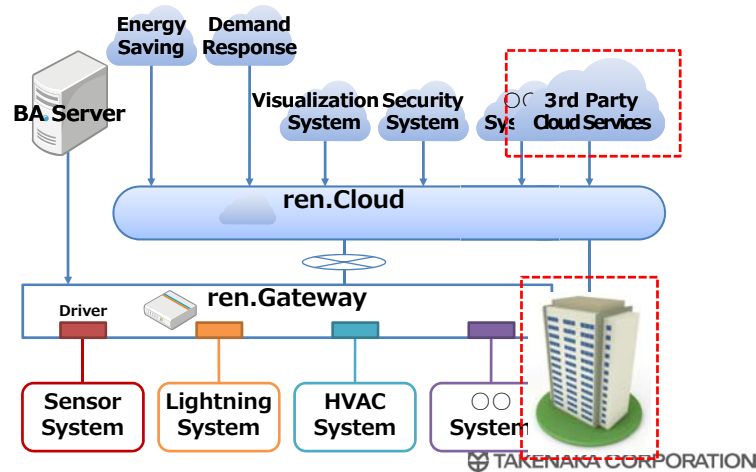
- Gateway converts various original protocols
- Functions are provided from cloud services
- Easy to add/remove functions
- Able to be shared local information by every systems



## Building Communications System Architecture

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- It does not depends on size and number of the buildings
- Interface for 3rd Party cloud services.



## Building Communications System Architecture

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- Gateway converts various original protocols
- Functions are provided from cloud services
- Easy to add/remove functions
- Able to be shared local information by every systems
- It does not depends on size and number of the buildings
- Interface for 3rd Party cloud services.

Reduction in cost of  
system upgrade.

Timely response for  
users' request.

Better building  
management service

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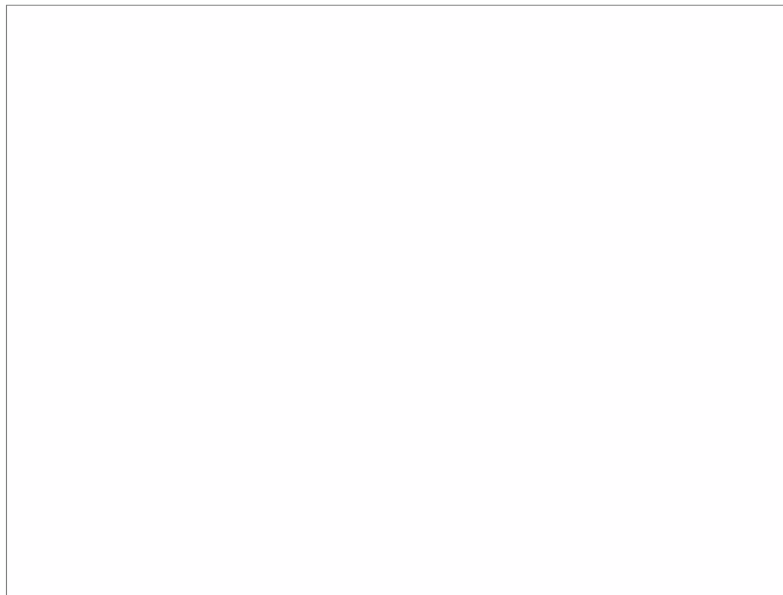
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## Smart Life Office, the Test Bed for New Work Space 10



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## Smart Life Office, the Test Bed for New Work Space 11



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## Case Studies : TAK E-HVAC Shinsna HQ 12



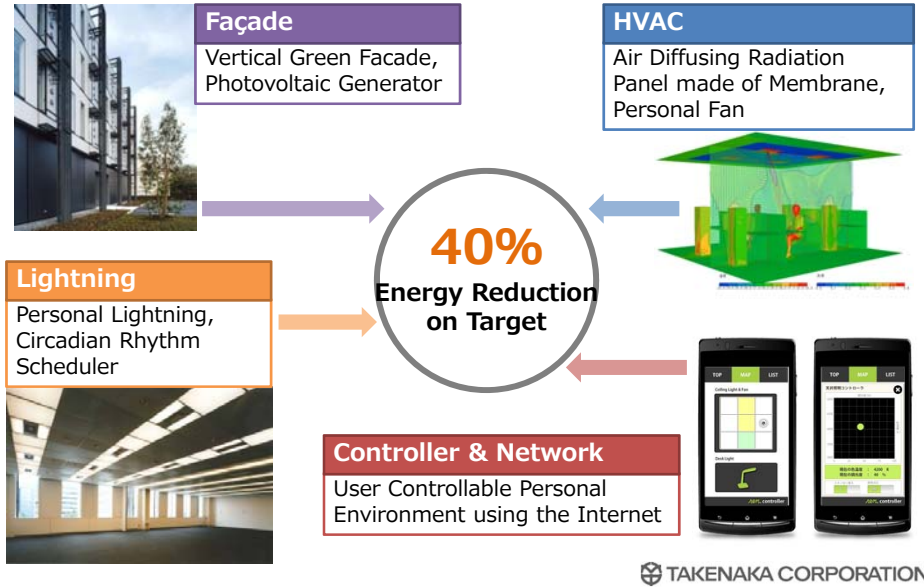
Owner : TAK E-HVAC Corporation  
 Design : Takenaka Corporation  
 Construction : Takenaka Corporation  
 Site : Shinsuna Koutou Tokyo, Japan  
 Total Floor : 3,918.05㎡ (※Test Bed Area, 170㎡)  
 Structure : Steel  
 Floor : 4-story  
 Completion : Apr. 2010

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## Case Studies : TAK E-HVAC Shinsna HQ

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The first case that Building Communication System is installed.



## Case Studies : TAK E-HVAC Shinsna HQ

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**Controller** User Controllable Personal Environment using the Internet

Building in the real world



Virtual building  
3D model on Cloud

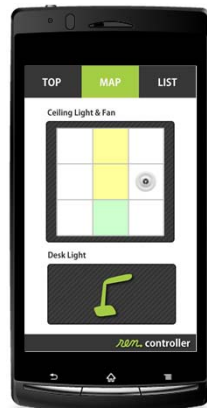
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## Case Studies : TAK E-HVAC Shinsna HQ

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**Controller** User Controllable Personal Environment using the Internet

User friendly interface makes it easy and convenient.



Equipment Selection



Brightness and  
Color Temperature Control



Scene Selection

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## Case Studies : Iino Building

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Owner : Iino-kaiun Corporation  
Design : Takenaka Corporation  
Construction : Takenaka Corporation  
Site : Chiyoda Tokyo, Japan  
Total Floor : 103,852 m<sup>2</sup>  
Floor : 27-story  
(+5 underground)  
Completion : Oct. 2011

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## Case Studies : Iino Building

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### Tenant Portal Website



### Information from Building Manager



### Energy Visualization



### Personal Environment Controller



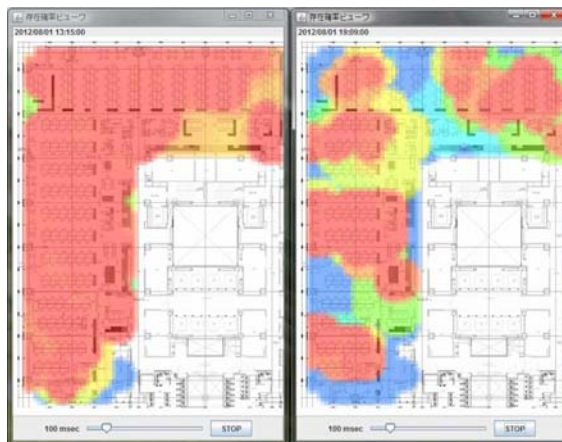
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## Case Studies : Iino Building

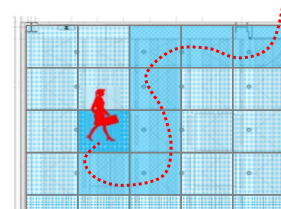
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### Motion sensor network

Analyzing the human detect events form motion sensors, in order to recognize human existence.



Day time Overtime  
0% 50% 100%



Motion sensors are located on grid



Motin sensor



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## Conclusion

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- ◆ It is not impossible to manage both comfort and saving energy.
- ◆ Key factor is "Usability" of building systems.
- ◆ People essentially know the importance of saving energy.

