



# Energy Management Control Systems

*It's All About  
Connectivity*



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# Topics

- Discuss building systems
- Examine communication protocols
- Explore needs of today's EMCS
- Redefine an EMCS as an Infrastructure



# EMCS Installed Base

- Were not designed to address diverse building systems
- Often are as old or older than the systems they control
- Single or limited number of users
- Single source





# Building Systems

- Energy Users
  - HVAC
  - Lighting
  - Office Equipment
  - Process Equipment
  - Waste
- Energy Suppliers
  - Electrical Utility
  - Electrical Equipment
  - Gas
  - Steam/Chilled Water
  - Water



# Protocols for Energy Users

- HVAC
  - BACnet
  - LonWorks
  - Proprietary
- Lighting
  - Dali
  - LonWorks
  - Proprietary
- Office Equipment
  - Proprietary
  - Web Services
- Process Equipment
  - Modbus
  - OPC
  - Proprietary
- Waste
  - Discrete I/O
  - Modbus



# Protocols for Energy Suppliers

- Electrical Utilities
  - Web Services
  - Proprietary
- Electrical Equip.
  - Modbus
  - LonWorks
  - Proprietary
- Gas
  - Modbus
  - Proprietary
- Steam/Chilled Water
  - Discrete I/O
  - Modbus
  - Proprietary
- Water
  - Discrete I/O
  - Modbus





# Emerging Technologies

- Wireless
- XML
- Web Services
- oBIX



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# Wireless Technology

- Not a protocol
- Communication media
  - Broadband
  - Cellular
  - Satellite
  - Point to point
  - Mesh





# XML

- EXtensible Markup Language
- Easily searchable data

```
<object>  
<type>analog</type>  
<name>Bulding 201 Electric Meter</name>  
<value>12000r</value>  
<units>KWH</units>  
</object>
```



# Web Services

- TCP/IP based systems
- Application and data sharing
- Uses XML/SOAP/UDDI
  - Simple Object Access Protocol
  - Universal Description and Discovery Integration





# oBIX

- Open Building Information Exchange
- Defines a Web Service for building systems
- XML-based protocol
- Optimized for Systems Integration
- Uses Contracts to define data structures



# EMCS Needs Today

- Designed to connect to all building systems
- Need to be extensible for future technologies
- Available to a diverse user base
- Open distribution



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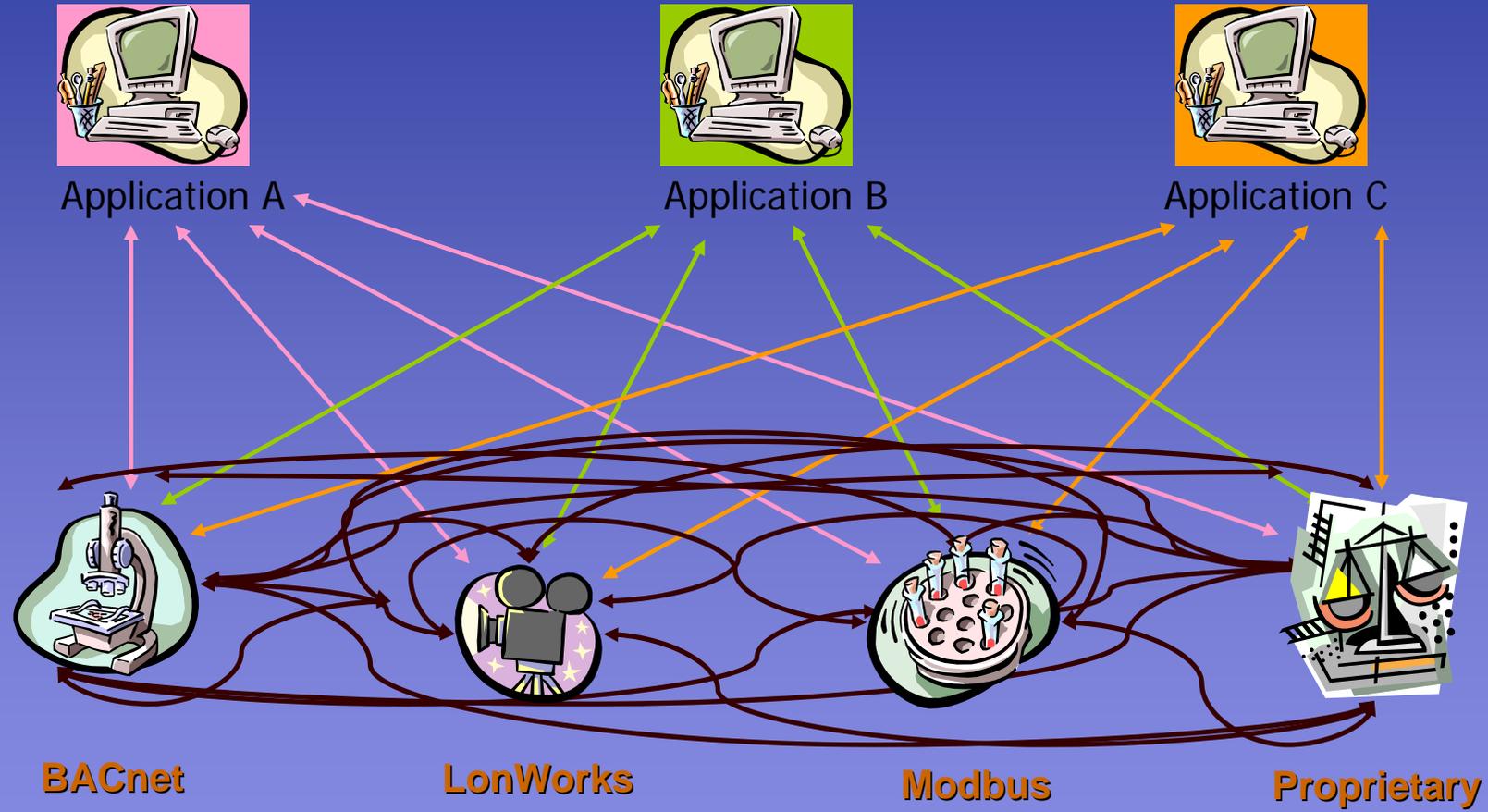


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# Protocol Based EMCS





# Information Technology

- Office Automation Infrastructure
  - Diverse systems
  - Diverse functions
  - Extensible
  - Open Architecture
  - Open Distribution





# Information Technology Infrastructure



User A



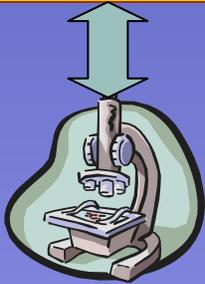
User B



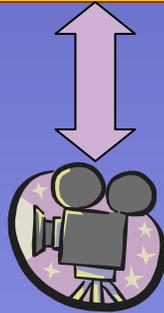
User C



OFFICE INFRASTRUCTURE



Email



Documents



Data Storage



Communication





# IT-Based EMCS Infrastructure



Application A



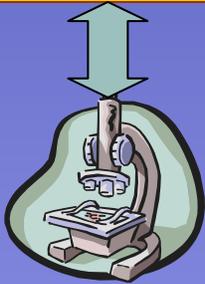
Application B



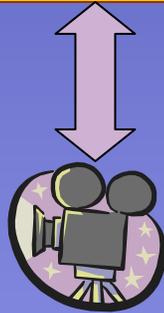
Application C



**AUTOMATION INFRASTRUCTURE**



BACnet



LonWorks



Modbus



Proprietary





# Information Technology

## Office Automation

- Connects to many diverse systems
- Different communication protocols
- Many users with different interest
- Open architecture
- Open distribution



# Needs of Today's EMCS

- Connect to many diverse systems
- Different communication protocols
- Many users with different interest
- Open architecture
- Open Distribution





# Would you like to know more about this session?

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- Don't forget to fill out  
and drop off your  
session evaluations.

## Some sources

- tridium.org
- oBIX.org
- w3.org
- xml.org





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**New Orleans**  
**August 5-8**