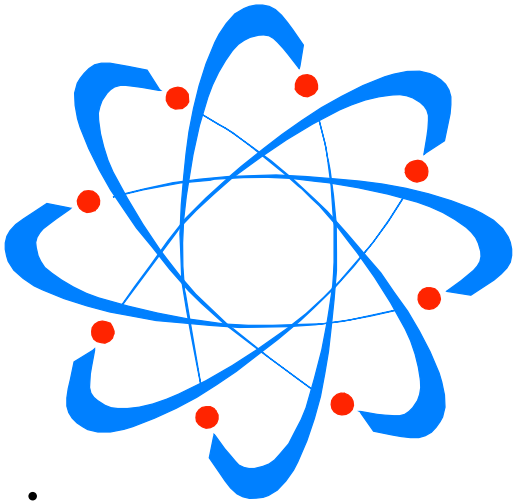
BACnet and Lighting Applications

The photographs used in this presentation were taken by Steve Karg.
This presentation was created and edited with OpenOffice.org Presenter.

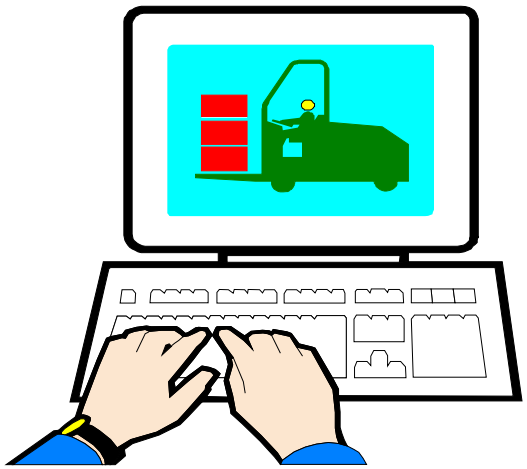
Why a Standard Protocol?



- Interoperability
- Competitive system expansion
- End fear of being locked in
- Integrating building services requires communication standards
- Reduce training cost by using a single operator interface.
- Enable development of new technology

Why a Standard Protocol?

- Share data among different vendor's systems for a more sensible and integrated approach to facilities management
- Access all systems from a common interface to permit common graphics, event and alarm annunciation, and data logging.



BACnet is a Standard Protocol

- ANSI/ASHRAE Standard 135-2004
- First released in 1995
- Adopted as EN ISO 16484-5
- Used by every HVAC manufacturer
- Used by fire, access control, and lighting manufacturers.

Unique BACnet Features

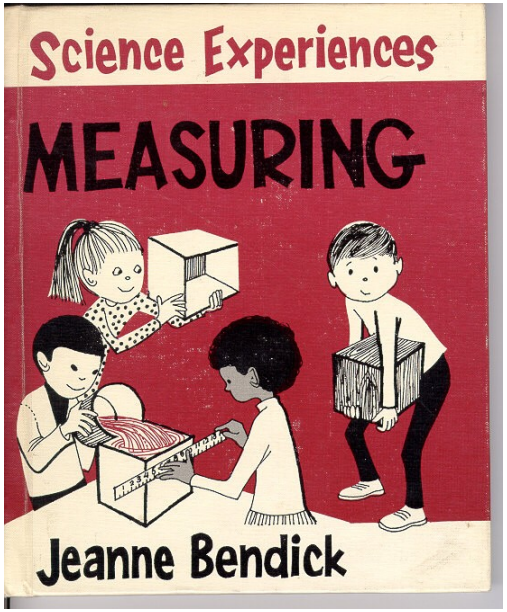
- Scalable from very small, price sensitive devices and networks, to large multi-building systems
- Wide range in cost/performance choices for networking technologies
- Alarm processing
- Scheduling

Unique BACnet Features

- Prioritized command to control equipment
- Flexible, object oriented representation of information
- Does not impose a particular philosophy for distributing control functionality

BACnet Success

- Installed in offices, schools, and churches
- Installations are often multi-vendor
- Used as native networking protocol on some lighting controls, others use gateway



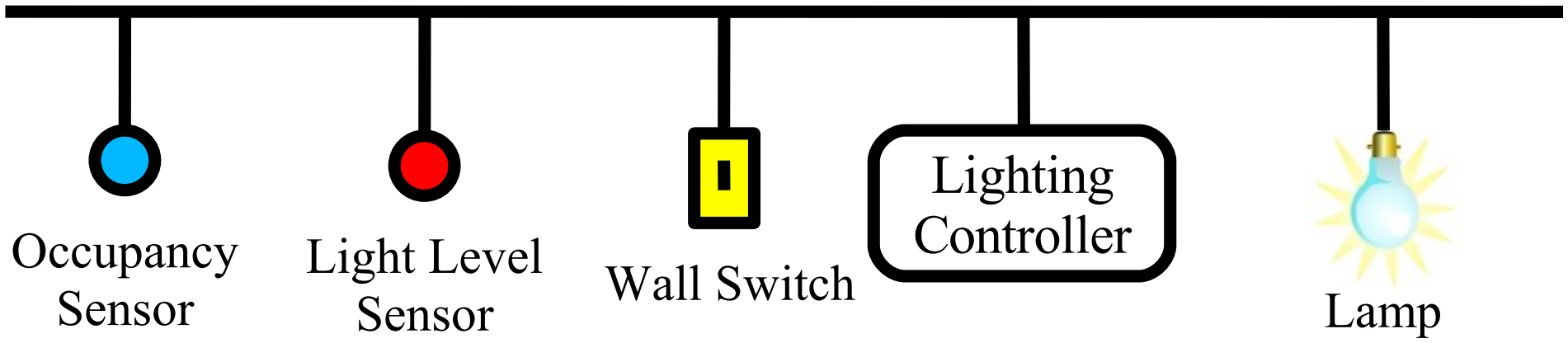
How BACnet Models Automation Systems

- Objects
- Services
- Networks
- Internetworks

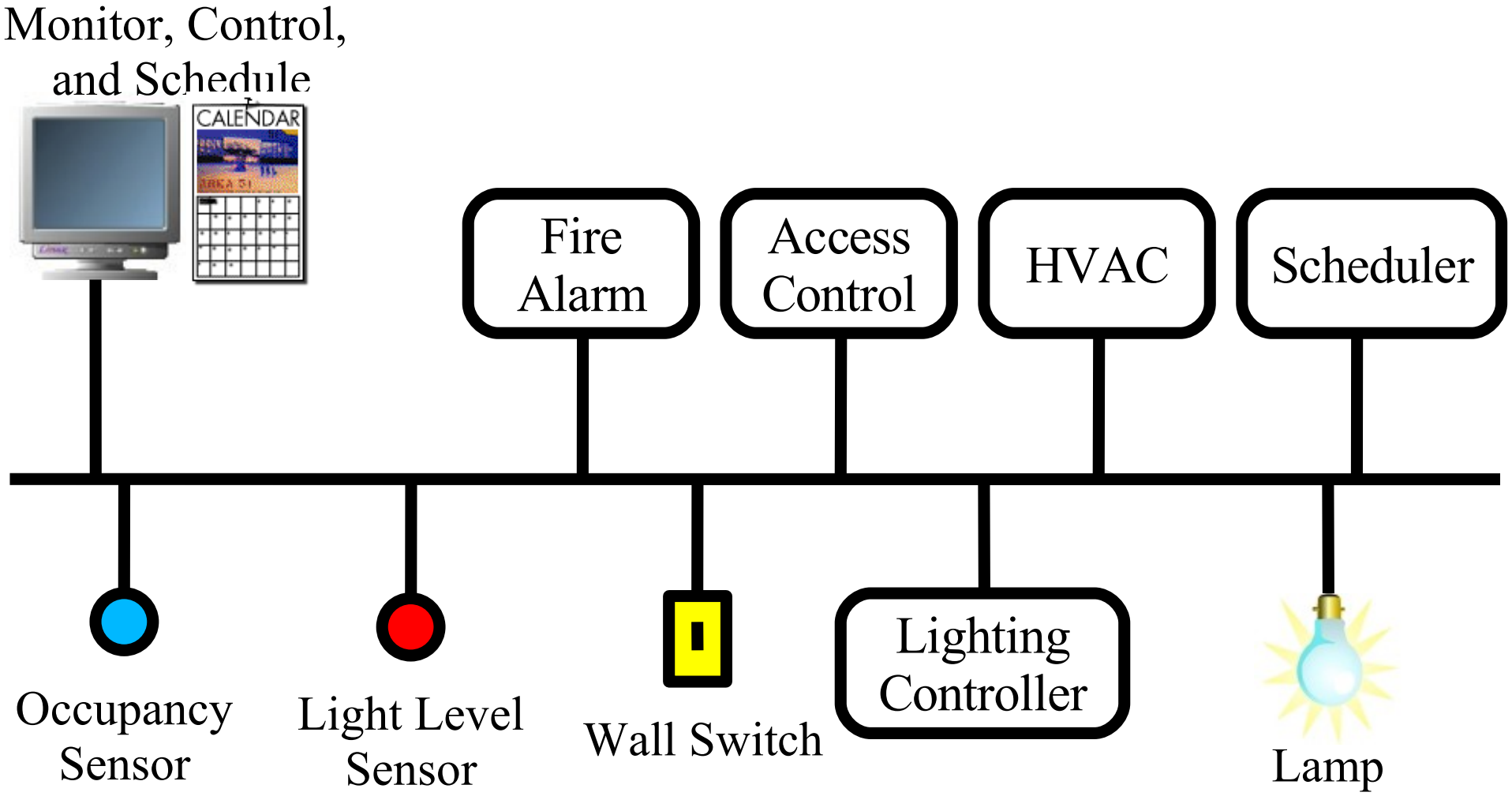
BACnet Objects and Services

- Objects represent physical inputs, outputs, and software processes
- Services
  - Object access
  - Device management
  - Alarm and event
  - File transfer
  - Virtual Terminal

Local Control



Integrated Control



BACnet Network Options

BACnet allows choices between various forms of Local Area Network to use for the Data Link Protocol and physical media for wiring and signaling.

- Ethernet over coax, UTP, or fiberoptic
- ARCNET over coax, UTP, or fiberoptic
- MS/TP over EIA-485, shielded twisted pair
- PTP over EIA-232, direct or dialup
- LonTalk Data Link Only (all media)
- Internet Protocol (IP)
- Web Services for facility data
- Wireless (proposed)

BACnet Internetworking

- When two devices which are connected to different networks need to exchange information or interoperate
  - Performance constraints
  - Cost constraints
  - Isolate message traffic
  - Remote access
  - Utilize existing infrastructure

BACnet's Future Addressed

- ASHRAE formed Standing Standards Project Committee 135 (SSPC 135) to address questions of interpretation and to develop appropriate addenda to the standard (continual maintenance)
- Conformance Testing by BACnet Manufacturers Association
- Working groups

BACnet Testing Labs

BACnet Manufacturers Association

- The product's implemented BACnet functionality must be consistent with the BACnet functionality declared in the testing application form and supporting documents provided to the BTL. Under special circumstances, exceptions may be permitted.
- The product must be compliant with the parts of the BACnet Standard and approved addenda that are relevant to the BACnet functionality implemented in the product.
- The product must not cause significant harm to the network to which the product is connected.

BACnet Lighting Applications Working Group

- This group researched, drafted, and proposed additions to the BACnet standard to support the requirements of light control applications.

- The group works in cooperation with the NEMA Lighting Control Council, and the Illumination Engineering Society Controls Committee.

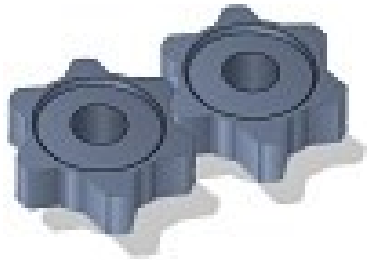
BACnet Lighting Applications Working Group (LA-WG)

- 72 members representing 45 organizations*
  - 19 lighting organizations represented
  - 13 members are active in SSPC 135 (BACnet)
  - 6 members actively worked on proposals
- Met during SSPC or IES-NA meetings

*Based on Yahoo Groups BACnetLighting member list October, 2006.

Lighting Application Requirements

- Interoperable Methods For:
  - Blink Warn
  - Fade or Step to Level
  - Group or Zone Actions
  - Automatic Timeouts (CA - Title 24)
  - Scenes and Preset Levels
  - Dawn / Dusk Schedules
- Network Speed
- Standard Practices



What does the LA-WG do?

- Produced standard practice information
- Monitor other BACnet working groups
  - ✓ BACnet conformance testing
  - ✓ Pulse Counter/Converter
  - ✓ Access Control
  - ✓ Load shed
  - ✓ Security

- Proposed changes and additions to BACnet
  - ✓ **Multiplexer Object – STK-004 – 04/2004**
  - ✓ **Lighting Output Object – DMF-011 – 04/2004**
  - ✓ **Famous Times – DMF-028 – 06/2005**
  - ✓ **Write Group Mode Service – DMF-030 - 06/2005**
  - ✓ **Tripped Status – STK-015 – 05/2004**
  - ✓ **Binary Output Timeout – DMF-019 – 01/2005**
  - ✓ **HOA Status – STK-018 – 09/2005**
  - ✓ **Write Group Service – DMF-032 – 06/2005**

BACnet Lighting Output Object

- Object properties based on DALI
- Designed to gateway to DALI ballasts
- Designed to control non-DALI dimmer
- Designed to support day to day needs