

SMART BUILDINGS LLC

AEE Northern Ohio

November 4th, 2010

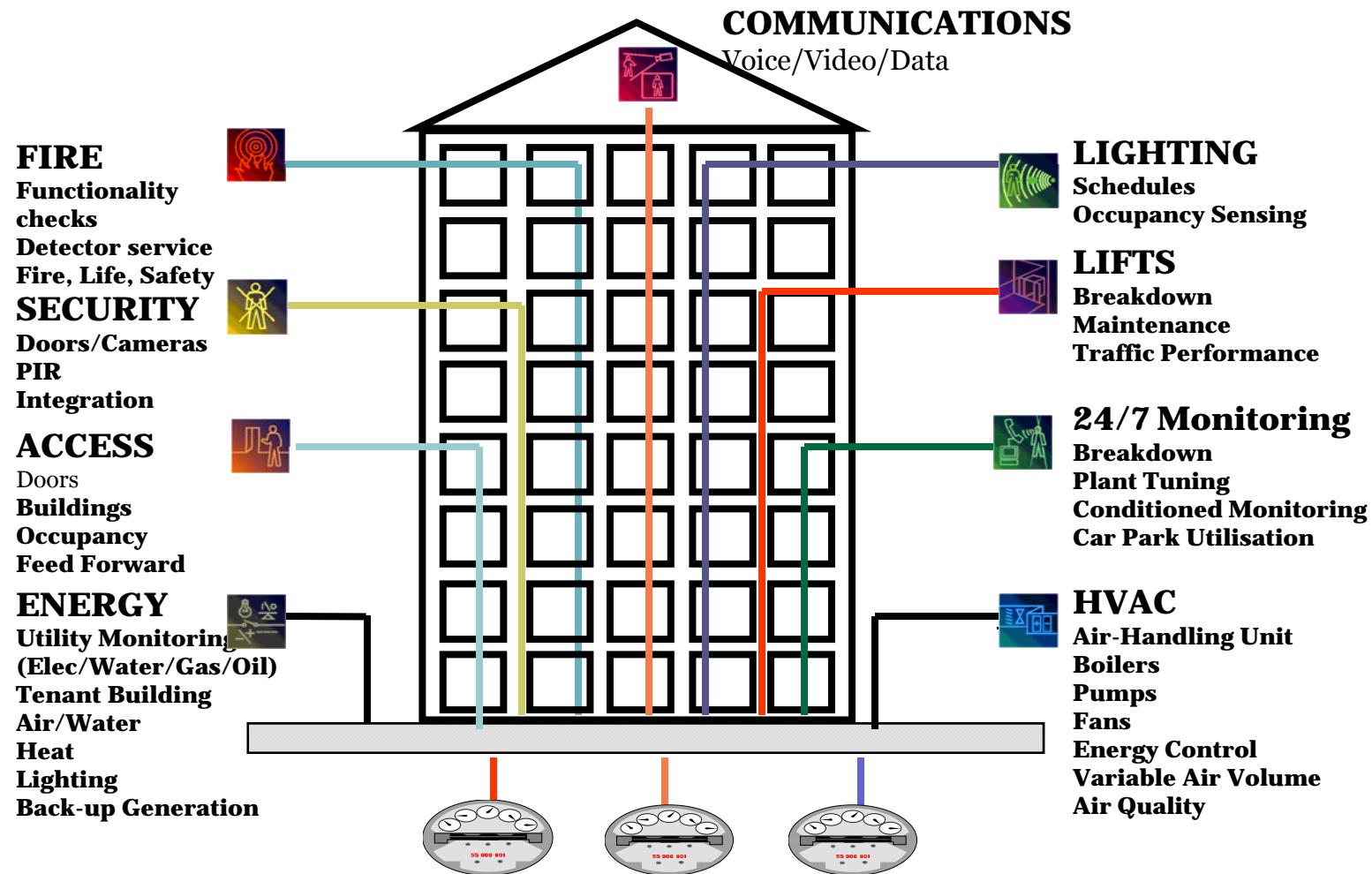




Agenda

- What is a smart building and integration?
- How do you lay the foundation for integration?
- What are the benefits?
- What's Middleware?
- Case Studies
- Evolution of the controls marketplace

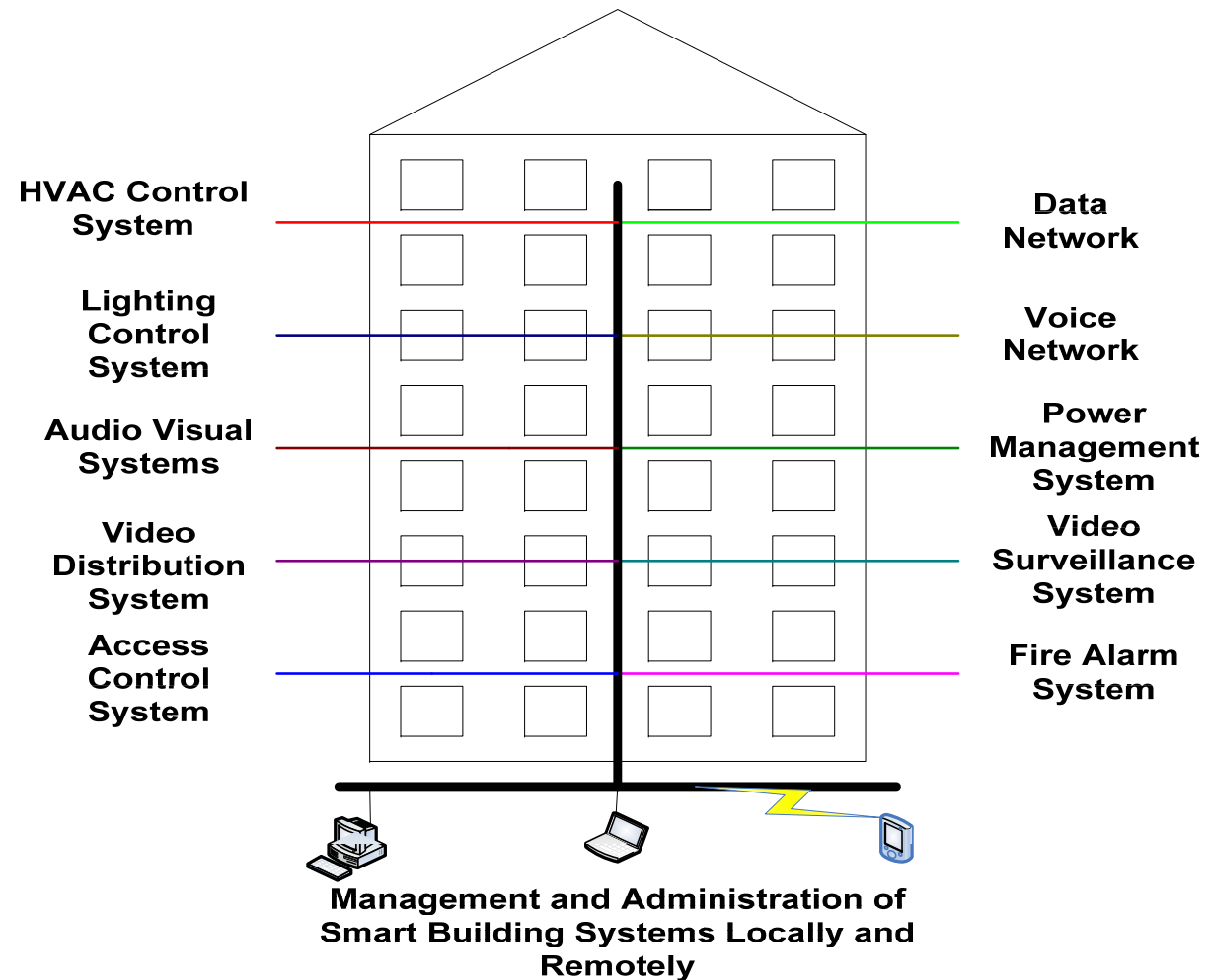
Traditional - Separate Systems



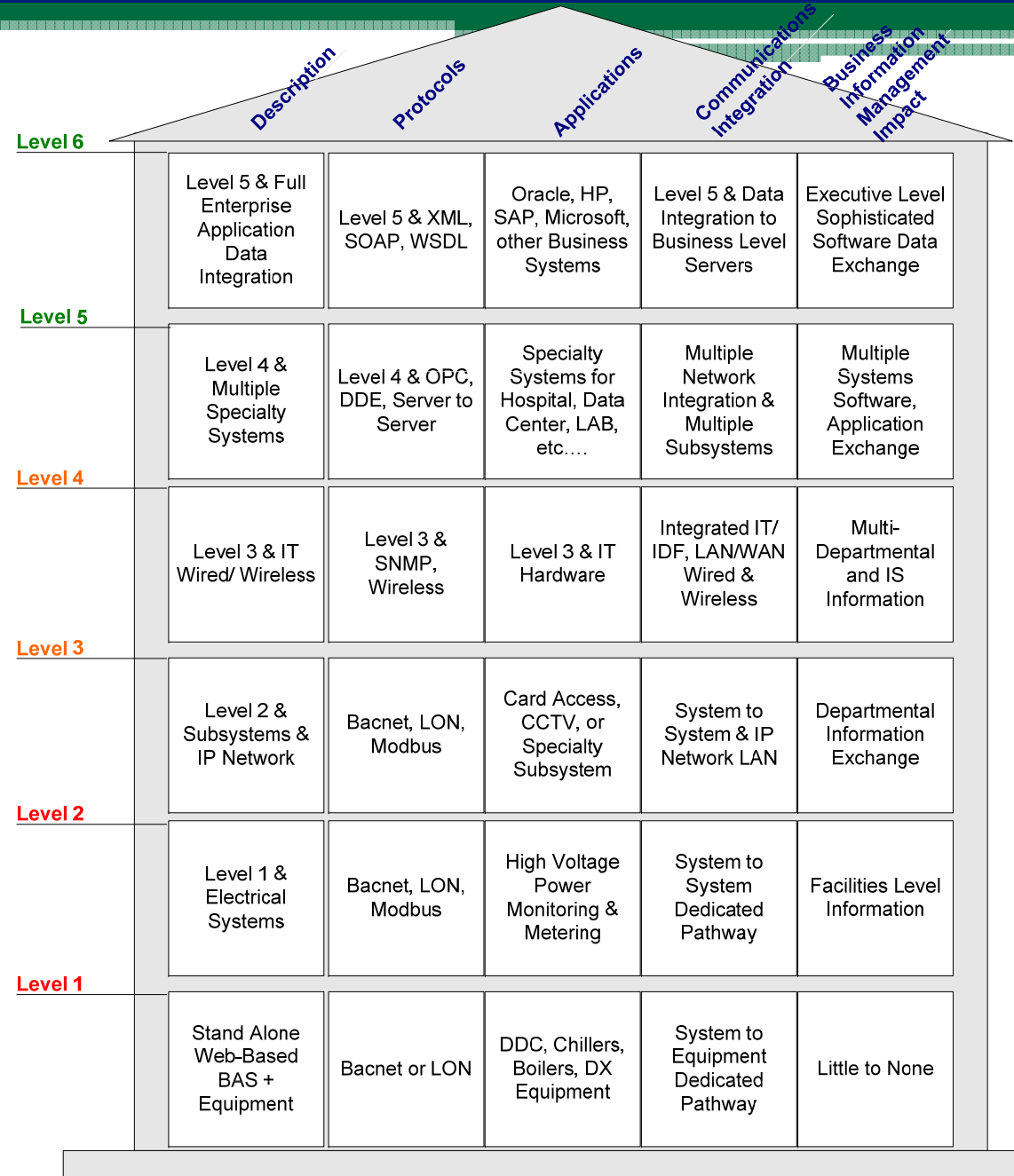
What Do Building Technology Systems Have In Common?

- Network Cabling
- Cable Pathways
- Communications Protocols or Rules
- System Databases
- System Administration and Management Workstations
- Power
- Equipment Room Space
- Web Access

Integrated and Converged Building Networks

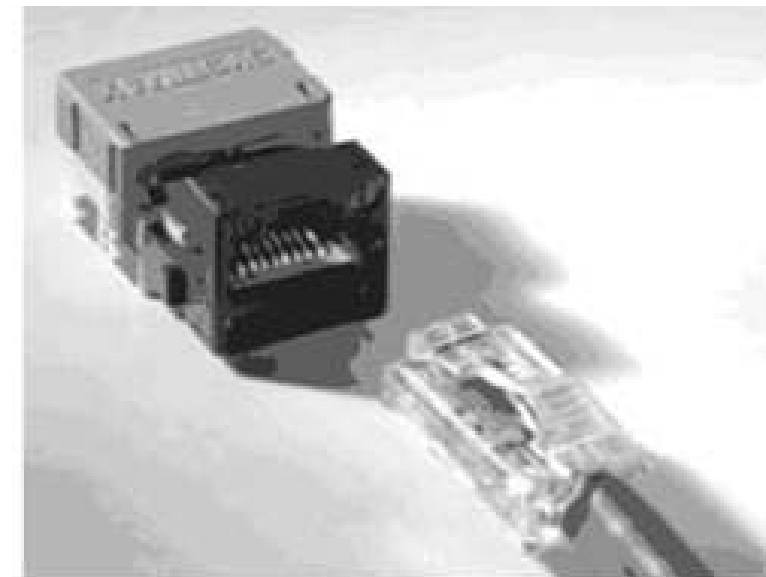


Smart Buildings Principles of Integration©



EFFICIENCY - CAPEX SAVINGS

- **CABLING** - 25-40% of labor cost, 12-20% of the overall cost of the cable installation.
- **CABLE PATHWAYS** - Potential cost savings ranging from 15% to as high as 60%.
- **PROJECT MANAGEMENT** - Approximately 30% of the project management for the systems is eliminated by consolidating the systems and cable installation.
- **EQUIPMENT** –Integration of the systems results in less hardware, less space and reductions in software licenses.
- **TRAINING** - Standard browser and GUI interfaces. Less training of personnel on system management tools and platforms
- **SCHEDULE COMPRESSION AND TIME TO COMMISSION** - Integrated systems take less time to install, less time to configure.
- **POWER** – Potential power and cooling reduction

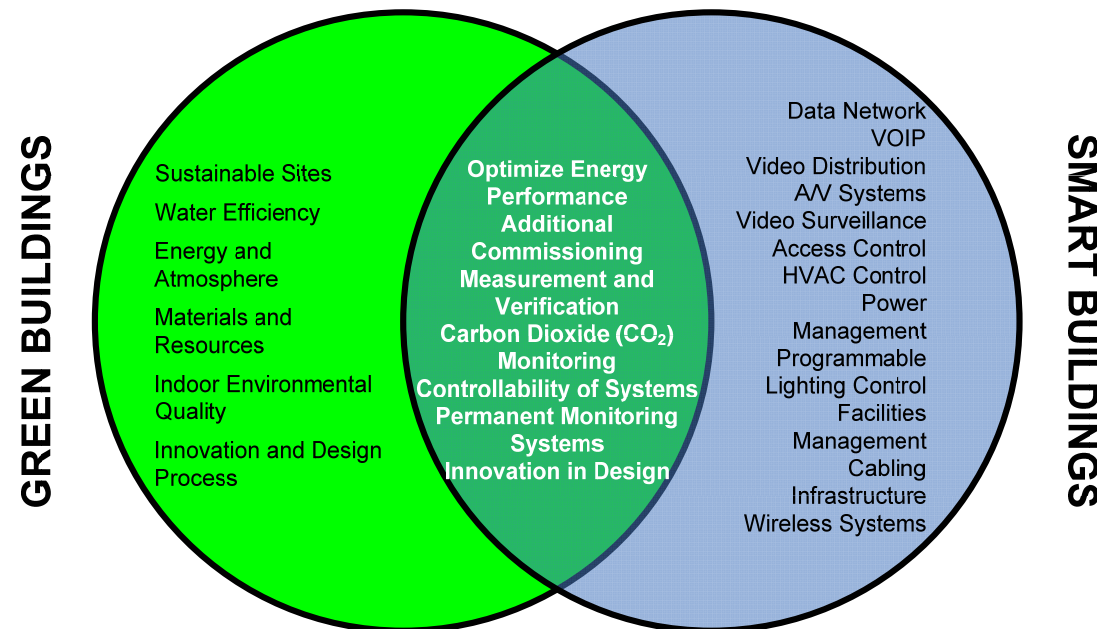


EFFICIENCY - OPEX SAVINGS

- **SERVICE CONTRACTS** - 15% savings with open systems versus proprietary systems
- **ADDITIONS AND REMODELLING** – 20% savings related to structured cable infrastructure.
- **PREVENTATIVE AND PREDICTIVE MAINTNENACE SYSTEM** – Savings of 1-5% of equipment in extending lifecycles.
- **ADDITIONAL ENERGY SAVINGS** – coordinated supply/demand, improved load factors. Additional 6% of energy savings

Green and Smart

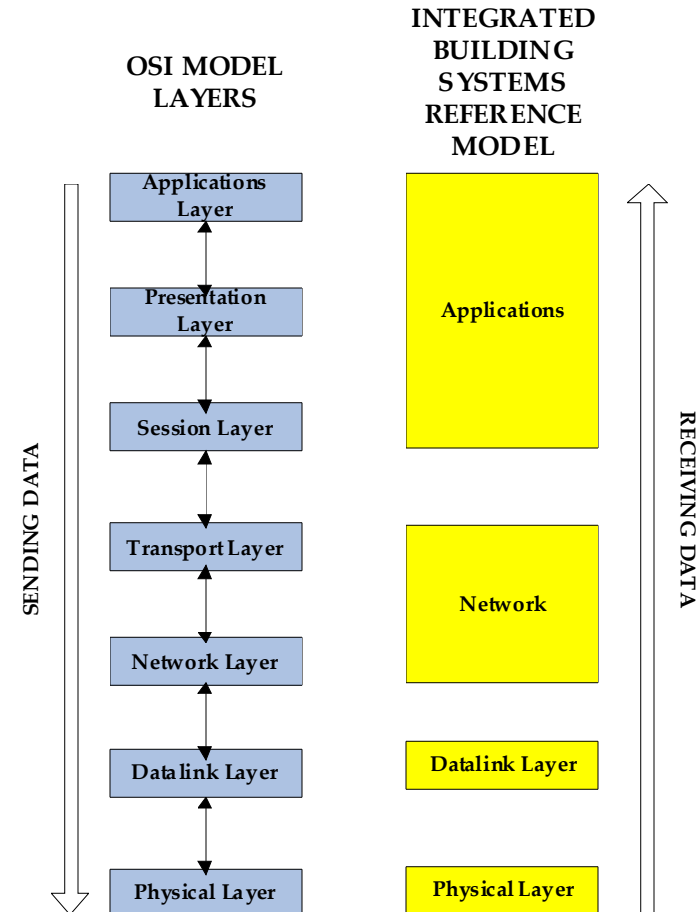
THE COMMONALITY OF SMART AND GREEN BUILDINGS



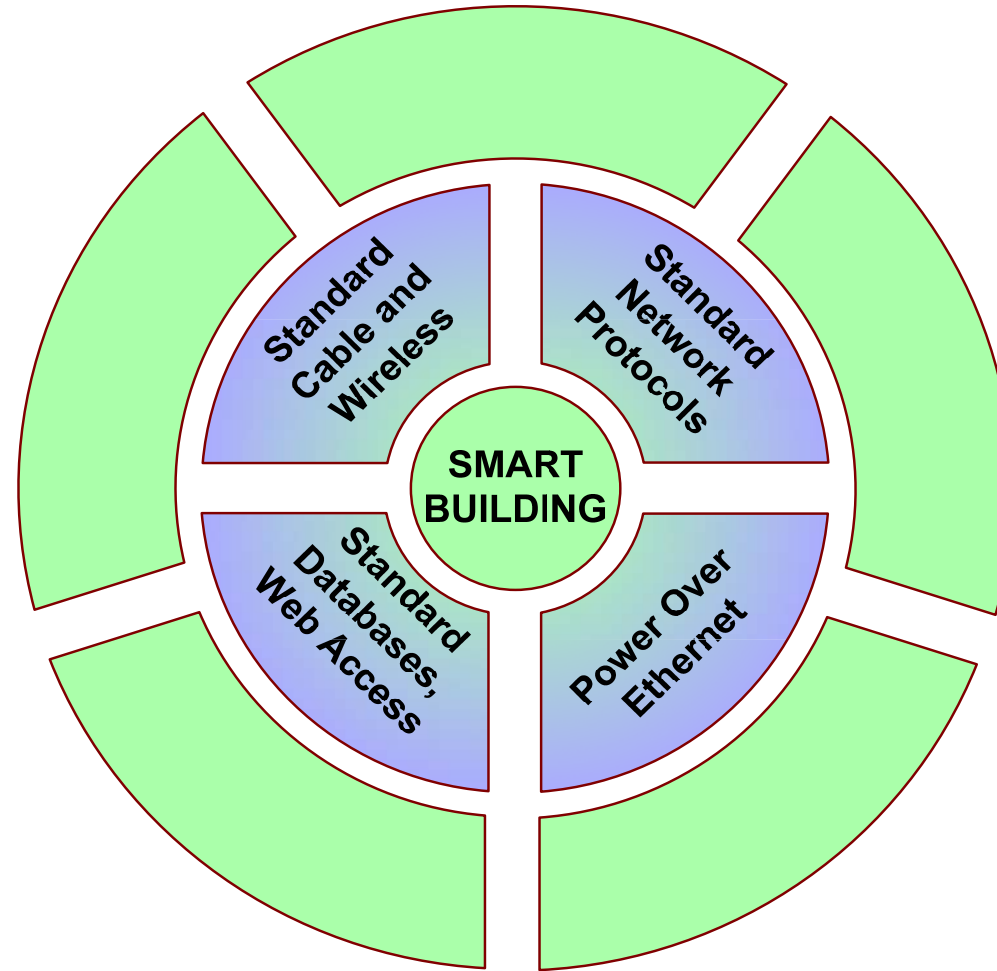
Integrated Systems

“ The Whole is Greater than the Sum of the Parts”

- Integration takes place at the physical, network and application levels
- Integrated systems share resources
- Sharing of resources underpins the financial metrics and improved functionality of integrated systems.
- System integration provides functionality that cannot be provided by any one system.
- Integrated systems strive for a single database, considerably reducing the cost and support for synchronizing separate databases.

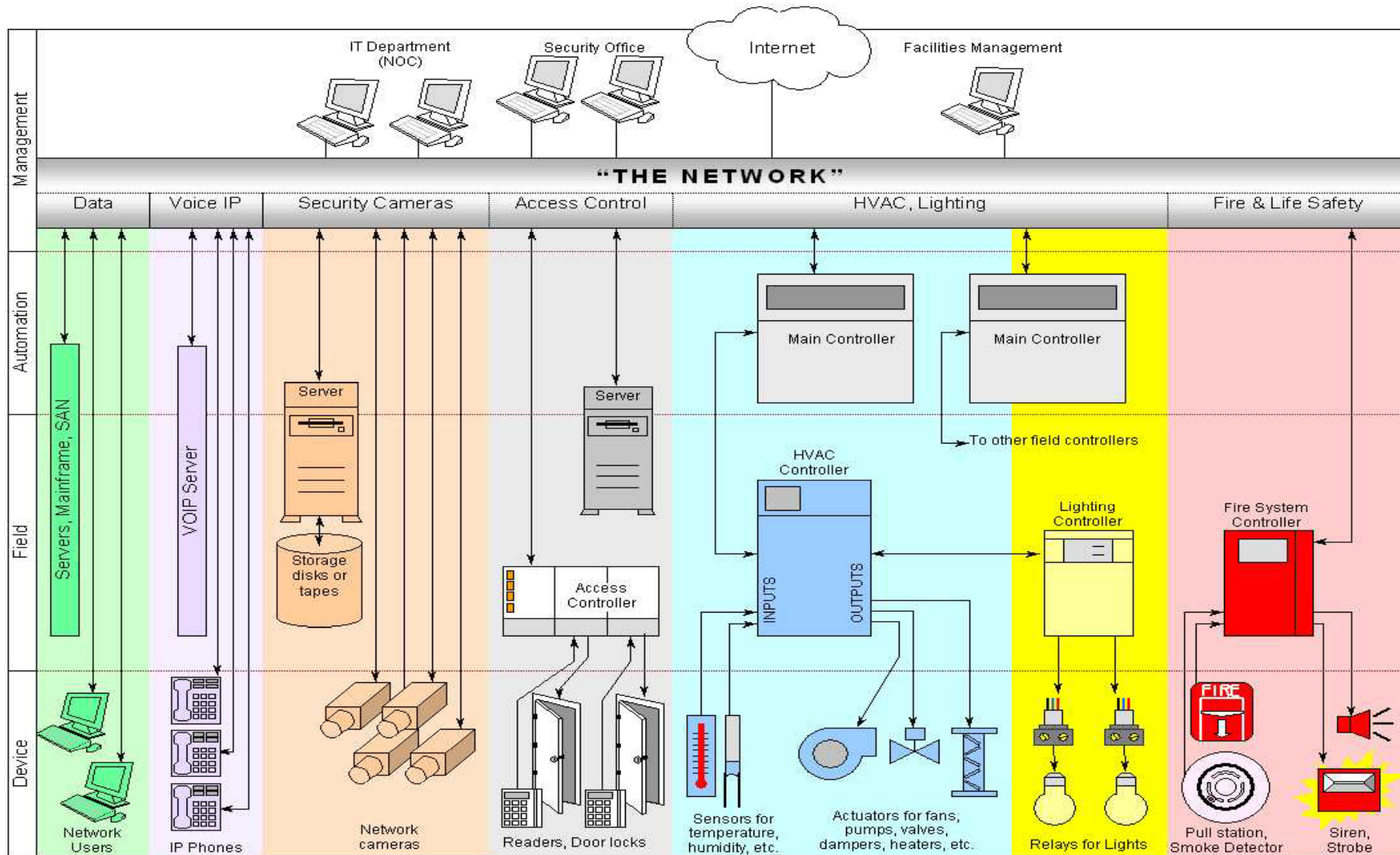


The Technical Foundations of a Smart Building



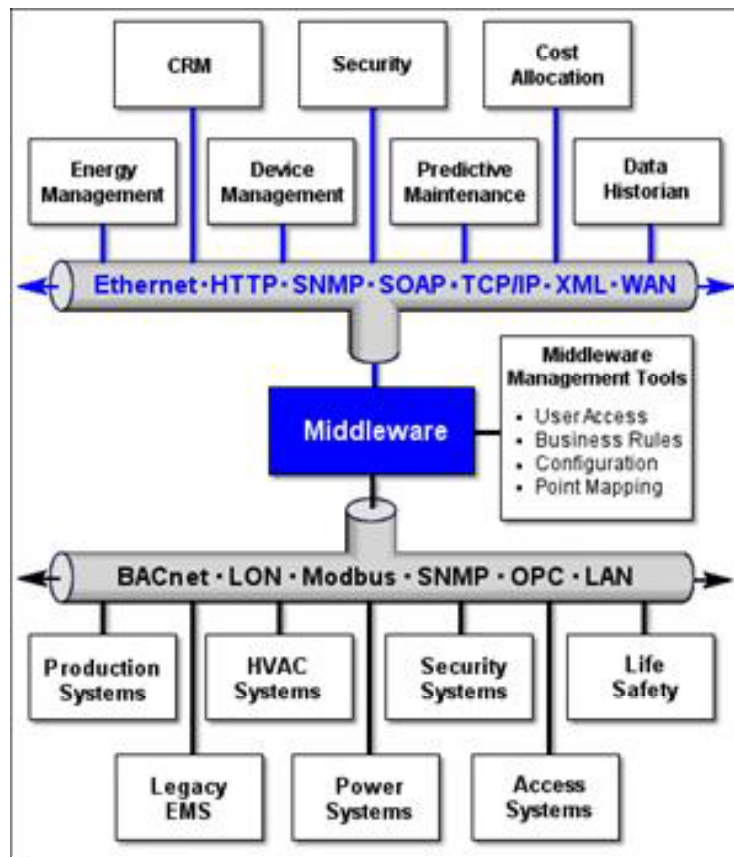
What is a Smart Building?

- Integrated building technology systems at a physical, logical and application level
- Integrated horizontally among all subsystems and vertically to facility management and business systems.
- Integration design includes structured cable, open network protocols and standardized databases and take advantage of current and emerging technology.



Existing Buildings

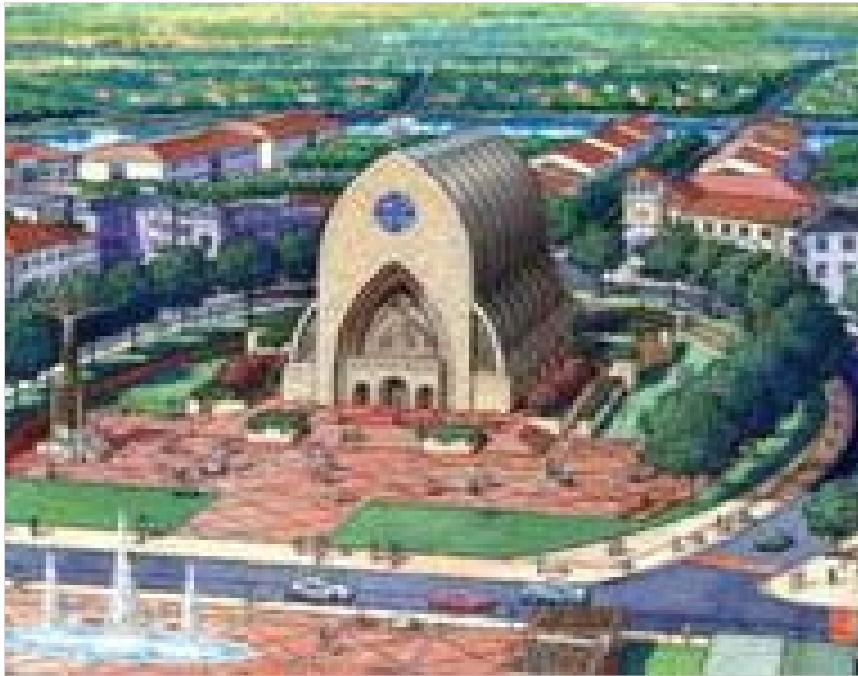
Managing the Tower of Babel



- Leverage those existing investments.
- Deploy the “best of breed” systems.
- Standard interfaces for all systems
- Vertical as well as horizontal integration of systems
- Permits the sharing of information between systems
- Software/ software and hardware
- Calculate how much data
- Careful attention must be paid to system communications structures

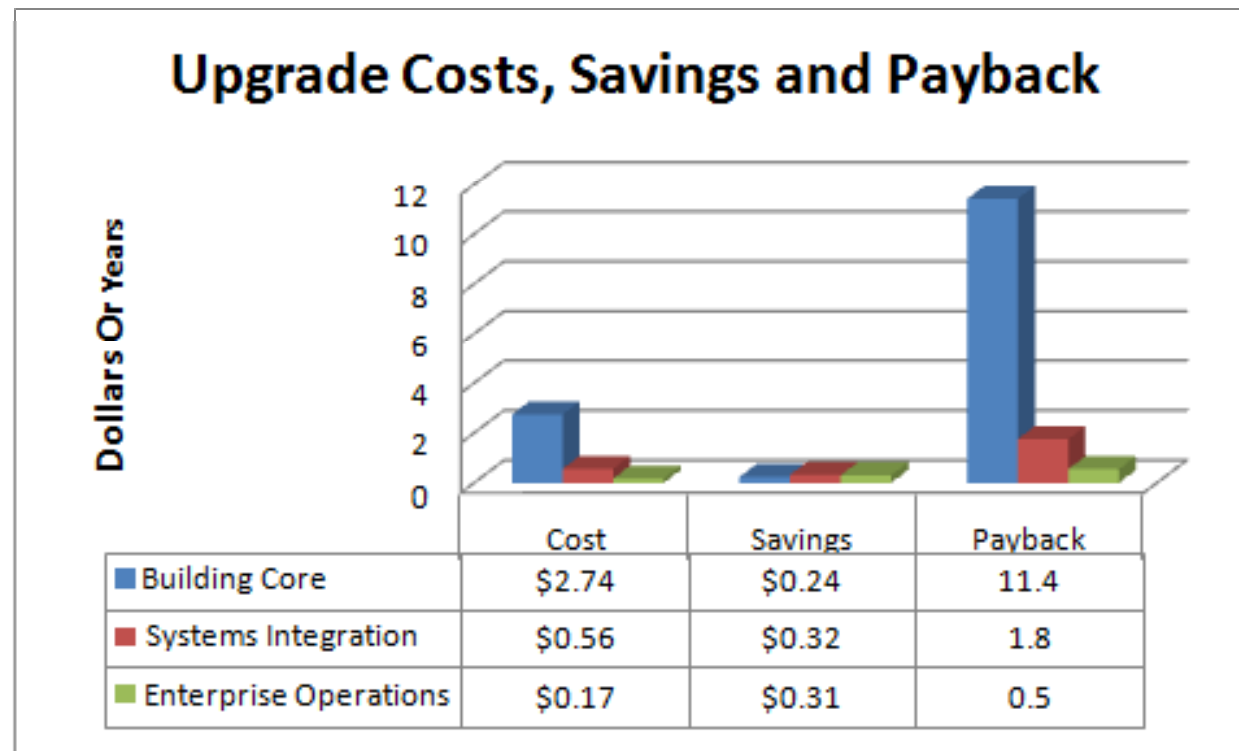
Ave Maria University

Award Winner for Best Use of Automation

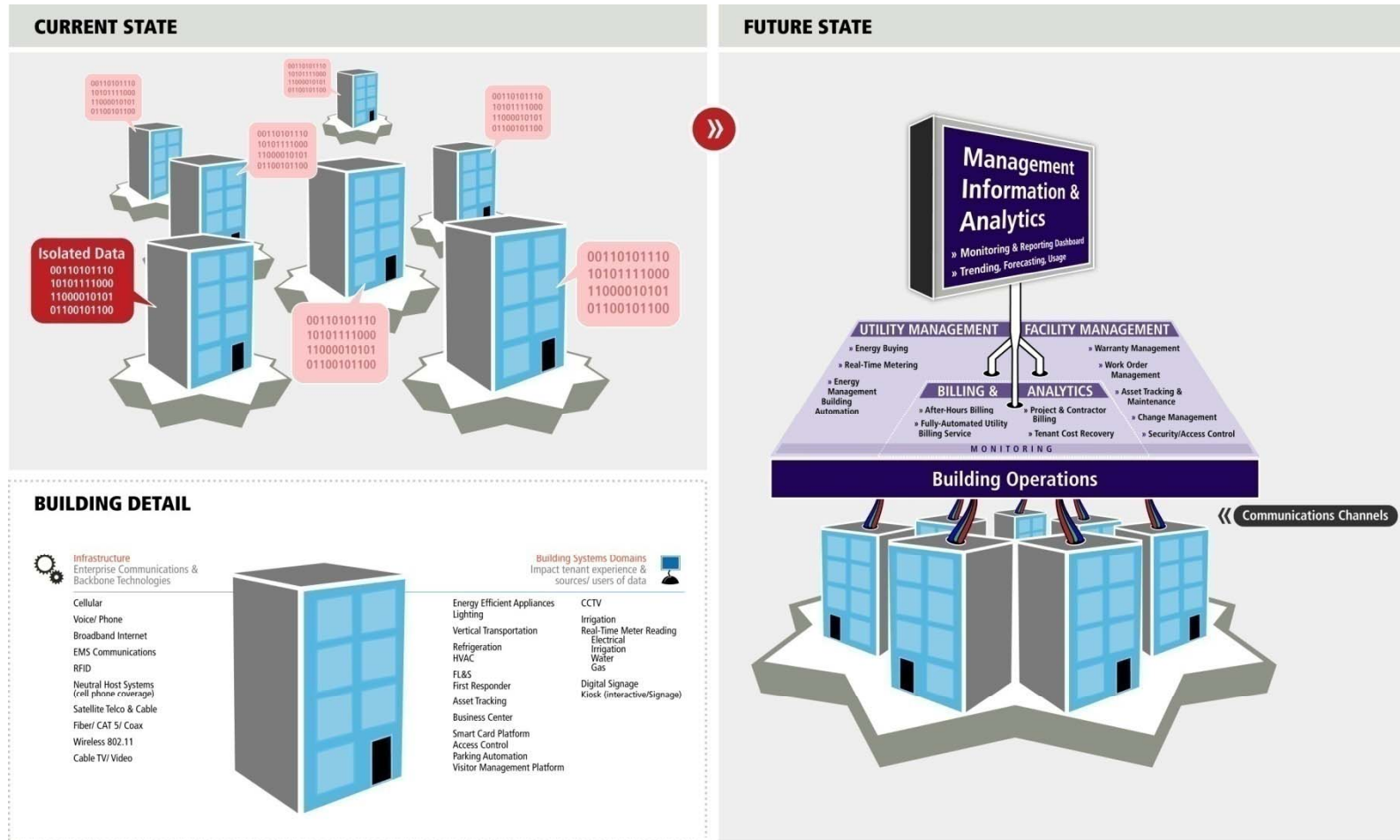


- CAPEX - 9% lower than a conventional approach.
- OPEX
 - Est. \$600,000 annual saving on utility costs
 - Est. \$350,000 annual saving on staff costs. (1 FTE/165 persons compared to 75 in peer institutions).

GSA Metrics



BUILDING OPERATIONS CENTERS



New energy systems and applications that FM will need to manage

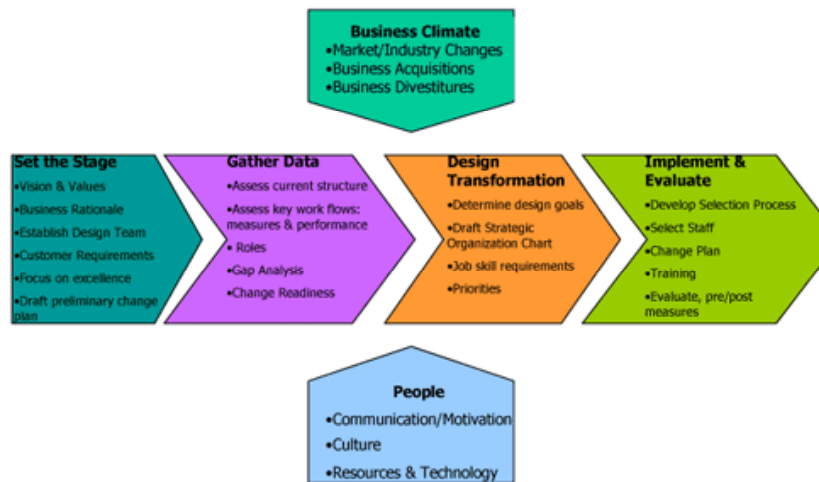
- Solar panels
- Geothermal sources
- Wind turbines
- Vehicle recharge stations
- Electrical switchable glass
- Exterior shading systems
- Wireless building systems
- Demand response planning
- Energy Dashboards
- Sun tracking systems
- Personnel RFID systems
- Structural anti-corrosion monitoring systems
- Oxygen depletion monitoring systems
- Personal rapid transit systems



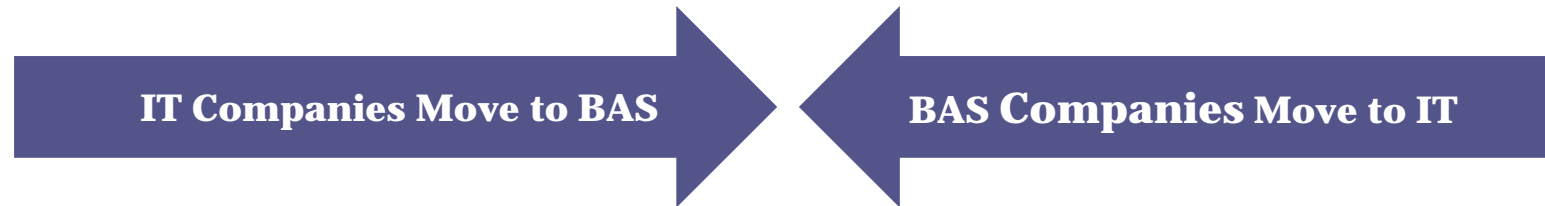
Are we constructing high performance buildings that no one will be able to operate?

- The knowledge base and skill sets is rapidly changing.
- Redefining the role
- Attract young people into the profession.
- Perception: underpaid, under-appreciated and organizationally marginalized
- Organizational Issues: IT, C-Level offices

Organizational Design Model



THE MOVEMENT OF IT AND BAS



- Cisco acquires Richards Zeta, collaborate on Energywise
- IBM moves into Smart Cities and Smart Buildings; teams with JCI
- Google – PowerMeter
- Microsoft – Hohm, Dynamics AX
- JCI acquires Gridlogix
- Honeywell acquires Tridium
- Schneider acquires TAC, Pelco and APC

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Additional Resources
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