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The Role of the Owners Rep for Energy Performance and Control

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Mr. Bernstein is President of RBCG, LLC providing consulting services to organizations needing help navigating their energy and automation strategy. He has over 30 years experience in industrial, commercial and residential automation and controls technologies. RBCG provides building automation standards, specification development support, educational program development, and facility master planning.

Key areas of focus include energy management and open solutions for energy efficient control networking. He helps organizations evaluate and implement technologies and solutions based upon open interoperable system architectures. He is an active member of several standards bodies including ASHRAE, ANSI/CEA, CEN, LonMark, OASIS and ISO.

Ron holds the position of LonMark International Chief Ambassador, is a Director of the Smart Buildings Institute, curriculum advisor to Mt. San Antonio College, frequent lecturer, published author, and educator.

He holds a BS in Mechanical Engineering from Carnegie Mellon University, a Masters in Psychology from The University of Santa Monica, and a Masters in Philosophy from PTS College of Philosophy

RB CG RON BERNSTEIN CONSULTING GROUP, LLC

Learning Objectives:

- Understanding the inter-relation of energy and control
- Navigating the project elements of energy and control systems
- A holistic model of building environments
- The value of an open, integrated control system architecture
- How to get from vision to specification
- Developing a team plan and core objectives
- Education and subject mater expertise
- The Owner's Representative value

The Scope: Energy and Control
A Holistic Approach

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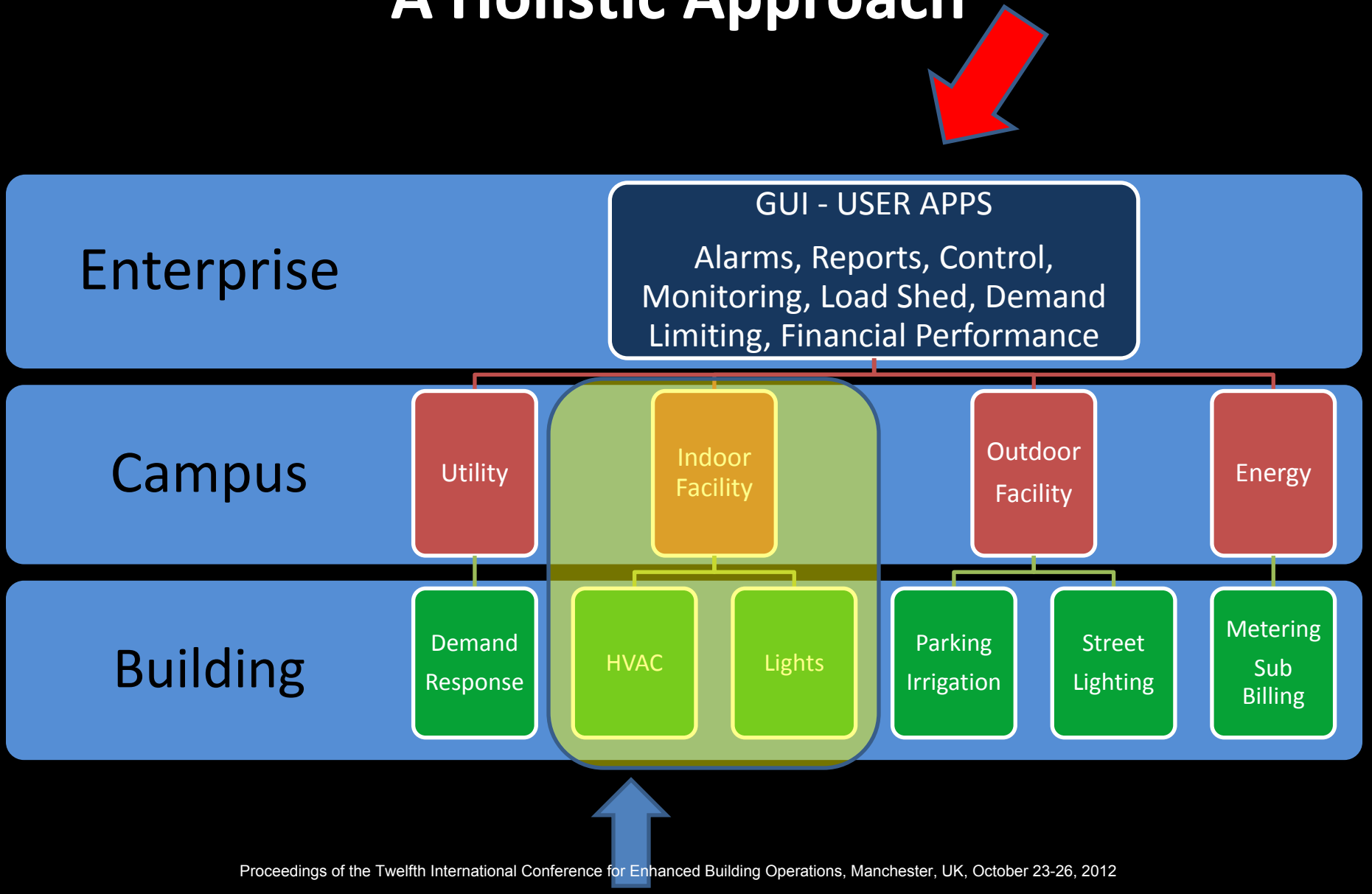

Multi-Subsystem Integration

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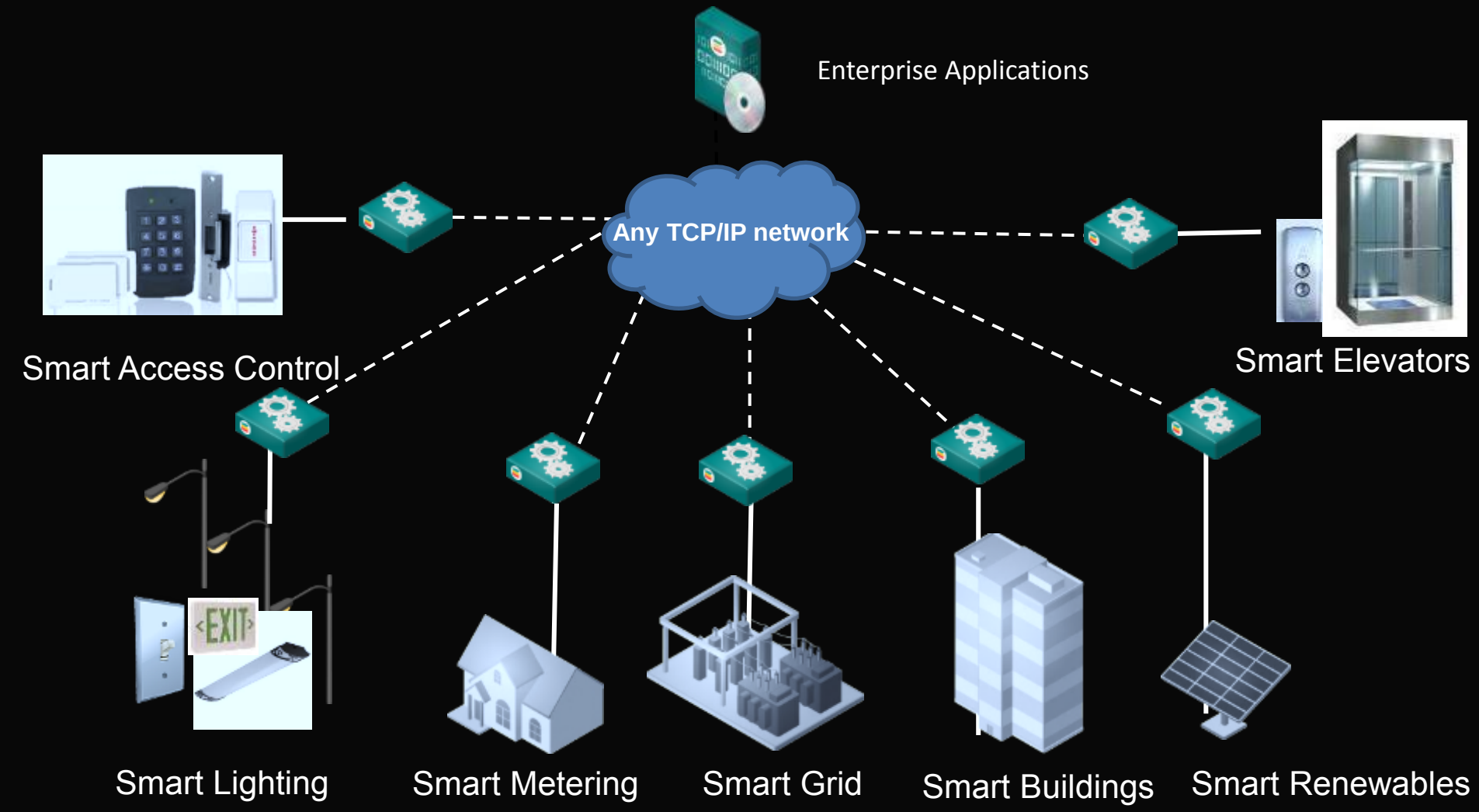

Energy and Control

- Direct correlation of energy usage and control systems
- Can’t control what you can’t see
- HVAC, Lighting, Electric SubMetering, Occupancy, Plug Load, Elevators, and more
- All use energy, all need optimization through control environment
- Integration of sub-systems into common “view” improves efficiency

System Integration

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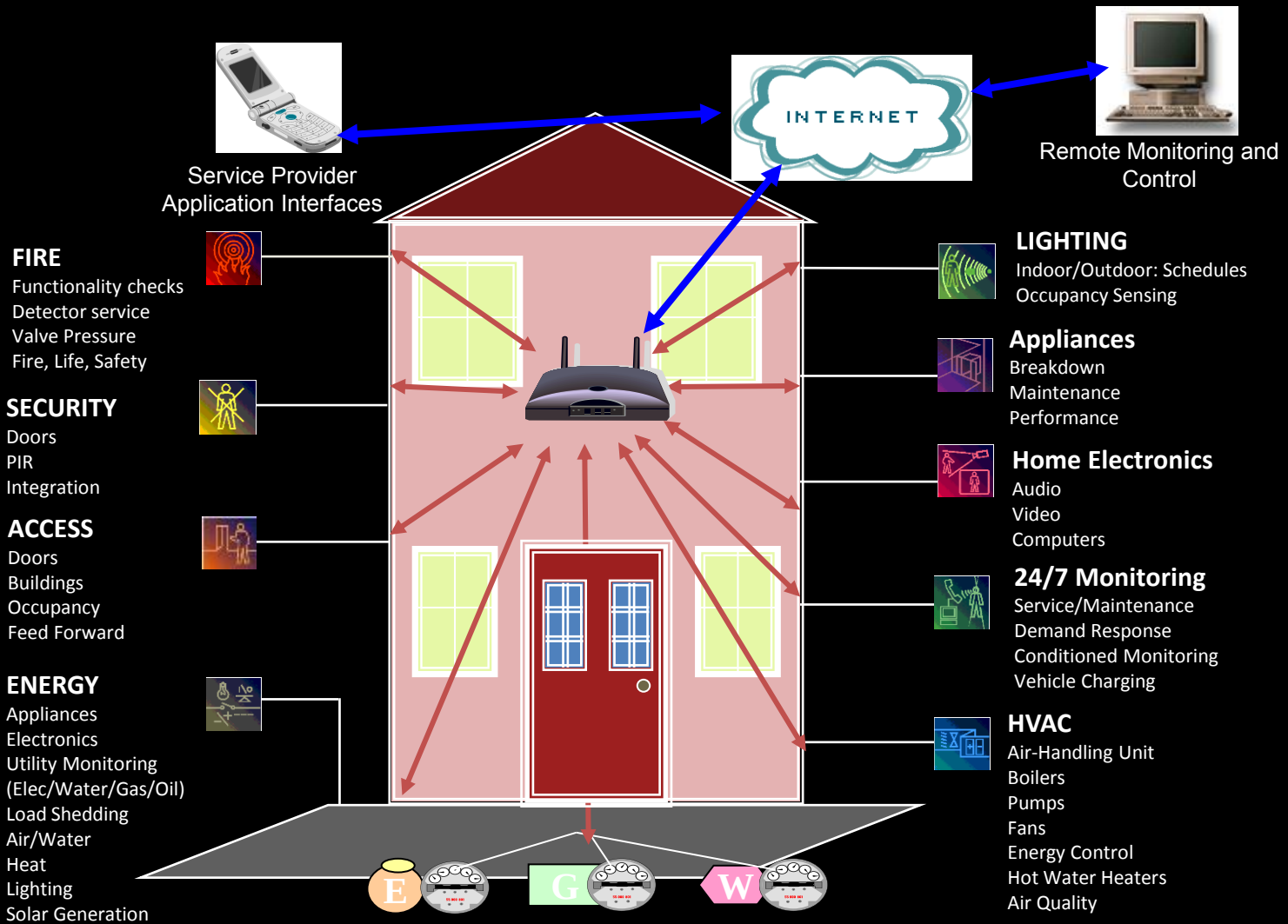
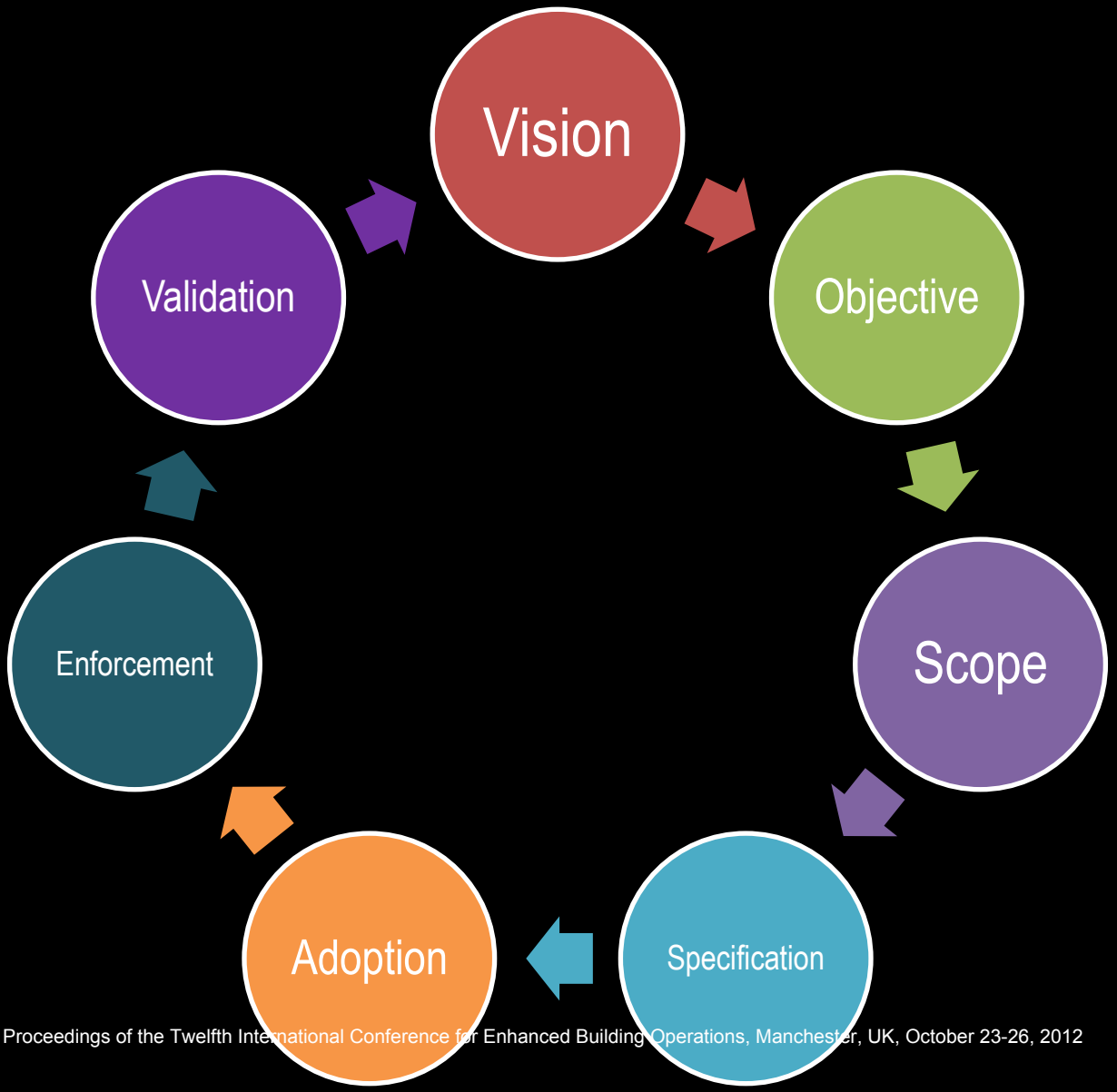


Process vs. Technical

- Process
  - Project Ownership
  - Management requirements
  - Teaming, SMEs
  - Knowledge and education
  - Consensus building
  - Engagement
  - Enforcement
  - Validation, revision

- Technical
  - System architecture
  - IT and BAS involved
  - Open systems and standards
  - Scope and spec
  - Compliance verification
  - Integration and Interoperability
  - Communication protocols
  - Hardware and software

Project Process



Project Progression

Vision	• Go Green, Improve Our Carbon Footprint, Be Better Environmental Stewards
Objective	• Implement strategies in alignment with our corporate green, energy conservation, and operational efficiency objectives
Scope	• Evaluate our processes and procedures and recommend projects to implement our key objectives
Specification	• Create corporate standards and guide specifications as a model for all projects
Adoption	• Work with our vendors, contractors, integrators, and engineers to ensure success
Enforcement	• Enforce all standards through the submittal process, require revision to meet specs
Validation	• Ensure validation process is in place, revise scope, specs and procedures as needed

Project Example

Vision	• Go Green, Improve Our Carbon Footprint, Improve our Work Environment
Objective	• Evaluate and improve our facility energy and operational procedures
Scope	• Update our building operational systems standards to meet industry best practices
Specification	• Define our corporate standards for energy and environmental comfort and safety
Adoption	• Interview our vendors, contractors, integrators, and engineers to ensure compliance
Enforcement	• Create submittal compliance check list for HVAC, Lighting, IAQ, Life Safety
Validation	• How much energy saved? Better operations – fewer complaints, better staff efficiency

The Teams – Subject Matter Experts

Internal

- Facility Management and Engineering
- Energy Engineering
- Construction
- Operation and Maintenance Departments including Electrical and Mechanical
- Information and Data Management - IT
- Security (life safety)
- Corporate or Institutional Management
- Contracting, Budgeting, and Finance Departments

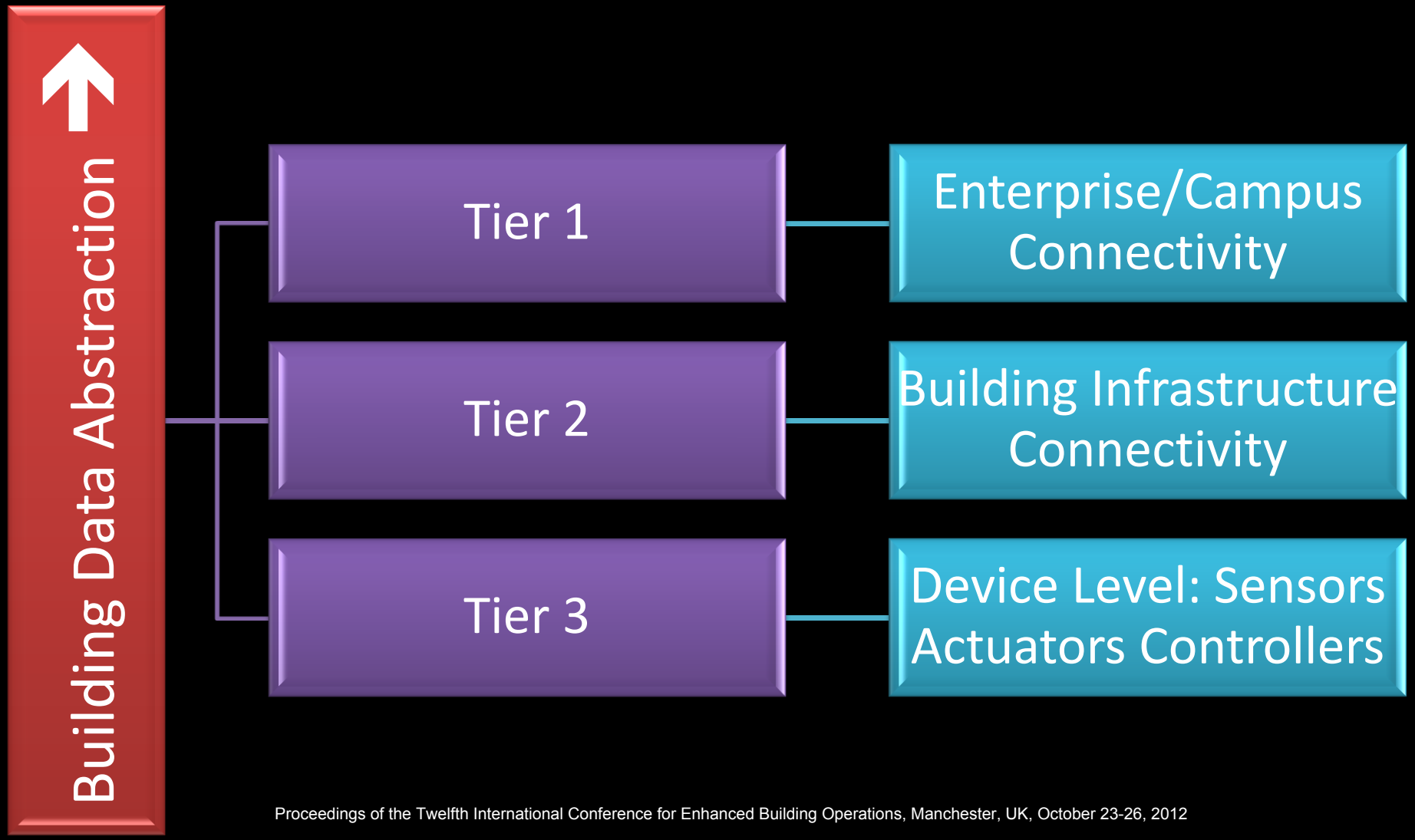
External

- Mechanical, Electrical and Controls Contractors
- Master System Integrator
- Project Manager
- Architect
- Consulting Engineer
- Product and System Vendors,
- Commissioning Agent
- Energy Auditor

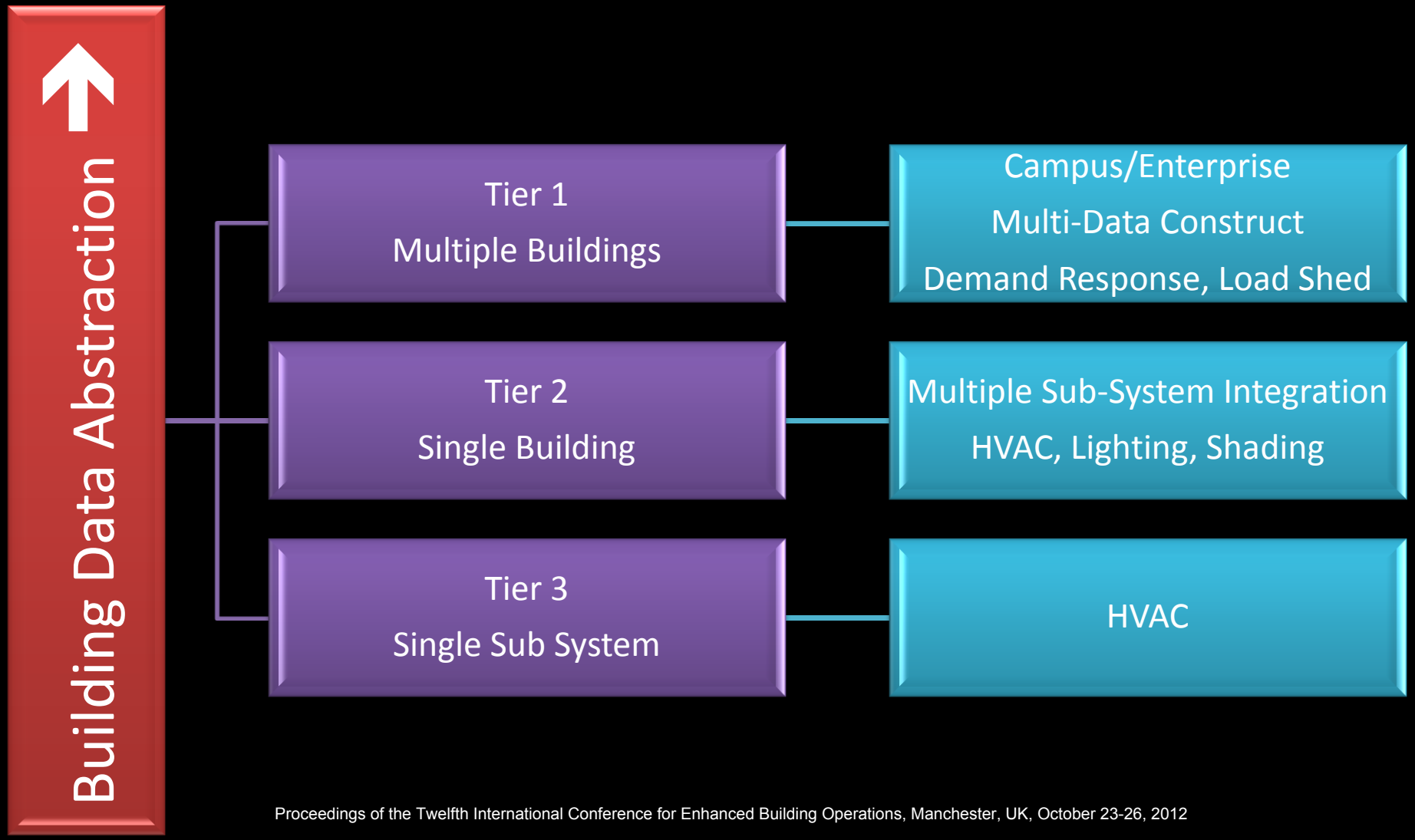
Energy and Control Effected System

- HVAC –chillers, air handlers, VAV systems, economizers, cooling towers
- Lighting - indoor, high-bay, emergency, facade, walkway, parking lot, and roadway lighting
- Energy Management - metering, sub-metering, and load management
- Power Systems - generation, cogeneration, and renewables
- Life Safety Systems - laboratory fume hood, smoke evac systems, fire detection, suppression, toxic gas monitoring, CO2 monitoring
- Elevator/escalators
- Process Control Systems
- Security and Access Control Systems
- Audio/Visual Systems
- Water Systems - irrigation, hot water/cold water, waste water
- Alarming and Annunciation Systems
- Occupancy and Vacancy Systems
- Monitoring, Control and Reporting - user interfaces, alarming and alerting, trending, scheduling, data analysis
- IT and Data Systems, LAN, WAN, VPN and related systems

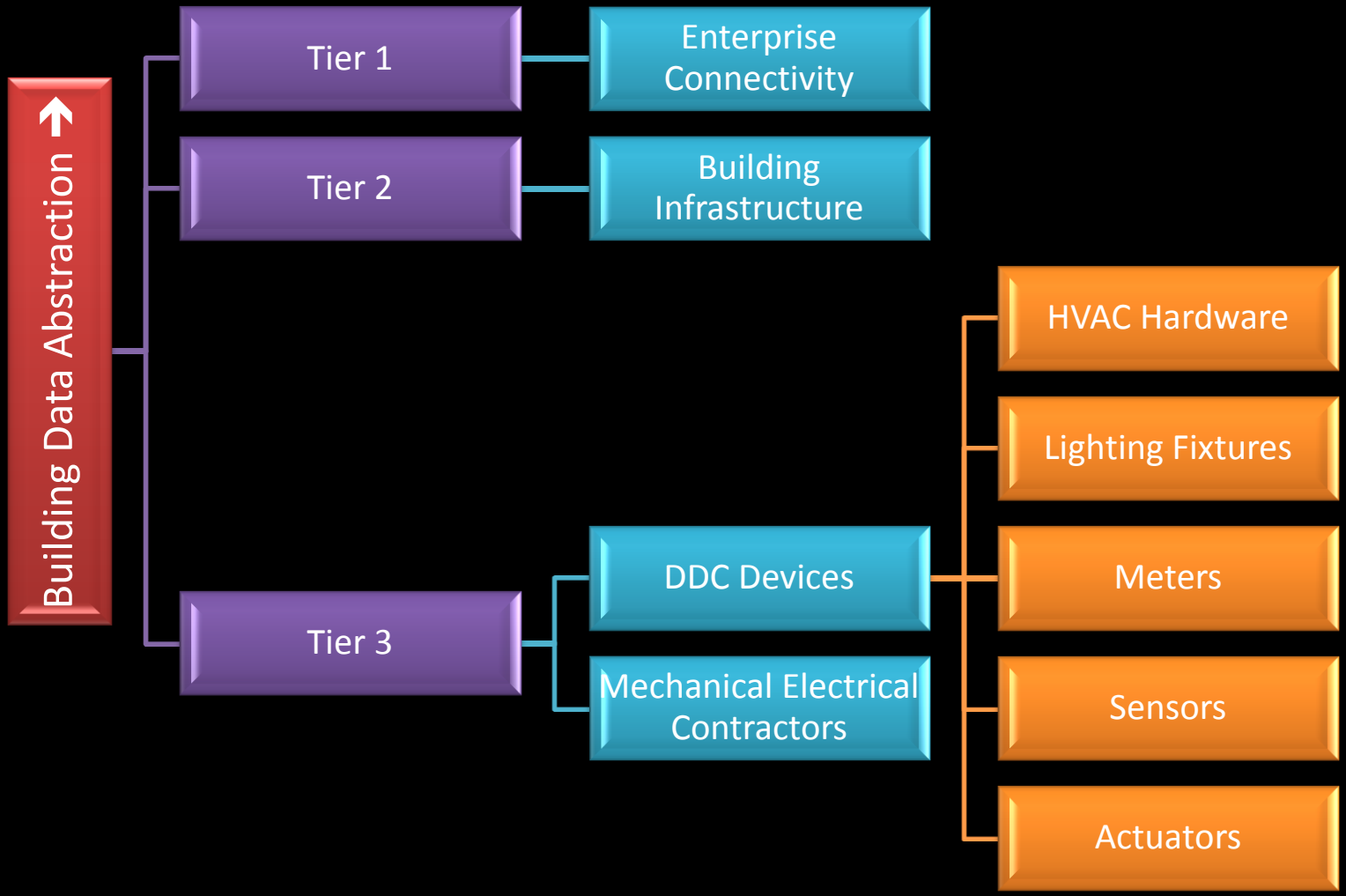
3-Tier Architecture



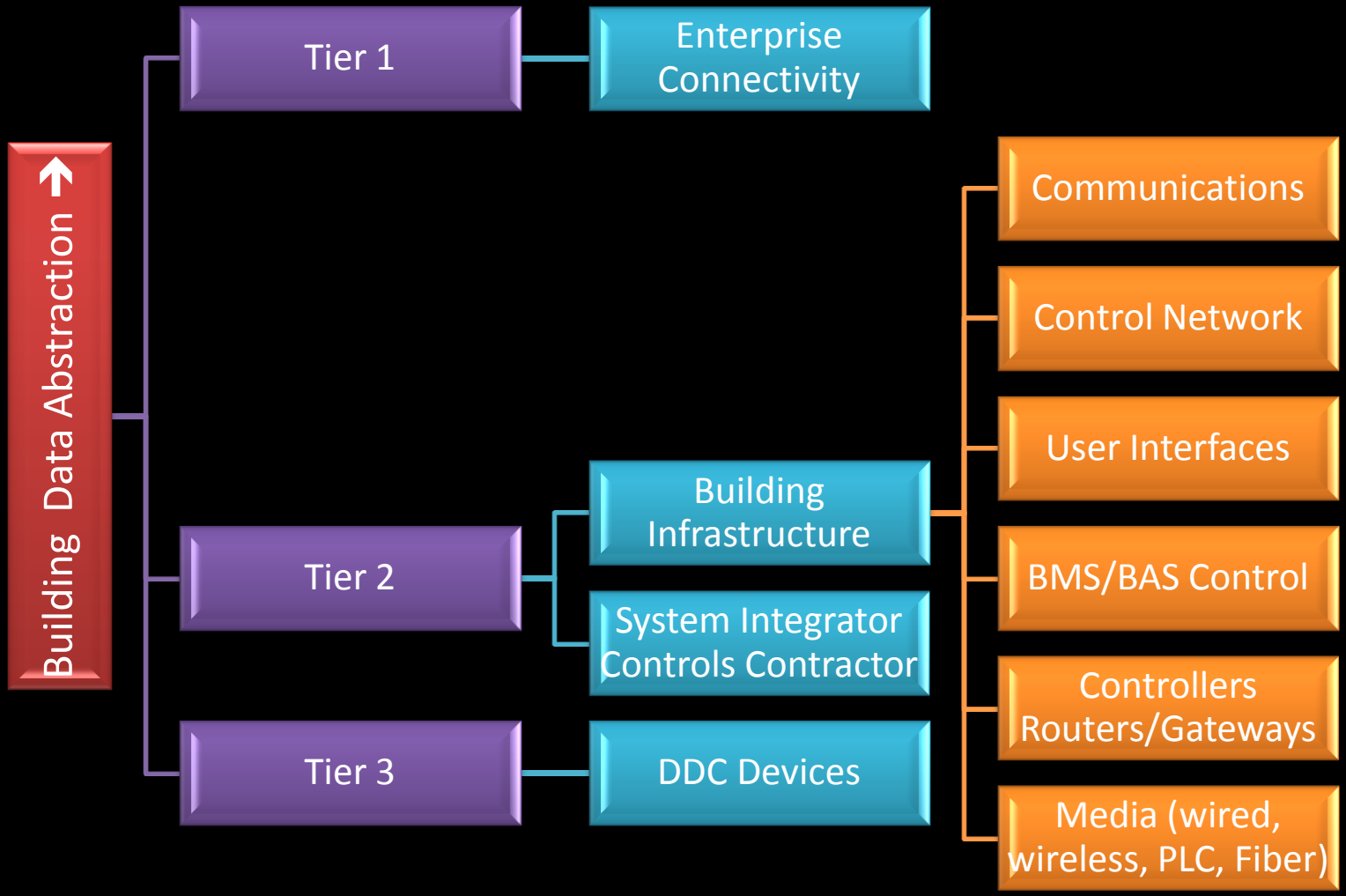
3-Tier Architecture



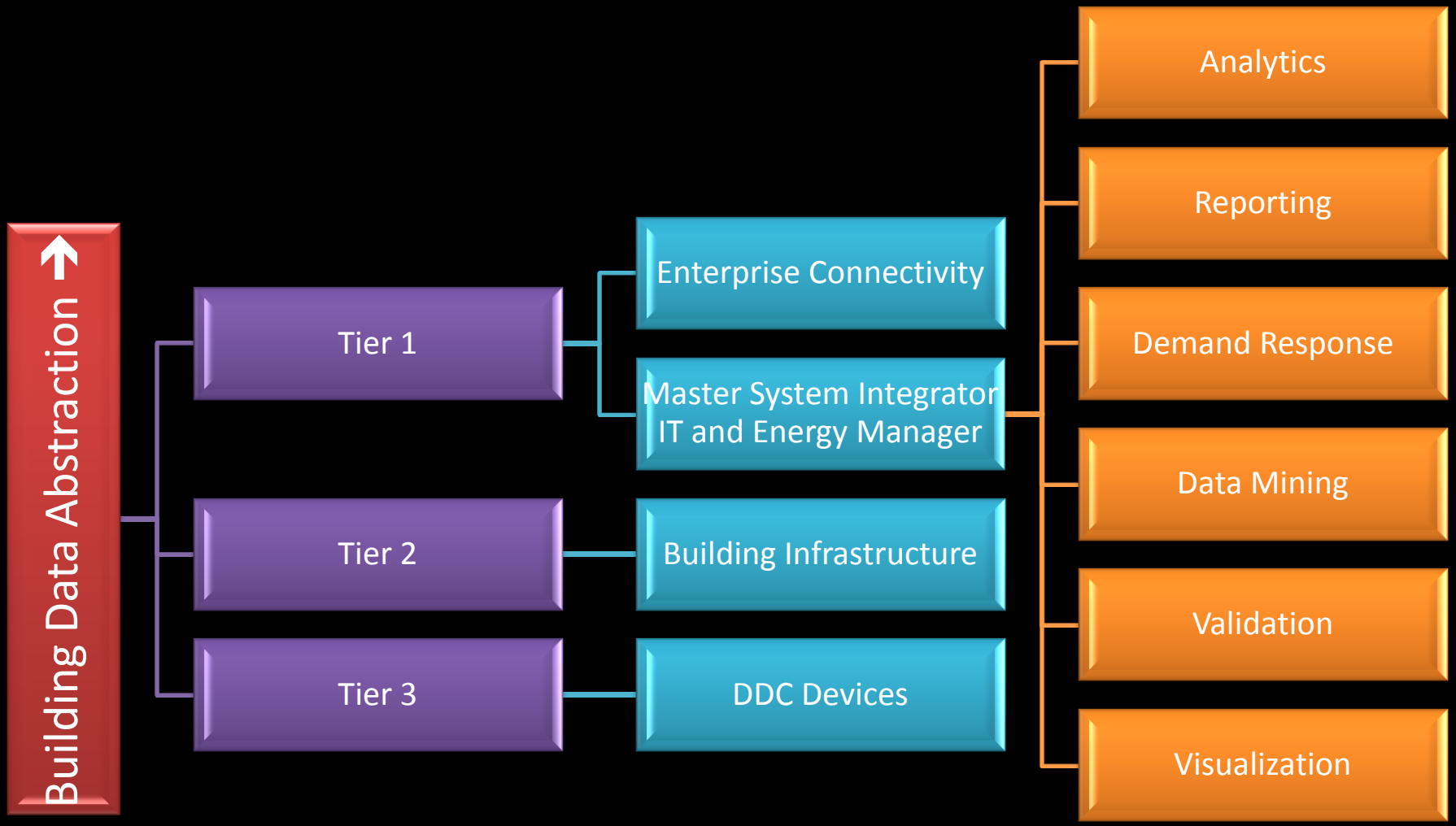
Tier 3 - DDC Devices



Tier 2 - Infrastructure



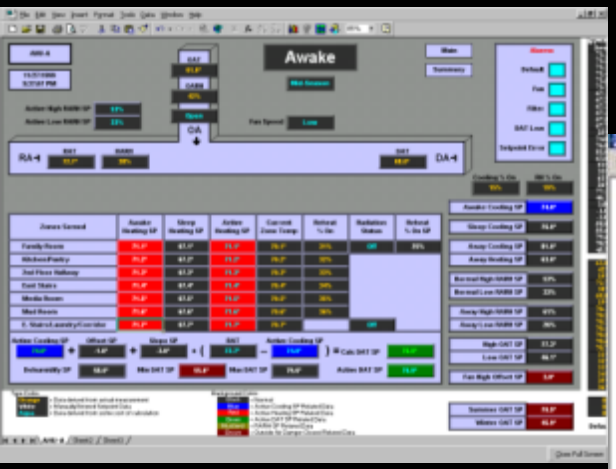
Tier 1 - Enterprise Connectivity

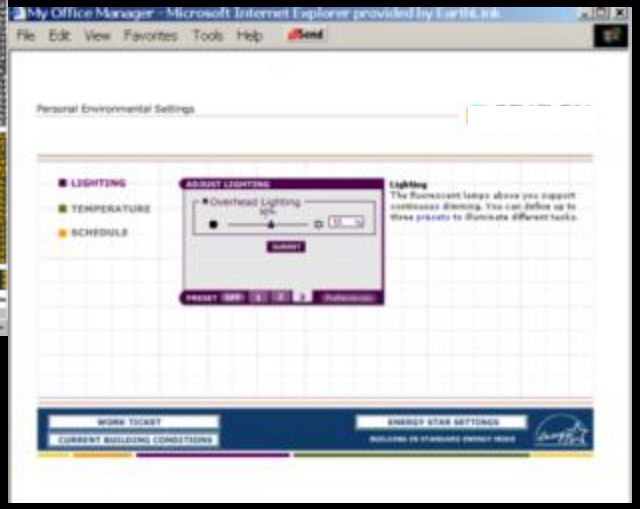


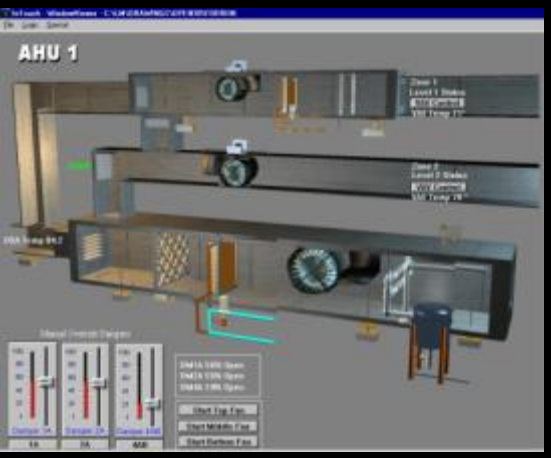
Total Facility Control Access to Data

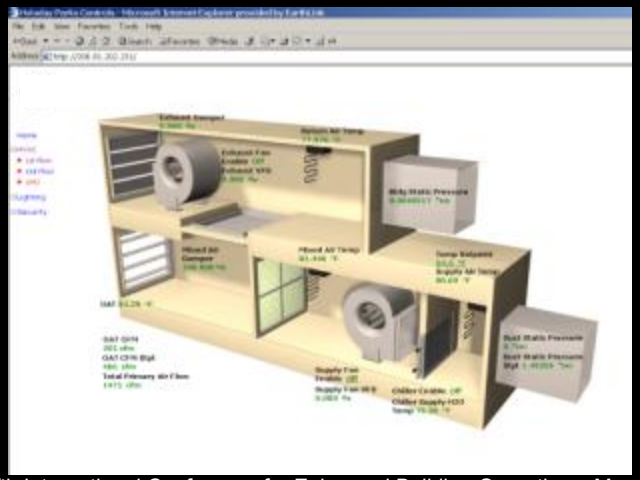
Layer	Stakeholder	Data level	Data Types Examples
Enterprise	Owner/Master integrator/Facility Staff/Application Developer/Aggregator	5, 6 - Aggregate, Monitor, Report	Energy savings, pricing, reporting/monitoring, scheduling
Campus/ District	Owner/Master integrator/Facility Staff/Application Developer/Aggregator	4, 5 - Schedule, Report, Monitor	Alarms, Monitoring, Scheduling, Energy Data,
Premises/ System	Owner/Integrator/Facility Staff/Application Developer	3, 4 - DR, Load shed, control, monitor, schedule	Energy mode, ADR Signals, Alarming, Scheduling
Zone	User/Occupant/ Manufacturer/Vendors/ Integrators	2, 3 - Status/Mode/Scene, schedule	Occupied mode, Load Shed mode, Lighting scene
Room	User/Occupant/ Manufacturer/Vendors/ Integrators	2 – Status Mode Scene	Occupied mode, Load Shed mode, Lighting scene
Device	Manufacturer/Vendors Integrators	1 - on/off/control, low level data	Temp, pressure, status, set points, mode, scene

Information Access – The Key









- Alarming
- Control
- Monitoring
- Setpoint changes
- Overrides
- Schedule changes
- Maintenance scheduling
- Event reporting
- Quality control
- Energy Management
- Enterprise wide consistency

Information Access – The Key

- And I want it from my browser
- From any computer on my network
- Or from home
- With different access levels for different personnel needs
- With my full campus integrated into one system
- And all of my subsystems working together
- To simplify my facility management
- And reduce my operating costs!

- Alarming
- Control
- Monitoring
- Setpoint changes
- Overrides
- Schedule changes
- Maintenance scheduling
- Event reporting
- Quality control
- Energy Management
- Enterprise wide consistency

Success Concepts

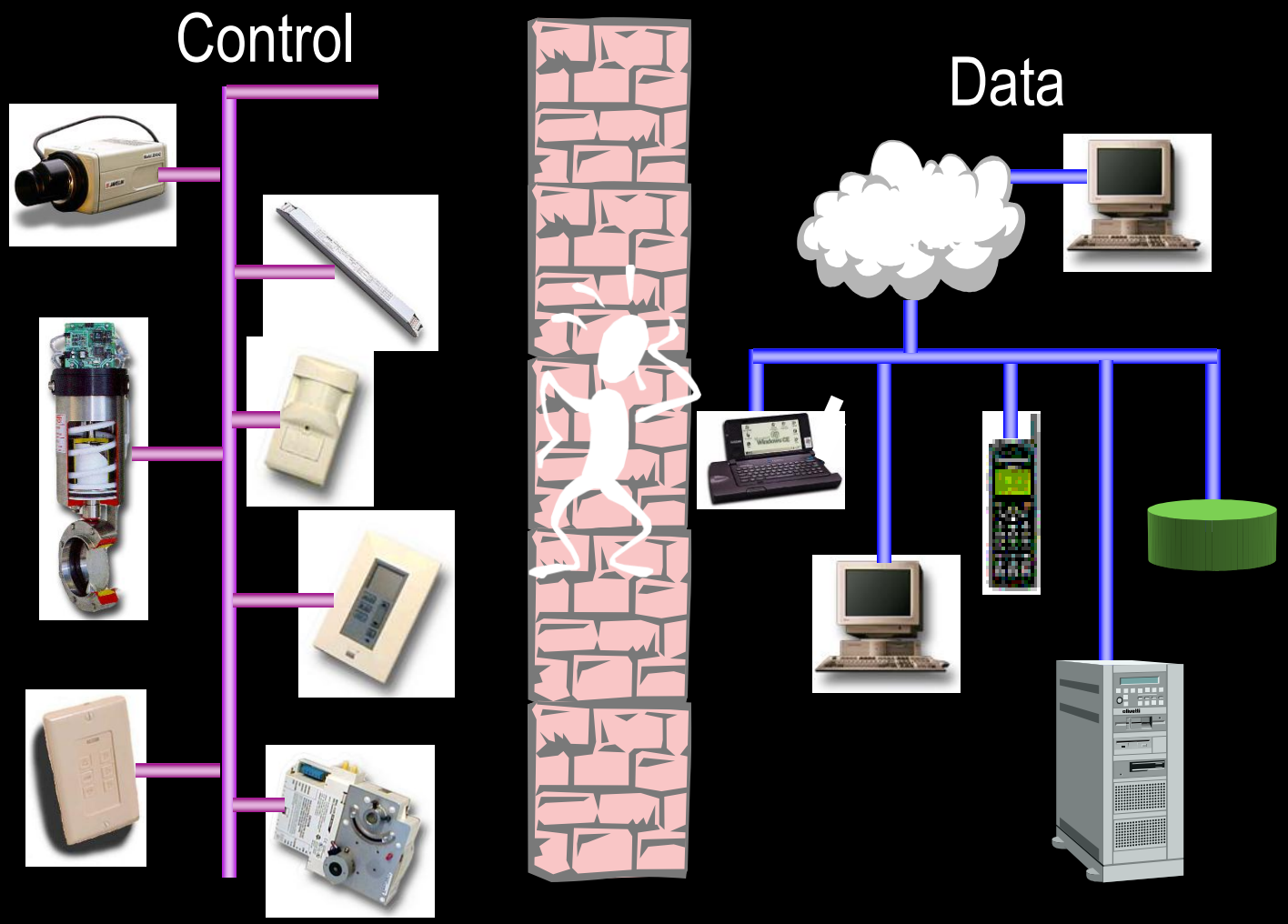
- Embrace Open Systems
- Interoperable Communications
- Common device and sub-system profiles
- No Closed or Locked-In vendor solutions or systems
- Manage from data monitoring and control, not bells and whistles
- Define Scope, Standards, Specifications
- Top Down Design, Bottom Up Implementation

Integration Examples

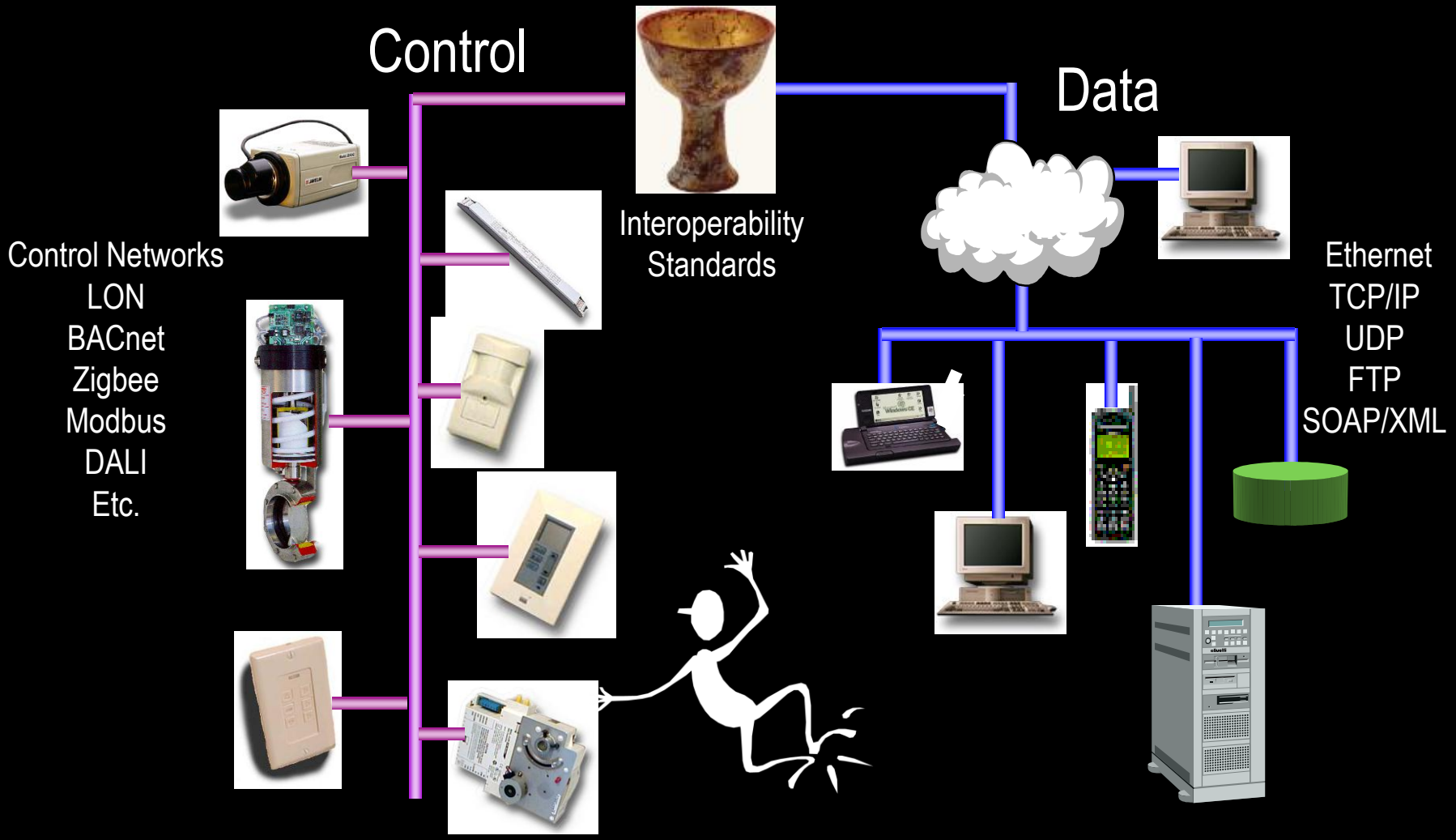
- Sharing data from sensors
  - Occupancy sensor data used by HVAC, Lighting, and Security
- Energy consumption data
  - Used by demand limiting control strategy
  - Real time adjustments via control system – load shed
- Scheduling by office workers
  - Direct control over environment
  - Lighting, HVAC, Security
- Alarm and equipment management
  - Single alarm, multiple recipients
  - Remote acknowledgement and response
  - Preventative maintenance based upon actual usage

Convergence

Of Two Separate Worlds



With it you have –
One Complete System



Qualifications of the Owner's Rep

- Independent – not tied to a particular vendor, product, or system approach
- Experienced – background in control, networking, facility systems, market and technology, able to advise on all aspects of the master planning process
- Professional – providing team leadership, quality reporting, objective setting, facilitation through the process
- Supportive– able to listen, digest, and assimilate the high level master plan objectives and also be able to deal with low level issues
- Networked – able to bring in Subject Matter Experts (SME) as needed into the process should the need arise

Responsibilities of the Owner's Rep

- Scope, standards, and guide spec support and development
- Training program needs identification and development
- Working with vendors and industry to ensure compliance
- Evaluating open systems technology, standards, and approaches that are "owner focused"
- Supporting fair competitive bidding best practices by developing guide specs that are non-proprietary and non-sole-sourced
- Coordinating internal and external teams to establish ability and commitment
- Reporting, documenting, and baselining the process
- Working with commissioning agents' procedures and requirements
- Understanding of costs, timing, quality, and reliability requirements

Summary

- Facilities are and will continue to be multi-platform, multi-protocol, multi system
- Communication and integration standards are critical
- New applications, new platforms - common data access
- New requirements emerging for connectivity from the devices to the building to the enterprise
- Multi-Tiered system architecture follows the contractor responsibilities
- An Owner's Representative can provide management and project oversight and expertise

Questions/Discussion

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