

Building Systems Integration

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Security Automation Fire Alarm Intelligent Buildings

Dallas Houston Las Vegas Calgary London Dubai



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Building Systems Integration

- Why Integrate Anything?
- What Systems Should Be Considered?
- What Level of Integration is Required?
- What System(s) Will Be The Backbone?
- Customized vs. “Off of the Shelf” Solutions
- Contracting / Delivery Methods
- Pre-Installation Requirements
- Case Study of Highly Integrated Facility



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Why Integrate Anything?

- Develop an “Owner Design Requirement”
- What is the intent of the systems?
- There should be a perceived benefit for interaction between building systems.
- Integration between two systems should result in the exchange of information that aids in the operations of the facility.



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What Systems Should Be Considered for Integration?

It's simple...only the ones that are required

- Building Management and Control System (HVAC temperature controls)
- Access Control
- Lighting Control
- Elevator Control
- Electrical Controls & Monitoring
- Thermal Metering
- CCTV Surveillance
- Parking Control
- Fire Alarm
- Point of Sale
- Electrical Metering
- Other special systems



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SYSTEM INTERACTIONS MATRIX

FROM	TO	SYSTEM																												
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Methods of Integration?

- Define specific information that can be shared between the candidate systems to achieve the Owner's goals
- Define the method that the information will be shared
 - Hardwired relays
 - Software interaction over an industry standard protocol
 - Software interaction with custom programming



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The System Backbone

- Backbone – the system that will be the centralized host for passing information between systems
- Options
 - Automation System (i.e., building temperature control systems)
 - Access Control System
 - Separate Dedicated System
 - One of the “other” facility systems
 - Or multiple systems



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The System Backbone

- What type of reliability is required?
- What protocols are anticipated?
- Which of the integrated subsystems are candidates for “hosting” the integration



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Customized vs. “Off of the Shelf”

- Common “standard” software exchange protocols
 - Modbus, Modbus RTU, Modbus ++
 - BacNET
 - LonTalk
 - Vendor specific standard protocols
 - Johnson Controls – N2
 - Siemens - FLN
- Common “open” software exchange protocols
 - ASCII
 - Modbus, Modbus RTU
 - TCP/IP



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Customized vs. “Off of the Shelf”

- Common software exchange architectures
 - RS 485
 - RS 232
 - Ethernet
 - MSTP
 - LonWorks
 - Arcnet
 - TCP/IP



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Customized vs. “Off of the Shelf” Integration

- Strive to solve your integration needs with standard architectures using open protocols
- If this can't be easily sourced for your solutions, use standard protocols
- Minimize, at all costs, the use of custom programming



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Contracting / Implementation Methods

- Single contractor responsible for all systems
 - Contractor hires other system vendors/integrators as subcontractors as required
 - Sole source of responsibility

Contracting / Implementation Methods

- Multiple contractors responsible for their system only with a third party contractor as integrator
- Multiple contractors responsible for their system and the integration of their system into another of the buildings systems

Contracting / Implementation Methods – Pro vs. Cons

Method	Pros	Cons
Single Source Contractor	<p>Only one direction to point a finger</p> <p>Coordination and delivery responsibility lies with one party</p> <p>Many of the integration solutions should not be new</p> <p>Coordinated and seamless operator interface</p> <p>An operator may have access to more features of the individual subsystems</p>	<p>May have inherent limitations on integration capability of “their” system offering</p> <p>May have limitations on their subsystem offerings</p>
Third Party Integrator “Overlaid”	<p>May get the best that each subsystem has to offer</p> <p>Seamless operator interface to multiple systems</p>	<p>Will require subsystem interfaces for high level programming</p>
Direct Integration Between Systems	<p>Each interface only involves two parties for discrete information exchange</p>	<p>May be limitation of protocol exchange capabilities</p> <p>Operator interface will most likely be different</p> <p>Will require subsystem interfaces for high level programming</p>



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Implementation Process

- Must do:
 - Defined protocol exchange capability between the systems
 - Share information/data tables
 - Define how the information will be displayed
 - Bench test prior to installation
 - Field test after installation



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Implementation Process

- Don'ts:
 - Assume a pre-existing interface is plug and play
 - Wait until the equipment is required on the jobsite to test the integration



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Highly Integrated Facility

- ABN AMRO Bank - Chicago
- 1.1 Million g.s.f.
- CBD Chicago
- Public - Level 2 (Cafeteria, Health Club, Security)
- High Tech Podium – Levels 3-8 (300k s.f.)
 - Data Center
 - Trading Floor
 - Check Processing
 - Mail Distribution
- Tower – Levels 9-29
 - 9-14 High Reliability support for podium functions
 - 15-29 Normal Office
- Awards
 - Build-to-Suit Project of the Year for 2003
 - Development of the Year for the 2003 Commercial Real Estate Awards

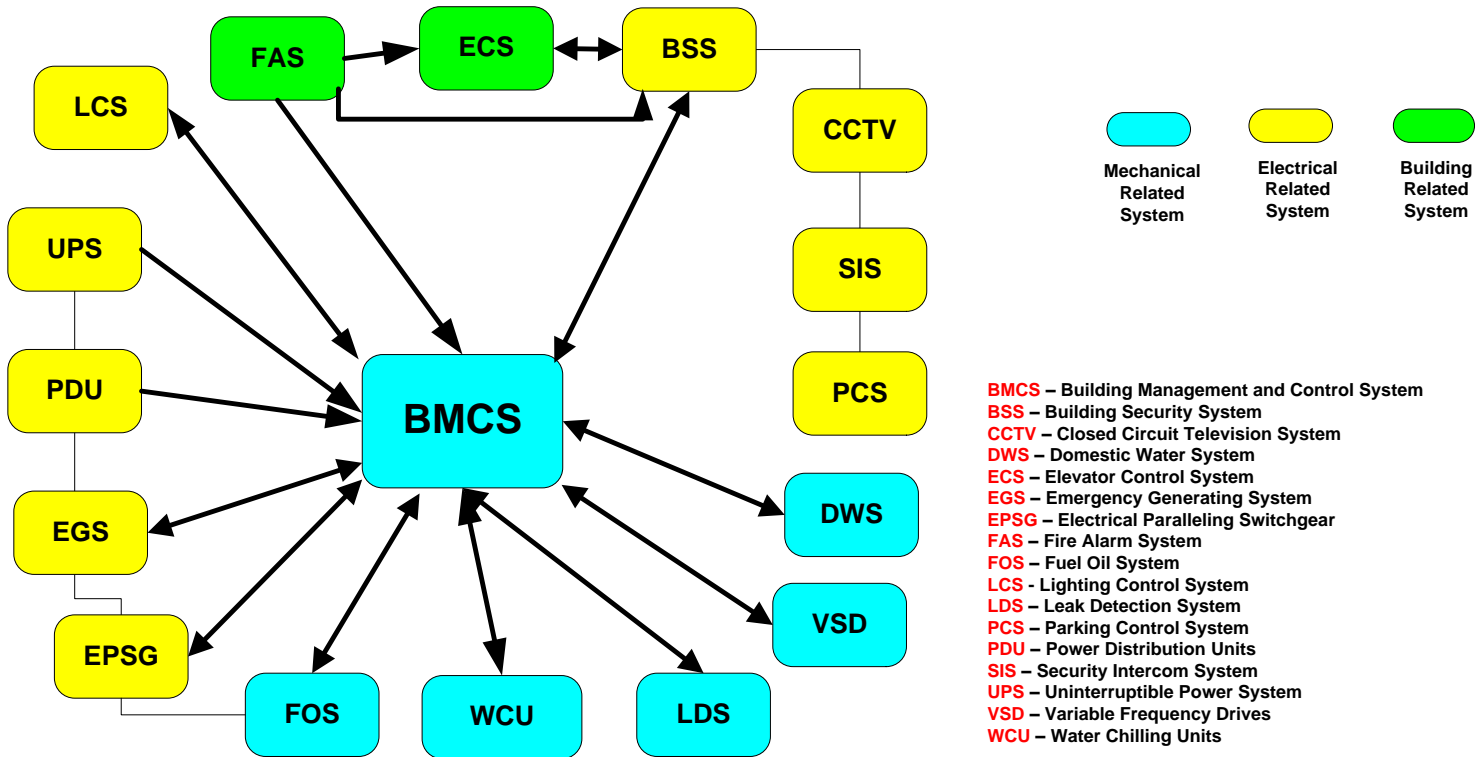


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Case Study – Integration MAP



Dallas 2006 INTEGRATED SYSTEMS INFORMATION EXCHANGE

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	ACMS	●		●	●	●	●	●	●		●				●											
	CCTV		●		●	●	●																			
	NVR		●																							
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ABN AMRO INTEGRATION PROTOCOLS

FROM	TO	SYSTEM																								
		BMCS	ACMS	CCTV	NVR	VBS	VMS	SIS	EIS	FAS	PCS	LCS	EMS	TMS	ECS	LDS	VSD	WCU	RLD	EPSP	EPS	FMS	EGS	PDU	UPS	DWS
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	PDU																									
	UPS																									
	DWS																									

- BACNET TCP/IP
- BACNET MS/TP
- MODBUS RTU
- HARDWIRED
- RS232 SERIAL, CSV
- TCP/IP
- JOHNSON N2
- LONWORKS

Building Systems Integration

John H. Hatcher, P.E., C.P.P., LEED
President



Security Automation Fire Alarm Intelligent Buildings

Dallas Houston Las Vegas Calgary London Dubai



Dallas 2006

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