

# Application of eCommerce to Building and Energy Systems



William Cox

Cox Software Architects LLC

[wtcox@CoxSoftwareArchitects.com](mailto:wtcoc@CoxSoftwareArchitects.com)

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# Agenda

- Introduction and Goals
- Enterprise Approach
- Side Show
- Opportunities
- A Challenge
- Summary
- Questions
- References

# Introduction

- Who am I?
  - Consulting enterprise software architect
  - Elected to OASIS Technical Advisory Board
    - OASIS is the leading eBusiness, Web services, and XML vocabulary standards venue
  - Skilled at building standards and products from ideas to adoption
  - Business, marketing, and technical background

# Goals of this Talk

- Describe eCommerce technologies
  - Selected for energy and building management
  - Problems in eCommerce are similar to problems in energy, building management and green buildings
  - Omit some technologies, e.g.
    - Portals
    - Campaign management
    - User interaction (e.g. shopping carts, checkout)
- Give you some ideas to use
  - You won't need all of these technologies!
  - Pick and choose to fit your needs

# Enterprise Approach

- Interoperation
- Security
- Reliability
- Consistency
- Service Orientation
- Process Modeling
- Test and Certification

# Interoperation

- Integration of diverse services
  - Heterogeneous
  - Can't rely on consistent versions
  - Much attention paid to interface evolution
- eCommerce typically uses Web services
  - Requires TCP/IP, XML, SOAP
  - Fits naturally with service view of the world
  - Richer semantics
- REpresentational State Transfer (REST)
  - Web model with HTTP get, put, post
  - But everything as a resource is clumsy

# Security

- SSL/TLS
  - Hop-to-hop
  - Protects entire message
- Web Services Security
  - End-to-end
  - More flexible; sign or encrypt portions
  - Profiles for using other standards (password, X.509, Kerberos, SAML, ...)
- Trust and federation
  - Many ways
  - SAML (Security Assertion Markup Language) [OASIS]
    - Single Signon. Identity
  - XACML (eXtensible Access Control Language) [OASIS]

# Reliability

- Did the message get there?
- Did the recipient act?
- Achieve with
  - Message/response
  - WS-ReliableMessaging or WS-Reliability [OASIS]
- Don't confuse with security
  - Security handles identity, assurance, privacy



# Consistency

- Acting in concert
- “Traditional” Transaction processing
  - All or none (WS-AtomicTransaction) [OASIS]
  - Rollback of actions required
  - Tight coupling
  - Same control/ownership domain
- Distributed Business Activities
  - Not all or none (WS-BusinessActivity) [OASIS]
  - More complex recovery
  - Loose coupling
  - Different control/ownership domains

# Service Orientation

- Service-Oriented Architecture
  - A mindset, not a product
  - SOA Reference Model [OASIS]
- Services and composition are not new
- Hard problems in factoring and composition
  - Granularity suited to problem and implementation
  - Many choices, many optimizations
    - EERP [OASIS TC]
- Binding, assembly, policy, management
  - Service Component Architecture [OASIS]
- Business process definition and execution
- Not merely Web services
  - Erl calls that “False SOA”

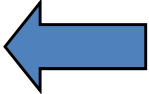
# Process Modeling

- Business process modeling
  - BPMN (Business Process Modeling Notation) [OMG]
- Business process execution
  - WS-BPEL [OASIS]
- Business today:
  - Business process (BPMN)
  - Execution engine (BPEL)
  - Deployment and optimization
    - Service Component Architecture, EERP [OASIS TCs]

# Test, Interop, Certification

- Complex area
  - Many standards
  - Many versions
  - Heterogeneous environment
- Learned to cope
  - Intense cross product testing where useful
  - Simple interfaces prove generally robust
  - Certification for simple cases

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# Side Show: How Big?

- Web Services stack too big?
  - TCP/IP + SOAP + XML + specific web services
  - Small devices with web services capabilities
    - MS Research (4k RAM, 10k ROM  $\mu$ Controller)
  - Security solutions available
    - Not just end-to-end (SSL/TLS)
- REST as a solution?
  - Not as rich and flexible
  - May not be much smaller
  - Resource paradigm a problem
- New Opportunities for tiny sensors, control
- Small oBix servers (and see Open Source oBix!)
  - Sedona/MicroNiagara 96k RAM, 128K Flash, wireless

# Side Show: Appropriate Level

- Appropriate [Software] Architectural Level
  - Important consideration in interface, interaction, standards design
  - Not too high, not too low, but “just right”
- Appropriate level depends on
  - What trying to accomplish, kinds of interaction, what’s available
- Not always intuitive
  - Service-Oriented Architectures--large “objects”, coarse-grained (not fine-grained) leads to better reuse/repurposing
  - Sensors/controls--fine grain, aggregate management into larger
- Don’t want your compressor controller negotiating with your energy supplier
  - Knowledge of contracts, authority isn’t cost-effective at that level
- Don’t want your eCommerce agent directly controlling the compressor
  - Instead, tell the AC’s manager to cycle/go into lower energy mode

# Opportunities

- New possibilities
  - Growing focus on intersection of eCommerce and energy/building management
  - Apply what works in other areas
  - Solve problems with tested technologies
- As energy and building interaction grows
  - Can see application of business approaches
  - Beyond control signals
    - Interactive exchanges, agents, intelligence



# A Challenge

- OASIS looking at Energy/Green Buildings/Building Management
  - Member section provides focus
  - Talk to me, Rik Drummond, Toby Considine
  - Many opportunities for collaboration
  - Many opportunities for new businesses and models
- New energy and building technologies need to consider eCommerce/enterprise issues
  - Enable economic interaction and solutions
  - Move from Command & Control to markets

# Summary

- Described eCommerce technologies
  - Selected for energy and building management
- eCommerce solutions can solve problems in energy, building, and related areas
- Opportunities to solve hard problems
- Opportunities to build new businesses
- Standards organizations and eCommerce experts can help

# Questions



# References 1

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- OASIS & Stds [www.oasis-open.org](http://www.oasis-open.org)
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