A Case Study in Design

The IASA Pillars in the Real World
# The IASA Pillars

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<tr>
<th>Business Technology Strategy</th>
<th>IT Environment</th>
<th>Design</th>
<th>Quality Attributes</th>
<th>Human Dynamics</th>
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<td>Balancing and Optimizing Quality Attributes</td>
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<td>Patterns and Styles</td>
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<td>Requirements Discovery, Constraints Analysis</td>
<td>Asset Management</td>
<td>Design Analysis and Testing</td>
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<td>Business Architecture Methods &amp; Tools</td>
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<td>Decision Support</td>
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<td>Knowledge Management</td>
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The ITABoK

- Vast body of knowledge
- Can be overwhelming
- How do we traverse the pillars in daily life?
Case Study

- A radio frequency identification (RFID) based asset tracking and management system
- How design played out during execution
- Learnings
The Idea

• Asset tracking and management using RFID

• Suitable for deployment in various settings like warehouses, factories, offices

• A system generic enough for implementation in any of these environments
Finding out About RFID

• Public sources

• Client-provided presentations

• Discussions
The Devices

• Tags
  o Active – on-board battery, transmits periodically
  o Passive – has to be polled by an RFID reader
  o Battery-assisted passive – has battery, but activated in presence of RFID reader
  o Various form factors
    ▪ Wristband
    ▪ Badge
    ▪ Sticker
    ▪ Other

• Readers
  o Devices that sense radio frequency signals
  o Concentrator software
Phase 1

• Functional prototype – proof of interface

• Environment
  o Active tags
  o One RFID reader
  o Concentrator software for RFID reader
  o Windows application
  o C#
  o SQL Server

• Store RFID data from concentrator in database
Phase 2

- Building an asset tracking system using RFID

- Vision
  - Enable mapping a factory floor
  - Enable asset tracking on map
  - Build rules engine that can take specified actions based on various parameters
  - Custom rules – no business rules engine until rules seen
Phase 2: Starting Off

- Complete empowerment to the team

- What must we build?

- Where do we start?

- We have business requirements, but how’s it possible?

- We must have UML! Train us!
Phase 2: Functionality

• UML
  o Use Case Model

• Functional specifications

• UML
  o Analysis Model

• UI specifications
Phase 2: Deployment
Phase 2: Application Tiers

pkg System Layers

Presentation Layer → Control Layer → Data Access Layer → Data Layer
Phase 2: Rules

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Phase 2: Non-Functional Requirements

- No throughput requirements even after query
- Confirmation that focus is to see what throughput can be achieved
- UI personalization
Phase 2: Results

• Unexpectedly satisfying to the client

• Rule execution
  o < 300 rules per second

• Proof that betterment was possible

• New phase commissioned
Phase 3

• Increase rules throughput

• Target 10,000 rules per second

• Not a hard figure
Phase 3: Discussions

- 10,000 rules per second not achievable
- No move to mainframes
- No change to technology stack
- Not a marketable product, but potential client demo material
Phase 3: Decisions

- Rules engine to be implemented as Windows service
- Code to be refactored for better performance
- 2 new servers, each running an instance of the Windows service
- Demand for 10,000 TPS down to 3,000 TPS
## Traversal Through the Pillars

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<tr>
<th>Phases</th>
<th>Activities</th>
<th>Pillars</th>
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</thead>
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<tr>
<td>Phase 1</td>
<td>Industry analysis</td>
<td>Business technology strategy</td>
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<tr>
<td></td>
<td>Technology stack finalization</td>
<td>IT environment</td>
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<td></td>
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<td>Design</td>
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<tr>
<td>Phase 2</td>
<td>Customer interaction, training</td>
<td>Human dynamics</td>
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<td></td>
<td>Industry analysis</td>
<td>Business technology strategy</td>
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<td>IT environment</td>
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<td></td>
<td></td>
<td>Design</td>
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<tr>
<td>Phase 3</td>
<td>Not a marketable product</td>
<td>Business technology strategy</td>
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<tr>
<td></td>
<td>10,000 TPS down to 3,000 TPS</td>
<td>Quality attributes</td>
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<tr>
<td></td>
<td>Extra infrastructure, no mainframes</td>
<td>IT environment</td>
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<td></td>
<td>Windows service</td>
<td>Design</td>
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## Moving Through the Pillars

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Learnings

- How the pillars are navigated in each project varies, as seen across phases in the case study.

- Organizational processes affect traversal.

- Looking for a pattern in which to navigate pillars can cause confusion.

- Addressing every pillar is the key.
• After phase 3, project moved out to a mainframe shop

• More than 5 man years of effort

• Seemed like failure

• Client feedback
  o Journey helped solidify perception of reality
  o Resounding success due to the learnings that made them take the step towards mainframe processing
In Closing

• Design is a human process.

• Knowledge of the pillars and their constituents helps ensure everything is addressed.

• The core measure of success is the success of the business technology strategy.

• The design pillar is the key enabler of business technology strategy success.