The Role of a Systems Architect

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What is a Systems Architect?
The holistic approach

End-to-end (holistic)

Requirements-driven

- Requirements Analysis
- End-to-End Systems Architecture

Viability - Non-functional Requirements
- Performance (response times, etc.)
- Availability (# breaks per year, etc.)
- Operability / Systems Management
- Security
- Etc.

Structured Method
- Global Services Method
- Enterprise Architecture Method
- End-to-End Design Method
- SMFD (Systems Management)
- Availability Method
- Performance Engineering method
The T-shaped skills profile

- Breadth of understanding & skill across IT
- Depth of technical expertise
An Enterprise Architecture (EA) is much like a city plan in that it defines an infrastructure that will meet the current and future needs of a diverse user population and will adapt to changing business requirements and technology.

<table>
<thead>
<tr>
<th>Architecture Components</th>
<th>Usage</th>
<th>City Planning Analogy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vision</td>
<td>• Strategy for I/T use across the enterprise</td>
<td>• City vision based on anticipated needs of residents</td>
</tr>
<tr>
<td>Principles</td>
<td>• Guidance for investment and design decisions</td>
<td>• Zoning and building codes to ensure quality &amp; consistency in construction</td>
</tr>
<tr>
<td>Models</td>
<td>• Overall context and views for systems and users</td>
<td>• Maps and diagrams for infrastructure systems like water, sewer &amp; electric</td>
</tr>
<tr>
<td>Arch. Building Blocks</td>
<td>• Standard Components for high level design</td>
<td>• Prefabricated building component specifications for off-site construction</td>
</tr>
<tr>
<td>Criteria</td>
<td>• Considerations for standards and product selection</td>
<td>• Considerations for component selection such as durability, cost, etc.</td>
</tr>
<tr>
<td>Standards</td>
<td>• Guidelines to which systems must conform</td>
<td>• Electrical wiring and plumbing standards</td>
</tr>
<tr>
<td>Arch. Mgmt. Process</td>
<td>• Process to allow additions &amp; variances to Architecture</td>
<td>• Process to change the city plan and allow for variances</td>
</tr>
<tr>
<td>Transition Initiatives &amp; Plan</td>
<td>• Prioritized infrastructure projects &amp; costs</td>
<td>• City improvement plan</td>
</tr>
</tbody>
</table>
Dealing with Fuzzy problems

Management: "I know I have a problem - it's impacting my business. But technically I don't really know where to begin."

The Systems Architect

Qualify the situation
Analyze background & context
Define problem

Problem Statement or Analysis

Recommend and plan project to handle problem
Resource team with appropriate skills
Carry out research
Make recommendations

Solution Recommendations
# Systems Architecture situations (1)

<table>
<thead>
<tr>
<th>The client has..</th>
<th>The client needs..</th>
<th>System Architect..</th>
<th>System Architect produces..</th>
</tr>
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<tbody>
<tr>
<td>IT-related problem</td>
<td>A solution</td>
<td>Defines problem Recommends actions</td>
<td>Problem Analysis Report Recommendations</td>
</tr>
<tr>
<td>Business requirements (possibly incomplete)</td>
<td>Outline of system solution &amp; its feasibility</td>
<td>Analyses &amp; completes requirements Creates first-cut IT solution Reviews technical feasibility</td>
<td>Requirements Analysis System Feasibility Report System Proposal</td>
</tr>
<tr>
<td>Existing infrastructure needs evolution</td>
<td>Technical direction</td>
<td>Establishes business &amp; technical context Creates a recommended strategy</td>
<td>Technical Strategy Report</td>
</tr>
</tbody>
</table>
# Systems Architecture situations (2)

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<tr>
<th>The client has..</th>
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<th>System Architect..</th>
<th>System Architect produces..</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fundamental change or increase in scale to existing infrastructure coming up</td>
<td>New technical architecture or system model</td>
<td>Uses structured approach to create an architecture or design</td>
<td>Enterprise Technical Architecture Report, Technical Infrastructure Design</td>
</tr>
<tr>
<td>Project with many disparate elements, or application but not technical infrastructure</td>
<td>Overall system design</td>
<td>Uses structured method to review design elements and create cohesive design</td>
<td>Technical Audit Report, System Architecture Report, Technical Infrastructure Design</td>
</tr>
<tr>
<td>Project under way or in plan</td>
<td>Assurance of technical viability</td>
<td>Reviews technical design in structured way. Creates systems architecture if necessary.</td>
<td>Technical Audit / Assurance Report, System or Technical Architecture</td>
</tr>
</tbody>
</table>
## Systems Architecture situations (3)

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</tr>
</thead>
<tbody>
<tr>
<td>Under-performing system (availability or response)</td>
<td>Recommended way forward</td>
<td>Establishes where in end-to-end system the problem lies, Recommends actions.</td>
<td>Performance Analysis, Availability Analysis, Scalability Analysis</td>
</tr>
<tr>
<td>Project starting</td>
<td>To know what tasks required, in what order</td>
<td>Works with PM to create work breakdown structure</td>
<td>Work Breakdown Structure, Plan</td>
</tr>
</tbody>
</table>


Benefits to the client

- **IT**
  - Raises technical integrity of solution (i.e. it works better & offers better service to business)
  - Increases flexibility, scalability, adaptability (etc., etc.) of system
  - Positions IT better for business change

- **Business**
  - Spur to creativity, innovation
  - Reduces & manages risk
  - Lowers cost and raises quality overall
  - Ties IT actions more closely to business
What skills do you need to do this?
Understand the business requirements

- What does the business need?
- What business processes will be supported?
- What system components are needed to do this?
- Where are the business rules?
- Who are the key users?
- Who is really behind this?
- Are there any key dates?
Keep up with the technology

- Disk (local, shared, NAS, SAN...)
- Windows, Unix, Linux, Solaris, z/OS, OS/400, ...
- DB2, Oracle, SQL Server, MySQL
- LANs, WANs, Routers, Firewalls
- RSA, SSL, Intrusion Detection
- DoS, 802.11b/a/g, WEP, WPA
- XML, SOAP, Web Services, .Net
- LDAP, JSR168, RDF, RSS
- Open Source options
The data

- Underlying data structures
- Tailored data groups
- Referential Integrity
- Interfacing requirements
- MIS requirements
- Imaging
Architectural Alternatives

- Client/Server or Web-model
- Operational or Informational
- Flexibility vs. Performance
- COTS vs RYO
Performance

- Design
  - Assign quotas
  - Think scalability
- Prototype heavy loads
  - Using a driver
- Tune
  - Understand where the time is going
  - Focus on key components
The operational environment

- 24/7 requirement?
- Overnight schedules
- The data centre view of life
- Interfacing requirements
- Disaster recovery
Human factors

- Business scripts
- Dialog structure
- Number of screens
- Layout of screens
- Drag and Drop
- Use of help
- Mnemonics

• Consistent
  • Look and feel
  • Response times
The development process

- Overall Development approach
- Tools
  - Library management
  - Debuggers
- Table data vs. code
- Standards and Guidelines
- Work activities
Don’t leave it too late…

Systems Management

Security

Performance hooks
Testing

- What to test
- Types of test
- Entry criteria
- Exit criteria
- When to stop testing

• Testing Infrastructure has to handle
  • Functional Testing
  • Regression Testing
  • Deployment Testing
  • Stress Testing
Management systems

- Risk management
- Project deliverables
- Escalation procedures
- Roles and Responsibilities
- Right of Veto
- Sign-off criteria
Certification criteria

- **Soft Skills**
  - People skills
  - References
  - Giveback
  - Leadership
  - Team player

- **Technical Skills**
  - Good mix of project experience
  - Full lifecycle experience
  - In depth skills in (at least) one technology and one industry
  - Keeps skills current
  - Can explain architectural concepts clearly
  - Reuses assets where appropriate
The Compleat architect

- A brain the size of a planet
- Eyes in the back of the head
- The memory of an elephant
- The armament of a tank
- The creativity of Salvador Dali
- An understanding spouse

With acknowledgements to Paul Booth of IBM on whose work these slides are based
Questions ?