Maximize your Business Impact as an Architect

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Contents

Introductions
The business value of architecture
Hands-on: prioritizing architectural concerns by economic impact
Applying risk- and cost-driven architecture
Eltjo Poort

CGI Architecture Community of Practice lead

- Reviewing Bids & Projects
- Standardizing & Improving Architecture Practice

Researcher

- Improving Architecture Practices
- With Universities (VU, Twente, Utrecht, Eindhoven)
- Member of IFIP WG 2.10 Software Architecture

http://eltjopoort.nl
Introductions

Name, organisation, role
Experience, recent projects
Personal details (as desired)
# The Business Value of Architecture

Quantified by research*

<table>
<thead>
<tr>
<th>Result</th>
<th>Improvement by applying Solution Architecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Budget predictability</td>
<td>2-3 x better</td>
</tr>
<tr>
<td></td>
<td>Std dev 32 → 13</td>
</tr>
<tr>
<td>Budget overrun</td>
<td>7 x less</td>
</tr>
<tr>
<td></td>
<td>22% → 3%</td>
</tr>
<tr>
<td>Time overrun</td>
<td>6 x less</td>
</tr>
<tr>
<td></td>
<td>48% → 8%</td>
</tr>
<tr>
<td>Troubled projects</td>
<td>3 x less</td>
</tr>
<tr>
<td></td>
<td>38% → 13%</td>
</tr>
<tr>
<td>Customer satisfaction</td>
<td>1-2 points better</td>
</tr>
<tr>
<td></td>
<td>10 point scale</td>
</tr>
<tr>
<td>Results delivered</td>
<td>+10%</td>
</tr>
</tbody>
</table>

*Survey among 49 software development projects between €50,000 and €2,500,000. Reported by Raymond Slot, PhD Thesis, 2010.
RCDA Risk and Cost Driven Architecture

Solution architecting principles and practices based on a view of architecture as a risk and cost management discipline

- Applicable in agile and traditional engagements
- Highly scalable and pragmatic
- Architectural decision making based on economic trade-offs
- Architecture communication in economic terms
- Traceability from requirements to cost
RCDA Principles

Decisions are your main deliverable

- Keep a backlog of architectural concerns
- Let economic impact determine your focus
- Keep it small
- Use just enough anticipation
Decisions are your main deliverable

Focus on Architectural Decisions

• Convey change
• Convey implications
• Convey rationale & options
• Ease of traceability
• Agile documentation
The Architect’s Daily Job

**Architecting Microcycle**

- Identify & prioritize architectural concerns
- Research possible solutions
- Decide best fitting solution

• What problems should I work on?
• What are my options?
• I’ll pick this one
RCDA Principles

Decisions are your main deliverable

Keep a backlog of architectural concerns

Let economic impact determine your focus

Keep it small

Use just enough anticipation
The Architecting Workflow

- Identify & prioritize architectural concerns
- Research possible solutions
- Decide best fitting solution
- Architectural decisions
- Architectural concerns (backlog)
RCDA Principles

Decisions are your main deliverable

Keep a backlog of architectural concerns

Let economic impact determine your focus

Keep it small

Use just enough anticipation
What is architecture about?

“Fundamental concepts or properties of a system in its environment embodied in its elements, relationships, and in the principles of its design and evolution”.

[ISO/IEEE]

“Architecture is about the important stuff. Whatever that is.”

[Fowler]

After talking to architects and stakeholders on dozens of projects, we have come to equate the “important stuff” with the stuff that has most impact on risk and costs.

Important \(\leftrightarrow\) high risk and cost
Architecture as a Risk- and Cost Management Discipline

Managing Cost and Risks is architecture’s primary business goal. Cost and Risks are prioritizing factors determining architect’s concerns. Architect should be an expert on costing and risk mitigation.

Architecture as a risk mitigation mechanism
- Reduce uncertainty in feasibility of solution
- Reduce troubled projects

Architecture as a cost control mechanism
- Better predictability of solution cost
- Less budget overrun
Stakeholder Communication
Architecture in terms of Risk and Cost

Many stakeholders not used to traditional architectural terms
• “levels of abstraction”
• “components and connectors”
• “close coupling”, “clustering criteria”, …

Risk and Cost: universal terms most stakeholders can relate to
• smoother stakeholder/architect communication
• relatively objective measure to explain priorities
• increase business managers’ awareness of value of architecture
The Architecting Workflow: Architectural Requirements Prioritization

- Identify & prioritize architectural concerns
- Research possible solutions
- Decide best fitting solution
- Architectural concerns (backlog)
- Architectural decisions
Consider more than formal technical requirements!

Primary business drivers of the client
Quality Attributes, sometimes captured in NFRs
System Lifecycle Constraints
Constraints of the development organization
Commercial considerations
Cost constraints
Contractual considerations
Current technical environment
Architectural Guidance (mandatory or not)
When are requirements architectural? (all related to cost and risk)

Hard or costly to realize
• usually systemic, with broad impact across the solution

Uncertainty of fulfillment
• no previous experiences or evidence of feasibility

Critical to stakeholders
• failing to fulfill would make solution worthless to e.g. end-users
• often revealed in stakeholder workshops

Bulk functionality
• functions not architectural by themselves but by their volume
Architectural Requirements Prioritization

Activity: Identify Architectural Concerns

Architectural Requirements lead to Architectural Concerns

- What is the best OS platform to host this application on?
- Which workflow engine should we use in this system?
- Should we have two geographically separated data centers?
- How can we achieve the multi-language requirement?
Architectural Requirements Prioritization
Activity: Prioritize Architectural Requirements and Concerns

Prioritize Architectural Concerns
• by Risk and Cost (for all stakeholders)
• to determine which to address first

Focus on max. 5 or 6 simultaneously
• when these are addressed, the rest will shift anyway

Avoid postponing hard questions
• if it’s hard to deal with, put it on top of list
• fight temptation to start on easy ones (“searching under the lamplight”)

Re-prioritize often
• concerns drop off after being addressed by architectural decisions
• criticality may drop when more info available
• new concerns triggered by architectural decisions
Architectural Requirements Prioritization
Activity: Prioritize Architectural Requirements and Concerns

Architectural Significance in terms of Risk and Cost is the key to prioritizing backlog of architectural concerns

- objective measure $AS(C) = Cost(C) + Risk(C)$
- stated in business terms

<table>
<thead>
<tr>
<th>Rank</th>
<th>Concern</th>
<th>Cost</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Instant Authorization revoke</td>
<td>$$$$</td>
<td>50% $$</td>
</tr>
<tr>
<td>2</td>
<td>Non-standard UI elements</td>
<td>$$$$</td>
<td>10% $$</td>
</tr>
<tr>
<td>3</td>
<td>Performance Criteria</td>
<td>$$</td>
<td>10% $$$</td>
</tr>
<tr>
<td>4</td>
<td>New version of Websphere</td>
<td>$</td>
<td>50% $$</td>
</tr>
<tr>
<td>5</td>
<td>Unknown utilisation of web services</td>
<td>$</td>
<td>5% $$</td>
</tr>
</tbody>
</table>
Architectural Requirements Prioritization
Practice Summary

**Objectives**
Determine architecturally significant Requirements and Concerns
Prioritize requirements and concerns

**Approach**
Prioritize by risk and cost
Focus on top 5/6 concerns
Re-prioritize often
Know when to stop

**Roles**
Stakeholder
Solution Architect

**Input**
Requirements from stakeholders

**Activities**
Identify Architectural Requirements
Describe Architectural Requirements
Identify Architectural Concerns
Prioritize Arch Reqs and Concerns

**Output**
Architectural Concerns
Architectural Requirements
Architectural Requirements Prioritization

Exercise

A Solution Architect works with key stakeholders to identify and prioritize the key Architectural Requirements and Concerns

Exercise (in groups of 3):
1. Choose one student and his/her current project as case study
2. The chosen student plays the role of Solution Architect, the others are interviewers eliciting key requirements & scenarios
3. The Solution Architect presents the case (5 minutes): context and key client requirement
4. In a 10 minute discussion, identify the 2 architectural requirements with the highest impact in terms of cost and risk
5. Present the risk and cost impact of the most significant requirement to the plenary group
Plenary feedback

When was cost or risk hard to estimate?
How did prioritizing concerns by risk and cost work out?
Would you be able to justify your prioritization to management?
Will you be able to apply this in your daily work?
Applying agile architecting practices in context
Applying RCDA practices

**SCRUM**

1. Solution Backlog
2. Sprint Backlog
3. Architectural decisions
4. Architectural concerns
5. Architectural Requirements Prioritization
6. Solution Selection
7. Daily
8. Sprint
9. Solution Increment

- Applying Architectural Strategies
- Architecture Roadmapping
- Technical Debt Control
- Architecture Implementation
Questions or Comments?

Spare slides follow
Scope of Solution- vs Enterprise Architecture

- CIO
- Program Manager
- Project Manager
- Lead Architect
- Enterprise Architect
- Enterprise
- Program
- Solution Architect Roles
What is the difference between an architect and a designer?

<table>
<thead>
<tr>
<th>Architecture</th>
<th>Design</th>
</tr>
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<tbody>
<tr>
<td>Fundamental properties</td>
<td>All properties</td>
</tr>
<tr>
<td>Define guidelines</td>
<td>Use guidelines</td>
</tr>
<tr>
<td>Cross-cutting concerns</td>
<td>Individual components</td>
</tr>
<tr>
<td>High impact (risk, cost)</td>
<td>Details</td>
</tr>
<tr>
<td>Business stakeholders</td>
<td>Developers</td>
</tr>
<tr>
<td>Manage uncertainty</td>
<td>Avoid uncertainty</td>
</tr>
<tr>
<td>Conceptual integrity</td>
<td>Completeness</td>
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Timing of architectural decisions

Certainty of correct architectural decision depends on knowledge:
- relative cost of the alternative solutions
- value and impact on the business
- delivery times

All architectural decisions are based on incomplete information
(and the highest impact decisions are taken while the least factual knowledge is available)

Timing architectural decision is balancing risk, cost and delivery time:
- too little information \(\rightarrow\) risk of not meeting key requirements
- waiting too long \(\rightarrow\) project delays, wasted resources

Key skills of Solution Architect:
- timing of architectural decisions
- making decisions based on incomplete information
- dealing with the resulting risks
RCDA Practitioner Course

- Interactive, classroom-based three-day training course
- Presentations, discussions and exercises
- Learn to apply good solution architecture practices in everyday work
- 5 half-day classroom sessions, plus an extensive group exercise
- RCDA teachers are experienced practicing architects

RCDA Practitioner Course Program

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<th>Module 2 Creating a Solution Architecture</th>
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<tr>
<td>Architecture Requirements Prioritisation - Solution Selection - Applying Architectural Strategies</td>
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<th>Module 3 Delivering the Architecture</th>
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<th>Exercise: Applying RCDA</th>
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<th>Module 4 Applying RCDA</th>
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<tr>
<td>Core Process - Waterfall Project - RUP Software Development - Agile Development - Bid - Blended Delivery - Enterprise to Solution Architecture</td>
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<tr>
<th>Module 5 Supporting Practices</th>
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The Role of Risk

Risk: something that may go wrong
• most directly related to Project and Solution
• impact usually measured in terms of cost
  • other impacts exist: delivery time, client satisfaction

Risk = PerceivedProbabilityOfFailure \times PerceivedImpactOfFailure

Stakeholders have different interests in risks:
• difference of scope of their stake
  • project manager: risks to project success
  • operational stakeholders: after-delivery
The Role of Cost

Solution Architect concerned with two types of cost:
• Total Cost of Ownership (TCO) → Solution
• Project Costs → Project

Stakeholders have different interests in cost:
• difference of scope of their stake
  • project manager: project costs
  • operational stakeholders, business owner: TCO

Make sure you know which costs to optimise for!
• unclarity will lead to conflicts between architect and stakeholders