Abstract

Many decisions are taken during the architecting of a system. The question is what are architectural decisions? And what is the process behind making these decisions? The expectations of the stakeholders will be discussed. The actual way of working of architects will be described.
Architectural Decision Making; What Happens Behind the Scenes?

Gerrit Muller

version: 0.2
September 9, 2018
ADMpresentationIcon
Buzzword, Hype, Solution or What?
What is Architecture?

Mark all applicable boxes:

- Specifications
- API's
- Components (implementations)
- Infrastructure
- Overarching vision
- Market, business, technology
- Process, product
- High level rules
- Concepts
- Standards
- Domain codification
- Other...

- Other...
Architecture vs Description

Architecture

Subset of which architect is aware

Flattened into

Architecture description

Actually written by architect(s)
My View on Architecture

Understanding Why

Describing What

Guiding How

Do the right things

Do the things right
"Guiding How” by providing rules for:

1. **Functional Decomposition**
2. **Construction Decomposition**
3. **Allocation**
4. **Infrastructure**
5. **Choice of integrating concepts**

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LWAarchitectureHow
The Art of Architecting

Stakeholders

Expectations

Architecting

Facts

Architect(\text{s})

Intuition, assumptions, beliefs, bias

problems, legacy

Architecture\text{(s)}

architecture, uncertainties, unknowns

Facts, Expectations and Intuition may be false
Integration requires a critical mindset that is alert for unknowns

architecting

analyze, assess, balance, trade-off, decide

vision, overview, insight, understanding

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LWA Architecting
Another Buzzword or Solution?
How many (architectural) decisions does an architect make?
Decision Making Process

1. Problem understanding
2. Analysis
3. Decision
4. Monitor, verify, validate

- vague problem statement
- conflicting other decision
- insufficient data
- no satisfying solution
- invalidated solution
- conflicting other decision
Decision Making Process *Annotated*

1. **Problem understanding**
   - by exploration and simple models

2. **Analysis**
   - by exploring multiple propositions (specification + design proposals)
   - by exploring decision criteria (by evaluation of proposition feedback)
   - by assessment of propositions against criteria

3. **Decision**
   - by review and agree on analysis
   - by communicate and document

4. **Monitor, verify, validate**
   - by measurements and testing
   - by assessment of other decisions

- **vague problem statement**
- **conflicting other decision**
- **invalidated solution**
- **no satisfying solution**
- **insufficient data**
Different Types of Decisions

Understanding Why
Describing What
Guiding How

- basic principles
- requirements
- architecture rules, implementation choices (e.g., technology)
Many Decisions are taken in the Dark

Highest impact decisions are taken while the least factual knowledge is available
Why Project Leaders Sometimes don’t like Architects

Facts, Expectations and Intuition might be false

Highest impact decisions are taken while the least factual knowledge is available

decision - action chicken or egg?
Bottom-line is a Working System

architecture

decision

architect

system
Decisions Are Related

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Worse, Decisions Are **Heavily** Related

![Diagram with nodes connected in different sections labeled Customer objectives, Application, Functional, Conceptual, and Realization.]
Architecting is much more than Decomposition

Decomposition is "easy"

Integration is difficult
In Documentation Terms

δ's or structured

minutes 1
  decision 1
  decision 2
  decision 3

minutes 2
  decision 4
  decision 5
  decision 6

minutes k
  decision n
  decision n+1
  decision n+2

qualities
e.g. performance

system

subsystem

subsystem

subsystem
Revisiting Architecture

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Fundamental Question

Is architecture = or = or = emerging from
preconceived = decision
all architect
environment system
context creation

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The End

Back-up Slides and Answers only after this Slide
<table>
<thead>
<tr>
<th>Quantity per year (order-of-magnitude)</th>
<th>architect time per item</th>
</tr>
</thead>
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</tr>
<tr>
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<td>seen details</td>
<td>$10^5 - 10^6$</td>
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<tr>
<td>real-world facts</td>
<td>infinite</td>
</tr>
</tbody>
</table>
Quantification from “Architectural Thinking”

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ATmentalDynamicRange