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?

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June 21, 2020
ADMpresentationIcon
Buzzword, Hype, Solution or What?

architecture → decision

architect → system
What is Architecture?

Mark all applicable boxes:

- specifications
- components (implementations)
- API's
- high level rules
- concepts
- standards
- infrastructure
- indicators
- overarching vision
- guidance monitoring
- customers
- environment
- Java
- SQL
- FPGA
- technology
- other...

Architectural Decision Making; What Happens Behind the Scenes?

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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
The Art of Architecting

Stakeholders

Expectations

Architecting

Facts

Architecture(s)

problems, legacy

analyze
assess
balance
trade-off
decide

vision
overview
insight
understanding

Architecture

uncertainties
unknowns

Intuition, assumptions, beliefs, bias

Facts, Expectations and Intuition may be false
Integration requires a critical mindset that is alert for unknowns
Another Buzzword or Solution?

architecture  
decision  
architect  
system
How many (architectural) decisions does an architect make?
Decision Making Process

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

- insufficient data
- no satisfying solution
- invalidated solution
- conflicting other decision
- vague problem statement
1. Problem understanding by exploration and simple models

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

3. Decision by
   + review and agree on analysis
   + communicate and document

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

vague problem statement

conflicting other decision

insufficient data

no satisfying solution

invalidated solution
Graph of Decisions and Alternatives

- **legend**
  - past decision
  - most probable decision
  - potential alternative
  - less probable alternative

- **time**
  - now
  - scope of architect's considerations

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Different Types of Decisions

Understanding Why
Describing What
Guiding How

- basic principles
- requirements
- architecture rules implementation choices f.i. technology

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Many Decisions are taken in the Dark

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

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Chicken or Egg?

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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?

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Bottom-line is a Working System

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Decisions Are Related

Customer objectives

why?

Application

why?

Functional

what?

how?

how?

what?

Conceptual

why?

Realization

how?
Worse, Decisions Are **Heavily** Related

- Customer objectives
- Application
- Functional
- Conceptual
- Realization

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Architecting is much more than Decomposition

Architectural Decision Making; What Happens Behind the Scenes?

Decomposition is "easy"

Integration is difficult
In Documentation Terms

'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
Revisiting Architecture

architect

architecture

decision

architect

system
Fundamental Question

Is architecture = \sum_{\text{decision}} \text{all} or \text{preconceived} or \text{emerging from} \text{environment} \text{system} \text{creation context}?
### Quantification from “The Role and Task of the System Architect”

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<tr>
<td>real-world facts</td>
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</tbody>
</table>

- consolidation in deliverables
- meetings
- informal contacts
- sampling scanning

**Architectural Decision Making; What Happens Behind the Scenes?**

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