Architectural Decision Making; What Happens Behind the Scenes?

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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.
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What is Architecture?

Mark all applicable boxes

- specifications
- APIs
- components (implementations)
- infrastructure
- high level rules
- concepts
- standards
- overarching vision
- guidance monitoring
- domain codification
- other...

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HMPAwhatIsArchitecture
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

Facts

Architecture(s)

problems, legacy

analyze
assess
balance
trade-off
decide

Architecting

vision
overview
insight
understanding

Architecture

uncertainties
unknowns

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

Intuition, assumptions, beliefs, bias
Another Buzzword or Solution?

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ADMpresentationIconDecision
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

no satisfying solution

invalidated solution
Graph of Decisions and Alternatives

Legend:
- Past decision
- Most probable decision
- Potential alternative
- Less probable alternative

Communication scope

Scope of architect's considerations

Now

Time
Different Types of Decisions

Understanding Why
Describing What
Guiding How

- basic principles
- requirements
- architecture rules implementation choices (f.i. technology)
Many Decisions are taken in the Dark

Highest impact decisions are taken while the least factual knowledge is available
Chicken or Egg?

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ADMchickenOrEgg
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

Customer objectives

Application

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Application

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Worse, Decisions Are **Heavily** Related

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TORnetworkedissues
Architecting is much more than Decomposition

Decomposition is "easy"

Integration is difficult
In Documentation Terms

δ's or structured

System

qualities

e.g. performance

Subsystems

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

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Revisiting Architecture

architecture

decision

architect

system
Fundamental Question

Is architecture = preconceived
= emerging from

or

= all

or

= decision

or

= architect

or

= environment

or

= system

or

= context

or

= creation

or

= system

Is?
Back-up Slides and Answers only after this Slide
Quantification from “The Role and Task of the System Architect”

<table>
<thead>
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<th>Classification</th>
<th>Quantity per year (order-of-magnitude)</th>
<th>architect time per item</th>
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<td>driving views</td>
<td>10</td>
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<td>shared issues</td>
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