Abstract

The question: "What is an architecture" is addressed. Trends in the customer world and in the technology are used to obtain an outline of the product requirements. The customer world itself is a value chain consisting of quite heterogeneous stakeholders.

To satisfy the needs of these customers an integral approach is required. Architectures play a key role in such an integral approach.

Architecture lessons from practice are given to illustrate criteria for a good architecture are discussed. The concept of architecture-weight is introduced.
What is Architecture?

Understanding Why

Describing What

Guiding How

Do the right things

Do the things right
1A. Do the right things; The Dynamic Market

Understanding
- Why

Describing
- What

Guiding
- How

1B. Do the things right; Lessons from Practice

2. The Weight of an Architecture; Architectural Chaos or Bureaucratic Control?
Part 1A:

Do the right things;
The Dynamic Market
Convergence

Telecom

Consumer

Computer

Light Weight Architecture: the way of the future?

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Integration and Diversity

Light Weight Architecture: the way of the future?

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LWAIntegrationAndDiversity
Uncertainty (Dot.Com effect)

source: BigChart.com
dd march 19, 2001
Moore's law

From: COPA tutorial, Rob van Ommering

1965
1979
2000
1990
1 kB
64 kB
2 MB

Moore's law

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LWAmooresLawRvO
System Integrator Problem Space - Business

- **Time to Market**
  - Infrastructure: 100 months
  - Application: 10 months
  - Digital TV: 1 month
- **Volume**
  - GSM: $10^6$ units
  - TV: $10^3$ units
  - Personalized (skins, themes): 1 unit
- **Effort**
  - Manyear: 1000
  - Digital TV: 100
  - GSM: 10

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LWAproblemSpaceBusiness
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LWAproblemSpaceTechnology
System profile

Problem space

- months
- units
- manyear
- Operations/s
- Watt
- Byte

- infrastructure
- digital TV
- home server
- personalized (skins, themes)
- digital server
- digital TV
- GSM

- time to market
- volume
- effort
- performance
- power
- storage

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LWA system profile

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LWA solution Space Technology
## Partial Solution: Configurable Component Platform

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<th>TriMedia</th>
<th>MPEG decoder</th>
<th>ARM</th>
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</tbody>
</table>

- ● required
- ○ optional
Exploring problem space and solution ingredients

Problem space

Programmability, flexibility
Increase supplier content
Competitive Performance / cost / power

Solution ingredients

Configurability

Family of products

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LWAfromStakeholderToQualities
Architecture only works if the complementary viewpoints are addressed consistently
Conclusions Part 1A

Understanding

Why

Describing

What

Dynamic Market Convergence Integration Diversity

Configurable Component Platform

Portfolio and Family architecture

Light Weight Architecture: the way of the future?

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Part 1B:

Do the things right;
Lessons from Practice
"Guiding How” by providing rules for:

1. Functional Decomposition

2. Construction Decomposition

3. Allocation

4. Infrastructure

5. Choice of integrating concepts

Light Weight Architecture: the way of the future?

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LWAarchitectureHow
The Art of Architecting

- Stakeholders
  - Expectations

- Architecture
  - Facts
    - analyze
    - assess
    - balance
    - trade-off
    - decide
  - architectural elements
    - vision
    - overview
    - insight
    - understanding

- Architect(s)
  - Intuition

Note:
Facts, Expectations and Intuition might be false
Architecting is much more than Decomposition

Decomposition is "easy"
Integration is difficult
Myth: Platforms are Stable

How stable is a platform or an architecture?

Dynamic Market

Fast changing Technology

Light Weight Architecture: the way of the future?

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LWAplatformStability
The first time right?

First time right?  maybe  unlikely  miracle  impossible

manyyears  1  10  100  1000
Feedback

stepsize: 3 months
elapsed time: 25 months

Start

Target

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LWAtutorialLarge
Feedback (2)

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LWAFeedbackMedium
Small feedback cycles result in Faster Time to Market

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LWAplatformEvolution

3rd generation components are mature, active maintenance needed.
Growth and change continues, some "old" components become obsolete.
Part 2:

The Weight of an Architecture; Architectural Chaos or Bureaucratic Control?
weight(architecture) = \sum_{\text{all rules}} \text{weight(rule)}

weight (rule) = f (\text{level of enforcement, scope (impact), size, level of coupling or number of dependencies})

Guideline | Conditional rule | Mandatory rule
---|---|---
Component | Product | Portfolio
Single-line | Multi-line | Multi-page
Stand-alone | Builds on many rules

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LWAarchitectureWeight
Scope and Impact

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LWAArchitectureScope
Criteria for an Architecture

Customer
- being informed
- functionality
- performance
- timely available
- acceptable cost

Business manager
- bottomline
- future growth

Open

Feedback Responsiveness

Solution Freedom Communicable

Evolution

Suppliers
- implementation
- decoupling
- solution freedom

Architecture

Implementation

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LWAstakeholdersArchitecture
Light Weight Architecture: the way of the future?

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LWAeffectivenessCurves
Conclusion Part 2

Effectiveness

Architecture

Weight

(for dynamic markets and fast changing technologies)

very low
low
medium
high

overall effectiveness = Flexibility * Manageability

Manageability

Flexibility

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weight(architecture) = \sum_{\text{all rules}} weight(rule)

1. Reduce the rule set to the (business) essential

2. Minimize the weight per rule

Understand your customer
your customer's customer
etcetera
Minimize Rule Weight

\[
\text{weight}(\text{rule}) = \minimize \text{number of mandatory rules}
\]

\[
f(\text{level of enforcement}, \text{scope (impact)}, \text{size}, \text{level of coupling or number of dependencies})
\]

- empower, delegate
- minimize implementation details
- focus on essential concepts
- Apply design principles on architecture
- Multi-view architecting
Summary

1A. Dynamic Market: Understand Your Customer

1B. Architecting in Practice:
Change is normal,
Stability is the exception

2. Optimal architecture:

Light weight!
Acknowledgements

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- Peter van den Hamer
- Lex Heerink