A Collection of Viewpoints
by Gerrit Muller
Philips Research IST-SWA-IA

Abstract
See next slide

Distribution
This article or presentation is written as part of the Gaudí project. The Gaudí project philosophy is to improve by obtaining frequent feedback. Frequent feedback is pursued by an open creation process. This document is published as intermediate or nearly mature version to get feedback. Further distribution is allowed as long as the document remains complete and unchanged.
Abstract

A system architect works by looking at the problem and solution from many different viewpoints, the so-called "viewpoint hopping". A collection of viewpoints is given, based on heuristics in product development of electronic systems, ranging from integrated circuits to wafersteppers and MRI scanners.

The focus is on the higher level viewpoints. The more detailed conceptual and realization viewpoints are not shown here.

This document is created for the WICSA workshop on "Architectural Viewpoints". The mindset of this workshop is strongly driven by the IEEE 1471 definitions. No attempt has been made yet to map the collected viewpoints on the IEEE ontology.
WICSA workshop questions

- Are there architectural description issues that don’t fit with the IEEE 1471 ontology of stakeholders, concerns, views and viewpoints?

- What methods are there for checking consistency BETWEEN views? How do viewpoint definitions help with consistency checking and view integration?

- What kinds of architectural knowledge about a system fall ”outside” of any particular viewpoint?

- Where do we go from here? What next steps should we take? A workshop proceedings or summary? Article? Future meetings? A viewpoint library or handbook?
WICSA workshop submitted viewpoints

- attribute/decision
- behavior
- conceptual
- feature
- implementation
- logical
- model
- operational
- pattern-composition
- requirements
- resource
- test
- system architect
IEEE 1471 Architecture Description Standard

System has 1 Architecture

Described by

Architecture Description

Consists of

Stakeholder has n concern covers n viewpoint covers n model

viewpoint

consforms to n view

defines n
Flattening an Architecture into a Description

Architecture

Subset of which architect is aware

Flattened into

Actually written by architect(s)

Architecture description
"BOPA" and "CAFCR" framework

From: COPA tutorial; Philips SW conference 2001.

A Collection of Viewpoints
Gerrit Muller

version: 1.1
25th February 2002
LWAcopaMethod

PHILIPS Research
IST-SWA-IA
What does Customer need in Product and Why?

Customer
  What
  Customer objectives

  How
  Application

Product
  What
  Functional

  How
  Conceptual
  Realization

Product How
Value Chain semiconductors

Providers
UPC
Canal+
AOL
AT&T

Consumers
Boonstra
Peper
Kok
Chirac
Blair
Pietersen
Smith
Jones
Jansen
Muller
Kleisterlee
v.d. Spijker
Kok
Jansen
Goedkoop

Retailers
Fry’s
Dixon

Component and Platform Suppliers
Philips Semiconductors
Liberate
Samsung
LG
TI
ST
Philips Components
Intel
Microsoft
Micron

System Integrators
Sony
Philips CE-TV
Loewe

Philips CE-DN
Philips CE-PCC

It’s
AOL
Canal+
AT&T
UPC

Providers
Philips Semiconductors
Microsoft
Intel
Micros...
Value Chain providers

User

Appliance

Home Server

Network Providers

Service Providers

Content Providers
Internal Value Chain

Product Creation
Decomposition and Integration

Specify Design Engineer Build

Validate Verify Transfer Integrate

Sub-System

Sub-System

Sub-System

Component

Component

Component

Order Realization

Order

Assembly Adjust Test
## Stakeholders

### Customer Stakeholders:
- Consumer
- User
- Operator
- Financial manager
- Department manager
- CEO
- Purchasing manager
- Support department
- Quality Assurance officer
- Service provider
- Infrastructure provider
- Content provider
- Retailer
- System Integrator / Solution Provider

### Operational Stakeholders:
- Sales manager
- Field service engineer
- Marketing manager
- Application specialist
- Portfolio manager
- Project manager
- Manufacturing engineer
- Logistics manager
- Purchasing manager
- Quality Assurance officer
- Line manager
- Developer
- Test engineer
Stakeholders of an Architecture

Customer
- functionality
- performance
- timely available
- acceptable cost

Business manager
- bottomline
- future growth

Open
- implementation
- decoupling
- solution freedom

Suppliers

Feedback
- Responsiveness

Solution Freedom
- Communicable

Evolution
- understandability
- accessibility
- product feasibility

Engineers
## "Quality" Concerns

<table>
<thead>
<tr>
<th>Performance</th>
<th>Operational</th>
<th>Economics and Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety</td>
<td>Manufacturability</td>
<td>Cost price</td>
</tr>
<tr>
<td>Security</td>
<td>Testability</td>
<td>Cost of operation</td>
</tr>
<tr>
<td>Reliability</td>
<td>Serviceability</td>
<td>Interaction with environment</td>
</tr>
<tr>
<td>Robustness</td>
<td>Configurability</td>
<td>Power consumption</td>
</tr>
<tr>
<td>Useability</td>
<td>Installability</td>
<td>Consumption rate (water, air,</td>
</tr>
<tr>
<td>Appeal, Appearance</td>
<td>Evolvability</td>
<td>chemicals, etcetera)</td>
</tr>
<tr>
<td>Throughput or Productivity</td>
<td>Portability</td>
<td>Disposability</td>
</tr>
<tr>
<td>Response Time</td>
<td>Upgradeability</td>
<td>Size, weight</td>
</tr>
<tr>
<td>Image Quality</td>
<td>Extendability</td>
<td>Resource utilization</td>
</tr>
<tr>
<td>Reproduceability</td>
<td>Maintainability</td>
<td></td>
</tr>
<tr>
<td>Predicatability</td>
<td>Logistics flexibility</td>
<td></td>
</tr>
<tr>
<td>Accuracy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transportability</td>
<td>Lead time</td>
<td></td>
</tr>
<tr>
<td>Wearability</td>
<td>Standards Compliance</td>
<td></td>
</tr>
<tr>
<td>Storability</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A Collection of Viewpoints
Gerrit Muller

version: 1.1
25th February 2002
VCqualities

IST-SWA-IA
1. Functional Decomposition
2. Construction Decomposition
3. Allocation
4. Infrastructure
5. Choice of integrating concepts
• Integrating all viewpoints
• Balancing
• Providing focus, by selecting the most relevant viewpoints
• Identify risks, by monitoring the non selected viewpoints
• Bridging the stakeholder worlds
• Providing overview
A method to Integrate CAFCR viewpoints

<table>
<thead>
<tr>
<th>Customer business</th>
<th>Application</th>
<th>Functional</th>
<th>Conceptual</th>
<th>Realization</th>
</tr>
</thead>
</table>

Scenario:

**Accessible** story, clearly outlining a **frequently** occurring situation with a **valuable**, but **challenging** solution

Typical Case:

- Functions and Quantification of **frequently** occurring **important** and **critical** case

Several iterations are required. In later iterations worst cases and exceptional cases are taken into account. The technical estimates are then transformed in budgets.
Gaudí relevant URL’s

  http://www.extra.research.philips.com/natlab/sysarch/  
  TheIndustreeDecember2000Slides.pdf

- *The Gaudi Project*.  
  http://www.extra.research.philips.com/natlab/sysarch/GaudiProject.html

- *The Gaudi Documents*.  