System Architecting Forum Introduction

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Abstract

The System Architecting Forum (SAF) is an international group of architecting practitioners that meet twice a year. Every meeting one major topic is discussed. The results of the discussion are consolidated in a white paper and a number of best practices.

The objective is to provide a venue for the exchange of practical experience in the realm of development, implementation and management of system and enterprise architectures. This shall in turn be a platform for the exchange of ideas for improved practices in the above areas as well as the goal-oriented use of architectural knowledge and information in various life cycle phases and enterprise functions.
System Architecting Forum
What, Why Who?

Intermezzo 1:
What is Architecting?

Intermezzo 2:
What are Models?

Meetings and Results

Conclusion
System Architecture Forum

Discuss practices, research, and lessons learned with regard to the practical development, implementation and management of system architectures

Jointly Hosted By:
Embedded Systems Institute and the Stevens Institute of Technology

Objective
The forum will have an emphasis on practical systems architecture and the application of architectural information and knowledge. The objective is to provide a venue for the exchange of practical experience in the realm of development, implementation and management of system and enterprise architectures. This shall in turn be a platform for the exchange of ideas for improved practices in the above areas as well as the goal-oriented use of architectural information and in various life cycle phases and enterprise functions.

Format
The forum will meet at regular intervals for a workshop equivalent to approximately one working day. A pre-defined topic will be discussed from two perspectives. The first perspective will be the "rear-view mirror" with exchange of experience around current and past practices, best and worst practices. The second perspective will look ahead with exchange of ideas to improve current practices. Research fellows from The Embedded Systems Institute (in Europe) and Stevens Institute of Technology (in the United States) will facilitate each workshop, capture the exchange and develop a whitepaper summarizing the outcome of each workshop.

Organization
The forum will meet twice a year, alternately in Europe and in the USA. Each meeting will be hosted by one of the participating companies. ESII (for Europe) and SII (for the USA) will lead the practical organization and meeting facilitation.

Participants
The forum is initially aiming for participation from 6-12 organizations (or subdivisions thereof) that consider themselves non-competing to the extent that it will not impede an open and constructive exchange of experiences and ideas. The participating organizations shall have identified the value of systems architecture and have a clear intent to improve their practices in this area. The participating individuals shall be actively practicing, experienced architects at a systems/product level or business/enterprise level.

In addition to corporate representatives, the participating research institutions, The Embedded Systems Institute (ESII) and Stevens Institute of Technology (SII), will participate with research fellows for facilitation and knowledge capture.

Participate
Participation is on an invite-only basis. When you are seriously interested in becoming a member of the Architecting Forum, you can contact us (see contact page). Please check the page first before expressing your interest.

Meetings
The next meeting is scheduled for March 12 and 13, 2007 in Hoboken NJ, USA.
practical systems architecting

application of architectural information and knowledge

deployment, implementation and management of system and enterprise architectures.

to improve practices

the goal-oriented use of architectural knowledge and information in various life cycle phases and enterprise functions
Participants and Domains

non-competing organizations
actively practicing, experienced architects
at a system/product level or business/enterprise level

Defense, Government and Space systems
Raytheon
ANSER/HSI
Kongsberg Defence & Aerospace

Power infrastructure
Philips Medical Systems
Asset Inc.

Healthcare equipment
FEI
Philips Research

Measurement equipment

Consumer electronics

Telecommunications

Semiconductors

facilitation and organization
Stevens Institute
Embedded Systems Institute
What is Architecture?

Mark all applicable boxes

- Specifications
- API's
- Components (Implementations)
- Infrastructure
- Overarching vision

- High level rules
- Indicators
- Guidance monitoring

- Standards
- Concepts

- Customers
- Environment

- Performance
- Reliability
- Cost
- Risk
- Functionality
- Power

- Design
- Codification

- Java
- SQL
- FPGA
- Technology

Other...
IEEE 1471 top level

Environment influences system

System has architecture

Mission fulfills system

Architecture provided by architecture description

Architecture description provides rationale
IEEE 1471 view level

System has Architecture

Described by Architecture Description

Consists of Stakeholder has concern covers viewpoint

covers viewpoint conforms to 1 view defines model
What is a Model?

**formal analytical model**

\[ t_{\text{processing}} = t_{\text{overhead}} + n_{\text{rows}} \cdot t_{\text{row}} + n_{\text{row}} \cdot n_{\text{col}} \cdot t_{\text{pixel}} \]

**synchronization model**

- Req → Ack → Strobe
- feedback frequency: 4 kHz (0.25 msec)

**value chain model**

- consumer
- retailer
- box-maker
- semiconductor supplier
- service provider
- content provider

**mockup**

- wooden model
- model of coordinate system

- 6 degrees of freedom

**feedback model**

- position control
- actual position
- required position (time)

- feedback model
- position

System Architecting Forum Introduction

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BWMAModelExamples
Standardized or Formalized Models and Views

or UML and SysML

or DoDAF

or Zachman

or....
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<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Topic</th>
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<tbody>
<tr>
<td>October 2005</td>
<td>Helsinki</td>
<td>The State-of-Practice of Systems Architecting: Where Are We Heading?</td>
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<tr>
<td>March 2006</td>
<td>Washington</td>
<td>Architectural Descriptions and Models</td>
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<td>October 2006</td>
<td>Eindhoven</td>
<td>Complexity and Right Sizing Architecture Descriptions</td>
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<td>March 2007</td>
<td>Hoboken</td>
<td>Reference Architectures</td>
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<td>November 2007</td>
<td>Kongsberg</td>
<td>Value of Systems Architecting and Architectures</td>
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First Meeting: State-of-Practice

**Problem Space**
- Lifecycle aspects
  - Integration
  - Infrastructure
  - Applications
  - Maintenance
- Customer
- Organizational
  - Processes
  - People
  - Politics

**Solution Space**
- Match
- Balance
- Value proposition
- Interoperability
- Risk mitigation
- Lifecycle provisions
- Product design
- Technology
- Lifecycle aspects
  - Product family
  - Interfaces
  - Standards

**Organizational**
- Productivity
- Responsiveness
- Design team
Second Meeting: Architecture Descriptions

26 DoDADF views

FEI architecture document coverage

externally oriented
objectives, requirements
what, why

internally oriented
technical architecture
how

systems
13
operational
9
all
2
technical

software
applications
tasks
control

hardware
firmware
electronics
cabling

mechanics
3D modeling
tolerances
in-depth illustrations of day to day architect struggles:

+ configuration management complexity

+ re-use and platforms

+ documentation size and content

*documenting problems*

- Missing Resources
- Missing the right resources
- Process, practises and organisation do not support

compromises legacy

complexity size, effort increase
Conclusions of first meetings

Most significant future value of system architecting:
facilitating innovation and evolution

A great need for better and more architects is being seen.

Architectural descriptions require balancing acts in many directions:
+ Depth versus breadth
+ Stakeholder interests, from technical expert to (naïve) consumer
+ Degree of formalism, from controllable and verifiable to understandable and usable

In all cases an optimum of 10 to 12 architecting views is perceived as optimal. More views create too much chaos, less views oversimplifies the situation.
One of several **prerequisites** for **architecture creative synthesis** is the definition of **5-7 specific key drivers** that are **critical for success**, along with the **rationale** behind the selection of these items.

The **essence** of a **system** can be captured in about **10 models/views**.

A **diversity** of **architecture descriptions** and **models** is needed: languages, schemata and the degree of formalism.

The **level of formality** increases as we move closer to the implementation level.

**Architecting education** must be **framework and standard** agnostic, but architects must have seen or used **multiple frameworks** and **standards**.
SAF participants:
    heterogeneous group of architecting practitioners.

Lots of shared struggles and best practices.

Investing in mutual relations and trust pays off:
    very open and challenging discussions.

Whitepapers and consolidation of best practices brings focus.

Assess the results yourself:

www.architectingforum.org