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 Architecting Forum Introduction

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version: 0.1
March 6, 2013
SAFIwebsite
practical systems architecting
application of architectural information and knowledge

exchange of practical experience
development, 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
Philips Medical Systems
Asset Inc.

Power infrastructure
FEI

Healthcare equipment
Philips Research

Measurement equipment

Consumer electronics

Telecommunications
Nokia

Semiconductors

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

- Market, Business, Technology
- Process, Product
- Components (Implementations)
- API's
- Specifications
- OS
- File System
- Bus
- Memory
- I/O
- Infrastructure
- HTTP
- DVB
- IPTV
- WMA
- MP3
- JPEG
- Audio Pipeline
- Message Routing
- Communication
- Whiteboard
- Overarching Vision
- Indicators
- Guidance Monitoring
- Customers
- Environment
- Java
- SQL
- FPGA
- Technology
- Domain Codification
- Other
- Specification
- Design
- Performance
- Reliability
- Cost
- Risk
- Functionality
- Power
IEEE 1471 top level

- **Environment** influences **System**, which has **Architecture**. **Mission** fulfills **Environment**.

**Architecture** is described by **Architecture Description**, which provides **Rationale**.
IEEE 1471 view level

System has Architecture

Architecture Description Described by

Architecture Description Consists of

Stakeholder has concern covers viewpoint

viewpoint conforms to 1 model

covers defines
What is a Model?

- **formal analytical model**
  \[ t_{\text{processing}} = t_{\text{overhead}} + n_{\text{rows}} \times t_{\text{row}} + n_{\text{row}} \times n_{\text{col}} \times t_{\text{pixel}} \]

- **synchronization model**
  
  Req
  
  Ack
  
  Strobe

- **feedback model**
  - feedback frequency: 4 kHz (0.25 msec)

- **value chain model**
  - consumer
  - retailer
  - box-maker
  - semiconductor supplier
  - service provider
  - content provider

- **mockup**
  - 6 degrees of freedom

- **model of coordinate system**
or UML and SysML

or DoDAF

or Zachman

or....

Detector

Identification

Information Management

Security

Request to Download Database

Request to Receive Data

Data

Download Completed

Enable Processing

from Assett Inc.
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<td>October 2005</td>
<td>Helsinki</td>
<td>The State-of-Practice of Systems Architecting: Where Are We Heading?</td>
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<td>March 2006</td>
<td>Washington</td>
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<td>October 2006</td>
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First Meeting: State-of-Practice

problem space

customer

solution space

lifecycle aspects
integration
infrastructure
applications
maintenance

organizational
· processes
· people
· politics

match
balance
value proposition

interoperability
risk mitigation
lifecycle provisions

lifecycle aspects
product family
interfaces
standards

organization
· productivity
· responsiveness
· design team

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SAFSOPvalueOfArchitecting
Second Meeting: Architecture Descriptions

26 DoDAF views

FEI architecture document coverage

exactly oriented objectives, requirements
what, why

internally oriented technical architecture
how

applications tasks control

hardware 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