










<p>SATURN 2008 Pia Stoll Industrial Software Systems ABB Corporate Research</p>	<h2>Reconstructing the Architecture Model for a Sustainable Software System</h2>
	
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The research Context of ABB

- Asea was founded 1890 and Brown Boveri founded 1891 merged 1988 to form ABB
- Today ABB has 112 000 employees worldwide
- The five ABB businesses;
 - Power Products
 - Power Products are the key components to transmit and distribute electricity
 - Power Systems
 - Systems and services for power transmission and distribution grids, and for power plants
 - Automation Products
 - Products to improve customers' productivity, including drives, motors and generators, low voltage products, instrumentation and analytical, and power electronics
 - Process Automation
 - Integrated solutions for control, plant optimization, and industry-specific application knowledge
 - Robotics
 - Industrial robots - also providing robot software, peripheral equipment, modular manufacturing cells and service for specific tasks such as welding, painting and finishing, picking, etc
- The Corporate Research program "Industrial Software Systems" assists the businesses in;
 - New platform projects
 - New technology projects
 - Re-factoring projects
 - Application projects
 - Assessment projects
- We team up with the businesses' software architect, management, developers, etc but we can also do pre-studies without the businesses taking active participation.

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Sustainable Systems Definition

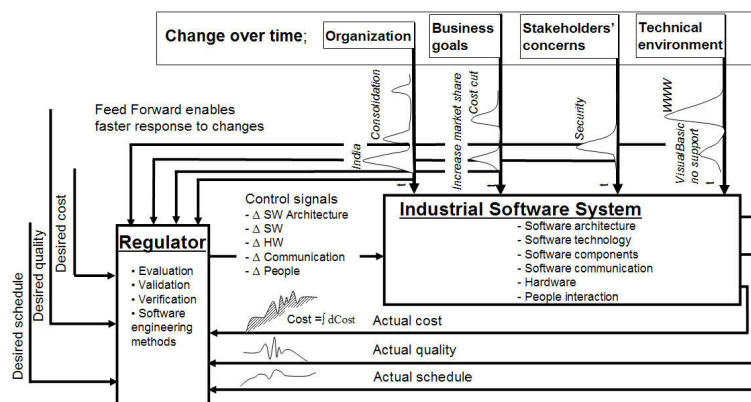
- A sustainable software system has *controllable outcome* in terms of;
 - Cost,
 - Schedule,
 - Quality
 despite *changes* during long life-times originating from
 - New technology
 - Stakeholders' concerns
 - Organization
 - Business Goals
- From this point of view it is not the highest goal of the system architects to preserve the architecture throughout the requirement changes but that the system has an architecture that enables the system to *deliver required functionality on time and on budget to the satisfaction of the customers during long life-times.*

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Sustainable Software System Control

- The architecture is at the heart of the system, but will have to adapt during the system's life-time.



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Architecture Model Goal

- Goals of the architecture model
 1. Assist in controlling the outcome of the system;
 - Cost
 - Quality
 - Schedule
 2. Strategic planning tool of future releases
 3. Architecture communication tool among stakeholders

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Architecture Model Requirements

- How to create an architecture model that will be adaptable to change in order to deliver the desired quality on desired schedule and at desired cost?
- If the architecture model is seen as a part of the system to be controlled what control parameters does it have to have?
 - Business goal representation and connection to architecture modules?
 - Technical Environment representation and connection to architecture modules?
 - Organization representation and connection to architecture modules?
 - Stakeholders' concerns representation and connection to architecture modules?
- The changes in organization, business goals, stakeholders' concerns and technical environment occurring over time can be seen as process disturbances requiring the control parameters to be changed in order to control the outcome of the system.

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Architectural Reconstruction

- Since the sustainable system has adapted its architecture over time, an architectural re-construction today will be the same as taking a snap-shot of a moving target.
 - Reflects only the state of today.
- What issues from the past are important?
 - The original design tactics and strategies relation to business goals, technology environment, organization, and stakeholders' concerns.
 - Business goals when system was designed?
 - Technology environment when the system was designed?
 - Organization when the system was designed?
 - Stakeholders' concerns when the system was designed?
- How will today's developers understand why the system was constructed the way it was 10-15 years ago?
 - Important for up-dates to understand what tactics we need to hang on to and what tactics we can let go of.

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Available standards, frameworks, etc.

- Available standards, books, frameworks etc
 - Book "Documenting Software Architecture", SEI
 - General guidelines on how to document software.
 - View model "4+1" views, Philippe Kruchten
 - 4 Views and one selection of use-cases
 - IEEE 1471 "Recommended Practice for Architectural Description of Software-Intensive Systems –Description"
 - Views, Viewpoints
 - TOGAF framework
 - Enterprise architecture focused
 - Plug in to the tool "Enterprise Architecture"
 - ICONIX process
 - Use case driven object modeling with UML.
 - Plug in to the tool "Enterprise Architecture".
 - ...

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Summary

- We do not want to use the architecture model only as a snap shot reflecting the state of today
- We want more focus on controlling the software economics of the system additional to the task of communicating architecture documentation (even though this is also very important)
- The dynamic architecture model will give us an answer of the current added value of the software architecture.

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Future works

- Continue to work with the construction of the architecture model for sustainable software systems.
 - Trying to construct a dynamical model with static methods not successful so far.

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The ABB logo is centered within a black rectangular border. It consists of the letters 'A', 'B', and 'B' stacked vertically. The top 'A' is a solid red block letter. The middle 'B' is a solid red block letter. The bottom 'B' is a solid red block letter. The letters are bold and sans-serif.