

Working Session: Software Architecture Competence

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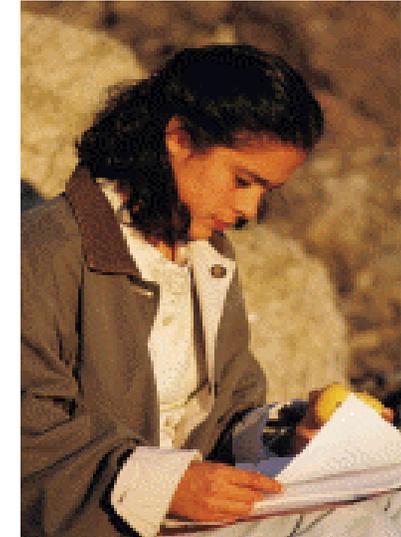
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Improving Software Architecture Competence

Most of the work in architecture to date has been technical

- Design and creation
- Evaluation and analysis of architectures
- Styles and patterns
- Architectural reuse and software product lines
- Architectures for particular domains
- Architectural re-engineering and recovery



But architectures are created by *architects*...

- How can we help them do their best work?
- What does it mean for an architect to be competent?
- How can an architect improve his/her competence?

...working in *organizations*.

- How can we help an organization help their architects do their best work?
- What does it mean for an organization that produces architectures to be competent?
- How can an organization improve its competence in architecture?



Participants

Len Bass	SEI	G. Todd Kaiser	Raytheon
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Opening discussion questions - 1

1. **Can you give an exemplary example of competence, or a pathological example of competence? How would you have measured or predicted these?**
 - Architect needs to understand roles, understand the scope of work. Ultimately, they need to understand the organization.
 - Be a good communicator. Frequency of communication is a measure.
 - Experience and knowledge in the domain, having built similar systems.
 - Embracing the most recent innovations in the field is not necessarily a good thing.
 - The architect should be aware of the skill set available in the team.
 - Specialized skills (e.g., security, performance).
 - What processes has the architect used? What was his role then?
 - Is the architect able to answer the hard questions about the design? Did the code end up like the original architecture?
 - If the architecture withstood the test of time, it's a sign that the architect did a good job. If the architecture did not withstand the test of time, we can't hold it against the architect because other factors may have affected the end result.
 - There's the competence on the acquirers side and the providers side.



Opening discussion questions - 2

2. What do you think is the value of architecture to an organization? For each, how might you measure the value?

- Decrease the amount of verification and validation of the product. The organization wants to move the cost of V&V on the product to the V&V of the architecture.
- Is there recognition of the architect in the organization? Definition of the role 'architect'?
- Are there groups within the organization where architects can share experiences?
- Having dedicated architects is a function of the size of the company.
- Does the software process in use prescribe architecture-related activities (e.g., producing a SAD)? Are there standard architecture artifacts as outputs?
- Are there experts in different quality attributes available to help in the software architecture of the systems.
- How does the organization staff development teams?
- Pathological: some organizations don't do better in architecture saying they don't have time/money for that and already know what to do.
- Can the managers speak the language of architecture?



Other questions

How can we convince an organization that architecture is important?

- It's difficult. You have to engage technical people that have a say within top management. These champions of architecture work need to be able to describe the benefits and artifacts that architecture-centric work would generate.
- Sacrifice training budget to send management to SEI or Zachman courses
- Training can be informal like brown bag lunches.
- You can incentivize people to create good architectures.
- You can incentivize developers not to ignore the architecture.
- You can create career path for architects.
- You can certificate architects.
- Organizations that do these things are more architecturally competent.
- To stimulate people to participate in QAW, we tell them it's their interest to be there.



Other questions

How can we convince a manager that architecture is important?

- Discuss the impact of not finding problems early in the design phase.
- If the customers ask for it, manager will do it.
- If we can tell managers how much money will be saved with architecture, they will buy it.

How can we measure the ROI of architecture?

- Tell executive that the way business is done can change dramatically in a short period of time and architecture is a mechanism for gaining control of these changes.



Possible value of architecture

Predictability in cost and schedule and quality

- Measure: Variance between predictions and actual
- Hypothesis: Architecture practices lead to lower variances

Ability to achieve system that meets its requirements (which presumably reflect business goals)

- Measure: Does it or doesn't it? What percentage of requirements are met?
What percentage of high-priority requirements are met?
- Hypothesis: Architecture practices lead to higher achievement



Architectural duties: How can we measure value?

Architecting

- Overall
- Creating the architecture
- Architecture evaluation and analysis
- Documentation
- Existing system and transformation

Life cycle phases other than architecture

- Requirements
- Testing
- Coding and development

Technology related

- Future technologies
- Tools and technology selection

Interacting with stakeholders

- Overall
- Clients
- Developers

Management

- Project management
- People management
- Support for project management

Organization and business related

- Organization
- Business

Leadership and team building

- Technical Leadership
- Team Building

