Architecting Social: Supporting the Exploration of Socio-Technical Dependencies through an Architectural Lens

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Team

- Collaborative effort
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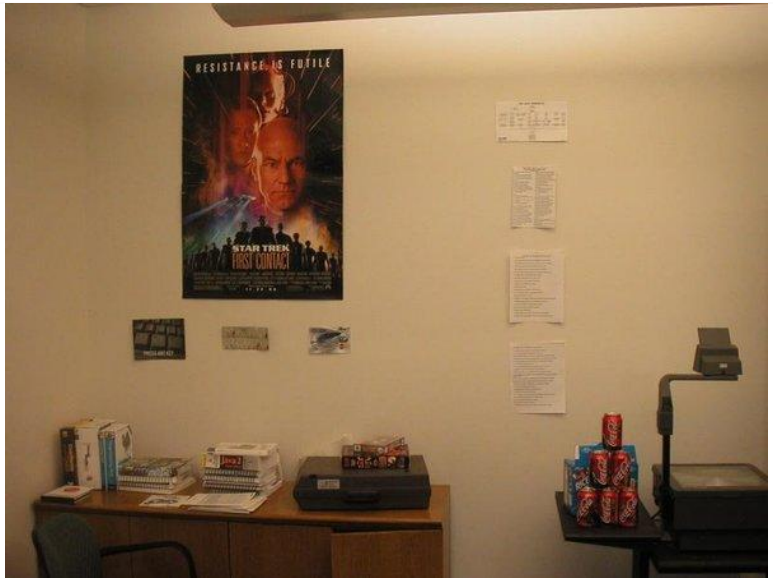
Context

- Software engineering
  - Complex
  - Large-scale
- Inherently and deeply social
  - Communication is key



Cheryan

Social and Technical: Side by Side

- Technical artifacts:
  - Requirements, design, source code, test cases, issues/bugs, frameworks
- Social factors:
  - Organizations, team structure, communication modes, location

If the social context is the environment within which the technical is produced, how does one affect the other?

Some Foundations

- Conway's Law ("mirroring"):
  - Designs of systems tend to match the organizational and communication structures of those who build them
  - Quality of the interfaces are dependent on communication
- Socio-technical Congruence (STC)
  - High congruence tied to higher productivity and improved quality

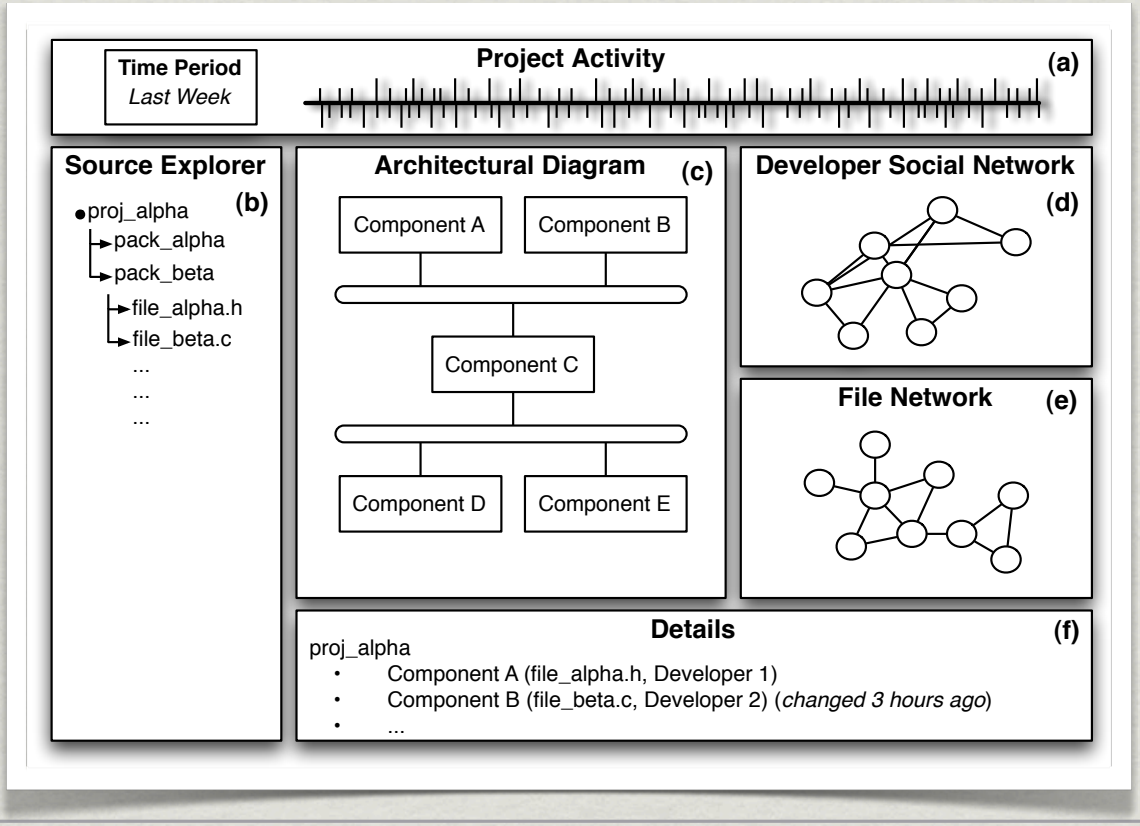
Challenges in Finding Answers

- Post-hoc analysis
  - Calculation of congruence metrics and inferences about quality
- Emphasis on low-level artifacts
  - Source code units becomes the primary view of the system

Too late for insights to be *actionable*

Less *useful* view early in development process

Awareness as the Foundation



(Some) Use Cases

- Awareness of developer activity through the lens of architectural and task assignment knowledge
  - ...developer working on non-assigned components adding undocumented interface
- Better understanding of design decision influences and their relation to requirements
  - ...architectural additions to better fit team structure, possibly violating requirements

STML: Modeling Underpinnings

- Socio-Technical Modeling Language
  - Addressing diversity and lack of standardization
  - XML-based, strong typing, type-based extensibility
    - Influences from xADL and using elements of the xADL toolset
  - Promoting reusability and exchange

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  <agent id="Paolo Borelli" type="Agent"/>
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      type="XMLLink"/>
  </edge>
</commNetwork>
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Interesting Questions

- Are socially-influenced designs supportive of requirements?
  - Do they erode up-front design decisions over time?
- What kinds of architectural styles “fit” best with organizational arrangements?
  - What about communication patterns?
- What is the right mode of intervention, and how do we know?
  - What is the easiest change to effect, and how to find the balance between social and technical?

Open Call

- Really interested your help!
  - Reports of socio-technical observations
  - Data-sets of past or ongoing projects
  - Interest in using toolset

Final Thoughts

- Fascinating interplay between technical and social
- Working toward providing development-time support for awareness
  - Basis for investigating socio-technical interplay
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