Orchestration of Global Software Engineering Projects

Position Paper

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Agenda

- Promises of Global Software Engineering
  - Results in practice
  - What is Global Software Engineering all about?
  - Scope

- A general approach
  - Example
  - Views

- Conclusion
Promises

- Main significant forces for global development (Software Engineering):
  - Economically, e.g.
    - Personnel costs
    - Networks of companies and suppliers
  - Organizational
    - Global organized company → global projects
    - Global personnel pool
  - Strategically
    - Close to market (big players like Microsoft, SAP etc.)
    - Political aspects

- Forces and (real) settings are mirrored by several „distribution styles“
  - Buyer/Supplier (e.g. simple development tasks)
  - Collaborative work in distributed teams
Promises – Results in Practice

- Global SE has additional risks
  - (risks of classical SE + )
  - Variability of a distributed project and its settings
  - Distances, including
  - Professional and social issues

- Fact: Global projects show the same lacks as co-located projects
  - Each communication lack $\rightarrow$ additional effort $\rightarrow$ costs
  - Each underspecified requirement $\rightarrow$ additional effort $\rightarrow$ costs
  - Task often take much longer $\rightarrow$ costs

*Originally Global SE should reduce costs of software projects...*
Promises – What is Global SE all about?

- Key question: *What is the difference between classical and global SE?*

- 1st notion: *In global SE*
  - *work is allocated to people at distributed sites with*
  - *different SE cultures.*

- 2nd key challenge: *Establish appropriate communication and collaboration.*

- 3rd approach: *(re-)orchestrate the existing communication and collaboration cultures of all participating parties…*
  - Levels:
    - project set-up and management
    - processes and information flow
    - artifact and product models
A General Approach

- Considering the three levels, each one has to be mentioned from
  - Organizational and
  - Technical points of view

- Need for (re-)orchestration, coupling and integration
  - At all levels
  - Explicit interfaces are required

- Our approach covers: communication, processes and technology
  - Tracing and consistency of dependencies of data and information
  - Constitution of a Global SE, multi-site development process
  - Constitution of a Global SE project organization
A General Approach - Example

- Organizations A and B will cooperate in a distributed setting
  - An integrated project
  - Mixed teams
  - Common process
  - Distributed data storage

- Each organization still has its own ones...
A General Approach - Example

- The approach:
  - Provide *task-specific* views
    (Sample 1: A developer has to perform some work...)
  - Provide *role-specific* views
    (Sample 2: A project manager has to determine some project state)
  - *There exist several views*...

- Views span all levels to be stated
  → project set-up has impacts on process
  → has impact on artifacts...
Detailed discussion and working hypotheses

- Sample and setting show
  - High degrees of variability and uncertainty
  - Simple integration wouldn’t work…
  - Simple provision of development artifacts using e.g. a shared folder is not suitable..
  - …

- For each level ➔ **key questions** has to be considered
  - To get an idea of what has to be done at a particular level
  - To collect best practices (if available) to combine them (bridging the levels)
  - To create new methods and techniques if required
Detailed discussion and working hypotheses

- **Level: Project Set-up**
  - What are responsibilities?
  - What are communication paths? → Is there a correlation?
  - What means “project management”?
  - Is there a correlation between communication and responsibility?
  - Is there some kind of “virtual super project”? 
Detailed discussion and working hypotheses

- Level: Processes
  - What are appropriate process interfaces?
  - How can information flow be “guided”?
  - What strategy for integration or coupling is the most promising?
  - How can we identify the integration options and appropriate process-interfaces or define some kind of common development process?
  - Reason: The harmonization of processes is necessary to build a common understanding of the whole global project. Understanding means a common vocabulary (terminology, ontology), a common set of milestones, deliverables, common strategies for coordinating the distributed (sub-)projects and knowledge of the requirements related to process-relevant artifacts
Detailed discussion and working hypotheses

- Level: Artifacts
  - Who owns an artifact?
  - Are artifacts consistent and free of redundancies?
  - Are there redundancies e.g. because the specification is mirrored at the developers’ location? And if so, are both copies of the specification consistent?
Detailed discussion and working hypotheses

- Key questions are just an outline
- Further questions relevant for Globale SE might be:
  - What are additional/other problems with Global SE?
  - Does the *view-based* approach cover all problems?
  - Do the intended levels cover all problems?
  - In how far, selective improvements are possible?
  - How to handle change and variability in a Global SE project?

- Hypotheses:

  *Integration and coupling not only solves problems, but generates new…*
Conclusion

- Global SE is reality but challenging
  - Level-building makes problem identification easier
  - View-building makes handling of complex structures easier

- Open questions
  - In sum: “What is the right amount of Global SE?”

- A weighted strategy might be advantageous, covering
  - People
  - Methods
  - Tools