Software Process Reengineering: CSE Working Group Report

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Recurring themes and topics

- Process metrics
- Institutionalizing process reengineering and change
- Reengineering process engineering paradigms

Overview

- Recurring themes and topics
- Technology roadmap: needs and efforts at USC

Process Metrics

- What metrics are needed?
- How should we measure process quality or “goodness”?
- How should we define process metrics that the community can use to assess effectiveness of process change or reengineering?
- Is process “baselining” (understanding “as-is” process) necessary?
- These appear to be topics appropriate for academic research.

Institutionalizing process reengineering and change

- How can we rapidly “pilot” (or prototype) new software processes?
- How can we rapidly construct, analyze, and enact processes tailored for specific organizational or business needs?
- How can we sustain the effectiveness of in-place processes, while transitioning to new processes? Does process prototyping help?
- How do we institutionalize process flexibility?

Institutionalizing process reengineering and change

- What are the successful processes and process benchmarks?
- What works, what does not work, and why do they work or not work?
- What resources, beyond process scripts or procedures, are needed to implement process change?
Reengineering process engineering paradigms
- "Dwarvinian" (long life cycles) versus "Genetic" (short life cycles) model of software process.
- How do we recognize and avoid process superoptimization?
- How do we determine, change, or drift process "granularity" to accommodate:
  - Radical vs. incremental process evolution
  - Global vs. localized process evolution
  - Re-design of "selected or "appropriate" subsystems
- What to push to new software engineering process analysis?

Reengineering process engineering paradigms
- Do we need some form of "agile process engineering" that can be tailored to different types of software development efforts, such as:
  - In-house information systems or NIC
  - Commercial or do-it-yourself products
  - Embedded systems and applications
  - Product manufacturing vs. test support systems

Distributed automated software engineering capability
- Models and simulations of application subsystems
- New and old data sets and repositories
- New and old software engineering tools and environments
- Built-in process support or guidance for how to accommodate these
- Virtual software service using electronic communication infrastructure

Technology roadmap: needs and research efforts at USC
- What’s needed or sought?
- Distributed automated software engineering capability
- Process-driven operating system for virtual organizations

USC CSE and ATRIUM Lab projects are currently examining this area.
Process-driven operating system for virtual organizations.

- An organizational operating system is a computing environment that supports the development, use, and evolution of complex business processes.
- These processes include, but are not limited to, software (re)development processes, and they are specialized to represent and address organizational requirements while supporting high-performance process work teams.

Process-driven operating system for virtual organizations.

- Advanced organizational operating systems will operate over wide-area networks, and support the integration of heterogeneous, autonomous software applications, tools, data sets, and repositories, whether new or legacy, and whether located within or across organizational boundaries.
- The required support will need to include process construction, modelling, analysis, resourcing, enactment, measurement, verification and validation, and management of process assets and repositories.

Process-driven operating system for virtual organizations.

USC ATRIUM Lab projects are currently researching this area. At present, this includes activity addressing process life cycle engineering environment and a distributed, wide-area hypermedia infrastructure for integrating tools, data, repositories, and processes.

For further information:

http://www.usc.edu/dept/ATRIUM/Papers/Software_Process_Reengineering.html

http://www.usc.edu/dept/ATRIUM/Software_Process.html

http://www.usc.edu/dept/ATRIUM/Papers/DHT-95.ps