Workshop 21: Problem Solving Environments

Topic Committee:

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Description:

This workshop will encompass a broad spectrum of issues related to Problem Solving Environments. A Problem Solving Environment (PSE) is an integrated computing environment for supporting the complete life cycle of design, development, and execution within a specific application domain. One of its main goals is to provide transparency to the end-user concerning problem specification. This should be supported by adequate human-computer interfaces and languages that are specific to each problem domain. A PSE must also assist the user in the evaluation of the more adequate solutions and problem-solving strategies. It must allow the development of rapid prototypes to ease the experimentation.

These goals have been pursued for several decades. There are already several fully developed PSEs in several areas, such as the automotive and aerospace industries, and PSEs are also being investigated in many academic projects. Modern PSEs increasingly depend on an adequate integration of a diversity of heterogeneous components such as parallel and distributed problem solvers, tools for data processing, advanced visualization, and computational steering, and access to large databases and scientific instruments.

However, there is still a long way ahead to exploit several emerging technologies, such as parallel and distributed computing, component-based software engineering, advanced interactive visualization, intelligent knowledge processing and discovery, and large-scale distributed computing. Such technologies are enabling the handling of more complex simulation models, higher degrees of human computer interaction and larger volumes of input or generated data. They will also enable more effective cooperation among multiple users in distributed collaborative problem solving environments.
This workshop addresses multiple aspects of research on PSEs, including design and implementation issues, exploitation of enabling technologies, applications and education issues. Reports of case studies on fully developed PSEs are particularly welcome.

Topics of interest include but are not limited to:

- Integration of heterogeneous components, including application packages, legacy codes, and parallel and distributed problem solvers.
- Software infrastructures, HPCN tools, and standards for building PSEs, e.g. based on MPI, Java, CORBA, and XML
- Hardware and software resource management
- Software architectures for high-level specification and configuration of PSEs
- Computational steering and advanced visualization tools
- Distributed collaborative PSEs, virtual laboratories, metacomputing and technologies for the Grid
- User interfaces and intelligence in PSEs (advisory, explanatory, expert)
- PSEs in science and engineering, and in "new" areas such as the environmental sciences, health, marketing and finance, etc.
- Experiences in developing and using PSEs for Education and Training