Tool support for SOFA 2 component system (Student project)

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SOFA 2 [2] is a component system. It employs a hierarchical component model and supports many advanced features like dynamic update, behavior description via behavior protocols, connections via software connectors, etc. An implementation is available as an open-source project [1], initially developed as another student project. The implementation provides a fully functional distributed runtime environment allowing for deploying and executing applications but the support for application development is rather low (with respect to contemporary standards) and overall usage of SOFA 2 is not very "user-friendly".

The general goal of the project is to develop a complete set of development tools and make the SOFA 2 user-friendly. The main requirements are the general usability, robustness, and extensibility of the implemented tools.

The specific goals are as follows:

1. To implement a complete development environment for SOFA 2 components. The environment has to provide both the command line and visual interfaces. The visual development part is expected to be an Eclipse [4] plugin. The environment has to support all stages of development of SOFA 2 components, i.e. designing a single component, composing components from existing ones (in a drag-and-drop style), implementing primitive components, assembling a complete application, developing control aspects of components, etc.

2. To develop tools for managing evolution of components. This goal comprises of updating the SOFA 2 component repository in order to correctly manage multiple versions of a single component, and creating user interface for managing these versions.

3. To develop tools for managing distribution packages of SOFA 2 components (creating packages, uploading them to the repository,...).

4. To develop tools for managing and monitoring component runtime, i.e. a deployment tool (allowing for application deployment in a visual manner) and runtime monitoring tool (allowing for obtaining current status of the hardware nodes and provide information for deployment).

5. To enhance the runtime environment with "autoconfiguration" execution mode (the current implementation requires rather a complex set of properly set configuration parameters – the desired situation is that it will be able to set most of these parameters automatically).

All tools etc. have to be implemented in Java but (especially the development tools) should be prepared to support different component implementations than in Java.

The candidates have to be familiar with Java, distributed systems, MDA [3] and EMF [5] technologies, component based systems, and service oriented architectures.

References

1. **SOFA 2**, http://sofa.ow2.org/

2. Bures, T., Hnetynka, P., Plasil, F.: **SOFA 2.0: Balancing Advanced Features in a Hierarchical Component Model**, Proc. of SERA 2006, Seattle, USA, IEEE CS, Aug 2006

3. **Model Driven Architectures**, OMG document

4. **Eclipse IDE**, http://eclipse.org/

5. **EMF**, http://eclipse.org/emf

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