POP-Python

Project specification

Context

This project is developed as a semester project, in the frame of different courses of the Department of Telecommunications and Computer Science of the College of Engineering and Architecture of Fribourg, Switzerland.

The topic of this project is the POP model, a model for object-oriented parallel computing on the grid, already implemented in the C++ and Java languages. This model introduces new syntax elements to the underlying language and handles the inter-process communication transparently to the developer.

More information about the POP model and its current C++ implementation can be found at the homepage of the GridGroup: http://gridgroup.hefr.ch/popc/.

Goals

The main goals of this semester project are, firstly, to provide a feasibility study of an implementation of the POP model using the Python programming language and secondly to exercise the project management skills of the student while developing a real-world project.

The time given to accomplish the project is not enough to provide a complete implementation of the model, but this doesn't exclude the development of some proofs of concept which can be reused later to code the final implementation.

1. Technical goals

1.1. Provide a detailed analysis of the communication process between two remote POP-C++ endpoints and the underlying application level protocol(s). This study shall be detailed enough to be able to implement a distributed programming model compatible with the POP one;

1.2. Study different possible approaches and tools to implement the POP model in Python and choose the one that best suits the task;

1.3. Conceive the Python-oriented syntax to apply the POP model and provide enough proofs of concept to illustrate the inner working;

1.4. (if there is enough time) Begin to code a first Python implementation of the model and evaluate its performance.

2. Managerial goals

2.1. Exercise the project management skills learned in the frame of the different courses;

2.2. Manage a project from its beginning to its end, while consolidating the acquired knowledge in both management and tools exploitation.

Activities

This section lists a series of activities which shall be accomplished during the project development. This activities are inspired by the goals above and included in the planning.

1. Technical activities

1.1. Analyze the communication between two remote POP-C++ endpoints by defining well-know use cases and documenting the data exchange between the peers (milestone: *Protocol analysis*, due: November 4, 2010);

1.2. Collect information about different tools and libraries and compare them to identify the programming approach which best suits a POP-Python implementation (milestone: *Tools comparison*, due: October 29, 2010);

1.3. Define a POP-Python syntax in a way that integrates with the Python programming philosophy and code different proofs-of-concept to validate it (milestone: *Syntax definition*, due: November 8, 2010);

1.4. Design the overall POP-Python architecture and possibly begin to code a basic implementation of it (milestone: *Design*, due: December 13, 2010).

2. Managerial activities

2.1. Prepare the specification of the project, including the context, goals and activities needed for its completion (deliverable 7.1, due: October 15, 2010);

2.2. Prepare a planning for the whole project, based on the goals and activities exposed in the specification and keep it updated for the complete project timespan (deliverable 7.2, due: October 15, 2010);

2.3. Write all documents as well as the final report in english;

2.4. Prepare a final report in the form of a technical documentation containing a description of all the work done so that it can be used as a starting point for a future POP-Python implementation (deliverable 7.4, due: February 4, 2010);

2.5. Keep an up-to-date website were all the needed documents are available for viewing/download;

2.6. Prepare the agendas and reports for each weekly meeting.

Deliverables

15. October 2010	Delivery of the project specification.
20. October 2010	First presentation about the progress of the project.
4. February 2011	Delivery of the final documents.
Week EX1	Oral defense