The University of Queensland
School of Information Technology and Electrical Engineering
Semester 1, 2012

CSSE4004/CSSE7014 - Assignment 2

Issued: 20/04/2012
Due: 2 pm on Friday 11/05/2012
Weighting: 13%

Introduction

This assignment is a team assignment and has three parts:

Part A - Ice. In this part students are required to develop a small distributed application in Java in the Ice distributed computing platform. This application can be seen as a very small subset of the application developed in Assignment 1.

Part B – A small exercise related to Web Services. In this part students should analyse process interaction from Assignment 1 and show the interactions that would be difficult to implement if the application was developed in Web Services.

Part C – An essay on a particular type of distributed systems. Each group of students will be addressing a different type of distributed systems. This part of the assignment includes an essay submitted on 11 May and also a 20-25 minutes presentation on 21 May (lecture time).

PART A (3%)

Simple Java application developed in Ice

This part of the assignment is a simple Java exercise in the Ice distributed computing platform (http://www.zeroc.com). The application that should be developed has the following functionality: a temperature sensor and a heart rate and blood pressure monitor send data to the Home Manager. The User Interface allows users to ask the Home Manager for the current temperature or the heart rate and blood pressure and the required reading is displayed on the User Interface. The specification of the sensor readings is the same as in Part A. The type of communication should be suitable for the application, i.e. students should evaluate which of the two main communication paradigms: RMI or notifications, is suitable for particular communication.

A short screencast that shows how to create an Ice client and server with Java and Eclipse taken from

http://www.zeroc.com/download/screencasts/IceIn20Minutes.mov

has been put on the csse4004 webpage for downloading.

The Ice distribution also includes a demo in demo/IceStorm/clock that shows how to use IceStorm for publish/subscribe style of communication.

PART B (1%)

The Web Services approach is designed to provide integration between heterogeneous distributed applications (e.g. applications developed in different distributed computing platforms). To invoke remote methods/operations processes in Web Services send XML messages formatted according to the SOAP standard. These messages are transmitted through the network using HTTP by default, though other application layer protocols can be used instead (such as FTP or SMTP).

As any distributed computing platform Web Services use IDL to describe interfaces of services/objects (and their methods and parameters). This IDL is called the Web Services Definition Language (WSDL). Service definitions, expressed in WSDL, are available through the XML-based platform independent UDDI (Universal Description, Discovery and Integration protocol) repository. Clients looking for particular services can query the UDDI repository to find WSDL descriptions for services that meet their requirements. The clients can then contact the services, using the WSDL descriptions to format their messages.

Analyse which interprocess communication required in the application described in Assignment 1 would be difficult to implement in Web Services. Explain why.

PART C (9%)

This part of the assignment requires that each learns about particular types of distributed systems, writes an essay about what has been learned and also presents a PowerPoint presentation on 21 May. The topics assigned to teams are as follows:

Team A: Cloud computing (goals, examples, architecture, middleware functionality, comments on any issue related to naming, communication paradigms, fault tolerance, consistency, etc.).

Team B: Cloud computing - architectures/models proposed by various companies (IBM, Microsoft, Hewlett-Packard, others).

Team C: Grid computing (goals, examples, architecture, middleware functionality, comments on any issue related to naming, communication paradigms, fault tolerance, consistency, etc.).

Team D: Autonomic computing and organic computing (goals, similarities/differences, architecture, example applications); overlap with context-aware systems.

Team E: Pervasive computing, context-aware computing (goals, example applications, middleware, role of standards (particularly sensor standards), reliability).

Team F: Distributed systems for Smart Cities (goals, example applications, architecture, middleware).

Assessment of Parts A, B, and C

The teams will have to provide a demonstration on how the PART A application works for the assessment purposes. The teams have the options of demonstrating their applications on their own laptops or the lab machines. Assignment must be demonstrated within 2 weeks of submission. To maintain academic integrity, the applications used for demonstration must be same as the one that students have submitted. That is, if the Java files students used to demonstrate their applications are different to the ones they submitted, they will be subjected to investigation.

The mark allocation for each component of the assignment is described below in Table 1:

Assessment item	**Marks allocated**
PART A	
Appropriate choice of communication primitives	1
Sensors sending data to Home Manager	1
Interface can retrieve data from Home Manager	1
PART B	
All difficult to implement communication interactions found. Explanation provided	1
PART C	
Essay (content, explanations)	7
Presentation (content, clarity)	2
TOTAL	13

Table 1: Mark allocations for Assignment 2

Partial marks will be awarded for assignments that are missing components or only partially fulfil the stated specifications.

Individual contribution (level of participation and effort) of each team member to the team assignment will be evaluated by peer-review. This peer review should be delivered on the form provided. The ratings should reflect each individual's level of participation and effort and sense of responsibility not only the level of academic ability. The rating in peer review will have an impact on the final assignment mark of each team member.

Marked assignments will be returned to students *no later than 2 weeks* after the assignment submission deadline. Assignment marks will be emailed to each student's UQ email account.

Submission details

The assignment must be submitted to the lecturer by email (jaga@itee.uq.edu.au) by the 2 pm deadline on 11/5/2012.

Teams that submit their assignments late will receive a penalty of 10% (1.3 marks) for each working day (or part there of) that the assignment is late.

Each assignment submission should contain all files needed to evaluate the assignment, including:

- Files to run the sensors and Interface in Ice (Part A)
- A file with Part B
- A file with an essay on Distributed Systems (Part C)
- Peer-review sheet (1 sheet per team)

Please send your submission as one zip file and use the following subject line: A2 submission – team X (where X is the team name/letter).

Updates to the specification

Clarifications and updates to this specification may be made up to one week prior to the submission deadline. If such clarifications or updates are made they will be communicated to students via the subject website, the subject newsgroup and also emailed directly to students' UQ email accounts. It is expected that students will check their email on a daily basis.

Plagiarism

Any cases of plagiarism detected will be dealt with according to the University's plagiarism policy.