

CS3250 Distributed Systems

Level: 3

Credits: 10

Teaching Period: 1

Module Tutor: Dr M Konecny

Aims

This module introduces students to both basic theory and practical implementation of distributed systems. In the end students should feel comfortable programming typical distributed systems using modern technologies such as stateful Web Services and Erlang. They will be also made aware of other, more advanced distributed system programming methodologies, enabling them to navigate towards optimal solutions when facing a distributed programming challenge.

Content

- Rationale for and requirements of distributed systems
- Overview of foundational distributed architectures and algorithms with examples in Erlang
- Distributed objects theory and implementation in Java RMI
- RESTful Web Services methodology and implementation
- XML serialisation and specification
- Stateless and stateful Web Services using recent standards
- Remote notification in Web Services
- Distributed processing of large data
- High-performance distributed processing

Teaching

2 hours lectures per week; 1 hour practical class per week

Assessment

Written exam: 75% (2 hours, May/June)

Practical assignment: 15%

Lab work: 10% – Note: This assessment element will require attendance at scheduled classes

Module outcomes

<i>What the student should gain from successful completion of the module</i>	<i>Teaching/Learning Methods</i>	<i>Assessment Methods</i>
<i>Knowledge and Understanding</i>		
The purpose and nature of distributed systems	Lectures and directed reading	Exam
The role and functionality of middleware		
Distributed system design issues and middleware services		
<i>Intellectual Skills</i>		
Ability in analysing a distributed computing problem, designing solution components and selecting suitable implementation techniques	Lectures, practical classes and coursework	Exam and coursework
<i>Professional/Subject-Specific Skills</i>		
Practical capability with Web Services technologies in a Java context	Practical classes and coursework	Coursework
Basic programming in Erlang and Java RMI		
Remote control via ssh and X-windows clients		
<i>Transferable Skills</i>		

Learning resources

Coulouris et al: Distributed Systems, Concepts and Designs (4th ed), Addison-Wesley 2005

Farley: Java Distributed Computing, O'Reilly 1998

Sotomayor, Childers: Globus Toolkit 4, Morgan Kaufmann 2006

Armstrong: Programming Erlang, Pragmatic Bookshelf 2007

Other study requirements to take this module

A solid foundation in Java programming (CS1310, CS1410 and CS2310; or CS1020, CS2300 and CS2290)

Working knowledge of UML (CS2020 Software Engineering OR CS2190 Software Lifecycle)