Enterprise Application Integration 2009/2010

Syllabus (v3.0, Sep. 10)

Week	Topic	Reading/Slides	Bibliography	Project
1 **Sep 11**	Introduction, Course Motivation and Dynamics. Introduction to XML.	00_Intro 01_XML: 1.1	[Harold01]	Project #1: *"Designing a Screen-Scrapper for the Web"*
2 **Sep 18**	Agnostic Data Representation and Processing in XML and XSLT	01_XML: 1.1, 1.2 02_XSLT: 2.1, 2.2	[Armstrong+05] Ch. 2, 4, 5, 6 [Harold01]	
3 **Sep 25**	Fundamental Problems in Large-Scale Application Integration ("Widgets & Gadgets" Case Study)	03_TwoHourEAI	[Hohpe03] Ch. 1	
4 **Oct 2**	*Invited Lecture – Paulo Merson (SEI)* Service Oriented Architecture (SOA)		[Erl09] Ch. 3, 4	Project #2: *"Designing a 3-tier System for Integration"*
5 **Oct 9**	Service Oriented Architecture (SOA) and Enterprise Service Bus (ESB) (cont.)	04_WebServices: 4.1, 4.2	[Erl09] Ch. 13, 14, 16	
-- **Oct 16**	***(no class)***			
6 **Oct 21 Wed**	2nd Generation Web Services (Messaging, Security, Reliability, Transactions, Processes, Metadata)	04_WebServices: 4.3	[Erl09] Ch. 6, 7, 17 [Gailey04]	
7 **Oct 23**	"Why Cryptosystems Fail" – Attack Patterns in Large Organizations	05_Security: 5.1, 5.2	[Anderson03]	
8 **Oct 30**	Design Principles and Evaluation of Security in Large-Scale Systems	05_Security: 5.3, 5.4	[Howard03] Ch. 1, 3, 14 [STRIDE]	Project #3: *"Designing a Service Oriented Architecture"*
9 **Nov 6**	Distributed Transactions, Two-Phase Commit, Business Activities, and relaxing Isolation	06_Middleware: 6.1	[Coulouris+05] Ch. 14 [Burke+05] Ch. 16	
10 **Nov 13**	Message Oriented Middleware (MOM)	06_Middleware: 6.2	[Hohpe05] [Hohpe03] Ch. 4, 6, 9, 10	
11 **Nov 20**	Integration with Legacy Systems: Challenges and Approaches	07_Legacy: 7.1	[Hohpe03] Ch. 2 [Linthicum99] Ch. 1-5 [Erl04] Ch. 8, 9	
12 **Nov 27**	Integration with External Partners: Standards RosettaNet, ebXML, UCCNet	08_BusinessPartners: 8.1, 8.2, 8.3, 8.4 08_BusinessPartners	[Linthicum99] Ch. 12, 14 [Dournaee04]	Project #4: *"Designing Reliable Services on an Enterprise Service Bus"* ***[This project is optional for CMU M.Sc. students]***
13 **Dec 4**	"Why Systems Fail and What Can We Do About it?" – Basic Techniques in Reliability and Fault-Tolerance ***[Last day of classes for CMU students]***	09_Reliability: 9.1, 9.2	[Marcus+03] [RELIABILITY] [AVAILABILITY]	
-- **Dec 11**	***(no class)***			
15 **Dec 18**	*Discussion and Wrap Up*			

Grading

M.Sc. Students at Coimbra:

- Exam: 50%
- 4 Projects: 50% [*Minimum of 35% in each project*]
- Exam and recurrence exam will take place in January and February, as usual.
- Projects defense will take place in beginning of January.
- Projects are done in groups of 3 students.
- You have 8 late days available for the 4 assignments. This means that you don't have to submit your assignment exactly on the day it's due. But, cumulatively on the 4 assignments you cannot go beyond 8 days.

M.Sc Students at CMU / MSE students:

- Exam: 50%
- 3 Projects: 50% [*Minimum of 35% in each project*]
- Students who do the 4th project (optional) will get extra credit
- The final exam will take place on the week of 7-11 of December.
- Projects defense will take place during the week of 7-11 of December.
- Projects are done in groups of 3 students.
- You have 6 late days available for the 3 assignments. This means that you don't have to submit your assignment exactly on the day it's due. But, cumulatively on the 3 assignments you cannot go beyond 6 days. You can do the 4^{th} project for extra credit.

General Notes

- Exams are closed book but you can bring 4 pages (i.e., 2 sheets of paper) of notes to the exam.

Bibliography

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[AVAILABILITY] “System Reliability and Availability”: http://www.eventhelix.com/RealtimeMantra/FaultHandling/system_reliability_availability.htm

[Burke+05] B. Burke and R. Monson-Haefel, “Enterprise JavaBeans 3.0”, 5th Ed., O'Reilly, ISBN 059600978X, 2006.

[Coulouris+05] G. Coulouris, J. Dollimore and T. Kindberg, “Distributed Systems: Concepts and Design”, 4th Ed., Addison Wesley, ISBN 0321263545, 2005

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[Erl04] T. Erl, “Service-Oriented Architecture: A Field Guide to Integrating XML and Web Services”, Prentice Hall, ISBN 0131428985, 2004

[Erl09] T. Erl, “SOA Design Patterns”, Prentice Hall, ISBN 0136135161, 2009

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[Hohpe03] G. Hohpe and B. Woolf, “Enterprise Integration Patterns: Designing, Building, and Deploying Messaging Solutions”, Addison-Wesley Professional, ISBN 0321200683, 2003

[Linthicum03] D. Linthicum, “Next Generation Application Integration: From Simple Information to Web Services”, Addison-Wesley, ISBN 0201844567, 2003

[Marcus03] E. Marcus, H. Stern, "Blueprints for High Availability", 2nd, Wiley, ISBN 0471430269, 2003

[Oppenheimer03] D. Oppenheimer, A. Ganapathi, D. Patterson, “Why do Internet services fail, and what can be done about it?”, in Proc. of the 4th USENIX Symposium on Internet Technologies and Systems (USITS'03), 2003

[Patterson+04] D. Patterson, J. Hennessy, et al., “Computer Organization and Design: The Hardware/Software Interface”, 3rd Ed., Morgan Kaufmann, ISBN 1558606041, 2004

[RELIABILITY] “Reliability and Availability Basics”: http://www.eventhelix.com/RealtimeMantra/FaultHandling/reliability_availability_basics.htm

[STRIDE] Microsoft’s STRIDE method: http://msdn2.microsoft.com/en-us/library/aa302419.aspx