

Integração de Sistemas

Welcome!

2014/2015



Filipe Araújo
Informatics Engineering Department
University of Coimbra
filipius@uc.pt

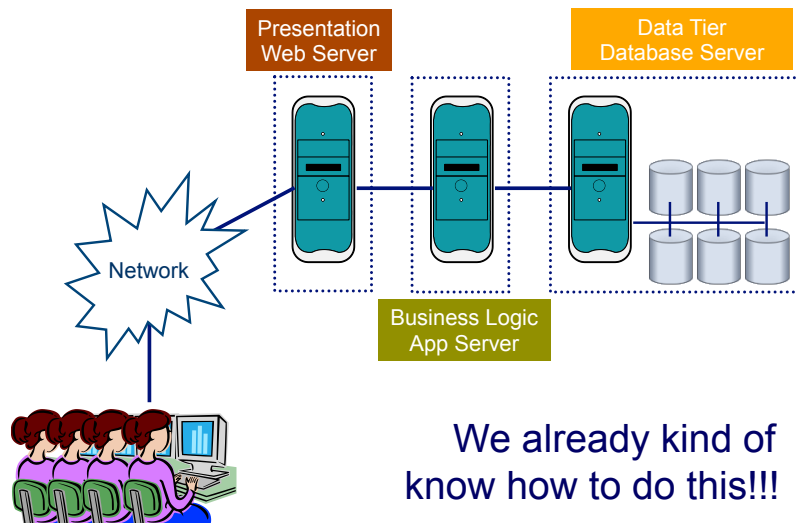
Slides Created by Paulo Marques
pmarques@dei.uc.pt
Adapted by Filipe Araújo

Instructor and contacts

- **Filipe Araújo**
 - Office: D2.1 – DEI
 - filipius@uc.pt
 - <http://eden.dei.uc.pt/~filipius>
- **Nuno Laranjeiro**
 - Office: D3.14 – DEI
 - cnl@dei.uc.pt
 - <http://eden.dei.uc.pt/~cnl>
- Office hours available at Infoestudante
- Also available other days besides office hours
 - In this case please use the e-mail to confirm availability

2

What's this all about?



We already kind of know how to do this!!!

3

Motivating Example



4

Motivating Example



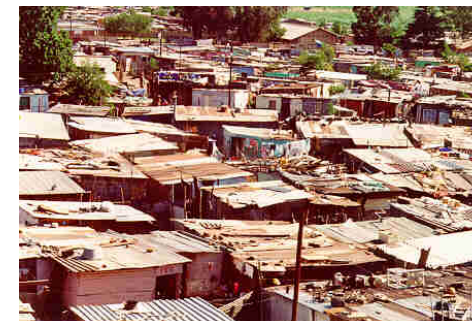
5

Big Ball of Mud Software Engineering



Spaghetti Code

Just-in-time Ad Hoc Construction

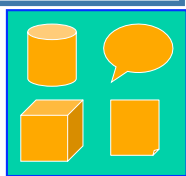


6

Enterprise Application Integration in Context

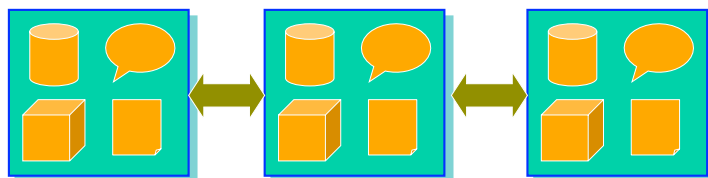
- Databases
- Networks
- Software Engineering
- Programming Languages

How to build Applications



- Enterprise Application Integration
- Service Oriented Architecture
- Enterprise Service Bus

How to integrate applications



7

Why Structured Enterprise Application Integration?

- Information systems are getting more and more complex!

Interconnected

Nowadays systems are not isolated: networks play a vital role! Also, new communication channels complicate issues (think about mobile devices)

Constantly Evolving

Today's systems are stressed beyond their limits. People want more and more functionality of the infrastructure in place. Thus, the size of systems continues to increase. Centralized monolithic solutions are no longer viable: cooperation among systems is paramount. Nevertheless, heterogeneity complicates things (e.g. J2EE, .NET, SAP)

Adhoc IS NOT AN OPTION

- 70 to 90% of the software costs are maintenance
- 40% of the code is within the databases
- 1.000.000 lines of code is now "low medium scale"
- How to create systems so that they can be easily integrated?
- How to create software that is reusable? And at what granularity?

8

How to integrate applications?

- File Transfer (FTP)
 - API-Based
 - Script-Based
 - Database-Based
 - Screen Scraping
 - ...
- } Ad hoc
-
- External Interfaces
 - Traditionally... CORBA
 - Service-Oriented Architecture
 - Inc. Web Services and WS-*
 - Middleware
 - Message-Oriented Middleware
 - Integration Platforms (e.g. MS Biztalk)
 - Enterprise Service Bus (ESB)
- } Structured

9

Objectives of this course

- To give a strong background in the technologies used in the industry for integrating applications and systems
 - **EAI** = **E**nterprise **A**pplication **I**ntegration
 - B2B Systems
- Focus on current architectures and technologies
 - **SOA** = **S**ervice **O**riented **A**rchitecture
 - **ESB** = **E**nterprise **S**ervice **B**us
 - XML, Web Services, WS-*, Message Queues
- **Technology-based** course
- The **hands-on component** is essential
- What is assumed:
 - Distributed Systems and network programming
 - Database systems

10

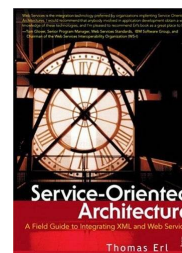
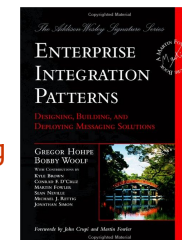
Syllabus

- Integration Challenges
- Data Integration
 - XML Technologies (XML, XSL, XSLT, XQUERY, etc.)
 - Semantic Integration
 - Java Persistence API
- Function Integration
 - Enterprise Java Beans
 - Web Services and 2nd generation Web Services
 - Service Oriented Architecture (SOA)
- Middleware for Enterprise Systems
 - Distributed transactions, long transactions, business activities, message-oriented middleware
- Integration of legacy systems
- Other Integration Platforms
 - Java EE Connector Architecture (JCA)
 - Microsoft Sharepoint
 - SAP Netweaver
- Integration with cloud applications

11

Course Materials

- This course has a blog:
 - <http://eai-course.blogspot.pt>
- Enterprise Integration Patterns: Designing, Building, and Deploying Messaging Solutions
 - by Gregor Hohpe & Bobby Woolf
 - Addison-Wesley Professional
 - ISBN: 0321200683
- Service-Oriented Architecture: A Field Guide to Integrating XML and Web Services
 - by Thomas Erl
 - Prentice Hall PTR
 - ISBN: 0131428985



12

Course Organization

- Theoretical classes
 - Gain Knowledge about EAI
 - Special focus on the most important points
- Lab (open!)
 - Gain Hands-on capabilities on EAI technology
 - Three assignments done in groups of 2 students
 - One individual defense in December or January
 - Assignments submitted at Nonio
 - Forum will be created at Nonio. Most questions should be at the forum! (FAQ)
- Grading
 - **Exam:** **10 points (min: 47.5%)**
 - open-book, paper resources only
 - **3 Assignments:** **10 points (min: 47.5%)**
 - **Project 1** due 17-Oct
 - **Project 2** due 14-Nov
 - **Project 3** due 19-Dec
- Special Cases
 - Working students: No special treatment regarding deadlines
 - "Special season" exam: Only available for students who complete the assignments

13

Why should I care? ... Testimonials ☺

Mas falando de mim... neste momento estou a trabalhar na empresa Azertia, em Lisboa, graças à cadeira de IS! Pois é verdade... na altura da entrevista disseram-me que era um "achado", pois não acreditava um recém-licenciado ter a formação que tenho em

Paulo:

Encontrei o seu contacto na net, por via do XML contido num dos seus cursos e lembrei-me de lhe pedir ajuda. A nossa companhia onTV Europe (UK/Pt) (<http://onTV.eu.com>) está à procura de gente que responda às seguintes características:

"We are setting up a pool of freelances with strong XSL-T skills and a solid understanding of XML Schema. The task is to write (quickly and well) converters for data sourced on the web, from RSS feeds and from APIs into our proprietary XML format (validated against our own schema). Members of the pool would not need to be available full-time, but we would need some indication of the time that they expect to have available and any patterns to that availability (e.g. months of the year/days of the week/time-of-day)."

Vinha perguntar-lhe se conhece ou nos pode pôr em contacto com pessoas que

Neste momento, uma das grandes empresas de informática em Portugal está à procura de um aluno finalista ou recém-licenciado com conhecimentos de tecnologias de integração de sistemas. Em particular, na empresa, eles usam um gestor de workflow baseado em BPEL. Desenham e interligam os vários sistemas usando web services e BPEL. Agora sentem necessidade de evoluir o produto, mas não têm tempo. O motor que eles usam para correr o BPEL é o da Oracle, que de preferência querem trocar por um Open Source (mas que dê garantias de poder ser usado em ambientes de produção). Para modelar usam um plug-in para o Eclipse (desenvolvido em parceria com a Oracle). Nos processos definidos quem também integrar recolha de indicadores para monitorização do andar das coisas. Os dados podem vir de uma série de sistemas informáticos subjacentes: pacotes comerciais, sistemas desenvolvidos pela empresa, etc.

entes, graduate ou
possam ter formação nesta

14

