INFS 3204/7204
Service-Oriented Architecture

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ITEE, UQ
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M1: Course Introduction

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- Course Website
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  - Consultation: **Wed 2-4pm**.
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M1 Topics

- Course information
  - Objective and Expectation
  - Course Schedule
  - Assessment
    - Prac, Project, Exam
- What
  - SOA
  - Web service
  - Connection between web service and SOA
- Why
  - Business motivation
  - Technical motivation

Objective

- Introduces the future of IT - Service-Oriented Architecture (SOA)
- Provides the in-depth knowledge for SOA and the practical experience in developing large-scale web applications
- Covers a wide range of SOA-related technologies, including .Net, web service, composition techniques, semantic web service, workflow, software-as-a-service...

Expectation

- Understand the rationale of SOA and bounded web technologies from .NET, web service, workflow, semantic web, to their recent development trends
- Understand the technical issues and business issues associated with SOA
- Be able to analyse business cases and develop large-scale web service system for complex business applications
- **Be innovative!**

Course Schedule

http://www.itee.uq.edu.au/~infs3204/
Time Table

Assessment

- Pracs – 15%
- Project – 35%
- Final exam – 50%
- http://www.itee.uq.edu.au/~infs3204/Assessment/

Prac

- 5 in total, 3% each
- It is compulsory to attend the prac session of your own
- No late demonstration or session change is allowed
- You have to demonstrate your program to tutors for evaluation during prac sessions
- They pave the way for your group project
- http://www.itee.uq.edu.au/~infs3204/Time_Table/

Project

- A big group project - 35%
- Each group has up to 5 students
- You have to form group by yourself before week 6 by sending your group information to lecturer
- For those cannot find a group, we will help you to find one
- It will be released in week 5, demonstrated and assessed in week 12 during lecture time, in the lab by using school PC or your own laptop
- Each group has about 5 minutes for demonstration. So be focused and clear
- http://www.itee.uq.edu.au/~infs3204/Project/

Exam

- Final exam - 50%
- Close book
- Cover all course materials
- **Tips will be given in the last lecture**

Additional

- Q&A
  - Your questions are read and answered.
  - http://www.itee.uq.edu.au/~infs3204/Q&A/
- Interesting websites
  - Many course resource and related web information are linked too.
  - http://www.itee.uq.edu.au/~infs3204/interesting_websites/

SOA

- Simple is beautiful!
  - "Make everything as simple as possible, but not simpler."
    -- **Albert Einstein**
- Future of IT:
  - **Complex** systems to **simple** components/services

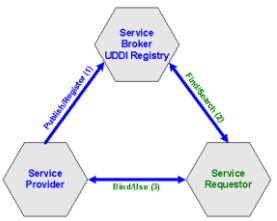
What is SOA?

- Simply, a collection of **services** which can **communicate** with each other
- Services
  - What you connect together
  - By default: web services
- Communication
  - Interface agreements
  - Internet protocols
- Conceptually, SOA is **not** a new idea
  - RPC (Remote Procedure Call) to invoke a procedure anywhere as if on the same machine
    - RMI (Remote Method Invocation)
    - CORBA (Common Object Request Broker Architecture)
    - DCOM (Distributed-Component Object Model)

Formally, SOA is:

- An **architectural style** whose goal is to achieve "loose coupling" among interacting and contracted services via communication protocol,
- An Internet-native distributed computing model
- The term **service-oriented** means to support service's dynamic description, publication, discovery, and usage

Trinity of SOA



Web service

- A briefer definition
  - Web services are loosely coupled, contracted components that communicate via XML-based interfaces using Internet protocols
- A closer look…
  - Loosely coupled: Web Services and programs that invoke them can be changed independently
  - Contracted: a Web Service's behaviour, its input/output parameters and how to bind to it are publicly available
  - Component: encapsulated code whose internal implementation is hidden
  - XML: human-readable, text-based format that is firewall friendly and self-describing

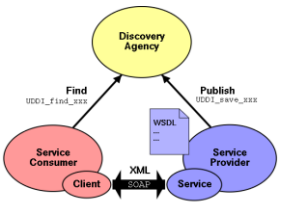
Key web service technology

- SOAP (Simple Object Access Protocol)
  - Simple messaging framework for transferring information between peers over web in a decentralized and distributed environment using XML
- WSDL (Web Service Description Language)
  - An XML-based means for describing a web service and expressing the interface to a given Web service
- UDDI (Universal Description Discovery and Integration)
  - A repository for WSDL docs

Web service from Microsoft

- Flash animation with cheesy American voiceover
  - http://www.microsoft.com/net/basics/webservices_flash/launch.html

Web service & SOA



Often, there is a confusion of web service = SOA?

Why SOA? – business point of view

- Business motivation
  - Broad intra and inter interoperability for enterprises
  - Future e-business: interoperability via internet
  - However,
    - High complexity leads to high IT complexity and costs
    - Quick response needs 'just-in-time' integration
- Benefits of SOA
  - Reducing costs by leveraging existing legacy services
  - Increasing revenue by assembling of existing services
  - Integrating value chains for e-business collaborations
  - Creating highly dynamic and distributed applications
  - ...

A good article on business value of SOA
http://www.dmreview.com/article_sub.cfm?articleID=8262

Why SOA? – technical point of view

- Technical motivation
  - Software reuse & integration
  - However, the old problems of RPC such as RMI, CORBA and DCOM remain:
    - Single-vendor, non-interoperable solutions
    - Binary protocols, not readable
    - Tightly coupled systems only
- Benefits of SOA
  - Aiming to solve all of the above problems

The key - Interoperability

- Web Services Interoperability Organisation: http://www.ws-i.org)
- Goal of WSI:
  - Ensure web services interoperate
    - across platforms, applications and languages
    - Set a set of standards for web service
  - Accelerate web services deployment
    - Provide guidance, tool, sample, and practices
    - Forum discussion and meeting

M1 summary

- This week:
  - Course information
  - What is SOA?
  - Why is SOA?
- Next week:
  - **EAI and B2B – a business case of SOA**

References

- **W3C SOA -** http://www.w3.org/TR/2004/NOTE-ws-arch-20040211/
- **Microsoft Web Services -** http://msdn.microsoft.com/webservices/
- **Sun Web Services -** http://developers.sun.com/prodtech/wspde/
- **IBM Web Services -** http://www-136.ibm.com/developerworks/webservices/
- **The Java™ Web Services Tutorial -** http://java.sun.com/webservices/docs/ea1/tutorial/
- **WSI Organisation -** http://www.ws-i.org/
- **A good article on business value of SOA -** http://www.dmreview.com/article_sub.cfm?articleID=8262