

INFS 3204/7204

Service-Oriented Architecture



A/Prof Heng Tao SHEN
ITEE, UQ
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M1: Course Introduction

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M1 - Course Introduction

- Course Website
 - <http://www.itee.uq.edu.au/~infs3204>
- Coordinator: Dr Heng Tao SHEN
 - Phone: 3365 – 8359
 - Email: shenht@itee.uq.edu.au
 - URL: <http://www.itee.uq.edu.au/~shenht>
 - Consultation: **by appointments**
- Tutors: Mr Zhen Lin Koh
 - Email: s4190910@student.uq.edu.au

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M1 Topics

- Course information
 - Objective
 - Learning activities
 - Assessment
- What
 - SOA
 - Web service
 - Connection between web service and SOA
- Why
 - Business motivation
 - Technical motivation

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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, and other advanced topics including cloud computing, semantic web service,...

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Learning Activities

- Week 01 (27/07): Introduction to Web Service & SOA
- Week 02 (03/08): The Business Case for SOA
- Week 03 (10/08): .NET basic: .NET framework, C#
- Week 04 (17/08): Holiday
- Week 05 (24/08): .NET advance: ADO.NET, ASP.NET, Web form, MVC, ORM
- Week 06 (31/08): Web service basic: SOAP, WSDL, UDDI
- Week 07 (07/09): Web service advance: Composition
- Week 08 (14/09): Service-Oriented Architecture
- Week 09 (21/09): Cloud Computing I
- Week 10 (05/10): Cloud Computing II
- Week 11 (12/10): Semantic Web Service
- Week 12 (19/10): Guest Lecture
- Week 13 (26/10): Course Review

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Assessment

- Pracs – 40%
- Final exam – 60%

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Prac

- Aim to build web applications using SOA
- **6** in total, **5%** for the **first 4**, and **10%** for the **last 2**
- It is **compulsory** to attend the prac session of your own
- Prac sign on is open from **week 1 to 3**
- **No late** demonstration or session change is allowed
- You have to demonstrate your program to tutors for evaluation during prac sessions

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Exam

- Final exam - 60%
- Close book
- Cover all course materials
- **Tips will be given in the last lecture**

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Additional

- Q&A
 - Your questions are read and answered.
- Interesting websites
 - Many course resource and related web information are linked too

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SOA

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

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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)

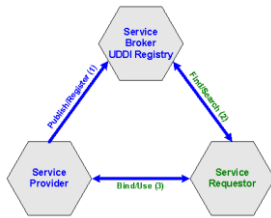
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Formally, SOA is:

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

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Trinity of SOA



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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

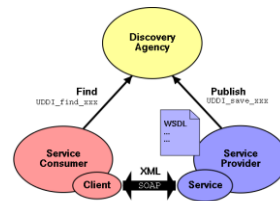
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Key web service technology

- **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

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Web service & SOA



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

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Why SOA? – business point of view

- Business motivation
 - Broad intra and inter interoperability
 - Future e-business: interoperability via internet
 - However, they lead to
 - high IT complexity and costs
 - demand for quick response
- Benefits of SOA
 - Reduce costs by leveraging existing legacy services
 - Increase revenue by assembling of existing services
 - Integrate value chains for e-business collaborations
 - Create highly dynamic and distributed applications
 - Achieve 'just-in-time' integration
 - ...

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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

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The key - Interoperability

- Web Services Interoperability (WSI) Organisation
- Goal of WSI:
 - Ensure web services interoperate
 - across platforms, applications and languages
 - by setting standards for web service
 - Accelerate web services deployment
 - guidance, tool, sample, and practices
 - forum discussion and meeting

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M1 summary

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

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References

- Microsoft Understanding Service-Oriented Architecture
 - <http://msdn.microsoft.com/en-us/library/aa480021.aspx>
- Oracle Service-Oriented Architecture
 - <http://www.oracle.com/soa>
- IBM SOA and Web Services Getting Started
 - <http://www.ibm.com/developerworks/cn/webservices/newto/>
- The Java™ Web Services Tutorial
 - <http://java.sun.com/webservices/docs/2.0/tutorial/doc/>
- WSI Organisation
 - <http://www.ws-i.org/>
- A good article on business value of SOA
 - http://www.dmreview.com/article_sub.cfm?articleID=8262

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