ابزارهای پیاده‌سازی معماری سرویس‌گرا (SOA)
سر فصل کلی مطالب (طی هفت جلسه)

1. معرفی معماری سرویس گرا
2. کاربرد معماری سرویس گرا
3. شناخت تفصیلی ادبیات کسب و کار
4. پروتکل های معماری سرویس گرا
5. متد تحلیل و طراحی سرویس گرا
6. شناخت تفصیلی معماری سرویس گرا
7. ابزارها و پیاده سازی معماری سرویس گرا
SOA Components
Creating Workflow Logic
Two Approaches;

- **A workflow language: Business Process Execution Language (BPEL)**
  - An XML-based language for defining process logic
  - Originally created by Microsoft and IBM
  - Now owned by OASIS

- **Generalized activities: Windows Workflow Foundation (WF)**
  - Each activity is defined as a class
  - Can also support BPEL with appropriate activities
Workflow Integrated into Middleware

- **IBM WebSphere** now incorporates BPEL-based process capabilities, although IBM MQ Workflow still has a large install base.

- **Oracle BPEL Process Manager** – technology incorporated from Collaxa acquisition – replaces Oracle Workflow, which is recommended only for legacy installations.

- **SAP Webflow** (aka SAP Business Workflow) – supports Wf-XML, BPML.

- **BEA**
BPEL Development

Requires:

- **BPEL Engine**
  - Executes BPEL processes
  - IBM BPWS4J
  - ActiveBPEL Engine
  - BPEL Developer (or text editor, for the masochistic)

- **BPEL Engine**
  - Oracle BPEL Designer
  - Eclipse BPEL Project
  - Parasoft BPEL Maestro
  - Intalio Designer
ORACLE
Oracle SOA Architecture
Business Process Analysis (BPA)
BPA COMPONENTS

- **Business Process Architect**: Standards-based tool for process modeling. Uses various standards-based notations and templates such as BPMN, EPC, etc.

- **Business Process Simulator**: Tool for simulating the process models based on a set of discrete events to do "what if" analysis.

- **Business Process Publisher**: Publishes process models to a large audience outside of the core team designing the process models.

- **Oracle Extensions for SOA**: Allows bi-directional directional integration with Oracle SOA Suite.
Process Granularity
Integrating BPA with Oracle suite
Oracle Business Process Analysis Suite
Oracle BPEL Manager
Human Work flow
BPMN to BPEL
Oracle SOA Components

Oracle BPM
- Native BPEL
- Workflow
- Rules
- Process Modeling

Enterprise Service Bus
- Adapters
- Routing
- UDDI Registry

Any Application Server
(Oracle, WebLogic, WebSphere, JBoss)

BAM
Monitoring & Action

JDev Eclipse

BPA Suite Provision TeleLogic Popkin

ILog JRules Corticon Oracle Biz Rules

Oracle Directory Active Directory LDAP

Oracle AQ Tibco MQ Series
BAM | User Experience

Service Oriented Architecture

SOA Workshop: A. Mahjoorian, Session 7
Oracle SOA Suite Consists of ..

- Integrated Service Environment (ISE) to develop services
- Oracle BPEL Process Manager to orchestrate services into business processes
- ESB to connect existing IT systems and business partners as a set of services
- Oracle Business Rules for dynamic decisions at runtime that can be managed by business users or business analysts
- OracleAS Integration Business Activity Monitoring to monitor services and disparate events and provide real-time visibility into the state of the enterprise, business processes, people, and systems.
- Oracle Web Services Manager to secure and manage authentication, authorization, and encryption policies on services that is separate from your service logic
- UDDI registry to discover and manage the lifecycle of Web services.
- Oracle Application Server 10g Release 3 (10.1.3) to provide a complete Java 2, Enterprise Edition (J2EE) 1.4-compliant environment for your J2EE applications.
Integrated Service Environment

- **Oracle JDeveloper (JDeveloper)** is the development component of Oracle SOA Suite. It forms a comprehensive ISE for developing, composing, and orchestrating services into business processes.
  - Business processes can be deployed, registered, and consumed from several types of user interfaces, including desktop clients, browsers, and mobile and telnet devices.
  - JDeveloper enables developers to model, create, discover, assemble, orchestrate, test, deploy, and maintain composite applications based on services.

- **Oracle ADF** is a model-driven SOA framework that automates and manages businesses and data services and provides a standard data-and-service-binding layer based on JSR 227 that can be used with process flows, page flows, and service invocations.
  - Oracle ADF implements SOA design practices and makes user interfaces as loosely coupled as services themselves.
Oracle BPEL Process Manager

- **Oracle BPEL Process Manager** provides a framework for easily designing, deploying, monitoring, and administering processes based on BPEL standards.

- **Oracle BPEL Process Manager** adds value and ease of use to BPEL functionality by providing support for the following in the JDeveloper BPEL Designer:
  - Transformations, workflows, worklists, notifications, and sensors
  - Technology adapters, including file, FTP, database, advanced queuing (AQ), Java Messaging Service (JMS), Oracle Applications for Oracle E-Business Suite, and WebSphere MQ
  - Third-party adapters, including J.D. Edwards OneWorld, PeopleSoft, SAP R/3, Siebel, Tuxedo, CICS, VSAM, IMS/TM, and IMS/DB
Oracle Business Rules

- Oracle Business Rules enables dynamic decisions at runtime allowing, among other features, applications to rapidly adapt to regulatory and competitive pressures.

- This increased agility is possible because business analysts using Oracle Business Rules can create and change business rules that are separated from the application code.

- By using Oracle Business Rules, business analysts can change business rules without stopping business processes. Also, externalizing business rules allows business analysts to manage business rules directly, without involving programmers.
OracleAS Integration Business Activity Monitoring

- OracleAS Integration Business Activity Monitoring (BAM) gives business executives the ability to monitor their enterprise business services in real-time and to correlate their KPIs (key performance indicators) to the actual business process.

- Oracle BAM provides the ability to aggregate service metrics and deliver actionable information on critical business service parameters to user.

- Oracle BAM delivers information to users through visual dashboards and alerts, improving effectiveness of operations and taking informed decisions.

- Oracle BAM is a complete solution for building real-time operational dashboards, monitoring and alerting applications.
Oracle Web Services Manager

Oracle Web Services Manager is a security administrator’s environment designed to secure access to Web services and monitor activities performed on protected Web services.

Oracle Web Services Manager includes two main parts:

- **policy decision point (PDP)**: The PDP includes security and management components accessed through a Web-based management console providing Oracle Enterprise Manager’s look and feel.

- **policy enforcement points (PEPs)**: PEPs are interceptors that can be either agents or gateways. Agents run in the same container as the Web services they protect whereas gateways are independent processes analogous to proxy servers. Agents and gateways can be used in combination to ensure end-to-end Web services security.
Oracle Enterprise Service Bus (ESB)

- An enterprise service bus moves data among multiple endpoints, both within and outside of an enterprise. It uses open standards to connect, transform, and route business documents (as Extensible Markup Language (XML messages), among disparate applications.

- It enables monitoring and management of business data, with minimal impact on existing applications. An enterprise service bus is the underlying infrastructure for delivering a service-oriented architecture (SOA) and event-driven architecture (EDA).

- ESB is the foundation for services using SOA and EDA. At its core, it is a loosely coupled application framework that provides your business with increased flexibility, reusability, and overall responsiveness in a distributed, heterogeneous, message-oriented environment using industry standards.
OracleAS UDDI Registry

- OracleAS UDDI Registry provides a key component of any SOA with a configurable, scalable, secure repository of Web services that can be managed, discovered and governed by Oracle Fusion Middleware. The OracleAS UDDI Registry meets the core service management needs of any enterprise:
  - Enables service providers to publish and advertise their offerings
  - Allows service consumers to find, access, and invoke services that meet defined criteria
  - Provides critical features for SOA governance

- Integration is provided with other products in the Oracle Fusion Middleware family, including Oracle BPEL Control, Oracle Web Services Manager, and JDeveloper, enabling users to query the Registry for published services.
Oracle Application Server

- Oracle Application Server is a standards-based application server that provides a comprehensive and fully integrated platform for running Web sites, J2EE applications, and Web services.
Oracle SOA Suite components:

- JDeveloper
- Oracle BPEL Process Manager (including Human Workflow)
- ESB
- Oracle Business Rules
- Oracle Application Server
IBM SOA Architecture

- Consumers
- Channel
- B2B
- Business Process
  - Composition; choreography; business state machines
- Services
  - Atomic and composite
- Service Components
- Operational Systems
  - Packaged Application
  - Custom Application
  - OO Application
IBM Websphere

Service Oriented Architecture

1. WebSphere Business Modeler
   - Role: Business analyst
   - Tasks:
     • Model business processes
     • Simulate and optimize business processes

2. Rational Software Architect
   - Role: Architect
   - Tasks:
     • Define design model (from business model)
     • Define application model
     • Model services

3. Rational Application Developer
   - Role: Developer
   - Tasks:
     • Implement services
     • Implement user advances
     • Build adapter interfaces

4. WebSphere Integration Developer
   - Role: Integration developer
   - Tasks:
     • Assemble composite application
     • Define message mediations

UML and code transformation

Service interfaces

Deploy services

Deploy composite application

Run
IBM Service Type

- **Business innovation and optimization services**: Facilitates better decision making with real-time business information
- **Process services**: Orchestrates and automates business processes
- **Information services**: Manages diverse data in a unified manner
- **ESB**: Facilitates communication between services
- **Interaction services**: Enables collaboration between people, processes and information
- **Partner services**: Connects with trading partners
- **Business application services**: Builds a robust, scalable and highly secure services environment
- **Access services**: Facilitates interactions with existing information and application assets
- **Infrastructure services**: Optimizes throughout availability and performance

**IT service management**: Manages and secures services, applications and resources
IBM BPM Components

- **WebSphere Integration Developer** provides easy-to-use integration development tools.
- **WebSphere Process Server** offers a flexible, robust deployment environment that supports processes, people, information and applications across your organization and beyond.
- **WebSphere Business Modeler** delivers process-modeling and analysis tools for business analysts.
- **WebSphere Business Monitor** provides real-time visibility into process performance, enabling process intervention and continuous improvement.

**Diagram:**
- Assemble
- Deploy
- Manage
- Model

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Service Oriented Architecture

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IBM’S BPM SOLUTIONS

- **WebSphere Business Modeler** is a business-analyst level tool for modeling and designing process flows for SOAs, based on the Eclipse open source Integrated Development Environment (IDE) framework.

- **WebSphere Integration Developer** is an Eclipse-based application development tool for IT to build and deploy business processes based on a services-oriented architecture.

- **WebSphere Process Server** is a new process server powered by WebSphere ESB that forms the foundation for IBM’s BPM solution.

- **WebSphere Business Monitor** has been enhanced to monitor business process performance and provide a way to track key performance indicators.
IBM Servers Topology
.Net Web Services
EAI

1) Send order request
2) Request PO
3) Return PO
4) Place order

Inventory Application
ERP Application
Fulfillment Application
Enterprises Interoperability
Orchestration
BRE
BAM

Service Oriented Architecture

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Example: Create Web Service

Create Sum Web Service:

- Launch Visual Studio, select ASP.NET Web Service, give a project name as Sum.
- Add two web methods into the project. Push F5
Create Client Project to consume the Web Service:

- Launch VS Windows application named “calculate” and create a form looks like the following.
- Right click on reference in solution window to add web reference. Provide a URL of the web services, click go, then click Add Reference button.
- In Form1, add code into button_Click() methods. Push F5
Output

```
12 + 24 = 36

addition

12 * 24 = 288

multiplication
```
Building a Simple Web Service

- Create your own **MathService**
  - .asmx
- Implement class MathService and Web methods
  - Create WSDL file (MathService.wsdl)
- Request to MathService.asmx
  - Generate C# proxy class (MathService.cs)
- **WebServiceUtil.exe**
  - Generate Assembly (MathService.dll)
- **C# compiler “csc”**
The .NET framework has two components:

- The common language runtime
  Agent that manages code at execution time, providing core services such as memory management, thread management, remoting, etc…

- .NET framework class library
  Object-oriented collection of reusable types that can be used to develop applications ranging from traditional command-line or graphical user interface (GUI) applications to applications based on the latest innovations provided by ASP.NET, such as Web Forms and XML Web services.
What is ASP.NET?

- Hosting environment that enables developers to use the .NET Framework to target Web-based applications.
- Architecture for developing Web sites and Internet-distributed objects using managed code.
- XML Web services use ASP.NET as the publishing mechanism for applications.
J2EE
What is J2EE?

- Java 2 Platform, Enterprise Edition
  - Component-based approach to the design, development, assembly, and deployment of enterprise applications
  - Not tied to the products or APIs of any one vendor
  - Freedom to choose products/components that best meet needs

- J2EE Offers:
  - Multitiered distributed application model
  - Ability to reuse components
  - XML-based data interchange
  - Unified security model
  - Flexible transaction control
Distributed Multitiered Applications

Application logic is divided into components according to function and the various application components that make up a J2EE application are installed on different machines depending on the tier in the multitiered J2EE environment to which the application component belongs.

The J2EE specification defines the following components:

- Application clients and applets: run on the client.
- Java Servlet and JavaServer Pages (JSP) technology
  - Web components that run on the server
- Enterprise JavaBeans (EJB) components (enterprise beans)
  - Business components that run on the server
.Net vs. J2EE
Web Service Development Environment

- Microsoft believes that you should be able to use any language to write a web service – They are right!
  - As long as you use a Microsoft Platform

- Sun believes that you should be able to use any platform you want – They are right!
  - As long as you use the Java programming language
.NET Framework 2.0

Accessing Data
- ADO.NET

Defining Logic
- C# / Visual Basic / etc.

Containing and Connecting Logic
- ASP.NET
- ASMX / WSE
- .NET Remoting
- Enterprise Services
- System Messaging

Using Logic
- Browser
- Windows Forms
- Remote Logic
J2EE 1.4

Accessing Data

Defining Logic

Containing and Connecting Logic

Using Logic

Servlets/Java Server Pages (JSP)

JAX-RPC

Remote Method Invocation (RMI)

Enterprise JavaBeans (EJB)

Java Message Service (JMS)

Browser

Standalone Client

Remote Logic

JDBC

Java
.NET Framework 3.0

Accessing Data
- ADO.NET

Defining Logic
- C#, VB, etc.
- Workflows
  - Windows Workflow Foundation (WF)
- Rules
  - WF Rules Engine

Containing and Connecting Logic
- ASP.NET
- Windows Communication Foundation (WCF)

Using Logic
- Browser/AJAX/ XBAPs
- Windows Presentation Foundation (WPF)
- Remote Logic
Java EE 5

Accessing Data
- JDBC
- Java Persistence API (JPA)

Defining Logic
- Java
- Workflows
- Rules

Containing and Connecting Logic
- Servlets/Java Server Pages (JSP)
- JAX-WS
- Remote Method Invocation (RMI)
- Enterprise JavaBeans 3.0
- Java Message Service (JMS)

Using Logic
- Browser/AJAX
- Standalone Client
- Remote Logic
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