Service Oriented Architecture (SOA) and Web Services

Assit. Dr. Anantakul Intarapadung
Agenda

• SOA
• Web Services
• Case Study Research
Service Oriented Architecture (SOA) has several core ideas that should be addressed in your organization’s SOA journey:

- **A set of services** that a business wants to provide to their customers, partners, or other areas of an organization.

- **An architectural style** that requires a service provider, mediation, and service requestor with a service description.

- **A set of architectural principles, patterns and criteria** that address characteristics such as modularity, encapsulation, loose coupling, separation of concerns, reuse and compositability.

- **A programming model** complete with standards, tools and technologies that supports web services, REST services or other kinds of services.


Web Services

Leverage industry standards to open up your business and IT functions

Web services enable the sharing of logic, data, and processes across networks using a programming interface.

Web services are characterized by:

- Extensible Markup Language (XML) to describe documents in a machine readable format.
- Web Services Description Language (WSDL) provides a description (in XML format) of how the service can be called, what parameters it expects, and what data structures it returns.

Web services can use various protocol specifications. The most important are:

- SOAP: a messaging protocol that allows two programs to pass information to each other regardless of the hardware or operating system those programs are running. Web Services may also use other messaging protocols besides SOAP.
Amazon Web Services

Overview
Compute
Storage & Content Delivery
Databases
Networking
Administration & Security
Analytics
Application Services
Deployment & Management
Mobile Services
Enterprise Applications
AWS Support
AWS Marketplace Software

Products & Services

Amazon Web Services offers a broad set of global compute, storage, database, analytics, application, and deployment services that help organizations move faster, lower IT costs, and scale applications. These services are trusted by the largest enterprises and the hottest start-ups to power a wide variety of workloads including: web and mobile applications, data processing and warehousing, storage, archive, and many others.

What is Amazon Web Services (2:56)

AWS Free Usage Tier
Get Started with AWS
Web Services

Services
- Enterprise Application Integration
- Electronic Data Interchange
- Business Intelligence
- Database Management Systems
- Enterprise Resource Planning
- Web Services
- e-Business & Web Technologies
- System Administration
- Custom Application Development
- Offshore Development

Web services are the software components that are made available over the Internet, intranets, and extranets using Web technologies and a standardized XML-based messaging system.

Since they are based on open standards such as HTTP and XML-based protocols including SOAP, WSDL, and UDDI, Web services are hardware, programming language, and operating system independent.

The benefits of Web services will be instrumental in propelling explosive business growth over the next few years.

We provide design and implementation of:

- Simple Web Services (such as online banking services)
- Complex Web Services (for CRM and ERP)

on all of the major Web services platforms, including Microsoft .NET and J2EE.

Get in Touch
To discuss how we can help your organization
Email us at: info@proactiveinfosys.com

Web Services
Case Study Research
Web Services

<table>
<thead>
<tr>
<th>Endpoint</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Name: <a href="http://ws/MapWS">http://ws/MapWS</a></td>
<td>Address: <a href="http://anantakul.net:80/MapServiceWS/MapWS">http://anantakul.net:80/MapServiceWS/MapWS</a></td>
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<td>WSDL: <a href="http://anantakul.net:80/MapServiceWS/MapWS?wsdl">http://anantakul.net:80/MapServiceWS/MapWS?wsdl</a></td>
</tr>
<tr>
<td>Implementation class: ws.MapWS</td>
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</table>

getLocation(province, aumphur, district);

Class MapServ Member

<table>
<thead>
<tr>
<th>Member</th>
<th>Return Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>title</td>
<td>string gettitle()</td>
</tr>
<tr>
<td>created</td>
<td>string getCreated()</td>
</tr>
<tr>
<td>modified</td>
<td>string getModified()</td>
</tr>
<tr>
<td>province_id</td>
<td>string getProvince_id()</td>
</tr>
</tbody>
</table>

Parameter

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>province</td>
<td>string</td>
<td>province id from table of province.</td>
</tr>
<tr>
<td>aumphur</td>
<td>string</td>
<td>aumphur id from table of aumphur.</td>
</tr>
<tr>
<td>district</td>
<td>string</td>
<td>district id from table of district.</td>
</tr>
</tbody>
</table>
Introduction to Web Services

This document provides an overview of web service concepts and technologies supported by NetBeans IDE. It is meant to help newcomers to web services before they use any tutorials.

Web services are distributed application components that are externally available. You can use them to integrate computer applications that are written in different languages and run on different platforms. Web services are language and platform independent because vendors have agreed on common web service standards.

Oracle is developing a Java net project called Metro. Metro is a complete web services stack, covering all of a developer's needs from simple "Hello, World!" demonstrations to reliable, secure, and transaction web services. For more information, see the Metro home page.

Metro includes Web Services Interoperability Technologies (WSIT). WSIT supports enterprise features such as security, reliability, and message optimization. WSIT ensures that Metro services with these features are interoperable with Microsoft .NET services. Within Metro, Project Tango develops and evolves the codebase for WSIT. To see how WSIT works, use the Advanced Web Service Interoperability tutorial.

Several programming models are available to web service developers. These models fall into two categories, both supported by the IDE:

- REST-based. Representational State Transfer is a new way to create and communicate with web services. In REST, resources have URLs and are manipulated through HTTP header operations. For more details, see RESTful Web Services.
- SOAP/WSDL-based. In traditional web service models, web service interfaces are exposed through WSDL documents (a type of XML), which have URLs. Subsequent message exchange is in SOAP, another type of XML document. For more details, see SOAP-based Web Services.

RESTful Web Services

REST-based ("RESTful") web services are collections of web resources identified by URLs. Every document and every process is modeled as a web resource with a unique URI. These web resources are manipulated by the actions that can be specified in an HTTP header. Neither SOAP, nor WSDL, nor WS-* standards are used. Instead, message exchange can be conducted in any format—XML, JSON, HTML, etc. In many cases a web browser can serve as the client.

HTTP is the protocol in REST. Only four methods are available: GET, PUT, POST, and DELETE. Requests can be bookmarked and responses can be cached. A network
NetBeans IDE supports Web services standards from Java EE 7, Java EE 6 and Java EE 5, including the JAX-WS 2.2, JAX-RS 2.0, and JAXB 2.2 web service standards. You can work with GlassFish Server Open Source Edition, Oracle Weblogic, Apache Tomcat, JBoss, and many more. The code completion functionality includes annotations that you can use in your web services.

RESTful Web Services

The IDE assists you in creating (JAX-RS 2.0) RESTful web services from JPA entity classes and patterns, or even directly from a database. RESTful web services are available to wrap entity beans and provide easy CRUD functionality.
package ws;

import javax.xml.WebService;
import javax.xml.WebMethod;
import javax.xml.WebParam;

import DbConnection.MySqlConnection;
import DbConnection.ThaiUnicode;
import Model.MapServ;
import java.sql.ResultSet;
import java.util.ArrayList;

/**
 * @author kae
 */
@WebService(serviceName = "MapWS")
public class MapWS {

    private String lat = "";
    private String lng = "";
    private String province = "";
    private String amphur = "";
    private String district = "";

    //-------------------------------

    @WebMethod(operationName = "getLoc")
    public ArrayList<Model.MapServ> getLocation(@WebParam(name = "province") String province, @WebParam(name = "amphur") String amphur) {

        MySqlConnection mysqlConn = new MySqlConnection();
        ThaiUnicode thaiUnicode = new ThaiUnicode();

        return null;
    }
}
Design and Implementation Web Service for Estimating Ceramic Clay in Thailand

Anantakul Intarapadung

Department of Information Technology Management, Faculty of Industrial Technology, Phramakhon Rajabhat University, Bangkhen Bangkok, 10220 Thailand,

Abstract

The Ceramic industry in Thailand is faced with several problems today. The raw clay material used in the ceramic industry is limited and fuel for production and labor have increased. A survey of ceramics factories found that production costs were 50 percent for raw materials 30 percent for fuel and 20 percent for labor. Clay material is considered to be a priority for the ceramic industry. In Thailand, mineral clay material is scattered across the landscape in the northern, central and southern areas. The Department of Mineral Resources and the Department of Primary Industries and Mines have been using a manual data collection system and cannot pinpoint the specific clay area. Many clay areas have been depleted and this data was not service to web application together.

This research aims to design and build Web services to gather clay data and such sources were used to assess ground-level clay data sources in a visual area using google maps to increase efficiency and to keep the information in a database. Also to create a virtual map that can input UTM coordinate location to Web service. Design and development of this research is to develop Web services in Java with the communications material through the SOAP protocol to connect to Google maps, create a database using MySQL program and register web service using UDDI with WSDL language.
Design For Six Sigma (DFSS) as a Proactive Business Process

Daw Alwerfalli and Trevor Lash
A. Leon Linton Department of Mechanical Engineering
College of Engineering
Lawrence Technological University
Southfield, Michigan 48075, USA

Abstract

Historically organizations have had a difficult time achieving Six Sigma levels of performance. Six Sigma level of quality consists of 3.4 defects per million opportunities (DPMO). Optimizing a product or process to this level required an extensive redesign. By redesigning the process or product engineers were essentially enabling Six Sigma levels by design. This is the premise of Design for Six Sigma (DFSS). DFSS is a proactive business process utilizing the voice of the customer into the design of products and processes. Designing a product that the customer wants rather than what the engineering thinks they want yields to greater customer satisfaction and market share. During the 1950’s Dr. Genichi Taguchi developed a methodology similar to how the DFSS process is used today. Dr. Taguchi’s methods to DFSS make use of some unique tools and terminology. Dr. Taguchi’s use of system thinking, approach to DOE’s using orthogonal arrays, Quality Loss Function, and using Signal to Noise Ratio in Robust Optimization are unique to the DFSS process. Dr. Taguchi’s framework for DFSS and tools will be discussed in this paper.
Proactive Decision Support During Business Process Execution

Kimon Batoulis
Hasso Plattner Institute at the University of Potsdam
Prof.-Dr.-Helmert-Str. 2-3, D-14482 Potsdam, Germany
Kimon.Batoulis@student.hpi.uni-potsdam.de

Abstract: The execution of business processes produces lots of events that can be used by complex event processing systems to analyze and improve the processes. Typically, events are stored in an event log repository that can be used to identify meaningful patterns of events, such that it is possible to react to them during process execution. However, in many cases it is beneficial to deal with those events before they actually occur to avoid an undesirable outcome, e.g., machine failure or poor performance indicator. Therefore, we present a system architecture connecting the operation of a process engine with a proactive framework. The framework forecasts events, provides the best corresponding action and generates appropriate business rules that can be used by the process engine to make optimal decisions during process runtime. An elaborated example demonstrates the utility of our concept.

Keywords: complex event processing, proactive computing, operational support, business process management
As an example of how the application of proactive techniques can improve a performance indicator value like time to repair, we present an example elicited and adapted from an event log of a simulated process used in the tutorial of the process mining tool ProM \(^1\) and illustrated as a BPMN diagram in Figure 1.

Figure 1: Telephone repair process

\(^1\)http://www.promtools.org/prom6/
The complete system architecture is illustrated in Figure 3. Business processes such as the phone repair process are executed by a process engine according to their models. This generates events such as the determined defect type that are stored in an appropriate repository. The events are then used by the BN component of the proactive framework to model the qualitative and quantitative dependencies between the events (interpreted as random variables). For instance, a dependency between the phone type and the defect type could be established and also how often a certain phone has a specific defect.
References

