Mastering Service-Oriented Architecture (SOA) Analysis and Design

Course Summary

Description

SOA Analysis and Design is a four day in-depth SOA analysis and design training course geared for software architects and designers who need to understand what SOA is, the impact of SOA, what it means in terms of today's systems and architectures, and how to apply the concepts in designing distributed architectures. Geared for software architects and designers, this course explores what services and service-oriented architectures are and what best practices and design patterns to use in designing SOA-based applications. This course presents a strong perspective on services as an essential and important part of enterprise systems as well as how to identify, design, and develop complex services using sound analysis and design techniques and best programming practices. The course presents a clear portrait of how a service orientation can fundamentally change the dynamics of how software is developed and "lives" within an enterprise.

Students who attend Service Oriented Architectures Analysis and Design will leave the course armed with the required skills to design and lead the implementation of realistic SOA-based business application projects. This course provides coverage of advanced SOA concepts and practices for enterprise applications. In addition, there is an extensive review of topics such as Enterprise Service Bus (ESB), the Business Process Execution Language (BPEL), SOAP, Web Services Description Language (WSDL), and Web services.

The course provides a solid foundation in basic terminology and concepts, extended and built upon throughout the engagement. Processes and best practices are discussed and illustrated through both discussions and group activities. Throughout the course students will be led through a series of progressively advanced topics, where each topic consists of lecture, group discussion, comprehensive hands-on lab exercises, and lab review. This course is "skills-centric", designed to train attendees in essential JEE web development skills, coupling the most current, effective techniques with the soundest coding practices.

Objectives

After taking this course, students will be able to:

- Explain the business impact of SOA
- Understand the history of services-oriented architecture and what design processes led up to SOA
- Discuss the challenges to adopting SOA in the enterprise
- Apply the concepts and principles of SOA to on-going and future projects
- Understand the relationship between SOA and the entire spectrum of services from SOAP and RESTful services to microservices
- Understand the various web service standards available to support SOA
- Explain how Enterprise Application Integration affects the reuse of existing applications
- Relate what SOA means from architectural and development perspectives
- Discuss business process analysis and its relation to BPEL
- Understand the difference between OO analysis and design and SOA analysis and design
- List the various roles involved in Service-oriented Analysis and Design (SOAD)
- Perform SOA Analysis to identify useful and manageable services
- Perform SOA Design to craft architectures that support the required data and communication dynamics for identified services
"Charting the Course ... … to Your Success!"

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Course Summary (cont’d)

- Understand the importance of business process modeling
- List the advantages of web services as a distributed systems technology
- Explain governance and how it applies to SOA and IT in general
- Compare SOA best practices
- Understand the responsibilities crucial to governance
- Explain what an Enterprise Service Bus is and its relationship to SOA
- Discuss ESB security and roles
- Understand web service and their standards

Topics

- Introduction to SOA
- SOA in Depth
- SOA Analysis and Design
- Making SOA Work
- SOA Patterns and Anti-Patterns
- Path to Useful Web Services
- Binding, Description, and Discovery
- SOA Security

Audience

This course is designed for Software Architects/Designers, and Business and Systems Analysts. This an intermediate to advanced level SOA training course, designed for architects and analysts who need to identify, design, and lead the implementation of SOA projects. We will explore and apply the terminology, the specification, the processes, and technologies specific to SOA.

Prerequisites

Before taking this course, attendees should have an extensive working knowledge of developing enterprise applications. Designing and analysis working knowledge is also extremely beneficial.

Duration

Four days
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Course Outline

I. Introduction to SOA
A. SOA Overview
   1. Services and SOA Defined
   2. Organizational Framework
   3. Technical Framework
   4. What is new in SOA
   5. SOA Workshop 1
B. SOA: The Business Proposition
   1. Web services standards
   2. ESBs
   3. Leveraging business processes
   4. Challenge to adoption
   5. The SOAD Process
C. SOA: An Architectural Perspective
   1. SOA Design Principles
   2. RPC vs. REST
   3. Web services, SOAP, and WSDL
   4. Architectural Issues
   5. SOA Maturity Model
   6. SOA Workshop 2
D. SOA: A Development Perspective
   1. The SOAD Process
   2. Services, operations and data
   3. Policies
   4. W3C standards
   5. Web services standards

II. SOA in Depth
A. Service-Oriented Architecture
   1. Business Process-driven development
   2. Transactions
   3. Security
   4. Business modeling
   5. Integrating legacy applications
   6. Governance
   7. SOA Interfaces
   8. SOA Workshop 3

III. SOA Analysis and Design
A. Service-Oriented Analysis and Design Review
   1. Service Lifecycle Phases
   2. Service Identification
   3. Service Specification
   4. Service Realization
   5. SOA Reference Architecture
   6. Challenge of Governance
B. Service Identification
   1. Top Down: Domain Decomposition
   2. Business Use Case: Order Processing
   3. Bottom Up: Asset Analysis
   4. Cross-Cutting: Goal-Service Modeling
C. Modeling Business Processes
   1. BPMN Fundamentals
   2. BPEL Overview
   3. Comparing BPEL and BPMN
   4. Service Identification
   5. Process Decomposition
   6. Exploring BPEL
   7. Service Identification
D. Service Specification
   1. Specification Supports Design of Service Details
   2. Service Analysis
   3. Elimination Criteria
   4. Service Specification
   5. Component Analysis
   6. Service Analysis
   7. Service Specification
E. Service Realization
   1. SOA Reference Architecture
   2. Solving Problems Using Layers
   3. Allocation
   4. Asset Feasibility
   5. Service Realization Decisions

IV. Making SOA Work
A. Common Framework: Infrastructure
   1. ESB Overview
   2. The Role of ESB in a SOA
   3. Typical Service Bus Functionality
   4. ESB Issues
B. Common Framework: Governance
   1. Implementing IT Governance
   2. Service Architecture
   3. Technology and Product Selection
   4. Development
   5. QA/Security/Regulatory Compliance
   6. Consumer/Provider Management
   7. Governance in Service Lifecycle
C. SOA Best Practices
   1. Planning
   2. Standardizing
   3. Service Modeling Guidelines
   4. Service Design Guidelines
   5. Managing
   6. Using Patterns
   7. Avoiding Anti-Patterns
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Course Outline (cont’d)

V. SOA Patterns and Anti-Patterns
   A. SOA Patterns and Anti-Patterns
      1. Web Service Broker
      2. Active Service
      3. Service Activator
      4. Service Locator
      5. Dependency Injection
      6. Service Locator vs. Dependency Injection
      7. Anti-Patterns
   B. SOA Security Patterns
      1. Authentication Enforcer
      2. Authorization Enforcer
      3. Intercepting Validator
      4. Secure Base Action
      5. Secure Logger
      6. Secure Pipe
      7. Secure Service Proxy
      8. Intercepting Web Agent

VI. Path to Useful Web Services
   A. Web Services Overview
      1. Web Services Architecturally
      2. Spec and Standard Evolution
      3. Web Services Interoperability Organization
      4. .NET Platform & .NET Web Services
      5. Java and Web Services
      6. Web Services in Action
   B. XML, Namespaces and Schemas
      1. XML Separates Structure, Content and Format
      2. XML Namespaces
      3. Namespaces Best Practices
      4. W3C XML Schemas
      5. Namespaces and Schemas

VII. Binding, Description and Discovery
    A. SOAP Overview
       1. Anatomy of a SOAP Message
       2. SOAP and HTTP
       3. SOAP Messaging
       4. Remote Procedure Calls
       5. SOAP With Attachments
       6. The SOAP Envelope
       7. SOAP Data Model
       8. SOAP in Action

B. REST Overview
   1. REpresentational State Transfer
   2. REST Characteristics
   3. REST Elements
   4. REST Architectural Principles
   5. REST and HTTP
   6. REST/HTTP: Representation-Oriented
   7. REST Design Principles
   8. Working With REST

C. WSDL
   1. Describing Web Services
   2. WSDL 2.0/1.1 in Practice
   3. WSDL Namespaces
   4. WSDL Anatomy

D. Discovery
   1. Issues With Broadly Scoped Discovery
   2. UDDI Registries
   3. Tools That Support Discovery
   4. Description and Discovery in Action

E. Transactions in Web Services: WS-TX
   1. SOA’s Challenge of Handling Transactions
   2. WS-Transaction (WS-TX)
   3. WS-Coordination
   4. WS-AtomicTransaction
   5. WS-BusinessActivity

VIII. SOA Security
    A. Lesson: XML Signature and Encryption
       1. XML Challenges
       2. XML Signature
       3. XML Signature Usage
       4. XML Encryption
       5. XML Encryption Usage
    B. WS-Security
       1. Transport-Level Security
       2. Message-Level Security
       3. Web Services Security Roadmap
       4. WS-Security Enables Interoperability
       5. Networking Devices Usage