

The Addison-Wesley Signature Series



SERVICE DESIGN PATTERNS

FUNDAMENTAL DESIGN SOLUTIONS FOR
SOAP/WSDL AND RESTFUL WEB SERVICES

ROBERT DAIGNEAU

With a Contribution by
IAN ROBINSON



Forewords by
MARTIN FOWLER and IAN ROBINSON

Web Service API Styles

<i>RPC API</i> (18)	How can clients execute remote procedures over HTTP?
<i>Message API</i> (27)	How can clients send commands, notifications, or other information to remote systems over HTTP while avoiding direct coupling to remote procedures?
<i>Resource API</i> (38)	How can a client manipulate data managed by a remote system, avoid direct coupling to remote procedures, and minimize the need for domain-specific APIs?

Client-Service Interaction Styles

<i>Request/Response</i> (54)	What's the simplest way for a web service to process a request and provide a result?
<i>Request/Acknowledge</i> (59)	How can a web service safeguard systems from spikes in request load and ensure that requests are processed even when the underlying systems are unavailable?
<i>Media Type Negotiation</i> (70)	How can a web service provide multiple representations of the same logical resource while minimizing the number of distinct URIs for that resource?
<i>Linked Service</i> (77)	Once a service has processed a request, how can a client discover the related services that may be called, and also be insulated from changing service locations and URI patterns?

Request and Response Management

<i>Service Controller</i> (85)	How can the correct web service be executed without having to write complex parsing and routing logic?
<i>Data Transfer Object</i> (94)	How can one simplify manipulation of request and response data, enable domain layer entities, requests, and responses to vary independently, and insulate services from wire-level message formats?
<i>Request Mapper</i> (109)	How can a service process data from requests that are structurally different yet semantically equivalent?
<i>Response Mapper</i> (122)	How can the logic required to construct a response be reused by multiple services?

Service Design Patterns: Fundamental Design Solutions for SOAP/WSDL and RESTful Web Services

Table of Contents

Contents

Foreword

Foreword

Preface

Acknowledgments

About the Author

Chapter 1: From Objects to Web Services

What Are Web Services?

From Local Objects to Distributed Objects

Why Use Web Services?

Web Service Considerations and Alternatives

Services and the Promise of Loose Coupling

What about SOA?

Summary

Chapter 2: Web Service API Styles

Introduction

Design Considerations for Web Service APIs

RPC API

Considerations

Message API

Table of Contents

Considerations

Resource API

Considerations

Chapter 3: Client-Service Interactions

Introduction

Request/Response

Considerations

Request/Acknowledge

Considerations

Media Type Negotiation

Considerations

Linked Service

Considerations

Chapter 4: Request and Response Management

Introduction

Service Controller

Considerations

Data Transfer Object

Data-Binding Considerations

General Considerations

Request Mapper

Considerations

Response Mapper

Considerations

Chapter 5: Web Service Implementation Styles

Introduction

Design Considerations for Web Service Implementation

Transaction Script

Table of Contents

Considerations

Datasource Adapter

Considerations

Operation Script

Considerations

Command Invoker

Considerations

Workflow Connector

Considerations

Chapter 6: Web Service Infrastructures

Introduction

Service Connector

Considerations

Service Descriptor

Considerations

Asynchronous Response Handler

Considerations

Service Interceptor

Idempotent Retry

Considerations

A Quick Review of SOA Infrastructure Patterns

The Service Registry

The Enterprise Service Bus

The Orchestration Engine

Chapter 7: Web Service Evolution

Introduction

What Causes Breaking Changes?

Structural Changes to Media Types or Messages

Table of Contents

Service Descriptor Changes

Common Versioning Strategies

Single-Message Argument

Dataset Amendment

Considerations

Tolerant Reader

Considerations

Consumer-Driven Contracts

Considerations

How the Patterns Promote or Hinder Service Evolution

Appendix: Reference to External Patterns

Glossary

A

B

C

D

E

F

G

H

I

J

L

M

N

O

P

Table of Contents

R

S

T

U

W

X

Bibliography

Index