SOAP UI

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About the Tutorial

SoapUI is an open-source tool used for functional and non-functional testing, widely used in WebServices testing. This is a brief tutorial that introduces the readers to the basic features and usage of SoapUI. The tutorial will guide the users on how to utilize the tool in WebService and other non-functional testing.

Audience

This tutorial has been prepared for beginners to help them understand how to use the SOAPUI tool.

Prerequisites

As a reader of this tutorial, you should have a basic understanding of the client/server environment, and knowledge of SOAP, WSDL, XML, and XML namespace.

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Table of Contents

About the Tutorial i

Audience i

Prerequisites i

Copyright & Disclaimer i

Table of Contents ii

1. SOAP – INTRODUCTION 1

2. SOAP – MESSAGES 2

3. SOAP – WHAT IS REST? 4

4. SOAPUI – INTRODUCTION 5

5. SOAPUI – CAPABILITIES 6

6. SOAPUI – NG PRO 8

7. SOAPUI – INSTALLATION & CONFIGURATION 9

8. SOAPUI – WSDL 19

WSDL Usage 19

Understanding WSDL 20

Format and Elements 20

WSDL – Port Type 22

Patterns of Operation 22

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9. SOAPUI – PROJECT 26

Create a SOAP Project **26**

Add a WSDL **28**

Details View **30**

10. SOAPUI – TESTSUITE 33

Creation of TestSuite **33**

11. SOAPUI – TESTCASE 37

12. SOAPUI – TESTSTEP 39

13. SOAPUI – REQUEST & RESPONSE 42

Request Setup **42**

Response **42**

HTTP Request **43**

HTTP Response **44**

14. SOAPUI – PROPERTIES 46

Defining Properties **46**

Accessing Property **47**

15. SOAPUI – PROPERTY TRANSFER 49

Adding Property Transfer **49**

Transferring a Property **50**

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SIMPLYEASYLEARNING

16. SOAPUI – LOGS PANE 54

SOAP UI Log **55**

HTTP Log **55**

Error Log **56**

Memory Log **56**

17. SOAPUI – ASSERTIONS 57

18. ASSERTION – CONTAINS 60

19. ASSERTION – NOT CONTAINS 63

20. ASSERTION – XPATH MATCH 65

21. ASSERTION – XQUERY MATCH 68

22. ASSERTION – SCRIPT 70

23. SOAPUI – TROUBLESHOOTING 74

24. SOAPUI – PERFORMANCE TESTING 76

Types of Performance Testing **76**

Key Aspects in Web Service **76**

25. SOAPUI – LOAD TESTING 78

Creation of Load Test **78**

Execution of Load Test **79**

Adding an Assertion **81**

26. SOAPUI – RESTFUL WEB SERVICES 84

27. REST – PROJECT SETUP 85

tutorialspoint
SIMPLYEASYLEARNING

28. REST – WADL 88

29. REST – REQUEST 90

30. REST – RESPONSE 94

31. REST – HTTP METHODS 97

POST **97**

GET **97**

PUT **98**

PATCH **98**

DELETE **99**

32. SOAPUI – JDBC CONNECTION 100

33. SOAPUI – JDBC PROPERTY 103

34. SOAPUI – JDBC ASSERTION 104

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1. SOAP – Introduction

SOAP is the acronym for Simple Object Access Protocol. It is defined by World Wide Web Consortium (W3C) at http://www.w3.org/TR/2000/NOTE-SOAP-20000508 as follows:

SOAP is a lightweight protocol for the exchange of information in a decentralized, distributed environment. It is an XML based protocol that consists of three parts: an envelope that defines a framework for describing what is in a message and how to process it; a set of encoding rules for expressing instances of application-defined data types; and a convention for representing remote procedure calls and responses.

SOAP – Important Features

Following are some important features of SOAP.

- It is a communication protocol designed to communicate via Internet.
- It can extend HTTP for XML messaging.
- It provides data transport for Web services.
- It can exchange complete documents or call a remote procedure.
- It can be used for broadcasting a message.
- It is both platform and language independent.
- It is the XML way of defining what information is sent and how.
- It enables client applications to easily connect to remote services and invoke remote methods.

Although SOAP can be used in a variety of messaging systems and can be delivered via a variety of transport protocols, the initial focus of SOAP is remote procedure calls transported via HTTP. Other frameworks such as CORBA, DCOM, and Java RMI provide similar functionality to SOAP, but SOAP messages are written entirely in XML and are therefore uniquely platform- and language-independent.

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2. SOAP – Messages

A SOAP message is an ordinary XML document containing the following elements:

- **Envelope**: Defines the start and the end of the message. It is a mandatory element.
- **Header**: Contains any optional attributes of the message used in processing the message, either at an intermediary point or at the ultimate end-point. It is an optional element.
- **Body**: Contains the XML data comprising the message being sent. It is a mandatory element.
- **Fault**: An optional Fault element that provides information about errors that occur while processing the message.

All these elements are declared in the default namespace for the SOAP envelope:

http://www.w3.org/2001/12/soap-envelope

The default namespace for SOAP encoding and data types is:

http://www.w3.org/2001/12/soap-encoding

Note: All these specifications are subject to change. Thus, keep updating yourself with the latest specifications available on the W3 website.

SOAP – Message Structure

The following block depicts the general structure of a SOAP message:

```
<?xml version="1.0"?>
<SOAP-ENV:Envelope
xmlns:SOAP-ENV="http://www.w3.org/2001/12/soap-envelope"
SOAP-ENV:encodingStyle="http://www.w3.org/2001/12/soap-encoding">

<SOAP-ENV:Header>
  ...
  ...
</SOAP-ENV:Header>

<SOAP-ENV:Body>
  ...
  ...
<SOAP-ENV:Fault>
```


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```
    ...
    ...
</SOAP-ENV:Fault>

</SOAP-ENV:Body>

</SOAP_ENV:Envelope>
```


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3. SOAP – What is REST?

REST is the acronym for Representational State Transfer. It can be defined as an architectural style of designing softwares. REST is not a specification or W3C standard. Hence, it is easier to work with RESTful Services. It doesn't require any middleware specification framework.

REST – Important Features

Following are some important features of REST.

- It relies on stateless, client-server, cacheable communication protocol – virtually in all cases, HTTP is used.
- It is light-weighted alternative of WebService and RPC (Remote Procedure Call) like SOAP-WSDL.
- It represents everything in unique ID or URIs.
- It makes the use of standard HTTP methods, such as GET, POST, PUT, DELETE.
- It links sources together.
- REST resources could have multiple representations.
- Any named information is considered as a Resource. For example: An image, a person, a document, all can be considered as an example of resource and represented as a unique ID or a URI.
- World Wide Web itself, based on HTTP, can be viewed as REST based architecture.

REST services are Platform and Language independent. Since it is based on HTTP standards, it can easily work in the presence of firewalls. Like WebServices, REST doesn't offer any in-built security, session management, QoS guarantee but these can be added by building on top of HTTP. For encryption, REST can be used on top of HTTPS.

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4. SoapUI – Introduction

SoapUI is a tool which can be used for both functional and non-functional testing. It is not limited to web services, though it is the de-facto tool used in web services testing.

SoapUI – Important Features

Following are some important features of SoapUI.

- It is capable of performing the role of both client and service.
- It enables the users to create functional and non-functional tests quickly and in an efficient manner using a single environment.
- It is licensed under the terms of the GNU Leaser General Public Licence (LGPL).
- It is purely implemented using JAVA platform.
- It supports Windows, Mac, multiple Linux dialects.
- It allows testers to execute automated functional, regression, compliance, and load tests on different Web API.
- It supports all the standard protocols and technologies to test all kinds of APIs.

SOAP UI can be used to test complete RESTful API and SOAP Web Service testing. It supports Functional Testing, Performance Testing, Interoperability Testing, Regression Testing, Load Testing, and much more.

It is user friendly as well as it is easy to convert functional test into non-functional tests such as Load, Stress testing.

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5. SoapUI – Capabilities

SOAP **UI is rich in** the **following five aspects:**

- Functional Testing
- Security Testing
- Load Testing
- Protocols and Technologies
- Integration with other tools

Let's learn more about each of these capabilities.

Functional Testing

- SOAP UI allows the testers to write functional API tests in SOAP UI.
- SOAP UI supports Drag-Drop feature that accelerates the script development.
- SOAP UI supports debugging of tests and allows testers to develop data driven tests.
- SOAP UI supports multiple environments making it easy to switch among QA, Dev, and Prod environments.
- SOAP UI allows advanced scripting (the tester can develop their custom code depending on the scenarios).

Security Testing

- SOAP UI performs a complete set of vulnerability scan.
- SOAP UI prevents SQL Injection to secure the databases.
- SOAP UI scans for stack overflows, caused by documents huge in size.
- SOAP UI scans for cross-site scripting, which occurs when service parameters are exposed in messages.
- SOAP UI performs fuzzing scan and boundary scan to avoid erratic behavior of the services.

Load Testing

- SOAP UI distributes the load tests across **n** number of LoadUI agents.
- SOAP UI simulates high volume and real-world load testing with ease.
- SOAP UI allows advanced custom reporting to capture performance parameters.

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- SOAP UI allows end-to-end system performance monitoring.

Protocols & Technologies

SOAP UI supports a wide range of protocols:

- SOAP – Simple Object Access Protocol
- WSDL – Web Service Definition Language
- REST – Representational State Transfer
- HTTP – Hyper Text Transmission Protocol
- HTTPS – Hyper Text Transmission Protocol Secured
- AMF –Action Message Format
- JDBC – Java Database Connectivity
- JMS – Java Messaging Service

Integration **w**ith **O**ther **T**ools

- Apache Maven Project
- HUDSON
- JUnit
- Apache – Ant and more….

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6. SoapUI – NG Pro

SOAP UI is an open source free version tool with basic features of testing, while SOAP UI NG Pro is a commercialized tool having advanced features of reporting, data-driven functionality and much more.

Comparison

The following table compares and contrasts the various features of SoapUI and SoapUI NG Pro.

Features	SoapUI	SoapUI NG Pro
Supported Technologies		
SOAP	Yes	Yes
WSDL/WADL	Yes	Yes
REST	Yes	Yes
JMS	Yes	Yes
AMF	Yes	Yes
JDBC	Yes	Yes
HTTP	Yes	Yes
General Features		
Standalone Application	Yes	Yes
Multi Environment Support	No	Yes
Floating Licence	No	Yes
WSDL Coverage	No	Yes
Request/Response Coverage	No	Yes
Message Assertion	Yes	Yes
Test Refactoring	No	Yes
Running multiple tests	Yes	Yes
Data Source Driven Test	No	Yes
Scripting Libraries	No	Yes
Unit Reporting	No	Yes
Manual test steps	Yes	Yes
Reporting		
Junit Reports	No	Yes
Report Data Export	No	Yes
WSDL HTML Report	Yes	Yes
Test Suite Coverage	No	Yes
Test Case Coverage	No	Yes
Assertion Coverage	No	Yes

Message Recording Coverage	No	Yes

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7. SoapUI – Installation & Configuration

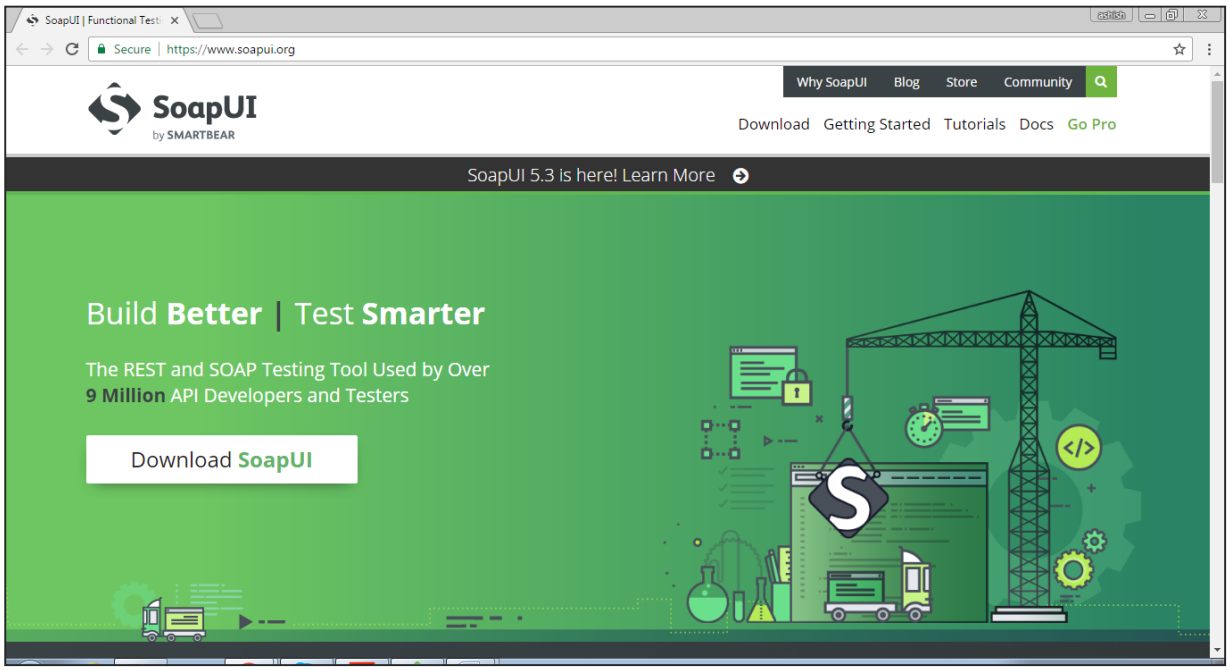
SoapUI is a cross-platform tool. It supports Windows, Linux, and Mac operating systems.

Prerequisites

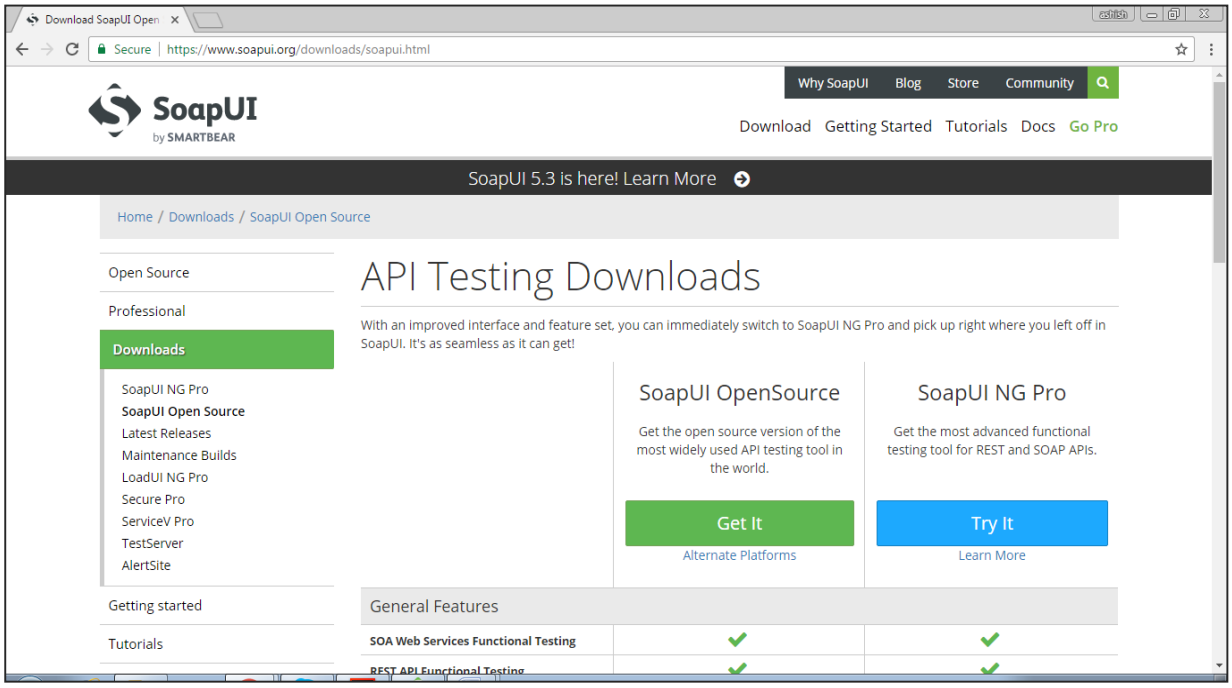
- **Processor**: 1GHz or higher 32-bit or 64-bit processor.
- **RAM**: 512MB of RAM.
- **Hard Disk Space**: Minimum 200MB of hard disk space for installation.
- **Operating System Version**: Windows XP or later, MAC OS 10.4 or later.
- **JAVA**: JAVA 6 or later.

Download Process

Step 1: Go to https://www.soapui.org/ and click Download SOAP UI.



Step 2: Click 'Get It' to download SOAP UI Open Source. It will start downloading 112MB .exe file in the system. Wait till the download process is complete.



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