

Technology Compatibility Kit User's Guide for Technology Licensees

Table of Contents

Eclipse Foundation	1
Preface	2
Who Should Use This Book	2
Documentation Accessibility	2
Before You Read This Book	2
Typographic Conventions	3
Shell Prompts in Command Examples	3
1 Introduction	4
1.1 Compatibility Testing	4
1.2 About the TCK	6
1.3 Getting Started With the TCK	13
2 Procedure for Certification	14
2.1 Certification Overview	14
2.2 Compatibility Requirements	14
2.3 Test Appeals Process	19
2.4 Specifications for Java Authentication API for Containers	21
2.5 Libraries for Java Authentication API for Containers	21
3 Installation	23
3.1 Obtaining the Reference Implementation	23
3.2 Installing the Software	23
4 Setup and Configuration	25
4.1 Configuring Your Environment to Run the TCK Against the Reference Implementation	25
4.2 Configuring Your Environment to Repackage and Run the TCK Against the Vendor Implementation	28
4.3 Publishing the Test Applications	30
4.4 Custom Configuration Handlers	30
4.5 Custom Deployment Handlers	31
4.6 Using the JavaTest Harness Software	32
4.7 Using the JavaTest Harness Configuration GUI	33
5 Executing Tests	37
5.1 Starting JavaTest	37
5.2 Running a Subset of the Tests	39
5.3 Running the TCK Against the RI	40
5.4 Running the TCK Against a Vendor's Implementation	41
5.5 Test Reports	41
6 Debugging Test Problems	44

6.1 Overview	44
6.2 Test Tree	45
6.3 Folder Information	45
6.4 Test Information	45
6.5 Report Files	46
6.6 Configuration Failures	46
A Frequently Asked Questions	47
A.1 Where do I start to debug a test failure?	47
A.2 How do I restart a crashed test run?	47
A.3 What would cause tests be added to the exclude list?	47

Eclipse Foundation

Technology Compatibility Kit User's Guide for Java Authentication API for Containers

Release 1.1 for Jakarta EE

September 2019

Technology Compatibility Kit User's Guide for Java Authentication API for Containers, Release 1.1 for Jakarta EE

Copyright © 2017, 2019 Oracle and/or its affiliates. All rights reserved.

This program and the accompanying materials are made available under the terms of the Eclipse Public License v. 2.0, which is available at <http://www.eclipse.org/legal/epl-2.0>.

SPDX-License-Identifier: EPL-2.0

Oracle and Java are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

Preface

This guide describes how to install, configure, and run the Technology Compatibility Kit (TCK) that is used to test the Java Authentication API for Containers (JASPIC 1.1) (JSR 196) technology.

The JASPIC TCK is a portable, configurable automated test suite for verifying the compatibility of a licensee's implementation of the JASPIC 1.1 Specification (hereafter referred to as the licensee implementation). The JASPIC TCK uses the JavaTest harness version 5.0 to run the test suite



Note All references to specific Web URLs are given for the sake of your convenience in locating the resources quickly. These references are always subject to changes that are in many cases beyond the control of the authors of this guide.

Refer to the Java Licensee Engineering (<https://javapartner.oracle.com>) Web site for answers to frequently asked questions and send questions you may have to your Java Licensee Engineering contact.

Who Should Use This Book

This guide is for licensees of the JASPIC 1.1 technology to assist them in running the test suite that verifies compatibility of their implementation of the JASPIC 1.1 Specification.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc>.

Before You Read This Book

You should be familiar with the JASPIC 1.1 Specification, which can be found at <http://jcp.org/en/jsr/detail?id=196>.

Before running the tests in the JASPIC TCK, you should familiarize yourself with the JavaTest documentation which can be accessed at the [JT Harness web site](#).

Typographic Conventions

The following table describes the typographic conventions that are used in this book.

Convention	Meaning	Example
Boldface	Boldface type indicates graphical user interface elements associated with an action, terms defined in text, or what you type, contrasted with onscreen computer output.	From the File menu, select Open Project . A cache is a copy that is stored locally. <code>machine_name% *su*</code> Password:
Monospace	Monospace type indicates the names of files and directories, commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.	Edit your <code>.login</code> file. Use <code>ls -a</code> to list all files. <code>machine_name% you have mail.</code>
<i>Italic</i>	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.	Read Chapter 6 in the <i>User's Guide</i> . Do <i>not</i> save the file. The command to remove a file is <code>rm filename</code> .

Shell Prompts in Command Examples

The following table shows the default UNIX system prompt and superuser prompt for the C shell, Bourne shell, and Korn shell.

Shell	Prompt
C shell	<code>machine_name%</code>
C shell for superuser	<code>machine_name#</code>
Bourne shell and Korn shell	<code>\$</code>
Bourne shell and Korn shell for superuser	<code>#</code>
Bash shell	<code>shell_name-shell_version\$</code>
Bash shell for superuser	<code>shell_name-shell_version#</code>

1 Introduction

This chapter provides an overview of the principles that apply generally to all Technology Compatibility Kits (TCKs) and describes the Java Authentication API for Containers TCK (JASPIC TCK 1.1) (JSR 196). It also includes a high level listing of what is needed to get up and running with the JASPIC TCK.

This chapter includes the following topics:

- [Compatibility Testing](#)
- [About the TCK](#)
- [Getting Started With the TCK](#)

1.1 Compatibility Testing

Compatibility testing differs from traditional product testing in a number of ways. The focus of compatibility testing is to test those features and areas of an implementation that are likely to differ across other implementations, such as those features that:

- Rely on hardware or operating system-specific behavior
- Are difficult to port
- Mask or abstract hardware or operating system behavior

Compatibility test development for a given feature relies on a complete specification and reference implementation for that feature. Compatibility testing is not primarily concerned with robustness, performance, or ease of use.

1.1.1 Why Compatibility Testing is Important

Java platform compatibility is important to different groups involved with Java technologies for different reasons:

- Compatibility testing ensures that the Java platform does not become fragmented as it is ported to different operating systems and hardware environments.
- Compatibility testing benefits developers working in the Java programming language, allowing them to write applications once and then to deploy them across heterogeneous computing environments without porting.
- Compatibility testing allows application users to obtain applications from disparate sources and deploy them with confidence.

- Conformance testing benefits Java platform implementors by ensuring a level playing field for all Java platform ports.

1.1.2 TCK Compatibility Rules

Compatibility criteria for all technology implementations are embodied in the TCK Compatibility Rules that apply to a specified technology. Each TCK tests for adherence to these Rules as described in [Chapter 2, "Procedure for Certification."](#)

1.1.3 TCK Overview

A TCK is a set of tools and tests used to verify that a licensee's implementation of a Java EE technology conforms to the applicable specification. All tests in the TCK are based on the written specifications for the Java platform. A TCK tests compatibility of a licensee's implementation of the technology to the applicable specification of the technology. Compatibility testing is a means of ensuring correctness, completeness, and consistency across all implementations developed by technology licensees.

The set of tests included with each TCK is called the test suite. Most tests in a TCK's test suite are self-checking, but some tests may require tester interaction. Most tests return either a Pass or Fail status. For a given platform to be certified, all of the required tests must pass. The definition of required tests may change from platform to platform.

The definition of required tests will change over time. Before your final certification test pass, be sure to download the latest Exclude List for the TCK you are using.

1.1.4 Java Community Process (JCP) Program and Compatibility Testing

The Java Community Process (JCP) program is the formalization of the open process that has been used since 1995 to develop and revise Java technology specifications in cooperation with the international Java community. The JCP program specifies that the following three major components must be included as deliverables in a final Java technology release under the direction of the responsible Expert Group:

- Technology Specification
- Reference Implementation
- Technology Compatibility Kit (TCK)

For further information about the JCP program, go to Java Community Process (<http://jcp.org/en/home/index>).

1.2 About the TCK

The JASPIC TCK 1.1 is designed as a portable, configurable, automated test suite for verifying the compatibility of a licensee's implementation of the JASPIC 1.1 Specification.

1.2.1 TCK Specifications and Requirements

This section lists the applicable requirements and specifications.

- **Specification Requirements:** Software requirements for a JASPIC implementation are described in detail in the JASPIC 1.1 Specification. Links to the JASPIC specification and other product information can be found at <http://jcp.org/en/jsr/detail?id=196>.
- **JASPIC Version:** The JASPIC TCK 1.1 is based on the JASPIC Specification, Version 1.1.
- **Reference Implementation:** The JASPIC 1.1 Reference Implementation (Java EE 8 RI) is available from Java Licensee Engineering (<https://javapartner.oracle.com>). See the RI documentation page at <http://glassfish.org> for more information.

See the JASPIC TCK Release Notes for more specific information about Java SE version requirements, supported platforms, restrictions, and so on.

1.2.2 TCK Components

The JASPIC TCK 1.1 includes the following components:

- JavaTest harness version 5.0 and related documentation. See the [ReleaseNotes-jtharness.html](#) file and the [JT Harness web site](#) for additional information.
- JASPIC TCK signature tests; check that all public APIs are supported and/or defined as specified in the JASPIC Version 1.1 implementation under test.
- If applicable, an exclude list, which provides a list of tests that your implementation is not required to pass.
- API tests for all of the JASPIC API in all related packages:
 - `javax.security.auth.message`
 - `javax.security.auth.message.callback`
 - `javax.security.auth.message.config`
 - `javax.security.auth.message.module`

The JASPIC TCK tests run on the following platforms:

- Windows 10
- Oracle Linux 7.1

1.2.3 JavaTest Harness

The JavaTest harness version 5.0 is a set of tools designed to run and manage test suites on different Java platforms. The JavaTest harness can be described as both a Java application and a set of compatibility testing tools. It can run tests on different kinds of Java platforms and it allows the results to be browsed online within the JavaTest GUI, or offline in the HTML reports that the JavaTest harness generates.

The JavaTest harness includes the applications and tools that are used for test execution and test suite management. It supports the following features:

- Sequencing of tests, allowing them to be loaded and executed automatically
- Graphic user interface (GUI) for ease of use
- Automated reporting capability to minimize manual errors
- Failure analysis
- Test result auditing and auditable test specification framework
- Distributed testing environment support

To run tests using the JavaTest harness, you specify which tests in the test suite to run, how to run them, and where to put the results as described in [Chapter 4, "Setup and Configuration."](#)

1.2.4 TCK Compatibility Test Suite

The test suite is the collection of tests used by the JavaTest harness to test a particular technology implementation. In this case, it is the collection of tests used by the JASPIC TCK 1.1 to test a JASPIC 1.1 implementation. The tests are designed to verify that a licensee's runtime implementation of the technology complies with the appropriate specification. The individual tests correspond to assertions of the specification.

The tests that make up the TCK compatibility test suite are precompiled and indexed within the TCK test directory structure. When a test run is started, the JavaTest harness scans through the set of tests that are located under the directories that have been selected. While scanning, the JavaTest harness selects the appropriate tests according to any matches with the filters you are using and queues them up for execution.

1.2.5 Exclude Lists

Each version of a TCK includes an Exclude List contained in a `.jtx` file. This is a list of test file URLs that identify tests which do not have to be run for the specific version of the TCK being used. Whenever tests are run, the JavaTest harness automatically excludes any test on the Exclude List from being executed.

A licensee is not required to pass or run any test on the Exclude List. The Exclude List file, `<TS_HOME>/bin/ts.jtx`, is included in the JASPIC TCK.



From time to time, updates to the Exclude List are made available on the Java Licensee Engineering (<https://javapartner.oracle.com>) Web site. You should always make sure you are using an up-to-date copy of the Exclude List before running the JASPIC TCK to verify your implementation.

A test might be in the Exclude List for reasons such as:

- An error in an underlying implementation API has been discovered which does not allow the test to execute properly.
- An error in the specification that was used as the basis of the test has been discovered.
- An error in the test itself has been discovered.
- The test fails due to a bug in the tools (such as the JavaTest harness, for example).

In addition, all tests are run against the reference implementations. Any tests that fail when run on a reference Java platform are put on the Exclude List. Any test that is not specification-based, or for which the specification is vague, may be excluded. Any test that is found to be implementation dependent (based on a particular thread scheduling model, based on a particular file system behavior, and so on) may be excluded.



Licensees are not permitted to alter or modify Exclude Lists. Changes to an Exclude List can only be made by using the procedure described in [Section 2.3.1, "TCK Test Appeals Steps."](#)

1.2.6 TCK Configuration

You need to set several variables in your test environment, modify properties in the `<TS_HOME>/bin/ts.jte` file, and then use the JavaTest harness to configure and run the JASPIC tests, as described in [Chapter 4, "Setup and Configuration."](#)

1.2.7 JASPIC Technology Overview

The JASPIC 1.1 Specification (JSR 196) defines a service provider interface (SPI) by which authentication providers implementing message authentication mechanisms can be integrated in client and server message processing runtimes or containers.

The JASPIC TCK uses a Test Suite SPI Verifier (TSSV) to verify whether the vendor's message processing runtimes invoke the correct SPI in the proper order.

TSSV includes test suite implementations of:

- `AuthConfigFactory`
- `AuthConfigProvider`
- `AuthConfigClient`, `AuthConfigServer`
- `AuthContextClient`, `AuthContextServer`
- `AuthenticationModulesClient`, `AuthenticationModules Server`

TSSV gets loaded into vendor's message processing runtime using one of the following ways, as defined by the JASPIC 1.1 Specification:

- By defining a property in `JAVA_HOME/jre/lib/security/java.security` as follows: `authconfigprovider.factory=com.sun.ts.tests.jaspic.tssv.config.TSAuthConfigFactory`
- By calling the `registerConfigProvider()` method in a vendor's `AuthConfigFactory` with the following values:
 - Test Suite Provider ClassName
 - Map of properties
 - Message Layer (such as `SOAP` or `HttpServlet`)
 - Application Context Identifier
 - A description of the provider



For the JASPIC TCK, more than one provider is registered in the vendor's message processing runtime.

In a typical test scenario (for each profile of Servlet or SOAP), an application is deployed into a vendor's runtime, and a client invokes the service. The message policies required for the secure invocations are built into TSSV implementations, and the runtime is analyzed to see whether it invokes the correct SPIs at the proper time.

TSSV uses Java logging APIs to log the client and server invocation into a log file (`TSSVLog.txt`), this log file is used by the TCK tests to validate actual logged runtime information against expected results to ensure that the runtime is compliant. The `jaspic_util_web.war` file contains the JASPIC log file processor, which writes output to the `TSSVLog.txt` file. The `TSSVLog.txt` file is put into the location defined by the `log.file.location` property in the `ts.jte` file.

1.2.8 JASPIC TSSV Files

The following sections describe the `tssv.jar`, `ProviderConfiguration.xml`, and `provider-configuration.xsd` files that are used by the JASPIC TCK tests.

1.2.8.1 tssv.jar file

The `tssv.jar` file contains classes necessary for populating a vendor implementation with a CTS `AuthConfigFactory` (ACF) as well as information used to register CTS providers. The `tssv.jar` file contains the class files for the Test Suite SPI Verifier. The `tssv.jar` file classes need to be loaded by the vendor implementation runtime during startup.

1.2.8.2 ProviderConfiguration.xml file

The format is a test suite-specific format. The file was designed to contain test provider information the test suite uses to populate the ACF with a list of providers for testing. The file needs to be copied to the location specified in the `ts.jte` file by the `provider.configuration.file` property. An edit to the `ProviderConfiguration.xml` file may be required for the vendor implementation. The current application context Ids are generic and should work as is, but there could be some scenarios in which the application Context Ids may need to be modified.

The value of the `<app-context-id>` element in the `ProviderConfiguration.xml` file should reflect what the vendor implementation will use for its internal representation of the application context identifier for a registered provider. Said differently, the test suite registers its providers with information from the `ProviderConfiguration.xml` file but every implementation is not guaranteed to use the application context identifier that is used in the call to register the configuration provider. This value of the `<app-context-id>` element corresponds to the `appContext` argument in the `AuthConfigFactory.registerConfigProvider()` API. The API documentation for this method indicates that the `appContext` argument may be used but is not guaranteed to be used.

The default `ProviderConfiguration.xml` file should work without modification, but a vendor may need to alter the value of the `<app-context-id>` element as previously described to accommodate the implementation under test. Vendors need to find the correct application context identifier for their implementation.

Vendors should enable two levels of logging output to get finer levels of debugging and tracing information than is turned on by default. This is done by setting the `traceflag` property in the `ts.jte` file to "true" and setting the `HARNESS_DEBUG` environment variable to "true". If both of these are set, the debug output should contain application context identifier information.

1.2.8.3 provider-configuration.xsd file

The `provider-configuration.xsd` file is a schema file that resides in the same directory as the `ProviderConfiguration.xml` file and describes the `ProviderConfiguration.xml` file. This file should not be edited.

thref4]]

1.2.9 Baseline Compatibility Requirements

To obtain Baseline compliance, a vendor must meet the Baseline Compatibility requirements.

1.2.10 Servlet Profile Tests

To obtain Servlet Profile compliance, a vendor must meet the Baseline Compatibility requirements as well as the Servlet Profile requirements.

1.2.11 SOAP Profile Tests

Since various SOAP implementations are possible in a vendor's message processing runtime, the JASPIC TCK considers the following SOAP implementations:

- SOAP implementation in a Java EE environment
- SOAP implementation in standalone container (non-Java EE)
- Non-container based SOAP implementation

For SOAP profile tests, the client invocations of webservice have been abstracted into two different types:

- Invocations of Service in a Java EE environment (for example, using JAXWS annotations `@WebServiceRef` for looking up the service and `@WebService` for service definition).
- Invocations of Service in a standalone (i.e. non-Java EE) environment (this includes standalone container and non-container based implementation).

The following are used to get the service reference:

- WSDL
- Service `QName` (for example, `QName(NAMESPACEURI, SERVICENAME)`)
- Service Class (such as `HelloService.class`)
- PORT `QName` (for example, `QName(NAMESPACEURI, PORT_NAME)`)
- Service Endpoint Interface class (for example, `Hello.class`)

The deployment abstraction for handling various SOAP implementations are handled in the following ways:

- A JSR 88–compliant deployment is used for Java EE-based implementations. This is differentiated by using a different deliverable class, `deliverable.class=com.sun.ts.lib.deliverable.jaspic.JaspicJavaEEDeliverable`, which is configurable in the `ts.jte` file. Vendors need to write their own `Deliverable` class that can be used to deploy in their environment.
- For standalone implementations (this includes container and non-container based implementations), a different deliverable class is used, `deliverable.class=com.sun.ts.lib.deliverable.jaspic.JaspicDeliverable`. Along with this deliverable class an Ant file, `TS_HOME/bin/xml/deploy.xml`, is used to deploy in GlassFish Server. Vendors are expected to implement the `deploy` and `undeploy` targets in `deploy.xml` to suite their environment.



Two deliverable implementations are provided with the GlassFish server. One implementation, for non-Java EE servers, turns off auto deployment and leaves the deployment up to the licensee by way of an Ant target.

- Along with the deliverable class, a configurable property in the `ts.jte` file, `platform.mode`, is used to distinguish the different SOAP implementations.
 - `platform.mode=javaEE` (for Java EE based implementation)
 - `platform.mode=standalone`



A deployable EAR , WAR, or JAR file is created, based on the value specified by the `platform.mode` property in the `ts.jte` file.

- For non-container based standalone SOAP implementations, vendors are expected to deploy the service and make it available for client invocations. For this purpose, a no-op for `deploy` and `undeploy` targets can be implemented in the `deploy.xml` file.

The JASPIC TCK uses Web Services (JSR 181) metadata-based annotations to define web service applications. Although JSR 181 support is not required in a vendor’s SOAP implementation, using web services metadata simplifies the definition of web services and the linking between various artifacts of web services (the WSDL, `ServiceEndpoint`, and implementation and their associations). Using other forms of web services implementation will lead to separate binding files, web services description files (`webservices.xml`) which are different for different SOAP implementations, such as a Java EE-based SOAP implementation, standalone implementation, and so on.

Since vendors are already expected to generate web service artifacts using `wsgen` and `wsimport` tools, writing an annotation processor to support JSR 181–based annotations is just a step further towards making a better SOAP implementation. Also having annotated web services helps vendors generate different artifacts that suit their SOAP implementation.



For Java EE-based SOAP implementations, JSR 181 support is required.

1.3 Getting Started With the TCK

This section provides an general overview of what needs to be done to install, set up, test, and use the JASPIC TCK. These steps are explained in more detail in subsequent chapters of this guide.

1. Make sure that the following software has been correctly installed on the system hosting the JavaTest harness:

- Java SE 8
- JASPIC 1.1 RI, which is Java EE 8 RI
- JASPIC TCK version 1.1, which includes:
 - JDOM 1.0
 - Apache Commons HTTP Client 3.1
 - Apache Commons Logging 1.1.1
 - Apache Commons Codec 1.3

- The JASPIC 1.1 Vendor Implementation (VI)

See the documentation for each of these software applications for installation instructions. See [Chapter 3, "Installation,"](#) for instructions on installing the JASPIC TCK.

1. Set up the JASPIC TCK software.

See [Chapter 4, "Setup and Configuration,"](#) for details about the following steps.

1. Set up your shell environment.
2. Modify the required properties in the `<TS_HOME>/bin/ts.jte` file.
3. Configure the JavaTest harness.

2. Test the JASPIC 1.1 implementation.

Test the JASPIC implementation installation by running the test suite. See [Chapter 5, "Executing Tests."](#)

2 Procedure for Certification

This chapter describes the compatibility testing procedure and compatibility requirements for Java Authentication API for Containers. This chapter contains the following sections:

- [Certification Overview](#)
- [Compatibility Requirements](#)
- [Test Appeals Process](#)
- [Specifications for Java Authentication API for Containers](#)
- [Libraries for Java Authentication API for Containers](#)

2.1 Certification Overview

The certification process for JASPIC 1.1 consists of the following activities:

- Install the appropriate version of the Technology Compatibility Kit (TCK) and execute it in accordance with the instructions in this User's Guide.
- Ensure that you meet the requirements outlined in [Compatibility Requirements](#) below.
- Certify to the Java Partner organization that you have finished testing and that you meet all of the compatibility requirements.

2.2 Compatibility Requirements

The compatibility requirements for JASPIC 1.1 consist of meeting the requirements set forth by the rules and associated definitions contained in this section.

2.2.1 Definitions

These definitions are for use only with these compatibility requirements and are not intended for any other purpose.

Table 2-1 Definitions

Term	Definition
API Definition Product	A Product for which the only Java class files contained in the product are those corresponding to the application programming interfaces defined by the Specifications, and which is intended only as a means for formally specifying the application programming interfaces defined by the Specifications.
Computational Resource	<p>A piece of hardware or software that may vary in quantity, existence, or version, which may be required to exist in a minimum quantity and/or at a specific or minimum revision level so as to satisfy the requirements of the Test Suite.</p> <p>Examples of computational resources that may vary in quantity are RAM and file descriptors.</p> <p>Examples of computational resources that may vary in existence (that is, may or may not exist) are graphics cards and device drivers.</p> <p>Examples of computational resources that may vary in version are operating systems and device drivers.</p>
Configuration Descriptor	Any file whose format is well defined by a specification and which contains configuration information for a set of Java classes, archive, or other feature defined in the specification.
Conformance Tests	All tests in the Test Suite for an indicated Technology Under Test, as distributed by the Maintenance Lead, excluding those tests on the Exclude List for the Technology Under Test.
Documented	Made technically accessible and made known to users, typically by means such as marketing materials, product documentation, usage messages, or developer support programs.
Exclude List	The most current list of tests, distributed by the Maintenance Lead, that are not required to be passed to certify conformance. The Maintenance Lead may add to the Exclude List for that Test Suite as needed at any time, in which case the updated Exclude List supplants any previous Exclude Lists for that Test Suite.
Libraries	<p>The class libraries, as specified through the Java Community Process (JCP), for the Technology Under Test.</p> <p>The Libraries for Java Authentication API for Containers are listed at the end of this chapter.</p>

Term	Definition
Location Resource	<p>A location of classes or native libraries that are components of the test tools or tests, such that these classes or libraries may be required to exist in a certain location in order to satisfy the requirements of the test suite.</p> <p>For example, classes may be required to exist in directories named in a CLASSPATH variable, or native libraries may be required to exist in directories named in a PATH variable.</p>
Maintenance Lead	<p>The Java Community Process member responsible for maintaining the Specification, reference implementation, and TCK for the Technology. Oracle is the Maintenance Lead for Java Authentication API for Containers.</p>
Operating Mode	<p>Any Documented option of a Product that can be changed by a user in order to modify the behavior of the Product.</p> <p>For example, an Operating Mode can be binary (enable/disable optimization), an enumeration (select from a list of protocols), or a range (set the maximum number of active threads).</p> <p>Note that an Operating Mode may be selected by a command line switch, an environment variable, a GUI user interface element, a configuration or control file, etc.</p>
Product	<p>A licensee product in which the Technology Under Test is implemented or incorporated, and that is subject to compatibility testing.</p>
Product Configuration	<p>A specific setting or instantiation of an Operating Mode.</p> <p>For example, a Product supporting an Operating Mode that permits user selection of an external encryption package may have a Product Configuration that links the Product to that encryption package.</p>
Rebuildable Tests	<p>Tests that must be built using an implementation-specific mechanism. This mechanism must produce specification-defined artifacts. Rebuilding and running these tests against the Java EE 8 RI verifies that the mechanism generates compatible artifacts.</p>
Resource	<p>A Computational Resource, a Location Resource, or a Security Resource.</p>
Rules	<p>These definitions and rules in this Compatibility Requirements section of this User's Guide.</p>
Security Resource	<p>A security privilege or policy necessary for the proper execution of the Test Suite.</p> <p>For example, the user executing the Test Suite will need the privilege to access the files and network resources necessary for use of the Product.</p>

Term	Definition
Specifications	<p>The documents produced through the Java Community Process that define a particular Version of a Technology.</p> <p>The Specifications for the Technology Under Test are referenced later in this chapter.</p>
Technology	Specifications and a reference implementation produced through the Java Community Process.
Technology Under Test	Specifications and the reference implementation for Java Authentication API for Containers Version 1.1.
Test Suite	The requirements, tests, and testing tools distributed by the Maintenance Lead as applicable to a given Version of the Technology.
Version	A release of the Technology, as produced through the Java Community Process.

2.2.2 Rules for Java Authentication API for Containers Products

The following rules apply for each version of an operating system, software component, and hardware platform Documented as supporting the Product:

JASPIC1 The Product must be able to satisfy all applicable compatibility requirements, including passing all Conformance Tests, in every Product Configuration and in every combination of Product Configurations, except only as specifically exempted by these Rules.

For example, if a Product provides distinct Operating Modes to optimize performance, then that Product must satisfy all applicable compatibility requirements for a Product in each Product Configuration, and combination of Product Configurations, of those Operating Modes.

JASPIC1.1 If an Operating Mode controls a Resource necessary for the basic execution of the Test Suite, testing may always use a Product Configuration of that Operating Mode providing that Resource, even if other Product Configurations do not provide that Resource. Notwithstanding such exceptions, each Product must have at least one set of Product Configurations of such Operating Modes that is able to pass all the Conformance Tests.

For example, a Product with an Operating Mode that controls a security policy (i.e., Security Resource) which has one or more Product Configurations that cause Conformance Tests to fail may be tested using a Product Configuration that allows all Conformance Tests to pass.

JASPIC1.2 A Product Configuration of an Operating Mode that causes the Product to report only version, usage, or diagnostic information is exempted from these compatibility rules.

JASPIC1.3 An API Definition Product is exempt from all functional testing requirements defined here,

except the signature tests.

JASPIC2 Some Conformance Tests may have properties that may be changed. Properties that can be changed are identified in the configuration interview. Properties that can be changed are identified in the JavaTest Environment (.jte) files in the Test Suite installation. Apart from changing such properties and other allowed modifications described in this User's Guide (if any), no source or binary code for a Conformance Test may be altered in any way without prior written permission. Any such allowed alterations to the Conformance Tests would be posted to the Java Licensee Engineering web site and apply to all licensees.

JASPIC3 The testing tools supplied as part of the Test Suite or as updated by the Maintenance Lead must be used to certify compliance.

JASPIC4 The Exclude List associated with the Test Suite cannot be modified.

JASPIC5 The Maintenance Lead can define exceptions to these Rules. Such exceptions would be made available to and apply to all licensees.

JASPIC6 All hardware and software component additions, deletions, and modifications to a Documented supporting hardware/software platform, that are not part of the Product but required for the Product to satisfy the compatibility requirements, must be Documented and available to users of the Product.

For example, if a patch to a particular version of a supporting operating system is required for the Product to pass the Conformance Tests, that patch must be Documented and available to users of the Product.

JASPIC7 The Product must contain the full set of public and protected classes and interfaces for all the Libraries. Those classes and interfaces must contain exactly the set of public and protected methods, constructors, and fields defined by the Specifications for those Libraries. No subsetting, supersetting, or modifications of the public and protected API of the Libraries are allowed except only as specifically exempted by these Rules.

JASPIC7.1 If a Product includes Technologies in addition to the Technology Under Test, then it must contain the full set of combined public and protected classes and interfaces. The API of the Product must contain the union of the included Technologies. No further modifications to the APIs of the included Technologies are allowed.

JASPIC8 Except for tests specifically required by this TCK to be rebuilt (if any), the binary Conformance Tests supplied as part of the Test Suite or as updated by the Maintenance Lead must be used to certify compliance.

JASPIC9 The functional programmatic behavior of any binary class or interface must be that defined by the Specifications.

2.3 Test Appeals Process

Oracle has a well established process for managing challenges to its Java technology Test Suites and plans to continue using a similar process in the future. Oracle, as JASPIC Maintenance Lead, will authorize representatives from the Java Partner Engineering group to be the point of contact for all test challenges. Typically this will be the engineer assigned to a company as part of its JASPIC TCK support.

If a test is determined to be invalid in function or if its basis in the specification is suspect, the test may be challenged by any licensee of the JASPIC TCK. Each test validity issue must be covered by a separate test challenge. Test validity or invalidity will be determined based on its technical correctness such as:

- Test has bugs (i.e., program logic errors).
- Specification item covered by the test is ambiguous.
- Test does not match the specification.
- Test assumes unreasonable hardware and/or software requirements.
- Test is biased to a particular implementation.

Challenges based upon issues unrelated to technical correctness as defined by the specification will normally be rejected.

Test challenges must be made in writing to Java Partner Engineering and include all relevant information as described in [Example 2-1, "Test Challenge Form"](#). The process used to determine the validity or invalidity of a test (or related group of tests) is described in [Section 2.3.1, "TCK Test Appeals Steps."](#)

All tests found to be invalid will either be placed on the Exclude List for that version of the JASPIC TCK or have an alternate test made available.

- Tests that are placed on the Exclude List will be placed on the Exclude List within one business day after the determination of test validity. The new Exclude List will be made available to all JASPIC TCK licensees on the Java Licensee Engineering website.
- Oracle, as Maintenance Lead has the option of creating alternative tests to address any challenge. Alternative tests (and criteria for their use) will be made available on the Java Licensee Engineering website.



Passing an alternative test is deemed equivalent to passing the original test.

2.3.1 TCK Test Appeals Steps

1. Java Authentication API for Containers TCK licensee writes a test challenge to Java Licensee Engineering contesting the validity of one or a related set of JASPIC tests.

A detailed justification for why each test should be invalidated must be included with the challenge as described in [Example 2-1, "Test Challenge Form"](#).

2. Java Licensee Engineering evaluates the challenge.

If the appeal is incomplete or unclear, it is returned to the submitting licensee for correction. If all is in order, Java Licensee Engineering will check with the responsible test developers to review the purpose and validity of the test before writing a response as described in [Example 2-2, "Test Challenge Response Form"](#). Java Licensee Engineering will attempt to complete the response within 5 business days. If the challenge is similar to a previously rejected test challenge (i.e., same test and justification), Java Licensee Engineering will send the previous response to the licensee.

3. The challenge and any supporting materials from test developers is sent to the specification engineers for evaluation.

A decision of test validity or invalidity is normally made within 15 working days of receipt of the challenge. All decisions will be documented with an explanation of why test validity was maintained or rejected.

4. The licensee is informed of the decision and proceeds accordingly.

If the test challenge is approved and one or more tests are invalidated, Oracle places the tests on the Exclude List for that version of the Java Authentication API for Containers TCK (effectively removing the test(s) from the Test Suite). All tests placed on the Exclude List will have a bug report written to document the decision and made available to all licensees through the bug reporting database. If the test is valid but difficult to pass due to hardware or operating system limitations, Oracle may choose to provide an alternate test to use in place of the original test (all alternate tests are made available to the licensee community).

5. If the test challenge is rejected, the licensee may choose to escalate the decision to the Executive Committee (EC), however, it is expected that the licensee would continue to work with Oracle to resolve the issue and only involve the EC as a last resort.

2.3.2 Test Challenge and Response Forms

[Example 2-1](#) shows the test challenge information you must provide to Java Licensee Engineering to initiate a challenge, and [Example 2-2](#) shows the test challenge response format.

Example 2-1 Test Challenge Form

```

Test Challenger Name and Company:
Specification Name(s) and Version(s):
Test Suite Name and Version:
Exclude List Version:
Test Name:
Complaint (argument for why test is invalid):
.jtr file of the failing test:
Console log of the JavaTest harness and device with all debugging flags turned on (if
applicable):
.jti or .jte file for the test run:
Startup scripts for the JavaTest harness and agent (if applicable):

```

Example 2-2 Test Challenge Response Form

```

Test Defender Name and Company:
Test Defender Role in Defense (e.g., test developer, Maintenance Lead, etc.):
Specification Name(s) and Version(s):
Test Suite Name and Version:
Test Name:
Defense (argument for why test is valid):
[Multiple challenges and corresponding responses may be listed here.]
Implications of test invalidity (e.g., other affected tests and test framework code,
creation or exposure of ambiguities in spec (due to unspecified requirements),
invalidation of the reference implementation, creation of serious holes in test suite):
Alternatives (e.g., are alternate test(s) appropriate?):

```

2.4 Specifications for Java Authentication API for Containers

The Java Authentication API for Containers specification is available on the JSR 196 Web site at <http://jcp.org/en/jsr/detail?id=196> or on the Java Community Process (<http://jcp.org/en/home/index>) site.

2.5 Libraries for Java Authentication API for Containers

The following is a list of the packages comprising the required class libraries for JASPIC 1.1:

- `javax.security.auth.message`
- `javax.security.auth.message.callback`
- `javax.security.auth.message.config`

- `javax.security.auth.message.module`

For the latest list of packages, also see:

<http://jcp.org/en/jsr/detail?id=196>

3 Installation

This chapter explains how to install the Java Authentication API for Containers TCK software.

After installing the software according to the instructions in this chapter, proceed to [Chapter 4, "Setup and Configuration,"](#) for instructions on configuring your test environment.

3.1 Obtaining the Reference Implementation

You can obtain the JASPIC Reference Implementation (RI) (Java EE 8 RI) software from Java Licensee Engineering (<https://javapartner.oracle.com>).

3.2 Installing the Software

Before you can run the JASPIC TCK tests, you must install and set up the following software components:

- Java SE 8
- JASPIC 1.1 RI, which is Java EE 8 RI
- JASPIC TCK version 1.1, which includes:
 - JDOM 1.0
 - Apache Commons HTTP Client 3.1
 - Apache Commons Logging 1.1.1
 - Apache Commons Codec 1.3
- The JASPIC 1.1 Vendor Implementation (VI)

Follow these steps:

1. Install the Java SE 8 software, if it is not already installed.
Download and install the Java SE 8 software from <http://www.oracle.com/technetwork/java/javase/downloads/index.html>. Refer to the installation instructions that accompany the software for additional information.
2. Install the JASPIC TCK 1.1 software.
 1. Copy or download the JASPIC TCK software to your local system.
You can obtain the JASPIC TCK software from the Java Licensee Engineering (<https://javapartner.oracle.com>) Web site. The JASPIC TCK software is located in the Web site's Download Center area.

2. Use the `unzip` command to extract the bundle in the directory of your choice:

```
unzip jaspictck-x.x_dd-Mmm-YYYY.zip
```

This creates the TCK directory. The TCK is the test suite home, `<TS_HOME>`.

3. Install the Java EE 8 RI software (the servlet Web container used for running the JASPIC TCK with the JASPIC 1.1 RI), if it is not already installed.

Download and install the Servlet Web container with the JASPIC 1.1 RI used for running the JASPIC TCK 1.1, represented by the Java EE 8 RI. This software can be obtained from the Java Licensee Engineering Web site. Refer to any installation instructions that accompany the software for additional information.

4. Install the JASPIC 1.1 Reference Implementation.

The Reference Implementation is used to validate your initial configuration and setup of the JASPIC TCK 1.1 tests, which are explained further in [Chapter 4, "Setup and Configuration."](#)

The JASPIC RI can be obtained from Java Licensee Engineering (<https://javapartner.oracle.com>).

5. Install a Web server on which the JASPIC TCK test applications can be published for testing the VI.

6. Install the JASPIC Vendor Implementation (VI) to be tested.

Follow the installation instructions for the particular VI under test.

4 Setup and Configuration

This chapter describes how to set up the JASPIC TCK and JavaTest harness software. Before proceeding with the instructions in this chapter, be sure to install all required software, as described in [Chapter 3, "Installation."](#)

After completing the instructions in this chapter, proceed to [Chapter 5, "Executing Tests,"](#) for instructions on running the JASPIC TCK.

4.1 Configuring Your Environment to Run the TCK Against the Reference Implementation

After configuring your environment as described in this section, continue with the instructions in [Section 4.6, "Using the JavaTest Harness Software."](#)



In these instructions, variables in angle brackets need to be expanded for each platform. For example, `<TS_HOME>` becomes `$TS_HOME` on Solaris/Linux and `%TS_HOME%` on Windows. In addition, the forward slashes (`/`) used in all of the examples need to be replaced with backslashes (`\`) for Windows. Finally, be sure to use the appropriate separator for your operating system when specifying multiple path entries (`;` on Windows, `:` on UNIX/Linux).

On Windows, you must escape any backslashes with an extra backslash in path separators used in any of the following properties, or use forward slashes as a path separator instead.

4.1.2 To Configure Your Environment for the JASPIC TCK

This section describes how to configure your environment to run the JASPIC TCK tests.

Deploy the JASPIC TCK tests in the manner that your implementation requires, based on the type of profile.

If your implementation is Java EE-based, set the `platform.mode` property in the `ts.jte` file to `javaEE`.

If your implementation is not Java EE-based, set the `platform.mode` property in the `ts.jte` file to `standalone`.

1. Set the following environment variables in your shell environment:
 1. `JAVA_HOME` to the directory in which Java SE 8 is installed

2. `TS_HOME` to the directory in which the JASPIC TCK 1.1 software is installed
 3. `PATH` to include the following directories: `JAVA_HOME/bin`, `JASPIC_HOME/bin`, and `<TS_HOME>/tools/ant/bin`
2. Edit your `<TS_HOME>/bin/ts.jte` file and set the following environment variables:
1. `pathsep` to the type of path separator used by your operating system
The default is `:` for Solaris/Linux. Windows users should change this value to `;`.
 2. Set the `jaspic.home` property to the root directory of implementation under test.
 3. Set the `orb.host` property to the name of the machine on which you are running the JASPIC TCK tests.
 4. Set the `orb.port` property to the port number of the machine on which you are running the JASPIC TCK tests.
 5. Set the `sigTestClasspath` property to point to the implementation classes that are to be validated for signature compliance. This classpath must also include any other classes that are referenced, implemented, or extended by your implementation .
 6. Set the `servlet.is.jsr115.compatible` property based on whether or not you are running the Servlet profile in a JSR 115-compatible container.
 7. Set the `soap.is.jsr115.compatible` property based on whether or not you are running the SOAP profile in a JSR 115-compatible container.
 8. Set the `log.file.location` property to the location where your implementation's log files and the JASPIC log file will be written.
 9. Set the `logical.hostname.servlet` property to the logical host that will process Servlet requests. Servlet requests may be directed to a logical host using various physical or virtual host names or addresses. A message processing runtime may be composed of multiple logical hosts. This setting is required to properly identify the Servlet profile's application context identifier hostname. If the logical host that will process Servlet requests does not exist, you can set this to the default hostname of your implementation's Web server.
 10. Set the `logical.hostname.soap` property to the name of the logical host that will process SOAP requests.
This hostname is used in the implementation runtime's application context identifier in the SOAP profile.
 11. Set the `vendor.authconfig.factory` property to specify your `AuthConfigFactory` class.
This property setting will be used by the JASPIC tests to register the test suite's provider in your `AuthConfigFactory`.
3. Run `ant config.vi`.
- This task configures the implementation under test to run the JASPIC TCK tests by doing the following:
1. Copies `jaspic.jar` and `tsharness.jar` to the lib extension directory (for example, `/glassfish/domains/domain1/lib/ext`)
 2. Set up users and passwords for your implementation.

For the purpose of running the CTS test suite, these should be set as follows:

User	Password	Groups
j2ee_vi	j2ee_vi	staff
javajoe	javajoe	guest
j2ee	j2ee	staff, mgr, asadmin

Also make sure the principal to role-mappings that are specified in the runtime XML files are properly mapped in your environment. Note that the principal-to-role mappings may vary for each application.

3. Install the client-side certificate in the `trustStore` in your implementation.

Certificates are located `<TS_HOME>/bin/certificates`.

Use the certificate that suits your environment:

- `cts_cert` - For importing the CTS client certificate into a `truststore`
- `clientcert.jks` - Used by the J2SE runtime to identify the CTS client's identity
- `clientcert.p12` - Contains CTS client certificate in `p12` format

4. Append the file `<TS_HOME>/bin/server_policy.append` to the Java policy file or files on your implementation.

This file contains the grant statements used by the test harness, signature tests, and API tests.

5. Appends the file `<TS_HOME>/bin/client_policy.append` to the application client's Java policy file, which is referenced in the `TestExecuteAppClient` section of the `ts.jte` file.

6. Creates a JVM option that increases the `MaxPermSize` for your implementation.

4. Run `ant enable.jaspic`.

This task performs the configuration necessary for adding the test suite's `SPI Verifier(TSSV)` to your implementation. Specifically, `ant enable.jaspic` performs the following operations:

1. Sets the `jvm` option `-Dlog.file.location` in your implementation.
This is the location of the log file where the Test Suite SPI Verifier (TSSV) creates log messages, which will be used by the JASPIC TCK tests, to identify the test status.
2. Sets the `jvm` option `-Dprovider.configuration.file` in your implementation.
This option is used to identify the provider configuration file that will be used by `TSAuthConfigFactory` to load the providers required by the JASPIC TCK tests.
3. Sets the `jvm` option `-Dschema.file.location=${schema.file.location}` in your implementation.
This option is used to identify the location of the schema file that is used by the `Provider-Configuration.xml` file.
4. Sets up your implementation to use the test suite's `AuthConfigFactory`.

This can be done in one of the following ways:

- Copy `<TS_HOME>/bin/ts.java.security` to the location in your implementation where the security configuration files reside. For example, the GlassFish Server security configuration files are in the `<JAVAAE_HOME>glassfish/domains/domain1/config` directory. After the file has

been copied, use the `-Djava.security.properties` JVM option to direct your implementation to use this security property file. For example, to direct GlassFish Server to use the `ts.java.security` file, you would use this JVM option:

```
-Djava.security.properties=glassfish/domains/domain1/config/ts.java.security
```

- Add the following lines as a single line to the `JAVA_HOME/jre/lib/security/java.security` file:

```
authconfigprovider.factory=  
com.sun.ts.tests.jaspic.tssv.config.TSAuthConfigFactory
```

Adding this property to the `java.security` file forces your implementation to load the test suite's `AuthConfigFactory`.

5. Copies the `TS_HOME/lib/tssv.jar` file to your implementation instance library directory. The `tssv.jar` file includes the class files necessary to load `TSAuthConfigFactory` and related classes.
 6. Copies the TSSV configuration files (`ProviderConfiguration.xml`, `provider-configuration.xsd`) to your implementation instance library directory.
 7. Deploys the JASPIC file processor, `com/sun/ts/tests/jaspic/util/jaspic_util_web.war`.
5. If necessary, provide your own implementations of the porting package interface provided with the JASPIC TCK. `TSURLInterface.java` obtains URL strings for web resources in an implementation-specific manner. API documentation for the `TSURLInterface.java` porting package interface is available in the documentation bundle in the `docs/api` directory.

4.2 Configuring Your Environment to Repackage and Run the TCK Against the Vendor Implementation

After configuring your environment as described in this section, continue with the instructions in [Section 4.4, "Using the JavaTest Harness Software."](#)



In these instructions, variables in angle brackets need to be expanded for each platform. For example, `<TS_HOME>` becomes `$TS_HOME` on Solaris/Linux and `%TS_HOME%` on Windows. In addition, the forward slashes (/) used in all of the examples need to be replaced with backslashes (\) for Windows. Finally, be sure to use the appropriate separator for your operating system when specifying multiple path entries (; on Windows, : on UNIX/Linux).

On Windows, you must escape any backslashes with an extra backslash in path separators used in any of the following properties, or use forward slashes as a path separator instead.

With the JASPIC TCK, vendors can specify the level of JASPIC support with which they comply. For example, a vendor may be compliant with the Servlet Profile, the SOAP Profile, or another (possibly unknown) profile. If a vendor chooses not to pursue compliance with any profile, they have an option of meeting something called baseline compliance. This is the level of compliance that exists regardless of which profile is being tested.

When a vendor is vying for compliance against no profile and is trying to get baseline compliance certification only, they have to implement a porting package (for example, a customvehicle) and pass the baseline tests that are in the `TS_HOME/src/com/sun/ts/tests/jaspic/spi/baseline` directory.

The sections that follow explain how to create a custom vehicle and how to replace the default vehicle with a custom vehicle.

4.2.1 To Create a Custom Vehicle

A custom vehicle must be created and used when JASPIC profile tests are run in an environment that does not contain a Web server. If your JASPIC profile implementation includes a Web server, you do not need to implement your own custom vehicle.

The custom vehicle exists, in stubbed out form, and must be implemented in a way that provides a wrapper in which JASPIC tests can execute. The default `jaspicservlet` vehicle is an example of a vehicle that wraps and executes tests in a Servlet container. The `jaspicservlet` vehicle source can be used a reference to help you implement your own custom vehicle. The `jaspicservlet` vehicle is in the `src/com/sun/ts/tests/common/vehicle/jaspicservlet` directory.

1. Use the stubbed-out `customvehicle` in the `src/com/sun/ts/tests/common/vehicle/customvehicle` directory as your starting point.
2. Modify the `CustomVehicleRunner` class, using other vehicles as references.
The `bin/xml/ts.vehicles.xml` file includes a stubbed-out section for the `customvehicle`, which you can modify to build you own `customvehicle`.
3. Build the `customvehicle` you created.
4. Modify the `src/vehicle.properties` file so that it refers to `customvehicle` instead of `jaspicservlet`.

The `vehicle.properties` file is used during runtime to indicate in which vehicle the tests should be executed.

5. Remove or rename the `src/testsuite.jtd` file.

This allows the test harness to identify tests to be run in your `customvehicle`.

4.2.2 To Replace the Default Vehicle With a Custom Vehicle

If your JASPIC server does not have web support, you will need to create your own vehicle. A vehicle is a wrapper that supports running tests in different server-side containers, such as servlet, JSP, and so on. The JASPIC TCK provides a default vehicle, `jaspicservlet`, which supports running the TCK tests in a JASPIC runtime that has a Servlet container. To support running tests in an environment other than a Servlet container, you need to implement your own vehicle, effectively replacing the default vehicle, `jaspicservlet`.

This TCK was designed so you could use `jaspicservlet` as a template for creating your own vehicle. The `jaspicservlet` vehicle is used to contain and execute your client-side tests in the connector runtime.

The `jaspicservlet` vehicle is located in the `<TS_HOME>/src/com/sun/ts/tests/common/vehicle/jaspicservlet` directory.

To run the tests in a vehicle other than `jaspicservlet`, you need to create a custom vehicle named `customvehicle`. See [Section 4.2.1, "To Create a Custom Vehicle,"](#) for more information on this topic.

4.3 Publishing the Test Applications

Not needed for the JASPIC TCK.

4.4 Custom Configuration Handlers

Configuration handlers are used to configure and unconfigure a JASPIC 1.1 implementation during the certification process. These are similar to deployment handlers but used for configuration. A configuration handler is an Ant build file that contains at least the required targets listed below: * `config.vi` - to configure the vendor implementation * `clean.vi` - to unconfigure the vendor implementation

These targets are called from the `<TS_HOME>/bin/build.xml` file and call down into the implementation-specific configuration handlers.

To provide your own configuration handler, create a `config.vi.xml` file with the necessary configuration steps for your implementation and place the file under the

<TS_HOME>/bin/xml/impl/<your_impl> directory.

For more information, see <TS_HOME>/bin/xml/impl/glassfish/config.vi.xml, the configuration file for the Java EE 8 RI.

4.5 Custom Deployment Handlers

Deployment handlers are used to deploy and undeploy the WAR files that contain the tests to be run during the certification process. A deployment handler is an Ant build file that contains at least the required targets listed in the table below.

The JASPIC TCK provides these deployment handlers: * <TS_HOME>/bin/xml/impl/none/deploy.xml * <TS_HOME>/bin/xml/impl/glassfish/deploy.xml

The `deploy.xml` files in each of these directories are used to control deployment to a specific container (no deployment, deployment to the GlassFish Web container, deployment to the Tomcat Web container) denoted by the name of the directory in which each `deploy.xml` file resides. The primary `build.xml` file in the <TS_HOME>/bin directory has a target to invoke any of the required targets (-deploy, -undeploy, -deploy.all, -undeploy.all).

4.5.1 To Create a Custom Deployment Handler

To deploy tests to another JASPIC implementation, you must create a custom handler. 1. Create a new directory in the <TS_HOME>/bin/impl directory tree. For example, create the <TS_HOME>/bin/impl/my_deployment_handler directory. Replace my_deployment_handler with the value of the impl.vi property that you set in Step 5 of the configuration procedure described in Section 4.2, "Configuring Your Environment to Repackage and Run the TCK Against the Vendor Implementation".

1. Copy the `deploy.xml` file from the <TS_HOME>/bin/xml/impl/none directory to the directory that you created.
2. Modify the required targets in the `deploy.xml` file. This is what the `deploy.xml` file for the "none" deployment handler looks like.

```

<project name="No-op Deployment" default="deploy">
  <!-- No-op deployment target -->
  <target name="-deploy">
    <echo message="No deploy target implemented for this deliverable"/>
  </target>
  <target name="-undeploy">
    <echo message="No undeploy target implemented for this deliverable"/>
  </target>
  <target name="-deploy.all">
    <echo message="No deploy target implemented for this deliverable"/>
  </target>
  <target name="-undeploy.all">
    <echo message="No undeploy target implemented for this deliverable"/>
  </target>
</project>

```

Although this example just echoes messages, it does include the four required Ant targets (-deploy, -undeploy, -deploy.all, -undeploy.all) that your custom deploy.xml file must contain. With this as your starting point, look at the required targets in the deploy.xml files in the tomcat and glassfish directories for guidance as you create the same targets for the Web container in which you will run your implementation of JASPIC.

The following Ant targets can be called from anywhere under the <TS_HOME>/src directory:

- `deploy`
- `undeploy`
- `deploy.all`
- `undeploy.all`

The `deploy.all` and `undeploy.all` targets can also be called from the <TS_HOME>/bin directory.



The targets in the `deploy.xml` file are never called directly. They are called indirectly by the targets listed above.

4.6 Using the JavaTest Harness Software

There are two general ways to run the JASPIC TCK test suite using the JavaTest harness software:

- Through the JavaTest GUI; if using this method, please continue on to [Section 4.7, "Using the JavaTest Harness Configuration GUI."](#)
- In JavaTest batch mode, from the command line in your shell environment; if using this method, please proceed directly to [Chapter 5, "Executing Tests."](#)

4.7 Using the JavaTest Harness Configuration GUI

You can use the JavaTest harness GUI to modify general test settings and to quickly get started with the default JASPIC TCK test environment. This section covers the following topics:

- [Configuration GUI Overview](#)
- [Starting the Configuration GUI](#)
- [To Configure the JavaTest Harness to Run the JASPIC TCK Tests](#)
- [Modifying the Default Test Configuration](#)



It is only necessary to proceed with this section if you want to run the JavaTest harness in GUI mode. If you plan to run the JavaTest harness in command-line mode, skip the remainder of this chapter, and continue with [Chapter 5, "Executing Tests."](#)

4.7.1 Configuration GUI Overview

In order for the JavaTest harness to execute the test suite, it requires information about how your computing environment is configured. The JavaTest harness requires two types of configuration information:

- **Test environment:** This is data used by the tests. For example, the path to the Java runtime, how to start the product being tested, network resources, and other information required by the tests in order to run. This information does not change frequently and usually stays constant from test run to test run.
- **Test parameters:** This is information used by the JavaTest harness to run the tests. Test parameters are values used by the JavaTest harness that determine which tests in the test suite are run, how the tests should be run, and where the test reports are stored. This information often changes from test run to test run.

The first time you run the JavaTest harness software, you are asked to specify the test suite and work directory that you want to use. (These parameters can be changed later from within the JavaTest harness GUI.)

Once the JavaTest harness GUI is displayed, whenever you choose Start, then Run Tests to begin a test run, the JavaTest harness determines whether all of the required configuration information has been supplied:

- If the test environment and parameters have been completely configured, the test run starts immediately.

- If any required configuration information is missing, the configuration editor displays a series of questions asking you the necessary information. This is called the configuration interview. When you have entered the configuration data, you are asked if you wish to proceed with running the test.

4.7.2 Starting the Configuration GUI

Before you start the JavaTest harness software, you must have a valid test suite and Java SE 8 installed on your system.

The JASPIC TCK includes an Ant script that is used to execute the JavaTest harness from the `<TS_HOME>` directory. Using this Ant script to start the JavaTest harness is part of the procedure described in [Section 4.7.3, "To Configure the JavaTest Harness to Run the TCK Tests."](#)

When you execute the JavaTest harness software for the first time, the JavaTest harness displays a Welcome dialog box that guides you through the initial startup configuration.

- If it is able to open a test suite, the JavaTest harness displays a Welcome to JavaTest dialog box that guides you through the process of either opening an existing work directory or creating a new work directory as described in the JavaTest online help.
- If the JavaTest harness is unable to open a test suite, it displays a Welcome to JavaTest dialog box that guides you through the process of opening both a test suite and a work directory as described in the JavaTest documentation.

After you specify a work directory, you can use the Test Manager to configure and run tests as described in [Section 4.7.3, "To Configure the JavaTest Harness to Run the TCK Tests."](#)

4.7.3 To Configure the JavaTest Harness to Run the TCK Tests

The answers you give to some of the configuration interview questions are specific to your site. For example, the name of the host on which the JavaTest harness is running. Other configuration parameters can be set however you wish. For example, where you want test report files to be stored.

Note that you only need to complete all these steps the first time you start the JavaTest test harness. After you complete these steps, you can either run all of the tests by completing the steps in [Section 5.1, "Starting JavaTest,"](#) or run a subset of the tests by completing the steps in [Section 5.2, "Running a Subset of the Tests."](#)

1. Change to the `<TS_HOME>/bin` directory and start the JavaTest test harness:

```
cd <TS_HOME>/bin
ant gui
```

2. From the File menu, click Open Quick Start Wizard.

The Welcome screen displays.

3. Select Start a new test run, and then click Next.
You are prompted to create a new configuration or use a configuration template.
4. Select Create a new configuration, and then click Next.
You are prompted to select a test suite.
5. Accept the default suite (<TS_HOME>/src), and then click Next.
You are prompted to specify a work directory to use to store your test results.
6. Type a work directory name or use the Browse button to select a work directory, and then click Next.
You are prompted to start the configuration editor or start a test run. At this point, the JASPIC TCK is configured to run the default test suite.
7. Deselect the Start the configuration editor option, and then click Finish.
8. Click Run Tests, then click Start.
The JavaTest harness starts running the tests.
9. To reconfigure the JavaTest test harness, do one of the following:
 - Click Configuration, then click New Configuration.
 - Click Configuration, then click Change Configuration.
10. Click Report, and then click Create Report.
11. Specify the directory in which the JavaTest test harness will write the report, and then click OK.
A report is created, and you are asked whether you want to view it.
12. Click Yes to view the report.

4.7.4 Modifying the Default Test Configuration

The JavaTest GUI enables you to configure numerous test options. These options are divided into two general dialog box groups:

- Group 1: Available from the JavaTest Configure/Change Configuration submenus, the following options are displayed in a tabbed dialog box:
 - Tests to Run
 - Exclude List
 - Keywords
 - Prior Status
 - Test Environment
 - Concurrency
 - Timeout Factor

- Group 2: Available from the JavaTest Configure/Change Configuration/Other Values submenu, or by pressing Ctrl+E, the following options are displayed in a paged dialog box:
 - Environment Files
 - Test Environment
 - Specify Tests to Run
 - Specify an Exclude List

Note that there is some overlap between the functions in these two dialog boxes; for those functions use the dialog box that is most convenient for you. Please refer to the JavaTest Harness documentation or the online help for complete information about these various options.

5 Executing Tests

The JASPIC TCK uses the JavaTest harness to execute the tests in the test suite. For detailed instructions that explain how to run and use JavaTest, see the JavaTest User's Guide and Reference in the documentation bundle.

This chapter includes the following topics:

- [Starting JavaTest](#)
- [Running a Subset of the Tests](#)
- [Running the TCK Against the RI](#)
- [Running the TCK Against a Vendor's Implementation](#)
- [Test Reports](#)



The instructions in this chapter assume that you have installed and configured your test environment as described in [Chapter 3, "Installation,"](#) and [Chapter 4, "Setup and Configuration,"](#) respectively.

5.1 Starting JavaTest

There are two general ways to run the JASPIC TCK using the JavaTest harness software:

- Through the JavaTest GUI
- From the command line in your shell environment



The `<TS_HOME>/tools/ant/bin/ant` command referenced in the following two procedures and elsewhere in this guide is the Ant build tool, which is included in the JASPIC TCK bundle. The `build.xml` file in `<TS_HOME>/bin` contains the various Ant targets for the JASPIC TCK test suite.

5.1.1 To Start JavaTest in GUI Mode

Execute the following commands:

```
cd <TS_HOME>/bin
ant gui
```

5.1.2 To Start JavaTest in Command-Line Mode

1. Change to the directory `<TS_HOME>/src/com/sun/ts/tests/jaspic`.
2. Start JavaTest using the following command:

```
ant runclient
```

Example 5-1 JASPIC TCK Signature Tests

To run the JASPIC TCK signature tests, enter the following commands:

```
cd <TS_HOME>/src/com/sun/ts/tests/signaturetest/jaspic
ant runclient
```

Example 5-2 JASPIC TCK Mandatory Tests

To run the JASPIC TCK mandatory tests, enter the following commands:

```
cd <TS_HOME>/src/com/sun/ts/tests/jaspic
ant -Dkeywords="jaspic_servlet | jaspic_baseline" runclient
```

Example 5-3 JASPIC TCK Optional Tests

To run the JASPIC optional TCK tests, enter the following commands:

```
cd <TS_HOME>/src/com/sun/ts/tests/jaspic
ant -Dkeywords="jaspic_soap_optional" clean build package runclient
```

A JASPIC implementation can implement one or more of the profiles specified in the specification. To accommodate this, the JASPIC TCK tests use the JavaTest **keyword** feature, which enables vendors to run tests that are relevant to their implementation.

For example, a vendor who implements only a **servlet** profile can run all tests specific to the **servlet** profile.

```
ant -Dkeywords="jaspic_core | jaspic_servlet" runclient
```

As another example, for running tests relevant to a **soap** profile, you could use the following command:

```
ant -Dkeywords="jaspic_core | jaspic_soap" runclient
```

The keywords that can be used are:

- `jaspic_core`
- `jaspic_servlet`
- `jaspic_soap`

5.2 Running a Subset of the Tests

Use the following modes to run a subset of the tests:

- [Section 5.2.1, "To Run a Subset of Tests in GUI Mode"](#)
- [Section 5.2.2, "To Run a Subset of Tests in Command-Line Mode"](#)
- [Section 5.2.3, "To Run a Subset of Tests in Batch Mode Based on Prior Result Status"](#)

5.2.1 To Run a Subset of Tests in GUI Mode

1. From the JavaTest main menu, click Configure, then click Change Configuration, and then click Tests to Run.
The tabbed Configuration Editor dialog box is displayed.
2. Click Specify from the option list on the left.
3. Select the tests you want to run from the displayed test tree, and then click Done.
You can select entire branches of the test tree, or use Ctrl+Click or Shift+Click to select multiple tests or ranges of tests, respectively, or select just a single test.
4. Click Save File.
5. Click Run Tests, and then click Start to run the tests you selected.
Alternatively, you can right-click the test you want from the test tree in the left section of the JavaTest main window, and choose Execute These Tests from the menu.
6. Click Report, and then click Create Report.
7. Specify the directory in which the JavaTest test harness will write the report, and then click OK.
A report is created, and you are asked whether you want to view it.
8. Click Yes to view the report.

5.2.2 To Run a Subset of Tests in Command-Line Mode

1. Change to the directory containing the tests you want to run.
2. Start the test run by executing the following command:

```
ant runclient
```

The tests in the directory and its subdirectories are run.

5.2.3 To Run a Subset of Tests in Batch Mode Based on Prior Result Status

You can run certain tests in batch mode based on the test's prior run status by specifying the `priorStatus` system property when invoking `<TS_HOME>/tools/ant/bin/ant`.

Invoke `ant` with the `priorStatus` property.

The accepted values for the `priorStatus` property are any combination of the following:

- `fail`
- `pass`
- `error`
- `notRun`

For example, you could run all the JASPIC tests with a status of failed and error by invoking the following commands:

```
ant -DpriorStatus="fail,error" runclient
```

Note that multiple `priorStatus` values must be separated by commas.

5.3 Running the TCK Against the RI

This test scenario ensures that the configuration and deployment of all the prebuilt JASPIC TCK tests against the Reference Implementation are successful, and that the TCK is ready for compatibility testing against the Vendor and Reference Implementations.

1. Verify that you have followed the configuration instructions in [Section 4.1, "Configuring Your Environment to Run the TCK Against the Reference Implementation."](#)
2. If required, verify that you have completed the steps in [Section 4.3.2, "Deploying the Prebuilt Archives."](#)
3. Run the tests, as described in [Section 5.1, "Starting JavaTest,"](#) and, if desired, [Section 5.2, "Running a Subset of the Tests."](#)

5.4 Running the TCK Against a Vendor's Implementation

This test scenario is one of the compatibility test phases that all Vendors must pass.

1. Verify that you have followed the configuration instructions in [Section 4.2, "Configuring Your Environment to Repackage and Run the TCK Against the Vendor Implementation."](#)
2. If required, verify that you have completed the steps in [Section 4.3.3, "Deploying the Test Applications Against the Vendor Implementation."](#)
3. Run the tests, as described in [Section 5.1, "Starting JavaTest,"](#) and, if desired, [Section 5.2, "Running a Subset of the Tests."](#)

5.5 Test Reports

A set of report files is created for every test run. These report files can be found in the report directory you specify. After a test run is completed, the JavaTest harness writes HTML reports for the test run. You can view these files in the JavaTest ReportBrowser when running in GUI mode, or in the web browser of your choice outside the JavaTest interface.

To see all of the HTML report files, enter the URL of the `report.html` file. This file is the root file that links to all of the other HTML reports.

The JavaTest harness also creates a `summary.txt` file in the report directory that you can open in any text editor. The `summary.txt` file contains a list of all tests that were run, their test results, and their status messages.

5.5.1 Creating Test Reports

Use the following modes to create test reports:

- [Section 5.5.1.1, "To Create a Test Report in GUI Mode"](#)
- [Section 5.5.1.2, "To Create a Test Report in Command-Line Mode"](#)

5.5.1.1 To Create a Test Report in GUI Mode

1. From the JavaTest main menu, click Report, then click Create Report.
You are prompted to specify a directory to use for your test reports.
2. Specify the directory you want to use for your reports, and then click OK.
Use the Filter list to specify whether you want to generate reports for the current configuration, all

tests, or a custom set of tests.

You are asked whether you want to view report now.

3. Click Yes to display the new report in the JavaTest ReportBrowser.

5.5.1.2 To Create a Test Report in Command-Line Mode

1. Specify where you want to create the test report.

1. To specify the report directory from the command line at runtime, use:

```
ant -Dreport.dir="report_dir"
```

Reports are written for the last test run to the directory you specify.

2. To specify the default report directory, set the `report.dir` property in `<TS_HOME>/bin/ts.jte`.
For example:

```
report.dir="/home/josephine/reports"
```

3. To disable reporting, set the `report.dir` property to `"none"`, either on the command line or in `<TS_HOME>/bin/ts.jte`.

For example:

```
ant -Dreport.dir="none"
```

5.5.2 Viewing an Existing Test Report

Use the following modes to view an existing test report:

- [Section 5.5.2.1, "To View an Existing Report in GUI Mode"](#)
- [Section 5.5.2.2, "To View an Existing Report in Command-Line Mode"](#)

5.5.2.1 To View an Existing Report in GUI Mode

1. From the JavaTest main menu, click Report, then click Open Report.
You are prompted to specify the directory containing the report you want to open.
2. Select the report directory you want to open, and then click Open.

The selected report set is opened in the JavaTest ReportBrowser.

5.5.2.2 To View an Existing Report in Command-Line Mode

Use the Web browser of your choice to view the `report.html` file in the report directory you specified from the command line or in `<TS_HOME>/bin/ts.jte`.

6 Debugging Test Problems

There are a number of reasons that tests can fail to execute properly. This chapter provides some approaches for dealing with these failures. Please note that most of these suggestions are only relevant when running the test harness in GUI mode.

This chapter includes the following topics:

- [Overview](#)
- [Test Tree](#)
- [Folder Information](#)
- [Test Information](#)
- [Report Files](#)
- [Configuration Failures](#)

6.1 Overview

The goal of a test run is for all tests in the test suite that are not filtered out to have passing results. If the root test suite folder contains tests with errors or failing results, you must troubleshoot and correct the cause to satisfactorily complete the test run.

- **Errors:** Tests with errors could not be executed by the JavaTest harness. These errors usually occur because the test environment is not properly configured.
- **Failures:** Tests that fail were executed but had failing results.

The Test Manager GUI provides you with a number of tools for effectively troubleshooting a test run. See the JavaTest User's Guide and JavaTest online help for detailed descriptions of the tools described in this chapter. Ant test execution tasks provide command-line users with immediate test execution feedback to the display. Available JTR report files and log files can also help command-line users troubleshoot test run problems.

For every test run, the JavaTest harness creates a set of report files in the reports directory, which you specified by setting the `report.dir` property in the `<TS_HOME>/bin/ts.jte` file. The report files contain information about the test description, environment, messages, properties used by the test, status of the test, and test result. After a test run is completed, the JavaTest harness writes HTML reports for the test run. You can view these files in the JavaTest ReportBrowser when running in GUI mode, or in the Web browser of your choice outside the JavaTest interface. To see all of the HTML report files, enter the URL of the `report.html` file. This file is the root file that links to all of the other HTML reports.

The JavaTest harness also creates a `summary.txt` file in the report directory that you can open in any text editor. The `summary.txt` file contains a list of all tests that were run, their test results, and their

status messages.

The work directory, which you specified by setting the `work.dir` property in the `<TS_HOME>/bin/ts.jte` file, contains several files that were deposited there during test execution: `harness.trace`, `log.txt`, `lastRun.txt`, and `testsuite`. Most of these files provide information about the harness and environment in which the tests were executed.



You can set `harness.log.traceflag=true` in `<TS_HOME>/bin/ts.jte` to get more debugging information.

If a large number of tests failed, you should read [Configuration Failures](#) to see if a configuration issue is the cause of the failures.

6.2 Test Tree

Use the test tree in the JavaTest GUI to identify specific folders and tests that had errors or failing results. Color codes are used to indicate status as follows:

- Green: Passed
- Blue: Test Error
- Red: Failed to pass test
- White: Test not run
- Gray: Test filtered out (not run)

6.3 Folder Information

Click a folder in the test tree in the JavaTest GUI to display its tabs.

Choose the Error and the Failed tabs to view the lists of all tests in and under a folder that were not successfully run. You can double-click a test in the lists to view its test information.

6.4 Test Information

To display information about a test in the JavaTest GUI, click its icon in the test tree or double-click its name in a folder status tab. The tab contains detailed information about the test run and, at the bottom of the window, a brief status message identifying the type of failure or error. This message may be sufficient for you to identify the cause of the error or failure.

If you need more information to identify the cause of the error or failure, use the following tabs listed in order of importance:

- Test Run Messages contains a Message list and a Message section that display the messages produced during the test run.
- Test Run Details contains a two-column table of name/value pairs recorded when the test was run.
- Configuration contains a two-column table of the test environment name/value pairs derived from the configuration data actually used to run the test.



You can set `harness.log.traceflag=true` in `<TS_HOME>/bin/ts.jte` to get more debugging information.

6.5 Report Files

Report files are another good source of troubleshooting information. You may view the individual test results of a batch run in the JavaTest Summary window, but there are also a wide range of HTML report files that you can view in the JavaTest ReportBrowser or in the external browser or your choice following a test run. See [Section 5.5, "Test Reports,"](#) for more information.

6.6 Configuration Failures

Configuration failures are easily recognized because many tests fail the same way. When all your tests begin to fail, you may want to stop the run immediately and start viewing individual test output. However, in the case of full-scale launching problems where no tests are actually processed, report files are usually not created (though sometimes a small `harness.trace` file in the report directory is written).

A Frequently Asked Questions

This appendix contains the following questions.

- [Where do I start to debug a test failure?](#)
- [How do I restart a crashed test run?](#)
- [What would cause tests be added to the exclude list?](#)

A.1 Where do I start to debug a test failure?

From the JavaTest GUI, you can view recently run tests using the Test Results Summary, by selecting the red Failed tab or the blue Error tab. See [Chapter 6, "Debugging Test Problems,"](#) for more information.

A.2 How do I restart a crashed test run?

If you need to restart a test run, you can figure out which test crashed the test suite by looking at the `harness.trace` file. The `harness.trace` file is in the report directory that you supplied to the JavaTest GUI or parameter file. Examine this trace file, then change the JavaTest GUI initial files to that location or to a directory location below that file, and restart. This will overwrite only `.jtr` files that you rerun. As long as you do not change the value of the GUI work directory, you can continue testing and then later compile a complete report to include results from all such partial runs.

A.3 What would cause tests be added to the exclude list?

The JavaTest exclude file (`<TS_HOME>/bin/ts.jtx`) contains all tests that are not required to be run. The following is a list of reasons for a test to be included in the Exclude List:

- An error in a reference implementation that does not allow the test to execute properly has been discovered.
- An error in the specification that was used as the basis of the test has been discovered.
- An error in the test has been discovered.

This Appendix is not used for the JASPIC TCK.