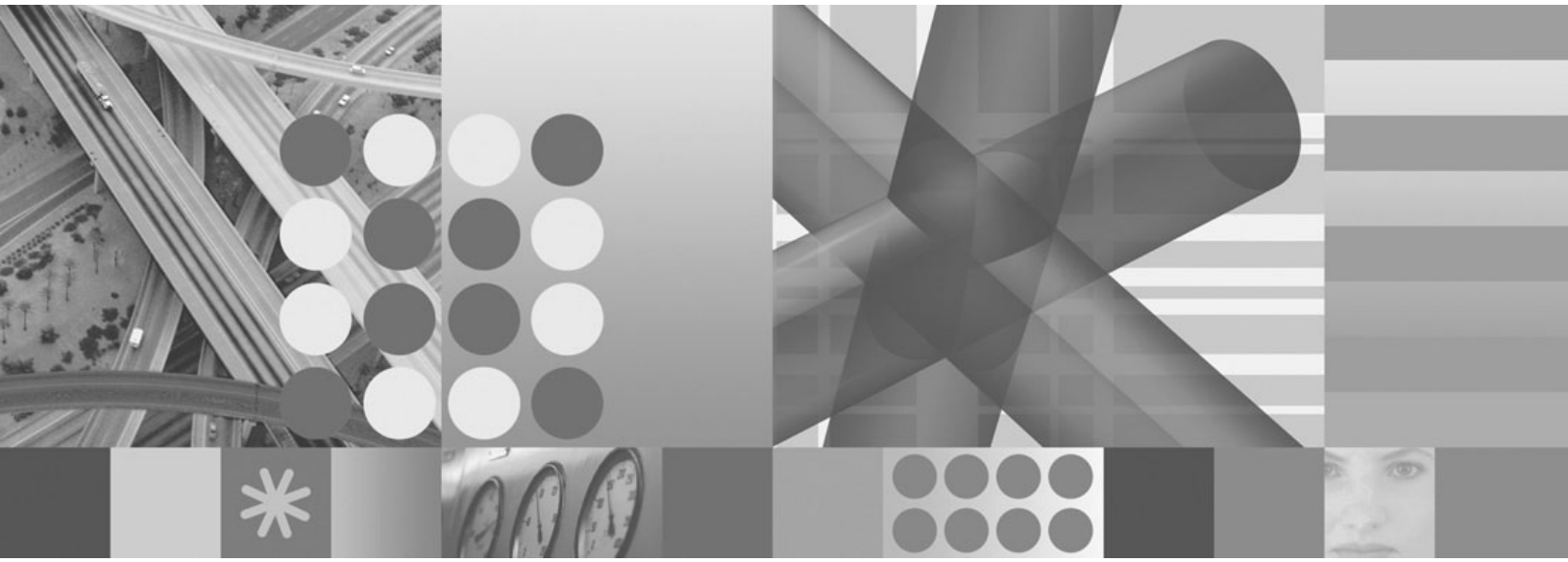
Tivoli® Federated Identity Manager
Version 6.2

IBM

Web Services Security Management Guide

GC32-0169-02

Tivoli® Federated Identity Manager
Version 6.2



Web Services Security Management Guide

GC32-0169-02

Note
Before using this information and the product it supports, read the information in "Notices" on page 89.

This edition applies to version 6, release 2, modification 0 of Tivoli Federated Identity Manager (product number 5724-L73) and to all subsequent releases and modifications until otherwise indicated in new editions.

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About this publication

IBM® Tivoli® Federated Identity Manager Version 6.2 implements solutions for federated single sign-on, Web services security management (WSSM), and provisioning that are based on open standards. Tivoli Federated Identity Manager extends the authentication and authorization solutions provided by IBM Tivoli Access Manager to simplify the integration of multiple existing Web solutions.

This publication describes the steps required to create a connection between a previously created and configured Web Services Security (WS-Security) Web service application that is deployed on WebSphere® Application Server and the Web services security management component. The steps required to create a Web service application for WS-Security are not addressed in this guide.

This guide also explains the configuration and use of the Echo demonstration application that is included with the Web services security management component. The Echo application can demonstrate the use of the WSSM token generator and the WSSM token consumer, which can help you understand how to set up your Web services security management environment effectively.

Intended audience

This guide is designed for network security architects, system administrators, network administrators, system integrators, and Web services security architects.

Readers of this book should have working knowledge of networking security issues, encryption technology, keys, certificates, and the implementation of authentication and authorization policies in a distributed environment. Readers should also be familiar with the development and deployment of applications for use in a Web services environment. Specifically, they should have experience with deploying applications into an WebSphere Application Server environment and be familiar with the Web security services standards (such as WS-Security and WS-Trust) from the Organization for the Advancement of Structured Information Standards (OASIS).

Publications

Read the descriptions of the IBM Tivoli Federated Identity Manager library, the prerequisite publications, and the related publications to determine which publications you might find helpful.

After you determine the publications you need, refer to the instructions for accessing publications online.

IBM Tivoli Federated Identity Manager library

The publications in the IBM Tivoli Federated Identity Manager library are:

- *IBM Tivoli Federated Identity Manager Quick Start Guide*

  Provides instructions for getting started with IBM Tivoli Federated Identity Manager.
- *IBM Tivoli Federated Identity Manager Installation and Configuration Guide*

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Provides instructions for installing and configuring IBM Tivoli Federated Identity Manager. Also provides instructions for configuring a demonstration application environment.

- *IBM Tivoli Federated Identity Manager for z/OS Program Directory*

  Provides instructions for installing IBM Tivoli Federated Identity Manager on z/OS.
- *IBM Tivoli Federated Identity Manager Administration Guide*

  Provides instructions for completing administration tasks that are required for all deployments.
- *IBM Tivoli Federated Identity Manager Single Sign-on Guide*

  Provides instructions for completing configuration tasks for federated single sign-on.
- *IBM Tivoli Federated Identity Manager Web Services Security Management Guide*

  Provides instructions for completing configuration tasks for Web services security management.
- *IBM Tivoli Federated Identity Manager Auditing Guide*

  Provides instructions for auditing IBM Tivoli Federated Identity Manager events.
- *IBM Tivoli Federated Identity Manager Error Message Reference*

  Provides explanations for the IBM Tivoli Federated Identity Manager error messages.
- *IBM Tivoli Federated Identity Manager Problem Determination Guide*

  Provides troubleshooting information and instructions for problem solving.

You can obtain the publications from the IBM Tivoli Federated Identity Manager Information Center:

http://publib.boulder.ibm.com/infocenter/tivihelp/v2r1/index.jsp?topic=/com.ibm.tivoli.fim.doc_6.2/welcome.htm

Prerequisite publications

To use the information in this book effectively, you should have some knowledge of related software products, which you can obtain from the following sources:

- IBM Tivoli Access Manager for e-business Information Center:

  http://publib.boulder.ibm.com/infocenter/tivihelp/v2r1/index.jsp?toc=/com.ibm.itame.doc/toc.xml
- IBM WebSphere Application Server Version 6.1 Information Center:

  http://publib.boulder.ibm.com/infocenter/wasinfo/v6r1/index.jsp

  You can obtain PDF versions of the IBM WebSphere Application Server documentation at:

  http://www.ibm.com/software/webservers/appserv/was/library/

Related publications

You can obtain related publications from the IBM Web sites:

- The IBM Tivoli Federated Identity Manager Business Gateway Information Center at http://publib.boulder.ibm.com/infocenter/tivihelp/v2r1/index.jsp?topic=/com.ibm.tivoli.fim_bg.doc_6.2/welcome.htm
- *Enterprise Security Architecture Using IBM Tivoli Security Solutions*. This book is available in PDF (Portable Document Format) at http://

www.redbooks.ibm.com/redbooks/pdfs/sg246014.pdf or in HTML (Hypertext Markup Language) at http://www.redbooks.ibm.com/redbooks/SG246014/

- *Federated Identity Management and Web Services Security with IBM Tivoli Security Solutions* (SG24-6394-01). This book is available in PDF at http://www.redbooks.ibm.com/redbooks/pdfs/sg246394.pdf or in HTML at http://www.redbooks.ibm.com/redbooks/SG246394/
- The Tivoli Software Library provides a variety of Tivoli publications such as white papers, datasheets, demonstrations, redbooks, and announcement letters. The Tivoli Software Library is available on the Web at: http://publib.boulder.ibm.com/tividd/td/tdprodlist.html
- The *Tivoli Software Glossary* includes definitions for many of the technical terms related to Tivoli software. The *Tivoli Software Glossary* is available at http://publib.boulder.ibm.com/tividd/glossary/tivoliglossarymst.htm

Accessing publications online

The publications for this product are available online in Portable Document Format (PDF) or Hypertext Markup Language (HTML) format, or both in the Tivoli software library: http://publib.boulder.ibm.com/tividd/td/tdprodlist.html

To locate product publications in the library, click the first letter of the product name or scroll until you find the product name. Then, click the product name. Product publications include release notes, installation guides, user's guides, administrator's guides, and developer's references.

Note: To ensure proper printing of PDF publications, select the **Fit to page** check box in the Adobe Acrobat Print window (which is available when you click **File** → **Print**).

Ordering publications

You can order many Tivoli publications online at the following Web site:

http://www.elink.ibmlink.ibm.com/public/applications/ publications/cgibin/pbi.cgi

You can also order by telephone by calling one of these numbers:

- In the United States: 800-879-2755
- In Canada: 800-426-4968

In other countries, see the Web site.

Accessibility

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use software products successfully. With this product, you can use assistive technologies to hear and navigate the interface. You also can use the keyboard instead of the mouse to operate all features of the graphical user interface.

For additional information, see the "Accessibility" topic in the information center at http://publib.boulder.ibm.com/infocenter/tivihelp/v2r1/index.jsp?topic=/com.ibm.tivoli.fim.doc_6.2/welcome.htm.

Tivoli technical training

For Tivoli software training information, refer to the IBM Tivoli Education Web site.

http://www.ibm.com/software/tivoli/education

Support information

If you have a problem with your IBM software, you want to resolve it quickly.

IBM provides the following ways for you to obtain the support you need:

Online
Go to the IBM Software Support site at http://www.ibm.com/software/support/probsub.html.

IBM Support Assistant
The IBM Support Assistant (ISA) is a free local software serviceability tool that helps you resolve questions and problems with IBM software products. The ISA provides quick access to support-related information and serviceability tools for problem determination. For information about the IBM Support Assistant, go to http://www.ibm.com/software/support/isa. For information about installing the ISA software, see the *IBM Tivoli Federated Identity Manager Installation and Configuration Guide*.

Problem Determination Guide
For more information about resolving problems, see the *IBM Tivoli Federated Identity Manager Problem Determination Guide*.

Conventions used in this book

This reference uses several conventions for special terms and actions and for operating system-dependent commands and paths.

Typeface conventions

The following typeface conventions are used in this guide.

Bold Lowercase commands or mixed case commands that are difficult to distinguish from surrounding text, keywords, parameters, options, names of Java™ classes, and objects are in **bold**.

Italic Variables, titles of publications, and special words or phrases that are emphasized are in *italic*.

`Monospace`
Code examples, command lines, screen output, file and directory names that are difficult to distinguish from surrounding text, system messages, text that the user must type, and values for arguments or command options are in `monospace`.

Operating system differences

This book uses the UNIX® convention for specifying environment variables and for directory notation.

When you are using the Windows® command line, replace *`$variable`* with *`%variable%`* for environment variables and replace each forward slash (/) with a

backslash (\) in directory paths. If you are using the bash shell on a Windows system, you can use the UNIX conventions.

Chapter 1. Overview of Web services security management

The Web services security management component of IBM Tivoli Federated Identity Manager is used to establish and manage federation relationships for WebSphere Web service applications that use WS-Security tokens.

The Web services security management component provides functions for:

- Web service providers, which need to process inbound security tokens using a token consumer
- Web service clients, which need to create outbound security tokens using a token generator

The processing and creation of the tokens is performed through a series of Web service request and response messages that interact with the Web services security management component and the Tivoli Federated Identity Manager trust service.

The Web services security management component also provides Web services applications with an authorization solution and identity and security token mapping capabilities that can be used without deployment of a federated single sign-on environment. Unlike the other Tivoli Federated Identity Manager components, the Web services security management component does not require the use of the Tivoli Access Manager WebSEAL component.

The Web services security management component enhances the WS-Security support provided by WebSphere Application Server in a number of ways:

- Extends the WS-Security token types available in WebSphere Application Server to additional token types supported by the Tivoli Federated Identity Manager trust service. For example, this feature permits a Security Assertion Markup Language (SAML) assertion to be directly used for authentication.
- Permits the type of token to be exchanged; for example, a UsernameToken can be exchanged for a SAML assertion.
- Permits the user identity to be mapped; for example, a user identity can be mapped to a local identity expected by the Web service.
- Permits both many-to-one and one-to-many user identity mappings.
- Permits authorization checks to be made on a Web service before invoking the Web service. Using the capabilities provided by Tivoli Access Manager for e-business, requests can be validated without actually invoking the underlying Web service.

All of these features are available at both the Web service client and the Web service.

Web services security management component and product interactions

The Web services security management component interacts with Tivoli Federated Identity Manager components and other products.

Figure 1 on page 2 illustrates these product and component interactions. The descriptions of each of the labeled interactions, denoted by letters A-E and

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numbers 1-6, are described following the diagram.

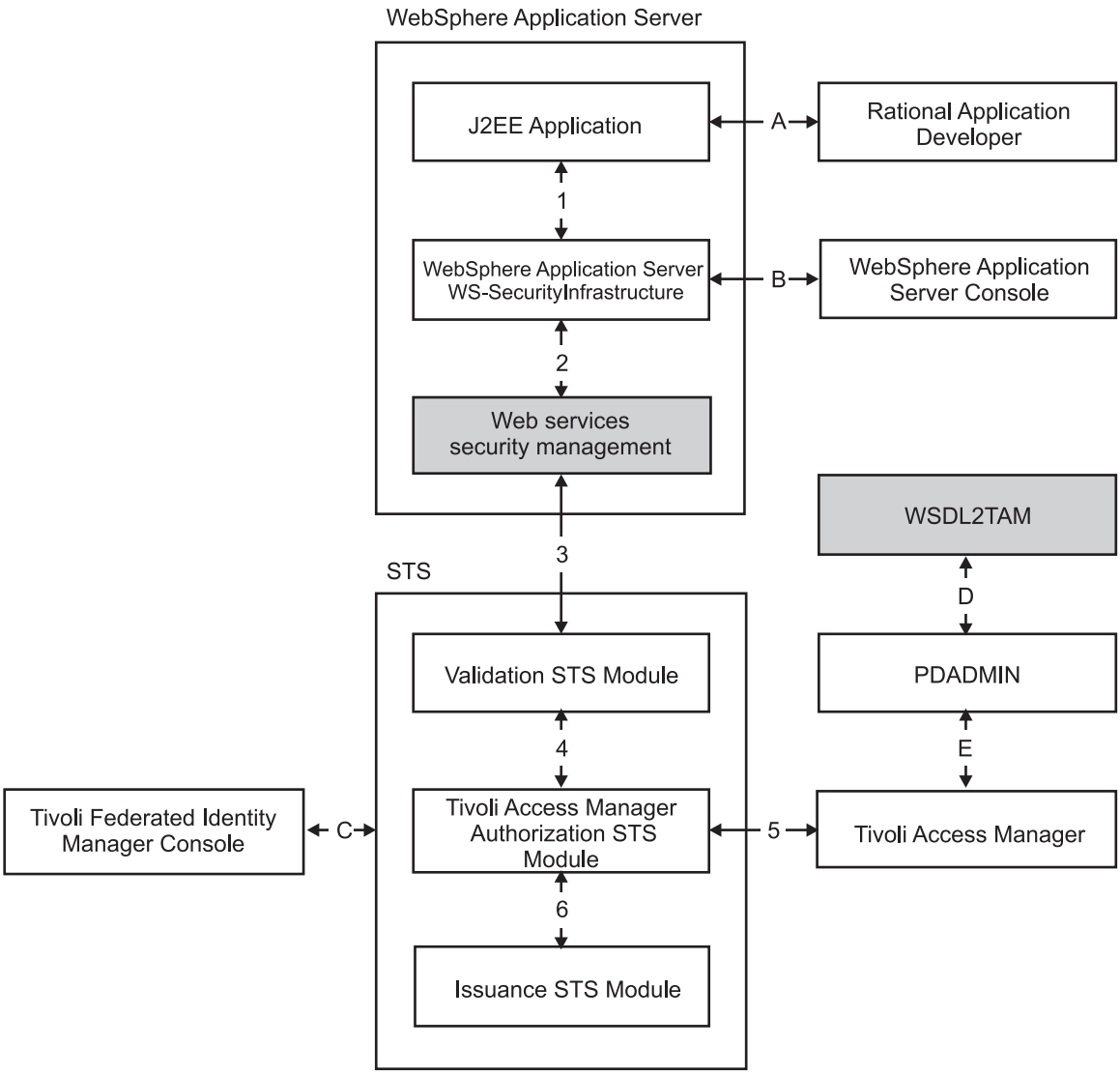

Figure 1. Web services security management components

In Figure 1, the following letters summarize the deployment and configuration interactions between the components and products.

A. A J2EE application, acting as either or both a Web service consumer or provider, is configured to use Web services security management for token generation, token consumption, or both, respectively. The Rational® Application Developer is used to update the WS-Security deployment descriptors with Web services security management configuration. The application does not invoke Web services security management directly.

B. Optionally, the WebSphere Application Server console may be used to modify the WS-Security configuration bindings of the J2EE application.

C. The Tivoli Federated Identity Manager console is used to configure the STS module chain to be invoked by the Web services security management runtime.

D. Optionally, the wsdl2tam command line utility is used to create a script for creating the Tivoli Access Manager protected objects representing the Web

service. This step is only required if the Tivoli Access Manager authorization STS module is included in the STS module chain.

E. The script generated by WSDL2TAM is run by PDADMIN to update the Tivoli Access Manager protected object space.

In Figure 1 on page 2, the following numbers summarize the runtime interactions between the components and products.

1. WebSphere Application Server invokes the WS-Security infrastructure on behalf of the J2EE application. This occurs in one of two ways. One way is if the application is about to consume a Web service. In this case, a security token needs to be generated. Another way is if a Web service provided by the application is being invoked. In this case, a security token needs to be consumed.

2. The WS-Security infrastructure delegates the security token processing to the Web services security management token generator or consumer, which uses the STS.

3. Web services security management sends a RequestSecurityToken message to the STS including a security token, issuer and AppliesTo. The STS runs the module chain configured for the security token, issuer and AppliesTo. For brevity, the optional mapping STS modules are not shown in the figure.

4. After token validation, the Tivoli Access Manager authorization STS module is invoked. Inclusion of this module in the chain is optional. Authorization may occur as part of token generation or, more typically, token consumption.

5. The Tivoli Access Manager authorization STS module makes an authorization check against Tivoli Access Manager to ensure that the user is permitted to invoke the Web service operation.

6. After passing the authorization check, the token issuing the STS module is invoked. This token is returned to the Web services security management token generator or consumer. The Web services security management token generator includes the token in the WS-Security header. The Web services security management token consumer performs a login using the token.

Preparing Web services security management for your Web service application

Prior to using the Web services security management component with your Web service application, you must perform some installation and configuration tasks.

1. Install the Web services security management component as described in the *IBM Tivoli Federated Identity Manager Installation and Configuration Guide* or the *IBM Tivoli Federated Identity Manager for z/OS Program Directory*, if you are using z/OS®.
2. Perform some configuration tasks for the component and its required software, including:
   a. Chapter 2, “Configuring WebSphere Application Server,” on page 25.
   b. Chapter 3, “Updating configuration batch and script files,” on page 35.
   c. Chapter 4, “Configuring Tivoli Access Manager,” on page 41, if you plan to use the authorization function of the Web services security management component.
   d. Chapter 5, “Configuring keystores and certificates,” on page 45, if keys or certificates will be used with the tokens you plan to validate or exchange.

Preparing your Web service application to use Web services security management

This guide provides the steps required to create a connection between a previously created and configured Web service application and the Web services security management component.

This guide does not provide the steps required to create a WebSphere Web services application that uses WS-Security standards. See the Rational Application Developer documentation, which contains information about developing Web services applications.

The general steps involved to enable a Web service application to be used with the Web services security management component are as follows:

1. Configure your Web service application to use the Web services security management component.

   This process is described in the following areas of this guide:

   - "Component summary" on page 6 describes the component parts, their class names, and parameters.
   - Chapter 6, "Configuring your Web services application to use Web services security management," on page 47 describes an application's deployment descriptors necessary for both generating and consuming tokens.
   - "Echo demonstration application" on page 17 shows a sample application that is provided with the component which you can use as a guide for configuring your application.
2. Configure the Tivoli Federated Identity Manager trust service to be used with your Web service application.

   You need to create STS module chains, using the Tivoli Federated Identity Manager administrative console, to validate and issue tokens for WSSM. This process is described in the *IBM Tivoli Federated Identity Manager Administration Guide*. This book also provides general information about the trust service, modules, module instances, and module chains.

Supported token module types

The Web services security management component supports a set of token module types by default.

AuthorizationSTSModule
: If you currently use this module type, it is recommended that you upgrade to use TAMAuthorizationSTSModule instead.

DynamicChainSelectionModule
: Requests that the trust service invoke a dynamic chain after processing is finished on the current module chain. This module is used by Web services security management. This type is not used in federated single sign-on.

DirectoryIntegratorSTSModule
: Performs generic user and attribute mapping functions. An assembly line executing on a Tivoli Directory Integrator (TDI) server is called to perform mapping of user and attribute data in an STSUniversalUser. Data may be resolved from a variety of data sources natively supported by TDI, including LDAP and relational databases. Custom code is also supported through JavaScript™ connectors.

KerberosSTSModule
Provides support for consuming Kerberos tokens. The following Kerberos V5 (WS-Security Kerberos Token Profile) security tokens are supported:

- GSS-wrapped Kerberos V5 AP-REQ
- Non-wrapped Kerberos V5 AP-REQ

PassTicketSTSModule
Provides support for creating or consuming PassTicket tokens. In Resource Access Control Facility (RACF®) secured signon, a PassTicket is a dynamically generated, random, one-time-use, password substitute that a workstation or other client can use to sign on to the host rather than sending a RACF password across the network.

This module can generate PassTickets on non-z/OS environments if the secret key is shared.

For information regarding RACF PassTicket tokens on z/OS, see the z/OS Security Server RACF Security library at http://publibz.boulder.ibm.com/cgi-bin/bookmgr_OS390/Shelves/ICHZBK61

Note: Although the RACF PassTicket token is not a token type that is defined by the OASIS WS-Security standards, it is supported by the Web services security management component and can be used just like an OASIS Username token in the configurations depicted in this book.

SAML10STSModule (SAML 1.0)
Provides support for creating or consuming SAML 1.0 tokens.

SAML20STSModule (SAML 2.0)
Provides support for creating or consuming SAML 2.0 tokens.

SAMLTokenSTSModule
Provides support for creating or consuming SAML tokens.

STSLTPATokenModule
Provides support for creating or consuming LTPA V1 and LTPA V2 tokens. These are represented as BinarySecurityToken elements.

STSMapDefault
Provides support for Extensible Stylesheet Language Transformation (XSLT) mapping files. This is also known as the default mapping module used by default in all federation configurations.

STSMessageLogger
Enables the tracking of all or part of a Security Token Service transaction, including requests, responses, incoming and outgoing mappings, errors and exceptions.

STSTokenIVCred
Provides support for creating or consuming Tivoli Access Manager credentials.

TAMAuthenticationSTSModule
Provides support for a Tivoli Access Manager authentication check using the supplied credentials.

TAMAuthorizationSTSModule
Provides support for a Tivoli Access Manager authorization check using the supplied user identity and resource name.

UsernameTokenSTSModule (Username Token)
Provides support for creating or consuming tokens in a WebSphere Web

services environment where the Username token is used to pass user identity information in the header of a Web services request.

X509STSModule
Provides support for consuming X.509 tokens by performing certificate path validation on certificates and certificate paths contained within the tokens.

The following module types, which are supported by Tivoli Federated Identity Manager in single sign-on federations, are not supported by the Web services security management component:

- DelegatorSTSModule
- DSigSTSModule
- JAASSTSModule
- Liberty12SAMLTokenSTSModule
- LibertySAMLTokenSTSModule
- STSMessageLoggerModule
- STSTAMGSOModule

Component summary

The Web services security management component consists of many parts.

These parts are:

- Token generator
- Callback handlers
- Token consumers
- Login modules

The token generator and callback handlers are used by Web service clients requesting a security token to be inserted into the Web service request. The token consumer and login modules are used by Web services to process the security token received in a Web service request and to create a login context in which to process the Web service request.

The token consumer, token generator, callback handlers, and login modules comply with the WebSphere Application Server WS-security model for adding support for additional token types. Refer to the Web services information that is part of the WebSphere Application Server Information Center for more information.

WSSM Token generator

The WSSM token generator module is a WebSphere Application Server token generator that delegates creation of a security token to a configured callback handler. Using the security token obtained, the token generator can optionally call the Tivoli Federated Identity Manager trust service to perform token validation, token exchange, and an authorization check.

The token generator module is called as part of the WebSphere Application Server WS-Security authentication processing when a request message is created. The token generator delegates token generation to the WSSM token generator callback handler. If the Web service client application uses this token generator but is not configured to call the trust service (that is, `sts.call` is false), the token generated by the callback handler is placed in the security header of the request message.

However, if the Web service client uses this token generator and is configured to call the trust service, then the token generator creates a RequestSecurityToken message, which it sends to the trust service. The token generator sets the `Issuer` to `urn:itfim:wssm:tokengenerator`, sets the `AppliesTo` to the URL of the Web service application, and includes the generated security token in the message. The trust service processes the request and returns a RequestSecurityTokenResponse message to the WSSM token generator. The generator then includes the token from the trust service response message in the security header of the Web service request message.

If no token is returned or an error occurs, then the token generation fails, the Web service is not called, and an error is returned to the Web services client.

The token generator module, and its use of the trust service, permits the following actions:

- The exchange of security tokens when the incoming or outgoing security tokens are of different types
- The exchange of security tokens when mapping one identity to another
- The evaluation of authorization checks to ensure that authenticated users are permitted to invoke the target Web service

The WSSM token generator class name is `com.tivoli.am.fim.wssm.tokengenerators.WSSMTokenGenerator`. This class name must be specified in the Web services security binding configuration to have the WSSM token generator invoked.

Supported token types

The token generator supports the exchange or evaluation of the following security token types:

- SAML 1.0
- SAML 1.1
- SAML 2.0
- Kerberos
- Username
- PassTicket
- Tivoli Access Manager

Note: The only support provided for X.509 tokens is for consuming them. Therefore, they are not supported by the token generator.

The token generator always passes the credentials of the Web service client to the trust service in a SAML 1.1 or SAML 2.0 token.

Parameters

The following token generator module properties can be configured in your Web service application.

Table 1. Token generator module configuration parameters

Parameter name	Description	Default value
issuer	The issuer address to use in the request security token message to the STS. Normally, the default issuer is sufficient. One scenario where you might wish to specify an issuer would be when using the token generator and two different client applications accessing the same Web service, but you want the two clients to use different token types. By specifying different issuer values in the deployment descriptor for each client application, you can define different STS module chains and thereby generate different security tokens to send to the Web service.	`urn:itfim:wssm:tokengenerator`
`sts.call`	A Boolean flag indicating whether the Tivoli Federated Identity Manager trust service is to be called. If the trust service is not called, the original security token is used for authentication. Valid values: `true`, `false`.	`true`

Table 1. Token generator module configuration parameters (continued)

Parameter name	Description	Default value
`unique.token.id.xpath`	The XPath that is evaluated against the security token to generate a unique identifier. The unique identifier uniquely identifies the security token to WebSphere Application Server. For some token types, the default unique identifier will be appropriate because the information used to create the identifier is always unique. However, in cases where the identifer might be the same for multiple tokens when in fact they should be unique or in which the identifier is unique for multiple tokens when they should be the same, you should use `unique.token.id.xpath`. For example, for SAML assertions, the default unique identifier is the SAML assertion identifier. Multiple SAML assertions, each with the same authentication and attribute statements, will have different identifiers. However, you might want to use `unique.token.id.xpath` so that the identifier is the same. WebSphere Application Server keeps a cache of login credentials. If an identifier matches the cached credentials, the performance of the WebSphere Application Server login processing can be improved.	`null` With a value of `null`, a unique identifier is determined based on the token type; for example, the SAML assertion identifier is used for SAML assertions.

Callback handlers

The callback handler modules perform specialized processing on Web service messages or tokens, as needed.

There are several types of callback handler modules that are part of the Web services security management component.

WSSM token generator callback handler and delegate handlers

The WSSM token generator callback handler is used by the WSSM token generator to create XML and WebSphere Application Server security tokens.

When the WSSM token generator is invoked, it calls the WSSM token generator callback handler to create an XML security token. The WSSM token generator callback handler delegates this creation to the configured xml.callback.handler.class.name handler. The WSSM token generator then optionally calls the trust service, passes it this XML security token, and receives a returned XML security token. If this call has been configured to not occur, then the original token is used. The WSSM token generator then calls the WSSM token generator callback handler to create a WebSphere Application Server token object

from the XML security token. The WSSM token generator callback handler delegates this creation to the configured token.callback.handler.class.name handler. When this process is done, WebSphere Application Server has enough information to insert the security token in the outgoing Web service request.

The WSSM token generator callback handler class name is `com.tivoli.am.fim.wssm.callbackhandlers.WSSMTokenGeneratorCallbackHandler`.

The callback handlers for generating XML and WebSphere Application Server security tokens are as follows:

- XML callback handlers:

  JAAS subject credential callback handler
  This callback handler returns the JAAS subject in a SAML 1.1 or SAML 2.0 assertion, configured by the property saml.version, which can be either 1.1 or 2.0 and defaults to 2.0. The principal name of the subject is contained within a SAML assertion authentication statement. The private and public credentials from the subject are included as attributes in the attribute statement of the SAML assertion.

  WSSM credential callback handler
  This callback handler returns the XML security tokens contained within the WSSM private credential of the JAAS Subject.

- WebSphere Application Server callback handlers:

  Kerberos callback handler
  The Kerberos callback handler enables the generation of Kerberos security tokens.

  SAMLA callback handler
  The SAMLA callback handler enables the generation of SAML security tokens.

  Username callback handler
  The Username callback handler enables the generation of Username security tokens.

  Tivoli Access Manager callback handler
  The Tivoli Access Manager callback handler enables the generation of Tivoli Access Manager security tokens.

Parameters

The following WSSM token generator callback handler properties can be configured. The delegate callback handlers do not have configurable parameters.

Table 2. WSSM token generator callback handler configuration parameters

Parameter name	Description	Default value

`xml.callback.handler.class.name`	The class name of the callback handler responsible for creating XML security tokens.
	
	Valid values:
	`com.tivoli.am.fim.wssm.callbackhandlers.JAASSubjectCallbackHandler`
	`com.tivoli.am.fim.wssm.callbackhandlers.WSSMCredentialCallbackHandler`
		None.

Table 2. WSSM token generator callback handler configuration parameters (continued)

Parameter name	Description	Default value

`token.callback.handler.class.name`	The class name of the callback handler responsible for creating WebSphere Application Server security tokens.
	
	Valid values:
	`com.tivoli.am.fim.wssm.callbackhandlers.KerberosCallbackHandler`
	`com.tivoli.am.fim.wssm.callbackhandlers.SAMLACallbackHandler`
	`com.tivoli.am.fim.wssm.callbackhandlers.UsernameCallbackHandler`
	`com.tivoli.am.fim.wssm.callbackhandlers.TAMCredentialCallbackHandler`
		None.

WSSM token consumer callback handler

The WSSM token consumer callback handler is used by the WSSM token consumer to pass a security token to a configured login module.

The WSSM token consumer is called as part of the WebSphere Application Server WS-Security authentication processing when a Web service request message is received.

If the trust service is not used to fulfill a request, the token is passed from the WSSM token consumer to the callback handler and then the callback handler passes it to the appropriate login module.

If the trust service is called by the token consumer to fulfill a request, the token consumer creates a RequestSecurityToken message and sends the message to the trust service. The trust service processes the request and returns a RequestSecurityTokenResponse message to the token consumer, which passes the token returned from the trust service to the callback handler. The callback handler makes the token available to the appropriate login module and the token is used to log in.

The WSSM token consumer callback handler class name is `com.tivoli.am.fim.wssm.callbackhandlers.WSSMTokenConsumerCallbackHandler`.

Parameters

There are no configuration parameters for this callback handler.

Token consumers

The token consumer modules are WebSphere Application Server token consumers that can perform token validation, token exchange, and an authorization check using the trust service of Tivoli Federated Identity Manager.

There are two token consumers in the Web services security management component:

- **WSSM token consumer.** The WSSM token consumer receives a token, calls the trust service (unless the `sts.call` that is configured for this consumer in your Web services application is `false`) and passes the returned token to the configured login module.

- **SAMLA token consumer.** The SAMLA token consumer receives a SAML assertion and passes it to the SAMLA login module.

WSSM token consumer

The WSSM token consumer receives tokens and calls the trust service to validate, exchange, and optionally check their authorization.

The WSSM token consumer is called as part of the WebSphere Application Server WS-Security authentication processing when a Web service request message is received.

If the Web service application uses this token consumer but is not configured to call the trust service (that is, `sts.call` is `false`), the input token in the message is used to log in.

However, if the Web service application uses this token consumer and is configured to call the trust service, then the token consumer creates a RequestSecurityToken message, which it sends to the trust service. The token consumer sets the `Issuer` to `urn:itfim:wssm:tokenconsumer`, sets the `AppliesTo` to the URL of the Web service application, and includes the received security token in the message. The trust service processes the request and returns a RequestSecurityTokenResponse message to the WSSM token consumer. The token returned by the trust service is the one used to perform a login. The target Web service is invoked.

If no token is returned or an error occurs, then the login attempt fails, the Web service is not called, and an error is returned to the Web service client.

The token consumer module, and its use of the trust service, permits the following actions:

- The validation of incoming security tokens
- The exchange of security tokens when the incoming or outgoing security tokens are of different types
- The exchange of security tokens when mapping one identity to another
- The evaluation of authorization checks to ensure that authenticated users are permitted to invoke the target Web service

The WSSM token consumer class name is `com.tivoli.am.fim.wssm.tokenconsumers.WSSMTokenConsumer`. This class name must be specified in the Web services security binding configuration to have the WSSM token consumer invoked.

Supported token types

The WSSM token consumer can receive the following security token types in a message from a partner Web service client:

- SAML 1.0
- SAML 1.1
- SAML 2.0
- Username
- Kerberos
- PassTicket
- X.509

- Tivoli Access Manager

The WSSM token consumer can receive the following security token types that can be issued by the trust service:

- SAML 1.0
- SAML 1.1
- SAML 2.0
- Username
- PassTicket
- Tivoli Access Manager

Parameters

The following WSSM token consumer module properties can be configured in your Web service application.

Table 3. WSSM token consumer module configuration parameters

Parameter name	Description	Default value
issuer	The issuer address to use in the request security token message to the STS.	`urn:itfim:wssm:tokenconsumer`
`sts.call`	A Boolean flag indicating whether the Tivoli Federated Identity Manager trust service is to be called. If the trust service is not called, the original security token is used for authentication. Valid values: `true`, `false`.	`true`

Table 3. WSSM token consumer module configuration parameters (continued)

Parameter name	Description	Default value
`unique.token.id.xpath`	The XPath that is evaluated against the security token to generate a unique identifier. The unique identifier uniquely identifies the security token to WebSphere Application Server. For some token types, the default unique identifier will be appropriate because the information used to create the identifier is always unique. However, in cases where the identifer might be the same for multiple tokens when in fact they should be unique or in which the identifier is unique for multiple tokens when they should be the same, you should use `unique.token.id.xpath`. For example, for SAML assertions, the default unique identifier is the SAML assertion identifier. Multiple SAML assertions, each with the same authentication and attribute statements, will have different identifiers. However, you might want to use `unique.token.id.xpath` so that the identifier is the same. WebSphere Application Server keeps a cache of login credentials. If an identifier matches the cached credentials, the performance of the WebSphere Application Server login processing can be improved.	`null` With a value of `null`, a unique identifier is determined based on the token type; for example, the SAML assertion identifier is used for SAML assertions.

SAMLA token consumer

The SAMLA token consumer consumes only SAML assertion security tokens that are contained within Web service requests.

If the SAMLA token consumer is configured as the token consumer in the WS-Security deployment descriptor of the Web service application, the request containing the SAML assertion is sent to the SAMLA token consumer module for processing. The SAMLA token consumer sends the request to the SAMLA login module for further processing.

The SAMLA token consumer name is `com.tivoli.am.fim.wssm.tokenconsumers.SAMLATokenConsumer`.

Supported token types

The SAMLA token consumer can receive the following security token types issued by the trust service:

- SAML 1.0
- SAML 1.1

- SAML 2.0

Parameters

There are no configuration parameters for the SAMLA token consumer.

Login modules

The login modules are Java Authentication and Authorization Service (JAAS) login modules that use credentials contained within security tokens to perform a login.

The login modules are called by the WSSM token consumer as part of the WebSphere Application Server WS-Security authentication processing when a request message is received. There are three login modules in the Web services security management component:

- SAMLA login module. The SAMLA login module performs a login using the credentials contained within a SAML assertion security token.
- Username login module. The Username login module performs a login using the credentials contained within a Username security token.
- Tivoli Access Manager login module. The Tivoli Access Manager login module performs a login using the credentials contained within a Tivoli Access Manager token.

SAML assertion login module

The SAML assertion login module is a Java Authentication and Authorization Service (JAAS) login module that accepts SAML assertions to perform a login.

Note: The SAML assertion login module does not use the trust service of Tivoli Federated Identity Manager.

The SAML assertions are not validated by the SAML assertion login module because the SAML assertion is assumed to have come from a trusted source that has already validated it, such as the trust service. Therefore, conditions are not checked and any digital signatures that are present are not verified by the login module. The only requirements are that the SAML 1.0 and 1.1 assertions should contain an authentication statement that includes a subject with a name identifier and SAML 2.0 assertions should contain a subject with a name identifier.

The SAML assertion login module enables the target Web service to be run using the login context of the principal created from the SAML assertion and permits attribute statements associated with the SAML assertion to be made available to the target Web service through private credentials.

The SAML assertion login module class name is `com.tivoli.am.fim.wssm.loginmodules.SAMLALoginModule`.

The preferred JAAS configuration name is `system.itfim.wssm.samla`.

Parameters

There are no configuration parameters for the SAML assertion login module.

Username login module

The Username login module is a Java Authentication and Authorization Service (JAAS) login module that accepts Username security tokens to perform a login.

Note: The Username login module does not use the trust service of Tivoli Federated Identity Manager.

The Username tokens are not validated by the Username login module because the Username token is assumed to have come from a trusted source that has already validated it, such as the trust service. Therefore, any password that is present is not verified by the login module. The only requirement is that the Username token includes a user name.

The Username login module enables the target Web service to be run using the login context of the principal created from the Username token.

The Username login module class name is `com.tivoli.am.fim.wssm.loginmodules.UsernameLoginModule`.

The preferred JAAS configuration name is `system.itfim.wssm.username`.

Note: The WebSphere Application Server supplied JAAS configurations, such as wssecurity.UsernameToken, cannot be used in conjunction with the Web services security management component because the credentials are presented in a different manner.

Parameters

There are no configuration parameters for the Username login module.

Tivoli Access Manager login module

The Tivoli Access Manager login module is a Java Authentication and Authorization Service (JAAS) login module that accepts Tivoli Access Manager security tokens to perform a login.

Note: The Tivoli Access Manager login module does not use the trust service of Tivoli Federated Identity Manager.

The Tivoli Access Manager login module permits login using a binary security token containing a privileged attribute certificate (PAC), which is known as a Tivoli Access Manager token. A PDPrincipal is created from the PAC and the principal name is used for login. The login module does not look up the principal name in a user registry.

The Tivoli Access Manager login module enables the target Web service to be run using the login context of the principal created from the Tivoli Access Manager token.

The Tivoli Access Manager login module class name is `com.tivoli.am.fim.wssm.loginmodules.TAMLoginModule`.

The preferred JAAS configuration name is `system.itfim.wssm.tam`.

To generate and consume Tivoli Access Manager security tokens, PDJRTE must be configured and the PDJRTE configuration file specified to WSSM. This PDJRTE configuration file will be used to create the PDPrincipal from the privileged attribute certificate (PAC). The WSSM configuration is specified in the wssm.properties file located at C:\Program Files\IBM\FIM\wssm\etc\ wssm.properties. Update the pdjrte.configuration property and specify the PDJRTE configuration file path.

Parameters

There are no configuration parameters for the Tivoli Access Manager login module.

JAAS login security token

Both the security token received by the Web service and the security token that is used to perform a JAAS login are made available to the Web service application by the Web services security management component.

If the trust service is called, then the security token received by the Web service is the token that is sent to the trust service for validation and the token returned by the trust service is used to perform a JAAS login. If the trust service is not called, then the received security token is used as the JAAS login security token.

These tokens are accessed through a com.tivoli.am.fim.wssm.credentials.WSSMCredential object that is a private credential in the JAAS Subject object. The WSSMCredential object includes a getReceivedSecurityToken method that returns the security token, as a DOM element, that was received by the Web service. It also includes a getLoginSecurityToken method that returns the security token, as a DOM element, that was used to perform a JAAS login.

Access to these tokens from the Web service application might be useful. For example, if the JAAS login token is a SAML assertion, then the application might process the attribute statements in the assertion.

The WSSMCredential class is defined in com.tivoli.am.fim.wssm.jar, which is included in the wssm/lib directory.

Code example

The following code demonstrates accessing this credential. For brevity, import statements and exception handling are not included:

```
Subject subject = WSSubject.getCallerSubject();
Set privateCredentials = subject.getPrivateCredentials(WSSMCredential.class);
Iterator iterator = privateCredentials.iterator();
WSSMCredential wssmCredential = (WSSMCredential) iterator.next();
Element receivedToken = wssmCredential.getReceivedSecurityToken();
Element loginToken = wssmCredential.getLoginSecurityToken();
```

Echo demonstration application

The Echo demonstration application (included with the Web services security management component) is a simple WebSphere Application Server Web service application that echoes text back to the Echo Web service client to demonstrate the use of the Web services security management component. You can use the Echo demonstration application to verify the configuration of your Web services security management component environment or to demonstrate the functions of the component.

The Echo demonstration application consists of:

Echo Web service definition language (WSDL) file
A file that describes the operations of the sample Web service application.

File name: EchoService.wsdl

The Echo Web service application

A sample WebSphere Application Server Web service application that implements the Web service defined in EchoService.wsdl. The Web service application is packaged as an EAR file and installed using the WebSphere Application Server console.

File name: echoapplication.ear

The Echo Web service client

A Java Server Page (JSP) Web application that invokes the operations that are defined in EchoService.wsdl and are implemented by the Echo Web service application. The client application is packaged as an EAR file and installed using the WebSphere Application Server console.

File name: echoclientapplication.ear

The source files for these applications are provided in the wssm/examples/source/echoapplication and wssm/examples/source/echoclientapplication directories.

Echo application WS-Security configuration

The Echo Web service application is pre-configured with specific WS-Security settings and some settings that are specific to the Web services security management component.

A number of ports are configured, each of which corresponds to the token types that are supported in the demonstration application:

Table 4. Web service token types and associated ports for the Echo application

Token type	Port name
No token	EchoServiceNoToken
Kerberos	EchoServiceKerberos
SAML 1.1	EchoServiceSAML11
SAML 2.0	EchoServiceSAML20
Tivoli Access Manager	EchoServiceTAM
Username	EchoServiceUsername
X.509	EchoServiceX509

In the request consumer section for each of these ports, except EchoServiceNoToken, a required security token and a caller part are configured.

The token consumer is
`com.tivoli.am.fim.wssm.tokenconsumers.WSSMTokenConsumer`

The `sts.call` for the consumer is set to `true`.

Echo client WS-Security configuration

The Echo Web service client is a Java Server Page (JSP) from which users can interact with the Echo Web service application. The JSP is protected with standard J2EE authentication and authorization. A user must log in with a username and password that is configured in the WebSphere Application Server user registry to access the JSP.

A number of ports are configured, each of which corresponds to the token types that are supported in the demonstration application:

Table 5. Web service token types and associated ports for the Echo client

Token type	Port name
No token	EchoServiceNoToken
Kerberos	EchoServiceKerberos
SAML 1.1	EchoServiceSAML11
SAML 2.0	EchoServiceSAML20
Tivoli Access Manager	EchoServiceTAM
Username	EchoServiceUsername
X.509	EchoServiceX509

In the request generator section for each of these ports, except EchoServiceNoToken, a security token is configured. The WSSM token generator is used for all ports, except EchoServiceNoToken and EchoServiceX509. The standard WebSphere Application Server X.509 token generator is used for EchoServiceX509.

Table 6. Ports and token generators for the Echo client

Port name	Token generator
EchoServiceNoToken	None
EchoKerberos	WSSM token generator
EchoServiceSAML11	WSSM token generator
EchoServiceSAML20	WSSM token generator
EchoSerivceTAM	WSSM token generator
EchoServiceUsername	WSSM token generator
EchoServiceX509	WebSphere Application Server generator: `com.ibm.wsspi.wssecurity.token.X509TokenGenerator`
The WSSM token generator is `com.tivoli.am.fim.wssm.tokenconsumers.WSSMTokenGenerator`.	

The following table describes the callback handlers that are configured for the Echo client.

Table 7. Types and associated callback handlers and properties for the Echo client

Token type	Callback handlers and properties
No token	None
Kerberos	Callback handler: `com.tivoli.am.fim.wssm.callbackhandlers.WSSMTokenGeneratorCallbackHandler` Properties: Name: `xml.callback.handler.class.name` Value: `com.tivoli.am.fim.wssm.callbackhandlers.JAASSubjectCallbackHandler` Name: `token.callback.handler.class.name` Value: `com.tivoli.am.fim.wssm.callbackhandlers.KerberosCallbackHandler`

Table 7. Types and associated callback handlers and properties for the Echo client (continued)

Token type	Callback handlers and properties
SAML 1.1	Callback handler: `com.tivoli.am.fim.wssm.callbackhandlers.WSSMTokenGeneratorCallbackHandler` Properties: Name: `xml.callback.handler.class.name` Value: `com.tivoli.am.fim.wssm.callbackhandlers.JAASSubjectCallbackHandler` Name: `token.callback.handler.class.name` Value: `com.tivoli.am.fim.wssm.callbackhandlers.SAMLACallbackHandler`
SAML 2.0	Callback handler: `com.tivoli.am.fim.wssm.callbackhandlers.WSSMTokenGeneratorCallbackHandler` Properties: Name: `xml.callback.handler.class.name` Value: `com.tivoli.am.fim.wssm.callbackhandlers.JAASSubjectCallbackHandler` Name: `token.callback.handler.class.name` Value: `com.tivoli.am.fim.wssm.callbackhandlers.SAMLACallbackHandler`
Tivoli Access Manager	Callback handler: `com.tivoli.am.fim.wssm.callbackhandlers.WSSMTokenGeneratorCallbackHandler` Properties: Name: `xml.callback.handler.class.name` Value: `com.tivoli.am.fim.wssm.callbackhandlers.JAASSubjectCallbackHandler` Name: `token.callback.handler.class.name` Value: `com.tivoli.am.fim.wssm.callbackhandlers.TAMCredentialCallbackHandler`
Username	Callback handler: `com.tivoli.am.fim.wssm.callbackhandlers.WSSMTokenGeneratorCallbackHandler` Properties: Name: `xml.callback.handler.class.name` Value: `com.tivoli.am.fim.wssm.callbackhandlers.JAASSubjectCallbackHandler` Name: `token.callback.handler.class.name` Value: `com.tivoli.am.fim.wssm.callbackhandlers.UsernameCallbackHandler`
X.509	Callback handler: `com.ibm.wsspi.wssecurity.auth.callback.X509CallbackHandler`

The `sts.call` for the generator is set to `false` for EchoServiceSAML11 and EchoServiceSAML20.

Credential handling

To understand the functions that can be demonstrated by the Echo demonstration application, it is helpful to understand how user credentials are handled by the application as various requests are made.

Note: A user with the name of `wssm-testuser` and a password of `testonly123` must be configured in both the WebSphere Application Server user registry that is used by the server where the Echo service is running and in the Tivoli Access Manager user registry.

Login at the Echo client

The user must perform a JAAS login to access the default.jsp Web page. The user name and password can be any user that exists in the WebSphere Application Server user registry used by the server where the Echo client is running for this login to succeed. There is no other credential checking performed at the Echo client.

Credentials sent by the Echo client

The following table describes the credentials sent for each token type that can be sent by the Echo client.

Table 8. Credentials sent by the Echo client

Token type	Credentials sent
No token	None.
Kerberos	WSSM generates a SAML 2.0 token internally from the JAAS subject. The STS exchanges it for a Kerberos token.
SAML 1.1	WSSM generates a SAML 1.1 token internally from the JAAS subject. No call is made to the STS.
SAML 2.0	WSSM generates a SAML 2.0 token internally from the JAAS subject. No call is made to the STS.
Tivoli Access Manager	WSSM generates a SAML 2.0 token internally from the JAAS subject. The STS exchanges it for a Tivoli Access Manager token.
Username	WSSM generates a SAML 2.0 token internally from the JAAS subject. The STS exchanges it for a Username token.
X.509	WebSphere Application Server generates an X.509 token. WSSM and the STS are not involved.

Credentials received by the Echo service

The following table describes the credentials received for each token type that can be received by the Echo client.

Table 9. Credentials received by the Echo service

Token type	Credentials received
No token	None.
Kerberos	WSSM receives a Kerberos token and calls the STS to exchange it for a SAML 2.0 token, which is used to perform a login.
SAML 1.1	WSSM receives a SAML 1.1 token and calls the STS to exchange it for Tivoli Access Manager token, which is used to perform a login.

Table 9. Credentials received by the Echo service (continued)

Token type	Credentials received
SAML 2.0	WSSM receives a SAML 2.0 token and calls the STS to exchange it for Username token, which is used to perform a login.
Tivoli Access Manager	WSSM receives a Tivoli Access Manager token and calls the STS to exchange it for a SAML 2.0 token, which is used to perform a login.
Username	WSSM receives a Username token and calls the STS to exchange it for a SAML 2.0 token, which is used to perform a login.
X.509	WSSM receives an X.509 token and calls the STS to exchange it for a SAML 1.1 token, which is used to perform a login.

Identity mapping

At the Echo Web service application, there is a many-to-one mapping of the identity so that all calls to the Echo service run under the `wssm-testuser` identity. A Tivoli Access Manager authorization check is used to ensure `wssm-testuser` is authorized to invoke the Web service. Therefore, the `wssm-testuser` must exist in the Tivoli Access Manager user registry.

Login in at the Echo service

The trust service returns a SAML 2.0 token that contains the `wssm-testuser` identity. The identity is used to perform a JAAS login to the Web service application. Therefore, the `wssm-testuser` must exist in the user registry where the Echo service is running.

Components used in the Echo demonstration application

The Echo demonstration application uses the Web services security management component parts along with some WebSphere Application Server modules to define its WS-Security environment.

The application is designed to demonstrate the operation of the:

- WSSM token consumer
- WSSM token generator

The Echo application and client can also be used to demonstrate ″no tokens,″ that is, interaction between the client and the service application without the use of the Web services security management component. In this demonstration, no parts of the Web services security management component are used.

Demonstration of the WSSM token generator

The Echo demonstration application can also be used to demonstrate the use of the WSSM token generator.

The following scenarios can be used to demonstrate the function of the WSSM token generator with the WSSM token consumer:

- Echo client sends a SAML 2.0 token. The WSSM token generator uses the JAASSubjectCallbackHandler to retrieve the logged in user's credentials and package them in a SAML 2.0 assertion token. No call is made to the STS.
- Echo client sends a SAML 1.1 token. The WSSM token generator uses the JAASSubjectCallbackHandler to retrieve the logged in user's credentials and package them in a SAML 1.1 assertion token. No call is made to the STS.
- Echo client sends a Tivoli Access Manager token. The WSSM token generator uses the JAASSubjectCallbackHandler to retrieve the logged in user's credentials and package them in a SAML 2.0 assertion token. It then calls the STS to exchange the SAML 2.0 token for a Tivoli Access Manager token.
- Echo client sends a Kerberos token. The WSSM token generator uses the JAASSubjectCallbackHandler to retrieve the logged in user's credentials and package them in a SAML 2.0 assertion token. It then calls the STS to exchange the SAML 2.0 token for a Kerberos token.
- Echo client sends a Username token. The WSSM token generator uses the JAASSubjectCallbackHandler to retrieve the logged in user's credentials and package them in a SAML 2.0 assertion token. It then calls the STS to exchange the SAML 2.0 token for a Username token.
- Echo client sends an X.509 token. The X509TokenGenerator retrieves an X.509 certificate from a key store and generates an X.509 token.

Demonstration of the WSSM token consumer

The Echo demonstration application can be used to demonstrate the function of the WSSM token consumer.

The following scenarios can be used to demonstrate the use of the WSSM token consumer in combination with the WSSM token generator:

- Echo client sends a SAML 2.0 token. Once received by the echo application, the WSSM token consumer accepts the SAML 2.0 token and calls the STS to exchange it for a Username token, which is then used to log in.
- Echo client sends a SAML 1.1 token. Once received by the echo application, the WSSM token consumer accepts the SAML 1.1 token and calls the STS to exchange it for a Tivoli Access Manager token, which is then used to log in.
- Echo client sends a Tivoli Access Manager token. Once received by the echo application, the WSSM token consumer accepts the Tivoli Access Manager token and calls the STS to exchange it for a SAML 2.0 token, which is then used to log in.
- Echo client sends an Kerberos token. Once received by the echo application, the WSSM token consumer accepts the Kerberos token and calls the STS to exchange it for a SAML 2.0 token, which is then used to log in.
- Echo client sends an Username token. Once received by the echo application, the WSSM token consumer accepts the Username token and calls the STS to exchange it for a SAML 2.0 token, which is then used to log in.
- Echo client sends an X.509 token. Once received by the echo application, the WSSM token consumer accepts the X.509 token and calls the STS to exchange it for a SAML 1.1 token, which is then used to log in.

Refer to "Demonstration of the WSSM token generator" on page 22 for more information.

Chapter 2. Configuring WebSphere Application Server

To extend the capabilities of WebSphere Application Server, you can enable Tivoli Federated Identity Manager Web services security management.

Prior to performing these tasks, be sure that you have completed all installation and configuration tasks described in the *IBM Tivoli Federated Identity Manager Installation and Configuration Guide* or the *IBM Tivoli Federated Identity Manager for z/OS Program Directory*, if you are installing on z/OS. As described in those guides, the prerequisite configuration tasks for WebSphere Application Server include:

1. Installing WebSphere Application Server, including creating an application server profile
2. Enabling global security, including configuring a user registry

Refer to the IBM WebSphere Application Server Information Center for assistance with these tasks:

http://www.ibm.com/software/webservers/appserv/was/library/

Note: Running Web services security management on the embedded version of WebSphere Application Server is not supported.

Starting the WebSphere Application Server administrative console

Open your Web browser to the WebSphere Application Server administrative console.

1. Open your Web browser.
2. Navigate to the WebSphere Application Server administrative console associated with the application server where the Web services security management component is installed. For example, if the administrative console is running on the same system as the Web browser and was installed using port number 9060, then use the following URL:

   ```
   http://localhost:9060/ibm/console
   ```
3. When prompted, enter the password that corresponds to the administrative user ID.
4. Click **Log in**.

Setting WebSphere variables

In order for the application to use Web services security management, several environment variables need to be defined in WebSphere Application Server.

1. Start the WebSphere Application Server administrative console and log in, if necessary.

   Note: Ensure that you are using the administrative console associated with the application server where the Web services security management component and the application server profiles for the applications you are securing with the Web services security management component are installed.
2. Click **Environment** → **WebSphere Variables** to open the WebSphere Variables page.

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3. Select a scope and click **New** to add an environment variable that specifies the installation directory for the Web services security management component of Tivoli Federated Identity Manager. For a WebSphere Cluster, use the **Node** scope and define the variable for each Node in the Cluster.
4. Enter the following information to define a variable called `ITFIM_WSSM`.
   a. In the **Name** field, enter `ITFIM_WSSM`.
   b. In the **Value** field, enter the name of the directory where the Web services security management component is installed. The default values are:

      UNIX and Linux®
      /opt/IBM/FIM/wssm

      Windows
      C:\Program Files\IBM\FIM\wssm

      z/OS /usr/lpp/FIM/wssm
   c. In the **Description** field, enter a description of the contents or purpose of the variable for future reference. For example, `Installation directory for the Web services security component of Tivoli Federated Identity Manager`.
   d. Click **OK** to add the variable.
5. In the Messages pane at the top of the WebSphere Variables window, click **Save** to commit your changes.

Configuring WebSphere shared library

In order for the application to use Web services security management, a shared library needs to be defined in WebSphere Application Server.

1. Start the WebSphere Application Server administrative console and log in, if necessary.

   Note: Ensure that you are using the administrative console associated with the application server where the Web services security management component is installed.
2. Click **Environment** → **Shared Libraries** to open the Shared Libraries page.
3. Select a scope and click **New** to specify the shared library needed by Tivoli Federated Identity Manager. For a WebSphere Cluster, use the **Node** scope and define the variable for each Node in the Cluster.
4. Enter the following information to define the necessary shared library.
   a. In the **Name** field, enter `ITFIM_WSSM`. This name is needed later when configuring the class loader.
   b. In the **Description** field, enter a description of the contents or purpose of the shared library for future reference. For example, `Shared libraries needed by the Web services security management component of Tivoli Federated Identity Manager`.
   c. In the **Classpath** field, enter the following information:

```
${ITFIM_WSSM}/etc
${ITFIM_WSSM}/lib/com.tivoli.am.fim.wssm.jar
${ITFIM_WSSM}/lib/com.tivoli.am.fim.common.jar
${ITFIM_WSSM}/lib/com.tivoli.am.fim.management.jar
${ITFIM_WSSM}/lib/com.tivoli.am.fim.war.sts.stubs.client.jar
${ITFIM_WSSM}/lib/com.tivoli.am.fim.midmgr.jar
${ITFIM_WSSM}/lib/com.tivoli.am.fim.sts.jar
${ITFIM_WSSM}/lib/itfim-locale-msgs.jar
```

Note: This list also can be copied from the following file:

UNIX and Linux
/opt/IBM/FIM/wssm/etc/wssm.classpath

Windows
C:\Program Files\IBM\FIM\wssm\etc\wssm.classpath

z/OS /usr/lpp/FIM/wssm/wssm_classpath.txt

d. Leave the **Native Library Path** field blank.

e. Click **OK** to add the shared library.

5. In the Messages pane at the top of the Shared Libraries window, click **Save** to commit your changes.

Configuring for a cluster environment

In order to use Web services security management in a WebSphere Application Server cluster environment, you have to copy the Web services security management directory and files to each node in the cluster.

1. Create a *WSSM_HOME* directory on each node in the cluster. By default, this directory is:

   UNIX and Linux
   /opt/IBM/FIM/wssm

   Windows
   C:\Program Files\IBM\FIM\wssm

   z/OS /usr/lpp/FIM/wssm

2. Copy the contents of the *WSSM_HOME* directory of the Deployment Manager to each node in the cluster.

Configuring the class loader for the application

To enable the application server to use the shared library, you must configure a class loader.

1. Start the WebSphere Application Server administrative console and log in, if necessary.

   Note: Ensure that you are using the administrative console associated with the application server where the Web services security management component is installed.

2. Click **Servers** → **Application Servers** and select the server associated with your application, such as `server1`.
3. In the Server Infrastructure pane, expand the **Java and Process Management** container and click **Class loader**.
4. Click **New**.
5. Do not make any changes; click **Apply**.
6. In the Additional Properties pane, click **Shared Library references**.
7. Click **Add** to specify a shared library.
8. In the **Library name** field, select the ITFIM_WSSM shared library previously defined, and click **OK**.
9. In the Messages pane at the top of the Application Servers window, click **Save** to commit your changes.

Configuring a SAML login module for WebSphere Application Server

The standard system login modules provided by WebSphere Application Server do not support using a SAML assertion to log in. Perform this task to use the SAML login module provided with the Web services security management component.

1. Start the WebSphere Application Server administrative console and log in, if necessary.

   Note: Ensure that you are using the administrative console associated with the application server where the Web services security management component is installed.
2. Click **Security** → **Secure administration, applications, and infrastructure**.
3. In the Authentication section, expand the **Java Authentication and Authorization Service** container, and click **System logins**.
4. Click **New** to define a new login configuration.
5. In the **Alias** field, enter `itfim.wssm.samla`, and then click **Apply**.

   Note: All system login configurations have an implied prefix of `system`. This system login configuration might be referred to as `system.itfim.wssm.samla`.
6. In the Additional Properties section, click **JAAS login modules**.
7. Click **New** to define a new system login module.
8. In the **Module class name** field, enter: `com.tivoli.am.fim.wssm.loginmodules.SAMLALoginModule`, and then click **OK**.
9. In the Messages pane at the top of the window, click **Save** to commit your changes.
10. Restart the application server.

Configuring a Tivoli Access Manager login module for WebSphere Application Server

The standard system login modules provided by WebSphere Application Server do not support using a Tivoli Access Manager assertion to log in. Perform this task to use the Tivoli Access Manager login module provided with the Web services security management component.

1. Start the WebSphere Application Server administrative console and log in, if necessary.

   Note: Ensure that you are using the administrative console associated with the application server where the Web services security management component is installed.
2. Click **Security** → **Secure administration, applications, and infrastructure**.
3. In the Authentication section, expand the **Java Authentication and Authorization Service** container, and click **System logins**.
4. Click **New** to define a new login configuration.
5. In the **Alias** field, enter `itfim.wssm.tam`, and then click **Apply**.

   Note: All system login configurations have an implied prefix of `system`. This system login configuration might be referred to as `system.itfim.wssm.tam`.
6. In the Additional Properties section, click **JAAS login modules**.
7. Click **New** to define a new system login module.

8. In the **Module class name** field, enter: `com.tivoli.am.fim.wssm.loginmodules.TAMLoginModule`, and then click **OK**.
9. In the Messages pane at the top of the window, click **Save** to commit your changes.
10. Restart the application server.

Configuring a Username login module for WebSphere Application Server

The Web services security management component needs to use its own Username JAAS configuration as opposed to the WebSphere Application Server Username JAAS configuration. This is because it uses different callbacks between the Web services security management token consumer and the Username login module. Perform this task to use the Username login module provided with the Web services security management component.

1. Start the WebSphere Application Server administrative console and log in, if necessary.

   Note: Ensure that you are using the administrative console associated with the application server where the Web services security management component is installed.
2. Click **Security** → **Secure administration, applications, and infrastructure**.
3. In the Authentication section, expand the **Java Authentication and Authorization Service** container, and click **System logins**.
4. Click **New** to define a new login configuration.
5. In the **Alias** field, enter `itfim.wssm.username`, and then click **Apply**.

   Note: All system login configurations have an implied prefix of `system`. This system login configuration might be referred to as `system.itfim.wssm.username`.
6. In the Additional Properties section, click **JAAS login modules**.
7. Click **New** to define a new system login module.
8. In the **Module class name** field, enter: `com.tivoli.am.fim.wssm.loginmodules.UsernameLoginModule`, and then click **OK**.
9. In the Messages pane at the top of the window, click **Save** to commit your changes.
10. Restart the application server.

Configuring Java 2 security

If you have selected the **Enforce Java 2 security** box in the WebSphere Application Server Global Security settings, you must configure the library.policy file for the Tivoli Federated Identity Manager node.

To configure the library.policy file, you must add to it the permissions that are specified in the sample wssm.policy file that was installed with the Web services security management component files.

To perform this task, you must be familiar with editing WebSphere Application Server policy files using the WebSphere Application Server Policy Tool. Refer to the

following topics in the WebSphere Application Server Information Center at http://publib.boulder.ibm.com/infocenter/ws60help/index.jsp:

- Configuring Java 2 policy files
- library.policy file permissions
- Using the Policy Tool to edit policy files

After reviewing these topics, continue with the following procedure:

1. Open a command prompt on the system where Tivoli Federated Identity Manager is installed.
2. Navigate to the directory that contains the files for the Web services security management component. The files can be found in the following default locations:

   UNIX and Linux
   /opt/IBM/FIM/wssm/etc

   Windows
   C:\Program Files\IBM\FIM\wssm\etc

   z/OS /usr/lpp/FIM/wssm/etc
3. Locate the wssm.policy file and open it in a text editor.
4. Make any changes to the paths as required for your environment. Then save the file. Keep the file open so that you can use its contents to modify the library.policy file on the WebSphere Application Server.
5. Log in to the WebSphere Application Server and open a command prompt.
6. Using the Policy Tool as described in the WebSphere Application Server Information Center, modify the library.policy file with the information from the wssm.policy file. The library.policy file can be found in the following default locations:

   AIX® - /usr/IBM/WebSphere/AppServer/profiles/AppSrv01/config/cells/fim6ode01Cell/nodes/fim6Node01

   UNIX and Linux
   /opt/IBM/WebSphere/AppServer for UNIX/profiles/AppSrv01/config/cells/fim6ode01Cell/nodes/fim6Node01

   Windows
   C:\Program Files\IBM\WebSphere\AppServer\profiles\AppSrv01\config\cells\fim6ode01Cell\nodes\fim6Node01

   z/OS /usr/lpp/WebSphere/V6R0/profiles/AppSrv01/config/cells/fim6ode01Cell/nodes/fim6Node01

   Note: These path names have been formatted to fit this page.
7. Restart the WebSphere Application Server.

Securing the connection to the trust service

You can secure the connection between the Web services security management component and the trust service using HTTPS.

Before beginning this task, you need to know which SSL repository is being used to secure the HTTPS port.

1. Start the WebSphere Application Server administrative console and log in, if necessary.

2. Click **Servers** → **Application servers** → **server1** → **Web Container Settings** → **Web container transport chains**.

   Note: The **server1** selection shown in this step might have a different name in your environment.
3. Select the chain for the port being used and then specify the SSL repertoire being used for the SSL channel. For example: `NodeDefaultSSLSettings`
4. Update the wssm.properties file to identify the repertoire. Refer to "Modifying the wssm.properties file" on page 35.

Controlling trust service authorization access

You can choose from three scenarios for controlling access to the trust service:

- Bypass WebSphere authentication for access to the trust service, relying on message level authentication for Web services messages.
- Use WebSphere authentication for Web services messages.
- Use a mix of both message level authentication and WebSphere authentication.

Using message level authentication only

1. Log in to the WebSphere administration console and navigate to the properties for the ITFIMRuntime application.
2. Click **Map Security Roles to users/groups**
3. Map the TrustClientRole to **Everyone**.

You are not required to authenticate to WebSphere Application Server before sending messages to the trust service. You should verify that your trust service modules provide adequate authentication and authorization of Web services messages.

Note: This scenario is not supported on WebSphere Application Server for z/OS when using System Authorization Facility (SAF) for role-based authorization. WebSphere Application Server on z/OS, when using SAF does not support the **Everyone** role for Web applications.

Using WebSphere authentication mechanisms with message-level authentication

If you need to use a mixture of WebSphere authentication mechanisms with Web services message-level authentication, you must use two separate URLs and two separate J2EE roles to control access to the trust service. Clients that can provide authentication information directly to WebSphere will use one URL, while clients that provide only message-level authentication will use the other URL.

IBM Tivoli Federated Identity Manager configures two URLs and two J2EE roles for access to the security token service. Access to the `/TrustServer/SecurityTokenServiceProtected` URL is granted to the TrustClientRole. Access to the`/TrustServer/SecurityTokenService` URL is granted to the client TrustClientInternalRole. This allows clients to choose their own authentication mechanism.

Using WebSphere authentication to access the trust service

Follow these steps to give appropriate access to the trust service.

1. Log in to the WebSphere administration console and navigate to the properties for the ITFIMRuntime application.
2. Click **Map Security Roles to users/groups**.
3. Map TrustClientRole to those users or groups you want to give access to the trust service.

Note: For WebSphere Application Server on z/OS using SAF for role-based authorization, profiles for TrustClientInternalRole and TrustClientRole can be defined, with READ access granted to those users or groups allowed to access the trust service.

Restarting WebSphere Application Server

WebSphere Application Server can be restarted in a number of ways.

After performing some operations in either the WebSphere Application Server administrative console or the Tivoli Federated Identity Manager administration console, you might need to restart WebSphere Application Server to apply your changes.

Using the command line

Script and batch files are provided for stopping and starting WebSphere Application Server.

To restart WebSphere Application Server using the command line:

1. Open a command prompt.
2. Locate the server scripts in the WebSphere Application Server installation directory and run them, specifying the name of the application server to stop and start. The following commands assume that WebSphere Application Server was installed in the default location:

AIX

```
/usr/IBM/WebSphere/AppServer/bin/stopServer.sh server_name -profileName profile_name  \
-username user_name -password password
/usr/IBM/WebSphere/AppServer/bin/startServer.sh server_name -profileName profile_name  \
-username user_name -password password
```

Linux and Solaris

```
/opt/IBM/WebSphere/AppServer/bin/stopServer.sh server_name \
 -profileName profile_name  \
-username user_name -password password \
/opt/IBM/WebSphere/AppServer/bin/startServer.sh server_name -profileName profile_name  \
-username user_name -password password
```

Windows

```
"C:\Program Files\IBM\WebSphere\AppServer\bin\stopServer.bat" server_name -profileName profile_name
-username user_name -password password


"C:\Program Files\IBM\WebSphere\AppServer\bin\startServer.bat" server_name -profileName profile_name
-username user_name -password password
```

z/OS

```
/usr/lpp/products/WebSphere/V6R0/AppServer/bin/stopServer.sh server_name
 -profileName profile_name \
-username user_name -password password
/usr/lpp/products/WebSphere/V6R0/AppServer/bin/startServer.sh server_name
 -profileName profile_name \
-username user_name -password password
```

For example, to stop and start an application called BankApp on a Windows system, you might use the following two commands:

```
"C:\Program Files\IBM\WebSphere\AppServer\bin\stopServer.bat" server1 -profileName BankApp
  -username wasadmin -password was60pwd

"C:\Program Files\IBM\WebSphere\AppServer\bin\startServer.bat" server1 -profileName BankApp
-username wasadmin -password was60pwd
```

Using the Tivoli Federated Identity Manager administration console

1. After performing a task in the Tivoli Federated Identity Manager administration console, message FBTCON197W might be displayed indicating that WebSphere Application Server must be restarted.
2. Click **Restart WebSphere** to stop and restart the current application server.

   Note: After starting the application server, wait until WebSphere Application Server has completely restarted before performing additional actions.

Checking WebSphere Application Server status

After starting WebSphere Application Server, check that the server is running before performing additional tasks.

Using the command line

Script and batch files are provided for checking the status of WebSphere Application Server.

To check the status of WebSphere Application Server using the command line:

1. Open a command prompt.
2. Locate the serverStatus script or batch file in the WebSphere Application Server installation directory. Run it, specifying the profile name and application server name. The following commands assume that WebSphere Application Server was installed in the default location:

   AIX

```
/usr/IBM/WebSphere/AppServer/bin/serverStatus.sh server_name  -profileName profile_name
```

   Linux and Solaris

```
/opt/IBM/WebSphere/AppServer/bin/stopServer.sh server_name  -profileName profile_name
```

   Windows

```
C:\Program Files\IBM\WebSphere\AppServer\bin\serverStatus.bat server_name  -profileName profile_name
```

   z/OS

```
/usr/lpp/products/WebSphere/V6R0/AppServer/bin/serverStatus.sh server_name  -profileName profile_name
```

Chapter 3. Updating configuration batch and script files

A number of script and batch files must be updated to reflect your environment before you can enable application security.

Configuration batch and script files can be run against WebSphere Application Server V6.0.2 and V6.1. Because WebSphere Application Server V6.0.2 and V6.1 have different classpaths, you must specify the WebSphere Application Server classpath before you run your script using commenting.

In the following example, the wsdl2tam.sh script is set to run against WebSphere Application Server V6.1:

```
# The required WAS 6.0.2 jars.

# export WAS_JARS=$WAS_HOME/lib/j2ee.jar:$WAS_HOME/lib/wsdl4j.jar

# The required WAS 6.1 jars.

export WAS_JARS=$WAS_HOME/lib/j2ee.jar:$WAS_HOME/plugins/
 com.ibm.ws.runtime_6.1.0.jar
```

To run this script against WebSphere Application Server V6.0.2, uncomment the earlier WAS-JARS export line and comment the current WAS_JAR export line; for example:

```
# The required WAS 6.0.2 jars.

  export WAS_JARS=$WAS_HOME/lib/j2ee.jar:$WAS_HOME/lib/wsdl4j.jar

# The required WAS 6.1 jars.

# export WAS_JARS=$WAS_HOME/lib/j2ee.jar:$WAS_HOME/plugins/
 com.ibm.ws.runtime_6.1.0.jar
```

Note: If you installed the Web services security management component on z/OS, the HFS in which these files were installed might be read-only. If so, copy the files that require updates from the read-only location (such as /usr/lpp/FIM/wssm/etc) to your own Tivoli Federated Identity Manager directory before making the changes.

Modifying the wssm.properties file

The wssm.properties file must be updated to reflect the appropriate values for WebSphere Application Server and Tivoli Federated Identity Manager. This file must be updated before using the trust service.

1. Navigate to the *WSSM_HOME* directory. By default, this directory is:

   UNIX and Linux
   /opt/IBM/FIM/wssm/etc

   Windows
   C:\Program Files\IBM\FIM\wssm\etc

   z/OS /usr/lpp/FIM/wssm/etc
2. Make a backup copy of the wssm.properties file.
3. Verify that the values specified are correct for your environment.

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a. Set the `sts.url` property. For example: `sts.url=http://localhost:9080/TrustServer/SecurityTokenService`. If the connection between the trust service and the Web services security management component is secured with HTTPS, an example would be `sts.url=https://localhost:9443/TrustServer/SecurityTokenService`

b. Optional: If you are using HTTPS to secure the connection between the Web services security management component and the trust service, set the `ssl.configuration` property. For example: `ssl.configuration=fim6Node01/DefaultSSLSettings`

   Note: Be sure that the SSL repository has also been identified using WebSphere Application Server administration console.

c. Optionally, if you are using HTTP basic authentication to secure the connection between the Web services security management component and the trust service, set the authorization.username and authorization.password properties. For example: `authorization.username=wssm` and `authorization.password=testonly`.

d. Optionally, if your application is creating or consuming Tivoli Access Manager security tokens, set the pdjrte.configuration property to the Tivoli Access Manager Java Runtime (PDJrte) configuration file. For example: `pdjrte.configuration=/opt/IBM/WebSphere/AppServer/profiles/AppSrv01/config/itfim/mg8lnx10-FIMCluster/nodes/mg8lnx10Cell01/mg8lnx11Node01/mg8lnx11/amconfig.conf`

4. Save the changes to the file. You do not need to restart WebSphere Application Server after making these changes.

Sample wssm.properties file

The Web services security management component uses a wssm.properties file that must be modified.

```
# The following are the configuration properties for Web Services Security Management (WSSM).
#

# The Trust Service URL
sts.url=http://localhost:9080/TrustServer/SecurityTokenService

# The WAS SSL configuration repertoire name (only required for HTTPS connections to the Trust Service)
ssl.configuration=

# The optional username, passed in the HTTP authorization header, identifying WSSM to the Trust Service
authorization.username=

# The optional password, passed in the HTTP authorization header, associated with the username
authorization.password=

# The location of a TAM configuration file (created with SrvSslCfg). This is used by the TAMLoginModule.
#pdjrte.configuration=
```

Figure 2. Sample wssm.properties file

Modifying the wsdl2tam file

The wsdl2tam script or batch file must be updated to reflect the appropriate values for Java, WebSphere Application Server, Tivoli Federated Identity Manager, and the Web services security management component.

1. Navigate to the *WSSM_HOME* directory. By default, this directory is:

UNIX and Linux
/opt/IBM/FIM/wssm/etc

Windows
C:\Program Files\IBM\FIM\wssm\etc

z/OS /usr/lpp/FIM/wssm/etc

2. Make a backup copy of the wsdl2tam.sh or wsdl2tam.bat file. In general, the wsdl2tam.sh file is used on z/OS, UNIX, and Linux systems as well as Windows systems using a UNIX shell, such as bash. The wsdl2tam.bat file is used on Windows systems.
3. Open the file in a text editor and verify that the values specified are correct for your environment.
   a. *JAVA_HOME* is the directory for the Java runtime environment being used by your WebSphere application.
   b. *WAS_HOME* is the directory where WebSphere Application Server is installed.
   c. *FIM_HOME* is the directory where Tivoli Federated Identity Manager is installed.
   d. *WSSM_HOME* is the directory where the Web services security management component of Tivoli Federated Identity Manager is installed.
4. Save the changes to the file.

Sample wsdl2tam.sh file

The Web services security management component uses the wsdl2tam.sh file, which must be modified. The wsdl2tam.sh file is used on z/OS, UNIX, and Linux systems. The file also can be used on Windows systems running a UNIX shell program, such as bash.

```
#!/bin/sh

#
# Runs the WSDL2TAM tool for taking WSDL documents and generating script for creating TAM protected objects.
#
# NB. Requires Java 1.4.2 or better. Ensure WAS_JARS is set for the correct version of WAS.
#

# Make sure the Java home directory is correct.

export JAVA_HOME=/opt/IBM/WebSphere/AppServer/java/jre

# Make sure the WAS home directory location is correct.

export WAS_HOME=/opt/IBM/WebSphere/AppServer

# Make sure the FIM home directory location is correct.

export FIM_HOME=/opt/IBM/FIM

# The WSSM home directory.

export WSSM_HOME=$FIM_HOME/wssm

# The required WAS 6.0.2 jars.

# export WAS_JARS=$WAS_HOME/lib/j2ee.jar:$WAS_HOME/lib/wsdl4j.jar

# The required WAS 6.1 jars.

export WAS_JARS=$WAS_HOME/lib/j2ee.jar:$WAS_HOME/plugins/com.ibm.ws.runtime_6.1.0.jar

# The required WSSM jars.

export WSSM_JARS=$WSSM_HOME/lib/itfim-wssm-common.jar:$WSSM_HOME/lib/itfim-wssm-mgmt.jar

export CLASSPATH=$WSSM_HOME:$WSSM_JARS:$WAS_JARS:$CLASSPATH

$JAVA_HOME/bin/java -Djava.ext.dirs="$JAVA_HOME/lib/ext:$WAS_HOME/lib"
 -Djava.util.logging.config.file=$WSSM_HOME/
 logging.properties com.tivoli.am.fim.wssm.management.WSDL2TAM $*
```

Note: Some lines of text in the figure have been split for readability.

Figure 3. Sample wsdl2tam.sh file

Sample wsdl2tam.bat file

The Web services security management component uses the wsdl2tam.bat file, which must be modified. The wsdl2tam.bat file is used on Windows systems.

```
@echo off

rem Runs the WSDL2TAM tool for taking WSDL documents and generating script for creating TAM protected objects.
rem
rem NB. Requires Java 1.4.2 or better. Ensure WAS_JARS is set for the correct version of WAS.

setlocal

rem Make sure the Java home directory is correct.

set JAVA_HOME=C:\Program Files\IBM\WebSphere\AppServer\java\jre

rem Make sure the WAS home directory location is correct.

set WAS_HOME=C:\Program Files\IBM\WebSphere\AppServer

rem Make sure the FIM home directory location is correct.

set FIM_HOME=C:\Program Files\IBM\FIM

rem The WSSM home directory.

set WSSM_HOME=%FIM_HOME%\wssm

rem The required WAS 6.0.2 jars.

rem set WAS_JARS=%WAS_HOME%/lib/j2ee.jar;%WAS_HOME%/lib/wsdl4j.jar

rem The required WAS 6.1 jars.

set WAS_JARS=%WAS_HOME%/lib/j2ee.jar;%WAS_HOME%/plugins/com.ibm.ws.runtime_6.1.0.jar

rem The required WSSM jars.

set WSSM_JARS=%WSSM_HOME%/lib/itfim-wssm-common.jar;%WSSM_HOME%/lib/itfim-wssm-mgmt.jar

set CLASSPATH=%WSSM_JARS%;%WAS_JARS%;%CLASSPATH%

"%JAVA_HOME%\bin\java" -Djava.ext.dirs="%JAVA_HOME%/lib/ext;%WAS_HOME%/lib"
 -Djava.util.logging.config.file="%WSSM_HOME%"/logging.properties
 com.tivoli.am.fim.wssm.management.WSDL2T
 AM %*

endlocal
```

Note: Some lines of text in the figure have been split for readability.

Figure 4. Sample wsdl2tam.bat file

Enabling logging for wsdl2tam

You can monitor the activities of the wsdl2tam tool by enabling logging for it.

1. Navigate to the *WSSM_HOME* directory. By default, this directory is:

   UNIX and Linux
   /opt/IBM/FIM/wssm/etc

   Windows
   C:\Program Files\IBM\FIM\wssm\etc

   z/OS /usr/lpp/FIM/wssm/etc
2. Make a backup copy of the logging.properties file.
3. To enable logging for the wsdl2tam tool, set the `.level` property to `ALL`.
4. Save the changes to the file.

Chapter 4. Configuring Tivoli Access Manager

Several configuration tasks are required if you plan to use Tivoli Access Manager for e-business as an authorization solution with the Web services security management component.

Object space

Tivoli Access Manager can provide an authorization solution for your Web service application. To use this function, you need to create a protected object space and objects for your Web service application in Tivoli Access Manager.

The Web services security management component provides the wsdl2tam command that can automate this object space creation. The command reads the WSDL file associated with a Web service application and creates a script file that you use with the pdadmin command to create objects that represent the corresponding Web services in your application. The object names are based on the names used in the WSDL file. Access control lists (ACLs) can be applied at different levels in the object hierarchy to provide coarse-grained or fine-grained access to the Web service application.

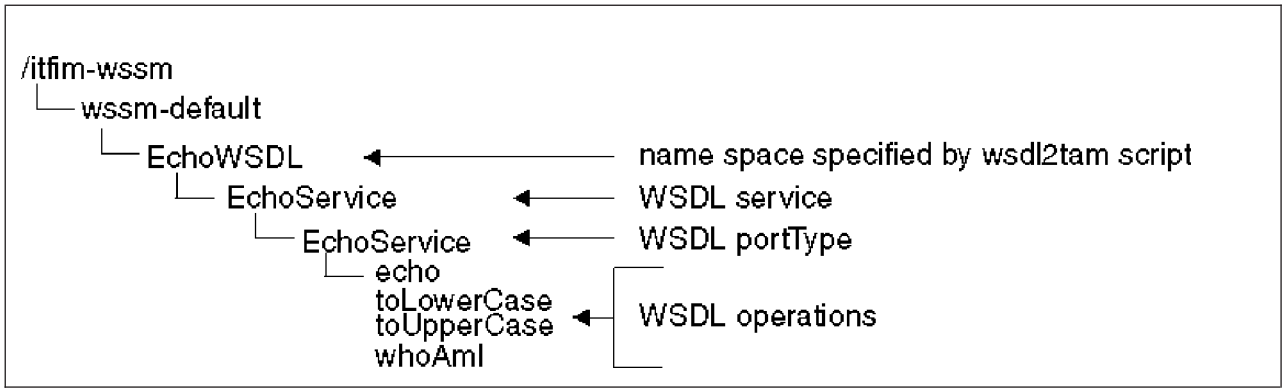

Figure 5. The object space created in Tivoli Access Manager for Web services security management component managed Web services

Figure 5 shows the object space that is created for the Echo demonstration application provided with Tivoli Federated Identity Manager. If an ACL granting access to a particular user is added to the `EchoService` object, that user can access any of the operations provided by the Echo demonstration application.[1]

In addition to ACLs, other Tivoli Access Manager controls, such as protected object policies (POPs) and authorization rules, also can be applied to these objects to control access to the Web services based on the day of the week, the time of day, and so on.

1. The full name of the `EchoService` object used in this example is:
   `/itfim-wssm/wssm-default/EchoWSDL/EchoService/EchoService`

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Creating protected objects

If you plan to use the AuthorizationSTSModule with Tivoli Access Manager, you must create a name space and protected objects in Tivoli Access Manager that correspond to your WSDL file. By running the wsdl2tam command, you can create a script file that you can use with pdadmin to automate the creation of the space and objects.

The wsdl2tam script or batch file must be modified before performing this task. Both the Tivoli Access Manager policy server and authorization server must be running and the pdadmin command must be accessible in the command path.

1. Open a command prompt on the system where WebSphere Application Server is installed.
2. Navigate to the directory that contains the files for the Web services security management component. The files can be found in the following default location:

   UNIX and Linux
   /opt/IBM/FIM/wssm/etc

   Windows
   C:\Program Files\IBM\FIM\wssm\etc

   z/OS /usr/lpp/FIM/wssm/etc
3. Run the modified wsdl2tam script or batch file specifying a unique logical name for the WSDL document (such as BankingWSDL), the name of the script file to be created (such as tamscript.txt), and the URL or file name with the WSDL file for the application (such as ExampleBanking.wsdl).

   UNIX and Linux

```
./wsdl2tam.sh -n BankingWSDL -tam tamscript.txt ExampleBanking.wsdl
```

   Note: When running this script on a Solaris system, you might need to use the ksh shell instead of the default shell (/bin/sh).

   Windows

```
wsdl2tam.bat -n BankingWSDL -tam tamscript.txt ExampleBanking.wsdl
```

   z/OS

```
./wsdl2tam.sh -n BankingWSDL -tam tamscript.txt ExampleBanking.wsdl
```

4. Open the script file and review its content to make sure it is correct.
5. Save and close the file.
6. Open a command prompt on the system where Tivoli Access Manager is installed.
7. Next, use the pdadmin command to run the script file, such as tamscript.txt, and create the protected object space. For example, use the following command:

```
pdadmin -a sec_master -p testonly tamscript.txt
```

   Note: The script will attempt to create all the objects in the hierarchy. If some of these objects already exist, messages regarding the existing objects will be displayed. You can ignore these messages.
8. Optional: Verify that the protected object space was created using the pdadmin command or Web Portal Manager.

wsdl2tam reference

Creates a protected object space in Tivoli Access Manager for objects defined in a WSDL file to be used with the AuthorizationSTSModule and Tivoli Access Manager.

Syntax

```
wsdl2tam{.sh|.bat} { -n unique_name -tam name_of_output_file WSDL_URL_or_file }
```

Options

-n *unique_name*
A unique logical name for the WSDL document. This name will be used as part of the name for the object space that will be created.

-tam *name_of_output_file*
The name of the script file to be created.

WSDL_URL_or_file_name
A URL or file name where the WSDL definition for the Web service is located.

Authorization

You must have a valid administrator user ID and password on the server and must have the required authority to perform the task.

Example: Creating protected objects in Tivoli Access Manager

Define protected objects called `CustomerBanking` based on the WSDL file located in the current directory on UNIX or Linux:

```
./wsdl2tam.sh -n CustomerBanking -tam tamscript.txt Banking.wsdl
```

Defining the access control policy

An access control policy must be defined for the Tivoli Federated Identity Manager access control objects.

1. Open a command prompt on the system where Tivoli Access Manager is installed.
2. Use the pdadmin command to define your desired access control policy in Tivoli Access Manager.

For example, if you want to create an access control group called `BankUsers` that has permission to invoke any Web service in an application and define a user called `wssm-bankuser` that is a member of that group, use the following pdadmin commands:

```
pdadmin -a sec_master -p password
user create wssm-bankuser cn=wssmbankuser,c=us wssm bankuser initial_user_password
user modify wssm-bankuser account-valid yes
group create BankUsers cn=BankUsers,c=us BankUsers
group modify BankUsers add wssm-bankuser
acl create BankUsers
acl modify BankUsers set group BankUsers T[WebService]i
acl attach /itfim-wssm/wssm-default/BankingWSDL BankUsers
```

The two `user` commands create the user and activate the user account. The next two `group` commands create an access control group and assign the user to the group. Finally, the two `acl` commands create an access control list and attach that

list to all of the access control objects associated with the Echo demonstration application. The result is that the `wssm-bankuser` user ID has permission to invoke any BankingWSDL Web service.

Refer to the *IBM Tivoli Access Manager for e-business Administration Guide* for additional details on ACLs.

Chapter 5. Configuring keystores and certificates

Depending on your application requirements and the types of tokens you use with the Web services security management component, you might need to configure keys or certificates prior to configuring the token modules in your module chains.

The Tivoli Federated Identity Manager service for managing keys is called the *key encryption and signing service*, or simply, *key service*. The key service is responsible for managing certificates and keys, and for performing cryptographic operation. If you use keys or certificates with your tokens, you should import your keys or certificates into this key service. Refer to the *IBM Tivoli Federated Identity Manager Administration Guide* for instructions on managing keys and certificates. Use the Tivoli Federated Identity Manager administration console to configure the key service and the token modules.

You can use the Tivoli Federated Identity Manager management console to generate self-signed certificates, generate a certificate request to be signed by a Certificate Authority and receive the signed certificate, and store certificates from an SSL connection.

The token modules that can be used with the Web services security management component have the following key or certificate configuration options:

SAML10STSModule and SAML11STSModule

Validate mode:

- Validation key that the partner must use. Specify the keystore, keystore password, and a key or certificate to use.

Exchange mode:

- Signing key used to sign outgoing tokens. Specify the keystore, keystore password, and a key or certificate to use.

SAML20STSModule

Validate mode:

- Validation key that the partner must use. Specify the keystore, keystore password, and a key or certificate to use.
- Decryption key used to decrypt encrypted messages. Specify the keystore, keystore password, and a key or certificate to use.

Exchange mode:

- Signing key used to sign outgoing tokens. Specify the keystore, keystore password, and a key or certificate to use.
- Encryption key used to encrypt assertions. Specify the keystore, keystore password, and a key or certificate to use.

UsernameTokenSTSModule

Validate mode:

- Validation key that the partner must use. Specify the keystore, keystore password, and a key or certificate to use.

Exchange mode:

- Signing key used to sign outgoing tokens. Specify the keystore, keystore password, and a key or certificate to use.

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KerberosSTSModule

No key or certificate configuration.

PassTicketSTSModule

Validate mode:

- Validation key that the partner must use. Specify the keystore, keystore password, and a key or certificate to use.

Exchange mode:

- PassTicket key used to generate a valid PassTicket. This key value must consist of exactly 16 hexadecimal digits. This key is required *only* if you want to use a PassTicket token with the Web services security management component *and* you are *not* using z/OS.

  Note: If you are using the z/OS operating system, the PassTicket is generated using RACF. However, you must configure RACF to use PassTickets in order to have PassTicket support. Refer to the *z/OS Security Server RACF Security Administrator's Guide* for configuration information.
- Signing key used to sign outgoing tokens. Specify the keystore, keystore password, and a key or certificate to use.

X509STSModule

Validate mode:

The X.509 module has two configuration properties and both are related to keys and certificates:

X.509 validator identifier or class name

Specifies an alternative X.509 validator identifier or class name. When this value is not specified, the Tivoli Federated Identity Manager key service uses the default algorithm to validate the certificate path.

Enable X.509 certificate validation

Specifies whether validation of X.509 certificates must be enforced. By default, this check box is selected. When this box is cleared, the certificate is not validated. This option can be used in deployments where the certificate has already been validated by another entity.

Exchange mode: Exchange mode is not supported for X.509 tokens.

Chapter 6. Configuring your Web services application to use Web services security management

In order for your Web services application to use Web services security management, you must configure the application's deployment descriptors for both generating and consuming tokens.

The following sections show what the configuration values are for a SAML 2.0 token using the Rational Application Developer. Then, depending on what type of token you are using, you can change the values as necessary to apply to your specific token type. See "Configuring WS-Security for the Echo application" on page 60, which shows sample values for Kerberos, SAML 1.1, Tivoli Access Manager, Username, and X.509 token types that were used in the Echo application.

Also, see the sample Echo client and Echo applications that are shipped with the Tivoli Federated Identity Manager product, as they also provide examples of this type of configuration.

Generating a SAML 2.0 token

This generation example generates a SAML 2.0 token from the contents of the logged in user's JAAS subject. It does not call the trust service.

1. Use the following table to assist you in specifying the values on the Security Token panel.

Table 10. Values for generating a SAML 2.0 token on the Security Token panel

Field name	SAML 2.0 sample values
Name	SAML20
Local name	urn:oasis:names:tc:SAML:2.0:assertion#Assertion

2. Use the following table to assist you in specifying the values on the Token Generator panel.

Table 11. Values for generating a SAML 2.0 token on the Token Generator panel

Field name	SAML 2.0 sample values
Token generator name	SAML20
Token generator class	com.tivoli.am.fim.wssm.tokengenerators.WSSMTokenGenerator
Security token	SAML20
Use value type	Select check box
Value type	Custom Token
Local name	urn:oasis:names:tc:SAML:2.0:assertion#Assertion
Callback handler	com.tivoli.am.fim.wssm.callbackhandlers.WSSMTokenGeneratorCallbackHandler
Callback Handler Property Name (1)	xml.callback.handler.class.name
Callback Handler Property Value	com.tivoli.am.fim.wssm.callbackhandlers.JAASSubjectCallbackHandler
Callback Handler Property Name (2)	token.callback.handler.class.name

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Table 11. Values for generating a SAML 2.0 token on the Token Generator panel (continued)

Field name	SAML 2.0 sample values
Callback Handler Property Value	com.tivoli.am.fim.wssm.callbackhandlers.SAMLACallbackHandler
Property Name (1)	sts.call
Property Value	false
Property Name (2)	issuer
Property Value	urn:itfim:wssm:tokengenerator

Consuming a SAML 2.0 token

This consumption example consumes a SAML 2.0 token by sending it to the trust service which exchanges it for a Username token. The Username token is used to perform the login at the Web service.

1. Use the following table to assist you in specifying the values on the Required Security Token panel.

Table 12. Values for consuming a SAML 2.0 token on the Required Security Token panel

Field name	SAML 2.0 sample values
Name	SAML20
URI	urn:oasis:names:tc:SAML:2.0:assertion
Local name	Assertion
Usage type	Required

2. Use the following table to assist you in specifying the values on the Caller Part panel.

Table 13. Values for consuming a SAML 2.0 token on the Caller Part panel

Field name	SAML 2.0 sample values
Name	SAML20
Local name	http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-username-token-profile-1.0#UsernameToken
Property name (1)	com.ibm.wsspi.wssecurity.caller.tokenConsumerNS
Property value	urn:oasis:names:tc:SAML:2.0:assertion
Property name (2)	com.ibm.wsspi.wssecurity.caller.tokenConsumerLN
Property value	Assertion

3. Use the following table to assist you in specifying the values on the Token Consumer panel.

Table 14. Values for consuming a SAML 2.0 token on the Token Consumer panel

Field name	SAML 2.0 sample values
Token consumer name	SAML20
Token consumer class	com.tivoli.am.fim.wssm.tokensonsumers.WSSMTokenConsumer
Security token	SAML20
Use value type	Select check box
Value type	Custom Token

Table 14. Values for consuming a SAML 2.0 token on the Token Consumer panel (continued)

Field name	**SAML 2.0 sample values**
Local name	Assertion
URI	urn.oasis:names:tc:SAML:2.0:assertion
Use jaas.config	Select check box
jaas.config name	system:itfim.wssm.username

Chapter 7. Monitoring communications

You can monitor communications and activities within your Web services security management environment in several ways.

- Monitor the communications between the trust service and the server on which the Echo Web service application is running.
- Monitor the activities of the Web services security management component and Tivoli Federated Identity Manager by enabling logging.
- Monitor the communications between a Web service and a client. This procedure is explained and exemplified in "Monitoring communications between the Echo client and the Echo application" on page 83.

Monitoring communications between the server and the trust service

The TCPMonitor application utility provided with WebSphere Application Server can be used to capture and display network communications between the server on which a Web service application is running and the Tivoli Federated Identity Manager trust service.

1. Start the TCPMonitor application provided with WebSphere Application Server. Refer to the Tracing SOAP messages with tcpmon topic in the WebSphere Application Server Information Center for further information.
2. In the **Listen Port #** field, specify the same port number used for the trust service URL.
3. To configure the TCPMonitor application to act as a listener, ensure that **Listener** is selected, and then enter the following information:
   a. In the **Target Hostname** field, enter the host name of the WebSphere Application Server system. A host name of `localhost` can be used if the TCPMonitor application is running on the same system as WebSphere Application Server.
   b. In the **Target Port #** field, enter the port number that the server application is using for SOAP requests.
4. Click **Add** to enable the TCPMonitor application to listen for requests. After this operation completes, the fields in the panel are cleared and a new tab appears at the top of the window.
5. Click the **Port nnnnn** tab at the top of the window, where *nnnnn* is the port number that was added in the previous step.
6. Perform an operation using the client application. The TCPMonitor window shows the request from the Web services security management component in the middle pane and the response from the trust service in the bottom pane.
7. Click **Switch Layout** in the TCPMonitor application, and resize the window if necessary, to show the request in the left pane and the response in the right pane.
8. Next, configure the settings for the trust service. Navigate to the directory where the wssm.properties file is located. The default directory is:

   UNIX and Linux
   /opt/IBM/FIM/wssm/etc

   Windows
   C:\Program Files\IBM\FIM\wssm\etc

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z/OS /usr/lpp/FIM/wssm/etc

9. Make a backup copy of the wssm.properties file.
10. Set the `sts.url` property to the port on which TCPMonitor is listening. For example: `sts.url=http://localhost:51962/TrustServer/SecurityTokenService`
11. Save the changes to the file.

Note: The request and its associated data, as well as the response and its data, can be viewed by anyone with sufficient authority on the WebSphere Application Server system. This is traffic between one application server and another on the same system.

Enabling logging

You can enable logging for the Web services security management component and for Tivoli Federated Identity Manager.

1. Start the WebSphere Application Server administrative console and log in, if necessary.

   Note: Ensure that you are using the administrative console associated with the application server where the Web services security management component is installed.
2. Click **Troubleshooting** → **Logs and Trace** to open the Logging and Tracing page.
3. Click the name of the server that you want to configure.
4. Click **Diagnostic Trace** and verify that diagnostic tracing is enabled. Diagnostic trace is enabled by default.
5. Click **Change Log Detail Levels** to open the Change Log Detail Levels page.
6. Click in the logging text box to edit the logging options text. This operation might take a minute or two to complete.
7. Enable logging for the Web services security management component and for Tivoli Federated Identity Manager by entering the following trace options in the text box all on one line and without any spaces:

   ```
   *=info
   :com.tivoli.am.fim.*=all
   :com.tivoli.am.fim.wssm.*=all
   ```

   Note: The options are shown on separate lines for readability in this document. The options must be entered all on one line without any spaces or tab or newline characters.
8. Scroll the window, if necessary, and click **Apply** to apply your changes.
9. In the Messages pane at the top of the Logging and Tracing window, click **Save** to commit your changes.
10. Restart the application server.
11. To view the log, locate the trace.log file associated with the application server. For example, if the application profile name is `BankApp` and the server name is `server1`, the default location for the trace.log file is:

    AIX /usr/IBM/WebSphere/AppServer/profiles/BankApp/logs/server1

    UNIX and Linux
    /opt/IBM/WebSphere/AppServer/profiles/BankApp/logs/server1

Windows
C:\Program Files\IBM\WebSphere\AppServer\profiles\BankApp\logs\server1

z/OS View the trace records in the JOB output for the WebSphere Application Server servant region.

12. Open the file in a text editor to view it.

Chapter 8. Running the Echo demonstration application

You might want to use the Echo demonstration application to validate that your WebSphere Application Server environment is working correctly with Tivoli Federated Identity Manager and to demonstrate the use of the Web services security management component.

Introduction to the Echo demonstration application

The Echo demonstration application is a simple Web service application for WebSphere Application Server that echoes text back to the Echo Web service client to illustrate the use of the Web services security management component.

The Echo demonstration application implements the Web service that is defined by the EchoService.wsdl file.

The file defines a number of ports to provide support for multiple token types and so that token processing at both the Web service application and at the client can be demonstrated.

The token types and their relative URLs, as defined in the WSDL file, are listed in the following table.

Table 15. Token types and associated relative URLs

Token types	Relative URL
No token	EchoApplication/services/ EchoServiceNoToken
Kerberos	EchoApplication/services/ EchoServiceKerberos
SAML 1.1	EchoApplication/services/ EchoServiceSAML11
SAML 2.0	EchoApplication/services/ EchoServiceSAML20
Tivoli Access Manager	EchoApplication/services/EchoServiceTAM
Username	EchoApplication/services/ EchoServiceUsername
X.509	EchoApplication/services/EchoServiceX509

Information about the WS-Security configuration of this application is provided in "Echo demonstration application" on page 17.

Configuring related components

Before installing and running the demonstration application, you must configure several components with information that is specific to the Echo demonstration application.

Note: Be sure you have completed the set up of your Web services security management component environment, including completing all tasks in the following chapters:

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- Chapter 2, “Configuring WebSphere Application Server,” on page 25.
- Chapter 3, “Updating configuration batch and script files,” on page 35.

User registry considerations for the Echo application

The Echo Web service expects a login from a user named `wssm-testuser` with a password of `testonly123`. Therefore, you must add this user to the user registry or user registries that you are using for your Echo environment.

You can use any user registry that is supported by WebSphere Application Server. However, to ensure that the Echo application works correctly, consider the following tips:

- An environment in which the Echo Web service application and Tivoli Access Manager use the same user registry simplifies your configuration because you must add the `wssm-testuser` to only that one registry.
- If you choose to use different registries for the Echo Web service and Tivoli Access Manager, be sure you have added the `wssm-testuser` to both of the registries.
- If you are running on the z/OS platform with WebSphere Application Server using ’Local operating system’ for the user registry and cannot use a username greater than eight characters, then select a different username to use with the Echo application. This username must be specified in the wssm_test.xsl mapping file located in the wssm/examples/etc directory. In the wssm_test.xsl file, replace `wssm-testuser` with the selected username. To perform Tivoli Access Manager authorization checking with the Echo application, the selected user ID must also be defined to Tivoli Access Manager and be given access to the protected object for Echo.

Note: To log in at the Echo client, you can use any user name and password that exists in the WebSphere Application Server user registry that is being used by the server where the Echo client is running.

Enabling Lightweight Third Party Authentication (LTPA) in WebSphere

You must enable Lightweight Third Party Authentication (LTPA) in WebSphere Application Server to run the demonstration application.

The following steps are only required if you are using WebSphere Application Server Version 6.0.2.x. LTPA is enabled by default in WebSphere Application Server Version 6.1.

1. Start the WebSphere Application Server administrative console and log in, if necessary.

   Note: Ensure that you are using the administrative console associated with the application server where the Web services security management component is installed.
2. Click **Security** → **Global security**.
3. Open the **Authentication mechanisms** section, and click **LTPA**.
4. Enter a password in both the **Password** and **Confirm password** fields, and then click **Apply**.
5. In the Messages pane at the top of the window, click **Save** to commit your changes.

Configuring Tivoli Access Manager for Echo

The authorization check made during the execution of the Echo application module chain requires the creation and configuration of a Tivoli Access Manager object space that contains objects representing the Echo Web service application and its operations. Tivoli Access Manager users, groups, and ACLs must also be created.

Creating protected objects for Echo

To create protected objects for the Echo Web service application, you can run the wsdl2tam command, which creates a script file that you use with pdadmin to automate the creation of the space and objects.

The wsdl2tam script or batch file must be modified before performing this task. Both the Tivoli Access Manager policy server and authorization server must be running and the pdadmin command must be accessible in the command path.

1. Open a command prompt on the system where WebSphere Application Server is installed.
2. Navigate to the directory that contains the files for the Web services security management component. The files can be found in the following default location:

   UNIX and Linux
   /opt/IBM/FIM/wssm/etc

   Windows
   C:\Program Files\IBM\FIM\wssm\etc

   z/OS /usr/lpp/FIM/wssm/etc
3. Run the modified wsdl2tam script or batch file specifying a unique logical name for the WSDL document (EchoWSDL), the name of the script file to be created (tamscript.txt), and the file name of the Echo WSDL file (EchoService.wsdl). For z/OS, convert the EchoService.wsdl file from EBCDIC format to ASCII format before running the wsdl2tam script or batch file.

   UNIX and Linux

```
./wsdl2tam.sh -n EchoWSDL -tam tamscript.txt examples/etc/EchoService.wsdl
```

   Note: When running this script on a Solaris system, you might need to use the ksh shell instead of the default shell (/bin/sh).

   Windows

```
wsdl2tam.bat -n EchoWSDL -tam tamscript.txt C:\PROGRA~1\IBM\FIM\wssm\examples\etc\EchoService.wsdl
```

   z/OS

```
./wsdl2tam.sh -n EchoWSDL -tam tamscript.txt examples/etc/EchoService.wsdl
```

4. Open the script file and review its content to make sure it is correct.
5. Save and close the file.
6. Open a command prompt on the system where Tivoli Access Manager is installed.
7. Next, use the pdadmin command to run the script file, such as tamscript.txt and create the protected object space.

```
pdadmin -a sec_master -p testonly tamscript.txt
```

8. Optional: Verify that the protected object space was created using the pdadmin command or Web Portal Manager.

Next, you must use the pdadmin to define users and groups and to create an ACL with permission [WebService]i and attach it to one of the objects in the WSSM object space.

Defining the access control policy for Echo

After you have created the object space for the Echo demonstration application, you need to create users, groups, and the access control list.

1. Open a command prompt on the system where Tivoli Access Manager is installed.
2. Use the pdadmin command to create an access control group called EchoUsers that has permission to invoke any Web service in the Echo demonstration application and define a user called wssm-testuser that is a member of that group and uses the password testonly123.

```
pdadmin -a sec_master -p password
user create wssm-testuser cn=wssmtestuser,c=us wssm testuser testonly123
user modify wssm-testuser account-valid yes
group create EchoUsers cn=EchoUsers,c=us EchoUsers
group modify EchoUsers add wssm-testuser
acl create EchoUsers
acl modify EchoUsers set group EchoUsers T[WebService]i
acl attach /itfim-wssm/wssm-default/EchoWSDL EchoUsers
```

The two user commands create the user and activate the user account. The next two group commands create an access control group and assign the user to the group. Finally, the two acl commands create an access control list and attach that list to all of the access control objects associated with the Echo demonstration application. The result is that the wssm-testuser user ID has permission to invoke any EchoWSDL Web service.

Refer to the *IBM Tivoli Access Manager for e-business Administration Guide* for additional details on ACLs.

Configuring the X.509 key

If you use an X.509 token in the demonstration, you must configure the X.509 key using the key service in Tivoli Federated Identity Manager.

The X.509 token module needs an additional keystore file that is configured as a certificate authority so the certificate in the X.509 token can be validated. The X.509 token module contains the wssm_client certificate from the wssm_client.jks keystore file. This certificate was issued by the demonstration certificate authority (itfim_demo_ca) that is part of Tivoli Federated Identity Manager. The certificate is stored in the wssm_server.jks keystore file, which is located, by default, in the following directory:

UNIX and Linux
/opt/IBM/FIM/wssm/examples/etc

Windows
C:\Program Files\IBM\FIM\wssm\examples\etc

z/OS /usr/lpp/FIM/wssm/examples/etc

The keystore file must be downloaded to your workstation, and then imported using the Tivoli Federated Identity Manager key service on the Tivoli Federated Identity Manager administration console:

1. Start the Tivoli Federated Identity Manager administration console and log in, if necessary.

2. Click **Tivoli Federated Identity Manager → Key Service**. The Key Service portlet shows the keystores that are currently defined.
3. Click **Import.**
4. Complete the configuration information for the keystore file:
   a. In the **Location of the keystore file** field, specify the location on your workstation where you have downloaded the `wssm_server.jks` file.
   b. In the **Keystore Password** field, type `testonly`.
   c. In the **Keystore Name** field, type `wssm_server`.
   d. In the **Type list**, select **CA Certificates**.
5. Click **Finish**.

Configuring Kerberos for Echo

If you use a Kerberos STS module in the demonstration, you must follow these configuration instructions.

These steps are specific for use with Active Directory as your Key Distribution Center (KDC). If you use another type of KDC, modify these instructions as necessary.

1. Make sure you have a DNS server installed.
2. Create a domain called, for example, `fim.test.com`.
3. Create a Kerberos realm called, for example, `FIM.TEST.COM`. The realm is automatically created for you, if you are using Active Directory.
4. Make sure you have the Windows 2003 SP2 support tools installed, which includes the Kerberos command line utilities.
5. Open **Administrative Tools → Active Directory Users and Computers** and create a user called `fimclient` with a password of `Passw0rd` under the domain `fim.test.com`. This user represents the Kerberos client.
6. Create a user called `fimservice` with a password of `Passw0rd` under `fim.test.com`. This user represents the Kerberos service.
7. Map the fimservice Kerberos principal name to the `fimservice` account using the following Windows ksetup command:

   ```
   ksetup /mapuser fimservice/fimtest.fim.test.com@FIM.TEST.COM fimservice
   ```

   where `fimtest.fim.test.com` is the fully-qualified domain name of the host machine on which the service is running.
8. Create a keytab file for `fimservice` using the following Windows ktpass command:

   ```
   ktpass –out fimservice.keytab
     –princ fimservice/fimtest.fim.test.com@FIM.TEST.COM
     –Crypto RC4-HMAC-NT –mapUser fimservice@FIM.TEST.COM –pass Passw0rd
     –ptype KRB5_NT_PRINCIPAL
   ```

   The location of the keytab file is specified in the Kerberos STS module's parameters for token validation panel in the console.
9. Modify the krb5.conf Kerberos configuration file that ships with Tivoli Federated Identity Manager:

   ```
   [libdefaults]
      default_realm = FIM.TEST.COM
      default_tkt_enctypes = rc4-hmac
      default_tgs_enctypes = rc4-hmac

   [realms]
   ```

```
    FIM.TEST.COM = {
       kdc = fimtest.fim.test.com:88
    }

[domain_realm]
    fim.test.com = FIM.TEST.COM
```

Ensure the kdc address is correct.

The location of the krb5.conf file is specified in the default Kerberos STS module initialization parameters panel in the console.

10. The jaas.conf Kerberos login configuration file is also part of the Tivoli Federated Identity Manager product. You do not need to modify this file. The location of the jaas.conf file is specified in the default Kerberos STS module initialization parameters panel in the console.

Configuring WS-Security for the Echo application

In order for your Web services application to use Web services security management, you must configure the application's deployment descriptors for both generating and consuming tokens.

In the Echo application, each of the token types has already been configured. Each section that follows shows the sample configuration values for SAML 1.1, Tivoli Access Manager, Username, and X.509 token types that were specified using the Rational Application Developer. Note that Chapter 6, "Configuring your Web services application to use Web services security management," on page 47 shows the sample values for SAML 2.0.

Use this information as a guide when you are configuring your own Web services application to use Web services security management.

WS-Security configuration for Kerberos

You must define values for generating and consuming a Kerberos token using the Rational Application Developer.

Generating a Kerberos token

1. Use the following table to assist you in specifying the values on the Security Token panel.

Table 16. Values for generating a Kerberos token on the Security Token panel

Field name	Kerberos sample values
Name	Kerberos
Local name	http://docs.oasis-open.org/wss/oasis-wss-kerberos-token-profile-1.1#GSS_Kerberosv5_AP_REQ

2. Use the following table to assist you in specifying the values on the Token Generator panel.

Table 17. Values for generating a Kerberos token on the Token Generator panel

Field name	Kerberos sample values
Token generator name	Kerberos
Token generator class	com.tivoli.am.fim.wssm.tokengenerators.WSSMTokenGenerator
Security token	Kerberos
Use value type	Select check box

Table 17. Values for generating a Kerberos token on the Token Generator panel (continued)

Field name	Kerberos sample values
Value type	Custom Token
Local name	http://docs.oasis-open.org/wss/oasis-wss-kerberos-token-profile-1.1#GSS_Kerberosv5_AP_REQ
Callback handler	com.tivoli.am.fim.wssm.callbackhandlers.WSSMTokenGeneratorCallbackHandler
Callback Handler Property Name (1)	xml.callback.handler.class.name
Callback Handler Property Value	com.tivoli.am.fim.wssm.callbackhandlers.JAASSubjectCallbackHandler
Callback Handler Property Name (2)	token.callback.handler.class.name
Callback Handler Property Value	com.tivoli.am.fim.wssm.callbackhandlers.KerberosCallbackHandler

Consuming a Kerberos token

1. Use the following table to assist you in specifying the values on the Required Security Token panel.

Table 18. Values for consuming a Kerberos token on the Required Security Token panel

Field name	Kerberos sample values
Name	Kerberos
Local name	http://docs.oasis-open.org/wss/oasis-wss-kerberos-token-profile-1.1#GSS_Kerberosv5_AP_REQ
Usage type	Required

2. Use the following table to assist you in specifying the values on the Caller Part panel.

Table 19. Values for consuming a Kerberos token on the Caller Part panel

Field name	Kerberos sample values
Name	Kerberos
URI	urn:oasis:names:tc:SAML:2.0:assertion
Local name	Assertion
Property name (1)	com.ibm.wsspi.wssecurity.caller.tokenConsumerNS
Property value	(no value)
Property name (2)	com.ibm.wsspi.wssecurity.caller.tokenConsumerLN
Property value	http://docs.oasis-open.org/wss/oasis-wss-kerberos-token-profile-1.1#GSS_Kerberosv5_AP_REQ

3. Use the following table to assist you in specifying the values on the Token Consumer panel.

Table 20. Values for consuming a Kerberos token on the Token Consumer panel

Field name	Kerberos sample values
Token consumer name	Kerberos

Table 20. Values for consuming a Kerberos token on the Token Consumer panel (continued)

Field name	Kerberos sample values
Token consumer class	com.tivoli.am.fim.wssm.tokensonsumers.WSSMTokenConsumer
Security token	Kerberos
Use value type	Select check box
Value type	Custom Token
Local name	http://docs.oasis-open.org/wss/oasis-wss-kerberos-token-profile-1.1#GSS_Kerberosv5_AP_REQ
Use jaas.config	Select check box
jaas.config name	system:itfim.wssm.samla

WS-Security configuration for SAML 1.1

You must define values for generating and consuming a SAML 1.1 token using the Rational Application Developer.

Generating a SAML 1.1 token

1. Use the following table to assist you in specifying the values on the Security Token panel.

Table 21. Values for generating a SAML 1.1 token on the Security Token panel

Field name	SAML 1.1 sample values
Name	SAML11
Local name	urn:oasis:names:tc:SAML:1.0:assertion#Assertion

2. Use the following table to assist you in specifying the values on the Token Generator panel.

Table 22. Values for generating a SAML 1.1 token on the Token Generator panel

Field name	SAML 1.1 sample values
Token generator name	SAML11
Token generator class	com.tivoli.am.fim.wssm.tokengenerators.WSSMTokenGenerator
Security token	SAML11
Use value type	Select check box
Value type	Custom Token
Local name	urn:oasis:names:tc:SAML:1.0:assertion#Assertion
Callback handler	com.tivoli.am.fim.wssm.callbackhandlers.WSSMTokenGeneratorCallbackHandler
Callback Handler Property Name (1)	xml.callback.handler.class.name
Callback Handler Property Value	com.tivoli.am.fim.wssm.callbackhandlers.JAASSubjectCallbackHandler
Callback Handler Property Name (2)	token.callback.handler.class.name
Callback Handler Property Value	com.tivoli.am.fim.wssm.callbackhandlers.SAMLACallbackHandler
Property Name (1)	sts.call
Property Value	false
Property Name (2)	issuer

Table 22. Values for generating a SAML 1.1 token on the Token Generator panel (continued)

Field name	SAML 1.1 sample values
Property Value	urn:itfim:wssm:tokengenerator

Consuming a SAML 1.1 token

1. Use the following table to assist you in specifying the values on the Required Security Token panel.

Table 23. Values for consuming a SAML 1.1 token on the Required Security Token panel

Field name	SAML 1.1 sample values
Name	SAML11
URI	urn:oasis:names:tc:SAML:1.0:assertion
Local name	Assertion
Usage type	Required

2. Use the following table to assist you in specifying the values on the Caller Part panel.

Table 24. Values for consuming a SAML 1.1 token on the Caller Part panel

Field name	SAML 1.1 sample values
Name	SAML11
Local name	http://ibm.com/2004/01/itfim/ivcred
Property name (1)	com.ibm.wsspi.wssecurity.caller.tokenConsumerNS
Property value	urn:oasis:names:tc:SAML:1.0:assertion
Property name (2)	com.ibm.wsspi.wssecurity.caller.tokenConsumerLN
Property value	Assertion

3. Use the following table to assist you in specifying the values on the Token Consumer panel.

Table 25. Values for consuming a SAML 1.1 token on the Token Consumer panel

Field name	SAML 1.1 sample values
Token consumer name	SAML11
Token consumer class	com.tivoli.am.fim.wssm.tokensonsumers.WSSMTokenConsumer
Security token	SAML11
Use value type	Select check box
Value type	Custom Token
Local name	Assertion
URI	urn.oasis:names:tc:SAML:1.0:assertion
Use jaas.config	Select check box
jaas.config name	system:itfim.wssm.tam

WS-Security configuration for Tivoli Access Manager

You must define values for generating and consuming a Tivoli Access Manager token using the Rational Application Developer.

Generating a Tivoli Access Manager token

1. Use the following table to assist you in specifying the values on the Security Token panel.

Table 26. Values for generating a Tivoli Access Manager token on the Security Token panel

Field name	Tivoli Access Manager sample values
Name	TAM
Local name	http://ibm.com/2004/01/itfim/ivcred

2. Use the following table to assist you in specifying the values on the Token Generator panel.

Table 27. Values for generating a Tivoli Access Manager token on the Token Generator panel

Field name	Tivoli Access Manager sample values
Token generator name	TAM
Token generator class	com.tivoli.am.fim.wssm.tokengenerators.WSSMTokenGenerator
Security token	TAM
Use value type	Select check box
Value type	Custom Token
Local name	http://ibm.com/2004/01/itfim/ivcred
Callback handler	am.fim.wssm.callbackhandlers.WSSMTokenGeneratorCallbackHandler
Callback Handler Property Name (1)	xml.callback.handler.class.name
Callback Handler Property Value	com.tivoli.am.fim.wssm.callbackhandlers.JAASSubjectCallbackHandler
Callback Handler Property Name (2)	token.callback.handler.class.name
Callback Handler Property Value	com.tivoli.am.fim.wssm.callbackhandlers.TAMCredentialCallbackHandler

Consuming a Tivoli Access Manager token

1. Use the following table to assist you in specifying the values on the Required Security Token panel.

Table 28. Values for consuming a Tivoli Access Manager token on the Required Security Token panel

Field name	Tivoli Access Manager sample values
Name	TAM
Local name	http://ibm.com/2004/01/itfim/ivcred
Usage type	Required

2. Use the following table to assist you in specifying the values on the Caller Part panel.

Table 29. Values for consuming a Tivoli Access Manager token on the Caller Part panel

Field name	Tivoli Access Manager sample values
Name	TAM
URI	urn:oasis:names:tc:SAML:2.0:assertion
Local name	Assertion

Table 29. Values for consuming a Tivoli Access Manager token on the Caller Part panel (continued)

Field name	Tivoli Access Manager sample values
Property name (1)	com.ibm.wsspi.wssecurity.caller.tokenConsumerNS
Property value	(no value)
Property name (2)	com.ibm.wsspi.wssecurity.caller.tokenConsumerLN
Property value	http://ibm.com/2004/01/itfim/ivcred

3. Use the following table to assist you in specifying the values on the Token Consumer panel.

Table 30. Values for the consuming a Tivoli Access Manager token on the Token Consumer panel

Field name	Tivoli Access Manager sample values
Token consumer name	TAM
Token consumer class	com.tivoli.am.fim.wssm.tokensonsumers.WSSMTokenConsumer
Security token	TAM
Use value type	Select check box
Value type	Custom Token
Local name	http://ibm.com/2004/01/itfim/ivcred
Use jaas.config	Select check box
jaas.config name	system:itfim.wssm.samla

WS-Security configuration for Username

You must define values for generating and consuming a Username token using the Rational Application Developer.

Generating a Username token

1. Use the following table to assist you in specifying the values on the Security Token panel.

Table 31. Values for generating a Username token on the Security Token panel

Field name	Username sample values
Name	Username
Local name	http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-username-token-profile-1.0#UsernameToken

2. Use the following table to assist you in specifying the values on the Token Generator panel.

Table 32. Values for generating a Username token on the Token Generator panel

Field name	Username sample values
Token generator name	Username
Token generator class	com.tivoli.am.fim.wssm.tokengenerators.WSSMTokenGenerator
Security token	Username
Use value type	Select check box
Value type	Username Token
Local name	http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-username-token-profile-1.0#UsernameToken

Table 32. Values for generating a Username token on the Token Generator panel (continued)

Field name	Username sample values
Callback handler	com.tivoli.am.fim.wssm.callbackhandlers.WSSMTokenGeneratorCallbackHandler
Callback Handler Property Name (1)	xml.callback.handler.class.name
Callback Handler Property Value	com.tivoli.am.fim.wssm.callbackhandlers.JAASSubjectCallbackHandler
Callback Handler Property Name (2)	token.callback.handler.class.name
Callback Handler Property Value	com.tivoli.am.fim.wssm.callbackhandlers.UsernameCallbackHandler

Consuming a Username token

1. Use the following table to assist you in specifying the values on the Required Security Token panel.

Table 33. Values for consuming a Username token on the Required Security Token panel

Field name	Username sample values
Name	Username
Local name	http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-username-token-profile-1.0#UsernameToken
Usage type	Required

2. Use the following table to assist you in specifying the values on the Caller Part panel.

Table 34. Values for consuming a Username token on the Caller Part panel

Field name	Username sample values
Name	Username
URI	urn:oasis:names:tc:SAML:2.0:assertion
Local name	Assertion
Property name (1)	com.ibm.wsspi.wssecurity.caller.tokenConsumerNS
Property value	(no value)
Property name (2)	com.ibm.wsspi.wssecurity.caller.tokenConsumerLN
Property value	http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-username-token-profile-1.0#UsernameToken

3. Use the following table to assist you in specifying the values on the Token Consumer panel.

Table 35. Values for consuming a Username token on the Token Consumer panel

Field name	Username sample values
Token consumer name	Username
Token consumer class	com.tivoli.am.fim.wssm.tokensonsumers.WSSMTokenConsumer
Security token	Username

Table 35. Values for consuming a Username token on the Token Consumer panel (continued)

Field name	Username sample values
Use value type	Select check box
Value type	Username Token
Local name	http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-username-token-profile-1.0#UsernameToken
Use jaas.config	Select check box
jaas.config name	system:itfim.wssm.samla

WS-Security configuration for X.509

You must define values for generating and consuming a X.509 token using the Rational Application Developer.

Generating an X.509 token

1. Use the following table to assist you in specifying the values on the Security Token panel.

Table 36. Values for generating an X.509 token on the Security Token panel

Field name	X.509 sample values
Name	X509
Local name	http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-x509-token-profile-1.0#X509

2. Use the following table to assist you in specifying the values on the Token Generator panel.

Table 37. Values for generating an X.509 token on the Token Generator panel

Field name	X.509 sample values
Token generator name	X509
Token generator class	com.ibm.wsspi.wssecurity.token.X509TokenGenerator
Security token	X509
Use value type	Select check box
Value type	X509 certificate token
Local name	http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-x509-token-profile-1.0#X509
Callback handler	com.ibm.wsspi.wssecurity.auth.callback.X509CallbackHandler
User key store	Select check box
Password	testonly
Path	${ITFIM_WSSM}/examples/etc/wssm_client.jks
Type	JKS
Key Alias	wssm_client
Key password	testonly
Key name	cn=wssm_client,ou=Tivoli,o=ibm,c=US

Consuming an X.509 token

1. Use the following table to assist you in specifying the values on the Required Security Token panel.

Table 38. Values for consuming an X.509 token on the Required Security Token panel

Field name	X.509 sample values
Name	X509
Local name	http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-x509-token-profile-1.0#X509
Usage type	Required

2. Use the following table to assist you in specifying the values on the Caller Part panel.

Table 39. Values for consuming a X.509 token on the Caller Part panel

Field name	X.509 sample values
Name	X509
URI	urn:oasis:names:tc:SAML:1.0:assertion
Local name	Assertion
Property name (1)	com.ibm.wsspi.wssecurity.caller.tokenConsumerNS
Property value	(no value)
Property name (2)	com.ibm.wsspi.wssecurity.caller.tokenConsumerLN
Property value	http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-x509-token-profile-1.0#X509

3. Use the following table to assist you in specifying the values on the Token Consumer panel.

Table 40. Values for consuming an X.509 token on the Token Consumer panel

Field name	X.509 sample values
Token consumer name	X509
Token consumer class	com.tivoli.am.fim.wssm.tokensonsumers.WSSMTokenConsumer
Security token	X509
Use value type	Select check box
Value type	X509 certificate token
Local name	http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-x509-token-profile-1.0#X509
Use jaas.config	Select check box
jaas.config name	system:itfim.wssm.samla

Installing the Echo Web service application

Install the Echo Web service application.

1. Start the WebSphere Application Server administrative console and log in, if necessary.

   Note: Ensure that you are using the administrative console associated with the application server where the Web services security management component is installed.
2. Click **Applications** → **Install New Application** to open the Preparing for the application installation page.

3. Click **Browse** and locate the EAR file, echoapplication.ear, containing the Echo Web service application. The binary files are located in the wssm/examples/bin directory.
4. Click **Next** on the remaining configuration panels, accepting the default values.
5. Click **Finish** to install the application.
6. After the secured Echo application has been installed, click **Save to Master Configuration** to save your changes.
7. Optional: You can confirm that the application is running by opening a Web browser and entering the URL for the location of the application. For example, the URL might be `http://localhost:9080/EchoApplication/services/EchoServiceNoToken`. If the application was installed successfully a ″Hi there″ message should be displayed.

Configuring the Echo Web service application

Before you can run the demonstration, you must configure the Echo Web service application by creating and configuring the application module chain and configuring the partner chains for the token types you want to demonstrate.

Configuring Echo application STS module chains

To use the Echo demonstration application, you must configure application STS module chains.

These chains are executed when the WSSM token consumer calls the STS to validate the token received in the Web request by the Echo application and to issue a token for login. Each chain shares the same mapping rules defined in the supplied wssm_test.xsl. The default location of this file is C:\Program Files\IBM\FIM\wssm\examples\etc\wssm_test.xsl.

Using the instructions below, you will create the following trust service chains:

- EchoApplication Kerberos to SAML 2.0
- EchoApplication SAML 1.1 to TAM
- EchoApplication SAML 2.0 to Username
- EchoApplication TAM to SAML 2.0
- EchoApplication Username to SAML 2.0
- EchoApplication X.509 to SAML 1.1

You can load the configuration changes to the runtime after creating each of these chains, or you can load them once after creating all of the chains.

1. Create an STS module chain to validate a Kerberos token and issue a SAML 2.0 token. Use the Trust Service Chain Mapping wizard in the console and specify the following properties for this chain:
   - On the Chain Mapping Identification panel, set:

Chain Mapping Name	`EchoApplication Kerberos to SAML 2.0`

   - On the Chain Mapping Lookup panel, set:

AppliesTo Address	`REGEXP:(.*/EchoApplication/services/EchoServiceKerberos)`
Issuer Address	`urn:itfim:wssm:tokenconsumer`

- On the Chain Assembly panel, add the following module instances in this order:

Order	Module Instance Name	Mode
1	Default Kerberos Token	validate
2	Default Map Module	map
3	Default TAM Authorization	authorize
4	Default SAML 2.0 Token	issue

  Click **Continue** in the message box that says that the module chain you have assembled does not meet the recommended Trust Service module chain structure.
- On the Kerberos Module configuration panel, set:

Kerberos service keytab file name	`C:\Program Files\IBM\FIM\wssm\examples\etc\fimservice.keytab`

- On the Default Map Module configuration panel, set:

XSLT File Containing Identity Mapping Rule	`wssm_test.xsl`

- On the Tivoli Access Manager Authorization Module configuration panel, use the default values. Note that the wssm_test.xsl mapping rules specify the Tivoli Access Manager authorization object name has a prefix of `/itfim-wssm/wssm-default/EchoWSDL/EchoService/EchoService`. This name must match the name in the Tivoli Access Manager object space.
- On the SAML 2.0 Module Configuration panel, set:

The name of the organization issuing the assertions	`fim.test.com`
Sign SAML Assertions	Clear the check box

  Use the defaults for the fields that are not specified above.

2. Create an STS module chain to validate a SAML 1.1 token and issue a Tivoli Access Manager token. The module chain also maps the remote identity to a local identity and performs a Tivoli Access Manager authorization check to ensure the caller is authorized to invoke the Web service operation. Use the Trust Service Chain Mapping wizard in the console and specify the following properties for this chain:
   - On the Chain Mapping Identification panel, set:

Chain Mapping Name	`EchoApplication SAML 1.1 to TAM`

   - On the Chain Mapping Lookup panel, set:

AppliesTo Address	`REGEXP:(.*/EchoApplication/services/EchoServiceSAML11)`
Issuer Address	`urn:itfim:wssm:tokenconsumer`

   - On the Chain Assembly panel, add the following module instances in this order:

Order	Module Instance Name	Mode
1	Default SAML 1.1 Token	validate
2	Default Map Module	map
3	Default TAM Authorization	authorize
4	Default IVCred Token	issue

Click **Continue** in the message box that says that the module chain you have assembled does not meet the recommended Trust Service module chain structure.

- On the SAML 1.1 Module Configuration panel, set:

Enable one-time assertion use enforcement	Clear the check box.
Enable Signature Validation	Clear the check box.

- On the Default Map Module configuration panel, set:

XSLT File Containing Identity Mapping Rule	`wssm_test.xsl`

- On the Tivoli Access Manager Authorization Module configuration panel, use the default values. Note that the wssm_test.xsl mapping rules specify the Tivoli Access Manager authorization object name has a prefix of `/itfim-wssm/wssm-default/EchoWSDL/EchoService/EchoService`. This name must match the name in the Tivoli Access Manager object space.
- On the IVCred Module configuration panel, set:

Enable signatures	Select the check box.
Keystore Password	Type the password and select the key from the list. The default password is `testonly`.

Use the defaults for the fields that are not specified above.

3. Create an STS module chain to validate a SAML 2.0 token and issue a Username token. The module chain also maps the remote identity to a local identity and performs a Tivoli Access Manager authorization check to ensure the caller is authorized to invoke the Web service operation. Use the Trust Service Chain Mapping wizard in the console and specify the following properties for this chain:
   - On the Chain Mapping Identification panel, set:

Chain Mapping Name	`EchoApplication SAML 2.0 to Username`

   - On the Chain Mapping Lookup panel, set:

AppliesTo Address	`REGEXP:(.*/EchoApplication/services/EchoServiceSAML20)`
Issuer Address	`urn:itfim:wssm:tokenconsumer`

   - On the Chain Assembly panel, add the following module instances in this order:

Order	Module Instance Name	Mode
1	Default SAML 2.0 Token	validate

Order	Module Instance Name	Mode
2	Default Map Module	map
3	Default TAM Authorization	authorize
4	Default Username Token	issue

Click **Continue** in the message box that says that the module chain you have assembled does not meet the recommended Trust Service module chain structure.

- On the SAML 2.0 Module Configuration panel, set:

Enable one-time assertion use enforcement	Clear the check box.
Enable Signature Validation	Clear the check box.

- On the Default Map Module configuration panel, set:

XSLT File Containing Identity Mapping Rule	`wssm_test.xsl`

- On the Tivoli Access Manager Authorization Module configuration panel, use the default values. Note that the wssm_test.xsl mapping rules specify the Tivoli Access Manager authorization object name has a prefix of `/itfim-wssm/wssm-default/EchoWSDL/EchoService/EchoService`. This name must match the name in the Tivoli Access Manager object space.
- On the Username Token Module configuration panel, use the default values.

Use the defaults for the fields that are not specified above.

4. Create an STS module chain to validate a Tivoli Access Manager token and issue a SAML 2.0 token. The module chain also maps the remote identity to a local identity and performs a Tivoli Access Manager authorization check to ensure the caller is authorized to invoke the Web service operation. Use the Trust Service Chain Mapping wizard in the console and specify the following properties for this chain:
   - On the Chain Mapping Identification panel, set:

Chain Mapping Name	`EchoApplication TAM to SAML 2.0`

   - On the Chain Mapping Lookup panel, set:

AppliesTo Address	`REGEXP:(.*/EchoApplication/services/EchoServiceTAM)`
Issuer Address	`urn:itfim:wssm:tokenconsumer`

   - On the Chain Assembly panel, add the following module instances in this order:

Order	Module Instance Name	Mode
1	Default IVCred Token	validate
2	Default Map Module	map
3	Default TAM Authorization	authorize
4	Default SAML 2.0 Token	issue

Click **Continue** in the message box that says that the module chain you have assembled does not meet the recommended Trust Service module chain structure.

- On the IVCred Module configuration panel, set:

Enable signatures	Select the check box.
Keystore Password	Type the password and select the key from the list.

- On the Default Map Module configuration panel, set:

XSLT File Containing Identity Mapping Rule	`wssm_test.xsl`

- On the Tivoli Access Manager Authorization Module configuration panel, use the default values. Note that the wssm_test.xsl mapping rules specify the Tivoli Access Manager authorization object name has a prefix of `/itfim-wssm/wssm-default/EchoWSDL/EchoService/EchoService`. This name must match the name in the Tivoli Access Manager object space.
- On the SAML 2.0 Token Module configuration panel, set:

The name of the organization issuing the assertions	`test`
Sign SAML Assertions	Clear the check box.

Use the defaults for the fields that are not specified above.

5. Create an STS module chain to validate a Username token and issue a SAML 2.0 token. The module chain also maps the remote identity to a local identity and performs a Tivoli Access Manager authorization check to ensure the caller is authorized to invoke the Web service operation. Use the Trust Service Chain Mapping wizard in the console and specify the following properties for this chain:
   - On the Chain Mapping Identification panel, set:

Chain Mapping Name	`EchoApplication Username to SAML 2.0`

   - On the Chain Mapping Lookup panel, set:

AppliesTo Address	`REGEXP:(.*/EchoApplication/services/EchoServiceUsername)`
Issuer Address	`urn:itfim:wssm:tokenconsumer`

   - On the Chain Assembly panel, add the following module instances in this order:

Order	Module Instance Name	Mode
1	Default Username Token	validate
2	Default TAM Authentication	authenticate
3	Default Map Token	map
4	Default TAM Authorization	authorize
5	Default SAML 2.0 Token	issue

   Click **Continue** in the message box that says that the module chain you have assembled does not meet the recommended Trust Service module chain structure.

- On the Username Module Configuration panel, set:

Skip password validation	Select the check box.

- On the Tivoli Access Manager Authentication Module configuration panel, there are no values to set.
- On the Default Map Module configuration panel, set:

XSLT File Containing Identity Mapping Rule	`wssm_test.xsl`

- On the Tivoli Access Manager Authorization Module configuration panel, use the default values. Note that the wssm_test.xsl mapping rules specify the Tivoli Access Manager authorization object name has a prefix of `/itfim-wssm/wssm-default/EchoWSDL/EchoService/EchoService`. This name must match the name in the Tivoli Access Manager object space.
- On the SAML 2.0 Token Module configuration panel, set:

The name of the organization issuing the assertions	`test`
Sign SAML Assertions	Clear the check box.

Use the defaults for the fields that are not specified above.

6. Create an STS module chain to validate an X.509 token and issue a SAML 1.1 token. The module chain also maps the remote identity to a local identity and performs a Tivoli Access Manager authorization check to ensure the caller is authorized to invoke the Web service operation. Use the Trust Service Chain Mapping wizard in the console and specify the following properties for this chain:
   - On the Chain Mapping Identification panel, set:

Chain Mapping Name	`EchoApplication X.509 to SAML 1.1`

   - On the Chain Mapping Lookup panel, set:

AppliesTo Address	`REGEXP:(.*/EchoApplication/services/EchoServiceX509)`
Issuer Address	`urn:itfim:wssm:tokenconsumer`

   - On the Chain Assembly panel, add the following module instances in this order:

Order	Module Instance Name	Mode
1	Default X.509 Token	validate
2	Default Map Token	map
3	Default TAM Authorization	authorize
4	Default SAML 1.1 Token	issue

     Click **Continue** in the message box that says that the module chain you have assembled does not meet the recommended Trust Service module chain structure.
   - On the X.509 Module Configuration panel, use the default values.

- On the Default Map Module configuration panel, set:

XSLT File Containing Identity Mapping Rule	`wssm_test.xsl`

- On the Tivoli Access Manager Authorization Module configuration panel, use the default values. Note that the wssm_test.xsl mapping rules specify the Tivoli Access Manager authorization object name has a prefix of `/itfim-wssm/wssm-default/EchoWSDL/EchoService/EchoService`. This name must match the name in the Tivoli Access Manager object space.
- On the SAML 1.1 Token Module configuration panel, set:

The name of the organization issuing the assertions	`test`
Sign SAML Assertions	Clear the check box.

Use the defaults for the fields that are not specified above.

Configuring dynamic Echo application STS module chains

You can use dynamic chains to configure the Echo application.

A description of dynamic chains is available in the *IBM Tivoli Federated Identity Manager Administration Guide*.

Before you begin, be sure to delete any conflicting module chains. For example, if there is already a module chain that validates a Tivoli Access Manager token for the echo application, this chain should be deleted prior to creating the equivalent dynamic chain.

As the issuing of a SAML 2.0 token may be performed independently of the incoming Tivoli Access Manager or Username token being validated, a dynamic chain is used. The validating of the Tivoli Access Manager and Username token is performed in separate chains.

You can load the configuration changes to the runtime after creating each of these chains, or you can load them once after creating all of the chains.

1. Create an STS module chain to validate a Tivoli Access Manager token. Use the Trust Service Chain Mapping wizard in the console and specify the following properties for this chain:
   - On the Chain Mapping Identification panel, set:

Chain Mapping Name	`EchoApplication validate TAM`

   - On the Chain Mapping Lookup panel, set:

AppliesTo Address	`REGEXP:(.*/EchoApplication/services/EchoServiceTAM)`
Issuer Address	`urn:itfim:wssm:tokenconsumer`

   - On the Chain Assembly panel, add the following module instances in this order:

Order	Module Instance Name	Mode
1	Default IVCred Token	validate

Order	Module Instance Name	Mode
2	Default Map Module	map
3	Default Dynamic Chain Module Instance	other

Click **Continue** in the message box that says that the module chain you have assembled does not meet the recommended Trust Service module chain structure.

- On the IVCred Module configuration panel, use the default settings.
- On the Default Map Module configuration panel, set:

XSLT File Containing Identity Mapping Rule	`wssm_test.xsl`

- The Dynamic Chain Module configuration panel has no properties to set.

Use the defaults for the fields that are not specified above.

2. Create an STS module chain to validate a Username token. Use the Trust Service Chain Mapping wizard in the console and specify the following properties for this chain:
   - On the Chain Mapping Identification panel, set:

Chain Mapping Name	`EchoApplication validate Username`

   - On the Chain Mapping Lookup panel, set:

AppliesTo Address	`REGEXP:(.*/EchoApplication/services/EchoServiceUsername)`
Issuer Address	`urn:itfim:wssm:tokenconsumer`

   - On the Chain Assembly panel, add the following module instances in this order:

Order	Module Instance Name	Mode
1	Default Username Token	validate
2	Default Map Module	map
3	Default Dynamic Chain Module Instance	other

   Click **Continue** in the message box that says that the module chain you have assembled does not meet the recommended Trust Service module chain structure.

   - On the Username Token Module Configuration panel, set:

Skip password validation	Select the check box.

   - On the Default Map Module configuration panel, set:

XSLT File Containing Identity Mapping Rule	`wssm_test.xsl`

   - The Dynamic Chain Module configuration panel has no properties to set.

   Use the defaults for the fields that are not specified above.

3. Create a dynamic STS module chain to issue a SAML 2.0 token. Use the Trust Service Chain Mapping wizard in the console and specify the following properties for this chain:

- On the Chain Mapping Identification panel, set:

Chain Mapping Name	`EchoApplication issue SAML 2.0 (dynamic)`
Create a dynamic chain	Select the check box.

- On the Chain Mapping Lookup panel, set:

AppliesTo Address	`REGEXP:(.*/EchoApplication/services/EchoService.*)`
Issuer Address	`urn:itfim:wssm:tokenconsumer`

- On the Chain Assembly panel, add the following module instances in this order:

Order	Module Instance Name	Mode
1	Default SAML 2.0 Token	issue

  Click **Continue** in the message box that says that the module chain you have assembled does not meet the recommended Trust Service module chain structure.
- On the SAML 2.0 Module Configuration panel, set:

The name of the organization issuing the assertions	`fim.test.com`
Sign SAML Assertions	Clear the check box.

Use the defaults for the fields that are not specified above.

Installing the Echo Client

Install the client for the Echo demonstration application.

1. Start the WebSphere Application Server administrative console and log in, if necessary.

   Note: Ensure that you are using the administrative console associated with the application server where the Web services security management component is installed.
2. Click **Applications** → **Install New Application** to open the Preparing for the application installation page.
3. Click **Browse** and locate the EAR file, echoclientapplication.ear, containing the Echo Web service client. The binary files are located in the wssm/examples/bin directory.
4. Click **Next** on the remaining configuration panels, accepting the default values.
5. Click **Finish** to install the application.
6. After the secured Echo application has been installed, click **Save to Master Configuration** to save your changes.
7. Optional: You can confirm that the application is running by opening a Web browser and entering the URL for the location of the application. For example, the URL might be `http://localhost:9080/EchoClientApplication/default.jsp`. If the application was installed successfully, you should be prompted for a user name and password. This user name and password must be configured in the WebSphere Application Server user registry. After you successfully log in, an Echo page will be displayed.

8. On z/OS, if SAF EJBROLE profiles are being used to enforce J2EE roles in WebSphere Application Server, you must create a profile for the EchoRole resource and grant appropriate access. To define a RACF profile for EchoRole in the EJBROLE class granting all authenticated users access, use the following commands:

```
RDEFINE EJBROLE T3.EchoRole UACC(READ)
SETR RACLIST(EJBROLE) REFRESH
```

where *T3* is the WebSphere Cell name used to qualify the profile name.

Configuring the Echo Client

Configure the Echo Web service client by creating and configuring the application module chain and the partner chain.

Configuring Echo client application STS module chains

To use the Echo demonstration application, you must configure client application STS module chains.

These chains are executed when the WSSM token generator calls the STS to generate a token for inclusion in the Web service request being sent by the Echo client application.

Using the instructions below, you will create the following trust service chains:

- EchoClientApplication SAML 2.0 to Kerberos
- EchoClientApplication SAML 2.0 to TAM
- EchoClientApplication SAML 2.0 to Username

You can load the configuration changes to the runtime after creating each of these chains, or you can load them once after creating all of the chains.

1. Create an STS module chain to validate a SAML 2.0 token and issue a Kerberos token. Use the Trust Service Chain Mapping wizard in the console and specify the following properties for this chain:
   - On the Chain Mapping Identification panel, set:

Chain Mapping Name	`EchoClientApplication SAML 2.0 to Kerberos`

   - On the Chain Mapping Lookup panel, set:

AppliesTo Address	`REGEXP:(.*/EchoApplication/services/EchoServiceKerberos)`
Issuer Address	`urn:itfim:wssm:tokengenerator`

   - On the Chain Assembly panel, add the following module instances in this order:

Order	Module Instance Name	Mode
1	Default SAML 2.0 Token	validate
2	Default Map Module	map
3	Default Kerberos Token	issue

Click **Continue** in the message box that says that the module chain you have assembled does not meet the recommended Trust Service module chain structure.

- On the SAML 2.0 Module Configuration panel, set:

Enable one-time assertion use enforcement	Clear the check box.
Enable Signature Validation	Clear the check box.

- On the Default Map Module configuration panel, set:

XSLT File Containing Identity Mapping Rule	`wssm_test.xsl`

- On the Kerberos Module configuration panel, set:

Kerberos realm name	`FIM.TEST.COM`
Kerberos service name	`fimservice/fimtest.fim.test.com`

Use the defaults for the fields that are not specified above.

2. Create an STS module chain to validate a SAML 2.0 token and issue a Tivoli Access Manager token. Use the Trust Service Chain Mapping wizard in the console and specify the following properties for this chain:
   - On the Chain Mapping Identification panel, set:

Chain Mapping Name	`EchoClientApplication SAML 2.0 to TAM`

   - On the Chain Mapping Lookup panel, set:

AppliesTo Address	`REGEXP:(.*/EchoApplication/services/EchoServiceTAM)`
Issuer Address	`urn:itfim:wssm:tokengenerator`

   - On the Chain Assembly panel, add the following module instances in this order:

Order	Module Instance Name	Mode
1	Default SAML 2.0 Token	validate
2	Default IVCred Token	issue

   Click **Continue** in the message box that says that the module chain you have assembled does not meet the recommended Trust Service module chain structure.
   - On the SAML 2.0 Module Configuration panel, set:

Enable one-time assertion use enforcement	Clear the check box.
Enable Signature Validation	Clear the check box.

   - On the IVCred Module configuration panel, set:

Enable signatures	Select the check box.
Keystore Password	Type the password and select the key from the list. The default password is `testonly`.

   Use the defaults for the fields that are not specified above.

3. Create an STS module chain to validate a SAML 2.0 token and issue a Username token. Use the Trust Service Chain Mapping wizard in the console and specify the following properties for this chain:
   - On the Chain Mapping Identification panel, set:

Chain Mapping Name	`EchoClientApplication SAML 2.0 to Username`

   - On the Chain Mapping Lookup panel, set:

AppliesTo Address	`REGEXP:(.*/EchoApplication/services/EchoServiceUsername)`
Issuer Address	`urn:itfim:wssm:tokengenerator`

   - On the Chain Assembly panel, add the following module instances in this order:

Order	Module Instance Name	Mode
1	Default SAML 2.0 Token	validate
2	Default Username Token	issue

     Click **Continue** in the message box that says that the module chain you have assembled does not meet the recommended Trust Service module chain structure.
   - On the SAML 2.0 Module Configuration panel, set:

Enable one-time assertion use enforcement	Clear the check box.
Enable Signature Validation	Clear the check box.

   - On the Username Module configuration panel, use the default values.

   Use the defaults for the fields that are not specified above.

Configuring dynamic Echo client application STS module chains

You can use dynamic chains to configure the Echo application.

A description of dynamic chains is available in the *IBM Tivoli Federated Identity Manager Administration Guide*.

Before you begin, be sure to delete any conflicting module chains. For example, if there is already a module chain that issues a Tivoli Access Manager token for the echo client application, this chain should be deleted prior to creating the equivalent dynamic chain.

As the issuing of Tivoli Access Manager and Username tokens both involve first validating a SAML 2.0 token, this common functionality may be contained within a single chain. The actual issuing of the Tivoli Access Manager or Username token is performed in separate dynamic chains.

You can load the configuration changes to the runtime after creating each of these chains, or you can load them once after creating all of the chains.

1. Create an STS module chain to validate a SAML 2.0 token. Use the Trust Service Chain Mapping wizard in the console and specify the following properties for this chain:

- On the Chain Mapping Identification panel, set:

Chain Mapping Name	`EchoClientApplication validate SAML 2.0`

- On the Chain Mapping Lookup panel, set:

AppliesTo Address	`REGEXP:(.*/EchoApplication/services/EchoService.*)`
Issuer Address	`urn:itfim:wssm:tokengenerator`

- On the Chain Assembly panel, add the following module instances in this order:

Order	Module Instance Name	Mode
1	Default SAML 2.0 Token	validate
2	Default Map Module	map
3	Default Dynamic Chain Module Instance	other

  Click **Continue** in the message box that says that the module chain you have assembled does not meet the recommended Trust Service module chain structure.
- On the SAML 2.0 Module Configuration panel, set:

Enable Signature Validation	Clear the check box.

- On the Default Map Module configuration panel, set:

XSLT File Containing Identity Mapping Rule	`wssm_test.xsl`

- The Dynamic Chain Module configuration panel has no properties to set.

  Use the defaults for the fields that are not specified above.

2. Create a dynamic STS module chain to issue a Tivoli Access Manager token. Use the Trust Service Chain Mapping wizard in the console and specify the following properties for this chain:
   - On the Chain Mapping Identification panel, set:

Chain Mapping Name	`EchoClientApplication issue TAM (dynamic)`
Create a dynamic chain	Select the check box.

   - On the Chain Mapping Lookup panel, set:

AppliesTo Address	`REGEXP:(.*/EchoApplication/services/EchoServiceTAM)`
Issuer Address	`urn:itfim:wssm:tokengenerator`

   - On the Chain Assembly panel, add the following module instances in this order:

Order	Module Instance Name	Mode
1	Default IVCred Token	issue

Click **Continue** in the message box that says that the module chain you have assembled does not meet the recommended Trust Service module chain structure.

- On the IVCred Module configuration panel, use the default settings.

Use the defaults for the fields that are not specified above.

3. Create a dynamic STS module chain to issue a Username token. Use the Trust Service Chain Mapping wizard in the console and specify the following properties for this chain:
   - On the Chain Mapping Identification panel, set:

Chain Mapping Name	`EchoClientApplication issue Username (dynamic)`
Create a dynamic chain	Select the check box.

   - On the Chain Mapping Lookup panel, set:

AppliesTo Address	`REGEXP:(.*/EchoApplication/services/EchoServiceUsername)`
Issuer Address	`urn:itfim:wssm:tokengenerator`

   - On the Chain Assembly panel, add the following module instances in this order:

Order	Module Instance Name	Mode
1	Default Username Token	issue

Click **Continue** in the message box that says that the module chain you have assembled does not meet the recommended Trust Service module chain structure.

- On the Username Module configuration panel, use the default values.

Use the defaults for the fields that are not specified above.

Monitoring the Echo service and client

You can monitor the Echo demonstration application in several ways.

- Monitor the communications between the trust service and the server on which the Echo Web service application is running. For this procedure, refer to “Monitoring communications between the server and the trust service” on page 51.
- Monitor the activities of the Web services security management component and Tivoli Federated Identity Manager by enabling logging. For this procedure, refer to “Enabling logging” on page 52.
- Monitor the communications between the Echo service and the Echo client, as described in “Monitoring communications between the Echo client and the Echo application” on page 83.
- Monitor the progress of the WebSphere Application Server, as described in “Monitoring progress” on page 83.

Monitoring communications between the Echo client and the Echo application

The TCPMonitor application utility provided with WebSphere Application Server can be used to capture and display network communications between the Echo client and the server on which the Echo Web service application is running.

Ensure that the server used by the Echo Web service application is running.

1. Start the TCPMonitor application provided with WebSphere Application Server. Refer to the topic Tracing SOAP messages with tcpmon in the WebSphere Application Server Information Center for further information.
2. In the **Listen Port #** field, specify a port number to use for incoming requests. Select a port number that is not currently in use on the system.
3. To configure the TCPMonitor application to act as a listener, select **Listener**, and then enter the following information:
   a. In the **Target Hostname** field, enter the host name of the WebSphere Application Server system. A host name of `localhost` can be used if the TCPMonitor application is running on the same system as WebSphere Application Server.
   b. In the **Target Port #** field, enter the port number that the server application is using for SOAP requests.
4. Click **Add** to enable the TCPMonitor application to listen for requests. For example, requests received on port 51962 might be sent to port 9080. Conversely, information returned from port 9080 is forwarded back to the client on port 51962. After this operation completes, the fields in the panel are cleared and a new tab appears at the top of the window.
5. Click the **Port nnnnn** tab at the top of the window, where *nnnnn* is the port number that was added in the previous step. After selecting the tab, the monitor panel is displayed
6. Perform an operation using the Echo client. The TCPMonitor window shows the request in the middle pane and the response in the bottom pane.
7. Click **Switch Layout** in the TCPMonitor application, and resize the window if necessary, to show the request in the left pane and the response in the right pane.

Monitoring progress

The progress of WebSphere Application Server can be monitored using its log files.

For more information about which log files are available and how to configure them, refer to the WebSphere Application Server information center at http://publib.boulder.ibm.com/infocenter/ws60help/index.jsp.

Starting the Echo demonstration application

Start the Echo demonstration application.

1. Start the WebSphere Application Server administrative console and log in, if necessary.

   Note: Ensure that you are using the administrative console associated with the application server where the Web services security management component is installed.
2. Click **Applications** → **Enterprise Applications** to open the Enterprise Applications page.

3. Select the EchoApplication server application, and click **Start**.

Running the Echo client

Start the Echo client. The client interacts with the Echo demonstration application.

Before beginning, ensure that the user you will log in as is configured in the WebSphere Application Server user registry.

1. Open a Web browser and navigate to the location where the Echo client is installed, for example `http://localhost:9080/EchoClientApplication/default.jsp`, and log in.

   Note: You must log in using a user name and password that exists in the WebSphere Application Server user registry that is used by the server where the client is running.

2. From the **Token type** list, select the token type to send from this client. Different parts of the Web services security management component are demonstrated depending on your selection.

Select token type	To demonstrate
No token	No credentials are sent.
Kerberos	WSSM generates a SAML 2.0 token internally from the JAAS subject. The STS exchanges it for a Kerberos token.
SAML 1.1	WSSM generates a SAML 1.1 token internally from the JAAS subject. No call is made to the STS.
SAML 2.0	WSSM generates a SAML 2.0 token internally from the JAAS subject. No call is made to the STS.
Tivoli Access Manager	WSSM generates a SAML 2.0 token internally from the JAAS subject. The STS exchanges it for a Tivoli Access Manager token.
Username	WSSM generates a SAML 2.0 token internally from the JAAS subject. The STS exchanges it for a Username token.
X.509	WebSphere Application Server generates an X.509 token. WSSM and the STS are not involved.

   Selecting a token type automatically selects Echo Web service URL for that token type.

   For example, if you select SAML 1.1, the Echo Web service URL is set to `http://localhost:9080/EchoApplication/services/EchoServiceSAML11.`

   However, this URL can be modified. For example, if you are using TCPMonitor to capture traffic to and from the Echo client, you might set this URL to `http://localhost:51962/EchoApplication/services/EchoServiceSAML11.jsp`.

3. Click one of the function buttons to invoke the Web service.

Using the client functions

The Echo client presents several functions.

Using the ″Echo″ function

The ″Echo″ function instructs the server application to simply return the text to the client unchanged.

1. In the **Input** field, enter the text to be sent to the Echo server application.
2. Click **Echo** to request that the server to echo the text back to the client. The returned text appears in the **Result** field.

Using the ″To Lower″ function

The ″To Lower″ function instructs the server application to convert the input text to lowercase and then return it.

1. In the **Input** field, enter the text to be sent to the Echo server application.
2. Click **To Lower** to request that the server convert the input text to lowercase and return the text back to the client. The returned text appears in the **Result** field.

Using the ″To Upper″ function

The ″To Upper″ function instructs the server application to convert the input text to uppercase and then return it.

1. In the **Input** field, enter the text to be sent to the Echo server application.
2. Click **To Upper** to request that the server convert the input text to uppercase and return the text back to the client. The returned text appears in the **Result** field.

Using the ″Who Am I″ function

The ″Who Am I″ function instructs the server application to return the credentials of the client.

Click **Who Am I** to request that the server return the credentials of the logged in user.

The ″Who Am I″ function returns the Java subject information that is available to the Echo Web service application. This information includes the principal names and the public and private credentials. A WSSMCredential is included with the private credentials. This WSSMCredential contains the SAML 2.0 assertion that is returned by the trust service and is used to perform the JAAS login for the application. The assertion includes an authentication statement that contains the identity used to log in as well as an attribute statement that contains the identity that was supplied by the Echo client.

Removing the Echo demonstration application

Remove the Echo demonstration application.

1. Start the WebSphere Application Server administrative console and log in, if necessary.

   Note: Ensure that you are using the administrative console associated with the application server where the Web services security management component is installed.
2. Click **Applications** → **Enterprise Applications** to open the Enterprise Applications page.
3. Optional: If the application to be removed is running, select the application and then click **Stop**.

4. Select the application to be removed.
5. Click **Uninstall** to remove the application from WebSphere Application Server.
6. Click **OK** to confirm removing the application.
7. In the Messages pane at the top of the window, click **Save** to save your changes.
8. Restart the application server.

Appendix. Web services standards

Web services security for WebSphere Application Server is based on standards described in the Organization for the Advancement of Structured Information Standards (OASIS) Web services security (WS-Security) specification.

For additional information about Web services standards, see:

http://www.ibm.com/developerworks/webservices/standards/

For information regarding service-oriented architecture from IBM, see:

http://www.ibm.com/soa

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