Sun Java System Access Manager 7.1 Federation and SAML Administration Guide

Beta

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Preface

The *Sun Java™ System Access Manager 7.1 Federation and SAML Administration Guide* provides information about the Federation and Security Assertions Markup Language (SAML) components of Sun Java System Access Manager. The *Federation and SAML Administration Guide* includes an introduction to the open-standard specifications used to develop these features and information on how Access Manager has implemented them. It also includes information on integrated web services, and summaries of the application programming interface (API).

Before You Read This Book

This *Federation and SAML Administration Guide* is intended for use by IT professionals, network administrators and software developers who implement a Liberty-enabled identity framework and access platform using Sun Java System servers and software. It is recommended that administrators understand the following technologies:

- Lightweight Directory Access Protocol (LDAP)
- Java™
- JavaServer Pages™ (JSP)
- HyperText Transfer Protocol (HTTP)
- HyperText Markup Language (HTML)
- eXtensible Markup Language (XML)
- Web Services Description Language (WSDL)
- Security Assertion Markup Language (SAML)
- SOAP (SOAP is no longer an acronym for the messaging protocol.)
- Liberty Alliance Project specifications

Related Books

Access Manager is a component of the Sun Java Enterprise System, a software infrastructure that supports enterprise applications distributed across a network or Internet environment. Related documentation is available as follows:

- "Access Manager Core Documentation" on page 18
- "Other Sun Java System Products Documentation" on page 19

Note – For instructions on installing Access Manager, begin with the *Sun Java Enterprise System 5 Installation Guide for UNIX*.

Access Manager Core Documentation

The Access Manager documentation set contains the following titles:

- The *Sun Java System Access Manager 7.1 Release Notes* will be available online after the product is released. It gathers an assortment of last-minute information, including a description of what is new in this current release, known problems and limitations, installation notes, and how to report issues with the software or the documentation.
- The *Sun Java System Access Manager 7.1 Technical Overview* provides an overview of how Access Manager components work together to consolidate access control functions, and to protect enterprise assets and web-based applications. It also explains basic Access Manager concepts and terminology.
- The *Sun Java System Access Manager 7.1 Deployment Planning Guide* provides information for planning an Access Manager deployment within an existing information technology infrastructure.
- The *Sun Java System Access Manager 7.1 Performance Tuning Guide* provides information on how to tune Access Manager and its related components for optimal performance.
- The *Sun Java System Access Manager 7.1 Administration Guide* describes how to configure, monitor, manage, and maintain Access Manager services, identities, and policies either through the console or the command-line interface.
- The *Sun Java System Access Manager 7.1 2006Q4 Administration Reference* provides reference information for administrators including, for example, error codes.
- The *Sun Java System Access Manager 7 2006Q4 Federation and SAML Administration Guide* (this guide) provides information about the features in Access Manager that are based on the Liberty Alliance Project and SAML specifications. It includes information on the services based on these specifications, instructions for enabling a Liberty-based environment, and summaries of the application programming interface (API) for extending the framework.
- The *Sun Java System Access Manager 7.1 Developer's Guide* offers information on how to customize Access Manager and integrate its functionality into an organization's current technical infrastructure. It also contains details about the programmatic aspects of the product and its API.
- The *Sun Java System Access Manager 7.1 C API Reference* provides summaries of data types, structures, and functions that make up the public Access Manager C APIs.
- The *Sun Java System Access Manager 7.1 2006Q4 Java API Reference* is generated from Java code using the Javadoc™ tool. The pages provide information on the implementation of the Java packages in Access Manager.
- The *Sun Java System Access Manager Policy Agent 2.2 User's Guide* provides an overview of the policy functionality and the policy agents available for Access Manager.

Updates to the *Release Notes* and links to modifications of the core documentation can be found on the Access Manager page at the Sun Java System documentation web site. Updated documents will be marked with a revision date.

Sun Java Enterprise System Documentation

The following books in the Sun Java Enterprise System documentation set contain planning and installation procedures for Access Manager:

- *Sun Java Enterprise System 2006Q3 Deployment Planning Guide*
- *Sun Java Enterprise System 5 Installation Guide for UNIX*
- *Sun Java Enterprise System 5 Installation Reference*
- *Sun Java Enterprise System 2006Q3 Upgrade Guide*

Other Sun Java System Products Documentation

Useful information can be found in the documentation for the following Sun Java System products:

- Because Sun Java System Directory Server can be used as the data store in an Access Manager deployment, you should be familiar with the Sun Java System Directory Server Enterprise Edition 6.
- Because Sun Java System Web Server can be used as the web container in an Access Manager deployment, you should be familiar with the Sun Java System Web Server 7, in particular the *Sun Java System Web Server 7.0 Developer's Guide to Java Web Applications*.
- Because Sun Java System Application Server can be used as the web container in an Access Manager deployment, you should be familiar with the Sun Java System Application Server Enterprise Edition 8.2.
- Because Sun Java System Web Proxy Server can be used as a proxy server in an Access Manager deployment, you should be familiar with theSun Java System Web Proxy Server.

Accessing Sun Resources Online

For product downloads, professional services, patches, support, and additional developer information, go to:

- Download Center
- Sun Software Services
- Sun Java Systems Services Suite
- Sun Enterprise Services, Solaris Patches, and Support
- Developer Information

Contacting Sun Technical Support

If you have technical questions about this product that are not answered in the product documentation, contact Sun Support Services.

Related Third-Party Web Site References

Third-party URLs are referenced in this documentation set and provide additional, related information. Sun is not responsible for the availability of third-party Web sites mentioned in this document. Sun does not endorse and is not responsible or liable for any content, advertising, products, or other materials that are available on or through such sites or resources. Sun will not be responsible or liable for any actual or alleged damage or loss caused by or in connection with the use of or reliance on any such content, goods, or services that are available on or through such sites or resources.

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Documentation, Support, and Training

Sun Function	URL	Description
Documentation	`http://www.sun.com/documentation/`	Download PDF and HTML documents, and order printed documents
Support and Training	`http://www.sun.com/supportraining/`	Obtain technical support, download patches, and learn about Sun courses

Typographic Conventions

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

TABLE P–1 Typographic Conventions

Typeface or Symbol	Meaning	Example
`AaBbCc123`	The names of commands, files, and directories, and onscreen computer output	Edit your `.login` file. Use `ls -a` to list all files. `machine_name% you have mail.`

`AaBbCc123`	What you type, contrasted with onscreen computer output	`machine_name%` **`su`**
		`Password:`

aabbcc123	Placeholder: replace with a real name or value	The command to remove a file is `rm` *filename*.
AaBbCc123	Book titles, new terms, and terms to be emphasized	Read Chapter 6 in the *User's Guide*. Perform a *patch analysis*. Do *not* save the file. [Note that some emphasized items appear bold online.]

Shell Prompts in Command Examples

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

TABLE P–2 Shell Prompts

Shell	Prompt
C shell prompt	`machine_name%`
C shell superuser prompt	`machine_name#`
Bourne shell and Korn shell prompt	`$`
Bourne shell and Korn shell superuser prompt	`#`

PART I

The Liberty Alliance Project Specifications and Access Manager

◆ ◆ ◆ CHAPTER 1

Introduction to the Liberty Alliance Project

Sun Java^{TM} System Access Manager implements identity federation, single sign-on (SSO), and web services specifications defined by the Liberty Alliance Project. This introductory chapter explains concepts used in the specifications, and the role of the Liberty Alliance Project in creating identity-based solutions. It covers the following topics:

- "Overview of the Liberty Alliance Project" on page 25
- "Concept of Identity" on page 26
- "Concept of Federation" on page 27
- "Concept of Trust" on page 28
- "Liberty Alliance Project Terms" on page 28
- "Liberty Alliance Project Specifications" on page 36

Overview of the Liberty Alliance Project

In 2001 Sun Microsystems joined with other major companies to form the *Liberty Alliance Project*. The goals were to define standards for developing identity-based infrastructures, software, and web services, and to promote adoption of these standards. The Liberty Alliance Project does not deliver products or services. It defines frameworks to ensure interoperability between homogeneous products while respecting the privacy and security of identity data. This section contains the following information:

- "Members of the Liberty Alliance Project" on page 26
- "Objectives of the Liberty Alliance Project Specifications" on page 26

Note – If you are already familiar with the concepts and protocols developed by the Liberty Alliance Project, go to Chapter 2 for information on how these standards are integrated into Access Manager.

Members of the Liberty Alliance Project

The members of the Liberty Alliance Project include some of the world's most recognized companies, representing products, services and partnerships across a wide spectrum of consumer and business service providers. Members also include government organizations and technology vendors. For a complete listing of current members, see the Liberty Alliance Project web site.

Note – Only members of the Liberty Alliance Project are allowed to provide feedback on drafts of the specifications although any organization may implement them.

Objectives of the Liberty Alliance Project Specifications

The specifications developed by the Liberty Alliance Project enable individuals and organizations to securely conduct network transactions. The main objectives include:

- Serve as open standards for federated identity management and web services.
- Support and promote permission-based sharing of personal identity attributes.
- Provide a standard for SSO that includes decentralized authentication and authorization for multiple providers.
- Create an open network identity infrastructure that supports all current and emerging *user agents* (also referred to as browsers or wireless browsers).
- Enable consumers to protect their network identity information.

Concept of Identity

In one dictionary, *identity* is defined as "a set of information by which one person is definitively distinguished". This information begins with a document that corroborates a person's name: a birth certificate. Over time, additional information further designates aspects of identity:

- An address
- A telephone number
- One or more diplomas
- A driver's license
- A passport
- Financial institution accounts
- Medical records
- Insurance statements
- Employment records
- Magazine subscriptions
- Utility bills

Each of these individual documents represents data that defines a person's identity as it relates to the enterprise for which the document was defined. The composite of this data constitutes an overall identity with each specific piece providing a distinguishing characteristic.

Because the Internet is becoming the primary vehicle for the types of interactions represented by this identity-defining information, people are now creating online identities specific to the businesses with which they interact. By defining a user identifier and password, an email address, personal preferences (such as style of music, or opt-in/opt-out marketing decisions) and other information more specific to the particular business (a bank account number or ship-to address), users distinguish themselves from others who use the enterprise's services. This distinguishing information is referred to as a *local identity* because it is specific to the service provider for which it has been set.

Considering the number of service providers for which you can define a local identity, accessing each one can be a time-consuming and frustrating experiencing. In addition, although most local identities are configured independently (and fragmented across the Internet), it might be useful to connect the information. For example, a user's local identity with a bank could be securely connected to the same user's local identity with a retailer. Federation addresses this issue.

Concept of Federation

Federation is defined as "an association formed by merging several groups or parties". In the Liberty Alliance Project specifications, federation encompasses both *identity federation* and *provider federation*.

- "Identity Federation" on page 27
- "Provider Federation" on page 28

Identity Federation

Federation, as it has evolved with regard to individual users and the World Wide Web, begins with the notion of identity. (See "Concept of Identity" on page 26.) Sending and receiving email, checking bank balances, finalizing travel arrangements, accessing utility accounts, and shopping are just a few online services for which a user might define an identity. If a user accesses all of these services, many different identity accounts have been configured. This virtual phenomenon offers an opportunity to fashion a system for users to *federate* these identities.

Identity federation allows the user to link, connect, or bind the local identities that have been created for each *service provider* (a networked entity that provides services to other entities). The linked local identities, referred to as a *federated identity*, allow the user to log in to one service provider site and click through to an affiliated service provider without having to reauthenticate or reestablish identity.

Provider Federation

The concept of federation, as defined by the Liberty Alliance Project, begins with a ”circle of trust.” A *circle of trust* is a group of service providers who contractually agree to exchange authentication information using a Liberty-enabled architecture. Each circle of trust must also include at least one *identity provider*, a service provider that maintains and manages identity data, and provides authentication services.

Note – The establishment of contractual agreements between providers is beyond the scope of this guide. See “Concept of Trust” on page 28 for an overview.

After the contracts and policies defining a circle of trust are in place, the specific protocols, profiles, endpoints, and security mechanisms being used in the deployment are collected into a metadata document that is exchanged amongst the members of the circle of trust. Access Manager provides the tools necessary to integrate the metadata and enable the circle of trust, technologically, as an *authentication domain*. Authentication within this virtual federation is honored by all membered providers of the authentication domain. For more information, see “Authentication Domain” on page 30.

Concept of Trust

The Liberty Alliance Project specifications assume existing trust relationships between members in a circle of trust. This trust is usually defined through business arrangements or contracts that describe the technical, operational, and legal responsibilities of each party and the consequences for not completing them. When defined, a trust relationship means that one organization trusts another’s user authentication decisions. That trust among members enables a user to log in at one site and access another site as well. Ensure that these agreements are in force before going live with a Liberty-compliant system. The Liberty Alliance Project has created a support document for helping to establish these arrangements. It is located on the Liberty Alliance Project web site at Liberty Trust Model Guidelines.

Liberty Alliance Project Terms

Many of the concepts defined in this section are derived from the specifications discussed in “Liberty Alliance Project Specifications” on page 36.

- “Account Federation” on page 29
- “Affiliation” on page 29
- “Attribute Provider” on page 30
- “Authentication Context” on page 30
- “Authentication Domain” on page 30
- “Binding” on page 31
- “Circle of Trust” on page 31

- “Client” on page 31
- “Common Domain” on page 31
- “Defederation” on page 31
- “Federation” on page 31
- “Federation Cookie” on page 32
- “Federated Identity” on page 32
- “Federation Termination” on page 32
- “Identity” on page 32
- “Identity Federation” on page 32
- “Identity Provider” on page 32
- “Identity Service” on page 33
- “Liberty-Enabled Client” on page 33
- “Liberty-Enabled Proxy” on page 33
- “Name Identifier” on page 33
- “Principal” on page 33
- “Profile” on page 33
- “Protocol” on page 33
- “Provider Federation” on page 34
- “Pseudonym” on page 34
- “Receiver” on page 34
- “Resource Offering” on page 34
- “Sender” on page 34
- “Server” on page 34
- “Service Provider” on page 35
- “Single Logout” on page 35
- “Single Sign-On” on page 35
- “Trusted Provider” on page 35
- “Web Service Consumer” on page 35
- “Web Service Provider” on page 35

Account Federation

See “Identity Federation” on page 32.

Affiliation

An *affiliation* is a group of providers formed without regard to their configured authentication domains. An affiliation is formed and maintained by an *affiliation owner*. Members of an affiliation may invoke services either as a member of the affiliation (by virtue of their Affiliation ID) or individually (by virtue of their Provider ID). An *affiliation document* describes a group of providers. See “Entities” on page 72 for more information.

Attribute Provider

An *attribute provider* is a web service that hosts attribute data. The Access Manager Liberty Personal Profile Service data service is an example of an attribute provider. For more information, see Chapter 7.

Authentication Context

Authentication context refers to information added to a SAML Authentication Assertion regarding details of the technology used for the actual authentication action. This information might include the method of authentication (for example, HTTP Basic or Safeword), the process followed in the issuance of the identity (for example, web self-registration), and any other characteristics that may be relevant to the service provider consuming the assertion. The following code sample describes a user having authenticated with a password over an SSL-protected session.

EXAMPLE 1–1 XML Code Sample Defining Authentication Context

```
<?xml version="1.0" encoding="UTF-8" ?>
<AuthenticationContextStatement>
            <AuthenticationMethod>
                <PrincipalAuthenticationMethod>
                   <Password>
                      <Length min="3"/>
                   </Password>
                </PrincipalAuthenticationMethod>
                <AuthenticatorTransportProtocol>
                   <SSL/>
                </AuthenticatorTransportProtocol>
            </AuthenticationMethod>
<AuthenticationContextStatement>
```

More information is in “Authentication and Authentication Context” on page 53.

Authentication Domain

An *authentication domain* is a federation of service providers (with at least one identity provider) that is configured using Access Manager.

Note – An authentication domain is not a domain in the Domain Name System (DNS) sense of the word.

Before an authentication domain can be configured, the service providers must contractually agree to exchange authentication information using the Liberty Alliance Project specifications. After this *circle of trust* is established, an authentication domain can be configured using Access Manager and single sign-on can be enabled. Simply put, an authentication domain is the term used by Access Manager when configuring a circle of trust. See “Concept of Trust” on page 28 for related information.

Binding

A *binding* describes how to integrate request and response messages into a transmission protocol. See “Profile” on page 33 and “Protocol” on page 33 for related information.

Circle of Trust

See “Provider Federation” on page 28.

Client

A *client* is the role that any system entity assumes when making a request of another system entity. In this scenario, the system entity to which the request is made is called a *server* as discussed in “Server” on page 34.

Common Domain

If an authentication domain has more than one identity provider, the service providers need a way to determine which identity provider is used by the principal (as discussed in “Principal” on page 33). Because this function must work across any number of DNS domains, the Liberty approach is to create one domain that is common to all identity and service providers in the authentication domain. This predetermined domain is called the *common domain*. Within the common domain, when a principal has been authenticated to a service provider, the identity provider writes a *common domain cookie* that stores the principal’s identity provider. When the principal attempts to access another service provider within the authentication domain, the service provider reads the common domain cookie and the request is forwarded to the correct identity provider. See Chapter 4 for more information.

Defederation

See “Federation Termination” on page 32.

Federation

See “Concept of Federation” on page 27.

Federation Cookie

A *federation cookie* called fedCookie is implemented by Access Manager. It can have a value of yes or no, based on the principal's federation status. For information on how a federation cookie is used, see "Process of Federation" on page 65 in Chapter 3.

Note – The concept of a *federation cookie* was developed for Access Manager and is not a defined part of the Liberty Alliance Project specifications. The definition is placed here for information only.

Federated Identity

A *federated identity* refers to a user's consolidated local identities. The user must choose to federate the separate identities that they have configured with multiple service providers. Although federated, the local identities are still administered by the user, but they can be securely shared between the service providers for which they were defined.

Federation Termination

Users can terminate their federations. *Federation termination* (or *defederation*) cancels identity federations established between the user's identity provider and service provider accounts.

Identity

See "Concept of Identity" on page 26.

Identity Federation

Identity federation occurs when a user chooses to unite distinct service provider accounts with one or more identity provider accounts. A user retains the individual account information with each provider while simultaneously establishing a link that allows the exchange of authentication information between them. For more information, see "Concept of Federation" on page 27.

Identity Provider

An *identity provider* is a service provider that specializes in providing authentication services. As the administrating service for authentication, an identity provider also maintains and manages identity information. Authentication by an identity provider is honored by all service providers with whom the identity provider is affiliated. This term is used when defining an entity of this sort specific to the Liberty Identity Federation Framework as discussed in "Liberty Identity Federation Framework" on page 36.

Identity Service

An *identity service* (also referred to as a *data service* or an *attribute provider*) is a web service that acts on a resource to retrieve, update, or perform some action on data attributes related to a principal (an *identity*). For example, an identity service might be a corporate phone book or calendar service. For more information, see Chapter 7.

Liberty-Enabled Client

A *Liberty-enabled client* is a client that has, or knows how to obtain, information about the identity provider that a principal will use to authenticate to a service provider.

Liberty-Enabled Proxy

A *Liberty-enabled proxy* is an HTTP proxy that emulates a Liberty-enabled client.

Name Identifier

To help preserve anonymity when identity information is exchanged between identity providers and service providers, an arbitrary name identifier is used. A *name identifier* is a randomly generated character string that is assigned to a principal and used to facilitate account linking at the identity provider and service provider sites. This pseudonym allows all providers to identify a principal without knowing the user's actual identity. The name identifier has meaning only in the context of the relationship between providers.

Principal

A *principal* is an entity that can acquire a federated identity, that is capable of making decisions, and has authenticated actions done on its behalf. Examples of principals include an individual user, a group of individuals, a corporation, other legal entities, or a component of the Liberty architecture.

Profile

A *profile* defines the HTTP exchanges required to transfer XML requests and responses between providers. See "Binding" on page 31 and "Protocol" on page 33 for related information.

Protocol

A *protocol* is an agreed-upon set of rules for formatting data to be transmitted between two or more devices. XML schemas define the syntax for request and response messages that are typically embedded into other structures for transport. Among other things, a protocol can determine:

- The type of error checking to be used.
- Data compression method, if any.
- How the sending device will indicate that it has finished sending a message.
- How the receiving device will indicate that it has received a message.

See "Binding" on page 31 and "Profile" on page 33 for related information.

Provider Federation

See "Concept of Federation" on page 27.

Pseudonym

See "Name Identifier" on page 33.

Receiver

A *receiver* is the role of a system entity when it receives a message sent by another system entity. In this scenario, the system entity from which the message is received is called a *sender* as discussed in "Sender" on page 34.

Resource Offering

In a discovery service, a *resource offering* defines associations between a piece of identity data and the service instance that provides access to it. See Chapter 8.

Sender

A *sender* is the role donned by a system entity when it constructs and sends a message to another system entity. In this scenario, the system entity from which the message is received is called a *receiver* as discussed in "Receiver" on page 34.

Server

A *server* is the role that any system entity assumes when providing a service in response to a request from another system entity. In this scenario, the system entity from which the request is received is called a client as discussed in "Client" on page 31.

Note – In order to provide a service to clients, a server will often be both a sender and a receiver.

Service Provider

A *service provider* is a commercial or not-for-profit organization that offers web-based services to a principal. This broad category can include Internet portals, retailers, transportation providers, financial institutions, entertainment companies, libraries, universities, and governmental agencies. This term is used when defining an entity of this sort specific to the Liberty Identity Federation Framework as discussed in "Liberty Identity Federation Framework" on page 36.

Single Logout

A *single logout* occurs when a user logs out of an identity provider or a service provider. By logging out of one provider, the user is logged out of all service providers or identity providers in that authentication domain.

Single Sign-On

Single sign-on is established when a user with a federated identity authenticates to an identity provider. If the user has previously opted-in for federation, access to affiliated service providers is available without having to reestablish identity.

Trusted Provider

A *trusted provider* is a generic term for one of a group of service and identity providers in an authentication domain. A user can transact and communicate with trusted providers in a secure environment.

Web Service Consumer

A *web service consumer* invokes the operations that a web service provides by making a request to a web service provider. This term is used when defining an entity of this sort specific to the Liberty Identity Web Services Framework as discussed in "Liberty Identity Web Services Framework" on page 41.

Web Service Provider

A *web service provider* implements a web service based on a request from a web service consumer. This term is used when defining an entity of this sort specific to the Liberty Identity Web Services Framework as discussed in "Liberty Identity Web Services Framework" on page 41.

Note – A web service provider may run on the same Java virtual machine as the web service consumer that is using it.

Liberty Alliance Project Specifications

The Liberty Alliance Project develops and delivers specifications that enable federated network identity management. Using web redirection and open-source technologies such as SOAP and XML, they enable distributed, cross-domain interactions. The specifications are divided into the following components:

- "Liberty Identity Federation Framework" on page 36
- "Liberty Identity Web Services Framework" on page 41
- "Liberty Identity Service Interface Specifications" on page 44
- "Support Documents" on page 45

Liberty Identity Federation Framework

The *Liberty Identity Federation Framework* (Liberty ID-FF) defines a set of protocols, bindings, and profiles that provides a solution for identity federation, cross-domain authentication, and session management. This framework can be used to create a new identity management system or to develop one in conjunction with legacy systems. This section contains information regarding the Liberty ID-FF.

- "The Liberty ID-FF Model" on page 36
- "The Liberty ID-FF Convergence" on page 37
- "Liberty ID-FF Protocols and Schema" on page 38
- "Liberty ID-FF Bindings and Profiles" on page 40
- "Additional Liberty ID-FF Documents" on page 41

More detailed information about the Liberty ID-FF 1.2 specifications can be found on the Liberty Alliance Project web site at `https://www.projectliberty.org/resources/specifications.php#box1`.

The Liberty ID-FF Model

The Liberty ID-FF is designed to work with heterogeneous platforms, various networking devices (including personal computers, mobile phones, and personal digital assistants), and emerging technologies. The following figure shows the subjects involved in a Liberty ID-FF implementation.

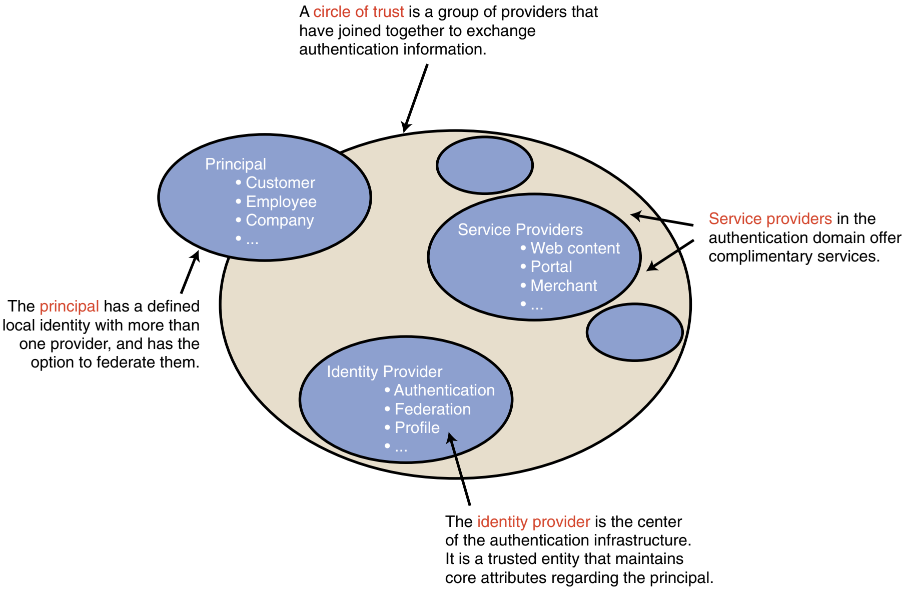

A circle of trust is a group of providers that have joined together to exchange authentication information.
Principal
• Customer
• Employee
• Company
• ...
Service Providers
• Web content
• Portal
• Merchant
• ...
Service providers in the authentication domain offer complimentary services.
The principal has a defined local identity with more than one provider, and has the option to federate them.
Identity Provider
• Authentication
• Federation
• Profile
• ...
The identity provider is the center of the authentication infrastructure. It is a trusted entity that maintains core attributes regarding the principal.

FIGURE 1–1 Subjects Involved in a Liberty ID-FF Implementation

- A *principal* can have a defined local identity with more than one provider, and it has the option to federate the local identities. The principal might be an individual user, a group of individuals, a corporation, or a component of the Liberty architecture.
- A *service provider* is a commercial or not-for-profit organization that offers a web-based service such as a news portal, a financial repository, or retail outlet.
- An *identity provider* is a service provider that stores identity profiles and offers incentives to other service providers for the prerogative of federating their user identities. Identity providers might also offer services above and beyond those related to identity profile storage.
- To support identity federation, all service providers and identity providers must join together into a *circle of trust*. A circle of trust must contain at least one identity provider and at least two service providers. (One organization may be both an identity provider and a service provider.) Providers in a circle of trust must first write operational agreements to define their relationships. An *operational agreement* is a contract between organizations that defines how the circle will work. For more information, see “Circle of Trust” on page 31, “Authentication Domain” on page 30 and “Provider Federation” on page 28.

The Liberty ID-FF Convergence

Up to version 1.1, the Liberty ID-FF was developed using the SAML 1.0 specification. The Liberty ID-FF 1.2 was then developed using the SAML 1.1 specification. Following the release of version 1.2, the Liberty ID-FF was reintroduced into the SAML 2.0 specification. Additionally, SAML 2.0 adds components of the Shibboleth initiative. Going forward, SAML 2.0 will be the basis on which the Liberty Alliance Project builds additional federated identity applications (such as web service-enabled permissions-based attribute sharing). As such, SAML 2.0 is a critical step towards full convergence of federated identity standards. The following diagram illustrates the convergence history of SAML and the Liberty ID-FF.

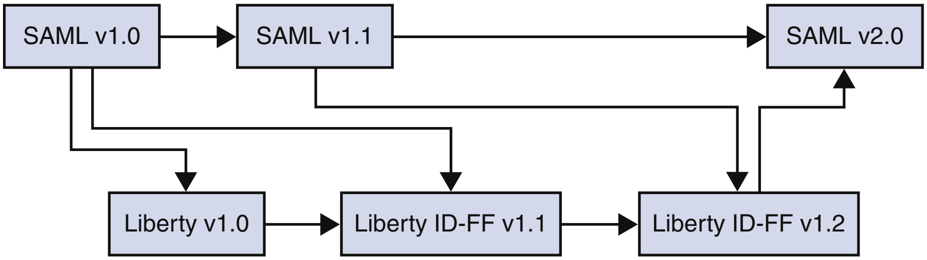


FIGURE 1–2 Liberty ID-FF and SAML Convergence

Liberty ID-FF Protocols and Schema

The *Liberty ID-FF Protocols and Schema Specifications* defines transmission formats for the following functions:

- "Single Sign-On and Federation Protocol" on page 38
- "Name Registration Protocol" on page 40
- "Federation Termination Notification Protocol" on page 40
- "Single Logout Protocol" on page 40
- "Name Identifier Mapping Protocol" on page 40

Following are short explanations of each protocol. More detailed information can be found in the *Liberty ID-FF Protocols and Schema Specifications*.

Single Sign-On and Federation Protocol

The *Single Sign-On and Federation Protocol* defines the rules for request and response messages with which a principal is able to authenticate to one or more service providers and federate (or link) configured identities. When a principal attempts to access a service provider resource, the service provider issues a request for authentication to the principal's identity provider. The identity provider responds with a message that contains authentication information, or an *artifact* that points to authentication information.

Note – Under certain conditions, an identity provider may issue an authentication response to a service provider without having received an authentication request.

The *Single Sign-On and Federation Protocol* also defines elements for inclusion in the request and response that control the following behaviors:

- **Account federation.** A principal can choose to federate a configured identity at the identity provider site with a configured identity at the service provider site.

- **Account handle.** An identity provider can issue an anonymous, temporary identifier to refer to a particular principal during communication with a service provider. This identifier is used to obtain information for or about the principal during federation (with the principal's consent). The account handle is generated by the identity provider during federation.

Note – This account handle is not to be confused with the handle that can be generated by the service provider after federation using the *Name Registration Protocol* as discussed in "Name Registration Protocol" on page 40.

- **Affiliation federation.** Federation based on group affiliation can be enabled in an authentication request. If enabled, it indicates that the requester is acting as a member of the specified affiliation group. Federations are then established and resolved based on the affiliation, not the requesting provider. The process allows for a unique identifier that represents the affiliation.
- **Authentication context.** A service provider can choose the type and level of authentication that should be used when a principal logs in.
- **Authentication credentials.** A principal can be prompted to authenticate with a user name and password, for example, at the behest of the service provider.
- **Dynamic identity provider proxying.** One identity provider might be asked to authenticate a principal that has already been authenticated by a second identity provider. In this case, the first identity provider may request authentication information from the second identity provider on behalf of the service provider. Proxy behavior can be controlled by indicating a list of preferred identity providers, and a value that defines the maximum number of proxy steps that can be taken. Proxy behavior is defined locally by the proxying identity provider, although a service provider controls whether or not to proxy. For more information, see "Dynamic Identity Provider Proxying" on page 109.
- **Identity provider introduction.** When an authentication domain has more than one identity provider, a service provider can use this feature to determine which identity provider a principal is using.
- **Message exchange.** The authentication request defines how messages are exchanged between identity providers and service providers. The particular transfer and messaging protocol used in the exchange (such as HTTP or SOAP) are specified in *profiles* defined in the *Liberty ID-FF Bindings and Profiles Specification*. Two of these profiles are:
  - The Liberty Artifact profile relies on Security Assertion Markup Language (SAML) artifacts and assertions to relay authentication information.
  - The Liberty Browser POST profile relies on an HTML form to communicate authentication information between providers.

  See "Liberty ID-FF Bindings and Profiles" on page 40 for more information.
- **One-time federation.** The ability to federate for one session only can be enabled in an authentication request. This feature is useful for service providers with no user accounts, for principals who want to act anonymously, or for dynamically created user accounts. It allows for one-time federation, rather than a one-time name identifier for a session.

Name Registration Protocol

The optional *Name Registration Protocol* defines the request and response messages a service provider would use to create its own opaque handle to identify a principal when communicating with the identity provider. This registration would occur after federation has been accomplished. After the service provider registers this new handle, subsequent communications with the identity provider would use this identifier rather than the identifier originally defined by the identity provider.

Caution – The handle discussed in this section is not related to the opaque handle that is generated by the identity provider during federation as defined in "Single Sign-On and Federation Protocol" on page 38. The Name Registration Protocol can, however, be used by the identity provider to change the opaque handle that it registered with the service provider during initial federation.

Federation Termination Notification Protocol

The *Federation Termination Notification Protocol* defines a one-way message that one provider would use to notify another provider when a principal has terminated identity federation. The message is asynchronous and states one of the following:

- The service provider will no longer accept authentication information regarding the particular user.
- The identity provider will no longer provide authentication information regarding the particular user.

Single Logout Protocol

The *Single Logout Protocol* defines the request and response messages that providers would exchange when notifying each other of logout events. This exchange would terminate all sessions when a logout occurs at either the service provider or the identity provider.

Name Identifier Mapping Protocol

The *Name Identifier Mapping Protocol* defines the request and response messages that one service provider can use to communicate with a second service provider to obtain the name identifier assigned to a principal federated in the name space of the second service provider. This would be used when a principal authenticated to one service provider requests access to a second service provider site with which it also has an identity federation relationship. The protocol allows the second service provider to communicate with the first service provider about the principal even though no identity federation for the principal exists between the two service providers.

Liberty ID-FF Bindings and Profiles

The *Liberty ID-FF Bindings and Profiles Specification* defines the bindings and profiles for the request and response messages explained in "Liberty ID-FF Protocols and Schema" on page 38. A *binding* describes how to integrate request and response messages into a transmission protocol. Currently, this specification defines only a SOAP binding. A *profile* defines the HTTP exchanges required to transfer the requests and responses between providers. The defined profiles are:

- Single Sign-on and Federation
- Name Identifier Registration
- Federation Termination Notification
- Single Logout
- Identity Provider Introduction
- Name Identifier Mapping
- Name Identifier Encryption

For more information about these profiles and transmission of requests and responses in general, see the *Liberty ID-FF Bindings and Profiles Specification*.

Additional Liberty ID-FF Documents

For additional information about the Liberty ID-FF specifications, see the following documents.

- *Liberty ID-FF 1.2 Architecture Overview*

  Provides an architectural description of the Liberty ID-FF framework as well as policy, security, and technical notes.
- *Liberty ID-FF 1.2 Implementation Guidelines*

  Provides guidance and checklists for implementing a Liberty-enabled environment using the Liberty ID-FF specifications.
- *Liberty ID-FF 1.2 Static Conformance Requirements*

  Defines what features are mandatory and optional for implementations conforming to this version of the Liberty ID-FF specifications.

Liberty Identity Web Services Framework

The Liberty ID-FF defines how to implement single sign-on and identity federation to solve problems related to network identity. The *Liberty Identity Web Services Framework* (Liberty ID-WSF) builds on this by providing specifications for identity-based web services to work in tandem with the Liberty ID-FF. (An identity-based web service, or *identity service*, is a type of web service that acts upon a resource to retrieve information about an identity, update information about an identity, or perform some action for the benefit of an identity.) The Liberty ID-WSF can be used to develop web services that retrieve, update, or perform an action on identity data in a federated network environment using a SOAP-based invocation. The web services include, among others, a calendar service, a wallet service, and an alert service. A scenario that implements these specifications includes the following subjects:

- A *web service consumer* (WSC) invokes the functions provided by a web service by making a request to the web service's provider.
- A *web service provider* (WSP) implements a web service based on a request from a WSC.

Note – For more information about the process between a WSC and WSP, see “Discovery Service Process” on page 154.

The following sections contain brief explanations of the Liberty ID-WSF 1.1 specifications.

- “SOAP Binding Specification” on page 42
- “Discovery Service Specification” on page 42
- “Security Mechanisms Specification” on page 43
- “Data Services Template Specification” on page 43
- “Interaction Service Specification” on page 43
- “Authentication Service Specification” on page 43
- “Client Profiles Specification” on page 44
- “Additional Liberty ID-WSF Documents” on page 44

More detailed information about the Liberty ID-WSF 1.1 specifications can be found on the Liberty Alliance Project web site at `https://www.projectliberty.org/resources/specifications.php#box2a`.

SOAP Binding Specification

The *Liberty ID-WSF SOAP Binding Specification* provides a transport layer framework for handling the request and response messages used by the Liberty ID-WSF services. It defines a mapping for the messages onto SOAP, an extensible XML-based messaging protocol by specifying, for example, how to:

- Correlate a particular SOAP request with its response.
- Indicate that Principal consent was obtained to carry out a given operation.
- Express additional context for a request.

For more information, see the *Liberty ID-WSF SOAP Binding Specification*.

Discovery Service Specification

The *Liberty ID-WSF Discovery Service Specification* defines a framework that enables a client to locate the appropriate web service for retrieving, updating, or modifying a particular piece of identity data. Typically, there are one or more services on a network that allow entities to perform an action on identity data. To keep track of these services or to know which can be trusted, clients require access to a discovery service. A *discovery service* is an identity service that acts as a registry of resource offerings. A *resource offering* defines an association between a particular piece of identity data and the instance of a web service that provides access to the data. With access to the discovery service, the client is able to *discover* which web service must be contacted to then access the desired identity data. A common use case is when personal profile or calendar data is placed within a resource offering so that the data can be located by other entities. For more information, see the *Liberty ID-WSF Discovery Service Specification*.

Security Mechanisms Specification

To access an identity service, an entity must interact with a discovery service to locate the appropriate identity service as well as the specific identity service instance that exposes the resource. The *Liberty ID-WSF Security Mechanisms Specification* describes mechanisms (providing authentication, signing and encryption operations) that can be used to ensure the integrity and confidentiality of the authorization messages exchanged when evaluating the entity's authorization to access the discovery service and identity service instance. These mechanisms consider:

- Authentication of the sender.
- Proxy rights for a third party to make a request as identity services may be accessed directly or through the assistance of an intermediary.
- Authentication of the response.
- Authentication context and session status of the interacting entity.
- Authorization of invocation identity to access service or resource.

For more information, see the *Liberty ID-WSF Security Mechanisms Specification*.

Data Services Template Specification

A *data service* is a web service that supports the query and modification of identity data. (An example of a data service is an identity service, such as an online corporate directory.) The *Liberty ID-WSF Data Services Template Specification* provides a protocol for the query and modification of the data attributes stored in a data service. The service interface specifications defined by the Liberty Alliance Project are based on this Data Services Template. For more information, see the *Liberty ID-WSF Data Services Template Specification*. For more information on the service interface specifications, see "Liberty Identity Service Interface Specifications" on page 44.

Interaction Service Specification

The *Liberty ID-WSF Interaction Service Specification* provides communication protocols for identity services to use when they must obtain permission from a principal (or someone who owns a resource on behalf of that principal) to allow the principal's identity data to be shared with requesting services. For more information, see the *Liberty ID-WSF Interaction Service Specification*.

Authentication Service Specification

The *Liberty ID-WSF Authentication Service Specification* defines how to authenticate parties communicating via SOAP request and response messages. It leverages widely used authentication services and mechanisms, and facilitates selection of these services and mechanisms at deployment time. The specification defines:

- An authentication protocol based on the Simple Authentication and Security Layer (SASL).
- An authentication service that Liberty-enabled clients can use to authenticate with identity providers.
- A single sign-on service that Liberty-enabled providers can use to interact with each other.

The specification also defines an identity-based authentication security token service, complementing the more general security token service as discussed in the section, "Discovery Service Specification" on page 42. For more information, see the *Liberty ID-WSF Authentication Service Specification*.

Client Profiles Specification

The *Liberty ID-WSF Client Profiles Specification* describes the requirements for Liberty-enabled clients that interact with the SOAP-based Authentication Service. Client profiles can enable browsers to perform an active role in transactions, in addition to the functions of a standard browser. For more information, see the *Liberty ID-WSF Client Profiles Specification*.

Additional Liberty ID-WSF Documents

For additional information about the Liberty ID-WSF specifications, see the following documents:

- *Liberty ID-WSF Architecture Overview*

  Provides an architectural description of the Liberty ID-WSF framework including basic usage scenarios. It also highlights how the Liberty ID-WSF interacts with an identity management framework (such as the Liberty ID-FF).
- *Liberty ID-WSF Security and Privacy Overview*

  Provides an overview of security and privacy issues in the Liberty ID-WSF.
- *Liberty ID-WSF Implementation Guidelines*

  Provides guidelines on how the Liberty ID-WSF specifications should be implemented.
- *Liberty ID-WSF Static Conformance Requirements*

  Defines the mandatory and optional features for implementations conforming to this version of the specifications.
- *Liberty ID-WSF Implementation Guidelines*

  Describes the Liberty ID-WSF architecture, including examples, lessons learned, and best practices.

Liberty Identity Service Interface Specifications

The *Liberty Identity Service Interface Specifications* (Liberty ID-SIS) are for building identity-based web services. Included in the Liberty ID-SIS 1.0 are the following:

- "Liberty ID-SIS Personal Profile Service Specification" on page 45
- "Liberty ID-SIS Employee Profile Service Specification" on page 45
- "Additional Liberty ID-SIS Service Specifications" on page 45

More detailed information about the service interface specifications can be found on the Liberty Alliance Project web site at `https://www.projectliberty.org/resources/specifications.php#box3`.

Additional service interface specifications have been defined. For more information, see

Liberty ID-SIS Personal Profile Service Specification

The *Liberty ID-SIS Personal Profile Service Specification* defines an identity-based web service that keeps, updates, and offers identity data regarding a user. This service queries and updates of attribute data and incorporates mechanisms for access control and conveying data validation information and usage directives from other specifications. A shopping portal that offers information such as the principal's account number and shopping preferences is an example of a personal profile service. For more information, see the *Liberty ID-SIS Personal Profile Service Specification*.

Liberty ID-SIS Employee Profile Service Specification

The *Liberty ID-SIS Employee Profile Service Specification* defines an identity-based web service that keeps, updates, and offers profile information regarding a user's workplace. An online corporate phone book that provides an employee name, office building location, and telephone extension number is an example of an employee profile service. For more information, see the *Liberty ID-SIS Employee Profile Service Specification*.

Additional Liberty ID-SIS Service Specifications

The Liberty Alliance Project defines several other service interface specifications not discussed in this section, including a contact book, a geolocation service, and a presence service. For more information on these services, see `http://www.projectliberty.org/resources/specifications.php#box3`.

Support Documents

The Liberty Alliance Project has also created a number of support documents including a metadata service protocol, reverse HTTP bindings, a glossary, and schema files. A listing of these documents and the appropriate links can be found at `http://www.projectliberty.org/resources/specifications.php#box4`.

CHAPTER 2

Implementation of the Liberty Alliance Project Specifications

Sun Java System Access Manager contains the Sun Microsystems implementation of the Liberty Alliance Project specifications. This chapter provides an overview of how these specifications have been implemented. It covers the following topics:

Overview

Sun Java System Access Manager is a software product that helps organizations manage secure access to the resources and web applications within their intranet and across the Internet. The initial release of Access Manager implemented the *Liberty Identity Federation Framework* (Liberty ID-FF) specifications, focusing on identity and provider federation, authentication domains, and single sign-on. Subsequent releases of Access Manager added new features as defined in version 1.2 of the Liberty ID-FF specifications as well as the version 1.1 specifications of the *Liberty Identity Web Services Framework* (Liberty ID-WSF). These web services include a framework for retrieving and updating *identity data*.

Identity data consists of all the information that companies maintain about individual customers, corporate partners, and employees. The data is stored in identity-based service providers (also referred to as *identity providers*) across the Internet. Federating the sources of identity data allows for accessing, transporting, sharing, and managing the data between partnered organizations and their applications without weakening existing security safeguards. For example, many corporations provide access to outsourced human resources services, such as health benefits and 401(k) plans. The corporate intranet offers central access to these services, but employees have to log in and authenticate themselves every time they access each service. Since employees might not want to share the same profile and password with both their 401(k) provider and their health care provider, federation of their identity data can provide seamless integration of these web resources across multiple security domains within the same enterprise.

To achieve this integration, enterprises can construct a network of partnered services for securely exchanging customer account information, transaction data, and credentials through a set of interoperable web services. Federation among partner networks allows identities to share key pieces of their respective data without sharing control. For example, logging in to one web site that represents an *authentication domain* consisting of an airline, a car rental company, and a hotel chain allows an identity to make travel plans even if one of the sites does not contain an identity data store.

The following sections contain additional information regarding the implementation of the Liberty Alliance Project specifications in Access Manager.

- "Sample Use Case" on page 48
- "Liberty Alliance Project Architecture in Access Manager" on page 49

Sample Use Case

Using a cell phone, a principal is able to access a ring-tone vendor's site. Due to implementation of single sign-on, the ring-tone vendor recognizes the principal from the cell-phone provider's authentication. This allows the principal to purchase ring tones by interacting with the user's bank for payment. The following figure illustrates the process of requesting a service and being authenticated for access. It assumes the following:

- *MyWireless* is a cellular service provider and an identity provider in a federation framework that contains access to the discovery service in a web services framework.
- *MyRingtones* is a service provider in a federation framework that also acts as a web service consumer (WSC) in a web services framework. It sells ringtones for use with cellular phones.
- *MyBank* is a web service provider (WSP) in a web services framework. Linking *MyBank* to *My Ringtones* offers the opportunity for seamless purchases.

Note – The same web service can act as a different entity in different scenarios.

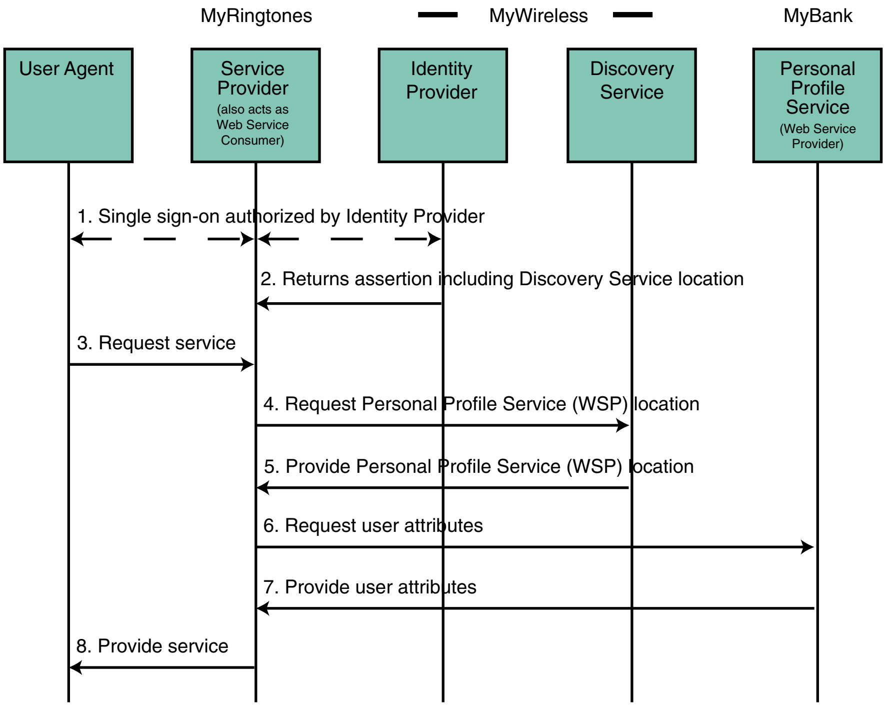

MyRingtones
MyWireless
MyBank
User Agent
Service Provider (also acts as Web Service Consumer)
Identity Provider
Discovery Service
Personal Profile Service (Web Service Provider)
1. Single sign-on authorized by Identity Provider
2. Returns assertion including Discovery Service location
3. Request service
4. Request Personal Profile Service (WSP) location
5. Provide Personal Profile Service (WSP) location
6. Request user attributes
7. Provide user attributes
8. Provide service

FIGURE 2–1 Process in a Liberty-enabled Use Case

The user attempts to access *MyRingtones* and, after being prompted for credentials stored with *MyBank*, receives authorization through *MyWireless*. Single sign-on is accomplished in the back end. The entire process is based on implementations of the Liberty ID-FF, Liberty ID-WSF, and Liberty ID-SIS specifications.

Liberty Alliance Project Architecture in Access Manager

The figure below shows the architecture of the Access Manager features that are based on the Liberty Alliance Project specifications. These features leverage existing Access Manager services including those for policy, service management, session management, and auditing.

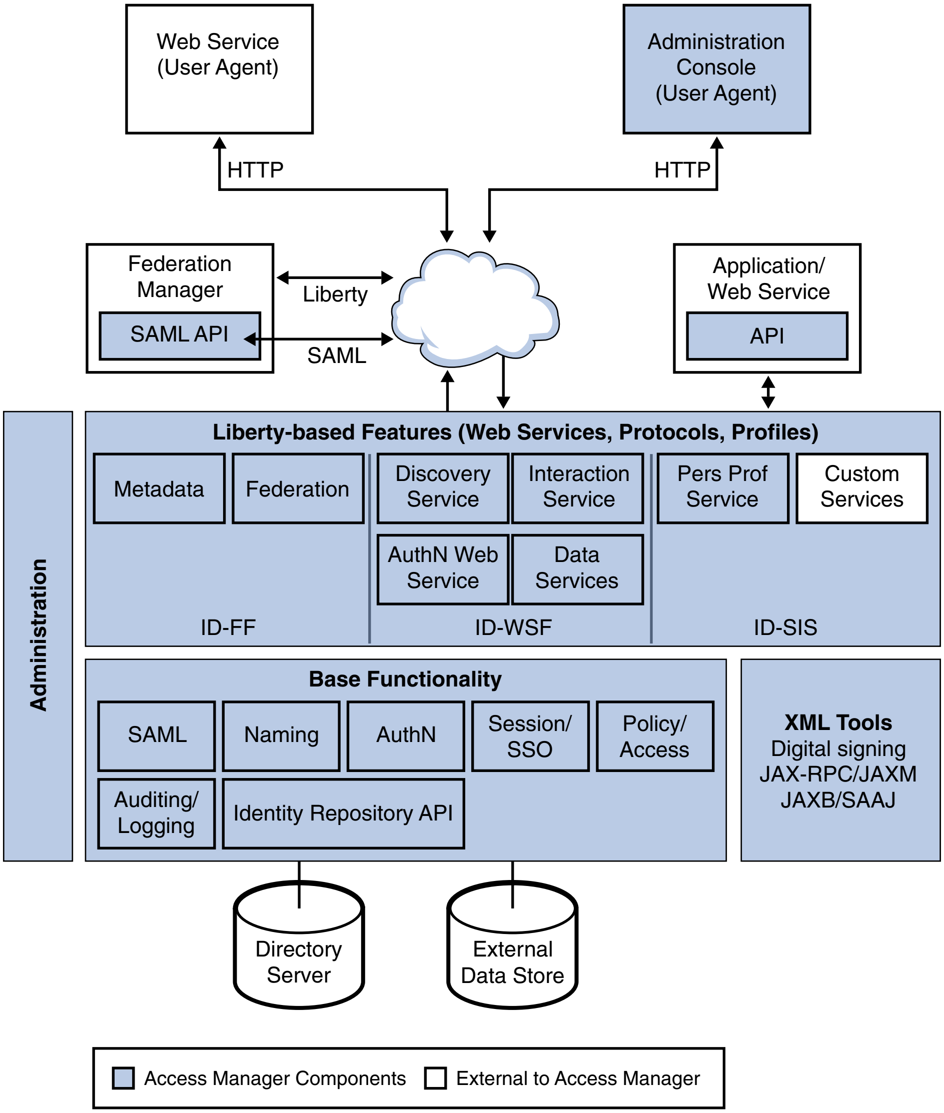
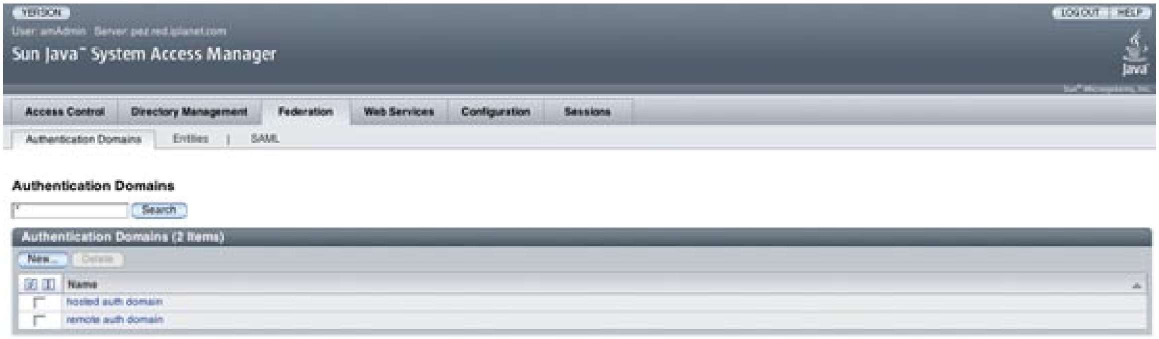


FIGURE 2–2 Liberty-based Architecture of Access Manager

Note – For a complete architectural overview of Access Manager, see the *Sun Java System Access Manager 7.1 Technical Overview*.

The Federation Module

The Federation component of Access Manager provides an interface for creating, modifying, and deleting authentication domains and service and identity providers (both remote and hosted types) for implementing a federated model. The web interface for the Liberty ID-FF in Access Manager is accessible from the Federation tab in the Access Manager Console, as shown.



User: amAdmin Server: pez.red.iplanet.com

Authentication Domains (2 Items)

	Name
□	hosted auth domain
□	remote auth domain

FIGURE 2–3 Federation Interface in Access Manager Console

The Federation module includes the capabilities described in the following sections.

- “Identity Federation and Single Sign-On” on page 51
- “Authentication and Authentication Context” on page 53
- “Identifiers and Name Registration” on page 55
- “Global Logout” on page 56
- “Dynamic Identity Provider Proxying” on page 56

More information can be found in Chapter 3. For more information about the Liberty ID-FF functions, see the *Liberty ID-FF Protocols and Schema Specifications*.

Identity Federation and Single Sign-On

Let’s assume that a principal has separate user accounts with a service provider and an identity provider in the same authentication domain. In order to gain access to these individual accounts, the principal authenticates with each provider separately. After authenticating with the service provider though, the principal can be given the option to federate the service provider account with the identity provider account. Consenting to the federation of these two accounts links them for the purpose of *single sign-on*. Single sign-on (SSO) is the means of passing a user’s credentials between applications without the user having to reauthenticate each time an application is accessed. With Access Manager, you can achieve SSO in the following ways:

- Install a policy agent in a web container to protect the application and pass the `HTTP_HEADER` and `REMOTE_USER` variables to the application to capture the user credentials. You may or may not need a custom authentication module.
- Customize the application's authentication module to create an `SSOToken` from the request object or from the SSO cookie. Afterwards, retrieve the user credentials using the SSO API and create a session using the application's API.

To set up federated SSO, you must first establish SSO. Following this, configure the service provider application and the identity provider in Access Manager to enable federation using the Liberty Alliance Project protocols. Liberty ID-FF providers differentiate between federated users by defining a unique *handle* for each account. (They are not required to use the principal's actual provider account identifier.) Providers can also choose to create multiple handles for a particular principal. However, identity providers must create one handle per user for service providers that have multiple web sites so that the handle can be resolved across all of them.

Note – Because both the identity provider and service provider in a federation need to remember the principal's handle, they create entries that note the handle in their respective user repositories. In some scenarios, only the identity provider's handle is conveyed to a service provider. For example, if a service provider does not maintain its own user repository, the identity provider's handle is used.

Access Manager can accommodate the following functions:

- Providers of either type give the principal notice upon identity federation or identity defederation.
- Providers of either type notify each other regarding a principal's defederation.
- Identity providers notify the appropriate service providers regarding a principal's account termination.
- Providers of either type give the principal a list of their federated identities.
- Users can terminate federations or defederate identities.

Additionally, Access Manager can accommodate the following:

- "Auto-Federation" on page 52
- "Bulk Federation" on page 53

Auto-Federation

Auto federation will automatically federate a user's disparate provider accounts based on a common attribute. During single sign-on, if it is deemed a user at provider A and a user at provider B have the same value for the defined common attribute (for example, an email address), the two accounts will be federated without consent or interaction from the principal. For more information, see "Auto-Federation" on page 106.

Bulk Federation

Federating one user's service provider account with their identity provider account generally requires the principal to visit both providers and link them. The organization though needs the ability to federate user accounts behind the scenes. Access Manager provides a script for federating user accounts in bulk. The script allows the administrator to federate many (or all) of a principal's provider accounts based on metadata passed to the script. Bulk federation is useful when adding a new service provider to an enterprise so you can federate a group of existing employees to the new service. For more information, see "Bulk Federation" on page 107.

Authentication and Authentication Context

Single sign-on is the means by which a provider of either type can convey to another provider that a principal has been authenticated. Authentication is the process of validating user credentials; for example, a user identifier accompanied by an associated password. You can authenticate users with Access Manager in the following ways:

- Use a policy agent to insert HTTP header variables into the request object. This functions for Web applications only.
- Use the authentication API to validate and retrieve user identities. This will work with either Web or non-Web applications.

Identity providers use local (to the identity provider) session information mapped to a user agent as the basis for issuing Security Assertion Markup Language (SAML) authentication assertions to service providers. Thus, when the principal uses a user agent to interact with a service provider, the service provider requests authentication information from the identity provider based on the user agent's session information. If this information indicates that the user agent's session is presently active, the identity provider will return a positive authentication response to the service provider. Access Manager provides the following authentication actions:

- Supports a range of authentication methods (for example, password or certificate-based SSL).
- Allows providers to exchange the following minimum set of authentication information with regard to a principal:
  - Authentication status (active or not)
  - Instant (time authenticated)
  - Authentication method
  - Pseudonym (temporary or persistent)
- Allows an identity provider, at the discretion of the service provider, to authenticate a principal by using an identity provider other than itself (proxy) and relay this information back to the service provider.

SAML is used for provider interaction during authentication but not all SAML assertions are equal. Different authorities issue SAML assertions of different quality. Therefore, the Liberty Alliance Project defines how the consumer of a SAML assertion can determine the amount of assurance to place in the assertion. This is referred to as the *authentication context*, information added to the SAML assertion that gives the assertion consumer details they need to make an informed entitlement decision. For example, a principal uses a simple identifier and a self-chosen password to authenticate to an identity provider. The identity provider sends an assertion that states the principal has been authenticated to a service provider. By including the authentication context, the service provider can place the appropriate level of assurance on the associated assertion. If the service provider were a bank, they might require stronger authentication than that which has been used and respond to the identity provider with a request to authenticate the user again using a more stringent context. The authentication context information sent in the assertion might include:

- The initial user identification mechanism (for example, face-to-face, online, or shared secret).
- The mechanisms for minimizing compromise of credentials (for example, private key in hardware, credential renewal frequency, or client-side key generation).
- The mechanisms for storing and protecting credentials (for example, smart card, or password rules).
- The authentication mechanisms (for example, password or smart card with PIN).

The Liberty Alliance Project specifications define authentication context *classes* against which an identity provider can claim conformance. The Liberty-defined authentication contexts are listed and described in the following table.

TABLE 2–1 Authentication Context Classes

Class	Description
MobileContract	Identified when a mobile principal has an identity for which the identity provider has vouched.
MobileDigitalID	Identified by detailed and verified registration procedures, a user's consent to sign and authorize transactions, and DigitalID-based authentication.
MobileUnregistered	Identified when the real identity of a mobile principal has not been strongly verified.
Password	Identified when a principal authenticates to an identity provider by using a password over an unprotected HTTP session.
Password-ProtectedTransport	Identified when a principal authenticates to an identity provider by using a password over an SSL-protected session.

TABLE 2–1 Authentication Context Classes *(Continued)*

Class	Description
Previous-Session	Identified when an identity provider must authenticate a principal for a current authentication event and the principal has previously authenticated to the identity provider. This affirms to the service provider a time lapse from the principal's current resource access request. **Note –** The context for the previously authenticated session is not included in this class because the user has not authenticated during this session. Thus, the mechanism that the user employed to authenticate in a previous session should not be used as part of a decision on whether to now allow access to a resource.
Smartcard	Identified when a principal uses a smart card to authenticate to an identity provider.
Smartcard-PKI	Identified when a principal uses a smart card with an enclosed private key and a PIN to authenticate to an identity provider.
Software-PKI	Identified when a principal uses an X.509 certificate stored in software to authenticate to the identity provider over an SSL-protected session.
Time-Sync-Token	Identified when a principal authenticates through a time synchronization token.

The procedures in "Entities" on page 72 contain a number of attributes related to authentication context. For more information, see the *Liberty ID-FF Authentication Context Specification*. Additionally, an XML schema has been defined by which the identity provider authority can incorporate the context of the authentication in the SAML assertions it issues.

Identifiers and Name Registration

Access Manager supports name identifiers that are unique across all providers in an authentication domain. This identifier can be used to obtain information for or about the principal (with consent) without requiring the user to consent to a long-term relationship with the service provider. During federation, the identity provider generates an opaque value that serves as the initial name identifier that both the service provider and the identity provider use to refer to the principal when communicating with each other.

After federation though, the identity provider or the service provider may register a different opaque value. The reasons for doing this would be implementation-specific. If a service provider registers a different opaque value for the principal, the identity provider must use the new identifier when communicating with the service provider about the principal.

Note – The initial name identifier defined by the identity provider is always used to refer to the principal unless a new name identifier is registered.

Global Logout

A principal may establish authenticated sessions with both an identity provider and individual service providers, based on authentication assertions supplied by the identity provider. When the principal logs out of a service provider session, the service provider sends a logout message to the identity provider that provided the authentication for that session. When this happen, or the principal manually logs out of a session at an identity provider, the identity provider sends a logout message to each service provider to which it provided authentication assertions under the relevant session. The one exception is the service provider that sent the logout request to the identity provider.

Dynamic Identity Provider Proxying

An identity provider can choose to proxy an authentication request to an identity provider in another authentication domain if it knows that the principal has been authenticated with this identity provider. The proxy behavior is defined by the local policy of the proxying identity provider. However, a service provider can override this behavior and choose not to proxy. This function can be implemented as a form of authentication when, for instance, a roaming mobile user accesses a service provider that is not part of the mobile home network. For more information see "Dynamic Identity Provider Proxying" on page 109.

The Liberty-based Web Services Modules

Liberty-based web services are those based on specifications in the Liberty ID-WSF and the Liberty ID-SIS. They are accessible from the Access Manager Console by clicking the Web Services tab. The following diagram illustrates how the different web service specifications have been implemented.

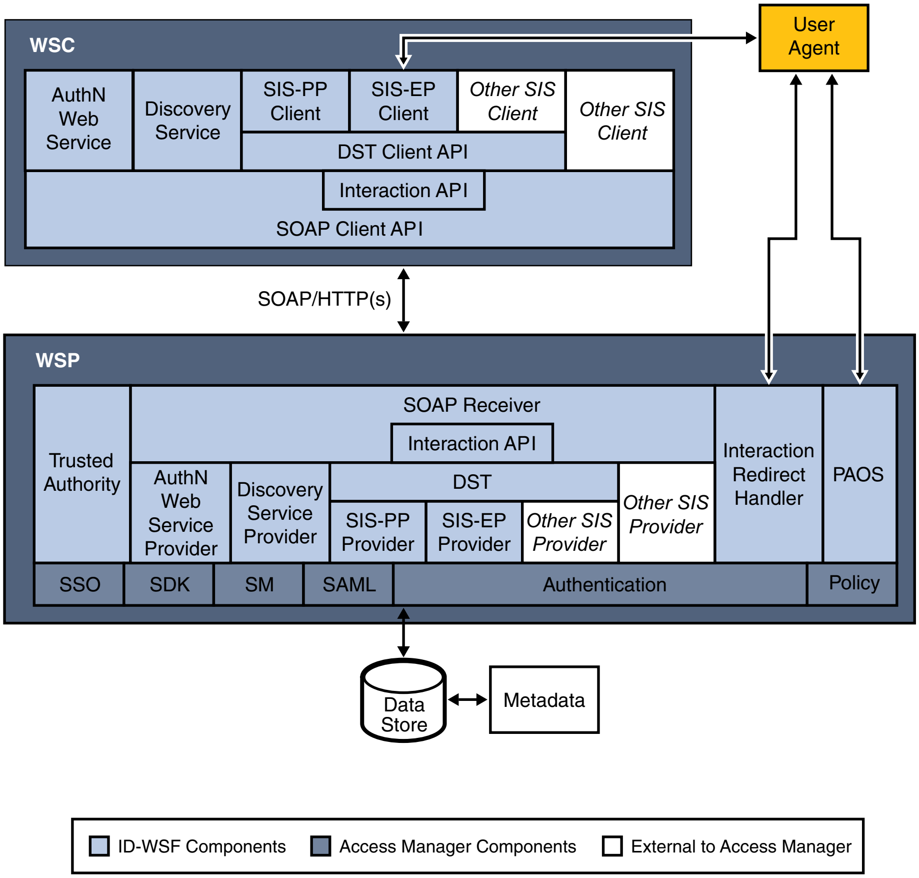
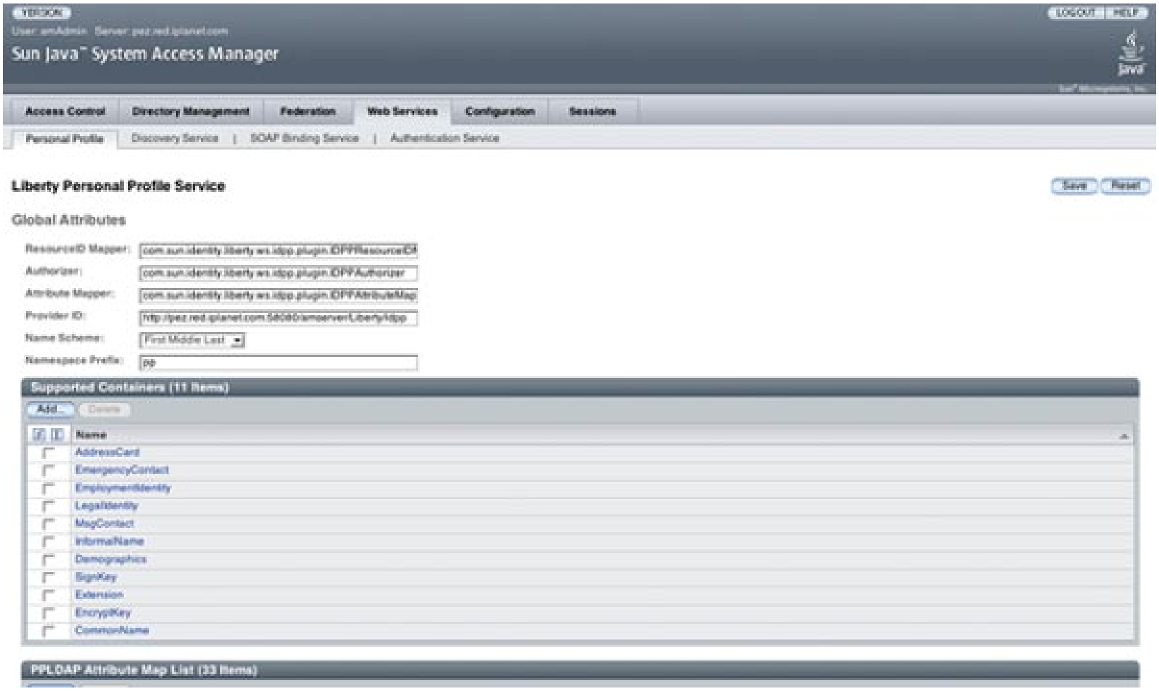

WSC
User Agent
AuthN Web Service
Discovery Service
SIS-PP Client
SIS-EP Client
Other SIS Client
Other SIS Client
DST Client API
Interaction API
SOAP Client API
SOAP/HTTP(s)
WSP
SOAP Receiver
Interaction API
Trusted Authority
AuthN Web Service Provider
Discovery Service Provider
DST
SIS-PP Provider
SIS-EP Provider
Other SIS Provider
Other SIS Provider
Interaction Redirect Handler
PAOS
SSO
SDK
SM
SAML
Authentication
Policy
Data Store
Metadata
ID-WSF Components
Access Manager Components
External to Access Manager

FIGURE 2–4 Architecture of Liberty-based Web Services

The web interface for the Liberty ID-WSF in Access Manager is accessible from the Web Services tab in the Access Manager Console, as shown. The implemented web services include:

- "Liberty Personal Profile Service" on page 58
- "Discovery Service" on page 59
- "SOAP Binding Service" on page 59
- "Authentication Web Service" on page 59



Liberty Personal Profile Service

Global Attributes

ResourceID Mapper:	com.sun.identity.liberty.ws.idpp.plugin.IDPPResourceIDI
Authorizer:	com.sun.identity.liberty.ws.idpp.plugin.IDPPAuthorizer
Attribute Mapper:	com.sun.identity.liberty.ws.idpp.plugin.IDPPAttributeMap
Provider ID:	http://pez.red.iplanet.com:58080/amserver/Liberty/idpp
Name Scheme:	First Middle Last
Namespace Prefix:	pp

Supported Containers (11 Items)

Name
AddressCard
EmergencyContact
EmploymentIdentity
LegalIdentity
MsgContact
InformalName
Demographics
SignKey
Extension
EncryptKey
CommonName

PPLDAP Attribute Map List (33 Items)

FIGURE 2–5 Web Services Interface in Access Manager Console

Liberty Personal Profile Service

The Liberty Personal Profile Service is a data service that supports storing and modifying a principal's identity attributes. Identity attributes might include information such as first name, last name, home address, and emergency contact information. The Liberty Personal Profile Service is queried or updated by a WSC acting on behalf of the principal. For more information, see Chapter 7.

Discovery Service

The Discovery Service is a web service that allows a requesting entity, such as a service provider, to dynamically determine a principal's registered attribute provider. Typically, a service provider queries the Discovery Service, which responds by providing a resource offering that describes the requested attribute provider. (A *resource offering* defines associations between a piece of identity data and the service instance that provides access to the data.) The implementation of the Discovery Service includes Java and web-based interfaces. For more information, see Chapter 8.

Note – By definition, a discoverable service is assigned a service type Uniform Resource Identifier (URI), allowing the service to be registered in Discovery Service instances. The service type URI is typically defined in the Web Service Definition Language (WSDL) file that defines the service.

SOAP Binding Service

The SOAP Binding Service is a set of Java APIs used by the developer of a Liberty-enabled identity service. The APIs are used to send and receive identity-based messages using SOAP, an XML-based messaging protocol. For more information, see Chapter 9.

Authentication Web Service

The Authentication Web Service provides authentication to a WSC, allowing the WSC to obtain security tokens for further interactions with other services at the same provider. These other services may include a discovery service or single sign-on service. The Authentication Web Service is for service-to-service (nonuser) authentication. For more information, see Chapter 6.

Note – Do not confuse the Liberty-based Authentication Web Service with the proprietary Access Manager Authentication Service discussed in the *Sun Java System Access Manager 7.1 Technical Overview*. "Process of Federation" on page 65 contains a small comparison of the two options.

The Liberty-based Application Programming Interfaces

A number of the Liberty-based web services specifications have also been implemented in the back end of Access Manager as APIs. The services include the Interaction Service and PAOS binding. The following table summarizes the public APIs. They can be used to deploy Liberty-enabled components or extend the core services.

TABLE 2–2 Public Interfaces

Package Name	Description
`com.sun.identity.federation.plugins`	Contains interfaces which can be implemented to allow applications to customize their actions before and after invoking the federation protocols. See Chapter 3.
`com.sun.identity.federation.services`	Provides interfaces for writing custom plug-ins that can be used during the federation or single sign-on process. See Chapter 3.
`com.sun.identity.liberty.ws.authnsvc`	Provides classes to manage the Authentication Web Service. See Chapter 6.
`com.sun.identity.liberty.ws.authnsvc.mechanism`	Provides an interface to process incoming Simple Authentication and Security Layer (SASL) requests and generate SASL responses for the different SASL mechanisms. See Chapter 6.
`com.sun.identity.liberty.ws.authnsvc.protocol`	Provides classes to manage Authentication Web Service protocol. See Chapter 6.
`com.sun.identity.liberty.ws.common`	Defines common classes that are used by many of the Access Manager Liberty-based web service components. See “Common Service Interfaces” on page 225 of this chapter.
`com.sun.identity.liberty.ws.common.wsse`	Provides an interface to parse and create a X.509 Certificate Token Profile. See “Common Service Interfaces” on page 225 of this chapter.
`com.sun.identity.liberty.ws.disco`	Provides interfaces to manage the Discovery Service. See Chapter 8.
`com.sun.identity.liberty.ws.disco.plugins`	Provides a plugin interface for the Discovery Service. See Chapter 8.
`com.sun.identity.liberty.ws.dst`	Provides classes to implement an identity service. See Chapter 7 for information about services built using this API.
`com.sun.identity.liberty.ws.dst.service`	Provides a handler class that can be used by any generic identity data service. See Chapter 7 for information about data services.
`com.sun.identity.liberty.ws.interaction`	Provides classes to support the Interaction RequestRedirect Profile. See the section on the “Interaction Service” on page 229 for information on this profile.

TABLE 2–2 Public Interfaces *(Continued)*

Package Name	Description
`com.sun.identity.liberty.ws.interfaces`	Provides interfaces that are common to all Access Manager Liberty-based web service components. See Chapter 8 and Chapter 7 for information about default implementations. See the section on "Common Service Interfaces" on page 225 for more general information.
`com.sun.identity.liberty.ws.paos`	Provides classes for web applications to construct and process PAOS requests and responses. See "PAOS Binding" on page 232 of this chapter.
`com.sun.identity.liberty.ws.security`	Provides an interface to manage Liberty-based web service security mechanisms. See "Common Security API" on page 227 of this chapter.
`com.sun.identity.liberty.ws.soapbinding`	Provides classes to construct SOAP requests and responses and to change the contact point for the SOAP binding. See Chapter 9.
`com.sun.identity.saml`	Provides a service provider interface (SPI) in which proprietary XML/signature implementations can be plugged in. See Chapter 10.
`com.sun.identity.saml.assertion`	Provides classes to manage assertions and profiles. See Chapter 10.
`com.sun.identity.saml.common`	Provides classes that are common to all SAML elements. See Chapter 10.
`com.sun.identity.saml.plugins`	Provides SPIs to integrate SAML into custom services. See Chapter 10.
`com.sun.identity.saml.protocol`	Provides classes that parse the XML messages used to exchange assertions and information. See Chapter 10.
`com.sun.identity.saml.xmlsig`	Provides an SPI in which proprietary XML/signature implementations can be plugged in. See Chapter 10.
`com.sun.liberty`	Provides interfaces common to the Access Manager Federation Management module. See Chapter 3.

For more information, see Chapter 11. For detailed API documentation, including classes, methods and their syntax and parameters, see the Java API Reference in /*AccessManager-base*/`SUNWam/docs` or on docs.sun.com.

The SAML Service

Access Manager uses SAML as the means for exchanging security information. SAML uses an eXtensible Markup Language (XML) framework to achieve interoperability between vendor platforms that provide SAML assertions. Originally, the Liberty ID-FF was created as an extension of SAML 1.0 and 1.1. With the release of SAML 2.0 though, the Liberty ID-FF has been rolled into the SAML 2.0 specifications. Going forward, SAML 2.0 will be used by the Liberty Alliance Project to build additional federation—based applications. See "The Liberty ID-FF Convergence" on page 37 for more information.

Note – The configuration and usage of the SAML Service is independent of the SAML functionality used by the Liberty-based features in Access Manager. SAML usage by the Liberty-based features in Access Manager is behind the scenes and not configurable.

Access Manager 7.1 supports SAML 1.1 and 2.0. SAML 1.1 is supported out of the box and can be configured using the Access Manager Console. SAML 2.0 is supported after installing the SAML v2 Plug-in for Federation Services on top of a working instance of Access Manager. For more information on the SAML Service (based on SAML 1.1), see Chapter 10. For more information on the SAML v2 Plug-in for Federation Services, see the *Sun Java System SAML v2 Plug-in for Federation Services Release Notes* and the *Sun Java System SAML v2 Plug-in for Federation Services User's Guide*.

Liberty-Based Samples

Access Manager has included sample code and files that can be used to further understand the implementation of the Liberty Alliance Project specifications. For information about the specifics of these samples, see the individual chapters or Appendix A.

PART II

Federation Management

CHAPTER 3

Federation

Sun Java™ System Access Manager provides an interface for creating, modifying, and deleting authentication domains, service providers, and identity providers. This chapter explains how to use the Federation module to configure these components, allowing for Liberty-based provider federation. It covers the following topics:

Process of Federation

The process of federation begins with authentication. A standard installation of Access Manager provides two options for user authentication: the proprietary Authentication Service and the Liberty-based Federation component. With the proprietary option, users attempting to access a resource protected by Access Manager are redirected to the Authentication Service via an Access Manager login page. After the users provide credentials, the Authentication Service allows or denies access to the resource based on the outcome.

Note – For more information about the proprietary Authentication Service, see the *Sun Java System Access Manager 7.1 Administration Guide*.

The second option for user authentication is Liberty-based federation. When a principal attempts to access a web site that belongs to the trusted member provider of a configured authentication domain, the process of user authentication begins with the search for a valid Access Manager session token from the proprietary Authentication Service.

- If no session token is found, the principal is redirected to a location defined by the pre-login URL to establish a valid session. See "Pre-login Process" on page 68 for details.

- If a session token is found, the principal is granted (or denied) access to the requested page. Assuming access is granted, the requested page contains a link so the principal can federate the Access Manager identity with the identity local to the requested site. If the principal clicks this link, federation begins. See "Federation and Single Sign-On" on page 68 for details.

The following figure illustrates these divergent paths.

Note – The process shown in the figure below is the default process when no application has been deployed. When an application is deployed and using Access Manager, the process will change based on the application's query parameters and preferences. For more information, see "The Pre-login URL" on page 102.

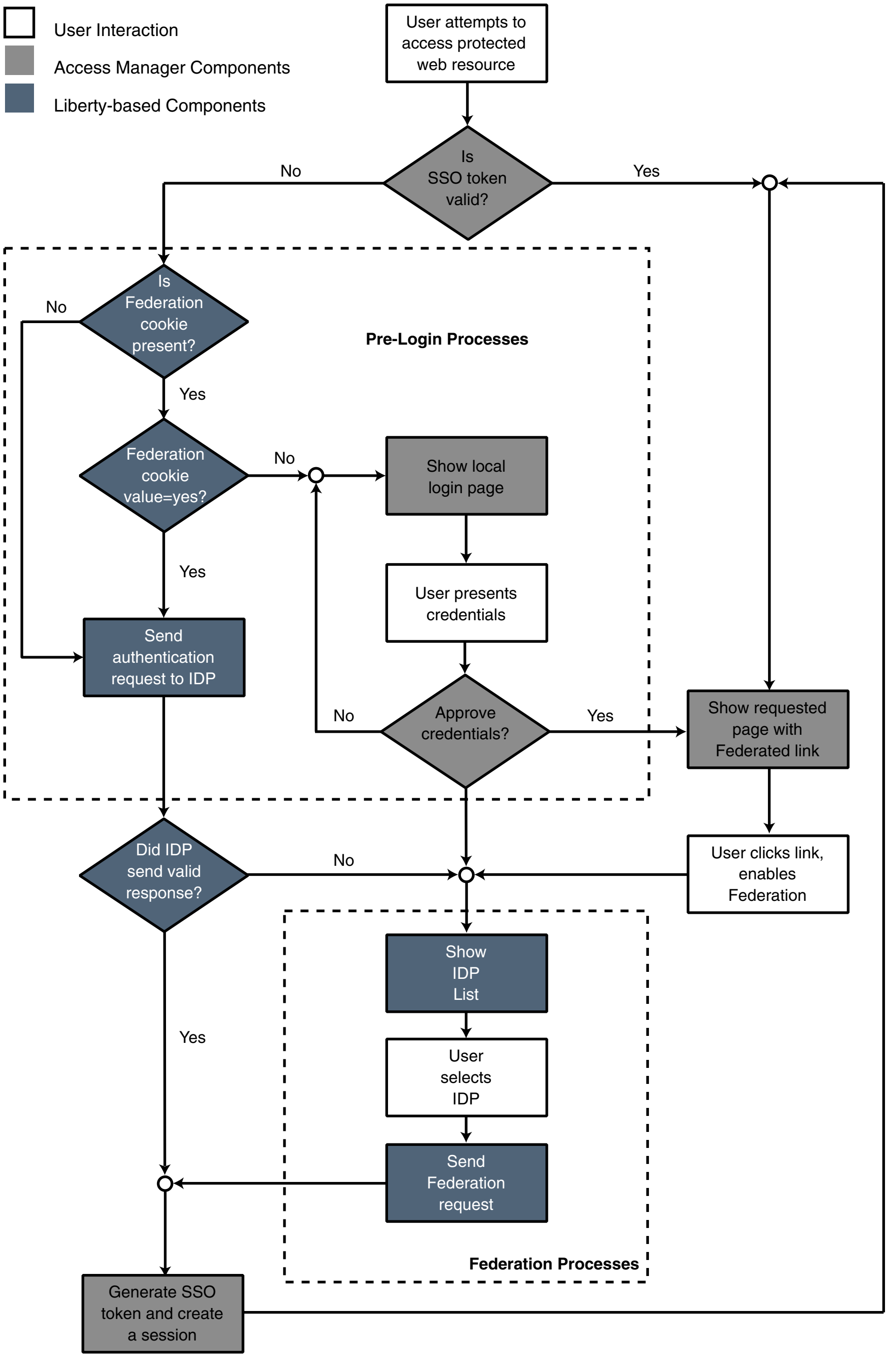

User Interaction
Access Manager Components
Liberty-based Components
User attempts to access protected web resource
Is SSO token valid?
No
Yes
Pre-Login Processes
Is Federation cookie present?
No
Yes
Federation cookie value=yes?
No
Yes
Show local login page
User presents credentials
Send authentication request to IDP
No
Approve credentials?
Yes
Show requested page with Federated link
Did IDP send valid response?
No
User clicks link, enables Federation
Show IDP List
Yes
User selects IDP
Send Federation request
Federation Processes
Generate SSO token and create a session

FIGURE 3–1 Default Process of Federation

Pre-login Process

The pre-login process establishes a valid Access Manager session. When a principal attempts to access a service provider site and no Access Manager session token is found, Access Manager searches for a federation cookie. A *federation cookie* is implemented by Access Manager and is called `fedCookie`. It can have a value of either `yes` or `no`, based on the principal's federation status.

Note – A federation cookie is *not* defined in the Liberty Alliance Project specifications.

At this point, the pre-login process may take one of the following paths:

- If a federation cookie is found and its value is `no`, an Access Manager login page is displayed and the principal submits credentials to the proprietary Authentication Service. When authenticated by Access Manager, the principal is redirected to the requested page, which might contain a link to allow for identity federation. If the principal clicks this link, federation begins. See "Federation and Single Sign-On" on page 68 for details.
- If a federation cookie is found and its value is `yes`, the principal has already federated an identity but has not been authenticated by an identity provider within the authentication domain for this Access Manager session. Authentication to Access Manager is achieved on the back end by sending a request to the principal's identity provider. After authentication, the principal is directed back to the requested page.
- If no federation cookie is found, a *passive* authentication request (one that does not allow identity provider interaction with the principal) is sent to the principal's identity provider. If an affirmative authentication is received back from the identity provider, the principal is directed to the Access Manager Authentication Service, where a session token is granted. The principal is then redirected to the requested page. If the response from the identity provider is negative (for example, if the session has timed out), the principal is sent to a common login page to complete either a local login or Liberty-based federation. See "Federation and Single Sign-On" on page 68 for details.

Note – This pre-login process is the default behavior of Access Manager. This process might change based on parameters passed to Access Manager from the participating application. For more details, see the section on "The Pre-login URL" on page 102.

Federation and Single Sign-On

When a principal logs in to access a protected resource or service, Access Manager sends a request to the appropriate identity provider for authentication confirmation. If the identity provider sends a positive response, the principal gains access to all provider sites within the authentication domain. If the identity provider sends a negative response, the principal is directed to authenticate again using the Liberty-based federation process.

In the Liberty-based federation process, a principal selects an identity provider and sends credentials for authentication. After authentication is complete and access is granted, the principal is issued a session token from the Access Manager Authentication Service and redirected to the requested page. As long as the session token remains valid, the principal can access other service providers in the authentication domain without having to authenticate again.

Note – Common Domain Services for Federation Management are used by a service provider to determine the identity provider used by a principal in an authentication domain that contains multiple identity providers. See Chapter 4 for details.

Federation Graphical User Interface

The Federation component uses JavaServer Pages™ (JSP™) to define its look and feel. *JSP* are HTML files that contain additional code to generate dynamic content. More specifically, a JavaServer page contains HTML code to display static text and graphics, as well as application code to generate information. When the page is displayed in a web browser, it contains both the static HTML content and, in the case of the Federation component, dynamic content retrieved through calls to the Federation API. An administrator can customize the look and feel of the interface by changing the HTML tags in the JSP but the invoked APIs must not be changed.

The JSP are located in `/`*AccessManager-base*`/SUNWam/web-src/services/config/federation/default`. The files in this directory provide a default interface to the Federation component. To customize the pages for a specific organization, this default directory can be copied and renamed to reflect the name of the organization (or any value). This directory would then be placed at the same level as the default directory, and the files within this directory would be modified as needed. The following table lists the JSP including details on what each page is used for and the invoked APIs that cannot be modified. For more information about modifying these pages to customize the console, see the *Sun Java System Access Manager 7.1 Developer's Guide*.

JSP Name and Implemented APIs	Purpose
■ `CommonLogin.jsp` Invoked APIs are: ■ `LibertyManager.getLoginURL(request)` ■ `LibertyManager.getInterSiteURL(request)` ■ `LibertyManager.getIDPList(providerID)` ■ `LibertyManager.getNewRequest(request)` ■ `LibertyManager.getSuccintID(idpID)` ■ `LibertyManager.cleanQueryString(request)`	Displays a link to the local login page as well as links to the login pages of the trusted identity providers. This page is displayed when a user is not logged in locally or with an identity provider. The list of identity providers is obtained by using the `getIDPList(hostedProviderID)` method.
■ `Error.jsp`	Displays an error page when an error has occurred. No APIs are invoked.
■ `Federate.jsp` Invoked APIs are: ■ `LibertyManager.isLECPProfile(request)` ■ `LibertyManager.getAuthnRequestEnvelope(request)` ■ `LibertyManager.getUser(request)` ■ `LibertyManager.getProvidersToFederate(providerID,userDN)`	Displays when a user clicks a federate link on a provider page. Contains a drop-down of all providers with which the user is not yet federated. This list is constructed by using the `getProvidersToFederate(userName,providerID)` method.
■ `FederationDone.jsp` Invoked API is: ■ `LibertyManager.isFederationCancelled(request)`	Displays the status of a federation (success or cancelled). This page checks the status by using the `isFederationCancelled(request)` method.
■ `Footer.jsp`	Displays a branded footer that is included on all the pages. No APIs are invoked.
■ `Header.jsp`	Displays a branded header that is included on all the pages. No APIs are invoked.

JSP Name and Implemented APIs	Purpose
■ `ListOfCOTs.jsp` Invoked API is: ■ `LibertyManager.getListOfCOTs(providerID)`	Displays a list of circles of trust. When a user is authenticated by an identity provider and the service provider belongs to more than one circle of trust, the user is shown this JSP and is prompted to select an authentication domain as their preferred domain. In the case that the provider belongs to only one domain, this page will not be displayed. The list is obtained by using the `getListOfCOTs(providerID)` method.
■ `LogoutDone.jsp` Invoked API is: ■ `LibertyManager.isLogoutSuccess(request)`	Displays the status of the local logout operation.
■ `NameRegistration.jsp` Invoked APIs are: ■ `LibertyManager.getUser(request)` ■ `LibertyManager.getRegisteredProviders(userDN)`	Displays when the Name Registration link is clicked on a provider page. When a federated user chooses to register a new Name Identifier from a service provider to an identity provider, this JSP is displayed.
■ `NameRegistrationDone.jsp` Invoked APIs are: ■ `LibertyManager.isNameRegistrationSuccess(request)` ■ `LibertyManager.isNameRegistrationCanceled(request)`	Displays the status of `NameRegistration.jsp`. When finished, this page is displayed.
■ `Termination.jsp` Invoked APIs are: ■ `LibertyManager.getUser(request)` ■ `LibertyManager.getFederatedProviders(userDN)`	Displays when a user clicks a defederate link on a provider page. Contains a drop-down of all providers to which the user has federated and from which the user can choose to defederate. The list is constructed by using the `getFederatedProviders(userName)` method, which returns all active providers to which the user is already federated.
■ `TerminationDone.jsp` Invoked APIs are: ■ `LibertyManager.isTerminationSuccess(request)` ■ `LibertyManager.isTerminationCanceled(request)`	Displays the status of federation termination (success or cancelled). Status is checked using the `isTerminationCancelled(request)` method.

Entities and Authentication Domains

The Federation component in the Access Manager Console provides an interface for configuring, modifying, and deleting authentication domains, and its member identity providers and service providers. To enable provider federation using Access Manager, create and populate an authentication domain using the following process:

1. Create an *entity* to hold the *metadata* (information that defines a particular identity services architecture) for each provider that will become a member of the authentication domain.

   See "Creating Entities" on page 74.
2. Configure and save an authentication domain.

   See "Authentication Domains" on page 100.
3. Add an entity (a configured provider) to the authentication domain by editing the entity's properties.

   See "Configuring Provider Entities" on page 74 or "Configuring Affiliate Entities" on page 92 dependent on the type of entity.

Note – The establishment of contractual agreements between providers is beyond the scope of this guide. For information, see the Liberty Trust Model Guidelines.

The following sections contain more detailed information:

- "Entities" on page 72
- "Authentication Domains" on page 100

Tip – In a federation setup, all service providers and identity providers must share a synchronized clock. You can implement the synchronization by pointing to an external clock source or by ensuring that, in case of delays in receiving responses, the responses are captured without fail through adjustments of the time outs.

Entities

An *entity* may be configured with metadata (configuration information that defines a particular identity service architecture) for an individual identity provider, an individual service provider, or one of each. Contrarily, an entity may be configured as an *affiliation*, a selected group of providers of either type. Both provider and affiliation entities can be configured using the Access Manager Console.

Note – For general information about entities, see the *Liberty Metadata Description and Discovery Specification*.

Provider Entity A *provider entity* holds the metadata for individual providers of either type. All identity providers and service providers must be configured within a provider entity before they can be associated with an authentication domain, or chosen to be included in an *affiliate entity*. Using the attributes provided in the Access Manager Console, one individual identity provider, one individual service provider, or one of each can be defined within a provider entity.

Affiliate Entity A configured *affiliation* (referenced by an `affiliationID`) enables a user to federate with a group of associated sites. The affiliation is formed and maintained by an *affiliation owner* who chooses the members from already configured provider entities. The chosen providers may invoke services either as a member of the affiliation, or individually as a provider. (An affiliation is formed without regard to the boundaries of an authentication domain.) If services are invoked as an affiliation member, a service provider might issue an authentication request for a user on behalf of an affiliation. When authentication is secured, the user can achieve single sign-on with all members of the affiliation.

An *affiliate entity* holds the metadata that defines the grouping of one or more provider entities that comprise the affiliation. It does not contain the configuration information for any providers, only the configuration information for the affiliation itself.

Tip – The name identifier (a single persistent randomized string) is used to achieve single sign-on between an identity provider and a group of service providers acting as a single affiliation. If there are several service providers and identity providers in the same circle of trust, use an affiliate entity to avoid having to generate different name identifiers for commonly shared services.

Configuring an entity using the Access Manager Console is a two-step process. First, you create a provider or affiliate entity. Then, you populate the entity with either remote or hosted provider metadata (either service or identity) or affiliation information. This process is described in the following sections.

- "Creating Entities" on page 74
- "Configuring Provider Entities" on page 74
- "Configuring Affiliate Entities" on page 92
- "Deleting Entities" on page 95
- "Creating and Configuring Entities using `amadmin`" on page 95

Note – This section contains information on how entities can be created and configured in one step using the `amadmin` command-line interface and prepared XML files (as opposed to the manual configuration illustrated in the previous sections).

Creating Entities

This section describes the process for creating a provider entity or an affiliate entity.

▼ To Create a Provider Entity or an Affiliate Entity

An entity can be created but it will not be available for assignment to an authentication domain until it has been populated with provider(s). Once created and populated, the entity (and thus the member providers) can be added to an authentication domain.

1. **In the Access Manager Console, select the Federation tab.**

2. **Under Federation, select the Entities tab.**

3. **Select New.**

   The new entity attributes are displayed.

4. **Type a value for the Entity Name.**

   This field specifies the uniform resource identifier (URI) of the entity and must be unique. For example, `http://shivalik.sun.com` or `http://provider2.com:875`.

5. **(Optional) Enter a description of the entity in the Description field.**

6. **Select one of the following options to define the entity's type.**

   - **Select Provider and click OK.**

     The new entity is now displayed as a provider in the list of configured Entities. To configure the entity, see "To Configure a Provider Entity" on page 75.

   - **Select Affiliate, type a value for both Affiliate Name and Affiliate Owner, and click OK.**

     The Affiliate Name (or `affiliationID`) specifies a URI that uniquely represents the affiliate entity. For example, `http://shivalik.sun.com` or `http://provider2.com:875`. The Affiliate Owner (or `providerID`) is the value assigned to the Entity Name attribute of the provider entity that is forming the affiliation. After entering these values and clicking OK, the new entity is displayed as an affiliate in the list of configured Entities. To configure the entity, see "To Configure an Affiliate Entity" on page 92.

     Note – Defining a service provider as the Affiliate Owner does not automatically include it as a member of the affiliate. If an owner is also a member, the provider ID must be defined as both.

Configuring Provider Entities

After you create a provider entity, you populate it with remote or hosted provider information (either service or identity). This section contains the following procedures:

- "To Configure a Provider Entity" on page 75
- "To Configure General Attributes for a Provider Entity" on page 75
- "To Configure Hosted or Remote Identity Provider Attributes for a Provider Entity" on page 77
- "To Configure Hosted or Remote Service Provider Attributes for a Provider Entity" on page 84

▼ To Configure a Provider Entity

When you configure a provider entity, you are populating it with remote or hosted provider information (either service or identity). You might also be defining values for attributes that were not available when the entity was initially created. Before performing this procedure, you must have completed the steps in "To Create a Provider Entity or an Affiliate Entity" on page 74.

1 **In the Access Manager Console, select the Federation tab.**

2 **Under Federation, select the Entities tab.**

3 **Select the provider entity that you want to configure.**

Ensure that you select an entity marked as type Provider.

4 **Define values for the General, Identity Provider or Service Provider attributes by choosing from the View menu.**

- **To define values for General attributes, see "To Configure General Attributes for a Provider Entity" on page 75.**
- **To define values for Identity Provider attributes, see "To Configure Hosted or Remote Identity Provider Attributes for a Provider Entity" on page 77.**
- **To define values for Service Provider attributes, see "To Configure Hosted or Remote Service Provider Attributes for a Provider Entity" on page 84.**

▼ To Configure General Attributes for a Provider Entity

Before performing this procedure, you must have completed the steps in "To Configure a Provider Entity" on page 75.

1 **Choose General from the View menu, and provide information for the Entity Common Attributes.**

Entity Common Attributes contain values that define the entity itself.

Entity Name
: The static value of this attribute is the name that you provided when creating the entity.

Type
: The static value of this attribute is Provider.

Description
: The value of this optional attribute is the description that you provided when creating the entity. You can modify the description.

2 Provide information for the Entity Contact Person Profile attributes.

Entity Contact Person Profile attributes contain values that define the administrator of the entity.

First Name
: Type the given name of the entity's contact person.

Last Name
: Type the surname of the entity's contact person.

Type
: Choose the type of contact from the drop-down menu:

- Administrative
- Billing
- Technical
- Other

Company
: Type the name of the company that employs this person.

Liberty Principal ID
: Type a URI that points to an online instance of the contact person's personal information profile.

Emails
: Type one or more email addresses for the contact person in New Value and click Add.

Telephone Numbers
: Type one or more telephone numbers for the contact person in New Value and click Add.

3 (Optional) Provide information for the Organization Profiles.

The Organization Profiles attributes contain values that define the organizational name of the entity.

Names
: Type the complete legal name of the entity's organization in New Value and click Add. Use the format *locale|organization-name*. For example, `en|`*organization-name*`.com`.

Note – If the Names attribute contains a value, it is required to add values to the Display Names and URL attributes.

Display Names
: Type a name that is suitable for display in New Value and click Add. Use the format *locale|organization-display-name*. For example, `en|`*organization-display-name*`.com`.

URL
: Type a URL that can be used to direct a principal to additional information on the entity's organization in New Value and click Add. Use the format *locale|organization-URL*. For example, `en|http://www.`*organization-name*`.com`.

4 Click Save to complete the configuration, or define additional values for the Identity Provider or Service Provider attributes by choosing from the View menu.

- **To define values for Identity Provider attributes, see "To Configure Hosted or Remote Identity Provider Attributes for a Provider Entity" on page 77.**
- **To define values for Service Provider attributes, see "To Configure Hosted or Remote Service Provider Attributes for a Provider Entity" on page 84.**

▼ To Configure Hosted or Remote Identity Provider Attributes for a Provider Entity

Before performing this procedure, you must have completed the steps in "To Configure a Provider Entity" on page 75.

Note – Some of the attributes below will only be visible after you have saved the initial provider configuration.

---

1 Choose Identity Provider from the View menu.

2 Select the type of provider that you are configuring:

- New Hosted Provider

  A *hosted provider* is installed on the same server as Access Manager.
- New Remote Provider

  A *remote provider* is not installed on the same server as Access Manager.

3 Provide information for the Common Attributes.

Common Attributes contain values that generally define the identity provider.

Provider Type
: The static value of this attribute is the type of provider being configured: hosted or remote.

Description
: The value of this attribute is a description of the identity provider.

Protocol Support Enumeration
: Choose the Liberty ID-FF release that is supported by this provider.

  - `urn:liberty:iff:2003-08` refers to the Liberty Identity Federation Framework Version 1.2.
  - `urn:liberty:iff:2002-12` refers to the Liberty Identity Federation Framework Version 1.1.

Server Name Identifier Mapping Binding
: Name identifier mapping allows a service provider to obtain a name identifier for a principal that has federated in the namespace of a different service provider. Implementing this protocol allows

the requesting service provider to communicate with the second service provider without an identity federation having been enabled. Type a URI that identifies the communication specifications in New Value and click Add.

Note – Currently, the Name Identifier Mapping profile only supports SOAP. If this attribute is used, its value must be `http://projectliberty.org/profiles/nim-sp-http`.

Signing Key: Key Alias
Type the key alias that is used to sign requests and responses.

Encryption Key: Key Alias
Type the security certificate alias. Certificates are stored in a Java keystore file. Each specific certificate is mapped to an alias that is used to fetch the certificate.

Encryption Key: Key Size
Type the length for keys that are used by the web service consumer when interacting with another entity.

Note – If the encryption method is DESede, the key size must be 192. If the encryption method is AES, the key size must be 128, 192 or 256.

Encryption Key: Encryption Method
Choose the method of encryption:

- None
- AES
- DESede

Name Identifier Encryption
Select the check box to enable encryption of the name identifier.

4 Provide information for the Communication URLs.

Communication URLs attributes contain locations for redirects and sending requests.

SOAP Endpoint
Type a URI to the identity provider's SOAP message receiver. This value communicates the location of the SOAP receiver in non browser communications.

Single Sign-On Service URL
Type a URL to which service providers can send single sign-on and federation requests.

Single Logout Service
Type a URL to which service providers can send logout requests. Single logout synchronizes the logout functionality across all sessions authenticated by the identity provider.

Single Logout Return
Type a URL to which the identity provider will redirect the principal after completing a logout.

Federation Termination Service
Type a URL to which a service provider will send federation termination requests.

Federation Termination Return
Type a URL to which the identity provider will redirect the principal after completing federation termination.

Name Registration Service
Type a URL to which a service provider will send requests to specify a new name identifier to be used when communicating with the identity provider about a principal. This service can only be used after a federation session is established.

Name Registration Return
Type a URL to which the identity provider will redirect the principal after HTTP name registration has been completed.

5 **Provide information for the Communication Profiles.**

Communication Profiles attributes define the transmission methods used by the identity provider.

Federation Termination
Select a profile to notify other providers of a principal's federation termination:

- HTTP Redirect
- SOAP

Single Logout
Select a profile to notify other providers of a principal's logout:

- HTTP Redirect
- HTTP Get
- SOAP

Name Registration
Select a profile to notify other providers of a principal's name registration:

- HTTP Redirect
- SOAP

Single Sign-on/Federation
Select a profile for sending authentication requests:

- Browser Post (specifies a browser-based HTTP POST protocol)
- Browser Artifact (specifies a non-browser SOAP-based protocol)
- LECP (specifies a Liberty-enabled Client Proxy)

Note – Access Manager can handle requests that come from a Liberty-enabled client proxy profile, but it requires additional configuration that is beyond the scope of this manual.

6 Select any of the available authentication domains to assign to the provider.

A provider can belong to one or more authentication domains. However, a provider without a specified authentication domain can not participate in Liberty-based communications. If no authentication domains have been created, you can define this attribute later.

Note – If configuring a remote identity provider, skip to step 11. If configuring a hosted identity provider, continue with step 7.

---

7 (Hosted Identity Provider Only) Provide mappings for the Authentication Context classes.

This attribute maps the Liberty-defined authentication context classes to authentication methods available from the identity provider.

Supported
: Select the check box next to the authentication context class if the identity provider supports it.

Context Reference
: The Liberty-defined authentication context classes are:

- Mobile Contract
- Mobile Digital ID
- MobileUnregistered
- Password
- Password-ProtectedTransport
- Previous-Session
- Smartcard
- Smartcard-PKI
- Software-PKI
- Time-Sync-Token

Key
: Choose the Access Manager authentication type to which the context is mapped.

Note – See “Authentication Types” in *Sun Java System Access Manager 7.1 Administration Guide* for more information.

Value
: Type the Access Manager authentication option.

Priority
: Choose a priority level for cases where there are multiple contexts.

8 (Hosted Identity Provider Only) Select any of the available provider entities to assign as a Trusted Provider and click Add.

This attribute tallies providers that the identity provider trusts.

9 (Hosted Identity Provider Only) Provide information for the Access Manager Configuration attributes.

Access Manager Configuration attributes define general information regarding the instance of Access Manager being used as an identity provider.

Provider Alias
Type an alias name for the local identity provider.

Authentication Type
Select the provider that should be used for authentication requests from a provider hosted locally:

- *Remote* specifies that the provider hosted locally would contact a remote identity provider upon receiving an authentication request.
- *Local* specifies that the provider hosted locally should contact a local identity provider upon receiving an authentication request (essentially, itself).

Default Authentication Context
Select the authentication context class (method of authentication) to use if the identity provider does not receive this information as part of a service provider request. This value also specifies the authentication context used by the service provider when an unknown user tries to access a protected resource. The options are:

- Password
- Mobile Digital ID
- Smartcard
- Smartcard-PKI
- MobileUnregistered
- Software-PKI
- Previous-Session
- Mobile Contract
- Time-Sync-Token
- Password-ProtectedTransport

Realm
Type a value that points to the realm in which this provider is configured. For example, `/sp`.

Liberty Version URI
Type the URI of the version of the Liberty Alliance Project specification being used. The default value is `http://projectliberty.org/specs/v1`.

Name Identifier Implementation
This field defines the class used by a service provider to participate in name registration. Name registration is a profile by which service providers specify a principal's name identifier that an identity provider will use when communicating with the service provider. The value is `com.sun.identity.federation.services.util.FSNameIdentifierImpl`.

Home Page URL
Type the URL of the home page of the identity provider.

Single Sign-on Failure Redirect URL
: Type the URL to which a principal will be redirected if single sign-on has failed.

Assertion Issuer
: Type the name of the host that issues the assertion. This value might be the load balancer's host name if Access Manager is behind one.

Generate Discovery Bootstrapping Resource Offering
: Select the check box if you want a Discovery Service Resource Offering to be generated during the Liberty-based single sign-on process for bootstrapping purposes.

Auto Federation
: Select the check box to enable auto-federation.

Auto Federation Common Attribute Name
: When creating an Auto Federation Attribute Statement, the value of this attribute will be used. The statement will contain the `AutoFedAttribute` element and this common attribute as its value.

Attribute Statement Plug-in
: Specify a pluggable class used for adding attribute statements to an assertion that is generated during the Liberty-based single sign-on process.

Identity Provider Attribute Mapping
: Specify values to define the mappings used by the default attribute mapper plug-in. Mappings should be configured in the format:

SAML-attribute=local-attribute

For example, `EmailAddress=mail` or `Address=postaladdress`. Type the mapping as a New Value and click Add.

10 (Hosted Identity Provider Only) Provide information for the SAML Attributes.

SAML Attributes define general information regarding SAML assertions that are sent by the identity provider.

Assertion Interval
: Type the interval of time (in seconds) that an assertion issued by the identity provider will remain valid. A principal will remain authenticated until the assertion interval expires.

Cleanup Interval
: Type the interval of time (in seconds) before assertions stored in the identity provider will be cleared.

Artifact Timeout
: Type the interval of time (in seconds) to specify the timeout for assertion artifacts.

Assertion Limit
: Type a number to define how many assertions an identity provider can issue, or how many assertions that can be stored.

Note – To continue configuring a hosted identity provider, skip to step 12.

11 (Remote Identity Provider Only) Provide information for the Proxy Authentication Configuration attributes.

Proxy Authentication Configuration attributes define values for dynamic identity provider proxying.

Proxy Authentication
: Select the check box to enable proxy authentication for a service provider.

Proxy Identity Providers List
: Type an identifier for an identity provider(s) that can be used for proxy authentication in New Value and click Add. The value is a URI defined as the provider's identifier.

Maximum Number of Proxies
: Enter the maximum number of identity providers that can be used for proxy authentication.

Use Introduction Cookie for Proxying
: Select the check box if you want introductions to be used to find the proxying identity provider.

12 (Optional) Provide information for the Organization Profiles.

The Organization Profiles attributes contain values that define the organizational name of the entity.

Names
: Type the complete legal name of the organization in New Value and click Add. Use the format *locale*|*organization-name*, for example, `en|`*organization-name*`.com`.

Note – If the Names attribute contains a value, it is required to add values to the Display Names and URL attributes also.

Display Names
: Type a name that is suitable for display to a principal in New Value and click Add. The value is defined in the format *locale*|*organization-display-name*, for example, `en|`*organization-display-name*`.com`.

URL
: Type a URL that can be used to direct a principal to additional information on the entity in New Value and click Add. Use the format *locale*|*organization-URL*, for example, `en|http://www.`*organization-name*`.com`.

13 Click New Contact Person to create a contact person for the provider.

The Contact Person attributes contain information regarding a human contact for the identity provider.

First Name
: Type the given name of the identity provider's contact person.

Last Name
: Type the surname of the identity provider's contact person.

Type
Choose the contact's role from the drop-down menu:

- Administrative
- Billing
- Technical
- Other

Company
Type the name of the company that employs the contact person.

Liberty Principal Identifier
Type the name identifier that points to an online instance of the contact person's personal information profile.

Emails
Type one or more email addresses for the contact person in New Value and click Add.

Telephone Numbers
Type one or more telephone numbers for the contact person in New Value and click Add.

14 Click Create to create the contact person.

15 Click Save to complete the configuration, or define values for General or Service Provider attributes by choosing from the View menu:

- **To define values for General attributes, see "To Configure General Attributes for a Provider Entity" on page 75.**
- **To define values for Service Provider attributes, see "To Configure Hosted or Remote Service Provider Attributes for a Provider Entity" on page 84.**

▼ To Configure Hosted or Remote Service Provider Attributes for a Provider Entity

Before performing this procedure, you must have completed the steps in "To Configure a Provider Entity" on page 75.

Note – Some of the attributes below will only be visible after you have saved the initial provider configuration.

---

1 Choose Service Provider from the View menu.

2 Select the type of provider that you are configuring:

- New Hosted Provider

  A *hosted provider* is installed on the same server as Access Manager.

- New Remote Provider

  A *remote provider* is not installed on the same server as Access Manager.

3 **Provide information for the Common Attributes.**

Common Attributes contain values that generally define the service provider.

Provider Type
: The static value of this attribute is the type of provider being configured: hosted or remote. This attribute is visible only after saving your configuration.

Description
: The value of this attribute is a description of the service provider.

Protocol Support Enumeration
: Select the Liberty ID-FF release that is supported by this provider.

- `urn:liberty:iff:2003-08` refers to the Liberty Identity Federation Framework Version 1.2.
- `urn:liberty:iff:2002-12` refers to the Liberty Identity Federation Framework Version 1.1.

Server Name Identifier Mapping Binding
: Name identifier mapping allows a service provider to obtain a name identifier for a principal that has federated in the namespace of a different service provider. Implementing this protocol allows the requesting service provider to communicate with the second service provider without an identity federation having been enabled. Type a URI that identifies the communication specifications in New Value and click Add.

Note – Currently, the Name Identifier Mapping profile only supports SOAP. If this attribute is used, its value must be `http://projectliberty.org/profiles/nim-sp-http`.

Signing Key: Key Alias
: Type the key alias that is used to sign requests and responses.

Encryption Key: Key Alias
: Type the security certificate alias. Certificates are stored in a Java keystore file. Each specific certificate is mapped to an alias that is used to fetch the certificate.

Encryption Key: Key Size
: Type the length for keys that are used by the web service consumer when interacting with another entity.

Encryption Key: Encryption Method
: Select the method of encryption:

- None
- AES
- DESede

Name Identifier Encryption
: Select the check box to enable encryption of the name identifier.

4 Provide information for the Communication URLs.

Communication URLs attributes contain locations for redirects and sending requests.

SOAP Endpoint
Type a URI to the service provider's SOAP message receiver. This value communicates the location of the SOAP receiver in non browser communications.

Single Logout Service
Type a URL to which identity providers can send logout requests.

Single Logout Return
Type a URL to which the service provider will redirect the principal after completing a logout.

Federation Termination Service
Type a URL to which identity providers will send federation termination requests.

Federation Termination Return
Type a URL to which the service provider will redirect the principal after completing federation termination.

Name Registration Service
Type a URL that will be used when communicating with the identity provider to specify a new name identifier for the principal. (Registration can occur only after a federation session is established.)

Name Registration Return
Type a URL to which the service provider will redirect the principal after HTTP name registration has been completed.

5 Provide information for the Communication Profiles.

Communication Profiles attributes define the transmission methods used by the service provider.

Federation Termination
Select a profile to notify other providers of a principal's federation termination:

- HTTP Redirect
- SOAP

Single Logout
Select a profile to notify other providers of a principal's logout:

- HTTP Redirect
- HTTP Get
- SOAP

Name Registration
Select a profile to notify other providers of a principal's name registration:

- HTTP Redirect
- SOAP

Single Sign-on/Federation
Select a profile for sending authentication requests:

- Browser Post (specifies a browser-based HTTP POST protocol)
- Browser Artifact (specifies a non-browser SOAP-based protocol)
- LECP (specifies a Liberty-enabled Client Proxy)

Note – Access Manager can handle requests that come from a Liberty-enabled client proxy profile, but it requires additional configuration that is beyond the scope of this manual.

6 **Select any of the available authentication domains to assign to the provider.**

A provider can belong to one or more authentication domains. However, a provider without a specified authentication domain cannot participate in Liberty-based communications. If no authentication domains have been created, you can define this attribute later.

Note – If configuring a hosted service provider, skip to step 9. If configuring a hosted service provider, continue with step 7.

7 **(Hosted Service Provider Only) Provide a hierarchy for the Authentication Context classes.**

This attribute corresponds to the authentication level defined for an Access Manager authentication module. It will redirect the principal to the authentication type with an authentication level equal to the number defined.

Context Reference

The Liberty-defined authentication context classes are:

- Password
- Mobile Digital ID
- Smartcard
- Smartcard-PKI
- MobileUnregistered
- Software-PKI
- Previous-Session
- Mobile Contract
- Time-Sync-Token
- Password-ProtectedTransport

Level

Type a level for each authentication context class. The number can be any positive number.

8 **(Hosted Service Provider Only) Select any of the available provider entities to assign as a Trusted Provider and click Add.**

This attribute tallies providers that the service provider trusts.

9 **Provide information for the Service Provider attributes.**

Service Provider attributes define general information regarding the service provider.

Assertion Consumer URL

Type the URL to the end point that defines where a provider will send SAML assertions.

Assertion Consumer Service URL ID
If the value of the Protocol Support Enumeration common attribute is `urn:liberty:iff:2003-08`, type the required ID.

Set Assertion Consumer Service URL as Default
Select the check box to use the Assertion Consumer Service URL as the default value when no identifier is provided in the request.

Sign Authentication Request
Select the check box to make the service provider always signs authentication requests.

Name Registration after Federation
Select the check box to enable the service provider to participate in name registration after a principal has been federated.

Name ID Policy
Select the option permitting requester influence over name identifier policy at the identity provider. The options are:

- *None* specifies that the identity provider will return the name identifier(s) for the principal corresponding to the federation that exists between the identity provider and the requesting service provider or affiliation group. If no such federation exists, an error will be returned.
- *One-time* specifies that the identity provider will issue a temporary, one-time-use identifier for the principal after federation.
- *Federation* specifies that the identity provider may start a new identity federation if one does not already exist for the principal.

Affiliation Federation
Select the check box to enable affiliation federation.

Note – If configuring a remote service provider, skip to step 11. If configuring a hosted service provider, continue with step 10.

10 (Hosted Service Provider Only) Provide information for the Access Manager Configuration attributes.

Access Manager Configuration attributes define general information regarding the instance of Access Manager being used as a service provider.

Service Provider Adapter
Defines the implementation class for the `com.sun.identity.federation.plugins.FederationSPAdapter` interface, used to add application-specific processing during the federation process.

Provider Alias
Type an alias name for the local service provider.

Authentication Type
Select the provider that should be used for authentication requests from a provider hosted locally:

- *Remote* specifies that the provider hosted locally would contact a remote identity provider upon receiving an authentication request.

- *Local* specifies that the provider hosted locally should contact a local identity provider upon receiving an authentication request (essentially, itself).

Default Authentication Context

This attribute defines the service provider's default authentication context class (method of authentication). This method will always be called when the service provider sends an authentication request. This value also specifies the authentication context used by the service provider when an unknown user tries to access a protected resource. The options are:

- Password
- Mobile Digital ID
- Smartcard
- Smartcard-PKI
- MobileUnregistered
- Software-PKI
- Previous-Session
- Mobile Contract
- Time-Sync-Token
- Password-ProtectedTransport

Identity Provider Forced Authentication

Select the check box to indicate that the identity provider must reauthenticate (even during a live session) when an authentication request is received. This attribute is enabled by default.

Request Identity Provider to be Passive

Select the check box to specify that the identity provider must not interact with the principal and must interact with the user.

Realm

Type a value that points to the realm in which this provider is configured, for example, `/sp`.

Liberty Version URI

Type the URI of the version of the Liberty specification being used. The default value is `http://projectliberty.org/specs/v1`.

Name Identifier Implementation

This field defines the class used by a service provider to participate in name registration. Name registration is a profile by which service providers specify a principal's name identifier that an identity provider will use when communicating with the service provider. The value is `com.sun.identity.federation.services.util.FSNameIdentifierImpl`.

Home Page URL

Type the URL of the home page of the service provider.

Single Sign-on Failure Redirect URL

Type the URL to which a principal will be redirected if single sign-on has failed.

Auto Federation

Select the check box to enable auto-federation.

Auto Federation Common Attribute Name

When creating an Auto Federation Attribute Statement, the value of this attribute will be used. The statement will contain the `AutoFedAttribute` element and this common attribute as its value.

Attribute Mapper Class

The class used to map attributes in the SAML assertion to user attributes defined locally by the service provider. The default class is `com.sun.identity.federation.services.FSDefaultAttributeMapper`.

Service Provider Attribute Mapping

Specify values to define the mappings used by the default attribute mapper plug-in specified above. Mappings should be configured in the format:

SAML-attribute=local-attribute

For example, `EmailAddress=mail` or `Address=postaladdress`. Type the mapping as a New Value and click Add.

11 Provide information for the Proxy Authentication Configuration attributes.

Proxy Authentication Configuration attributes define values for dynamic identity provider proxying.

Proxy Authentication

Select the check box to enable proxy authentication for a service provider.

Proxy Identity Providers List

Add a list of identity providers that can be used for proxy authentication. Type the URI defined as the provider's identifier in New Value and click Add.

Maximum Number of Proxies

Enter the maximum number of identity providers that can be used for proxy authentication.

Use Introduction Cookie for Proxying

Select the check box if you want introductions to be used to find the proxying identity provider.

12 (Optional) Provide information for the Organization Profiles.

The Organization Profiles attributes contain values that define the organizational name of the entity.

Names

Type the complete legal name of the entity's organization in New Value and click Add. Use the format *locale*|*organization-name*, for example, `en|`*organization-name*`.com`.

Note – If the Names attribute contains a value, it is required to add values to the Display Names and URL attributes.

Display Names

Type a name that is suitable for display in New Value and click Add. Use the format *locale*|*organization-display-name*, for example, `en|`*organization-display-name*`.com`.

URL
: Type a URL that can be used to direct a principal to additional information on the entity's organization in New Value and click Add. Use the format *locale|organization-URL*, for example, `en|http://www.`*organization-name*`.com`.

13 Click New Contact Person to create a contact person for the provider.

The Contact Person attributes contain information regarding a human contact for the identity provider.

First Name
: Type the given name of the identity provider's contact person.

Last Name
: Type the surname of the identity provider's contact person.

Type
: Choose the contact's role from the drop-down menu:

- Administrative
- Billing
- Technical
- Other

Company
: Type the name of the company that employs the contact person.

Liberty Principal Identifier
: Type the name identifier that points to an online instance of the contact person's personal information profile.

Emails
: Type one or more email addresses for the contact person in New Value and click Add.

Telephone Numbers
: Type one or more telephone numbers for the contact person in New Value and click Add.

14 Click Create to create the contact person.

15 Click Save to complete the configuration, or define values for General or Identity Provider attributes by choosing from the View menu:

- **To define values for General attributes, see "To Configure General Attributes for a Provider Entity" on page 75.**
- **To define values for Identity Provider attributes, see "To Configure Hosted or Remote Identity Provider Attributes for a Provider Entity" on page 77.**

Configuring Affiliate Entities

After you create an affiliate entity, you populate it with affiliation information. This section contains the following procedures:

- "To Configure an Affiliate Entity" on page 92
- "To Configure General Attributes for an Affiliate Entity" on page 92
- "To Configure Affiliate Attributes for an Affiliate Entity" on page 94

▼ To Configure an Affiliate Entity

Before performing this procedure, you must have completed the steps in "To Create a Provider Entity or an Affiliate Entity" on page 74.

1 **In the Access Manager Console, select the Federation tab.**

2 **Under Federation, select the Entities tab.**

3 **Select the provider entity that you want to configure.**

Ensure that you select an entity marked as type Affiliate.

4 **Define values for the General or Affiliate attribute groupings by choosing from the View menu:**

- **To define values for General attributes, see "To Configure General Attributes for an Affiliate Entity" on page 92**
- **To define values for Affiliate attributes, see "To Configure Affiliate Attributes for an Affiliate Entity" on page 94**

▼ To Configure General Attributes for an Affiliate Entity

Before performing this procedure, you must have completed the steps in "To Configure an Affiliate Entity" on page 92.

1 **Choose General from the View menu, and provide information for the Entity Common Attributes.**

Entity Common Attributes contain values that define the entity.

Entity Name
The static value of this attribute is the name that you provided when creating the entity.

Type
The static value of this attribute is Affiliate.

Description
The value of this optional attribute is the description that you provided when creating the entity. You can modify the description.

2 Provide information for the Entity Contact Person Profile attributes.

Entity Contact Person Profile attributes contain values that define the administrator of the entity.

First Name
Type the given name of the entity's contact person.

Last Name
Type the surname of the entity's contact person.

Type
Choose the type of contact from the drop-down menu:

- Administrative
- Billing
- Technical
- Other

Company
Type the name of the company that employs this person.

Liberty Principal ID
Type a URI that points to an online instance of the contact person's personal information profile.

Emails
Type one or more email addresses for the contact person in New Value and click Add.

Telephone Numbers
Type one or more telephone numbers for the contact person in New Value and click Add.

3 (Optional) Provide information for the Organization Profiles.

The Organization Profiles attributes contain values that define the organizational name of the entity.

Names
Type the complete legal name of the organization in New Value and click Add. Use the format *locale*|*organization-name*, for example, `en|`*organization-name*`.com`.

Note – If the Names attribute contains a value, it is required to add values to the Display Names and URL attributes also.

Display Names
Type a name that is suitable for display to a principal in New Value and click Add. The value is defined in the format *locale*|*organization-display-name*. For example, `en|`*organization-display-name*`.com`.

URL
Type a URL that can be used to direct a principal to additional information on the entity in New Value and click Add. Use the format *locale*|*organization-URL*, for example, `en|http://www.`*organization-name*`.com`.

4 **Click Save to complete the configuration, or choose Affiliate from the View menu to configure the Affiliate attributes.**

To define values for Affiliate attributes, see "To Configure Affiliate Attributes for an Affiliate Entity" on page 94.

To Configure Affiliate Attributes for an Affiliate Entity

Before performing this procedure, you must have completed the steps in "To Configure an Affiliate Entity" on page 92.

1 **Select any of the available provider entities to assign as members of the affiliation.**

A provider can belong to one or more affiliations. However, a provider without a specified authentication domain cannot participate in Liberty-based communications. Also, be sure that the provider entity being assigned to the affiliate entity has enabled affiliation federation.

2 **Choose Affiliate from the View menu and provide information for the Common Attributes.**

Common Attributes contain values that generally define the affiliation.

Name
The value of this attribute is the name of the affiliation.

Owner
The value of this attribute is the owner of the affiliation.

Signing Key: Key Alias
Type the key alias that is used to sign requests and responses.

Encryption Key: Key Alias
Type the security certificate alias. Certificates are stored in a JKS keystore file. Each specific certificate is mapped to an alias that is used to fetch the certificate.

Encryption Key: Key Size
Type the length for keys used by the web service consumer when interacting with another entity.

Encryption Key: Encryption Method
Select the method of encryption:

- None
- AES
- DESede

3 **Click Save to complete the configuration.**

4 **Click OK to complete the configuration, or choose General from the View menu to configure the General attributes.**

To define values for General attributes, see "To Configure General Attributes for an Affiliate Entity" on page 92.

Deleting Entities

If an entity is to be deleted from the console, it first needs to be manually removed from the Trusted Providers list (if the provider is hosted) or the Available Providers list (if part of an affiliation).

▼ To Delete a Provider or Affiliate Entity

1. **In the Access Manager Console, click the Federation tab.**
2. **Under Federation, select the Entities tab.**
3. **Select the check box next to the entity that you want to delete.**

   No warning message is displayed when performing a delete.
4. **Click Delete.**

Creating and Configuring Entities using `amadmin`

The previous sections detailed how to create and configure entities using the Access Manager console. But entities can also be created and configured in one step using the `amadmin` command-line interface and prepared XML files. Rather than filling in attribute values manually, you would create an XML file containing the attributes and corresponding values and import it using `amadmin`. The format of the XML file used as input is based on the `sms.dtd`. It is located in `/`*AccessManager-base*`/SUNWam/dtd`.

Caution – Do not modify the Access Manager DTD files as the APIs and their internal parsing functions are based on the default definitions. Alterations to the DTD files may hinder the operation of Access Manager.

There are two types of XML files that can be used as input to `amadmin`:

- **Standard metadata** properties are defined in the Liberty ID-FF specification.
- **Extended metadata** properties are proprietary and used by features specific to Access Manager.

Note – Information on how to use `amadmin` can be found in “Using amadmin for Federation Management” in *Sun Java System Access Manager 7.1 2006Q4 Administration Reference*. Information regarding the attributes and possible values can be found in the online help of the Access Manager console or in the following sections:

- “Creating Entities” on page 74
- “Configuring Provider Entities” on page 74
- “Configuring Affiliate Entities” on page 92

Following are instructions to load the Liberty ID-FF metadata:

- “Loading Standard Metadata Using `amadmin`” on page 96

- “Loading Proprietary Metadata Using amadmin” on page 98

Loading Standard Metadata Using `amadmin`

To load metadata compliant with the Liberty ID-FF use the following command:

```
amadmin --runasdn userdn --password password --import metadata_filename
```

This option is usually used to load provider metadata sent from a trusted partner in an XML file compliant with the Liberty ID-FF. Here is an example of a service provider metadata XML file compliant with the Liberty ID-FF.

EXAMPLE 3–1 Service Provider XML File for `amadmin`

```
<!--
  Copyright (c) 2005 Sun Microsystems, Inc. All rights reserved
  Use is subject to license terms.
-->

<EntityDescriptor meta:providerID="http://sp10.com" meta:cacheDuration="360"
xmlns:meta="urn:liberty:metadata:2003-08" xmlns="urn:liberty:metadata:2003-08">
  <SPDescriptor cacheDuration="180" xmlns:meta="urn:liberty:metadata:2003-08"
   aaa="aaa" protocolSupportEnumeration="urn:liberty:iff:2003-08">
   <KeyDescriptor use="signing">
    <EncryptionMethod>http://something/encrypt</EncryptionMethod>
     <KeySize>4567</KeySize>
     <ds:KeyInfo xmlns:ds="http://www.w3.org/2000/09/xmldsig#">
     <ds:X509Data xmlns:ds="http://www.w3.org/2000/09/xmldsig#">
     <ds:X509Certificate xmlns:ds="http://www.w3.org/2000/09/xmldsig#">
      MIIC1DCCApICBD8poYwwCwYHKoZIzjgEAwUAMFAxCzAJBgNVBAYTAlVTMQwwCgYDVQQKEwNTdW4x
      IDAeBgNVBAsTF1NVTiBPTkUgSWRlbnRpdHkgU2VydmVyMREwDwYDVQQDEwhzdW4tdW5peDAeFw0w
      MzA3MzEyMzA5MDBaFw0wNDAxMjcyMzA5MDBaMFAxCzAJBgNVBAYTAlVTMQwwCgYDVQQKEwNTdW4x
      IDAeBgNVBAsTF1NVTiBPTkUgSWRlbnRpdHkgU2VydmVyMREwDwYDVQQDEwhzdW4tdW5peDCCAbcw
      ggEsBgcqhkjOOAQBMIIBHwKBgQD9f1OBHXUSKVLfSpwu7OTn9hG3UjzvRADDHj+AtlEmaUVdQCJR
      +1k9jVj6v8X1ujD2y5tVbNeBO4AdNG/yZmC3a5lQpaSfn+gEexAiwk+7qdf+t8Yb+DtX58aophUP
      BPuD9tPFHsMCNVQTWhaRMvZ1864rYdcq7/IiAxmd0UgBxwIVAJdgUI8VIwvMspK5gqLrhAvwWBz1
      AoGBAPfhoIXWmz3ey7yrXDa4V7l5lK+7+jrqgvlXTAs9B4JnUVlXjrrUWU/mcQcQgYC0SRZxI+hM
      KBYTt88JMozIpuE8FnqLVHyNKOCjrh4rs6Z1kW6jfwv6ITVi8ftiegEkO8yk8b6oUZCJqIPf4Vrl
      nwaSi2ZegHtVJWQBTDv+z0kqA4GEAAKBgCNS1il+RQAQGcQ87GBFde8kf8R6ZVuaDDajFYE4/LNT
      Kr1dhEcPCtvL+iUFi44LzJf8Wxh+eA5K1mjIdxOo/UdwTpNQSqiRrm4Pq0wFG+hPnUTYLTtENkVX
      IIvfeoVDkXnF/2/i1Iu6ttZckimOPHfLzQUL4ldL4QiaYuCQF6NfMAsGByqGSM44BAMFAAMvADAs
      AhQ6yueX7YlD7IlJhJ8D4l6xYqwopwIUHzX82qCzF+VzIUhi0JG7slSpyis=
     </ds:X509Certificate>
     </ds:X509Data>
     </ds:KeyInfo>
   </KeyDescriptor>
   <SingleLogoutServiceURL>http://www.sun.com/slo"</SingleLogoutServiceURL>
   <SingleLogoutServiceReturnURL>http://www.sun.com/sloservice
```

EXAMPLE 3–1 Service Provider XML File for `amadmin` *(Continued)*

```
    </SingleLogoutServiceReturnURL>
   <FederationTerminationServiceURL>http://www.sun.com/fts
    </FederationTerminationServiceURL>
   <FederationTerminationServiceReturnURL>http://www.sun.com/ftsr
    </FederationTerminationServiceReturnURL>
   <FederationTerminationNotificationProtocolProfile>http://projectliberty.org/profiles/
    fedterm-sp-http</FederationTerminationNotificationProtocolProfile>
   <SingleLogoutProtocolProfile>http://projectliberty.org/profiles/slo-sp-http
    </SingleLogoutProtocolProfile>
   <RegisterNameIdentifierProtocolProfile>http://projectliberty.org/profiles/
    rni-sp-http</RegisterNameIdentifierProtocolProfile>
   <RegisterNameIdentifierServiceURL>http://www.sun2.com/risu
    </RegisterNameIdentifierServiceURL>
   <RegisterNameIdentifierServiceReturnURL>http://www.sun2.com/rstu
    </RegisterNameIdentifierServiceReturnURL>
   <RelationshipTerminationNotificationProtocolProfile>http://projectliberty.org/
    profiles/rel-term-soap</RelationshipTerminationNotificationProtocolProfile>
   <NameIdentifierMappingBinding AuthorityKind="ppp:AuthorizationDecisionQuery"
    Location="http://eng.sun.com" Binding="http://www.sun.com"
    xmlns:ppp="urn:oasis:names:tc:SAML:1.0:protocol"></NameIdentifierMappingBinding>
   <AdditionalMetaLocation namespace="abc">http://www.aol.com</AdditionalMetaLocation>
   <AdditionalMetaLocation namespace="efd">http://www.netscape.com</AdditionalMetaLocation>
   <AssertionConsumerServiceURL id="jh899" isDefault="true">
    http://www.iplanet.com/assertionurl</AssertionConsumerServiceURL>
   <AuthnRequestsSigned>true</AuthnRequestsSigned>
  </SPDescriptor>
  <ContactPerson xmlns:meta="urn:liberty:metadata:2003-08" contactType="technical"
   meta:libertyPrincipalIdentifier="myid">
  <Company>SUn Microsystems</Company>
  <GivenName>Joe</GivenName>
  <SurName>Smith</SurName>
  <EmailAddress>joe@sun.com</EmailAddress>
  <EmailAddress>smith@sun.com</EmailAddress>
  <TelephoneNumber>45859995</TelephoneNumber>
  </ContactPerson>
  <Organization xmlns:xml="http://www.w3.org/XML/1998/namespace">
  <OrganizationName xml:lang="en">sun com</OrganizationName>
  <OrganizationName xml:lang="en">sun micro com</OrganizationName>
  <OrganizationDisplayName xml:lang="en">sun.com</OrganizationDisplayName>
  <OrganizationURL xml:lang="en">http://www.sun.com/liberty</OrganizationURL>
  </Organization>
</EntityDescriptor>
```

Loading Proprietary Metadata Using `amadmin`

Access Manager provides proprietary attributes that are not a specific part of the Liberty ID-FF. To load Access Manager proprietary metadata use the following command:

`amadmin --runasdn` *userdn* `--password` *password* `--data` *proprietary_metadata_filename*

After loading the metadata, the `--export` option can be used to export metadata compliant with the Liberty ID-FF. This file can then be exchanged with trusted partners. Here is an example of an identity provider metadata XML file for proprietary attributes.

EXAMPLE 3–2 Identity Provider XML File for `amadmin`

```
<!--
    Copyright (c) 2005 Sun Microsystems, Inc. All rights reserved
    Use is subject to license terms.
-->

<EntityDescriptor meta:cacheDuration="360" meta:providerID="http://idp2.com"
 xmlns:meta="urn:liberty:metadata:2003-08" xmlns="urn:liberty:metadata:2003-08">
  <IDPDescriptor cacheDuration="180" xmlns:meta="urn:liberty:metadata:2003-08"
   aaa="aaa" protocolSupportEnumeration="urn:liberty:iff:2003-08 urn:liberty:iff:2002-12">
   <KeyDescriptor use="signing">
   <EncryptionMethod>http://something/encrypt</EncryptionMethod>
   <KeySize>4567</KeySize>
   <ds:KeyInfo xmlns:ds="http://www.w3.org/2000/09/xmldsig#">
   <ds:X509Data xmlns:ds="http://www.w3.org/2000/09/xmldsig#">
   <ds:X509Certificate xmlns:ds="http://www.w3.org/2000/09/xmldsig#">
    MIIC1DCCApICBD8poYwwCwYHKoZIzjgEAwUAMFAxCzAJBgNVBAYTAlVTMQwwCgYDVQQKEwNTdW4x
    IDAeBgNVBAsTF1NVTiBPTkUgSWRlbnRpdHkgU2VydmVyMREwDwYDVQQDEwhzdW4tdW5peDAeFw0w
    MzA3MzEyMzA5MDBaFw0wNDAxMjcyMzA5MDBaMFAxCzAJBgNVBAYTAlVTMQwwCgYDVQQKEwNTdW4x
    IDAeBgNVBAsTF1NVTiBPTkUgSWRlbnRpdHkgU2VydmVyMREwDwYDVQQDEwhzdW4tdW5peDCCAbcw
    ggEsBgcqhkjOOAQBMIIBHwKBgQD9f1OBHXUSKVLfSpwu7OTn9hG3UjzvRADDHj+AtlEmaUVdQCJR
    +1k9jVj6v8X1ujD2y5tVbNeBO4AdNG/yZmC3a5lQpaSfn+gEexAiwk+7qdf+t8Yb+DtX58aophUP
    BPuD9tPFHsMCNVQTWhaRMvZ1864rYdcq7/IiAxmd0UgBxwIVAJdgUI8VIwvMspK5gqLrhAvwWBz1
    AoGBAPfhoIXWmz3ey7yrXDa4V7l5lK+7+jrqgvlXTAs9B4JnUVlXjrrUWU/mcQcQgYC0SRZxI+hM
    KBYTt88JMozIpuE8FnqLVHyNKOCjrh4rs6Z1kW6jfwv6ITVi8ftiegEkO8yk8b6oUZCJqIPf4Vrl
    nwaSi2ZegHtVJWQBTDv+z0kqA4GEAAKBgCNS1il+RQAQGcQ87GBFde8kf8R6ZVuaDDajFYE4/LNT
    Kr1dhEcPCtvL+iUFi44LzJf8Wxh+eA5K1mjIdxOo/UdwTpNQSqiRrm4Pq0wFG+hPnUTYLTtENkVX
    IIvfeoVDkXnF/2/i1Iu6ttZckimOPHfLzQUL4ldL4QiaYuCQF6NfMAsGByqGSM44BAMFAAMvADAs
    AhQ6yueX7YlD7IlJhJ8D4l6xYqwopwIUHzX82qCzF+VzIUhi0JG7slSpyis=
   </ds:X509Certificate>
   </ds:X509Data>
   </ds:KeyInfo>
   </KeyDescriptor>
   <SingleLogoutServiceURL>http://www.sun.com/slo"</SingleLogoutServiceURL>
   <SingleLogoutServiceReturnURL>http://www.sun.com/sloservice
    </SingleLogoutServiceReturnURL>
```

EXAMPLE 3–2 Identity Provider XML File for `amadmin` *(Continued)*

```
 <FederationTerminationServiceURL>http://www.sun.com/fts
  </FederationTerminationServiceURL>
 <FederationTerminationServiceReturnURL>http://www.sun.com/ftsr
  </FederationTerminationServiceReturnURL>
 <FederationTerminationNotificationProtocolProfile>http://projectliberty.org/
  profiles/fedterm-sp-http</FederationTerminationNotificationProtocolProfile>
 <FederationTerminationNotificationProtocolProfile>http://projectliberty.org/
  profiles/fedterm-idp-http</FederationTerminationNotificationProtocolProfile>
 <SingleLogoutProtocolProfile>http://projectliberty.org/profiles/slo-sp-http
  </SingleLogoutProtocolProfile>
 <SingleLogoutProtocolProfile>http://projectliberty.org/profiles/slo-sp-soap
  </SingleLogoutProtocolProfile>
 <SingleLogoutProtocolProfile>http://projectliberty.org/profiles/slo-sp-http
  </SingleLogoutProtocolProfile>
 <SingleLogoutProtocolProfile>http://projectliberty.org/profiles/slo-idp-soap
  </SingleLogoutProtocolProfile>
 <RegisterNameIdentifierProtocolProfile>http://projectliberty.org/profiles/rni-sp-http
  </RegisterNameIdentifierProtocolProfile>
 <RegisterNameIdentifierServiceURL>http://www.sun2.com/risu</RegisterNameIdentifierServiceURL>
 <RegisterNameIdentifierServiceReturnURL>http://www.sun2.com/rstu</RegisterNameIdentifierServiceReturnURL>
 <RelationshipTerminationNotificationProtocolProfile>http://projectliberty.org/profiles/
  rel-term-soap</RelationshipTerminationNotificationProtocolProfile>
 <NameIdentifierMappingBinding AuthorityKind="ppp:AuthorizationDecisionQuery"
  Location="http://eng.sun.com" Binding="http://www.sun.com"
  xmlns:ppp="urn:oasis:names:tc:SAML:1.0:protocol">
  </NameIdentifierMappingBinding>
 <AdditionalMetaLocation namespace="abc">http://www.aol.com</AdditionalMetaLocation>
 <AdditionalMetaLocation namespace="efd">http://www.netscape.com</AdditionalMetaLocation>
 <SingleSignOnServiceURL>http://www.sun.com/idp-sso</SingleSignOnServiceURL>
 <SingleSignOnProtocolProfile>http://projectliberty.org/profiles/brws-post</SingleSignOnProtocolProfile>
 <SingleSignOnProtocolProfile>http://projectliberty.org/profiles/brws-art</SingleSignOnProtocolProfile>
 <IntroductionNotificationProtocolProfile>http://projectliberty.org/profiles/intro-notify-soap
  </IntroductionNotificationProtocolProfile>
</IDPDescriptor>
<ContactPerson xmlns:meta="urn:liberty:metadata:2003-08" contactType="technical" meta:libertyPrincipalIdentifie
<Company>Sun Microsystems</Company>
<GivenName>Joe</GivenName>
<SurName>Smith</SurName>
<EmailAddress>joe@sun.com</EmailAddress>
<EmailAddress>smith@sun.com</EmailAddress>
<TelephoneNumber>5859995</TelephoneNumber>
</ContactPerson>
<Organization xmlns:xml="http://www.w3.org/XML/1998/namespace">
<OrganizationName xml:lang="en">sun com</OrganizationName>
<OrganizationName xml:lang="en">sun micro com</OrganizationName>
<OrganizationDisplayName xml:lang="en">sun.com</OrganizationDisplayName>
```

EXAMPLE 3–2 Identity Provider XML File for `amadmin` *(Continued)*

```
  <OrganizationURL xml:lang="en">http://www.sun.com/liberty</OrganizationURL>
  </Organization>
</EntityDescriptor>
```

Authentication Domains

An *authentication domain* is a federation of any number of service providers (and at least one identity provider) with whom principals can transact business in a secure and apparently seamless environment. (The members of the domain must have previously established a *circle of trust* based on the Liberty Alliance Project architecture and operational agreements.)

Note – An authentication domain is *not* a domain in the domain name system (DNS) sense of the word.

The following procedures describe how to create, configure, and delete authentication domains using the Access Manager Console.

- "To Create An Authentication Domain" on page 100
- "To Configure or Modify an Authentication Domain" on page 101
- "To Delete an Authentication Domain" on page 102

▼ To Create An Authentication Domain

1. **In the Access Manager Console, click the Federation tab.**

2. **Under Federation, select the Authentication Domains tab.**

3. **Select New.**

   The New Authentication Domain attributes are displayed.

4. **Type a name for the authentication domain.**

5. **(Optional) Type a description of the authentication domain in the Description field.**

6. **(Optional) Type a value for the Writer Service URL.**

   The Writer Service URL specifies the location of the service that writes the common domain cookie. Use the format `http://`*common-domain-host:port*`/common/writer`. For more information about the Common Domain Services, see Chapter 4.

7 **(Optional) Type a value for the Reader Service URL.**

The Reader Service URL specifies the location of the service that reads the common domain cookie. Use the format `http://`*common-domain-host:port*`/common/transfer`. For more information about the Common Domain Services, see Chapter 4.

8 **Select Active or Inactive.**

The default status is Active. Selecting Inactive disables communication within the authentication domain.

9 **Click OK.**

The new authentication domain is now displayed in the list of configured Authentication Domains.

▼ To Configure or Modify an Authentication Domain

1 **In the Access Manager Console, click the Federation tab.**

2 **Under Federation, select the Authentication Domains tab.**

All created Authentication Domains are displayed.

3 **Click the name of the authentication domain that you want to modify.**

The General and Providers properties for the authentication domain are displayed.

4 **(Optional) Enter or modify a description of the authentication domain in the Description field.**

5 **(Optional) Enter or modify the value for the Writer Service URL.**

The Writer Service URL specifies the location of the service that writes the common domain cookie. Use the format `http://`*common-domain-host:port*`/common/writer`. For more information on the Common Domain Services, see Chapter 4.

6 **(Optional) Enter or modify the value for the Reader Service URL.**

The Reader Service URL specifies the location of the service that reads the common domain cookie. Use the format `http://`*common-domain-host:port*`/common/transfer`. For more information on the Common Domain Services, see Chapter 4.

7 **Select Active or Inactive.**

The default status is Active. Selecting Inactive disables communication within the authentication domain.

8 **Click Add to populate the authentication domain with providers.**

The Trusted Providers page is displayed.

9 **Choose from the list of Available Providers and click Add.**

10 **Click OK to save the providers to the authentication domain.**

The authentication domain's attribute page is displayed.

11 **Click Save to complete the configuration.**

▼ To Delete an Authentication Domain

Deleting an authentication domain does not delete the providers that belong to it although it will impact the trusted relationship.

1 **In the Access Manager Console, click the Federation tab.**

2 **Under Federation, select the Authentication Domains tab.**

All created Authentication Domains are displayed.

3 **Select the check box next to the authentication domain that you want to delete.**

4 **Click Delete.**

The Pre-login URL

The pre-login process is the entry point for applications participating in Liberty-based single sign-on. As described in "Process of Federation" on page 65, the principal would be redirected to the location defined by the pre-login URL if no Access Manager session token is found. This default process, though, can be modified based on the values of query parameters passed to Access Manager by the service provider via a URL.

A *query parameter* is a name/value pair appended to the end of a URL. The parameter starts with a question mark (?) and takes the form *name*=*value*. A number of parameters can be combined in one URL; when more than one parameter exists, they are separated by an ampersand (&). Use the format `http://`*hostname*`:`*port*`/`*deploy-uri*`/preLogin?metaAlias=`*metaAlias*. Additional parameters are appended to the URL as &*param1*=*value1*&*param2*=*value2* and so on. These parameters and their usage and values are described in the following table.

TABLE 3–1 Pre-login URL Parameters for Federation

Parameter	Description
actionOnNoFedCookie	The actionOnNoFedCookie parameter provides the flexibility to redirect a user when the fedCookie is not present in the browser, and when there is only one identity provider. It takes the following values: ▪ commonlogin will redirect to a common login page. ▪ locallogin will redirect to the local Access Manager login page. ▪ passive will issue a request to the identity provider by setting the isPassive parameter of the AuthnRequest element to true. ▪ active will issue a normal single sign-on request to the identity provider.
anonymousOnetime	The anonymousOnetime parameter can be used by service providers that authenticate users with anonymous, one time federation sessions. A value of true enables the service provider to issue a one time federation request and generate an anonymous session after successful verification of the authentication assertion from the identity provider. This feature is useful when the service provider doesn't have a user repository (for example, http://www.weather.com) but would like to depend on an identity provider for authentication. When the service provider receives a successful authentication assertion from an identity provider, they would generate an anonymous, temporary session.
authlevel	The authlevel parameter takes as a value a positive number that maps to an authentication level defined in the Access Manager Authentication Framework. The authentication level indicates how much to trust a method of authentication. **Note** – More information on the authentication framework can be found in *Sun Java System Access Manager 7.1 Administration Guide*. In this framework, each service provider is configured with a default authentication context (preferred method of authentication). However, the provider might like to change the assigned authentication context to one that is based on the defined authentication level. For example, provider B would like to generate a local session with an authentication level of 3 so it requests the identity provider to authenticate the user with an authentication context assigned that level. The value of this query parameter determines the authentication context to be used by the identity provider.
goto	The goto parameter takes as a value a URL to which the principal will be redirected after a successful SSO. If the value is not specified, default redirection will occur based on the value of the Provider Home Page URL attribute defined in the service provider configuration. The value of this URL can be configured by changing the iplanet-am-provider-homepage-url attribute in the amProviderConfig.xml file.

TABLE 3–1 Pre-login URL Parameters for Federation *(Continued)*

Parameter	Description
`gotoOnFedCookieNo`	The `gotoOnFedCookieNo` parameter takes as a value a URL to which the principal is redirected if a `fedCookie` with a value of `no` is found. The default behavior is to redirect the user to the Access Manager login page.

In order to modify the pre-login URL, edit the relevant properties in either the `AMConfig.properties` file or the `AMAgent.properties` file, dependant on your deployment. See the following procedures for more information:

- "To Configure for Pre-login" on page 104
- "To Configure for Global Logout" on page 104

▼ To Configure for Pre-login

In a federation setup, Access Manager acts as a service provider and manages an application that runs on a separate instance of Sun Java System Web Server. You must configure the agent that is protecting this application as follows:

1 **Point the `com.sun.am.policy.loginURL` property in the `AMAgent.properties` file to the pre-login service URL running on Access Manager.**

For example: `com.sun.am.policy.loginURL = http://www.sp1.com:58080/amserver/preLogin?metaAlias=www.sp1.com`

2 **Point the `com.sun.am.policy.am.library.loginURL` in the `AMAgent.properties` file to the login URL of the instance of Access Manager acting as the service provider.**

For example: `com.sun.am.policy.am.library.loginURL = http://www.sp1.com:58080/amserver/UI/Login`

▼ To Configure for Global Logout

To implement the logout process for all service providers using the Liberty Logout method, do the following:

1 **Copy the `AMClient.properties` file to the service provider's web container.**

2 **Revise the Logout method, as follows:**

```
ResourceBundle rsbu =ResourceBundle.getBundle("AMClient");
String logouturl = rsbu.getString
("com.sun.identity.federation.client.samples.logoutURL");
response.sendRedirect(logouturl);
```

This revision is equivalent to a redirection to `http://www.sp1.com:58080/amserver/liberty-logout?metaAlias=www.sp1.com`.

Federation API

The following packages form the Federation API.

- "com.sun.identity.federation.plugins" on page 105
- "com.sun.identity.federation.services" on page 105
- "com.sun.liberty" on page 105

com.sun.identity.federation.plugins

The com.sun.identity.federation.plugins package contains the FederationSPAdapter interface which can be implemented to allow applications to customize their actions before and after invoking the federation protocols. For example, a service provider may want to choose to redirect to a specific location after single sign-on. For more detailed information, see the Java API Reference in /*AccessManager-base*/SUNWam/docs or on *Sun Java System Access Manager 7.1 2006Q4 Java API Reference*.

com.sun.identity.federation.services

The com.sun.identity.federation.services package provides interfaces for writing custom plug-ins that can be used during the federation or single sign-on process. The interfaces are described in the following table. For more detailed information, see the Java API Reference in /*AccessManager-base*/SUNWam/docs or on *Sun Java System Access Manager 7.1 2006Q4 Java API Reference*.

TABLE 3–2 com.sun.identity.federation.services Interfaces

Interface	Description
FSAttributeMapper	Plug-in for mapping the attributes passed from the identity provider to local attributes on the service provider side during the single sign-on.
FSAttributePlugin	Plug-in for an identity provider to add AttributeStatements into a SAML assertion during the single sign-on process.
FSIDPProxy	Interface used to find a preferred identity provider to which an authentication request can be proxied.

com.sun.liberty

The com.sun.liberty package contains the LibertyManager class which must be instantiated by web applications that want to access the Federation component. It also contains the methods needed for account federation, session termination, log in, log out and other actions. Some of these methods are described in the following table. For more detailed information, see the Java API Reference in `/`*AccessManager-base*`/SUNWam/docs` or on *Sun Java System Access Manager 7.1 2006Q4 Java API Reference*.

TABLE 3–3 `com.sun.liberty` Methods

Method	Description
`getFederatedProviders(String userName)`	Returns a specific user's federated providers.
`getIDPFederationStatus(String user, String provider)`	Retrieves a user's federation status with a specified identity provider. This method assumes that the user is already federated with the provider.
`getIDPList()`	Returns a list of all trusted identity providers.
`getIDPList(java.lang.String hostedProviderID)`	Returns a list of all trusted identity providers for the specified hosted provider.
`getProvidersToFederate (java.lang.String providerID, java.lang.String userName)`	Returns a list of all trusted identity providers to which the specified user is not already federated.
`getSPList()`	Returns a list of all trusted service providers.
`getSPList(java.lang.String hostedProviderID)`	Returns a list of all trusted service providers for the specified hosted provider.
`getSPFederationStatus(java.lang.String user, java.lang.String provider)`	Retrieves a user's federation status with a specified service provider. This method assumes that the user is already federated with the provider.

Liberty ID-FF Operations

This section contains procedures illustrating how to use Access Manager to configure interactions based on the Liberty ID-FF. They are:

- "Auto-Federation" on page 106
- "Bulk Federation" on page 107
- "Signing Liberty ID-FF Requests and Responses" on page 108
- "Dynamic Identity Provider Proxying" on page 109

Auto-Federation

The auto-federation feature in Access Manager will automatically federate a user's disparate provider accounts based on a common attribute. This common attribute will be exchanged in a single sign-on assertion so that the consuming service provider can identify the user and create account federations. If auto-federation is enabled and it is deemed that a user at provider A and a user at provider B have the same value for the defined common attribute (for example, `emailaddress`), the two accounts will be federated automatically without principal interaction.

Note – Auto-federating a principal's two distinct accounts at two different providers requires each provider to have agreed to implement support for this functionality beforehand.

▼ To Enable Auto Federation

Ensure that each local service and identity provider participating in auto federation is configured for it. Remote providers would not be configured in your deployment.

1. **In the Access Manager Console, click the Federation tab.**

2. **Under Federation, select the Entities tab.**

3. **Select the name of a hosted provider entity to edit its profile.**

   Whether an entity is configured to hold hosted or remote providers is not information that is disclosed on this screen.

4. **Select Identity Provider or Service Provider from the View menu.**

5. **Select Access Manager Configuration.**

6. **Enable Auto Federation by checking the box.**

7. **Type a value for the Auto Federation Common Attribute Name attribute.**

   For example, enter `emailaddress` or `userID`. You should be sure that each participating user profile (at both providers) has a value for this attribute.

8. **Click Save to complete the configuration.**

Bulk Federation

Access Manager provides a script for federating user accounts in bulk. It is called `ambulkfed` and is located in `/opt/SUNWam/bin`. The script assumes that the user database is LDAPv3–compliant.

Note – The `ambulkfed` script is the primary script for bulk federation. It uses two other Perl scripts, `amGenerateLDIF.pl` and `amGenerateNI.pl`, behind the scenes.

As input, the script takes a file that maps the user distinguished name (DN) of the identity provider to the user DN of the service provider. Each line of the file must place the mappings in the following order and separated by a pipe ("|"): uid=spuser,dc=iplanet,dc=com | uid=idpuser,dc=iplanet,dc=com. The script generates unique random identifiers for each mapping and creates four files:

- spnameidentifiers.txt
- idpnameidentifiers.txt
- spuserdata.ldif
- idpuserdata.ldif

These files contain the data for bulk federation. The LDIFs are used for instances of Access Manager. ambulkfed generates and loads the LDIF data into Access Manager based on its given provider role. For example, it will load spuserdata.ldif if Access Manager acts as a service provider and it will load idpuserdata.ldif if Access Manager acts as an identity provider. The LDIFs will also be stored locally and can be used with ldapmodify to load the data into a remote instance of Access Manager. If the remote provider is not an instance of Access Manager, the generated text files spnameidentifiers.txt and idpnameidentifiers.txt can be used to generate federation data based on the input needs of the provider.

Signing Liberty ID-FF Requests and Responses

Federation-based communications passing between identity providers and service providers are generally required to be digitally signed and verified. Signing and verifying messages provides data integrity, data origin authentication, and a basis for non-repudiation. To turn on signing for all Liberty ID-FF requests and responses emanating from your instance of Access Manager, set the value of the com.sun.identity.federation.services.signingOn property in AMConfig.properties to true and restart Access Manager and its web container. This allows for signing of Liberty ID-FF requests being sent and verification of signature validity for Liberty ID-FF responses received. If set to false, signing is disabled. If set to optional, requests and responses will be signed or verified only if required by the federation profile being used. After installation, AMConfig.properties is located in the etc/opt/SUNWam/config directory.

Note – More information on com.sun.identity.federation.services.signingOn and the other identity federation properties in AMConfig.properties can be found in the Chapter 6, "AMConfig.properties Reference," in *Sun Java System Access Manager 7.1 2006Q4 Administration Reference*.

Additionally, you can enable the signing of an authentication request from a service provider configured on your instance of Access Manager, use the following procedure.

▼ To Enable Signing of Service Provider Authentication Requests

Before You Begin A keystore must be set up before turning on the signing properties. See Appendix B information on how to do this.

1 **Log in to the Access Manager console as the top-level administrator, by default,** amadmin**.**

2 **Select the Federation tab.**

3 **Select the Entities tab.**

4 **Select the name of the entity that contains the service provider configuration for which you want to enable the signing of an authentication request.**

5 **Select Service Provider from the View pull-down menu.**

6 **Enable the Sign Authentication Request property under the Service Provider configuration and click Save.**

7 **Log out of the Access Manager console.**

Dynamic Identity Provider Proxying

An identity provider that is asked to authenticate a principal that has already been authenticated with another identity provider may proxy the authentication request, on behalf of the requesting service provider, to the authenticating identity provider. This is called *dynamic identity provider proxying*. When the first identity provider receives an authentication request regarding a principal, it prepares a new authentication assertion on its own behalf by referencing the relevant information from the original assertion and sending the assertion to the authenticating identity provider.

Note – The service provider requesting authentication may control this proxy behavior by setting a list of preferred identity providers or by defining the amount of times the identity provider can proxy the request.

▼ To Configure and Test Dynamic Identity Provider Proxying

The following steps describe the procedure to enable three machines for identity provider proxying and test the configuration. The procedure assumes the three machines have Access Manager installed and are configured as follows:

Machine	Authentication Function	Federation Function
Machine 1	Authenticating Identity Provider	Identity Provider
Machine 2	Proxying Identity Provider	Identity Provider and Service Provider
Machine 3	Requesting Service Provider	Service Provider

All of the WAR files and metadata used in the following procedure can be found in /*AccessManager-base*/`samples/liberty/sample1`.

1. **To configure machine 3, deploy the SP1 WAR files and load `sp1Metadata.xml`.**

   Ensure that the metadata defines machine 2 as an identity provider and machine 3 as a service provider.

2. **To configure machine 1, deploy the IDP1 WAR files and load `idp1Metadata.xml`.**

   Ensure that the metadata defines machine 1 as an identity provider and machine 2 as a service provider.

3. **To configure machine 2, do the following:**

   a. **To configure machine 2 as a service provider, deploy the SP1 WAR files.**

      Modify `AMClient.properties` to reflect this.

   b. **To configure machine 2 as an identity provider, load a second, modified `idp1Metadata.xml`.**

      Ensure that `idp1Metadata.xml` contains *only* data that defines machine 1 as an identity provider. Remove all other metadata.

4. **Log in to machine 2 and modify the following metadata:**

   a. **Change the value of the Authentication Type attribute to Local.**

      This attribute can be found in the Access Manager Configuration section of the entity describing machine 2 as a service provider.

   b. **Add machine 1 and machine 3 to the list of Trusted Providers configured for machine 2.**

      This attribute can be found in the Trusted Provider section of the entity describing machine 2 as a service provider.

   c. **Save the configuration.**

5. **Also on machine 2, modify the following metadata regarding machine 3.**

   a. **Select the check box next to Enable Proxy Authentication.**

      This attribute can be found in the Proxy Authentication Configuration section of the entity that defines machine 3 as an identity provider.

   b. **Add machine 1 to the list of Proxy Identity Providers List.**

      This attribute can be found in the Proxy Authentication Configuration section of the entity that defines machine 3 as an identity provider. The value is a URI defined as the provider's identifier.

   c. **Set Maximum Number of Proxies to 1.**

   d. **Save the configuration.**

6 **Federate a user between machine 3 (acting as a service provider) and machine 2 (acting as an identity provider).**

7 **Federate a user between machine 2 (acting as a service provider) and machine 1 (acting as an identity provider).**

8 **Close the browser and attempt single sign-on.**

You will be redirected to machine 1 rather than machine 2 if you enter the username and password used to federate with machine 1.

Sample Federation Environment

Access Manager provides a collection of samples based on the Liberty Alliance Project specifications. They are located in the `/`*AccessManager-base*`/SUNWam/samples/liberty/` directory. Appendix A includes information about these samples.

Sample 1, located in `/`*AccessManager-base*`/SUNWam/samples/liberty/Sample1`, can be used to configure an environment for creating and managing a federation. The sample demonstrates the basic use of various Liberty-based federation protocols including account federation, single sign-on, single logout, and federation termination. Completing the procedures in the sample `Readme.txt` or `Readme.html` will help to give you a more complete understanding of how federation works.

Note – The `Readme` file also contains instructions for configuring a common domain. For information about common domains, see Chapter 4.

CHAPTER 4

Common Domain Services for Federation Management

Sun Java System Access Manager provides the Common Domain Services for Federation Management that enable a service provider to determine the identity provider used by a principal in an authentication domain that contains multiple identity providers.

This chapter covers the following topics:

Common Domain

Service providers need a way to determine which identity provider is used by a principal requesting authentication. Because authentication domains are configured without regard to their location, this function must work across DNS-defined domains. Thus, a common domain is configured for this purpose. The *common domain* is established for use only within the scope of the Common Domain Services for Federation Management. In Access Manager deployments, the Common Domain Services for Federation Management are deployed in a web container installed in a predetermined and pre-configured *common* domain so that the common domain cookie is accessible to all providers in the authentication domain. If the HTTP server in the common domain is operated by the service provider, the service provider will redirect the user agent to the appropriate identity provider.

Let's suppose an authentication domain contains more than one identity provider; in this case, a service provider in the authentication domain trusts more than one identity provider. But, a principal can only issue a federation request to one identity provider, so the service provider to which the principal is requesting access must have the means to determine the correct one. To ascertain a principal's identity provider, the service provider invokes a protocol exchange to retrieve the *common domain cookie*, a cookie written for the purpose of *introducing* the identity provider to the service provider. If no common domain cookie is found when the principal issues a federation request, the service provider must present a list of trusted identity providers from which the principal will choose. After successful authentication, the identity provider writes (using the Writer Service URL as defined in "Configuring the Common Domain Services for Federation Management URLs" on page 115) a common domain cookie. The next time the principal attempts to access a service, the service provider finds and reads the common domain cookie (using the Reader Service URL as defined in "Configuring the Common Domain Services for Federation Management URLs" on page 115), to determine the identity provider.

After a principal authenticates with a particular identity provider, the identity provider redirects the principal's browser to their Common Domain Services for Federation Management using a parameter that indicates they are the identity provider for this principal. The Common Domain Services for Federation Management then writes a cookie using that parameter. Thereafter, all providers configured in this common domain will be able to tell which identity provider is used by the principal. For example, suppose an identity provider is available at `http://www.Bank.com` and a service provider is available via `http://www.Store.com`. If the common domain they define is `RetailGroup.com`, the addresses will be `Bank.RetailGroup.com` and `Store.RetailGroup.com`, respectively.

Note – The Common Domain Services for Federation Management is based on the Identity Provider Introduction Profile detailed in the *Liberty ID-FF Bindings and Profiles Specifications*.

Common Domain Cookie

After an identity provider authenticates a principal, the identity provider sets a URL-encoded cookie that is defined in a predetermined domain common to all identity providers and service providers within the authentication domain. The *common domain cookie* is named `_liberty_idp`. After successful authentication, a principal's identity provider appends their encoded identifier to a list in the cookie. If their identifier is already present in the list, the identity provider may remove the initial appearance and append it again. The intent is that the service provider reads the last identifier on the cookie's list to find the principal's most recently established identity provider.

The identifiers in the common domain cookie are a list of `SuccinctID` elements encoded in the Base64 format. One element maps to each identity provider in the authentication domain. Service providers then use this `SuccinctID` element to find the user's preferred identity provider.

Note – When the request contains no common domain cookie, the service provider presents a list of trusted identity providers from which the principal may choose.

Configuring the Common Domain Services for Federation Management URLs

In Access Manager, the Common Domain Services for Federation Management are configured using two URLs that point to servlets developed for writing and reading the common domain cookie. They are:

- "Writer Service URL" on page 115
- "Reader Service URL" on page 115

Note – For more information on how to configure these URLs, see "To Create An Authentication Domain" on page 100 in Chapter 3.

Writer Service URL

The Writer Service URL is used by the identity provider. After successful authentication, the common domain cookie is appended with the query parameter `_liberty_idp=`*entity-ID-of-identity-provider*. This parameter is used to redirect the principal to the Writer Service URL defined for the identity provider. The URL is configured as the value for the Writer Service URL attribute when an authentication domain is created. Use the format `http://`*common-domain-host:port*`/`*deployment-uri*`/writer` where *common-domain-host:port* refers to the machine on which the Common Domain Services for Federation Management are installed and *deployment-uri* tells the web container where to look for information specific to the application (such as classes or JARs). The default URI is `amcommon`.

Reader Service URL

The Reader Service URL is used by the service provider. The service provider redirects the principal to this URL in order to find the preferred identity provider. Once found, the principal is redirected to the identity provider for single sign-on. The URL is defined as the value for the Reader Service URL attribute when an authentication domain is created. It is formatted as `http://`*common-domain-host:port*`/`*deployment-uri*`/transfer` where *common-domain-host:port* refers to the machine on which the Common Domain Services for Federation Management are installed and *deployment-uri* tells the web container where to look for information specific to the application (such as classes or JARs). The default URI is `amcommon`.

Configuring the Common Domain Services for Federation Management Properties

FSIntroConfig.properties is a file that contains properties used to configure the Common Domain Services for Federation Management. It is deployed as part of the web application and located in /*AccessManager-base*/web-src/common/WEB-INF/classes. It contains the properties described in the following table (which may be modified).

TABLE 4–1 Common Domain Services for Federation Management Properties in FSConfig.properties

Property	Description
com.sun.identity.federation.services.introduction.cookiedomain	The value of this property is the name of the common domain.
com.sun.identity.federation.services.introduction.cookietype	This property takes a value of either PERSISTENT or SESSION. PERSISTENT defines the cookie as one that will be stored and reused after a web browser is closed and reopened. SESSION defines the cookie as one that will not be stored after the web browser has been closed.
com.iplanet.am.cookie.secure	This property takes a value of either false or true. It defines whether the cookie needs to be secured or not.
com.iplanet.am.cookie.encode	This property takes a value of either false or true. It defines whether the cookie will be URL encoded or not. This property is useful if, for example, the web container that reads or writes the cookie decrypts or encrypts it by default.

Installing the Common Domain Services for Federation Management

The Common Domain Services for Federation Management are installed as a web application within Access Manager using the Sun Java Enterprise System installer. However, the Common Domain Services for Federation Management can also be installed as a standalone web application (separate from the Access Manager product) on a Java Enterprise Edition web container. This option allows for generating common domain cookies on a machine on which Access Manager is not installed. Once the Common Domain Services for Federation Management is installed, you must set up the writer URL attribute for any identity providers and the reader URL for any service providers. These URLs point to the machine on which Common Domain Services for Federation Management is installed. For more information, see the *Sun Java Enterprise System 5 Installation Guide for UNIX*.

Tip – In most real world deployments, installing the Common Domain Services for Federation Management on a separate machine is the obvious choice because of the need to setup a third-level common domain between service providers and identity providers in disparate enterprises.

▼ To Test a Common Domain Services for Federation Management Installation

For troubleshooting, make sure the debug level property in `FSIntroConfig.properties` is set to `message`.

1. **Install the Common Domain Services for Federation Management as a standalone application in a web container in the common domain.**

   Ensure that the common domain has been defined and the web container is installed in it.

2. **Modify the properties in `FSIntroConfig.properties` as needed.**

   See "Configuring the Common Domain Services for Federation Management Properties" on page 116 for more information.

3. **Configure at least two identity providers for a service provider.**

   Ensure that the "Writer Service URL" on page 115 is configured for each identity provider and the "Reader Service URL" on page 115 is configured for each service provider.

4. **Login as a user and complete federation and single sign-on between one identity provider and the service provider.**

   Ensure that the `_liberty_idp` cookie is set to the common domain.

5. **Login as a user and complete federation and single sign-on between the second identity provider and the service provider.**

   After the initial successful federation and single sign-on, all service providers in the common domain are redirected to the first identity provider based on the information in the common domain cookie.

Note – Whether the cookie is persistent or for this browser session alone is dependent on how `FSIntroConfig.properties` is configured.

PART III

Supported Web Services

- Chapter 5
- Chapter 6
- Chapter 7
- Chapter 8
- Chapter 9

CHAPTER 5

Liberty Alliance Project Web Services Framework

Sun Java™ System Access Manager implements the Liberty Identity Web Services Framework (Liberty ID-WSF) which defines a web services stack that can be used to support the Liberty Alliance Project business model. Example services include a personal profile service, a discovery service, an authentication service, and a SOAP binding service. These web services leverage the Liberty ID-FF for principal authentication, federation, and privacy protections. This overview chapter covers the following topics:

- "Access Manager Liberty ID-WSF Implementation" on page 121
- "Implemented Web Services" on page 121
- "Setting Up Liberty ID-WSF 1.1 Profiles" on page 123

Access Manager Liberty ID-WSF Implementation

Access Manager 7.1 extends the implementation of the Liberty ID-WSF specifications to include version 1.1. (The previous release of Access Manager implemented version 1.0.) The primary reason for updating Liberty ID-WSF is to ensure that security tokens generated by implementations of the Liberty ID-WSF Discovery Service are inline with the name spaces used by other web services framework. Thus, the major change is in security mechanism URIs. For example, the name space for the security header has been changed to incorporate WS-Security. For more information, see the Liberty ID-WSF Security Mechanisms Specification.

Implemented Web Services

Access Manager includes the following Liberty ID-WSF web services:

- "Liberty Personal Profile Service" on page 122
- "Discovery Service" on page 122
- "SOAP Binding Service" on page 122
- "Authentication Web Service" on page 122

Liberty Personal Profile Service

The Liberty Personal Profile Service is a data service that supports storing and modifying a principal's identity attributes. It maps attributes defined in a user's personal profile to LDAP attributes in a data store. These identity attributes might include the user's first name, last name, home address, or emergency contact information. The Liberty Personal Profile Service is queried or updated by a web services consumer (WSC) acting on behalf of the principal. For more information, see Chapter 7.

Discovery Service

The Discovery Service is a framework for describing and discovering identity web services. It allows a requesting entity, such as a service provider, to dynamically determine a principal's registered attribute provider. Typically, a service provider queries the Discovery Service, which responds by providing a resource offering that describes the requested attribute provider. (A *resource offering* defines associations between a piece of identity data and the service instance that provides access to the data.) The implementation of the Discovery Service includes Java and web-based interfaces. The service is bootstrapped using Liberty ID-FF single sign-on or the Liberty ID-WSF Authentication Service. For more information, see Chapter 8.

Note – By definition, a discoverable service is assigned a service type Uniform Resource Identifier (URI), allowing the service to be registered in Discovery Service instances. The service type URI is typically defined in the Web Service Definition Language (WSDL) file that defines the service.

SOAP Binding Service

The SOAP Binding Service is a set of Java APIs used by the developer of a Liberty-enabled identity service. The APIs are used to send and receive identity-based messages using SOAP, an XML-based messaging protocol. The service invokes the correct request handler class (specified by a service endpoint) to handle the messages. For more information, see Chapter 9.

Authentication Web Service

The Authentication Web Service adds authentication functionality to the SOAP binding. It provides authentication to a WSC, allowing the WSC to obtain security tokens for further interactions with other services at the same provider. These other services may include a discovery service or single sign-on service. The Authentication Web Service is for provider-to-provider (nonuser) authentication using Simple Authentication and Security Layer (SASL) with both PLAIN and CRAM-MD5 implemented. Upon successful authentication, the final SASL response contains the resource offering for the Discovery Service. For more information, see Chapter 6.

Note – Do not confuse the Liberty-based Authentication Web Service with the proprietary Access Manager Authentication Service discussed in the *Sun Java System Access Manager 7.1 Technical Overview*.

Setting Up Liberty ID-WSF 1.1 Profiles

Access Manager automatically detects which version of the Liberty ID-WSF profiles is being used. If Access Manager is the web services provider (WSP), it detects the version from the incoming SOAP message. If Access Manager is the WSC, it uses the version the WSP has registered with the Discovery Service. If the WSP can not detect the version from the incoming SOAP message or the WSC can not communicate with the Discovery Service, the version defined in the `com.sun.identity.liberty.wsf.version` property in `AMConfig.properties` will be used. Following are the steps to configure Access Manager to use Liberty ID-WSF 1.1 profiles.

▼ To Configure Access Manager to Use Liberty ID-WSF 1.1 Profiles

1 **Install Access Manager on two different machines.**

Test the installation by logging in to the console at **`http://`***server***`:`***port***`/amserver/UI/Login`**.

2 **Setup the two instances of Access Manager for communication using the Liberty ID-FF protocols.**

This entails setting up one instance as the service provider (SP) and the other as the identity provider (IDP). Instructions for doing this can be found in “Entities and Authentication Domains” on page 72 or in the README file located in the /*AccessManager-base*/`samples/liberty/sample1` directory.

Note – This step also entails creating a keystore for each provider. Instructions for this procedure are located in /*AccessManager-base*/`samples/saml/xmlsig/keytool.html`. Be sure to update the Key Alias attribute for each provider and change the cookie name if both machines are in same domain.

3 **Change the value of the Protocol Support Enumeration attribute to `urn:liberty:iff:2003-08` in both provider configurations.**

The value of this attribute defines the supported release of the Liberty ID-FF; in this case, version 1.1.

4 **Setup the two instances of Access Manager for communication with the Liberty ID-WSF web services.**

This entails copying the files located in the /*AccessManager-base*/`samples/phase2/wsc` directory to your web container’s doc root directory and making the changes specified in the sample README file. The relevant files and corresponding function are:

- `index.jsp`: Retrieves boot strapping resource offering for Discovery Service.
- `discovery-modify.jsp`: Adds resource offering for a user.

- `discovery-query.jsp`: Sends query to Discovery Service for a resource offering.
- `id-sis-pp-modify.jsp`: Sends Data Service Modify request to modify user attributes.
- `id-sis-pp-query.jsp`: Sends Data Service Query request to retrieve user attributes.

5 **Copy the `discovery-modify.jsp` reproduced below into the web container's doc root directory.**

This JSP is configured to use the Liberty ID-WSF 1.1 Bearer token profile with appropriate directives and should replace the file already in the directory. You can modify this file to use other profiles if you know the defined URI of the particular Liberty ID-WSF 1.1 profile. (X509 or SAML token, for example.)

```
<%--
    Copyright (c) 2005 Sun Microsystems, Inc. All rights reserved
    Use is subject to license terms.
--%>

<%@page import="java.io.*,java.util.*,com.sun.identity.saml.common.*,
com.sun.identity.liberty.ws.disco.*,com.sun.identity.liberty.ws.disco.common.*,
javax.xml.transform.stream.*, com.sun.identity.liberty.ws.idpp.plugin.IDPPResourceIDMapper,
com.iplanet.sso.*,com.sun.liberty.LibertyManager" %>
<html xmlns="http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<head><title>Discovery Service Modification</title></head>
<body bgcolor="white">
<h1>Discovery Service Modification</h1>
<%
    if (request.getMethod().equals("GET")) {
        String resourceOfferingFile =
            request.getParameter("discoveryResourceOffering");
        if (resourceOfferingFile == null) {
            resourceOfferingFile= "";
        }
        String entryID =
            request.getParameter("entryID");
        if (entryID == null) {
            entryID= "";
        }

        // The following three values need to be changed to register a personal
        // profile resource offering for a user.

        String ppProviderID =
         "http://shivalik.red.iplanet.com:58080/amserver/Liberty/idpp";
        String userDN = "uid=amAdmin,ou=People,dc=iplanet,dc=com";
        String ppEndPoint =
       "http://shivalik.red.iplanet.com:58080/amserver/Liberty/idpp";

        String providerID = request.getParameter("providerID");
        String ppResourceID = (new IDPPResourceIDMapper()).getResourceID(
               ppProviderID, userDN);
        String newPPRO =
                "<ResourceOffering xmlns=\"urn:liberty:disco:2003-08\">"
                + "  <ResourceID>" + ppResourceID + "</ResourceID>\n"
                + "  <ServiceInstance>\n"
                + "    <ServiceType>urn:liberty:id-sis-pp:2003-08</ServiceType>\n"
                + "    <ProviderID>" + ppProviderID + "</ProviderID>\n"
                + "    <Description>"
                + "      <SecurityMechID>urn:liberty:security:2005-02:null:Bearer"
                + "</SecurityMechID>\n"
                + "      <Endpoint>" + ppEndPoint + "</Endpoint>\n"
                + "    </Description>\n"
                + "  </ServiceInstance>\n"
                + "  <Abstract>This is xyz </Abstract>\n"
                + "</ResourceOffering>";
%>
<form method="POST">
<table>
<tr>
<td>ResourceOffering (for discovery service itself)</td>
<td>
<textarea rows="2" cols="30" name="discoResourceOffering"><%= resourceOfferingFile %></textarea>
</td>
</tr>
<tr>
<td>PP ResourceOffering to add</td>
<td>
<textarea rows="20" cols="60" name="insertStr"><%= newPPRO %></textarea>
</td>
</tr>
<tr>
<td>AND/OR PP ResourceOffering to remove</td>
<td>
<textarea rows="2" cols="30" name="entryID"></textarea>
</td>
</tr>
</table>
<input type="hidden" name="providerID" value="<%= providerID %>" />
<input type="submit" value="Send Discovery Update Request" />
</form>
<%
    } else {
        try {
            String resourceXMLFile = request.getParameter("discoResourceOffering");
      String resourceXML = null;
            try {
                 BufferedReader bir = new BufferedReader(
          new FileReader(resourceXMLFile));
```

```
                 StringBuffer buffer = new StringBuffer(2000);
                 int b1;
                 while ((b1=bir.read ())!= -1) {
                 buffer.append((char) b1);
                 }
                 resourceXML = buffer.toString();
         } catch (Exception e) {
                    %>Warning: cannot read disco resource offering.<%
         }
            String insertString = request.getParameter("insertStr");
            String entryID = request.getParameter("entryID");
            String providerID = request.getParameter("providerID");
            if (resourceXML == null || resourceXML.equals("")) {
                %>ERROR: resource offering missing<%
            } else {
                ResourceOffering offering;
            try {
                 offering = new ResourceOffering(DiscoUtils.parseXML(
            resourceXML));
                    DiscoveryClient client = new DiscoveryClient(
           offering,
          SSOTokenManager.getInstance().createSSOToken(request),
          providerID);
                    Modify mod = new Modify();
                    mod.setResourceID(offering.getResourceID());
      mod.setEncryptedResourceID(offering.getEncryptedResourceID());
                    if ((insertString != null) &&
                            !(insertString.equals("")))
                    {
     InsertEntry insert = new InsertEntry(
       new ResourceOffering(
          DiscoUtils.parseXML(insertString)),
              null);
// Uncommnent the following when it's required.
                        List directives = new ArrayList();
                        Directive dir1 = new Directive(
                          Directive.AUTHENTICATE_REQUESTER);
                        directives.add(dir1);
//                        Directive dir2 = new Directive(
//                          Directive.AUTHORIZE_REQUESTER);
//                        directives.add(dir2);
                        Directive dir3 = new Directive(
                            Directive.GENERATE_BEARER_TOKEN);
                        directives.add(dir3);
                        insert.setAny(directives);
          List inserts = new ArrayList();
          inserts.add(insert);
          mod.setInsertEntry(inserts);
```

```
              }
          if ((entryID != null) && !(entryID.equals(""))) {
                        RemoveEntry remove = new RemoveEntry(
                        com.iplanet.am.util.XMLUtils.escapeSpecialCharacters(
                        entryID));
                        List removes = new ArrayList();
                        removes.add(remove);
                        mod.setRemoveEntry(removes);
                    }
                    if ((mod.getInsertEntry() == null) &&
                            (mod.getRemoveEntry() == null))
                    {
                            %>ERROR: empty Modify<%
                    } else {
                        %>
                            <h2>Formed Modify :</h2>
                            <pre><%= SAMLUtils.displayXML(mod.toString()) %></pre>
                        <%
                            ModifyResponse resp2 = client.modify(mod);
                        %>
                            <h2>Got result:</h2>
                            <pre><%= SAMLUtils.displayXML(resp2.toString()) %></pre>
                        <%
                    }
                } catch (Throwable t) {
                    t.printStackTrace();
                    StringWriter buf = new StringWriter();
                    t.printStackTrace(new PrintWriter(buf));
                    %>
                        ERROR: caught exception:
                        <pre>
                    <%
                              out.println(buf.toString());
                    %>
                        </pre>
                    <%
                }
            }
%>
            <p><a href="index.jsp">Return to index.jsp</a></p>
<%
        } catch (Throwable e) {
            e.printStackTrace();
            StringWriter buf = new StringWriter();
            e.printStackTrace(new PrintWriter(buf));
            %>
                ERROR: oocaught exception:
                <pre>
            <%
                out.println(buf.toString());
            %>
                </pre>
            <%
        }
    }
%>
        <hr/>
    </body>
</html>
```

6 **Modify the** `index.jsp` **file by inserting** `com.sun.org.apache.xml.security.Init.init();` **before the line** `com.sun.org.apache.xml.security.utils.XMLUtils.outputDOM`**.**

This issue is documented in the Sun Java System Access Manager 7.0 Release Notes.

7 **Modify the values of the following properties in the IDP** `AMConfig.properties` **to reflect the key alias.**

`AMConfig.properties` is located in `/etc/opt/SUNWam/config`. The following properties should be changed.

- **`com.sun.identity.liberty.ws.wsc.certalias=`***keyalias*
- **`com.sun.identity.liberty.ws.ta.certalias=`***keyalias*`=mykey`
- **`com.sun.identity.liberty.ws.trustedca.certaliases=`***keyalias:http://serverhost*

8 **Register the Liberty Personal Profile Service to the Access Manager administrator, amAdmin by default.**

Under the default top-level realm on the instance of Access Manager acting as an IDP, go to Subjects and click User. Select amAdmin (or the administrator user) and click Services. Click Add and register the Liberty Personal Profile Service.

9 **Restart both instances of Access Manager.**

10 **Test that the Liberty ID-WSF 1.1 profiles are working by following the Basic Flow section of the README located in** `/`*AccessManager-base*`/samples/phase2/wsc`**.**

CHAPTER 6

Authentication Web Service

Sun Java^{TM} System Access Manager contains the Authentication Web Service. It enables web service consumers and Liberty-enabled user agents to authenticate with identity providers using SOAP messages. This chapter covers the following topics:

Authentication Web Service Overview

The SOAP specifications define an XML-based messaging paradigm, but do not specify any particular security mechanisms. Particularly, they do not describe user authentication using SOAP messages. To rectify this, the Authentication Web Service was implemented based on the *Liberty ID-WSF Authentication Service and Single Sign-On Service Specification*. The specification defines a protocol that adds the Simple Authentication and Security Layer (SASL) authentication functionality to the SOAP binding described in the *Liberty ID-WSF SOAP Binding Specification* and, Chapter 9 in this guide. The Authentication Web Service is for provider-to-provider authentication.

Note – The specification also contains an XML schema that defines the authentication protocol. This XML Schema Definition (XSD) file can be found on the Liberty Alliance Project web site. Version 1.0 is also reproduced in Appendix C.

XML Service File

The Authentication Web Service is configured using the XML service file `amAuthnSvc.xml`. This file defines the attribute for the Authentication Web Service which can be managed through the Access Manager console or the XML file.

Note – For information about service files, see the *Sun Java System Access Manager 7.1 Administration Guide*.

Authentication Web Service APIs

The Access Manager Authentication Web Service includes the following Java programming packages:

- `com.sun.identity.liberty.ws.authnsvc`
- `com.sun.identity.liberty.ws.authnsvc.mechanism`
- `com.sun.identity.liberty.ws.authnsvc.protocol`

The first package is a client API for external Java applications to send SASL requests and receive SASL responses. The second package defines an interface to handle different SASL mechanisms. The final package contains classes that represent the SASL request and response. Together, the packages are used to initiate the authentication process and communicate authentication credentials to the Authentication Web Service. For more information, see the "Authentication Web Service API" on page 133.

Which Authentication Service to Use?

The Liberty-based Authentication Web Service is not to be confused with the proprietary Authentication Service discussed in the *Sun Java System Access Manager 7.1 Administration Guide*. Architecturally, the Authentication Web Service sits on top of the Access Manager Authentication Service and the Liberty Alliance Project framework. You might use the Authentication Web Service if you are a service provider and want to use a standards-based mechanism to authenticate users.

Following are two use cases where the Authentication Web Service is preferable to the Access Manager Authentication Service:

- A service provider relies on a remote identity provider (not necessarily using Access Manager) for authentication.
- An enterprise in a service-oriented architecture (SOA) environment wants to use non-proprietary mechanisms to authenticate users and web services clients before accessing a protected web service.

In addition to providing an authentication service to verify credentials (for example, user ID and password), the Authentication Web Service provides the web services consumer (WSC) with *bootstrap* information that contains the endpoint and credentials needed to access the Discovery Service (as discussed in Chapter 8). The WSC can ignore the bootstrap or use it to access other web services, such as the authenticated user's personal profile or calendar.

Note – An authenticated enterprise might also use the bootstrap information to access a partner in a business-to-business environment.

Following is an example that shows how the Authentication Web Service interacts with the Access Manager Authentication Service. It assumes the following separate entities:

- A user (principal)
- A service provider (acting as a WSC)
- An identity provider hosted by Access Manager where the Access Manager Authentication Service is configured for Certificate and LDAP authentication and the Authentication Web Service has mapped LDAP to its own PLAIN authentication mechanism
- The user's personal profile (hosted by another product)

The WSC delegates all authentication to the identity provider and prefers PLAIN authentication which accepts a user identifier and password.

1. The user attempts access to a service provider (not necessarily hosted by Access Manager).
2. When the service provider finds that the user is not authenticated, it invokes the identity provider's Authentication Web Service by sending it a SOAP request.
3. After inspecting its configuration, the Authentication Web Service sends back a response indicating that it supports Certificate and PLAIN authentication.
4. The service provider decides on PLAIN authentication and prompts the user for an identifier and password.
5. Interactions based on the standard PLAIN authentication mapping ensues between the service provider and identity provider (hosted on Access Manager) using the Authentication Web Service.
   a. The service provider receives the user identifier and password and sends it to the identity provider.
   b. The identity provider passes the credentials to the locally hosted LDAP Authentication module using the proprietary Access Manager Authentication Service's Java API.
   c. The LDAP Authentication module verifies the credentials.
   d. The Authentication Web Service is notified of the verification and sends a response to the service provider indicating successful authentication. If configured to do so, it also includes bootstrap information formatted using XML and containing the Discovery Service endpoint and a token to invoke it.
6. The service provider parses the response, verifies that it is a successful authentication, and provides the service to the user.

At some point the service provider might need to access the user's personal profile. To do this, it will use the bootstrap information received during this process to contact the Discovery Service and find where the profile is stored. The Discovery Service returns a *resource offering* (containing a token and the location of an endpoint), and the service provider uses that to invoke the Liberty Personal Profile Service.

Authentication Web Service Process

The exchange of authentication information between a web service consumer (WSC) and the web service provider (WSP) is accomplished using SOAP-bound messages. The messages are a series of client requests and server responses specific to the defined SASL mechanism (or mode of authentication). The authentication exchange can involve an arbitrary number of round trips, dictated by the particular SASL mechanism employed. The WSC might have knowledge of the supported SASL mechanisms, or it might send the server its own list of mechanisms and allow the server to choose one. The list of supported mechanisms can be found at `http://www.iana.org/assignments/sasl-mechanisms`.

After receiving a request for authentication (or any response from the WSC), the WSP may issue additional challenges or indicate authentication failure or success. The sequence between the WSC and the Authentication Web Service (a WSP) is as follows.

1. The authentication exchange begins when a WSC sends an SASL authentication request to the Authentication Web Service on behalf of a principal.

   The request message contains an identifier for the principal and indicates one or more SASL mechanisms from which the service can choose.
2. The Authentication Web Service responds by asserting the method to use and, if applicable, initiating a challenge.

   If the Authentication Web Service does not support any of the cited methods, it responds by aborting the exchange.
3. The WSC responds with the necessary credentials for the chosen method of authentication.
4. The Authentication Web Service replies by approving or denying the authentication.

   If approved, the response includes the credentials the WSC needs to invoke other web services, such as the Discovery Service.

Authentication Web Service Attribute

The Authentication Web Service attribute is a *global* attribute. The value of this attribute is carried across the Access Manager configuration and inherited by every organization.

Note – For information about the types of attributes used in Access Manager, see the *Sun Java System Access Manager 7.1 Technical Overview*.

The attribute for the Authentication Web Service is defined in the `amAuthnSvc.xml` service file and is called the Mechanism Handlers List.

Mechanism Handlers List

The Mechanism Handler List attribute stores information about the SASL mechanisms that are supported by the Authentication Web Service.

key Parameter

The required key defines the SASL mechanism supported by the Authentication Web Service.

class Parameter

The required class specifies the name of the implemented class for the SASL mechanism. Two authentication mechanisms are supported by the following default implementations:

TABLE 6–1 Default Implementations for Authentication Mechanism

Class	Description
com.sun.identity.liberty.ws.authnsvc.mechanism.PlainMechanismHandler	This class is the default implementation for the PLAIN authentication mechanism. It maps user identifiers and passwords in the PLAIN mechanism to the user identifiers and passwords in the LDAP authentication module under the root organization.
com.sun.identity.liberty.ws.authnsvc.mechanism.CramMD5MechanismHandler	This class is the default implementation for the CRAM-MD5 authentication mechanism.

Note – The Authentication Web Service layer provides an interface that must be implemented for each SASL mechanism to process the requested message and return a response. For more information, see "com.sun.identity.liberty.ws.authnsvc.mechanism Package" on page 134.

Authentication Web Service API

The Authentication Web Service provides programmatic interfaces to allow clients to interact with it. The following sections provide short descriptions of these packages. For more detailed information, see the Java API Reference in /*AccessManager-base*/SUNWam/docs or on docs.sun.com. The authentication-related packages include:

- "com.sun.identity.liberty.ws.authnsvc Package" on page 133
- "com.sun.identity.liberty.ws.authnsvc.mechanism Package" on page 134
- "com.sun.identity.liberty.ws.authnsvc.protocol Package" on page 134

com.sun.identity.liberty.ws.authnsvc Package

This package provides web service clients with a method to request authentication credentials from the Authentication Web Service and receive responses back from it using the Simple Authentication and Security Layer (SASL).

`com.sun.identity.liberty.ws.authnsvc.mechanism` Package

This package provides an interface that must be implemented for each different SASL mechanism to enable authentication using them. Each SASL mechanism will correspond to one implementation that will process incoming SASL requests and generate outgoing SASL responses.

`com.sun.identity.liberty.ws.authnsvc.protocol` Package

This package provides classes that correspond to the request and response elements defined in the Liberty XSD schema that accompanies the *Liberty ID-WSF Authentication Service Specification*. This schema is reproduced in Appendix C.

Authentication Web Service Sample

A sample authentication client is included with Access Manager. It is located in the `/`*AccessManager-base*`/SUNWam/samples/phase2/authnsvc` directory. The client uses the `PLAIN` SASL authentication mechanism. It first authenticates against the Authentication Web Service, then extracts a resource offering to bootstrap the Discovery Service. It looks for a SAML `Bearer` token credential, issues a discovery query request with SAML assertion included, and receives a response.

Note – This sample can be used by a Liberty User Agent Device WSC.

CHAPTER 7

Data Services

Sun Java™ System Access Manager contains implementations of the *Liberty ID-WSF Data Services Template Specification* in addition to instructions on how you can add a custom data service to your deployment. This chapter covers the following topics:

- "Data Services Overview" on page 135
- "Liberty Personal Profile Service" on page 138
- "Liberty Employee Profile Service" on page 145
- "Data Services Template API" on page 145
- "Developing A New Data Service" on page 147

Data Services Overview

A *data service* is a web service that supports the query and modification of data regarding a principal. An example of a data service is a web service that hosts and exposes a principal's profile information, such as name, address and phone number. A *query* is when a web service consumer (WSC) requests and receives the data (in XML format). A *modify* is when a WSC sends new information to update the data. The Liberty Alliance Project has defined the *Liberty ID-WSF Data Services Template Specification* (Liberty ID-WSF-DST) as the standard protocol for the query and modification of data profiles exposed by a data service. Using this specification, the Liberty Alliance Project has developed additional specifications for other types of data services: personal profile service, geolocation service, contact service, and calendar service). Of these data services, Access Manager has implemented the Liberty Personal Profile Service and, using the included sample, the Liberty Employee Profile Service.

Note – To develop your own data service see the instructions in "Developing A New Data Service" on page 147.

Liberty ID-WSF Data Services Template Specification

The Liberty ID-WSF-DST specifies a base layer that can be extended by any instance of a data service. An example of a data service is an identity service, such as an online corporate directory.

When you want to contact a colleague, you conduct a search based on the individual's name, and the data service returns information associated with that person's identity. The information might include the individual's office location and phone number, as well as job title or department name. For proper implementation, all data services must be built on top of the Liberty ID-WSF-DST because it provides the data model and message interfaces. The following figure illustrates how Access Manager uses the Liberty ID-WSF-DST as the framework for data services.

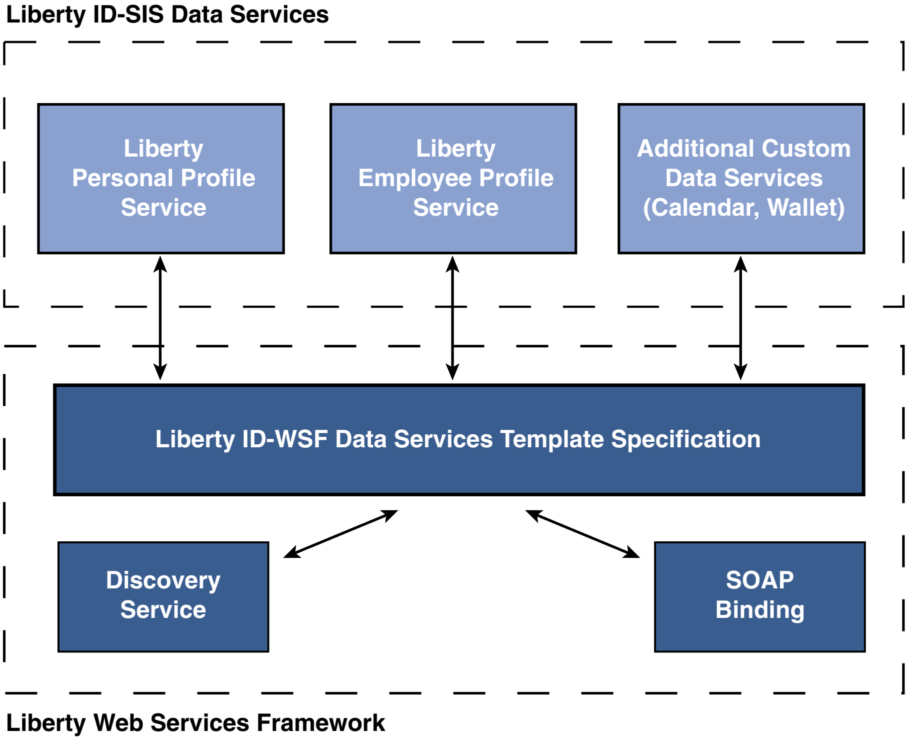

Liberty ID-SIS Data Services
Liberty Personal Profile Service
Liberty Employee Profile Service
Additional Custom Data Services (Calendar, Wallet)
Liberty ID-WSF Data Services Template Specification
Discovery Service
SOAP Binding
Liberty Web Services Framework

FIGURE 7–1 Data Service Template as Building Block of Data Services

The Web Services framework in Access Manager uses the Liberty ID-WSF-DST to develop data services. The Access Manager Liberty Personal Profile Service and Liberty Employee Profile Service were developed on top of the Web Services framework, using the specification. Additional data services can also be developed by the customer.

Note – For more information on the data services specification, see the *Liberty ID-WSF Data Services Template Specification*.

Liberty Personal Profile Service

The *Liberty ID-SIS Personal Profile Service Specification* (Liberty ID-SIS-PP) describes a data service that provides an identity's basic profile information, such as full name, contact details, and financial information. This data service is intended to be the least common denominator for holding consumer-based information about a principal. Access Manager has implemented this specification and developed the Liberty Personal Profile Service.

For more information, see the *Liberty ID-SIS Personal Profile Service Specification*.

XML Service File

The Access Manager Liberty Personal Profile Service is configured using the XML service file `amLibertyPersonalProfile.xml`. This file defines attributes for the Liberty Personal Profile Service which can be managed through the Access Manager Console or the XML file itself.

Note – For information about service files, see the *Sun Java System Access Manager 7.1 Administration Guide*.

XSD Schema Definition

The Liberty ID-SIS-PP also defines an XML schema for use in building a personal profile service. This XML Schema Definition (XSD) file is on the Liberty Alliance Project web site. Version 1.0 is also reproduced in Appendix C.

Liberty Employee Profile Service

The *Liberty ID-SIS Employee Profile Service Specification* (Liberty ID-SIS-EP) describes a data service that provides an identity's profile information as it relates to employment. An example of a employee profile service might be a corporate calendar or phone book.

Access Manager has implemented this specification by developing a sample that includes the files needed to deploy and invoke a Liberty Employee Profile Service. The Liberty Employee Profile Service is not available when Access Manager is installed. It must first be deployed. For information about accessing the sample files and how to deploy them, see "Liberty Employee Profile Service" on page 145.

Note – For more information, see the *Liberty ID-SIS Employee Profile Service Specification*.

XML Service File

Among the files included with the sample is the XML service file `amLibertyEmployeeProfile.xml`. This file defines the attributes for the Liberty Employee Profile Service which, once deployed, can be managed through the Access Manager Console or the XML file itself.

Note – For information about service files, see the *Sun Java System Access Manager 7.1 Administration Guide*.

XSD Schema Definition

The Liberty ID-SIS-EP also defines an XML schema for use in building an employee profile service. This XSD file is on the Liberty Alliance Project web site. Version 1.0 is also reproduced in Appendix C.

Data Services API

Access Manager data services are built using a Java package called `com.sun.identity.liberty.ws.dst`. Access Manager provides this package for developing custom services based on the Liberty ID-WSF-DST. Additional information about these interfaces can be found in "Data Services Template API" on page 145 and in the Java API Reference at `/`*AccessManager-base*`/SUNWam/docs` or on docs.sun.com.

Liberty Personal Profile Service

The Liberty Personal Profile Service is a default Access Manager identity service. It can be queried for identity data and its attributes can be updated.

For access to occur, the hosting provider of the Liberty Personal Profile Service needs to be registered with the Discovery Service on behalf of each identity principal. To register a service with the Discovery Service, update a resource offering for that service. For more information, see Chapter 8.

Liberty Personal Profile Service Process

The invocation of a personal profile begins when a WSC posts a query or a modify request to the Liberty Personal Profile Service on behalf of a user. The following process is also illustrated in Figure 6–2.

1. A web services client uses the Data Services Template API to post a query or a modify request to the Liberty Personal Profile Service.

   All the query or modify requests to any identity service are SOAP requests.
2. The client's SOAP request is received by the SOAP receiver provided by the SOAP Binding Service.

   The SOAP receiver invokes either the Discovery Service, the Authentication Web Service, or the Liberty Personal Profile Service, depending on the service key transmitted as part of the URL. The SOAP Binding Service might also authenticate the client identity.

3. The Liberty Personal Profile Service implements the `DSTRequestHandler` to process the request.

   The request is processed based on the request type (query or modify) and the query expression. Processing might entail the authorization of a WSC using the Access Manager Policy Service, or it might entail using the Interaction Service for interacting with the user before sending data to the WSC.

4. The Liberty Personal Profile Service builds a service response, adds credentials (if they are required), and sends the response back to the WSC.

   - For a response to a query request, the Liberty Personal Profile Service builds a personal profile container (as defined by the specification). It is formatted in XML and based on the Query Select expression. The Personal Profile attribute values are extracted from the data store by making use of the attribute mapper. The attribute mapper is defined by the XML service file, and the attribute values will be used while building the XML container. The Personal Profile Service then applies `xpath` queries on the XML and provides us with the resultant XML data node.
   - For a response to a modify request, the Liberty Personal Profile Service parses the Modifiable Select expression and updates the new data from the new data node in the request.

The following diagram illustrates the Liberty Personal Profile Service process.

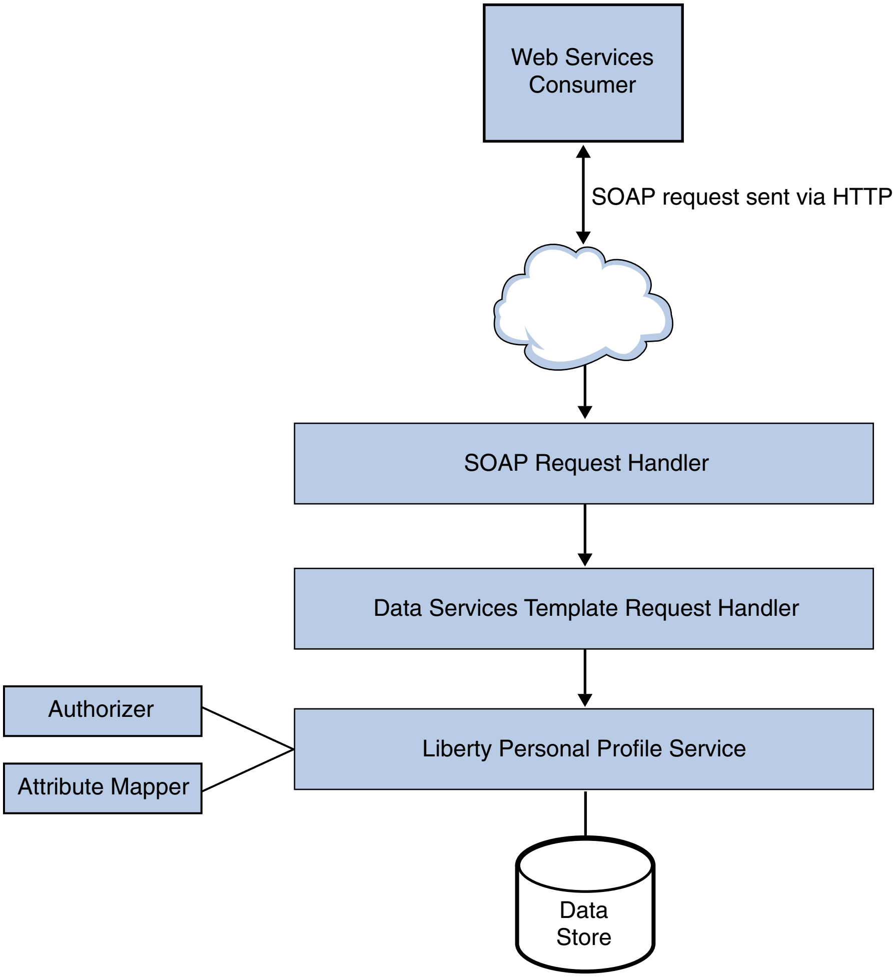

Web Services Consumer
SOAP request sent via HTTP
SOAP Request Handler
Data Services Template Request Handler
Authorizer
Attribute Mapper
Liberty Personal Profile Service
Data Store

FIGURE 7–2 Liberty Personal Profile Service Process

Liberty Personal Profile Service Attributes

The Liberty Personal Profile Service attributes are *global* attributes. The values of these attributes are carried across the Access Manager configuration and inherited by each configured organization.

Note – For information about the types of attributes used in Access Manager, see the *Sun Java System Access Manager 7.1 Technical Overview*.

Attributes for the Personal Profile Service are defined in the `amLibertyPersonalProfile.xml` service file. The attributes are:

ResourceID Mapper

The value of this attribute specifies the implementation of `com.sun.identity.liberty.ws.interfaces.ResourceIDMapper`. Although a new implementation can be developed, Access Manager provides the default `com.sun.identity.liberty.ws.idpp.plugin.IDPPResourceIDMapper`, which maps a discovery resource identifier to a user identifier.

Authorizer

Before processing a request, the Liberty Personal Profile Service verifies the authorization of the WSC making the request. There are two levels of authorization verification:

- Is the requesting entity authorized to access the requested resource profile information?
- Is the requested resource published to the requestor?

Authorization occurs through a plug-in to the Liberty Personal Profile Service, an implementation of the `com.sun.identity.liberty.ws.interfaces.Authorizer` interface. Although a new implementation can be developed, Access Manager provides the default class, `com.sun.identity.liberty.ws.idpp.plugin.IDPPAuthorizer`. This plug-in defines four policy action values for the `query` and `modify` operations:

- `Allow`
- `Deny`
- `Interact For Consent`
- `Interact For Value`

The resource values for the rules are similar to `x-path` expressions defined by the Liberty Personal Profile Service. For example, a rule can be defined like this:

```
/PP/CommonName/AnalyzedName/FN    Query   Interact for consent
/PP/CommonName/*                  Modify  Interact for value
/PP/InformalName                  Query   Deny
```

Authorization can be turned off by deselecting one or both of the following attributes, which are also defined in the Liberty Personal Profile Service:

- “Require Query PolicyEval” on page 143
- “Require Modify PolicyEval” on page 143

Attribute Mapper

The value of this attribute defines the class for mapping a Liberty Personal Profile Service attribute to an Access Manager user attribute. By default, the class is `com.sun.identity.liberty.ws.idpp.plugin.IDPPAttributeMapper`.

Note – `com.sun.identity.liberty.ws.idpp.plugin.IDPPAttributeMapper` is not a public class.

Provider ID

The value of this attribute defines the unique identifier for this instance of the Liberty Personal Profile Service. Use the format *protocol*`://`*hostname*`:`*port*`/`*deloy-uri*`/Liberty/idpp`.

Name Scheme

The value of this attribute defines the naming scheme for the Liberty Personal Profile Service common name. Choose First Last or First Middle Last.

Namespace Prefix

The value of this attribute specifies the namespace prefix that is used for Liberty Personal Profile Service XML protocol messages. A *namespace* differentiates elements with the same name that come from different XML schemas. The Namespace Prefix is prepended to the element.

Supported Containers

The values of this attribute define a list of supported containers in the Liberty Personal Profile Service. A *container*, as used in this instance, is an attribute of the Liberty Personal Profile Service.

Note – The term *container* as described in this section is not related to the Access Manager identity-related object that is also called *container*.

For example, Emergency Contact and Common Name are two default containers for the Liberty Personal Profile Service. To add a new container, click Add, enter values in the provided fields and click OK.

Note – This functionality is not yet public.

PPLDAP Attribute Map List

Each identity attribute defined in the Liberty Personal Profile Service maps one-to-one with an Access Manager LDAP attribute. For example, `JobTitle=sunIdentityServerPPEmploymentIdentityJobTitle` maps the Liberty `JobTitle` attribute to the Access Manager `sunIdentityServerPPEmploymentIdentityJobTitle` attribute.

The value of this attribute is a list that specifies the mappings. The list is used by the attribute mapper defined in "Attribute Mapper" on page 142, by default, `com.sun.identity.liberty.ws.idpp.plugin.IDPPAttributeMapper`.

Note – When adding new attributes to the Liberty Personal Profile Service or the LDAP data store, ensure that the new attribute mappings are configured as values of this attribute.

In the following code sample, the Liberty Personal Profile Service `informalName` attribute mapping to the LDAP attribute `uid` is added to the mappings already present in the Liberty Personal Profile Service XML service file, `amLibertyPersonalProfile.xml`.

Note – Attribute mappings are defined as global attributes under the name `sunIdentityServerPPDSAttributeMapList` in `amLibertyPersonalProfile.xml`. This attribute corresponds to that `sunIdentityServerPPDSAttributeMapList` global attribute.

```
<AttributeSchema name="sunIdentityServerPPDSAttributeMapList"
          type="list"
          syntax="string"
          i18nKey="p108">
          <DefaultValues>
              <Value>CN=sunIdentityServerPPCommonNameCN</Value>
              <Value>FN=sunIdentityServerPPCommonNameFN</Value>
              <Value>MN=sunIdentityServerPPCommonNameMN</Value>
              <Value>SN=sunIdentityServerPPCommonNameSN</Value>
              <Value>InformalName=uid</Value>
          </DefaultValues>
</AttributeSchema>
```

Require Query PolicyEval

If selected, this option requires that a policy evaluation be performed for Liberty Personal Profile Service queries. For more information, see "Authorizer" on page 141.

Require Modify PolicyEval

If selected, this option requires that a policy evaluation be performed for Liberty Personal Profile Service modifications. For more information, see "Authorizer" on page 141.

Extension Container Attributes

The Liberty Personal Profile Service allows you to specify extension attributes that are not defined in the Liberty Alliance Project specifications. The values of this attribute specify a list of extension container attributes. All extensions should be defined as:

```
/PP/Extension/PPISExtension [@name='extensionattribute']
```

The following sample illustrates an extension query expression for `creditcard`, an extension attribute.

EXAMPLE 7–1 Extension Query for `creditcard`

```
 /pp:PP/pp:Extension/ispp:PPISExtension[@name='creditcard']
Note: The prefix for the PPISExtension is different,
 and the schema for the PP extension is as follows:
<?xml version="1.0" encoding="UTF-8" ?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns="http://www.sun.com/identity/liberty/pp"
  targetNamespace="http://www.sun.com/identity/liberty/pp">
  <xs:annotation>
      <xs:documentation>
      </xs:documentation>
  </xs:annotation>

  <xs:element name="PPISExtension">
     <xs:complexType>
        <xs:simpleContent>
           <xs:extension base="xs:string">
              <xs:attribute name="name" type="xs:string"
                use="required"/>
           </xs:extension>
        </xs:simpleContent>
     </xs:complexType>
   </xs:element>
</xs:schema>
```

Type the new attribute and click Add.

Extension Attributes Namespace Prefix

The value of this attribute specifies the namespace prefix for the extensions defined in the "Extension Container Attributes" on page 144. This prefix is prepended to the element and helps to distinguish metadata from different XML schema namespaces.

Service Update

The SOAP Binding Service allows a service to indicate that requesters should contact it on a different endpoint or use a different security mechanism and credentials to access the requested resource. If selected, this attribute affirms that there is an update to the service instance.

Service Instance Update Class

The value of this attribute specifies the default implementation class `com.sun.identity.liberty.ws.idpp.plugin.IDPPServiceInstanceUpdate`. This class is used to update the information for the service instance.

Alternate Endpoint

The value of this attribute specifies an alternate SOAP endpoint to which a SOAP request can be sent.

Alternate Security Mechanisms

This attribute allows you to choose a security mechanism. For more information about this functionality and the mechanisms, see the *Liberty ID-WSF Security Mechanisms* specification.

Liberty Employee Profile Service

The Liberty Employee Profile Service sample provides a collection of files that can be used to deploy and invoke a corporate-based data service. The files are located in the `/`*AccessManager-base*`/SUNWam/samples/phase2/sis-ep` directory.

Note – Before implementing this sample, you must have two instances of Access Manager installed, running, and Liberty-enabled. Completing the steps in “`sample1` Directory” on page 237 will accomplish this.

The Liberty Employee Profile Service is a deployment of the ID-SIS-EP specification as discussed in “Liberty Employee Profile Service” on page 137. The `Readme.html` file in the sample directory provides detailed steps on how to deploy and configure this sample for use as a data service. See also Appendix A.

Data Services Template API

Access Manager contains two packages based on the Liberty ID-WSF-DST. They are:

- “`com.sun.identity.liberty.ws.dst` Package” on page 146
- “`com.sun.identity.liberty.ws.dst.service` Package” on page 146

For more detailed API documentation, including methods and their syntax and parameters, see the Java API Reference in `/`*AccessManager-base*`/SUNWam/docs` or on docs.sun.com.

com.sun.identity.liberty.ws.dst Package

The following table summarizes the classes in the Data Services Template client API that are included in the com.sun.identity.liberty.ws.dst package.

TABLE 7–1 Data Service Client APIs

Class	Description
DSTClient	Provides common functions for the Data Services Templates query and modify options.
DSTData	Provides a wrapper for any data entry.
DSTModification	Represents a Data Services Template modification operation.
DSTModify	Represents a Data Services Template modify request.
DSTModifyResponse	Represents a Data Services Template response to a DST modify request.
DSTQuery	Represents a Data Services Template query request.
DSTQueryItem	Wrapper for one query item.
DSTQueryResponse	Represents a Data Services Template query response.
DSTUtils	Provides utility methods used by the DST layer.

com.sun.identity.liberty.ws.dst.service Package

This package provides a handler class that can be used by any generic identity data service that is built using the *Liberty Alliance ID-SIS Specifications*.

Note – The Liberty Personal Profile Service is built using the *Liberty ID-SIS Personal Profile Service Specification*, based on the *Liberty Alliance ID-SIS Specifications*.

The DSTRequestHandler class is used to process query or modify requests sent to an identity data service. It is an implementation of the interface com.sun.identity.liberty.ws.soapbinding.RequestHandler. For more detailed API documentation, see the Java API Reference in /*AccessManager-base*/SUNWam/docs or on docs.sun.com.

Note – Access Manager provides a sample that makes use of the `DSTRequestHandler` class. The `sis-ep` sample illustrates how to implement the `DSTRequestHandler` and deploy a new identity data service instance. The sample is located in the `/`*AccessManager-base*`/SUNWam/samples/phase2/sis-ep` directory. For more information, see “`sis-ep` Directory” on page 239.

Developing A New Data Service

In addition to deploying an employee profile service, the Liberty Employee Profile Service sample can be used to develop other custom data services that are based on the Liberty ID-WSF-DST. Sections 2 and 3 in the `Readme.html` file in the `/`*AccessManager-base*`/SUNWam/samples/phase2/sis-ep` directory has detailed steps on how to deploy and configure data services. To use those instructions for a new data service, you need to write a new data service schema. This XML Schema Definition (XSD) document (as discussed in Appendix C) defines the service’s data and data structure. After you write a new XSD file, use it to deploy your new data service instead of the `lib-id-sis-ep.xsd` file.

Note – Instructions on writing an XSD file are beyond the scope of this guide.

CHAPTER 8

Discovery Service

Sun Java^{TM} System Access Manager contains a Discovery Service defined by the Liberty Alliance Project. The Discovery Service allows a requesting entity to dynamically determine a principal's registered identity service. It might also function as a security token service, issuing security tokens to the requester that can then be used in the request to the discovered identity service.

This chapter covers the following topics:

Discovery Service Overview

All web services are defined by a Web Services Description Language (WSDL) file that describes the type of data the service contains, the available ways said data can be exchanged, the operations that can be performed using the data, a protocol that can be used to perform the operations, and a URL (or *endpoint*) for access to the service. Additionally, the WSDL file itself is assigned a unique resource identifier (URI) that is used to locate it. The file is then published and the URI is placed in a Universal Description, Discovery and Integration (UDDI) repository so it can be found by potential users. Thus, the web service can now be *discovered*. According to the Web Services Glossary, *discovery* of a web service is the act of locating a WSDL file for it. Typically, there are one or more web services on a network so, a *discovery service* is required to keep track of them.

Access Manager implements the *Liberty ID-WSF Discovery Service Specification* for its Discovery Service. The Discovery Service is a registry for identity-based web services. An *identity-based web service* presents an interface to access a type of data that is considered a part of a principal's online identity. For example, a payment web service might contain an individual's credit card information and would allow payments to be made using this information. When a web service consumer (WSC) queries the Discovery Service for a web service provider that allows access to a particular user's credit card information, the Discovery Service matches the properties in the request against the properties of it's registered services and returns the appropriate *resource offering*.

Note – A *resource offering* defines an association between a type of identity data and a URI to the WSDL definition that provides information about obtaining access to the data. For more information on resource offerings, see "Storing Resource Offerings" on page 160.

This overview contains the following sections:

- "Discovery Service WSDL" on page 150
- "amDisco XML Service Files" on page 153
- "Discovery Service Architecture" on page 153

Discovery Service WSDL

A WSDL document is written in the eXtensible Markup Language (XML) and describes a web service. It specifies the location of the service and the operations the service exposes.

Note – The WSDL specification can be found at `http://www.w3.org/TR/wsdl`.

The `portType` property in the Liberty ID-WSF Discovery Service WSDL file defines the Discovery Service operations.

- `DiscoveryLookup` allows the Discovery Service to be queried. Using a `Query`, a WSC can find out which web service provider (WSP) stores the identity data relevant to the principal's request. The Discovery Service responds with `QueryResponse` that includes the necessary information for that identity.
- `DiscoveryUpdate` enables maintenance of resource offerings already defined for the Discovery Service. Using a `Modify`, a WSC can add and remove resources, or change existing ones. The Discovery Service responds with `ModifyResponse`.

Following is a reproduction of `liberty-idwsf-disco-svc-v1.2.wsdl`, the Liberty ID-WSF Discovery Service WSDL file.

EXAMPLE 8–1 Abstract WSDL for Liberty ID-WSF Discovery Service Specification

```
<?xml version="1.0"?>
<definitions name="disco-svc"
  targetNamespace="urn:liberty:disco:2003-08"
  xmlns:typens="urn:liberty:disco:2003-08"
  xmlns="http://schemas.xmlsoap.org/wsdl/"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"
  xmlns:sb="urn:liberty:sb:2003-08"
```

EXAMPLE 8–1 Abstract WSDL for Liberty ID-WSF Discovery Service Specification *(Continued)*

```
xmlns:disco="urn:liberty:disco:2003-08">

<!-- Abstract WSDL for Liberty Discovery Service Specification -->

    <xsd:documentation>

      XML Schema from Liberty Discovery Service Specification.

      ### NOTICE ###

      Copyright (c) 2004-2005 Liberty Alliance participants, see
      http://www.projectliberty.org/specs/idwsf_1_1_copyrights.php

    </xsd:documentation>

<types>
  <xsd:schema>
    <xsd:import schemaLocation="liberty-idwsf-disco-svc-exts-v1.2.xsd"/>
    <xsd:import schemaLocation="liberty-idwsf-soap-binding-exts-v1.2.xsd"/>
    <xsd:import schemaLocation="liberty-idwsf-soap-binding-v1.2.xsd"/>
  </xsd:schema>
</types>

<message name="Query">
  <part name="body" element="disco:Query"/>
</message>

<message name="QueryResponse">
  <part name="body" element="disco:QueryResponse"/>
</message>

<message name="Modify">
  <part name="body" element="disco:Modify"/>
</message>

<message name="ModifyResponse">
  <part name="body" element="disco:ModifyResponse"/>
</message>

<message name="CorrelationHeader">
  <part name="Correlation" element="typens:Correlation"/>
</message>

<portType name="DiscoveryPort">

  <operation name="DiscoveryLookup">
```

EXAMPLE 8–1 Abstract WSDL for Liberty ID-WSF Discovery Service Specification *(Continued)*

```
      <input message="typens:Query"/>
      <output message="typens:QueryResponse"/>
    </operation>

    <operation name="DiscoveryUpdate">
      <input message="typens:Modify"/>
      <output message="typens:ModifyResponse"/>
    </operation>

  </portType>

  <!--
  An example of a binding and service that can be used with this
  abstract service description is provided below.
  -->

  <binding name="DiscoveryBinding" type="typens:DiscoveryPort">

    <soap:binding style="document" transport="http://schemas.xmlsoap.org/soap/http"/>

    <operation name="DiscoveryLookup">
      <soap:operation soapAction="http://example.com/DiscoveryLookup"/>

      <input>
        <soap:header message="typens:CorrelationHeader" part="Correlation" use="literal"/>
        <soap:body use="literal"/>
      </input>

      <output>
        <soap:header message="typens:CorrelationHeader" part="Correlation" use="literal"/>
        <soap:body use="literal"/>
      </output>

    </operation>

    <operation name="DiscoveryUpdate">
      <soap:operation soapAction="http://example.com/DiscoveryUpdate"/>

      <input>
        <soap:header message="typens:CorrelationHeader" part="Correlation" use="literal"/>
        <soap:body use="literal"/>
      </input>

      <output>
        <soap:header message="typens:CorrelationHeader" part="Correlation" use="literal"/>
        <soap:body use="literal"/>
```

EXAMPLE 8–1 Abstract WSDL for Liberty ID-WSF Discovery Service Specification *(Continued)*

```
      </output>

    </operation>

  </binding>

  <service name="DiscoveryService">

    <port name="DiscoveryPort" binding="typens:DiscoveryBinding">

      <!-- Modify with the REAL SOAP endpoint -->

      <soap:address location="http://example.com/discovery"/>

    </port>

  </service>

</definitions>
```

amDisco XML Service Files

The Discovery Service is defined by the XML service file amDisco.xml. This file defines the attributes for the Discovery Service. All of the attributes in the Discovery Service can be managed through either the Access Manager Console or this file.

Note – For more information about service files, see the *Sun Java System Access Manager 7.1 Administration Guide*. For more information about Discovery Service attributes, see “Discovery Service Attributes” on page 156.

A second XML file, amDisco_add.xml is in /AccessManager-base/SUNWam/upgrade/services50_sunIdentityServerDiscoveryService/10_20/data. This file is used for upgrading Identity Server 6.2 to Access Manager 7.1. It lists the changes to the amDisco.xml file since the earlier release.

Discovery Service Architecture

Java applications use the client API (discussed in “Client APIs in com.sun.identity.liberty.ws.disco” on page 173) to form requests sent to the Discovery Service and to parse the responses received back from it. Requests are initially received by a SOAP receiver which constructs the SOAP message that incorporates the client request.

Note – The SOAP Binding Service defines how to send and receive messages using SOAP, an XML-based messaging protocol. The SOAP receiver is a servlet that constructs the message using these definitions. For more information, see Chapter 9.

The SOAP message is then routed to the Discovery Service which parses the resource identifier from it. This identifier is used to find a matching user distinguished name (DN). The necessary information is then culled from the corresponding profile, a response is generated, and the response is sent back to the SOAP receiver. The SOAP receiver then sends the response back to the client. The following figure illustrates this architecture. The "Discovery Service Process" on page 154 has more information on how the Discovery Service works.

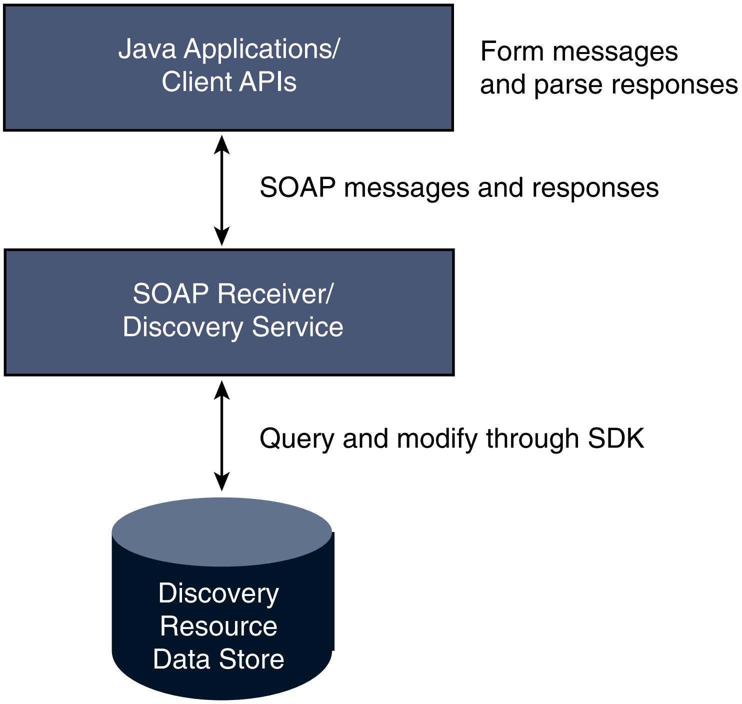


FIGURE 8–1 Discovery Service Architecture

Discovery Service Process

This figure provides a high-level overview of the interaction between parties in a web services environment using the Discovery Service. In this scenario, the identity provider hosts the Discovery Service. The process assumes that the Discovery Service is not generating security tokens. The individual steps are written up in more detail following the figure.

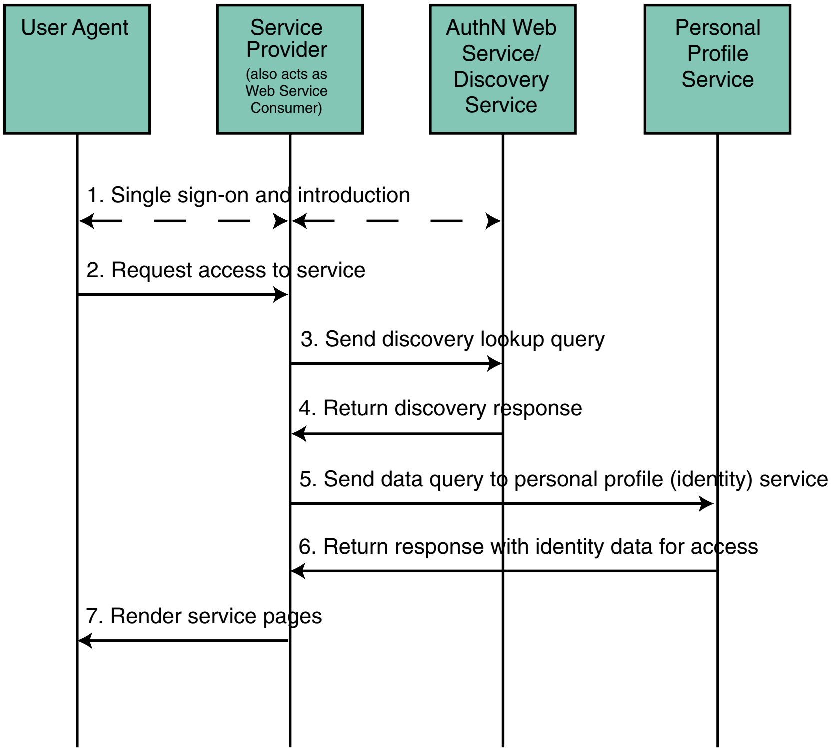

User Agent
Service Provider
(also acts as Web Service Consumer)
AuthN Web Service/ Discovery Service
Personal Profile Service
1. Single sign-on and introduction
2. Request access to service
3. Send discovery lookup query
4. Return discovery response
5. Send data query to personal profile (identity) service
6. Return response with identity data for access
7. Render service pages

FIGURE 8–2 Participants in, and Process of, the Discovery Service

1. The user logs in to a Liberty-enabled identity provider, is authenticated, and completes the federation process, enabling single sign-on with other members of the authentication domain. More specifically:

    a. Within a browser, the user types the URL for a Liberty-enabled service provider.

    b. The service provider collects the user's credentials and redirects the information to the identity provider for authentication.

    c. If the credentials are verified, the user is authenticated.

    d. Assuming the identity provider is the center of an authentication domain, that provider will notify the authenticated user of the option to federate any local identities created with member organizations. The user would then accept or decline this invitation to federate. By accepting the invitation, the user will be given the option to federate to a member organization's web site at each login. If the user accepts this option to federate, single sign-on is enabled.

2. After authentication, the user now requests access to services hosted by another service provider in the authentication domain.

3. The service provider, acting as a web service consumer (WSC), sends a `DiscoveryLookup` query to the Discovery Service looking for a pointer to the user's identity provider.

The service provider is able to bootstrap the Discovery Service using the end point reference culled from the authentication statement.

4. The Discovery Service returns a `DiscoveryLookup` response to the service provider that points to the instance of the requested identity provider.

   The response contains the resource offering for the user's Personal Profile Service.

5. The service provider then sends a query (using the "Data Services Template Specification" on page 43) to the Personal Profile Service.

   The required authentication mechanism specified in the Personal Profile Service resource offering must be followed.

6. The Personal Profile Service authenticates and validates authorization, or policy, or both for the requested user and service provider, and returns a Data Services Template response.

   If user interaction is required for some attributes, the Interaction Service will be invoked to query the user for consents or attribute values. The Data Services Template would then be returned after all required data is collected.

7. The service provider processes the Personal Profile Service response and renders HTML pages based on the original request and user authorization.

   A user's actual account information is not exchanged during federation. Thus, the identifier displayed on each provider site will be based on the respective local identity profile.

Discovery Service Attributes

The Discovery Service attributes are global attributes whose values are applied across the Access Manager configuration and inherited by every configured organization. The Discovery Service attributes are:

- "Provider ID" on page 157
- "Supported Authentication Mechanisms" on page 157
- "Supported Directives" on page 157
- "Policy Evaluation for Discovery Lookup" on page 158
- "Policy Evaluation for Discovery Update" on page 158
- "`Authorizer` Plug-in Class" on page 158
- "Entry Handler Plug-in Class" on page 158
- "Classes For `ResourceIDMapper` Plug-in" on page 159
- "Authenticate Response Message" on page 159
- "`SessionContextStatement` for Bootstrapping" on page 159
- "Encrypt `NameIdentifier` in Session Context for Bootstrapping" on page 159
- "Implied Resource" on page 159
- "Resource Offerings for Bootstrapping" on page 160

Note – For information about the types of attributes used in Access Manager, see the *Sun Java System Access Manager 7.1 Technical Overview*.

Provider ID

This attribute takes a URI that points to the Discovery Service. Use the format *protocol*`://`*host*`:`*port*`/amserver/Liberty/disco`. This value can be changed only if other relevant attributes values are changed to match the new pointer.

Supported Authentication Mechanisms

This attribute specifies the authentication methods supported by the Discovery Service. These security mechanisms refer to the way a web service consumer authenticates to the web service provider or provides message-level security. By default, all available methods are selected. If an authentication method is not selected and a WSC sends a request using that method, the request is rejected. For more information, see the Liberty ID-WSF Security Mechanisms specification.

Supported Directives

This attribute allows you to specify a policy-related directive for a resource. If a service provider wants to use an unsupported directive, the request will fail. The following table describes the available options. More information can be found in the Liberty ID-WSF Discovery Service Specification.

TABLE 8–1 Policy-Related Directives

Directive	Purpose
`AuthenticateRequester`	The Discovery Service should include a SAML assertion containing an `AuthenticationStatement` in its query responses to enable the client to authenticate to the service instance hosting the resource.
`AuthenticateSessionContext`	The Discovery Service should include a SAML assertion containing a `SessionContextStatement` in its query responses that indicate the status of the session.
`AuthorizeRequestor`	The Discovery Service should include a SAML assertion containing a `ResourceAccessStatement` in its responses that indicate whether the client is allowed to access the resource.

TABLE 8–1 Policy-Related Directives *(Continued)*

Directive	Purpose
`EncryptResourceID`	The Discovery Service should encrypt the resource identifier in responses to all clients.
`GenerateBearerToken`	For use with Bearer Token Authentication, the Discovery Service should generate a token that grants the bearer permission to access the resource.

Policy Evaluation for Discovery Lookup

If enabled, the service will perform a policy evaluation for the `DiscoveryLookup` operation. By default, the check box is not selected.

Policy Evaluation for Discovery Update

If enabled, the service will perform a policy evaluation for the `DiscoveryUpdate` operation. By default, the check box is not selected.

`Authorizer` Plug-in Class

The value of this attribute is the name and path to the class that implements the `com.sun.identity.liberty.ws.interfaces.Authorizer` interface used for policy evaluation of a WSC. The default class is `com.sun.identity.liberty.ws.disco.plugins.DefaultDiscoAuthorizer`. See "`com.sun.identity.liberty.ws.interfaces.Authorizer` Interface" on page 175.

Entry Handler Plug-in Class

The value of this attribute is the name and path to the class that implements the `com.sun.identity.liberty.ws.disco.plugins.DiscoEntryHandler` interface. This interface is used to set or retrieve a principal's discovery entries. To handle discovery entries differently, implement the `com.sun.identity.liberty.ws.disco.plugins.DiscoEntryHandler` interface and set the implementing class as the value for this attribute. The default implementation for the Discovery Service is `com.sun.identity.liberty.ws.disco.plugins.UserDiscoEntryHandler`. See "`com.sun.identity.liberty.ws.disco.plugins.DiscoEntryHandler` Interface" on page 174.

Classes For `ResourceIDMapper` Plug-in

The value of this attribute is a list of classes that generate identifiers for a resource offering configured for an organization or role. `com.sun.identity.liberty.ws.interfaces.ResourceIDMapper` is an interface used to map a user identifier to the resource identifier associated with it. The Discovery Service provides two implementations for this interface:

- `com.sun.identity.liberty.ws.disco.plugins.Default64ResourceIDMapper` assumes the format to be *providerID* + "/" + *the Base64 encoded userIDs*
- `com.sun.identity.liberty.ws.disco.plugins.DefaultHexResourceIDMapper` assumes the format to be *providerID* + "/" + *the hex string of userIDs*

Different implementations may also be developed with the interface and added as a value of this attribute by clicking New and defining the following attributes:

- *Provider ID* takes as a value a URI that points to the Discovery Service. Use the format `http://`*host*`:`*port*`/amserver/Liberty/disco`. See "Provider ID" on page 157.
- *ID Mapper* takes as a value the class name and path of the implementing class.

See "`com.sun.identity.liberty.ws.interfaces.ResourceIDMapper` Interface" on page 177.

Authenticate Response Message

If enabled, the service authenticates the response message. By default, the function is not enabled.

`SessionContextStatement` for Bootstrapping

If enabled, this attribute specifies whether to generate a `SessionContextStatement` for bootstrapping. A `SessionContextStatement` conveys the session status of an entity. By default, this function is not enabled.

Encrypt `NameIdentifier` in Session Context for Bootstrapping

If enabled, the service encrypts the name identifier in a `SessionContextStatement`. By default, this function is not enabled.

Implied Resource

If enabled, the service does not generate a resource identifier for bootstrapping. By default, this function is not enabled.

Resource Offerings for Bootstrapping

This attribute defines a resource offering for bootstrapping a service. After single sign-on (SSO), this resource offering and its associated credentials will be sent to the client in the SSO assertion. Only one resource offering is allowed for bootstrapping. The value of the Resource Offerings for Bootstrapping attribute is a default value configured during installation. If you want to define a new resource offering, you must first delete the existing resource offering, then click New to define the attributes for a new resource offering. If you want to edit an existing resource offering, click the name of the existing Service Type to modify the attributes. For more information, see "Storing a Resource Offering for Discovery Service Bootstrapping" on page 168.

Storing Resource Offerings

A *resource offering* defines an association between a type of identity data and a URI to the WSDL file that provides information about obtaining access to the data. In Access Manager, a resource offering can be stored as a user attribute or as a dynamic attribute. Storing resource offerings within a user profile supports both `DiscoveryLookup` and `DiscoveryUpdate` operations. Storing resource offerings within a service and assigning that service to a realm or role supports only the `DiscoveryLookup` operation using the discovery protocol. (Updates can still be done using the Access Manager Console.) More information is provided in the following sections:

- "Storing Resource Offerings as User Attributes" on page 160
- "Storing Resource Offerings as Dynamic Attributes" on page 163
- "Storing a Resource Offering for Discovery Service Bootstrapping" on page 168

Storing Resource Offerings as User Attributes

Resource offerings can be stored as an attribute under a user's profile using the Lightweight Directory Access Protocol (LDAP). Storing resource offerings within a user profile supports both `DiscoveryLookup` and `DiscoveryUpdate` operations. The following procedure explains how to access and create a user's resource offerings.

▼ To Store a Resource Offering as a User Attribute

1. **In the Access Manager Console, click the Access Control tab.**

2. **Select the name of the realm that contains the user profile you want to modify.**

3. **Select Subjects to access user information.**

4. **Select the name of the user profile that you want to modify.**

5. **Select Services to access the user's services.**

6 **Click Add to configure the Discovery Service for this user.**

7 **Select Discovery Service and click Next.**

The Discovery Service is added to the user's services.

8 **Select General to access the user's User Discovery Resource Offering attribute.**

9 **Click Edit.**

A User Discovery Resource Offering window opens.

10 **Click Add in the User Discovery Resource Offering window.**

11 **(Optional) Type a value for the Resource ID Attribute.**

This field defines an identifier for the resource offering.

12 **Type the Resource ID Value.**

This field defines the resource identifier. A *resource identifier* is a URI registered with the Discovery Service that point to a particular discovery resource. It is generated by the profile provider. The value of this attribute must not be a relative URI and should contain a domain name that is owned by the provider hosting the resource. If a discovery resource is exposed in multiple Resource Offerings, the Resource ID Value for all of those resource offerings would be the same. An example of a valid Resource ID value is `http://profile-provider.com/profiles/l4m0B82k15csaUxs`.

Tip – `urn:libery:isf:implied-resource` can be used as a Resource ID Value when only one resource can be operated upon at the service instance being contacted. The URI only implicitly identifies the resource in question. In some circumstances, the use of this resource identifier can eliminate the need for contacting the discovery service to access the resource.

---

13 **(Optional) Enter a description of the resource offering in the Description field.**

14 **Type a URI for the value of the Service Type attribute.**

This URI defines the type of service.

Tip – It is recommended that the value of this attribute be the `targetNamespace` URI defined in the abstract WSDL description for the service. An example of a valid URI is `urn:liberty:id-sis-pp:2003-08`.

---

15 **Type a URI for the value of the Provider ID attribute.**

This attribute contains the URI of the provider of the service instance. This information is useful for resolving trust metadata needed to invoke the service instance. A single physical provider may have multiple provider IDs. An example of a valid URI is `http://profile-provider.com`.

Note – The provider represented by the URI in the Provider ID attribute must also have a class entry in the `ResourceIDMapper` attribute. For more information, see "Classes For `ResourceIDMapper` Plug-in" on page 159.

16 Click Add Description to define the Service Description.

For each resource offering, at least one service description must be created.

a. Select the values for the Security Mechanism ID attribute to define how a web service client can authenticate to a web service provider.

This field lists the security mechanisms that the service instance supports. Select the security mechanisms that you want to add and click Add. To prioritize the list, select the mechanism and click Move Up or Move Down.

b. Type a value for the End Point URL.

This value is the URL of the SOAP-over-HTTP endpoint. The URI scheme must be HTTP or HTTPS as in `https://soap.profile-provider.com/soap`.

c. (Optional) Type a value for the SOAP Action.

This value is the equivalent of the `wsdlsoap:soapAction` attribute of the `wsdlsoap:operation` element in the service's concrete WSDL-based description.

d. Click OK to complete the configuration.

17 Check the Options box if there are no options or add a URI to specify options for the resource offering.

This field lists the options that are available for the resource offering. Options provide hints to a potential requestor about the availability of certain data or operations to a particular offering. The set of possible URIs are defined by the service type, not the Discovery Service. If no option is specified, the service instance does not display any available options. For a standard set of options, see the *Liberty ID-SIS Personal Profile Service Specification*.

18 Select a directive for the resource offering.

Directives are special entries defined in SOAP headers that can be used to enforce policy-related decisions. You can choose from the following:

- `GenerateBearerToken` specifies that a bearer token be generated.
- `AuthenticateRequester` must be used with any service description that use SAML for message authentication.
- `EncryptResourceID` specifies that the Discovery Service encrypt the resource ID.
- `AuthenticateSessionContext` is specified when a Discovery Service provider includes a SAML assertion containing a `SessionContextStatement` in any future `QueryResponse` messages.

- `AuthorizeRequester` is specified when a Discovery Service provider wants to include a SAML assertion containing a `ResourceAccessStatement` in any future `QueryResponse` messages.

If you want to associate a directive with one or more service descriptions, select the check box for that Description ID. If no service descriptions are selected, the directive is applied to all description elements in the resource offering.

19 **Click OK.**

20 **Click Close to close the User Discovery Resource Offering window.**

21 **Click Save to save the configuration.**

Storing Resource Offerings as Dynamic Attributes

Due to the repetition inherent in storing discovery entries as user attributes, Access Manager has established the option of storing a discovery entry as a dynamic attribute within a role or a realm. The role or realm can then be assigned to an identity-related object, making the entry available to all users within the object. Unlike storing a discovery entry as a user attribute, this scenario only supports the `DiscoveryLookup` operation.

There are two ways in which you can store discovery entries as dynamic attributes. You can store them in a realm or in a role. The following sections describe the procedures:

- "To Store Resource Offerings as Dynamic Attributes in a Realm" on page 163
- "To Store Resource Offerings as Dynamic Attributes in a Role" on page 166

▼ To Store Resource Offerings as Dynamic Attributes in a Realm

To create a discovery entry as a dynamic attribute in a realm, the Discovery Service must first be added and a template created.

1 **In the Access Manager Console, click the Access Control tab.**

2 **Select the name of the realm you want to modify.**

3 **Select Services to access the realm's services.**

4 **Click Add to add the Discovery Service to the realm.**

A list of available services is displayed.

5 **Select Discovery Service and click Next to add the service.**

A list of added services is displayed including the Discovery Service.

6 **Select Subjects to access user information.**

7 **Select the name of the user you want to modify.**

8 **Select Services to add the Discovery Service to the user.**

9 **Click Add to add the Discovery Service to the user.**

A list of available services is displayed.

10 **Select Discovery Service and click Next to add the service.**

A list of added services is displayed including the Discovery Service.

11 **Using the path displayed on top of the Access Manager Console, click the name of the realm.**

12 **Click Services to access the realm's services.**

13 **Click Add.**

14 **Select Discovery Service and click Next to add the service.**

15 **Click Discovery Service to add a resource offering to the service.**

16 **Click Add to add a resource offering.**

17 **(Optional) Enter a description of the resource offering in the Description field.**

18 **Type a URI for the value of the Service Type attribute.**

This URI defines the type of service. It is *recommended* that the value of this attribute be the `targetNamespace` URI defined in the *abstract* WSDL description for the service. An example of a valid URI is `urn:liberty:id-sis-pp:2003-08`.

19 **Type a URI for the value of the Provider ID attribute.**

The value of this attribute contains the URI of the provider of the service instance. This information is useful for resolving trust metadata needed to invoke the service instance. A single physical provider may have multiple provider IDs. An example of a valid URI is `http://profile-provider.com`.

Note – The provider represented by the URI in the Provider ID attribute must also have an entry in the `ResourceIDMapper` attribute. For more information, see "Classes For `ResourceIDMapper` Plug-in" on page 159.

20 Click Add Description to define the Service Description.

For each resource offering, at least one service description must be created.

a. **Select the values for the Security Mechanism ID attribute to define how a web service client can authenticate to a web service provider.**

   This field lists the security mechanisms that the service instance supports. Select the security mechanisms that you want to add and click Add. To prioritize the list, select the mechanism and click Move Up or Move Down.

b. **Type a value for the End Point URL.**

   This value is the URL of the SOAP-over-HTTP endpoint. The URI scheme must be HTTP or HTTPS as in `https://soap.profile-provider.com/soap`.

c. **(Optional) Type a value for the SOAP Action.**

   This value is the equivalent of the `wsdlsoap:soapAction` attribute of the `wsdlsoap:operation` element in the service's concrete WSDL-based description.

d. **Click OK to complete the configuration.**

21 Check the Options box if there are no options or add a URI to specify options for the resource offering.

This field lists the options that are available for the resource offering. Options provide hints to a potential requestor about the availability of certain data or operations to a particular offering. The set of possible URIs are defined by the service type, not the Discovery Service. If no option is specified, the service instance does not display any available options. For a standard set of options, see the *Liberty ID-SIS Personal Profile Service Specification*.

22 Select a directive for the resource offering.

Directives are special entries defined in SOAP headers that can be used to enforce policy-related decisions. You can choose from the following:

- `GenerateBearerToken` specifies that a bearer token be generated.
- `AuthenticateRequester` must be used with any service description that use SAML for message authentication.
- `EncryptResourceID` specifies that the Discovery Service encrypt the resource ID.
- `AuthenticateSessionContext` is specified when a Discovery Service provider includes a SAML assertion containing a `SessionContextStatement` in any future `QueryResponse` messages.
- `AuthorizeRequester` is specified when a Discovery Service provider wants to include a SAML assertion containing a `ResourceAccessStatement` in any future `QueryResponse` messages.

If you want to associate a directive with one or more service descriptions, select the check box for that Description ID. If no service descriptions are selected, the directive is applied to all description elements in the resource offering.

23 Click OK.

24 Click Close to close the Discovery Resource Offering window.

25 Click Save to save the configuration.

▼ To Store Resource Offerings as Dynamic Attributes in a Role

To create a discovery entry as a dynamic attribute in a role, the Discovery Service must first be added and a template created.

1 In the Access Manager Console, click the Access Control tab.

2 Select the name of the realm you want to modify.

3 Select Subjects to access the realm's identity information.

4 Select Role to access the realm's role information.

5 Select the name of the role you want to modify.

Alternately, you can create a new role and then select the name of this new role.

6 Under Services, click Add to add the Discovery Service to the role.

A list of available services is displayed.

7 Select Discovery Service and click Next to add the service.

A list of added services is displayed including the Discovery Service.

8 Click Discovery Service to add a resource offering to the service.

9 Click Add.

10 (Optional) Enter a description of the resource offering in the Description field.

11 Type a URI for the value of the Service Type attribute.

This URI defines the type of service. It is *recommended* that the value of this attribute be the `targetNamespace` URI defined in the *abstract* WSDL description for the service. An example of a valid URI is `urn:liberty:id-sis-pp:2003-08`.

12 Type a URI for the value of the Provider ID attribute.

The value of this attribute contains the URI of the provider of the service instance. This information is useful for resolving trust metadata needed to invoke the service instance. A single physical provider may have multiple provider IDs. An example of a valid URI is `http://profile-provider.com`.

Note – The provider represented by the URI in the Provider ID attribute must also have an entry in the ResourceIDMapper attribute. For more information, see "Classes For ResourceIDMapper Plug-in" on page 159.

13 Click Add Description to define the Service Description.

For each resource offering, at least one service description must be created.

a. Select the values for the Security Mechanism ID attribute to define how a web service client can authenticate to a web service provider.

This field lists the security mechanisms that the service instance supports. Select the security mechanisms that you want to add and click Add. To prioritize the list, select the mechanism and click Move Up or Move Down.

b. Type a value for the End Point URL.

This value is the URL of the SOAP-over-HTTP endpoint. The URI scheme must be HTTP or HTTPS as in `https://soap.profile-provider.com/soap`.

c. (Optional) Type a value for the SOAP Action.

This value is the equivalent of the `wsdlsoap:soapAction` attribute of the `wsdlsoap:operation` element in the service's concrete WSDL-based description.

d. Click OK to complete the configuration.

14 Check the Options box if there are no options or add a URI to specify options for the resource offering.

This field lists the options that are available for the resource offering. Options provide hints to a potential requestor about the availability of certain data or operations to a particular offering. The set of possible URIs are defined by the service type, not the Discovery Service. If no option is specified, the service instance does not display any available options. For a standard set of options, see the *Liberty ID-SIS Personal Profile Service Specification*.

15 Select a directive for the resource offering.

Directives are special entries defined in SOAP headers that can be used to enforce policy-related decisions. You can choose from the following:

- `GenerateBearerToken` specifies that a bearer token be generated.
- `AuthenticateRequester` must be used with any service description that use SAML for message authentication.
- `EncryptResourceID` specifies that the Discovery Service encrypt the resource ID.
- `AuthenticateSessionContext` is specified when a Discovery Service provider includes a SAML assertion containing a `SessionContextStatement` in any future `QueryResponse` messages.

- AuthorizeRequester is specified when a Discovery Service provider wants to include a SAML assertion containing a ResourceAccessStatement in any future QueryResponse messages.

If you want to associate a directive with one or more service descriptions, select the check box for that Description ID. If no service descriptions are selected, the directive is applied to all description elements in the resource offering.

16 **Click OK.**

17 **Click Close to close the Discovery Resource Offering window.**

18 **Click Save to save the configuration.**

Storing a Resource Offering for Discovery Service Bootstrapping

Before a WSC can contact the Discovery Service to obtain a resource offering, the WSC needs to discover the Discovery Service. Thus, an initial resource offering for locating the Discovery Service is sent back to the WSC in a SAML assertion generated during authentication. The following procedure describes how to configure a global attribute for bootstrapping the Discovery Service. For more information on bootstrapping the Discovery Service, see “Resource Offerings for Bootstrapping” on page 160.

▼ To Store a Resource Offering for Discovery Service Bootstrapping

1 **In the Access Manager Console, select the Web Services tab.**

2 **Under Web Services, click the Discovery Service tab.**

3 **Choose New under the Resource Offerings for Bootstrapping Resources attribute.**

By default, the resource offering for bootstrapping the Discovery Service is already configured. In order to create a new resource offering, you must first delete the default resource offering.

4 **(Optional) Type a description of the resource offering.**

5 **Enter a URI for the value of the Service Type attribute.**

This field defines the type of service. It is recommended that the value of this attribute be the targetNamespace URI defined in the *abstract* WSDL description for the service. An example of a valid URI is urn:liberty:disco:2003-08.

6 **Enter a URI for the value of the Provider ID attribute.**

This attribute contains the URI of the provider of the service instance. This is useful for resolving trust metadata needed to invoke the service instance. A single physical provider may have multiple provider IDs. An example of a valid URI is http://sample_disco.com.

Note – The provider represented by the URI in the Provider ID attribute must also have an entry in the Classes for ResourceIDMapper Plugin attribute. For more information, see "Classes For ResourceIDMapper Plug-in" on page 159.

7 **Click Add Description to define a security mechanism ID.**

For each resource offering, at least one service description must be created.

a. **Select the values for the Security Mechanism ID attribute to define how a web service client can authenticate to a web service provider.**

This field lists the security mechanisms that the service instance supports. Select the security mechanisms you wish to add and click the Add button. To arrange the priority of the list, select the mechanism and use the Move Up or Move Down buttons.

b. **Type a value for the End Point URL.**

This value is the URL of the SOAP-over-HTTP endpoint. The URI scheme must be HTTP or HTTPS as in `https://soap.profile-provider.com/soap`.

c. **(Optional) Type a value for the SOAP action.**

This field contains the equivalent of the `wsdlsoap:soapAction` attribute of the `wsdlsoap:operation` element in the service's concrete WSDL-based description.

d. **Click OK to save the configuration.**

8 **Check the Options box if there are no options or add a URI to specify options for the resource offering.**

This field lists the options that are available for the resource offering. Options provide hints to a potential requestor about the availability of certain data or operations to a particular offering. The set of possible URIs are defined by the service type, not the Discovery Service. If no option is specified, the service instance does not display any available options. For a standard set of options, see the *Liberty ID-SIS Personal Profile Service Specification*.

9 **Select a directive for the resource offering.**

Directives are special entries defined in SOAP headers that can be used to enforce policy-related decisions. You can choose from the following:

- `GenerateBearerToken` specifies that a bearer token be generated.
- `AuthenticateRequester` must be used with any service description that use SAML for message authentication.
- `EncryptResourceID` specifies that the Discovery Service encrypt the resource ID.
- `AuthenticateSessionContext` is specified when a Discovery Service provider includes a SAML assertion containing a `SessionContextStatement` in any future `QueryResponse` messages.

- AuthorizeRequester is specified when a Discovery Service provider wants to include a SAML assertion containing a ResourceAccessStatement in any future QueryResponse messages.

If you want to associate a directive with one or more service descriptions, select the check box for that Description ID. If no service descriptions are selected, the directive is applied to all description elements in the resource offering.

10 **Click OK to complete the configuration.**

Generating Security Tokens

In general, a discovery service and an identity provider are hosted on the same machine. Because the identity provider hosting the Discovery Service might be fulfilling other roles for an identity (such as a Policy Decision Point or an Authentication Authority), it can be configured to provide the requesting entity with security tokens. The Discovery Service can include a security token (inserted into a SOAP message header) in a DiscoveryLookup response. The token can then be used as a credential to invoke the service returned with it.

▼ To Configure the Discovery Service to Generate Security Tokens

After completing the following procedure, you can test the functionality by running the samples. See "Web Services Framework Samples" on page 239 for information.

1 **Generate the keystore and certificate aliases for the machines that are hosting the Discovery Service, the WSP and the WSC.**

Access Manager uses a Java keystore for storing the public and private keys so, if this is a new deployment, you might need to generate one. keystore.html in AccessManager-base/SUNWam/samples/saml/xmlsig/ has information on accomplishing this using keytool, the key and certificate management utility supplied with the Java Platform, Standard Edition. In short, keytool generates key pairs as separate key entries (one for a public key and the other for its associated private key). It wraps the public key into an X.509 self-signed certificate (one for which the issuer/signer is the same as the subject), and stores it as a single-element certificate chain. Additionally, the private key is stored separately, protected by a password, and associated with the certificate chain for the corresponding public key. All public and private keystore entries are accessed via unique aliases. The default keytool configuration generates the keystore as a .keystore file.

2 **Update the values of the following key-related properties in the AMConfig.properties files of the appropriate deployed instances of Access Manager.**

AMConfig.properties is located in /etc/opt/SUNWam/config/.

Note – The same property might have already been edited depending on the deployment scenario.

a. **Update the values of the following key-related properties in the `AMConfig.properties` files on the machine that hosts the Discovery Service.**

   - `com.sun.identity.saml.xmlsig.keystore` defines the location of the keystore file.
   - `com.sun.identity.saml.xmlsig.storepass` defines the location of the file that contains the password used to access the keystore file.
   - `com.sun.identity.saml.xmlsig.keypass` defines the location of the file that contains the password used to protect the private key of a generated key pair.
   - `com.sun.identity.liberty.ws.ta.certalias` defines the certificate alias used by the Discovery Service to sign SAML assertions.
   - `com.sun.identity.liberty.ws.wsc.certalias` defines the certificate alias used by the Discovery Service to sign the protocol response.

b. **Update the values of the following key-related properties in the `AMConfig.properties` files on the machines that acts as the WSP.**

   - `com.sun.identity.saml.xmlsig.keystore` defines the location of the keystore file.
   - `com.sun.identity.saml.xmlsig.storepass` defines the location of the file that contains the password used to access the keystore file.
   - `com.sun.identity.saml.xmlsig.keypass` defines the location of the file that contains the password used to protect the private key of a generated key pair.
   - `com.sun.identity.liberty.ws.wsc.certalias` defines the certificate alias used for signing the WSP protocol responses.
   - `com.sun.identity.liberty.ws.trustedca.certaliases` defines the certificate alias and the Provider ID list on which the WSP is trusting.

c. **Update the values of the following key-related properties in the `AMConfig.properties` files on the machine that acts as the WSC.**

   - `com.sun.identity.saml.xmlsig.keystore` defines the location of the keystore file.
   - `com.sun.identity.saml.xmlsig.storepass` defines the location of the file that contains the password used to access the keystore file.
   - `com.sun.identity.saml.xmlsig.keypass` defines the location of the file that contains the password used to protect the private key of a generated key pair.
   - `com.sun.identity.liberty.ws.wsc.certalias` defines the certificate alias used by web service clients for signing protocol requests.

Note – The `com.sun.identity.liberty.ws.wsc.certalias` property must be *added* to the `AMConfig.properties` file.

---

3. **Configure each identity provider and service provider as an entity using the Access Manager Federation module.**

   This entails configuring a entity for each provider using the Access Manager Console or loading an XML metadata file using `amadmin`. See "Entities" on page 72 for information on the former and Chapter 1, "The amadmin Command Line Tool," in *Sun Java System Access Manager 7.1 2006Q4 Administration Reference* for information on the latter.

   Note – Be sure to configure each provider's entity so that all providers in the scenario are defined as Trusted Providers.

   ---

4. **Establish provider trust between the entities by creating an authentication domain using the Access Manager Federation module.**

   See "Authentication Domains" on page 100.

5. **Change the default value of the Provider ID for the Discovery Service on the machine where the Discovery Service is hosted to the value that reflects the previously loaded metadata.**

   a. **Click the Web Services tab from the Access Manager Console.**

   b. **Click the Discovery Service tab under Web Services.**

   c. **Change the default value of the Provider ID from** *protocol*`://`*host*`:`*port*`/`*deployuri*`/`**`Liberty/disco`**.

   Note – If using the samples, make sure that the value of Provider ID in `discovery-modify.jsp` is changed, if necessary, before the WSP registers with the Discovery Service.

   ---

6. **Change the default value of the Provider ID for the Liberty Personal Profile Service on the machine where the Liberty Personal Profile Service is hosted to the value that reflects the previously loaded metadata.**

   a. **Click the Web Services tab from the Access Manager Console.**

   b. **Click the Liberty Personal Profile Service tab under Web Services.**

   c. **Change the default value of the Provider ID from** *protocol*`://`*host*`:`*port*`/`*deployuri*`/`**`Liberty/idpp`**.

7. **Register a resource offering for the WSP using either of the following methods.**

   - Access Manager Console

See "Storing Resource Offerings" on page 160 for information on registering a resource offering using the Access Manager Console.

- Client API

  See `discovery-modify.jsp` in *AccessManager-base*/`samples/phase2/wsc` which calls the API for registering a resource offering.

Also, make sure that the appropriate directives are chosen.

- For SAML Bearer token use `GenerateBearerToken` or `AuthenticateRequester`.
- For SAML Token (Holder of key) use `AuthenticateRequester` or `AuthorizeRequester`.

Discovery Service APIs

Access Manager contains several Java packages that are used by the Discovery Service. They include:

- `com.sun.identity.liberty.ws.disco` includes a client API that provides interfaces to communicate with the Discovery Service. See "Client APIs in `com.sun.identity.liberty.ws.disco`" on page 173.
- `com.sun.identity.liberty.ws.disco.plugins` includes an interface that can be used to develop plug-ins. The package also contains some default plug-ins. See "`com.sun.identity.liberty.ws.disco.plugins.DiscoEntryHandler` Interface" on page 174.
- `com.sun.identity.liberty.ws.interfaces` includes interfaces that can be used to implement functionality common to all Liberty-enabled identity services. Several implementations of these interfaces have been developed for the Discovery Service. See "`com.sun.identity.liberty.ws.interfaces.Authorizer` Interface" on page 175 and "`com.sun.identity.liberty.ws.interfaces.ResourceIDMapper` Interface" on page 177.

Note – Additional information is in the Java API Reference in `/`*AccessManager-base*`/SUNWam/docs` or on docs.sun.com. Information about the `com.sun.identity.liberty.ws.common` package is in "Common Service Interfaces" on page 225 in Chapter 11.

Client APIs in `com.sun.identity.liberty.ws.disco`

The following table summarizes the client APIs in the package `com.sun.identity.liberty.ws.disco`. For more information, including methods and their syntax and parameters, see the Java API Reference in `/`*AccessManager-base*`/SUNWam/docs` or on docs.sun.com.

TABLE 8–2 Discovery Service Client APIs

Class	Description
`Description`	Represents a DescriptionType element of a service instance.
`Directive`	Represents a discovery service DirectiveType element.
`DiscoveryClient`	Provides methods to send Discovery Service queries and modifications.
`EncryptedResourceID`	Represents an EncryptionResourceID element for the Discovery Service.
`InsertEntry`	Represents an Insert Entry for Discovery Modify request.
`Modify`	Represents a discovery modify request.
`ModifyResponse`	Represents a discovery response to a modify request.
`Query`	Represents a discovery Query object.
`QueryResponse`	Represents a response to a discovery query request.
`RemoveEntry`	Represents a remove entry element for the discovery modify request.
`RequestedService`	Enables the requester to specify that all the resource offerings returned must be offered through a service instance that complys with one of the specified service types.
`ResourceID`	Represents a Discovery Service Resource ID.
`ResourceOffering`	Associates a resource with a service instance that provides access to that resource.
`ServiceInstance`	Describes a web service at a distinct protocol endpoint.

`com.sun.identity.liberty.ws.disco.plugins.DiscoEntryHandler` Interface

This interface is used to get and set discovery entries for a user. A number of default implementations are provided, but if you want to handle this function differently, implement this interface and set the implementing class as the value of the Entry Handler Plugin Class attribute as discussed in “Entry Handler Plug-in Class” on page 158. The default implementations of this interface are described in the following table.

TABLE 8–3 Implementations of `com.sun.identity.liberty.ws.disco.plugins.DiscoEntryHandler`

Class	Description
`UserDiscoEntryHandler`	Gets or modifies discovery entries stored in the user's entry as a value of the `sunIdentityServerDiscoEntries` attribute. The `UserDiscoEntryHandler` implementation is used in business-to-consumer scenarios such as the Liberty Personal Profile Service.
`DynamicDiscoEntryHandler`	Gets discovery entries stored as a value of the `sunIdentityServerDynamicDiscoEntries` dynamic attribute in the Discovery Service. Modification of these entries is not supported and always returns `false`. The resource offering is saved in an organization or a role. The `DynamicDiscoEntryHandler` implementation is used in business-to-business scenarios such as the Liberty Employee Profile service.
`UserDynamicDiscoEntryHandler`	Gets a union of the discovery entries stored in the user entry `sunIdentityServerDiscoEntries` attribute and discovery entries stored in the Discovery Service `sunIdentityServerDynamicDiscoEntries` attribute. It modifies only discovery entries stored in the user entry. The `UserDynamicDiscoEntryHandler` implementation can be used in both business-to-consumer and business-to-business scenarios.

`com.sun.identity.liberty.ws.interfaces.Authorizer` Interface

This interface is used to enable an identity service to check the authorization of a WSC. The `DefaultDiscoAuthorizer` class is the default implementation of this interface. The class uses the Access Manager Policy Service for creating and applying policy definitions. Policy definitions for the Discovery Service are configured using the Access Manager Console.

Note – The Policy Service looks for an `SSOToken` defined for Authenticated Users or Web Service Clients. For more information on this and the Policy Service in general, see the *Sun Java System Access Manager 7.1 Administration Guide*.

▼ To Configure Discovery Service Policy Definitions

1 **In the Access Manager Console, click the Access Control tab.**

2 **Select the name of the realm in which the policy definitions will be configured.**

3 **Select Policies to access policy configurations.**

4 **Click New Policy to add a new policy definition.**

5 **Type a name for the policy.**

6 **(Optional) Enter a description for the policy.**

7 **(Optional) Select the check box next to Active.**

8 **Click New to add rules to the policy definition.**

9 **Select Discovery Service for the rule type and click Next.**

10 **Type a name for the rule.**

11 **Type a resource on which the rule acts.**

The Resource Name field uses the form *ServiceType* + *RESOURCE_SEPARATOR* + *ProviderID*. For example, `urn:liberty:id-sis-pp:2003-08;http://example.com`.

12 **Select an action and appropriate value for the rule.**

Discovery Service policies can only look up or update data.

13 **Click Finish to configure the rule.**

The `com.sun.identity.liberty.ws.interfaces.Authorizer` interface can be implemented by any web service in Access Manager. For more information, see "Common Service Interfaces" on page 225 and the Java API Reference in /*AccessManager-base*/`SUNWam/docs` or on docs.sun.com.

14 **Click New to add subjects to the policy definition.**

15 **Select the subject type and click Next.**

16 **Type a name for the group of subjects.**

17 **(Optional) Click the check box if this is an exclusive group.**

18 **Select the users and click to add them to the group.**

19 **Click Finish to return to the policy definition screen.**

20 **Click New to add conditions to the policy definition.**

21 **Select the condition type and click Next.**

22 **Type values for the displayed attributes.**

For more information, see the *Sun Java System Access Manager 7.1 Administration Guide*.

23 **Click Finish to return to the policy definition screen.**

24 **Click New to add response providers to the policy definition.**

25 **Type a name for the response provider.**

26 **(Optional) Add values for the StaticAttribute.**

27 **(Optional) Add values for the DynamicAttribute.**

28 **Click Finish to return to the policy definition screen.**

29 **Click Create to finish the policy configuration.**

`com.sun.identity.liberty.ws.interfaces.ResourceIDMapper` Interface

This interface is used to map a user ID to the resource identifier associated with it. Access Manager provides two implementations of this interface.

- `com.sun.identity.liberty.ws.disco.plugins.Default64ResourceIDMapper` assumes the format to be *providerID* + "/" + *the Base64 encoded userIDs*
- `com.sun.identity.liberty.ws.disco.plugins.DefaultHexResourceIDMapper` assumes the format to be *providerID* + "/" + *the hex string of userIDs*

A different implementation of the interface may be developed. The implementation class should be given to the provider that hosts the Discovery Service. The mapping between the *providerID* and the implementation class can be configured through the "Classes For `ResourceIDMapper` Plug-in" on page 159 attribute.

Note – The `com.sun.identity.liberty.ws.interfaces.ResourceIDMapper` interface is common to all identity services in Access Manager not only the Discovery Service. For more information, see "Common Service Interfaces" on page 225 and the Java API Reference in /*AccessManager-base*/`SUNWam/docs` or on docs.sun.com.

Discovery Service Sample

A sample that shows the process for querying and modifying the Discovery Service is included with Access Manager in the /*AccessManager-base*/`SUNWam/samples/phase2/wsc` directory. The sample initially shows how to deploy and run a WSC. The final portion queries the Discovery Service and modifies identity data in the Liberty Personal Profile Service. For more information, see Appendix A.

CHAPTER 9

SOAP Binding Service

Sun Java System Access Manager contains an implementation of the *Liberty ID-WSF SOAP Binding Specification* from the Liberty Alliance Project. The specification defines a transport layer for sending and receiving SOAP messages.

This chapter covers the following topics:

- "SOAP Binding Service Overview" on page 179
- "SOAP Binding Process" on page 180
- "SOAP Binding Service Attributes" on page 181
- "SOAP Binding Service Package" on page 183

SOAP Binding Service Overview

The Liberty Identity Web Services Framework (Liberty ID-WSF) and Liberty Identity Service Interface Specifications (Liberty ID-SIS) components of the Liberty Alliance Project specifications use messages to convey identity data between providers. Access Manager has implemented the *Liberty ID-WSF SOAP Binding Specification* (Liberty ID-WSF-SBS) as the method of transport for this purpose. The specification defines SOAP as the binding to the Hypertext Transport Protocol (HTTP), which is itself layered onto the TCP/IP stack.

Note – For more information, see the *Liberty ID-WSF SOAP Binding Specification*.

XML Service File

The Access Manager SOAP Binding Service is defined using the XML service file `amSOAPBinding.xml`. This file defines the attributes for the SOAP Binding Service which can be managed through the Access Manager Console or the XML file.

Note – For more information on service files, see the *Sun Java System Access Manager 7.1 Administration Guide*.

The Liberty ID-WSF-SBS also defines an XML schema for use in building the SOAP messages. This XML Schema Definition (XSD) file is on the Liberty Alliance Project web site. Version 1.0 is also reproduced in Appendix C.

SOAP Binding Service APIs

The Access Manager SOAP Binding Service includes a Java package named `com.sun.identity.liberty.ws.soapbinding`. For more information about these interfaces, see "SOAP Binding Service Package" on page 183.

SOAP Binding Process

In the SOAP Binding process, an identity service calls the client-side application programming interface (API) to construct a message and send it to the SOAP endpoint URL. The URL is, in effect, a servlet that receives and processes SOAP messages.

Note – The Discovery Service, implemented Data Services Template services (including the Liberty Personal Profile Service and the sample Employee Profile Service), and the Authentication Web Service use the SOAP Binding Service client API.

The SOAP Receiver servlet receives the message, verifies the signature, and constructs a second message. The SOAP Receiver servlet then invokes the correct request handler class to send this second message to the corresponding service for a response.

Note – `com.sun.identity.liberty.ws.soapbinding.RequestHandler` is an interface that must be implemented on the server side by any Liberty-based web service using the SOAP Binding Service. For more information, see "Request Handler List" on page 181.

The service processes the second message, generates a response, and sends that response back to the SOAP Receiver servlet. The SOAP receiver, in turn, sends the response back to the service for processing.

Note – Before invoking a corresponding service, the SOAP framework might also do the following:

- Authenticate the sender identity to verify the credentials of a WSC peer, probably by verifying its client certificate.
- Authenticate the invoking identity to verify the credentials of a WSC on behalf of a user to verify whether the user has been authenticated. This depends on the security authentication profile.
- Granular authorization to authorize the WSC before processing a service request.

SOAP Binding Service Attributes

The SOAP Binding Service attributes are *global* attributes. The values of these attributes are carried across the Access Manager configuration and inherited by every organization.

Note – For information about the types of attributes used in Access Manager, see the *Sun Java System Access Manager 7.1 Technical Overview*.

Attributes for the SOAP Binding Service are defined in the `amSOAPBinding.xml` service file. The SOAP Binding Service attributes are as follows:

- “Request Handler List” on page 181
- “Web Service Authenticator” on page 182
- “Supported Authentication Mechanisms” on page 182

Request Handler List

The Request Handler List stores information about the classes implemented from the `com.sun.identity.liberty.ws.soapbinding.RequestHandler` interface. The SOAP Binding Service provides the interface to process requests and return responses. It must be implemented on the server side for each Liberty-based web service that uses the SOAP Binding Service.

Note – The Discovery Service, implemented Data Services Template (DST) services (including the Liberty Personal Profile Service and the sample Employee Profile Service, if deployed), and the Authentication Web Service use the SOAP Binding Service client API.

To add a new implementation, click New and define values for the following parameters.

`Key` Parameter

The `Key` parameter is the last part of the URI path to a SOAP endpoint. The SOAP endpoint in Access Manager is the SOAP Receiver servlet. The URI to the SOAP Receiver uses the format `protocol://`*host*`:`*port*`/`*deloy-uri*`/Liberty/`*key*. If you define `disco` as the `Key`, the URI path to the SOAP endpoint for the corresponding Discovery Service would be *protocol*`://`*host*`:`*port*`/amserver/Liberty/disco`.

Note – Different service clients use different keys when connecting to the SOAP Receiver.

`Class` Parameter

The `Class` parameter specifies the name of the class implemented from `com.sun.identity.liberty.ws.soapbinding.RequestHandler` for the particular web service. For example, `class=com.example.identity.liberty.ws.disco.DiscoveryService`.

`SOAP Action` Parameter

The optional `SOAP Action` can be used to indicate the intent of the SOAP HTTP request. The SOAP processor on the receiving system can use this information to determine the ultimate destination for the service. The value is a URI. No defined value indicates no intent.

Note – SOAP places no restrictions on the format or specificity of the URI or that it is resolvable.

Web Service Authenticator

This attribute takes as a value the implementation class for the Web Service Authenticator interface. This class authenticates a request and generates a credential for a WSC.

Note – This interface is not public. The value of the attribute is configured during installation.

Supported Authentication Mechanisms

This attribute specifies the authentication mechanisms supported by the SOAP Receiver. Authentication mechanisms offer user authentication as well as data integrity and encryption. By default, all available authentication mechanisms are selected. If a mechanism is not selected and a WSC sends a request using it, the request is rejected. Following is a list of the supported authentication mechanisms:

- `urn:liberty:security:2003-08:null:null`
- `urn:liberty:security:2003-08:null:X509`
- `urn:liberty:security:2003-08:null:SAML`
- `urn:liberty:security:2004-04:null:Bearer`
- `urn:liberty:security:2003-08:TLS:null`
- `urn:liberty:security:2003-08:TLS:X509`
- `urn:liberty:security:2003-08:TLS:SAML`
- `urn:liberty:security:2004-04:TLS:Bearer`
- `urn:liberty:security:2003-08:ClientTLS:null`
- `urn:liberty:security:2003-08:ClientTLS:X509`

- `urn:liberty:security:2003-08:ClientTLS:SAML`
- `urn:liberty:security:2004-04:ClientTLS:Bearer`

Note – For more complete information about authentication mechanisms and their level of security, see the *Liberty ID-WSF Security Mechanisms* specification.

SOAP Binding Service Package

The Access Manager SOAP Binding Service includes a Java package named `com.sun.identity.liberty.ws.soapbinding`. This package provides classes to construct SOAP requests and responses and to change the contact point for the SOAP binding. The following table describes some of the available classes. For more detailed information, see the Java API Reference in `/`*AccessManager-base*`/SUNWam/docs` or on docs.sun.com.

TABLE 9–1 SOAP Binding Service Classes

Class	Description
`Client`	Provides a WSC with a method to send requests using a SOAP connection with a WSP.
`ConsentHeader`	Defines the SOAP element named `Consent`.
`CorrelationHeader`	Defines the SOAP element named `Correlation`.
`ProcessingContextHeader`	Defines the SOAP element named `ProcessingContext`.
`ProviderHeader`	Defines the SOAP element named `Provider`.
`RequestHandler`	Defines an interface that needs to be implemented by each web service in order to receive a request from your web service client. After implementing the handler class, the user must register the class in the SOAP Binding Service so the SOAP layer knows where to forward incoming WSC requests.
`Message`	Used by both the web service client and server to construct SOAP requests and responses.
`ServiceInstanceUpdateHeader`	Allows a service to change the endpoint on which requesters will contact it.
`ServiceInstanceUpdateHeader.Credential`	Allows a service to use a different security mechanism and credentials to access the requested resource.
`SOAPBindingException`	Represents an error that has occurred while processing a SOAP request and response.
`SOAPFault`	Defines the SOAP element named `Fault`.

TABLE 9–1 SOAP Binding Service Classes *(Continued)*

Class	Description
`SOAPFaultDetail`	Defines the SOAP element named `Consent`.
`SOAPFaultException`	Represents a SOAP fault while processing a SOAP request.
`UsageDirectiveHeader`	Defines the SOAP element named `UsageDirective`.

See Appendix A for sample code and files to help you understand the implementation of the Liberty Alliance Project specifications.

See "PAOS Binding" on page 232 for information on this reverse HTTP binding for SOAP.

PART IV

SAML Administration and Application Programming Interfaces

CHAPTER 10

SAML Administration

Sun Java™ System Access Manager uses the Security Assertion Markup Language (SAML) as the means for exchanging security information. SAML uses an eXtensible Markup Language (XML) framework to achieve interoperability between vendor platforms that provide SAML assertions. This chapter explains SAML and defines how it is used within Access Manager. It covers the following topics:

SAML Overview

SAML is an XML-based standard for communicating authentication, authorization and attribute information amongst online partners. It allows businesses to securely send assertions between partnered organizations regarding the identity and entitlements of a principal. The Organization for the Advancement of Structured Information Standards (OASIS) Security Services Technical Committee is in charge of defining, enhancing, and maintaining the SAML specifications. SAML standardizes queries for, and responses that contain, user authentication, entitlements, and attribute information in an XML format. This format can then be used by a relying party to request security information about a principal from a SAML authority. A *SAML authority*, sometimes called the *asserting party*, is a platform or application that can relay security information. The *relying party* (or *assertion consumer* or *requesting party*) is a partner site that receives the security information. The exchanged information deals with a subject's authentication status, access authorization, and attribute information. A *subject* is an entity in a particular domain. A person identified by an email address is a subject, as might be a printer.

Note – All parties in a SAML interaction need to form a trust relationship before they can share information about a subject's identity. How this is accomplished is beyond the scope of this guide.

Comparison of SAML and Liberty Specifications

SAML was designed to address the issue of cross-domain single sign-on. The Liberty Alliance Project was formed to develop technical specifications that would solve business process problems. These issues include single sign-on, but also incorporate protocols for account linking and consent, among others. SAML, on the other hand, does not solve issues such as privacy, single logout, and federation termination.

The SAML 1.0 and 1.1 specifications and the Liberty Alliance Project specifications do not compete with one another. They are complementary. In fact, the Liberty Alliance Project specifications leverage profiles from the SAML specifications. The decision of whether to use SAML or the Liberty specifications depends on your goal. In general, SAML should suffice for single sign-on basics. The Liberty Alliance Project specifications can be used for more sophisticated functions and capabilities, such as global sign-out, attribute sharing, web services. The following table compares the benefits of the two.

TABLE 10–1 Comparison of the SAML and Liberty Alliance Project Specifications

SAML Uses	Liberty Alliance Project Uses
Cross-domain single sign-on	Single sign-on *only* after user federation
No user federation	User federation
No privacy control, best for use within one company	Built on top of SAML
User identifier is sent in plain text	User identifier is sent as a unique handle

Note – The Organization for the Advancement of Structured Information Standards (OASIS) drives the development of SAML. For information and specifications, see the OASIS Security Services (SAML) Technical Committee home page.

SAML Architecture in Access Manager

SAML security information is expressed in the form of an assertion about a subject. An *assertion* is a package of verified security information that supplies one or more statements concerning a subject's authentication status, access authorization decisions, or identity attributes. Assertions are issued by the SAML authority, and received by partner sites defined by the authority as *trusted*. SAML authorities use different sources to configure the assertion information, including external data stores or assertions that have already been received and verified. The following figure illustrates how SAML interacts with the other components in Access Manager.

Note – Although Federation (as described in Chapter 3) integrates aspects of the SAML specifications, its usage of SAML is independent of the SAML component as described in this chapter.

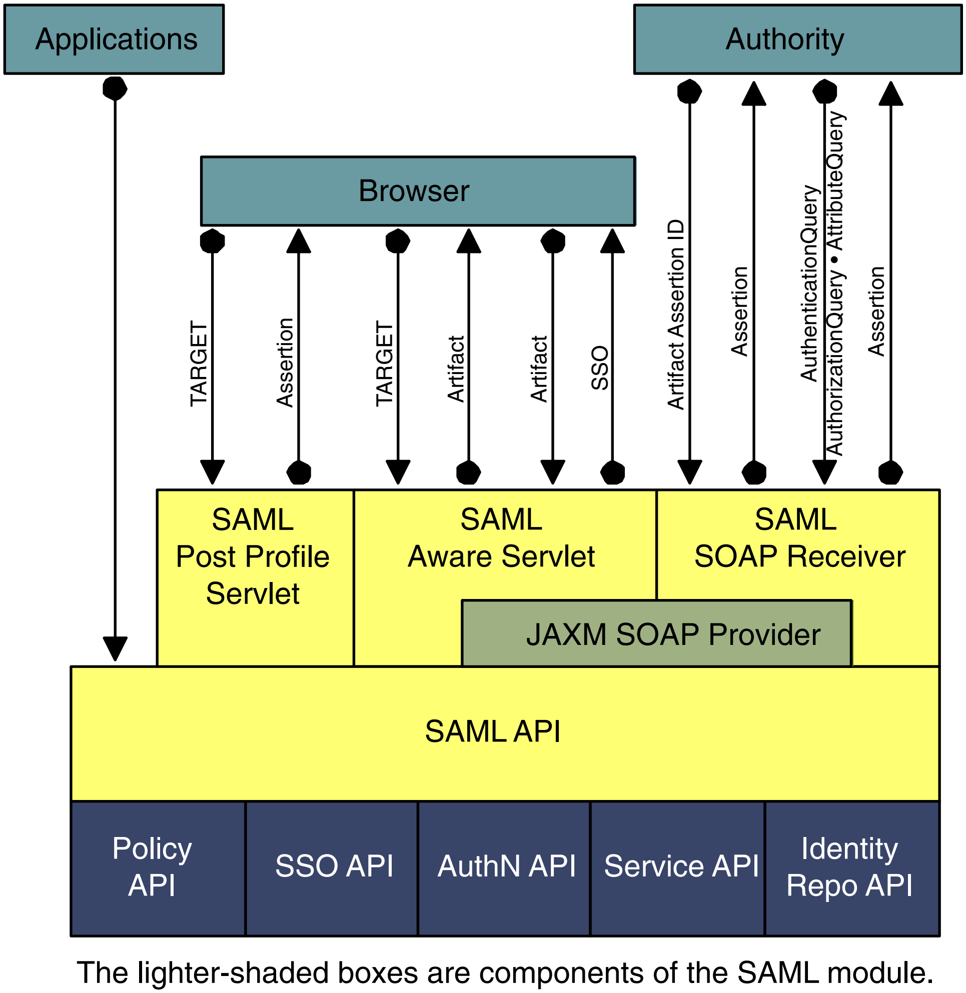


FIGURE 10–1 SAML Interaction in Access Manager

SAML allows Access Manager to work in the following ways:

- Users can authenticate using Access Manager and access trusted partner sites without having to reauthenticate.

Note – This single sign-on process is independent of the proprietary Access Manager process discussed in the *Sun Java System Access Manager 7.1 Administration Guide*.

- Access Manager acts as a policy decision point, allowing external applications to access user authorization information for the purpose of granting or denying access to their resources. For example, employees of an organization can be allowed to order office supplies from suppliers if they are authorized to do so.
- Access Manager acts as both an attribute authority (allowing trusted partner sites to query a subject's attributes) and an authentication authority (allowing trusted partner sites to query a subject's authentication information).
- Two parties in different security domains can validate each other for the purpose of performing business transactions.
- The SAML API can be used to build Authentication, Authorization Decision, and Attribute Assertions.
- The SAML service permits an XML-based digital signature signing and verifying functionality to be plugged into it.

Using the SAML Service

The SAML Service can be accessed using a web browser or the SAML API. An end user authenticates to Access Manager using a web browser and, once authorized to do so, attempts to access URLs on trusted partner sites. Developers, who have integrated the SAML API into their applications, are then able to exchange security information with Access Manager. For example, a Java application can use the SAML API to achieve single sign-on. After obtaining a `SSOToken` from Access Manager, the application can call the `doWebArtifact()` method of the `SAMLClient` class, which will send a SOAP request for authorization information to Access Manager and, if applicable, redirect the application to the destination site. For more information, see "SAML API" on page 212.

Elements of SAML

SAML defines message formats in XML for queries and responses. SAML queries are sent to a SAML authority and responses, in the form of SAML assertions, are returned via SOAP over HTTP, the request-response protocol used to carry SAML messages. The following sections describe these and other elements of SAML.

- "Queries and Responses" on page 191
- "Assertions" on page 192
- "Profiles" on page 193
- "SAML SOAP Receiver" on page 199

Queries and Responses

An entity can interact with a SAML authority using requests containing queries and responses containing assertions. AuthenticationQuery, AttributeQuery, and AuthorizationDecisionQuery XML tags containing requests for security information are wrapped within a <samlp:Request> XML tag and sent to a SAML authority. AuthenticationStatement, AttributeStatement, and AuthorizationDecisionStatement XML tags containing assertions of security information are wrapped within a <samlp:Response> XML tag and returned to the assertion consumer. See the following sections for more information.

- "Queries" on page 191
- "Responses" on page 191

Queries

A requesting party uses AuthenticationQuery, AttributeQuery, and AuthorizationDecisionQuery tags within a <samlp:Request> to ask for assertions about a particular entity from a SAML authority. Following is an example request containing an attribute query.

```
<samlp:Request
xmlns:samlp="urn:oasis:names:tc:SAML:1.1:protocol"
RequestID="s9c4a43c0265e904ca86f43c3e30034dd56582a79"
MajorVersion="1" MinorVersion="1"
IssueInstant="2006-01-09T11:33:48Z">
  <samlp:AttributeQuery>
   <saml:Subject xmlns:saml="urn:oasis:names:tc:SAML:1.1:assertion">
   <saml:NameIdentifier NameQualifier="dc=example,dc=com">uid=amadmin,dc=example,dc=com</saml:NameIdentifier>
   <saml:SubjectConfirmation>
   <saml:ConfirmationMethod>urn:com:sun:identity</saml:ConfirmationMethod>
   <saml:SubjectConfirmationData>
   </saml:SubjectConfirmationData>
   </saml:SubjectConfirmation>
   </saml:Subject>
  </samlp:AttributeQuery>
</samlp:Request>
```

Responses

A SAML authority uses AuthenticationStatement, AttributeStatement, and AuthorizationDecisionStatement tags within a <samlp:Response> to return information about an entity to the requesting party. Following is an example response containing an assertion. See "Assertions" on page 192 for more information.

```
<samlp:Response
xmlns:samlp="urn:oasis:names:tc:SAML:1.1:protoco"
ResponseID="s757013615ab8ab95ffe272f9e377aa6ed823d030"
```

```
InResponseTo="s9c4a43c0265e904ca86f43c3e30034dd56582a79"
MajorVersion="1" MinorVersion="1"
IssueInstant="2006-01-09T11:33:48Z"
Recipient="10.17.246.43">
  <samlp:Status>
  <samlp:StatusCode Value="samlp:Success">
  </samlp:StatusCode>
  </samlp:Status>
    <saml:Assertion
     xmlns:saml="urn:oasis:names:tc:SAML:1.1:assertion"
     MajorVersion="1" MinorVersion="1"
     AssertionID="s1f3764242b274a835475d5433b8c62020a0e39a80"
     Issuer="dde280-3.france.sun.com:80"
     IssueInstant="2006-01-09T09:44:48Z" >
    <saml:Conditions NotBefore="2006-01-09T09:41:48Z" NotOnOrAfter="2006-01-09T09:51:48Z">
    </saml:Conditions>
<!-- statements go here -->
</saml:Assertion>
</samlp:Response>
```

Assertions

SAML assertions are a declaration of facts about a principal. For example, an assertion can be made that a particular client was granted update privileges to a specific database resource at a certain time. Assertions are constructed in XML based on the SAML assertion schema. Assertions are built from the user's session information and optional attribute information using the siteAttributeMapper class. For more information, see "PartnerSiteAttributeMapper Interface" on page 215.

Note – One assertion can contain many different statements made by the authority.

The SAML specification provides for different types of assertions:

- An *authentication assertion* declares that the specified subject has been authenticated by a particular means at a particular time. This information is declared within an AuthenticationStatement XML tag. In Access Manager, the Authentication Service is the authentication authority. The following code example illustrates a SAML assertion with an AuthenticationStatement.

  ```
  <?xml version="1.0" encoding="UTF-8" ?>
  <saml:Assertion xmlns:saml="urn:oasis:names:tc:SAML:1.0:assertion"
   MajorVersion="1" MinorVersion="0" AssertionID="random-182726"
   Issuer="sunserver.example.com" IssueInstant="2001-11-05T17:23:00GMT-02:00">
    <saml:AuthenticationStatement
       AuthenticationMethod="urn:oasis:names:tc:SAML:1.0:am:password"
       AuthenticationInstant="2001-11-05T17:22:00GMT-02:00">
          <saml:Subject>
  ```

```
                <saml:NameIdentifier
                 NameQualifier="example.com">John Doe
                </saml:NameIdentifier>
            </saml:Subject>
      </saml:AuthenticationStatement>
    </saml:Assertion>
```

- An *attribute assertion* declares that the specified subject is associated with the specified attribute. This information is declared within an `AttributeStatement` XML tag. The identity data store that is networked with Access Manager is the attribute authority. The following code example illustrates a SAML assertion with an `AttributeStatement`.

```
<?xml version="1.0" encoding="UTF-8" ?>
<saml:Assertion xmlns:saml="urn:oasis:names:tc:SAML:1.0:assertion"
 MajorVersion="1" MinorVersion="0" AssertionID="random-182726"
 Issuer="sunserver.example.com" IssueInstant="2001-11-05T17:23:00GMT-02:00">
  <saml:AttributeStatement>
   <saml:Subject>
     <saml:NameIdentifier NameQualifier="dc=example,dc=com">
      uid=amadmin,dc=example,dc=com</saml:NameIdentifier>
   </saml:Subject>
   <saml:Attribute AttributeName="sn" AttributeNamespace="urn:sun:fm:samples:saml:query">
   <saml:AttributeValue xmlns:saml="urn:oasis:names:tc:SAML:1.1:assertion">amadmin</saml:AttributeValue>
   </saml:Attribute>
   <saml:Attribute AttributeName="cn" AttributeNamespace="urn:sun:fm:samples:saml:query">
   <saml:AttributeValue xmlns:saml="urn:oasis:names:tc:SAML:1.1:assertion">amadmin</saml:AttributeValue>
   </saml:Attribute>
  </saml:AttributeStatement>
</saml:Assertion>
```

- An *authorization decision assertion* declares that the specified subject's request for access to a specified resource has been granted or denied. This information is declared within an `AuthorizationDecisionStatement` XML tag. In Access Manager, the Policy Service is the authorization authority.

Note – The OASIS Security Services (SAML) Technical Committee has recently frozen this query in favor of using the eXtensible Access Control Markup Language (XACML). Future versions of Access Manager will reflect this.

Profiles

A *profile* is a set of rules that defines how to embed and extract SAML assertions. The profile describes how the assertions are combined with other objects by an authority, transported from the authority, and subsequently processed at the trusted partner site. Access Manager supports two profiles: the Web Browser Artifact Profile and the Web Browser POST Profile. Both profiles use HTTP. Either can be used in single sign-on between two SAML-enabled entities, allowing an authenticated user to access resources from a trusted partner site. Each profile has its benefits:

- The Web Browser Artifact Profile requires less processing overhead because there is no assertion signing as there is in the Web Browser POST Profile.
- The Web Browser Artifact Profile works without browsers enabled with JavaScript technology. It is considered more secure than the Web Browser POST Profile.
- The Web Browser POST Profile does not require SOAP. This profile is more firewall-friendly and involves fewer steps and less server-side processing.

The profile methods can be initiated through a web browser or the SAML API. For more information about the API method, see "SAML API" on page 212. For more information, see the following sections:

- "Web Browser Artifact Profile" on page 194
- "Web Browser POST Profile" on page 196

Web Browser Artifact Profile

The Web Browser Artifact Profile defines interaction between three parties: a user equipped with a web browser, an authority site, and a trusted partner site. The SOAP communication should be either Basic Authentication or Client Certificate Authentication over SSL. Note that XML signing is a stronger alternative.

1. When an authenticated user attempts to access a trusted partner (generally by clicking a link), the user is directed to a transfer service at the authority site.

   In Access Manager, the transfer service is SAMLAwareServlet. The base of the transfer service URL is `http(s)://`*access-manager-host.domain*`:`*port*`/`*deploy-uri*`/SAMLAwareServlet`. The URL is appended with the location to which the user is requesting access (`?TARGET=`*URL-of-destination*).
2. SAMLAwareServlet receives the information and compares the SAML module's list of Trusted Partners against the user's `TARGET` location.

   Only targets that are configured in the Trusted Partners attribute of the SAML module are accessible. For more information about this attribute, see "Trusted Partners" on page 207.
3. Assuming the `TARGET` location was found in the list of Trusted Partners, SAMLAwareServlet looks for and validates the session token from the inbound request.

   Without a valid session token, Access Manager will not create an assertion.
4. Assuming a valid session token, SAMLAwareServlet creates an artifact and a corresponding assertion.

   An *artifact* is carried as part of the URL and points to an assertion and its source. An artifact is not (and does not contain) security information. The assertion contains the security information. For more information, see "`PartnerSiteAttributeMapper` Interface" on page 215.

   Note – The need to send an artifact rather than the assertion itself is dictated by the restrictions on URL size that are imposed by many web browsers.
5. SAMLAwareServlet redirects the user's browser to the Artifact Receiver URL with a query string that contains the artifact and the original `TARGET` location.

Note – In Access Manager, the Artifact Receiver URL and SAMLAwareServlet are the same. Other SAML implementations might not integrate the two functions.

6. At the Artifact Receiver URL, the artifact is extracted from the query string to locate the SOAP Receiver URL at the trusted partner site.

   The SAML API extracts the source ID from the artifact and uses it to locate the SOAP Receiver URL at the trusted partner site. For more information about the use of SOAP, see "SAML SOAP Receiver" on page 199.

7. A SOAP query that contains the artifact is sent to the SOAP Receiver URL at the trusted partner site that is requesting the assertion to which the artifact points.

8. The SOAP Receiver URL accepts the returned artifact query from the trusted partner site and responds by sending the correct assertion in a SOAP response.

9. The assertion is processed, mapping the user account information from the trusted partner site to the target site's user account.

   The user is either granted or denied access to the trusted partner site. If access is granted, a `SSOToken` is generated, a cookie is set to the browser, and the user is redirected to the `TARGET` location.

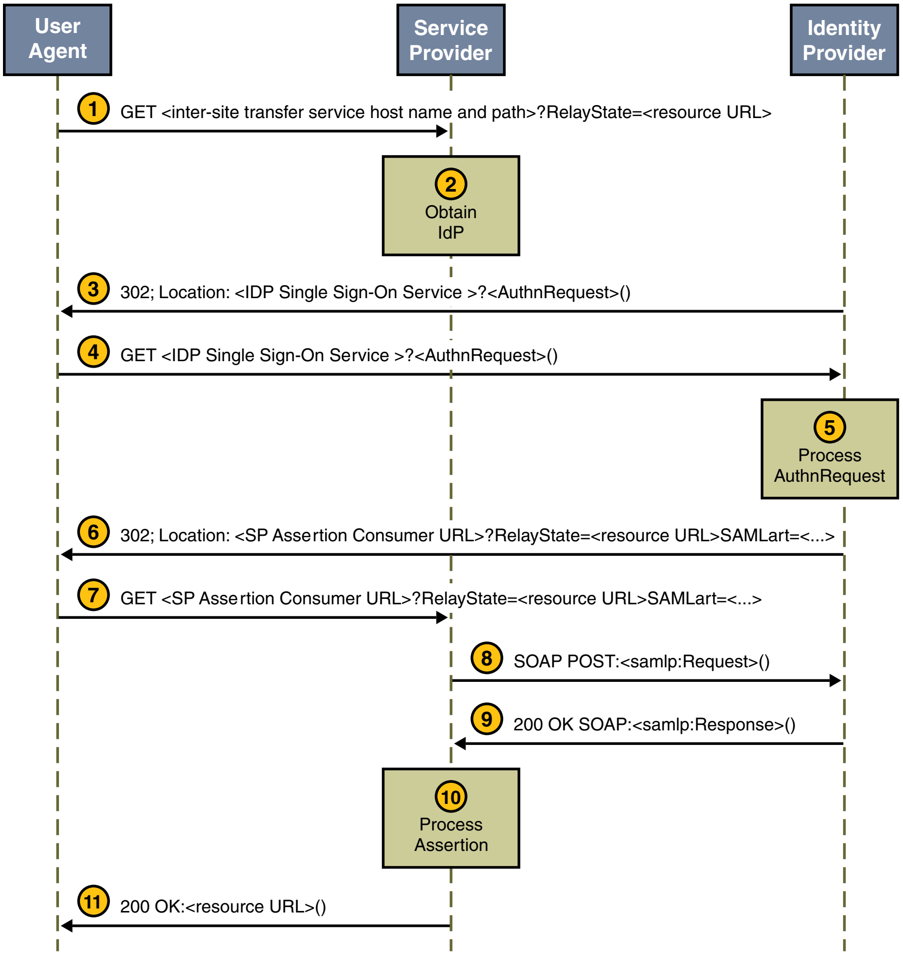

User Agent
Service Provider
Identity Provider
1 GET <inter-site transfer service host name and path>?RelayState=<resource URL>
2 Obtain IdP
3 302; Location: <IDP Single Sign-On Service >?<AuthnRequest>()
4 GET <IDP Single Sign-On Service >?<AuthnRequest>()
5 Process AuthnRequest
6 302; Location: <SP Assertion Consumer URL>?RelayState=<resource URL>SAMLart=<...>
7 GET <SP Assertion Consumer URL>?RelayState=<resource URL>SAMLart=<...>
8 SOAP POST:<samlp:Request>()
9 200 OK SOAP:<samlp:Response>()
10 Process Assertion
11 200 OK:<resource URL>()

FIGURE 10–2 Web Browser Artifact Profile Interactions

A sample has been provided to test the Web Browser Artifact Profile function. See “SAML Samples” on page 222 for more information.

Web Browser POST Profile

The Web Browser POST Profile allows security information to be supplied to a trusted partner site using the HTTP POST method (without the use of an artifact). This interaction consists of two parts. The first part is between a user with a web browser and Access Manager. The second part is between the same user and the trusted partner site. The content of the POST should be signed to ensure message integrity, and the method of transport should be SSL.

Note – The POST profile function is provided by either of two means: an HTTP request using SAMLPOSTProfileServlet, or an `SAMLClient` API call [`doWebPost()`] to a Java application.

- The first interaction of the Web Browser POST Profile is as follows:
  1. An authenticated user attempts to access a trusted partner site using a web browser (usually by clicking a link), and the user is redirected to a transfer service at the authority site.

     In Access Manager, the transfer service is SAMLPostProfileServlet. The base of the transfer service URL is `http(s)://`*access-manager-host.domain*`:`*port*`/`*deploy-uri*`/SAMLPOSTProfileServlet`. This URL is appended with the location to which the user is requesting access (`?TARGET=`*URL-of-destination*).

     Note – SAMLPostProfileServlet provides functions for both Web Browser POST Profile interactions.

  2. Access Manager obtains the `TARGET` location from the request and matches it against the trusted partners configured in the Trusted Partners attribute of the SAML module.

     For more information, see “Trusted Partners” on page 207.

  3. Access Manager generates an assertion using the `AssertionManager` class of the SAML API.

     For information about the `AssertionManager` class, see “`com.sun.identity.saml` Package” on page 212.

  4. Access Manager forms, signs, and Base64 encodes a `SAMLResponse` that contains the assertion.
  5. Access Manager generates an HTML form that contains both the `SAMLResponse` and the `TARGET` as parameters and posts the form as an HTTP response back to the user’s browser.
  6. The user’s browser is then directed to the location based on this information.
- The second interaction of the Web Browser POST Profile is as follows:
  1. The trusted partner site obtains the `TARGET` and `SAMLResponse` from the redirected request.
  2. The trusted partner site decodes the `SAMLResponse`, verifies the signature on the `SAMLResponse`, and obtains and verifies the SAML response.

     The trusted partner site also verifies the assertion inside the `SAMLResponse` and enforces single sign-on policy.

  3. Assuming a positive authentication, the trusted partner site obtains or creates an `SSOToken` and redirects the authenticated user to the `TARGET` location.

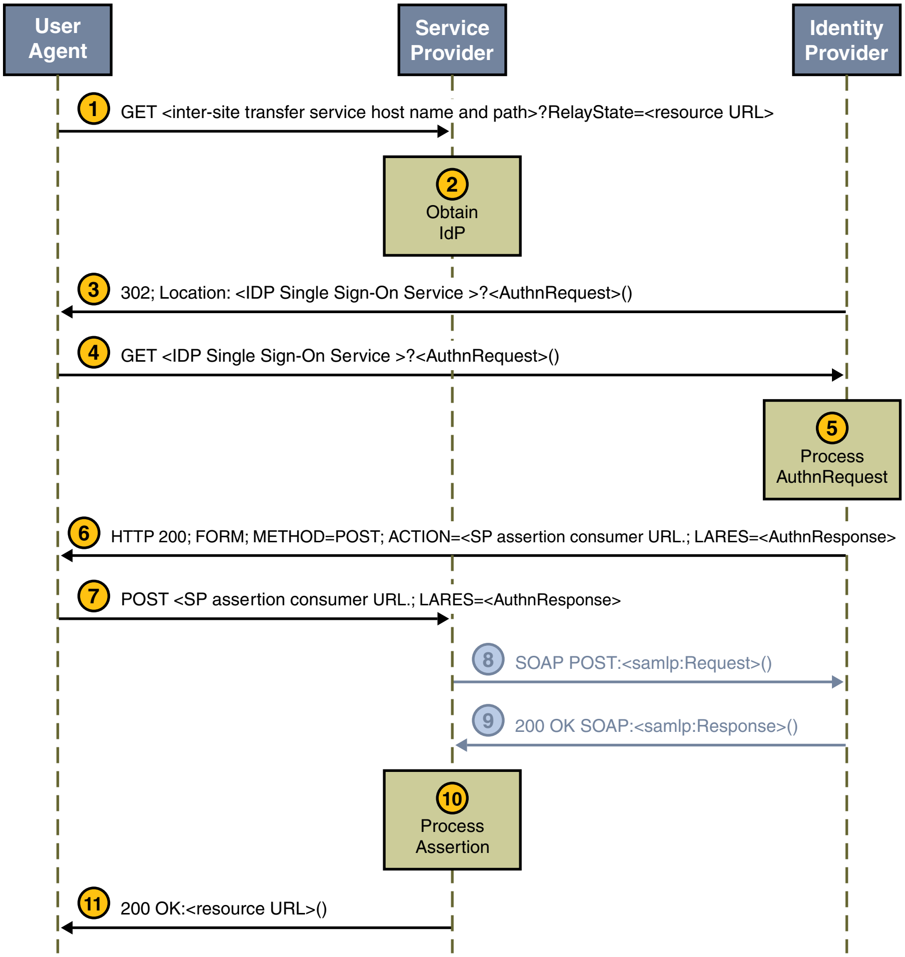

User Agent
Service Provider
Identity Provider
1 GET <inter-site transfer service host name and path>?RelayState=<resource URL>
2 Obtain IdP
3 302; Location: <IDP Single Sign-On Service >?<AuthnRequest>()
4 GET <IDP Single Sign-On Service >?<AuthnRequest>()
5 Process AuthnRequest
6 HTTP 200; FORM; METHOD=POST; ACTION=<SP assertion consumer URL.; LARES=<AuthnResponse>
7 POST <SP assertion consumer URL.; LARES=<AuthnResponse>
8 SOAP POST:<samlp:Request>()
9 200 OK SOAP:<samlp:Response>()
10 Process Assertion
11 200 OK:<resource URL>()

FIGURE 10–3 Web Browser POST Profile Interactions

A sample has been provided to test the Web Browser POST Profile function. See “SAML Samples” on page 222.

Single-Use Policy With POST Profile

According to the SAML specifications, the trusted partner site *must* ensure a single-use policy for SSO assertions that are communicated using the Web Browser POST Profile. SAMLPOSTProfileServlet maintains a store of SSO assertion identifiers and the time that they expire. When an assertion is received, the servlet first checks for an entry in the map. If an entry exists, the servlet returns an error. If an entry does not exist, the assertion identifier and expiration time are saved to the map. `POSTCleanUpThread` removes expired assertion identifiers periodically.

SAML SOAP Receiver

Assertions are exchanged between Access Manager and inquiring parties using the `<Request>` and `<Response>` XML constructs defined in the SAML specification. These SAML constructs are then integrated into SOAP messages for transport.

Note – A SAML `<Request>` can contain queries for authentication status, authorization decisions, attribute information, and one or more assertion identifier references or artifacts.

Access Manager uses SOAP, a message communications specification that integrates XML and HTTPS, to transport the SAML constructs. The request is received by SAML SOAP Receiver, a servlet that receives a SOAP message, extracts the SAML request, and responds with another SOAP message that contains the requested assertion. SAML SOAP Receiver responds to queries for authentication, attributes, or authorization decisions (including those that have an artifact) by returning assertions. The access URL for SAML SOAP Receiver is `http(s)://`*access-manager-host.domain*`:`*port*`/`*deploy-uri*`/SAMLSOAPReceiver`.

Note – SAML SOAP Receiver only supports the POST method.

SOAP Messages

SOAP messages consist of three parts: an envelope, header data, and a message body. The SAML `<Request>` and `<Response>` elements are enclosed in the message body. A client transmits a SAML `<Request>` element within the body of a SOAP message to an entity.

Note – The SAML API and the Java API for XML Messaging (JAXM) are used to construct SOAP messages and send them to SAML SOAP Receiver.

The following two samples illustrate a SOAP exchange for the "Web Browser Artifact Profile" on page 194. The first is a request for an authentication assertion.

EXAMPLE 10–1 SOAP Request for Authentication Assertion Using Web Browser Artifact Profile

```
POST /authn HTTP/1.1
Host: idp.example.com
Content-type: text/xml
Content-length: nnnn
<soap-env:Envelope
xmlns:soap-env="http://schemas.xmlsoap.org/soap/envelope/">
<soap-env:Header/>
<soap-env:Body>
<samlp:Request xmlns="urn:oasis:names:tc:SAML:1.0:protocol"
    xmlns:lib="http://projectliberty.org/schemas/core/2002/12"
    xmlns:saml="urn:oasis:names:tc:SAML:1.0:assertion"
    xmlns:samlp="urn:oasis:names:tc:SAML:1.0:protocol"
```

EXAMPLE 10–1 SOAP Request for Authentication Assertion Using Web Browser Artifact Profile *(Continued)*

```
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
IssueInstant="2002-12-12T10:08:56Z"
MajorVersion="1"
MinorVersion="0"
RequestID="e4d71c43-c89a-426b-853e-a2b0c14a5ed8"
id="ericssonb6dc3636-f2ad-42d1-9427-220f2cf70ec1"
xsi:type="lib:SignedSAMLRequestType">
<ds:Signature xmlns:ds="http://www.w3.org/2000/09/xmldsig#">
    <ds:SignedInfo>
        <ds:CanonicalizationMethod
            Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#">
        </ds:CanonicalizationMethod>
        <ds:SignatureMethod
            Algorithm="http://www.w3.org/2000/09/xmldsig#rsa-sha1">
        </ds:SignatureMethod>
        <ds:Reference URI="#ericssonb6dc3636-f2ad-42d1-9427-220f2cf70ec1">
            <ds:Transforms>
                <ds:Transform
                    Algorithm="http://www.w3.org/2000/09/xmldsig#enveloped-signature">
                </ds:Transform>
                <ds:Transform
                    Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#">
                </ds:Transform>
            </ds:Transforms>
            <ds:DigestMethod
                Algorithm="http://www.w3.org/2000/09/xmldsig#sha1">
            </ds:DigestMethod>
            <ds:DigestValue>+k6TnolGkIPKZlpUQVyok8dwkuE=</ds:DigestValue>
        </ds:Reference>
    </ds:SignedInfo>
    <ds:SignatureValue>
        wXJMVoPO1V1jFnWJPyOWqP5Gqm8A1+/2b5gNzF4L4LMu4yEcRtttLdPPT3bvhwkwHXjL9
        NuOFumQ5YEyiVzlNcjAxX0LfgwutvEdJb748IU4L+8obXPXfqTZLiBK1RbHCRmRvjlPIu
        22oGCV6EwuiWRvOD6Ox9svtSgFJ+iXkZQ
    </ds:SignatureValue>
    <ds:KeyInfo>
        <ds:X509Data>
        <ds:X509Certificate>
        MIIDMTCCApqgAwIBAgIBHDANBgkqhkiG9w0BAQQFADCBlTELMAkGA1UEBhMCVVMxCzAJB
        gNVBAcTAlNGMRkwFwYDVQQKExBMaWJlcnR5IEFsbGlhbmNlMRQwEgYDVQQLEwtJT1AgVG
        VzdGVyczEiMCAGA1UEAxMZTGliZXJ0eSBUZXN0ZXJzIENlcnRpZmllcjEkMCIGCSqGSIb
        3DQEJARYVcnJvZHJpZ3VlekBuZW9zb2wubmV0MB4XDTAyMTIwNDE1NTg0NFoXDTEyMTIw
        MTE1NTg0NFowgasxCzAJBgNVBAYTAlVTMQswCQYDVQQHEwJTRjEkMCIGA1UEChMbTGliZ
        XJ0eSBBbGxpYW5jZSBlcmljc3Nvbi1hMSYwJAYDVQQLEx1JT1AgVGVzdGVycyBlcmljc3
        Nvbi1hIHNpZ25lcjEXMBUGA1UEAxMOZXJpY3Nzb24tYS5pb3AxKDAmBgkqhkiG9w0BCQE
```

EXAMPLE 10–1 SOAP Request for Authentication Assertion Using Web Browser Artifact Profile *(Continued)*

```
            WGXJyb2RyaWd1ZXpAZXJpY3Nzb24tYS5pb3AwgZ8wDQYJKoZIhvcNAQEBBQADgY0AMIGJ
            AoGBAPUoGYvJxQc5jzDnJ14TV6TaTbB3fH95ju24Z0y6HQxm6gXdJSAoWh7/AIes4UcV0
            9DC2kKS6Vow2YoXt2LIyH9HWH2tEUt1jS/PUeBHEWcW3tFezM6jh5GG5rCuVPZaW9eoGU
            bFPSzOPFKUAwdHUXSDWufY1KZ93IxhOBeZgg6VAgMBAAGjeTB3MEoGCWCGSAGG+EIBDQQ
            9FjtUaGlzIHNpZ25pbmcgY2VydCB3YXMgY3JlYXRlZCBmb3IgdGVzdGluZy4gRG8gbm90
            IHRydXN0 IGl0LjAJBgNVHRMEAjAAMBEGCWCGSAGG+EIBAQQEAwIEMDALBgNVHQ8EBAMC
            BsAwDQYJKoZIhvcNAQEEBQADgYEAR/HSgBpAprQwQVyWDE9pCaiduKv4/W/+hrdpXlVKS
            r6TIlg4ouDCQJNos7tNuG9ZAbfWtHvCss51N2cfAzfns/DKqxRqcsxzL5ZUBksPpmsDob
            oopUv6Xm8RFsi7yB9AGaVuqObeY/+m70nOu03O+FlMN3U1k2E3rOKXlU1noC0
            </ds:X509Certificate>
            </ds:X509Data>
        </ds:KeyInfo>
    </ds:Signature>
<samlp:AssertionArtifact>
    AAM1uXw6+f+jyA/4XuFHqPl7QDvc/LIQL9+t7YQtG1Gwk9bph0Adl+o+
</samlp:AssertionArtifact>
</samlp:Request>
</soap-env:Body>
</soap-env:Envelope>
```

In response to the request, SAML SOAP Receiver must return either a <Response> element within the body of another SOAP message or a SOAP fault code (error message) for every request received. The following sample is a response that contains an authentication assertion.

EXAMPLE 10–2 SOAP Response to SOAP Request for Web Browser Artifact Profile

```
HTTP/1.1 200 OK
Content-Type: text/xml
Content-Length: nnnn
<soap-env:Envelope
    xmlns:soap-env="http://schemas.xmlsoap.org/soap/envelope/">
    <soap-env:Header/>
    <soap-env:Body>
        <samlp:Response
            xmlns:samlp="urn:oasis:names:tc:SAML:1.0:protocol"
            InResponseTo="RPCUk2ll+GVz+t1lLURp51oFvJXk"
            IssueInstant="2002-10-31T21:42:13Z"
            MajorVersion="1" MinorVersion="0"
            Recipient="http://localhost:8080/sp"
            ResponseID="LANWfL2xLybnc+BCwgY+p1/vIVAj">
            <samlp:Status>
                <samlp:StatusCode
                    xmlns:qns="urn:oasis:names:tc:SAML:1.0:protocol"
                    Value="qns:Success">
                </samlp:StatusCode>
```

EXAMPLE 10–2 SOAP Response to SOAP Request for Web Browser Artifact Profile *(Continued)*

```
</samlp:Status>
<saml:Assertion
    xmlns:saml="urn:oasis:names:tc:SAML:1.0:assertion"
    xmlns:ds="http://www.w3.org/2000/09/xmldsig#"
    xmlns:lib="http://projectliberty.org/schemas/core/2002/12"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    AssertionID="SqMC8Hs2vJ7Z+t4UiLSmhKOSUO0U"
    InResponseTo="RPCUk2ll+GVz+t1lLURp51oFvJXk"
    IssueInstant="2002-10-31T21:42:13Z"
    Issuer="http://host:8080/idp"
    MajorVersion="1" MinorVersion="0"
    xsi:type="lib:AssertionType">
    <saml:Conditions
        NotBefore="2002-10-31T21:42:12Z"
        NotOnOrAfter="2002-10-31T21:42:43Z">
        <saml:AudienceRestrictionCondition>
            <saml:Audience>http://localhost:8080/sp</saml:Audience>
        </saml:AudienceRestrictionCondition>
    </saml:Conditions>
    <saml:AuthenticationStatement
        AuthenticationInstant="2002-10-31T21:42:13Z"
        AuthenticationMethod="urn:oasis:names:tc:SAML:1.0:am:password"
        xsi:type="lib:AuthenticationStatementType">
        <saml:Subject xsi:type="lib:SubjectType">
            <saml:NameIdentifier>
                C9FfGouQdBJ7bpkismYgd8ygeVb3PlWK
            </saml:NameIdentifier>
            <saml:SubjectConfirmation>
                <saml:ConfirmationMethod>
                    urn:oasis:names:tc:SAML:1.0:cm:artifact-01
                </saml:ConfirmationMethod>
            </saml:SubjectConfirmation>
            <lib:IDPProvidedNameIdentifier>
                C9FfGouQdBJ7bpkismYgd8ygeVb3PlWK
            </lib:IDPProvidedNameIdentifier>
        </saml:Subject>
    </saml:AuthenticationStatement>
    <ds:Signature>
        <ds:SignedInfo>
            <ds:CanonicalizationMethod
                Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#">
            </ds:CanonicalizationMethod>
        <ds:SignatureMethod
            Algorithm="http://www.w3.org/2000/09/xmldsig#rsa-sha1">
        </ds:SignatureMethod>
        <ds:Reference URI="">
```

EXAMPLE 10–2 SOAP Response to SOAP Request for Web Browser Artifact Profile *(Continued)*

```
                    <ds:Transforms>
                    <ds:Transform
                    Algorithm="http://www.w3.org/2000/09/xmldsig#enveloped-signature">
                    </ds:Transform>
                    <ds:Transform
                    Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#">
                    </ds:Transform>
                    </ds:Transforms>
                    <ds:DigestMethod Algorithm="http://www.w3.org/2000/09/xmldsig#sha1">
                    </ds:DigestMethod>
                    <ds:DigestValue>ZbscbqHTX9H8bBftRIWlG4Epv1A=</ds:DigestValue>
                    </ds:Reference>
                </ds:SignedInfo>
                <ds:SignatureValue>
                    H+q3nC3jUalj1uKUVkcC4iTFClxeZQIFF0nvHqPS5oZhtkBaDb9qI
                    TA7gIkotaB584wXqTXwsfsuIrwT5uL3r85Rj7IF6NeCeiy3K0+z3u
                    ewxyeZPz8wna449VNm0qNHYkgNak9ViNCp0/ks5MAttoPo2iLOfaK
                    u3wWG6d1G+DM=
                </ds:SignatureValue>
            </ds:Signature>
        </saml:Assertion>
    </samlp:Response>
</soap-env:Body>
</soap-env:Envelope>
```

Note – The entities requesting and responding with SAML must not include more than one SAML request or response per SOAP message. They must also not include any additional XML elements in the SOAP body.

Protecting SAML SOAP Receiver

The Access Manager administrator has the option of protecting the SAML SOAP Receiver. The available methods are:

- `NOAUTH`
- `BASICAUTH`
- `SSL`
- `SSLWITHBASICAUTH`

This value is configured as a subattribute of the Trusted Partners attribute in the SAML module. The default authentication type is `NOAUTH`. If `SSL` authentication is to be specified, it is configured in the `SOAPUrl` field with the `https` protocol. For more information, see "Trusted Partners" on page 207.

▼ To Configure Access Manager for Basic Authentication

Basic authentication allows a provider originating a request to authenticate itself by transmitting a username and password. The credentials are presented in response to a challenge from the provider to which the request is being sent. You need to configure Access Manager to support basic authentication using the following procedure.

1 **In the Access Manager Console, click the Federation tab.**

2 **Under Federation, click the SAML tab.**

3 **Select New under the Trusted Partners attribute.**

4 **Select the Web Browser Artifact Profile (Artifact) under Source and click Next.**

5 **Type a value for the Source ID attribute.**

This is a 20–byte sequence (encoded using the Base64 format) that comes from the partner site. It is generally the same value as that used for the Site ID attribute when configuring "Site Identifiers" on page 206.

6 **Enter the SOAP Receiver URL for the site you are configuring as a value for the SOAP URL attribute.**

General information on SOAP endpoints is in "SAML SOAP Receiver" on page 199.

7 **Select `BASICAUTH` or `SSLWITHBASICAUTH` (if the endpoint is configured with Secure Sockets Layer) as the authentication type.**

8 **Enter a user identifier for the user on the partner side being used to protect their SOAP Receiver.**

9 **Enter and reenter the password associated with the user on the partner side being used to protect their SOAP Receiver.**

10 **Click Finish to complete the configuration.**

11 **Click Save to save the configuration.**

SAML Attributes

The SAML module is configured by applying values to its attributes. `amSAML.xml` is the XML service file that defines the attributes. All SAML attributes are *global* in that the values applied to them are carried across the Access Manager configuration and inherited by every organization defined in the instance of Access Manager.

Note – For more information on service files, see *Sun Java System Access Manager 7.1 Administration Guide*.

Most attributes in the SAML module can be configured either through the Access Manager Console or the XML service file. "amSAML.xml Attributes" on page 205 lists the attributes that can *only* be configured by modifying the amSAML.xml file. "Console Attributes" on page 205 lists the attributes that can be configured using the console or the XML service file.

amSAML.xml Attributes

The following attributes can *only* be configured through the amSAML.xml file using the amadmin command-line interface.

- iplanet-am-saml-cleanup-interval is used to specify how often the internal thread is run to clean up expired assertions from the internal data store. The default is 180 seconds.
- iplanet-am-saml-assertion-max-number is used to specify the maximum number of assertions that the server can hold at one time. No new assertion is created if the maximum number is reached. The default value is 0, which means no limit.

▼ To Modify Attributes in the amSAML.xml File

1 **Duplicate the amSAML.xml service file and make any changes to the attributes.**

2 **Remove the old amSAML.xml service file.**

3 **Use amadmin to reload the newly modified amSAML.xml file.**

For more information on amadmin, see the *Sun Java System Access Manager 7.1 Administration Guide*.

Console Attributes

The following SAML attributes can be configured by using the Access Manager Console or by modifying amSAML.xml as described in "amSAML.xml Attributes" on page 205. When viewed using the Console, the SAML attributes are separated into the following groups:

- "Properties Group" on page 206
- "Assertion" on page 210
- "Artifact" on page 211
- "Signing" on page 211

Properties Group

The attributes in the Properties group are as follows:

- "Target Specifier" on page 206
- "Site Identifiers" on page 206
- "Trusted Partners" on page 207
- "Target URLs" on page 210

Target Specifier

This attribute assigns a name to the destination site URL value that is used in the redirects discussed in "Profiles" on page 193. The default is `TARGET`. Only sites configured in the Trusted Partners attribute can be specified as a `TARGET`. For information, see "Trusted Partners" on page 207.

Site Identifiers

This attribute defines any site that is hosted by the server on which Access Manager is installed. A default value is defined for the host during installation (with values retrieved from `AMConfig.properties`), and a Site ID is automatically generated. Multiple entries are possible (for example, load balancing or multiple instances of Access Manager sharing the same Directory Server) although the default site identifier should always remain an entry.

Note – If configuring SAML for SSL (in both the source and destination site), ensure that the protocol defined in the Instance ID attribute is `HTTPS//`.

▼ To Configure a Site Identifier

You may also edit or duplicate entries already listed.

1. **In the Access Manager Console, click the Federation tab.**

2. **Under Federation, click the SAML tab.**

3. **Select New under the Site Identifiers attribute.**

4. **Enter values for the following attributes:**

   Instance ID

   The value of this property is *protocol*`://`*host*`:`*port*.

   Site ID

   This identifier is generated for each site, although the value will be the same for multiple servers behind a load balancer. To obtain this identifier manually, type the following at the command line:

   ```
   % #java -classpath AM-classpath \ com.sun.identity.saml.common.SAMLSiteID
   \protocol://host:port
   ```

For more information, see "`com.sun.identity.saml.common` Package" on page 213.

Issuer Name
The value of this property is *host*:*port*.

5 **Click OK.**

Trusted Partners

This attribute defines any trusted partner (remote to the server on which Access Manager is installed) that will be communicating with Access Manager.

Note – The trusted partner site must have a prearranged trust relationship with one or more of the sites configured in "Site Identifiers" on page 206.

Before configuring a trusted partner, you must determine the partner's role in the trust relationship. A trusted partner can be a *source site* (one that generates a single sign-on assertion) or a *destination site* (one that receives a single sign-on assertion). Following is the procedure for configuring a trusted partner.

▼ To Configure a Trusted Partner

The Trusted Partners attribute can contain one or more entries. Each entry is configured based on the site's defined role. For example, if the partner is the source site, this attribute is configured based on how it will send assertions. If the partner is the destination site, this attribute is configured based on which profile it uses to receive assertions.

1 **In the Access Manager Console, click the Federation tab.**

2 **Under Federation, click the SAML tab.**

3 **Select New under the Trusted Partners attribute.**

4 **Select the role (Destination or Source) of the partner site that you are configuring by checking the appropriate profiles used to communicate with it and click Next.**

Select Web Browser Artifact Profile or Web Browser Post Profile for either Destination, Source, or both, or SOAP Query for Source. The choices made dictate which of the attributes in the following steps need to be configured.

5 **Type values for the Common Settings subattributes based on the selected roles.**

Source ID
This is a 20–byte sequence (encoded using the Base64 format) that comes from the partner site. It is generally the same value as that used for the Site ID attribute when configuring "Site Identifiers" on page 206.

Target
: This is the domain of the partner site (with or without a port number). If you want to contact a web page that is hosted in this domain, the redirect URL is picked up from the values defined in "Trusted Partners" on page 207.

Note – If there are two defined entries for the same domain (one containing a port number and one without a port number), the entry with the port number takes precedence. For example, assume the following two trusted partner definitions: `target=sun.com` and `target=sun.com:8080`. If the principal is seeking `http://machine.sun.com:8080/index.html`, the second definition will be chosen.

Site Attribute Mapper

The class is used to return a list of attribute values defined as `AttributeStatements` elements in an Authentication Assertion. A site attribute mapper needs to be implemented from the com.sun.identity.saml.plugins.PartnerSiteAttributeMapper interface.

If no class is defined, no attributes will be included in the assertion. For more information, see "`PartnerSiteAttributeMapper` Interface" on page 215.

Version

The SAML version used (`1.0` or `1.1`) to send SAML requests. If this parameter is not defined, the following default values (defined in `AMConfig.properties`) are used:

- `com.example.identity.saml.assertion.version=1.1`
- `com.example.identity.saml.protocol.version=1.1`

Account Mapper

The class that defines how the subject of an assertion is related to an identity at the destination site. The default is `com.sun.identity.saml.plugins.DefaultAccountMapper`. An account mapper needs to be implemented from one of the included interfaces:

- `com.sun.identity.saml.plugins.AccountMapper`
- `com.sun.identity.saml.plugins.PartnerAccountMapper`

If no class is defined, no attributes will be included in the assertion. For more information, see "`PartnerAccountMapper` Interface" on page 214.

Certificate

A certificate alias that is used to verify the signature in an assertion when it is signed by the partner and the certificate cannot be found in the `KeyInfo` portion of the signed assertion.

Host List

A list of the IP addresses, the DNS host name, or the `Certificate` name for all hosts within the partner site that can send requests to this authority. This list helps to ensure that the requestor is indeed the intended receiver of the artifact. If the requester is defined in this list, the interaction will continue. If the requester's information does not match any hosts defined in the host list, the request will be rejected.

Issuer

The creator of a generated assertion. The default syntax is *hostname*:*port*.

6 Type values for the Destination subattributes.

Artifact: SAML URL

The URL that points to the servlet that implements the Web Browser Artifact Profile. See “Web Browser Artifact Profile” on page 194.

Post: Post URL

The URL that points to the servlet that implements the Web Browser POST Profile. See “Web Browser POST Profile” on page 196.

SOAP Query: Attribute Mapper

The class that is used to obtain single sign-on information from a query. You need to implement an attribute mapper from the included interface. If no class is specified, the `DefaultAttributeMapper` will be used. For more information, see “`com.sun.identity.saml.plugins` Package” on page 213.

SOAP Query: Action Mapper

The class that is used to get single sign-on information and map partner actions to Access Manager authorization decisions. You need to implement an action mapper from the included interface. If no class is specified, the `DefaultActionMapper` will be used. For more information, see “`com.sun.identity.saml.plugins` Package” on page 213.

7 Type values for the Source subattributes.

Artifact: SOAP URL

The URL to the SAML SOAP Receiver. See “SAML SOAP Receiver” on page 199.

Authentication Type

Authentication types that can be used with SAML:

- `NOAUTH`
- `BASICAUTH`
- `SSL`
- `SSLWITHBASICAUTH`

This attribute is optional. If not specified, the default is `NOAUTH`. If `BASICAUTH` or `SSLWITHBASICAUTH` is specified, the Trusted Partners attribute is required and should be `HTTPS`. For more information, see “Trusted Partners” on page 207.

User

When Basic Authentication is chosen as the Authentication Type, the value of this attribute defines the user identifier of the partner being used to protect the partner’s SOAP receiver.

User’s Password

When Basic Authentication is chosen as the Authentication Type, the value of this attribute defines the password for the user identifier of the partner being used to protect the partner’s SOAP receiver.

User’s Password (reenter)

Reenter the password defined previously.

8 Click Finish to complete the configuration.

Target URLs

If the TARGET URL received through either profile is listed as a value of this attribute, the assertions received will be sent to the TARGET URL using an HTTP FORM POST.

Caution – Do not use test URLs or any other additional URLs in a POST.

To configure this attribute, type values for the following subattributes:

Protocol
Choose either `http` or `https`.

Server Name
The name of the server on which the TARGET URL resides, such as `www.sun.com`.

Port
The port number, such as `58080`.

Path
The URI, such as `/amserver/console`.

Assertion

The attributes in the Assertion group are as follows:

- "Assertion Timeout" on page 210
- "Assertion Skew Factor For notBefore Time" on page 210

Assertion Timeout

This attribute specifies the number of seconds before a timeout occurs on an assertion. The default is 420.

Assertion Skew Factor For notBefore Time

This attribute is used to calculate the `notBefore` time of an assertion. For example, if `IssueInstant` is `2002-09024T21:39:49Z`, and `Assertion Skew Factor For notBefore Time` is set to 300 seconds (180 is the default value), the `notBefore` attribute of the conditions element for the assertion would be `2002-09-24T21:34:49Z`.

Note – The total valid duration of an assertion is defined by the values set in both the `Assertion Timeout` and `Assertion Skew Factor For notBefore Time` attributes.

Artifact

The attributes in the Artifact group are as follows:

- "Artifact Timeout" on page 211
- "SAML Artifact Name" on page 211

For more information about artifacts, see "Web Browser Artifact Profile" on page 194.

Artifact Timeout

This attribute specifies the period of time an assertion that is created for an artifact will be valid. The default is 400.

SAML Artifact Name

This attribute assigns a variable name to a SAML artifact. The artifact is bounded-size data that identifies an assertion and a source site. It is carried as part of a URL query string and conveyed by redirection to the destination site. The default name is `SAMLart`. Using the default `SAMLart`, the redirect query string could be `http://`*host:port*`/`*deploy-URI*`/SamlAwareServlet?TARGET=`*target-URL*`/&SAMLart=artifact123`.

Signing

The attributes in the Signing group are as follows:

- "Sign SAML Assertion" on page 211
- "Sign SAML Request" on page 211
- "Sign SAML Response" on page 211

Sign SAML Assertion

This attribute specifies whether all SAML assertions will be digitally signed (`XML DSIG`) before being delivered. Selecting the check box enables this feature.

Sign SAML Request

This attribute specifies whether all SAML requests will be digitally signed (`XML DSIG`) before being delivered. Selecting the check box enables this feature.

Sign SAML Response

This attribute specifies whether all SAML responses will be digitally signed (`XML DSIG`) before being delivered. Selecting the check box enables this feature.

Note – All SAML responses used by the Web Browser POST Profile are digitally signed whether or not this feature is enabled.

SAML API

Access Manager contains a SAML API that consists of several Java packages. Administrators can use these packages to integrate the SAML functionality and XML messages into their applications and services. The API supports all types of assertions and operates with the Access Manager authorities to process external SAML requests and generate SAML responses. The packages include the following:

- "com.sun.identity.saml Package" on page 212
- "com.sun.identity.saml.assertion Package" on page 213
- "com.sun.identity.saml.common Package" on page 213
- "com.sun.identity.saml.plugins Package" on page 213
- "com.sun.identity.saml.protocol Package" on page 215
- "com.sun.identity.saml.xmlsig Package" on page 217

For more detailed information, including methods and their syntax and parameters, see the Java API reference in /*AccessManager-base*/SUNWam/docs or on docs.sun.com.

com.sun.identity.saml Package

This package contains the AssertionManager and SAMLClient classes.

AssertionManager Class

The AssertionManager class provides interfaces and methods to create and get assertions, authentication assertions, and assertion artifacts. This class is the connection between the SAML specification and Access Manager. Some of the methods include the following:

- createAssertion creates an assertion with an authentication statement based on an Access Manager SSO Token ID.
- createAssertionArtifact creates an artifact that references an assertion based on an Access Manager SSO Token ID.
- getAssertion returns an assertion based on the given parameter (given artifact, assertion ID, or query).

SAMLClient Class

The SAMLClient class provides methods to execute either the Web Browser Artifact Profile or the Web Browser POST Profile from within an application as opposed to a web browser. Its methods include the following:

- getAssertionByArtifact returns an assertion for a corresponding artifact.
- doWebPOST executes the Web Browser POST Profile.
- doWebArtifact executes the Web Browser Artifact Profile.

com.sun.identity.saml.assertion Package

This package contains the classes needed to create, manage, and integrate an XML assertion into an application. The following code example illustrates how to use the Attribute class and getAttributeValue method to retrieve the value of an attribute. From an assertion, call the getStatement() method to retrieve a set of statements. If a statement is an attribute statement, call the getAttribute() method to get a list of attributes. From there, call getAttributeValue() to retrieve the attribute value.

EXAMPLE 10–3 Sample Code to Obtain an Attribute Value

```
// get statement in the assertion
Set set = assertion.getStatement();
//assume there is one AttributeStatement
//should check null& instanceof
AttributeStatement statement = (AttributeStatement) set.iterator().next();
List attributes = statement.getAttribute();
// assume there is at least one Attribute
Attribute attribute = (Attribute) attributes.get(0);
List values = attribute.getAttributeValue();
```

com.sun.identity.saml.common Package

This package defines classes common to all SAML elements, including site ID, issuer name, and server host. The package also contains all SAML-related exceptions.

com.sun.identity.saml.plugins Package

Access Manager provides service provider interfaces (SPIs), three of which have default implementations. The default implementations of these SPIs can be altered, or brand new ones written, based on the specifications of a particular customized service. The implementations are then used to integrate SAML into the custom service. Currently, the package includes the following interfaces:

- "ActionMapper Interface" on page 214
- "AttributeMapper Interface" on page 214
- "NameIdentifierMapper Interface" on page 214
- "PartnerAccountMapper Interface" on page 214
- "PartnerSiteAttributeMapper Interface" on page 215

ActionMapper Interface

ActionMapper is an interface used to obtain single sign-on information and to map partner actions to Access Manager authorization decisions. A default action mapper is provided if no other implementation is defined.

AttributeMapper Interface

AttributeMapper is an interface used in conjunction with an AttributeQuery class When a site receives an attribute query, this mapper obtains the SSOToken or an assertion (containing an authentication statement) from the query. The retrieved information is used to convert the attributes in the query to the corresponding Access Manager attributes. A default attribute mapper is provided if no other implementation is defined.

For more information, see “AttributeQuery Class” on page 215.

NameIdentifierMapper Interface

NameIdentifierMapper is an interface that can be implemented by a site to map a user account to a name identifier in the subject of a SAML assertion. The implementation class is specified when configuring the site's Trusted Partners.

PartnerAccountMapper Interface

⚠ **Caution –** The AccountMapper interface has been deprecated. Use the PartnerAccountMapper interface.

The PartnerAccountMapper interface needs to be implemented by each partner site. The implemented class maps the partner site's user accounts to user accounts configured in Access Manager for purposes of single sign-on. For example, if single sign-on is configured from site A to site B, a site-specific account mapper can be developed and defined in the Trusted Partners sub-attribute of site B's Trusted Partners profile. When site B processes the assertion received, it locates the corresponding account mapper by retrieving the source ID of the originating site. The PartnerAccountMapper takes the whole assertion as a parameter, enabling the partner to define user account mapping based on attributes inside the assertion. The default implementation is com.sun.identity.saml.plugin.DefaultAccountMapper. If a site-specific account mapper is not configured, this default mapper is used.

Note – Turning on the Debug Service in the AMConfig.properties file logs additional information about the account mapper, for example, the user name and organization to which the mapper has been mapped. For more information about the AMConfig.properties file, see the *Sun Java System Access Manager 7.1 Developer's Guide*.

PartnerSiteAttributeMapper **Interface**

Caution – The SiteAttributeMapper interface has been deprecated. Use the PartnerSiteAttributeMapper interface.

The PartnerSiteAttributeMapper interface needs to be implemented by each partner site. The implemented class defines a list of attributes to be returned as elements of the AttributeStatements in an authentication assertion. By default, when Access Manager creates an assertion and no mapper is specified, the authentication assertion only contains authentication statements. If a partner site wants to include attribute statements, it needs to implement this mapper which would be used to obtain attributes, create the attribute statement, and insert the statement inside the assertion.

▼ How to Set Up a PartnerSiteAttributeMapper

1. **Implement a customized class based on the** PartnerSiteAttributeMapper **interface.**

   This class will include user attributes in the SAML authentication assertion.

2. **Log in to the Access Manager console to configure the class in the Site Attribute Mapper attribute of the Trusted Partner configuration.**

   See "Trusted Partners" on page 207 for more information.

com.sun.identity.saml.protocol **Package**

This package contains classes that parse the request and response XML messages used to exchange assertions and their authentication, attribute, or authorization information.

AuthenticationQuery **Class**

The AuthenticationQuery class represents a query for an authentication assertion. When an identity attempts to access a trusted partner web site, a SAML request with an AuthenticationQuery inside is directed to the authority site.

The Subject of the AuthenticationQuery must contain a SubjectConfirmation element. In this element, ConfirmationMethod needs to be set to urn:com:sun:identity, and SubjectConfirmationData needs to be set to the SSOToken ID of the Subject. If the Subject contains a NameIdentifier, the value of the NameIdentifier should be the same as the one in the SSOToken.

AttributeQuery **Class**

The AttributeQuery class represents a query for an identity's attributes. When an identity attempts to access a trusted partner web site, a SAML request with an AttributeQuery is directed to the authority site.

You can develop an attribute mapper to obtain an SSOToken, or an assertion that contains an AuthenticationStatement from the query. If no attribute mapper for the querying site is defined, the DefaultAttributeMapper will be used. To use the DefaultAttributeMapper, the query should have either the SSOToken or an assertion that contains an AuthenticationStatement in the SubjectConfirmationData element. If an SSOToken is used, the ConfirmationMethod must be set to urn:com:sun:identity:. If an assertion is used, the assertion should be issued by the Access Manager instance processing the query or a server that is trusted by the Access Manager instance processing the query.

Note – In the DefaultAttributeMapper, a subject's attributes can be queried using another subject's SSOToken if the SSOToken has the privilege to retrieve the attributes.

For a query using the DefaultAttributeMapper, any matching attributes found will be returned. If no AttributeDesignator is specified in the AttributeQuery, all attributes from the services defined under the userServiceNameList in amSAML.properties will be returned. The value of the userServiceNameList property is user service names separated by a comma.

AuthorizationDecisionQuery **Class**

The AuthorizationDecisionQuery class represents a query about a principal's authority to access protected resources. When an identity attempts to access a trusted partner web site, a SAML request with an AuthorizationDecisionQuery is directed to the authority site.

You can develop an ActionMapper to obtain the SSOToken ID and retrieve the authentication decisions for the actions defined in the query. If no ActionMapper for the querying site is defined, the DefaultActionMapper will be used. To use the DefaultActionMapper, the query should have the SSOToken ID in the SubjectConfirmationData element of the Subject. If the SSOToken ID is used, the ConfirmationMethod must be set to urn:com:sun:identity:. If a NameIdentifier is present, the information in the SSOToken must be the same as the information in the NameIdentifier.

Note – When using web agents, the DefaultActionMapper handles actions in the namespace urn:oasis:names:tc:SAML:1.0:ghpp only. Web agents serve the policy decisions for this action namespace.

The authentication information can also be passed through the Evidence element in the query. Evidence can contain an AssertionIDReference, an assertion containing an AuthenticationStatement issued by the Access Manager instance processing the query, or an assertion issued by a server that is trusted by the Access Manager instance processing the query. The Subject in the AuthenticationStatement of the Evidence element should be the same as the one in the query.

Note – Policy conditions can be passed through `AttributeStatements` of assertion(s) inside the `Evidence` of a query. If the value of an attribute contains a TEXT node only, the condition is set as `attributeName=attributeValueString`. Otherwise, the condition is set as `attributename=attributeValueElement`.

The following example illustrates one of many ways to form an authorization decision query that will return a decision.

EXAMPLE 10–4 AuthorizationDecisionQuery Code Sample

```
// testing getAssertion(authZQuery): no SC, with ni, with
// evidence(AssertionIDRef, authN, for this ni):
    String nameQualifier = "dc=iplanet,dc=com";
    String pName = "uid=amadmin,ou=people,dc=iplanet,dc=com";
    NameIdentifier ni = new NameIdentifier(pName, nameQualifier);
    Subject subject = new Subject(ni);
    String actionNamespace = "urn:test";
    // policy should be added to this resource with these
    // actions for the subject
    Action action1 = new Action(actionNamespace, "GET");
    Action action2 = new Action(actionNamespace, "POST");
    List actions = new ArrayList();
    actions.add(action1);
    actions.add(action2);
    String resource = "http://www.sun.com:80";
    eviSet = new HashSet();
    // this assertion should contain authentication assertion for
    // this subject and should be created by a trusted server
    eviSet.add(eviAssertionIDRef3);
    evidence = new Evidence(eviSet);
    authzQuery = new AuthorizationDecisionQuery(eviSubject1, actions,
                        evidence, resource);
    try {
        assertion = am.getAssertion(authzQuery, destID);
    } catch (SAMLException e) {
        out.println("--failed. Exception:" + e);
    }
```

`com.sun.identity.saml.xmlsig` Package

All SAML assertions, requests, and responses can be signed using this signature package. It contains SPI that are implemented to plug in proprietary XML signatures. This package contains classes needed to sign and verify using XML signatures. By default, the keystore provided with the Java Development Kit is used and the key type is DSA. The configuration properties for this functionality are in the AMConfig.properties file. For information about these properties, see the *Sun Java System Access Manager 7.1 Developer's Guide*. For details on how to use the signature functionality, see "SAML Samples" on page 222.

SAML Operations

This section contains procedures illustrating how to use the Access Manager SAML Service. They are:

- "Setting Up SAML Single Sign-on" on page 218

Setting Up SAML Single Sign-on

The following procedures explain how to configure and access instances of Access Manager for single sign-on using SAML 1.x assertions. Machine A (exampleA.com) is the source site which authenticates the user and creates the SAML authentication assertion. Machine B (exampleB.com) is the destination site which consumes the assertion and generates a SSOToken for the user.

Note – If both machines are in the same domain, the cookie names must be different. You can change the cookie name by modifying the com.iplanet.am.cookie.name property in AMConfig.properties, located in /etc/opt/SUNWam/config/.

This section contains the following procedures:

- "To Set Up SAML Single Sign-on" on page 218
- "To Verify the SAML Single Sign-on Configurations" on page 221

▼ To Set Up SAML Single Sign-on

This procedure assumes the following values:

Deployment URI	amserver
Port	58080
Protocol	http

1 **Write down or copy the value of the Site ID attribute from the destination site (machine B).**

   a. **Login to the Access Manager console running at exampleB.com as the default administrator, amadmin.**

   b. **Click the Federation tab.**

   c. **Click the SAML tab.**

d. **Click the sole entry listed under Site Identifiers.**

   This takes you to the *Edit site identifier* page.

e. **Write down or copy the value of the Site ID attribute.**

f. **Click Cancel.**

g. **Log out of this instance of Access Manager.**

2 **Configure the source site (machine A) to trust the destination site (machine B) AND write down or copy the value of the Site ID attribute from the source site.**

a. **Login to the Access Manager console running at** `exampleA.com` **as the default administrator,** `amadmin`**.**

b. **Click the Federation tab.**

c. **Click the SAML tab.**

d. **Click New under Trusted Partners.**

   This takes you to the *Select trusted partner type and profile* page.

e. **Check Artifact and Post under Destination and click Next.**

   This takes you to the *Add New Trusted Partner* page.

f. **Set the values of the following attributes to configure machine B as a trusted partner of machine A:**

Source ID	Type the Site ID copied from the destination site, machine B, in the previous step.
Target	The value of this attribute contains the host's domain or domain with port. Do not include the accompanying protocol. For example, `exampleB.com` and `exampleB.com:58080` are valid but, `http://exampleB.com:58080`.
SAML URL	`http://exampleB.com:58080/amserver/SAMLAwareServlet`
HOST LIST	`exampleB.com`
POST URL	`http://exampleB.com:58080/amserver/SAMLPOSTProfileServlet`

g. **Click Finish.**

h. **Click Save.**

- i. **Click the sole entry listed under Site Identifiers.**

  This takes you to the *Edit site identifier* page.

- j. **Write down or copy the value of the Site ID attribute.**

- k. **Click Cancel to go to previous page.**

- l. **Log out of Access Manager.**

3 **Configure the destination site (machine B) to trust the source site (machine A).**

- a. **Login to the Access Manager console running at `exampleB.com` as the default administrator, `amadmin`.**

- b. **Click the top-level realm under Access Control.**

- c. **Click the Authentication tab.**

- d. **Click New under Module Instances.**

- e. **Type a value in the Name field.**

- f. **Select the SAML radio button and click OK.**

- g. **Click Save.**

- h. **Click Access Control in the upper left corner.**

- i. **Click the Federation tab.**

- j. **Click the SAML tab.**

- k. **Click New under Trusted Partners.**

  This takes you to the *Select trusted partner type and profile* page.

- l. **Check Artifact and Post under Source and click Next.**

  This takes you to the *Add New Trusted Partner* page.

- m. **Set the values of the following attributes to configure machine A as a trusted partner of machine B:**

Source ID	Type the Site ID you copied from the source site, machine A, in the previous step.

SOAP URL	`http://exampleA.com:58080/amserver/SAMLSOAPReceiver`
Issuer	`exampleA.com:58080`

Note – If machine B uses `https`, check SSL under Authentication Type. Be sure to modify the protocol in the other attributes as necessary.

---

n. **Click Finish.**

o. **Click Save.**

p. **Log out of Access Manager.**

▼ To Verify the SAML Single Sign-on Configurations

1 **Login to the Access Manager console running at `exampleA.com` as the default administrator, `amadmin`.**

2 **To initialize single sign-on from machine A, do one of the following:**

- **Access the following URL to use the SAML Artifact profile:**

  `http://exampleA.com:58080/amserver/SAMLAwareServlet?`
  `TARGET=`*exampleB.com_Target_URL*

- **Access the following URL to use the SAML POST profile:**

  `http://exampleA.com:58080/amserver/SAMPOSTProfileServlet?`
  `TARGET=`*exampleB.com_Target_URL*

Note – XML signing must be enabled before running the SAML POST profile. See "Signing Liberty ID-FF Requests and Responses" on page 108 for details.

---

exampleB.com_Target_URL is any URL on the `exampleB.com` site to which the user will be redirected after a successful single sign-on. For testing purpose, this could be the login page as in `TARGET=http://exampleB.com:58080/amserver/UI/Login`. If the administrator successfully accesses the Access Manager console on the destination site without manual authentication, we know that an `SSOtoken` has been created for the principal on the destination site and single sign-on has been properly established.

SAML Samples

You can access several SAML-based samples from the Access Manager installation in `/`*AccessManager-base*`/SUNWam/samples/saml`. These samples illustrate how the SAML service can be used in different ways, including the following:

- A sample that serves as the basis for using the SAML client API. This sample is located in `/`*AccessManager-base*`/SUNWam/samples/saml/client`.
- A sample that illustrates how to form a Query, write an `AttributeMapper`, and send and process a SOAP message using the SAML SDK. This sample is located in `/`*AccessManager-base*`/SUNWam/samples/saml/query`.
- A sample application for achieving SSO using either the Web Browser Artifact Profile or the Web Browser POST Profile. This sample is located in `/`*AccessManager-base*`/SUNWam/samples/saml/sso`.
- A sample that illustrates how to use the XMLSIG API and explains how to configure for XML signing. This sample is located in `/`*AccessManager-base*`/SUNWam/samples/saml/xmlsig`.

Each sample includes a README file with information and instructions on how to use it.

CHAPTER 11

Application Programming Interfaces

Sun Java System Access Manager provides a framework for identity federation and creating, discovering, and consuming identity web services. This framework includes a graphical user interface for Liberty-based web services as well as application programming interfaces (APIs). This chapter provides information on the APIs that do not have a corresponding graphical user interface (GUI).

This chapter covers the following topics:

- "Public Interfaces" on page 223
- "Common Service Interfaces" on page 225
- "Common Security API" on page 227
- "Interaction Service" on page 229
- "PAOS Binding" on page 232

Public Interfaces

The following list describes the public APIs you can use to deploy Liberty-enabled components or extend the core services. Packages that are part of a web service that has a GUI are described in the corresponding chapters of this book. Packages that are used solely on the back end are described in this chapter. Links to those sections are also provided. For more information, including methods and their syntax and parameters, see the Java API Reference in /*AccessManager-base*/SUNWam/docs or on docs.sun.com.

TABLE 11–1 Access Manager Public APIs

Package Name	Description
com.sun.identity.federation.plugins	Provides interfaces which can be implemented to allow applications to customize their actions before and after invoking the federation protocols. See Chapter 3.

TABLE 11–1 Access Manager Public APIs *(Continued)*

Package Name	Description
`com.sun.identity.federation.services`	Provides interfaces for writing custom plug-ins that can be used during the federation or single sign-on process. See Chapter 3.
`com.sun.identity.liberty.ws.authnsvc`	Provides classes to manage the Authentication Web Service. See Chapter 6.
`com.sun.identity.liberty.ws.authnsvc.mechanism`	Provides an interface to process incoming Simple Authentication and Security Layer (SASL) requests and generate SASL responses for the different SASL mechanisms. See Chapter 6.
`com.sun.identity.liberty.ws.authnsvc.protocol`	Provides classes to manage the Authentication Web Service protocol. See Chapter 6.
`com.sun.identity.liberty.ws.common`	Defines common classes used by many of the Access Manager Liberty-based web service components. See “Common Service Interfaces” on page 225.
`com.sun.identity.liberty.ws.common.wsse`	Provides an interface to parse and create an X.509 Certificate Token Profile. See “Common Service Interfaces” on page 225.
`com.sun.identity.liberty.ws.disco`	Provides interfaces to manage the Discovery Service. See Chapter 8.
`com.sun.identity.liberty.ws.disco.plugins`	Provides a plug-in interface for the Discovery Service. See Chapter 8.
`com.sun.identity.liberty.ws.dst`	Provides classes to implement an identity service on top of the Access Manager framework. See Chapter 7 for information about a service built using this API.
`com.sun.identity.liberty.ws.dst.service`	Provides a handler class that can be used by any generic identity data service. See Chapter 7 for information on data services.
`com.sun.identity.liberty.ws.idpp.plugin`	Defines plug-in interfaces for the Liberty Personal Profile Service.
`com.sun.identity.liberty.ws.interaction`	Provides classes to support the Liberty-based Interaction RequestRedirect Profile. See “Interaction Service” on page 229.
`com.sun.identity.liberty.ws.interfaces`	Provides interfaces common to all Access Manager Liberty-based web service components. See Chapter 7 and Chapter 8 for information about default implementations. See “Common Service Interfaces” on page 225 for more general information.

TABLE 11–1 Access Manager Public APIs *(Continued)*

Package Name	Description
`com.sun.identity.liberty.ws.paos`	Provides classes for web applications to construct and process PAOS requests and responses. See "PAOS Binding" on page 232.
`com.sun.identity.liberty.ws.security`	Provides an interface to manage Liberty-based web service security mechanisms. See "Common Security API" on page 227.
`com.sun.identity.liberty.ws.soapbinding`	Provides classes to construct SOAP requests and responses and to change the contact point for the SOAP binding. See Chapter 9.
`com.sun.identity.saml`	Provides an SPI in which proprietary XML signature implementations can be plugged in. See Chapter 10.
`com.sun.identity.saml.assertion`	Provides classes that manage assertions and profiles. See Chapter 10.
`com.sun.identity.saml.common`	Provides classes common to all SAML elements. See Chapter 10.
`com.sun.identity.saml.plugins`	Provides SPIs to integrate SAML into custom services. See Chapter 10.
`com.sun.identity.saml.protocol`	Provides classes that parse the XML messages used to exchange assertions and information. See Chapter 10.
`com.sun.identity.saml.xmlsig`	Provides an SPI in which proprietary XML signature implementations can be plugged in. See Chapter 10.
`com.sun.liberty`	Provides interfaces common to the Access Manager Federation Management module. See Chapter 3.

Common Service Interfaces

This section summarizes classes that can be used by all Liberty-based Access Manager service components, as well as interfaces common to all Liberty-based Access Manager services. The packages that contain the classes and interfaces are:

- "`com.sun.identity.liberty.ws.common` Package" on page 225
- "`com.sun.identity.liberty.ws.interfaces` Package" on page 226

`com.sun.identity.liberty.ws.common` Package

This package includes classes common to all Liberty-based Access Manager service components.

TABLE 11–2 `com.sun.identity.liberty.ws.common` Classes

Class	Description
`LogUtil`	Defines methods that are used by the Liberty component of Access Manager to write logs.
`Status`	Represents a common status object.

For more information, including methods and their syntax and parameters, see the Java API Reference in `/`*AccessManager-base*`/SUNWam/docs` or on docs.sun.com.

`com.sun.identity.liberty.ws.interfaces` Package

This package includes interfaces that can be implemented to add their corresponding functionality to each Liberty-based Access Manager web service.

TABLE 11–3 `com.sun.identity.liberty.ws.interfaces` Interfaces

Interface	Description
`Authorizer`	Interface for identity service to check authorization of a WSC.
`ResourceIDMapper`	Interface used to map between a user ID and the Resource ID associated with it.
`ServiceInstanceUpdate`	Interface used to include a SOAP header (`ServiceInstanceUpdateHeader`) when sending a SOAP response.

`com.sun.identity.liberty.ws.interfaces.Authorizer` Interface

This interface, once implemented, can be used by each Liberty-based web service component for access control.

Note – The `com.sun.identity.liberty.ws.disco.plugins.DefaultDiscoAuthorizer` class is the implementation of this interface for the Discovery Service. For more information, see Chapter 8. The `com.sun.identity.liberty.ws.idpp.plugin.IDPPAuthorizer` class is the implementation for the Liberty Personal Profile Service. For more information, see Chapter 7.

The `Authorizer` interface enables a web service to check whether a web service consumer (WSC) is allowed to access the requested resource. When a WSC contacts a web service provider (WSP), the WSC conveys a sender identity and an invocation identity. Note that the *invocation identity* is always the subject of the SAML assertion. These conveyances enable the WSP to make an authorization decision based on one or both identities. The Access Manager Policy Service performs the authorization based on defined policies.

Note – See the *Sun Java System Access Manager 7.1 Technical Overview* for more information about policy management, single sign-on, and user sessions. See the *Sun Java System Access Manager 7.1 Administration Guide* for information about creating policy.

`com.sun.identity.liberty.ws.interfaces.ResourceIDMapper` Interface

This interface is used to map a user DN to the resource identifier associated with it. Access Manager provides implementations of this interface.

- `com.sun.identity.liberty.ws.disco.plugins.Default64ResourceIDMapper` assumes the Resource ID format to be: *providerID* + "/" + *the Base64 encoded userIDs*.
- `com.sun.identity.liberty.ws.disco.plugins.DefaultHexResourceIDMapper` assumes the Resource ID format to be: *providerID* + "/" + *the hex string of userID*.
- `com.sun.identity.liberty.ws.idpp.plugin.IDPPResourceIDMapper` assumes the Resource ID format to be: *providerID* + "/" + *the Base64 encoded userIDs*.

A different implementation of the interface may be developed. The implementation class should be given to the provider that hosts the Discovery Service. The mapping between the *providerID* and the implementation class can be configured through the Classes For ResourceIDMapper Plugin attribute.

Common Security API

The Liberty-based security APIs are included in the `com.sun.identity.liberty.ws.security` package and the `com.sun.identity.liberty.ws.common.wsse` package.

`com.sun.identity.liberty.ws.security` Package

The `com.sun.identity.liberty.ws.security` package includes the `SecurityTokenProvider` interface for managing Web Service Security (WSS) type tokens and the `SecurityAttributePlugin` interface for inserting security attributes, via an `AttributeStatement`, into the assertion during the Discovery Service token generation. The following table describes the classes used to manage Liberty-based security mechanisms.

TABLE 11–4 `com.sun.identity.liberty.ws.security` Classes

Class	Description
`ProxySubject`	Represents the identity of a proxy, the confirmation key, and confirmation obligation the proxy must possess and demonstrate for authentication purposes.
`ResourceAccessStatement`	Conveys information regarding the accessing entities and the resource for which access is being attempted.
`SecurityAssertion`	Provides an extension to the Assertion class to support ID-WSF `ResourceAccessStatement` and `SessionContextStatement`.
`SecurityTokenManager`	An entry class for the security package `com.sun.identity.liberty.ws.security`. You can call its methods to generate X.509 and SAML tokens for message authentication or authorization. It is designed as a provider model, so different implementations can be plugged in if the default implementation does not meet your requirements.
`SecurityUtils`	Defines methods that are used to get certificates and sign messages.
`SessionContext`	Represents the session status of an entity to another system entity.
`SessionContextStatement`	Conveys the session status of an entity to another system entity within the body of an `<saml:assertion>` element.
`SessionSubject`	Represents a Liberty subject with its associated session status.

For more information, including methods and their syntax and parameters, see the Java API Reference in `/`*AccessManager-base*`/SUNWam/docs` or on docs.sun.com.

`com.sun.identity.liberty.ws.common.wsse` Package

This package includes classes for creating security tokens used for authentication and authorization in accordance with the *Liberty ID-WSF Security Mechanisms*. Both WSS X.509 and SAML tokens are supported.

TABLE 11–5 `com.sun.identity.liberty.ws.common.wsse` Classes

Class	Description
`BinarySecurityToken`	Provides an interface to parse and create the X.509 Security Token depicted by Web Service Security: X.509
`WSSEConstants`	Defines constants used in security packages.

For more information, including methods and their syntax and parameters, see the Java API Reference in `/`*AccessManager-base*`/SUNWam/docs` or on docs.sun.com.

Interaction Service

Providers of identity services often need to interact with the owner of a resource to get additional information, or to get their consent to expose data. The Liberty Alliance Project has defined the *Liberty ID-WSF Interaction Service Specification* to specify how these interactions can be carried out. Of the options defined in the specification, Access Manager has implemented the Interaction RequestRedirect Profile. In this profile, the WSP requests the connecting WSC to redirect the user agent (principal) to an interaction resource (URL) at the WSP. When the user agent sends an HTTP request to get the URL, the WSP has the opportunity to present one or more pages to the principal with questions for other information. After the WSP obtains the information it needs to serve the WSC, it redirects the user agent back to the WSC, which can now reissue its original request to the WSP.

Configuring the Interaction Service

While there is no XML service file for the Interaction Service, this service does have properties. The properties are configured upon installation in the `AMConfig.properties` file located in `/`*AccessManager-base*`/SUNWam/lib` and are described in the following table.

TABLE 11–6 Interaction Service Properties in `AMConfig.properties`

Property	Description
`com.sun.liberty.ws.interaction.wspRedirectHandler`	Points to the URL where the `WSPRedirectHandler` servlet is deployed. The servlet handles the service provider side of interactions for user redirects.
`com.sun.identity.liberty.interaction.wscSpecifiedInteractionChoice`	Indicates the level of interaction in which the WSC will participate if the WSC participates in user redirects. Possible values include `interactIfNeeded`, `doNotInteract`, and `doNotInteractForData`. The affirmative `interactIfNeeded` is the default.

TABLE 11–6 Interaction Service Properties in `AMConfig.properties` *(Continued)*

Property	Description
`com.sun.identity.liberty.interaction.wscWillIncludeUserInteractionHeader`	Indicates whether the WSC will include a SOAP header to indicate certain preferences for interaction based on the Liberty specifications. The default value is `yes`.
`com.sun.identity.liberty.interaction.wscWillRedirect`	Indicates whether the WSC will participate in user redirections. The default value is `yes`.
`com.sun.identity.liberty.interaction.wscSpecifiedMaxInteractionTime`	Indicates the maximum length of time (in seconds) the WSC is willing to wait for the WSP to complete its portion of the interaction. The WSP will not initiate an interaction if the interaction is likely to take more time than . For example, the WSP receives a request where this property is set to a maximum 30 seconds. If the WSP property `com.sun.identity.liberty.interaction.wspRedirectTime` is set to 40 seconds, the WSP returns a SOAP fault (`timeNotSufficient`), indicating that the time is insufficient for interaction.
`com.sun.identity.liberty.interaction.wscWillEnforceHttpsCheck`	Indicates whether the WSC will enforce HTTPS in redirected URLs. The Liberty Alliance Project specifications state that, the value of this property is always `yes`, which indicates that the WSP will not redirect the user when the value of `redirectURL` (specified by the WSP) is not an HTTPS URL. The `false` value is primarily meant for ease of deployment in a phased manner.
`com.sun.identity.liberty.interaction.wspWillRedirect`	Initiates an interaction to get user consent for something or to collect additional data. This property indicates whether the WSP will redirect the user for consent. The default value is `yes`.
`com.sun.identity.liberty.interaction.wspWillRedirectForData`	Initiates an interaction to get user consent for something or to collect additional data. This property indicates whether the WSP will redirect the user to collect additional data. The default value is `yes`.

TABLE 11–6 Interaction Service Properties in `AMConfig.properties` *(Continued)*

Property	Description
`com.sun.identity.liberty.interaction.wspRedirectTime`	Indicates the length of time (in seconds) that the WSP expects to take to complete an interaction and return control back to the WSC. For example, the WSP receives a request indicating that the WSC will wait a maximum 30 seconds (set in `com.sun.identity.liberty.interaction.wscSpecifiedMaxInteractionTime`) for interaction. If the `wspRedirectTime` is set to 40 seconds, the WSP returns a SOAP fault (`timeNotSufficient`), indicating that the time is insufficient for interaction.
`com.sun.identity.liberty.interaction.wspWillEnforceHttpsCheck`	Indicates whether the WSP will enforce a HTTPS `returnToURL` specified by the WSC. The Liberty Alliance Project specifications state that the value of this property is always `yes`. The `false` value is primarily meant for ease of deployment in a phased manner.
`com.sun.identity.liberty.interaction.wspWillEnforceReturnToHostEqualsRequestHost`	Indicates whether the WSP would enforce the address values of `returnToHost` and `requestHost` if they are the same. The Liberty Alliance Project specifications state that the value of this property is always `yes`. The `false` value is primarily meant for ease of deployment in a phased manner.
`com.sun.identity.liberty.interaction.htmlStyleSheetLocation`	Points to the location of the style sheet that is used to render the interaction page in HTML.
`com.sun.identity.liberty.interaction.wmlStyleSheetLocation`	Points to the location of the style sheet that is used to render the interaction page in WML.

Interaction Service API

The Access Manager Interaction Service includes a Java package named `com.sun.identity.liberty.ws.interaction`. WSCs and WSPs use the classes in this package to interact with a resource owner. The following table describes the classes.

TABLE 11–7 Interaction Service Classes

Class	Description
`InteractionManager`	Provides the interface and implementation for resource owner interaction.

TABLE 11–7 Interaction Service Classes *(Continued)*

Class	Description
`InteractionUtils`	Provides some utility methods related to resource owner interaction.
`JAXBObjectFactory`	Contains factory methods that enable you to construct new instances of the Java representation for XML content.

For more information, including methods and their syntax and parameters, see the Java API Reference in `/`*AccessManager-base*`/SUNWam/docs` or on docs.sun.com.

PAOS Binding

Access Manager has implemented the optional *Liberty Reverse HTTP Binding for SOAP Specification*. This specification defines a message exchange protocol that permits an HTTP client to be a SOAP responder. HTTP clients are no longer necessarily equipped with HTTP servers. For example, mobile terminals and personal computers contain web browsers yet they do not operate HTTP servers. These clients, though, can use their browsers to interact with an identity service, possibly a personal profile service or a calendar service. These identity services could also be beneficial when the client devices interact with an HTTP server. The use of PAOS makes it possible to exchange information between user agent-hosted services and remote servers. This is why the reverse HTTP for SOAP binding is also known as PAOS; the spelling of SOAP is reversed.

Comparison of PAOS and SOAP

In a typical SOAP binding, an HTTP client interacts with an identity service through a client request and a server response. For example, a cell phone user (client) can contact the phone service provider (service) to retrieve stock quotes and weather information. The service verifies the user's identity and responds with the requested information.

In a reverse HTTP for SOAP binding, the phone service provider plays the client role, and the cell phone client plays the server role. The initial SOAP request from the server is actually bound to an HTTP response. The subsequent response from the client is bound to a request.

PAOS Binding API

The Access Manager implementation of PAOS binding includes a Java package named `com.sun.identity.liberty.ws.paos`. This package provides classes to parse a PAOS header, make a PAOS request, and receive a PAOS response.

Note – This API is used by PAOS clients on the HTTP server side. An API for PAOS servers on the HTTP client side would be developed by the manufacturers of the HTTP client side products, for example, cell phone manufacturers.

The following table describes the available classes in `com.sun.identity.liberty.ws.paos`. For more detailed API documentation, see the Java API Reference in `/`*AccessManager-base*`/SUNWam/docs` or on docs.sun.com.

TABLE 11–8 PAOS Binding Classes

Class	Description
`PAOSHeader`	Used by a web application on the HTTP server side to parse a PAOS header in an HTTP request from the user agent side.
`PAOSRequest`	Used by a web application on the HTTP server side to construct a PAOS request message and send it via an HTTP response to the user agent side. **Note –** `PAOSRequest` is made available in `PAOSResponse` to provide correlation, if needed, by API users.
`PAOSResponse`	Used by a web application on the HTTP server side to receive and parse a PAOS response using an HTTP request from the user agent side.
`PAOSException`	Represents an error occurring while processing a SOAP request and response.

For more information, including methods and their syntax and parameters, see the Java API Reference in `/`*AccessManager-base*`/SUNWam/docs` or on docs.sun.com.

PAOS Binding Sample

A sample that demonstrates PAOS service interaction between an HTTP client and server is provided in the `/`*AccessManager-base*`/SUNWam/samples/phase2/paos` directory. The PAOS client is a servlet, and the PAOS server is a stand-alone Java program. Instructions on how to run the sample can be found in the `Readme.html` or `Readme.txt` file. Both files are included in the `paos` directory. The following code example is the PAOS client servlet.

EXAMPLE 11–1 PAOS Client Servlet From PAOS Sample

```
import java.util.*;
import java.io.*;

import javax.servlet.*;
import javax.servlet.http.*;
```

EXAMPLE 11–1 PAOS Client Servlet From PAOS Sample *(Continued)*

```
import com.sun.identity.liberty.ws.paos.*;

import com.sun.identity.liberty.ws.idpp.jaxb.*;

public class PAOSClientServlet extends HttpServlet {

  public void doGet(HttpServletRequest req, HttpServletResponse res)
    throws ServletException, IOException {

      PAOSHeader paosHeader = null;
      try {
    paosHeader = new PAOSHeader(req);
      } catch (PAOSException pe1) {
    pe1.printStackTrace();

    String msg = "No PAOS header\\n";
    res.setContentType("text/plain");
    res.setContentLength(1+msg.length());
    PrintWriter out = new PrintWriter(res.getOutputStream());
    out.println(msg);
    out.close();

    throw new ServletException(pe1.getMessage());
      }

      HashMap servicesAndOptions = paosHeader.getServicesAndOptions();

      Set services = servicesAndOptions.keySet();

      String thisURL = req.getRequestURL().toString();
      String[] queryItems = { "/IDPP/Demographics/Birthday" };
      PAOSRequest paosReq = null;
      try {
    paosReq = new PAOSRequest(thisURL,
                (String)(services.iterator().next()),
                thisURL,
                queryItems);
      } catch (PAOSException pe2) {
    pe2.printStackTrace();
    throw new ServletException(pe2.getMessage());
      }
      System.out.println("PAOS request to User Agent side -------------->");
      System.out.println(paosReq.toString());
      paosReq.send(res, true);
  }
```

EXAMPLE 11–1 PAOS Client Servlet From PAOS Sample *(Continued)*

```
  public void doPost(HttpServletRequest req, HttpServletResponse res)
    throws ServletException, IOException {

      PAOSResponse paosRes = null;
      try {
    paosRes = new PAOSResponse(req);
      } catch (PAOSException pe) {
    pe.printStackTrace();
    throw new ServletException(pe.getMessage());
      }

      System.out.println("PAOS response from User Agent side -------------->");
      System.out.println(paosRes.toString());

      System.out.println("Data output after parsing -------------->");

      String dataStr = null;
      try {
    dataStr = paosRes.getPPResponseStr();
      } catch (PAOSException paose) {
    paose.printStackTrace();
    throw new ServletException(paose.getMessage());
      }
      System.out.println(dataStr);

      String msg = "Got the data: \\n" + dataStr;

      res.setContentType("text/plain");
      res.setContentLength(1+msg.length());

      PrintWriter out = new PrintWriter(res.getOutputStream());

      out.println(msg);

      out.close();
  }
}
```

See Appendix A for information about all the sample code and files included with Access Manager.

APPENDIX A

Liberty-based and SAML Samples

Sun Java System Access Manager contains a number of samples that make use of the Access Manager implementation of the Liberty Alliance Project specifications. This appendix contains information about the samples. The samples are located in /*AccessManager-base*/SUNWam/samples. This directory includes samples for the entire Access Manager product as well as two directories specific to the Liberty-based features: liberty and phase2.

This appendix covers the following samples:

- "Federation Framework Samples" on page 237
- "Web Services Framework Samples" on page 239
- "SAML Samples" on page 240

Federation Framework Samples

Access Manager 7.1 supports the *Liberty Alliance Identity Federation Framework 1.2 Specifications*. The Federation Framework samples are located in /*AccessManager-base*/SUNWam/samples/liberty. To demonstrate the different Liberty-based federation protocols featured in Access Manager, three sample applications are included. They are located in the following subdirectories:

- "sample1 Directory" on page 237
- "sample2 Directory" on page 238
- "sample3 Directory" on page 238

sample1 Directory

The sample1 directory provides a collection of files to configure a basic environment for creating and managing a federation. The sample demonstrates the basic use of various Liberty-based federation protocols, including account federation, SSO, single logout, and federation termination. The scenario includes a service provider (SP), an identity provider (IDP), and configuration information for the two required servers. Each server must be deployed and configured on different installations of Access Manager.

TABLE A–1 Configuration Information for `sample1` Servers

Variable Placeholder	Host Name	Components Deployed on This Host
machine1	`www.sp1.com`	■ Service Provider ■ Web Service Consumer
machine2	`www.idp1.com`	■ Identity Provider ■ Discovery Service ■ Liberty Alliance Project

The `Readme.html` file in the `sample1` directory provides detailed steps on how to deploy and configure this sample. `sample1` also contains instructions for configuring a common domain. For information on common domains, see Chapter 4.

`sample2` Directory

The `sample2` directory also provides a collection of files to configure a basic environment for creating and managing a federation. However, in this sample, the resources of the SP are deployed on a Sun Java System Web Server that is protected by a Sun Java System Policy Agent. As in "`sample1` Directory" on page 237, the SP and IDP are deployed and configured on different Access Manager installations. Besides demonstrating account federation, SSO, single logout, and federation termination, this sample also shows how different authentication contexts can be configured by associating different authentication levels with different protected pages. This association is made by creating policies for the protected resources. The `Readme.html` file in the `sample2` directory provides detailed steps on how to deploy and configure this sample.

`sample3` Directory

The `sample3` directory provides a collection of files to configure an environment for creating and managing a federation that includes two SPs and two IDPs. In this case, though, all hosted providers are deployed on a single installation of Access Manager. You need to host the same IP address (the one on which Access Manager is installed) in four different DNS domains. Thus, four virtual server instances are created on a Sun Java System Web Server, one for each of the providers.

Note – Virtual server instances can be simulated by adding entries in the `/etc/hosts` file for the fully qualified host names of the virtual servers.

Because this scenario involves multiple IPs, you also need to install a common domain. You can install the Common Domain Services for Federation Management on the same machine as the Access Manager software or on a different machine. The `Readme.html` file in the `sample3` directory provides detailed steps on how to deploy and configure this sample. You can also find information about common domains in Chapter 4.

Web Services Framework Samples

Access Manager 7.1 supports both the *Liberty Alliance Identity Web Services Framework 1.0 Specifications* and the *Liberty Alliance Identity Services Interface Specifications 1.0*. The web services samples are located in */AccessManager-base*`/SUNWam/samples/phase2`. To demonstrate the different Liberty-based web services protocols featured in Access Manager, four sample applications are included. They are located in the following sub-directories:

- "`wsc` Directory" on page 239
- "`sis-ep` Directory" on page 239
- "`paos` Directory" on page 240
- "`authnsvc` Directory" on page 240

`wsc` Directory

The `wsc` directory contains a collection of files to deploy and run a web service consumer (WSC).

Note – Before implementing this sample, you must have two instances of Access Manager installed, and running, and Liberty-enabled. Completing the procedure in "`sample1` Directory" on page 237 will accomplish this.

In addition, this sample illustrates how to use the Discovery Service and Data Services Template client APIs to allow the WSC to communicate with a web service provider (WSP). This sample describes the flow of the Liberty-based Web Service Framework (ID-WSF) and how the security mechanisms and interaction service are integrated. The `Readme.html` file in the `wsc` directory provides detailed steps on how to deploy and configure this sample. For more information, see also Chapter 7 and Chapter 8.

`sis-ep` Directory

The `sis-ep` directory contains a collection of files to develop, deploy, and invoke a new Liberty-based web service to Access Manager. The sample implements the Liberty Employee Profile Service.

Note – Before implementing this sample, you must have two instances of Access Manager installed, and running, and Liberty-enabled. Completing the procedure in "sample1 Directory" on page 237 will accomplish this.

The Liberty Employee Profile Service is a deployment of the *Liberty ID-SIS Employee Profile Service Specification* (ID-SIS-EP), which is one of the *Liberty Alliance ID-SIS 1.0 Specifications*. The Readme.html file in the sample directory provides detailed steps on how to deploy and configure this sample. For more information, see also Chapter 7

paos Directory

The paos directory contains a collection of files that demonstrate how to set up and invoke a PAOS Service interaction between a client and server. The sample is based on the following scenario: a cell phone user subscribes to a news service offered by the cell phone's manufacturer. The news service automatically provides stocks and weather information to the user's cell phone at regular intervals. In this scenario, the manufacturer is the news service provider, and the individual cell phone user is the consumer. After running the sample, you will see the output from the PAOSServer program.

You can also see the output from PAOSClientServlet program in the log file of the Web Server. For example, when using Sun Java System Web Server, look in the log subdirectory for the errors file.

The Readme.html file in the sample directory provides detailed steps on how to deploy and configure this sample. In addition, see "PAOS Binding Sample" on page 233.

Note – In an actual deployment, the server-side code would be developed by a service provider.

authnsvc Directory

The authnsvc directory contains a collection of files to illustrate the use of the Access Manager Authentication Web Service. This sample program authenticates against the service and extracts the resource offering of a discovery bootstrap. The Readme.html file in the sample directory provides detailed steps on how to deploy and configure this sample. In addition, see Chapter 6

SAML Samples

For information on the samples related to the SAML component of Access Manager, see "SAML Samples" on page 222.

APPENDIX B

Key Management

A public key infrastructure enables users on a public network to securely and privately exchange data through the use of a public and a private key pair that is shared using a trusted authority. For example, the PKI allows the data from a client, such as a web browser, to be encrypted prior to transmission. The private key is used to decrypt text that has been encrypted with the public key. The public key is made publicly available (as part of a digital certificate) in a directory which all parties can access. This appendix contains information on how to create a keystore and generate public and private keys. It includes the following sections:

- "Public Key Infrastructure Basics" on page 241
- "`keytool` Command Line Interface" on page 243
- "Setting Up a Keystore" on page 243

Public Key Infrastructure Basics

Web containers support the use of keystores to manage keys and certificates. The *keystore file* is a database that contains both public and private keys. Public and private keys are created simultaneously using the same algorithm (for example, RSA). A *public key* is used for encrypting or decrypting information. This key is made known to the world with no restrictions, but it cannot be used to decrypt information that the same key has encrypted. A *private key* is never revealed to anyone except it's owner and does not need to be communicated to third parties. The private key might never leave the machine or hardware token that originally generated it. The private key can encrypt information that can later be decrypted by using the public key. Also the private key can be used to decrypt information that was previously encrypted using the public key.

A public key infrastructure (PKI) is a framework for creating a secure method of exchanging information on an unsecure network. This ensures that the information being sent is not open to eavesdropping, tampering, or impersonation. It supports the distribution, management, expiration, rollover, backup, and revoking of the public and private keys used for public key cryptography. *Public key cryptography* is the most common method for encrypting and decrypting a message. It secures the data involved in the communications by using a private key and its public counterpart. Each entity protects its own private key while disseminating its public key for all to use. Public and private keys operate inversely; an operation performed by one key can be reversed, or checked, only by its partner key.

Note – The Internet X.509 Public Key Infrastructure Certificate and CRL Profile is a PKI.

Digital Signatures

So, a private key and a public key can be used for simple message encryption and decryption. This ensures that the message can not be read (as in eavesdropping) but, it does not ensure that the message has not been tampered with. For this, a *one-way hash* (a number of fixed length that is unique for the data to be hashed) is used to generate a digital signature. A *digital signature* is basically data that has been encrypted using a one-way hash and the signer's private key. To validate the integrity of the data, the server receiving the communication uses the signer's public key to decrypt the hash. It then uses the same hashing algorithm that generated the original hash (sent with the digital signature) to generate a new one-way hash of the same data. Finally, the new hash and the received hash are compared. If the two hashes match, the data has not changed since it was signed and the recipient can be certain that the public key used to decrypt the digital signature corresponds to the private key used to create the digital signature. If they don't match, the data may have been tampered with since it was signed, or the signature may have been created with a private key that doesn't correspond to the public key presented by the signer. This interaction ensures that any change in the data, even deleting or altering a single character, results in a different value.

Digital Certificates

A *digital certificate* is an electronic document used to identify an individual, a server, a company, or other entity and to bind that entity to a public key by providing information regarding the entity, the validity of the certificate, and applications and services that can use the certificate. The process of signing the certificate involves tying the private key to the data being signed using a mathematical formula. The widely disseminated public counterpart can then be used to verify that the data is associated with the sender of the data. Digital certificates are issued by a certificate authority (CA) to authenticate the identity of the certificate-holder both before the certificate is issued and when the certificate is used. The CA can be either independent third parties or certificate-issuing server software specific to an enterprise. (Both types issue, verify, revoke and distribute digital certificates.) The methods used to authenticate an identity are dependant on the policies of the specific CA. In general, before issuing a certificate, the CA must use its published verification procedures for that type of certificate to ensure that an entity requesting a certificate is in fact who it claims to be.

Certificates help prevent the use of fake public keys for impersonation. Only the public key certified by the certificate will work with the corresponding private key possessed by the entity identified by the certificate. Digital certificates automate the process of distributing public keys and exchanging secure information. When one is installed on your machine, the public key is freely available. When another computer wants to exchange information with your computer, it accesses your digital certificate, which contains your public key, and uses it to validate your identity and to encrypt the information it wants to share with you. Only your private key can decrypt this information, so it remains secure from interception or tampering while traveling across the Internet.

Note – You can get a digital certificate by sending a request for one to a CA. Certificate requests are generated by the certificate management tool used. In this case, we are using the `keytool` command line interface. When `keytool` generates a certificate request, it also generates a private key.

`keytool` Command Line Interface

`keytool` is a key and certificate management utility used to create the keys. It also manages a `.keystore` file containing private keys and the associated X.509 certificate chains authenticating the corresponding public keys, issues certificate requests (which you send to the appropriate CA), imports certificate replies (obtained from the contacted CA), designates public keys belonging to other parties as trusted, and generates a unique key alias for each *keystore entry*. There are two types of entries in a keystore:

- A keystore entry holds sensitive cryptographic key information, stored in a protected format to prevent unauthorized access. Typically, a key stored in this type of entry is a secret or private key accompanied by a certificate chain for the corresponding public key.
- A trusted certificate entry contains a single public key certificate belonging to another party. It is called a *trusted certificate* because the keystore owner trusts that the public key in the certificate indeed belongs to the identity identified by the *subject* of the certificate. The issuer of the certificate vouches for this, by signing the certificate.

To create a keystore and default key entry in `.keystore`, you must use `keytool`, available from the Java Development Kit (JDK), version 1.3.1 and above. For more details, see keytool — Key and Certificate Management Tool.

Setting Up a Keystore

The following procedure illustrates how to create a keystore file and default key entry using `keytool`.

▼ To Set Up a Keystore

Be sure to use the `keytool` provided with the JDK bundled with Access Manager. It is located in *JAVA_HOME*`/bin/keytool`. When installed using the Java Enterprise System installer, *JAVA_HOME* is *AccessManager-base*`SUNWam/java`.

Note – The italicized option values in the commands used in this procedure may be changed to reflect your deployment.

1. **Generate a certificate using one of the following procedures.**

- **Generate a keystore with a public and private key pair and a self-signed certificate for your server using the following command.**

```
keytool -genkey -keyalg rsa -alias test -dname "cn=sun-unix,ou=SUN Java System Access Manager,o=Sun,c=US" -keypass 11111
```

This command will generate a keystore called `.mykeystore` in the directory from which it is run. A private key entry with the alias `test` is created and stored in `.mykeystore`. If you do not specify a path to the keystore, a file named `.keystore` will be generated in your home directory. If you do not specify an alias for the default key entry, `mykey` is created as the default alias. To generate a DSA key, change the value of `-keyalg` to `dsa`. This step generates a self-signed certificate.

- **Create a request and import a signed certificate from a CA (to authenticate your public key) using the following procedure.**

a. **Create a request to retrieve a signed certificate from a CA (to authenticate your public key) using the following command:**

```
keytool -certreq -alias test -file request.csr -keypass 11111111 -keystore .mykeystore -storepass 11111111 -storetype JKS
```

`.mykeystore` must also contain a self-signed certificate authenticating the server's generated public key. This step will generate the certificate request file, `request.csr`, under the directory from which the command is run. By submitting `request.csr` to a CA, the requestor will be authenticated and a signed certificate authenticating the public key will be returned. Save this root certificate to a file named `myroot.cer` and save the server certificate generated in the previous step to a file named `mycert.cer`.

b. **Import the certificate returned from the CA using the following command:**

```
keytool -import -alias test -trustcacerts -file mycert.cer -keypass 11111111 -keystore .mykeystore -storepass 11111111
```

c. **Import the certificates of any trusted sites (from which you will receive assertions, requests and responses) into your keystore using the following command:**

```
keytool -import -file myroot.cer -keypass 11111111 -keystore .mykeystore -storepass 11111111
```

The data to be imported must be provided either in binary encoding format, or in printable encoding format (also known as *Base64*) as defined by the Internet RFC 1421 standard. In the latter case, the encoding must be bounded at the beginning by a string that starts with `-----BEGIN` and bounded at the end by a string that starts with `-----END`.

2. **Change to the** *AccessManager-base*/`SUNWam/bin` **directory and run the following command:**

```
ampassword -e original password
```

This encrypts the password. The command will return something like `AQICKuNVNc9WXxiUyd8j9o/BR22szk8u69ME`.

3 **Create a new file named `.storepass` and put the encrypted password in it.**

4 **Create a new file named `.keypass` and put the encrypted password in it.**

5 **Copy `.mykeystore` to the location specified in `AMConfig.properties`.**

For example, if `com.sun.identity.saml.xmlsig.keystore=/etc/opt/SUNWam/lib/keystore.jks`, copy `.mykeystore` to `/etc/opt/SUNWam/lib/` and rename the file to `keystore.jks`.

6 **Copy `.storepass` and `.keypass` to the location specified in `AMConfig.properties`.**

For example, if `com.sun.identity.saml.xmlsig.storepass=/etc/opt/SUNWam/config/.storepass` and `com.sun.identity.saml.xmlsig.keypass=/etc/opt/SUNWam/config/.keypass`, copy both files to `/etc/opt/SUNWam/config/`.

7 **Define a value for the `com.sun.identity.saml.xmlsig.certalias` property in `AMConfig.properties`.**

For this example, the value would be `test`.

8 **(Optional) If the private key was encrypted using the DSA algorithm, change `xmlsigalgorithm=http://www.w3.org/2000/09/xmldsig#rsa-sha1` in *AccessManager-base*`/locale/amSAML.properties` to `xmlsigalgorithm=http://www.w3.org/2000/09/xmldsig#dsa-sha1`.**

9 **(Optional) Change the canonicalization method for signing or the transform algorithm for signing by modifying `amSAML.properties`, located in *AccessManager-base*`/locale/`.**

a. **Change `canonicalizationMethod=http://www.w3.org/2001/10/xml-exc-c14n#` to any valid canonicalization method specified in Apache XML security package Version 1.0.5.**

Note – If this entry is deleted or left empty, we will use `SAMLConstants.ALGO_ID_C14N_OMIT_COMMENTS` (required by the XML Signature specification) will be used.

b. **Change `transformAlgorithm=http://www.w3.org/2001/10/xml-exc-c14n#` to any valid transform algorithm specified in Apache XML security package Version 1.0.5.**

Note – If this entry is deleted or left empty, the operation will not be performed.

10 **Restart Access Manager.**

APPENDIX C

Service Schema Files

This appendix contains some of the XML Schema Definition (XSD) files that are discussed in this guide. It contains the following sections:

- "XSD Overview" on page 247
- "SOAP Binding Schema" on page 248
- "Personal Profile Schema" on page 250
- "Employee Profile Schema" on page 256
- "Authentication Web Service Schema" on page 258
- "PAOS Binding Schema" on page 262
- "Metadata Description Schema" on page 263

XSD Overview

The purpose of an eXtensible Markup Language (XML) schema is to describe the structure of an XML document. The XML schema language is referred to as XML Schema Definition (XSD).

Note – XSD is an XML-based alternative to the Document Type Definition (DTD). A DTD also describes the structure of an XML document, but it is not in the XML format.

The XSD files in this appendix specify the information that its corresponding service can host by defining the data and data structure. Typically, this structure is hierarchical and has one root node. Individual branches of the structure can be accessed separately, and the whole structure can be accessed by pointing to the root node. The data might be stored in implementation-specific ways, However, the data will be exposed by the service using the XML schema (specified here) and the Web Services Description Language (WSDL) definition of the service type (not specified in this documentation set). The XSD files in this appendix are reproduced here for your convenience. These files and a number of other XSD files are also available on the Liberty Alliance Project web site (`http://www.projectliberty.org/resources/specifications.php`).

SOAP Binding Schema

Following is a reproduction of `liberty-idwsf-soap-binding-v1.1.xsd`, the XSD file that accompanies the *Liberty ID-WSF SOAP Binding Specification* as discussed in Chapter 9.

EXAMPLE C–1 SOAP Binding XSD File

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema targetNamespace="urn:liberty:sb:2004-04"
    xmlns:S="http://schemas.xmlsoap.org/soap/envelope/"
    xmlns:sb-ext="urn:liberty:sb:2004-04"
    xmlns:lib="urn:liberty:iff:2003-08"
    xmlns:xs="http://www.w3.org/2001/XMLSchema"
    xmlns="urn:liberty:sb:2004-04"
    elementFormDefault="qualified"
    attributeFormDefault="unqualified">

    <!-- Author: John Kemp -->
    <!-- Last editor: $Author: dgreenspon $ -->
    <!-- $Date: 2004/08/02 19:25:27 $ -->
    <!-- $Revision: 1.1 $ -->

    <xs:import
        namespace="http://schemas.xmlsoap.org/soap/envelope/"
        schemaLocation="http://schemas.xmlsoap.org/soap/envelope/"/>

    <xs:import
        namespace="urn:liberty:iff:2003-08"
        schemaLocation="liberty-idff-protocols-schema-v1.2.xsd"/>

    <xs:include schemaLocation="liberty-idwsf-utility-1.0-errata-v1.0.xsd"/>

    <xs:annotation>
        <xs:documentation>
            Liberty ID-WSF SOAP Binding Specification Extension XSD
        </xs:documentation>
        <xs:documentation>
            The source code in this XSD file was excerpted verbatim from:

            Liberty ID-WSF SOAP Binding Specification
            Version 1.1
            April 2004

            Copyright (c) 2004 Liberty Alliance participants, see
            http://www.projectliberty.org/specs/idwsf_copyrights.html
        </xs:documentation>
    </xs:annotation>
```

EXAMPLE C–1 SOAP Binding XSD File *(Continued)*

```
    <xs:complexType name="CredentialsContextType">
        <xs:sequence>
            <xs:element ref="lib:RequestAuthnContext" minOccurs="0"/>
            <xs:element name="SecurityMechID" type="xs:anyURI" minOccurs="0"
                maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="id" type="xs:ID" use="optional"/>
        <xs:attribute ref="S:mustUnderstand" use="optional"/>
        <xs:attribute ref="S:actor" use="optional"/>
    </xs:complexType>

    <xs:element name="CredentialsContext" type="CredentialsContextType"/>

    <xs:complexType name="ServiceInstanceUpdateType">
        <xs:sequence>
            <xs:element name="SecurityMechID" type="xs:anyURI" minOccurs="0"
                maxOccurs="unbounded"/>
            <xs:element name="Credential" minOccurs="0" maxOccurs="unbounded">
                <xs:complexType>
                   <xs:sequence>
                       <xs:any namespace="##any" processContents="lax"/>
                   </xs:sequence>
                   <xs:attribute name="notOnOrAfter" type="xs:dateTime" use="optional"/>
                </xs:complexType>
            </xs:element>
            <xs:element name="Endpoint" type="xs:anyURI" minOccurs="0"/>
        </xs:sequence>
        <xs:attribute name="id" type="xs:ID" use="optional"/>
        <xs:attribute ref="S:mustUnderstand" use="optional"/>
        <xs:attribute ref="S:actor" use="optional"/>
    </xs:complexType>

    <xs:element name="ServiceInstanceUpdate" type="ServiceInstanceUpdateType"/>

    <xs:complexType name="TimeoutType">
        <xs:attribute name="maxProcessingTime" type="xs:integer" use="required"/>
        <xs:attribute name="id" type="xs:ID" use="optional"/>
        <xs:attribute ref="S:mustUnderstand" use="optional"/>
        <xs:attribute ref="S:actor" use="optional"/>
    </xs:complexType>

    <xs:element name="Timeout" type="TimeoutType"/>

</xs:schema>
```

EXAMPLE C–1 SOAP Binding XSD File *(Continued)*

Personal Profile Schema

Following is a reproduction of `liberty-idsis-pp-v1.0.xsd`, the XSD file that accompanies the *Liberty ID-SIS Personal Profile Service Specification* as discussed in Chapter 7.

EXAMPLE C–2 Personal Profile Service XSD File

```
<!-- 2003-11-02-->
<xs:schema targetNamespace="urn:liberty:id-sis-pp:2003-08" xmlns="urn:liberty:id-sis-pp:2003-08"
xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns:ds="http://www.w3.org/2000/09/xmldsig#"
elementFormDefault="qualified" version="1.0">
  <xs:import namespace="http://www.w3.org/2000/09/xmldsig#"
      schemaLocation="http://www.w3.org/TR/xmldsig-core/xmldsig-core-schema.xsd"/>
  <xs:annotation>
    <xs:documentation>Title: Liberty ID-WSF-SIS Personal Profile Services Schema
    </xs:documentation>
    <xs:documentation>The source code in this XSD file was excerpted verbatim from:

Liberty Liberty ID-SIS Personal Profile Service Specification
Version 1.2
12th November 2003

Copyright (c) 2003 Liberty Alliance participants, see
https://www.projectliberty.org/specs/idwsf_copyrights.html
</xs:documentation>
  </xs:annotation>
  <xs:include schemaLocation="liberty-idwsf-dst-v1.0.xsd"/>
  <xs:include schemaLocation="liberty-idwsf-dst-dt-v1.0.xsd"/>
  <xs:complexType name="KeyInfoType" mixed="true">
    <xs:complexContent mixed="true">
      <xs:extension base="ds:KeyInfoType">
        <xs:attribute ref="modificationTime"/>
        <xs:attribute ref="ACC"/>
        <xs:attribute ref="ACCTime"/>
        <xs:attribute ref="modifier"/>
      </xs:extension>
    </xs:complexContent>
  </xs:complexType>
  <xs:simpleType name="SelectType">
    <xs:restriction base="xs:string"/>
  </xs:simpleType>
  <xs:element name="PP" type="PPType"/>
```

EXAMPLE C–2 Personal Profile Service XSD File *(Continued)*

```
<xs:complexType name="PPType">
  <xs:sequence>
    <xs:element ref="InformalName" minOccurs="0"/>
    <xs:element ref="LInformalName" minOccurs="0" maxOccurs="unbounded"/>
    <xs:element ref="CommonName" minOccurs="0"/>
    <xs:element ref="LegalIdentity" minOccurs="0"/>
    <xs:element ref="EmploymentIdentity" minOccurs="0"/>
    <xs:element ref="AddressCard" minOccurs="0" maxOccurs="unbounded"/>
    <xs:element ref="MsgContact" minOccurs="0" maxOccurs="unbounded"/>
    <xs:element ref="Facade" minOccurs="0"/>
    <xs:element ref="Demographics" minOccurs="0"/>
    <xs:element ref="SignKey" minOccurs="0"/>
    <xs:element ref="EncryptKey" minOccurs="0"/>
    <xs:element ref="EmergencyContact" minOccurs="0"/>
    <xs:element ref="LEmergencyContact" minOccurs="0" maxOccurs="unbounded"/>
    <xs:element ref="Extension" minOccurs="0"/>
  </xs:sequence>
  <xs:attributeGroup ref="commonAttributes"/>
</xs:complexType>
<xs:element name="InformalName" type="DSTString"/>
<xs:element name="LInformalName" type="DSTLocalizedString"/>
<xs:element name="CommonName" type="CommonNameType"/>
<xs:complexType name="CommonNameType">
  <xs:sequence>
    <xs:element ref="CN" minOccurs="0"/>
    <xs:element ref="LCN" minOccurs="0" maxOccurs="unbounded"/>
    <xs:element ref="AltCN" minOccurs="0" maxOccurs="unbounded"/>
    <xs:element ref="LAltCN" minOccurs="0" maxOccurs="unbounded"/>
    <xs:element ref="AnalyzedName" minOccurs="0"/>
    <xs:element ref="Extension" minOccurs="0"/>
  </xs:sequence>
  <xs:attributeGroup ref="commonAttributes"/>
</xs:complexType>
<xs:element name="CN" type="DSTString"/>
<xs:element name="LCN" type="DSTLocalizedString"/>
<xs:element name="AltCN" type="DSTString"/>
<xs:element name="LAltCN" type="DSTLocalizedString"/>
<xs:element name="AnalyzedName" type="AnalyzedNameType"/>
<xs:complexType name="AnalyzedNameType">
  <xs:sequence>
    <xs:element ref="PersonalTitle" minOccurs="0"/>
    <xs:element ref="LPersonalTitle" minOccurs="0" maxOccurs="unbounded"/>
    <xs:element ref="FN" minOccurs="0"/>
    <xs:element ref="LFN" minOccurs="0" maxOccurs="unbounded"/>
    <xs:element ref="SN" minOccurs="0"/>
    <xs:element ref="LSN" minOccurs="0" maxOccurs="unbounded"/>
```

EXAMPLE C–2 Personal Profile Service XSD File *(Continued)*

```
      <xs:element ref="MN" minOccurs="0"/>
      <xs:element ref="LMN" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="Extension" minOccurs="0"/>
    </xs:sequence>
    <xs:attribute name="nameScheme" type="xs:anyURI" use="optional"/>
    <xs:attributeGroup ref="commonAttributes"/>
  </xs:complexType>
  <xs:element name="PersonalTitle" type="DSTString"/>
  <xs:element name="LPersonalTitle" type="DSTLocalizedString"/>
  <xs:element name="FN" type="DSTString"/>
  <xs:element name="LFN" type="DSTLocalizedString"/>
  <xs:element name="SN" type="DSTString"/>
  <xs:element name="LSN" type="DSTLocalizedString"/>
  <xs:element name="MN" type="DSTString"/>
  <xs:element name="LMN" type="DSTLocalizedString"/>
  <xs:element name="LegalIdentity" type="LegalIdentityType"/>
  <xs:complexType name="LegalIdentityType">
    <xs:sequence>
      <xs:element ref="LegalName" minOccurs="0"/>
      <xs:element ref="LLegalName" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="AnalyzedName" minOccurs="0"/>
      <xs:element ref="VAT" minOccurs="0"/>
      <xs:element ref="AltID" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="DOB" minOccurs="0"/>
      <xs:element ref="Gender" minOccurs="0"/>
      <xs:element ref="MaritalStatus" minOccurs="0"/>
      <xs:element ref="Extension" minOccurs="0"/>
    </xs:sequence>
    <xs:attributeGroup ref="commonAttributes"/>
  </xs:complexType>
  <xs:element name="LegalName" type="DSTString"/>
  <xs:element name="LLegalName" type="DSTLocalizedString"/>
  <xs:element name="VAT" type="VATType"/>
  <xs:complexType name="VATType">
    <xs:sequence>
      <xs:element ref="IDValue"/>
      <xs:element ref="IDType" minOccurs="0"/>
      <xs:element ref="Extension" minOccurs="0"/>
    </xs:sequence>
    <xs:attributeGroup ref="commonAttributes"/>
  </xs:complexType>
  <xs:element name="IDValue" type="DSTString"/>
  <xs:element name="IDType" type="DSTURI"/>
  <xs:element name="AltID" type="AltIDType"/>
  <xs:complexType name="AltIDType">
    <xs:sequence>
```

EXAMPLE C–2 Personal Profile Service XSD File *(Continued)*

```
      <xs:element ref="IDValue"/>
      <xs:element ref="IDType" minOccurs="0"/>
      <xs:element ref="Extension" minOccurs="0"/>
    </xs:sequence>
    <xs:attributeGroup ref="commonAttributes"/>
  </xs:complexType>
  <xs:element name="DOB" type="DSTDate"/>
  <xs:element name="Gender" type="DSTURI"/>
  <xs:element name="MaritalStatus" type="DSTURI"/>
  <xs:element name="EmploymentIdentity" type="EmploymentIdentityType"/>
  <xs:complexType name="EmploymentIdentityType">
    <xs:sequence>
      <xs:element ref="JobTitle" minOccurs="0"/>
      <xs:element ref="LJobTitle" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="O" minOccurs="0"/>
      <xs:element ref="LO" minOccurs="0"/>
      <xs:element ref="AltO" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="AltLO" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="Extension" minOccurs="0"/>
    </xs:sequence>
    <xs:attributeGroup ref="commonAttributes"/>
  </xs:complexType>
  <xs:element name="JobTitle" type="DSTString"/>
  <xs:element name="LJobTitle" type="DSTLocalizedString"/>
  <xs:element name="O" type="DSTString"/>
  <xs:element name="LO" type="DSTLocalizedString"/>
  <xs:element name="AltO" type="DSTString"/>
  <xs:element name="AltLO" type="DSTLocalizedString"/>
  <xs:element name="AddressCard" type="AddressCardType"/>
  <xs:complexType name="AddressCardType">
    <xs:sequence>
      <xs:element ref="AddrType" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="Address" minOccurs="0"/>
      <xs:element ref="Nick" minOccurs="0"/>
      <xs:element ref="LNick" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="LComment" minOccurs="0"/>
      <xs:element ref="Extension" minOccurs="0"/>
    </xs:sequence>
    <xs:attributeGroup ref="commonAttributes"/>
  </xs:complexType>
  <xs:element name="AddrType" type="DSTURI"/>
  <xs:element name="Address" type="AddressType"/>
  <xs:complexType name="AddressType">
    <xs:sequence>
      <xs:element ref="PostalAddress" minOccurs="0"/>
      <xs:element ref="LPostalAddress" minOccurs="0" maxOccurs="unbounded"/>
```

EXAMPLE C–2 Personal Profile Service XSD File *(Continued)*

```
      <xs:element ref="PostalCode" minOccurs="0"/>
      <xs:element ref="L" minOccurs="0"/>
      <xs:element ref="LL" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="St" minOccurs="0"/>
      <xs:element ref="LSt" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="C" minOccurs="0"/>
      <xs:element ref="Extension" minOccurs="0"/>
    </xs:sequence>
    <xs:attributeGroup ref="commonAttributes"/>
  </xs:complexType>
  <xs:element name="PostalAddress" type="DSTString"/>
  <xs:element name="LPostalAddress" type="DSTLocalizedString"/>
  <xs:element name="PostalCode" type="DSTString"/>
  <xs:element name="L" type="DSTString"/>
  <xs:element name="LL" type="DSTLocalizedString"/>
  <xs:element name="St" type="DSTString"/>
  <xs:element name="LSt" type="DSTLocalizedString"/>
  <xs:element name="C" type="DSTString"/>
  <xs:element name="Nick" type="DSTString"/>
  <xs:element name="LNick" type="DSTLocalizedString"/>
  <xs:element name="LComment" type="DSTString"/>
  <xs:element name="MsgContact" type="MsgContactType"/>
  <xs:complexType name="MsgContactType">
    <xs:sequence>
      <xs:element ref="Nick" minOccurs="0"/>
      <xs:element ref="LNick" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="LComment" minOccurs="0"/>
      <xs:element ref="MsgType" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="MsgMethod" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="MsgTechnology" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="MsgProvider" minOccurs="0"/>
      <xs:element ref="MsgAccount" minOccurs="0"/>
      <xs:element ref="MsgSubaccount" minOccurs="0"/>
      <xs:element ref="Extension" minOccurs="0"/>
    </xs:sequence>
    <xs:attributeGroup ref="commonAttributes"/>
  </xs:complexType>
  <xs:element name="MsgType" type="DSTURI"/>
  <xs:element name="MsgMethod" type="DSTURI"/>
  <xs:element name="MsgTechnology">
    <xs:complexType>
      <xs:complexContent>
        <xs:extension base="DSTURI">
          <xs:attribute name="msgLimit" type="xs:integer" use="optional"/>
        </xs:extension>
      </xs:complexContent>
```

EXAMPLE C–2 Personal Profile Service XSD File *(Continued)*

```
    </xs:complexType>
  </xs:element>
  <xs:element name="MsgProvider" type="DSTString"/>
  <xs:element name="MsgAccount" type="DSTString"/>
  <xs:element name="MsgSubaccount" type="DSTString"/>
  <xs:element name="Facade" type="FacadeType"/>
  <xs:complexType name="FacadeType">
    <xs:sequence>
      <xs:element ref="MugShot" minOccurs="0"/>
      <xs:element ref="WebSite" minOccurs="0"/>
      <xs:element ref="NamePronounced" minOccurs="0"/>
      <xs:element ref="GreetSound" minOccurs="0"/>
      <xs:element ref="GreetMeSound" minOccurs="0"/>
      <xs:element ref="Extension" minOccurs="0"/>
    </xs:sequence>
    <xs:attributeGroup ref="commonAttributes"/>
  </xs:complexType>
  <xs:element name="MugShot" type="DSTURI"/>
  <xs:element name="WebSite" type="DSTURI"/>
  <xs:element name="NamePronounced" type="DSTURI"/>
  <xs:element name="GreetSound" type="DSTURI"/>
  <xs:element name="GreetMeSound" type="DSTURI"/>
  <xs:element name="Demographics" type="DemographicsType"/>
  <xs:complexType name="DemographicsType">
    <xs:sequence>
      <xs:element ref="DisplayLanguage" minOccurs="0"/>
      <xs:element ref="Language" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="Birthday" minOccurs="0"/>
      <xs:element ref="Age" minOccurs="0"/>
      <xs:element ref="TimeZone" minOccurs="0"/>
      <xs:element ref="Extension" minOccurs="0"/>
    </xs:sequence>
    <xs:attributeGroup ref="commonAttributes"/>
  </xs:complexType>
  <xs:element name="DisplayLanguage" type="DSTString"/>
  <xs:element name="Language" type="DSTString"/>
  <xs:element name="Birthday" type="DSTMonthDay"/>
  <xs:element name="Age" type="DSTInteger"/>
  <xs:element name="TimeZone" type="DSTString"/>
  <xs:element name="SignKey" type="KeyInfoType"/>
  <xs:element name="EncryptKey" type="KeyInfoType"/>
  <xs:element name="EmergencyContact" type="DSTString"/>
  <xs:element name="LEmergencyContact" type="DSTLocalizedString"/>
</xs:schema>
```

EXAMPLE C–2 Personal Profile Service XSD File *(Continued)*

Employee Profile Schema

Following is a reproduction of `liberty-idsis-ep-v1.0.xsd`, the XSD file that accompanies the *Liberty ID-SIS Employee Profile Service Specification* as discussed in Chapter 7.

EXAMPLE C–3 Employee Profile Service XSD Schema

```
<!-- Generated by gen-prof.pl  $Id: liberty-idsis-ep-v1.0.xsd,v 1.1 2004/08/02
19:25:27 dgreenspon Exp $from $Id: liberty-idsis-ep-v1.0.xsd,v 1.1 2004/08/02 19:25:27
dgreenspon Exp $ -->
<!-- adjust 2003-10-02 TDW: changed copyright -->
<xs:schema targetNamespace="urn:liberty:id-sis-ep:2003-08"
xmlns="urn:liberty:id-sis-ep:2003-08" xmlns:xs="http://www.w3.org/2001/XMLSchema"
elementFormDefault="qualified" version="1.0">
  <xs:annotation>
    <xs:documentation>Title: Liberty ID-SIS Employee Profile Services Schema</xs:documentation>
    <xs:documentation>The source code in this XSD file was excerpted verbatim from:

Liberty Liberty ID-SIS Employee Profile Service Specification
Version 1.2
12th November 2003

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https://www.projectliberty.org/specs/idwsf_copyrights.html

</xs:documentation>
  </xs:annotation>
  <xs:include schemaLocation="liberty-idwsf-dst-v1.0.xsd"/>
  <xs:include schemaLocation="liberty-idwsf-dst-dt-v1.0.xsd"/>
  <xs:element name="EP" type="EPType"/>
  <xs:complexType name="EPType">
    <xs:sequence>
      <xs:element ref="EmployeeID" minOccurs="0"/>
      <xs:element ref="AltEmployeeID" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="DateOfHire" minOccurs="0"/>
      <xs:element ref="JobStartDate" minOccurs="0"/>
      <xs:element ref="EmployeeStatus" minOccurs="0"/>
      <xs:element ref="EmployeeType" minOccurs="0"/>
      <xs:element ref="InternalJobTitle" minOccurs="0"/>
      <xs:element ref="LInternalJobTitle" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="OU" minOccurs="0"/>
      <xs:element ref="LOU" minOccurs="0" maxOccurs="unbounded"/>
```

EXAMPLE C–3 Employee Profile Service XSD Schema *(Continued)*

```
      <xs:element ref="CorpCommonName" minOccurs="0"/>
      <xs:element ref="CorpLegalIdentity" minOccurs="0"/>
      <xs:element ref="ManagerEmployeeID" minOccurs="0"/>
      <xs:element ref="SubalternateEmployeeID" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="Extension" minOccurs="0"/>
    </xs:sequence>
    <xs:attributeGroup ref="commonAttributes"/>
  </xs:complexType>
  <xs:element name="EmployeeID" type="DSTString"/>
  <xs:element name="AltEmployeeID" type="DSTString"/>
  <xs:element name="DateOfHire" type="DSTDate"/>
  <xs:element name="JobStartDate" type="DSTDate"/>
  <xs:element name="EmployeeStatus" type="DSTURI"/>
  <xs:element name="EmployeeType" type="DSTURI"/>
  <xs:element name="InternalJobTitle" type="DSTString"/>
  <xs:element name="LInternalJobTitle" type="DSTLocalizedString"/>
  <xs:element name="OU" type="DSTString"/>
  <xs:element name="LOU" type="DSTLocalizedString"/>
  <xs:element name="CorpCommonName" type="CorpCommonNameType"/>
  <xs:complexType name="CorpCommonNameType">
    <xs:sequence>
      <xs:element ref="CN" minOccurs="0"/>
      <xs:element ref="LCN" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="AltCN" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="LAltCN" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="Extension" minOccurs="0"/>
    </xs:sequence>
    <xs:attributeGroup ref="commonAttributes"/>
  </xs:complexType>
  <xs:element name="CN" type="DSTString"/>
  <xs:element name="LCN" type="DSTLocalizedString"/>
  <xs:element name="AltCN" type="DSTString"/>
  <xs:element name="LAltCN" type="DSTLocalizedString"/>
  <xs:element name="CorpLegalIdentity" type="CorpLegalIdentityType"/>
  <xs:complexType name="CorpLegalIdentityType">
    <xs:sequence>
      <xs:element ref="LegalName" minOccurs="0"/>
      <xs:element ref="LLegalName" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="VAT" minOccurs="0"/>
      <xs:element ref="AltID" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="Extension" minOccurs="0"/>
    </xs:sequence>
    <xs:attributeGroup ref="commonAttributes"/>
  </xs:complexType>
  <xs:element name="LegalName" type="DSTString"/>
  <xs:element name="LLegalName" type="DSTLocalizedString"/>
```

EXAMPLE C–3 Employee Profile Service XSD Schema *(Continued)*

```
  <xs:element name="VAT" type="VATType"/>
  <xs:complexType name="VATType">
    <xs:sequence>
      <xs:element ref="IDValue"/>
      <xs:element ref="IDType" minOccurs="0"/>
      <xs:element ref="Extension" minOccurs="0"/>
    </xs:sequence>
    <xs:attributeGroup ref="commonAttributes"/>
  </xs:complexType>
  <xs:element name="IDValue" type="DSTString"/>
  <xs:element name="IDType" type="DSTURI"/>
  <xs:element name="AltID" type="AltIDType"/>
  <xs:complexType name="AltIDType">
    <xs:sequence>
      <xs:element ref="IDValue"/>
      <xs:element ref="IDType" minOccurs="0"/>
      <xs:element ref="Extension" minOccurs="0"/>
    </xs:sequence>
    <xs:attributeGroup ref="commonAttributes"/>
  </xs:complexType>
  <xs:element name="ManagerEmployeeID" type="DSTString"/>
  <xs:element name="SubalternateEmployeeID" type="DSTString"/>
  <xs:simpleType name="SelectType">
    <xs:restriction base="xs:string"/>
  </xs:simpleType>
</xs:schema>
```

Authentication Web Service Schema

Following is a reproduction of `liberty-idwsf-authn-svc-v1.0.xsd`, the XSD file that accompanies the *Liberty ID-WSF Authentication Service Specification* as discussed in Chapter 6.

EXAMPLE C–4 Authentication Web Service XSD File

```
<?xml version="1.0" encoding="UTF-8"?>

<xs:schema
targetNamespace="urn:liberty:sa:2004-04"
xmlns:S="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:sa="urn:liberty:sa:2004-04"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
```

EXAMPLE C–4 Authentication Web Service XSD File *(Continued)*

```
xmlns:lib="urn:liberty:iff:2003-08"
xmlns:disco="urn:liberty:disco:2003-08"
xmlns="urn:liberty:sa:2004-04"
elementFormDefault="qualified"
attributeFormDefault="unqualified"
version="06">

<!-- Filename: lib-arch-authn-svc.xsd  -->
<!-- $Id: liberty-idwsf-authn-svc-v1.0.xsd,v 1.1 2004/08/02 19:25:27 dgreenspon Exp $ -->
<!-- Author: Jeff Hodges -->
<!-- Last editor: $Author: dgreenspon $ -->
<!-- $Date: 2004/08/02 19:25:27 $ -->
<!-- $Revision: 1.1 $ -->

  <xs:import
      namespace="urn:liberty:iff:2003-08"
      schemaLocation="liberty-idff-protocols-schema-v1.2.xsd"/>

  <xs:import
      namespace="urn:liberty:disco:2003-08"
      schemaLocation="liberty-idwsf-disco-svc-1.0-errata-v1.0.xsd"/>

  <xs:include schemaLocation="liberty-idwsf-utility-1.0-errata-v1.0.xsd"/>

  <xs:annotation>
      <xs:documentation>
          Liberty ID-WSF Authentication Service XSD
      </xs:documentation>
      <xs:documentation>
          The source code in this XSD file was excerpted verbatim from:
          Liberty ID-WSF Authentication Service Specification
          Version 1.0
          16 Feb 2004
          Copyright (c) 2003, 2004 Liberty Alliance participants,
          see http://www.projectliberty.org/specs/idwsf_copyrights.html
      </xs:documentation>
  </xs:annotation>

  <!-- SASLRequest and SASLResponse ID-* messages  -->

  <xs:element name="SASLRequest">
      <xs:complexType>
          <xs:sequence>

              <xs:element name="Data" minOccurs="0">
                  <xs:complexType>
```

EXAMPLE C–4 Authentication Web Service XSD File *(Continued)*

```
                    <xs:simpleContent>
                        <xs:extension base="xs:base64Binary"/>
                    </xs:simpleContent>
                </xs:complexType>
            </xs:element>

            <xs:element ref="lib:RequestAuthnContext"
                        minOccurs="0"/>

        </xs:sequence>

        <xs:attribute name="mechanism"
                      type="xs:string"
                      use="required"/>

        <xs:attribute name="authzID"
                      type="xs:string"
                      use="optional"/>

        <xs:attribute name="advisoryAuthnID"
                      type="xs:string"
                      use="optional"/>

        <xs:attribute name="id"
                      type="xs:ID"
                      use="optional"/>

    </xs:complexType>
</xs:element>


<xs:element name="SASLResponse">
    <xs:complexType>
        <xs:sequence>

            <xs:element ref="Status"/>

            <xs:element ref="PasswordTransforms" minOccurs="0"/>

            <xs:element name="Data" minOccurs="0">
                <xs:complexType>
                    <xs:simpleContent>
                        <xs:extension base="xs:base64Binary"/>
                    </xs:simpleContent>
                </xs:complexType>
            </xs:element>
```

EXAMPLE C–4 Authentication Web Service XSD File *(Continued)*

```
            <xs:element ref="disco:ResourceOffering"
                        minOccurs="0"
                        maxOccurs="unbounded"/>

            <xs:element name="Credentials" minOccurs="0">
                <xs:complexType>
                    <xs:sequence>
                        <xs:any namespace="##any"
                                processContents="lax"
                                minOccurs="0"
                                maxOccurs="unbounded"/>
                    </xs:sequence>
                 </xs:complexType>
             </xs:element>

         </xs:sequence>

         <xs:attribute name="serverMechanism"
                       type="xs:string"
                       use="optional"/>

         <xs:attribute name="id"
                       type="xs:ID"
                       use="optional"/>

    </xs:complexType>
</xs:element>

<!-- Password Transformations  -->

<xs:element name="PasswordTransforms">

    <xs:annotation>
        <xs:documentation>
            Contains ordered list of sequential password transformations
        </xs:documentation>
    </xs:annotation>

    <xs:complexType>
        <xs:sequence>

            <xs:element name="Transform" maxOccurs="unbounded">
                <xs:complexType>
                    <xs:sequence>
```

EXAMPLE C–4 Authentication Web Service XSD File *(Continued)*

```
                        <xs:element name="Parameter"
                                    minOccurs="0"
                                    maxOccurs="unbounded">
                            <xs:complexType>
                                <xs:simpleContent>
                                    <xs:extension base="xs:string">
                                        <xs:attribute name="name"
                                                      type="xs:string"
                                                      use="required"/>
                                    </xs:extension>
                                </xs:simpleContent>
                            </xs:complexType>
                        </xs:element>

                    </xs:sequence>

                    <xs:attribute name="name"
                                  type="xs:anyURI"
                                  use="required"/>

                    <xs:attribute name="id"
                                  type="xs:ID"
                                  use="optional"/>

                </xs:complexType>
            </xs:element>
        </xs:sequence>
    </xs:complexType>
  </xs:element>

</xs:schema>
```

PAOS Binding Schema

Following is a reproduction of `liberty-paos-1.0-errata-v1.0.xsd`, the XSD file that accompanies the *Liberty Reverse HTTP Binding for SOAP Specification*. This XSD file describes the structure of PAOS requests and responses. PAOS binding is discussed in Chapter 11.

EXAMPLE C–5 Reverse HTTP Binding for SOAP XSD File

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema targetNamespace="urn:liberty:paos:2003-08" xmlns:xs="http://www.w3.org/2001/XMLSchema"
```

EXAMPLE C–5 Reverse HTTP Binding for SOAP XSD File *(Continued)*

```
xmlns:S="http://schemas.xmlsoap.org/soap/envelope/" xmlns="urn:liberty:paos:2003-08"
elementFormDefault="qualified" attributeFormDefault="unqualified">
  <xs:annotation>
    <xs:documentation>The source code in this XSD file was excerpted verbatim from:

Liberty Reverse HTTP Binding
Version 1.0
12th November 2003

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https://www.projectliberty.org/specs/idwsf_copyrights.html

        </xs:documentation>
  </xs:annotation>
  <xs:import namespace="http://schemas.xmlsoap.org/soap/envelope/"
      schemaLocation="http://schemas.xmlsoap.org/soap/envelope/"/>
  <xs:include schemaLocation="liberty-utility-v1.0.xsd"/>
  <xs:element name="Request" type="RequestType"/>
  <xs:complexType name="RequestType">
    <xs:attribute name="responseConsumerURL" type="xs:anyURI" use="required"/>
    <xs:attribute name="service" type="xs:anyURI" use="required"/>
    <xs:attribute name="messageID" type="IDType" use="optional"/>
    <xs:attribute ref="S:mustUnderstand" use="required"/>
    <xs:attribute ref="S:actor" use="required"/>
  </xs:complexType>
  <xs:element name="Response" type="ResponseType"/>
  <xs:complexType name="ResponseType">
    <xs:attribute name="refToMessageID" type="IDType" use="optional"/>
    <xs:attribute ref="S:mustUnderstand" use="required"/>
    <xs:attribute ref="S:actor" use="required"/>
  </xs:complexType>
</xs:schema>
```

Metadata Description Schema

Following is a reproduction of `liberty-metadata-1.0-errata-v1.0.xsd`, the XSD file that accompanies the *Liberty Metadata Description and Discovery Specification*. This XSD file describes metadata, protocols for obtaining metadata, and resolution methods for discovering the location of metadata.

EXAMPLE C–6 Metadata Description and Discovery XSD File

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema targetNamespace="urn:liberty:metadata:2003-08" xmlns="urn:liberty:metadata:2003-08"
xmlns:ds="http://www.w3.org/2000/09/xmldsig#" xmlns:saml="urn:oasis:names:tc:SAML:1.0:assertion"
xmlns:xs="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified"
attributeFormDefault="unqualified" version="1.0">
  <xs:import namespace="http://www.w3.org/2000/09/xmldsig#"
   schemaLocation="http://www.w3.org/TR/xmldsig-core/xmldsig-core-schema.xsd"/>
  <xs:import namespace="urn:oasis:names:tc:SAML:1.0:assertion" schemaLocation="oasis-sstc-saml-schema-assertion-1.1.xs
  <xs:import namespace="http://www.w3.org/XML/1998/namespace" schemaLocation="http://www.w3.org/2001/xml.xsd"/>
  <xs:include schemaLocation="liberty-utility-v1.0.xsd"/>
  <xs:annotation>
    <xs:documentation>XML Schema fom Metadata description and discovery protocols</xs:documentation>
    <xs:documentation>The source code in this XSD file was excerpted verbatim from:

Liberty Metadata Description and Discovery Specification
Version 1.0
12th November 2003

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https://www.projectliberty.org/specs/idff_copyrights.html

</xs:documentation>
  </xs:annotation>
  <xs:simpleType name="entityIDType">
    <xs:restriction base="xs:anyURI">
      <xs:maxLength value="1024" id="maxlengthid"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:attribute name="libertyPrincipalIdentifier" type="entityIDType"/>
  <xs:attribute name="providerID" type="entityIDType"/>
  <xs:attribute name="validUntil" type="xs:dateTime"/>
  <xs:attribute name="cacheDuration" type="xs:duration"/>
  <xs:complexType name="additionalMetadataLocationType">
    <xs:simpleContent>
      <xs:extension base="xs:anyURI">
        <xs:attribute name="namespace" type="xs:anyURI"/>
      </xs:extension>
    </xs:simpleContent>
  </xs:complexType>
  <xs:complexType name="organizationType">
    <xs:sequence>
      <xs:element name="OrganizationName" type="organizationNameType" maxOccurs="unbounded"/>
      <xs:element name="OrganizationDisplayName" type="organizationDisplayNameType" maxOccurs="unbounded"/>
      <xs:element name="OrganizationURL" type="localizedURIType" maxOccurs="unbounded"/>
      <xs:element ref="Extension" minOccurs="0"/>
    </xs:sequence>
```

EXAMPLE C–6 Metadata Description and Discovery XSD File *(Continued)*

```
</xs:complexType>
<xs:complexType name="organizationNameType">
  <xs:simpleContent>
    <xs:extension base="xs:string">
      <xs:attribute ref="xml:lang"/>
    </xs:extension>
  </xs:simpleContent>
</xs:complexType>
<xs:complexType name="organizationDisplayNameType">
  <xs:simpleContent>
    <xs:extension base="xs:string">
      <xs:attribute ref="xml:lang" use="required"/>
    </xs:extension>
  </xs:simpleContent>
</xs:complexType>
<xs:complexType name="localizedURIType">
  <xs:simpleContent>
    <xs:extension base="xs:anyURI">
      <xs:attribute ref="xml:lang" use="required"/>
    </xs:extension>
  </xs:simpleContent>
</xs:complexType>
<xs:complexType name="contactType">
  <xs:sequence>
    <xs:element name="Company" type="xs:string" minOccurs="0"/>
    <xs:element name="GivenName" type="xs:string" minOccurs="0"/>
    <xs:element name="SurName" type="xs:string" minOccurs="0"/>
    <xs:element name="EmailAddress" type="xs:anyURI" minOccurs="0" maxOccurs="unbounded"/>
    <xs:element name="TelephoneNumber" type="xs:string" minOccurs="0" maxOccurs="unbounded"/>
    <xs:element ref="Extension" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute ref="libertyPrincipalIdentifier" use="optional"/>
  <xs:attribute name="contactType" type="attr.contactType" use="required"/>
</xs:complexType>
<xs:simpleType name="attr.contactType">
  <xs:restriction base="xs:string">
    <xs:enumeration value="technical"/>
    <xs:enumeration value="administrative"/>
    <xs:enumeration value="billing"/>
    <xs:enumeration value="other"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="keyTypes">
  <xs:restriction base="xs:string">
    <xs:enumeration value="encryption"/>
    <xs:enumeration value="signing"/>
```

EXAMPLE C–6 Metadata Description and Discovery XSD File *(Continued)*

```
    </xs:restriction>
  </xs:simpleType>
  <xs:complexType name="providerDescriptorType">
    <xs:sequence>
      <xs:element name="KeyDescriptor" type="keyDescriptorType" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="SoapEndpoint" type="xs:anyURI" minOccurs="0"/>
      <xs:element name="SingleLogoutServiceURL" type="xs:anyURI" minOccurs="0"/>
      <xs:element name="SingleLogoutServiceReturnURL" type="xs:anyURI" minOccurs="0"/>
      <xs:element name="FederationTerminationServiceURL" type="xs:anyURI" minOccurs="0"/>
      <xs:element name="FederationTerminationServiceReturnURL" type="xs:anyURI" minOccurs="0"/>
      <xs:element name="FederationTerminationNotificationProtocolProfile" type="xs:anyURI" minOccurs="0" maxOccurs="unb
      <xs:element name="SingleLogoutProtocolProfile" type="xs:anyURI" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="RegisterNameIdentifierProtocolProfile" type="xs:anyURI" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="RegisterNameIdentifierServiceURL" type="xs:anyURI" minOccurs="0"/>
      <xs:element name="RegisterNameIdentifierServiceReturnURL" type="xs:anyURI" minOccurs="0"/>
      <xs:element name="NameIdentifierMappingProtocolProfile" type="saml:AuthorityBindingType" minOccurs="0" maxOccurs=
      <xs:element name="NameIdentifierMappingEncryptionProfile" type="xs:anyURI" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="Organization" type="organizationType" minOccurs="0"/>
      <xs:element name="ContactPerson" type="contactType" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="AdditionalMetaLocation" type="additionalMetadataLocationType" minOccurs="0" maxOccurs="unbounde
      <xs:element ref="Extension" minOccurs="0"/>
      <xs:element ref="ds:Signature" minOccurs="0"/>
    </xs:sequence>
    <!--xs:attribute ref="providerID" use="required"/-->
    <xs:attribute name="protocolSupportEnumeration" type="xs:NMTOKENS" use="required"/>
    <xs:attribute name="id" type="xs:ID" use="optional"/>
    <xs:attribute ref="validUntil" use="optional"/>
    <xs:attribute ref="cacheDuration" use="optional"/>
  </xs:complexType>
  <!--added-->
  <xs:element name="KeyDescriptor" type="keyDescriptorType"/>
  <xs:complexType name="keyDescriptorType">
    <xs:sequence>
      <xs:element name="EncryptionMethod" type="xs:anyURI" minOccurs="0"/>
      <xs:element name="KeySize" type="xs:integer" minOccurs="0"/>
      <xs:element ref="ds:KeyInfo" minOccurs="0"/>
      <xs:element ref="Extension" minOccurs="0"/>
    </xs:sequence>
    <xs:attribute name="use" type="keyTypes" use="optional"/>
  </xs:complexType>
  <!-- -->
  <xs:element name="EntityDescriptor" type="entityDescriptorType"/>
  <xs:group name="providerGroup">
    <xs:sequence>
      <xs:element name="IDPDescriptor" type="IDPDescriptorType" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="SPDescriptor" type="SPDescriptorType" minOccurs="0" maxOccurs="unbounded"/>
```

EXAMPLE C–6 Metadata Description and Discovery XSD File *(Continued)*

```
    </xs:sequence>
  </xs:group>
  <xs:complexType name="entityDescriptorType">
    <xs:sequence>
      <xs:choice>
        <xs:group ref="providerGroup"/>
        <xs:element name="AffiliationDescriptor" type="affiliationDescriptorType"/>
      </xs:choice>
      <xs:element name="ContactPerson" type="contactType" minOccurs="0"/>
      <xs:element name="Organization" type="organizationType" minOccurs="0"/>
      <xs:element ref="Extension" minOccurs="0"/>
      <xs:element ref="ds:Signature" minOccurs="0"/>
    </xs:sequence>
    <xs:attribute ref="providerID" use="required"/>
    <xs:attribute name="id" type="xs:ID" use="optional"/>
    <xs:attribute ref="validUntil" use="optional"/>
    <xs:attribute ref="cacheDuration" use="optional"/>
  </xs:complexType>
  <xs:complexType name="SPDescriptorType">
    <xs:complexContent>
      <xs:extension base="providerDescriptorType">
        <xs:sequence>
          <xs:element name="AssertionConsumerServiceURL" maxOccurs="unbounded">
            <xs:complexType>
              <xs:simpleContent>
                <xs:extension base="xs:anyURI">
                  <xs:attribute name="id" type="xs:ID" use="required"/>
                  <xs:attribute name="isDefault" type="xs:boolean" default="false"/>
                </xs:extension>
              </xs:simpleContent>
            </xs:complexType>
          </xs:element>
          <xs:element name="AuthnRequestsSigned" type="xs:boolean"/>
        </xs:sequence>
      </xs:extension>
    </xs:complexContent>
  </xs:complexType>
  <xs:complexType name="IDPDescriptorType">
    <xs:complexContent>
      <xs:extension base="providerDescriptorType">
        <xs:sequence>
          <xs:element name="SingleSignOnServiceURL" type="xs:anyURI"/>
          <xs:element name="SingleSignOnProtocolProfile" type="xs:anyURI" maxOccurs="unbounded"/>
          <xs:element name="AuthnServiceURL" type="xs:anyURI" minOccurs="0"/>
        </xs:sequence>
      </xs:extension>
```

EXAMPLE C–6 Metadata Description and Discovery XSD File *(Continued)*

```
    </xs:complexContent>
  </xs:complexType>
  <xs:element name="EntitiesDescriptor" type="entitiesDescriptorType"/>
  <xs:complexType name="entitiesDescriptorType">
    <xs:sequence>
      <xs:element ref="EntityDescriptor" minOccurs="2" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="affiliationDescriptorType">
    <xs:sequence>
      <xs:element name="AffiliateMember" type="entityIDType" maxOccurs="unbounded"/>
      <xs:element ref="Extension" minOccurs="0"/>
      <xs:element name="KeyDescriptor" type="keyDescriptorType" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="ds:Signature" minOccurs="0"/>
    </xs:sequence>
    <!-- <xs:attribute name="affiliationID" type="entityIDType" use="required"/> -->
    <xs:attribute name="affiliationOwnerID" type="entityIDType" use="required"/>
    <xs:attribute ref="validUntil" use="optional"/>
    <xs:attribute ref="cacheDuration" use="optional"/>
    <xs:attribute name="id" type="xs:ID" use="optional"/>
  </xs:complexType>
</xs:schema>
```

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