IBM SPSS Collaboration and Deployment Services 5 Authentication Service Developer's Guide

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Preface

This guide is intended for developers working with the web services available in IBM® SPSS® Collaboration and Deployment Services. Users should have experience writing web service client applications and are assumed to have knowledge of IBM Corp. applications, Java and .NET development, data modeling concepts, and related technologies.

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Introduction to web services

What are web services?

At a high level, a **web service** is a set of functionality distributed across a network (LAN or the Internet) using a common communication protocol. The web service serves as an intermediary between an application and its clients, providing both a standardized information structure and a standardized communication protocol for interaction between the two. Where other methods of distributed application architecture rely on a single programming language being used on both the application and its clients, a web service allows the use of loosely coupled services between non-homogenous platforms and languages. This provides a non-architecture-specific approach allowing, for example, Java services to communicate with C# clients, or vice-versa.

Advantages to implementing application functionality as web services include the following:

- Software written in different languages (Java or C#) running on different platforms (UNIX or Windows) can exchange services and data

- Application functionality can be accessed by a variety of clients. For example, both a thin-client interface and a rich-client interface can take advantage of the web service operations.

- Updates to the service are immediately available to all service clients

Web service system architecture

Web services are deployed and made publicly available using an application server, such as WebSphere®, JBoss Application Server, or Oracle WebLogic Server. The published web services are hosted by this application server to handle application requests, access permissions, and process load. A high-level architecture of how web services are implemented is displayed in the following diagram.

Figure 1-1
Web service architecture
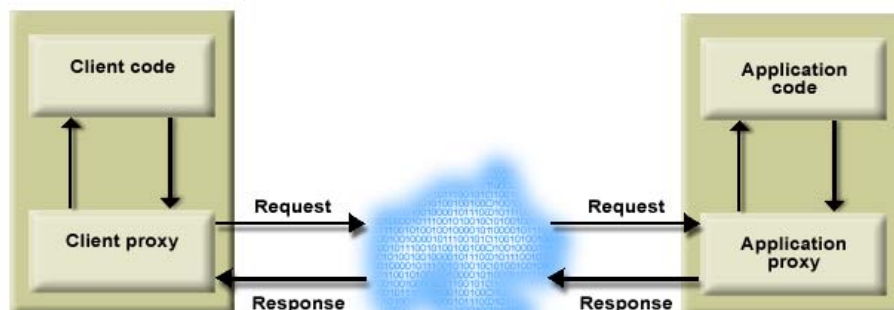
The client code supplies input to an operation offered by a proxy class. The proxy class generates a request containing a standardized representation of the input and sends it across the network to the application. A proxy class on the server receives the request and unmarshals the contents into objects for processing by the application. Upon completing the operation, the application supplies a proxy with the output. The proxy creates a standardized representation of that output and sends the response back to the client. The client proxy unmarshals the response into native objects for subsequent processing by the client code.

Standardizing the format of the information passing between the client and the application allows a client written in one programming language to communicate with an application written in another. The proxy classes, which are automatically generated from a web service description by a variety of toolkits, handle the translation between native programming objects and the standardized representation. For more information, see the topic Proxies on p. 6.

Web service protocol stack

A web service implementation depends on technologies often organized in a layered stack. The implementation itself defines a standard protocol for each technology layer, with each layer depending on the layers appearing below it in the stack.

Figure 1-2
Web service protocol stack
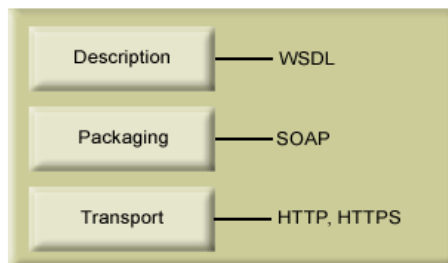
Beginning at the bottom of the stack, the Transport layer defines the technology standards for communication, allowing information to move across the network. HTTP or HTTPS are often used as the standard for the transport layer.

The Packaging layer rests on top of Transport and defines the standard for structuring information for transport across the network. The SOAP format is commonly used, which offers an XML structure for packaging the data. For more information, see the topic Simple Object Access Protocol on p. 3.

The topmost layer is Description and identifies the standards used by the layers below it in the stack, as well as providing the definition of the interface available for client use. The most common means of conveying this information is through the use of a WSDL file. For more information, see the topic Web Service Description Language on p. 3.

Simple Object Access Protocol

The Simple Object Access Protocol (SOAP) is a way to pass information between applications in an XML format. SOAP messages are transmitted from the sending application to the receiving application, typically over an HTTP session. The actual SOAP message is made up of the Envelope element, which contains a Body element and an optional Header element.

■ **Envelope.** This mandatory element is the root of the SOAP message, identifying the transmitted XML as being a SOAP packet. An envelope contains a body section and an optional header section.

■ **Header.** This optional element provides an extension mechanism indicating processing information for the message. For example, if the operation using the message requires security credentials, those credentials should be part of the envelope header.

■ **Body.** This element contains the message payload, the raw data being transmitted between the sending and receiving applications. The body itself may consist of multiple child elements, with an XML schema typically defining the structure of this data.

A SOAP packet and the corresponding XML is structured in the following way:

Figure 1-3
An example SOAP packet
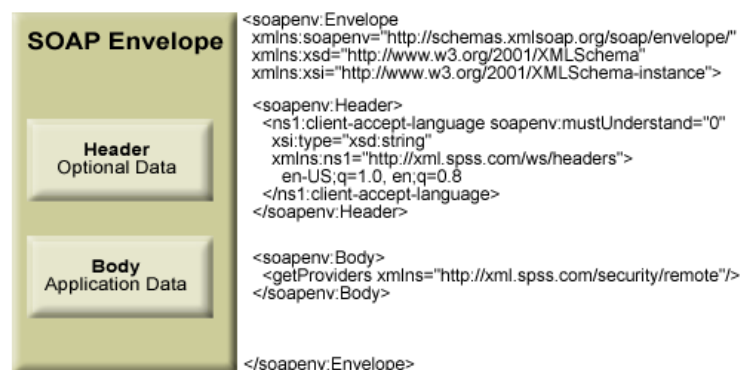
Web Service Description Language

A Web Service Description Language (WSDL) file provides an XML-based map of what functionality the published web service allows, separating the implementation in the service from the interface. The WSDL defines the following:

■ The access location of the web service

■ Operations the web service exposes

■ Parameters the exposed operations accept

■ Any request or response messages associated with the operations

The WSDL provides the information necessary to generate a client-side proxy in the desired programming language.

In accordance with the WSDL specification (*http://www.w3.org/TR/wsdl*) adopted by the World Wide Web Consortium, information in the WSDL is organized into the following sections:

- **Types.** Content definitions for web service operation input and output. For more information, see the topic Types on p. 4.

- **Messages.** Input and output definitions for the web service operations. For more information, see the topic Messages on p. 5.

- **PortTypes.** Groups of operations offered by the web service. For more information, see the topic Port types on p. 5.

- **Bindings.** Protocols and formats for the web service operations. For more information, see the topic Bindings on p. 5.

- **Services.** Endpoints at which the web service functionality can be accessed. For more information, see the topic Services on p. 6.

Types

The types element of a WSDL file contains the data type definitions employed by messages processed by the web service. These definitions use XML to organize the information relevant to the type element being defined. Consider the following example type definitions:

```
<wsdl:types>
 <schema targetNamespace="http://xml.spss.com/security/remote"
  xmlns="http://www.w3.org/2001/XMLSchema">
  <element name="getProviders">
   <complexType />
  </element>
  <element name="getProvidersResponse">
   <complexType>
    <sequence>
     <element name="providerInfo[unbounded]" type="tns1:providerInfo" />
    </sequence>
   </complexType>
  </element>
 </schema>
</wsdl:types>
```

This section defines two elements, *getProviders* and *getProvidersResponse*. The former is an empty element. The latter contains a sequence of *providerInfo* child elements. These children are all of the *providerInfo* type, which is defined elsewhere.

In practice, the WSDL file typically references type element definitions found in an external XML schema. For instance, the following definition uses *security-remote.xsd* to define type elements.

```
<wsdl:types>
 <xs:schema>
  <xs:import namespace="http://xml.spss.com/security/remote"
   schemaLocation="security-remote.xsd"/>
 </xs:schema>
</wsdl:types>
```

Messages

The message elements of a WSDL file defines the input or output parameters for operations available in the web service. Each message can consist of one or more parts, with the parts similar to the parameters of a function call in a traditional programming language. Consider the following two example message definitions:

```
<wsdl:message name="getProvidersResponse">
 <wsdl:part element="tns2:getProvidersResponse" name="parameters" />
</wsdl:message>
<wsdl:message name="getProvidersRequest">
 <wsdl:part element="tns2:getProviders" name="parameters" />
</wsdl:message>
```

The *getProvidersResponse* message contains a single part, corresponding to the *getProvidersResponse* element defined in the types section of the WSDL file. Similarly, the *getProvidersRequest* message also contains a single part, as defined by the *getProviders* element in the types section. For more information, see the topic Types on p. 4.

Port types

The portType element of a WSDL file defines the actual interface to the web service. A port type is simply a group of related operations and is comparable to a function library, module, or class in a traditional programming language. The definition specifies the parameters for the operations, as well as any values returned. The parameters and return values correspond to messages defined elsewhere in the WSDL file. Consider the following example port type definition:

```
<wsdl:portType name="ProviderInformation">
 <wsdl:operation name="getProviders">
  <wsdl:input message="impl:getProvidersRequest" name="getProvidersRequest" />
  <wsdl:output message="impl:getProvidersResponse" name="getProvidersResponse" />
 </wsdl:operation>
</wsdl:portType>
```

The *ProviderInformation* port type consists of a single operation, *getProviders*. Input to this operation corresponds to the *getProvidersRequest* message. The operation returns information in the structure defined by the *getProvidersResponse* message. For more information, see the topic Messages on p. 5.

Bindings

The binding element of a WSDL file binds the interface defined by the port type to transport and messaging protocols. Consider the following example binding definition:

```
<wsdl:binding name="ProviderInformationSoapBinding" type="impl:ProviderInformation">
 <wsdlsoap:binding style="document" transport="http://schemas.xmlsoap.org/soap/http" />
 <wsdl:operation name="getProviders">
  <wsdlsoap:operation soapAction="" />
  <wsdl:input name="getProvidersRequest">
   <wsdlsoap:body namespace="http://xml.spss.com/security/remote" use="literal" />
```

```
    </wsdl:input>
    <wsdl:output name="getProvidersResponse">
     <wsdlsoap:body namespace="http://xml.spss.com/security" use="literal" />
    </wsdl:output>
   </wsdl:operation>
</wsdl:binding>
```

In this case, the transport attribute of the wsdlsoap:binding element defines HTTP as the transport protocol. The *getProviders* operation in the interface is bound to the SOAP messaging protocol.

Services

The service element of a WSDL file identifies the network location at which the service interface can be accessed. Consider the following example service definition:

```
<wsdl:service name="ProviderInformationService">
 <wsdl:port binding="impl:ProviderInformationSoapBinding" name="ProviderInformation">
  <wsdlsoap:address location="http://pes_server:8080/security-ws/services/ProviderInformation" />
 </wsdl:port>
</wsdl:service>
```

In this example, the operations comprising the *ProviderInformation* port type can be accessed at:

http://pes_server:8080/security-ws/services/ProviderInformation

Proxies

Proxies serve as bridges between the client and the web service. A client-side proxy marshals the input objects into a standardized representation which is sent to the web service. A server-side proxy unmarshals the information into input objects for the service operations. The results of the operation are marshalled into standard representations and returned to the client. The client proxy unmarshals the response information into objects for any additional processing by the client.

Creating a proxy is the first step when developing a web service client; the proxy is the translation-unit between your application and the web service the application is using. Fortunately, many development environments include tools for automatically generating the client proxy from the web service WSDL file, allowing the client developer to focus on the client application code instead of transport and packaging protocols.

The proxy classes generated from a WSDL file depend on the tool used. For Java, the *wsdl2java* tool, which is part of the Apache Axis project, can be used. This tool produces a Java class for each type in the WSDL. Each port type results in a Java interface. A binding creates a stub class, and a WSDL service yields a service interface with a locator implementation. These generated classes and interfaces can be called directly from a client application written in Java to access the web service functionality.

An alternative Java proxy tool is *wsimport*, which is part of JAX-WS. The general structure of the generated classes is similar to that created by the Axis tool, but there are some differences. For example, instead of using arrays for input fields and returned items, the code generated from the *wsimport* tool uses List collections. In addition, if an input type matches an output type for a method, the *wsimport* tool uses a Holder class for the parameter.

In contrast, on the .NET platform, the *wsdl.exe* tool is often used to generate a web service proxy. This tool creates a single source file in a specified language containing the proxy class. This class includes both synchronous and asynchronous methods for each operation defined in the WSDL. For example, the web service operation *getProviders* results in the methods *getProviders*, *getProvidersBegin*, and *getProvidersEnd*. The latter two can be used for asynchronous processing.

A variety of other tools exist for other programming languages. For details, consult the documentation for those tools. In each case, the tool creates native programming constructs that permit leveraging a web service regardless of the service implementation language.

Authentication Service overview

The Authentication Service provides methods for users of client applications to connect to and disconnect from the IBM® SPSS® Collaboration and Deployment Services server. When a user attempts to log in to the system, the service provides access if the user credentials are valid. For a valid user, the service reports information about the user, such as actions the user can perform, as controlled by the authorization mechanism. In addition, the Authentication Service offers validated users the ability to modify their passwords.

Accessing the Authentication Service

To access the functionality offered by the Authentication Service, create a client application using the proxy classes generated by your preferred web service tool. The endpoint for the service is:

http://<host-name>:<port-number>/security-ws/services/Authentication

The value of *<host-name>* corresponds to the machine on which IBM® SPSS® Collaboration and Deployment Services Repository is installed, with *<port-number>* indicating the port number on which it is running. To access the WSDL file for the service, append *?wsdl* to the service endpoint.

For example, if IBM SPSS Collaboration and Deployment Services Repository is running on port 80 of the machine *cads_server*, the WSDL file can be accessed using the path:

http://cads_server:80/security-ws/services/Authentication?wsdl

Calling Authentication Service operations

Clients access the operations offered by the web service using a stub for the service. The following is an example of how to acquire a stub in Java through Axis defined methods:

```
String context = "/security-ws/services/Authentication";
URL url = new URL("http", "cads_server", 80, context);
AuthenticationService service = new AuthenticationServiceLocator();
stub = service.getAuthentication(url);
```

The service operations can be called directly from the stub, such as:

```
stub.login();
```

Authentication Service concepts

Logging in

To interact with IBM® SPSS® Collaboration and Deployment Services, a user must log into the system using valid credentials created by an administrator. However, the functionality available may vary across users. To allow a client application to respond appropriately to a user's functional capabilities, IBM SPSS Collaboration and Deployment Services returns information about the user logging in and the server being logged into. This capabilities information can be classified into three primary categories, as follows:

- Actions available to the user
- Services available on the server
- Configuration settings for the server

Actions

An action is something the user can do. The ability to perform an action is controlled by the IBM® SPSS® Collaboration and Deployment Services access control mechanism. Access control can be applied to objects in the repository or to actions. Think of repository objects as nouns and actions as verbs. Both can have access control lists. Users, groups, or roles can be authorized to deal with these nouns or verbs.

The list of actions in the capabilities information are those that a specified user can actually use. If the user has administrative rights, then the list will contain all of the actions defined in the installation. A non-administrative user will have a subset of actions and may have none. Typical available actions include the following:

- **Access Contents and Folders.** Access the IBM® SPSS® Collaboration and Deployment Services Repository.
- **Access Syndicated Feeds.** Access syndicated feeds such as RSS (Really Simple Syndication) feeds.
- **Configuration.** Modify repository settings.
- **Configure Model.** Configure models for scoring.
- **Create Subscriptions.** Create individual subscribtions to repository objects, such as folders, files, jobs, etc. The subscribers receive e-mail messages when changes are made to the corresponding objects.
- **Define and Manage Notifications.** Define and manage notifications for multiple individuals for events such as job success or failure.
- **Define Credentials.** Create, view, and modify security credentials for execution servers.
- **Define Custom Properties.** Define and modify custom properties for objects within the repository.

- **Define Datasources.** Define and modify data sources.
- **Define Message Domains.** Define and modify domains for JMS messaging.
- **Define Promotion Policies.** Define and modify policies (sets of rules) for promoting repository objects.
- **Define Server Clusters.** Define and modify execution server clusters.
- **Define Servers.** Define and modify execution servers.
- **Define Topics.** Define and modify topic hierarchy for the repository.
- **Job Edit.** Create and modify jobs. Note that job visibility to a user is determined by permissions.
- **Job Run.** Execute jobs. Note that job visibility to a user is determined by permissions.
- **Manage Locks** Manage locks that users create on repository resources, for example, unlock resources locked by others.
- **Manage IBM® SPSS® Collaboration and Deployment Services Enterprise View.** Create, modify, and delete Enterprise Views, Application Views, and Data Provider Definitions.
- **Manage Subscriptions.** Manage other users' subscriptions, and delete subscriptions.
- **MIME Types.** Manage MIME type mappings for the repository.
- **Promote Objects.** Promote repository objects.
- **Repository Index.** Reindex the contents of the repository.
- **Run Custom Dialogs** Run IBM® SPSS® Statistics custom dialogs.
- **Run Report Dynamically.** Run dynamic reports, such as Business Intelligence Reporting Tools (BIRT) reports, in IBM® SPSS® Collaboration and Deployment Services Deployment Portal.
- **Schedules.** Manage job schedules.
- **Score Model.** Score models.
- **Show All Versions.** View all versions of objects (labeled and unlabeled) in Deployment Portal. By default, users are able to see only labeled versions in Deployment Portal.
- **Show latest.** View only the latest version of objects.
- **Submit Work** Submit work (for example, reports) for processing by IBM SPSS Collaboration and Deployment Services.
- **User Preference Administration.** Manage the preferences of other users. Note that IBM SPSS Collaboration and Deployment Services products do not provide any user interfaces for modifying the preferences of other users. This setting only applies if calling the User Preference Web Service directly.
- **View Expired Files.** View expired content, such as files and jobs.
- **View Model Management Dashboard.** View model management dashboards in IBM® SPSS® Collaboration and Deployment Services Deployment Manager and Deployment Portal.

Note:Show latest action is a subset of *Show All Versions* and if a user has both actions, *Show All Versions* supersedes *Show latest*.

The most important piece of information about an action is its resource ID. This is a non-localized, internal identifier of the action. Much of the time the client is only interested in whether the user has access to the action or not. In such cases, the client should examine the list of actions for the user and see if the resource ID exists. If it does, the user can do something with the action. That information can be used to modify the client interface accordingly. For example, if the resource ID for *Export Content* is present in the capabilities information, a menu item for exporting can be enabled for a user.

Services

IBM® SPSS® Collaboration and Deployment Services includes a variety of web services. Service information includes a list of all services available using a resource ID to identify each. A client can use the resource IDs to access the services without a need to hard-code the URL path of each service.

For example, if the repository is running on port *80* of *cds_server*, the Provider Information Service has a resource ID of *security/providers* with a URL of:

http://cds

A client should use the service information to build a map of resource ID to service URLs. The URLs are suitable for being passed to a service locator, usually generated by a proxy code generator.

Configuration

Configuration information identifies modifiable properties of the repository. Services may offer these configurable items to allow control over settings used. The items can be presented to a client user to be customized as needed. Configuration items are characterized by the following properties:

- A *configkey* used to internally access the item
- A *name* used to identify the item
- A *group* identifier used to classify similar items together

For example, the configuration item for allowing a guest user has a name of *Allow guest user* with a configkey of *com.spss.security/enableGuest*. The item belongs to the group *Security*, allowing it be grouped with other security-related items in client interfaces. The default value is *0*.

All values for configuration items are stored as strings, with boolean values stored as "0" and "1." Some items can have a collection of values, but most only have one. In addition, items without values are possible.

Logging out

Logging out involves disconnecting a user from the repository. The act of logging out returns two pieces of information about the user session, as follows:

- Time the user logged in
- Duration of the session

Operation reference

The changePassword operation

Changes the current user's password to a new value.

Input fields

The following table lists the input fields for the `changePassword` operation.

Table 4-1
Fields for changePassword

Field	Type/Valid Values	Description
changePassword	changePassword	Password information for the user. The userID, security provider, and domain are obtained using the current authenticated subject.

Return information

The following table identifies the information returned by the `changePassword` operation.

Table 4-2
Return Value

Type	Description
string	General purpose response. Just a string.

Java example

Changing a password involves the specification of two pieces of information in a `ChangePassword` object: the old password and the new password. Supply the `changePassword` operation with this object to perform the change.

```
ChangePassword cp = new ChangePassword();
cp.setNewPassword("newpwd");
cp.setOldPassword("password");
String status = stub.changePassword(cp);
```

SOAP request example

Client invocation of the `changePassword` operation generates a SOAP request message that is sent to the server for processing. An example of such a message follows.

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
```

```
        xmlns:xsd="http://www.w3.org/2001/XMLSchema"
        xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
        <soapenv:Header>
         <wsse:Security soapenv:actor="http://schemas.xmlsoap.org/soap/actor/next"
          soapenv:mustUnderstand="0"
          xmlns:wsse="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd">
          <wsse:UsernameToken>
           <wsse:Username>validUser</wsse:Username>
           <wsse:Password>password</wsse:Password>
          </wsse:UsernameToken>
         </wsse:Security>
         <ns1:client-accept-language soapenv:actor="http://schemas.xmlsoap.org/soap/actor/next"
          soapenv:mustUnderstand="0" xmlns:ns1="http://xml.spss.com/ws/headers">
          en-US;q=1.0, en;q=0.8</ns1:client-accept-language>
        </soapenv:Header>
        <soapenv:Body>
         <changePassword xmlns="http://xml.spss.com/security/remote">
          <ns2:changePassword oldPassword="password" newPassword="newpwd"
           xmlns:ns2="http://xml.spss.com/security"/>
         </changePassword>
        </soapenv:Body>
       </soapenv:Envelope>
```

SOAP response example

The server responds to a changePassword operation call by sending a SOAP response message containing the results. An example of such a message follows.

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
 xmlns:xsd="http://www.w3.org/2001/XMLSchema"
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
 <soapenv:Body>
  <changePasswordResponse xmlns="http://xml.spss.com/security/remote">
   <ns1:status xmlns:ns1="http://xml.spss.com/security">OK</ns1:status>
  </changePasswordResponse>
 </soapenv:Body>
</soapenv:Envelope>
```

The getVersion operation

Returns the version number of the service.

Return information

The following table identifies the information returned by the getVersion operation.

Table 4-3
Return Value

Type	Description
string	The version of the web service.

Java example

The following code uses the WSConnections class to return stubs for the services. The getVersion
operation returns the version number of each returned service to the standard output.

```
String host = "localhost";
    int port = 80;
    boolean useSSL = false;
    String username = "admin";
    String password = "spss";
    String acceptLanguage = "en_us";

    // create an instance of the WebServiceConnections, passing in all the
    // relevant connection information.
    WebServiceConnections wsConnections = new WebServiceConnections(host,
        port, useSSL, username, password, acceptLanguage);

CapabilityInformation capabilityInformation = wsConnections.getCapabilityInformation();
    System.out.println("CapabilityInformation version = " + capabilityInformation.getVersion());

DirectoryManagement directoryManagement = wsConnections.getDirectoryManagement();
    System.out.println("Directory Management version = " + directoryManagement.getVersion());

ProviderInformation providerInformation = wsConnections.getProviderInformation();
    System.out.println("ProviderInformation version = " + providerInformation.getVersion());

DirectoryInformation directoryInformation = wsConnections.getDirectoryInformation();
    System.out.println("DirectoryInformation version = " + directoryInformation.getVersion());

Authentication authentication = wsConnections.getAuthentication();
    System.out.println("Authentication version = " + authentication.getVersion());

SSODirectoryManagement ssoDirectoryManagement = wsConnections.getSSODirectoryManagement();
    System.out.println("SSODirectoryManagement version = " + ssoDirectoryManagement.getVersion());
```

SOAP request example

Client invocation of the getVersion operation generates a SOAP request message that is sent to the
server for processing. An example of such a message follows.

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
 xmlns:xsd="http://www.w3.org/2001/XMLSchema"
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
```

```
 <soapenv:Body>
  <getVersion xmlns="http://xml.spss.com/security/remote"/>
 </soapenv:Body>
</soapenv:Envelope>
```

SOAP response example

The server responds to a getVersion operation call by sending a SOAP response message containing the results. An example of such a message follows.

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
 xmlns:xsd="http://www.w3.org/2001/XMLSchema"
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
 <soapenv:Body>
  <getVersionResponse xmlns="http://xml.spss.com/security/remote">
   <version>4.20.000</version>
  </getVersionResponse>
 </soapenv:Body>
</soapenv:Envelope>
```

The login operation

Logs a user into the system, returning information about the actions, services, and configuration of the IBM® SPSS® Collaboration and Deployment Services server. This information is useful in the determination of how a client interacts with the server.

Return information

The following table identifies the information returned by the login operation.

Table 4-4
Return Value

Type	Description
capabilities	The capabilities of the server and how they are available for the user. A client should usually ask for this as a part of a user login operation.

Java example

To login, call the login operation for the service stub. This operation returns a Capabilities object from which actions, services, and configuration information can be obtained.

```
Capabilities cap = stub.login();
Actions act = cap.getActions();
```

SOAP request example

Client invocation of the login operation generates a SOAP request message that is sent to the
server for processing. An example of such a message follows.

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
 xmlns:xsd="http://www.w3.org/2001/XMLSchema"
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
 <soapenv:Header>
  <wsse:Security soapenv:mustUnderstand="0"
   xmlns:wsse="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd">
   <wsse:UsernameToken>
    <wsse:Username xsi:type="xsd:string">validUser</wsse:Username>
    <wsse:Password xsi:type="xsd:string">password</wsse:Password>
   </wsse:UsernameToken>
  </wsse:Security>
  <ns1:client-accept-language soapenv:mustUnderstand="0" xsi:type="xsd:string"
   xmlns:ns1="http://xml.spss.com/ws/headers">en-US;q=1.0, en;q=0.8</ns1:client-accept-language>
 </soapenv:Header>
 <soapenv:Body>
  <getCapabilities xmlns="http://xml.spss.com/security/remote"/>
 </soapenv:Body>
</soapenv:Envelope>
```

SOAP response example

The server responds to a login operation call by sending a SOAP response message containing the
results. An example of such a message follows.

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
 xmlns:xsd="http://www.w3.org/2001/XMLSchema"
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
 <soapenv:Body>
  <getCapabilitiesResponse xmlns="http://xml.spss.com/security/remote">
   <ns1:capabilities platformVersion="2.5 (2.50.000.335) at 04/04/2007 22:13:59:921 CDT)"
    stamp="2007-04-06T10:25:20.617-05:00" host="http://pes_server.spss.com:80"
    userID="validUser" primaryPrincipalID="//uNative//validuser"
    xmlns:ns1="http://xml.spss.com/security">
    <ns1:actions>
     <ns1:action name="Repository Index" description="Reindex the repository contents."
      resourceID="contentRepository/index" url="/cr/index">
      <ns1:navItems>
       <ns1:navItem locus="bookkeeper" name="Repository Index" order="0"/>
      </ns1:navItems>
      <ns1:permissions><ns1:permission>/perform</ns1:permission></ns1:permissions>
     </ns1:action>
     <ns1:action name="Manage Subscriptions"
      description="Manage other users' subscriptions, for example, delete subscriptions"
      resourceID="notification/manageIndividualSubscriptions">
```

```
<ns1:navItems/>
<ns1:permissions><ns1:permission>/perform</ns1:permission></ns1:permissions>
</ns1:action>
<ns1:action name="Birt Installer" description="Birt Designer Installer"
 resourceID="peaInstall/birtDesignerInstall" url="/birtdesignerinstall">
 <ns1:navItems>
   <ns1:navItem locus="bookkeeper" name="Birt Installer" order="0"/>
 </ns1:navItems>
 <ns1:permissions><ns1:permission>/perform</ns1:permission></ns1:permissions>
</ns1:action>
<ns1:action name="Define and Manage Notifications"
 description="Define notifications of job processing events and content changes for multiple recipients"
 resourceID="notification/multicastSubscriptions">
 <ns1:navItems/>
 <ns1:permissions><ns1:permission>/perform</ns1:permission></ns1:permissions>
</ns1:action>
<ns1:action name="Define Custom Properties"
 description="Define and modify custom properties for repository objects"
 resourceID="contentRepository/customProperties">
 <ns1:navItems/>
 <ns1:permissions><ns1:permission>/perform</ns1:permission></ns1:permissions>
</ns1:action>
<ns1:action name="Run Report Dynamically"
 description="Permission to Run Report dynamically" resourceID="erExtension/RunReport"
 url="/erExtension/RunReport">
 <ns1:navItems/>
 <ns1:permissions><ns1:permission>/perform</ns1:permission></ns1:permissions>
</ns1:action>
<ns1:action name="Define Datasources"
 description="Create and modify data source definitions"
 resourceID="contentRepository/datasources">
 <ns1:navItems/>
 <ns1:permissions><ns1:permission>/perform</ns1:permission></ns1:permissions>
</ns1:action>
<ns1:action name="Manage Enterprise View"
 description="Allows user to create, edit, and delete Enterprise Views, Application Views,
   and Data Provider Definitions."
 resourceID="pev/managePevId">
 <ns1:navItems/>
 <ns1:permissions><ns1:permission>/perform</ns1:permission></ns1:permissions>
</ns1:action>
<ns1:action name="Access Contents and Folders" description="Access the repository"
 resourceID="contentRepository/folders">
 <ns1:navItems/>
 <ns1:permissions><ns1:permission>/perform</ns1:permission></ns1:permissions>
</ns1:action>
<ns1:action name="Define Servers" description="Create and modify execution servers"
 resourceID="contentRepository/servers">
 <ns1:navItems/>
 <ns1:permissions><ns1:permission>/perform</ns1:permission></ns1:permissions>
</ns1:action>
<ns1:action name="Submit Work"
```

```
 description="Allow work (e.g. reports) to be submitted to the Process Management System"
 resourceID="prms/submitwork">
 <ns1:navItems/>
 <ns1:permissions><ns1:permission>/perform</ns1:permission></ns1:permissions>
</ns1:action>
<ns1:action name="Export Content" description="Export repository folder content"
 resourceID="contentRepository/export">
 <ns1:navItems/>
 <ns1:permissions><ns1:permission>/perform</ns1:permission></ns1:permissions>
</ns1:action>
<ns1:action name="User Preference Administration"
 description="Manage the preferences of other users" resourceID="userPref/Admin">
 <ns1:navItems/>
 <ns1:permissions><ns1:permission>/perform</ns1:permission></ns1:permissions>
</ns1:action>
<ns1:action name="Import Content"
 description="Import folders that have been exported from the repository"
 resourceID="contentRepository/import">
 <ns1:navItems/>
 <ns1:permissions><ns1:permission>/perform</ns1:permission></ns1:permissions>
</ns1:action>
<ns1:action name="MIME Types" description="Manage MIME types and icons."
 resourceID="configuration/MimeManager" url="/config/mimeManager">
 <ns1:navItems>
   <ns1:navItem locus="bookkeeper" name="MIME Types" order="0"/>
 </ns1:navItems>
 <ns1:permissions><ns1:permission>/perform</ns1:permission></ns1:permissions>
</ns1:action>
<ns1:action name="Configuration" description="Modify system-wide settings"
 resourceID="configuration/Editor" url="/config/config">
 <ns1:navItems>
   <ns1:navItem locus="bookkeeper" name="Configuration" order="0"/>
 </ns1:navItems>
 <ns1:permissions><ns1:permission>/perform</ns1:permission></ns1:permissions>
</ns1:action>
<ns1:action name="View Expired Files" description="View expired content"
 resourceID="contentRepository/showExpired">
 <ns1:navItems/>
 <ns1:permissions><ns1:permission>/perform</ns1:permission></ns1:permissions>
</ns1:action>
<ns1:action name="Define Topics"
 description="Define and modify the repository topic hierarchy"
 resourceID="contentRepository/topics">
 <ns1:navItems/>
 <ns1:permissions><ns1:permission>/perform</ns1:permission></ns1:permissions>
</ns1:action>
<ns1:action name="Schedules" description="Create and modify schedules for jobs"
 resourceID="prms/schedules">
 <ns1:navItems/>
 <ns1:permissions><ns1:permission>/perform</ns1:permission></ns1:permissions>
</ns1:action>
<ns1:action name="Jobs"
```

```
        description="Create and modify jobs.
          Note: Use appropriate object security/permissions to restrict visibility to jobs."
        resourceID="prms/jobs">
        <ns1:navItems/>
        <ns1:permissions><ns1:permission>/perform</ns1:permission></ns1:permissions>
      </ns1:action>
      <ns1:action name="Define Credentials"
        description="Create and modify security credentials for execution servers"
        resourceID="contentRepository/credentials">
        <ns1:navItems/>
        <ns1:permissions><ns1:permission>/perform</ns1:permission></ns1:permissions>
      </ns1:action>
      <ns1:action name="Show All Versions"
        description="View all versions (labelled and unlabelled) of files in Deployment Portal"
        resourceID="consumerUI/ShowAllVersions" url="consumerUI/ShowAllVersions">
        <ns1:navItems/>
        <ns1:permissions><ns1:permission>/perform</ns1:permission></ns1:permissions>
      </ns1:action>
      <ns1:action name="Create Subscriptions"
        description="Subscribe to repository objects to get notified of changes to the objects (individual users only)"
        resourceID="notification/individualSubscriptions">
        <ns1:navItems/>
        <ns1:permissions><ns1:permission>/perform</ns1:permission></ns1:permissions>
      </ns1:action>
    </ns1:actions>
    <ns1:services>
      <ns1:service resourceID="capabilities" name="security/wsCapabilities"
        url="http://pes_server.spss.com:80/security-ws/services/CapabilityInformation"
        >security/wsCapabilitiesDesc</ns1:service>
      <ns1:service resourceID="notification/EventCollector" name="Event Collector Endpoint"
        url="http://pes_server.spss.com:80/notification/services/EventCollector"/>
      <ns1:service resourceID="notification/SubscriptionManager"
        name="Subscription Manager Endpoint"
        url="http://pes_server.spss.com:80/notification/services/SubscriptionManager"/>
      <ns1:service resourceID="notification/SubscriptionRepository"
        name="Subscription Repository Endpoint"
        url="http://pes_server.spss.com:80/notification/services/SubscriptionRepository"/>
      <ns1:service resourceID="pemupdate" name="PEM Update"
        url="http://pes_server.spss.com:80/pem/update">This is not a SOAP web service, it's
        just a web site in Eclipse update format.</ns1:service>
      <ns1:service resourceID="prms/ProcessManagement"
        name="Endpoint address of the Process Management web service."
        url="http://pes_server.spss.com:80/process/services/ProcessManagement"/>
      <ns1:service resourceID="prms/SchedulingServer"
        name="Endpoint address of the Process Management Scheduling Server web service."
        url="http://pes_server.spss.com:80/process/services/SchedulingServer"/>
      <ns1:service resourceID="reportservice/reportservice" name="SPSS Reporting Service"
        url="http://pes_server.spss.com:80/reporting-ws/services/Reporting">Report Services</ns1:service>
      <ns1:service resourceID="repository/ContentRepository"
        name="Repository"
        url="http://pes_server.spss.com:80/cr-ws/services/ContentRepository"/>
      <ns1:service resourceID="repository/ContentRepositoryURI"
```

```
   name="Repository URI"
   url="http://pes_server.spss.com:80/cr-ws/services/ContentRepositoryURI"/>
  <ns1:service resourceID="search/search" name="SearchService "
   url="http://pes_server.spss.com:80/search-ws/services/Search">Searches the index</ns1:service>
  <ns1:service resourceID="search/values" name="SearchValuesService "
   url="http://pes_server.spss.com:80/search-ws/services/Values">Search values endpoint</ns1:service>
  <ns1:service resourceID="security/authentication" name="security/wsAuthentication"
   url="http://pes_server.spss.com:80/security-ws/services/Authentication"
   >security/wsAuthenticationDesc</ns1:service>
  <ns1:service resourceID="security/directoryManagement"
   name="security/wsDirectoryManagement"
   url="http://pes_server.spss.com:80/security-ws/services/DirectoryManagement"
   >security/wsDirectoryManagementDesc</ns1:service>
  <ns1:service resourceID="security/providers" name="security/wsProviderInformation"
   url="http://pes_server.spss.com:80/security-ws/services/ProviderInformation"
   >security/wsProviderInformationDesc</ns1:service>
  <ns1:service resourceID="security/userDirectories" name="security/wsDirectoryInformation"
   url="http://pes_server.spss.com:80/security-ws/services/DirectoryInformation"
   >security/wsDirectoryInformationDesc</ns1:service>
  <ns1:service resourceID="userpref/client" name="User Preference Client"
   url="http://pes_server.spss.com:80/userpref-ws/services/Client">Client User
   Preference services.</ns1:service>
  <ns1:service resourceID="userpref/manager" name="User Preference Manager"
   url="http://pes_server.spss.com:80/userpref-ws/services/Manager">Manager User
   Preference services.</ns1:service>
 </ns1:services>
 <ns1:configuration>
  <ns1:configItem configKey="com.spss.search/fieldFold" name="Field Count" group="Search ">
   <ns1:value>5</ns1:value>
  </ns1:configItem>
  <ns1:configItem configKey="com.spss.repository.ContentRepository/defaultCharset"
   name="Default charset" group="Repository">
   <ns1:value>UTF-8</ns1:value>
  </ns1:configItem>
  <ns1:configItem configKey="mail.smtp.from" name="SMTP from e-mail address"
   group="Notification">
   <ns1:value>bmcgee18594@yahoo.com</ns1:value>
  </ns1:configItem>
  <ns1:configItem configKey="com.spss.search/Normalizer/Mode"
   name="Unicode Normalizer Mode " group="Search ">
   <ns1:value>1</ns1:value>
  </ns1:configItem>
  <ns1:configItem configKey="com.spss.security/enableGuest" name="Allow guest user"
   group="Security">
   <ns1:value>0</ns1:value>
  </ns1:configItem>
  <ns1:configItem configKey="URLPrefix" name="URL Prefix" group="Setup">
   <ns1:value>http://pes_server.spss.com:80</ns1:value>
  </ns1:configItem>
  <ns1:configItem configKey="com.spss.search/fieldList" name="Field Order" group="Search ">
   <ns1:value>Title</ns1:value>
   <ns1:value>Description</ns1:value>
```

```
                    <ns1:value>Keyword</ns1:value>
                    <ns1:value>Author</ns1:value>
                    <ns1:value>Version Creation By</ns1:value>
                    <ns1:value>Label</ns1:value>
                    <ns1:value>Version Creation Date</ns1:value>
                   </ns1:configItem>
                   <ns1:configItem configKey="com.spss.security/LoginInfo" name="Message" group="Security">
                    <ns1:value>PES 3.0</ns1:value>
                   </ns1:configItem>
                   <ns1:configItem configKey="com.spss.search/pageSize" name="Default Page Size "
                    group="Search ">
                    <ns1:value>25</ns1:value>
                   </ns1:configItem>
                   <ns1:configItem configKey="com.spss.configsys/clientProtocolTimeout"
                    name="Protocol Timeout" group="Deployment Manager">
                    <ns1:value>180</ns1:value>
                   </ns1:configItem>
                   <ns1:configItem configKey="com.spss.repository.ContentRepository/notificationEnabled"
                    name="Repository Notification Enabled" group="Repository">
                    <ns1:value>1</ns1:value>
                   </ns1:configItem>
                   <ns1:configItem configKey="securityP/passwordAnnotation" name="security/cfgNameAnno"
                    group="security/cfgPseudoGroup"/>
                   <ns1:configItem configKey="securityP/supportPasswordChange"
                    name="security/cfgNameAllowPwdChange" group="security/cfgPseudoGroup">
                    <ns1:value>true</ns1:value>
                   </ns1:configItem>
                  </ns1:configuration>
                 </ns1:capabilities>
               </getCapabilitiesResponse>
              </soapenv:Body>
             </soapenv:Envelope>
```

The logout operation

Logs a user out of the system, returning information about the user's session.

Return information

The following table identifies the information returned by the logout operation.

Table 4-5
Return Value

Type	Description
logoutDetails	Information about the user session being terminated.

Java example

To logout, call the logout operation from the service stub. The operation returns a LogoutDetails object from which the session information can be obtained. Use the getLoginStamp method to access the login time as a Calendar object. Use the getDuration method to access the session duration as a Duration object.

```
LogoutDetails ld = stub.logout();
java.util.Calendar cal = ld.getLoginStamp();
org.apache.axis.types.Duration dur = ld.getDuration();
```

SOAP request example

Client invocation of the logout operation generates a SOAP request message that is sent to the server for processing. An example of such a message follows.

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
 xmlns:xsd="http://www.w3.org/2001/XMLSchema"
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
 <soapenv:Header>
  <wsse:Security soapenv:actor="http://schemas.xmlsoap.org/soap/actor/next"
   soapenv:mustUnderstand="0"
   xmlns:wsse="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd">
   <wsse:UsernameToken>
    <wsse:Username>validUser</wsse:Username>
    <wsse:Password>password</wsse:Password>
   </wsse:UsernameToken>
  </wsse:Security>
  <ns1:client-accept-language soapenv:actor="http://schemas.xmlsoap.org/soap/actor/next"
   soapenv:mustUnderstand="0" xmlns:ns1="http://xml.spss.com/ws/headers">
    en-US;q=1.0, en;q=0.8
  </ns1:client-accept-language>
 </soapenv:Header>
 <soapenv:Body>
  <logout xmlns="http://xml.spss.com/security/remote"/>
 </soapenv:Body>
</soapenv:Envelope>
```

SOAP response example

The server responds to a logout operation call by sending a SOAP response message containing the results. An example of such a message follows.

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
 xmlns:xsd="http://www.w3.org/2001/XMLSchema"
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
 <soapenv:Body>
```

```
        <logoutResponse xmlns="http://xml.spss.com/security/remote">
          <ns1:logoutDetails loginStamp="2006-06-12T11:45:09.365-05:00"
            duration="PT4M45.433S" xmlns:ns1="http://xml.spss.com/security"/>
        </logoutResponse>
      </soapenv:Body>
    </soapenv:Envelope>
```

Microsoft® .NET Framework-based clients

In order to use the web services from a Microsoft Windows Communication Foundation (WCF) client, you will need Visual Studio 2008 or later. The discussion here assumes the use of Visual Studio 2008. In general, the process for accessing IBM® SPSS® Collaboration and Deployment Services web services involves the following steps:

1. Add a Service Reference. For more information, see the topic Adding a service reference on p. 25.

2. Configure the web service endpoint. For more information, see the topic Configuring the web service endpoint on p. 27.

3. Programmatically configure the necessary endpoint behaviors. For more information, see the topic Configuring endpoint behaviors on p. 28.

4. Exercise the web service. For more information, see the topic Exercising the service on p. 28.

Note that the IBM SPSS Collaboration and Deployment Services single sign-on implementation is not compatible with Microsoft .NET web services, or the WCF. As a result, single sign-on is not available from these clients.

Adding a service reference

The first step in using a WCF client to access IBM® SPSS® Collaboration and Deployment Services web services is to make the service available to the Visual Studio project by adding it as a Service Reference.

1. In Visual Studio, right-click the folder's *References* folder and select Add Service Reference.

2. Type the URL of the service WSDL location in the Address field, and click Go. The value corresponds to the service endpoint appended with *?wsdl*.

3. Specify the desired namespace in the Namespace field.

4. Click OK.

Visual Studio adds a new service reference to the Service Reference directory for the project. The name of the reference corresponds to the specified namespace.

Service reference modifications

Due to known compatibility issues between Microsoft tooling and some WSDL files, you need to manually modify some service references before they can be used successfully. For information about the specific issues, see articles 891386 (*http://support.microsoft.com/kb/891386*) and 326790 (*http://support.microsoft.com/kb/326790*) on the Microsoft Support site.

To modify a service reference:

1. In Visual Studio, select the project and click Show All Files from the Project menu.

2. Expand the service reference that needs to be modified.

3. Expand the *Reference.svcmap* node.

4. Open the *Reference.cs* file.

5. Make the required modifications.

6. Save the file.

For the Content Repository Service , Content Repository URI Service, and Process Management Service, you need to make the following changes to the RowType class:
- private value[][] cellField should be changed to private value[] cellField
- public value[][] cell should be changed to public value[] cell

For the Scoring Service, you need to make the following changes:
- in the returnedDPDOutputTable class, private returnedDPDOutputValue[][] returnedDPDOutputrowField should be changed to private returnedDPDOutputValue[] returnedDPDOutputrowField
- in the returnedDPDOutputTable class, private returnedDPDOutputValue[][] returnedDPDOutputRow should be changed to private returnedDPDOutputValue[] returnedDPDOutputRow
- in the returnedRequestInputTable class, private returnedRequestInputValue[][] returnedRequestInputRow should be changed to private returnedRequestInputValue[] returnedRequestInputRow
- in the returnedRequestInputTable class, private returnedRequestInputValue[][] returnedRequestInputRowField should be changed to private returnedRequestInputValue[] returnedRequestInputRowField
- in the requestInputTable class, private input1[][] requestInputRowField should be changed to private input1[] requestInputRowField
- in the requestInputTable class, private input1[][] requestInputRow should be changed to private input1[] requestInputRow

For the PevServices Service, you need to make the following changes:
- in the avTableConflict class, private avColumnMeta[][] avColumnConflictField should be changed to private avColumnMeta[] avColumnConflictField

- in the avTableConflict class, private avColumnMeta[][] avColumnConflict should be changed to private avColumnMeta[] avColumnConflict

- in the evTableConflict class, private evColumnMeta[][] evColumnConflictField should be changed to private evColumnMeta[] evColumnConflictField

- in the evTableConflict class, private evColumnMeta[][] evColumnConflict should be changed to private evColumnMeta[] evColumnConflict

Configuring the web service endpoint

In WCF, you can configure a service endpoint either declaratively using an *app.config* file, or programmatically using the WCF APIs. The following steps describe the creation of a basic configuration within an *app.config* file.

1. In Visual Studio, double-click the *app.config* file for the application (or *web.config* for a web-application).

2. Find the system.serviceModel element. Create it if it does not already exist.

3. Find the client element. Create it if it does not already exist.

4. Create a new endpoint element as a child of the client element.

5. Specify the appropriate service endpoint URL as the value of the *address* attribute.

6. Specify *basicHttpBinding* as the value of the *binding* attribute.

7. Specify the appropriate service contract as the value of the *contract* attribute. The service contract is the value of the service reference namespace appended with the service name.

8. Optionally specify a value for the *name* attribute that identifies a name for the endpoint configuration. If the *name* is blank, the configuration is used as the default for the service.

The resulting *app.config* file should be similar to the following example:

```
<system.serviceModel>
  <client>
    <endpoint
      address="http://cads_server:8080/cr-ws/services/ContentRepository"
      binding="basicHttpBinding"
      bindingConfiguration=""
      contract="IBM.SPSS.ContentRepository"
      name=""/>
  </client>
</system.serviceModel>
```

Configuring endpoint behaviors

The following two issues complicate the use of IBM® SPSS® Collaboration and Deployment Servicesweb services by WCF clients:

■ WCF does not allow the username and password to be transmitted over HTTP

■ WCF does not correctly understand the SOAP Fault format returned by the services

To address these problems, a sample Visual Studio project is available that contains classes adding endpoint behaviors that resolve both issues. The IBM SPSS Collaboration and Deployment Services installation media includes this project.

To use these classes, ensure that the *IBM.SPSS.WCF.Utilities* project containing these classes has been compiled and added as a reference to the Visual Studio project that exercises the web services. When constructing a new service client instance, ensure that the behaviors are added as follows:

```
ContentRepositoryClient serviceClient = new ContentRepositoryClient();
serviceClient.Endpoint.Behaviors.Add(
  new ApplyClientInspectorsBehavior(
  new HeaderInjectionMessageInspector(
    new UsernameTokenSecurityHeader("admin", "Abcdefg1")
  ),
  new SOAPFaultFormatMessageInspector())
);
```

This adds two message inspectors to the behaviors for the endpoint. The first allows message headers to be injected, permitting a UsernameToken security header containing the username and password to be transmitted over HTTP. The second message inspector intercepts SOAP Faults, ensuring that they are formatted for proper WCF processing.

Exercising the service

After adding the service reference to the project, configuring the endpoint, and adding the necessary endpoint behaviors, the WCF-based web service client is ready. Add the .NET source code to the project to exercise the web service as needed.

There may be instances in which the .NET client proxies are generated incorrectly, leading to unexpected missing results at runtime. If a web service call returns no results when results are expected, the generated .NET types associated with the request and response should be examined. Specifically, members of the types may have two .NET attributes assigned. The first, MessageBodyMemberAttribute, will often include the proper namespace for the member type. The second, XmlElementAttribute, should have the same namespace as MessageBodyMemberAttribute. If this is not the case, add the namespace to XmlElementAttribute. Moreover, the addition of XML serialization attributes, such as System.XML.Serialization.XmlElementAttribute, may be necessary to correctly name the expected namespace or element. For example, the following generated client code would need to be modified:

```
public partial class getUsersResponse {
  System.ServiceModel.MessageBodyMemberAttribute(Namespace =
    "http://xml.spss.com/pes/userPref/remote", Order = 0)]
```

```
public IBM.SPSS.ManagerUserPref.usersResponse usersResponse;
```

The corrected code is as follows:

```
public partial class getUsersResponse {
  [System.ServiceModel.MessageBodyMemberAttribute(Namespace =
    "http://xml.spss.com/pes/userPref/remote", Order = 0)]
  [System.Xml.Serialization.XmlElementAttribute(ElementName="usersRequestResponse")]
  public IBM.SPSS.ManagerUserPref.usersResponse usersResponse;
```

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