



Agile Product Lifecycle Management

AIS Developer Guide

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Preface

The Oracle|Agile documentation set includes Adobe® Acrobat™ PDF files. The [Oracle Technology Network \(OTN\) Web site](http://www.oracle.com/technology/documentation/agile.html) (<http://www.oracle.com/technology/documentation/agile.html>) contains the latest versions of the Oracle|Agile PLM PDF files. You can view or download these manuals from the Web site, or you can ask your Agile administrator if there is an Oracle|Agile Documentation folder available on your network from which you can access the Oracle|Agile documentation (PDF) files.

Note To read the PDF files, you must use the free Adobe Acrobat Reader™ version 7.0 or later. This program can be downloaded from the [Adobe Web site](http://www.adobe.com) (<http://www.adobe.com>).

The [Oracle Technology Network \(OTN\) Web site](http://www.oracle.com/technology/documentation/agile.html) (<http://www.oracle.com/technology/documentation/agile.html>) can be accessed through Help > Manuals in both the Agile Web Client and the Agile Java Client. If you need additional assistance or information, please contact [support](http://www.oracle.com/agile/support.html) (<http://www.oracle.com/agile/support.html>) (<http://www.oracle.com/agile/support.html>) for assistance.

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Readme

Any last-minute information about Oracle|Agile PLM can be found in the Readme file on the [Oracle Technology Network \(OTN\) Web site](http://www.oracle.com/technology/documentation/agile.html) (<http://www.oracle.com/technology/documentation/agile.html>)

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Go to the [Oracle University Web page](http://www.oracle.com/education/chooser/selectcountry_new.html)

(http://www.oracle.com/education/chooser/selectcountry_new.html) for more information on Agile Training offerings.

Accessibility of Code Examples in Documentation

Screen readers may not always correctly read the code examples in this document. The conventions for writing code require that closing braces should appear on an otherwise empty line; however, some screen readers may not always read a line of text that consists solely of a bracket or brace.

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Introduction

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Understanding AIS

Agile Integration Services (AIS) are a collection of predefined Web services in the Agile Integration Framework to enable communication between the Agile server and disparate systems, including Enterprise Resource Planning (ERP) systems, Customer Resource Management (CRM) systems, Business-to-Business Integration systems (B2Bi), other Agile PLM systems, and supply chain partners. Using AIS to exchange content with other systems simplifies the process for aggregating raw product content, and makes critical product content available in real time to other core systems.

AIS Web services provide import and export capabilities, which can be used to:

- Make product content available to Enterprise Application Integration (EAI) systems.
- Share product content with product design, manufacturing planning, shop floor, Enterprise Resource Planning (ERP), and Customer Relationship Management (CRM) applications.
- Make product content available to Business-to-Business (B2B) systems, which can transfer Agile Application server data across corporate boundaries to a wide range of external applications.
- Provide content to custom applications.
- Import product content data from ERP and other supply chain applications.

Key Features

AIS includes the following key features:

- Programmatic access to data — AIS provides programmatic access to data stored in Agile PLM systems.
- Programmatic validation of imported data— The Agile SDK provides the necessary methods to check imported data for compliance with server rules before they are actually imported.
- Accessibility — AIS provides accessibility of Agile product content outside of corporate firewall using standard HTTP(S) technology.

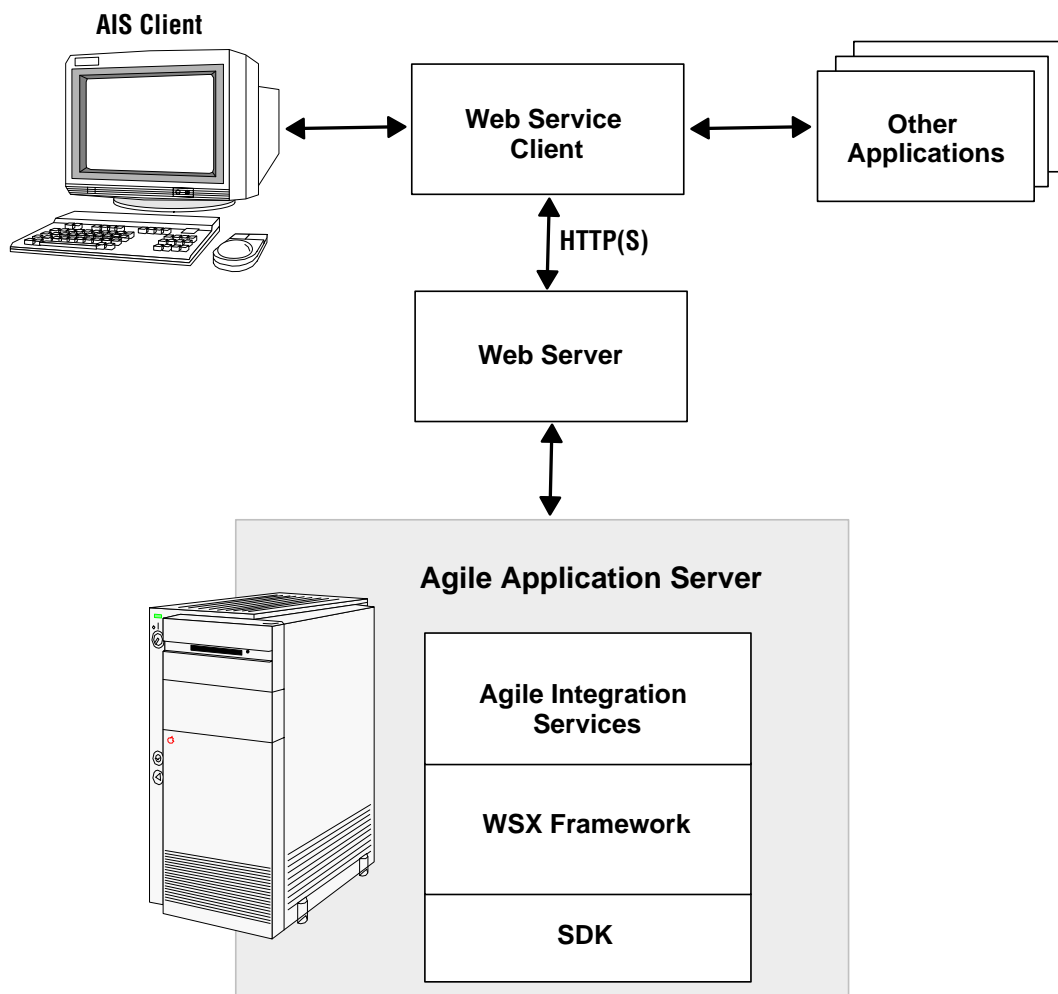
- WSX Framework — Agile Web Service Extensions (WSX) are based on the AXIS package. Agile certifies client applications using AXIS package client.

Note Export and Import attachment types are not compatible with the .Net attachment types.

- Multiple output format support — AIS supports aXML and PDX 1.0.
- Security — AIS communicates with XML-compliant applications using Internet-standard communication and security protocols (HTTP and SSL), so the interface is both firewall-friendly and secure.
- Multilevel BOM support — Lets you convert a multilevel BOM into individual parts data in XML

AIS Architecture

To connect to AIS, you use standard Web service invocation methodologies.



AIS Folders

The AIS documentation and source files for sample clients are contained in the AIS_samples (ZIP file). You can find this folder in the Oracle Agile Product Lifecycle Management Media Pack at Oracle E-Delivery Web site (<http://edelivery.oracle.com/>). For more information about the Oracle Media Pak and procedures to access the contents, contact your System Administrator, or refer to your Agile PLM installation guide.

The AIS_samples.ZIP folder includes the following folders:

- documentation — Documents the Web services that are supported by the Agile Import/Export function
- lib — Contains the common JAR files used by AIS samples
- sample — Contains the source code of a sample Import/Export Web service client

Understanding Web Services

Web services is a technology for building distributed applications. These services, which can be made available over the Internet, use a standardized XML messaging system and are not tied to any one operating system or programming language. Through Web services, companies can encapsulate existing business processes, publish them as services, search for and subscribe to other services, and exchange information throughout and beyond the enterprise. Web services are based on universally agreed upon specifications for structured data exchange, messaging, discovery of services, interface description, and business process design.

A Web service makes remote procedure calls across the Internet. It uses HTTP(S) or other protocols to transport requests and responses and the Simple Object Access Protocol (SOAP) to communicate request and response information.

The key benefits of Web services are:

- Service-oriented Architecture — Unlike packaged products, Web services can be delivered as streams of services that allow access from any platform. Components can be isolated; only the business-level services need be exposed.
- Interoperability — Web services ensure complete interoperability between systems.
- Integration — Web services facilitate flexible integration solutions, particularly if you are connecting applications on different platforms or written in different languages.
- Modularity — Web services offer a modular approach to programming. Each business function in an application can be exposed as a separate Web service. Smaller modules reduce errors and result in more reusable components.
- Accessibility — Business services can be completely decentralized. They can be distributed over the Internet and accessed by a wide variety of communications devices.
- Efficiency — Web services constructed from applications meant for internal use can be used for externally without changing code. Incremental development using Web services is relatively simple because Web services are declared and implemented in a human readable format.

As in any technology, Web services have some limitations. When developing Web services, you should consider the following:

- SOAP is a simple mechanism for handling data and requests over a transport medium. It is not designed to handle advanced operations such as distributed garbage collection, object activation, or call by reference.
- Because Web services are network-based, they are affected by network traffic. The latency for any Web service invocation can often be measured in hundreds of milliseconds. Thus, the amount of functionality provided by the service should be significant enough to warrant making a high-latency call.
- Web services are not good at conversational programming. Thus, when designing services to be exposed, try to make the service as independent as possible.

Web Services Architecture

You can view Web services architecture in terms of roles and the protocol stack:

- Web service roles:
 - Service provider—provides the service by implementing it and making it available on the Internet.
 - Service requester—user of the service who accesses the service by opening a network connection and sending an XML request.
 - Service registry—a centralized directory of services where developers can publish new services or find existing ones.
- Web services protocol stack:
 - Service transport layer—uses HTTP to transport messages between applications. Other transports will be supported in future AIS releases.
 - XML messaging layer—encodes messages in XML format by using SOAP, a platform-independent XML protocol used for exchanging information between computers. It defines an envelope specification for encapsulated data being transferred, the data encoding rules, and RPC conventions.
 - Service description layer—describes the public interface to a specific Web service by using the Web Service Description Language (WSDL) protocol. WSDL defines an XML grammar for describing network services as collections of communication endpoints capable of exchanging messages, which contain either document-oriented or procedure-oriented information. The operations and messages are described abstractly, and then bound to a network protocol and message format. WSDL allows description of endpoints and their messages regardless of what message formats or network protocols are used to communicate. A WSDL document defines services as collections of network endpoints (called ports). A port is defined by associating a network address with a reusable binding, and a collection of ports define a service.
 - Service discovery layer—centralizes services into a common registry by using the Universal Description, Discovery, and Integration (UDDI) protocol.

Note	AIS Web services do not currently support UDDI or other service discovery layers.
------	---

Additional Information about Web Services

Here are some helpful Web sites to explore:

- WebServices.Org — <http://www.webservices.org/>
- webservices.xml.com — <http://webservices.xml.com/>
- O'Reilly Web Services — <http://webservices.oreilly.com/>
- Apache Axis — <http://ws.apache.org/axis/>
- Java Web Services Developer Pack 1.1 — <http://java.sun.com/webservices/index.jsp>
- Sun ONE Web Services Platform Developer Edition — http://sunonedev.sun.com/building/development/developer_platform_overview.html
- Microsoft .Net Framework — <http://msdn.microsoft.com/netframework/>
- SOAP::Lite for Perl — <http://www.soaplite.com>
- Soap Tutorial — <http://www.w3schools.com/soap/default.asp>

What Is New in Release 9.2.2.5?

With the exception of new Part and Release numbers and the publication date, no new feature or enhancements to existing features were implemented in this release.

AIS Web Service Operations

AIS enables you to export data programmatically into structured XML documents and import data into the Agile PLM system by providing the following prebuilt Web service operations:

- `exportData` — A Web service operation that extracts data from an Agile PLM system. The `exportDataRequest` element encapsulates all the information needed to extract data from an Agile PLM system. The `ExportData` Web service operation supports the following formats:
 - Product Data eXchange (PDX) — A standardized XML format for representing structured product content. It provides a means for partners in the e-supply chain (OEMs, EMS providers, and component suppliers) to exchange product content and changes (BOMs, AMLs, ECRs, ECOs).

For more information about PDX, including a link to the DTD, see following Web page:
<http://webstds.ipc.org/2571/2571.htm> (<http://webstds.ipc.org/2571/2571.htm>)
 - Agile XML (also known as aXML) — Agile XML format is an XML representation of Agile's business schema. aXML contains all product content managed in Agile such as items, change details, manufacturer information, cost, drawings and other files. As a representation of schema elements across all Agile products, aXML will evolve with Agile's business schema over time.

The list and location of Agile aXML schema files for different releases of the application are available at the following sites:

- Release 9.2.2.4 — <http://support.agile.com/misc/axml/2008/05/>
- Release 9.2.2, 9.2.2.1, 9.2.2.2, 9.2.2.3 — <http://support.agile.com/misc/axml/2007/03/>
(<http://support.agile.com/misc/axml/2007/03/>)
- Release: 9.2.1, 9.2.1.x — <http://support.agile.com/misc/axml/2006/03/>
(<http://support.agile.com/misc/axml/2006/03/>)
- Release: 9.2, 9.2.0.x — <http://support.agile.com/misc/axml/2005/11/>
(<http://support.agile.com/misc/axml/2005/11/>)
- Release: 9.1 — <http://support.agile.com/misc/axml/2004/10/>
(<http://support.agile.com/misc/axml/2004/10/>)
- Release: 9.0 — <http://support.agile.com/misc/axml/2004/02/>
(<http://support.agile.com/misc/axml/2004/02/>)

- `exportPartList` — A Web service operation that takes a multilevel BOM and “flattens” it into a list of the items and associated manufacturer parts in the BOM and their quantities and returns the data in aXML format. That is, it enables you to extract a rolled up set of parts, and the related Quantities Per Top Level Assembly (QPTLA). The `exportPartListRequest` element encapsulates all the information needed to extract a flattened partlist from an Agile PLM system.

Note The value of the QPTLA is computed as the sum over recursive products starting from the top of the BOM tree. `exportPartList` calculates the QPTLA for each unique item-revision pair, and returns the results in the Part Quantities element of the resulting aXML output.

- `importData` — A Web service operation that imports data into the Agile PLM system. The `importDataRequest` element encapsulates all the information needed to request an import operation. The source for the import data can be an Agile database, a third party Product Data Management (PDM) system, or an Enterprise Resource Planning (ERP) system. The Agile server stores information about customer-specific items—the parts that the company uses to build its products. It also maintains the relationships that assembly parts have with BOM components and that parent items have with approved manufacturers.
- `importSupplierResponse` — A Web service operation that imports an RFQ response from a supplier. The response is associated with an existing RFQ in the Agile PLM system.

Note The `importSupplierResponse` Web service operation is deprecated and may not be supported in future releases. Use `importData` instead. For more information, see [Importing Supplier Responses](#) (on page 43).

These Web service operations are invoked by submitting a properly formatted XML document to AIS. The contents of the XML document define the parameters that determine how the operation should be performed.

For more information about using the prebuilt AIS Web services, see [Using AIS Web Services](#) (on page 15).

AIS Web Service Extensions

You can use the Agile SDK to develop Web service extensions (WSX) that leverage the functionality of AIS while at the same time extending the functionality of the Agile PLM system. For example, if you need to extract data from the Agile server and then transform it before sending it to another ERP system, you could create a custom Web service that leverages the Export web service.

For more information about web service extensions, refer to the *Agile SDK Developer Guide*.

Security

AIS communicates with XML-compliant applications using Internet-standard communication and security protocols (HTTP and SSL). Communication between AIS and its clients (via the Web server) may be encrypted via Secure Sockets Layer (SSL) and a server-side certificate, thus providing authentication, privacy, and message integrity. Using standard Java cryptography libraries, you can encrypt and decrypt files, create security keys, digitally sign a file, and verify a digital signature.

Username and password security is enforced whenever a client attempts to invoke an Agile Integration Service operation.

For more information about Java security and cryptography support, see the following Web page:
<http://java.sun.com/j2se/1.5.0/docs/guide/security/index.html>

Using AIS Web Services

This chapter includes the following:

▪ Getting Started.....	15
▪ Checking Your AIS System	16
▪ Using the AIS Java Samples	16
▪ Creating a Web Service Client.....	25

Getting Started

This section describes the tools you can use to develop client applications, the languages that can generate and process XML and process HTTP request/response messages, and the general steps to access the prebuilt AIS Web services. The AIS samples are used to illustrate the indicated steps.

Tools

There is no single set of tools needed to access Web services. The tools you choose depend very much on the environment you use to develop clients. Basically, you'll need tools that enable you to generate and process XML, and process HTTP request/response messages.

AIS is based on the Apache eXtensible Interaction System (AXIS), which is a SOAP processor. However, you can use other implementations of SOAP tools, regardless of source language, to build Web service clients.

Note AIS 9.1 uses AXIS 1.1. This will impact the class names that are generated for the Java samples included with AIS. For information about AXIS, its features, and to use it, see the Apache Web site: <http://ws.apache.org/axis/>

Client Programming Languages

Agile tests and certifies Java for use in developing AIS clients.

Note WSDL is only supported with J2EE.

Here are some Web sites where you can find more information:

- Apache Axis — Open source SOAP implementation for Java. See the following Website:
<http://ws.apache.org/axis/>
- Java Web Services Developer Pack (JWSDP) — Sun's Java implementation of the SOAP protocol. See the following Website:
<http://support.agile.com/misc/axml/2008/05/>

- Microsoft .Net — An XML Web services platform for Microsoft Windows that can be used to create Web service clients. See the following Website:
<http://msdn.microsoft.com/net>
- SOAP::Lite for Perl — A Perl implementation of the SOAP protocol. See the following Website:
<http://www.soaplite.com/>

Note For a comprehensive list of other SOAP implementations, see the following Website:
<http://www.soapware.org/>

Accessing AIS Web Services

In general, to access AIS Web services, you need to do the following:

1. Generate a SOAP request — In many cases, a Web-Service-aware code library will be able to generate client-side stubs that generate an appropriately formatted SOAP request.
2. Submit that request to AIS via HTTP or HTTPS — Once an appropriate set of client-side stubs has been generated, a client application can use these stubs to submit a request.
3. Process the SOAP response — The client-side stubs usually are responsible for processing the SOAP response and converting the response into an appropriate set of return objects.

The AIS samples provide good examples of how SOAP and Web service-related libraries can make this process simple. The following sections illustrate, using the ExportData sample, the above steps in greater detail.

Checking Your AIS System

Before trying to compile and run the sample AIS Web service clients, make sure Web services are working properly on the Agile PLM server. For more information, refer to Agile PLM installation guide.

Using the AIS Java Samples

AIS provides several sample Java Web service clients that you can download. The AIS samples use Axis to connect with the AIS Web service engine to generate client-side stubs. The sample clients can be used to export and import data. They provide command-line interfaces to the ExportData, ExportPartlist, and ImportData Web service operations.

It's important to remember that the AIS Java samples do not expose all AIS functionality. They are merely sample clients. For example, the samples let you run only one query at a time, but AIS lets you run multiple queries and then aggregate the results. You may choose to develop AIS clients with additional functionality. The samples provide source code you can use to learn how to develop your own AIS clients. For complete information about the functionality supported by the Export and Import Web services, see the Export and Import XML Schema documentation.

Before you can build and run the AIS samples, download the following required tools:

Java 2 SDK SE Version 1.5. You can download this software at:

http://java.sun.com/javase/downloads/index_jdk5.jsp

- The Apache Project's Ant build tool, version 1.6, available at: <http://ant.apache.org/>

Installing the Java SDK

This section provides the instructions for installing the Java SDK on Windows and on Solaris. You can skip this section if you already have the proper version of Java installed.

To install the Java SDK on Windows:

1. Double-click the distribution and follow the installation procedures.
2. Set the system variable JAVA_HOME to point to the home directory of your Java SDK installation (for example, D:\j2sdk142).

To install the Java SDK on Solaris:

1. Execute the distribution (for example, `$./j2sdk-1_4_2-solaris-sparc.sh`) and follow the installation procedures.
2. Set the environment variable JAVA_HOME to point to the home directory of your Java SDK installation (for example, `/home/<user>/j2sdk142`).
3. Execute your `.profile` or `.cshrc` (depending on your shell) file to reinitialize your environment settings.

Installing Ant

This section provides the instructions for installing Ant on Windows and on Solaris.

To install the Ant on Windows:

1. Extract the contents of the Zip archive to a local directory and follow the installation procedures.
The Ant distribution for Windows is a zip file (for example, `apache-ant-1.6.0-bin.zip`).
2. Open a command prompt window and verify that Ant can be invoked by entering the following command: `%ANT_HOME%\bin\ant -version`

The following output should be displayed: Apache Ant version 1.6.0 compiled on date

To install the Ant on Solaris:

1. Extract the contents of the tar archive to a local directory (for example, `/home/user/ant`) and follow the installation procedures.
The ANT distribution for UNIX is a tar file (for example, `apache-ant-1.6.0-bin.tar.gz`).
2. Execute your `.profile` or `.cshrc` (depending on your shell) file to reinitialize your environment settings.
3. From a command prompt, verify that Ant can be invoked by entering the following command: `$ANT_HOME/bin/ant -version`

The following output should be displayed: Apache Ant version 1.6.0 compiled on date

Building the Java Samples

Building the Java samples is very straightforward. You need the Ant build tool, which is available for download at

<http://ant.apache.org/>. For procedures, see [Installing Ant](#) ("Installing Ant" on page 17).

Run Ant within the samples directory, specifying the URL to your AIS installation. After you build the samples, the AIS samples directory contains a runner file, which can be used to run the samples. It contains all the necessary CLASSPATH initialization for the samples.

Note	If you generated client stubs for the AIS samples from the WSDL, they will work fine on any other computer. Alternately, if you have the WSDL, you can use it to generate the client stubs on another computer.
------	---

To build the AIS Java samples on Windows:

1. Download wsdl4j-1.5.1.jar from http://archive.apache.org/dist/ws/axis/1_2/ (axis-bin-1_2.zip#/lib).
2. Copy the contents to the folder called ais/lib, and rename to wsdl4j.jar.
3. Open a command prompt window and go to the AIS samples folder, which contains a file named build.xml.

4. Type the following command:

```
%ANT_HOME%\bin\ant -  
Dais.url=https://<hostname:port/virtualPath>/ws -  
Dusername=<username>  
-Dpassword=<password target>
```

where:

- *hostname* is the name of the Agile server
- *port* is the application server port. If you are using Oracle Application Server to host the Agile PLM system, enter 7777. If you are using BEA WebLogic Server, enter 7001.
- *virtualPath* is the virtual path for your Agile server. The virtual path is specified when the Agile PLM system is installed. The default virtual path is "Agile". For more information, refer to *Agile PLM Installation and Upgrade Guide*.
- *target* identifies the AIS sample to build. Available build targets are export, import, and all. The default target is all. If you do not specify a target, all AIS samples will be built.
- *username* is the Agile PLM user ID
- *password* is the Agile PLM password

Note	Agile PLM 9.2.1 requires username and password for the building of Java samples. The makefile will error if all three parameters are not set.
------	---

To build AIS Java samples on Solaris:

1. Go to the AIS samples directory, which contains a file named build.xml.
2. Enter the following command:

```
$ANT_HOME/bin/ant -Dais.url=http://<hostname:port/virtualPath/ws
target>
```

If you are connecting to a secure URL that uses SSL, enter the following command instead:

```
$ANT_HOME/bin/ant -Dais.url=http://<hostname:port/virtualPath>/ws
-Dusername=<username> -Dpassword=<password target>
```

For descriptions of hostname, port, virtualPath, username, password, and target, see the previous section.

After you build a sample, it is ready to run. See the comments (or JavaDoc) in each sample for more information.

Building the Java Samples Using SSL

To build the Java AIS samples on a server that has enabled Secure Sockets Layer (SSL), follow these steps:

1. Get the self-signed certificate from the server.
2. Install the self-signed certificate into your Java development environment.
3. Build the sample programs as described above by connecting to the server using HTTPS.
4. Run the sample programs as usual but include the command line parameter -P. For example:
runner importer.ImportData -P HTTPS <insert other parameters here>

Note	The Readme.txt file installed with the AIS samples includes more information about obtaining a certificate, installing it in your Java environment, and building and running the AIS samples on an SSL-enabled system.
------	--

Running the Java Samples

Once you perform the build, the AIS samples directory will contain the following file that contains all the necessary CLASSPATH initialization and can be used to simplify the process of actually invoking a sample application:

- On Windows, the file is runner.bat
- On Solaris, the file is runner.sh

The invocations below will print out usage statements for each of the examples. You can use those usage statements, along with the additional documentation on the samples themselves, to determine how to run the samples in a meaningful fashion.

To print out usage statements for the clients, type the following commands:

```
> runner export.ExportData
> runner export.ExportPartlist
> runner importer.ImportData
> runner importer.ImportSupplierResponse
> runner importer.ValidateData
```

export.ExportData Usage

Usage: export.ExportData <options>

Option	Description
-a axml	Selects aXML output format instead of the default PDX output format.
-c criteria	The search criteria for locating objects to export. The criteria must be formatted using the Agile SDK query language. For more information, see the <i>Agile SDK Developer Guide</i> .
-e virtual-path	The Agile PLM virtual path. For example, if you access the Agile Web Client via http://www.sample.com/Agile/PLMServlet , the virtual path is "Agile". When you install the Agile PLM system, the default virtual path is "Agile".
-f filter	Predefined filter name or ID. If you have administrator privileges, you can define Agile PLM filters using the Agile Java Client.
-F filter-flag	<p>Ad hoc filter flag. The legal values for this argument derive from the <filters> element shown in the Export XML Schema documentation. The filter flags correspond to child elements with names ending in "Filter," like ChangeFilter and ItemFilter. The basic pattern for this option is filter-name.attribute.value. filter-name corresponds to the name of the XML element, such as ItemFilter (the "Filter" suffix may be omitted). attribute corresponds to name of the attribute being defined (for example, "PageTwo"). value corresponds to the value for the attribute. If the attribute is a boolean, the value is optional and defaults to "true." For the Attachments attribute, the value "Tables and Files" causes the attachment table and all the referenced files to be exported. Here is an example of a filter flag:</p> <p>-F "Item.TitleBlock" "Item.Attachments.TableAndFiles" "Item.BOM.Recurse"</p> <ul style="list-style-type: none"> ▫ If you are extracting data to a PDX file, the filter flag should be a superclass filter such as ItemFilter or ChangeFilter. In the following example, ChangeFilter is used. <pre>runner export.ExportData -h agilesvr -l 7001 -u aisuser -p agile -t ECO -c "[Number] is not null" -F "ChangeFilter.CoverPage" -o eco.pdx</pre> ▫ If you are extracting data to an aXML file, the filter flag should be a class filter such as PartFilter or ECOFilter. In the following example, ECOFilter is used. <pre>runner export.ExportData -h agilesvr -l 7001 -u aisuser -p agile -t ECO -c "[Number] is not null" -F "ECOFilter.CoverPage" -o eco.axml -a axml</pre> <p>For a complete list of filter types, see the Export XML Schema Documentation.</p>
-h host	The Agile PLM server machine. Default: localhost
-l port	Port on which the Agile PLM server is listening. Default: 80
-o output-file	The output file name. Default: either out.pdx or out.axml, depending on the output format.
-p password	User's password.
-P protocol	URL protocol. Either HTTP (the default) or HTTPS.
-s site	The manufacturing site for which data is extracted. If you do not specify a manufacturing site, data is extracted for all sites.

Option	Description
-t type	<p>Type of object being queried. Enter either the class name or predefined object type. Default:Items. For a list of predefined object types, see the Export XML schema documentation.</p> <p>The Export XML schema, export.xsd, can be obtained by installing the documentation and samples: C:\Agile\Agile921Docs\integration\ais\documentation\schemas\export.xsd</p> <p>The predefined types listed in export.xsd, map to Agile PLM classes, not subclasses. For example, the predefined ECO object type actually maps to the Change Orders class, not the ECO subclass. If you specify -t ECO when you run ExportData, objects of the Change Orders class will be exported, not objects of the ECO subclass.</p> <hr/> <p>Note If you want to use only your Agile PLM system's class names and subclass names for object types instead of the predefined Export object types, you can modify the ExportData.java source code and disable predefined object types by replacing the following lines of code:</p> <hr/> <pre>try { // Let's try to use a predefined type. objType.setPredefined(ObjectTypes.fromString(type)); } catch (Exception ex) { // Fall back to specifying a type by name (i.e., user-defined type) objType.setTypeNames(type); }</pre> <p>with this line:</p> <pre>objType.setTypeNames(type);</pre>
-T timeout	Amount of time to wait for a response (in minutes). Defaults to 15 minutes.
-u user	Agile PLM username.

Note The export.ExportData client does not have an option to specify an item's revision. When you use the client to export items, the latest released revision is exported. However, you can develop an AIS client that lets you specify a revision to export. For more information, see the Export XML Schema documentation.

Here are some examples showing how to run the export.ExportData client.

- runner export.ExportData -h agilesvr -u aisuser -p e-agile -l 7001 -c "[Title Block.Number] equal to 'P00014'" -t Part -F "Item.TitleBlock" "Item.PageTwo" "Item.Attachments.TableAndFiles" "Item.BOM.Recurse" -o P00014.pdx
- runner export.ExportData -h agilesvr -u aisuser -p agile -l 7001 -c "[Title Block.Number] equal to '1000-02'" -f "Default Item Filter" -t Item -s "San Jose" -o D:\data\out.pdx
- runner export.ExportData -h agilesvr -u aisuser -p e-agile -l 7001 -c "[Title Block.Number] equal to '1000-02'" -f "Default Item Filter" -t Item -a axml
- runner export.ExportData -h agilesvr -u aisuser -p e-agile -l 7001 -c "[General Info.Name] equal to 'ACT'" -f "Default Manufacturer Filter" -t Manufacturer

Note Note Substitute appropriate port numbers. For example, for BEA Weblogic, use port 7001 and for Oracle, use port 7777. For readability, these examples use attribute name, such as [Title Block.Number], instead of IDs. Agile strongly recommends using attribute IDs. If you use attribute names, make sure they are fully qualified to avoid ambiguity.

export.ExportPartlist Usage

Usage: export.ExportPartlist <options>

Option	Description
-c criteria	The search criteria for locating objects to export. ExportPartlist exports data only for items with AMLs (approved manufacturer parts and their associated manufacturers). The criteria you specify must be formatted using the Agile SDK query language. For more information, refer to <i>Agile SDK Developer Guide</i> .
-e virtual-path	The Agile PLM virtual path. For example, if you access the Agile Web Client via http://www.sample.com/Agile/PLMServlet , the virtual path is "Agile". When you install the Agile PLM system, the default virtual path is "Agile".
-f filter	Predefined filter name or ID. If you have administrator privileges, you can define Agile PLM filters using the Agile Java Client.
-F filter-flag	<p>Ad hoc filter flag. The legal values for this argument derive from the <filters> element shown in the Export XML Schema documentation. The filter flags correspond to child elements with names ending in "Filter," like ChangeFilter and ItemFilter. The basic pattern for this option is filter-name.attribute.value. filter-name corresponds to the name of the XML element, such as ItemFilter (the "Filter" suffix may be omitted). attribute corresponds to name of the attribute being defined (for example, "PageTwo"). value corresponds to the value for the attribute. If the attribute is a boolean, the value is optional and defaults to "true." For the Attachments attribute, the value "Tables and Files" causes the attachment table and all the referenced files to be exported.</p> <p>The filter flag should be a class filter such as PartFilter (or Part). For a complete list of filter types, see the Export XML Schema Documentation.</p> <p>Here is an example of a filter flag:</p> <p>-F "Part.TitleBlock" "Part.Attachments.TableAndFiles" "Part.BOM.Recurse"</p>
-h host	The Agile PLM server machine. Default: localhost
-l port	Port on which the Agile PLM server is listening. Default: 80
-o output-file	The output file name. Default: out.xml
-p password	User's password.
-P protocol	URL protocol. Either HTTP (the default) or HTTPS.
-r revision	The item revision to export.
-s site	The manufacturing site for which data is extracted. If you do not specify a manufacturing site, data is extracted for all sites.
-T timeout	Amount of time to wait for a response (in minutes). Defaults to 15 minutes.
-u user	Agile PLM username.

These examples show how to run the export.ExportPartlist client.

- `runner export.ExportPartlist -h agilesvr -u aisuser -p agile -l 7778 -c "[Title Block.Number] equal to 'P00408'" -f "Default Item Filter" -o D:\out.xml`
- `runner export.ExportPartlist -h agilesvr -u aisuser -p agile -l 7001 -c "[Title Block.Number] equal to 'P00502'" -r "A" -f "Default Item Filter" -o D:\data\out.xml`
- `runner export.ExportPartlist -h agilesvr -u aisuser -p agile -l 7778 -c "[Title Block.Number] equal to 'P00025'" -f "Default Item Filter" -o D:\data\partlist_rev.xml -r "A"`
- `runner export.ExportPartlist -h agilesvr -u aisuser -p agile -l 7778 -c "[Title Block.Number] equal to 'P00163'" -f "Default Item Filter" "Default Manufacturer Filter" "Default Manufacturer Part Filter" -o D:\data\partlist_bom.xml -r "B"`

importer.ImportData Usage

Usage: importer.ImportData <options>

Option	Description
-a mapfile	A previously saved mapping definition file.
-e virtual-path	The Agile PLM virtual path. For example, if you access the Agile Web Client via http://www.sample.com/Agile/PLMServlet , the virtual path is "Agile". When you install the Agile PLM system, the default virtual path is "Agile".
-f filetype	Type of file being imported. If this option is omitted, the client tries to determine the filetype based on the MIME type of the import source file.
-h host	The Agile PLM server machine. Default: localhost
-i input-file	The source data file.
-l port	Port on which the Agile PLM server is listening. Default: 80
-m map	A textual mapping definition. Arguments should take the form of <source-path>=<target-path>.
-n option	An import server option. Arguments should take the form of <group> <option>=<value>. Please see the Import XML Schema documentation for more information on available options.
-o output-file	The output file name. Default: log.xml
-p password	User's password.
-P protocol	URL protocol. Either HTTP (the default) or HTTPS.
-t type	Type of import operation(s) to run. At least one type must be specified. The format of a type argument is type[.<child-type>] (for example., items.bom, manufacturerParts.attachments, and prices.priceLines). Please see the Import XML Schema documentation for a complete set of available import types.
-T timeout	Amount of time to wait for a response (in minutes). Defaults to 15 minutes.
-u user	Agile PLM username.
-x transform	A previously saved transformation definition file. For information on how to use the Import wizard to create a transformation definition file, refer to <i>Agile PLM Import and Export Guide</i> .

These examples show how to run the importer.ImportData client.

- runner importer.ImportData -h agilesvr -u aisuser -p agile -l 7778 -i D:\data\bom2.txt -f DelimitedTextFile -t items -n "BusinessRuleOptions|ChangeMode=Authoring" "TextParser|FieldDelimiter=," -o D:\data\result.xml -m Parent="Part.Title Block.Number" Child="Part.Title Block.Description"
- runner importer.ImportData -h agilesvr -u aisuser -p agile -l 7778 -i D:\data\bom2.txt -f DelimitedTextFile -t items -n "BusinessRuleOptions|ChangeMode=Authoring" "TextParser|FieldDelimiter=," -o D:\data\result.xml -m Parent="Part.Title Block.Number" Child="Part.Title Block.Description" Type="Part.Title Block.Part Type"
- runner importer.ImportData -h agilesvr -u aisuser -p agile -l 7778 -i D:\data\Book1.xls -f ExcelFile -t items -m num="Part.Title Block.Number" desc="Part.Title Block.Description" type="Part.Title Block.Part Type" -o D:\data\result.xml -n "ExcelFileParser|SelectWorksheet=1"
- runner importer.ImportData -h agilesvr -u aisuser -p agile -l 7778 -i D:\SourceFiles\Source\Item\item_tab.txt -a D:\SourceFiles\Mapping\Item\item_tab.xml -t items -f DelimitedTextFile -o D:\SourceFiles\Baseline\Item\item_tab_import.xml -n "BusinessRuleOptions|ChangeMode=Authoring" "TextParser|FieldDelimiter=tab"
- runner importer.ImportData -h agilesvr -u aisuser -p agile -l 7778 -i D:\SourceFiles\Source\price_lines_import.xls -a D:\SourceFiles\Mapping\price_lines_import.xml -f ExcelFile -t prices.priceLines -o D:\SourceFiles\Baseline\price_lines_import.xml -n "BusinessRuleOptions|ChangeMode=Redline" "BusinessRuleOptions|ChangeNumber=PCO00005"
- runner importer.ImportData -h agilesvr -u aisuser -p agile -l 7778 -i D:\SourceFiles\Source\AML_PC.txt -a D:\SourceFiles\Mapping\AML_PC.xml -t items.aml items.bom -f DelimitedTextFile -o D:\SourceFiles\Baseline\AML_PC.xml -n "BusinessRuleOptions|ChangeMode=Redline" "BusinessRuleOptions|ChangeNumber=C00041" "Template|TemplateType=com.agile.imp.template.TemplateParentChildFilter"
- runner importer.ImportData -h agilesvr -u aisuser -p agile -l 7778 -i D:\SourceFiles\Source\bom_RefDelimiter.txt -a D:\SourceFiles\Mapping\bom_RefDelimiter.xml -t items.bom -f DelimitedTextFile -o D:\SourceFiles\Baseline\new_bom.xml -n "BusinessRuleOptions|ChangeMode=Authoring" "BusinessRuleOptions|ReferenceDesignatorRangeCharacter=-" "BusinessRuleOptions|ReferenceDesignatorDelimiterCharacter=,"
- runner importer.ImportData -h agilesvr -u aisuser -p agile -l 7778 -i D:\SourceFiles\Source\bom_Level.txt -a D:\SourceFiles\Mapping\bom_Level.xml -t items.bom items.aml -f DelimitedTextFile -o D:\SourceFiles\Baseline\bom_Level.xml -n "BusinessRuleOptions|ChangeMode=Redline" "Template|TemplateType=com.agile.imp.template.TemplateLevelFilter" "BusinessRuleOptions|ChangeNumber=C00013"
- runner importer.ImportData -h agilesvr -u aisuser -p agile -l 7778 -i D:\SourceFiles\Source\Item\item_comma_category.txt -a D:\SourceFiles\Mapping\Item\all_mapping_comma.xml -o D:\SourceFiles\Baseline\all_mapping_comma.xml -t items -f DelimitedTextFile -n "BusinessRuleOptions|ChangeMode=Authoring" "TextParser|FieldDelimiter=," "TextParser|LocationOfHeaderRow=3" "TextParser|FileEncoding=ISO8859_1" "ParsingAndValidationOptions|MultilistDelimiterCharacter=,"

"ParsingAndValidationOptions|WhitespaceValidationAction=Reject"
 "ParsingAndValidationOptions|CaseValidationAction=Convert"
 "ParsingAndValidationOptions|LengthValidationAction=Reject" "TextParser|TextQualifier="

importer.ImportSupplierResponse Usage

Usage: importer.ImportSupplierResponse <options>

Option	Description
-e virtual-path	The Agile virtual path. For example, if you access the Agile Web Client via http://www.sample.com/Agile/PLMServlet , the virtual path is "Agile". When you install the Agile PLM system, the default virtual path is "Agile".
-h host	The Agile server machine. Default: localhost
-i input-file	The source data file.
-l port	Port on which the Agile server is listening. Default: 80
-o output-file	The output file name. Default: log.xml
-p password	User's password.
-P protocol	URL protocol. Either HTTP (the default) or HTTPS.
-r RFQ-number	The RFQ into which you are importing the supplier's response.
-s supplier-number	Supplier number. The supplier number is needed only when a buyer imports an RFQ response for an off-line supplier. If the supplier number is not specified, the import server retrieves the supplier number from the specified input file.
-T timeout	Amount of time to wait for a response (in minutes). Defaults to 15 minutes.
-u user	Agile username.

Here are some examples showing how to run the importer.ImportSupplierResponse client.

- runner importer.ImportSupplierResponse -h agilesvr -u joesupplier -p agile -l 7778
- -i D:\SourceFiles\Source\RFQ00256.csv -r RFQ00256
- runner importer.ImportSupplierResponse -h agilesvr -u joebuyer -p agile -l 7778
- -i D:\SourceFiles\Source\RFQ00013.csv -o D:\SourceFiles\Source\Response.xml
- r RFQ00013 -s SUP11003

importer.ValidateData Usage

Usage: importer.ValidateData <options>

The options is exactly the same as the importer.ImportData web service. See "importer.ImportData Usage" command.

Creating a Web Service Client

Using the ExportData sample, this section illustrates steps for creating a Web service client application for AIS.

Generating the SOAP Request

In most cases, generating an appropriate SOAP request is as simple as making use of client-side stubs. Many Web-Service-aware code libraries are able to generate client-side stubs on your behalf. This entails using a code generation utility along with the WSDL for the desired Web service.

The provided AIS samples make use of Axis in order to connect with the AIS Web service engine. Axis provides a WSDL2Java utility that can be used for this purpose; other Web-Service-aware libraries will have their own client-side stub generation facility (for example, .Net includes a wsdl.exe utility). In the case of the samples, the client-side stub generation occurs during the samples' build process. Within the build.xml file is the following Ant target:

```
<target name="generate-export-stubs" depends="init"
        unless="exp-stubs.present">
  <echo>Generating export Java client-side stubs from
    WSDL...</echo>
  <java fork="true"
        classname="org.apache.axis.wsdl.WSDL2Java"
        failonerror="true">
    <classpath refid="build.classpath"/>
    <arg line="-o ${built.scratch.dir}/gen"/>
    <arg line="-p export"/>
    <arg line="${ais.url}/Export?wsdl"/>
  </java>
</target>
```

Note AXIS also includes an Ant task definition, which you can use instead of the above <java> task. For more information about Axis Ant tasks, see the following Website:
<http://ws.apache.org/axis/java/ant/ant.html>

The above Ant target is responsible for generating the export-related client-side stubs. This invocation retrieves the Export WSDL from \${ais.url}/Export?wsdl, generates Java code in the export Java package, and places the source code within the \${built.scratch.dir}/gen directory. For more information on the WSDL2Java utility, please consult the Axis documentation, which can be found on the Axis Website at <http://ws.apache.org/axis/>.

Once the client-side stubs have been generated, the user can use the generated object definitions in order to more easily generate the appropriate SOAP request. Rather than requiring the user to understand how to construct a valid SOAP request, these stubs allow the user to focus on the capabilities of the target Web service operation. Looking at the ExportData.java sample, you can see that the run method contains all the code used to generate the SOAP request. However, instead of explicitly constructing a SOAP request, the code is concerned with setting up a Java data structure, which will be provided as the parameter to a stub method invocation. The code is more concerned with functionality than it is with formatting, which makes it easier to read, write, and maintain.

Submitting the SOAP Request

The next step in consuming a Web service operation is properly submitting the generated SOAP request to the Web service engine. When dealing with generated client-side stubs, this step usually becomes as simple as pointing the stubs to the desired server and invoking a method on the stubs. You do not need to worry about opening a connection or manually marshaling your data onto the wire; instead, the generated stubs handle these details on your behalf.

The `ExportData.java` sample illustrates the above in two places:

- The `getExportStub` method is responsible for pointing the client-side stubs to the desired Web service engine.
- The `stub.exportData` method invocation found within the `run` method is responsible for actually submitting the request to the Web service engine. The actual submitting of the request and all the minutiae that entails are managed by the stubs themselves; you do not need to worry about the connecting, submitting, or marshaling particulars.

The details on how you point the stubs to the desired Web service engine and submit the request will vary from code library to code library. Please consult the documentation for your Web-Service-aware code library for more information.

Processing the SOAP Response

As with submitting the SOAP request, the processing of the SOAP response is usually handled via the generated client-side stubs. Without these generated stubs, you would be responsible for parsing the XML-based SOAP response and dealing with the many formatting and unmarshaling issues that arise. However, when dealing with generated stubs, all of these details are taken care of for you, allowing you to receive properly type Java objects.

The `ExportData.java` sample illustrates this point nicely. In this sample, you can see that the result of the `stub.exportData` method is a `javax.activation.DataHandler`, which is a handy way of encapsulating a binary data stream. Rather than require you to parse an XML document and discern what the returned data is, the stubs automatically do this for you, returning the response's attachment to you as a `DataHandler` object.

The details on how SOAP responses are processed will vary from code library to code library. Please consult the documentation for your Web-Service-aware code library for more information.

Extracting Agile Objects and Attachments

This chapter includes the following:

- Understanding Export Web Service Operations 29
- Using the exportData Web Service Operation 29
- Using the exportPartlist Web Service Operation 34

Understanding Export Web Service Operations

There are two export Web service operations that are delivered as part of AIS:

- `exportData` — A Web service operation that extracts data from an Agile PLM system in one of several data formats.
- `exportPartList` — A Web service operation that takes a multilevel BOM and *flattens* it into a list of the manufacturer parts in the BOM and their quantities and returns the data in aXML format.

Using the exportData Web Service Operation

The `exportData` Web service operation is capable of extracting Agile data in one of several structured formats. This operation can be used to provide integration functionality between your Agile PLM system and other, third-party systems.

This section illustrates how to format an XML request in order to use the `exportData` Web service operation. For more information on the XML schema that describes an `exportData` request, please see the Export XML Schema documentation.

The `exportDataRequest` XML element describes the XML format you should use when submitting an `exportData` request to AIS; it allows you to specify four different types of data:

- **Queries** — One or more queries that define what objects should be exported
- **Filters** — One or more filters that define what data from the selected objects should be exported.
- **Formats** — What format should be used for the exported data.
- **Sites** — Manufacturing sites for which data should be exported. By default, data for all sites is exported.

Working with Queries

The exportData Web service operation allows you to specify several parameters related to the object query:

- The query itself (Required)
- The type of object being queried (Required)
- The site to apply to all objects matched by the query (Optional)
- The revision to apply to all objects matched by the query (Optional)

You can specify multiple queries at once, returning multiple result sets. More information on query parameters can be found in the Agile API reference documentation. However, the following section provides a brief introduction to the criteria syntax.

Specifying Query Criteria

This section introduces the basics of Agile SDK query syntax. For complete information on how to construct complex search criteria, refer to the Agile SDK Developer Guide.

The value for the criteria parameter for the exportData and exportPartlist is a single string consisting of one or more search conditions. Strings that appear within the search criteria should be enclosed in single quotes (').

Each search condition contains the following elements:

- Left operand — The left operand is always an attribute enclosed in brackets, such as [Title Block.Number]. You can specify the attribute as an attribute name (fully qualified name or short name) or attribute ID number. The attribute specifies which characteristic of the object to use in the search.
- Relational operator — The relational operator defines the relationship that the attribute has to the specified value. Relational operators are: “equal to” (==), “not equal to” (!=), “greater than” (>), “greater than or equal to” (>=), “less than” (<), “less than or equal to” (<=), “contains,” “does not contain,” “starts with,” “does not start with,” “is null,” “is not null,” “between,” “not between,” “in,” and “not in.”
- Right operand — The matching value for the specified attribute in the left operand. The right operand can be a constant expression or a set of constant expressions. A set of constant expressions is needed if the relational operator is “between,” “not between,” “in,” or “not in.”

This is an example of a search condition:

```
[Title Block.Description] == 'Computer'
```

[Title is another example where the right operand is a set of constant expressions:

```
[Title Block.Number] in ('1000', '2000')
```

You can also string multiple search conditions together using the logical operators “and” or “or.” Here is an example of search criteria that includes two conditions separated by the logical operator “and”:

```
[Title Block.Part Category] == 'Electrical' and [Title Block.Lifecycle Phase] == 'Inactive'
```

An exportData Query Example

The following XML snippet illustrates how to specify a single query with the following conditions:

- Locate the part with the part number 1000-02.
- Export revision C

If you are exporting items, you can specify revisions by effectivity date, change number, or revision identifier. For more information, see the Export XML Schema documentation. If you don't specify a revision, the latest released revision is exported.

```
<exportDataRequest>
  <queries>
    <query>
      <criteria>[Title Block.Number] == '1000-02'</criteria>
      <revision>
        <revisionidentifier>C</revisionidentifier>
      </revision>
      <objectType>
        <predefined>Item</predefined>
      </objectType>
    </query>
  </queries>
  ...
```

Working with Sites

Companies that practice distributed manufacturing use several different manufacturing sites for their products. The exportData Web service operation allows you export data for all manufacturing sites or for a specific site. Manufacturing sites affect how items and changes are exported. For items, BOMs and AMLs can vary per site. For changes, the Affected Items table specifies which manufacturing sites are affected.

By default, the exportData Web service operation extracts information for all sites. If you specify a manufacturing site, only the data associated with that site is exported. All objects not associated with that manufacturing site are filtered out of the query results.

The following XML snippets illustrate different ways to specify a manufacturing site:

```
...
<site>
  <site-name>Taipei</site-name>
</site>
...
<site>
  <site-id>6</site-id>
</site>
...
<!--The following is optional since the default is all sites -->
<site>
  <all/>
</site>
...
```

Working with Filters

The exportData Web service operation allows you to define what information from the selected objects should be queried. These parameters are captured by specifying one or more filters. Filters are either predefined in the Agile PLM system or they are defined in an ad hoc fashion by the AIS client.

You can specify multiple filters and their effect is cumulative. The resulting filter is the combination of all specified filters. For example, if one filter includes an item's PageTwo information and a separate filter includes the item's History information, the effective filter includes both PageTwo and History information.

Predefined Filters

Agile provides several predefined filters that allow you to refine query results. Predefined filters can be specified in one of three different ways:

- By ID — Specify the numeric ID of a defined filter with the Agile administrative data. This information can be found using the Agile API to inspect the Agile administrative data. By using the ID of a defined filter, you reduce the risk of having a name change adversely affect your code.
- By name — Specify the name of a defined filter found in the Agile administrative data. This is an easy way to reference previously defined filter definitions.
- By object type — The set of possible filters includes one for each object type, allowing you to specify different information sets for each type.

Note	If you have administrator privileges to the Agile PLM system, you can define new filters. Log into the Agile Java Client and choose Admin > System Settings > Agile Contents Service > Filters.
------	---

For more information on the predefined filters, see the Export XML Schema documentation.

Ad Hoc Filters

Ad hoc filters are defined for a particular purpose and are not stored in the Agile PLM system. The Export XML Schema defines several <filters> elements, such as ItemFilter, ChangeFilter, ManufacturerFilter, and ManufacturerPartFilter. The general usage for ad hoc filters is to specify the filter type, such as ItemFilter, and then supply boolean values for each table that you want included by the filter. For example, the following ad hoc filter includes the TitleBlock and PageTwo tables for items:

```
<filters>
  <ItemFilter TitleBlock="true" PageTwo="true"/>
</filters>
```

Most tables require simple boolean values. However, other tables support enumerated values that let you include associated objects. For example, the BOM table supports the following enumerated values for filters: DoNotInclude (the default), TableOnly, SingleLevel, and Recurse.

Note The filter type you specify depends on the output format. If you extract data to a PDX file, the filter type should be a superclass filter such as ItemFilter or ChangeFilter. If you extract data to an aXML file, the filter type should be a class filter such as PartFilter or ECOFilter.

An exportData Filter Example

The following illustrates how to combine a predefined filter, "Default Part Filter," with an ad hoc filter that extracts all Item data, including attachments, that may result from the query defined in the query example above.

```
...
<filters>
  <!--The following is a predefined filter specified by name-->
  <filter-name>Default Part Filter</filter-name>
  <!--The following is an ad hoc filter -->
  <ItemFilter TitleBlock="true" PageTwo="true"
    PageThree="true" History="true"
    Attachments="TablesAndFiles"
    BOM="Recurse" Changes="true"
    WhereUsed="true"
    AML="TableOnly" Site="true"/>
</filters>
...
```

Working with Formats

The exportData Web service operation can export data in either PDX or aXML format. For a description of these formats, see [AIS Web Service Operations](#) (on page 11).

For more information on how to specify the supported formats, see the Export XML Schema documentation.

An exportData Format Example

The following illustrates how to extract data in PDX format:

```
...
<format>PDX</format>
...
```

A Sample exportData Web Service Operation

The following is a sample exportDataRequest, which demonstrates a complete exportData Web service operation request:

```
<exportDataRequest>
  <queries>
    <query>
      <criteria>[Title Block.Number] == '1000-02'</criteria>
      <objectType>
        <predefined>Item</predefined>
      </objectType>
    </query>
  </queries>
  <site>
    <site-name>Taipei</site-name>
  </site>
  <filters>
    <!--The following is a predefined filter specified by name-->
    <filter-name>Default Part Filter</filter-name>
```

```
<!--The following is an ad hoc filter -->
<ItemFilter TitleBlock="true" PageTwo="true"
           PageThree="true" History="true"
           Attachments="TablesAndFiles"
           BOM="Recurse" Changes="true"
           WhereUsed="true"
           AML="TableOnly" Site="true"/>
</filters>
<format>PDX</format>
</exportDataRequest>
```

The above XML document is not a complete or valid SOAP request. Rather, this XML document represents the contents of a SOAP request body. Generally, you do not need to generate the above XML document by hand. Instead, the client-side stubs generated by a Web-Service-aware code library will usually take care of creating an appropriately formatted XML document and placing it within a SOAP request. The above sample is simply an illustration of what the XML request generated by client-side stubs might look like.

Using the exportPartlist Web Service Operation

The exportPartlist Web service operation takes a multilevel BOM and “flattens” it into a list of the manufacturer parts in the BOM and their quantities and returns the data in aXML format. That is, it enables you to extract a rolled up set of parts, and the related Quantities Per Top Level Assembly (QPTLA). The value of the QPTLA is computed as the sum over recursive products starting from the top of the BOM tree. exportPartlist calculates the QPTLA for each unique item-revision pair, and returns the results in the Part Quantities element of the resulting aXML output.

Note	ExportPartlist exports data only for items with AMLs (approved manufacturer parts and their associated manufacturers). Items without AMLs are ignored.
------	--

Working With exportPartlist Queries

exportPartlist accepts query definitions in almost the exact same fashion as exportData. The main difference is that you do not need to specify the object type against which the query is operating. This is because the queries related to a part list must always be queries against items.

Working With exportPartlist Filters

Filters are specified for the exportPartlist Web service operation in much the same way as they are for the exportData Web service operation. The only difference is which filters can be specified. Since exportPartlist only operates over items, manufacturer parts (that is., AML) and manufacturers (AML's related manufacturers), the object-related filters are restricted to those three data types.

An exportPartlist Example

The following is an example `exportPartlistRequest` element, which demonstrates a complete `exportPartlist` Web service operation request. You will quickly notice that this is a simple adaptation of the prior `exportData` sample.

```
<exportPartlistRequest>
  <queries>
    <query>
      <criteria>[Title Block.Number] == '1000-02'</criteria>
    </query>
  </queries>
  <site>
    <site-name>Taipei</site-name>
  </site>
  <filters>
    <!--The following is a predefined filter specified by name-->
    <filter-name>Default Part Filter</filter-name>
    <!--The following is an ad hoc filter -->
    <ItemFilter TitleBlock="true" PageTwo="true"
      PageThree="true" History="true"
      Attachments="TablesAndFiles"
      BOM="Recurse" Changes="true"
      WhereUsed="true"
      AML="TableOnly" Site="true"/>
  </filters>
</exportDataRequest>
```

Two things have been removed in order to make this adaptation:

- The query element does not include an `objectType` element. This is because the `exportPartlist` Web service operation only queries against item objects.
- The format element is not included in the `exportPartlistRequest`. This is because the `exportPartlist` Web service operation only exports data in aXML format.

The preceding XML example is not a complete or valid SOAP request. Rather, this XML document represents the contents of a SOAP request body. Generally, you do not need to generate the above XML document by hand. Instead, the client-side stubs generated by a Web-Service-aware code library will usually take care of creating an appropriately formatted XML document and placing it within a SOAP request. The above sample is simply an illustration of what the XML request generated by client-side stubs might look like.

Importing Data

This chapter includes the following:

- Understanding the Import Web Service Feature 37
- Using the importData Web Service Operation 37
- Importing Date Values 43

You can use the importData Web service operation of AIS to import data into the Agile PLM system. The source for the import data can be an Agile database, a third party Product Data Management (PDM) system, or an Enterprise Resource Planning (ERP) system. The Agile server stores information about customer-specific items—the parts that the company uses to build its products. It also maintains the relationships that assembly parts have with BOM components and that parent items have with approved manufacturers.

For more information on importing data into the Agile PLM system, please refer to the Agile PLM Import and Export Guide.

Understanding the Import Web Service Feature

There are three import Web service operations that are delivered as part of AIS:

- importData — A Web service operation that imports data into the Agile PLM system.
- importSupplierResponse - A Web service operation that imports an RFQ response from a supplier.

Note The ImportSupplierResponse Web service operation is deprecated as of Agile 9.0 SP1. Instead, invoke the importData Web service operation and construct a valid importSupplierResponseRequestType XML datastructure. For more information, see [Importing Supplier Responses](#) (on page 43). Although the old ImportSupplierResponse Web service operation is supported for this release, you should migrate your code to the new API.

- validateData — A Web service operation that validates source data with compliance rules

Using the importData Web Service Operation

The importData Web service operation exposes all Import Server functionality through a Web service interface, which can be accessed programmatically.

This section will help illustrate how to format an XML request in order to use the importData Web service operation. For more information on the XML schema that describes an importData request, please see the Import XML Schema documentation.

The importDataRequest XML element describes the XML format you should use when submitting an importData request to AIS. It supports two types of XML datastructures:

```
<importDataRequest xsi:type="importDataRequestType">
  ...
</importDataRequest>
<importDataRequest xsi:type="importSupplierResponseRequestType">
  ...
</importDataRequest>
```

Specifying Data Types

The importDataRequest XML element allows you to specify several different types of data, including:

- Data Source - The source of the data to be imported
- Operations - Which import operations should be performed.
- Mapping - How incoming data should be mapped into the Agile PLM system.
- Transformation - How incoming data should be transformed before importing into the Agile PLM system.
- Options - Other options that affect the behavior of the import server.

Working With Data Sources

A data source is defined by two pieces of information: an URL which references the data to be imported and a data type that defines what kind of data is being imported. The URL specified can be a reference to either an attachment sent along with the SOAP request, or an external resource. If the URL references an attachment, then the SOAP request can follow either the SwA (SOAP With Attachments) or DIME (Direct Internet Message Encapsulation) encoding rules. For more information on these parameters, refer to the Import XML Schema documentation.

The following XML snippet illustrates how to specify a PDX data source that is sent along with the SOAP request:

```
<importDataRequest xsi:type="importDataRequestType">
  <dataSource>
    <attachmentRef href="cid:E36C913548344EDA1B7FC20CEDCEDEB3" />
    typeIPC2571</type>
  </dataSource>
  ...
```

In the above snippet, the HREF attribute is not intuitive, but it is of the form expected when referencing an attachment sent as part of the SOAP request.

Working with Operations

By specifying one or more import operations, you can define what data is imported into the Agile PLM system. The following table lists valid import operations.

Operation	Child Attributes
currencyConversion	n/a
customers	n/a
declarations	items, manufacturerParts, partFamilies, itemSubstances, mfrpartSubstances, partFamilySubstances, specifications, attachments
items	aml, bom, sites, attachments, composition, substances, suppliers, specifications, relationships
manufacturerParts	attachments, composition, substances, suppliers, specifications, relationships
manufacturers	attachments, relationships
partgroups	parts, suppliers, specifications, relationships, attachments
prices	priceLines, attachments
productServiceRequests	affectedItems, relatedPSR, relationships, attachments
projectItems	aml, bom, attachments
qualityChangeRequests	affectedItems, relationships, attachments
quoteHistories	quoteHistoryLines
specifications	substances, attachments
substances	materialCompositions, attachments
suppliers	supplier, manufacturerOfferings, commodityOfferings
users	usergroup
usergroups	user

Depending on what you specify, the import server will perform the desired import operations, ignoring certain data if it is not relevant to the selected import operation. For more information on import operations, see the Import XML Schema documentation.

The following code snippet illustrates how to import manufacturers, manufacturer parts, and items. For items, the BOM and AML tables are also imported.

```

...
<operations>
  <manufacturers attachments="false"/>
  <manufacturerParts attachments="false"/>
  <items aml="true" bom="true" sites="false"
attachments="false"/>
</operations>
...

```

Working with Mappings

The specified mappings determine how the incoming data is mapped into the Agile PLM system. Mappings may be specified either by referencing a previously defined mapping definition file, or by specifying the mappings via the submitted XML data structure. Referencing a previously defined mapping definition file occurs in much the same way as a data source is referenced (that is, via an HREF attribute on the appropriate element). Specifying a mapping via the XML data structure requires specifying the source and target attributes in the appropriate format.

For more information on these parameters, see the Import XML Schema documentation.

The following snippet illustrates how to map a field from the incoming PDX package onto the Title Block of an item.

```
...
<mapping>
  <entry>

    <source>/ProductDataExchangePackage/Items/Item@itemIdentifier</source>
    <target>Part.Title Block.Number</target>
  </entry>
</mapping>
...
```

The following snippet illustrates how you can reference a previously defined mapping definition file.

```
...
<mapping>
  <attachmentRef href="cid:E36C913548344EDA1B7FC20CEDCEBEEF" />
</mapping>
...
```

In the above snippet, the HREF attribute is not very intuitive, but it is of the form expected when referencing an attachment sent as part of the SOAP request.

Note	Agile PLM allows you to define an unlimited number of new flex fields for each type of business object. Both the Agile Import wizard and AIS now support user-defined flex fields. Therefore, you can import data to user-defined flex fields.
------	--

Working with Transforms

Transforms allow you to specify how to transform data as it is imported into the Agile PLM system. Transforms are specified via previously defined transformation definition files, as indicated in the following snippet.

```
...
<transform href="cid:E36C913548344EDA1B7FC20CEDCE0123" />
...
```

In the above snippet, the href attribute is not very intuitive, but it is of the form expected when referencing an attachment sent as part of the SOAP request. For more information on this parameter, see the Import XML Schema documentation.

Working with Options

The import server contains a number of options which you can set in order to alter its behavior. These options are grouped together into related option groups, which makes it easier to distinguish the purpose of the related options. For more information on these parameters, see the Import XML Schema documentation.

The following snippet illustrates how to set several Business Rule and Parsing & Validation options.

```
...
<options>
  <BusinessRuleOptions>
    <ChangeMode value="Authoring"/>
    <MultiRowUpdateMode value="AddUpdateOnly"/>
  </BusinessRuleOptions>
  <ParsingAndValidationOptions>
    <CaseValidationAction value="Convert"/>
  </ParsingAndValidationOptions>
</options>
...
```

ChangeType and ChangeAutoNumber Options

The import server supports setting the following *ChangeType* and *ChangeAutoNumber* options when importing items in the Redline mode. This in addition to setting the same for a *ChangeNumber*. You have the option to specify a non-existing change in AIS, and the Import server will generate the change for the affected *ChangeType*, *ChangeNumber* or *ChangeAutoNumber*. When a change order is initiated, the server will record a message that includes the type and number of the change in the AIS log file. For more information on these parameters, see the Import XML Schema documentation.

- The *ChangeType* option supports specifying the subclass name or ID of the change order for the ECO,SCO, or MCO. If the change type is invalid, the Import server will reject the entire Import operation and will record a fatal message in the AIS log file.
- The *ChangeAutoNumber* option supports generating change numbers with the specified autonumber. If the specified *ChangeAutoNumber* is invalid, the Import server will reject the entire import operation and will record a fatal message in the AIS log file.

Note	Do not set the <i>ChangeNumber</i> option if you have already invoked the <i>ChangeAutoNumber</i> option.
-------------	---

The following snippet illustrates how to set the *ChangeMode*, *ChangeType*, and *ChangeAutoNumber* options in the aXML file.

```
...
<options>
  <BusinessRuleOptions>
    <ChangeMode value="Redline"/>
    <ChangeType value="ECO"/>
    <ChangeAutoNumber value="ECO AutoNumber"/>
    <MultiRowUpdateMode value="AddUpdateOnly"/>
  </BusinessRuleOptions>
  <ParsingAndValidationOptions>
    <CaseValidationAction value="Convert"/>
  </ParsingAndValidationOptions>
</options>
...
```

Options to Import Non-Existing Objects

You have the option to accept or reject importing non-existing objects during import operations. This behavior is supported by the `BehaviorUponNonExistingObjects` option. This option has two values, `Accept` and `Reject`. `Accept` will create the non-existing objects during the import and `Reject` will skip creating these objects.

There is detailed information about `BehaviorUponNonExistingObjects` in the *documentation* folder in `AIS_samples` (ZIP file). To access the `AIS_samples.zip` file, see [AIS Folders](#) (on page 9). To view the information, select `documentation > schemas > import.html`.

An importData Sample

The following is a complete sample `importDataRequest`, which demonstrates how a fully configured `importData` operation request might appear.

```
<importDataRequest xsi:type="importDataRequestType">
  <dataSource>
    <attachmentRef href="cid:E36C913548344EDA1B7FC20CEDCEDEB3"/>
    typeIPC2571</type>
  </dataSource>
  <operations>
    <manufacturers attachments="false"/>
    <manufacturerParts attachments="false"/>
    <items aml="true" bom="true" sites="false" attachments="false"/>
  </operations>
  <mapping>
    <attachmentRef href="cid:E36C913548344EDA1B7FC20CEDCEBEEF"/>
  </mapping>
  <options>
    <BusinessRuleOptions>
      <ChangeMode value="Authoring"/>
      <MultiRowUpdateMode value="AddUpdateOnly"/>
    </BusinessRuleOptions>
    <ParsingAndValidationOptions>
      <CaseValidationAction value="Convert"/>
    </ParsingAndValidationOptions>
  </options>
</importDataRequest>
```

The above XML document is not a complete or valid SOAP request. Rather, this XML document represents the contents of a SOAP request body. Generally, you do not need to generate the above XML document by hand. Instead, the client-side stubs generated by a Web-Service-aware code library will usually take care of creating an appropriately formatted XML document and placing it within a SOAP request. The above sample is simply an illustration of what the XML request generated by client-side stubs might look like.

Using the validateData Web Service Operation

This operation exposes the validation service through a Web service interface that you can invoke programmatically. This operation validates the source data for compliance with server rules that govern length, size, and other formats before importing them into the Agile PLM system. For information on programmatic support, refer to the Agile PLM SDK Developer Guide. For information on the UI implementation, refer to the Agile PLM Import and Export Guide.

The validateData operation uses the same importDataRequestType used by the importData Web service operation. For procedures to specify the importDataRequestType, see [Using the importData Web Service Operation](#) (on page 37) . For more information on the XML schema that describes the importData request, refer to the Import XML Schema.

Note The validateDataRequestType is a subclass of the importDataRequestType, but it does not define any additional methods. In that way, the two are exactly the same. In future releases, the validateData operation will use the validateDataRequestType instead of the importDataRequestType.

Importing Supplier Responses

To import supplier responses using the importDataRequest Web service operation, specify "importSupplierResponseRequestType" for the xsi:type element. The importSupplierResponseRequestType is much simpler than importDataRequestType because it is much more constrained. You don't need to specify import operations, mapping files, transformation files, or options to import an RFQ response. The importSupplierResponseRequestType XML element allows you to specify three types of data:

- Data Source — The source of the data to be imported.
- RFQ Number — The alphanumeric identifier of the RFQ that is associated with the response.
- Supplier Number — The supplier number is needed only when a buyer imports an RFQ response for an off-line supplier. If the supplier number is not specified, the import server retrieves the supplier number from the specified input file.

For more information on importSupplierResponseRequestType parameters, see the Import XML Schema documentation.

The following is a complete sample for importSupplierResponseRequest. It demonstrates how a fully configured importSupplierResponse operation request can appear.

```
<importDataRequest xsi:type="importSupplierResponseRequestType">
  <dataSource>
    <attachmentRef href="cid:E36C913548344EDA1B7FC20CEDCEDEB3"/>
  </dataSource>
  <rfqNumber value="RFQ00123"/>
</importDataRequest>
```

The above XML document is not a complete or valid SOAP request. It is simply an illustration of what the XML request generated by the client-side stubs will look.

Importing Date Values

The Import Web service supports a variety of date formats based on several different criteria, including user preferences and locale.

Note	The upper limit for dates is today's date + 150 years. Date values later than that are invalid and cannot be imported.
------	--

Setting the Preferred Date Format and Time Zone

Each Agile user can select a preferred date format.

To change date format preferences for your Agile account:

1. In the Agile Web Client, click Settings > User Profile > Preferences > Edit.
2. Select the desired date format in the Preferred Date Format field.
3. Select a GMT time zone in the Time Zone field.
4. Click Save.

Supported Date Formats

The Import Web service supports all combinations of date and time formats available in the `java.text.DateFormat` class as well as additional formats. `DateFormat` provides many date and time formatting styles based on locale. The following table shows date formats available for the U.S. locale, evaluated in order:

Date Format	Example
MMM-dd-yyyy HH:mm:ss	Jul-10-2001 14:08:35
MMM-dd-yyyy HH:mm	Jul-10-2001 14:08
MMM-dd-yyyy hh:mm:ss a	Jul-10-2001 02:08:35 PM
MMM-dd-yyyy hh:mm a	Jul-10-2001 02:08 PM
MMM-dd-yyyy	Jul-10-2001
dd-MMM-yyyy HH:mm:ss	10-Jul-2001 14:08:35
dd-MMM-yyyy HH:mm	10-Jul-2001 14:08
dd-MMM-yyyy hh:mm:ss a	10-Jul-2001 02:08:35 PM
dd-MMM-yyyy hh:mm a	10-Jul-2001 02:08 PM
dd-MMM-yyyy	10-Jul-2001
EEEE, MMMM d, yyyy	Thursday, June 25, 1998
EEEE, MMMM d, yyyy h:mm a	Thursday, June 25, 1998 1:32 PM
EEEE, MMMM d, yyyy h:mm:ss a	Thursday, June 25, 1998 1:32:19 PM

Date Format	Example
EEEE, MMMM d, yyyy h:mm:ss a z	Thursday, June 25, 1998 1:32:19 PM GMT-05:00
MMMM d, yyyy	June 25, 1998
MMMM d, yyyy h:mm a	June 25, 1998 1:32 PM
MMMM d, yyyy h:mm:ss a	June 25, 1998 1:32:19 PM
MMMM d, yyyy h:mm:ss a z	June 25, 1998 1:32:19 PM GMT-05:00
MMM d, yyyy	Jun 25, 1998
MMM d, yyyy h:mm a	Jun 25, 1998 1:32 PM
MMM d, yyyy h:mm:ss a	Jun 25, 1998 1:32:19 PM
MMM d, yyyy h:mm:ss a z	Jun 25, 1998 1:32:19 PM GMT-05:00
M/d/yy	6/25/98
M/d/yy h:mm a	6/25/98 1:32 PM
M/d/yy h:mm:ss a	6/25/98 1:32:19 PM
M/d/yy h:mm:ss a z	6/25/98 1:32:19 PM GMT-05:00

Each date format is specified using a time pattern string where

- y = year
- M = month in year
- d = day in month
- h = hour in AM/PM (1~12)
- m = minute in hour
- s = second in minute
- E = day in week
- a = AM/PM marker
- z = time zone
- ' = escape for text
- " = single quote

The count of each letter such as “M” in the time pattern determines the format. For example, three “M” characters indicate that the month is represented as text instead of a number; less than three “M” characters means that the month is represented by a number.

For more information about Java date formats and time pattern syntax, see Sun’s documentation for the SimpleDateFormat and DateFormat classes:

<http://www.javasoft.com/j2se/1.3/docs/api/index.html>

Specifying Time Zones

Date values can specify a GMT time zone. If a date value omits the time zone, the user's time zone preference is used. Time zones must be entered in the following format:

GMT Sign hh:mm

where:

GMT = Greenwich Mean Time

Sign = + or -

h = hour in AM/PM (1~12)

m = minute in hour

For example, "GMT-05:00" and "GMT+02:00" are valid time zones.

Note	Do not use three-character codes (such as PST or PDT) to specify time zones. Three-character time zone codes are unreliable because some are used for multiple time zones. Consequently, the Agile server might resolve a three-character time zone code to an incorrect time zone.
------	---

aXML and PDX Package Date Formats

For aXML and PDX packages, the Import Web service supports a relaxed version of the ISO String date format: yyyy/MM/ddTHH:mm:ssZ. The T and Z characters are optional.