



Smilehouse OpenSyncro 2.2 Whitepaper

Free, lightweight enterprise application integration tool

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1. Introduction

1.1. Overview

OpenSyncro is a free, lightweight enterprise application integration tool written in Java language. It runs on 100% open source platform, being based on Apache Tomcat application server and storing its configuration data in MySQL database.

OpenSyncro was originally developed for connecting Smilehouse Workspace e-commerce software (workspace.smilehouse.com) to other enterprise applications, for example ERP, CRM and SCM systems. However OpenSyncro can be used independently of Workspace for integrations between other applications, as well as for various data conversion tasks.

OpenSyncro is based on J2SE architecture and is continuously developed and supported by Smilehouse.

This document is targeted for partners, developers and CTO's interested in OpenSyncro technology, architecture, security and other technical issues.

1.2. Necessary skills

For installation of OpenSyncro, including the other required software (see OpenSyncro manual, section 2: "Installing and updating OpenSyncro"), you need basic system administration skills.

It should take about 1-2 hours to install and configure the database (MySQL), Java 2 Standard Edition, a servlet container (Tomcat) and OpenSyncro.

Technical skill level necessary for integrating enterprise applications with OpenSyncro depends on the components selected for the project. Most of the built-in Source and Destination components are pretty simple to configure and require only parameters like file and directory name, or URL address.

Converter components for a specific data format need settings similar to import/export wizards in e.g. spreadsheet or database applications. The more general purpose Converter component (e.g. XSLTConverter), the more technical and programming skills are required.

1.3. How to proceed?

You can download OpenSyncro software, installation instructions and related documentation from www.opensyncro.org website.

Feedback and technical questions concerning OpenSyncro can be emailed to: support@opensyncro.org.

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2. Business cases

2.1. Overview

Modern ERP solutions are becoming increasingly integrated to other IT systems to enable more efficient processes, partner integration and future growth.

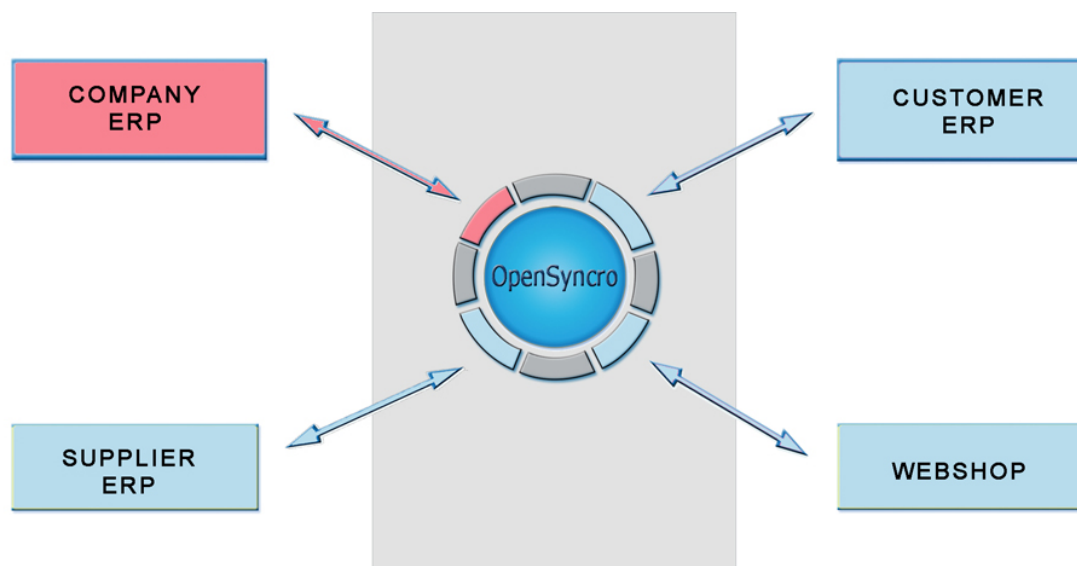
OpenSyncro enables building these integrations. The built-in components offer basic functionality to transfer and transform data. This functionality can be used for instance to extract CSV data file from an FTP server, transforming the CSV table to XML format and finally loading the XML file to desired location through HTTP.

To broaden the scope, OpenSyncro functionality can be extended using application specific Connector Packs. For instance an OpenSyncro Connector Pack for SAP Business One enables extracting product and customer data form SAP and loading order data to SAP.

Combining the built-in components and Connector Pack components enable integrating for instance SAP Business One to multiple other systems.

2.2. Data integration between enterprise applications

In this example OpenSyncro is used to build integrations between four different systems. OpenSyncro extracts product data from suppliers system and loads this to both webshop and corporate customers ERP systems. Purchase orders form webshop and corporate customers can be loaded to company ERP.



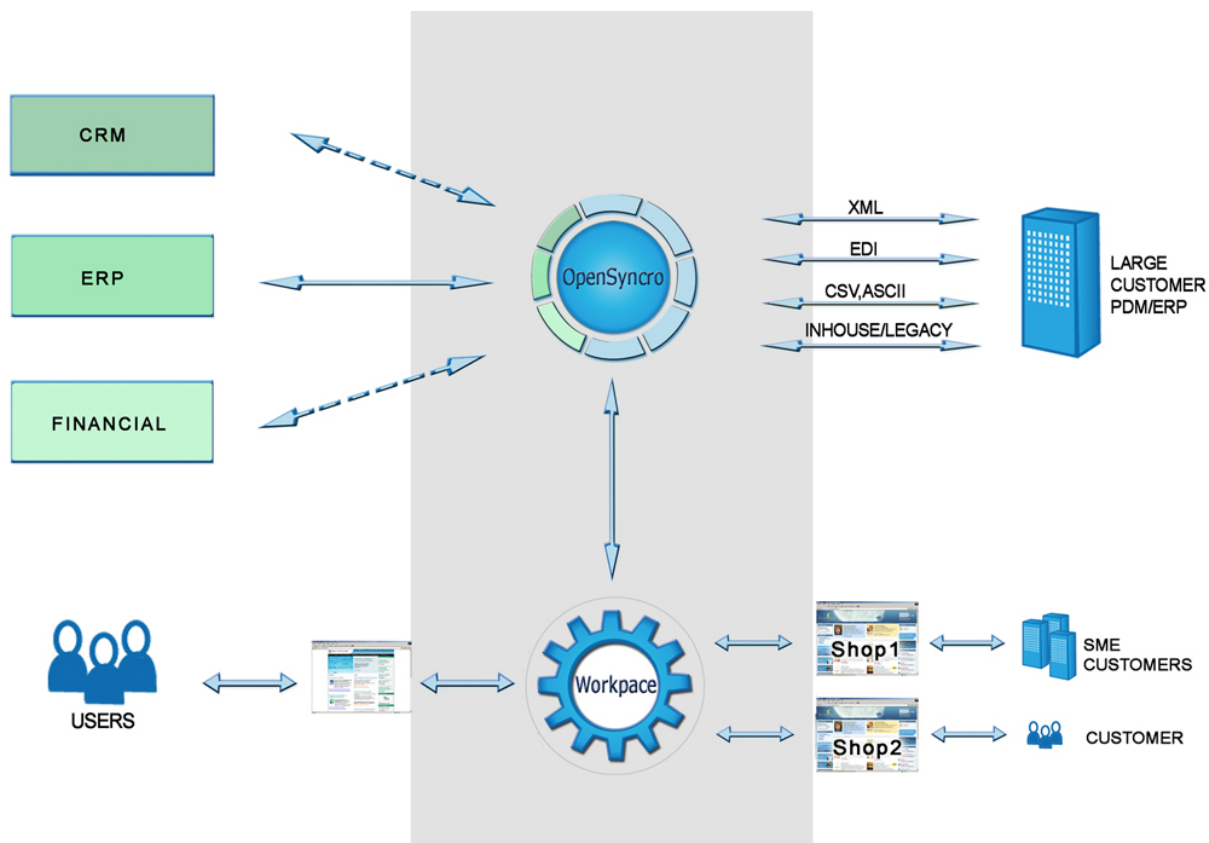
2.3. Integrated e-commerce solution

In this case a company developed an advanced e-commerce solution with multiple integrations.

OpenSyncro is deployed to extract product and customer data from the company ERP. This data is sent to e-commerce site built with Smilehouse Workspace. The e-commerce site is used by consumers and smaller corporate customers. Orders placed in this e-commerce site are integrated back to company ERP.

OpenSyncro also delivers product data to larger corporate customers. Different data formats can be used for different corporate customers.

These corporate customers can also place purchase orders. OpenSyncro can extract the orders for customers' systems, transform the data to desired format and then load the orders to company ERP.



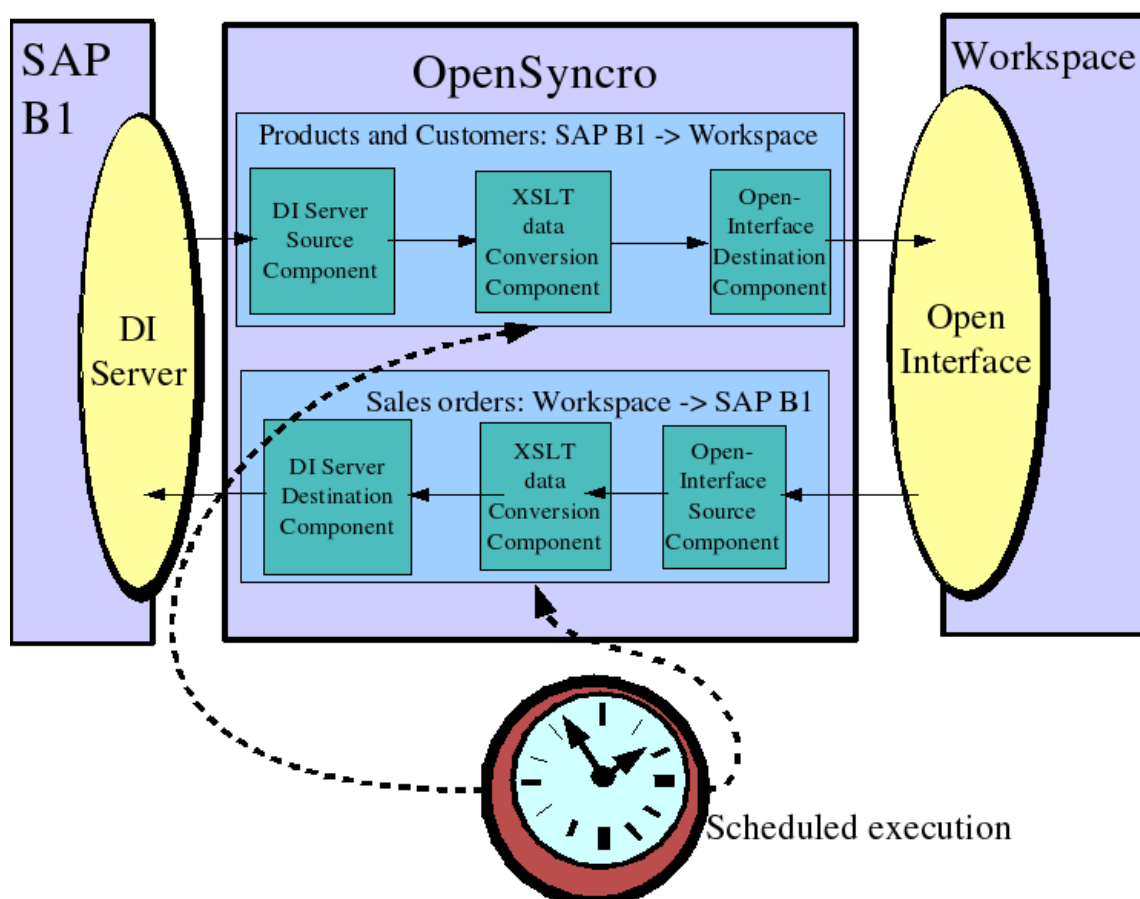
3. Technical overview

3.1. Architecture

Integration solutions built with OpenSyncro are based on one or more data transfer Pipes to connect the applications.

The Pipes consist of a Source component which requests data from the first application, Destination component which sends the data to the second application and optional Converter components responsible for data format translation between the first and second application.

The image below shows an example integration between SAP Business One (SAP B1) ERP system and a Smilehouse Workspace webshop.



The example integration deploys two Pipes to send all product and customer data from SAP B1 to Workspace and one Pipe to transfer new sales orders from Workspace to SAP B1.

OpenSyncro communicates with the applications through available APIs, in this case SAP B1's Data Interface Server and Workspace's Open Interface.

The batch type execution of data transfer Pipes is scheduled to take place at regular intervals, using the operating system's built-in task scheduler.

3.2. Administration interface modules

3.2.1.Module: Users

User management allows adding new user accounts for OpenSyncro administration interface as well as changing password and name information of existing users.

3.2.2.Module: Components

Component manager displays technical information and description about all Source, Converter and Destination components currently loaded to OpenSyncro. It is also possible to dynamically load/unload external components from a directory path specified in OpenSyncro configuration file.

3.2.3.Module: Pipe List

All Pipes view shows a list of integration processes currently stored in OpenSyncro database with start, edit, clone, remove and create new Pipe actions. The previous execution date, duration and status along with the name of the user who started the process are also displayed.

3.2.4.Module: Pipe Editor

Pipe Editor is used to set up and maintain integration processes. Components used for the Pipe are selected and configured here.

3.2.5.Module: Pipe Settings

Pipe Settings allows changing the transfer log detail level, setting up email notifications and a password for remote HTTP invocation of the Pipe execution.

3.2.6.Module: Component Editor

Each OpenSyncro component in each Pipe can have different parameters, which are set in the component's own GUI. Component Editor is used to specify e.g. connection parameters for Source and Destination components and data conversion rules for the Converters.

3.2.7.Module: Transfer Log

Transfer Log displays status information and optional debug messages from each integration process execution.

3.2.8.Module: Pipe Execution Queue

Pipe Execution Queue displays all queued integration process execution requests and the currently running processes.

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3.3. Platform compatibility

3.3.1. General

This section describes the supported and recommended platforms and browsers.

3.3.2. Supported platforms

Smilehouse OpenSyncro has been tested with the following server side software. Recommended software written in **bold**.

Supported platforms:

- **Debian GNU/Linux (x86)**
- Redhat Linux (x86)
- Windows 2000
- Windows XP
- Windows 2003

Supported JVMs:

- **SUN Java 5.0 (x86)**
- SUN Java 6.0 (x86)

Supported application servers:

- Apache Tomcat 5.0
- **Apache Tomcat 5.5**
- Apache Tomcat 6.0
- JBoss 4.0
- Jetty 6

Supported databases:

- MySQL 4.0
- **MySQL 5.0**

Supported database connectors:

- MySQL Connector/J 3.1
- **MySQL Connector/J 5.0**

3.3.3. Supported browsers

Smilehouse OpenSyncro administration interface has been tested with the following browsers:

- Microsoft Internet Explorer, Windows (any version)
- Mozilla Firefox (any version)
- Mozilla (any version)

Both interfaces require the following browser options:

- Cookies
- SSL (if configured in the application server)

Administration Interface requires also the following browser options:

- Javascript
- SSL (if configured in the application server)

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4. Interfaces and extensibility

4.1. Built-in Components

OpenSyncro ships with built-in components for accessing the local file system, HTTP(S) and FTP servers, relational databases and Smilehouse Workspace for data retrieval and storage. The most common data conversions tasks can be also performed with the built-in Converters.

Source components:

- **DirectorySource:** Reads contents of all files from a given directory in the local file system. Supports wildcard type selection of files using regular expressions.
- **FTPSource:** Retrieves data from a file located on an FTP server.
- **HTTPSource:** Retrieves data from an HTTP(S) server.
- **IteratingFileSource:** Reads a local file in blocks and sends them one-by-one through the integration Pipe. Makes it possible for example to process CSV tables larger than the available free memory.
- **IteratingXMLFileSource:** Reads XML elements from a local file and sends their contents one-by-one through the integration Pipe. Enables processing of arbitrarily large XML documents.
- **JDBCSource:** Retrieves data from a database. Sends an SQL select query to database and returns the query results in XML format. Supports processing of arbitrarily large data sets by sending a fixed amount of result rows through the Pipe at once.
- **LocalFileSource:** Reads contents of a file from the local file system.
- **RemoteCustomerSource:** Exports customer data in XML from a Workspace webshop.
- **RemoteOrderSource:** Exports sales orders from Smilehouse Workspace in WS OpenInterface XML format.
- **StringSource:** Sends a static text as an input to the integration Pipe.
- **TimestampFileSource:** Reads contents of a local file with a timestamp in the filename.
- **WorkspaceHQLOrderSource:** Exports order XML data from a Smilehouse Workspace webshop and updates the orders' handling and payment statuses. Data selection is based on a free Hibernate query (HQL).
- **WorkspaceHQLSource:** Exports product and order XML data from a Smilehouse Workspace webshop. Data selection is based on user definable Hibernate query (HQL).

Converter components:

- **ASCIItoXMLConverter:** Converts generic ASCII data to XML, based on a list of Java regular expressions.
- **CSVtoXMLConverter:** Converts CSV table data to XML.
- **HTTPConverter:** Sends HTTP and SOAP queries passing the server's response for further processing by the next Pipe component.
- **JDBCConverter:** Retrieves data from a database. Converts an SQL select query from input data to a query result in XML format.
- **LocalFileReadConverter:** Reads additional data from a local file in the middle of the integration Pipe.
- **LocalFileWriteConverter:** Captures data to a local file from between other Pipe components. Facilitates testing and troubleshooting of integration processes.
- **RemoteOrderConverter:** Imports XML sales order data to Workspace through OpenInterface. Functionally identical to RemoteOrderDestination component, but

allows integration Pipe execution continue after successful order import operation.

- SplitConverter/JoinConverter: Splitting data into multiple parts around matches of a regular expression and joining them back to one part (after being processed individually by another Converter component).
- WorkspaceHQLResultConverter: Exports product and order XML data from a Smilehouse Workspace webshop. Uses a Hibernate (HQL) query that is generated from the input data.
- XMLGroupExpander: Creates multiple copies of an XML element structure, changing the content of a specified child element in each copy.
- XSLTConverter/XSLT20Converter: Performs XSLT 1.0 and 2.0 compatible transformations for XML data using Xalan and Saxon-B XSLT processors.

Destination components:

- FTPDestination: Uploads the data as a file to an FTP server.
- HTTPDestination: Sends GET, POST and PUT requests to an HTTP(S) server. Supports sending SOAP commands.
- JDBCDestination: Inserts and updates data into a database using SQL.
- LocalFileDestination: Writes the data to a file in local file system.
- MultiFileDestination: Writes data to multiple files with an auto-incrementing number in the filename.
- RemoteCustomerDestination: Imports XML customer data to Workspace through OpenInterface.
- RemoteOrderDestination: Imports XML sales order data to Workspace through OpenInterface.
- RemotePriceListDestination: Imports XML contract pricing data (price lists) to Workspace through OpenInterface.
- RemoteProductDestination: Imports XML product data to Workspace through OpenInterface.
- TimestampFileDestination: Writes data to a local file with a timestamp in the filename.

4.2. Additional Components – Connector Packs

OpenSyncro functionality is extensible with so-called Connector Packs. Components for connecting to various ERP systems, such as SAP Business One, Hansa Financials / HansaWorld, Exact Globe 2003, Compiere, Econet 2000, SugarCRM, QuickBooks, NetBaron, ProCounter, Google Base and eBay are available for purchase from Smilehouse.

You can download datasheets describing these OpenSyncro Connector Packs from <http://www.opensyncro.org/>

4.3. Additional Components – Self-created

New components can also be created by programming in Java language. The source code distribution of OpenSyncro includes an example on how to build Dynamic Components that can be loaded run-time into an existing OpenSyncro installation.

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5. Security considerations

5.1. General

Many security issues have been addressed in the development of OpenSyncro. Sufficient security in web applications is difficult to implement and it is impossible to confirm that all security issues have been properly addressed in any application, including ours. We have tested for multiple known security issues in OpenSyncro ourselves and implemented protection for these issues.

5.2. Addressed issues

5.2.1. Session management

Session identifiers are kept in cookies

Session identifiers are always transferred via cookies to prevent them leaking via referrer URLs or bookmarks.

Secure session identifiers

OpenSyncro doesn't generate its own session identifiers but delegates that responsibility to its application server. Although the solutions security then depends on the application server's security, it usually provides stronger session identifiers than homegrown solutions because application servers go through much scrutiny by their large user base.

5.2.2. Authentication and authorization

Single point of entry

The OpenSyncro administration interface authentication implements a single point of entry which enables easier evaluation of authentication's correctness.

Password based authentication

Users are authenticated via passwords.

5.2.3. Platform security support

SSL enabling

SSL should always be enabled for the administration interface. See your application server instructions for configuring SSL support.

Java Sandbox and OpenSyncro security policy

Java Security policy descriptions can be created to externally restrict OpenSyncro access to the system. An example catalina.policy file for Apache Tomcat is included in the OpenSyncro distribution.

Note that general system security issues should also be addressed, such as updating security fixes, auditing user access, using a well-configured firewall and secure passwords, checking log files, etc.

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5.2.4. Other issues

Buffer overflows

Buffer overflows are not likely to happen on the Java platform and OpenSyncro doesn't include any native extensions that would increase the likelihood of buffer overflows.

6. Language support

OpenSyncro currently supports English and Finnish languages in the Administration Interface. Java resource bundles are used for the language support, so adding new languages (e.g. German or Russian) is possible.

7. 3rd party elements

Smilehouse OpenSyncro distribution contains the following 3rd party libraries:

Another Tool for Language Recognition

File: antlr-2.7.6rc1.jar

Version: 2.7.6rc1

License: BSD License

URL: <http://www.antlr.org>

Description: Library required by Hibernate 3

Sun JavaBeans(TM) Activation Framework (JAF)

File: activation.jar

Version: 1.0.2

License: Sun Microsystems, Inc. Binary Code License Agreement

URL: <http://java.sun.com/products/javabeans/glasgow/jaf.html>

Description: Library required by Sun's JavaMail API.

CGLIB Code Generation Library

File: cglib-full-2.1.3.jar

Version: 2.1.3

License: Apache License, Version 2.0, January 2004, <http://www.apache.org/licenses/>

URL: <http://cglib.sourceforge.net>

Description: Required by the Hibernate library for dynamic code generation.

Jakarta Commons Beanutils

File: commons-beanutils.jar

Version: 1.7.0

License: Apache License, Version 2.0, January 2004, <http://www.apache.org/licenses/>

URL: <http://jakarta.apache.org/commons/beanutils/>

Description: Required by the Hibernate library.

Jakarta Commons Codec

File: commons-codec-1.3.jar

Version: 1.3

License: Apache License, Version 2.0, January 2004, <http://www.apache.org/licenses/>

URL: <http://jakarta.apache.org/commons/codec/>

Description: Codec contains some general encoding/decoding algorithms.

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Jakarta Commons Collections

File: commons-collections-3.1.jar

Version: 3.1

License: Apache License, Version 2.0, January 2004, <http://www.apache.org/licenses/>

URL: <http://jakarta.apache.org/commons/collections/>

Description: Required by the Hibernate library for efficient handling of data structures.

Jakarta Commons Digester

File: commons-digester-1.7.jar

Version: 1.7

License: Apache License, Version 2.0, January 2004, <http://www.apache.org/licenses/>

URL: <http://jakarta.apache.org/commons/digester/>

Description: Required by the Hibernate library.

Jakarta Commons HTTPClient

File: commons-httpclient-3.0.1.jar

Version: 3.0.1

License: Apache License, Version 2.0, January 2004, <http://www.apache.org/licenses/>

URL: <http://jakarta.apache.org/commons/httpclient/>

Description: Provides a framework for working with the client-side of the HTTP protocol.

Jakarta Commons Lang

File: commons-lang-2.1.jar

Version: 2.1

License: Apache License, Version 2.0, January 2004, <http://www.apache.org/licenses/>

URL: <http://jakarta.apache.org/commons/lang/>

Description: Required by the Hibernate library.

Jakarta Commons Logging

File: commons-logging.jar

Version: 1.0.4

License: Apache License, Version 2.0, January 2004, <http://www.apache.org/licenses/>

URL: <http://jakarta.apache.org/commons/logging/>

Description: Required by the Hibernate library for logging.

Jakarta Commons Net

File: commons-net-1.4.0.jar

Version: 1.4.0

License: Apache License, Version 2.0, January 2004, <http://www.apache.org/licenses/>

URL: <http://jakarta.apache.org/commons/net/>

Description: Required by the Hibernate library.

dom4j

File: dom4j-1.6.1.jar

Version: 1.6.1

License: BSD style license, <http://dom4j.org/license.html>

URL: <http://dom4j.org>

Description: Required by the Hibernate library for reading xml configuration files.

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DynAPI

File: dynapi-2.5.6.tar.gz

Version: 2.5.6

License: GNU Lesser General Public License, Version 2.1, February 1999,

<http://dynapi.sourceforge.net/doccenter/index.php?License>

URL: <http://dynapi.sourceforge.net/dynapi/>

Description: Used for creating dropdown-menus in the administration interface.

Apache ECS Element Construction Set

File: ecs-1.4.2.jar

Version: 1.4.2

License: Apache License, Version 2.0, January 2004, <http://www.apache.org/licenses/>

URL: <http://jakarta.apache.org/ecs/>

Description: Used for creating pages in the administration interface.

Libraries from Sun Java Web Services Developer Pack (JWSDP) with updated SAAJ library

File: jaxrpc-api.jar, jaxrpc-impl.jar, jaxrpc-spi.jar, jax-qname.jar, FastInfoset.jar, jsr173_api.jar, saaj-api.jar, saaj-impl.jar

Version: JWSDP 1.6, SAAJ 1.3

License: Sun Microsystems, Inc. Binary Code License Agreement. BEA Reference Implementation License (JSR173). SAAJ library has dual license consisting of CDDL v1.0 and GPL v2 (<https://glassfish.dev.java.net/public/CDDL+GPL.html>).

URL: <https://jax-rpc.dev.java.net/>, <https://saaj.dev.java.net/>

Description: Used for JAX-RPC/SOAP client implementation in Workspace webshop connector components.

Hibernate

File: hibernate3.jar, ehcache-1.1.jar, asm-attrs.jar, asm.jar

Version: 3.1.3

License: LGPL

URL: <http://www.hibernate.org>

Description: Used for persisting Java objects to the database.

Sun's JavaMail

File: javamail-1.3.3.jar

Version: 1.3.3

License: Sun Microsystems, Inc. Binary Code License Agreement

URL: <http://java.sun.com/products/javamail/>

Description: Required by JAX-RPC.

Sun Java Transaction API (JTA)

File: jta.jar

Version: 1.0.1B

License: Sun Microsystems, Inc. Binary Code License Agreement

URL: <http://java.sun.com/products/jta/>

Description: Required by the Hibernate library.

Jason Pell's MultipartRequest library

File: multipartrequest.jar

Version: 1.30rc1

License: LGPL

URL: <http://www.geocities.com/jasonpell/programs.html>

Description: Used for handling multipart form data.

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ODMG API

File: odmng-3.0.jar

Version: 3.0

License: <http://www.odmg.org>

URL: <http://www.odmg.org>

Description: Specification used by the Hibernate library for supporting the standard for storing objects.

Saxon-B XSLT Processor

File: saxon9.jar, saxon9-dom.jar, saxon9-dom4j.jar, saxon9-jdom.jar, saxon9-sql.jar, saxon9-xom.jar, saxon9-xpath.jar, saxon9-xqj.jar

Version: 9.0.0.2

License: Mozilla Public (MPL) License 1.0, <http://www.mozilla.org/MPL/MPL-1.0.html>

URL: <http://saxon.sourceforge.net/>

Description: Used for XSLT 2.0 processing.

Xalan-Java

File: xalan.jar, xsltc.jar, serializer.jar

Version: 2.7.0

License: Apache License, Version 2.0, January 2004, <http://www.apache.org/licenses/>

URL: <http://xml.apache.org/xalan-j/>

Description: Used for XSLT 1.0 processing.

Xerces2 Java Parser

File: xercesImpl.jar, xml-apis.jar

Version: 2.7.1

License: Apache License, Version 2.0, January 2004, <http://www.apache.org/licenses/>

URL: <http://xml.apache.org/xerces2-j/>

Description: Used for XSLT parsing.

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