



Architecture & Technology

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INTRODUCTION

openwork® is a Business Process Management suite that offers functionalities for information, organizations and processes management.

openwork® is the answer to the more and more pressing requirements: representing organizations, data, documents and processes, in order to elaborate, optimize and share them, having the possibility to obtain web-based software applications for the operative execution of processes, data and document management, exactly as represented.

TECHNOLOGY

The architecture is based on some paradigms illustrated in the following features:

Component-based

openwork® allows to model and manage processes, by combining items according to the logic of corporate organization everyday reality.

The design and implementation of components that constitute and take part in the activities (processes, sub-processes, documents, users, roles, events, etc.) allow the organization to "wear" a suite and especially to implement the present procedures.

Service Oriented

The SOA architecture and the use of Web Services guarantees the suite great scalability, solidness and reliability: actually, it is possible to interface the application via HTTP through calls to the exposed services, which can occur from systems produced and/or that use different languages.

Multi-tier

The application subdivision in 4 levels easily allows to adapt the application architecture to the physical architecture and guarantees easy management of work loads and fail-over situations.

Compliant with the most diffused standards

The use of standard technologies such as HTML, SOAP, WSDL, XML, XPATH, XSL, XSD, XSL-FO, CSS, javascript, guarantees the opening of the application and facilitates the extension of its functionalities.

Integrable

Standard interfaces, such as Web Services and DCOMs, along with the provided entry-points both client-side custom code and server-side custom code, enable the integration, through the workflow logics of other applications already existing in organizations.

Stepwise implementation

The presence of advanced modelling tools enables the gradual implementation of solutions within an organization, so as to minimize the risks and considerably facilitate change management.

Scalable

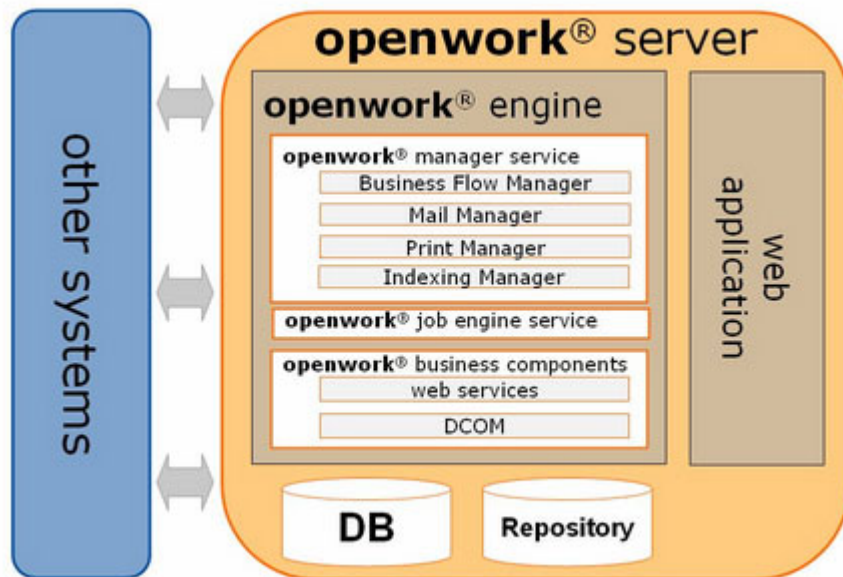
The suite is made of several elements and allows for scalability and distribution of the elements on several systems:

- openwork business components
- openwork manager
- openwork job engine
- Web application
- database
- document repository
- additional components: openwork professional and power components
- Business Process Management Tools (BPM Tools)

ARCHITECTURE

Openwork business components, openwork manager and openwork job engine compose the core suite called openwork engine.

All the modules can be configured in several ways according to the chosen architecture and to the performance, redundancy and security system requirements.



ARCHITECTURE

Every single module can be installed on one server or deployed onto several servers and it presents characteristics of scalability deriving from the particular software technology used.

Since the whole system (configuration and data) is composed of one or more relational databases and a set of files, it is compliant with the most popular solutions for backup, data security, and monitoring available on the market.

It is possible to configure the different modules so as to manage, with a sole engine, different databases and different repositories which are related to different organizations. Such configuration is called ASP modality.

openwork® business components

Openwork business components provide Web Services e DCOM interfaces:

- components realized in Microsoft .NET technology that supply the Web Services interface on Microsoft IIS server version 5 or subsequent.
- COM components integrated in COM+ (component services in Windows 2000/2003) that supply a series of APIs for use of the suite through external applications.

The use of COM components makes the suite server side configurable and programmable allowing the management of process events through scripting code.

Web services expose the entire logic of the openwork® suite according to WSDL standards, guaranteeing the reusability by any applicative or development environment on any platform.

With the use of web services it is possible, for example, to easily provide a logic cabled vertical applicative with a workflow logic or supply an applicative with the profile of the user authorizations depending on his/her position in the organization.

The Web Services interface can be called by systems or applications based on any language that allows to carry out SOAP requests.

This not only allows customers to write their own client applications but it also allows for calling from other systems with high integration level.

For a complete list of openwork® Web Services and WSDL provided see:

<http://www.openworkBPM.com/wsopenwork>.

openwork® Manager Service

It is a Microsoft Windows 2000/XP/2003 service deputed to the supervision of what occurs in the suite, and used to monitor and resolve abnormal situations that can happen in the data and activity flow.

The openwork® Manager service has mainly the task to carry out active processes on the suite. Designed on a thread-based architecture, it is able to manage several processes contemporarily running on the system, assigning each of them to a specific thread, so as to guarantee high efficiency and reliability.

openwork® manager implements the following functionalities:

Business Flow Manager

It is the workflow engine: it manages process enactment, activity dispatching, automatic activities execution, timing check, etc. It allows to regulate the development of the ongoing procedures, distributing tasks and activities to delegated consumers (users, mail manager, print manager, job engine ...).

Mail Manager

It is the deputed module of electronic mail according to the SMTP and POP3 standards. The system can exploit this tool to send documents or information of any kind throughout process enactment.

Print Manager

Printing is one of the provided process automations. This tool achieves several goals: it frees clients from having software for the management of printing devices, it allows remote printing and, especially, it centralises document management cutting out mistakes (wrong documents, wrong versions, etc.).

Indexing Manager

The openwork® framework can exploit several document indexing applications: thanks to this module, the functionalities of the indexing engine are activated on the existing documents.

Job Engine Service

openwork® Job Engine Service facilitates integration of openwork® with any typology of external architecture, especially for what regards the execution of batch operations even of long duration, in which request and answer execution occur in an asynchronous way.

The service offers functions of documental management- typical and advanced – but it also allows to integrate any practicable component or system: therefore the application becomes “extended” – both client-side and server-side – of the functionalities offered by it.

So, a substantial “independence” between openwork® and the external components integrated is generated, therefore several using tips: for example, you can exploit the service to carry out slow and heavy operations, if necessary deputing one or more workstations to carry out all the functions, documental and non documental (ex. OCR, PDF Conversion etc.). This protects the performance and reliability of the openwork® framework, guaranteeing at the same time the parallelism of the tasks demanded from it.

The integration of external components in openwork® is simple and immediate both for what concerns the web application and the workflow engine, both in the planning phase and during use.

Service functionalities

- **Advanced OCR:** letters identification of entire documents (even multipage) maintaining formatting, styles and images (ref. openwork® OCR and Barcode).

- **Integrated Barcode Separation:** separates entire multipage documents acquired in bulk through scanner and automatically attaches it to the forms on which the correspondent bar codes have been generated (ref. openwork® OCR and Barcode).
- **Generic Barcode Separation:** separates entire multipage documents acquired in bulk through scanner, based on bar codes defined by the user, detecting the correspondent numeric/textual values (ref. openwork® OCR and Barcode).
- **Conversion into PDF:** transforms images, Word documents, Excel and PowerPoint in PDF (ref. openwork® PDF Converter).
- **Separation and extraction in bulk:** separates multipage document based on the initial, final page number, and in bulk of n-pages. (ref. Advanced Job Engine).
- **XSL Transformation and XSL-FO:** allows to transform through style pages (XSL or XSL-FO) a XML into HTML, XML or PDF (ref. Advanced Job Engine).
- **Personalized Module or Custom:** allows to create, use or connect suitable components to specific demands, having the tools available to communicate with the openwork® processes, some utilities and the possibility to use advanced IDE (ref. Advanced Job Engine).

Web Application

The Web application is composed of a server-side application and client-side libraries in XSL, JavaScript and CSS (thick client).

The server-side Web application is one of the possible client applications based on openwork® Web Services.

The architecture rigorously follows the principal of separation between data and presentation; the described flow that follows, illustrates what normally happens when the client forwards a request to the Web Server.

- the client requests Web Server the opening of a form;
- the Web Server asks a suitable Web Service the data with which the form must be filled in through a SOAP call;
- the Web Service gives data back to the Web Server;
- data contains also information about rendering rules (such rules are defined through openwork® BPM Tools during modelling of processes and forms) that allow Web Server to resolve style sheet needed to display data; the Web Server verifies if the style sheet is contained in the Web Application Directory and, if not, some other Web Service is invoked;
- the Web Server sends the client the data and style sheet, that are presented as a web page in the browser;

When changes are made and saved in the form, the course is the following:

- the client sends a SOAP message to the Web Server containing the modified data together with possible attachments in DIME format to be saved in Document Repository;
- the Web Server routes them to the Web Service, through ws-addressing and ws-referral;
- the indexed data (contained in the various form fields) are stored in the database, the possible attachments are stored in the repository;

Form and list can be rendered also through server side transformation, for example Formatting Objects transformation for PDF document production according to rules defined in openwork® BPM Tools or transformation for Microsoft Excel® or Microsoft Word® documents production (ref. openwork® Export).

The server-side Web Application is currently implemented by means of Microsoft .NET technology for Microsoft IIS Server version 5 or subsequent.

Furthermore, client-side extensions of JavaScript Modules and XSL libraries are also very easy to do, through the insertion of custom codes and transformations.

The directory structure on the Web Server was conceived so as to separate proprietary modules from possible customised ones (CSS, JavaScript code, etc.) to simplify the operations of application maintenance. The protocol used in the communications can be *http* or *https*.

Database

openwork® database contains configuration and data related to the application.

The openwork® database can be installed on the following DMBS typologies:

- Oracle 9i or 10g

- SQL Server 2000 or 2005
- Microsoft Access (only for demo installations)

Even this component can be installed in both distributed architecture and stand-alone. Both modalities are supported by the setup procedure (openwork® installation).

openwork® accesses the database by means of OLEDB Providers released directly by the DMBS producers, and, therefore, uses the management of priorities and concurrent accesses made available by these.

Document repository

Document Repository is set of files (attached to forms) that can be located on any type of platform accessible through FTP or NETBIOS protocol.

In the default configuration this is composed by a structure in which the files are distributed according to the typology of form they are attached and to the chronological identification. Attachments can be saved compressed in zip format or not.

This component can also be replaced by the use of an external dedicated Document Management System.

Additional components: openwork® Professional and Power Components

The core Business Process Management functionalities of openwork®, allow to represent and govern organizations, data, documents and processes of a company.

To further extend the potentials of the suite openwork® Professional and Power components are made available.

openwork® Professional Components: in addition to the fundamental openwork® functionalities, the suite also has components dedicated to the management of specific matters:

- **openwork® Authentication:** single-sign-on management for the authentication of users (e.g. Active Directory, LDAP or other).
- **openwork® Document Management Connector:** the openwork® processes also operate on Document Repository external to the suite, using DMS of any vendor.
- **openwork® Export:** lists and documents exported in PDF, Word, Excel and in any other file preferred format.
- **openwork® FullText:** search extension also to the textual content of files attached to the documents.
- **openwork® PDF converter:** any attachment to an openwork® document can be converted into PDF with a simple click.

openwork® Power Components: as a complement to the openwork® Business Process Management functionalities, important integration with third-party technologies have been implemented.

openwork® Document Store (Compliant document storage): Document Storage fully compliant with the Italian regulations.

- **openwork® BarCode:** generation and print of bar codes to facilitate the massive acquisition of paper documents.
- **openwork® Digital Sign:** Integrated digital signature to put a signature or a temporal marking on a file, in accordance with the rigorous Italian CNIPA regulations.
- **openwork® OCR:** Graphic file transformation (e.g. fax or scanning of any paper document) into an editable file in WORD, RTF, XML format or pure text file.
- **openwork® Business Console:** cockpit for monitoring and close analysis of processes and organizations managed through openwork®.

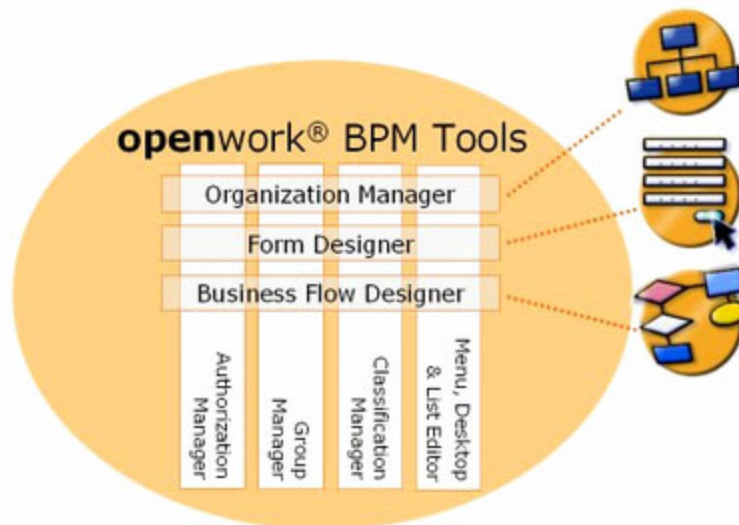


Business Process Management Tools

It is a custom Windows application that makes available to openwork® authorized users a set of Graphic Tools to design applications, by modelling organization *shape* into the openwork® server.

The main openwork® Business Process Management Tools are:

- Organization Manager for the organization/function charts
- Form Designer to design the Forms layout
- Business Flow Designer for the Process Modelling you wish to manage




BPM Tools

These tools are integrated by: Authorization Manager (used for the management of data access and functionalities), Group Manager (used for the management of corporate transversal workgroups), Classification Manager (used for management and information classification of forms and processes) and Menu, Desktop & List Editor used to manage the interface among users and applicative functionalities implemented.

openwork® BPM Tools uses exclusively openwork® Web Services (through *http* or *https*), so it is possible to manage any installation from a sole remote station.

Form Designer

The Form Designer enables the design of forms, besides standard web items (HTML standard controls) also a complete collection of openwork® controls that allow to easily create advanced interfaces for data management within the processes of a corporate organization.

	<p>Note The Form Designer automatically generates style sheets used for the data rendering depending on the organization and workflow context whereby data are requested, managing also the versioning.</p>
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Business Flow Designer

Business Flow Designer provides Graphic Tools which can be used to define the sequence of activities, defining WHO can do WHAT, HOW, with which documents, permissions, etc.

Business Flow Designer integrates a VBScript programming environment through which it is possible to enter custom code (server-side), processed by the workflow engine, when some specific events occur

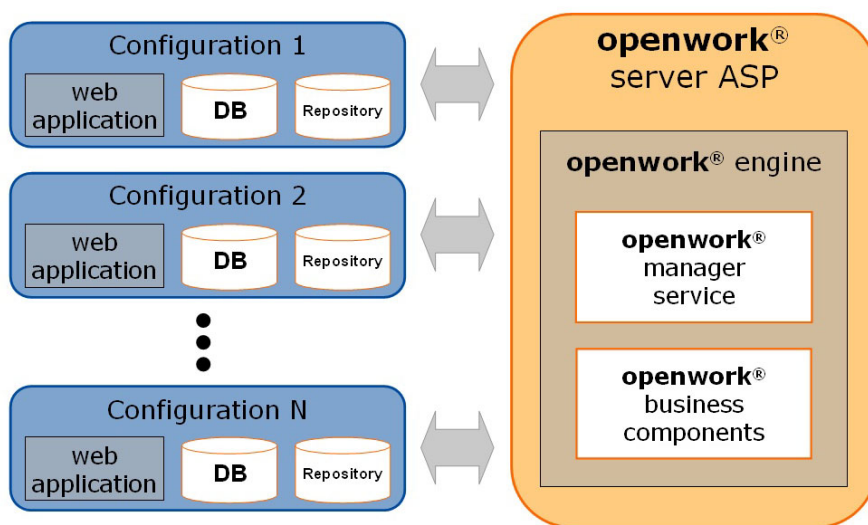
(activity start, execution or completion, etc.) or to condition activity completion when some specific conditions occur.

This functionality, along with openwork® API enables the interaction with external Applications, implementing a unique integrated Workflow infrastructure.

ASP Modality

The openwork® framework is designed to allow ASP modality service supply, that is for the connection via *http* or *https* to a Data-Center.

The openwork® server ASP version allows to implement several configurations on the same installation; the different configurations will share the same engine but they will have their own repository database and client access database, that for sake of simplicity we will indicate as Web Application, making reference to the server provided by the producer.



ASP Architecture

The installation of an ASP server counts on the installation of a server framework (by means of the specific licence released by the producer) and the start up of the ASP modality on it (also this by means of specific licence).

The framework will allow the creation of configurations using the openwork® Server Manager application (indicated in the openwork® Server Management – The installations section) that is implemented in the installation of database, webserver and repository components and in the actuation of the installation itself (always by means of specific licence released by the producer), while the core implemented part (engine, openwork manager, job engine and additional components) will be shared with other configurations present on the system.

The properties of scalability and distribution of the components remain unvaried and the access to the configuration/design of the configuration is enabled by the same installations of the dedicated application (Business Process Management Tools).



