



D9.2

Integrated and Tested platforms and services including mobile - First

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DELIVERABLE PEER REVIEW SUMMARY

ID	Comments	Addressed (X) Answered (A)

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Executive Summary


Task WP9.2 deals with the integration of the different components as provided by PSYMBIOSYS WP3, WP4, WP5, WP6 and WP8 and according to the overall architecture as designed in WP9.1.

This deliverable details the software components openly provided at month 18th that have been actually used and integrated in the timeframe up to month 18th of the PSYMBIOSYS project. Deliverable D9.3, planned for month 33rd, will provide the final and complete set of PSYMBIOSYS openly available components.

The selected components are the available ones in the past months that have been integrated and tested for the purposes of PSYMBIOSYS use cases.

To enable readers to fully frame the released components, the deliverable provides a quick overview of the PSYMBIOSYS architecture and of its instantiation in each of the PSYMBIOSYS technical WPs.

The described software components are openly available, but, for the time being, they have to be requested to the PSYMBIOSYS project pending the discussion, within the H2020 PSS Cluster (Product Service Systems Cluster), on the possible setup of a common, cluster wide, software and public documents repository so to improve the visibility of the whole PSS cluster, its achievements, and tools, and the effectiveness of its projects' outcomes.

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1 Introduction

This deliverable details the software components released by PSYMBIOSYS by month 18th that have been actually used and integrated in the timeframe up to month 18th of the project and that can be freely used by subjects outside the PSYMBIOSYS project.

Further components, both released in the indicated time frame or to be released in the coming months, are not reported in this deliverable because, for the delivered ones, they were not integrated and tested in the indicated timeframe. More details on PSYMBIOSYS components used and tested, also for the purposes of D9.2, are reported in deliverables D9.4, D9.6, D9.8 and D9.10.

Deliverable D9.3 will include all PSYMBIOSYS openly provided, integrated and tested tools.

A still open issue is the actual availability of the D9.2 software components outside of the PSYMBIOSYS project. This aspect is still open waiting for decisions to be taken within the H2020 PSS Cluster (Product Service Systems Cluster¹) that is discussing the opportunity to set up a common software and public documents repository so to improve the visibility of the whole PSS cluster, its achievements, and tools, and the effectiveness of its projects' outcomes.

Therefore, the actual availability of the D9.2 components is currently on-request. Subjects outside the PSYMBIOSYS project can use all D9.2 software components, but the software kits must be currently requested to the PSYMBIOSYS project. In the future, they will instead be openly provided.

The following sections provide a quick summary of the PSYMBIOSYS architecture, so to give to the reader of D9.2 software users a reference framework, and then a short technical description of the D9.2 software elements, as well as use's hints.

1.1 Applicable Documents


Further information on the PSYMBIOSYS approach, methodologies and supporting software components, can be found in the project's deliverables reported below, which constitute the reference documentation for WP9.2's outcomes. The public deliverables are:

- D3.5 “Engineering-Manufacturing Collaboration Processes First”
- D4.5 “PLM-SLM knowledge-process interoperability First”
- D5.5 “Cooperative knowledge mechanisms in product-service value chains First”
- D6.1 “Privacy, Security and Data Protection in product-service design” providing the description of the components released for the WP6
- D8.1 “Tangible / Intangible Assets as a Service Platform First”
- D8.3 “Stream Data Analysis and Processing Platform First”
- D8.5 “Mobile Applications Development Platform First Mobile Applications First”
- D8.7 “Big Data Analytics Tools and Platforms First”

While the confidential deliverables contributing to the D9.2 achievements are:

- D3.7 “Symbiotic Platform for engineering- manufacturing collaboration” providing the description of the components released for the WP3

¹ <http://fof-pss-cluster.eu/>

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- D4.7 “Symbiotic Platform for PLM-SLM concurrency First” providing the description of the components released for the WP4
- D5.7 “Symbiotic Platform for knowledge- sentiment innovation” providing the description of the components released for the WP5.

2 Overall Architecture

The PSYMBIOSYS project has structured its research and development approach into a set of well-focused and interrelated set of work packages (see Figure 2-1). WP3, WP4 and WP5 focus on doing research and development of tools and services in specific areas (respectively: product lifecycle management, product-service management, and idea generation and knowledge sharing). WP8 and WP6, instead, focus on providing supporting technologies and functionalities. Finally, WP9 focuses on providing applications, based on components from the previous WPs, useful in P-S design and development, while WP10 focuses on applications and services that are specific to the PSYMBIOSYS use cases.

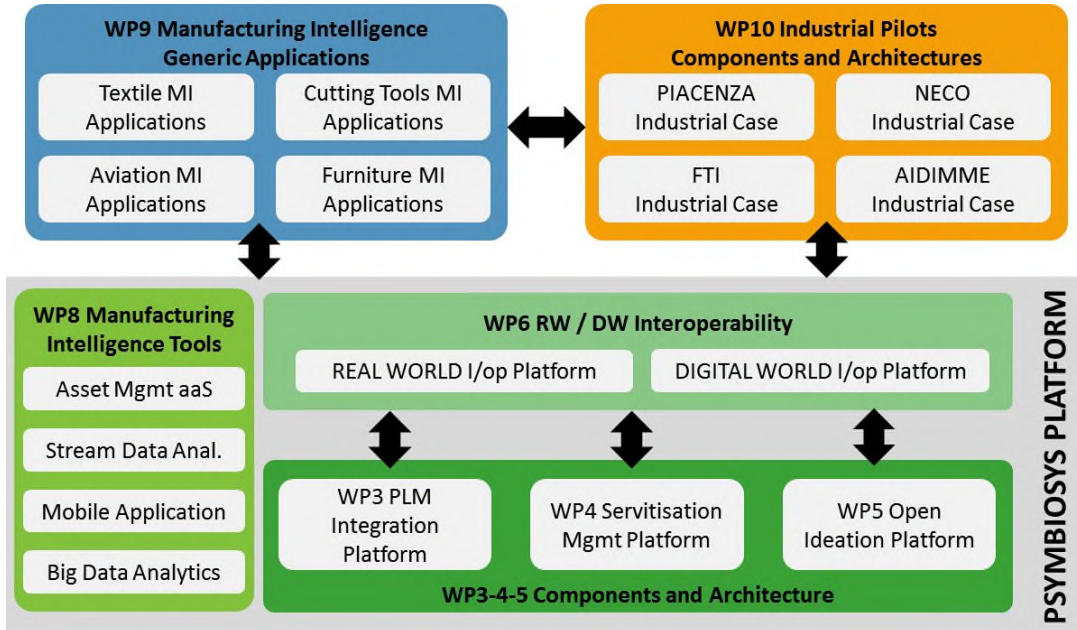


Figure 2-1: Overall PSYMBIOSYS architecture and relationships with the WPs

PSYMBIOSYS refers to, possibly, widely used standards to promote both its integrability within operative contexts, as well as its capability to integrate and interoperate with other tools and services.

Therefore, the design of the overall detailed architecture, as well as the identification of standards, technical solutions (e.g., protocols, APIs) has been performed taking into account the foci of each WPs.

The WP6 functionalities focus on supporting the integration among the digital and physical worlds, as well as on providing basic functionalities for the integration of digital world services or useful to the other PSYMBIOSYS tools and components (e.g., security, event's analysis). Figure 2-2 sketches the overall WP6 structure and its components.

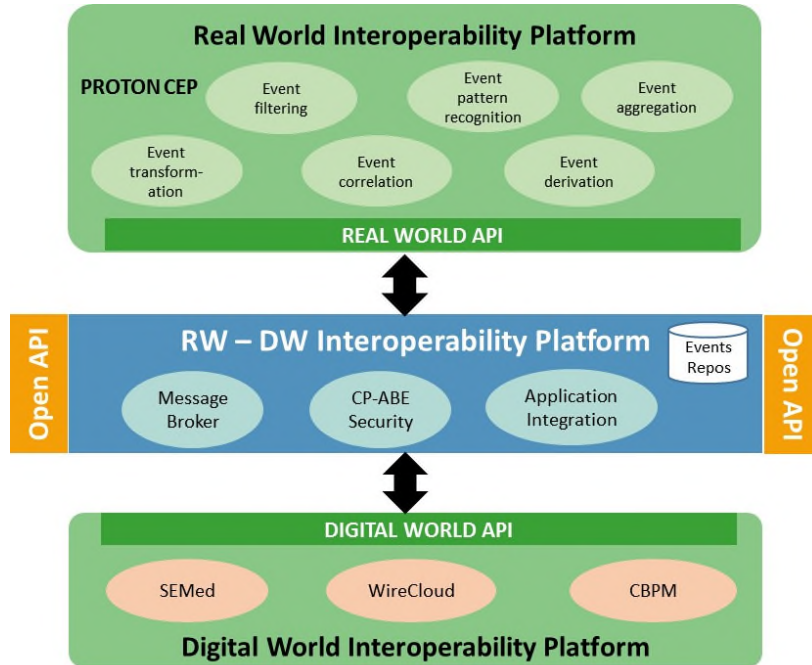


Figure 2-2: PSYMBIOSYS WP6 internal architecture

WP8, as sketched in Figure 2-1, provides platforms for big and stream data analytics, mobile applications development and asset management. These platforms are *enablers* from the point of view of the PSYMBIOSYS platform and, therefore, can have their own structure and architecture with the only requirement that solutions developed using these platforms can seamlessly interoperate or be integrated with the PSYMBIOSYS platform and services.

Figure 2-3 shows the WP3 internal architecture. WP3 is centred on the OSLC standard to support interoperability among tools supporting the various phases of the P-S design and development.

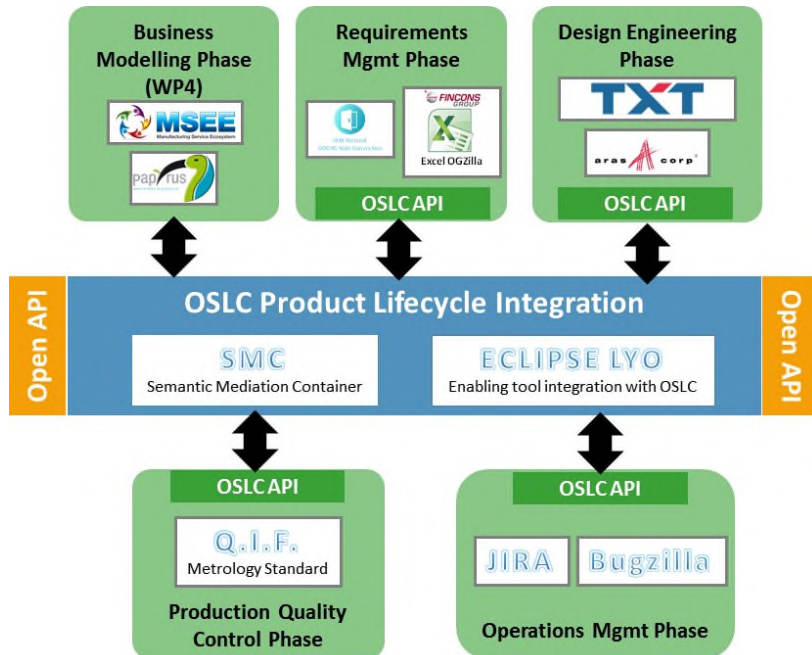


Figure 2-3: PSYMBIOSYS WP3 internal architecture

As sketched in the previous figure, WP3 potentially supports, through the seamless integration and interoperability of tools, the whole P-S lifecycle since the business and P-S process modelling.

Figure 2-4 summarizes the structuring of WP4. As evident from the figure, even WP4 is centered on a common standard for the integration and exchange of information among the tools supporting the P-S lifecycle management. Due to the wide adoption of the Microsoft Project tool and formats for project management, WP4 envisages this Microsoft platform as the major instrument to support interoperability and integration among the identified tools.

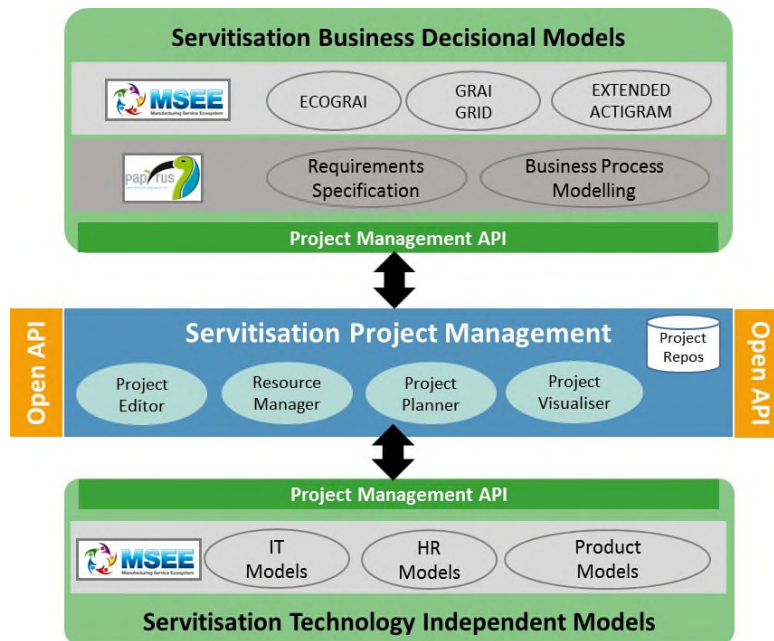



Figure 2-4: PSYMBIOSYS WP4 internal architecture

As indicated in the above figure, WP4 envisages features to model both business and technological processes that feed the P-S lifecycle management as supported by tools like Microsoft Project.

Finally, Figure 2-5 provides an overview of the structuring of the PSYMBIOSYS approach to manage corporate and crowd knowledge and use them to support the ideation process.

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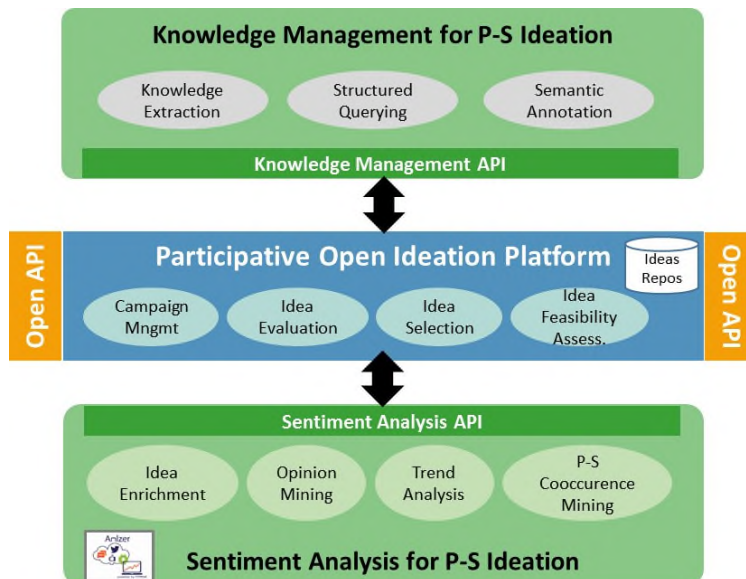


Figure 2-5: PSYMBIOSYS WP5 internal architecture

Unfortunately, the WP5 domain does not have relevant reference standards around which to structure tools' interoperability and integration. Anyway, PSYMBIOSYS will provide a common API to support interoperability and will refer to widely used taxonomies, or ontologies, for the specific domains addressed in the project to support effective internal and external knowledge exchange.

2.1 D9.2 Components Availability

WP9.2 was, as envisaged by the DoA, focused on providing a first integration of the PSYMBIOSYS components as documented in D9.2 (*Integrated and Tested platforms and services including mobile First*).

All the software components in D9.2 are available with open source licenses, so to not restrict PSYMBIOSYS components usability and exploitability.

Of course, the integration activities had to take into account both the actual availability of the various PSYMBIOSYS components, as devised in D9.1, as well as the priorities of the use cases, and specifically the ones identified in WP9.3-9.6. Therefore, the components integrated and tested at the present time and provided by D9.2 were conditioned by these constraints.

As stated, the actual, open availability of WP9.2 outcomes by subjects outside the PSYMBIOSYS project is still an open issue. This aspect will be, hopefully, solved with a PSS Cluster wide and uniform approach setting up a common software and public repository.

The following sections provide details of the actual software components delivered as D9.2.

3 WP3 Released Software Packages

3.1 OGZilla

The OGZilla system has been specifically designed and developed to address the needs of companies that use Microsoft Excel for requirements management², but want to have it capable to interact via OSLC with other tools used in the software development process like a tracker system used to handle issues such as requests for support, bugs, defects, or change requests.

Indeed, Microsoft Excel is often used to manage requirements due to its ability to easily structure data elements, to filter data, to provide formulas and macros, and to the widespread availability of Excel.

Of course, Excel does not natively support integration with other software development related tools and is not aware of standards like OSLC.

To overcome these lacks, and actually show how a new tool can interoperate with other tools using the PSYMBIOSYS platform, FINCONS has developed the *OGZilla* system that enables the OSLC based interoperability among the Excel tool and the Bugzilla ticket tracker system thanks to:

- Excel macros able to interact with the Bugzilla tracking system using OSLC compliant messages,
- A Bugzilla OSLC Gateway, based on OSLC4J Bugzilla (<http://open-services.net/software/oslc4j-bugzilla-adapter/>), which is part of the Eclipse Lyo project (<http://www.eclipse.org/lyo/>). The Gateway is able to expose the data elements in Bugzilla as OSLC resources.

Bugzilla is a web-based general-purpose bug/change request tracker and testing tool originally developed and used by the Mozilla project, and licensed under the Mozilla Public License.

The *OGZilla* system is made up of the following components (see Figure 3-1):

- a set of Excel macros able to enhance the Excel to act as an *OSLC consumer* and able to use the PSYMBIOSYS WP6 Event Bus to *publish* requirement's change related events;
- additional Excel macros to support the user in managing requirements (e.g., retrieve from the Bugzilla system all tickets related to a specific requirement) or to directly create a new ticket on the Bugzilla system from within the Excel tool;
- the *OSLC Gateway for Bugzilla* module (i.e., the OGZilla Proxy), which is a proxy based on Eclipse Lyo, that exposes an OSLC compliant REST API so that Bugzilla becomes an *OSLC provider*;
- the *CEP Based Events' Subscriber* that is a Java module acting as a *subscriber* towards the PSYMBIOSYS Event Bus so that it receives all events it has subscribed to (i.e., all requirement's change request published by an OGZilla Excel instance) and embedding a PROTON CEP filtering component so that only events that meet specific patterns are actually processed. The processing performed on the survived filtered events is to reopen all Bugzilla tickets whose requirements have been changed.

Thanks to the publish/subscribe approach any tool affected by requirement's changes can actually become aware of these changes simply subscribing to the WP6 Event Bus as OGZilla does.

² This, for example, is the case for the FTI partner

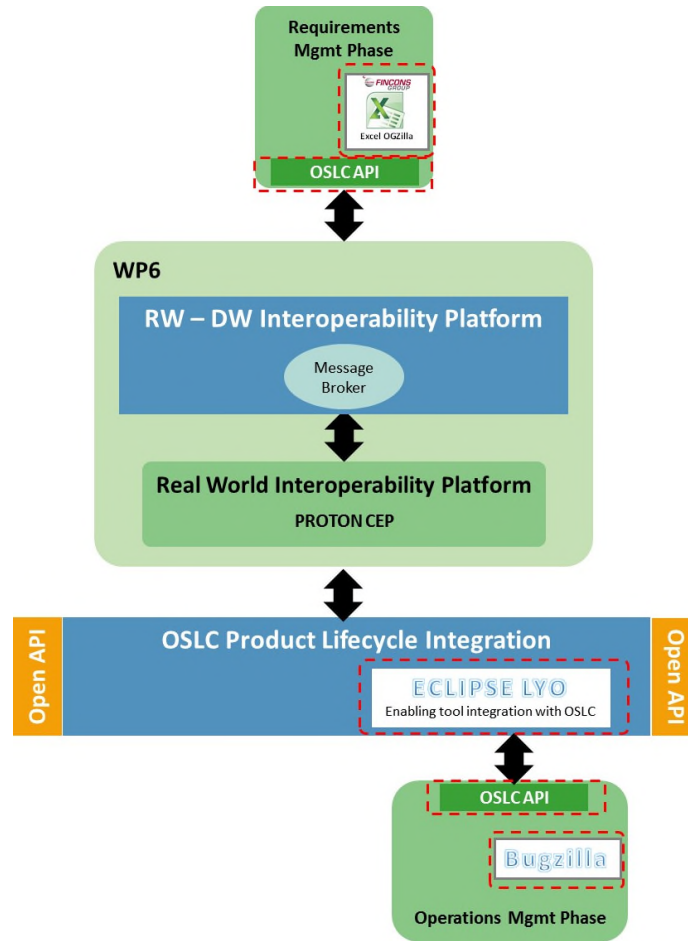


Figure 3-1: OGZilla in the PSYMBIOSYS overall architecture

The following sections provide more details on the OGZilla components.

3.1.1 Software Factsheet

Item	Value
Component Name	OGZilla
Software version	v1.0
Reference workpackage	WP3.4
Responsible Partner	FINCONS SpA
Contact person	Diego Pedone (diego.pedone@finconsgroup.com), Leonardo Straniero (leonardo.straniero@finconsgroup.com)
Source control	Currently FINCONS Internal SVN

3.1.2 Summary of Functionalities

The OGZilla enhanced Excel provides the following features:

- User authentication: when starting an OGZilla enhanced Excel file, the user is requested to provide his/her Bugzilla credentials so that the OGZilla Excel macros can operate (e.g., retrieve tickets, create new tickets) on the Bugzilla system;
- Selection of the software project and the possibility to get a list of bugs or create new ones;
- Management of requirements. The OGZilla enhanced Excel provides a set of fields where to specify information (e.g., Requirement Title, Requirement Description) or select from a predefined set of values (e.g., Requirement Type, Status). Additionally, for each requirement the user has two buttons “Modified” and “Find”. The first button must be used to actually generate a change request event to notify, via the PSYMBIOSYS Event Bus, all interested services that the requirement at hand has been changed. The “Find” button, instead, can be used to get a list of tickets associated to the requirement at hand.

The OGZilla CEP Based Events’ Subscriber is essentially a RabbitMQ subscriber to receive relevant published events that uses the CEP PROTON to filter received events according to predefined patterns.

The OGZilla Proxy, which is based on the Eclipse Lyo library, exposes Bugzilla resources as OSLC ones.

3.1.3 Technical Information

This section provides additional technical details on the OGZilla system. This tool is a PSYMBIOSYS foreground.

3.1.3.1 Internal Architecture

Figure 3-2 provides a more detailed view of the OGZilla system.

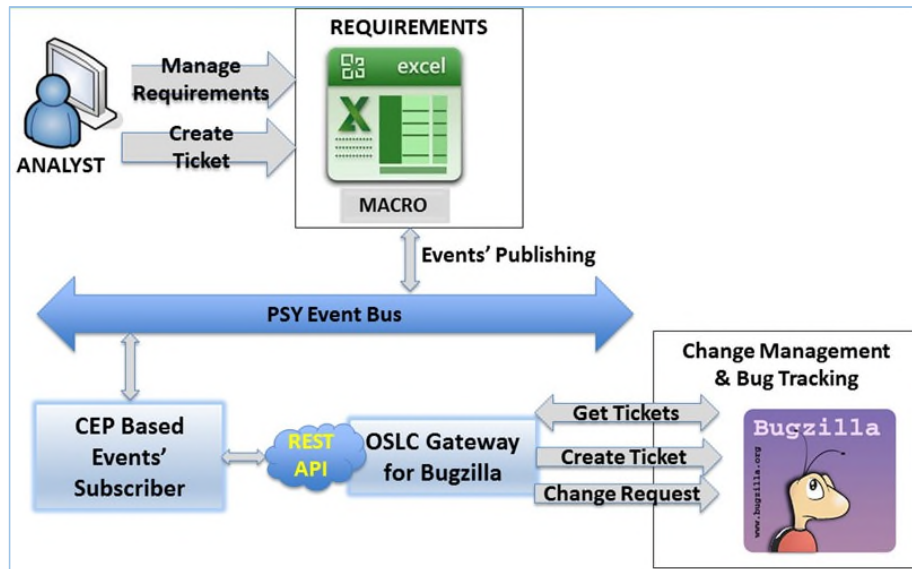


Figure 3-2: OGZilla architecture

3.1.3.2 Technological stack


Item	Value
Nature	Excel macro-enabled workbook
System requirements	Microsoft Excel 2010 / 2013
Programming Language	Visual Basic
Development Tools	Excel

Item	Value
Nature	CEP Based Events' Subscriber
System requirements	Java SE 7 or later installed
Programming Language	Java
Development Tools	None specific.
Additional Libraries	RabbitMQ Client Library, CEP Proton Engine

Item	Value
Nature	OGZilla Proxy
System requirements	Java SE 7 or later installed
Programming Language	Java
Development Tools	None specific.
Additional Libraries	Eclipse Lyo OSLC4J Bugzilla
Application Server	Apache Tomcat 7 installed

3.1.3.3 Licensing

The licensing of the OGZilla components will be compliant to the Eclipse Public License 1.0.

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4 WP5 Released Software Packages

4.1 Professional Innovation Platform

The PSYMBIOSYS Knowledge extraction and management features currently is provided via the PSYMBIOSYS CMIS Knowledge Browser.

For the management of knowledge internal to enterprises, PSYMBIOSYS took into account that enterprise knowledge is usually embedded in company's documents (e.g., Word, PDF, Excel files) or internal blogs/wikis. We also assumed that these information elements are managed via a Content Management System (CMS) that enforces control on the information, and the usage of company's formats and rules. In order to support a variety of CMSs, the PSYMBIOSYS knowledge sharing system refers to the OASIS Content Management Interoperability Services standard to gain access to CMS's managed contents. Therefore, the PSYMBIOSYS CMIS Knowledge Browser provides access to any CMS providing a CMIS API, even if, for this release, the open source Alfresco CMS was integrated.

The OASIS CMIS standard not only provides a standard API to gain access to information managed by the CMS, but it also provides a powerful query language to perform specific searches on managed information using both data as well as metadata.

The PSYMBIOSYS CMIS Knowledge Browser platform provides knowledge extraction capabilities, queries via CMIS query language, visual exploration of directories and sub-directories, uniform access to documents' content and metadata independently from the document's format (PDF, Word or Excel documents, blogs or wikis, etc.).

4.1.1 Software Factsheet

Item	Value
Component Name	PSYMBIOSYS CMIS Knowledge Browser
Software version	v1.0
Reference workpackage	WP5.4
Responsible Partner	FINCONS SpA
Contact person	Leonardo Straniero (leonardo.straniero@finconsgroup.com) Domenico Rotondi (domenico.rotondi@finconsgroup.com)
Source control	http://demos.txt.it:8096/intranet/wp5/d5-7-symbiotic-platform-for-knowledge-sentiment-innovation-first/source_finc

4.1.2 Summary of Functionalities

The functionalities are provided by two complementary components:

A Web service API providing:

- CMS and KM API;
- CMIS Query Management;
- CMS Information retrieval, parsing and tagging.

A Web application providing:

- Analysis and classification of information in the CMS system;
- Guided CMIS tagged queries;
- Access to analysed data and metadata information;
- Some statistical outcomes.

4.1.3 Technical Information

4.1.3.1 Internal Architecture

See Figure 4-1 for details about the CMIS Knowledge Browser architecture.

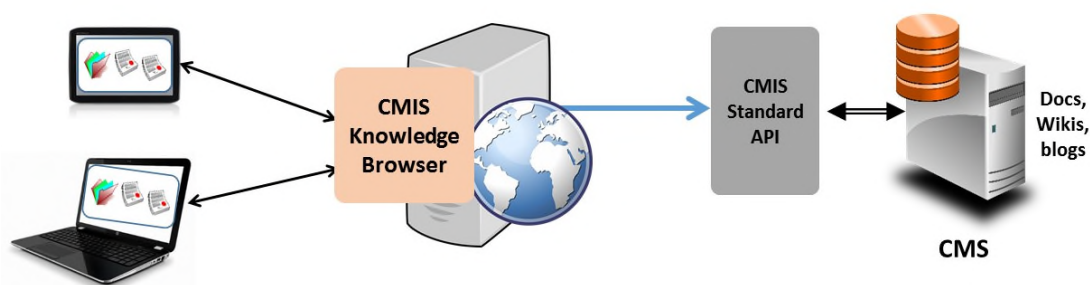



Figure 4-1: PSY CMIS Knowledge Browser architecture

4.1.3.2 Technological stack

Item	Value
Nature	CMIS Knowledge Browser
System requirements	Java SE 7 or later, a CMS with a CMIS AtomPub Endpoint
Programming Language	Java
Development Tools	Eclipse IDE
Additional Libraries	Apache Chemistry OpenCMIS, Tika Toolkit, Struts2, JQuery
Application Server	Apache Tomcat 7 installed
Databases	N/A
I/O formats	JSON

4.1.3.3 Licensing

The licensing of this software is still to be defined being based on libraries having the following licenses:

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- Apache Chemistry OpenCMIS: Apache License V2.0
- Tika Toolkit: Apache License V2.0
- Struts2: Apache License V2.0
- JQuery: MIT License

The software will provided as open source, possibly under the Apache License 2.0 umbrella, even if the actual compatibility between the indicated licenses have to be further investigated.

4.2 Idea Generation Platform


The purpose of the platform is to drive innovation inside companies allowing people to provide ideas for new products or new services, answering to the company challenges (specific topics needing an answer). Main driver of the platform is the collaboration among employees on expressing and continuously improving ideas.

The purpose of the usage in PSYMBIOSYS is not just to find the most suitable idea but is it based on several other sub-goals that are as important as the idea identification:

- Innovative employees are usually few in companies; most of employees are doing their job as they have been taught and instructed without “losing” time in identifying how to change the “status quo”. The goal of the involvement is to make employees actively think about their work and what is surrounding them to improve it; even without providing new breakthrough ideas, the active participation can lead to small daily improvements.
- The platform is built in order to be fully horizontal without any hierarchy. This supports the expression of employees that do not have normally the possibility to propose something. They can be in subsidiaries outside the major company streams or lately hired employees. This possibility allows not to lose that valuable knowledge and innovation spirit.
- The fact that employees from different departments can collaborate in the same virtual space provides a better understanding among departments that is in one hand fruitful from the ideation phase (ideas and comments from different mind-sets) and in the other hand provides more “sense of the company” for all employees that get benefits from all the company results.
- Another important aspect is to open the collaboration with external people that can be external consultants, suppliers and even customers who can be engaged as well in both B2B an B2C scenarios.

4.2.1 Software Factsheet

Item	Value
Component Name	PSY Innovation Platform
Software version	V1.0
Reference workpackage	WP5.4
Responsible Partner	TXT
Contact person	Paolo Civardi (paolo.civardi@txtgroup.com)
Source control	Original: https://git.drupal.org/project/idea.git

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	Extension: http://svn.services.research.txt:8090/PSY/WP5 (only from TXT VPN)
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4.2.2 Summary of Functionalities

Here are the major functionalities provided by the platform.

- Ideator:
 - Registration
 - Login
 - Idea creation
 - Idea presentation + comments
 - Add Category
 - Add tag page
 - View Popular ideas
 - Answer to challenge
 - Recent ideas
 - Profile page
 - Search for ideas
 - Search for members
 - Project page
 - Trends & analytics reports
 - Chat
 - Q&A
- Administrator
 - User management (create, read, update, delete)
 - Modelling of the idea
 - Modelling of the challenge
 - Modelling of point
 - Model Head to head - Features 2 selected ideas, and ask users to vote for one of them

4.2.3 Technical Information

4.2.3.1 Internal Architecture

The software solution is visible in the picture below. The technological basis is the Drupal version 7 having its own database, its back-end for the configuration to be done by the administrator and the front-end for end-users. The CMS has been extended including, first of all, the OpenIdeaL plugin providing the capabilities for idea management: ideas, challenges, points management, etc. The OpenIdeaL is not the only plugin; a set of plugins has been installed in the CMS for two main reasons: to support the communication among people (e.g.: chat) and to support the people inspiration (e.g.: youtube feed, news feed, etc.). As in the major architectural picture, the ideation platform is in close cooperation with the sentiment analysis platform (described in section 5) and the professional knowledge platform (described in section 3); a simple integration is planned for the second iteration in order to display output data of those platforms into the Ideation platform. These data will be the inspiration basis for new or improved products and services.

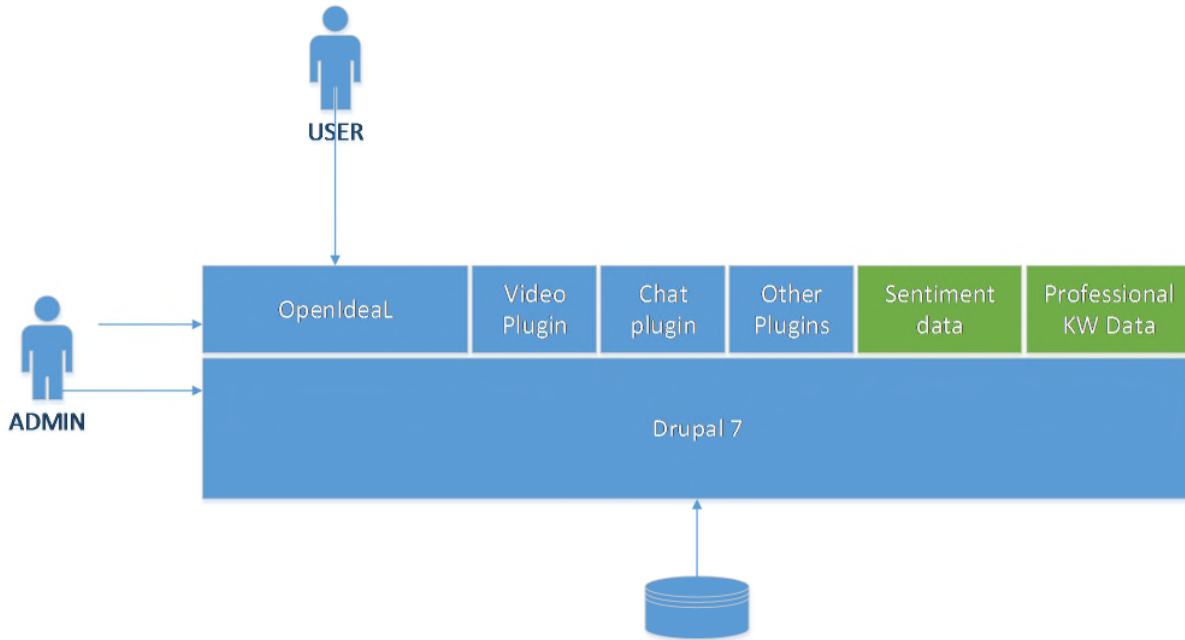


Figure 4-2: Idea Generation Platform Architecture

4.2.3.2 Technological stack


Item	Value
Nature	Web portal
Programming Language	PHP
Development Tools	Eclipse
Additional Libraries	Drupal + Openideadapp
Application Server	Apache
Databases	mySQL

4.2.3.3 Licensing

The license of the platform is GNU GPL; the PSYMBIOSYS developments and bug fixing of the original version are going to be released with the same license.

4.3 Crowd Innovation Platform

The PSY-Anlzer Platform is responsible for the crowd idea enrichment and validation that mainly corresponds to Stage S.2, namely “Crowd Insights Extraction”, of the symbiotic knowledge-sentiment methodology presented in the PSYMBIOSYS Deliverable D5.5 “Cooperative knowledge mechanisms in product-service value chains – First Iteration”. In essence, PSY-Anlzer is a web platform that supports data retrieval from various social networks, blogs and other online sources and implements a large number of natural language processing algorithms and machine learning

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techniques in order to transform the unstructured information into clear insights regarding products and services (P-S) in a given manufacturing domain.

Such a Crowd Innovation Platform is addressed at P-S designers, providing them with intuitive and user-friendly (not requiring technical background) interfaces in order to support them through configuring the sources to include, filtering of information and finally interacting with the results in dashboards which will help them quickly understand the crowd sentiment, as well as the market trends, and how they relate to the ideas that were expressed and selected in the previous stages (e.g. during ideation).

Sentiment and, where possible, more fine-grained emotion analysis plays an instrumental role in PSY-Anlzer. Casual online discussions and expressed opinions, often presented as facts, are a large source of subjective statements which, if properly analyzed, can give valuable insights into customer preferences, needs, desires and even complaints regarding products and services. The PSYMBIOSYS Crowd Innovation Platform aspires to turn these insights into product-service recommendations and unveil hidden relations among P-S bundles or specific product / service features, guiding the design team towards better and more innovative decisions.

It is important to underline the need for extracting relevant and actionable data regarding sentiments for products-services from the social media and, generally, the online “chaos”. In order to avoid introducing noise in the form of currently irrelevant (i.e. for the current strategic goals of the manufacturer) or impossible product-service designs, it is crucial that the product-service design team pays particular attention to the configuration of the PSY-Anlzer project’s settings. In addition, in terms of ensuring the efficiency and result quality, the retrieved data can be also chosen based on existing, thus feasible and interesting, ideas coming from the Inspiration and Ideation phases which are taken as output from the Idea Generation Platform (see section 4). Finally, another potential dependency of PSY-Anlzer concerns the Professional Innovation platform (see section 3), which is responsible for knowledge extraction from internal - to the manufacturer - sources, with regard to the proper modelling of the retrieved social data, their linking to domain terminology and the extraction of patterns based on product-service and specific attribute ontologies.


4.3.1 Software Factsheet

Item	Value
Component Name	PSYMBIOSYS Crowd Innovation Platform (PSY-Anlzer)
Software version	v1.0
Reference workpackage	WP5.4
Responsible Partner	NTUA
Contact person	Fenareti Lampathaki (flamp@epu.ntua.gr)
Source control	https://github.com/epu-ntua/Anlzer

4.3.2 Summary of Functionalities

The platform’s major functionalities are listed as follows:

- Sentiment Analysis based on 5 different emotion types (Happy, Excited, Sad, Angry, Neutral)
- Data retrieval, processing and normalization from sentiment sources (e.g. social media, RSS, Idea Generation Platform)
- Product-Service co-occurrence mining

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- Project creation and configuration based on each manufacturer’s data needs
- Flexible report creation process (i.e. smart information filtering)
- Report visualizations
- Collaboration functionality for team members through comments
- Shared projects and reports for team members
- Different user access levels

4.3.3 Technical Information

4.3.3.1 Internal Architecture

The Crowd Innovation Platform (PSY-Anlzer) comprises 3 distinct components which communicate through RESTful APIs, namely the Analysis Engine, the User Interface and the Communication Layer between them. Figure 5-1 depicts the platform’s high level architecture, i.e. the three main components and their internal structure.

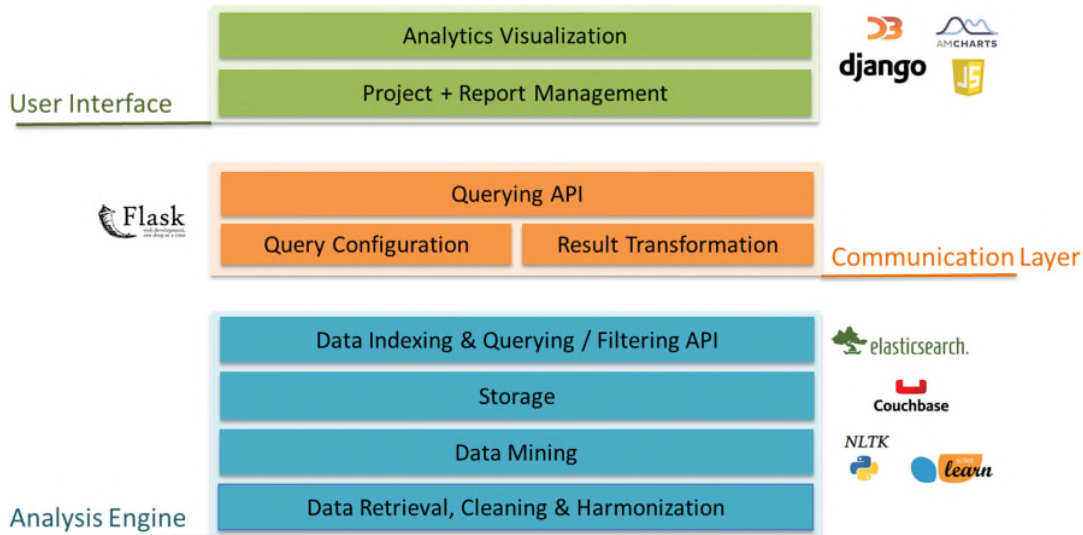


Figure 4-3: Crowd Innovation Platform Architecture

The Analysis Engine is responsible for the data retrieval, data processing and required computations. Apart from the various Natural Language Processing (NLP) techniques, the engine supports the application of the machine learning and other algorithms for sentiment analysis, correlation mining and feature extraction. The analysis engine can be used directly as a standalone installable application to perform various text processing tasks to data coming from the supported sources. However, in order to truly leverage the acquired results, grouping and visualization are required.

The User Interface is actually more than what the name implies as it is a standalone web application that supports all functionalities regarding projects, reports and user management and handles all user interactions. Its main functionality is to help the user gain sentiment-related insights into the collected

data, guiding him to perform queries in an intuitive way, apply filters and browse the results through various visualizations.

The third component, Communication Layer, as its name implies is not really a component, but it is only intended to facilitate the interaction between the two other components, i.e. it essentially translates the queries performed by the UI application to a format suitable for the Analysis engine and then also transforms the retrieved results to be directly read and visualized by the User Interface, without the need for any other computation. This layer could be seen as part of the analysis engine and more specifically as the provision of a REST API to make the engine results more easily accessible. However, they are designed to be decoupled in order to ensure that the User Interface will receive responses tailored to its needs, without enforcing any dependencies on the computation engine.

The platform is developed using Python and JavaScript, both of which offer a large number of libraries and frameworks to support the efficient implementation of all required functionalities.

4.3.3.2 Technological stack

Item	Value
Nature	webapp
Programming Language	Python, JavaScript
Development Tools	JetBrains PyCharm
Additional Libraries	Requests - Apache 2.0 markdown - MIT license Django 1.8 - BSD DjangoRestFramework - Include Copyright (c) 2011-2016, Tom Christie All rights reserved Django-widget-tweaks - Deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software Django-filter - Copyright (c) 2009-2012, Alex Gaynor-All rights reserved Django-allauth - Copyright (c) 2010-2015 Raymond Penners and contributors Tweepy - MIT Django-sass-processor - MIT NLTK - Apache 2.0 D3.js - BSD AMcharts - linkware license Flask – BSD Scikit-Learn – BSD (Elasticsearch – Apache 2.0)
Application Server	Gunicorn, Nginx
Databases	CouchBase Server, SQLite

4.3.3.3 Licensing

The source code for the Crowd Innovation Platform (Anlzer) is released under MIT license. The licensing information of the required external software, frameworks and libraries is provided in the Technological Stack table provided in section 5.2.2.

5 WP6 Released Software Packages

5.1 ABE Service

The purpose of this software system is to provide a CP-ABE based service to protect information using more sophisticated encryption techniques that avoid having to share keys among users and that can encrypt the information according to a specific access policy the encrypting user has to specify. Access policies specify which characteristics the user's profiles must have in order to be able to decrypt the file. When generating a user's decryption key, the ABE Service takes into account the user's profile, stored in an LDAP service, to generate the user's key. When decrypting the protected information, the user has to provide his/her decryption key and the decryption process will succeed only if the user's characteristics (i.e., user's profile attributes) used to generate the decryption key meet the access policy embedded in the protected information (encrypted file).

The ABE Service uses an LDAP server to store user's profiles.

The advantage to use Attribute Based Encryption is that a user's key can decrypt many files (if the user's key meets the access policy in the encrypted files) and that each decryption key belongs to a specific user (which helps for auditing access to the protected information).

5.1.1 Software Factsheet

Item	Value
Component Name	ABE Service
Software version	0.9
Reference workpackage	WP6.1
Responsible Partner	FINCONS SpA
Contact person	Diego Pedone diego.pedone@finconsgroup.com
Source control	The executable code is available on the PSYMBIOSYS portal under the WP6 folder of the project's Intranet section

5.1.2 Summary of Functionalities

This web service has 5 main functionalities:

- */registration*: This features permit to register new users.
- */login*: encryption/decryption functionalities is subject to the authentication of the user.
- */encryption*: this function requires the provision of an input the file to be encrypted and of the access policy to be used to encrypt the file. These information are uploaded to the service that returns the encrypted file with file extension “.cpabe”.
- */decryption*: with this function the user uploads the encrypted file, with a file extension “.cpabe”, and provides his/her Personal Decryption Key, see next functionality for its generation. If the key satisfies the access policy the file decryption will succeed and the user

will be prompted to download and save the decrypted file, otherwise the service returns a 403 error.

- */keygen*: generates the personal decryption key for the logged in user. The generated key is based on the user’s attributes as stored in the LDAP server. The service displays the Personal Decryption Key to the user that can copy it for later uses.

Access to the ABE Service is subject to the user’s authentication that is provided via a specific service’s login page. The service has also a *User Registration* functionality to support an initial registration of new users (i.e., a service administrator has to complete the profile of new users for example assigning roles).

5.1.3 Technical Information

5.1.3.1 Internal Architecture

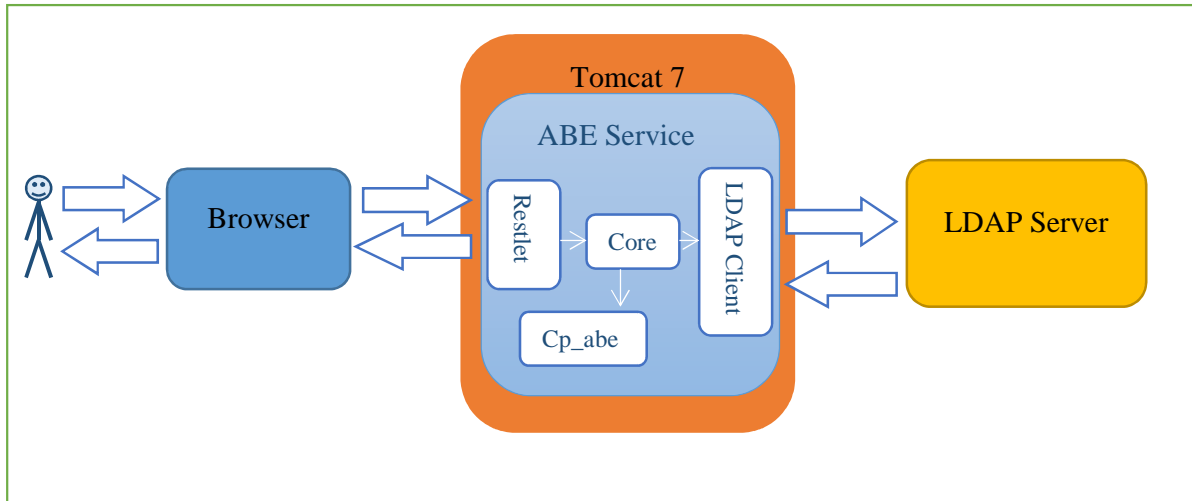


Figure 5-1: ABE High Level Architecture

Restlet is use to make available the service for login, registration, key generation, file decryption and encryption.

Cp_abe is use to generate the key based on attribute, to encrypt the file based on policy, and decrypt file through personal decrypting key.

LDAP Client is use to register a user’s profile, and get profile’s information from the LDAP Server.

Core is use to manager the flow between the three components.

5.1.3.2 Technological stack

Item	Value
Nature	Web Application
System requirements	java 6
Programming Language	Java, jQuery

Development Tools	Eclipse Luna
Additional Libraries	Cp_abe, Restlet, CryptoJS, JSRSASign, jPBC, BouncyCastle
Application Server	Tomcat 7, ApacheDS
Databases	Not Applicable
I/O formats	<list input and output formats if applicable>

5.1.3.3 Licensing

The licensing of this software is still to be defined being based on libraries having the following licenses:

- Cp_abe: GPL2
- CryptoJS: 3-Clause BSD
- JSRSASign: MIT
- jPBC: LGPL3
- BouncyCastle: MIT

The current use of the Cp_abe library would force the whole service to be licensed as GPL2, while the other licenses are not incompatible even with a proprietary licensing.

5.2 Secure Event Management (SEM)

The purpose of this software system is to provide a software solution based on a publish/subscribe middleware to manage a complete decoupling of event's sources and consumers (asynchronous, *fire-and-forget* patterns), bringing data to the interested consumers instead of bringing consumers to data in a scalability and reconfiguration flexibility mode, provide an advanced, flexible, and scalable access control features and a dynamic and smooth addition of new events' sources and consumers (zero downtime).

For the access control issue, the SEM objective is to manage events using distinct, autonomous and independent "partitions" called Namespaces whose number and structure are only related to the functional needs of the production site.

The SEM development has been done in order to support a capability based mechanism to govern access to event's namespaces from single namespace nodes, up to set of disjoint nodes or whole namespace subtrees. The capability based approach has the following features: access right delegation, capability tokens revocation, fine-grained access rights.

The Secure Event Management (SEM) is a FITMAN Specific Enabler (SE) that acts as a flexible, scalable and secure connector among event sources (called publishers) and event consumers (called subscribers) representing a key component to implement systems based on the asynchronous, fire-and-forget communication paradigm at the core of the Event Driven Architecture (EDA) approach.

The SEM SE enhances the ENS (Event Notification Service) developed in the FP7 IoT@Work project.

5.2.1 Software Factsheet

Item	Value
Component Name	Secure Event Management (SEM)
Software version	v1.0
Reference workpackage	WP6.1
Responsible Partner	FINCONS SpA
Contact person	Domenico Rotondi domenico.rotondi@finconsgroup.com
Source control	http://sourceforge.net/projects/fitman-fi/files/Fitman%20Specific%20Enablers/Smart%20Factory/Secure%20Event%20Management/

5.2.2 Summary of Functionalities

The main functionalities of the SEM Specific Enabler is:

- organize events in independent namespaces (whose structures are strictly related to the factory and production needs);
- access to namespaces, and therefore to the events managed via them through a capability-based access control mechanism that supports access rights delegation and minimizes management effort (e.g., no need to set up federated identity management, cross-organizations roles, etc.);
- provide a scalable solution based on the AMQP standard and on the use of the RabbitMQ AMQP implementation;
- provide a web based management features for configuring SEM components and supporting tools (Access Tokens generation/revocation and others);
- implement two kinds of interface: a native Java OSGi API (provided as an OSGi bundle, usable also as a simple Java library) and a REST API.

5.2.3 Technical Information

5.2.3.1 Internal Architecture

The functional components that made up the Secure Event Management SE Architecture are depicted in the following picture.

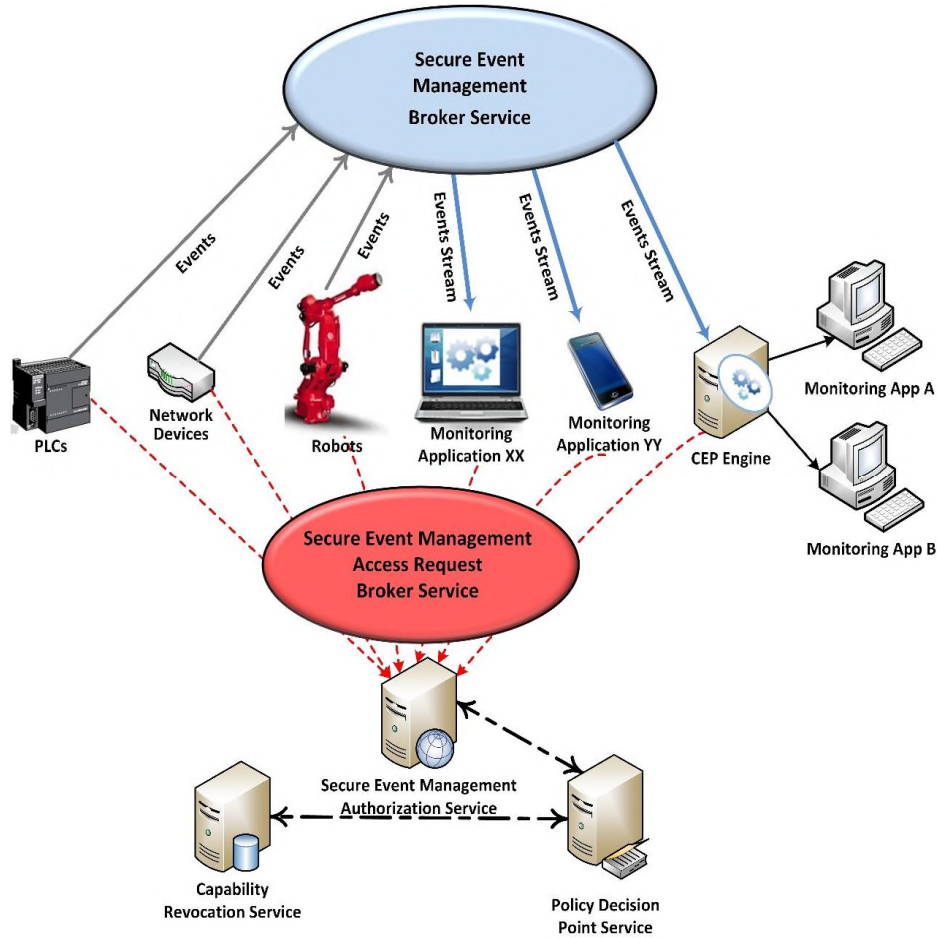


Figure 5-2: SEM SE high level architecture

The elements highlighted in the figure are:

- the *SEM Access Request Broker Service* is an AMQP broker that is used to manage Authorization access requests among SEM Client and the Service;
- the *SEM Operative Broker Service* represents one or more AMQP brokers that take care of the operative phase by actually collecting and dispatching events;
- the *SEM Authorization Service* is in charge of validating the access requests to the SEM middleware, assigning the operative communication broker to be used;
- the *Policy Decision Point Service* supports the authorization service in checking if the access token provided by the requesting client is still valid;
- the *Capability Revocation Service* is in charge of receiving and processing requests to revoke access tokens.

5.2.3.2 Technological stack

Item	Value
Nature	Web Application and Standalone Java Application

System requirements	A minimum of 4 GB of RAM, around 10 GB of disk space, at least 1 Ethernet controller, Java7
Programming Language	Java, Erlang, HTML, Javascript
Development Tools	Eclipse
Additional Libraries	RabbitMQ, Java Cryptography Extension (JCE)
Application Server	Apache Tomcat 7
Databases	OrientDB 1.3
I/O formats	Not Applicable

5.2.3.3 Licensing

Apache License 2.0 (<http://www.apache.org/licenses/LICENSE-2.0.html>). This SE is based on RabbitMQ (<http://www.rabbitmq.com>), Pivotal’s implementation of the AMQP standard released under the terms of the Mozilla Public License version 1.1 (<http://www.mozilla.org/MPL/1.1/>).

6 WP8 Released Software Packages

6.1 Social-Big Data Analytics Platform (PSY- InfluenCial)

The PSYMBIOSYS InfluenCial Platform builds on the premise that ideas expressed by influential people are more probable to turn out into new trends that affect the product-service design phase. PSY-InfluenCial is a big data infrastructure to analyze “social” data (i.e. indicating interactions between stakeholders) in order to identify influencers and point the product-service design team towards the most popular/trending ideas.

It needs to be noted that the definition of an influencer may vary depending on the context to include:

- People who are often mentioned in other people's discussions, e.g. in social media.
- People whose expressed opinions are commonly referenced by others, e.g. in social media (retweets, fb share...), in ideation platforms, in blogs.
- People whose expressed opinions are widely adopted and liked, e.g. through upvotes or likes.
- People who are popular in a network, e.g. number of followers or number of blog views.
- Friends of influent people for a specific topic should also be influent and typically talk about the same or similar topics, e.g. in Twitter, Instagram, Blogs.

Acknowledging different definitions of social influencers, the PSYMBIOSYS InfluenCial Platform shall implement different algorithms for Link Analysis, Association Rule Learning, Correlation Computation, Unusual Voting Pattern Detection, Link Propagation Analysis, Clustering. In the first iteration, the PSYMBIOSYS InfluenCial Platform ranks influencers according to the times they are mentioned in other people’s discussion taking also into consideration how “important” those people are, according to the PageRank algorithm.

6.1.1 Software Factsheet

Item	Value
Component Name	Social-Big Data Analytics Platform (PSY- InfluenCial)
Software version	v1.0
Reference workpackage	WP8.4
Responsible Partner	NTUA
Contact person	Fenareti Lampathaki, flamp@epu.ntua.gr
Source control	https://github.com/epu-ntua/PSYMBIOSYS-Influencial

6.1.2 Summary of Functionalities

The PSYMBIOSYS InfluenCial Platform provides data analysts, product-service managers and generally the product-service design team with the following core functionalities:

- *Detect influencers*: Identify and rank influencing behaviour per industry, topic and in time with the help of the PageRank algorithm.
- *Track and cluster interactions*: Visualize the correlation between different influencers on specific topics of interest.

In general, the procedure followed included the following steps: (a) Import data that contain or imply the importance of a user in a certain network/communication channel; (b) Extract the interactions that indicate influencing behaviour and model them in a predefined format; and (c) Apply importance measuring algorithms and identify influencers graphs (clusters of influencers or independent graphs). When the information retrieved is in the form of text, mentions of specific predefined entities are extracted and algorithms to detect entities commonly appearing together are applied. When the influencers along with the associated topics are calculated, the PSYMBIOSYS InfluenCial Platform starts investigating what is the correlation between trends and influencers to identify who is talking about what in the specified time period. Such an extensive calculation also classifies hashtags to topics and explores link propagation in time, in order to result into the daily impact of each influencer on each topic category.

In the first release of the PSYMBIOSYS InfluenCial Platform, the Big Data sources from social networks include: Twitter and Instagram, that were considered as most relevant for the PSYMBIOSYS application in the fashion and furniture domains (by the PIACENZA and AIDIMA use cases).

6.1.3 Technical Information

6.1.3.1 Internal Architecture

The architecture upon which the PSYMBIOSYS InfluenCial Platform is built relies upon a set of state-of-the-art, open technologies (Figure 6-1):

- *Pre-Processing Layer* which is based on ElasticSearch as an indexing repository that allows fast and complex queries on unstructured data, allowing real-time data and analytics. Note:

the Elasticsearch infrastructure is indirectly included through the FITMAN Anlzer Specific Enabler.

- *Cluster Computing Engine* built on top of Hadoop and Spark in order to conduct the necessary big data processing activities, running the algorithms for the identification of social influencers and their graph interrelations.
- *Results Storage Layer* to store the structured results of the big data analysis conducted on the selected social data.
- *Post-Processing, Export and Visualization Engine*: JavaScript-based visualization frameworks have been used to present in a meaningful and user-friendly way the results of the analysis.

It needs to be noted that the Data Connectors in the present first release include only the FITMAN Anlzer Specific Enabler that has already implemented RESTful based connectors in order to retrieve data according to the users' preferences, yet in future releases further data sources are expected to be incorporated.

The PSYMBIOSYS InfluenCial Platform is built on the Django Web Framework, written in Python, which follows the model-view-controller (MVC) architectural pattern.

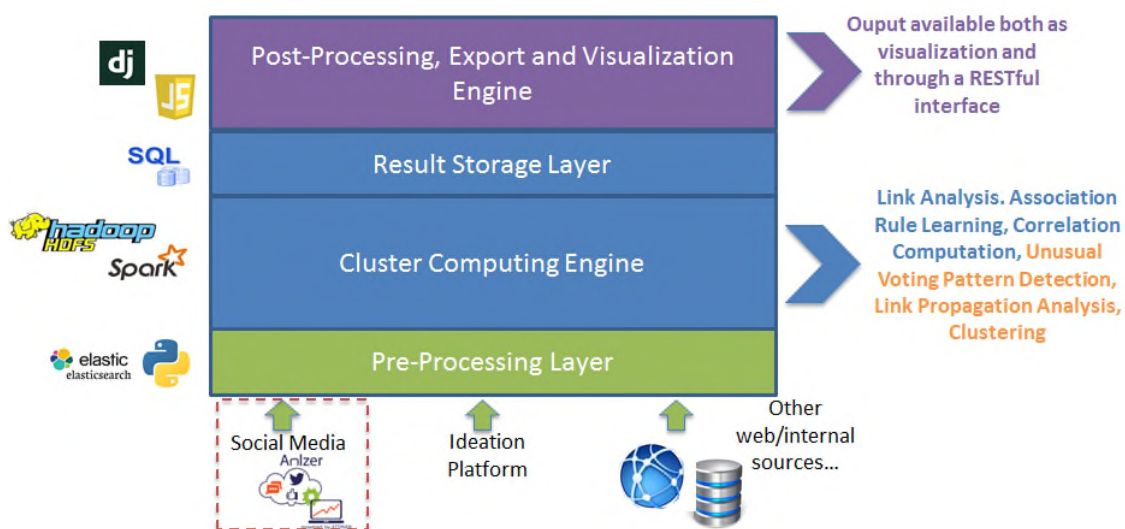


Figure 6-1: PSYMBIOSYS InfluenCial Platform: High-level Architecture

6.1.3.2 Technological stack

Item	Value
Nature	Web Application
System requirements	<ul style="list-style-type: none"> • Big Data Infrastructure: 8 CPU, 16 gb RAM • Web App: 1 CPU, 512 mb RAM • Anlzer Infrastructure: 2 CPU, 4 gb RAM
Programming Language	Python
Development Tools	Any Python IDE (e.g. Eclipse or Pycharm)

Additional Libraries / Tools / Frameworks	<ul style="list-style-type: none"> • FITMAN Anlzer SE, v2.0 • Apache Hadoop, v2.5.1 • Apache Spark, v1.6.0 • Django, v1.8 • Python, v2.7.9 • REQUESTS • PYTHON-TWITTER • (python) MARKDOWN • psycopg2, v2.5.1 • (python) white-noise • python-instagram • (python-django) static • (python-django) REST FRAMEWORK • (python) unirest • WIDGET-TWEAKS • gunicorn • Docker
Application Server	Nginx and gunicorn
Databases	HDFS for Big Data and SQL for the Web Interface (i.e. SQLite)
I/O formats	JSON serializations


6.1.3.3 Licensing

The PSY-InfluenCer platform is released under the MIT Licence.

The 3rd party tools that were used for the development of the PSY-InfluenCer platform are listed in the following table along with their licences.

Software	License
FITMAN Anlzer SE, v2.0	MIT
Apache Hadoop, v2.5.1	Apache 2.0
Apache Spark, v1.6.0	Apache 2.0
Django, v1.8	BSD
Python, v2.7.9	Python Open Source License
REQUESTS	Apache 2.0
PYTHON-TWITTER	Apache 2.0
(python) MARKDOWN	MIT License
psycopg2, v2.5.1	GNU Lesser General Public License
(python) white-noise	MIT licence

Software	License
python-instagram	Include Copyright (c) 2014, Facebook, Inc. All rights reserved.
(python-django) static	MIT License
(python-django) REST FRAMEWORK	Include Copyright (c) 2011-2016, Tom Christie All rights reserved.
(python) unirest	Deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software
WIDGET-TWEAKS	
gunicorn	
Docker	Apache 2.0

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7 Conclusions and Future plans

The previous sections have tried to properly frame the software components openly released at M18 within the overall PSYMBIOSYS scenario, and to provide the main features of the delivered components.

D9.2, as stated, represents the first deliverable of WP9.2 task that will continue its activities integrating and testing, primarily in the context of the PSYMBIOSYS use cases, the components are they are made available and evolve in time according to the R&D activities envisaged by the PSYMBIOSYS WPs in the second half of the project.

Deliverable D9.3, planned for month 33rd, constitutes the evolution of D9.2 and will therefore provide details on the final openly released PSYMBIOSYS integrated and tested software components.

Before the provision of D9.3, PSYMBIOSYS plans to solve, hopefully within the context of the H2020 PSS Cluster, the actual open accessibility of the software components described in the previous sections, so to fully meet the objectives of WP9.2.