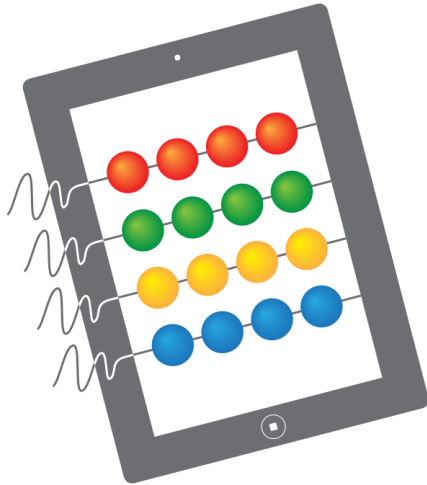




FP7 ICT STREP Project



LEARN PAd

Deliverable D9.5

Technology-oriented Learn PAd whitepaper

First version

<http://www.learnpad.eu>



LINAGORA



No Magic Europe

n|w

Fachhochschule
Nordwestschweiz



*WIKI



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Abstract

In this white paper, you'll be shown a technical overview of the Learn PAd platform. Learn PAd platform is targeting learning of processes in Public Administration with innovative approach combining model-driven learning and collaborative learning. This white paper will first expose the different functionalities of the platform through a scenario that covers a variety of use cases. Then it will present the components and communications involved in order to orchestrate these use cases.

Keyword List

platform, white paper

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1 E-Learning and Knowledge Management of processes in Public Administration

1.1. Why Learn PAd?

In modern society public administrations (PAs) are undergoing a transformation of their perceived role from controllers to proactive service providers, and are under pressure to constantly improve their service quality while coping with quickly changing context (changes in law and regulations, societal globalization, fast technology evolution) and decreasing budgets. Civil servants are challenged to understand and put in action latest procedures and rules within tight time constraints.

1.2. What is Learn PAd?

Learn PAd is an innovative holistic e-learning platform for PAs that enables process-driven learning and fosters cooperation and knowledge-sharing. Learn PAd technical innovation is based on four pillars:

- 1) a new concept of model-based e-learning (both process and knowledge)

Learning of processes by Civil Servants is driven by a very structured information: models

- 2) open and collaborative e-learning content management

Learning should be based on open data and everybody can participate to improve these data

- 3) automatic, learner-specific and collaborative content quality assessment

Every new content is verified by automatic systems and also by other Civil Servants, collaboratively

- 4) automatic model-driven simulation-based learning and testing

Civil Servants can run a process in a risk-free simulation in order to learn and be evaluated on their new knowledge

1.3. Who will benefit Learn PAd?

Learn PAd is designed with and for the Public Administration. Civil Servants from these Public Administrations implements processes everyday: they must be aware of any evolution or any new process.

1.4. When will Learn PAd exist?

Learn PAd is a European Union funded project and started on February 2014. It's a two and half years long project so it will end on August 2016. In the meantime, a first prototype has been evaluated by Regione Marche Administration (Italy) on November 2015. A second release of the platform will be release on April 2016. A final release is expected for April 2016.

1.5. What is in this white paper?

This white paper will present the technical solutions that have been merged together to meet the requirements of this Learn PAd platform. In the next section, you'll meet with the Learn PAd platform. In the last section, you'll meet the partners that participate in the elaboration of this Learn PAd platform.

2 Learn PAd platform: how to use it?

In this section, we'll provide different use cases which will give an overview of Learn PAd Platform. These use cases are user-driven: you'll see Modeler use cases and Learner use cases. But first, let's explain what is the Learn PAd Platform and what are the kind of users that will use this Learn PAd Platform.

2.1. Overview of Learn PAd Platform

The Figure 2.1 shows the global workflow happening inside the Learn PAd platform. The Modeling Environment component ❶ is the place where the models are designed. Then they are verified by the Model Verification component ❷ before being transformed by the Transformations component ❸ in different kinds of representations:

- Wiki pages for the Collaborative Workspace component ❹
- Ontologies for the Ontology Recommender component ❺
- Business Process files for the Simulation Environment component ❻

Eventually, Collaborative Workspace is checking the content co-created by Civil Servants by sending them to the Content Analysis component ❼.

2.2. Kind of users in Learn PAd Platform

Learn PAd platform has the goal to document processes in the Public Administration for Civil Servants to learn them. It means that the first users of the platform will be Civil Servants: they will learn or improve their existing knowledge about processes.

In the meantime, someone has to document these processes: the Modeler. Based on information of an experienced Civil Servant, the Modeler will translate the process into models that will be injected in the Learn PAd platform.

The two following sections will be about the typical use cases of a Modeler and of a Civil Servant, and more specifically, a Learner.

2.3. Modeler use cases

2.3.1. Modeling

The first task of the Modeler is to create and document a existing process from the Public Administration. Working on a Modeling tool, he will model Business Processes. But in Learn PAd, the Modeler brings a lot more than Business Process modeling. The Modeler will also complete Business Process model with: Organization Structure, Documents and Knowledge, Competencies, Case Management, KPI, Motivations.

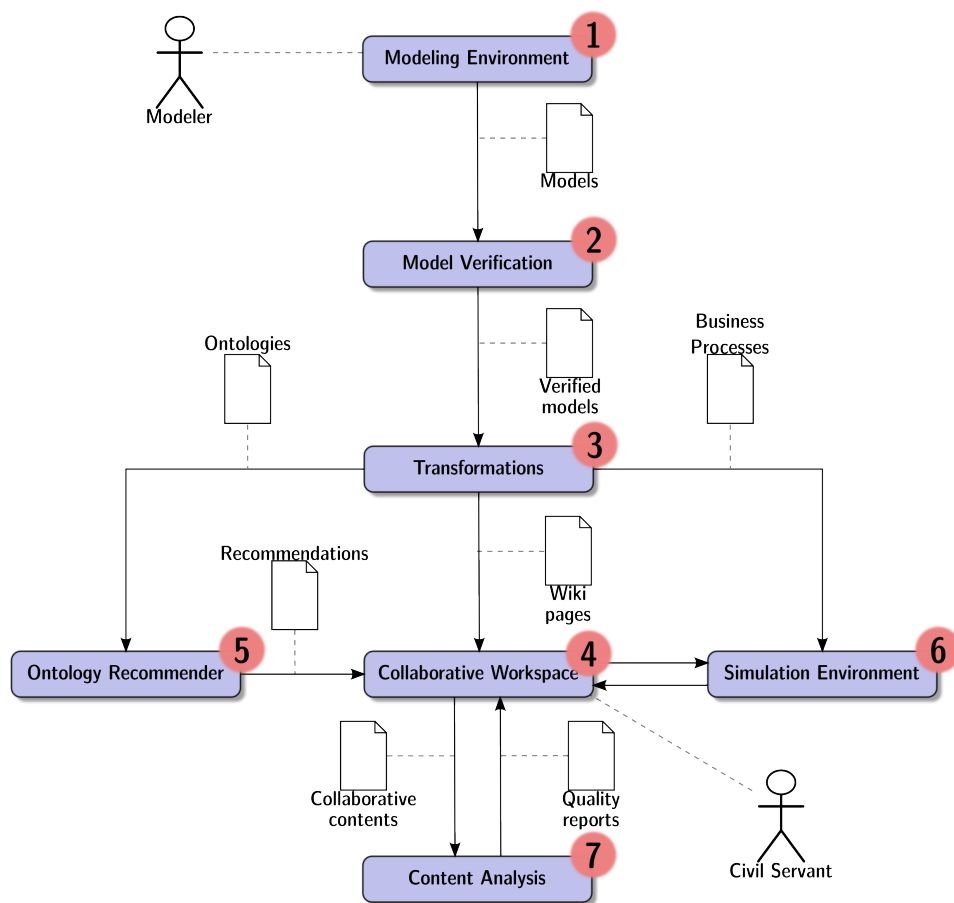


Figure 2.1: Flow view of the Learn PAd platform

Behind the scene The Modeler will work on the Modeling Environment component [3.2]. In Learn PAd, two of these components have been tested: Adoxx from BOC, and MagicDraw from No Magic. Both these softwares have implemented specific meta-models for Business Process, Organization Structure, Documents and Knowledge, Competencies, Case Management, KPI, Motivations. On top of that, they also include a weaving meta-model that links all these meta-models together.

2.3.2. Publishing the models

Once the models has been finalized, the Modeler will publish them in order to make them accessible to the Learners.

Behind the scene Once the Modeler decide to publish the models, the Modeling Environment component [3.2] will push the models toward the Learn PAd Core Platform component [3.1]. The Learn PAd Core Platform component [3.1] will have to check the models then import them into the other components (more details about these processes in the next sections).

2.3.3. Verification of the models

When the Modeler is publishing the models, the Learn PAd Platform may reject them because of errors. In fact, the Learn PAd Platform will run a list of automatic verifications to check the consistency of models.

Behind the scene In the Learn PAd Platform, a Model Verification component [3.7] is in charge of formal verifications of the models. It will provide help to the Modeler by spotting errors and providing warnings. Once Learn PAd Core Platform component [3.1] has check that models don't contain errors, it will pushed them towards other component of the Learn PAd Platform, mainly Collaborative Workspace component [3.3], Ontology Recommender component [3.5] and Simulation Environment component [3.6] (more details on these component in the following sections).

2.3.4. Resolve feedbacks

Civil Servants may spot inconsistencies in the models. In this case, they'll fill a feedback intended for the Modeler. When starting his modeling tool, the Modeler will see these feedbacks, he will either fix them or reject them, then publish the new model toward the Learn PAd Platform.

Behind the scene Civil Servants can fill a feedback from the Collaborative Workspace component [3.3]. The Modeling Environment component [3.2] will ask feedback to the Learn PAd Core Platform component [3.1] which will gather them from the Collaborative Workspace component [3.3]. Once the Modeler has modified and fixed the models, then the publish procedure will be the same as already described in Section 2.3.2. See also Section 2.4.5 for how Civil Servants are creating feedbacks in the Collaborative Workspace component [3.3].

2.4. Learner use cases

2.4.1. Discover a new process

At some point, a Learner will want to learn about a new process from the Public Administration. Once the Learner is logged onto the Learn PAd Platform, he'll see a list of the available processes on his dashboard. He'll be able to navigate through the process, going forward and backward in the series of activities of the process and all of the contextual information linked to this process.

Behind the scene The models are imported into the Collaborative Workspace component [3.3] which is wiki-based. When the Learn PAd Core Platform is pushing models towards the Collaborative Workspace component [3.3], the models are transformed into wiki pages by a Transformations component [3.4]: each element of the model is becoming a structured wiki page. Once the models have been imported into the Collaborative Workspace component [3.3], the Learner can navigate through the models directly in the wiki.

2.4.2. Getting recommendations

In order to improve the learning experience of the Learner, the wiki will also display recommendations to the Learner as he browses through the models in the wiki. Recommendations could be about people to get help from, existing example that could help to understand the process, multimedia materials, etc.

Behind the scene In the Learn PAd Platform, the Ontology Recommender component [3.5] is able to give recommendations based on contextual information from the browsing of the Learner. For example, information about who he is and what he's looking at could be used to suggest colleagues that may help him on this particular activity of the learned process. In order to infer recommendations from the contextual informations, Ontology Recommender component [3.5] is transforming models into an ontology through a Transformations component [3.4].

2.4.3. Collaborate to the documentation

At some point, the Learner will get experience on the process and may point out the weaknesses of the documentation. Looking at a particular activity in the process, he'd like to complete with some pertinent information. He can create a new document which will be linked to this specific activity of the process, and write, based on his experience, new content that could help other Learners. Note that everybody is able to collaborate so the documentation of the Learn PAd Platform is not only tight to the Modeler but also to the collaboration of every Civil Servant in the Public Administration.

Behind the scene In the Collaborative Workspace component [3.3], each wiki page will display a possibility to create a collaborative content attached to this page. The collaborative content will create a new wiki page that will be editable by any Civil Servant willing to improve the documentation.

2.4.4. Reviewing collaborative content

Collaborative contents give the ability to Civil Servants to cooperate in the improvement of the documentation of the processes. Learn PAd Platform will execute automatic text verifications in order to improve the quality of the produces content. The results of these executions will be shown to an experienced Civil Servant who may improve the collaborative content accordingly or reject the propositions.

Behind the scene Learn PAd Platform provides a Content Analysis component [3.8] which is able to run semantic analysis on the textual content and detects text vagueness. A specific Graphical User Interface provide a review workflow inside the wiki, only available to Civil Servant experienced on the given process.

2.4.5. Formulate a feedback to Modelers

Even if Learners can improve documentation with these collaborative content (see previous section), it's also possible they think there is a mistake in the model and would like to contact the Modeler in order to fix it. Like collaborative content, each wiki page is providing the functionality to write a feedback

directly to the Modeler. Usually, these functionality will be restricted to any experienced Civil Servant on the concerned process.

Behind the scene Based on the role of the user, his experience of the process, he will or not be able to propose a feedback to Modelers. When the Modeler will start his modeling tool, the Modeling Environment component [3.2] will ask Learn PAd Core Platform about any new feedback to display to the Modeler.

2.4.6. Simulate a process

Learn PAd Platform provides a way to run a process which is very efficient way to learn. The Learner will be taught by simulating a process with simulated data; he'll be able to execute the activities of the process, do his own mistakes.

Behind the scene From the Collaborative Workspace component [3.3], the Learner will be able to access a simulation of the process. The process is simulated by the Simulation Environment component [3.6], which provides its own Graphical User Interface embedded into the wiki. The Simulation Environment component [3.6] uses documents and data in order to execute a full process. During the simulation, two things are happening:

- the context of the simulation (who, what is currently simulated, what are the data, etc.) is sent to the Ontology Recommender component [3.5] in order to provide real-time recommendations to the Learner during the simulation
- the Learner will be monitored during the simulation (time of achievement, number of successes and errors, etc.) by the Monitoring Component which is part of the Simulation Environment component [3.6]

3 Learn PAd platform: solutions and technologies

In the previous section, we explained what were the functionalities of the Learn PAd Platform and how the users were interacting with it. A lot of different components are implied in these processes. This section will present the different components of the Learn PAd platform. This component view will show which are the implemented components and how they are connected to each other into the Learn PAd platform (see Figure 3.1).

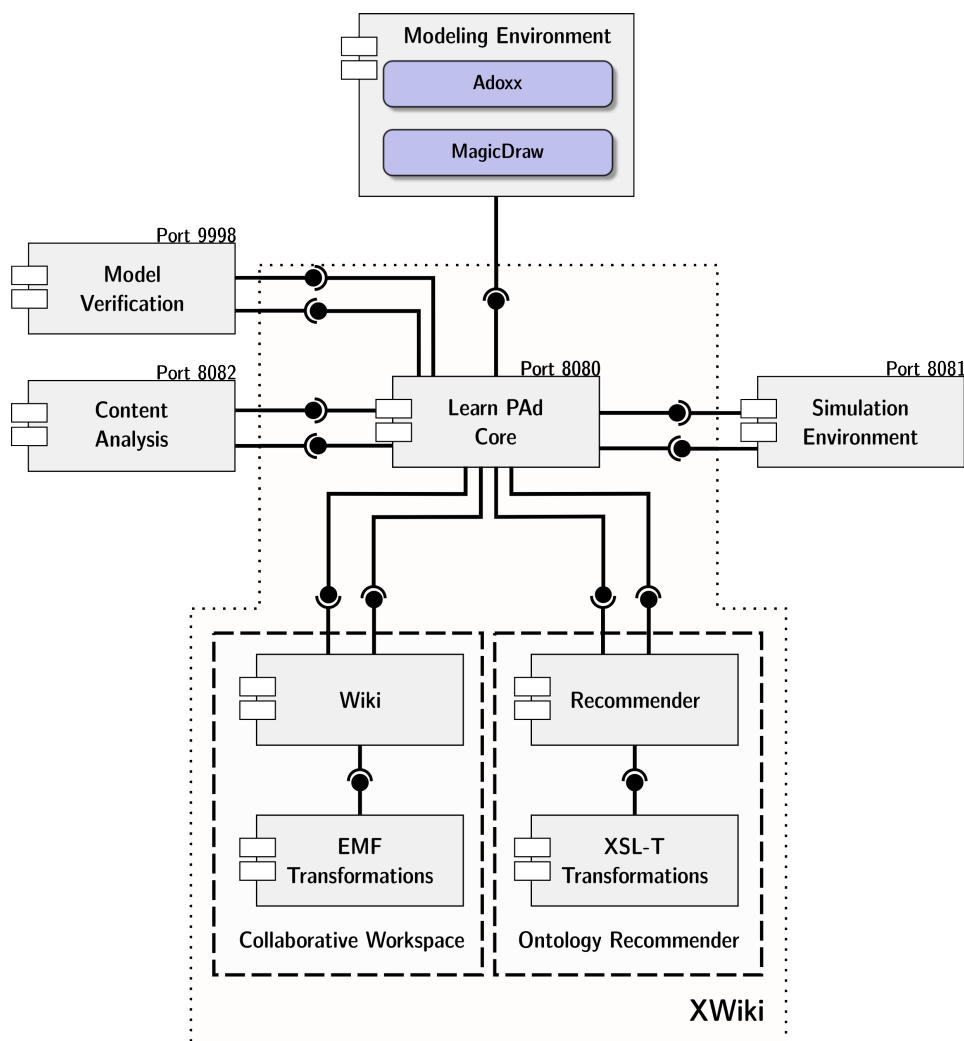


Figure 3.1: Component view of the Learn PAd platform

3.1. Learn PAd Core

Description Learn PAd platform has been designed as modular as possible. Everything is plugged onto this Learn PAd Core component. In order to be independent as much as possible from the technologies used in each component, each component is communicating with the Learn PAd Core component with REST APIs.

This component is developed inside the XWiki software. This means that storage is shared with all components that are part of XWiki. However, it communicates with all the components with REST which make it a replaceable component.

Provided services

- Orchestrator for inter-component communications
- Storage system for the Learn PAd Platform¹

Technologies

Java for platform server development

Jax-RS/Restlet Framework to implement REST services

Jax-B Framework to serialize Java class to XML

Component Manager XWiki library for a component-oriented architecture

Jetty Platform webserver

3.2. Modeling Environment

Description Modeling Environment component is a specific component. It's used for modeling but once used, it can be shutdown. However, the Learn PAd Core component is assumed to be always on-line. Therefore, communication between these two components are always a one way communication: the Modeling Environment component send or ask information to the Learn PAd Core component.

The format Modeling Environment component is pushing toward the Learn PAd platform is a ZIP archive (files *.lpzip) which contains:

- Set of models [format:XML/Adoxx or XML/MagicDraw]
- Images [format: BMP, JPG, PNG, SVG]
- Images map [format:HTML-Map]
- Business Process models [format:BPMN 2.0]

Provided services

- TO BE DONE

Technologies

NoTech TO BE DONE

¹Note that each component may also have its own storage system.

3.3. Collaborative Workspace

Description The Collaborative Workspace is divided into two main components. Since the Learn PAd Core component is not doing any transformation on the files (Learn PAd Core component is more like a router), the Collaborative Workspace component is getting raw files. Therefore, the Wiki component is downloading the raw files from the Learn PAd Core component, then use an EMF Transformation component (see Section 3.4) to transform models into wiki pages.

The Wiki component is the most important part of the Collaborative Workspace component. The Graphical User Interface will display models. Wiki component will download models, ask for transformation, and import the resulting wiki pages from the transformation.

Provided services

- Graphical User Interface for Civil Servants
- Embedding simulation in the Graphical User Interface
- Provide widget for recommendations to the Civil Servants

Technologies

Velocity/Groovy Scripting languages for server-side rendering in the wiki

HTML5 Web technologies for interactive applications in the wiki

Bootstrap for client-side web interface design

Java for platform server development

3.4. Transformations

Description The models respectively, produced by the ADOxx, and Magic Draw Modelling Environment are transformed to the corresponding Wiki pages by means of techniques and tools provided by the Eclipse Modeling Framework (EMF). Such models, describe the same business process, and are not directly comparable due to the different standard representation. In order to normalize the artifacts, UDA developed a transformational architecture which provide an Ecore representation for them and bridge the abstraction distance between the Learn Pad models and the wiki structures. The architecture performs several operations, among them:

- a model-to-model transformation
- a model-to-code transformation in order to produce the XWiki structure which are sent to the Wiki component.

Provided services

- Pre-processing of models for preparation to EMF parsing
- Transformation of models from one meta-model to another one
- Serialization of model

Technologies

EMF (Eclipse Modeling Framework) is a modeling framework and code generation facility for building tools and other applications based on a structured data model

ATL (Atlas Transformation Language) is a model-to-model transformation engine where a source model is translated into a target model Mb according to a transformation definition

Acceleo is a model-to-code transformation engine that produce the code according to a template-based rules

3.5. Ontology Recommender

Description For the same reasons than the Collaborative Workspace component, the Ontology Recommender component is getting raw files from Learn PAd Core. Therefore, the Recommender component is getting these files, sending them to the XSL-T Transformations component which return back ontologies of the models.

The Recommender component is using an ontology to organize the information of the models. The ontology is expressed as a RDF format. This component will be able to make recommendations to a Civil Servants as he browses a model or play a simulation. Contextual information will be used to get the best possible recommendations, for example:

- Who is the current Civil Servant?
- What the Civil Servant is currently looking at?
- In case of simulation, what are the data already entered by the Civil Servant?

This component is transforming models into ontologies. The technology used is XML specific, and very efficient at parsing XML files to transform them into other serialization, RDF ontologies in this case.

Provided services

- TO BE DONE

Technologies

NoTech TO BE DONE

3.6. Simulation Environment

Description The simulation framework provides the subsystem where learners can simulate Business Processes interactively and is used by one or multiple civil servant(s) in order to learn processes. It proposes a simulation platform providing a flexible and interoperable simulation environment with support for collaboration. The simulation engine supports both the software emulation of the involved parties, and the provisioning of dedicated means for gathering learners willing to train on the business process by interacting with other learners. The infrastructure also includes monitoring feature providing feedbacks for the evaluation of learners, business processes, and associated learning contents.

Provided services

- BPMN process simulation session management, in single-user, collaborative, or mixed modes
- graphical interface for interacting with a simulation session
- Automated tasks verification and validation
- Simulation sessions dynamic monitoring via events notifications

Technologies

Java for simulator server development

Junit for automated testing

Activiti engine for BPMN execution

Jetty for simulator webserver

Resteasy for REST API creation and consumption

Jackson for object/json conversion between client and server

HTML5 for client-side web interface

Bootstrap for client-side web interface design

JSON form for client-side form generation

Glimpse for monitoring messages processing

ActiveMQ for monitoring messages dispatch

3.7. Model Verification

Description The Model Verification component is in charge of verifying consistency of models. It runs multiple tests on models in order to identify different kind of errors. The Modeling Environment component is able to ask Learn PAd Core component for errors and report them to the modelers.

Provided services

- TO BE DONE

Technologies

NoTech TO BE DONE

3.8. Content Analysis

Description The Content Analysis component is a Web application with a REst interface, to analyse natural language content according to six quality criteria (Correctness, Presentation Clarity, Completeness, Simplicity, Non Ambiguity and Content Clarity). Given a text, produced by civil servants and content managers, the component checks for language defects and, for each defect, returns the defective part of the text, together with a suggestion for improvement.

Provided services

- Detection of textual defects concerning Correctness, Presentation Clarity, Completeness, Simplicity, Non Ambiguity and Content Clarity
- Suggestion for defects removal

Technologies

LanguageTool a class library used to check the Correctness of a sentence, in terms of grammar.

GATE a class library implemented in Java for processing natural language. It is used to check Simplicity, Non Ambiguity and Content Clarity.

JSOUP a Java library for working with HTML. It is used to parse HTML Content for the Presentation Clarity and Completeness.

4 About partners

4.1. Consiglio Nazionale delle Ricerche

Leading partner of the Learn PAd project, CNR is an Italian Public Research Institute. Learn PAd is carried out by Software Engineering and Dependable Computing (SEDC) and Formal Methods and Tools (FMT) laboratories, that provide the Content Analysis and Model Verification components, as well as monitoring for simulation.

Competencies

- Identification of defects in natural language text
- Formal verification of business processes
- Monitoring of business processes and learning assessment

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Consiglio Nazionale
delle Ricerche

<http://www.cnr.it>



<http://fmt.isti.cnr.it/doku.php>



ISTITUTO DI SCIENZA E TECNOLOGIE
DELL'INFORMAZIONE "A. FAEDO"

<http://www.isti.cnr.it/>

4.2. BOC Asset Management GmbH

Based in Austria, it's a leading company in Modeling. It's providing the software Adoxx for the Modeling Environment component.

Competencies

- TO BE DONE

Contact

TO BE DONE TO@BE.DONE or PHONE



<http://www.boc-group.com>

4.3. Linagora Grand Sud Ouest SA

LINAGORA is a French leading company in Open Source Software and a Professional Services Provider. Its novice support solution (OSSA, Open Source Software Assurance) is a unique solution on a French market that provides a full line of services available through our one-stop shop in order to secure the FLOSS oriented information systems.

Competencies

- Research projects management
- Distributed and collaborative systems
- Business process related technologies
- Open Source projects management and dissemination

Contact

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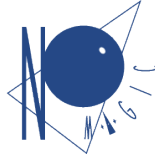
<http://www.linagora.com>

4.4. No Magic Europe UAB

Based in Lithuania, it's a leading company in Modeling. It's providing the software MagicDraw for the Modeling Environment component.

Competencies

- TO BE DONE



<http://www.nomagic.com>

Contact

TO BE DONE TO@BE.DONE or PHONE

4.5. Regione Marche

Italian Public Administration of the Marche region, it's providing expertise on processes in Public Administration.



<http://www.regione.marche.it>

4.6. Fachhochschule Nordwestschweiz

Swiss University with expertise on ontologies. It's working on the recommendation engine.

Competencies

- TO BE DONE

Contact

TO BE DONE TO@BE.DONE or PHONE



<http://www.fhnw.ch>

4.7. Università degli Studi di Camerino

This Italian University is having expertise in Business Process. It's working on formal verification of processes.

Competencies

- TO BE DONE

Contact

TO BE DONE TO@BE.DONE or PHONE



<http://www.unicam.it>

4.8. Università degli Studi dell'Aquila

The University of L'Aquila (UDA) has developed a solid research and experience in the model-driven area (software engineering) on the metamodeling field, model manipulation and analysis. UDA concentrates his research in the specification of transformations and their application to several problem domains: web engineering, software architectures and middleware-based communication systems.

Competencies

- metamodeling and general model management
- the definition and instantiation of the Learn PAd metamodel that permits the specification of extended business processes in the domain of Public Administrations
- a transformational architecture where models produced in the different modeling environments are processed in order to generate the wiki structures associated to the business processes
- the adoption of state-of-the-art techniques and tools for designing and implementing model-to-model transformations
- the adoption of state-of-the-art techniques and tools for designing and implementing model-to-code transformations

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<http://www.disim.univaq.it/main/index.php>

4.9. XWiki SAS

French open-source company, which is developing XWiki software. It's providing XWiki as the base of the Learn PAd platform and expertise about collaboration and knowledge management.

Competencies

- Expert on XWiki software used as basis for Learn PAd Platform
- Specialized in Collaborative Workspaces and Knowledge-Base Wikis
- Software development and integration
- Open-source software and community management

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