



## *D8.1*

# *Tangible / Intangible Assets as a Service Platform*

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## Document Acronyms

Acronym	Full Name/Explanation
CAM	FITMAN Collaborative Assets Management
GeToVa	FITMAN Generation and Transformation of Virtualized Assets
IA	Intangible Assets
MoVA	FITMAN Management of Virtualised Assets
SCApp	FITMAN Supply Chain & Business Ecosystem Apps
TA	Tangible Assets

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## Executive Summary

### The deliverables accompanying the software release of the D8.1 prototype.

Work package 8.1 deals with Tangible and Intangible assets of companies as a service, transforming static information related to the outer or inner resources into powerful services to be exploited to strengthen the manufacturing ecosystem. Within this context, this work relates to platforms component suitable for analysis of manufacturing resource requirements. The goal is being able to generate, process, and analyze events produced by Internet of Things sensors in order to extract meaningful knowledge for a real time and well-founded decisional support.

The software architecture is composed by four elements based on FITMAN software integrated and collaborating together. Collaborative Assets Management (CAM) manages the storage and basic services on assets, Generation and Transformation of Virtualized Assets (GeToVa) generating the assets as batch starting from existing sources like CVs and company assets, Management of Virtualised Assets (MoVa) providing composition and partner search and, finally, Supply Chain & Business Ecosystem Apps (SCApp) that provides business collaboration among involved parties.

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# 1 Introduction

This chapter will introduce the software release including the purpose of the software, the positioning of this deliverable in the context of the project and the applicable documents.

## 1.1 Introduction to the software release

The platform allows to manage Tangible and Intangible assets of companies as a service, transforming static description into powerful services to be exploited. Typical tangible assets are machineries which services can be the hours of work correlated to the activities that they can perform. Same approach for the intangible assets that can be skills of the workforce.

The need for exchanging information inside a network of companies is a strategic but difficult task. Same items are called in different ways, the visibility of the availability is difficult as well as the process to find an agreement. The assets platform allows network to describe its own assets in order to be able, when needed, to complement them with other partner's assets. The application can be applied to strategic, tactical and operational level. At Strategic level the need could be a new business opportunity for which a new consortium should be set based on strategic competencies, at operational level could be to find a missing asset in daily operations (EG: reacting to a machinery failure).

Basis functionalities of the tool are assets manual description, semi-automatic insertion from curriculum vitae, semi-automatic insertion from company profiles, storage in a repository and retrieval. Functionalities for the user are: assets search, virtual rooms for agreements on assets sharing, assets composition and partners search.

## 1.2 Positioning of the deliverable in PSYMBIOSYS

This deliverable describes the technical platform output of 8.1 and specify how the platform implement a Tangible, Intangible Asset Manager to respond to the needs of the business actors.

The platform is composed by an asset repository, a semi-automatic ingestion system and a GUI to provide functionalities to the network analysts. The FITMAN virtual factory platform is an important starting point for the technical analysis. The software will be integrated into D9.2 and used by end-users later.

## 1.3 Applicable Documents

- FITMAN DOW describing the aim of the project, of WP8 and WP8.1
- D9.1 Functional and Modular Architecture

## 2 Tangible/Intangible Assets Platform (TIAP)

This chapter focuses on the description of the software platform (TIAP) released. The section starts summarising the overall information about the software released (description, overall data, functionalities and architecture), after that technical information are reported about architectural stack, technical manual for installation and licensing (including third parties components). Finally, the user manual as well as conclusions and future steps close the chapter.

### 2.1 Software Description

#### 2.1.1 Overall Data

Item	Value
<b>Component Name</b>	TIAP
<b>Software version</b>	v1.0
<b>Reference workpackage</b>	WP8.1
<b>Responsible Partner</b>	TXT
<b>Contact person</b>	Paolo Civardi (paolo.civardi@txtgroup.com)
<b>Source control</b>	<a href="http://vmproject.mil.txtii.it:9097/svnroot/TRI/TIAP">http://vmproject.mil.txtii.it:9097/svnroot/TRI/TIAP</a>
<b>Short Description</b>	Platform to model, manage and provide services about tangible and intangible assets as a service

#### 2.1.2 Purpose of the tool

The TIAP platform has the goal to allow the creation of services on top of companies assets with a particular focus on assets sharing among different actors. The software components allows, for example, to provide a partner search to answer to the new business opportunity found from the new product-service. In this case the major aim is to collect data about network partners assets and create a strong and long collaboration with them in order to form virtual enterprises composing best assets from the different partners to accomplish the new project.

This is a selection of services offered:

- Find a specific machinery in the industrial district to support maintenance activities reacting to a need (ie: production pick, down of a machinery, etc.);
- Create a team of expert for a new project;
- Find a person owning a specific competence ;
- Analyse, at strategic level, company/ecosystem assets to identify its strength and weaknesses;
- partner search to answer to the new business opportunity found from the new product-service creating a strong and long collaboration with them in order to form virtual enterprises.

#### 2.1.3 Summary of Functionalities

TIAP functionalities for the user are:

##### CAM Module

- Create Asset
- Read Asset
- Update Asset
- Delete Assets

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- Discontinue Asset
- Search Asset

### **Supply Chain Applications Module**

- Find asset
- Get Asset Details
- Contact Owner
- Request quotation
- Provide quotation
- Provide Offer
- Chat
- Send email
- Open Virtual Room
- List Virtual Room
- Close Virtual Room
- Delete Virtual Room
- Create Production Order

### **GeToVa Module**

- Define non structured search parameter
- Create cluster parameters
- Ingest

### **MoVa Module**

- Search asset
- Compose asset
- Define keywords
- Define composition criteria
- Partner Search
- Edit Virtual Organisation
- Cluster

## 2.2 Technical Information

### 2.2.1 Internal Architecture

The TIAP software platform is visible in next picture and it is composed by four integrated modules, based on FITMAN components. CAM is the architectural basis providing basis functionalities on assets like the asset repository and CRUD (Create, Read, Update, Delete) functionalities on assets. CAM provides as well the GUI container for the usage of basis functionalities based on Liferay portal server<sup>1</sup>. The SCApp, working on top of the CAM functionalities provides advanced functionalities on assets focusing on assets visibility and sharing, collaboration and business agreement. The GUI of SCApp is based on the Open social Gadget standard<sup>2</sup>. The two GUIs (CAN and SCApp) have been integrated in to a unique visualisation including gadgets into Liferay portlets.

MoVa and GetoVa are going to be addressed in next version of WP8.1 but are already indicated and defined as part of the final architecture. MoVa, similarly to SCApp works on top of assets stored in lined-USDL to provide functionalities. The peculiarity of the software is on the possibility to compose partners assets in order to support more evolved services not available just with a single asset. This is particularly important to provide Partner Search capabilities. A company or a network, receiving a Business Opportunity, can start composing assets from different suppliers in order to find the best Virtual Organisation possible. All the services needs as precondition the availability of the assets; this operation can be very time consuming for network that don't have a structured assets repository description; GeToVa provides the functionalities to ingest assets from non-structured data sources like CV and companies descriptions.



Figure 1: TIAP software platform architecture

<sup>1</sup> <https://www.liferay.com/>

<sup>2</sup> <https://developers.google.com/opensocial/> - <https://www.w3.org/blog/2014/12/opensocial-foundation-moves-standards-work-to-w3c-social-web-activity/>

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## 2.2.2 Technological stack

Item	Value
<b>Nature</b>	Web Platform
<b>System requirements</b>	Linux Operating System (suggested CentOS) 8Gb RAM
<b>Programming Language</b>	Java
<b>Development Tools</b>	Eclipse
<b>Additional Libraries</b>	OpenRDF.jar
<b>Application Server</b>	Apache Tomcat 8.1
<b>Databases</b>	mySQL5.5.1
<b>I/O formats</b>	SCApp Module: UBL 2.0, CSV

## 2.2.3 Technical Manual

The TIAM Platform start from FITMAN ecosystem and reuse all the four module describe before. The installation's steps of all the modules is specify inside the FITMAN project, here we apply only a stylesheet and use case data to demonstrate the platform.

## 2.2.4 Licensing

TIAM is released under the [GNU General Public License \(GPL\)](#)

All the modules have been integrated are released with the same license: SCApp, CAM, MoVa and GeToVa.

## 2.3 User Manual

To simplify the comprehension of the software capabilities and usage the user manual is based on a scenario. In the scenario goal is to allow the sharing of manufacturing services in the network based on partners’ tangible assets (eg: machineries) exposed as a service.

### Step 1: Search of available machineries

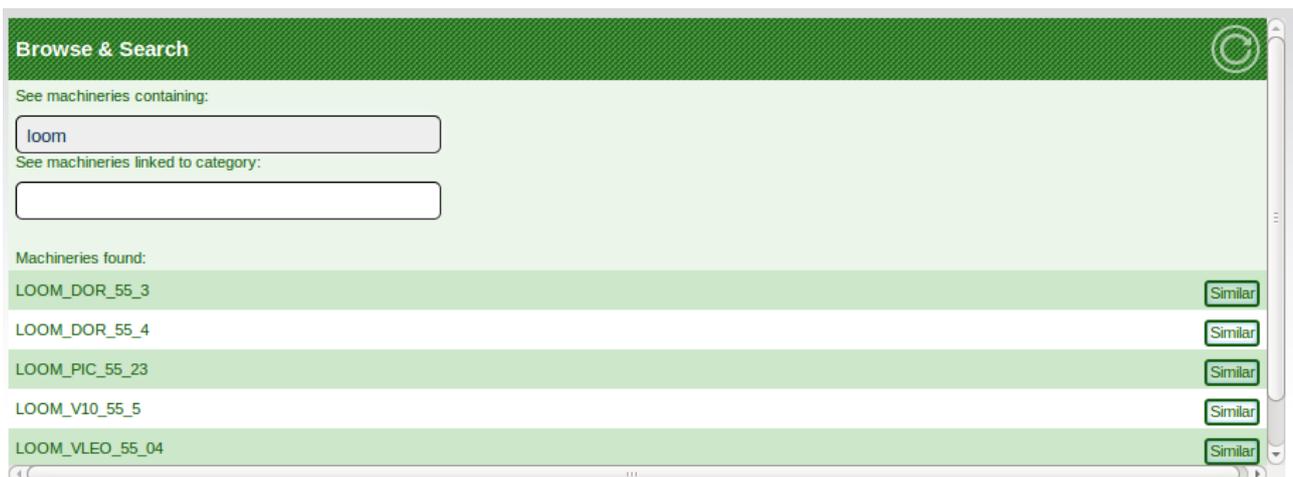
In case of need for a service (for example “loom”) the application offers the search functionality. The following options are available to load a machineries bunch:

- See machineries containing: displays all machineries containing in its name the string inserted in the textfield;
- See machineries linked to category: this option search all the machineries offering a specific service (e.g.: “WeavingProcessCapability”) inserted in the textfield. Use autocomplete function that provides suggestions while you type into the textfield;
- “Similar” icon button: allows to display all the machineries similar to the one selected

Results are displayed under “machineries found” label.

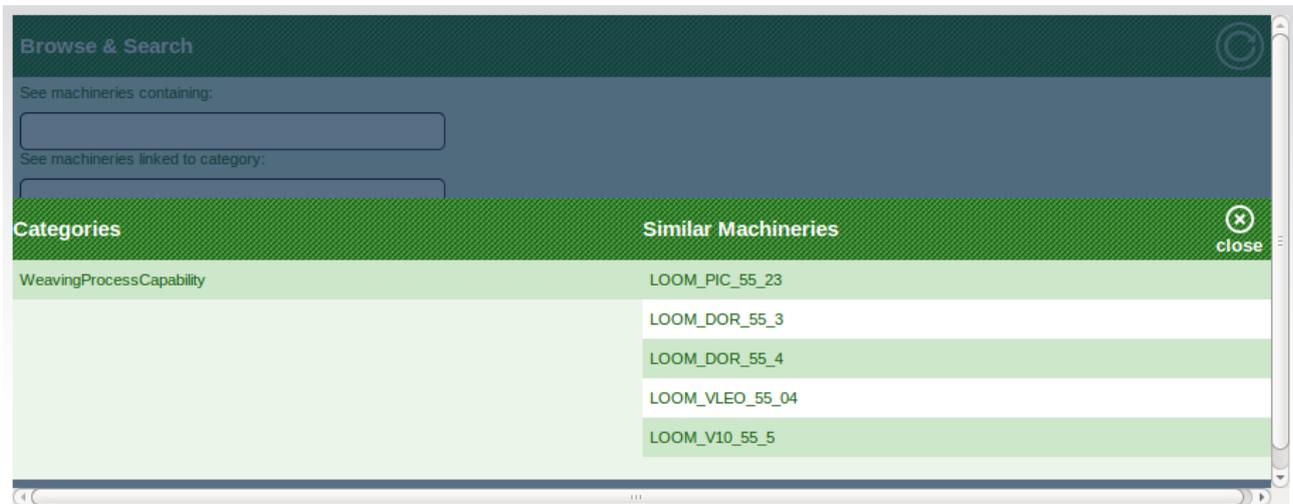


**Figure 2: Search for offered service**



**Figure 3: Search for machinery name**

Every time a machinery is selected the similar machineries are displayed.



**Figure 4: similar machineries**

To have detailed information on a specific machinery the user has to click on the machinery name in any place of the application and the *details gadget* will show requested data.

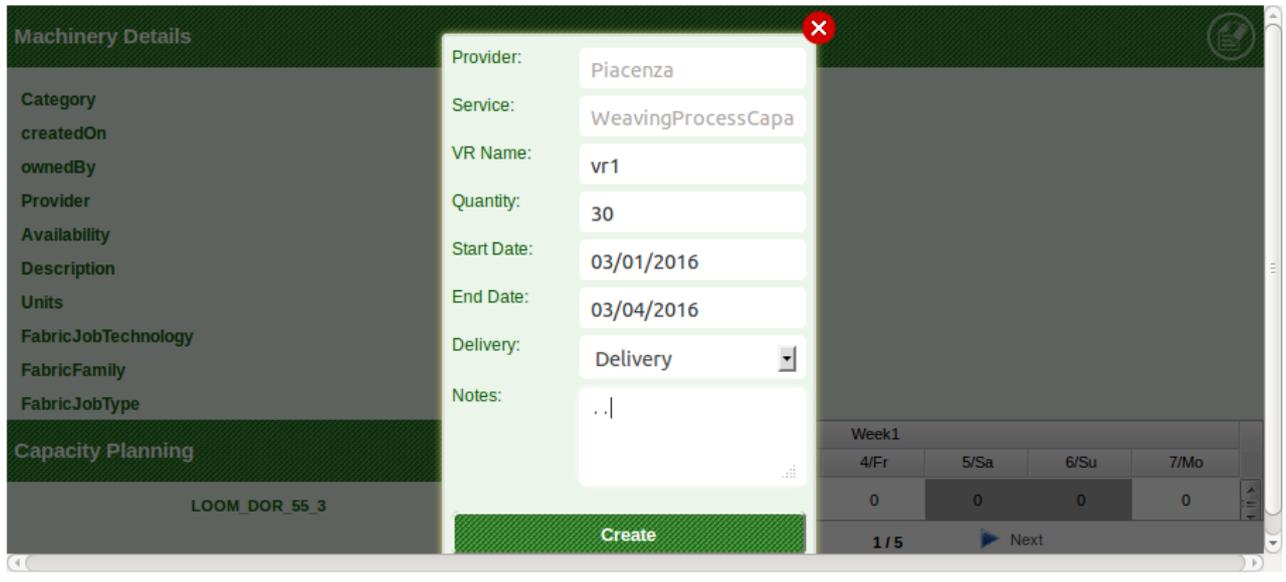
Detailed machinery information provides several characteristics including:

- Availability
- Provider (owner of the machinery)
- Description
- Units
- Other important information



**Figure 5: Machinery details**

For each machinery is possible to create a virtual room to discuss with the owner by clicking on “Request for Quotation” button and the possibility to select it for the involvement in the production planning.



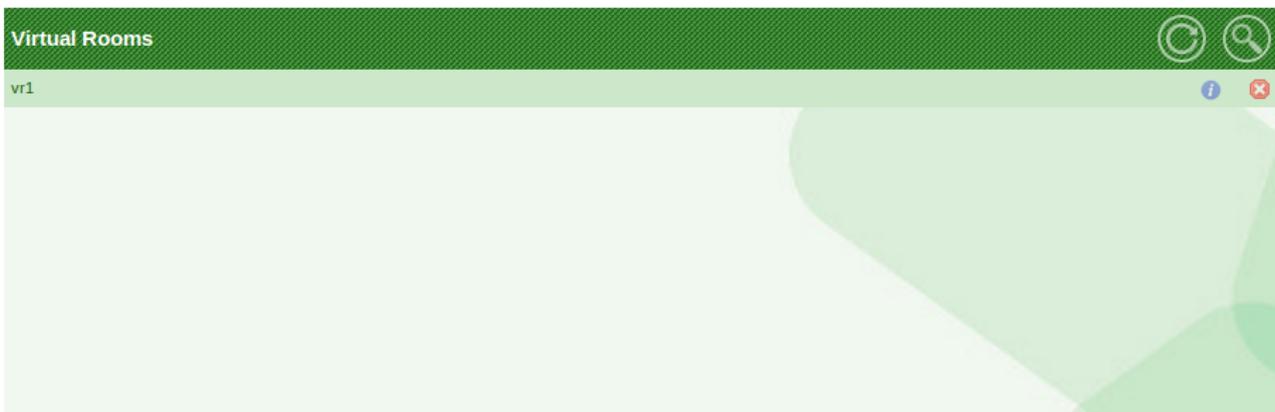
**Figure 6: Virtual Room creation**

## Step 2 collaborate and find an agreement

### Virtual Room Manager

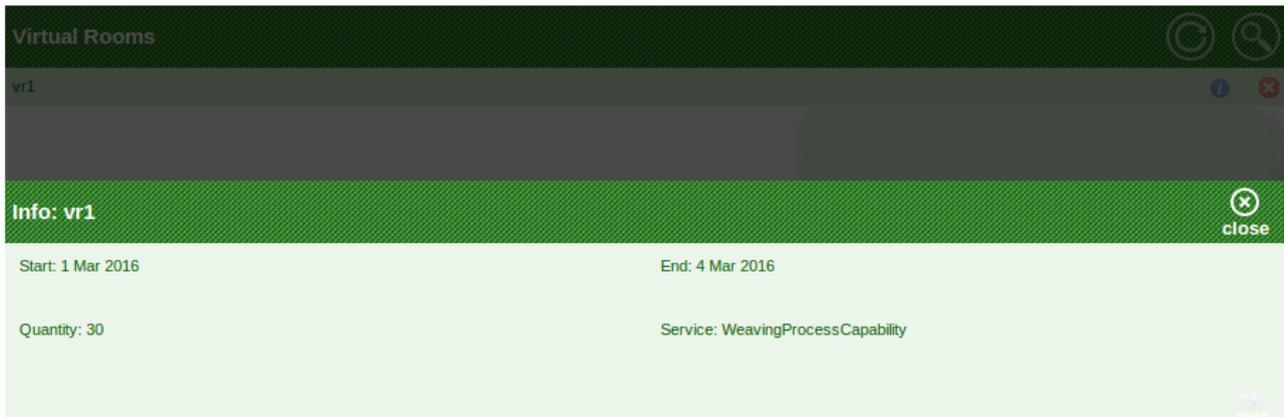
A Virtual Room can be opened to discuss one or more quotations answering to a RfQ.

Of course it is possible to manage several virtual rooms (and, consequently, several commercial discussions) at the same time; the virtual room list gadget allow to manage all rooms. The gadget allows the user to see all the virtual rooms, filter them by some parameters, check the details and open the selected one in another gadget.



**Figure 7: Virtual Room list**

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**Virtual Rooms**

vr1

**Info: vr1** close

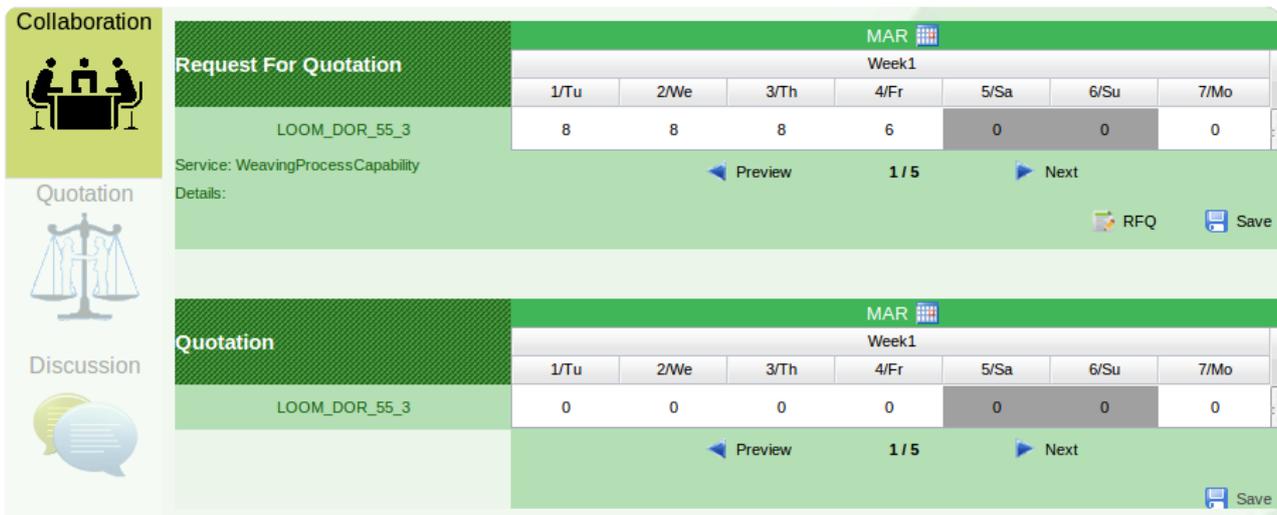
Start: 1 Mar 2016      End: 4 Mar 2016

Quantity: 30      Service: WeavingProcessCapability

**Figure 8: Virtual Room details**

**Collaboration Panel:**

- Partner can see its own Capacity Schedule calculate with production planning algorithm and the availability of the service capacity of the provider
- Possibility to download the RfQ in UBL2.0 format clicking on “RFQ” button



**Collaboration**

**Request For Quotation**

LOOM\_DOR\_55\_3

Service: WeavingProcessCapability

MAR						
Week1						
1/Tu	2/We	3/Th	4/Fr	5/Sa	6/Su	7/Mo
8	8	8	6	0	0	0

Preview 1 / 5 Next

RFQ Save

---

**Quotation**

LOOM\_DOR\_55\_3

MAR						
Week1						
1/Tu	2/We	3/Th	4/Fr	5/Sa	6/Su	7/Mo
0	0	0	0	0	0	0

Preview 1 / 5 Next

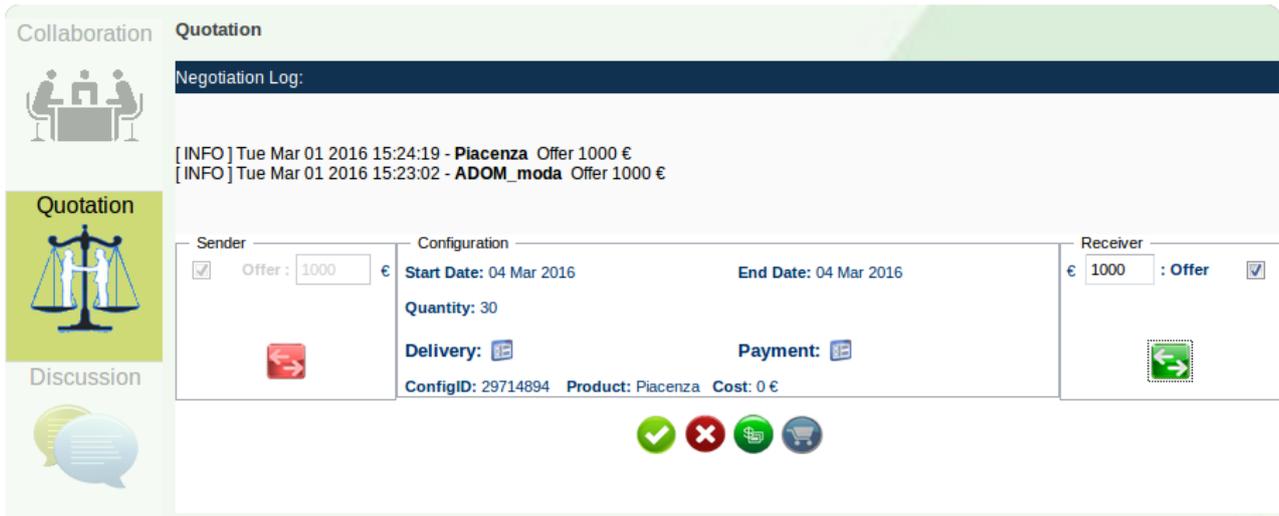
Save

**Figure 9: Collaboration panel**

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**Quotation Panel:**

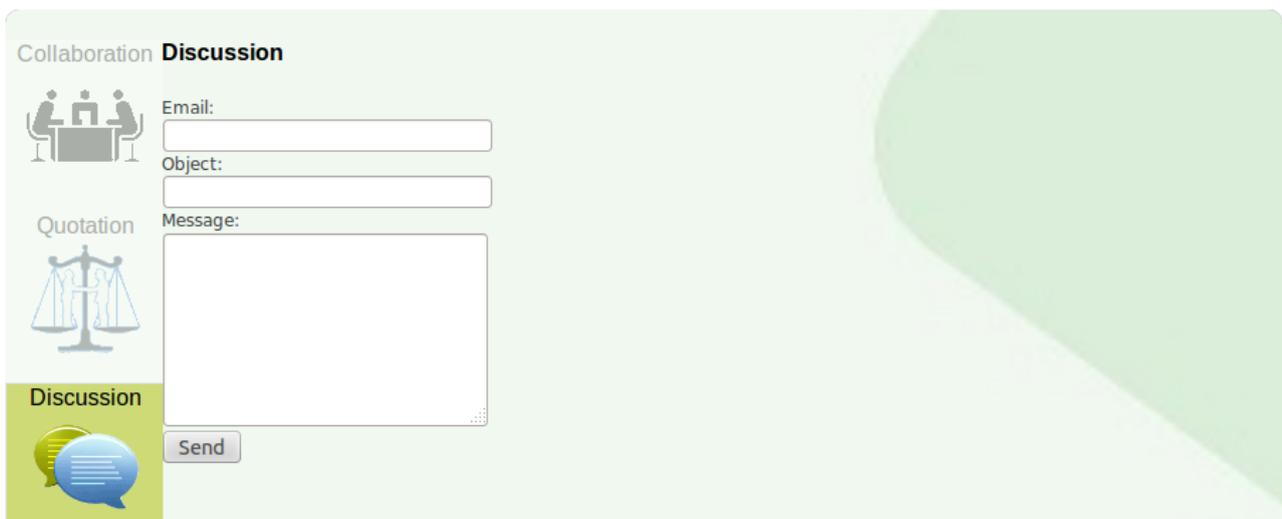
- allow partners to discuss on quotations and collaboratively agree on a production orders. To send the offer is necessary to select the checkbox related to a specific quotation and click on the “counter” button
- Export of the order in UBL2.0 format when the offers from Sender and Receiver have the same value
- Further information about the order can be discussed by clicking on “Delivery” and “Payment” button



**Figure 10: Quotation panel**

**Discussion Panel:**

- Discuss with partners by email service



**Figure 11: Discussion panel**

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## 2.4 Conclusions and Future plans

Next steps of the platform are about the integration with the other components of the project in WP9 and the usage in end-users scenarios in WP10. Components are coming from WP3.4, WP4.4, WP5.4, WP6 as well as other WP9 workpackages (WP8.2, WP8.3 and WP8.4). The usage of the TIAP platform on pilots will be depending on a based on case by case reasoning on top of end-users requirements.

This version of the platform is focusing on CAM and SCApp components; as next steps on platform components is the integration of MoVa and GeToVa in order to provide integrated partner search and automatic ingestion of TA/IA from unstructured data sourced functionalities.