

Biomass On-line Management System: BI.O.MA.S.

Christos Stefanis¹, Eleni Kamateri³, Maria Partalidou², Stelios Gargas⁴, Kostas Nasias⁵

¹ Aristotle University of Thessaloniki, Department of Food Science and Technology, Thessaloniki 54124, Greece, e-mail: cstefan@agro.duth.gr

² Aristotle University of Thessaloniki, School of Agriculture, Dept. of Agricultural Economics, 54124 Thessaloniki, Greece, e-mail: parmar@agro.auth.gr

³Nasias K. & Co LP (EXEO), 54352, Thessaloniki, e-mail: ekamater@hotmail.com

⁴Nasias K. & Co LP (EXEO), 54352, Thessaloniki, e-mail: steliosgargas@gmail.com

⁵Nasias K. & Co LP (EXEO), 54352, Thessaloniki, e-mail: nasias@exeo.gr

Abstract. A new tool that will exploit the benefits of ICT technology and promote biomass entrepreneurship is presented: BI.O.MA.S. This new approach is based on a web-based tool for the real-time biomass supply chain management, an online marketplace combined with an auction platform for biomass products/services and the release of an app for smartphones and mobile devices. The goals and the novelty of Biomass-On-line-Management-System (BI.O.MA.S.) will be the creation of an integrated, online system which will help the interactions between the several actors of the biomass market and the agricultural sector, contribute to domestic and international bioenergy trade, and increase business-to-business, business-to-consumers and e-commerce in agriculture.

Keywords: biomass, energy, agriculture, e-commerce, e-auction.

1 Introduction

Over the past decades energy from biomass has been on the cutting edge of research in renewable energy. This is expected to be doubled in next decade. Moreover, the biomass production for the generation of bioenergy still encounters several issues that have to be addressed. The biomass supply chain comprehends of diverse and independent procedures including production of biomass, collecting, storage, transportation to the point and eventually energy production (J.E Iakovou E et. al. 2010; Sharma B et. al. 2013).

Currently, there are several biomass trading systems. Notwithstanding, most of them do not focus on small-medium biomass stakeholders, do not aim to train or motivate the biomass community towards the environmental and social benefits of agriculture. Also, they lack a user-friendly interface and do not work properly on mobile devices. Towards this direction we aim to developing BI.O.MA.S. an integrated, online system for the real-time management and auctioning of the

Copyright © 2015 for this paper by its authors. Copying permitted for private and academic purposes.

Proceedings of the 7th International Conference on Information and Communication Technologies in Agriculture, Food and Environment (HAICTA 2015), Kavala, Greece, 17-20 September, 2015.

biomass products and services. Besides a web-based platform, B.I.O.M.A.S will be available as a mobile app.

2 Architecture

The B.I.O.M.A.S. architecture will introduce a scalable and modular approach for facilitating the design, deployment and execution of the B.I.O.M.A.S. functionality on top of an integrated platform. It comprises of three horizontal layers: the Presentation Layer, the Application Layer/Business Intelligence and the Data Layer (Figure 1). Each layer comprises a set of FIWARE and new components (addressing the specific needs of the project).

The core environment will be developed using the Marketplace – WMarket enabler. The Marketplace will provide functionality necessary for bringing together offering and demand for making business. It also provides a Pricing Simulator Decision Support feature (Pricing Simulator Tool) that supports the decision-making processes. The IaaS Resource Management enabler will enable BIOMAS to address the increasing needs on computing resources (scalability) required for the real-time performance of the B.I.O.M.A.S. platform in order to store data and perform powerful analytics. POI (Points of interest) GE will be used by B.I.O.M.A.S to enable users to run location-based search queries. The Identity Management – KeyRock enabler will be used in order to reduce the effort for account creation and management ensuring the users' privacy. The Object Storage is object-based storage container which can be efficiently used as the storage of the marketplace's data (product descriptions, profiles, actions, events, statistics, etc.) and informational content (tutorials, videos, user manuals etc.). The revenue model of the B.I.O.M.A.S system will be managed by RSS GE. It will publish to inform when users or agreements exceed predefined targets, upcoming events etc.

Apart from mentioned GEs, the B.I.O.M.A.S project will develop (from scratch) new components. The Biomass Storage and Logistics module will help users to implement and maintain a storehouse of biomass products and services. Logging/auditing module will keep track and display previous for each user. The Collaboration module will help different actors to collaborate and combine different services/products. Trend Analysis and BI module provides data analysis and business intelligence support to users enabling them to define their pricing policy, make predictions and decide where to invest. Finally, the Event Planning Calendar module will be used to plan user activity and future business transactions, services/products delivery, opening of new auctions etc.

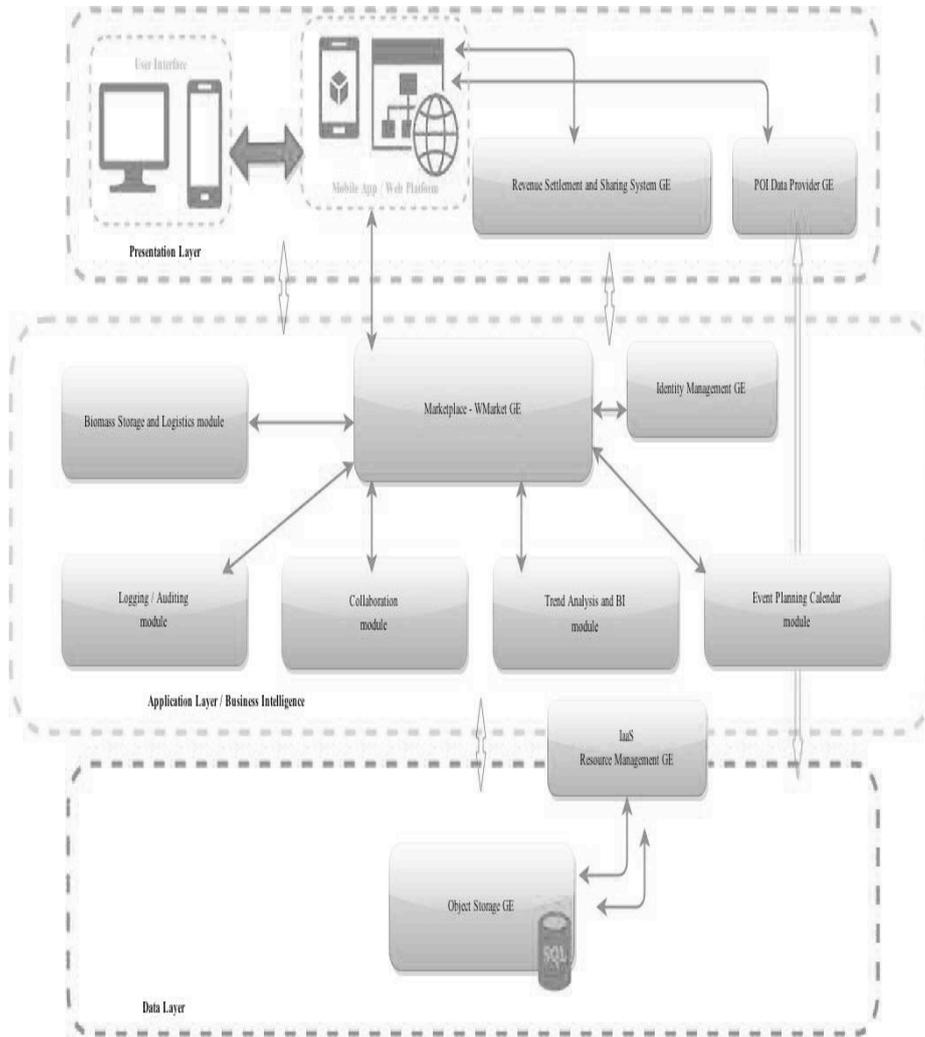


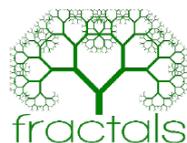
Fig. 1. The architecture of BI.O.MA.S. platform and FIWARE technologies usage.

3 Conclusions

In this paper we present the architecture of an online marketplace and auction platform for biomass products and services via the usage of FI-WARE technology. Moreover, the additional design of five new components specially developed for project's purposes will offer new added-value functionalities and advances such as real time-auctions, event planning calendar, location-based searching, history monitoring, statistics and trends analytics. Compared with existing solutions,

BI.O.MA.S. will offer a trading solution that will enable small and medium biomass players to enter the biomass market. Subsequently, we plan, as future work, to expand the supported features and properties of biomass products or extend the platform to support other agricultural products.

Acknowledgments. This project is funded by FRACTALS (Future Internet Enabled Agricultural Applications, FP7 project No. 632874), under the funding framework of the European Commission".



References

1. Iakovou E., Karagiannidis, A., Vlachos, D., Toka, A. and Malamakis, A. (2010) Waste biomass-to-energy supply chain management: A critical synthesis. *Waste Management* 30(10), pp. 1860–1870.
2. Sharma, B., Ingalls, R.J., Jones, C.L. and Khanchi, A. (2013) Biomass supply chain design and analysis: Basis, overview, modeling, challenges and future. *Renewable and Sustainable Energy Reviews*, 24, p. 608–627.