



USER GROUP ACTIVITIES

YEAR 3

Deliverable D8.4.3

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EXECUTIVE SUMMARY

This deliverable is the documentation of the third-year User Group activities arising from Task 8.2 “The IQmulus User Group” up to project month 36. The report is updated annually, so final version will be provided at month 48.

By the end of the third project year, user requirements have been finalized. During this process, interaction with professional users was crucial for the further refinement and consolidation of user requirements.

In the present document the first prototype testing is in focus. Moreover, we provide updated information events (workshops, publications, dissemination activities, possible IQmulus presence).

Also, a chapter is devoted to the annually organized scientific IQmulus Workshop, and the IQmulus Processing Contest, and last, but not least we introduce the changes in the content of the IQmulus website, and other forms of dissemination and provision of information (such as LinkedIn).

In the next project period, the project focus will shift towards exploitation of IQmulus results. In line with the exploitation plans, end Users will be in target beside other potential markets.

TABLE OF CONTENTS

1	Introduction.....	5
2	Methodology.....	6
3	Results.....	7
3.1	Information about User related activities - eRoom	7
3.2	The second IQmulus Workshop and the Processing Contest.....	13
	The second IQmulus workshop	13
	The IQmulus Processing Contest (2015)	14
3.3	User Group participation in the Assessment and Evaluation process.....	16
4	Online communication channels.....	19
4.1	Project Website.....	19
	Background.....	19
	Content and strategy for user-centric evolution	19
	Current structure as of November 2015.....	23
4.2	Other forums.....	26
	LinkedIn	26
5	Conclusions and further tasks.....	28

1 INTRODUCTION

IQmulus has manifold connections to users through different organizational structures: especially in Work Packages 1 (Requirements) and WP7 (Assessment and Evaluation) but also WP8 (Dissemination and Outreach) and WP9 (Exploitation and Business Models).

An overview of the User Group established by the end of the first project year in terms of statistics on user involvement was given in the first deliverable on this topic at PM 12 (D8.4.1 Report on User Group activities M12). As it was reported in D8.4.1, altogether 38 institutions were contacted by different IQmulus partners, and User Stories have been provided by 25 of them. Arising from the development work described in D1.2.3, besides the 38 IQmulus-external user institutions, 8 partner institutions provided internal users. Internal user expertise was provided by the following IQmulus partners: Liguria Region, FOMI, MOSS, IGN, UCL, TUDelft, Ifremer, and HRW. The total number of involved (representative) persons from the contacted external institutions is 99 and 26 more persons got involved as employee or member of the internal user institutions.

At the end of the second project year D8.4.2 Report on User Group activities M24 summarized the most relevant and updated information concerning mainly internal users currently involved in the project. The reason for concentrating on internal users was that most of these internal users had a role in IQmulus as User Story providers during the user requirement formulation in the first phase of the project, in addition to this in the second project year some of them took over an important part in the requirement consolidation process: by the formulation of showcases, workflows, providing As-Is analyses of current solutions, and shaping requirements towards IQmulus for better solutions.

By the end of the third project year, user requirements have been finalized. During this process, interaction with professional users was crucial for the further refinement and consolidation of user requirements. As in year two, the project partners' internal users were mainly involved in the consolidation process in 2015 as well, because by working together with a local developer team smooth communication, easy consultation and rapid problem solving became possible.

In the present document, the first prototype testing is in focus as a User Group activity, because users played an important role in testing the workflows through the graphical user interface (GUI) as a part of the "Assessment and Evaluation" Work Package (WP7) activities. The Redmine system was provided as a communication channel to the developers. The role of the Redmine system in work of the User Group was introduced in D8.4.2 Report on User Group activities M24.

D8.4.2 has given information on User Group activities of the second project year, including events documented thematically in eRoom. In the present document we provide updated information on these topics as well (workshops, publications, dissemination activities, possible IQmulus presence). In the present document, a chapter is devoted to the annually organized scientific IQmulus Workshop, and the IQmulus Processing Contest, and last, but not least we introduce the changes in the content of the IQmulus website, and other forms of dissemination and provision of information (such as LinkedIn).

2 METHODOLOGY

Concerning the user related activities we mainly refer to information presented so far in eRoom in the online databases. The databases in the eRoom including details on user related activities are continuously updated and are listed in Table 1.

User Workshops	https://project.sintef.no/eRoom/math/IQmulus/0_2ef9d
Workshop material	https://project.sintef.no/eRoom/math/IQmulus/0_2f356
IQmulus publications	https://project.sintef.no/eRoom/math/IQmulus/0_2da16
IQmulus dissemination activities (what was happened)	https://project.sintef.no/eRoom/math/IQmulus/0_2da08
Events with possible IQmulus presence	https://project.sintef.no/eRoom/math/IQmulus/0_30160
Notification of future dissemination	https://project.sintef.no/eRoom/math/IQmulus/0_2e4f2
Other Dissemination Channels	https://project.sintef.no/eRoom/math/IQmulus/0_2cb4d

Table 1. Databases including details on user related activities

The reports about the second IQmulus workshop and IQmulus Processing Contest are already released, thus we provide just a short summary in present document, and rely heavily on the following documents:

1. Deliverable D8.6.2: Second IQmulus Geobigdata Workshop (https://project.sintef.no/eRoom/math/IQmulus/0_2d4ca)
2. Deliverable D8.8.3 Report on IQmulus Processing Contest Year 3 (https://project.sintef.no/eRoom/math/IQmulus/0_2d4dc)
3. IQmulus website (www.iqmulus.eu)
4. Website of GeoBigData'15 – ISPRS Geospatial Week (<http://www.isprs-geospatialweek2015.org/workshops/geobigdata/>)

The *first prototype testing* is in focus as a User Group activity in the third and the fourth project year, because users played an important role in testing the workflows through the general user interface (GUI). A short summary is given in present document about this activity, mainly based on the deliverable *D7.3.2 Evaluation of First system prototype*.

As in the previous year we also introduce developments, notes and suggestions concerning activities within WP8 related to informing the User Group about the IQmulus activities and results. This latter topic of the document primarily brings into focus the issues listed below:

- The project website introducing developments made in the third project year
- LinkedIn as channels for informing users;
- Other dissemination channels.

3 RESULTS

3.1 INFORMATION ABOUT USER RELATED ACTIVITIES - EROOM

Information on all the interviews and workshops organized by the partners has been collected in the “User Workshop” database in eRoom. The database – besides the basic information about the workshop such as the organizing partner, date of the event, and number of participants – provides information on the user type of the attendees, the sectors and topics the attendees belonged to, and the relation of the workshop topics to the IQmulus test beds and scenarios. Up to the submission date of this deliverable, altogether 36 workshops were organized in the frame of the project.

In 2014 (the number of workshops in this project period was 25, reported in D8.4.2) the project partners’ internal users were mainly involved in the consolidation process of the user requirements, consequently workshops organized this year were targeting attendees from internal user groups. In most cases developers were also invited to the workshops, so that through the common work direct communication was realized between users and developers concerning solutions IQmulus could provide for the workflows.

Since the release of the previous deliverable (D8.4.2 *User Group Activities Year 2 M24*), 9 workshops were organized for users. This means that so far 36 workshops have been organized since the beginning of the project (see Table 2).

Organising IQmulus partner	Cumulated number of workshops (beginning – 5 November 2015)		
	D8.4.1 (until April 2013)	D8.4.2 (until October 2014)	until 5 November 2015
FOMI	4	15	22
UBO-IFREMER	2	2	2
CNR-IMATI and Regione Liguria	1	1	1
CNR-IMATI	2	3	3
IGN	2	3	5
UCL	1	2	2
Liguria	-	1	1
Total	12	27	36

Table 2. Number of workshops and interviews organized by IQmulus partners until 5 November 2015

According to the eRoom database “User workshops” the topics covered at the workshops with internal users can be grouped as follows:

- Informing internal users about the results of the first and second review meeting.
- Discussion about the start of dissemination and evaluation.
- Actual state of IQmulus developments. Effects of code camp achievements on further development directions.

- Technical questions such as advantages and disadvantages of different solutions regarding IQmulus targets (e.g., Hadoop), or the practical usage of the "cloud" and Hadoop.
- Latest IQmulus developments in the user aspects (Showcases/Workflows).
- Clarification of user requirements concerning visualization aspects for a given workflow.
- Detailed specification of present solutions (As-Is-Analysis) and required IQmulus development directions of a given workflow in order to revise user requirements.
- Discussion on new approaches to the prevention of natural hazards and laboratories for the analysis of issues and best practices of municipal emergency planning.
- Introduction of information papers, brochures to users.
- Discussion with data providers about the provision of additional data for testing and validation of results calculated by IQmulus services.
- Planning and execution of prototype testing and discussion of results with internal users.

In D8.4.1 seven publications (in periodicals or series) were reported in the eRoom "IQmulus publications" database, of which four have been or will be provided with open access to the public. Until October 2014 the number of publications already published or in press increased to 15, of which eight already offer or will offer open access to the public. With additional publication activities in the third project year (until 5 November 2015) the number of publication increased by 26, 16 out of it with open access opportunity. To demonstrate the topics of the publications we provide an overview table of them (Table 3). In the eRoom table there are also five more future publications proposed for periodicals, series or books.

IQmulus partner	Title of the publication	Title of the periodical or the series	Year
CNR-IMATI-GE	Grouping real functions defined on 3D surfaces	Computers & Graphics	2013
	An Introduction to Ricci Flow and Volumetric Approximation with Applications to Shape Modeling	ACM SIGGRAPH ASIA 2014 Course	2014
	Laplacian spectral distances and kernels on 3D shapes	Pattern Recognition Letters	2014
	Volumetric Heat Kernel: Padé-Chebyshev Approximation, Convergence, and Computation	Computers & Graphics	2014
	Local barycentric coordinates	ACM Transactions on Graphics (SIGGRAPH ASIA 2014)	2014
	3D shape retrieval and classification using multiple kernel learning on extended Reeb graphs	The Visual Computer	2014
	Quantifying 3D Shape Similarity Using Maps: Recent Trends, Applications and Perspectives	Eurographics 2014 - State of the Art Reports	2014
	Reasoning About Shape in Complex Datasets: Geometry, Structure and Semantics	Tutorials of Eurographics 2014	2014
	Retrieval and classification methods for textured 3D models: a comparative study	The Visual Computer	2015

IQmulus partner	Title of the publication	Title of the periodical or the series	Year
	Book Proposal "Heterogeneous Spatial Data: Fusion, Modelling, and Analysis for GIS applications".	Acceptance of the book proposal under discussion with Morgan & Claypool Publisher.	2015
Fraunhofer	VCoRE: a web resource oriented architecture for efficient data exchange	Proceedings of the 18th International Conference on 3D Web Technology	2013
	Controlling the Processing of Smart City Data in the Cloud with Domain-Specific Languages	Proceedings of the 8th IEEE/ACM International Conference on Utility and Cloud Computing UCC 2014	2014
	A modular software architecture for processing of big geospatial data in the cloud	Computers & Graphics	2015
TUDelft	Automatic registration of iPhone images to laser point clouds of urban structures using shape features	ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences	2013
	Trends in Detecting Changes from Repeated Laser Scanning Data	Proc. 2nd Joint International Symposium on Deformation Monitoring (JISDM) Nottingham	2013
	Automatic volume estimation from laser mobile mapping data for mountain road widening	Remote Sensing	2013
	Accuracy assessment of building point clouds automatically generated from iphone images	ISPRS Int. Archives Photogramm. Remote Sens. Spatial Inf. Sci.	2014
	Detection of harvested trees in forests from repeated high density airborne laser scanning	ISPRS Annals Photogramm. Remote Sens. Spatial Inf. Sci.,	2014
	Massive point cloud data management: Design, implementation and execution of a point cloud benchmark	Computers & Graphics	2015
	A Semi-Automatic Procedure for Texturing of Laser Scanning Point Clouds with Google Streetview Images	The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences	2015
	Automated large Scale Parameter Extraction of Road-Side Trees Sampled by a Laser Mobile Mapping System	The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences	2015
	Automatic Classification of Trees From Laser Scanning Point Clouds	ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences	2015
	Evaluating Voxel Enabled Scalable Intersection of Large Point Clouds	ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences	2015
UBO	Tree Separation and Classification in Mobile Mapping Lidar Data	The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences	2015
	Direct sediment transfer from land to deep-sea: Insights into shallow multibeam bathymetry at La Réunion Island	Marine Geology	2013
	Giant dune morphologies and dynamics in a deep continental shelf environment: Example of the banc du four (Western Brittany, France)	Marine Geology	2013
IGN	Semantic 3D scene interpretation: a framework	ISPRS Annals of the Photogrammetry,	2014

IQmulus partner	Title of the publication	Title of the periodical or the series	Year
	combining optimal neighborhood size selection with relevant features	Remote Sensing and Spatial Information Sciences	
	TerraMobilita/iQmulus urban point cloud analysis benchmark	Computers & Graphics	2015
	3D octree based watertight mesh generation from ubiquitous data	The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences	2015
	Distinctive 2D and 3D features for automated large-scale scene analysis in urban areas	Computers & Graphics	2015
	Distributed dimensionality-based rendering of Lidar point clouds	The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences	2015
UCL	A New Framework For Interactive Segmentation of Point Clouds	The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences	2014
	Classification of big point cloud data using cloud computing	The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences	2015
	NOSQL for Storage and Retrieval of Large Lidar Data Collections	The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences	2015
FOMI	Decision support on distributed computing environment (IQmulus)	Proceedings of the 3rd Open Source Geospatial Research & Education Symposium OGRS 2014	2014
	A framework for processing large scale geospatial and remote sensing data in MapReduce environment	Computers & Graphics	2015
	Big geospatial data processing	5th GIS Conference book: Theory meets practice	2015
	Raster data partitioning for supporting distributed GIS processing	The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences	2015
	Using big geospatial data for fast flood detection: developments from the IQmulus project	International Geoscience and Remote Sensing Symposium (IGARSS) 2015 Proceedings	2015
	Water detection and classification on multisource remote sensing and terrain data.	The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, ISPRS Geospatial Week	2015
SINTEF	Locally Refined Splines Representation for Geospatial Big Data	The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences	2015
	Locally refined spline surfaces for representation of terrain data	Computers & Graphics	2015
CNR-IMATI-GE, UCL, TUDelft	Preface to the special session on processing of large geospatial data	Computers & Graphics	2015

IQmulus partner	Title of the publication	Title of the periodical or the series	Year
IGN, UBO	Towards time-series processing of VHR satellite images for surface deformation detection and measurements	The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences	2015
SINTEF, CNR-IMATI-GE	A Comparison of Methods for The Approximation and Analysis of Rainfall Fields in Environmental Applications	ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences	2015
SINTEF, Fraunhofer, UBO	Visualization of Marine Sand Dune Displacements Utilizing Modern GPU Techniques	ISPRS - International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences	2015

Table 3. IQmulus publications (until 5 November 2015)

Information on IQmulus dissemination activities can be found in the folder with the same name in eRoom. A summary of the contents is presented in Tables 4-6. Further information on the notification of dissemination can be found in the folder “Dissemination reporting”.

	Type of activities (and related cumulated number of activities, since the beginning of the project)							
Time period	Conference	Exhibition	Poster	Presentation	Press release	Publication	Web sites/ Application	Workshop
D8.4.1	5	5	1	4	2	2	1	12
D8.4.2	11	6	3	12	2	2	3	20
until 5 November 2015	33	14	22	44	2	17	3	33

Table 4. IQmulus dissemination activities (activity type) (until 5 November 2015)

	Main leader of the activity (and related cumulated number of activities, since the beginning of the project)											
Time period	CNR-IMATI-GE	FOMI	Fraunhofer	HRW	Ifremer	IGN	Liguria	MOSS	SINTEF	TU-Delft	UBO	UCL
D8.4.1	4	4	6	2	1	2	1	3	2	0	6	1
D8.4.2	8	7	6	2	2	6	2	4	4	2	13	5
until 5 November 2015	15	14	17	5	2	9	2	8	9	10	17	11

Table 5. IQmulus dissemination activities (main leader of the activity) (until 5 November 2015)

	Type of audience (and related cumulated number of activities, since the beginning of the project)						
Time period	(none selected)	Civil society	Industry	Medias	Policy makers	Scientific (higher Research)	community education,

D8.4.1	1	6	15	6	13	27
D8.4.2	6	16	26	9	26	49
until 5 November 2015	7	46	68	21	57	102

Table 6. IQmulus dissemination activities (type of audience) (until 5 November 2015)

Several events with possible IQmulus presence are listed in eRoom (till now altogether 81). Most of them are (were) planned for project year 1, 2, and 3 (70 items), the rest (11 items) are being planned for project year 4. Of course this will change as soon as details of future conferences will be published. Information extracted from this database is presented in Tables 7-8.

	Focus of the presentation/poster/exhibition, etc. (cumulated number)						
Time period	(none selected)	Big data	Computer Graphics	Geometry	GIT	ICT	Sensing
D8.4.1	7	4	4	4	2	1	6
D8.4.2	1	16	10	15	17	8	18
until 5 November 2015	1	26	15	22	21	11	29

Table 7. Possible IQmulus presence I

	IQmulus partner the presentation is provided by (cumulated number)										
Time period	CNR-IMATI-GE	Fraunhofer	FÖMI	Ifremer	IGN	Liguria	MOSS	SINTEF	TUDeft	UBO	UCL
D8.4.1	5	5	-	-	3	-	1	7	4	1	4
D8.4.2	8	13	9	-	5	1	5	9	7	1	9
until 5 November 2015	13	14	13	1	8	1	4	11	8	4	10

Table 8. Possible IQmulus presence II

Other dissemination opportunities where practitioners from industry, research, the public sector and the community can meet with IQmulus are listed in the folder “Other dissemination channels” in eRoom. Currently the Maritime Industries Forum, ISO 15926 and Semantic Technologies Annual Meeting, and the European Data Forum are mentioned here as well as a Web page dedicated to IQmulus on the Liguria Region web site on environment. This site describes the topics and the foreseen outputs of the project but is available only in Italian. In fact, the purpose of this page is to inform the interested Italian bodies and enterprises, in particular the involved user groups, about IQmulus aims and activities.

3.2 THE SECOND IQMULUS WORKSHOP AND THE PROCESSING CONTEST

“As part of the research and development efforts concerning the IQmulus platform, the consortium members are strongly committed to the dissemination of the project results through publications and presentations. This includes the organization of an annual scientific IQmulus Workshop, which incorporates as one specific session the presentation of the results of the annual IQmulus Processing Contest. The contest is meant to provide task-specific benchmarking of software which is of interest for the application domain and which has been developed by the scientific community, and not only by the project.”

D8.6.1 Foreword by Ewald Quak, 2014

The next chapters give short summaries on the topics mentioned above.

The second IQmulus workshop

The second IQmulus workshop – the **GeoBigData'15 Workshop** – was co-organized with the ISPRS working group III/5, October 1 and 2 as the GeoBigData workshop of the ISPRS Geospatial Week 2015 (La Grande Motte, France, 28. September - 2 October 2015). The ISPRS Geospatial Week is a new conference format for ISPRS. It will be organized every odd year. The idea of the Geospatial Week is to co-locate several Geospatial Sciences communities and scientific events: Conferences; Workshops, Exhibitions. The 2015 event included 11 events with a total of 512 participants.

The workshop allowed IQmulus to present and disseminate its research and results to the ISPRS community. 43 participants added their name to the participant list circulated, out of which 15 were connected to IQmulus. The participants were a mixture of mapping authorities, research organizations and industry. The workshop gathered researchers interested in the geospatial big data challenges, including storage, data management, processing, and rendering.

Users could get to know the results through publications and presentations. The IQmulus GeoBigData workshop included:

- Eight long presentations out of which four were from IQmulus
- Fourteen short presentations (accompanied by posters) out of which eight were from IQmulus

IQmulus contributed as well with presentations in four other workshops. The IQmulus GeoBigData workshop included:

- Two plenary talks for all conference attendees
- One keynote talk
- Presentations of three papers accepted for publication in the ISPRS Annals, out of which one paper was pure IQmulus and one had IQmulus contribution.
- A first presentation of the IQmulus scalability testing
- IQmulus Processing Contest including three oral presentations of results, out of which one paper was pure IQmulus and one had IQmulus contribution.
- 14 short presentations of papers accepted for publication in ISPRS Archives. These were also presented as posters. 8 of these were from IQmulus.

The selected full papers and extended abstracts appeared in a special issue of the ISPRS Annals and Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, respectively. Selected research papers mainly address the following topics: extensions of big data frameworks to deal with geospatial big data; processing and rendering of geospatial big data; challenges in geospatial big data storage, processing and rendering; geospatial big data tools, services, and infrastructures on clouds. Full papers were presented in an oral session and submissions accepted as extended abstracts were presented both at an interactive poster session and a flash 5' talk session. Finally, the GeoBigData'15 Workshop has hosted one keynote talk by Rob Emanuele (Azavea, USA) on "The State of Distributed Processing in Open Source Geospatial Software".

Two papers of the workshop have been selected for the **Special Issue in the ISPRS Journal of Photogrammetry and Remote Sensing**:

1. Point Cloud Server (PCS): Point clouds in base management and processing, Rémi Cura, Julien Perret and Nicolas Paparoditis.
2. Approximation and Analysis of Rainfall Fields for Environmental Applications, Giuseppe Patané, Andrea Cerri, Vibeke Skytt, Simone Pittaluga, Silvia Biasotti, Tor Dokken, Michela Spagnuolo and Davide Sobrero.

The best paper awards for *GeoBigData'15 Workshop* were as follows:

1. Point Cloud Server (PCS): Point clouds in base management and processing, Rémi Cura, Julien Perret and Nicolas Paparoditis (best student paper).
2. Approximation and Analysis of Rainfall Fields for Environmental Applications, Giuseppe Patané, Andrea Cerri, Vibeke Skytt, Simone Pittaluga, Silvia Biasotti, Tor Dokken, Michela Spagnuolo and Davide Sobrero (best paper).

The GeoBigData'16 Workshop will be organized within the Geometry Summit, which will take place in Berlin from June 20th to 24th; the Chairs of the Workshop are Mathieu Brédif, IGN (FR), Giuseppe Patané, CNR-IMATI (IT), and Tor Dokken, SINTEF (NO).

The IQmulus Processing Contest (2015)

The GeoBigData'15 Workshop has also included a special oral session for the IQmulus Processing Contest (IQPC'15).

IQPC is featured by the EU IQmulus project (<http://www.iqmulus.eu/>) and *encourages the participation of the whole scientific community as well as specific user groups*.

The IQmulus Processing Contest started in 2013 to provide the scientific community and practioners working in the field of 3D point cloud processing with certified benchmarks and ground truths in geospatial data processing. While in 2013 the tracks (and therefore the challenges to be approached) were proposed by partners involved in the WP4, in the second year calls for track proposals were specifically targeted to the project stakeholders. Once the tracks proposed have been validated and accepted by the Advisory Board, they have been publicized with specific call for participations and through a set of mailing lists (among the others the geometryprocessing list "geometryprocessing@inria.fr").

A similar procedure has been used for IQPC 2015 too, but a few significant changes have been introduced. Besides the usual "open" call for tracks, in 2015 a limited number of personal

invitations have been sent to scholars with an exceptional background in areas of particular interest for IQmulus. Furthermore, a “Best Track Award” has been established to acknowledge the organizers of the most successful track: the evaluation to assign the award is conducted by the Advisory Board based on the datasets proposed for each track, the ground truth, the accuracy and technical soundness of the evaluation methodology.

The results of the contests have been made publicly available and presented at the ISPRS GeoBigData Workshop held in La Grande Motte (See previous chapter), October 2nd, 2015, where a special session on IQPC 2015 has been organized. To allow a large scientific consensus, the IQmulus contest is implemented in collaboration with the research community and the support of an international advisory board, composed of high level scientific and technical experts in the field.

Software performance is evaluated through the creation of benchmarks and evaluation methodologies specific for selected processing tasks (IQmulus tracks). Besides the selection of test datasets with a ground truth, IQPC supports the usage of a common infrastructure where the executables submitted are run and results are collected and evaluated.

In 2015, three track proposals have been selected as representatives of acute issues in geospatial data: For each track, software authors were invited to run their tools on a common dataset, and a final report summarizes all the relevant aspects of the experiment (i.e. speed, accuracy, robustness). Examples of problems tackled by IQPC tracks are the registration and alignment of heterogeneous point clouds, the classification and extraction of features in spatial datasets, the detection and characterization of dynamic events acquired by remote sensing or lidar techniques.

To participate to a specific track participants had to follow the instructions provided in the track's webpage or contact the track organizers. Track papers were accepted for publication in [ISPRS Archives](#).

1. Track: Evaluation of automatically generated 2D footprints from urban Lidar data

The description of the track is hosted at the address: <https://sites.google.com/site/iqpc15/> and has been proposed by Dr. Linh Truong-Hong, University College Dublin, Ireland and Prof. Debra Laefer, University College Dublin, Ireland (linh.truonghong@ucd.ie, debra.laefer@ucd.ie). One participant applied to this track.

The goal of this track was to evaluate the 2D footprints of a city scale automatically from ALS data. The participants were asked to submit the results of automatically generated 2D building footprints (Task A) and/or 2D road profiles (Task B) from three pre-designated sections of the 1 km² study area. The contest organizers evaluate submitted results based on the ground truth derived from both Ordinate Survey Ireland (OSI) and OpenStreetMap. A winner and two runners up for each task are selected based on the overall evaluation score. The article on the topic is presented in [ISPRS Archives](#).

2. Track: Water detection and classification on multisource remote sensing and terrain data

The description of the track is hosted at the address:

<http://iqmulus.eu/iqmulus-processing-contest-2015/2-water-detection-and-classification-on-multi-source-remote-sensing-and-terrain-data>. It has been organized by FÖMI, Institute of Geodesy, Cartography and Remote Sensing, 1149 Budapest, Hungary (A. Olasz, D. Kristóf, M. Belényesi, K. Bakos) and D. Kristóf (kristof.daniel@fomi.hu) is the contact person. One participant applied to this track.

This processing track addresses a particular problem in the field of big data processing and management with the objective of simulating a realistic remote sensing application scenario. The main focus was on the detection of water surfaces (natural waters, flood, inland excess water, other water-affected categories) using remotely sensed data. Multiple independent data sources were available and different tools could be used for data processing and evaluation. The main challenge was to identify the right combination of data and methods to solve the problem in the most efficient way. The article on the topic is presented in [ISPRS Archives](#).

3. Track: Tree separation and classification in mobile mapping Lidar data

The description of the track is hosted at the address:

<http://homepage.tudelft.nl/41s94/iqmulus/Contest3.html> and has been proposed by Ben Gorte, Delft University of Technology, The Netherlands (B.G.H.Gorte@tudelft.nl). Three participants applied to this track.

The goal of the Track was to establish the state-of-the-art of available algorithms for detection of individual trees in point clouds. The focus was on point clouds obtained by Mobile Mapping Systems (MMS), and therefore on trees that are in the vicinity of the public road network, notably in urban environments.

Two sub-tasks were identified:

- Classifying the points of an MMS point cloud into two classes: tree points and other points
- Separating the tree points in a point cloud into the individual trees

The emphasis in this contest was on separation. Therefore, the primary task for participants in the contest was to separate the trees in a given point cloud that contains only tree points.

In addition, participants were invited to analyse the raw MMS data, from which the tree points were extracted. The provided tree points only represent a subset of about 30 trees, but actually the number of trees in the area is much larger. Therefore, participants who had access to classification software were challenged to identify as many tree points as possible, in addition to the ones provided, and after that separate the entire set of tree points into individual trees. The article on the topic is presented in [ISPRS Archives](#).

The GeoBigData'16 Workshop will be organized within the Geometry Summit, which will take place in Berlin from June 20th to 24th

3.3 USER GROUP PARTICIPATION IN THE ASSESSMENT AND EVALUATION PROCESS

Assessment and evaluation phase is of major importance as it confirms whether requirements defined at an early stage of the project have been fulfilled by developments and integration. The

evaluation work in IQmulus was planned to be carried out in three different phases, each one corresponding to a development stage of the system according to the Description of Work: "In the first step (PM 12-18) only individual prototype components (either processing services or visualization services) were evaluated. In the second step (PM 24-30) the first version of the IQmulus system is evaluated. Finally, a last evaluation cycle (PM 42-48) will assess the final version of the IQmulus system and will also be the place for user training."

The tester group of the first system prototype was formed by IQmulus internal Users, mostly GIS experts and GIS end users.

It is important to know, expected end-user groups (we call them "Persona") of the IQmulus system were defined in the testing methodology, which were the follows:

1. Default Persona: Data providers, data managers, field experts, etc. Authorized to upload/download/search and manage input and output data, metadata. They are allowed to run workflows, but not authorized to create and edit them except data change in a given workflow.
2. Expert Persona: GIS and/or Remote Sensing experts, algorithmic experts, software engineers, etc. In addition to data management, they are allowed (and responsible) for creating and editing simple and complex workflows, setting the order of services with parameters to run services in order to get the best results.
3. Decision Makers: Senior Research Officers, Head of Department, Deputy Director, etc. They are interested in search and preview input and output data and metadata, check workflow status and download results. Not allowed to edit and run workflows. By looking at result data, they should be able to make a decision on their question.
4. Account Manager: responsible person for user management (set user roles, manage user accounts) and organization management.

The first system prototype integrates services with the web-based graphical user interface (GUI) enabling user evaluation; therefore, tests were carried out only via the GUI. During the testing procedure, internal users were looking at the GUI through the eyes of an expert persona. It also means, that the test users had a preliminary knowledge on the story to be evaluated.

Two main aspects were tested in this phase of the testing process in two test cycles (rounds): **functionality aspects** (test if the system is providing the functionalities written in user requirements documentation) and **usability aspects** (if the system is usable and how intuitive to use it).

As a part of testing the first system prototype, test stories were defined as basic units for testing functions from the user side, and were categorized by their activity (Story) group, namely authentication, data management, GIS processing, and account management. Test Stories defined had to be realistic (stories had to be chosen from user requirements specification document), actionable (if a user is asking for verbal and written support, then that task is not actionable) and compact (simple and not descriptive).

Based on usability attributes tested, namely: learnability, memorability, efficiency, error handling and user satisfaction, we are able to track progress of the IQmulus system as it evolves.

For documentation purposes of test results, an online framework was set up, which consists of three elements. Two of them were shared via Google Drive among testers:

- Google spreadsheets for testing usability attributes of each test story
- a Google document for overall documentation purposes, which is called “Remarks document”.

The third element is the Redmine system itself, where all the bugs, remarks or suggestions were registered and assigned directly to the developers. In previous deliverable about User Group activities (D8.4.2) we provided details about the role of the Redmine system in IQmulus. We can say, that as the IQmulus project progresses, the Redmine system is evolving into the most important communication tool along with eRoom. It gets a more and more important role in issue tracking and management, task distribution, testing, progress monitoring and communication. The IQmulus GUI is connected to the Redmine system to provide a direct feedback to the developers through a “Give us feedback” button. Feedback arrived until now has the tracker “Bug”, “Documentation remark”, “Feature” or “Support”. Communication with developers and the process/status of problem solving is easily traceable this way.

Testing is still an ongoing procedure (details can be read in the deliverables D7.x.x) and internal users of the IQmulus project are key players in the process.

4 ONLINE COMMUNICATION CHANNELS

4.1 PROJECT WEBSITE

This chapter describes the current functionality and the menu structure of the IQmulus website as a continuation of deliverables D8.2, D8.4.1 and D8.4.2. In D8.4.2 several notes and suggestions on further developments of the website were made last year, most of which have already been realized. The website will be subject to continuous evolution, refinement and updating, and will have extended functionality during the project lifetime and the follow-up period. In this chapter the focus is on the changes made in the third project year compared to the year before.

Background

The IQmulus website has been created and is hosted by FOMI. The domain registered is the following: <https://www.iqmulus.eu>. Encryption of connections via https/SSL is also possible as the site has an SSL certificate. The website based on a well-designed CMS developed by a third party company dedicated to the IQmulus project needs. It has extended capabilities for users and user group management, among other features. From the beginning of October 2014 we started to develop a new website, which has been operational since December 2014. The new custom-made CMS (content management system) allows us to arrange and manage information in a more efficient way. Updating and enhancements are much easier for the project partners. This allows us to be more up to date on the website according to our agenda.

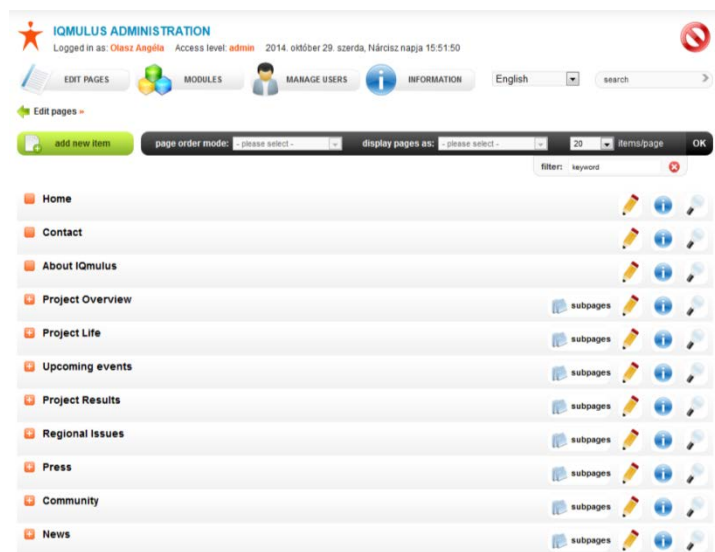


Figure 1. First Version of the administration interface of the new CMS

Content and strategy for user-centric evolution

The structure and contents of the first version of the website were created by FOMI and were a matter of discussions and adjustments. Content was mainly taken from the Description of Work for the first version. In the implementation of the sections we tried to keep in mind practicality and utility, and to publish all the relevant information in a brief but appropriate way.

For the third project year, a shorter and user-friendly brief overview of the project components and events has been written. We have continuously kept track with and posted summaries on IQmulus consortium meeting and other events where IQmulus project partners participated. For the further evolution of the website, a strategy focusing on user community has been set up in D8.4.2 User Related activities in M24.

Development work was organized along the main points of this strategy. The structure and the content have changed a lot, and a complete new design was created by a professional web designer company. The website was re-structured, and became more logical and transparent (the current updated structure is documented below) for a better organized and more informative appearance of the relevant information about the project.

Here we provide an overview of the changes realized in the website structure and content in the third project year, according to the plans formulated in D8.4.2.

1. After the structure of the newly designed website was set, regular update on the project life and the actual events is provided continuously.
2. We have updated some content on Regional Issues concerning the user group activities, but other communication channels – such as eRoom and Redmine – were also used with internal users. Also, we have added some news on the topic of IQPC 2015 on native language for the different user groups (see Figure 2.) As the project evolves, this part of the website will play an increasingly important role in keeping in touch with the user community in their native languages and will expand the possibilities of information exchange.

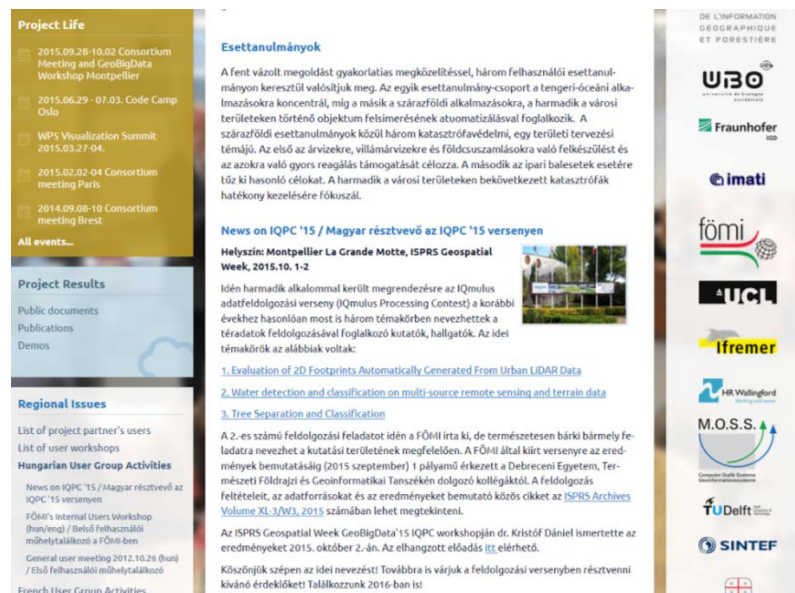


Figure 2. Hungarian regional issues updated news.

3. We also use the new website to continuously inform the greater community about the project-related topics and our events. We have inserted two tiles on the main page to provide communication channels about the latest news and events (see Figure 3.)

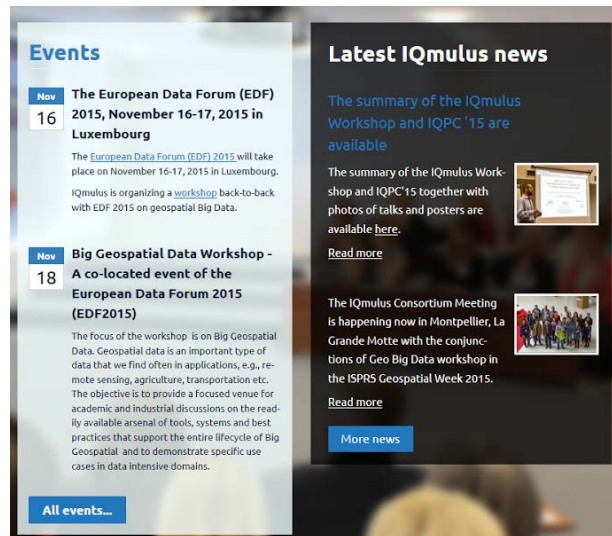


Figure 3. Events and Latests news tiles on the main page of the IQmulus website

Events are arranged into 2 sections: Upcoming events, and the Project Life section to provide brief summaries and some details. These two sections are also visible from the left menu bar to keep attention on the dates of the events (see Figure 4.) Reaching this evolution step of the website we could achieve the goals set up in D8.4.2.

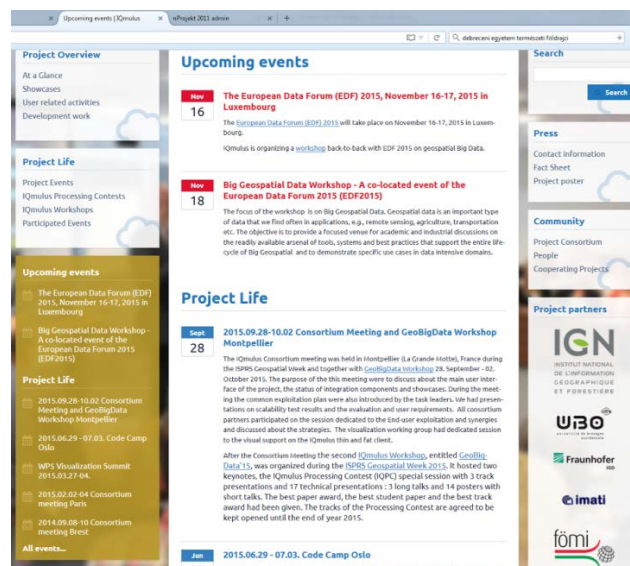


Figure 4. Upcoming events the Summary about the happened events.

4. Links to LinkedIn group of the IQmulus Project are also implemented, where project partners keep posting project-relevant topics and initiate discussions among the user community (see Figure 5.)

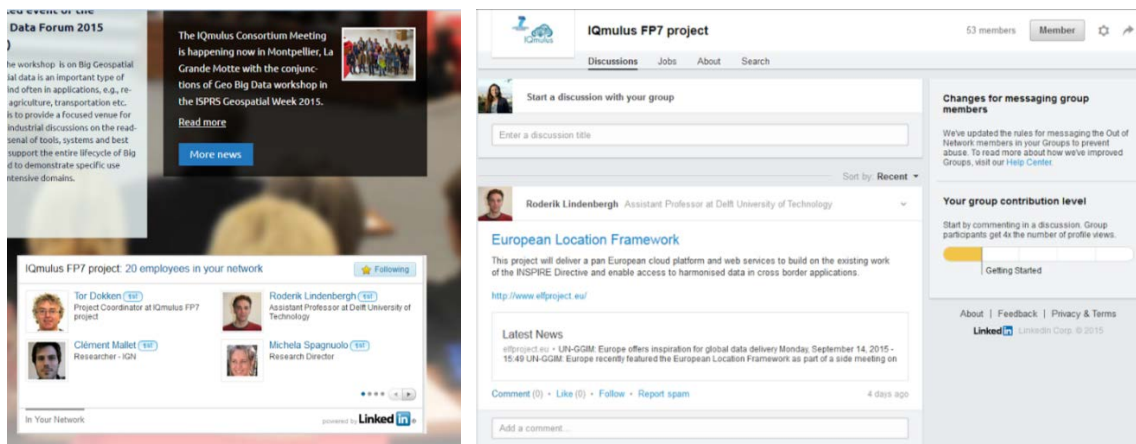



Figure 5. IQmulus Linked in group integrated to the main page of the project website

A further LinkedIn-related feature is the appearance of the  button to foster better spread of information within the user group.

Another goal stated in the in D8.4.2. was to “personalize” relationships by providing introductory presentations about people participating in the project (i.e. not only organizations but also people - to ensure personal involvement and profit from already established personal links) (see Figure 6.).

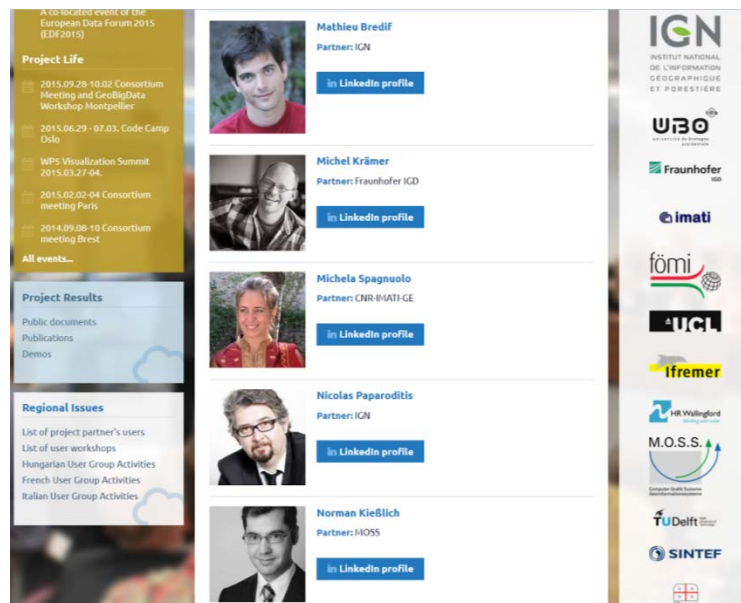


Figure 6. People modul on the project website

Personal connections with project participants can be initiated by using the LinkedIn system, where we can also have insights on the professional/scientific background of people, and profit from all the advanced features the system provides.

- Information on cooperating projects has also been posted on the website as planned in D8.4.2. (see Figure 7).

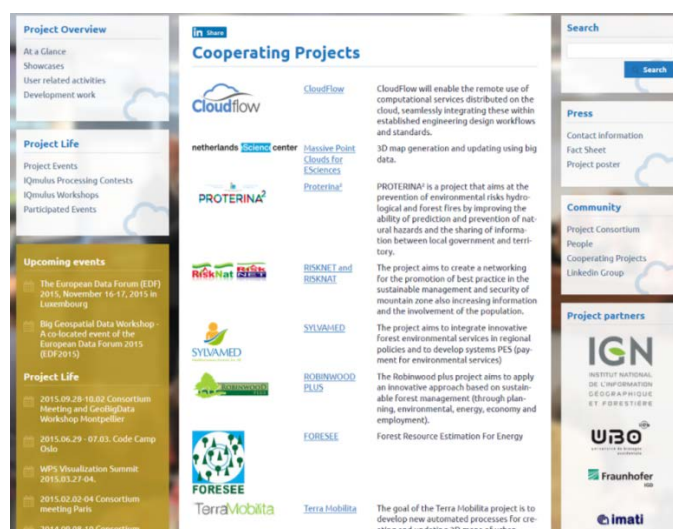


Figure 7. Cooperating projects published on the website

The Fact sheet and the IQmulus project poster also has been created and published on the site, as well as on some conferences in printed format (see Figure 8.).

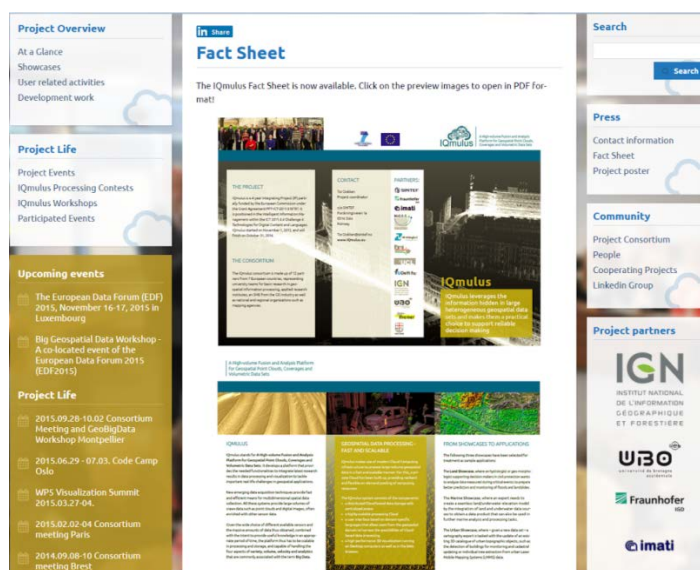


Figure 8. Fact sheet of the IQmulus project

Short summaries – not longer than 1-2 pages – are published in a general (non-technical) and native language for the users (IQmulus website/News for the User Community/Regional Issues/.Country link) to explain the main goals of the project in project-internal native languages and to disseminate results. This has been started in the third project year and is planned to be completed during the testing and training phases in Year 4.

Current structure as of November 2015

The sections of the site are the following (the blue highlighted text are new elements from the last project year):

1. Banner and logos of the project**2. Left hand side menus:**

2.1. Project Overview menu:

2.1.1. At a Glance

2.1.2. Project overview

2.1.3. Showcases**2.1.3.1. The [Land Showcase](#)****2.1.3.2. The [Marine Showcase](#)****2.1.3.3. The [Urban Showcase](#)**

2.1.4. User related activities

2.1.4.1. [Requirements \(WP 1\)](#)2.1.4.2. [Assessment and Evaluation \(WP 7\)](#)2.1.4.3. [Dissemination and Outreach \(WP 8\)](#)

2.1.5. Development work

2.1.5.1. [Infrastructure Design \(WP 2\)](#)2.1.5.2. [Heterogeneous Data Integration Platform \(WP 3\)](#)2.1.5.3. [Processing Services \(WP 4\)](#)2.1.5.4. [Interactive Visual Decision Support \(WP 5\)](#)2.1.5.5. [System Integration and Testing \(WP 6\)](#)

2.2. Project Life menu:

2.2.1. Project events

2.2.1.1. Consortium meetings**2.2.1.2. Code Camps****2.2.1.3. WP meetings****2.2.2. IQmulus Processing Contest****2.2.2.1. IQmulus Processing Contest 2015****2.2.2.2. IQmulus Processing Contest 2014****2.2.2.3. IQmulus Processing Contest 2013****2.2.3. IQmulus Workshops****2.2.3.1. 2nd Workshop****2.2.3.2. 1st Workshop**

2.2.4. Participated Events

2.2.4.1. 2015 (project year 3)

2.2.4.2. 2014 (project year 2)

2.2.4.3. 2013 (project year 1)

2.3. Upcoming events menu

2.4. Project Results menu:

2.4.1. Public documents**2.4.2. Publications****2.4.3. Demos**

2.5. Regional Issues

2.5.1. List of project partner's users

2.5.2. List of User workshops

2.5.3. Hungarian User Group Activities**2.5.4. French User Group Activities****2.5.5. Italian User Group Activities**

2.6. Login Form

3. Right hand side menus:

- 3.1. Search
- 3.2. Press
 - 3.2.1. Project poster
 - 3.2.2. Fact sheet**
 - 3.2.3. Contact information
- 3.3. Community
 - 3.3.1. Project partners
 - 3.3.2. People
 - 3.3.3. Cooperating projects**
 - 3.3.4. Connect us to LinkedIn
- 3.4. Project partner logos and links
- 4. Main content section**
 - 4.1. Featured**
 - 4.2. Events**
 - 4.3. Latest IQmulus news**
 - 4.4. LinkedIn Group content**
 - 4.5. IQmulus photo gallery**

4.2 OTHER FORUMS

LinkedIn

Since last year, the IQmulus LinkedIn group has reached 53 members (November 2015). The group is active and keep sharing and discussing interesting topics, news and issues that are in close relation to the development trends of the IQmulus project (see Figure 9).

It was agreed that the LinkedIn group would have significant importance in sharing ideas and news connected to our project and research area. Since the creation of the group, updates were posted regularly with information on the latest developments, keeping of course the link to the project website.



Figure 9. IQmulus FP7 project group profile in LinkedIn

Since the 3rd of March, 2014, we have a growing community on LinkedIn. Some statistics about the group members are shown on Figure 10. Concerning sector-wise distribution, originally 72%

of members were from Research, 12% from Information Technology and Services, 8% from Higher Education, 4% from Computer Science and 4% from Education and Management.

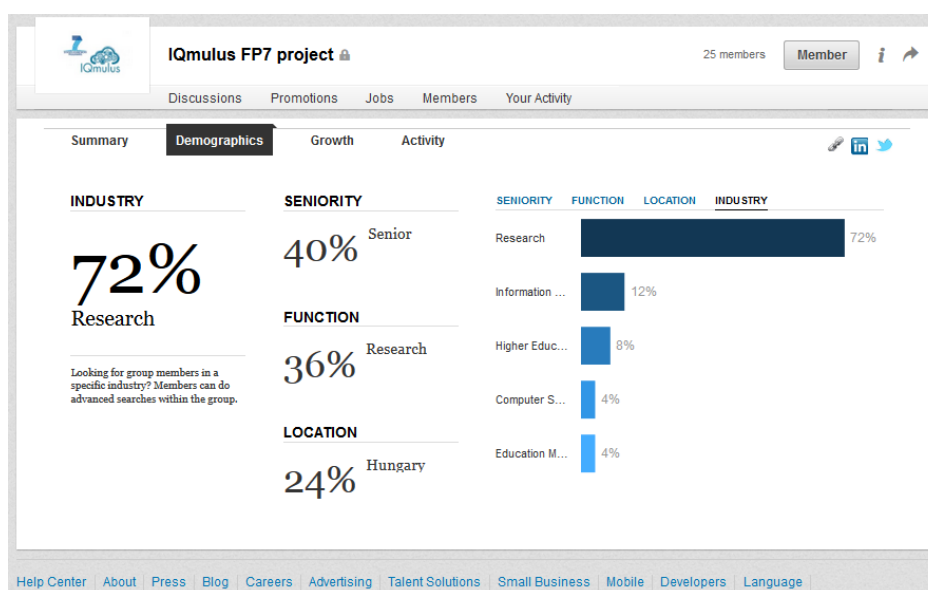


Figure 10. IQmulus FP7 project group statistics 2014

With the community growing during the last year, the structure and background of the group has changed significantly (see Figure 11).

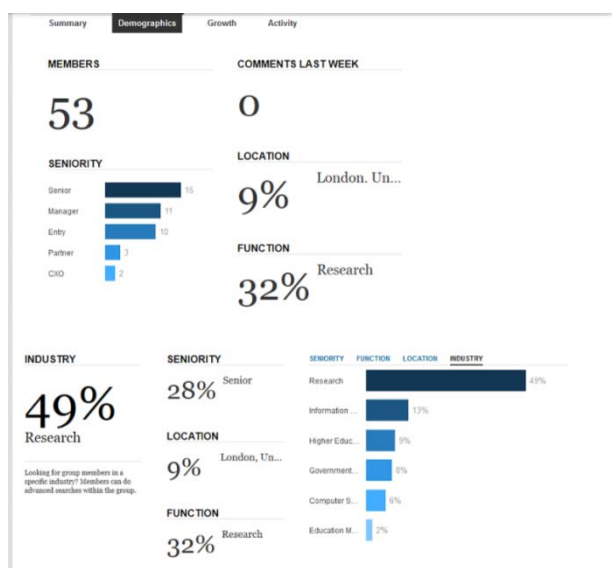


Figure 11. IQmulus FP7 project group statistics 2015

As of now (November 2015), we have 49% from the Research sector, which is still the biggest group. Information management, Higher education and Governmental background are also strongly represented. The comments and discussions are well distributed during the year, but on the following diagram a sharp peak can be seen around November last year (see figure 12).

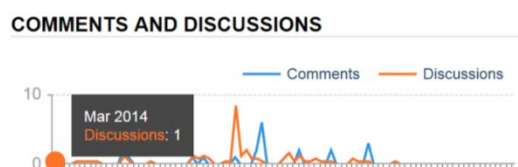


Figure 12. IQmulus FP7 project group statistics on discussions 2015

5 CONCLUSIONS AND FURTHER TASKS

User Group activities in the third project year, in close cooperation with WP1, WP4 and WP7 have been focused on internal users mainly, during the process of refinement and finalization of user requirements, and the testing procedure of the first system prototype. Deliverables *D7.3.2 Evaluation of First System Prototype* and *D1.2.4 Finalized User Requirements* provide details on the results of the work performed.

Testing and evaluation is an ongoing work. The tester group of the first system prototype was formed by IQmulus internal Users, mostly GIS experts and GIS end users, and we rely heavily on the work of the end Users for the assessment of the first and the final prototypes as well in the future.

The Redmine system (introduced in detail in *D8.4.2 User Group Activities – Year 2*) plays a major role in the tasks mentioned above, as an important online communication channel between developers and the end User group (as testers). The other online channels – the IQmulus website and the LinkedIn Group – continue to provide the appropriate interface for communication, awareness-raising, sharing news and ideas.

As part of the research and development efforts concerning the IQmulus platform, the consortium members are strongly committed to the dissemination of the project results through publications and presentations. As it can be seen in the user group and dissemination activity tables, the number of events with IQmulus presence is growing constantly, and it seems that – due to the interim outcomes from the IQmulus research works – this tendency will be kept in the fourth project year as well.

The dissemination procedure includes the organization of an annual scientific IQmulus Workshop, which incorporates as one specific session the presentation of the results of the annual IQmulus Processing Contest also. In 2015 the second IQmulus workshop – the GeoBigData'15 Workshop – was co-organized with the ISPRS working group III/5, October 1 and 2 as the GeoBigData workshop of the ISPRS Geospatial Week 2015 (La Grande Motte, France, 28 September - 2 October 2015). It allowed IQmulus to present and disseminate its research and results to the ISPRS community. The participants were a mixture of mapping authorities, research organizations and industry. The GeoBigData'16 Workshop will be organized within the Geometry Summit, which will take place in Berlin from June 20th to 24th

Finally we have to declare, that as the fourth project year arrives, the exploitation strategies of the IQmulus results will be in focus soon. In line with the exploitation plans documented in *D9.1.3 Exploitation Plan – Version 3*, end Users will be in target besides other potential markets.