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1. Executive summary

This report is part of task T12.4 Clustering and provides an update on the clustering activities done in the third year of the ebbitts project, covering activities from September 2012 through August 2013. Planned cluster activities for the fourth project year are mentioned as well.

The ebbitts project is involved in the following clusters: IERC (IOT European Research Cluster), FInES (Future Internet Enterprise Systems), Monitoring and Control cluster on Smart Buildings/Smart Spaces. The project also participates in the concertation activities arranged by the Future Internet Assembly (FIA).

In the IERC cluster, ebbitts partners have been organising demonstration workshops to support the Activity Chains and contributed to cluster documents such as the deliverable D1 "Catalogue of IoT Naming, Addressing and Discovery Schemes in IERC Projects" which was released on 31st January 2013. The document provides an overview of the different naming, addressing and discovery schemes for the IoT currently researched and adopted in IERC projects. ebbitts solutions are presented, highlighting the concept of virtualisation that allows physical devices, sub-systems and cloud services to be viewed as services or composition of services. Furthermore, the deliverable includes an introduction to how ebbitts manages entities which are static resources being monitored throughout their life cycle, e.g. pieces of meat or other objects not enriched with computational or communicative capabilities. Additionally, the ebbitts demonstrator on food traceability has been presented at the IoT Week in Helsinki on 16-20th June 2013 where it received many positive comments.

The FInES cluster has been very active in assessing the future position of ICT for manufacturing and enterprises within the Horizon 2020 Research and Innovation Programme. The cluster is trying to position the need for more research and innovation in ICT for enterprise systems and the concept of the Sensing Enterprise based on the Internet of Everything. The main view is that the European way towards the Internet of the Future, based on open platforms, web entrepreneurship and collective innovation, represents now an unprecedented opportunity for European enterprises to obtain multi-faceted business innovation, socio-economic competitive advantage and human-centric sustainable growth. On 30th June 2013, the FInES Final Position Paper entitled "Embarking on New Research Orientations towards Horizon 2020" was released. It will be presented in detail to European Commission officials in September 2013.

In FIA, ebbitts partners participated in the Future Internet Assembly 2013 which took place in Dublin, Ireland on 8-10th May 2013 showing a demo from the manufacturing domain on process oriented energy optimisation. The feedback was overall very good and the approach with combining IoT and business based systems was well received. Also the potential deployability in the real world was welcomed.

A considerable amount of effort has gone into participating in clusters during the first three years of the project. ebbitts partners have decided that much less effort must be invested in cluster work in the future to create a balance with core ebbitts work, focusing only on cluster and EU-events that are considered particularly strategic for the project.

The fourth and final cluster collaboration report is due in M48.

2. Introduction

2.1 Project overview

The ebbts project develops architecture, technologies and processes which allow businesses to semantically integrate the Internet of Things into mainstream enterprise systems and support interoperable real-world, on-line end-to-end business applications.

ebbts provides semantic resolution to the Internet of Things and hence present a new bridge between backend enterprise applications, people, services and the physical world, using information generated by tags, sensors, and other devices and performing actions on the real world.

The ebbts platform enables the convergence of the Internet of People, the Internet of Things and the Internet of Services into the "Internet of People, Things and Services (IoPTS)" for business purposes.

2.2 Purpose, context and scope of this deliverable

The ebbts project is committed to actively participate in clustering activities with other related ICT projects organised by the European Commission.

Relevant clusters have been identified and a cluster collaboration plan for participation in the different clusters has been completed in month 6. More information can be found in the following deliverables:

- D12.7 Cluster collaboration plan (M6)
- D12.2.1 Dissemination strategy, cluster and other activities 1 (M6)
- D12.8.1 Cluster collaboration report 1 (M12)
- D12.2.2 Dissemination strategy, cluster and other activities 2 (M18)
- D12.8.2 Cluster Collaboration report 2 (M24)
- D12.2.3 Dissemination strategy, cluster and other activities 3 (M30).

This report outlines the planned objectives for each cluster and the corresponding activities in the third project year. It also states which activities are planned for the fourth and final project year.

2.3 Background

The aim of task T12.4 - Clustering is to plan and coordinate the active participation in clustering and concertation activities with other FP7 EU-funded ICT projects related to the ebbts project.

The European Commission is actively supporting and facilitating concertation and clustering activities involving the many research projects that are being funded under the 6th and 7th Framework Programmes.

The main objective is to set up a framework of cooperation among research projects and to facilitate programme management by the Commission Services. Cooperation takes the form of knowledge sharing, procedures, peer discussion of intermediate results, interchange of deliverables, coordination of activities, etc.

Projects use the framework to start bilateral cooperation or, when justified, to cluster with other projects around specific topics of interest and eventually seek consensus on architectures, standards, inputs to policy, etc.

The purpose of the cluster work is to achieve sound IOT building blocks and thereby become a contact point for IOT research in Europe.

3. Activities M25-M48

The following sections outline the objectives, the results and the plans for each cluster including the activities that have taken place in the third year of the project (M25-M36) and the activities planned for the last project year (M37-M48).

3.1 The clusters and ebbits involvement

The clusters in which ebbits is involved are

- IERC IOT *European Research Cluster*¹
- FInES *Future Internet Enterprise Systems*²
- Monitoring and Control cluster on Smart Buildings/Smart Spaces³
- CERP-IoT *Cluster of European RFID Projects*⁴
- FIA *Future Internet Assembly*⁵

The work in the CERP-IoT cluster has moved to the IERC IoT cluster and in some aspects to the FInES cluster and therefore it is not mentioned in the reporting sections below.

In general, ebbits partners contribute to the clustering activities by participating in workshops, expert groups and joint conferences. Further, partners participate in the creation of cluster publications and contribute to the development of research roadmaps where relevant. Senior staff members from ebbits participate in cluster meetings and assume positions as leaders of certain activities as required.

A list of completed cluster activities M25-M36 is listed in the following table:

Completed cluster activities M25-M36			
September 2012 through August 2013			
DATE	Place (city, country)	Type of dissemination activity and audience	Partners involved
12 October 2012	Brussels	FInES Cluster Meeting	FIT, IN-JET
18 December 2012	Web conference call	Organised by IERC AC2	ISMB
Release January 2013		IERC produced deliverable D1 "Catalogue of IoT Naming, Addressing and Discovery Schemes in IERC Projects"	ISMB, IS, FIT
December 2012 June 2013	Web conference calls	Seven FInES conference calls on organising the transition work of the FInES cluster and preparing the Position Paper toward H2020	IN-JET
13 March 2013	Brussels	FInES cluster meeting to discuss the content of a Position Paper towards H2020	IN-JET

¹ IOT European Research Cluster: <http://www.internet-of-things-research.eu/>

² Future Internet Enterprise Systems: <http://www.fines-cluster.eu/fines/jm/>

³ http://cordis.europa.eu/fp7/ict/necs/home_en.html

⁴ <http://www.rfid-in-action.eu/cerp>

⁵ <http://www.future-internet.eu/home/future-internet-assembly.html>

Completed cluster activities M25-M36			
September 2012 through August 2013			
DATE	Place (city, country)	Type of dissemination activity and audience	Partners involved
4 April 2013	Brussels	FInES management meeting to decide and confirm the new management structure	IN-JET
6 May 2013	Brussels	FInES Cluster Meeting to present the first draft of the Position Paper towards H2020 to the cluster community	FIT, IN-JET
8-10 May 2013	Dublin	FIA – Future Internet Assembly	FIT
3-6 June 2013	Shanghai, China	IoT China 2013. Conference and exhibition	FIT
16-20 June 2013	Helsinki	IoT Week 2013	CNET, ISMB, TNM
19 June 2013	Helsinki	IERC AC2 Meeting organised within the IoT Week 2013	ISMB

The completed activities (M25-M36) and planned activities (M37-48) for each cluster are further described in the following sections.

3.2 IERC - IOT European Research Cluster on the Internet of Things

IERC is bringing together EU-funded projects to define and promote a common vision of the Internet of Things.

The plan for ebbits is to participate actively in the cluster activities and bring further potential to the cluster in terms of open service architecture and open governance schemes with a strong international perspective has been successful.

IERC activities are organised in Activity Chains and ebbits is involved in the following:

- AC2 - Naming and addressing schemes. Means of search and discovery (John Soldatos - OPENIOT)
- AC3 - Application scenarios, Pilots and Innovation (Amine Houyou - IOT@Work)
- AC4 - Service openness and inter-operability issues/semantic interoperability (Philippe Cousin, PROBE-IT, Co-Coordinator Martin Serrano – OpenIOT)
- AC8 - Cognitive Technologies for IoT (Abdur Rahim Biswas – iCore)

Markus Eisenhauer (FIT), Peter Rosengren (CNET), Maurizio Spirito and Claudio Pastrone (ISMB) represent ebbits in this cluster and Peter Rosengren has been elected as leader of Semantic Technologies. Other ebbits partners participate on an ad hoc basis.

3.2.1 Completed activities in IERC – IOT M25-M36

The cluster activities in IERC include participating and presenting ebbits at cluster meetings, organising workshops/demo-sessions to support the Activity Chains and contributing to cluster documents. Besides participating in an AC2 meeting and web conference call, the activities have been as follows:

Papers and Publications

In Activity Chain 2 – Naming and addressing schemes, ebbits partner ISMB, with the support of IS and FIT, has contributed to the deliverable D1 "Catalogue of IoT Naming, Addressing and Discovery

Schemes in IERC Projects” which was released on 31st January 2013⁶. The document provides an overview of the different naming, addressing and discovery schemes for the IoT currently researched and adopted in IERC projects. ebbits solutions are presented, highlighting the concept of virtualisation that allows physical devices, sub-systems and cloud services to be viewed as services or composition of services. Furthermore, the deliverable includes an introduction to how ebbits manages entities intended as static resources - e.g., cattle or other objects not enriched with computational or communication capabilities - to be monitored throughout their whole life cycle.

Demonstration

At the IoT Week in Helsinki on 16-20th June 2013, ebbits partners CNET, ISMB and TNM exhibited the ebbits demonstrator on food traceability. The IoT Week is organised by the European Integrated Project IoT-A (Internet of Things - Architecture) together with several research projects from the IERC Cluster. Many visited the ebbits booth and the exhibition in general. There were visitors from local industries in Finland, Singapore, Taiwan and China who had come to learn about EU activities in IoT. The ebbits demonstrator received many positive comments and people were generally impressed although the demonstrator was not yet fully complete.



Picture: The ebbits stand at the IoT Week in Helsinki

3.2.2 Planned activities in IERC – IOT M37-M48

Besides participating in cluster meetings and conferences, targets include contributing to position papers and publications.

3.3 FInES – Future Internet Enterprise Systems

The FInES cluster is composed of FP7 funded projects, as well as experts and stakeholders from all over Europe. As stated by the FInES cluster, the overall objective is to make “The full potential of the Future Internet accessible to, relevant for, and put to use by European enterprises including SMEs”⁷.

ebbits has an important role in terms of architecture, open infrastructure, physical addressing schemes and virtualisation design. Semantic interoperability and service openness of the platform are also key objectives in FInEs.

The FInES cluster has been very active in assessing the future position of ICT for manufacturing and enterprises within the Horizon 2020 Research and Innovation Programme. ICT for manufacturing

⁶ <http://www.theinternetofthings.eu/sites/default/files/%5Buser-name%5D/IERC-AC2-D1-v1.7.pdf>

⁷ <http://www.fines-cluster.eu/fines/jm/FiNES-Public-Information/about-fines.html>

and enterprises is a relatively minor part of the "Advanced manufacturing systems" section of the programme "Leadership in enabling and industrial technologies". In this context, the FInES cluster is trying to position the need for more research and innovation in ICT for enterprise systems and the concept of the Sensing Enterprise based on the Internet of Everything. The main view is that the European way to the Internet of the Future, based on open platforms, web entrepreneurship and collective innovation, represents now an unprecedented opportunity for European enterprises to obtain multi-faceted business innovation, socio-economic competitive advantage and human-centric sustainable growth.

A Position Paper has been produced in open collaboration between several key organisations across Europe. It thus represents the FInES community's perspective of "Digital BusiNet Innovation" and shares insights from an Enterprise perspective on Future Internet Capabilities. To this end, five themes, in alignment with the focus and interest areas of European Commission Unit E3, are proposed: Future Internet (in the context of the Future Internet Public Private Partnership), Web Entrepreneurship, Sensing Enterprise, Digital Enterprise, and Collaborative Awareness Platforms (CAPS). The position paper results in 28 concrete recommendations for research topics and policy actions.

On 30th June 2013, the FInES Final Position Paper entitled "Embarking on New Research Orientations towards Horizon 2020" was released. It will be presented in detail to European Commission officials in September. The position paper can be found here:

<http://www.fines-cluster.eu/fines/jm/Publications/Download-document/409-FInES-Horizon-2020-Position-Paper-v2.0-final.html>

IN-JET has one of two co-chair posts in the management of the FInES cluster. Innovalia (ES) has the other co-chair. In July 2013, a new Support Action Grant Agreement will come into force with the aim of providing secretarial and practical support to the FInES cluster.

The aim is further to take a leading role in this work by being in charge of two FInEs taskforces: "Manufacture and Industry Task Force" and "Going Global: The International Dimension of FInES Research and International Cooperation Task Force". It is foreseen that the structure of taskforces will be reviewed in 2014 when the H2020 comes into force.

Manufacture and Industry Taskforce

This taskforce is presently led by Jesper Thestrup from IN-JET. The overall strategy is to involve a broad range of industrial and other enterprises in the work undertaken and the results obtained, primarily within the various research projects in the FInES cluster, but also beyond.

Going Global: The International Dimension of FInES Research and International Cooperation Task Force

The Going Global Taskforce aims to link with international activities in the area of Future Internet and enterprise systems, building on similarities and complementarities in order to strengthen the position of Europe. Markus Eisenhauer from FIT has been elected as leader of this taskforce. Targeted countries are the BRIC countries (Brazil, Russia, India, China) as well as the US, Japan, South Korea and Africa.

3.3.1 Completed activities in FInES M25-M36

The FInES Position Paper towards H2020

Jesper Thestrup from IN-JET took an active part of the Position Paper coordination team and provided several input to the Collective Awareness Platform section based on the experience from the ebbitts foodstuff traceability scenario.

Cluster meetings

The following cluster meetings and conference calls have taken place:

- 12th October 2012, Brussels: FInES cluster meeting

- December 2012 and January 2013: Web conference calls on organising the transition work of the FInES cluster
- 6th May 2013, Brussels: The meeting was a high level meeting discussing the Horizon 2020 approach to the needs of enterprises in terms of the Future Internet and the Internet of Things. The occasion was the publication to the entire FInES community and to the EC of the first draft of the FInES Position Paper towards H2020.

Manufacture and Industry Taskforce

No activities have been performed due to the focus on Position Paper towards H2020.

3.3.2 Planned activities in FInES M37-M48

The imminent plans for the cluster are to organise a presentation meeting with the European Commission to present the final Position Paper and collecting their feedback. Further, a Cluster Meeting is planned for October 2013 to discuss H2020 and decide on future organisation and activities.

The management of the FInES cluster will need to be further consolidated. The present two co-chairs need to be extended to maybe three or four people; the future participation of IN-JET needs to be decided and the structure of task forces needs to be reviewed.

Manufacture and Industry Taskforce

No activities planned in this taskforce until 2014.

Going Global Taskforce

The Taskforce International Relations will continue to concentrate on active collaboration with new upcoming economies and research activities in the BRIC countries. Similarly, cooperation with the prosperous activities in the Asian-Pacific relations including a sensible exchange with China, Korea and Japan is advisable (with an emphasis on ensuring that knowledge is also steered towards Europe).

Another obvious target for the FInES strategy covers the activities concerning business innovation that have been established between Europe and US. This has been so far an excellent example of high-level international collaboration of mutual benefit.

Additionally, it is important to support an Africa-EU Partnership on interoperability of enterprises thereby strengthening the research dimension of IT in manufacturing and industry between the EU and African countries, including long term perspectives aligned with EU priorities and recommendations for a future Africa.

3.4 Monitoring and Control Cluster on Smart Buildings/Smart Spaces

The overall objective of this cluster is to align shared activities in the area of monitoring and control of Smart Buildings and Spaces. Markus Eisenhauer from FIT and Peter Rosengren from CNET represent ebbits in this cluster. The activities in this cluster have decreased and the cluster seems no longer active.

3.4.1 Completed activities in the Monitoring and Control Cluster M25-M36

The cluster has not been active in this period.

The cluster has previously been engaged in discussions on common ontologies, their alignment and merging as well as discussions on semantic interoperability, common standards, policies on security and privacy, the interplay of Home Healthcare and Ambient Assisted Living as well as interplay of construction and structural monitoring. Specific topics: Support networking in large-scale heterogeneous Wireless Sensor and Actuator Networks (WSANs), WSANs with scalable monitoring, control and self-diagnosis capabilities and the use of semantic interoperability to allow the cooperation of WSAN with legacy devices/systems.

3.4.2 Planned activities in the Monitoring and Control Cluster M37-M48

No activities have been planned in this cluster.

3.5 FIA - Future Internet Assembly

FIA is structured to support open interactions and cross-fertilisation across technical domains and works towards the creation of added value for the projects involved and development of joint strategic research agenda regarding common actions and requirements. ebbits is supporting and participating in the Future Internet Assembly (FIA).

3.5.1 Completed activities in FIA M25-M36

The FIA 2013 took place in Dublin, Ireland on 8-10th May. FIT participated showing a demo from the manufacturing domain on process oriented energy optimisation.

The demonstrator was a small scale version of a production line together with three robots which performed different tasks e.g. welding. On a large screen the visitor could see the actual energy consumption and the average consumption of previously built cars and a comparison between different kinds of cars that were produced.



Picture: Overview of booth at FIA Dublin 2013

During the event we talked with visitors from academia, other FIA participants and representatives from commercial companies. We exchanged ideas regarding software architecture and discussed different approaches to design within the ebbits project. The commercial companies were mostly providers of cloud services which would be beneficial to users of the ebbits system. As there is no immediate need for the ebbits project to use commercial grade cloud providers there was no further discussions after FIA.

The feedback was overall very good and the approach with combining IoT and business based systems was well received. Also the potential deployability in the real world was welcomed. We expect to be able to create new proposals for research projects that extend the ebbits approach.



Picture: Zoran Stančič (right), Deputy Director General, Information Society and Media Directorate visits the ebbits booth

3.5.2 Planned activities in FIA M37-M48

No planned activities.

4. Conclusions

ebbitts has been actively involved in cluster and concertation activities during the first three years of the project, also taking a lead in taskforces and on certain technological areas. A considerable amount of effort has been spent on participating in clusters.

As a consequence, ebbitts partners have decided that much less effort must be invested in cluster work to create a balance with core ebbitts work, focusing only on cluster activities and EU-events that are considered particularly strategic for the project.

The fourth and final cluster report is due in M48.