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Internet of Things and Services

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D2.9.2 Updated requirements report 2

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1. Executive summary

This is the second update to the deliverables report and is intended to show the changes made to the requirements and complements the deliverable *D2.8.2 Change request and re-engineering report 2*.

After the second year we have currently 16 requirements that are in status 'Open', 61 are in status 'QC passed', 22 are 'Part of specification", 26 are 'In Progress', 35 have been 'resolved', 45 have been 'Closed' and 2 of the requirements are in status 'Reopened'.

The only requirement that has both been 'Closed' and 'Implemented' is EBBITS-216 "ebbits platform should integrate Programmable Logic Controllers (PLCs) and make them interoperable with the system". This is due to the fact that until the end of year 2 in ebbits no formal external validation should take place and therefore those remaining 11 requirements that are marked 'Implemented' could not be closed yet. Several of the requirements that are 'In Progress' have made good effort but are not completely implemented yet and therefore need to remain in status 'In Progress'.

The consortium has recognized that there is a gap between the visions of the project (which are inherently broad) and the very detailed level that the requirements usually describe. Therefore we want to introduce a new concept labelled "Innovations". Those "Innovations" are our proposed solutions to the problems stated within the requirements. They describe what key technological innovations we envision for the ebbits project and for each of those innovations we prioritize the order of high-level-requirements that we have identified.

This will also be the basis for the future technological work and leads the path to the components needed to be included in the platform and the SDK.

In that sense we foresee that we will probably add only a few more requirements to the database in the future that highlight technological detail aspects and close more of the currently open requirements in order to gain a clear focus on what to develop.

2. Introduction

2.1 Purpose, context and scope of this deliverable

This is the second update to the deliverables report and is intended to show the changes made to the requirements and complements the deliverable *D2.8.2 Change request and re-engineering report 2*.

In this deliverable we highlight the already implemented requirements, those that have been closed due to different reasons and all the updated requirements.

2.2 Background

For first time readers we strongly recommend the reading of the first Lessons Learned (LL) deliverable *D2.7.1 Lessons Learned and Results of Usability Evaluation 1*, the first change request and reengineering report (D2.8.1). As a kind of background knowledge about the methodology used the initial requirements report (D2.4) and validation framework (D2.6) deliverables are also recommended. A short overview of the requirements process steps and their associated requirements status is given in chapter 3.1.

Lessons Learned of the second year can be found in deliverable *D2.8.2 Change Request and Reengineering Report 2*.

2.3 Structure of this document

In chapter 3 a general overview of the changes to the requirements is given while in chapter 4 the conclusions of the work are reported. The following chapters highlight the list of requirements that have been implemented (refer to chapter 5) and closed (refer to chapter 6).

Chapter 7 is titled "Updated requirements" but since all requirements have been updated due to the move to a new requirements tool this chapter now includes all the requirements gathered until the end of year 2 in ebbits.

3. Status of requirements

3.1 Overview

Within our iterative requirements process we have defined and refined a workflow (extensively covered in D2.4, D2.8.1 and D2.8.2) that each requirement runs through (shown in figure 1).

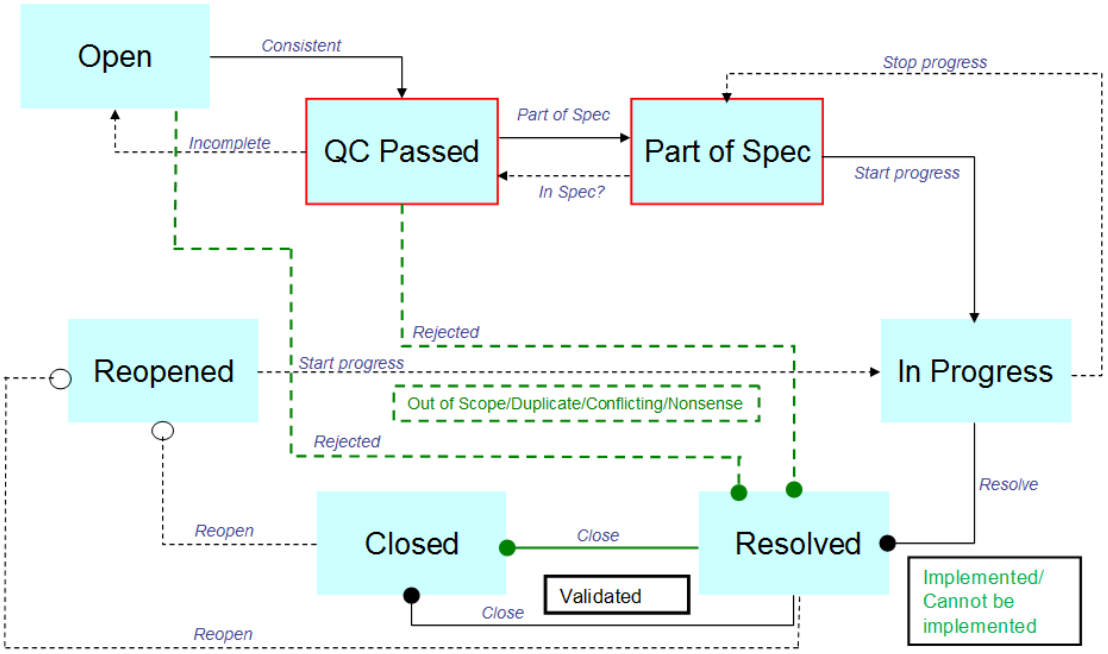

Figure 1: ebbits requirements workflow

After the second year we have currently 16 requirements that are in status 'Open', 61 are in status 'QC passed', 22 are 'Part of specification", 26 are 'In Progress', 35 have been 'resolved', 45 have been 'Closed' and 2 of the requirements are in status 'Reopened'.

For the status 'Resolved' the following table gives a more detailed overview:

Resolved	**35**
Cannot be implemented	1
Duplicate	10
Implemented	11
Nonsense	2
Out of scope	11

Table 1: Requirements overview of status 'Resolved'

3.2 Updated requirements

After having worked with the GForge system during the first year of the project the consortium noticed several shortcomings that were hindering an effective requirements engineering and a proper management of the requirements database. Therefore the consortium decided to switch to the more professional system Atlassian JIRA[1]. This required changing all of the IDs because JIRA has its own way of numbering requirements. In the following chapters you will see a column named

[1] http://www.atlassian.com/de/software/jira/overview

"ID" which is the id of the requirements as it was stored in the GForge system and used in the previous deliverables. As can be seen in D2.8.2 from now on only the JIRA numbers will be used.

As stated above all requirements have been updated during the last year in the sense that the requirements were refined. So this is not a contradiction to D2.8.2 where some WPs stated that no update to the requirements happened. This means that no major changes to the requirements have happened.

3.3 Implemented requirements

The list of implemented requirements shows those requirements that have been completed and have been implemented in the demonstrators.

Implemented	**12**
Closed	1
Resolved	11

Table 2: Requirements overview of resolution 'Implemented'

The 11 requirements that are in status 'Resolved" are not yet externally validated and therefore could not be closed. There are a lot of requirements that we are currently working on but have not been fully implemented yet.

3.4 Closed requirements

In year 2 we have closed the largest number of requirements because they were duplicates and two were either nonsense or out of scope. Only one requirement has been closed and has the resolution 'Implemented'. This is due to the fact that in ebbits we have currently not done any external validation (which was not planned to happen in year 1 and 2) but this would be required for moving to 'Closed' and 'Implemented'. The one requirement that has both been 'Closed' and implemented is EBBITS-216 "ebbits platform should integrate Programmable Logic Controllers (PLCs) and make them interoperable with the system". This was one of the key parts in the demonstrator of year 2.

During the revision of the requirements some have been labelled "Nonsense" or "Out of scope". This decision was taken by the respective WP leader in order to gain a clearer focus on what to concentrate in the next years. Also if a requirement was much too broad or too vague it was labelled "Nonsense" or "Out of scope".

Closed	**45**
Duplicate	40
Implemented	1
Nonsense	2
Out of scope	2

Table 3: Requirements overview of status 'Closed'

4. Conclusion

A lot of work has been done working with the requirements and we feel that we have now a good set of requirements to base the future work on. What we also have recognized is that the "big picture" of what a requirement contributes to the project idea is not so easily understandable.

Therefore we plan to introduce a new concept labelled "Innovations" that describe what key technological innovations we envision for the ebbits project and for each of those innovations we prioritize the order of high-level-requirements that we have identified.

This will also be the basis for the future technological work and leads the path to the components needed to be included in the platform and the SDK.

Those "Innovations" are our proposed solutions to the problems stated within the requirements. Introducing this concept gives us the opportunity to bridge the gap between visions (which are inherently broad) and the very detailed level that the requirements usually describe.

In that sense we foresee that we will probably add only a few more requirements to the database in the future that highlight technological detail aspects and close more of the currently open requirements in order to gain a clear focus on what to develop.

5. Implemented Requirements

Key	ID	Summary	Rationale	Fit Criterion	Requirement Type	Cust. Satisf.	Cust. Dissatisf.	Priority	Component/s	Workpackage
EBBITS-178	43	Aggregating collected sensor data at a central point	The aggregation of collected data is important for analyzing the data.	A framework is provided that aggregates collected sensor data at a central point of an application.	Functional	very high	low	Blocker	Architecture	WP5 - Centralised..
EBBITS-327	451	Sensor fusion algorithm must be added during run-time in a modular and extensible way.	Sensor fusion algorithms vary greatly and can't be generalized only in one module.	New sensor fusion algorithms can be added in a pluggable way	Functional	high	neutral	Critical	Architecture	WP5 - Centralised..
EBBITS-171	36	Controlling of machines/stations in manufacturing plant remotely	To optimize production process.	Relevant stations that operate automatically can be started/stopped via remote calls.	Functional	low	high	Major	Communication	WP5 - Centralised..

EBBITS-182	47	Resilience and adaptable to environment condition changes	Environmental changes such as lighting, temperature affect the results of manufacturing process. so far machines are tuned manually by technicians. adapting to environmental condition can lead to reducing energy consumption e.g.: reduce heater temperature when it's warm outside.	Machines can adapt its parameters adapting to environmental changes.	Non-Functional - Operational	low	high	Critical	Configurability	WP5 - Centralised..
EBBITS-250	139	Support runtime reconfiguration	To supporting monitoring leading to adaptation, the architecture should be dynamic in the sense that components/services should be connectable at runtime.	Services and devices can be connected during runtime.	Functional	high	high	Major	Configurability	WP5 - Centralised..

EBBITS-266	155	Synchronisation of Acquired Data is necessary	Data synchronization might be necessary, because data will be acquired automatically, manually, semi-manually with different timestamps.	A data synchronization component performs a time stamp based synchronization of a data set.	Functional	high	neutral	Major	Context	WP5 - Centralised..
EBBITS-330	454	Applications can monitor the state of devices and context entities	Continuous monitoring of context entities (e.g., pigs, welding guns) can be used to detect anomalies (e.g.: ill Pigs, overheated welding gun)	Applications receives current state of context entity/device and notifications about state changes in 100% of state changes.	Functional	low	very high	Blocker	Context	WP5 - Centralised..
EBBITS-252	141	Report errors in devices	Devices should be able to report errors.	Devices proxies provide report and log errors.	Functional	high	neutral	Critical	Devices	WP5 - Centralised..
EBBITS-329	453	The system must be able to assign fused data as a context attribute of an entity	Entities cannot provide their own context values, therefore sensors are needed to provide their context values. e.g.:a thermometer is needed to provide the temperature of a room.	The system allows relationship among context of entities and sensors to be modelled.	Functional	neutral	very high	Blocker	Interface	WP5 - Centralised..

EBBITS-337	463	Semantic event processing	It must be possible to interpret events in the context of the different layers in the architecture (from PWAL to a business rules layer).	The system provides at minimum two layers of event processing where events can be captured and possibly filtered/fused	Functional	high	high	Major	Architecture	WP7 - Event..
EBBITS-216	84	ebbits platform should integrate Programmable Logic Controllers (PLCs) and make them interoperable with the system	Production automation is controlled through a network of PLCs	The PWAL (developing a proper driver) and the DDM (defining proper models in the Device Catalog ontology) are able to integrate PLCs into the ebbits platform.	Functional	very high	very high	Major	Interface	WP8 - Physical..
EBBITS-194	61	Display plant activities in real-time	To observe the complexity of a production inside the plant.	A user-friendly interface is provided to the relevant stakeholders to view activities inside the plant.	Non-Functional - Usability	low	high	Major	Interface	WP10 - End-to-end..

6. Closed Requirements

6.1 Duplicate Requirements

Key	ID	Summary	Rationale	Fit Criterion	Requirement Type	Cust. Satisf.	Cust. Dissatisf.	Priority	Component/s
EBBITS-183	49	Access to energy-related information from production machines needs to be provided.	Energy-related information is measured by some of the operational machines (e.g. in the production plant), but it is not distributed into a network.	If any machine provides access to energy-related information, ebbits distributes this information to all interested parties.	Functional	neutral	very high	Critical	Context
EBBITS-314	406	Farm's Local server/repo should be accessible by RFID tag readers and National servers/repos/stores.	Information about animals is stored in farm local servers and used to retrieve information when reading RFID tags or when requested by National/European authorities.	The ebbits system grants authority servers and local RFID readers read access to farm's information.	Non-Functional - Operational	low	high	Critical	Architecture
EBBITS-320	412	Farm's Management System should have access to external information (crop price, fertilizers price,	Consumables information can be exploited through ebbits in order to manage efficiently the farm's production processes.	The ebbits system grants Farm's Management System (FMS) read access to external information and services.	Non-Functional - Operational	low	low	Minor	Architecture

		consumables price, weather, etc).							
EBBITS-321	413	Sow Farm Management System should have access to production/animal repository.	The knowledge obtained by tracking all production processes in the farm will allow managers to optimise them through a single platform.	The ebbits system grants Sow Farm Management System (SFMS) read/write access to animal growth/production data repository.	Non-Functional - Operational	low	neutral	Major	Architecture
EBBITS-313	405	Feed Provider should transfer delivery information about sent feedstuff.	The traceability relays on the successful exchange of information about the monitored processes linked to the tracked product.	The ebbits system annotates/tags each food delivery transaction according to the defined semantic models for deliveries which includes BPM-related metadata and relationships.	Non-Functional - Operational	high	neutral	Critical	Context
EBBITS-323	415	Accounting Management System should store orders, and have access to Supplier Management System (to send/receive orders/acks/invoices).	The ebbits paradigm can be exploited also for improving the efficiency of accounting task.	The ebbits system grants Accounting Management System (AMS) read access to Supplier Management System data repository/retrieval services.	Non-Functional - Operational	neutral	neutral	Minor	Interface

EBBITS-324	416	Accounting Management System should have access to bank's management system for sending/receiving payment orders/confirms.	The ebbits paradigm can be exploited also for improving the efficiency of accounting task.	The ebbits system grants Accounting Management System (AMS) read access to banks' management systems/services.	Non-Functional - Operational	neutral	neutral	Minor	Interface
EBBITS-292	384	Produced items should be annotated with relevant metadata allowing the computation of OEE and BPM metrics (like number of orders/items requested/delivered/in-progress/faulty)	Real-time traceability of produced goods/services is achieved by properly annotating their status and metrics during the manufacturing process.	The ebbits system annotates/tags each produced item according to the defined semantic models for produced items which includes OEE/BPM-related metadata and relationships.	Non-Functional - Operational	high	low	Critical	Modelling
EBBITS-293	385	Produced items and consumables should be annotated with logistics-related metadata, allowing their traceability (e.g. present, in transit from supplier, ordered, etc)	The ebbits platform could provide also a system for efficient management of consumables and logistic aspects needed in (not only) manufacturing domains.	The ebbits system annotates/tags each produced item and monitored consumable according to the defined semantic models for produced items and consumables which includes logistics-related metadata and relationships.	Non-Functional - Operational	low	neutral	Major	Modelling

EBBITS-294	386	Feedstuff should be annotated with origin, genetics, treatment, storage conditions and transport/delivery info (batch number, silo id, amount, timestamp).	A detailed annotation of feedstuff is required to the reasoning processes devised.	The ebbits system annotates/tags each feedstuff unit/item according to the defined semantic models for feedstuff which includes relevant medical- and logistics-related metadata and relationships.	Non-Functional - Operational	high	very high	Critical	Modelling
EBBITS-295	387	Animals should be annotated with RFID tag, weight, genetics, birth date, and current/historical (timestamped) data (growth/weight, location/movements, consumed feed, water, weaning, insemination, heat during pregnancy, born piglets, anomalies, vaccines).	Proper identification of animals and logging the most relevant information about their lives is vital for the traceability and quality control proposed in ebbits.	The ebbits system annotates/tags each animal according to the defined semantic models for traced animals which includes live-events and quality-related metadata and relationships.	Non-Functional - Operational	high	very high	Critical	Modelling
EBBITS-296	388	Meat packages should be annotated with ID of animal (for tracing purposes).	Meat traceability is one of the main added values of the ebbits platform in the agricultural	The ebbits system annotates/tags each meat package according to the defined semantic models for meat	Non-Functional - Operational	low	high	Major	Modelling

			domain.	packages which includes traceability-related metadata and relationships.					
EBBITS-297	389	Farm's soil/fields should be annotated with location, laboratory analysis info (date, sample field source, lab id/name, results, etc), current/historical data (types of crops, grain maturity, soil nutrients, quality of products grown, etc).	Different reasoning applications devised in ebbits for tracking the soil efficiency require a detailed annotation and logging of farms' soil.	The ebbits system annotates/tags each soil field according to the defined semantic models for farms and soil fields which includes soil efficiency and historical metadata and relationships.	Non-Functional - Operational	low	neutral	Major	Modelling
EBBITS-298	390	Farm's repository should store information about harvesting equipment, man power, etc.	The ebbits platform would provide also some functionalities for the management of resources needed for harvesting, thus they need to be included in the knowledge model.	The ebbits system annotates/tags each monitored farm resource (tools and consumables) according to the defined semantic models for farm resources which includes logistics-related metadata and relationships.	Non-Functional - Operational	low	neutral	Major	Modelling

EBBITS-299	391	Sow farm production should be annotated or modelled in order to allow tracking the number of piglets, pigs at fertile age, pigs ready to slaughter, maximum capacity, etc.	By proper reasoning and processing, the ebbits platform can exploit the knowledge in the network and extract aggregated information required in real time.	The ebbits system annotates/tags each monitored sow according to the defined semantic models for sows/animals which includes medical- and logistics-related metadata and relationships.	Non-Functional - Operational	neutral	neutral	Critical	Modelling
EBBITS-300	392	Halves of slaughtered pigs should be annotated with id, id of slaughtered pig, weight, fat thickness, date of slaughter, price, etc.	Traceability of meat requires proper tracking of pigs since birth to stores, thus the information after its slaughter is very relevant.	The ebbits system annotates/tags each slaughtered pig half according to the defined semantic models for halves of slaughtered animals which includes relevant pig characteristics, metadata and relationships.	Non-Functional - Operational	high	low	Critical	Modelling
EBBITS-301	393	Order should be annotated with type/ID of good/service, amount, price, dates(issue, expiry, delivery, etc).	ebbits platform can be exploited also for generic enterprise processes, like account management.	The ebbits system annotates/tags each order according to the defined semantic models for accounting data which includes BPM-related metadata and relationships.	Non-Functional - Operational	neutral	neutral	Minor	Modelling

EBBITS-302	394	Invoices should be annotated with supplier's info (name, id, bank account, contacts, etc), goods or services info (type/id, amount, price, dates, etc).	ebbits platform can be exploited also for generic enterprise processes, like account management.	The ebbits system annotates/tags each invoice according to the defined semantic models for accounting data which includes BPM-related metadata and relationships.	Non-Functional - Operational	neutral	neutral	Minor	Modelling
EBBITS-303	395	Payment reports should be annotated with responsible id/name, bank, order number, status, etc.	ebbits platform can be exploited also for generic enterprise processes, like account management.	The ebbits system annotates/tags each payment according to the defined semantic models for accounting data items which includes BPM-related metadata and relationships.	Non-Functional - Operational	neutral	neutral	Minor	Modelling
EBBITS-304	396	Generic Information should be annotated with requester, sender, content (price, capacity, dates), etc.	Information exchanged between stakeholders could be exploited for some reasoning, thus it is convenient to model such exchange semantically and to forward or keep linked its metadata through the different stakeholders.	The ebbits system annotates/tags each data exchanged according to the defined semantic models for exchange requests which includes BPM-related metadata and relationships, and copy or link metadata previously associated to the exchanged information.	Non-Functional - Operational	neutral	neutral	Minor	Modelling

EBBITS-310	402	Manufacturing Monitor System must have read access to internal and external environment data.	The reasoning processes devised by ebbits for the manufacturing domain require environmental monitoring.	The ebbits system grants Manufacturing Monitor System (MMS) read access to data coming from internal/external sensors collected and annotated in their respective repositories.	Non-Functional - Operational	low	low	Major	Modelling
EBBITS-305	397	Stakeholders should be stored in local catalogues or external directories (advisory company, chamber of commerce, etc) and accessed by the different subsystems inside and outside ebbits.	In order to apply access control lists/policies, all stakeholders must be identified.	Stakeholder directories.	Non-Functional - Operational	neutral	very high	Critical	Security
EBBITS-306	398	Manufacturing Monitor System should have write access to local server/repo/store.	The reasoning processes devised in ebbits require access to knowledge/information found in local stores.	The ebbits system grants Manufacturing Monitor System (MMS) write access to semantic stores.	Non-Functional - Operational	low	high	Critical	Security
EBBITS-307	399	Manufacturing system for analysis should have read/write acc. to local server/ repo/store.	Analysis/reasoning is based on local monitored data, and reports are sent back to local server/repo/store.	The ebbits system grants Manufacturing System fo Analysis (MSA) read and write access to semantic stores.	Non-Functional - Operational	low	high	Critical	Security

EBBITS-308	400	Reports should have a list of allowed readers/subscribers.	Aggregated data, reports, alerts, etc, should be available only to stakeholders interested in them.	The ebbits system grants generation and reading of reports to allowed systems/applications/stakeholders.	Non-Functional - Operational	high	very high	Major	Security
EBBITS-311	403	Maintenance Manager and operators should have access to devices' and production info (proper ACL have to be implemented)	Some of the added values that ebbits will provide to managers in the manufacturing domain require a continuous tracking of the production processes, metrics and modifications introduced.	The ebbits system grants to allowed stakeholders access to data and services from production devices.	Non-Functional - Operational	high	low	Critical	Security
EBBITS-312	404	Farm's Management System should have access (through secure connection) to Feed Provider Resources Monitoring System.	The food traceability scenario requires an exchange of information between all the enterprises involved in the production chain.	Authenticated/secure access to Feed Provider RMS. The ebbits system grants Farm's Management System (FMS) secure read access to Feed Provider Resources Monitoring System (RMS).	Non-Functional - Operational	neutral	low	Major	Security
EBBITS-315	407	Farm's Monitoring System should have access to local server/repo/store.	Monitoring system keep track of several process in the farm and needs the metadata stored in local server.	The ebbits system grants Farm's Monitoring System (FMoS) write access to semantic stores and data repositories.	Non-Functional - Operational	low	neutral	Critical	Security

EBBITS-316	408	Farm's Management Application Server should access local monitoring system servers/repos/stores for generation of reports	Management/accounting systems perform their tasks based on the information stored/provided by local monitoring systems.	The ebbits system grants Farm's Management Application Server (FMAS) report generation.	Non-Functional - Operational	low	neutral	Major	Security
EBBITS-317	409	Consumer should have access to meat reports.	Relevant reports about the produced meat since the piglet born will be used by ebbits in order to enhance the information provided to consumers about the meat they are buying.	The ebbits system grants consumer applications read access to meat production chain reports.	Non-Functional - Operational	high	neutral	Major	Security
EBBITS-318	410	Controller should have access to (online) queries to meat packages IDs.	Quality and health control authorities can rely on ebbits in order to track the distribution of meat packages when they discover some anomaly.	The ebbits system grants quality controllers query access to meat origin and traced metadata.	Non-Functional - Operational	low	very high	Major	Security

EBBITS-319	411	Farm's Management System should have access to field info repository.	Optimisation of the resources, like fields in an agricultural domain can be achieved by analyzing and processing information logged by their respective monitoring systems.	The ebbits system grants Farm's Management System (FMS) read/write access to historical data repository.	Non-Functional - Operational	neutral	low	Major	Security
EBBITS-322	414	Slaughterhouse Management System and Retail Management System should have access to both production (read) and slaughter (write) repositories.	Accounting though ebbits will be simplified thanks to the knowledge acquired by multiple systems in the food production chain.	The ebbits system grants Slaughterhouse Management System (SMS) and Retail Management System (RMS) read access to production and slaughter data repositories.	Non-Functional - Operational	low	low	Major	Security
EBBITS-325	417	Manager should have access to directory of stakeholders to interact with them (send/receive info).	The ebbits paradigm can be exploited also for improving the efficiency of accounting task.	The ebbits system grants allowed stakeholders read access to stakeholders directories/identity manager(s).	Non-Functional - Operational	neutral	neutral	Major	Security

EBBITS-249	138	The system should support distributed intelligence on embedded system.	We have a need for "intelligence" (Semantics, reflection etc.). We have a need for supporting embedded systems. This should not conflict	Minimum hardware requirements (which must be supported by all target hardware) are defined and all hardware that meets the specifications is guaranteed to work with hydra.	Constraint	neutral	neutral	Blocker	Architecture
EBBITS-265	154	Aggregate data from various data bases and sources	Information will be stored in several places, but needs to be combined in some place and assigned to the actual product or entity.	A data aggregation component is available.	Functional	neutral	high	Major	Architecture
EBBITS-211	79	Location tracking should be implemented as independent app	Decoupling from existing system	Tracking system is implemented independently	Non-Functional - Operational	very high	high	Critical	Configurability
EBBITS-288	380	Monitored/sensed data should be contextualized (timestamp, geotag, type, etc).	It is important to know when and where data were sensed/monitored.	The ebbits system annotates/tags each measurement according to the defined semantic models for sensed data which includes relevant classification and spatial-temporal metadata and relationships.	Non-Functional - Operational	low	high	Major	Context
EBBITS-290	382	Alerts should be contextualized (timestamp, geotag, type, message,	Generated messages and alerts need to be traceable and provide rich	The ebbits system allows the generation/consumption and historical trace of alerts.	Non-Functional - Operational	low	high	Major	Context

		warning level, etc).	information about the event detected.						
EBBITS -184	50	Filtering to Obtain relevant Information	Too much information overwhelms farmers while making decisions.	Farmers are able to view the relevant information out of the whole.	Non-Functional - Usability	low	high	Major	Interface
EBBITS -291	383	Devices should be annotated with id, type, name, location, and current/historical data (status, work in progress, consumables levels, quality record, energy consumption, energy profile, planned/unplanned intervention/maintenance, fault info, etc).	Another added value that ebbits could introduce in enterprise domains is efficiency tracking, which requires a monitoring and log of several metrics in devices/tools/machinery and resources in general.	The ebbits system provides a device catalog with the semantic models for all supported devices.	Non-Functional - Operational	high	low	Major	Modelling
EBBITS -214	82	System should provide access restrictions to sensitive information.	Some sensitive information endanger company existence.	System provides access restrictions to sensitive information.	Functional	very high	very high	Blocker	Security

EBBITS-212	80	ebbits should bridge communication between different applications in farms	Application between vendors are not able to communicate to each other, while data sometimes needs to be shared among applications.	At least applications from 3 different vendors are able to exchange information.	Functional	high	high	Major	Communication
EBBITS-272	161	Electronic exchange of reports between enterprises	Report on the slaughtered pig is sent back ON PAPER to the farmer. This should be done electronically, in order for the farmer to combine it with the feeding information, e.g. identification of a father that "produces" ill pigs.	Information is automatically put into a report format and send to a recipient.	Non-Functional - Operational	low	very low	Major	Communication
EBBITS-229	106	Energy benchmarking of different granularity such as machines, processes, plants	Management would like to know how effective the energy is used in different operational levels.	Management can do benchmarking in different operational level	Functional	very high	very high	Blocker	Configurability
EBBITS-225	93	Bring data from fieldbus network to ethernet network	Analytics is done by ERP program on a computer that work on TCP/IP.	Analytics software can analyze data from manufacturing robots	Functional	high	high	Major	Networking

EBBITS-162	22	The ebbits should be able to handle massive number of devices	The future use cases of ebbits need to handle massive number of devices and applications within and cross enterprises, i.e. ci. 300-1000 in a manufacturing plant and 500 in a farm.	ebbits is able to handle 500 devices simultaneously.	Non-Functional - Operational	low	high	Critical	Networking
EBBITS-173	38	Flexible Integration of HW/SW components	The process to set-up a plant and to fine-tune each machine costs at least a day. In this sense, the integration of new HW/SW must be very easy to not disturb the overall process.	In plug'n'play manner new HW/SW components can be easily integrated into an existing system without losing much time.	Functional	low	high	Major	Architecture
EBBITS-221	89	Scalable solution (scale up and scale down)	adjustment to desired number of production, require to add or reduce machines	configuration of scaling up / down a plant can be achieved in max 8 hours.	Non-Functional - Maintainability	very high	very high	Major	Architecture
EBBITS-219	87	reliability of the system should be more than 30 years	a production plant of trucks can runs for 30 years	99% of the time system is able to run 30 years.	Non-Functional - Operational	very high	very high	Nice to have	Devices

6.2 Other closed requirements

Key	ID	Summary	Rationale	Fit Criterion	Requirement Type	Cust. Satisf.	Cust. Dissatisf.	Component/s	Resolution

EBBITS-170	35	Hazardous Environmental Monitoring of Manufacturing Plant	Currently the environment of a plant provide is not monitored properly. However, this is quite important to guarantee the safety of an operator.	The safety of the operator is improved by 20% on the basis of environmental input information.	Non-Functional - Maintainability	low	low	Context	Out of scope
EBBITS-175	40	Life-cycle of a robot and its components is traceable	At the moment the life-cycle of a robot's component is not predictable. However, being able to predict its life-cycle could support to avoid deviations during production.	Based on analyzing data of real field tests the life-cycle can be predicted properly.	Non-Functional - Maintainability	very high	neutral	Context	Cannot be implemented
EBBITS-208	76	feeding systems should aware of the animals weight	farmers must keep poultry products on certain weights	feeding system can control the portion of feed based on the weight	Functional	high	high	Context	Out of scope
EBBITS-275	164	Consider ethical issues	It is an ethical issue if you track the driver driving a van or that a product is at the end-user's fridge	-	Constraint - Ethical	neutral	very high	unassigned	Out of scope

EBBITS-276	165	Consider cost benefit	There is no NICE-To-HAVE in the agriculture domain, there always needs to be cost benefit. A slaughter pig brings 5-15 Euros.	Cost benefit is considered.	Constraint - External factor	neutral	very high	unassigned	Out of scope
EBBITS-259	148	Mobile management of farms	Mobility and mobile devices are required to manage aspects of the farm locally and remotely if you are on holiday or in the cinema.	Mobile access to important function of the management system is granted.	Non-Functional - Operational	very high	low	Devices	Out of scope
EBBITS-190	56	farmers need to save and able to reflect breedings history information	breeders combinations produce different quality of piglets	farmers can at least trace breeders combinations that produce unhealthy piglets.	Functional	very high	high	Modelling	Out of scope
EBBITS-271	160	The system should be self-ware	User statement: "Let me make my system self-aware"	User gets informed of any event she is interested in.	Functional	high	neutral	Context	Nonsense
EBBITS-268	157	Different Views on the Data is necessary	We need services that provide different views on the data cloud by combining data from different sources.	Data can be filtered and sorted based on an arbitrary set of parameters.	Functional	very high	very low	Interface	Out of scope

EBBITS-179	44	Farmers are able to retrieve optimized models from research	Farmers are willing to share data if they could get something in return such as models to optimize feeding process.	Farmers can get optimized models electronically.	Functional	high	low	unassigned	Out of scope
EBBITS-180	45	System can feed the farms data to research	Most of the farming models are developed by research organizations, universities etc.	Researchers are able to get their hands on life data on farms.	Functional	high	low	unassigned	Nonsense
EBBITS-167	28	Heterogeneous enterprise systems need to be able to exchange information.	Enterprises use various information systems that need to exchange information. Information needs to be propagated throughout the chain.	At least three different enterprise systems can exchange information.	Functional	low	very high	Communication	Nonsense
EBBITS-351	477	PWAL should implement a heterogeneous multi-data aggregation in single events.	Event-driven data acquisition can easily generate scalability issues if single events are generated per sample. Thus aggregation of several samples in a single or few events has to be devised.	It is possible to aggregate events coming from the same source at PWAL level	Functional	None	neutral	Architecture	Out of scope

EBBITS-181	46	Affordable tagging/tracking system for pigs	If the tagging price is too high, the farmers are reluctant to use this tags	The price of a tag is less than 5% of the total profit a farmer can get from a pig.	Non-Functional - Operational	very high	low	Devices	Out of scope
EBBITS-348	474	PWAL should be able to match PLC symbols with ebbits ontologies	The definition of symbols on an OPC server (i.e., variables of interest inside the PLC) could be made in accordance with the PLC programmer according to an agreed convention that could be exploited for an automatic matching with a predefined model in the Device Catalogue Ontology	PWAL provides an interface to expose PLC symbols as events, services or variables according to the models described within the ebbits ontologies.	Functional	None	neutral	Devices	Out of scope

EBBITS-241	130	ID Management: Item identification system should provide open interfaces to other systems	Identification of pigs is done with RFID tags at their ears and with antennas in corridors that recognize pigs passing by. The system should not be connected to a specific system, but rather provide open interfaces that can be exploited by any system.	Any system can easily access the item identification system.	Functional	neutral	very high	Interface	Out of scope
EBBITS-172	37	Higher bandwidth and range of wireless connection	Currently, BT is used for wireless communication. It supports ranges <50m. Especially, the bandwidth is too low: max 24 MBit/s.	Communication range and in particular bandwidth are considerably higher.	Non-Functional - Performance	low	very high	Networking	Nonsense
EBBITS-220	88	hardware components are able to handle harsh condition	Manufacturing environment can have harsh condition that can damage electronic devices	devices used should fulfill relevant manufacturing standards for encapsulation and wiring.	Non-Functional - Operational	high	high	Devices	Out of scope

7. Updated requirements for ebbits

7.1 WP3

Key	ID	Summary	Status	Rationale	Fit Criterion	Requirement Type	Cust. Satisf.	Cust. Dissatisf.	Priority	Component/s	Resolution
EBBITS-164	24	A product's lifecycle history can be traced within less than 24 hours.	Part of specification	EU Regulation in the future will obligate enterprises to be able to produce a request of information within 24 hours.	A product lifecycle cross Enterprises can be traced within less than 24 hours.	Functional	high	high	Blocker	Communication	*Unresolved*
EBBITS-206	73	Transfering IDs cross enterprises	Quality Check passed	when IDs have no standard (such as EAN), IDs are generated from each ERP. thus each enterprise has their own IDs.	IDs from cross enterprises can be linked automatically.	Functional	low	very high	Blocker	Communication	*Unresolved*
EBBITS-168	29	Stakeholders should be able to access product-related information instantly.	Part of specification	Farms want to able to sell their "brand" to the costumer, which creates a good business case to motivate farmers to participate in sharing information. A certificate of origin would be good for the customers.	For each meat product, stakeholders can access the name of the producing farm, the millage, Feed stuff, medicine and the CO2 foodprint. stakeholders e.g.: meat quality control of	Functional	very high	low	Critical	Context	*Unresolved*

				There exists also a safety issue: when the end-user is allergic to something, we can provide information about the contents of the beef	slaughterhouse and retail store, end consumers						
EBBITS-188	54	Slaughter house needs to know how many pigs they will get from farmers	Part of specification	slaughter house needs to know the flow of the pigs coming to them so that they can plan and balance supply from farmers and demands from retail store.	slaughter house can forecast how many pigs are going to be supplied by farmers.	Functional	high	high	Minor	Context	*Unresolved*
EBBITS-233	121	Items need to be traced within an enterprise	Quality Check passed	Goods and items need to be traced within one farm or enterprise.	Any item that has an ebbits identifier can be reliably located within a determined area.	Functional	high	high	Critical	Context	*Unresolved*
EBBITS-234	122	Items need to be traced between enterprise	Part of specification	Goods, parts and items need to be traced when they leave one enterprise and appear in another.	Any item with needs to be identifiable with ebbits in different enterprises even though they don't use same identification.	Functional	high	high	Critical	Context	*Unresolved*
EBBITS-193	60	Improve air compression energy usage	Quality Check passed	Air compression is one main energy guzzler. Only 40%	More than 40% of air can be transferred	Non-Functional -	very high	very low	Major	Devices	*Unresolved*

				of air can be transferred effectively.	effectively	Operational					
EBBITS-217	85	3 Measurement Points for every station in body welding	Open	energy cost that can be calculated includes: lightings, processes, energy for welding	3 measurement points are covered	Functional	very high	very high	Major	Devices	*Unresolved*
EBBITS-228	105	reduce water consumption in PWT	Open	water consumption for cooling and lubricating purposes in PWT is really high (300-500 lt./minute)	10% of water consumption can be reduced	Non-Functional - Operational	high	high	Minor	Devices	*Unresolved*
EBBITS-259	148	Mobile management of farms	Resolved	Mobility and mobile devices are required to manage aspects of the farm locally and remotely if you are on holiday or in the cinema.	Mobile access to important function of the management system is granted.	Non-Functional - Operational	very high	low	Major	Devices	Out of scope
EBBITS-257	146	Support for interfacing with external workflow systems	Quality Check passed	Applications must include workflow management possibilities	Supports at least one workflow system, for instance OpenWorkFlow.	Functional	high	high	Critical	Interface	*Unresolved*
EBBITS-190	56	farmers need to save and able to reflect breedings history information	Resolved	breeders combinations produce different quality of piglets	farmers can at least trace breeders combinations that produce unhealthy piglets.	Functional	very high	high	Critical	Modelling	Out of scope
EBBITS-239	128	A standard way of numbering	Quality Check	No world standard way of numbering	A standard way of	Functional	very high	low	Major	Modelling	*Unresolved*

		batches needs to be provided	passed	the batches exists. The numbering depends on the local ERP system: Currently, one solution is to create a huge database to link the numbers together	numbering/identifying batches exists.						
EBBITS-377		Deconstruction and reconstruction of created or existed value models should be viable to reflect and understand the variation in value created.	Open	Using deconstruction we are able to split a value model into smaller parts and reconstruction composes these parts in different ways. That enables us to reflect the possible variations in value created.	The requirement is met if the value model and value operational scenarios has been created.	Non-Functional			Major	Modelling	*Unresolved*
EBBITS-165	25	Authentication to product-related tracing information should be provided on a product level	Quality Check passed	Enterprises want to share valuable product-related information, if there is a business value for them, and they want to be able to grant access to this information on a product level. Owner of information can control what	Owner of data can select access level. Ebbits enforces authorization.	Functional	very low	very high	Major	Security	*Unresolved*

				groups have access to their information.							

7.2 WP4

Key	ID	Summary	Status	Rationale	Fit Criterion	Requirement Type	Cust. Satisf.	Cust. Dissatisf.	Priority	Component/s	Resolution
EBBITS-314	406	Farm's Local server/repo should be accessible by RFID tag readers and National servers/repos/stores.	Closed	Information about animals is stored in farm local servers and used to retrieve information when reading RFID tags or when requested by National/European authorities.	The ebbits system grants authority servers and local RFID readers read access to farm's information.	Non-Functional - Operational	low	high	Critical	Architecture	Duplicate
EBBITS-320	412	Farm's Management System should have access to external information (crop price, fertilizers price, consumables price, weather, etc).	Closed	Consumables information can be exploited through ebbits in order to manage efficiently the farm's production processes.	The ebbits system grants Farm's Management System (FMS) read access to external information and services.	Non-Functional - Operational	low	low	Minor	Architecture	Duplicate

EBBITS-321	413	Sow Farm Management System should have access to production/animal repository.	Closed	The knowledge obtained by tracking all production processes in the farm will allow managers to optimise them through a single platform.	The ebbits system grants Sow Farm Management System (SFMS) read/write access to animal growth/production data repository.	Non-Functional - Operational	low	neutral	Major	Architecture	Duplicate
EBBITS-365	592	The ebbits platform offers performant ad-hoc reasoning	In Progress	Applications request information that needs to be inferred from the ontology and other knowledge sources through reasoning/information processing.	The platform is able to provide a response to queries that require reasoning with an acceptable delay (< 1 sec)	Functional	high	high	Critical	Architecture	*Unresolved*
EBBITS-186	52	Interoperability needs to be created between various subsystems in the manufacturing area	Quality Check passed	The subsystems in manufacturing environments are currently not interconnected and not able to exchange information.	Three independent subsystems from the manufacturing area can exchange information (show a use case)	Functional	neutral	high	Critical	Communication	*Unresolved*

EBBITS-235	123	Information needs to be described in a standardised way	Quality Check passed	Heterogeneous data sources and exchange formats.	A standard for exchanging information between system components is provided.	Functional	high	neutral	Major	Communication	*Unresolved*
EBBITS-274	163	The traceability chain should be computed on demand	Quality Check passed	The traceability chain should be computed on demand and not stored and recalled, due to storage. Thus, the combination of data is the challenge and a handover of identities might be required. A combination of searches should be realized by semantics.	The traceability chain is computed and not stored.	Functional	neutral	high	Major	Communication	*Unresolved*
EBBITS-245	134	The context model needs to be extensible during runtime.	Quality Check passed	A knowledge model enables the middleware to contain a representation of itself and manipulate its state during its execution. This feature should serve as the basis for self-adaptation	Middleware is able to adapt its configuration in 60% of identified cases requiring reconfiguration.	Functional	neutral	low	Critical	Configurability	*Unresolved*

				of the middleware (e.g. reconfiguration of resource usage, triggering the component-based services).							
EBBITS-386		Toolset support allows administrators of a local ebbits instance to map the available devices to the domain model defined by the application	Quality Check passed	Application developers cannot define the mapping of devices to domain entities	Tool is available and tested	Non-Functional - Maintainability			Major	Configurability	*Unresolved*
EBBITS-197	64	Historical data should be recorded persistently.	Quality Check passed	Quality is very important inside an assembly line as it is the essential parameter used for force tests or lack tests.Furthermore, if failures are detected lately when a car is already in the market, but shows some lack, the production history can be traced to find the devil in the detail.	Quality related information is logged inside a proper carrier medium.	Functional	low	high	Blocker	Context	*Unresolved*

EBBITS-313	405	Feed Provider should transfer delivery information about sent feedstuff.	Closed	The traceability relays on the successful exchange of information about the monitored processes linked to the tracked product.	The ebbits system annotates/tags each food delivery transaction according to the defined semantic models for deliveries which includes BPM-related metadata and relationships.	Non-Functional - Operational	high	neutral	Critical	Context	Duplicate
EBBITS-360	503	Measured data and the context model (as defined by WP5) are consistent.	Quality Check passed	Consistency between abstract context model and concrete measured data.	We measure consistency by a standard reasoner. Consistency checking is one basic reasoning service.	Functional	None	high	Major	Context	*Unresolved*

EBBITS-243	132	Device and service exception handling	Quality Check passed	Exception handling	Exception handling constructs that the developer can use to specify exception responses with a success rate of 9/10.	Functional	high	neutral	Major	Devices	*Unresolved*
EBBITS-244	133	Different views on the device ontology	Part of specification	It should be possible to present a developer user with different perspectives on the device ontology, depending on that user functional need (e.g., a services perspective, device category perspective. etc.)	At least two different views are available in the ontology browser.	Functional	high	neutral	Critical	Interface	*Unresolved*
EBBITS-323	415	Accounting Management System should store orders, and have access to Supplier Management System (to send/receive orders/acks/invoices) .	Closed	The ebbits paradigm can be exploited also for improving the efficiency of accounting task.	The ebbits system grants Accounting Management System (AMS) read access to Supplier Management System	Non-Functional - Operational	neutral	neutral	Minor	Interface	Duplicate

					data repository/retrieval services.						
EBBITS-324	416	Accounting Management System should have access to bank's management system for sending/receiving payment orders/confirms.	Closed	The ebbits paradigm can be exploited also for improving the efficiency of accounting task.	The ebbits system grants Accounting Management System (AMS) read access to banks' management systems/services.	Non-Functional - Operational	neutral	neutral	Minor	Interface	Duplicate
EBBITS-340	466	Query the ontologies conveniently	In Progress	Easy query possibility	SPARQL is used as query language, or an abstraction is used if this turns out to be more usable.	Non-Functional - Usability	None	high	Major	Interface	*Unresolved*
EBBITS-177	42	semantic relationships between data	Quality Check passed	Currently, any data is stored in a simple database. Hence, data is availabe, but cannot be interrelated intelligently.	Data can be queried and inferred in order.	Functional	very low	very high	Blocker	Modelling	*Unresolved*

EBBITS-204	71	Definition of smallest unit can be traced or uniquely identified	Quality Check passed	Small parts of products / cheap parts of products cannot be identified anymore because of physical limitation of tags. Price of tags is too expensive to tag cheap parts.	Clear definition in both domains of what can be tagged.	Functional	neutral	very high	Critical	Modelling	*Unresolved*
EBBITS-247	136	Handling of different device versions in device ontology	Quality Check passed	The device ontology should be able to handle different versions of a device.	The device ontology can maintain at minimum 2 versions of any single device	Functional	neutral	neutral	Major	Modelling	*Unresolved*
EBBITS-253	142	Download and harmonisation of third party device ontologies	Quality Check passed	Re-use of existing device ontologies.	Ontologies from different manufacturers can be used if they are in RDF, OWL or OWL-S.	Functional	very high	very high	Blocker	Modelling	*Unresolved*
EBBITS-258	147	Waste of energy act definitions	Quality Check passed	Some users are waisting energy without realizing/being conscious that there are better alternatives.	Energy wasting behaviors are modeled	Functional	very high	very high	Major	Modelling	*Unresolved*

EBBITS-262	151	Common structure of information is needed	Quality Check passed	Describe situations of pigs in a computable way.	Common data structure to describe situations of arbitrary entities is available	Functional	high	high	Major	Modelling	*Unresolved*
EBBITS-263	152	The system should allow the correlation of information emerging from several sources	Quality Check passed	In order to easily analyse information, the system should allow for the correlation of information from different sources on a farm or enterprise	Information is correlated so that information from different sources on a farm has >0 explicit links. One criterion for the correlation can be timestamps.	Functional	high	low	Major	Modelling	*Unresolved*
EBBITS-289	381	Monitored/sensed data should be (semantically) annotated in local server/repo/store.	Quality Check passed	Information relationships should be available as soon as data enters the ebbits system.	ebbits data acquisition devices/proxies annotates sensed data according to metadata models locally	Non-Functional - Operational	low	high	Major	Modelling	*Unresolved*

					available or requested to semantic stores.						
EBBITS-292	384	Produced items should be annotated with relevant metadata allowing the computation of OEE and BPM metrics (like number of orders/items requested/delivered/ in-progress/faulty)	Closed	Real-time traceability of produced goods/services is achieved by properly annotating their status and metrics during the manufacturing process.	The ebbits system annotates/tags each produced item according to the defined semantic models for produced items which includes OEE/BPM-related metadata and relationships.	Non-Functional - Operational	high	low	Critical	Modelling	Duplicate
EBBITS-293	385	Produced items and consumables should be annotated with logistics-related metadata, allowing their traceability (e.g. present, in transit from supplier, ordered, etc)	Closed	The ebbits platform could provide also a system for efficient management of consumables and logistic aspects needed in (not only) manufacturing domains.	The ebbits system annotates/tags each produced item and monitored consumable according to the defined semantic models for	Non-Functional - Operational	low	neutral	Major	Modelling	Duplicate

					produced items and consumables which includes logistics-related metadata and relationships.						
EBBITS-294	386	Feedstuff should be annotated with origin, genetics, treatment, storage conditions and transport/delivery info (batch number, silo id, amount, timestamp).	Closed	A detailed annotation of feedstuff is required to the reasoning processes devised.	The ebbits system annotates/tags each feedstuff unit/item according to the defined semantic models for feedstuff which includes relevant medical- and logistics-related metadata and relationships.	Non-Functional - Operational	high	very high	Critical	Modelling	Duplicate

EBBITS-295	387	Animals should be annotated with RFID tag, weight, genetics, birth date, and current/historical (timestamped) data (growth/weight, location/movements, consumed feed, water, weaning, insemination, heat during pregnancy, born piglets, anomalies, vaccines).	Closed	Proper identification of animals and logging the most relevant information about their lives is vital for the traceability and quality control proposed in ebbits.	The ebbits system annotates/tags each animal according to the defined semantic models for traced animals which includes live-events and quality-related metadata and relationships.	Non-Functional - Operational	high	very high	Critical	Modelling	Duplicate
EBBITS-296	388	Meat packages should be annotated with ID of animal (for tracing purposes).	Closed	Meat traceability is one of the main added values of the ebbits platform in the agricultural domain.	The ebbits system annotates/tags each meat package according to the defined semantic models for meat packages which includes traceability-	Non-Functional - Operational	low	high	Major	Modelling	Duplicate

					related metadata and relationships.						
EBBITS-297	389	Farm's soil/fields should be annotated with location, laboratory analysis info (date, sample field source, lab id/name, results, etc), current/historical data (types of crops, grain maturity, soil nutrients, quality of products grown, etc).	Closed	Different reasoning applications devised in ebbits for tracking the soil efficiency require a detailed annotation and logging of farms' soil.	The ebbits system annotates/tags each soil field according to the defined semantic models for farms and soil fields which includes soil efficiency and historical metadata and relationships.	Non-Functional - Operational	low	neutral	Major	Modelling	Duplicate
EBBITS-298	390	Farm's repository should store information about harvesting equipment, man power, etc.	Closed	The ebbits platform would provide also some functionalities for the management of resources needed for harvesting, thus they need to be included in the	The ebbits system annotates/tags each monitored farm resource (tools and consumable	Non-Functional - Operational	low	neutral	Major	Modelling	Duplicate

				knowledge model.	s) according to the defined semantic models for farm resources which includes logistics-related metadata and relationships.						
EBBITS-299	391	Sow farm production should be annotated or modelled in order to allow tracking the number of piglets, pigs at fertile age, pigs ready to slaughter, maximum capacity, etc.	Closed	By proper reasoning and processing, the ebbits platform can exploit the knowledge in the network and extract aggregated information required in real time.	The ebbits system annotates/tags each monitored sow according to the defined semantic models for sows/animals which includes medical- and logistics-related metadata and relationship	Non-Functional - Operational	neutral	neutral	Critical	Modelling	Duplicate

					s.						
EBBITS-300	392	Halves of slaughtered pigs should be annotated with id, id of slaughtered pig, weight, fat thickness, date of slaughter, price, etc.	Closed	Traceability of meat requires proper tracking of pigs since birth to stores, thus the information after its slaughter is very relevant.	The ebbits system annotates/tags each slaughtered pig half according to the defined semantic models for halves of slaughtered animals which includes relevant pig characteristics, metadata and relationships.	Non-Functional - Operational	high	low	Critical	Modelling	Duplicate
EBBITS-301	393	Order should be annotated with type/ID of good/service, amount, price, dates(issue, expiry, delivery, etc).	Closed	ebbits platform can be exploited also for generic enterprise processes, like account management.	The ebbits system annotates/tags each order according to the defined semantic models for accounting data which includes	Non-Functional - Operational	neutral	neutral	Minor	Modelling	Duplicate

					BPM-related metadata and relationships.						
EBBITS-302	394	Invoices should be annotated with supplier's info (name, id, bank account, contacts, etc), goods or services info (type/id, amount, price, dates, etc).	Closed	ebbits platform can be exploited also for generic enterprise processes, like account management.	The ebbits system annotates/tags each invoice according to the defined semantic models for accounting data which includes BPM-related metadata and relationships.	Non-Functional - Operational	neutral	neutral	Minor	Modelling	Duplicate
EBBITS-303	395	Payment reports should be annotated with responsible id/name, bank, order number, status, etc.	Closed	ebbits platform can be exploited also for generic enterprise processes, like account management.	The ebbits system annotates/tags each payment according to the defined semantic models for accounting data items	Non-Functional - Operational	neutral	neutral	Minor	Modelling	Duplicate

					which includes BPM-related metadata and relationships.						
EBBITS-304	396	Generic Information should be annotated with requester, sender, content (price, capacity, dates), etc.	Closed	Information exchanged between stakeholders could be exploited for some reasoning, thus it is convenient to model such exchange semantically and to forward or keep linked its metadata through the different stakeholders.	The ebbits system annotates/tags each data exchanged according to the defined semantic models for exchange requests which includes BPM-related metadata and relationships, and copy or link metadata previously associated to the exchanged information.	Non-Functional - Operational	neutral	neutral	Minor	Modelling	Duplicate

EBBITS-310	402	Manufacturing Monitor System must have read access to internal and external environment data.	Closed	The reasoning processes devised by ebbits for the manufacturing domain require environmental monitoring.	The ebbits system grants Manufacturing Monitor System (MMS) read access to data coming from internal/external sensors collected and annotated in their respective repositories.	Non-Functional - Operational	low	low	Major	Modelling	Duplicate
EBBITS-338	464	Appropriate ontology language used: follow standard, provide enough expressivity	In Progress	Tradeoff between expressiveness vs. expensive processing of knowledge representation formalism.	The knowledge representation formalisms must be as small and easy as possible, but as expressive as necessary for our scenarios. As it looks	Functional	high	high	Major	Modelling	*Unresolved*

					currently, using OWL-Lite will solve this requirement.						
EBBITS-339	465	Ontology namespace	In Progress	Common ontology namespace is important.	ebbits ontologies will share namespace http://www.ebbits-project.eu/ontologies	Functional	None	high	Major	Modelling	*Unresolved*
EBBITS-341	467	Only relevant parts in the ebbits ontologies	In Progress	The development of the semantic models must be driven by the real use-cases instead of the theoretical assumptions to avoid the unnecessary complexity in the knowledge.	Ontologies are relevant for ebbits use cases. The ratio of used/non-used terms contained in the ebbits ontologies is >90%.	Functional	None	high	Major	Modelling	*Unresolved*
EBBITS-362	589	Semantic model for the manufacturing domain is created	In Progress	It is important to know when and where data were sensed/monitored. Generated messages and alerts need to be traceable and provide rich	The semantic model fully enables the manufacturing scenarios	Non-Functional - Operational	high	high	Critical	Modelling	*Unresolved*

				information about the event detected. Another added value that ebbits could introduce in enterprise domains is efficiency tracking, which requires a monitoring and log of several metrics in devices/tools/machinery and resources in general. Real-time traceability of produced goods/services is achieved by properly annotating their status and metrics during the manufacturing process. The ebbits platform could provide also a system for efficient management of consumables and logistic aspects needed in (not only) manufacturing domains.						

EBBITS-363	590	Semantic model for the traceability domain is created	Part of specification	A detailed annotation of feedstuff is required to the reasoning processes devised. Proper identification of animals and logging the most relevant information about their lives is vital for the traceability and quality control proposed in ebbits. Meat traceability is one of the main added values of the ebbits platform in the agricultural domain. Different reasoning applications devised in ebbits for tracking the soil efficiency require a detailed annotation and logging of farms' soil. The ebbits platform would provide also some functionalities for the management of resources needed for harvesting, thus they need to be included in the	The semantic model fully enables the traceability scenarios	Non-Functional - Operational	high	very high	Critical	Modelling	*Unresolved*

				knowledge model. Traceability of meat requires proper tracking of pigs since birth to stores, thus the information after its slaughter is very relevant. The traceability relays on the successful exchange of information about the monitored processes linked to the tracked product.							
EBBITS-364	591	Semantic model for the business process domain is created	Quality Check passed	ebbits platform can be exploited also for generic enterprise processes. Information exchanged between stakeholders could be exploited for some reasoning, thus it is convenient to model such exchange semantically and to forward or keep linked its metadata through the different stakeholders.	The semantic model fully enables business processes specified in scenarios	Non-Functional - Operational	neutral	neutral	Minor	Modelling	*Unresolved*
EBBITS-	156	Meta-information	Quality	ebbits needs to	Acquired	Non-	high	very high	Major	Security	*Unresolved*

267		associated with entities needs to be trustworthy	Check passed	guarantee that the information associated with a specific product is the right and correct one that has not been manipulated.	information cannot be manipulated by unauthorized people.	Functional - Security					
EBBITS-287	379	All stakeholders should be annotated with unique Id, type, name and relevant info.	Quality Check passed	Model the users accessing the ebbits system.	The ebbits system includes one or more directories of stakeholders or identity managers, including for each stakeholder annotations about id, type, name and relevant info.	Non-Functional - Security	neutral	very high	Critical	Security	*Unresolved*
EBBITS-305	397	Stakeholders should be stored in local catalogues or external directories (advisory company, chamber of commerce, etc) and accessed by the different subsystems inside and outside	Closed	In order to apply access control lists/policies, all stakeholders must be identified.	Stakeholder directories.	Non-Functional - Operational	neutral	very high	Critical	Security	Duplicate

		ebbits.									
EBBITS-306	398	Manufacturing Monitor System should have write access to local server/repo/store.	Closed	The reasoning processes devised in ebbits require access to knowledge/information found in local stores.	The ebbits system grants Manufacturing Monitor System (MMS) write access to semantic stores.	Non-Functional - Operational	low	high	Critical	Security	Duplicate
EBBITS-307	399	Manufacturing System for Analysis should have read/write access to local server/repo/store.	Closed	Analysis/reasoning is based on local monitored data, and reports are sent back to local server/repo/store.	The ebbits system grants Manufacturing System fo Analysis (MSA) read and write access to semantic stores.	Non-Functional - Operational	low	high	Critical	Security	Duplicate
EBBITS-308	400	Reports should have a list of allowed readers/subscribers.	Closed	Aggregated data, reports, alerts, etc, should be available only to stakeholders interested in them.	The ebbits system grants generation and reading of reports to allowed systems/applications/stakeholders.	Non-Functional - Operational	high	very high	Major	Security	Duplicate

EBBITS-311	403	Maintenance Manager and operators should have access to devices' and production info (proper ACL have to be implemented)	Closed	Some of the added values that ebbits will provide to managers in the manufacturing domain require a continuous tracking of the production processes, metrics and modifications introduced.	The ebbits system grants to allowed stakeholders access to data and services from production devices.	Non-Functional - Operational	high	low	Critical	Security	Duplicate
EBBITS-312	404	Farm's Management System should have access (through secure connection) to Feed Provider Resources Monitoring System.	Closed	The food traceability scenario requires an exchange of information between all the enterprises involved in the production chain.	Authenticated/secure access to Feed Provider RMS. The ebbits system grants Farm's Management System (FMS) secure read access to Feed Provider Resources Monitoring System (RMS).	Non-Functional - Operational	neutral	low	Major	Security	Duplicate

EBBITS-315	407	Farm's Monitoring System should have access to local server/repo/store.	Closed	Monitoring system keep track of several process in the farm and needs the metadata stored in local server.	The ebbits system grants Farm's Monitoring System (FMoS) write access to semantic stores and data repositories.	Non-Functional - Operational	low	neutral	Critical	Security	Duplicate
EBBITS-316	408	Farm's Management Application Server should access local monitoring system servers/repos/stores for generation of reports	Closed	Management/accounting systems perform their tasks based on the information stored/provided by local monitoring systems.	The ebbits system grants Farm's Management Application Server (FMAS) report generation.	Non-Functional - Operational	low	neutral	Major	Security	Duplicate
EBBITS-317	409	Consumer should have access to meat reports.	Closed	Relevant reports about the produced meat since the piglet born will be used by ebbits in order to enhance the information provided to consumers about the meat they are buying.	The ebbits system grants consumer applications read access to meat production chain reports.	Non-Functional - Operational	high	neutral	Major	Security	Duplicate

EBBITS-318	410	Controller should have access to (online) queries to meat packages IDs.	Closed	Quality and health control authorities can rely on ebbits in order to track the distribution of meat packages when they discover some anomaly.	The ebbits system grants quality controllers query access to meat origin and traced metadata.	Non-Functional - Operational	low	very high	Major	Security	Duplicate
EBBITS-319	411	Farm's Management System should have access to field info repository.	Closed	Optimisation of the resources, like fields in an agricultural domain can be achieved by analyzing and processing information logged by their respective monitoring systems.	The ebbits system grants Farm's Management System (FMS) read/write access to historical data repository.	Non-Functional - Operational	neutral	low	Major	Security	Duplicate
EBBITS-322	414	Slaughterhouse Management System and Retail Management System should have access to both production (read) and slaughter (write) repositories.	Closed	Accounting though ebbits will be simplified thanks to the knowledge acquired by multiple systems in the food production chain.	The ebbits system grants Slaughterhouse Management System (SMS) and Retail Management System (RMS) read access to production and	Non-Functional - Operational	low	low	Major	Security	Duplicate

					slaughter data repositories.						
EBBITS-325	417	Manager should have access to directory of stakeholders to interact with them (send/receive info).	Closed	The ebbits paradigm can be exploited also for improving the efficiency of accounting task.	The ebbits system grants allowed stakeholders read access to stakeholders directories/identity manager(s).	Non-Functional - Operational	neutral	neutral	Major	Security	Duplicate
EBBITS-367	596	ebbits Access Control Policy will be respected by Ontology Manager	Part of specification	WP4 components need to respect WP8's access control policies	ebbits Access Control Policy will be respected by Ontology Manager	Non-Functional - Security	None	very high	Major	Security	*Unresolved*
EBBITS-366	593	The ebbits platform offers ad-hoc aggregation of knowledge	In Progress	Knowledge is distributed in the ebbits network, and must be aggregated when a query requires so, transparently for the application	The platform is able to provide a response to queries that require aggregation of	Functional	high	high	Critical		Unresolved

					knowledge with an acceptable delay (< 1 sec)						

7.3 WP5

Key	ID	Summary	Status	Rationale	Fit Criterion	Requirement Type	Cust. Satisf.	Cust. Dissatisf.	Priority	Component/s	Resolution
EBBITS-178	43	Aggregating collected sensor data at a central point	Resolved	The aggregation of collected data is important for analyzing the data.	A framework is provided that aggregates collected sensor data at a central point of an application.	Functional	very high	low	Blocker	Architecture	Implemented
EBBITS-249	138	The system should support distributed intelligence on embedded system.	Resolved	We have a need for "intelligence" (Semantics, reflection etc.). We have a need for supporting embedded systems. This should not conflict	Minimum hardware requirements (which must be supported by all target hardware) are defined and all hardware that meets the specifications is guaranteed	Constraint	neutral	neutral	Blocker	Architecture	Duplicate

					to work with hydra.						
EBBIT S-265	154	Aggregate data from various data bases and sources	Closed	Information will be stored in several places, but needs to be combined in some place and assigned to the actual product or entity.	A data aggregation component is available.	Functional	neutral	high	Major	Architecture	Duplicate
EBBIT S-309	401	ebbits platform should have a publish-subscribe system	Part of specification	The different monitored processes in ebbits should generate alerts and send them to the interested subsystems or stakeholders.	Directory of alerts/events. The ebbits system includes one or more directories of alerts or events, including for each item the list of subscribers.	Non-Functional - Operational	neutral	high	Major	Architecture	*Unresolved*
EBBIT S-327	451	Sensor fusion algorithm must be added during run-time in a modular and extensible way.	Resolved	Sensor fusion algorithms vary greatly and can't be generalized only in one module.	New sensor fusion algorithms can be added in a pluggable way	Functional	high	neutral	Critical	Architecture	Implemented
EBBIT S-328	452	Sensor fusion algorithms must be realized as a decoupled component.	Part of specification	Sensor fusion algorithms can be re-used by several other components.	Sensor fusion algorithms are available as services or libraries	Non-Functional - Maintainability	neutral	neutral	Major	Architecture	*Unresolved*

					to the entire platform.						
EBBITS-332	456	Context management should be able to process a large number of sensor events	In Progress	A Manufacturing site has at least 500 sensors, where each one raises about 1 event per second. All these events have to be processed by context management.	Context management is able to process at least 500 events / second.	Non-Functional - Performance	neutral	neutral	Major	Architecture	*Unresolved*
EBBITS-171	36	Controlling of machines/stations in manufacturing plant remotely	Resolved	To optimize production process.	Relevant stations that operate automatically can be started/stopped via remote calls.	Functional	low	high	Major	Communication	Implemented
EBBITS-200	67	Distributed data can be referenced in data fusion and context management	Quality Check passed	Data is spread across several instances of ebbits, even several enterprises. In context management, data fusion, and also semantic querying, distributed data needs to be referenced.	References to remote data can be defined and the queries can be executed.	Functional	high	high	Major	Communication	*Unresolved*

EBBIT S-182	47	Resilience and adaptable to environment condition changes	Resolved	Environmental changes such as lighting, temperature affect the results of manufacturing process. so far machines are tuned manually by technicians. adapting to environmental condition can lead to reducing energy consumption e.g.: reduce heater temperature when it's warm outside.	Machines can adapt its parameters adapting to environmental changes.	Non-Functional - Operational	low	high	Critical	Configurability	Implemented
EBBIT S-211	79	Location tracking should be implemented as independent app	Closed	Decoupling from existing system	Tracking system is implemented independently	Non-Functional - Operational	very high	high	Critical	Configurability	Duplicate
EBBIT S-250	139	Support runtime reconfiguration	Resolved	To supporting monitoring leading to adaptation, the architecture should be dynamic in the sense that components/services should be connectable at runtime.	Services and devices can be connected during runtime.	Functional	high	high	Major	Configurability	Implemented

EBBITS-210	78	System should provide location tracking of context entities	Reopened	Location is one of the basic context attributes. Due to its importance, as well as the explicit request from end-user workshops and the different options of location tracking, this is considered a requirement on its own.	Location is available as a generic context attribute (EBBITS-330), and applications can specify which sensors to use for location tracking (and choose among different standard tracking methods)	Functional	neutral	very high	Blocker	Context	*Unresolved*
EBBITS-213	81	System should show Energy Cost for different granularity of production processes	In Progress	Energy cost at different levels is needed to do benchmarking of operational processes.	Each automated process, machine is able to show energy cost	Functional	very high	very high	Blocker	Context	*Unresolved*
EBBITS-223	91	The system provides access to aggregated/selected information through filters or fusion	In Progress	Different processes or process steps require different access to information, e.g. they only need parts of the information or they need aggregated	Processes can specify that information should be fused or filtered, and they only get the requested information	Functional	high	high	Major	Context	*Unresolved*

				information.							
EBBITS-224	92	Early maintenance notification when needed	Part of specification	Early maintenance prevent permanent damage to the robots, ensure the reliability of robots	Show 3-5 early maintenance use cases. Users/technicians are notified if robots need maintenance	Functional	high	high	Minor	Context	*Unresolved*
EBBITS-266	155	Synchronisation of Acquired Data is necessary	Resolved	Data synchronization might be necessary, because data will be acquired automatically, manually, semi-manually with different timestamps.	A data synchronization component performs a time stamp based synchronization of a data set.	Functional	high	neutral	Major	Context	Implemented
EBBITS-271	160	The system should be self-ware	Resolved	User statement: "Let me make my system self-aware"	User gets informed of any event she is interested in.	Functional	high	neutral	Major	Context	Nonsense
EBBITS-288	380	Monitored/sensed data should be contextualized (timestamp, geotag, type, etc).	Closed	It is important to know when and where data were sensed/monitored.	The ebbits system annotates/tags each measurement according to the defined semantic models for	Non-Functional - Operational	low	high	Major	Context	Duplicate

					sensed data which includes relevant classification and spatial-temporal metadata and relationships.						
EBBITS-290	382	Alerts should be contextualized (timestamp, geotag, type, message, warning level, etc).	Resolved	Generated messages and alerts need to be traceable and provide rich information about the event detected.	The ebbits system allows the generation/consumption and historical trace of alerts.	Non-Functional - Operational	low	high	Major	Context	Duplicate
EBBITS-326	450	The system should compensate deviations of incoming data.	Part of specification	The incoming data could contain outliers e.g.: spikes which should not influence the measurement.	System provides configureable filter to exclude outliers e.g.: define upper & lower threshold	Functional	neutral	high	Major	Context	*Unresolved*

EBBIT S-330	454	Applications can monitor the state of devices and context entities	Resolved	Continuous monitoring of context entities (e.g., pigs, welding guns) can be used to detect anomalies (e.g.: ill Pigs, overheated welding gun)	Applications receives current state of context entity/device and notifications about state changes in 100% of state changes.	Functional	low	very high	Blocker	Context	Implemented
EBBIT S-196	63	Diagnostic component to detect and correct malfunctions	Reopened	If a malfunction has slipped in the plant it should be corrected ASAP. In fact, if possible any fault behaviour should be prevented at all.	Malfunctions or strange behaviour of machinery are recognized early enough.	Functional	high	neutral	Major	Devices	*Unresolved*
EBBIT S-252	141	Report errors in devices	Resolved	Devices should be able to report errors.	Devices proxies provide report and log errors.	Functional	high	neutral	Critical	Devices	Implemented
EBBIT S-381		Self-* manager needs to monitor the connection to the physical devices	Quality Check passed	Proxy connection to the physical devices could be unstable.	Self-* manager implementation is available that can handle unstable device connection.	Functional			Major	Devices	*Unresolved*

EBBIT S-382		Device proxies can shut off a physical device from the network if it causes a lot of problem	Quality Check passed	Sensors causing a lot of problems could affect the stability of the proxy.	Shut-off functionality available, logic to detect problems implemented.	Functional			Major	Devices	*Unresolved*
EBBIT S-383		Device proxies adjust event publishing frequency according to the network bandwidth	Open	Static frequency of sensor reading is not optimal when the network bandwidth fluctuates because it causes congestion when the bandwith is currently slow.	Control management services available.	Non-Functional - Performance			Major	Devices	*Unresolved*
EBBIT S-384		Device proxies reset devices upon problems when no other fix is defined by the developer	Quality Check passed	Sensors causing a lot of problems could effect the stability of the proxy; Reset is an easy way to recover the device states.	Shut-off functionality available, logic to detect problems implemented.	Functional			Major	Devices	*Unresolved*
EBBIT S-385		Device Proxies need a standardized interface that provides control management services for event publication	Quality Check passed	a way to configure the event publication (topic, frequency, data fusion etc.) is needed to support adjusting data traffic according to the network	Device proxy interface defined	Functional			Major	Devices	*Unresolved*

EBBITS-184	50	Filtering to Obtain relevant Information	Resolved	Too much information overwhelms farmers while making decisions.	Farmers are able to view the relevant information out of the whole.	Non-Functional - Usability	low	high	Major	Interface	Duplicate
EBBITS-268	157	Different Views on the Data is necessary	Resolved	We need services that provide different views on the data cloud by combining data from different sources.	Data can be filtered and sorted based on an arbitrary set of parameters.	Functional	very high	very low	Major	Interface	Out of scope
EBBITS-329	453	The system must be able to assign fused data as a context attribute of an entity	Resolved	Entities cannot provide their own context values, therefore sensors are needed to provide their context values. e.g.:a thermometer is needed to provide the temperature of a room.	The system allows relationship among context of entities and sensors to be modelled.	Functional	neutral	very high	Blocker	Interface	Implemented
EBBITS-242	131	The system should be able to take decision based on uncertain facts	Quality Check passed	uncertain fact could happen due to noisy sensor data, interference from the environment, unreliable sensors, etc.	The system supports at least two different soft-logic algorithms. e.g.: Fuzzy logic & probabilistic approach	Functional	high	neutral	Minor	Modelling	*Unresolved*

EBBITS-291	383	Devices should be annotated with id, type, name, location, and current/historical data (status, work in progress, consumables levels, quality record, energy consumption, energy profile, planned/unplanned intervention/maintenance, fault info, etc).	Resolved	Another added value that ebbits could introduce in enterprise domains is efficiency tracking, which requires a monitoring and log of several metrics in devices/tools/machinery and resources in general.	The ebbits system provides a device catalog with the semantic models for all supported devices.	Non-Functional - Operational	high	low	Major	Modelling	Duplicate
EBBITS-214	82	System should provide access restrictions to sensitive information.	Resolved	Some sensitive information endanger company existence.	System provides access restrictions to sensitive information.	Functional	very high	very high	Blocker	Security	Duplicate
EBBITS-246	135	Dynamically loaded libraries must undergo a security check before their usage	Quality Check passed	Dynamically loaded libraries (e.g. DLL, JAR, OSGI bundle) could contain malicious code.	Dynamically loaded libraries must contain a valid signature in order to prevent security breaches in the system.	Functional	neutral	neutral	Major	Security	*Unresolved*

EBBIT S-333	458	Libraries must only be accessible only for permitted applications.	Quality Check passed	Libraries could contain functionality that should not be available to all kinds of applications (e.g. calculation of quality rating of meat should only be allowed for slaughterhouse application but not for consumer application.)	The dynamic loading of libraries must be restricted through policies.	Non-Functional - Security	very high	low	Minor	Security	*Unresolved*
EBBIT S-179	44	Farmers are able to retrieve optimized models from research	Resolved	Farmers are willing to share data if they could get something in return such as models to optimize feeding process.	Farmers can get optimized models electronically.	Functional	high	low	Minor	unassigned	Out of scope
EBBIT S-180	45	System can feed the farms data to research	Closed	Most of the farming models are developed by research organizations, universities etc.	Researchers are able to get their hands on life data on farms.	Functional	high	low	Minor	unassigned	Nonsense

7.4 WP6

Key	ID	Summary	Status	Rationale	Fit Criterion	Requirement Type	Cust. Satisf.	Cust. Dissatisf.	Priority	Component/s	Resolution
EBBITS-189	55	Reduce paper based communication	In Progress	Paper based communication between companies/enterprises takes time and efforts for inputing/aggregating sensor data into the backend enterprise systems	With the use of the Ebbits middleware, 50% reduction of current paper based communication.	Functional	neutral	very high	Critical	Communication	*Unresolved*
EBBITS-212	80	ebbits should bridge communication between different applications in farms	Closed	Applications between vendors are not able to communicate to each other, while data sometimes needs to be shared among applications.	At least applications from 3 different vendors are able to exchange information.	Functional	high	high	Major	Communication	Duplicate
EBBITS-272	161	Electronic exchange of reports between enterprises	Closed	Report on the slaughtered pig is sent back ON PAPER to the farmer. This should be done electronically, in order for the farmer to combine it with the feeding information, e.g. identification of a father that	Information is automatically put into a report format and send to a recipient.	Non-Functional - Operational	low	very low	Major	Communication	Duplicate

				"produces" ill pigs.							
EBBITS-229	106	Energy benchmarking of different granularity such as machines, processes, plants	Closed	Management would like to know how effective the energy is used in different operational levels.	Management can do benchmarking in different operational level	Functional	very high	very high	Blocker	Configurability	Duplicate
EBBITS-230	107	Possibility for comparing different energy consumption among plants and corresponding processes	Part of specification	Management would like to learn from other plants if they use energy more efficiently.	Management can compare energy data of plants.	Functional	very high	high	Critical	Context	*Unresolved*
EBBITS-231	108	Summary of energy related information at management level for supporting management level optimizing energy use	Part of specification	Management needs a summary of energy related information that help them making decision to optimize the energy usage. The detailed information to be summed up has to be provided be the ebbits middleware.	Management can access summary.	Functional	high	very high	Major	Context	*Unresolved*
EBBITS-334	459	Mobile access to farm data in the ERP system	In Progress	Mobility and access to mobile devices are required to manage aspects of the farm remotely if you are outside	Mobile access (at least a read one) to the data of the ERP system is granted	Non-Functional - Operational	very high	low	Major	Devices	*Unresolved*

				your office.	and solution should be browser-based.						
EBBITS-369		Query the main data in web services and the ontologies in a convenient, combined way	In Progress	It should be possible to pose combined queries to the background knowledge in form of ontologies and data coming from web services.	SPARQL can be used as query language to ask information from ontologies and get the important data from web services.	Functional	high	high	Major	Interface	*Unresolved*
EBBITS-264	153	Store meta-information with package labels	In Progress	Meta-data should possibly be stored with packages, this may include: Temperature, location, dimension and weight	A minimal set of 5 attribute-value pairs can be associated with any package/label.	Functional	high	neutral	Major	Modelling	*Unresolved*
EBBITS-368		Service descriptions include operational and business aspects	In Progress	Bring together business, operational and technical aspects of services into one single coherent language.	At least one service from one use case has been described including operational and business aspects.	Functional	very high	high	Major	Modelling	*Unresolved*

EBBITS-273	162	Access-control of data in enterprise systems	Part of specification	Access to data needs to be controlled, because some authorities require having access to this data, other stakeholders might have restricted access, other information could be made publicly available.	Access rights can be defined for several stakeholders.	Functional	high	very high	Blocker	Security	*Unresolved*

7.5 WP7

Key	ID	Summary	Status	Rationale	Fit Criterion	Requirement Type	Cust. Satisf.	Cust. Dissatisf.	Priority	Component/s	Resolution
EBBITS-279	214	Graceful degradation	In Progress	The system should be functional even if some parts are unreachable or non functioning	System should be working even if 50 percent of sub systems are unreachable	Functional	high	very high	Major	Architecture	*Unresolved*
EBBITS-280	215	Automatic Recovery from communication failures	In Progress	We need to able to still guarantee delivery of data/events also in case of minor/temporary communication disruption.	The system should be able to recover from a 10 minute communication failure	Functional	high	very high	Critical	Architecture	*Unresolved*

EBBITS-282	217	It must be possible to order events in the actual event sequence	In Progress	The delivery of events received from different sources might not follow in the original sequence at transmission. There might be communication delays etc that make them arrive in the wrong order. Nevertheless rules should be able to express temporal/sequence dependencies on events that reflect the actual temporal event sequence at the sources.	It will be possible to express rules that contain temporal/sequence dependencies	Functional	neutral	very high	Critical	Architecture	*Unresolved*
EBBITS-283	218	An event history should be maintained	In Progress	Rule definitions can refer to past events, and behaviour can be defined based on that event history.	A rule that refers to previous events can be expressed.	Functional	neutral	very high	Critical	Architecture	*Unresolved*

EBBITS-285	220	Event model based on common vocabulary	In Progress	The ebbits platform must be able to handle a potentially large number of events on different levels of abstraction in the system architecture and with different semantics. The processing of events should also be related to the processing and management of data in ebbits, and this should be based on the use of common vocabularies.	The system can distinguish between several (minimum 2) event types based on a common ebbits vocabulary, represented in the event model.	Functional	high	high	Critical	Architecture	*Unresolved*
EBBITS-286	221	Events mapped to (business) rules	In Progress	Events and services are basic mechanisms for the implementation of the (business) rules logic in the ebbits architecture.	Events of a at least two different event types can be detected in a (business) rule, as expressed in the ebbits business rules framework.	Functional	high	high	Major	Architecture	*Unresolved*

EBBITS-335	461	Dependencies on past events possible	In Progress	An action executed by the system may be dependent on more than one event, and some of them could have occurred in the past.	Actions executed by the system can be processed dependent on current events as well as events having occurred in the past.	Functional	high	high	Major	Architecture	*Unresolved*
EBBITS-336	462	Scalable event processing	In Progress	The platform must be able to handle a large number/high frequency of parallel event streams.	The platform can be configured to handle a span from low frequency processing (10 e/s) to high frequency processing (500 e/s).	Non-Functional - Performance	high	neutral	Critical	Architecture	*Unresolved*
EBBITS-337	463	Semantic event processing	Resolved	It must be possible to interpret events in the context of the different layers in the architecture (from PWAL to a business rules layer).	The system provides at minimum two layers of event processing where events can be captured and possibly filtered/fused	Functional	high	high	Major	Architecture	Implemented

EBBITS-378		Entity structure accessible from event rules	Open	The Event Processing Agent needs the entity structure for writing rules over complex entities.	Relations expressing entity compositions (part-of, consists-of) can be used in rules expressed over ebbits entities.	Functional	high	high	Major	Architecture	*Unresolved*
EBBITS-167	28	Heterogeneous enterprise systems need to be able to exchange information.	Resolved	Enterprises use various information systems that need to exchange information. Information needs to be propagated throughout the chain.	At least three different enterprise systems can exchange information.	Functional	low	very high	Minor	Communication	Nonsense
EBBITS-201	68	Notification throughout the chain	In Progress	A reduction of time for recalling a product from end consumers is needed.	At least 2 levels of the link in the chain can be notified automatically. For instance, a farmer found a mutating pig problem, it can notify slaughterhouse and sausage factories who	Functional	neutral	very high	Minor	Communication	*Unresolved*

					bought meat from the slaughterhouse automatically.						
EBBITS-269	158	Alarms are send when specific situations occur	In Progress	Issue alarms when an animal or production machine behaves differently or abnormal.	Application (domain) specific alarms can be modelled and executed by specific event types and by employing the event management functionality of the ebbits archiecture. Rules can be expressed (by an application developer) that may trigger alarm events based on lower level device or system events as well as system	Functional	high	very low	Major	Communication	*Unresolved*

					states (including time).						
EBBITS-284	219	Event history size and/or time span should be configurable	In Progress	Different applications have different needs for the event history.	The event history can be configured wrt to timespan and size.	Functional	high	very high	Critical	Configurability	*Unresolved*
EBBITS-174	39	Retrieve manufacturing data history of any relevant event during production	In Progress	If production defects are recognized, it is helpful to look at the production process history in order to find out what caused the defects.	Any manufacturing relevant (pressure, energy consumption, temperature, humidity, time etc) data is retrievable.	Functional	very low	very high	Major	Context	*Unresolved*
EBBITS-281	216	Explicit model of context	In Progress	It must be possible to trace events and data items across processes and workflows, context management is one of the mechanisms to support this.	The system supports an explicit model of context, which can be applied in at least two application domains.	Functional	high	high	Major	Context	*Unresolved*

EBBITS-379		Navigable entity IDs	Quality Check passed	The Event Processing Agent needs to be able to find related entities instances from a given entity id.	Given en entity instance (and id), it is possible to follow at least one edge in the correspondin g entity structure model.	Functio nal	neutral	neutral	Major	Context	*Unresolved*
EBBITS-380		Using Process IDs in Events	Quality Check passed	The Event model processID needs to be mapped to the corresponding process model.	If there is a process model available in the system, it can be referenced by any event processed by the event processing network.	Functio nal	neutral	neutral	Major	Modellin g	*Unresolved*

7.6 WP8

Key	ID	Summary	Status	Rationale	Fit Criterion	Requirement Type	Cust. Satisf.	Cust. Dissatisf.	Priority	Component/s	Resolution
EBBITS-163	23	The ebbits platform should facilitate the integration of new physical devices into existing enterprise systems	Part of specification	Enterprises that already have a running ebbits system may need to add new devices.	ebbits provides a plug 'n' play framework for the integration of new devices, abstracting their technological-specific interfaces (via Physical World Adaptation Layer) and exposing to the platform their capabilities and information in a common way (PWAL API), such that they can be discoverable and aggregated	Functional	high	very high	Blocker	Architecture	*Unresolved*

					(by the Device Discovery Manager) to models previously defined (in the Device Catalog Ontology).						
EBBITS-256	145	Support of low-end devices	Quality Check passed	Middleware must support low-end devices like RFID tags. Therefore, it must be compatible with at least 32-bit devices with < 512 KB RAM/FLASH or less. For smaller devices, proxies can be used.	Middleware is able to be installed and run on low-end 32-bit devices with 512 KB RAM/FLASH in 90% of all cases. Proxies can be created to support more limited devices in 40% of all cases.	Constraint	high	neutral	Critical	Architecture	*Unresolved*
EBBITS-345	471	ebbits should implement a distributed time dissemination and synchronization service	Quality Check passed	Several application in ebbits relay directly or indirectly on accurate timestamping of data and events, thus given the distributed nature	ebbits provides a time dissemination and time synchronization service	Functional	None	high	Major	Architecture	*Unresolved*

				of ebbits, a time dissemination and synchronization service is required within the platform.							
EBBITS-346	472	PWAL should support accurate timestamping of data acquainted	Quality Check passed	The PWAL should be able to properly handle time information of the data and events it access/generate. This handling must include the synchronization to the ebbits time dissemination service and compensation of hardware and communication delays if possible.	The PWAL, while managing data or events, handles time-related information through the interaction with the time synchronization services.	Functional	None	neutral	Major	Architecture	*Unresolved*
EBBITS-347	473	PWAL should expose suitable methods in order to enrich raw data	Quality Check passed	Data acquainted through the PWAL needs to be enriched with meta-data (like source, geotag, timestamp, units, etc), which will be then used by upper layers and applications. Being the PWAL the lowest link between ebbits	Meta-information could be attached to data or events at PWAL level	Functional	None	neutral	Major	Architecture	*Unresolved*

				platform and the physical world, part of this meta-information could be already attached at this level, easing the processing of it by the multi-sensor fusion and context awareness services.							
EBBITS-351	477	PWAL should implement a heterogeneous multi-data aggregation in single events.	Resolved	Event-driven data acquisition can easily generate scalability issues if single events are generated per sample. Thus aggregation of several samples in a single or few events has to be devised.	It is possible to aggregate events coming from the same source at PWAL level	Functional	None	neutral	Major	Architecture	Out of scope

EBBITS-352	478	PWAL should expose basic feature extraction and sensor fusion functionalities (e.g., moving average, decimation, filtering, etc) in order to minimize scalability issues	Quality Check passed	Some variables gathered through the PWAL could require high sampling frequencies and maybe just some feature of the acquired signal is of interest, so in order to save some bandwidth and avoid scalability issues, the PWAL could offer some basic feature extraction and sensor fusion capabilities.	The PWAL offers methods to extract features and to exploit the sensor fusion	Functional	None	neutral	Major	Architecture	*Unresolved*
EBBITS-354	480	Multiradio devices should avoid re-generation of HIDs when migrating to a different LinkSmart Network Manager	Quality Check passed	Devices with multiradio capabilities should be able to migrate to different networks without affecting the functionalities at the LinkSmart layer, including identificability, thus when registering to a new Network Manager, the device should try to register itself with the previous	Devices with multiradio capabilities don't affect the LinkSmart layer while switching radio interface, thanks to a proper HIDs assignments' mechanism.	Functional	None	neutral	Major	Architecture	*Unresolved*

				HID, triggering an unregistration request to the previous Network Manager							
EBBITS-355	481	Multiradio devices should be use local data caching and delay tolerance networking	Quality Check passed	Devices with multiple radio interfaces and in general devices with delay tolerance networking capabilities may experience periods with no networking, where some events may have happen, thus a local caching of its data may prevent any loss of data.	ebbits allow multiradio devices to use local data caching and delay tolerance networking.	Functional	None	neutral	Major	Architecture	*Unresolved*
EBBITS-356	482	Multiradio devices with local data caching should implement suitable application specific data-expiration policies in order to prevent cache overflows	Quality Check passed	Devices with local data caching for delay tolerance networking, may exhibit cache overflows if they generate big amounts of information and/or experience large offline periods, thus data-expiration policies need to be applied	The platform prevents the data loss of devices with multiple radio interfaces (e.g. in case of loss of network intervals)	Functional	None	neutral	Major	Architecture	*Unresolved*

				in order to prevent this.							
EBBITS-357	483	Multiradio devices should be able to gather information about their network interfaces needed for the selection policies.	Quality Check passed	Multiradio devices must be able to collect and expose some information about their interfaces, like throughput, energy consumption, cost of traffic, quality of service, between others. Such information will be useful for defining interface selection policies.	Multiradio devices can expose information about network interfaces	Functional	None	neutral	Major	Architecture	*Unresolved*
EBBITS-358	484	Multiradio devices should select the most proper network interface according to the application requirements	Quality Check passed	Depending on the properties of the information (e.g., importance, quality of service, timeout, etc), multiradio devices should select the network interface most suitable to the requirements of the application accessing it, which could be a energy or cost saving policy for instance, or an urgent event that should be	Multiradio devices are able to select most proper network interface consistently with the application implemented	Functional	None	neutral	Major	Architecture	*Unresolved*

				transmitted at all costs							
EBBITS-388		Provide support to logging of information from physical-world devices and sub-systems	Quality Check passed	Logging mechanisms are used by companies to check correct functioning of devices and subsystems. Since logging at device level generates a great amount of information which is not needed continuosly, configurable and flexible methods should be provided to control logging features. Among the logged information, additional meta-data about the lack or corruption of information from the field should also be included.	Logging mechanisms within the PWAL can be controlled and configured at runtime	Functional			Major	Architecture, Middleware Layer	*Unresolved*

EBBITS-359	485	6LoWPAN networks should include frequency agility features in order to enhance the overall system reliability	Quality Check passed	The ability to jump to a different channel automatically according to the channel occupancy or interference seems a promising solution in order to cope with the high electromagnetic pollution present in manufacturing scenarios, thus a frequency agility service should be included in 6LoWPAN networks	The ebbits platform includes frequency agility features in order to increase overall system reliability	Functional	None	low	Major	Communication	*Unresolved*
EBBITS-373		Out of channel event management is needed	Open	Due to poor IT reliability, it is not always possible to programmatically react to channel problems or errors. It is supposed to just trigger channel events. Out of channel reporting of network events is prefered to automatic reaction to problems. Out of channel alarm mechanisms are	network related problem are triggered as events.	Functional			Trivial	Communication	*Unresolved*

				needed.							
EBBITS-176	41	integration of mobile sensing devices on running infrastructure manufacturing plant without interrupting running processes	Part of specification	In brown field it is too risky or too expensive to stop production in order to install missing sensors (e.g. smart meter).	It is possible to enhance a station/machine/robot with mobile sensing devices to gather data.	Functional	very high	very low	Critical	Communication, Context	*Unresolved*
EBBITS-185	51	The network infrastructure needs to have self-configuration capabilities	Quality Check passed	Due to the huge amount of heterogeneous devices that can be connected to one network, this network needs to support the deployment through some sort of self-configuration.	A network of 20 devices can be deployed within one hour.	Non-Functional - Operational	high	neutral	Major	Configurability	*Unresolved*
EBBITS-187	53	New products should be networked with mainstream enterprise systems easily and cost-efficiently.	Part of specification	New products should be integrated into existing systems easily and cost-effectively, in order to support higher value-added, interoperable solutions.	A new product can be connected to an existing enterprise system within one day by one person.	Non-Functional - Operational	high	very high	Major	Configurability	*Unresolved*

EBBITS-240	129	Energy consumption should be optimized automatically	Open	Farmers want to optimize the energy consumption in their production and they adapt this manually, and they would like to have this done automatically (e.g. putting some production steps towards a cheaper time of the day).	Rules can be defined to automatically optimize the energy Consumption	Functional	very high	high	Major	Configurability	*Unresolved*
EBBITS-248	137	Systems built using HYDRA should be scalable in terms of devices communicating	Part of specification	In large installations (e.g. in large factories) there will be many (embedded) devices in total. The middleware should support the development of such big systems.	The middleware supports applications in which more than 500 devices exist.	Non-Functional - Performance	neutral	neutral	Major	Configurability	*Unresolved*

EBBITS-344	470	PWAL should support reconfigurable dynamic polling policies	Part of specification	Applications could have different polling needs, which eventually could change in runtime, so the PWAL must offer an easy reconfiguration of the polling policies per parameter and per application	The PWAL provides a control interface supporting the definition of polling policies (i.e., sampling and/or reporting frequency, intervals, time-outs, etc.) for the available devices.	Functional	None	neutral	Major	Configurability	*Unresolved*
EBBITS-372		PWAL framework must scale efficiently when multiple drivers are executed at runtime	Quality Check passed	Multiple PWAL drivers might be running inside the same PWAL instances; the coexistence of multiple driver should not affect performance. The core framework currently should provide methods to divide PWAL workload if needed.	PWAL runs multiple PWAL drivers withouth performance issues (beyond the ones caused by the underlying hardware).	Functional			Minor	Configurability, Devices	*Unresolved*

EBBITS-237	125	Associate meta-information to items	Quality Check passed	In parallel to the actual lifecycle (grow up of the animal, feeding, butchering, transportation, selling, consuming) there exists additional information such as the amount of food, medication an animal has had, the energy for the production and transportation, that needs to be acquired and associated with the (bits and pieces of) animal.	Any item with an ebbits identifier can be associated with a set of meta-information.	Functional	high	low	Major	Context	*Unresolved*
EBBITS-260	149	Retrieve the behaviour on an individual animal level	Quality Check passed	Monitoring the drinking behaviour allows to recognize diseases 20 hours before. However, today it is not able to retrieve the drinking behaviour on an individual pig level, rather in a group. But with the emerging RFID identification it would be possible	The drinking behaviour can be retrieved on a individual pig level	Functional	very high	low	Major	Context	*Unresolved*

EBBITS-278	167	Save historical information in farms	Open	Feeding history	Historical information is saved	Functional	very high	high	Major	Context	*Unresolved*
EBBITS-169	34	Each sow carry an electronic unique ID	Quality Check passed	If battery cage is not used anymore and sows are let loose, farmers need to identify and track sows uniquely because each sow produces piglets with different quality and productivity.	Farmers can identify sows uniquely and track them if they are on the loose.	Functional	low	high	Major	Devices	*Unresolved*
EBBITS-181	46	Affordable tagging/tracking system for pigs	Resolved	If the tagging price is too high, the farmers are reluctant to use this tags	The price of a tag is less than 5% of the total profit a farmer can get from a pig.	Non-Functional - Operational	very high	low	Critical	Devices	Out of scope
EBBITS-251	140	Device proxies should provide a common monitoring interface	Quality Check passed	The middleware should contain services that allow monitoring on what devices are doing. This includes monitoring response time, device load (e.g., CPU), and message interchanges per second.	Device proxies are instantiated with a monitoring interface linked to the network- and context-management features at device level.	Functional	neutral	high	Major	Devices	*Unresolved*

EBBITS-261	150	Applied stand-alone devices should have a long battery life span	Quality Check passed	Data analysis is not done on the chip, because this consumes energy and the battery life-span comes to 3 months which is far too low.	Applied stand-alone devices have a minimal battery life span of one year.	Non-Functional - Operational	high	low	Major	Devices	*Unresolved*
EBBITS-348	474	PWAL should be able to match PLC symbols with ebbits ontologies	Resolved	The definition of symbols on an OPC server (i.e., variables of interest inside the PLC) could be made in accordance with the PLC programmer according to an agreed convention that could be exploited for an automatic matching with a predefined model in the Device Catalogue Ontology	PWAL provides an interface to expose PLC symbols as events, services or variables according to the models described within the ebbits ontologies.	Functional	None	neutral	Minor	Devices	Out of scope
EBBITS-349	475	PWAL should adopt a lock and semaphore-based policy to the access of PLC memory	Part of specification	Since different applications could eventually be interested in a common variable, the PWAL must assure its access is controlled in order to avoid	When the PWAL tries to read or write some critical variable onboard the PLCs, all variables	Functional	None	very high	Major	Devices	*Unresolved*

				collisions in concurrent requests, as well as possible locks or restrictions to specific applications	exposed are safe						
EBBITS -350	476	PWAL should implement an error control strategy to assert correct data type and values written to the PLC	Quality Check passed	Errors in writing variables to the PLC must be avoided at all cost, since they can lead to a halt in the running program. The PWAL has to adopt a suitable error control strategy in order to assert data has been introduced correctly (this eventually would require a control logic in the PLC program as well).	The PWAL always writes on the PLC memory the appropriate data types, consistently with variables and respecting the appropriate value ranges.	Functional	None	very high	Major	Devices	*Unresolved*

EBBITS-353	479	Multiradio devices should be able to detect which LinkSmart Network Manager to connect/migrate to, according to the current network interface active	Quality Check passed	Devices with multiradio capabilities should be able to switch interface, and therefore network, without compromising the connectivity to the LinkSmart layer, this means that when migrating to a new interface, the device should register itself to the closest Network Manager available in that network	Devices accessing ebbits by using non-corporate or external networks (e.g. 3GPP) can detect which border network manager they must connect to.	Functional	None	neutral	Major	Devices	*Unresolved*
EBBITS-390		PLC driver supports symbols recursive discovery.	Quality Check passed	PLC developers often rely on nested structures to organize variables and signals; the PLC PWAL driver should be updated to support recursive symbols discovery.	Supports to recursive symbols discovery is implemented.	Non-Functional			Minor	Devices	*Unresolved*
EBBITS-391		PWAL Robot Controller driver should support automatic discovery of available axes.	Quality Check passed	Information about available axis is needed from the Robot controller to support autonomous discovery of robot	Axis information by the robot controller can be accessed.	Functional			Minor	Devices	*Unresolved*

				capabilities .							
EBBITS-392		Robot Controller PWAL driver must support the automatic parIDs mapping into variables.	Quality Check passed	The Robot Controller itself does not support an automatic map of parIDs to variables and so a mechanism to receive and retrieve a list with the semantic information regarding the available parIDs is needed within the PWAL Robot controller driver.	Spport of the automatic parIDs mapping into variables is implemented into Robot Controller driver	Functional			Minor	Devices	*Unresolved*
EBBITS-393		meta-data about missing or corrupted information should be managed	Quality Check passed	Sometimes field information is missing or corrupted e.g. because the user has not entered it correctly or because of malicious behavior. ebbits should be aware and able to report that some information is missing or corrupted.	meta-data about missing or corrupted information is kept within the ebbits framework	Functional	neutral	high	Critical	Devices, Middleware Layer, Modelling	*Unresolved*

EBBITS-195	62	The ebbits system should integrate 6LoWPAN sensor nodes for seamless data collection	Part of specification	Data collection is the required input for simple and complex analysis in both manufacturing and traceability scenario. Both mobile or static sensors are affixed to any medium (animal, robot etc) in order to sense the environment.	The PWAL (developing a proper driver) and the DDM (defining proper models in the Device Catalog ontology) are able to integrate 6LoWPAN sensor nodes into the ebbits platform.	Functional	very low	very high	Major	Interface	*Unresolved*
EBBITS-209	77	ebbits should support legacy network interfaces	Quality Check passed	Many legacy systems still use old network interfaces	At least 3 types of common old interfaces of each domain (manufacturing and farm) are supported	Functional	very high	very high	Blocker	Interface	*Unresolved*
EBBITS-216	84	ebbits platform should integrate Programmable Logic Controllers (PLCs) and make them interoperable with the system	Closed	Production automation is controlled through a network of PLCs	The PWAL (developing a proper driver) and the DDM (defining proper models in the Device Catalog	Functional	very high	very high	Major	Interface	Implemented

					ontology) are able to integrate PLCs into the ebbits platform.						
EBBITS-241	130	ID Management : Item identification system should provide open interfaces to other systems	Resolved	Identification of pigs is done with RFID tags at their ears and with antennas in corridors that recognize pigs passing by. The system should not be connected to a specific system, but rather provide open interfaces that can be exploited by any system.	Any system can easily access the item identification system.	Functional	neutral	very high	Major	Interface	Out of scope
EBBITS-343	469	ebbits should properly handle network and environment instability	Quality Check passed	ebbits should be more robust to different network issues, like temporary offline periods or restarting of remote instances.	The critical event of ebbits environment reboot while developing is handled by a specific exception.	Functional	neutral	high	Major	Middleware Layer	*Unresolved*

EBBITS-374		Support for multiple identification schemes	Quality Check passed	Application uses different identification schemes. In this way ebbits should support both the existing own identification scheme and other possible future identity management schemes. It is necessary to support an association between identifiers (while storing and querying them), which should be managed by the Entity Manager.	The Entity Manager supports multiple application-dependant identification schemes	Functional			Minor	Middleware Layer	*Unresolved*
EBBITS-238	127	Batches need to be identified on a farm level	Quality Check passed	The average feed production batch size is 20 tons; however farmers want their own specific production which is way smaller. A unique identification of the batch to the farm is necessary.	Every batch has one unique identifier.	Functional	high	neutral	Critical	Modelling	*Unresolved*

EBBITS-162	22	The ebbits should be able to handle massive number of devices	Resolved	The future use cases of ebbits need to handle massive number of devices and applications within and cross enterprises, i.e. ci. 300-1000 in a manufacturing plant and 500 in a farm.	ebbits is able to handle 500 devices simultaneously.	Non-Functional - Operational	low	high	Critical	Networking	Duplicate
EBBITS-172	37	Higher bandwidth and range of wireless connection	Closed	Currently, BT is used for wireless communication. It supports ranges <50m. Especially, the bandwidth is too low: max 24 MBit/s.	Communication range and in particular bandwidth are considerably higher.	Non-Functional - Performance	low	very high	Major	Networking	Nonsense
EBBITS-218	86	Reliable wireless solution for new sensors	Open	cable costs are high and due to harsh condition, cable might break	sensors are using wireless connection.	Functional	high	high	Major	Networking	*Unresolved*
EBBITS-225	93	Bring data from fieldbus network to ethernet network	Closed	Analytics is done by ERP program on a computer that work on TCP/IP.	Analytics software can analyze data from manufacturing robots	Functional	high	high	Major	Networking	Duplicate
EBBITS-254	143	Comply with industrial standards	Quality Check passed	The middleware should embrace existing industrial device integration and communication standards, e.g.	Claimed support for any specific standard in ebbits can be verified using the	Non-Functional - Legal	very high	high	Critical	Networking	*Unresolved*

				EIB/KNX	conformance rules / procedures available from the issuing standards body.						
EBBITS-375		Robot Controller PWAL driver must support multiple clients	Quality Check passed	The Robot Controller server does not support multiple clients. As a consequence, the Robot Controller PWAL driver should provide mechanisms to manage requests from multiple clients e.g. by supporting queuing.	the Robot Controller PWAL driver receives requests from multiple clients; such requests are fed into the Robot Controller and answered.	Functional			Minor	Networking	*Unresolved*
EBBITS-376		Robot Controller must not freeze when clients interrupts communication	Quality Check passed	Robot Controller must not freeze when clients interrupts communication; more specifically, it may happen that the Robot Controller PWAL driver is interrupted or restarted for maintenance.	Robot Controller doens't freeze when client interrupts communication	Functional			Critical	Networking	*Unresolved*

EBBITS-361	588	Fine grained access control policies have to be definable in the ebbits system.	Quality Check passed	Merged from Requirements #398-#417, except #401+#405	Registering access control policies results in blocked requests from unauthorized entities.	Functional	neutral	very high	Major	Security	*Unresolved*
EBBITS-387		Support to describe company security policies and rules must be provided	Quality Check passed	Sometimes companies have restricted policies for information sharing and network traffic management. ebbits should provide means to describe such policies and rules programmatically, so that they can be enforced or at least understood automatically by ebbits security framework.	Comapanies policy and rule based procedures are modeled in a format which is compatible with ebbits security framework				Minor	Security	*Unresolved*
EBBITS-389		Support to proxy authentication through NTML	Quality Check passed	LinkSmart should support strict security policies in enterprise networks.	NTML proxy authentication supported	Non-Functional			Minor	Security	*Unresolved*

7.7 WP9

Key	ID	Summary	Status	Rationale	Fit Criterion	Requirement Type	Cust. Satisf.	Cust. Dissatisf.	Priority	Component/s	Resolution
EBBITS-173	38	Flexible Integration of HW/SW components	Resolved	The process to set-up a plant and to fine-tune each machine costs at least a day. In this sense, the integration of new HW/SW must be very easy to not disturb the overall process.	In plug'n'play manner new HW/SW components can be easily integrated into an existing system without losing much time.	Functional	low	high	Major	Architecture	Duplicate
EBBITS-221	89	Scalable solution (scale up and scale down)	Resolved	adjustment to desired number of production, require to add or reduce machines	configuration of scaling up / down a plant can be achieved in max 8 hours.	Non-Functional - Maintainability	very high	very high	Major	Architecture	Duplicate
EBBITS-255	144	Configurable and easy to install middleware	Part of specification	The middleware should be configurable and easy to install/deploy.	The average installation time is less than 1 hour.	Non-Functional - Usability	very high	very high	Major	Configurability	*Unresolved*
EBBITS-219	87	reliability of the system should be more than 30 years	Resolved	a production plant of trucks can runs for 30 years	99% of the time system is able to run 30 years.	Non-Functional - Operational	very high	very high	Nice to have	Devices	Duplicate

EBBITS-220	88	hardware components are able to handle harsh condition	Closed	Manufacturing environment can have harsh condition that can damage electronic devices	devices used should fulfill relevant manufacturing standards for encapsulation and wiring.	Non-Functional - Operational	high	high	Major	Devices	Out of scope
EBBITS-227	104	automatic start up synchronization among machines	Quality Check passed	starting up machines in a plant is complicated such as the order of machines, min temperature etc.	a plant can be "re-started" automatically in less than an hour.	Functional	very high	very high	Minor	Devices	*Unresolved*
EBBITS-277	166	Integration of legacy systems into ebbits platform	Quality Check passed	ebbits platform is deployed for solving interoperability of the existing systems (software and devices)	3 different existing systems used in each domain is supported i.e.: Danish national cattle database, Farm managemnt system, ERP system in manufacturing	Functional	very high	very high	Major	Interface	*Unresolved*
EBBITS-342	468	ebbits platform should support automatic builds	Quality Check passed	To make the ebbits platform easier to use for future developers it has to be easy to build and start.	All demos and prototypes have to provide a uniform	Functional	neutral	high	Major	SDK	*Unresolved*

				Else developers will not take it serious and will not try it.	method for building and starting. The build process has to be decided in advance else it will take extra effort to realize it.						

7.8 WP10

Key	ID	Summary	Status	Rationale	Fit Criterion	Requirement Type	Cust. Satisf.	Cust. Dissatisf.	Priority	Component/s	Resolution
EBBITS-192	59	back tracing production problem from complaints	Open	the source of the problem during production need to be localized and used for repairing recalled products.	50% of time reduction to localize the source of the problem. (no determinant time is possible because it depends on how complex the production processes are)	Functional	high	high	Blocker	Communication	*Unresolved*
EBBITS-198	65	producers can push notification of recalled products to costumers	Quality Check passed	producers want to avoid getting sued because they weren't fast enough notifying consumers about recalled products. the	customers who bought the products are notified within 24 hours since products being recalled	Functional	high	high	Critical	Communication	*Unresolved*

				common methods is through TV, Radio, Website, for cars can be through phones							
EBBITS-236	124	The ebbits platform should amplify branding for enterprises.	Open	Support for branding in the ebbits platform will help to overcome several challenges and needs to be analyzed in details in the ebbits business models. Thus, using and being part of the ebbits platform should be a quality attribute. This is a demand from consumer in future.	90% of such businesses exploiting the ebbits platform perceive this as a quality attribute.	Functional	high	very low	Major	Communication	*Unresolved*
EBBITS-170	35	Hazardous Environmental Monitoring of Manufacturing Plant	Resolved	Currently the environment of a plant is not monitored properly. However, this is quite important to guarantee the safety of an operator.	The safety of the operator is improved by 20% on the basis of environmental input information.	Non-Functional - Maintainability	low	low	Minor	Context	Out of scope

EBBITS-175	40	Life-cycle of a robot and its components is traceable	Resolved	At the moment the life-cycle of a robot's component is not predictable. However, being able to predict its life-cycle could support to avoid deviations during production.	Based on analyzing data of real field tests the life-cycle can be predicted properly.	Non-Functional - Maintainability	very high	neutral	Critical	Context	Cannot be implemented
EBBITS-183	49	Access to energy-related information from production machines needs to be provided.	Resolved	Energy-related information is measured by some of the operational machines (e.g. in the production plant), but it is not distributed into a network.	If any machine provides access to energy-related information, ebbits distributes this information to all interested parties.	Functional	neutral	very high	Critical	Context	Duplicate
EBBITS-191	57	Products rating by experts	Quality Check passed	Customer satisfaction is an important factor in business area.	Experts are able to give rating to products	Functional	neutral	very high	Blocker	Context	*Unresolved*
EBBITS-202	69	supplier can predict when to make the next delivery to a consumer	Open	suppliers can make an early offer when the inventory of their costumers almost depletes	supplier can make an estimation when the inventory of their costumer are almost empty.	Functional	neutral	high	Critical	Context	*Unresolved*

EBBITS-203	70	Predict if his suppliers will not be able to fulfill their demands (quantity)	Open	consumers are able to find other suppliers to fulfill their demands	consumers are able to make estimation if the a supplier will not be able to supply his demands.	Functional	high	very high	Major	Context	*Unresolved*
EBBITS-207	75	System should aware of what which livestocks are in the building	Open	Pigs in different phases have different requirements of climate, insulation, feed, vitamins, etc	System can adjust itself according to what's inside the building.	Functional	very high	high	Major	Context	*Unresolved*
EBBITS-215	83	Adjust production processes according to energy price policies	Quality Check passed	reduce production cost by taking into account energy price policy from energy provider.	at least production speed and start/stop production can be adjusted according to the price of energy.	Functional	high	high	Critical	Context	*Unresolved*
EBBITS-226	103	Automatic calibration	Open	Calibration is still done manually it is error prone, and takes time.	75% of existing manual calibration is done automatically.	Functional	high	very high	Nice to have	Context	*Unresolved*
EBBITS-232	109	Recognition of energy wasting behaviors	Open	Help decision makers to optimize energy usage	Decision makers are alerted when energy wasting takes place	Functional	neutral	neutral	Minor	Context	*Unresolved*

EBBITS-331	455	System needs to trigger business events based on changes of devices and entities states.	Open	Enterprise applications have to be notified when the process starts and finishes, and further how much resources have been consumed for the process.	System generates business events defined in WP3.	Functional	low	very high	Blocker	Context	*Unresolved*
EBBITS-371		Data sources are not perfect	Quality Check passed	Data are typically at some point entered by hand. Also databases found at slaughterhouses feature legacy systems with non-optimal structure and possible inconsistencies.	The system is able to repair or warn in case of inconsistencies with its data.	Functional	neutral	high	Major	Context	*Unresolved*
EBBITS-394		Traceability application is functioning on Android devices	Quality Check passed	There is a great abundance of Android devices. It will help to make the application widely available	The application is functioning on a wide range of Android devices	Functional	high	high	Critical	Devices	*Unresolved*

EBBITS-161	21	Seamless Access to Energy Related Information	Quality Check passed	Energy-related information is only available right at the Human-Machine Interface at the respective station.	At least three different types of devices within the enterprise (manufacturing plant, management, administration) that feature a user interface can display energy-related information.	Functional	low	high	Major	Interface	*Unresolved*
EBBITS-194	61	Display plant activities in real-time	Resolved	To observe the complexity of a production inside the plant.	A user-friendly interface is provided to the relevant stakeholders to view activities inside the plant.	Non-Functional - Usability	low	high	Major	Interface	Implemented
EBBITS-205	72	Officials have direct access to highly important information	Open	Officials want to avoid enterprises commit information / documents forgery	The platform provides an interface for officials.	Functional	neutral	low	Minor	Interface	*Unresolved*
EBBITS-222	90	central point to start the whole plant	Quality Check passed	machines have to be started in the right order.	the whole machines in a plant can be started from a central point.	Non-Functional - Operational	very high	very high	Major	Interface	*Unresolved*
EBBITS-270	159	End-users need to be able to manage their	Open	Farmers want to manage their distributed data, because today	End-users can easily manage data from distributed	Non-Functional - Usability	very high	neutral	Major	Interface	*Unresolved*

		distributed data		they have no full control of data.	sources.						
EBBITS-370		Access to traceability data from legislative actors	Open	A lot of administrative work can be avoided if public control instances can access the traceability data.	A public control instance can verify proper operations at the secondary processor.	Functional	high	neutral	Minor	Interface	*Unresolved*
EBBITS-395		Traceability application can scan QR codes using ZXING	Quality Check passed	QR codes are the chosen technology to hold the product id. The application must be able to scan these to retrieve relevant data from the backend.	The application can scan QR codes using open source framework ZXING	Functional	very high	very high	Blocker	Interface	*Unresolved*
EBBITS-396		QR code format	Quality Check passed	Ebbits core and the traceability app must agree upon a format which both parties understand otherwise the traceability app cannot interpret the information in the QR code.	The format is agreed upon and the traceability app can interpret the information in the QR code.	Functional	very high	very high	Major	Interface	*Unresolved*
EBBITS-166	27	Product labels / tags for the traceability should be readable by	Quality Check passed	the stakeholders do not want to invest for buying new label / tag readers.	The meat package must have a either a Barcode or RFID that	Constraint - External factor	neutral	very high	Blocker	Modelling	*Unresolved*

		legacy system of the stakeholders			contains information for the traceability scenario						
EBBITS-199	66	Correlate problems found with production batches	Open	When the source of problem have been isolated, producers must know which products/batches are affected.	Production batches affected by problems can be identified.	Functional	neutral	very high	Critical	Modelling	*Unresolved*

7.9 WP11

Key	ID	Summary	Status	Rationale	Fit Criterion	Requirement Type	Cust. Satisf.	Cust. Dissatisf.	Priority	Component/s	Resolution
EBBITS-208	76	feeding systems should aware of the animals weight	Resolved	farmers must keep poultry products on certain weights	feeding system can control the portion of feed based on the weight	Functional	high	high	Major	Context	Out of scope
EBBITS-275	164	Consider ethical issues	Closed	It is an ethical issue if you track the driver driving a van or that a product is at the end-user's fridge	-	Constraint - Ethical	neutral	very high	Major	unassigned	Out of scope

EBBITS-276	165	Consider cost benefit	Resolved	There is no NICE-To-HAVE in the agriculture domain, there always needs to be cost benefit. A slaughter pig brings 5-15 Euros.	Cost benefit is considered.	Constraint - External factor	neutral	very high	Major	unassigned	Out of scope