The Infinity Project
Infrastructures for the Future Internet Community
FI-PPP

Contract Number 285192

D3.2 METHODOLOGIES AND TOOLS FOR DETECTION OF INFRASTRUCTURE REQUIREMENTS

1

Document Reference

Project Acronym	INFINITY				
ICT Project Number	FP7-285192				
Project URL	www.fi-infinity.eu				
EU Project Officer	Mr.GiorgiosTselentis				
Project Coordinator	**Name**	Federico Alvarez	**Affiliation**		UPM
	Email	fag@gatv.ssr.upm.es	**Phone**	+34-91 336-7344	**Fax** +34-91 336-7350
Deliverable Name	D3.2 Methodology and tools for the detection of infrastructure requirements				
Code name	D3.2				
Nature		**Distribution Type**			
Responsible Author(s)	**Name**	Ana Cerezo	**Affiliation**		UPM
	Email	ace@gatv.ssr.upm.es	**Phone**	+34 915495700 ext.4092	**Fax** +34-91 336-7350
Abstract (for dissemination)	This deliverable contains an initial version of the methodologies and tools that will be used in for detection of infrastructure requirements				
Keywords	Methodology, Requirements, Analysis, Common Description Framework, CDF updating process				
Contractual Date of Delivery	29/02/2012				
Status	Final				
Quality assurance readers	Dai Davies		Mike Surridge		
result	Pass		Pass		

Change history

Vers	Date	Notes	Authors
0.1	13/01/12	Draft TOC	Ana Cerezo
0.2	17/01/12	Review of the ToC	Ana Cerezo
0.3	17/01/12	Review of the ToC	Pedro Chas
0.4	19/01/12	Review of the ToC	Ana Cerezo
0.5	15/01/12	Proposal for methodology	Ana Cerezo
0.6	07/03/12	General editing	Pedro Chas
0.7	07/03/12	Update Current status section and figure about relationship with WP5	Stefano Modafferi

0.8	07/03/12	Some minor changes	Ana Cerezo Stefano Modafferi
0.9	08/03/12	Figure about relationship with WP5 changed	Ana Cerezo
0.95	08/03/12	Tables added and Conclusions section edited	Ana Cerezo
0.97	09/03/12	Some modifications introduced in sections 5.1.1, 5.1.2, 5.1.3 and 5.2	Ana Cerezo
0.98	13/03/12	Implementation of reviewer's comments (including a modification of the ToC)	Ana Cerezo
0.99	20/03/12	Implementation of reviewer's comments	Pedro Chas
1.0	22/03/12	Update Annex A and data from tables	Ana Cerezo
1.1	22/03/12	Final version for internal review	Pedro Chas
1.2	23/03/12	Implementation of reviewer's comments	Ana Cerezo
1.4	26/03/12	Final version	Ana Cerezo

3

Table of Contents

1 Disclaimer

This document contains material, which is the copyright of certain INFINITY contractors, and may not be reproduced or copied without permission. All INFINITY consortium partners have agreed to the full publication of this document. The commercial use of any information contained in this document may require a license from the proprietor of that information.

The INFINITY Consortium consists of the following companies:

Beneficiary Number	Beneficiary name	Beneficiary short name	Country
1(coordinator)	Universidad Politécnica de Madrid	UPM	Spain
2	FraunhoferGesellschaftzurFoerderug der angewandten Forschunge.V.	FhG	Germany
3	University of Southampton IT Innovation Centre	IT Innovation	UK
4	Waterford Institute of Technology	WIT	Ireland
5	Center for Research and Telecommunication Experimentation for Networked Communities	CREATE-NET	Italy
6	INTERINNOV SAS	INTERINNOV	France
7	European Regional Information Society Association	ERISA	Belgium
8	Martel GmbH	Martel	Switzerland
9	Telefónica Investigacion Y Desarrollo SA	TID	Spain
10	Thales Services SAS	Thales	France
11	Ericsson GmbH	Ericsson	Germany
12	InstytutChemiiBioorganicznej Pan	ICBP	Poland
13	Delivery of Advanced Network Technology to Europe Limited	DANTE	UK

Table 1 - Partners list

The information in this document is provided "as is" and no guarantee or warranty is given that the information is fit for any particular purpose.

The user thereof uses the information at their sole risk and liability.

2 Introduction

Deliverable D3.2 "Methodologies and tools for detection of infrastructure requirements "is the first official document published by Task 3.3 "Methodologies for requirements deductions", which is one of the tasks that belongs to WP3 "Methodologies for infrastructure modelling".

More specifically, D3.2 presents the results corresponding to the first iteration of Task 3.3.

The objective of this task is to deliver the part of the methodology that enables the determination of the requirements that the infrastructures have in order to be supported by the Core Platform. It also delivers the requirements that the FI-PPP Use Cases have in order to be supported by the infrastructures. The task description in the project DoW is as follows:

> *"For the determination of requirements that existing infrastructures pose to FI-PPP Core Platform and the FI-PPP Use Cases pose to the existing infrastructures, the profiling has to go also a step further: next to the four dimensions introduced in Task 3.2, the acquisition of requirements also depends on the functional breakdown of infrastructures in order to determine which components of the infrastructure pose specific requirements for future integration with the FI projects. Task 3.3 introduces therefore a notation for the description of requirements. With the function breakdown and the notation definition, this task will deliver that part of the methodology that enables the determination of requirements the infrastructures pose for their support by the Core Platform."*

Even given the stated DoW task objectives, and due to the situation of the project at this stage and the needs of other tasks and workpackages (Task 3.1, WP5), as a first step, in the first iteration of the task presented in this deliverable, the requirements from the FI-PPP Use Cases have been analysed to ensure that they will be covered by information collected from the infrastructures. Consequently, the main result presented in this deliverable is the definition of a methodology, to be applied by WP5, able to match the information coming from the FI-PPP projects (i.e. the usage area projects and FI-WARE) with the information coming from the analysis of the existing infrastructures. In addition, the deliverable defines and presents the results of the application of a process for the identification and representation of FI-PPP Use Case requirements, results to be handled by Task 3.1 as one of the main inputs of the CDF updating process.

Further iterations of the task will complete the work in line with the DoW description.

The document includes the following sections:

- "Status of the task", which intoduce the general context of the deliverable.

7

- "Outline of the Approach", which includes both the description of the scope of the task ("Scope of the task") and the description of the relations with the other workpackages ("Relations with other tasks and workpackages").

- "Methodology and tools for requirement identification and analysis", which is the main section of the deliverable and includes the following sections:
  - o "Methodology for the analysis of survey data against FI-PPP requirements"
  - o "Process for the acquisition of new requirements from infrastructures"

  This section methodology and process are intended to be an input to and to be applied by WP5.

- "Process for the identification and representation of FI-PPP Use case requirements", which contains the following sections:
  - o "Definition of the process for the identification and representation of FI-PPP Use case requirements"
  - o "Application of the process for the identification and representation of FI-PPP Use case requirements"

  This section describes (and present the results of the application of) a process to be used for the identification, extraction, analysis and classification of requirements associated to FI-PPP Use Cases. The referred results are presented in Annex A. Results of the Application of the Process for the Identification and Representation of FI-PPP Use Case Requirements.

  The objective of the process is to provide a consolidated input to the CDF (Common Description Framework) updating process related to the referred FI-PPP Use Cases requirements. The CDF, as explained in D3.1 ("Common Description Framework for Infrastructure Profiling 1st Release") [10], is a model that has the objective to give us the appropriate tools for gathering structured information that can be stored in a Web repository and allow the classification of existing infrastructures. This process is internal to WP3.

- "Conclusions", providing a summary of the main results and conclusions of the deliverable.

- "References", providing a list of the documents and references that has been used as inputs of the deliverable.

- Annex A. Results of the Application of the Process for the Identification and Representation of FI-PPP Use Case Requirements, presents the results of the application of the process related to the identification and representation of FI-PPP Use Case requirements.

3 Status of the task

As it is shown in Fig 1 the aim of Task 3.3 and Task 3.4 is to define a methodology able to match the information coming from the FI-PPP projects (i.e. the usage area projects and FI-WARE) with the information coming from the analysis of the existing infrastructures.
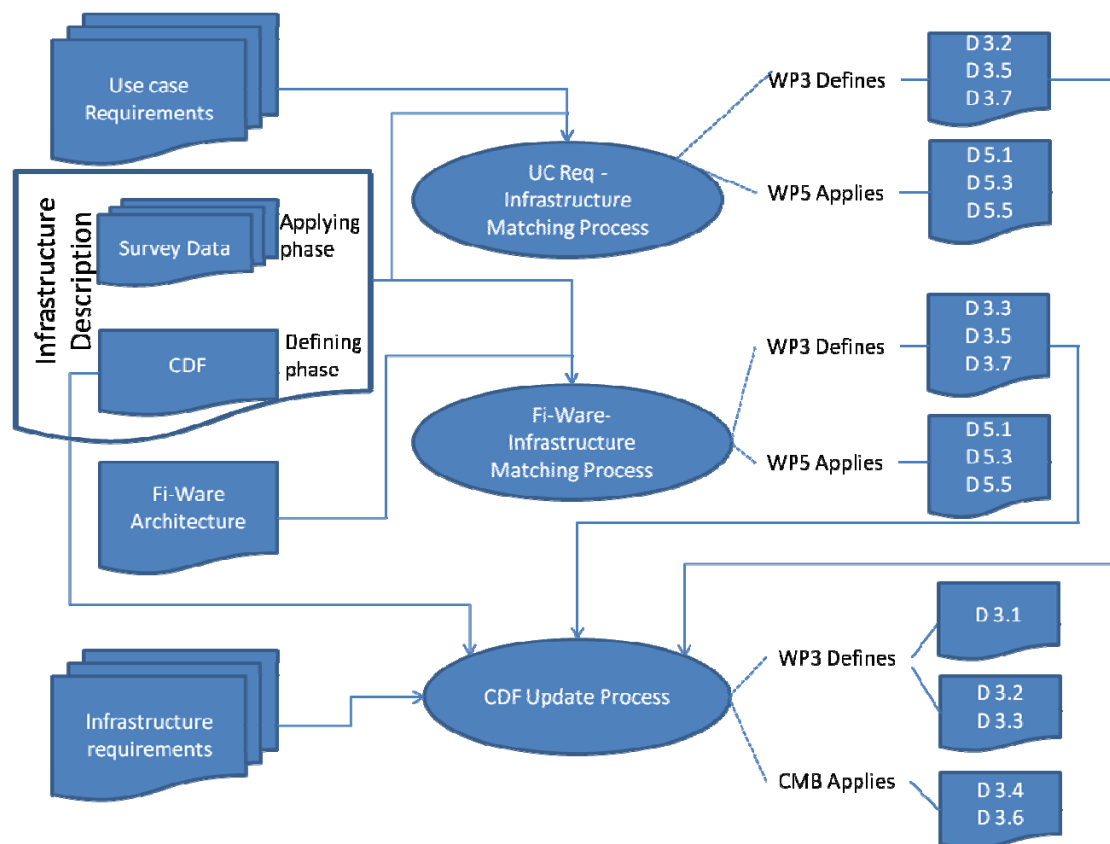
Fig 1: I/O diagram for methodology.

The work is therefore strongly related to the definition of requirements to be provided by the FI-PPP projects and the validation of the CDF structure coming from the feedback of pilot infrastructures.

By taking account of the inputs coming from the requirements of FI-PPP usage case projects and the capabilities offered by the Infrastructures, this deliverable defines a methodology for mapping between the two. It will be validated by using the data collected from these two sources and testing the effectiveness of

9

the mapping. Issues identified in this validation process will be fed back into further refinements of the mapping process.

The next iteration will also consider possible refinements of the algorithms used in the methodology basing on feedback received by WP5 "Assessment of Infrastructures & Roadmapping". Specific attention will be also put into refining the procedure for taking into account requirements coming from infrastructures not currently considered in the CDF.

Therefore, the deliverable provides in itspresent form a valid methodology and a useful input both in relation with WP3 / Task 3.1 (CDF updating process) and with WP5.

4   Outline of the Approach

4.1   Scope of the task

The scope of the task, associated with this first iteration, can be summarized as follows:

- First, this deliverable presents a methodology mainly devoted to defining how to match the requirements coming from the FI-PPP use Case projects with the actual data retrieved for the survey.

  Two valuable outputs are produced: the first one is the actual input for the methodology and the second one is to provide inputs for the CDF updating process.

- Second, this deliverable also presents a process for use in WP5 on how to consider requirements coming from the side of the infrastructures, pointing out that the chosen model for representing infrastructures does not, at the present state, cover some specific issues and has to be improved.

- Third, this deliverable defines and applies a process used within WP3 for the identification and representation of FI-PPP Use Case requirements. The results of the application of this process can be seen in Annex A. Results of the Application of the Process for the Identification and Representation of FI-PPP Use Case Requirements, which forms an input to the process used in WP5 as well as providing inputs to the CDF updating process.

  The results that have been provided include not only a set of identified requirements but also proposals for how to map each identified requirement to the (updated) CDF. These mapping proposals should be

considered as preliminary and have been fed back to Task 3.1 for further analysis and refinement.

4.2 Relation with other tasks and work packages

Task 3.3 is related to other WPs and tasks within the project. Of special importance are the following relationships:

- With WP2 ("Engagement, Dissemination and Communication"), especially with Task 2.1 ("FI-PPP Engagement") which facilitates the liaison with the FI-PPP projects, in order to exchange information on available or planned private and public-private infrastructures, mapping the requirements from the FI-PPP projects and applications with the features provided by the infrastructures operated by industry.

  WP2 has provided many of inputs used by this task as related to this D3.2 deliverable and has performed some early identification of FI-PPP requirements that have been reviewed and completed by Task 3.3. The current deliverable presents the final results of this requirements analysis and identification process.

- Inside WP3 ("Methodologies for Infrastructure Modeling"), Task 3.3 is providing one of the key inputs needed by Task 3.1 ("Methodology for Survey and Quick Check") in order to update the CDF and develop the new releases of the CDF, needed as the basis for the next releases of the INFINITY Web Repository.

  D3.2 provides a first list of consolidated requirements related to the identified needs of FI-PPP Use Case projects and also provides Task 3.1 with a first analysis and proposal for the respective priorities that can be associated to each of the requirements and the possible way of mapping each requirement to the CDF. These Task 3.3 proposals should be considered as first proposals and will need further consideration and analysis in cooperation between Task 3.1 and Task 3.3.

- With WP5 there is a continuing relationship. On one hand Task 3.3, and specifically this deliverable, will provide inputs to Task 5.2 ("Identification of technological constraints") and Task 5.3 ("Assessment of operational constraints"). Also the results of the INFINITY full survey (related to Task 5.1, "Survey infrastructures and populate repository") will provide inputs to the second and third iterations of Task 3.3.

Fig 1 above highlights the work related to Task 3.3 (responsible for document D3.2) and Task 3.4 (responsible for D3.3). These two tasks are very closely related with one another and also with other work packages, mainly WP5.

Fig 1 also shows that WP3 is in charge of defining methodologies to be followed for three distinct aspects:

- The matching process between use case requirements and what existing infrastructures are able to offer.
- The matching process between FI-WARE architecture and the existing and emerging infrastructures.
- The process for updating the CDF, considering the output of the previous analysis and the possible requirements directly requested by infrastructures.

The input sources (as presented in Fig 1) are the following:
- FI-PPP Use Case requirements, based on preliminary work by WP2
- Infrastructure description divided into:
  - CDF definition
  - Actual data from the survey
- FI-WARE architecture document
- Requirements from existing infrastructures

There is a distinction of roles between WP3, which is in charge of defining the methodologies, and WP5, which is in charge of applying them to data retrieved from the survey.

In addition, the application of the process defined in section 6 below produces as one of its results a list of classified and prioritized FI-PPP Use Case requirements that is a very valuable input for the CDF updating process managed by Task 3.1.

5 Methodology and tools for requirements identification and analysis

The methodology developed in this deliverable is mainly devoted to defining how to match the requirements coming from the FI-PPP use Case projects and the actual data retrieved for the survey. A prerequisite to doing this matching is to provide a consistent representation of the use case requirements and of the infrastructures.

This common representation is provided in terms of CDF [10] attributes. The process of building it produced two valuable outputs: the first one is the actual input for the methodology. The second one is to provide inputs for the CDF updating process.

In addition, in the global picture of representing the infrastructure capabilities, this section also presents a process to consider requirements coming from the infrastructures, potentially pointing out that the chosen model for representing infrastructures does not, currently, cover some specific issues and has to be improved.

This document is produced under the EC contract FP7 ICT-285192.
This document is property of the INFINITY consortium and shall not be distributed or reproduced without the written approval of the INFINITY consortium

5.1 Methodology for the Analysis of Survey Data against FI-PPP Requirements

5.1.1 Input

This section describes the methodology intended to be followed by WP5 to indicate when an existing infrastructure is compliant with one or more attributes of the CDF and, consequently, it is compliant with a requirement (or set of requirements) associated to one or more FI-PPP Use Cases projects.

The methodology is based on a simple matching process to be used to decide if an infrastructure is compliant with a particular requirement or set of requirements.

The main inputs of the referred process are:
- INFINITY CDF (developed by Task 3.1 and documented in [10])
- FI-PPP Use Cases projects requirements (documented in the present deliverable on the basis of inputs from WP2)

5.1.2 Process

The matching process can be described as follows:
- The possible mappings of a particular requirement (related to, e.g., one or several FI-PPP Use Cases projects) to the INFINITY CDF attributes are analysed and established.
- If no mappings of the requirement to the CDF are identified, then there is a need for some extension of the CDF and relevant feedback is to be provided to the CDF updating process (managed by WP3).
- The best CDF attribute (possibly set of attributes) that can be associated (mapped) to the referred requirement is selected.
- The value given to the (possibly set of) selected CDF attribute in a particular infrastructure stored in the INFINITY Web Repository is examined.
- If the referred value means that the infrastructure supports the required feature then it can be said that the infrastructure is compliant with the requirement.
- The last step is repeated for each of the infrastructures stored in the INFINITY Web Repository. As a result, the set of infrastructures compliant with the referred requirement is established.
- The whole process is repeated for each requirement considered of interest.

5.1.3 Output

The main outputs of the referred process are:
- Feedback to the CDF updating process, proposing extensions of the CDF identified as a result of the application of the matching process (no mappings to the CDF identified for some requirements).

13

- The subset of INFINITY Web Repository infrastructures is identified that is compliant with particular requirements from, e.g., FI-PPP Use Cases projects.

5.2 Process for the Acquisition of New Requirements from Infrastructures

It is expected that the results from the survey will provide useful information from the existing infrastructure owners' points of view that can imply the identification of new requirements. At this stage, survey data is still being collected, so the process is not so formalised. The idea is that having checked what FI-PPP usage area project requirements are met, any new requirements can be identified manually from the survey response data. This process uses the same tables that the process for the identification and representation of FI-PPP Use Case Requirements described in section 6.1.

The process can be described as follows:
- The new requirement, associated to a particular infrastructure, is identified. This identification is expected to be mostly based on the comment fields included in the INFINITY survey. In some cases the identification can also be based on the requests for support to complete the survey, made by infrastructure owners to INFINITY.
- WP5 analyzes the identified requirement and makes a proposal using the table structure presented in detail in section 6 of the current document. The proposal must include aspects like a definition of the requirement and its context, the priority to be associated to it and how to map the new requirement in the CDF, providing it to Task 3.1 as an input.
- Task 3.1 analyzes the requirement using the table facilitated by WP5 as an input. This task also makes a final proposal detailing the mapping of the requirement in the CDF and making a recommendation about its adoption.
- The project, using the established procedures (described in section 4.6 of D3.1 [10]), makes a final decision about the adoption of the requirement, on the basis of Task 3.1 recommendation.
- Task 3.1 implements the project decision, making the necessary changes in the CDF.

6 Process for the Identification and Representation of FI-PPP Use Case Requirements

This section presents a process for the identification and representation of FI-PPP Use Case requirements and conversion to a form that can be used in WP5 to analyse infrastructure survey data. This is mostly internal to WP3 and is intended to provide inputs for the CDF updating process.

6.1 Definition of the Process for the Identification and Representation of FI-PPP Use Case Requirements

14

In the context of INFINITY in general and, more specifically, of Task 3.3 we define (see D2.2) a requirement as "a specification of the type of information which a FI-PPP Use Case project deems necessary to gain a sufficient understanding of a test infrastructure".

In this sense, Task 3.3 is intended to identify and analyze the main requirements associated with the FI-PPP Use Cases projects. The aim is to make them accessible through the INFINITY Web Repository.

The large number of requirements related to FI-PPP Use Cases projects makes their identification and analysis a difficult task without a structured and well defined process.

This section describes the process used for the identification, extraction, analysis and classification of requirements associated to FI-PPP Use Cases Projects. The objective of the process is to provide a consolidated input to the CDF updating process, as related to FI-PPP Use Cases projects requirements, as well as a useful representation of the relationship of these requirements to survey data, for use in WP5.

The process and its application should be considered as internal to WP3.

The final result of the process is a table that lists all the requirements and attaches to each of them several parameters. e.g.:
- Priority allocated to the requirement.
- FI-PPP Use Case Project related to the requirement.
- CDF object proposed to be mapped to the requirement.
- Status of the requirement.

In particular, the "Status" parameter stresses the situation of each requirement as related to the CDF. The following situations are considered:
- If the requirement is already (completely or partially) included in the CDF.
- If the requirement is considered to be too domain specific for being added to the CDF.
- If the requirement is considered not relevant enough to be added to the CDF.
- If the requirement needs further investigation.

Both the Status and the Priority parameters are intended to be used in the necessary filtering and prioritization of the requirements.

The process also allows the grouping of requirements coming from different FI-PPP Use Cases projects, reducing the implementation effort.

The process is described as follows:

1) A cooperative analysis and identification process of new requirements has been followed. The table generated in the process is composed of the following columns, although some of them are not included in the tables of the present deliverable and will be incorporated in future versions, as its status of completeness and maturity was considered too preliminary at the date of production of the document:

- **Requirement-ID**: Identification code to be used for each requirement identified within WP3.
- **Proposer name**: Who proposed the requirement (this column is not included in the tables of the present deliverable).
- **Proposed priority**: Proposed priority of the requirement (Low/Medium/High) (this column is not included in the tables of the present deliverable, as its status of completeness and maturity was considered too preliminary at the date of production of the document).
- **FI-PPP project**: Indicates to which project the requirement is related to.
- **Enabler**: indicates the enabler related to the requirement (this column is not included in the tables of the present deliverable).
- **Requirement name**: short name of the requirement.
- **Description**: short description of the requirement.
- **Context / Justification**: free text description of the requirement (it must be clear and allow identify the unique features of the requirement).
- **Status**: Current status of the requirement on relation with the CDF. It can take one of the following predefined labels: R, I, P, NR, S and F. Meanings of each label can be seen in Table 1.
- **Upgradability** (Low, Medium, High) (this column was not included in the tables of the present deliverable).
- **CDF object associated**: it indicates the CDF object the requirement can be related to.
- **CDF attribute name proposed**: Proposed name for the new CDF attribute related to the requirement (if that is the case).
- **Notes**: free text comments.

The labels associated to the Status field of the referred spreadsheet, and the respective meanings, are the following:

LABEL	VALUE	LABEL	VALUE
R	new Requirement	NR	Not Relevant
I	Included	S	too Specific
P	Partially Included	F	Further investigation needed

Table 1: Labels defined for the "status" field and their meanings.

- **R** (new requirement): if the requirement is completely new (meaning that is not included in the current version of the CDF) and it is considered as interesting enough to propose to be incorporated.
- **I** (Included): if it is already included in the current version of the CDF.
- **P** (Partially included): if there is a very similar requirement included in the current version of the CDF.
- **NR** (Not Relevant): if it is considered not relevant enough to consider it for inclusion in an evolved release of the CDF.
- **S** (too Specific): if the requirement could be interesting but it is considered to be too specific to one UC project to consider it for inclusion in an evolved version of the CDF.
- **F** (Further investigation needed): if it is required a further analysis.

2) Requirements identification and extraction– FI-PPP Use Cases: Identify and extract the most relevant requirements using as inputs the appropriate documents describing the needs and features associated with the FI-PPP Use Case projects.

For the present deliverable the documents that have been used as inputs are the following:

FI-PPP USE CASES	SOURCE	EDITORS
FINSENY, OUTSMART, SMARTAGRIFOOD, FI-CONTENT, SAFECITY, INSTANT MOBILITY	FI-PPP Requirements [1]	Chris Foley, Jacques Magen et al
OUTSMART, SAFECITY, INSTANT MOBILITY	Specific additional questions related to smart cities to be considered [1]	Jacques Magen, Sarah Guigon et al
ENVIROFI	FI-WARE Mediawiki [2]	Several authors
FINSENY	D7.1: First set of consolidated ICT Requirements to the Architecture Board (V1.0) [3]	Martin N. Wagner Neumann et al
OUTSMART	OUTSMART User Requirements **¡Error! No se encuentra el origen de la referencia.**	Several authors
SMARTAGRIFOOD	D500.1: Requirements on Core Platform for all use cases supported in SmartAgriFood (v019) [5]	Several authors
SAFECITY	D2.7: Public Safety Scenarios guidelines and conclusions [6]	Several authors

FI-CONTENT	D3.2 / D3.3: Platform Interoperability requirements and open interfaces - Detailed description of content usage are requirements and generic/specific enablers (Draft version) [7]	Denis Mischler et al
INSTANT MOBILITY	D2.1: Instant Mobility functional and technical requirements description (iteration 1) [8]	Cristina Peña et al
FINEST	FI-WARE Mediawiki [9]	Several authors

Table 2: List of documents used as inputs for the analysis.

The identification and extraction process, as related to FI-PPP Use Cases projects requirements, has been started by WP2 (see the corresponding documents in Table 2) and has been reviewed and completed by Task 3.3 with the final results of this analysis and identification process presented in the current deliverable.

3) Filling the relevant columns of the table provided according with the results of the analysis made of each requirement identified in the previous step.

4) Prioritization of the requirements: Propose a priority for each of the requirements identified in the previous steps and fill in the corresponding column of the table (described in step 1).

The assignment of a priority to each requirement is a consequence of the rather large number of FI-PPP Use Case projects requirements identified. The assigned priority is internal to WP3 and is intended to be used as an input to further stages of analysis of the identified requirements in cooperation with Task 3.1, as related to the CDF updating process (in order to be in the position to add first the most "important" new requirements to the next release of the CDF and the INFINITY Web Repository).

The priority assigned to each requirement in this first iteration of the Task 3.3 should be considered as a first proposal to be handled within WP3 and should be subjected to further analysis in cooperation with Task 3.1.

5) Matching analysis and mapping of the requirements to the CDF: Analyze each of the identified requirements and make a first proposal of how to map / include each of them within an updated release of the CDF.

The mapping proposed should be considered as a first proposal and should be subjected to further analysis in cooperation with Task 3.1.

The following matching process is proposed:

18

1. Check if the requirement is already included in the CDF or if it can be mapped (e. g. adding an additional value) to an existing attribute.
2. If that is not the case, propose how to map the requirement in the CDF (e.g. adding a new attribute in an existing infrastructure component). In general several proposals for the mapping can be proposed in order for the CMB (the project body controlling the CDF updating process) to decide which one to adopt.
3. Fill the relevant columns of the table provided.

6.2 Application of the Process for the Identification and Representation of FI-PPP Use Case Requirements

The process presented in the previous section, related to the identification, extraction, analysis and classification of requirements associated to FI-PPP Use Case Projects, has been applied with the results presented in table form in Annex A. Results of the Application of the Process for the Identification and Representation of FI-PPP Use Case Requirements of the current document.

The documents used as inputs are listed in Table 2 of the current deliverable.

In this first iteration of the Task 3.3, the resultant tables include the following columns:

- **Requirement-ID**: A code associated to each requirement to allow an easier and faster identification.
- **FI-PPP project**: Indicates to which project the requirement is related to.
- **Requirement name**: short name of the requirement.
- **Description**: short description of the requirement.
- **Context / Justification**: free text description of the requirement (it must be clear and allow identify the unique features of the requirement).
- **Status**: Current status of the requirement on relation with the CDF. It can take one of the following predefined labels: R, I, P, NR, S, F.
- **CDF object associated**: it indicates the CDF object the requirement can be related to.
- **CDF attribute name proposed**: Proposed name for the new CDF attribute related to the requirement (if that is the case).
- **Notes**: free text comments.

At the current Task 3.3 state of work, the "Status" column is the most relevant in the analysis accomplished up to now, because it is the one related to the filtering of requirements performed in this first iteration of the task.

As an example, in this first iteration of Task 3.3, the filtering process has reduced the number of proposed requirements to be considered for their inclusion in the CDF from the total amount of near 400 to less than 70.

In this first deliverable of Task 3.3, all the potential inconsistencies that have been identified among requirements from different Use Cases projects have not yet been completely solved. This is because the related FI-PPP Use cases projects documented their requirements in different ways, according to their respective application areas.

The consequence is that, in some cases, some further investigation is needed to clarify if (e.g. several) requirements are referring exactly to the same aspects and can be mapped to the same CDF attribute. That further investigation will be carried out in further iterations of Task 3.3.

The prioritization column will be completed in subsequent iterations of Task 3.3 when the necessary further analysis has been carried out.

An instance of the tables included in Annex A. Results of the Application of the Process for the Identification and Representation of FI-PPP Use Case Requirements, including examples of the use of each of the possible Status labels, is shown below:

Req-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R53	SmartAgrifood	Multimedia Analysis	Gathering multimedia information for further analysis should be possible	The collection of multimedia data (photos, videos) could be used in order to analyze specific patterns and produce important results.	I			The requirement is one of the possible values of the attribute Services offered (Data&Context Management)
R64	SmartAgrifood	Broadcast of devices capabilities	Devices linked to the system announce their capabilities	Knowing the unique capabilities of a device, we will be able to manage the notifications and the profiles more efficiently e.g., if the mobile phone cannot support HD videos, we could send a simple text.	R	Customer Device	Device communication capabilities	
R72	SmartAgrifood	Identity Management	Agri-logistics security systems should allow for trusted human interventions	The system shall enable the user/ object to authenticate and/or authorise each other (i.e. in a client server, as well as p2p environment) based on decentralised certificate scheme.	S			There are other attributes about authentification
R46	Outsmart	Support of external service integration.	Integration of information coming from other sources (out of Outsmart) like weather forecasts, traffic incidences, Google maps, etc.	E.g. can you plug in Google maps widget, possibly into the infrastructure management toolkit? Not so sure how to best word this wrt gathering the information from an infrastructure!!	F			
R51	Outsmart	Device Capabilities/Profile	Sensors for pressure monitoring and leakage detectors should possess long autonomy in terms of operations and require very low maintenance; preference should be given to powered devices. Also, devices should be working in harsh conditions of temperature and humidity.	The devices which the infrastructure accesses, should be profiled with respect to how they react to harsh conditions, e.g. heat, cold, water resistent. This information should be available. Also is the device powered or does it do energy harvesting?	P	Sensor Node		Partially included in the sensor network description
R63	SmartAgrifood	Community capabilities	Finding other players and link to them should be available	Different communities will be reinforced since there will be developed a dynamic network that can easily link all stakeholders.	NR			

Table 3: Examples of each one of the possible labels.

7   Conclusions

This deliverable D3.2 presents a set of methodologies and processes that allow to perform all the actions related with the analysis of requirements:

- Methodology for the analysis of survey data against FI-PPP requirements.
- Process for the acquisition of new requirements from infrastructures.
- Process for the identification and representation of FI-PPP Use case requirements.

The first two items of the previous list are described but not applied, as the application of them is a WP5 responsibility.

For the third item, the process has been both defined and applied and the results are presented in Annex A. Results of the Application of the Process for the Identification and Representation of FI-PPP Use Case Requirementsin table form.

As is shown in the Annex A. Results of the Application of the Process for the Identification and Representation of FI-PPP Use Case Requirementstables, at the moment of publication of the current deliverable there is a total of 387 requirements identified and analyzed (this number is expected to increase in the future and will be the subject of further iterations of Task 3.3 as the classification, filtering and prioritization of requirements will remain key actions as related to the CDF Updating Process).

In this first iteration of Task 3.3, the filtering process reported in Annex A. Results of the Application of the Process for the Identification and Representation of FI-PPP Use Case Requirements has reduced the number of proposed requirements to be considered for their inclusion in the CDF from the initial amount of 378 to 67.

Label	Meaning	Number of
R	New requirement	68
I	Included	93
P	Partially included	61
NR	Not Relevant	48
S	Domain Specific	63
F	Further analysis	47

Fig 2: Distribution of status between the requirements (values).
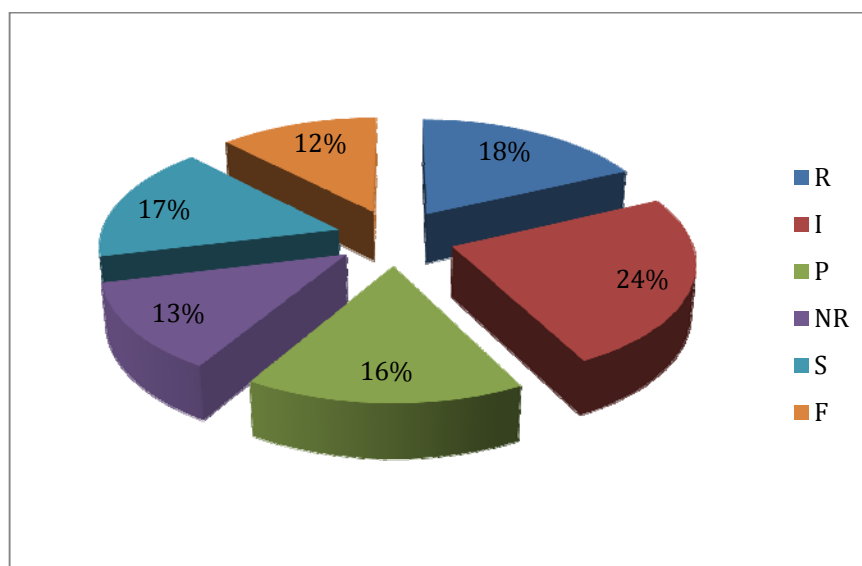
Fig 3: Distribution of status between the requirements (%).

In the analysis performed and reported in Annex A. Results of the Application of the Process for the Identification and Representation of FI-PPP Use Case

Requirements, it has been shown that many requirements can be considered as too specific and application dependent as has been illustrated above using one of the requirements included in Table 3.

In the Table 3 example, a very specific security requirement related to the agricultural application area has been included by a Use Cases project, while more generic security mechanisms are already a part of the CDF. That means that, although this particular security requirement can be interesting, it has been considered as too specific (too application related) and it is proposed not to include it in the CDF.

It can also be seen that there are requirements related to topics like, e.g., reliability, security, event notification, data integrity, or QoS, addressed several times in many of the FI-PPP Use Case projects. That information is also useful to know what kind of requirements are considered as more important by the Use Cases projects and, therefore, which directions the CDF updating process should prioritize.

This document is extensively linked with other tasks within the project, either as input or output, as shown in Fig 1 above. This implies that the further analysis and refinement that should be done in the second and third iterations of the Task 3.3 should be carried out in cooperation with, mainly, Task 3.1, WP2 and WP5 in order to complete the process of selection, prioritization and mapping of the identified requirements as needed for further releases of the CDF and the INFINITY Web Repository.

8   References

[1]   http://www.fi-infinity.eu/
[2]   http://www.envirofi.eu/
[3]   http://www.fi-ppp-finseny.eu/
[4]   http://www.fi-ppp-outsmart.eu
[5]   http://www.smartagrifood.eu/
[6]   http://www.safecity-project.eu/
[7]   http://www.fi-content.eu/
[8]   http://instant-mobility.com/
[9]   http://www.finest-ppp.eu/
[10]   S. Cretti, A. Maestrini ,P. Chas, A. Cerezo, R. Kutsche, H. Weber. D3.1 – Common Description Framework for Infrastructure Profiling (1st Release)

9 Annex A. Results of the Application of the Process for the Identification and Representation of FI-PPP Use Case Requirements

In this Annex the results of the application of the process of identification and representation of FI-PPP Use case requirements are presented.

A table form has been used.

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
Identifi cation code (Rx)	It indicat es which project the require ment is extract ed from	Short name of the requirement	Short description of the requirement	Free text description of the requirement. It must be clear and allow identify the requirement as a unique feature.	Curren t status of the requir ement in relatio n to the CDF	It indicates which CDF object the requirement can be related to	Propose a name for the CDF attribute	Free text comments
R1	FI-Content	Support XML3D Format	support XML3D format through a Web Service API	What data formats are supported option in the questionnaire - http://xml3d.org. XML3D is integrated with HTML5.	R			
R2	FI-Content	Real-Time data access	Is there access to real time data, e.g. sensor information,		R			
R3	FI-Content	High Bandwidth	it should be capable of distributing high quality video to single and multiple end users. 320 Mbps per stream	the levels of bandwidth could be options inside the questionnaire	I	3G_4G_WIMAX Network WIFI Network Backbone Network Wired Access Network		

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R4	FI-Content	QoS	zero delay and jitter	also metrics on delay and jitter could be options in the questionnaire	I	3G_4G_WIMAX Network WIFI Network Backbone Network Wired Access Network		
R5	FI-Content	Content Delivery Network	the infrastructure should provide a CDN with high quality content delivery and user experience		I	Data & Context Management		
R6	FI-Content	Storage capabilities for all users	with the possibility of users having one personal cloud holding their various media types (text, image, sound, video and associated metadata)	may be an option to see what volume of storage is available through the infrastructure or what it could be expanded to	P	IAAS		The concepts in CDF are expressed in a consistent, but not perfectly equal way, as in the requirements
R7	FI-Content	Access to a users content	What device access will the infrastructure provide (PC, mobile phone, tablet, etc.).	Is there an app available for accessing the content	I	Derived from the general view, not explicitly stated in the CDF		

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R8	FI-Content	Management capabilities of a users content	Are there management capabilities for a users content, e.g. search, add, delete	SNIA and CDMI interfaces are related to this topic. SNIA: Storage Networking Industry Association (http://www.snia.org/) CDMI: Cloud Data Management Interface	P	Cloud Computing		CDMI is present, SNIA is not present.
R9	FI-Content	Content Discovery	Search content over various sources on the web, including social networks and controlled data repositories. Grasp content repositories. Aggregate and normalize data (image, semantic, contextual, social information)	This whole area could be seen as service composition (i.e. the aggregation part at least)	F			Probably it is present hidden in the infrastructure (it is not explicitly stated as feature)

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R10	FI-Content	Content Enrichment	Annotation and collaborative editing. Ratings, feedback and recommendation. Exploiting semantic technologies and linked open data (LOD) for a more effective retrieval of additional information.	Associate Standards to be taken into account; Dublin Core, MPEG7, Open social, Open annotation collaboration (OAC), REST, SOAP, LDAP, Shibboleth, Open ID	P	Data & Context Management		CDF explicitly says semantic (just once in Data and context management), but it is not specifically associated with the cited protocols that can be partially found elsewhere in the CDF
R11	FI-Content	Content Sharing	Upload content to user(s) public or private repository. Announce new content in the platform.		NR			This feature is obviously implicitly supported, but it is not explicitly addressed in the CDF
R12	FI-Content	Authentication and Single sign on to access content	Secure access to content		I	3G_4G_WIMAX Network Cloud Computing		

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R13	FI-Content	Ensure content rights, mind usage restrictions and privacy. Respect private/public content.			F			Requirement is not clear
R14	FI-Content	Augmented reality features exposed in an API		Associated Standards to be taken into account; W3C POI WG, OMA MobAR, OGC KML/GML	R			
R15	FI-Content	Efficient Web Services	Not sure if this is a planned new standard. There was mention of backwards compatible to SOAP and RESTful services, where necessary.	Not sure if this is a planned new standard. There was mention of backwards compatible to SOAP and RESTful services, where necessary.	F			
R17	FI-Content	Certificate handling/authentication (Single Sign On)	The handling of credentials/certificates is needed to be able to access applications and contents in the same framework of tied applications (single sign-on) in a single content service session.		I	Cloud Computing		

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R16	FI-Content	Access Control		Take the following into consideration; OpenID [OpenId] and OASIS SAML v2.0 [Saml] (Security Assertion Markup Language), for Identity management	P	Cloud Computing		Only OpenId found
R18	FI-Content	Tunnelling			S			Not found
R19	FI-Content	User Logging	Transparency of data usage should be ensured: what/who/when data has been collected and how it has been exploited		R			Not found
R20	FI-Content	Synchronization capabilities relative to a users content	Consistency and coherence of user's data (contents and contacts synchronization between all the user's devices and the user's Personal Cloud). Provide aN easy to use and rich interaction with Social Networks (content publication, deletion and update).		F	Customer Device IAAS		An action to investigate if the meaning of the synchronization is the same here and in the CDF. Using a common sense definition for synchronization this requirement, as it is, is out of scope of an infrastructure

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R21	FI-Content	Multi-channel and device access for local video	The recording and the distribution of the videos should be possible for different channels and devices. Especially mobile devices should be supported. The network should support the transmission of multiple videos. Up to 50 streams should be sent over the network without any significant delay.		S			Multichanneling is ensured by the support of many different protocols. The other requirements seem too specific and are probably included or derivable by other parameters (e.g. bandwidth etc. etc.)

31

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R22	FI-Content	Display as a Service	The goal is to replace today's VGA / DVI / HDMI / DP / whatever-cables with the fully switched Intra-/Internet. By making what is currently a HW problem into a SW problem we allow for many innovative uses of displays simply by new or upgraded SW modules. This includes connecting the output of arbitrary and multiple notebooks onto a large display, connecting many tiled (LCD-) display into a single, large, logical display.	Have it as N/A, but this may need more investigation as to whether there are underlying requirements which may be applicable.	F			
R23	FI-Content	Content Protection and Provenance (CProPro)	Content protection is needed to ensure that digitally distributed content is used according to restrictions placed by content owners and distributors, such that unauthorized copies cannot made or content otherwise redistributed.	This requirement has underlying security requirements but may be covered within the security requirement. Not so sure if an infrastructure will provide protection mechanisms for the content	F			

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R24	FI-Content	Media Transcoding on content before uploading to a social network due to media types handled by the social network			R			This requirement is a very Important feature to be offered by an infrastructure and it should be part of the new set of attributes added to CDF
R25	FI-Content	Media Transformation for optimization of the reading of content prior to upload to social network	Examples of transformations: rotation, resizing, file size compression, re- sampling, color depth reduction, etc.	Possible use of the STI interface: the STI (Standard Transcoding Interface) is an interface standardized by OMA (Open Mobile Alliance, http://www.openmobilealliance.org) that can be used for the connection to a Multimedia Content Adaptation processor.	NR			

33

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R26	FI-Content	Multimedia Imaging and Media Recognition (near realtime)	Recorded multimedia data should be analyzed (e.g. segmentation, structure, object and audio/speech recognition), indexed and XML metadata (e.g. MPEG-7) should be generated. The indexing should process video, audio, images and text data. It is important that the service performs near realtime.	It is expected that some of the described functionalities are exposed as set of API in order to be better reused and integrated with other functionalities to enable a richer	NR			
R27	Outsma rt	Publish / Subscribe Capabilities		publish / subscribe capabilities on specific content	F			Need more clarification to understand what CDF attribute can fit with this requirement
R28	Outsma rt	List information types		what types of information can the infrastructure provide	F			This requirement is too generic to be considered as it is.
R29	Outsma rt	Alarm reaction time			S			

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R31	Outsmart	Geo location of an event		If the system produces an event, it should be tagged with a geo location if possible. Can an infrastructure provide this?	R			
R30	Outsmart	Security of data		General data security plus capabilities on having low or high security dependent on the type of data being transmitted.	I	Data & Context Management		Security is widely covered in the CDF
R32	Outsmart	Asynchronous message transfer	The system should be capable of supporting handling of more than 20000 messages in one second.		I	see note		Asynchronous interaction is covered by the supported protocols even if it is not explicitly stated in any part of the CDF
R33	Outsmart	Plug and Play of Sensors	Support for standard plug-and-play addition of new sensors		R			This requirement is not explicitly covered in the CDF, even if it is very likely already supported
R34	Outsmart	Services on Historical data			F			

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R35	Outsma rt	Systems interoperability		What interfaces can be used for system interoperability?	I, F			Without a more specific definition of interoperability it is not possible to state if this requirement is addressed or not.
R36	Outsma rt	Trust		Does the infrastructure provide any trust mechanism for its users? Also trust and integrity of the users' data.	P			Trust can be included in the security mechanism provided by the infrastructure. Trust is not explicitly stated in the CDF
R37	Outsma rt	Robustness, reliability and QoS/QoD		Robustness and reliability are difficult to measure!	I	Technical		
R38	Outsma rt	Always on services		Santander, we will change this requirement to "The system must provide high availability"? (four 9's, five 9's, please specify	I	Technical		

Requirement-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R39	Outsmart	Alarm Handling or Service			F			
R40	Outsmart	Management of devices within the infrastructure		Does the infrastructure contain device management capabilities? SDR.6.1.1 asks for real-time monitoring through the management interface. SDR6.1.2 asks if the devices within the infrastructure network (or accessed by the infrastructure) support real-time processing. TN.1.4.2 looks for the capability of rescheduling of polling of sensors and transmissions based on critical priorities, as a result of an alarm being received. TN.1.1.2 looking for scheduler functionality.	P			

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R41	Outsma rt	Wireless/Remote configuration, control and reprogramming of IoT devices (Sensors, etc.) also must be required to the platform/Sensor network		Does the infrastructure support for MOTAP (Multihop Over the Air Programming) functionalities?	R			
R42	Outsma rt	Historical and real time data support		Also is the management of this historical data configurable, e.g. can volume of data be increased/decreased?	NR			
R44	Outsma rt	Network devices synchronisation	Support for secure time synchronization	SDR.6.1.4 asks if the devices support secure time synchronization	I	Customer Device		

38

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R45	Outsma rt	Support of interfaces for system integration	The streetlighting management system must be integrated with other information systems in order to share information and react depending on the data shared	Does the infrastructure support such interfaces for integration? The type of interfaces should also be specified. Some of the interface types mentioned; SOAP & WSDL interfaces AND REST style interfaces. TN.1.6 looks for Web2.0 support.	I	Data & Context Management Application Service Delivery IAAS PAAS		
R43	Outsma rt	Bi-directional communication capabilities to IoT network	Capability for sending command messages to the IoT devices. Hence, IoT does not just sense but also acts. This means that the IoT capillary network supports bidirectional communications.	Does the infrastructure provide this capability, i.e. that mgt interface allows for monitoring and actuation?	I	Data & Context Management Application Service Delivery IAAS PAAS		Management and monitoring interfaces are widely diffused in CDF.
R46	Outsma rt	Support of external service integration.	Integration of information coming from other sources (out of Outsmart) like weather forecasts, traffic incidences, Google maps, etc.	E.g. can you plug in Google maps widget, possibly into the infrastructure management toolkit? Not so sure how to best word this wrt gathering the information from an infrastructure!!	F			

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R47	Outsma rt	Distributed Datamining	Datamining process should be able to correlate data from different sources (devices, enablers, software, DDBB…)	Does the infrastructure support this functionality?	R			This requirement is not explicitly addressed in CDF
R48	Outsma rt	Provision of user interface access to the infrastructure		Is there a user interface, on what platforms is this available, e.g. PCs, smartphones, tablets?	P			
R49	Outsma rt	Standard interfaces using standard data format and with authorised access for data sharing	Access to water management data should be available to the end users through compatible end interfaces: requires standard data format and secure interfaces. Levels of access: 1. Operator personnel 2. Industrial consumers 3. Private consumers 4. Regulator	Data formats, possibly lightweight formats + user authentication	S			somehow included in the security topic

40

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R50	Outsma rt	Alarms with a guarantee of (A) delivery and (B) time of delivery. Alarms are displayed to users with appropriate access rights.		Possibly can be coupled with R39. TN.1.4.1 asks for alarm prioritization.	F			
R51	Outsma rt	Device Capabilities/Profil e	Sensors for pressure monitoring and leakage detectors should possess long autonomy in terms of operations and require very low maintenance; preference should be given to powered devices. Also, devices should be working in harsh conditions of temperature and humidity.	The devices which the infrastructure accesses, should be profiled with respect to how they react to harsh conditions, e.g. heat, cold, water resistant. This information should be available. Also is the device powered or does it do energy harvesting?	P	Sensor Node		Partially included in the sensor network description

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R52	Outsma rt	Robustness of the System	Sensors: guaranteed operation for 12 hours in case of a failure of power supply system. Infrastructure: industry reliability standards and requirements can be applied. Reliability: 99.994% (max. outage: 30 minutes in a year)	This requirement is applicable from both the sensor/device perspective and also form the infrastructure perspective.	S			Included in the reliability and availability topic covered before.
R53	SmartA grifood	Multimedia Analysis	Gathering multimedia information for further analysis should be possible	The collection of multimedia data (photos, videos) could be used in order to analyze specific patterns and produce important results.	I			The requirement is one of the possible values of the attribute Services offered (Data&Context Management)
R54	SmartA grifood	Plug and Play	Self- configuration mechanisms should take place	Zero - configuration techniques are proposed for people who are not familiar to ICT; in this way, every stakeholder can use every component of the involved system effortlessly.	P			There are some elements with self-configuration attributes

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R55	SmartA grifood	Autonomous Service Management	Mechanisms should be developed for managing and controlling all up – coming services and applications	The cooperation of different services must be managed by a proper mechanism which will ensure the smooth operation of the overall system.	R	Deliveries (Infrastructure level)	Autonomo us Service Managem ent	It is a requirement for the infrastructure level
R56	SmartA grifood	Availability of Geo-meta data for users and products	Geo – located users activity data and mobility profiles should be available	Geo - spatial data should be gathered; those can be used in different areas, by different services and for different aims e.g. food - awareness subsystem needs to know the exact origin of a product	P			There are attributes related to location, although it is not GEO location specifically: - Data localization (Data&Context Management) - location of terminals (Customer Devices) - GPS position (Sensor Network)

43

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R57	SmartA grifood	Seamless handover between devices	Seamless transition between different devices should be performed (Multi-channel/Multi-device Access System GE)		F			Is this referred to a sort of content syndication between devices?
R58	SmartA grifood	Network Management and Control capabilities	Defined level of control and management of the network should be available	The cooperation of different services must be managed by a proper mechanism which will ensure the smooth operation of the overall system.	NR			This requirement would be included in requirement R55
R59	SmartA grifood	Infrastructure Feedback Mechanisms	Stakeholders should be given with the opportunity to give feedback for any stakeholders as well as the overall system.	Opinion mining procedures will help end - users gradually trust the recommendations and suggestions that are given to them. For example, if a stakeholder is not satisfied by a certain service, he could inform the respective help desk office which it in turn takes into consideration this complaint. After that, the provided service could be updated so as to cover users' needs.	R	Stakeholders (Infrastructure level)	Feedback	

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R60	SmartA grifood	Event/Notification Service Capability	Proper notifications should be sent to neighboring stakeholders for any emergencies or alterations.	Collaborative mechanisms should take into consideration any publications and forward them to the involved stakeholders.	R	Sensor Network or Customer Device	Notificatio n capabilitie s	
R61	SmartA grifood	Personalisation of Services	Different stakeholders' profiles should be loaded for different services	Depending on which service wants to access stakeholder's profile, proper information should be loaded. The visibility of proper information and the encapsulation of internal processes must be defined every time, for every stakeholder and every service.	R	Application Service Delivery	Personali zation of services	
R62	SmartA grifood	Update profiles	Periodic updates of different profiles should be possible depending on different types of feeds.	Different profiles should be updated with recent information so as all the external services that use those data, or stakeholders who want to be informed about a profile, are sure that the data they receive is correct and true.	NR	Application Service Delivery	Regular profile update	

45

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R63	SmartA grifood	Community capabilities	Finding other players and link to them should be available	Different communities will be reinforced since there will be developed a dynamic network that can easily link all stakeholders.	NR			
R65	SmartA grifood	Information adapted to device type	Adaptability of content on different devices should be possible	The information that will be presented a stakeholder has to be adapted according to the devices that it will be displayed e.g. it is not preferable to send HD data to a device with limited capabilities.	R	Application Service Delivery	Content adaptability	
R66	SmartA grifood	Local processing at the network's edge	Local system has to take control when internet connection fails	Future Internet systems must work properly regardless the internet connection; this means that the local system should be implemented so as to efficiently take the overall control when the "cloud" proxy one is not accessible. Smooth handover between different networks enables data integrity and trustworthiness among different players.	NR	Deliveries (Infrastructure level)	Smart handover between networks	

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R67	SmartA grifood	Data types supported	Multimedia analysis should be present.	To provide with the opportunity to facilitate the system with more accurate information (HD data) for each stakeholder.	R	Data&Context Management	Type data analysed	Related to requirement R53
R68	SmartA grifood	Real-time data handling	Real – time recommendations should be sent according to stakeholder's behaviour	The system should be clever enough to identify the different interest of stakeholders and gradually provide them with personalized recommendations and advertisements.	S			Similar to requirement R60 --> Notification capabilities
R69	SmartA grifood	Sensor/device Profile and its capabilities	Advanced sensor capabilities, e.g. ripeness, temperature, humidity should be in place	Advanced sensor capabilities should be in place. These sensors must be able to sense ripeness, temperature, humidity and other quality parameters. These sensor devices must have interfaces to connect them to some kind of local data collection service that can derive the environment conditions of the produce.	I			Already in Sensor Node component

47

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R64	SmartA grifood	Broadcast of devices capabilities	Devices linked to the system announce their capabilities	Knowing the unique capabilities of a device, we will be able to manage the notifications and the profiles more efficiently e.g., if the mobile phone cannot support HD videos, we could send a simple text.	R	Customer Device	Device communic ation capabilitie s	
R70	SmartA grifood	Sensor data available online	It should be possible to access advanced sensor data on-line via the internet	It should be possible to access advanced sensor data on-line via the internet. More specifically, the data collection service as introduced in the previous requirement 11 must be accessible anywhere, anytime to give access to the sensored data about the environment and the produce.	R	Sensor Node	Software Interfaces	

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R71	SmartA grifood	Real-time Alert Service based on sensor data	It should be possible to communicate quality alerts about products in transit on-line via the internet	The local data collection services that monitor the environment conditions and quality level of the produce should be able to communicate quality alerts about produce on-line via the internet when certain thresholds are exceeded, e.g. temperature too high. An alert signal must be given towards responsible stakeholders in order to take action upon it.	S			Similar to requirements R60 and R68
R72	SmartA grifood	Identity Management	Agri-logistics security systems should allow for trusted human interventions	The system shall enable the user/ object to authenticate and/or authorise each other (i.e. in a client server, as well as p2p environment) based on decentralised certificate scheme.	S			There are other attributes about authentication
R73	SmartA grifood	Trust	Logistic objects should allow for decentralised generation of trusted relationships	Logistic objects should allow for decentralised generation of trusted relationships	F			

49

Requirement-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R74	SmartAgrifood	RFID facilities	Readable RFID chips from pallets	RFID chips from pallets must be read at warehouse, truck and retail store in order to know information of the pallet and delivery conditions of the products on it. Thus, a component is needed to read information contained on the RFID chip and a data reader in the warehouse and in the retail store. Such readers should be connected to other components that comprise the information system around the logistics process	P			May it be included in Sensor RFID--> What is tagged?
R75	SmartAgrifood	Platform and OS agnostic user interfaces, yes or no?	The user interfaces of mobile logistic devices should be OS or platform-independent	The user interfaces of mobile logistic devices should be OS or platform-independent. In that way, these interfaces are portable and can be easily adapted towards other platforms and devices.	R	Customer Devices	Platform independent	

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R76	SmartA grifood	Access to certification of producers by customers	Provision to consumers of up- to-date certification information via websites and mobile devices	Consumers want to have up-to-date information via websites and mobile devices about the certification status of the various organisations in the agrifood chain. Thereby, consumers can check whether the product they are buying has been delivered via a chain that is certified around quality information. Thus, the information in the "certification database" must be accessible via multiple channels and devices.	NR			I think this requirement is more related to an application level than an infrastructure level
R77	SmartA grifood	Specification of the types of devices used	Supply chain monitoring systems must support different communication media/devices	The events and their corresponding actions must be monitored via various different communication media and devices, such as mobile apps/devices, fixed back office apps/systems and internet-based apps/services.	NR			Same as requirement R76

51

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R78	SmartA grifood	Local routing of messages based on different priorities	Local routing of messages must be possible.	Local routing of messages must be possible. For various reasons of network efficiency and real-time behavior, certain messages should be routed as locally as possible.	R	Wireless Network Wired Access Network Backbone Network	Optimizati on network	
R79	SmartA grifood	Delay tolerant networking supported or not	Asynchronous communication of exception event/messages must be possible.	Asynchronous communication of exception event/messages must be possible. It is not always the case that an internet connection is available. In that case, an asynchronous message has to be delivered somewhere that can be picked up once the receiver is connected again.	R	Application Delivery System	Asynchro nous communic ation capabilitie s	

52

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R80	SmartA grifood	Plug and play of different systems, e.g. logistics of different actors	It should be possible to smoothly connect the logistic information systems of different actors ('pick, plug and play')	Different legacy systems are often offering semantically similar but technical incompatible interfaces. Nevertheless, they need to im- and export information from/ to a product related digital/virtual object. There shall be a module to also map those different technical interfaces to the object, executed by a user, familiar with the semantics.	S			
R81	SmartA grifood	Ability to use application in an offline mode	Allow functionality without an internet connection	In rural areas it is not possible to be always connected to the internet/cloud. To allow devices to work under such conditions it should be possible to migrate services from the cloud on the device.	R	Application Delivery System	Offline availabilit y	Related also to requirement R47

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R82	SmartA grifood	Part of delay tolerant networking - asynchronous message sending, no need for response (ACK).	Compensate loss of connectivity in rural areas	To allow work in rural areas, the system should compensate disconnects from the internet on mobile devices by allowing asynchronous communication (i.e. sending data without waiting for an immediately response).	P			Related to requirements R79 and R81
R83	SmartA grifood		Create/Join/Leave P2P Networks	To map real-life communication inside a supply-chain it should be possible to easily create, join and leave P2P networks. This includes centralized, hybrid and pure P2P networks. Additionally problems like routing of messages through the chain, not requiring a central authority that tracks the latest IP should be addressed, while taking care for routing, prioritization, message handling and storage.	R			It is needed a new BB: P2P networks?

Requirement-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R84	SmartAgrifood	Rapid notification to stakeholders of risk to safety information	Safety risk information has to be communicated very rapidly to the involved stakeholders	In conjunction with requirement 39, it must be possible to communicate any safety risk information based on detected problems very rapidly to stakeholders such as the European Rapid Alert System for Food and Feed (RASFF). Thus, the same notification GE component that is responsible for notifying the product owner can also notify the ERASFF and other stakeholders involved.	S			
R85	SmartAgrifood		Service and service components manager	The service infrastructure has to support the storage and management of service components, service templates and executable services	F			I don't understand this requirement
R86	SmartAgrifood	Service Creation/Composition toolset	Service creation	The prosumer requires a suitable environment for creating services and service components	P			There are attributes about interfaces

55

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R87	SmartA grifood	Service execution environment	Service Execution	Service Execution should be supported locally combining user terminal and environment in order to provide a fully adapted service execution	S			Too application specific
R88	SmartA grifood	Availability of context information which can be integrated to the service	Configuration and context adaptation	Service modules and the service itself should be able to adapt and configure to the user and context	P			What component does this affect? There are attributes about configurability
R89	SmartA grifood	Standard device usage	Transparent Device usage	Service created by prosumers will interact with devices so transparent and standard mechanism for communicating and interacting with them should be provided	R	Customer Device	Standard Device Usage	
R90	SmartA grifood	Event handling service	Processing of heterogeneous event provided by sources of different nature	Event generation, gathering identification, processing and management	P			There are proposals about data processing and event notification

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R91	SmartA grifood	Capability of inputing a domain specific model	Domain model for structured information	Common processing capabilities to heterogeneous metadata linked to different types of "objects" in the retailer domain, including those that come from the other stakeholders of the supply chain, the consumers, etc	F			
R92	SmartA grifood	Capability of processing unstructured information?	Integrate unstructured information in system's data model	Processing of unstructured information	R	Data&Context Management	Configura bility and extensibili ty of services	To add a new value: "proc. Data"
R93	SmartA grifood	Geo-positioning, irrespective of the network type its connected to	Obtain Geographical positioning of the user	Application of localization algorithms to calculate a device's positioning based on Wifi, AGPS, RTLS systems. Etc	R	Customer Device	GEO location	There are attributes about sensor localization, but not about Customer Devices positioning
R94	SmartA grifood	Database Access	Obtain easy access to the information stored in heterogeneous databases	Abstraction layer for the retrevial of information from different databases	R	Application Service Delivery	Services offered	Include a new value: smooth presentation
R95	SmartA grifood	Standard interface for heterogeneous data access	Unified access to different types of information	Retrevial and delivery of information to/from different sources	P	Application Service Delivery	Services offered	Include a new value: standard presentation

Requirement-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R96	SmartAgrifood	Domain Model Access with Annotations	Semantic description of the domain	Semantic description of the domain's components that defines the objects attributes and how they interact with the rest of the domain.	I			In Data&Context Management -->semantic support
R97	SmartAgrifood		Development of semantic based scalable systems		F			
R98	SmartAgrifood	User profile with movement activity recorded	Process the information of the instant positions of the user into an activity and/or movements profile		R	Customer Device	Services offered	Include a new value: tracking
R99	SmartAgrifood	Generation of customized content	Statistical analysis of the user behaviour and preferences and generation of tailored information	Statistical analysis of the user behaviour and preferences and generation of tailored information	S			Application level
R100	SmartAgrifood	Pattern analysis service which is configurable	Infer behavioural patterns based on user activity	Given the information provided by the user profile, its past actions and its current action this module will infer behavioural patterns of the users.	S			Application level (like R99)

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R101	SmartA grifood	Service Repository which is querable	Availability of a repository of commonly structured services	A (most probably) distributed repository of all the services that operate in the system, including their capabilities' description and availability	S			Application level
R102	SmartA grifood	Service Repository management	Management of service repository platform; discovery of services	Tool for the administration of the service repository used for maintenance and deployment of the services that exists in the system.	S			Dependent on requirement R101
R103	SmartA grifood	Service Composition	Users can compose their own services following the prosumer approach.	Current trends in the ICT paradigm are dealing with the concept of prosumer, in where the classical end user changes its hard consuming role to a new one in which himself can create new services that perfectly fit his requirements. These services are created using a "user friendly" application where the user can combine different logical components to create a personalized service or application.	P			There are many extensibility attributes. This seems to be one more

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R104	SmartA grifood	Standard visualization in devices	Abstraction layer for the visualization of applications in mobile devices	The abstractions layer comprises the mechanisms to provide adapted visualization to all the end-user services with independency of the mobile device used.	P			Abstraction layer in Customer Device, in general
R105	SmartA grifood	Standard interfaces for developers working with different devices, and communication protocols	Establishment and management of the communications of the system with sensors and devices with independency on the communication protocols	Abstraction layer that will provide technologies developers with an common API to communicate with different devices that use different communication protocols and interfaces	S			Sensor Network --> open interfaces
R106	SmartA grifood	Data fusion for the data coming from the sensors	Collection, filtering and distribution of data generated by sensors	System component that will gather all the raw data incoming from the sensors, filter it in a way that all the not usable information is deleted, combine it into usable information, and deliver it to the next component in the information flow chain.	R			

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R107	SmartA grifood	Rule based approach to increaser automocity	Establish mechanisms to automatically trigger actions involving IoT components	Unified model for the description of domain specific rules for a more autonomous management and operation of IoT resources.	P			Related to notifications
R108	SmartA grifood	Security management tool	Offer the user a tool to understand how their privacy is being managed by the ICTs and to correctly express their preferences	Language that provides the non expert user with a translation, in understandable terms, of the privacy policies of the services he receives / wants to receive. It also applies the other way around. This tool will translate user preferences expressed in common language to technical language that security experts can understand.	I/R			Processes (Infrastructure Level) --> SLA Management

61

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R109	Instant Mobility	Computing as a service	Given the precondition that the system has available Information about traffic volume, car speed, traffic flows, parking space, public transport timetable (no matter the source - e.g. cars, drivers, infrastructure, etc. - or the used technology), there is a need of computing based on huge amount of data (dynamic and static) and algorithms for forecast of traffic demand. The algorithms for computing the target flows will need high computing capacity and the data input such as position of the vehicles should be very precise.	Does the infrastructure offer compute resources? If so in what form, e.g as a service	I	Cloud Computing		

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R110	Instant Mobility	API for Management of Virtual Data Centers	This requirement is related with Instant Mobility functionality consisting in offering drivers a recommended speed to avoid stopping, and adapting the traffic signals to the real demand, in real time. This Instant Mobility service will be built combining data hosted in VDCs (Virtual Data Centers). Instant Mobility Service Providers do not need either want to know exactly where, how, how many VMs compose the Data Center, but need an abstraction layer which allows to run the following services which may be seen as user stories: forecast better speed for each vehicle, communicate with traffic signaling system, coordinate with special cases (i.e. be able to give priority to public transport, emergency, etc.). Each of these user stories will be classified as generic or specific, being developed by the CP or Instant Mobility).		F	Cloud Computing		Not sure if the generic cloud computing topics can cover the specific requirement

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R111	Instant Mobility	Fast Algorithms	This is a non-functional requirement. The calculation algorithms of the equilibrium state will need high computing capacity and should be very precise fulfilling ultra short response times of msec.		I	Cloud Computing		claimed to be a non functional requirements

Requirement-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R112	Instant Mobility	On Board Unit cloud capabilities	The black box in the car, with extra requirements regarding safety, could be seen as a Cloud-Edge Proxy, with storage and hosting capabilities, ability to automate connections towards persons/devices inside the car, ability to upload/download information from the traffic infrastructure and the traffic managers and traffic services providers. The unit on board may also offer a middleware platform to execute traffic services. All these capabilities could be enabled by implementing a management from the cloud.		I	Cloud Computing		Not sure if the generic cloud computing topics can cover the specific requirement

65

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R113	Instant Mobility	Data Collection	Information that I want to gather first and offer afterwards: traffic volume, car speed, traffic flows, parking space, public transport timetable. Technologies I may want to use: inductive loops, DSRC, CCTV, ANPR, communications vehicle-infrastructure (3G, Bluetooth), social networks, ... Who else can offer this information, so I want to collaborate with: travellers, transport managers, Who will be consuming this information: mainly Service Providers Possible EPICS inside: DataCollection, DataOffering		P	3G_4G_WIMAX Network		Not sure the meaning of "collaboration" is the same for requirement a CDF

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R114	Instant Mobility	Availability of high quality traffic forecasts	I want to be able to process all the information gathered (traffic load, disruption of service, weather forecast, pricing) in real time and provide the end user (traveller, driver or float manager) with the best route.		P	Sensor Network	Data managem ent on site	
R115	Instant Mobility	Real-time location	To find the best solution in real-time, I have to provide my location anytime, anywhere (indoor/outdoor) so the service provider can update the solution, As a traveller my mobile handset could provide this information,		P			

67

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R116	Instant Mobility	Discover relevant vehicles for multimodal solutions for people and goods: busses, cars, trucks, trains	To answer the request of the best solution for a journey, as a Service provider I want to identify all vehicles available between A & B to manage with my algorithms the optimal way. Each vehicle should provide its own capabilities (available seats or volume for goods, planned routes, location).		P			
R117	Instant Mobility		As a member of Instant Mobility community, I publish regularly what are my capabilities to take into account new passengers or parcels along my planned route, I publish for a limited geographical area depending of my vehicle and driver profile,		NR			This requirement is considered not relevant and it can be better described as a publish and subscribe functionality with also a geolocalization filter

Requirement-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R118	Instant Mobility		As a good operator, I want to know where are the parcels in a city and based on their profiles if it is possible to transfer them in another trucks to optimize route & loading based on traffic constraints		NR			
R119	Instant Mobility		As a traveller, I define some profiles depending what kind of urban move I expect to do (home-office, home-school, home-commercial center) and publish the relevant profile to multimodal service providers when I'm looking for a multimodal solution, My profiles are stored in my personal handset.		S			
R120	Instant Mobility		As a driver or a traveller, I want to provide in real-time information about traffic jam status (location, speed) to optimize the next steps of my journey: new routes for drivers, new transport solutions for traveller		S			

69

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R121	Instant Mobility	Mobile handset user identification	Unequivocal identification of a traveller or a driver through mobile phone to ensure trust; this allows for instance authentication and payment services. Even when information is anonymous it is necessary to assess authenticity and avoid spreading of fraudulent and fake information. Devices are used to identify the users.		I	Customer Device		Addressed by security issues

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R122	Instant Mobility	Multiple Device Interface	A software middleware platform is then needed that gives unified access to sensors, information, interfaces etc. available on devices; this will allow developing each application once for all devices.	As Instant Mobility services must be available to the largest number of travellers, device and OS fragmentation may be a severe issue requiring replicating the development of the same mobile application many times just coping with it. A software middleware platform is then needed that gives unified access to sensors, information, interfaces etc. available on devices; this will allow developing each application once for all devices. Such platform should be conceived in order to facilitate the developer in building applications that can be experienced with minimum difference by users having devices from different vendors, running different OSs and having different capabilities. Another important feature is the impact on performance (speed), which must not be impaired by excessive processing workload from the platform.	I	Customer Device		

71

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R123	Instant Mobility	Service Handover between Devices	Instant Mobility services require that applications are accessed by different devices in different moments. For instance planning a trip is normally done at home using a domestic fixed device like a PC or Connected TV; later when travelling the same service should be accessed through a mobile phone in order to take proper transport means and eventually make changes to the itinerary. In some cases the same session should be instantly moved between devices, for instance when approaching a POI info kiosk after having searched the POI with the mobile phone.		S			

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R124	Instant Mobility	End-user device positioning data access	Today's mobile cellular networks can provide only rough location information, like the whole cell area and this information is useful to accelerate other location systems like GPS. Future mobile networks will use advanced radio technologies and network functions that will improve location information accuracy.	The most innovative Instant Mobility services would be barely impossible without knowing the position of travellers and vehicles. Today's mobile cellular networks can provide only rough location information, like the whole cell area, in worst case; nevertheless this very approximate information is useful to accelerate other location systems like GPS and future mobile networks will use advanced radio technologies and network functions that will improve location information accuracy. Raw location data is expected to be complemented by other information like speed, direction, location source technology, estimated accuracy, time stamp etc. This enabler is obviously linked to privacy and security issues; the traveller must always be aware of how his/her position information is processed by one or more mobility service.	P			The handover between application sessions is not an infrastructure topic.

73

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R125	Instant Mobility	End user device position from network	Today's mobile cellular networks can provide only rough location information, like the whole cell area and this information is useful to accelerate other location systems like GPS. Future mobile networks will use advanced radio technologies and network functions that will improve location information accuracy.	The most innovative Instant Mobility services would be barely impossible without knowing the position of travellers and vehicles. Today's mobile cellular networks can provide only rough location information, like the whole cell area, in worst case; nevertheless this very approximate information is useful to accelerate other location systems like GPS and future mobile networks will use advanced radio technologies and network functions that will improve location information accuracy. Raw location data is expected to be complemented by other information like speed, direction, location source technology, estimated accuracy, time stamp etc. This enabler is obviously linked to privacy and security issues as previous requirement	P			Related to R124

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R126	Instant Mobility	End-user device proximity	Instant Mobility services need direct communication between nomadic devices and devices in the Internet of Things. Examples are payment, traveller access to transport means, parcel tracking in urban goods delivery; proximity communication is the only way to detect traveller access to or presence in a given transport mean and a fast and effective way for handling payment of tickets. Application developers need to access proximity interfaces in a way as much as possible abstracted from their specific radio technologies (NFC, ZigBee, others...) and also from the specific device brand, model and OS.		I	Sensor Network Sensor Gateway		CDF covers it in the sensor network topic. Not sure it is applicable also to the context of Instant Mobility

75

Requirement-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R127	Instant Mobility	Traveller Profile Rights Management	As a traveller I delegate some rights to reach personal data (profiles) to a service provider to identify a multimodal solution, I delegate also some rights to delivery companies through commercial website to optimize the delivery of expected parcels, As a traveller or a driver, I propose to share some of my profiles with other travellers and drivers to share common multimodal solutions, As a end-user a delegate the rights for a dedicated period of time,		NR			

76

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R128	Instant Mobility	Profile Rights Renunciation	As a traveller, the rights provided to find multimodal solutions are removed after the dedicated period of time I've validated when looking for the solution, As a delivery operator, acknowledgement of delivery will reject all rights on consumer profiles,		NR			
R129	Instant Mobility	Anonymous Data for Traffic and Public Transport Management	As a traveller or a driver, I agree to share data about my usual journeys without any link to my personal profiles and real-time and permanent location,		S			

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R130	Instant Mobility	End-user Single Sign On	Instant Mobility users need to access different service providers using a single authentication ID to avoid keeping track of different user IDs and password. Also users need to authenticate once for many services. This also applies to application accessed by the mobile phone; in this case the user should be automatically recognized through SIM ID.		I	Cloud Computing 3G_4G_WIMAX Network		
R131	Instant Mobility	Secure Transaction	Communication between different actors may be authenticated and encrypted for privacy and security reasons.		I	Application Service Delivery		

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R132	Instant Mobility	Context and User Driven Privacy Control	Application and services on terminal devices, both fixed and mobile, must provide a simple and clear way to user to select the data that are shared. Also it should be possible to configure different settings for data sharing according to different context. For instance when taking transport means user may agree in sharing some information for billing, while when driving a car he may want to share only his position; also he may choose to share information anonymously.		I	Data & Context Management		

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R133	Instant Mobility	Secure Proximity Communication	Many Instant Mobility services require connection between handheld devices and IoT devices through proximity communication. This communication must be secured and it's advisable to use a secure element on the phone, most likely SIM card based. This is needed for two reasons. On one side user IDs and personal data have to be protected, on the other side the authenticity of the user ID must be granted. For instance if a traveller is using a given transport mean it should be avoided that he accesses it using another traveller ID.		I	Customer Device		Addressed by the security topic. Not explicitly stated in the CDF.

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R134	Instant Mobility	Secure Mobile Communication	Most of Instant Mobility services require connection to internet services through mobile phone. Most of these services need to provide customized and personalized services and in some cases private data have to be shared. For instance a booking ID may be		I	Customer Device		Addressed by the security topic. Not explicitly stated in the CDF.
R135	SAFECI TY	Enable multi-modal input data	Ability to accept data from different sources (images, audio, video signal, sensor data).		I			The input format is not the same thing of "data sources"
R136	SAFECI TY	Definition of knowledge databases	Definition of event profiles, modeling of suspicious targets to be detected.		NR			The information modeling is out of the scope of an infrastructure

81

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R137	SAFECITY	Alert rise software on the basis of images/video/data reading and knowledge databases	Ability to obtain meaningful semantic information from extracted data. Ability to identify an alerting event.		I	Data & Context Management		The semantic topic is addressed in "Data & Context Management", the event handling in not explicitly addressed in the CDF
R138	SAFECITY	Active learning while detecting	Getting relevant insights from incoming data allowing continuous estimations and predictions.		S			This topic seems related to the ability of the infrastructure to reconfigure itself, but it is related to an application perspective, not sure to be suitable for an architecture analysis
R139	SAFECITY	Detection of malfunction of other equipment	Automatic repositioning of the video cameras in case of malfunctions detected to other equipment		R			

82

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R140	SAFECI TY	Automatic repositioning of the cameras	Automatic repositioning of the video cameras if necessary. E.g. the traffic values have been exceeded		R			
R141	SAFECI TY	Sensor/device Profile and its capabilities	Potential technologies: • counting of people • human avalanche's detection • audio detection • motions detection • real time tracking • body gestures detection • human facial expressions detection • face recognition • presence detection • biometric identification	This is kind of related to sensors which can record this kind of information	S			This is kind of related to sensors which can record this kind of information

Requirement-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R142	SAFECITY	Guidelines for behaviour profiling	Behaviour: • definition of "normal" activity deviation percentage • likelihood of next in sequence activities Location: likelihood of events in different places Time: • likelihood of events depends on the time of the day • deviation in behaviour characterized in terms of time ranges.	These are very advanced specific value add services	S			
R143	SAFECITY	Type and location of incoming data	Video signal Metadata; fixed camera location or camera ID, date and time		S			
R144	SAFECITY	Identification of suspected objects	Unattended bags, long time stationary vehicles possibly based on size shape, car features	Very specialised	S			Image analysis and shape recognition are example of specific requirement.

84

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R145	SAFECITY	Guidelines for suspect object definition	Location: intense surveillance in high risk areas (public places as airports) Time: likelihood of suspected object depends on time of day and time being unattended.		R			Not functional requirements
R146	SAFECITY	Surveillance data type	Video surveillance • Fixed camera location or camera ID • Date, time		R			

85

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R147	SAFECI TY	Sensor/device Profile and its capabilities	Ability to detect Fires, smoke or health risks in public areas (critical infrastructures, parks, traffic tunnels, etc.): • Low-consuming fire detectors • Smoke detectors • Infrared cameras • Gas leaks, high contamination levels in public areas • Environmental impairments in traffic roads. • Gas detectors, CO, NO and opacity sensors • Snow and ice detectors • Floods detectors		I	Sensor Node		
R148	SAFECI TY	Detect traffic congestion, traffic incidents, road conditions, geo positioning of police, irregular vehicle behaviour	GPS tracking, GIS applications, detection traffic flow variations. Use of the following data types; Video images • Camera location (GPS coordinates) • Road identification: type of road, sector.		I	Sensor Node (gps) Sensor Gateway (gps) Data & Context Management (GIS)		

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R149	SAFECI TY	Bandwidth at least enough to cope with existing necessities	Video Surveillance 8 MB per stream per fixed cameras, 512 kbps per stream for mobile cameras Optical Character Recognition (OCR) data (license plates, GPS coordinates): 100kbps Signaling; 25kbps		I	3G_4G_WIMAX Network WIFI Network		
R150	SAFECI TY	Strictest storage requirements	Continuous 8Mbps video stream without compression for 7 days storage → 670GB per camera stream		P			The CDF does not ask for specific ability for storing data.
R151	SAFECI TY	Frame rate for video images reading tools	8-25 frames per second		S			
R152	SAFECI TY	Optimization video storage	Encoding video. - Video compression algorithms (MJPEG,MPEG-2,MPEG-4, H.264)		S			

87

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R153	SAFECI TY	Network transmission cope with real time services	Minimum latency of Video images display		P			realTime is not explicitly addressed, but high bandwidth and minimum latency are concept widely addressed
R154	SAFECI TY	Connectivity with fixed and mobile devices	City wide connection with fixed devices (cameras, sensors) and mobile devices (as smart phones, in-vehicle computers)		I	see note		This requirement is widely supported by infrastructures and covered by other attributes in the CDF, but it not explicitly addressed there.
R155	SAFECI TY	High network availability even for mobile devices	Currently, video signal from mobile devices to the C2 centers suffer from poor availability of public networks		I	Technical		
R156	SAFECI TY	Open and flexible solutions enabling scalability of surveillance systems	Handling thousands of cameras, environmental low-consuming sensors, other sensors		I	Technical		

88

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R157	SAFECI TY	Proper integration of video signal from fixed and mobile cameras.	Integration of different output formats depending on the: • Type of camera: optical, infrared. • Camera brand (Sony, Panasonic, Axis, etc.)		R			Transcoding is not explicitly addressed in the CDF
R158	SAFECI TY	Integrate Traffic management with Traffic lights management			S			
R159	SAFECI TY	Sensitive data handling should cope with Ethical constraints	Personal data: criminal records, license plates, recorded images.		I	Societal		
R160	SAFECI TY	Physical system protection of sensitive data	Location limited to secure places (as police centers)		R			Physical access to data is not addressed in the CDF
R161	SAFECI TY	Visualization of public places recordings only allowed by selected authorities	Visualization restricted to authorities (generally, police officers)		I	Application Service Delivery		Considered as user profiling

89

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R162	SAFECITY	Sensitive databases cannot be directly connected to public network	Accessible by internal and secure requests.		P			Widely addressed as concept, not found any specific items related to data access protection
R163	SAFECITY	Sensitive data should be securely encrypted for transmission over public network	E.g. License Plate Recognition (LPR) system of Madrid City Police: LPs are sent from vehicle cameras through public networks to control centers where identification of suspected LPs is performed checking internal databases.		P	see note		The LPR system cited in the requirement is not explicitly cited In the CDF, while the feature seems covered by it
R164	SAFECITY	Mobile Command and Control Centers	Mobile Command and Control Vehicles equipped with communication, imaging and computational facilities		S			

90

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R165	SAFECI TY	High degree of reliability in "intelligent" detection of alarms	False alarms may cause the unnecessary costs and work. Guidance : less than 20% false alarms in traffic incident detection tools are accepted (Ref 4)		S			Infrastructure reliability is addressed, whereas this kind of application reliability is out of the scope of an infrastructure
R166	SAFECI TY	Automated cross-references before alarm triggering	Historical data or 3rd party data sources		NR			
R167	SAFECI TY	Provide full flexibility to model events to be alerted of	Proper user interfaces to re-defined alarms. Especially important when frequent malfunctioning detected		S			

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R168	SAFECI TY	Full flexibility for alarm triggering configuration. Enable a wide range of different procedures: from automatic functionalities to human intervention.	E.g. minimum human intervention for incidents detection E.g. human visualization for verification of abnormal behaviour in citizens/objects/traffic surveillance		S			Even if it can be found inside the supported protocol, CDF should explicitly address the topic of notification toward subscriptors. This is a widely requested requirement. Even if the content of the notification is out of the scope, the functionality of providing this kind of notification should be addressed especially in the sensor area.

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R169	SAFECI TY	Flexibility for configuration of visual /audio notifications	E.g. In M30 surveillance system there are 960 cameras monitored by 4 operators small squares for each camera border in red colour when positive detection. Operator enlarges the image by clicking on it		S			Even if it can be found inside the supported protocol, CDF should explicitly address the topic of notification toward subscriptors. This is a widely requested requirement. Even if the content of the notification is out of the scope, the functionality of providing this kind of notification should be addressed especially in the sensor area.

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R170	SAFECI TY	Enable awareness of Software/hardwar e failure	Anomalous functionality of algorithms Anomalous functionality of equipment		R			
R171	SAFECI TY	Enable remote configuration of sensor devices.	Remote management of high resolution IP cameras of any vendor and model: • Optical Cameras: Pan Tilt Zoom (PTZ) , domo, 360o view of sight • Infrared cameras. • Wireless cameras, fixed		R			
R172	SAFECI TY	Flexible control of devices: centralized or distributed as required by the user.	E.g. Pyramidal structure of M30 management architecture where Command Centre is at the top. Allow local logic at each control level.		S			
R173	SAFECI TY	Service Discovery			R			Registry and service discovery are not explicitly addressed in the CDF

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R174	SAFECI TY	Enable visualization of real time /recoded video. Simultaneous access from different operators.			S			Related to bandwidth availability
R175	SAFECI TY	Multiple web-based consoles to configure and control video			I	see note		Addressed by supporting the different protocols.
R176	SAFECI TY	Enable scheduled and event-based video recording. "Record-now" feature while viewing live video			S			
R177	SAFECI TY	Enable Video annotation capabilities.			I	Data & Context Management		Considered as semantic support
R178	SAFECI TY	Real time tracking of suspicious target from one surveillance camera to another.	Triggered when positive suspicious detection. Stream synchronization mechanisms. Required		S			

95

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R179	SAFECI TY	Enable 3D visualization in the real time tracking of targets	Potential applications that ease the user development of 3D models of places with video surveillance cameras.		S			
R180	SAFECI TY	Common operational picture integrating multi-source data	Geo-spatial map of a city with various layers: street names, cameras locations, sensors locations, units deployed, etc. Enable zoom over any region of the map and watch live video displayed with a click on the camera		I	Data & Context Management (GIS)		
R181	SAFECI TY	Integration of input data with: - exiting GIS in C2 centers - commercial web services providing online and offline aerial, ortho image data as Google Earth & Google Maps			P			This requirement is about the feature composition. The CDF does not have a specific topic covering it, even if composition is widely supported by the infrastructures.

96

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R182	SAFECI TY	Full redundancy Command Centers structure			S			
R183	SAFECI TY	Efficient video storage			P			
R184	SAFECI TY	Storage Scalability, Simple storage administration, Efficient data handling of large volumes of data	E.g. Data centre M30 C2 Centre employs Storage Area Network (SAN) solution for disk storage, a sharing storage philosophy that optimizes the transmission of high volumes of data between servers and storage devices.		I	Technical		
R185	SAFECI TY	Full management of servers (application services, databases) and communication networks.	User management of network resources (BW, computing, storage) while using an application.		I	PAAS IAAS SAAS		

Requirement-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R186	SAFECITY	Dynamic configuration of different traffic flows	Virtual private communication links to separate traffic from different sub-systems or applications		I	Wired Access Network Backbone Network WIFI Network 3G_4G_WIMAX Network		This requirement can be considered as Traffic Priority
R187	SAFECITY	Dynamic management of user groups accessing to web-based applications	Dynamic creation of private domains accessible through virtual private and secure connections by subscribed users		I	Application Service Delivery		This requirement can be considered as Security services
R188	SAFECITY	Integration of private CCTV systems for public safety and security purposes.	Video signal generated by Private operated cameras (private buildings, critical infrastructures, etc.) and police operated cameras of public spaces (streets, market squares) should be merged together to maximize surveillance capacities.		P			

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R189	SAFECI TY	Enable automated trustworthy surveillance information from citizens (fixed and mobile)	E.g. Video streams from incident place sent directly to systems operated by authorities over mobile networks and public Internet. E.g. Image of disturbing objects in a road.		NR			
R190	SAFECI TY	Integration of other CCTV systems handling by other PS organisms	E.g. In Madrid, CISEM receives M30 tunnel video signals		NR			
R191	SAFECI TY	Share automated detections of larger incidents	Generally, not currently available.		NR			

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R192	SAFECI TY	Unified Incident Emergency Response	Benefits pursued: • reduce ER time • standardize procedures and protocols • seamless coordination • enable shared use of resources	Unified Incident Emergency Response • Enable coordination of emergency assets, e.g. at regional level • On-line secure access to the user application • Real time input: o PS resources, real-time location o PS regular actuation procedures o Ad-hoc security procedures of critical infrastructures o Incidents information o Major plan events • Semi-automated plan as output: o Assignment of right resources that should attend a detected incident (Madrid SITE*) o Indication of ad-hoc optimal procedures for each responder - route calculation system - Nearest access points/emergency exits - Crucial nearby places (hospitals)	S			

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R193	SAFECITY	Require interoperability with private networks (PMR, TETRA and TETRAPOL) offering mobile connectivity to PS members in the field	Enable sending low data rate messages (voice commands and short instantaneous messages) form C2 centers to targeted PS members in the field (FRs attending an incident, surveillance agents, patrol units)		P	interoperability with other infrastructures		Can be seen as interoperability among different infrastructures
R194	SAFECITY	Require interoperability with public networks (wireless hotspots networks, GSM/GPRS/UMTS/4G) offering mobile connectivity to PS members in the field.	Enable remote access to surveillance video through internet browser (password protected). E.g. Swedish fire-brigades access video surveillance data of the incident area through mobile devices. Remote access to Common Operational Pictures in mobile terminals of first responders in an emergency		P	interoperability with other infrastructures		Can be seen as interoperability among different infrastructures

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R195	SAFECI TY	Enable different security levels for database access and storage	Sensitive data requires the highest security level (password-protection and other mechanisms that guarantee the security requirements)		I	Application Service Delivery		Considered as user profiling
R196	SAFECI TY	Flexible set up of security level			I	Application Service Delivery		Considered as user profiling
R197	SAFECI TY	Monitoring of sensitive data entries. Keep access records.	Allow checking identification of entries, access statistics.		I	Data & Context Management		
R198	SAFECI TY	Full security management of sensitive & non-sensitive databases	Full management queries, storage, and transmission of sensitive information.		I			Not explicitly related to database
R199	SAFECI TY	Guarantee that citizens are aware of entering in surveillance place	E.g.: cameras with laser illuminators associated to cameras in order to advise people involve in incidents E.g.: Internet-based access to surveillance images (enable previous automated blurring of other citizens' faces)		NR			Not functional

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R200	SAFECI TY	Automated advertising through traffic electronic panels (human supervision)	Informing of traffic restrictions, alternative routes, estimated period of unavailability.		NR			
R201	SAFECI TY	Integration with megaphone systems	E.g. in tunnels, critical infrastructures		S			
R202	SAFECI TY	Enable automated identification of fixed and mobile terminals' location	Allow targeting alerts to citizens located in affected area		I	Application Service Delivery		

103

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R203	SAFECI TY	Send automatically generated instantaneous messages (SMS alerting) to targeted citizens mobile phones	E.g. bomb attacks, fires, evacuations, adverse weather conditions, etc. are critical incidents where these tools are critical.		I	see note		Even if it can be found inside the supported protocol, CDF should explicitly address the topic of notification toward subscriptors. This is a widely requested requirement. Even if the content of the notification is out of the scope, the functionality of providing this kind of notification should be addressed, especially in the sensor area.

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R204	SAFECI TY	Enable automatically sending alerting voice messages to targeted fixed terminals	E.g. bomb attacks, fires, evacuations, adverse weather conditions, etc. are critical incidents where these tools are critical.		I	see note		Even if it can be found inside the supported protocol, CDF should explicitly address the topic of notification toward subscriptors. This is a widely requested requirement. Even if the content of the notification is out of the scope, the functionality of providing this kind of notification should be addressed, especially in the sensor area.

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R205	SAFECI TY	Enable Internet-based alerting through E-mail/social network	On-line message warnings for subscribed citizens		I	see note		Even if it can be found inside the supported protocol, CDF should explicitly address the topic of notification toward subscriptors. This is a widely requested requirement. Even if the content of the notification is out of the scope, the functionality of providing this kind of notification should be addressed, especially in the sensor area.

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R206	SAFECI TY	Ease the integration of alarm messages into relevant web sites (Governmental sites, big enterprises sites).	On-line message warnings for every user.		S			included in requirement R206
R207	SAFECI TY	Enable broadcast warnings on TV and radio			F			Specific requirement, quite interesting, but probably too specific
R208	SAFECI TY	Ensure low data rate FRs communications in the field (voice and localization).	IP-based ad-hoc networks should have proper interfaces with radio communication networks. Nodes should be easily deployed after fixed ICT infrastructure is destroyed or not working properly.		F			This topic could be addressed with a specific component in the CDF about the ability of reacting to disaster (disaster recovery by an infrastructure
R209	SAFECI TY	Enlarge coverage of private networks (PMR, TETRA)			F			

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R210	SAFECI TY	Ensure interoperability with legacy terminals	Different FR would use their own terminal, ensure the communications among them.		P			Can be seen as interoperability among different infrastructures
R211	SAFECI TY	Ensure high data rate communications (video stream and sensor data) between C2 centers and deployed units.	Wireless communication nodes (WiFi, WiMAX protocols based) can likely provide broadband services in the field with integration with 4G /LTE public mobile networks or prioritized services over 3G networks.		I	3G_4G_WIMAX Network		
R212	SAFECI TY	Ensure high data rate communications between video cameras and processing centers	As high-resolution IP cameras may require additional communication infrastructure (wired or wireless).		I	3G_4G_WIMAX Network		
R213	SAFECI TY	Ensure connectivity of remote wireless sensors with processing centers.	Deployment of wireless nodes to enable internet access to devices with proper interfaces.		P	Sensor Network	services offered → data analysis	

Require-ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R214	SAFECITY	The network should not fall in case any node fails.			R			Robustness of infrastructure has to be addressed in the CDF
R215	FInseny	Billing and Payment Mechanism	billing and payment types like m-payment, prepaid, credit card, pay-as-you-go	The Billing and Payment Systems allows manage the information required by the user to make a transaction.	P	processes/billing		describes the different types of payment methods required
R216	FInseny	Derivation of energy prices	dynamic pricing	Energy providers need to be able to dynamically derive energy prices for the next hours. This requires precise forecasts of the availability of energy, as well as of the expected demand. Dynamic prices are then a means to balance the energy need and to avoid potentially expensive peaks of the demand.	R	economical	dynamic pricing	dynamic pricing can be classified in terms of update frequency and functions involved (like forecasts)

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R217	FInseny	Forecast of grid loads	infrastructure usage monitoring and forecasts	In electric-vehicle scenarios, unstable electricity grid situations are more likely and they should be avoided. In order to avoid such situations, the grid operators need to be able to precisely forecast the grid load for the next ours. Charge station operators might then react to the current grid situation.	P	technical/process es	monitoring, forecasting	could apply to other infrastructures as well
R218	FInseny	Smart charging scheduling		In a smart-charging scenario, a new (near) optimal schedule needs to be calculated whenever certain parameters change.	S			scheduling is important, but is more of a technology used within an infrastructure

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R219	FInseny	Environmental Requirements for Information and Communication Technology	rugged devices	Communication equipment for SG (Smart Grid)-field-devices / Field Mobile Devices and IT (Servers) operated reliably under different environmental conditions.	R	customer devices	usage environments and conditions	specific requirements for operation in different environmental conditions should be classified; e.g. line of sight, temperature, humidity, acceleration etc
R220	FInseny	Modularity of Communication Devices		Communication technology is developing rather rapidly. More and more bandwidth will be provided for communication. Wireless reliable secure communication will replace wired communication more and more in the future. It should be easy to replace one communication technology with another one simply by exchanging HW and / or SW modules at the network devices.	NR			we are looking into how to classify the upgradability (right now its low/medium/high), this seems related

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R221	FInseny	Persistent data storage		SG (Smart Grid) devices must contain enough non-volatile memory (e.g. flash memory) for storing measurements, internal data, and enable future firmware and software updates.	S			probably too specific to be included
R222	FInseny	Future-proof system design requirements		Future-proof system design wrt to modularity, standardization, maintainability and HW/SW upgradeability	I			too generic to be mapped to requirements, addressed through upgrade procedures, extensibility etc
R223	FInseny	Multi-Communication Media		For vehicles that are used in different Use Case categories, different communication media may be required (PLC, Wireless, RFID etc)	I			communication media is covered already (Wireless, sensor network, ...)
R225	FInseny	Quality of Service		Every network (or network part) should be able to manage differentiated services through the management of priority levels.	I			QoS

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R226	FInseny	Low latency of data transmissions		The information exchange for grid stabilizing purpose has to be quasi real-time	I			SLA
R227	FInseny	Support of different SLAs of network infrastructure		The network infrastructure should feature numerous levels of SLA's, the best being guaranteed QoS, the worst being best effort QoS.	P	technical/process es/QoS\SLA Management		common SLA/QoS features to be classified in more detail
R228	FInseny	Direct or emergency load control installation		Automatic and secure pairing of control appliances module with the IS of the provider, on one hand, and with smart appliances of the home of another hand	F	technical/deliverie s/security protocol, authentication		a combination of requirements enable this; secure plug&play
R229	FInseny	Display installation & configuration		Automatic and secure pairing of display with meter or meter module, on one hand, and with smart appliances of the home of another hand	F			secure plug&play
R230	FInseny	Self Configuration for Devices	plug&play	Any new device that connects to the network must be able to be configured automatically.	P	Customer Device	plug&play feature	plug&play

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R231	FInseny	Energy Management & Optimization System Installation		Automatic and secure pairing of control appliances module with the meter or the meter module on one hand, and with smart appliances of the home of another hand.	F			secure plug&play
R232	FInseny	secure connection of BEMS with DR Operator		The DR(Demand Response) events or dynamic prices must be certified by the originator before being taken into account, so that faked events (or price information) may be dismissed. The verification by the BEMS (Building Energy Management System) should require no difficult configuration yet be secure.	R		validation of content	more of an issue for implementation and security of dynamic pricing; validation of content
R233	FInseny	Staff connects to the BEMS		Facility or security staff should easily connect to the BEMS to get the energy consumption information of the building	I	technical/deliverie s/authentication		

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R234	FInseny	Automatic pairing		automatic and secure pairing of control appliances module with the IS of the provider, on one hand, and with smart appliances of the home of another hand	F			secure plug&play
R235	FInseny	Interoperability of Public Charge Points with EV (ICT and Electrical)		The charging point supports various models of electric vehicles.	R			need to classify the standards for charging of electric vehicles; what access points to the infrastructure and what that access point can support!
R236	FInseny	Varying Energy suppliers at one Public Charge Point		Different energy suppliers use the same charging point to deliver their services.	R		open vs. proprietar y	openness/inter operability in some form

115

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R237	FInseny	eMarket4E services		The services that will be provided at the eMarket4E will have to comply with: Ease of learning, memorability, maintainability, natural interaction and user satisfaction. This refers to the service interaction design in one side (service provider) and on the other by the artifacts provided at the platform side to mash up and produce services.	NR			high level requirements
R238	FInseny	Real time system to monitor the available kind of energy for the energy retailers		A SW WEB-based system that allow to the energy retailers to give the kind of requested energy together at all the necessary market information	I	deliveries/services offered		This would be a service provided by the infrastructure. This one being a service which provides real time data.

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R239	FInseny	Service discovery mechanism to set appropriate CoS for communication		A service discovery mechanism needs to be specified and implemented in order to set the communication network CoS according to the SG-devices´ communication requirements.	I	deliveries/services offered		What form of service discovery does the infrastructure provide, is this discovery configurable?
R240	FInseny	Interfaces		The interfaces for all users should be easy-understandable and user-friendly.	NR			non-functional requirement that depends on definitions of what is understandable and friendly. In a way included as the interfaces have to be specified
R241	FInseny	High portability applications for fixed and mobile services targeted to the final customer		The applications for the services about the eMarket4E have to function properly on the widest possible range of devices, whether they are fixed or mobile, with different operating systems.	F			need to define the range of devices supported

117

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R242	FInseny	Simple Communication EV User - Charge Station	user constraints	Electric Vehicle Users (EV Users) need to specify preferences such as the Charge Time Frame and the Minimum Battery State Of Charge (BSOC). This can be done in the simplest case by means of a touch screen at the charge station.	R		constraint s defined by the user	kind of constraints that can be defined by the users
R243	FInseny	Topology view		Visual view of generation and consumption locations (preferable connection with asset management).	S			monitoring aspects

118

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R244	FInseny	Service level interfaces having high portability toward the client side		As described DC6, in order to save energy and money, a customer can choose a service that runs workloads having a medium-low dynamic priority. It's natural that the customer wants to monitor the performance/cost ratio for its workload. To do this is required offer service-level interfaces that works properly on the widest possible range of devices, whether they are fixed or mobile, with different operating systems.	R			Service level infrastructure provided by the infrastructure

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R245	FInseny	End users interface for Office Buildings		End users of office buildings shall retain control over a limited set of functionalities at local level to some of the systems of the building, without compromising the global energy efficiency strategies set for the whole building. These might include lighting (dimmers, on/off switches), shutter controls, controlled sockets switches, and visualization of energy consumption metering	S			very domain specific

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R246	FInseny	Monitoring and control user interfaces for building end-users		User Interfaces for building end-users have to be proposed in at least two different ways: as fixed interfaces inside the building, possibly using a dedicated interface devices (like a home/building control panel), and as either mobile or generic remote interfaces. This duality makes it almost mandatory that the support of these interfaces be available outside of the home network, which will also make it easier for third parties to have access to their own user interfaces	S			very domain specific

Requirement-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R247	FInseny	Monitoring, control and management user interfaces for technical staff, facilities managers, etc		Similar to interfaces for building inhabitants, and excluding the case of homes, these do generally have to be available through fixed or dedicated devices inside the building, and, possibly with reduced functionality, as interfaces outside the building. Similar arguments apply to the support of these interfaces outside the building network.	S			very domain specific
R248	FInseny	User feedback		The network must provide a form of user feedback. This can be a return channel in communication or the assured observability of an event by the user	F		user feedback	what forms of user feedback are provided
R249	FInseny	Device Configuration		When new devices or sub-systems are installed on any point of the Grid they automatically configure itself. Additional Synchronization can be allowed remote control/configuration.	R		plug and play	Plug and Play of devices

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R250	FInseny	Availability		All ICT infrastructure has to ensure high availability	F		high availabilit y	definition needed
R251	FInseny	ICT Interoperability		Syntactic and semantic ICT interoperability between all elements of the Grid (HW & SW)	P	Technical	Interopera bility with other infrastruct ures	Interoperability comes down to interfaces what an infrastructure supports, what standards the support?
R252	FInseny	Grid/Network Management		The companies responsible for the management of the network must have tools that allow them to handle the available information and predict contingences.	S			this one is about intelligent data analysis and prediction
R253	FInseny	Transactional mechanisms		The actions of "offering Energy" and "buying Energy" are meant as ICT transactions between the prosumer and Green Market Operator.	R		transactio n mechanis m	kinds of transaction mechanisms

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R254	FInseny	Performance Management		Performance management ensures that SLA's are being met in an effective and efficient manner. Performance management can focus on the performance of any ICT component of the Grid.	F	QoS/SLA management	SLA performance management	e.g., deterministic behaviour, required network latency
R255	FInseny	Reliability		Guarantee the reliability of the system in terms of response time performance.	S	QoS/SLA management		reliability in terms to identify a loss of the communication systems and be able to switch to a fallback mode.
R256	FInseny	Scalability		Scalability is the guarantee that a system can grow without compromising its operations.	F		scalability	define magnitudes of scalability
R257	FInseny	Availability of Public Charge Points		Public charge points are available to all as many people as possible.	S			very domain specific
R258	FInseny	Latency		For each Function/Service/Application, the right level of latency must be guaranteed.	P	latency	latency	Granularity of latency; per function/service /application

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R259	FInseny	Bandwidth, Throughput, Good put		For each Function/Service/Application, the right level of bandwidth, throughput and good put must be guaranteed.	F		bandwidth	Granularity of bandwidth; per function/service /application
R260	FInseny	Request/Respon se		Data will be sent on a request, when a system is asking for a certain information and the Data Provider response back to that system with requested information	R		message exchange pattern	message exchange patterns; request-response pattern, one-way pattern
R261	FInseny	Time synchronization		To achieve network wide synchronization of control tasks on different time-ranges and scalability up to hundreds of systems, while being robust to topology	R		time synchroni sation	protocols used?
R262	FInseny	Error detection, error correction		The data link layer must provide sufficient error detection and/or error correction.	F		error handling	error detection and correction
R263	FInseny	Always on		There must be an always on connectivity of selected elements.	I	QoS		

125

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R264	FInseny	Connectivity		Defines the need to "connect" in all relevant senses devices, appliances, and any physical entities that need to have a network presence inside the extended perimeter of the building management system	S			connection required: on- vs offline availability
R265	FInseny	Coexistence of communication standards		Several communication standards must be able to coexist on different communication layers.	F			Existing standards may not be sufficient to guarantee expected QoS
R266	FInseny	Loose coupling		The communication protocols used must be as independent as possible from particular energy functions/services/application s.	NR			
R267	FInseny	Remote Upgrades		Required software upgrades of the charging station shall be possible remotely.	F		remote software upgrades	Capability of remote software upgrade
R268	FInseny	Network aggregation nodes		Aggregation nodes could be used in order to deploy present transport protocols in an efficient way.	NR			

Requirement-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R269	FInseny	Wireless coverage		The level of wireless coverage should be enhanced.	NR			
R270	FInseny	Adaptation of application to available bandwidth		If a low bandwidth media is used (for example in the case of a crisis situation after a tempest), the central IS Dispatch System must adapt its response according to the bandwidth available: only the core data of the work order are sent and not the attached files.	NR			

127

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R271	FInseny	Handover Management		The communication handset device used by field worker to synchronize work orders should have the availability to manage the handover between several commutations media in a transparent way. The best media should be selected regarding the QoS needed in term of latency, jitter and bandwidth. In case of a crisis situation (a tempest for example), a crisis media (such as Private Mobile Radio) should be available for data communication with the same handset device used by workers during "normal" situation.	NR			

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R272	FInseny	IP mobility		From the Dispatch System point of view, the communication system must be able to "push" data to the worker handset whatever the telecommunication medium the worker is currently using, even if its IP address has changed.	I	services offered		push functionality
R273	FInseny	Reliability and availability on Communications Technology (CT) layer		Reliability of CT layer I/Fs towards Aggregator, VPP or DSO and SG-devices	R			Interfaces at different accessible layers specified clearly per infrastructure.
R274	FInseny	Priority		Priority in transmission scheduling is an easy way to prefer data of one connection compared to other connections.	F		scheduling	Transmission priority
R275	FInseny	Latency		The communication infrastructure must offer a guarantee on the maximal round trip time for messages (from the application on the originator device to the	I	latency		
R276	FInseny	Bandwidth allocation		Bandwidth ~ 100 kbps	F		bandwidth	

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R277	FInseny	Packet Loss		Packet loss here means the maximum acceptable percentage of lost packets on a communication link. The lost packets may be retransmitted (reducing the goodput) or not. In the latter case the acceptable packet loss rate means the number of lost packets that would allow the receiving endpoint to realize the communication with a quality that may still be acceptable for the user (i.e. in video transmission: with which percentage of lost packets a video transmission may still be reasonable for the user at the receiving end?)	I	backbone network, wlan		

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R278	FInseny	High priority asynchronous messages		In case of alarms, e.g. in conjunction with power inverters, the according asynchronous messages must be transported very fast to the controller, as alarms normally reflects a very soon loss of energy production. In order to further guarantee the stability of the smart grid, therefore, this information must be transported with highest priority or via reserved communication channels. Without time-synchronization just the priority of the (asynchronous) telegram can be used to reduce the latency from submitting the message until receiving it.	F		message priorizatio n	priorization

131

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R279	FInseny	Publish / Subscribe		In asynchronous messaging a system places a message in a message queue based on internal logic or event and does not need to wait for a reply to continue processing. Subscribers express interest in one or more message classes, and only receive messages that are of interest for them.	R		message exchange pattern	see R260
R280	FInseny	Join networks		The network layer must allow for the combination of two or more separate physical networks into one logical network	F			logical vs physical networks
R281	FInseny	Reliable data transport over heterogeneous networks		Different Communication Service Providers (CSP) are maybe involved in a single data transaction. End-2-End QoS has to be assured over CSP boundaries	F	QoS		QoS over cross boundaries.

132

Requirement-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R282	FInseny	Multi-Communication Media		For vehicles that are used in different Use Case categories, different communication media may be required (PLC, Wireless, RFID etc)	I			
R283	FInseny	Remote Upgrades		Required software upgrades of the charging station shall be possible remotely.	F		remote software upgrades	Capability of remote software upgrade; see R267
R284	FInseny	Abstraction from Media		Despite many different access communication protocols and lots of different hardware solutions, communication must be possible	NR			
R285	FInseny	Provision of Ethernet / IP bandwidth on demand services		Aggregation nodes could be used in order to deploy present transport protocols in an efficient way.	NR			
R286	FInseny	Advanced Communication EV User - Charge Station via Virtualisation		The network infrastructure should feature non-blocking advanced virtualisation technologies so that many virtual electro-mobility network operators can co-exist	R		non-blocking virtualization	Possibly be offered as a service

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R287	FInseny	Data bus		The data bus should provide different communication services (e.g. request/response, publish/subscribe, transactions). Furthermore, it should support different levels of Quality of Service because different applications have different demands, e.g. wrt. latency, frequency of data exchange, quality or time synchronization.	I			a combination of requirements enable this
R288	FInseny	Database system		A central or local (distributed) database system is required to provide storage system(s) for context information (EV users, EVSE, environmental 3rd party). In an EVSE, also a local database may be used for charge detailed record.	I			Infrastructure provides storage or not

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R289	FInseny	Distributed Processing		For balancing supply and demand the Microgrid Control Center has to run the state analysis and define the sub-sequent actions. These tasks include power flow calculations and forecasting models. To minimize processing latency the jobs could be processed in parallel and distributed across different machines. Also for forecasting, planning and revenue in the revenue distributed processing capabilities are crucial.	S			very domain specific. Again could be covered by a service offered by an infrastructure
R290	FInseny	High Demand for Computing Resources / Processing		For some use cases, it is necessary to provide high performance computing resources for calculation and simulation models in the Microgrid Control Centre including real-time processing.	R		processing power	

Requirement-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R291	FInseny	Demand management based on criticality of loads		MG management and control system shall control loads and enable smart load controlling (cancellation of loads, shifting if loads etc.).	I			A service offering
R292	FInseny	Persistent data storage		SG devices must contain enough non-volatile memory (e.g. flash memory) for storing measurements, internal data, and enable future firmware and software	P	cloud computing, customer device		An infrastructure should specify memory available, a figure for volatile and non-volatile.
R293	FInseny	Data management		A use case involves handling (processing, analyzing, semantically classifying and accessing) large volumes of data that partially have to be stored for later use (e.g. billing, planning, historical analysis, regulation). The data must be kept consistent and synchronized with other systems within seconds. Data consistency has to be executed by DMS/SCADA system	NR			

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R294	FInseny	Data values checking		The use cases involve monitoring and otherwise retrieving large amounts of data from different parts of the distribution network. The data integrity ensures that there is no tampering with the data but still there could be problems e.g. with sensors. Malfunctioning devices of the SG could produce data that should not be accepted by the receiving entity. This can be considered as a certain kind of sanity check, but it can also be utilized with fault detection procedures. This is a requirement for the application level of the SG system software.	NR			

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R295	FInseny	Common data models (CDM)		Definition of common data models (CDM) per type of sensor/appliance. In order to perform energy optimization on behalf of the consumer, home appliances must be modeled in a common way so that the intelligence in the system is able to monitor them, know control capabilities, programming capabilities and have at any moment information on the reachability of the device.	R			What CDMs are supported by the infrastructure?
R296	FInseny	Check Energy Use		Availability of access to data of current status of the building shall be guaranteed both locally and remotely from Internet connected devices 95% of time	I	QoS		
R297	FInseny	Reliability		Data transmission has to be reliable	I	reliability		

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R298	FInseny	Reliable data transport over heterogeneous networks		Different Communication Service Providers (CSP) are maybe involved in a single data transaction. End-2-End QoS has to be assured over CSP boundaries including identification of Location of Failure.	R	QoS		QoS over cross boundaries. see R281
R299	FInseny	Data integrity		In particular for all payment scenarios, data integrity has to be ensured.	I	reliability		
R300	FInseny	Low latency of data transmissions for V2G / G2V		The information exchange for grid stabilizing purpose has to be quasi real-time	I	SLA		
R301	FInseny	Low latency of data transmissions for Stored Energy Services		The information exchange for grid stabilizing purpose has to be quasi real-time	I	SLA		
R302	FInseny	Data management for VAS		High amounts of data have to be stored and evaluated	I	data & context management		
R303	FInseny	Data management for V2G		High amounts of data have to be stored and evaluated in order to allow for grid integration services	I	data & context management		

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R304	FInseny	Data management Performance		Computing resources must be highly scalable in order to process, storage and evaluate data in order to allow for grid integration services. Data Integrity must be ensured	F	scalability		
R305	FInseny	Data throughput for ES		High data throughput has to be ensured for all kinds of enhanced Services when high numbers of EV are used	NR			
R306	FInseny	Data integrity		The data to be transmitted and received have to be reliable in term of truthfulness and timing. The transmitted and received data has to be reliable	P	reliability		
R307	FInseny	Data management and storage		Large amounts of data need to be collected, stored and made available.	I	data & context management		

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R308	FInseny	Cloud computing for high speed data processing		To exchange in real time: pricing Information, present demand, available energy to bid and forecast for the future energy demand, a large amounts of data need to be collected and processed in high speed mode through cloud computing.	I	cloud computing		
R309	FInseny	Building data transmission availability		The BEMS installed at the user premises will have to transmit data over the Internet. Always on connectivity and ADSL speeds are required and on the provider side (Marketplace) Data Mining will thus apply.	NR			
R310	FInseny	Data Integrity at the MarketPlace		The Information that is to be collected by the Marketplace has to be handled taking care of personalization and context based information	I	data & context management		

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R311	FInseny	Authentication and authorization		System components shall uniquely authenticate users and specific components before establishing a connection. The components shall enforce separation of duties through assigned access authorization. The user privileges should be restricted to only those that is required for each person's role (role based access restriction), taking into account emergency cases.	I	authentication		

142

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R312	FInseny	Data backup and recovery		Backups of critical software, applications, and data for all components of the SCADA system should be assured. Backup should be all data and applications necessary to replace failed components within a reasonable period of time as required to satisfy regulatory requirements and to restore the system to normal operation. Backups shall be separated from the operational components. Synchronization of the backup and operating data must be assured.	F			data backup and recovery may be exposed as a service supported by an infrastructure

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R313	FInseny	Data confidentiality		It shall be possible to ensure the confidentiality of the communicated data by cryptographic mechanisms, unless otherwise protected by alternative physical measures. The latency introduced from the cryptographic mechanism shall not degrade the functionality of the system. Data confidentiality relates also to stored data in different type of databases or some devices like ID cards.	R		encryptio n	security services?
R314	FInseny	Data integrity		It shall be possible to ensure the integrity of the communicated data (during the data transfer as well as stored data) and to verify whether the data hasn't been tampered	I	Technical	reliability	signing and integrity checks

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R315	FInseny	Non-repudiation		It shall be possible to prove that information has been send by a specific source to prevent the sender of information from denying sending it.	F		integrity	signing and integrity checks; see R314
R316	FInseny	System protection against malicious code		The smart grid system shall employ malicious code protection mechanism.	P	security		
R317	FInseny	Intrusion detection		The system shall detect the anomalous events (e.g. meter data alerted) within the network boundaries.	P	security		
R318	FInseny	Denial-of-service (DoS) protection		The system should restrict the ability of internal or external users to launch denial-of-service attacks against the network components.	P	security		Maybe classify security measures like DoS protection, intrusion detection, etc
R319	FInseny	Cryptographic Key Establishment and Management		Cryptographic protection and key management infrastructure shall be selected. The selection should match the value of the information being protected and the protected system operating constraints.	P	security		

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R320	FInseny	Data privacy		Stored or processed information while not sensitive is still personal and access to it by unauthorized parties would be construed as a privacy infringement reveling the customers' daily habits.	F		privacy policy	
R321	FInseny	Workload profiler		Develops and executes a series of experiments (software simulations) to characterize how much energy capping can be applied to the servers before the performance target is hit. If implemented, this requirement may increase the autonomy of the UPSs in case of blackouts due to fortuitous events or to physical intentional attacks.	S			UPS protection?
R322	FInseny	Fault detection/monitori ng system		Faults should be detected as early as possible and communicated to given parties. For that reason security monitoring means should be applied.	R		security monitorin g	

146

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R323	FInseny	Secure Software/Firmware Updates		The system shall ensure software/firmware updates only with integrity protected packages from an authorized source.	P	security		update protection
R324	FInseny	Security Management		Security management policy has to consider all involved cryptographic protection means, including key management infrastructure, certificate management, security policies, addressing both, technical and organizational means.	R		security managem ent	
R325	FInseny	Logging and Audit		Logging processes shall be established on devices having appropriate resources. Logging supports security monitoring and auditing.	R		logging	
R326	FInseny	Rating system		To enhance the trust between different business actors of the system, a rating system that facilitates a possibly objective assessment of the actors shall be available	R		trust rating	Does the infrastructure provide any form of a rating system, possibly of their services?

147

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R327	FInseny	Smart Metering		Smart Metering is one of the key functions in Smart Energy Grid scenarios. It allows: all customers to have means to analyze/view the corresponding data in order to be precisely aware of their energy consumption; Grid Users and Grid Operators to actually know close-to-real-time consumption (e.g., to decide on various demand-side and production-management activities) and consequently they are able to know when and how much energy they have to trade in order to improve their business efficiency.	S			Very domain specific service requirement

148

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R328	FInseny	Energy Monitoring		Mechanisms for delivering data related to the energy consumption and/or production within a Smart House need to be in place for planning, procuring and selling activities. Besides Smart Meters, devices need to be intelligent and to be able to communicate.	NR			

149

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R329	FInseny	Control mechanisms for Smart Homes		Standardized mechanisms need to be in place in order to: control the energy consumption and production in Smart Homes from the outside; control intelligent devices and electric vehicles within a Smart Home (Internet of Things domain). These mechanisms include in particular communication interfaces, a protocol for information exchange, network connection for all devices and control mechanisms/ information exchange (e.g., balancing signals).	S			very domain specific
R330	FInseny	Efficient and secure service access and provision		The Ability of generating contracts on the fly over the internet will need to be reliable by employing standard protocols and interfaces fro the users. Security access has to be provided also following usual	R		service provisioni ng	

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R331	FInseny	Local processing and storage		Data processing and storage requirements are indispensable for any sort of building-level intelligence and so to inform the consumers about the building status (through a human-machine interface) or to communicate with the grid (through an interoperability interface). See more extended discussion in referenced document.	S			very domain specific

151

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R332	FInseny	Remote processing and storage		The platform must offer a way for calculating aggregated consumption, energy-related data and costs for homes and buildings with the same profile. Moreover, the consideration of demand-shaping measures and the implementation of peak-shaving capabilities require the grid administrator to have some sort of further data access. Concretely, it is necessary to maintain information about the contract model of each subscriber, the options available to that model, and the extent to which some of these options have already been used.	S			very domain specific

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R333	FInseny	Dedicated or Shared Transport Infrastructure		Control from an Aggregator, VPP or DSO needs appropriate transport network capacity, which may be supplied by a dedicated operator on an exclusive or shared basis	NR			
R334	FInseny	Dedicated or Shared Transport Infrastructure 2		The Communication Technology (CT) layer requires utilization of any useful link available under disturbed operating conditions. This may be supplied by a dedicated operator on an exclusive or shared basis.	NR			
R335	FInseny	Telco Infrastructure		Control from an Aggregator, VPP or DSO needs appropriate transport network capacity, which may be supplied by a Telco operator	NR			

153

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R336	FInseny	Telco Infrastructure 2		The Communication Technology (CT) layer requires utilization of any useful link available under disturbed operating conditions. This may be supplied by a Telco operator.	NR			
R337	FInseny	Web-Service-enabled technologies for electricity network management		Services for monitoring, supervisory control and operation of electrical networks need to be in place. The network infrastructure should feature open web-service APIs so that electro mobility cloud services and marketplace services can simultaneously query and reserve both network and cloud services without any human intervention.	I	application\servic e delivery system		service offerings, accessible through web-service APIs

154

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R338	FINEST	Widget Platform & Infrastructure	For mash-ups and widgets (gadgets) a portal-like website is needed which is serves as a visual container for them. It should also provide widget management functionality.	A visual portal website is needed where each user can add, remove and use widgets. Therefore, also a widget repository is needed where a user can select widgets from. An infrastructure should be provided to deploy new widgets to the portal. It should be easy to use by an end-user.	NR			
R339	FINEST	Application Composition and Connectivity	Connect new applications to existing ones to create a richer application	Once an application is deployed (or part of its deployment) it should be possible to logically connect it to other applications to offer more capabilities than before, however, this should not break any ongoing executions and should not be necessary in any future executions if those were planned not to include the new capability	I	Application Service Delivery	Mashup is a value of "services offered"	

155

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R340	FINEST	Widget Platform & Infrastructure.	As a user of the FIWARE platform, I want to be able to create a graphical view of the workflow. The graphical view should give a picture of the process execution at certain points in time.	During workflow execution, it would be very valuable for the end user to have a graphical view of the progress of the execution. Other information items related to the process description could be included, in addition to the work flow descriptions, for instance: Status information, Event and trigger information or Time line information	NR			
R341	FINEST	Service Orchestration	As a platform user, I would like to have languages and tools for service orchestration (including editing and executing the orchestrations)		NR			
R342	FINEST	Service Coordination	As a platform user, I would like to have languages and tools for service coordination (including monitoring and adaptation)		NR			

156

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R343	FINEST	Service Choreography	As a platform user, I would like to have Languages for modeling service choreographies and relating to service orchestrations (global vs. local perspective)		NR			
R344	FINEST	Service Assembly	As a platform user, I would like to have languages and tools for service description and deployment, as well as service search.		NR			

157

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R345	FINEST	Financial Clearing Services	Users of any FI service may need to pay to use the service, pay partners they are collaborating with, receive payments from partners, transfer funds or perform any one or another financial transaction. The FI WARE platform should provide facilities to allow users to set up these types of services based on their particular requirements	Payments for services rendered (transaction services, cloud based functional service use, physical services, etc.) must be paid for. An underlying GE should exist that can be configured to track usage, contracted service payment requirements, etc. This GE should be integrated with inter-bank clearing systems so that payments can be made in a secure manner (bank-to-bank, credit card, etc.). The GE should also record all transactions (non-repudiation) to ensure that any legal challenge between transaction partners can be supported by properly logged information.	P			

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R346	FINEST	IoT Event Subscription	Subscribe to events\data generated by things – whether sensors or other devices	Subscription mechanism to events or data produced by things such as devices or sensors. It should be possible to subscribe to such events by non IT users of the platform, online and on-the-fly with the ability to discover, identify and understand what they are subscribing to.	F			
R347	FINEST	Big Data Analysis at Runtime	The use of appropriate technologies should enable the analysis of high data volumes at runtime in order to support critical data-driven decisions, when time is a limiting factor.	The hugely increased amount of transient and very fast memory, especially in modern server systems, lead to a grown impact of in-memory computing systems. Newly developed data base systems provide in-memory layers in addition to the traditional persistence data storage in order to support fast analyses of big amounts of data.	P	Data & Context Management	services offered	

159

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R348	FINEST	Query Broker	As a user I want to be able to submit queries through abstracting interface on the one hand and on the other hand, use well-established query languages.	The provided (proprietary) API should abstract completely from the underlying data source. A good example for this is Microsoft's LINQ (cf. [link]), which provides a uniform language and binding to different data source (LINQ-2-Object, LINQ-2-SQL, LINQ-2-XML). For the support of existing query languages, at least the following query languages should be supported: SQL, XQuery and SPARQL. Additional languages could encompass LINQ or similar approaches, XPath or XPointer. The applicability of the different languages should not be determined by the underlying data source, so that, for example, XQuery can be used to access relational data bases. This would require a previous transformation in an internal representation format and a translation in a target language for the actual data source	S			

160

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R349	FINEST	Event Processing and Prediction	Facilitate operations on streams of incoming events to allow detection of situations of interest.	Event Processing logic is computing that performs operations on events; including reading, creating, transforming, deleting, and finding combination of events to detect situations of interest. The event processing logic should be configurable through API; meaning that the application can send parameters to rules, and also activate and deactivate rules, in runtime. Event Processing should also allow to predict future situations based on current events (for example, predict ETA based on traffic information), according to rules specified by designer. The event processing engine should be deployed in a distributed manner, and not affect the performance of the application.	S			

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R350	FINEST	Capture and Collect Events	Collect data from various sources (sensors and electronic systems) and supply to event processing engine in platform.	Collect data from various sources, such as sensors and various electronic systems (examples from the transport domain: weather services, traffic services, airport system, AIS) and feed the data in the form of events to the complex event processing system. The Enabler should support data collection in both push (sources sending data to platform when available) and pull (platform queries sources for data) modes. The Enabler should support gathering of data from potentially very large amount of sources; in addition, sources can be added at any time, also when the application that consumes the data is up and running.	R	Data & Context Management	services offered: data event processing	

This document is produced under the EC contract FP7 ICT-285192.
This document is property of the INFINITY consortium and shall not be distributed or reproduced without the written approval of the INFINITY consortium

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R351	FINEST	Disseminate Derived Events	Allow distribution of events to consumers which are interested in that event.	Allow consumers of events to subscribe to particular event type which they wish to receive. The subscribers will receive any instance of that event type each time one is emitted (published). Any software entity can be a subscriber. In particular, these can be components within an application, as long as they are able to provide a calling address for the pub / sub broker interface. An event is a specific data type defined by the core platform; however, it may carry any kind of data as an attachment.	F			

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R352	FINEST	Optimization Models and Execution	As a user of the FIWARE platform, I want to be able to set up optimization models and execution of the models.	It would be useful to have a GE that enables the possibility to describe and build optimization models used to solve planning and scheduling problems. By describing optimization using more high level descriptions than in standard programming languages, this problem may be solved faster. In addition, execution of the optimization models is also an important part of this.	R	Wireless Network Wired Access Network Backbone Network	Optimizati on network	Related to R78

164

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R353	FINEST	Transaction Non-Repudiation	All inter-company transactions should be stamped as having been sent, received, rejected and completed (if appropriate) so that, should there ever be a question as to whether something occurred by any party in a transaction, positive documentation of the transaction exists.	All inter-company transactions must be documented and their status (sent, received, rejected, responded to, etc.) archived to ensure that all parties to a transaction can prove what occurred with the transaction. This service must be implemented for any commercial use of an inter-company service if it is to be legally acceptable to the parties and in a court of law should a dispute arise.	NR			

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R354	FINEST	Trusted Object Storage	As a user I want to precisely know where my data is stored within the cloud. I have to reveal confidential information to certain business partners through the cloud. Due to this fact, I do not want to use a cloud-based black box, where I do not know who manages my data and ensures their non-disclosure. Before I save data, I want to be informed about the underlying storage infrastructure and know that I can trust it.	A cloud-based infrastructure that ensures privacy in cross-border environments is highly desirable for the FI-WARE cloud hosting platform, so that FIWARE instance provider can be checked against their trustworthiness or infrastructure transparency. Transparency in this regards means that a user is able to determine where (e.g. physical location) his or her information will be stored and what type of infrastructure will be used.	I	Cloud Computing	Security Services	

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R355	FINEST	Dynamic Scale of Infrastructure	Underlying system to scale and grow to meet the growing number of logistics processes managed and executed by FINEST – this in number of transactions, processes, participants and storage	The underlying system is expected to scale without much intervention and without any degradation in any user role experience in using the domain specific application developed on top of FIWARE. This regardless of increase in amount of data increases, number of transactions, number of parallel sessions, etc.	I	Technical dimension	Scalability	
R356	FINEST	Infrastructure Interoperability	Have FIWARE platform be able to interoperate with other service providers on different virtualization technologies. Connectivity to such ser-vice providers shall be a simple process that non IT users can enable.	Connecting, calling out on and interoperating with external (to FIWARE) service providers is requested to allow for retrieving information, updating and working with services that are not hosted and owned within a FIWARE platform instance. Establishing such connectivity should be able to be done online, on-the-fly and by non technical platform users	P/I/F	Technical dimension	interopera bility with other infrastruct ures	But not with service providers, explicitly. IAAS component specify nothing about interoperability

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R357	FINEST	Application Deployment and Management	Simple deployment of user developed applications into an existing setup with existing applications without interfering with the ongoing operation. The deployment should not require to understand the infrastructure, where and how to deploy. Performance requirements from the application should also be manageable via configuration.	An appropriately developed application shall be deployable to FIWARE platform through some tool with no programming efforts and without the need to know where to deploy, on what infrastructure and on top of what middleware. While the application is running it should be possible to configure and request performance characteristics that the platform should try and meet accordingly.	I	PaaS	Technolo gy layer	This attribute is referred to the tools supported by the provider in order to develop upper layers
R358	FINEST	SLA & Contracts Storage and Retrieval	As a user from the FI-WARE platform I want to be able to store SLAs and contracts and mechanisms to retrieve information from those SLAs and contracts.	Future Internet business applications executing over the FI-WARE platform will need a storage place for their SLAs and contracts and associated retrieval information mechanisms. The retrieval mechanisms should allow the search for individual attributes of SLAs and contracts.	I	Technical	QoS/SLA Managem ent	

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R359	FINEST	L2ND for Future Internet Applications	Enable access to applications located in a FInest FI PPP platform instance on all possible network-enabled devices in a uniform way.	The FI PPP Core Platform needs to provide a network infrastructure which supports especially Smartphones and Tablets in a special way. An additional network layer is needed to treat heterogeneous mobile and non-mobile devices. A way needs to be explored how the same applications can be run on mobile devices (with restricted calculating power and internet access with low bandwidth and limited data volume), as well as, with enhanced features on local devices.	S			

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R360	FINEST	VPN	In Finest projects secure communication will be needed to reach to user interfaces	Secure Communication is will be important to reach to user interfaces or any user systems. End user devices also should be platform independent like desktop, mobiles etc. SSL VPN technologies will supply the secure communications to reach to systems and also user, roles and policy control for the connections.	P	Customer Device	security services	

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R361	FINEST	Identity Management	All the users must use their own accounts and when the user's business role changed his/her authorization must be changed on systems automatically. Creating new accounts or disabling account could be done from centralized system.	The target resources will be connected with web based Identity Management tool. End user can login and change their password or non-critical attributes by themselves. There will be a trusted resource for employees and IdM will get information from this system and sets the values to target system authoritatively. Key users or local administrator could give users some authorization at their own resources and/or organizations	R	Application Service Delivery	Personali zation of services	Related to R61

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R362	FINEST	Access Control	Access Control is very important to reach data. Strong Authentication will supply better access control and more security	Strong Authentication Mechanisms can be implemented by using two factor authentication mechanisms. For example two factors can be supplied by using hard tokens (otp – on time password tokens) or soft tokens (works on mobile / desktop and produce one time password). Single Sign on integration will be more useful with these authentication mechanisms	I	Technical	security services	
R363	FINEST	Secure Storage Service	The main objective of Secure Storage service is to provide a secure storage to sensitive / private data, privacy-oriented capacities, according to legislation.	Secure storage service that offers the possibility to safely backup his data and delegates the access to parts of is data to third party	I	Data & Context Management	security services	

172

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R364	FINEST	Security Monitoring & Event Management	Analyzing the events is important for the cyber attacks.	Security monitoring is focused essentially on monitoring alarms from network equipment, systems and security sensors. The Security Monitoring GE is part of the overall Security Management System in FI-WARE and as such is part of each and every FI-WARE instance.	P			There are monitoring attributes in all network components, customer devices and data&content management.

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R365	FINEST	Next Generation Firewall	Network Security is important for blocking unknown port and applications and packet inspections	Most of the traffic has been web based and web 2.0 threats are more common. Next generation firewalls can be analyze the applications from http protocol. Next Generation Firewalls can be used for application and user based control of the traffic and inspection of the packets. Application database of the firewall should be updated. It should be integrated with Security Monitor and Event Management module to follow the attacks and analyzing purposes.	NR			

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R366	FINEST	Anti Virus and Malware Detection	Anti Virus – Malware Detection is important in network layer and also FI-WARE platform.	In network layer Antivirus and malware detection can be installed front of the systems. On the other hand also integrated as a module to the FI-WARE platform will be better for the systems that run on the cloud. Antivirus and malware data-base should be updated for new attacks. It should be integrated with Security Monitor and Event Management module to follow the attacks and analyzing purposes	P	Network components	Security services	Related to R316
R367	FINEST	IPS Intrusion Prevention Systems	Detect and Prevent Intrusions and threats	Signature based IPS will be useful for detect known attacks. IPS can be deployed on network segment. It should be integrated with Security Monitor and Event Management module to follow the attacks and analyzing purposes	S			

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R368	FINEST	Database and Web Application Firewall	Protect database and web specific attacks	Most of the attacks are targeted to web applications and database. Specific protection systems will be more granular to control and prevent systems	F			
R369	ENVIR OFI		Cloud-enabled backend for ENVIROFI.Epic.Data.Observ ationService	I as a service provider would like to improve my Observation Service, through use of cloud-enabled backend for observation storage.	I	CloudComputing Iaas Paas Saas		
R370	ENVIR OFI		Assure the Data/Context Management enablers explicitly handle uncertainty	I as a decision maker need to know how good the information on which my decisions are based is. For this, it is important to keep track of uncertainty along the data processing chain - from measurements over various data fusion and modeling services, to final indicators and visualization of the information (observations).	R	Data and Context Management		Important issue

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R371	ENVIR OFI		Provide improved alternative to aGPS on mobile devices.	I as a user of location based services need a fast and reliable alternative to aGPS. (same for application providers)	R	Customer Device		
R372	ENVIR OFI		Assure the service and data providers can request and receive payments for (premium) environmental data and services	I as a service/data provider want to offer commercial services for paying customers. The payment and revenue sharing mechanisms should be standardized, versatile, transparent, secure and easy to use for both me and my customers	P	Societal Saas		
R373	ENVIR OFI		Assure the service user accepts the usage conditions before being able to use the service.	Description: I as a service/data provider want to assure the user explicitly agrees with specific conditions before allowing him/her to proceed with service use. This should also work with service chaining.	P	Societal		

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R374	ENVIR OFI		Assure the built-in and external sensors can be easily accessed on mobile devices (smartphones, tablet PCs, other?) in a way which is independent from sensor manufacturer, smartphone manufacturer.	I, as VGI service provider rely on volunteers as data providers. In order to reach the maximal number of volunteers, I want to provide my mobile observation reporting client on *all* types of smartphones and tablet PCs. For this I need device-independent and OS-Independent sensor abstraction layer.	R			The proposed architectures are quite decoupled and therefore they probably already address this requirement, that anyway should be explicitly mentioned in the CDF
R375	ENVIR OFI		Assure the ENVIROFI.Epic.Data.Observ ationService and ENVIROFI.Epic.Data.Observ ationReportingClient work with minimal invasion of the users privacy.	I as a service provider need to build a trust in (observations provided by) volunteers, and also need to push some information towards them - preferably without ever storing any sensitive information on my own servers.	P			This topic seems to be referred to asynchronous interaction and asynchronous process definition.

178

Requirement-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R376	ENVIROFI		Assure the ENVIROFI.Epic.Data.ObservationService and ENVIROFI.Epic.Data.ObservationReportingClient accept NFC Card-mediated authentication and authorization.	I as a service provider need to authenticate volunteers using NFC cards instead of login/password mechanism.	P			Probably addressed but not explicitly stated in the CDF
R377	ENVIROFI		Geo-spatially enable the GEs from the Security chapter	I as a service provider need to define security-related authorization rules based on some geospatial constraints.	I	Application Service Delivery		User profiling

179

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R378	ENVIR OFI		Request actions from Users depending on Geospatial Constraints	I as a service provider need to request help from users depending on their position, and on the coordinates associated with the data.	R			Geolocalization of node inside the infrastructure is supported. This specific requirements can be relevant if the required localization is somewhat related to a node inside the infrastructure, otherwise it is related to GIS topic in Data & Context Management. Not sure if GIS can fully cover the topic that, instead, risks to by outside the scope of an infrastructure

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Propose d	Notes
R379	SAFECI TY	Detection of traffic issues	Detect traffic congestion, traffic incidents, road conditions, geo positioning of police, irregular vehicle behaviour	GPS tracking, GIS applications, detection traffic flow variations. Use of the following data types; Video images • Camera location (GPS coordinates) • Road identification: type of road, sector.	I	Sensor/device	data collected	
R380	SAFECI TY	Streaming supported	Network transmission cope with real time services	Minimum latency of Video images display	P	Network components	latency for priority traffic latency for non-priority traffic	"Real Time" is not explicitly addressed, but high bandwidth and minimum latency are concept widely addressed in all the network components
R381	Outsma rt	Plug and play sensors	Plug and play mechanism for new sensors	Plug and play mechanism for new sensors to move sensor configuration from waste basket maintenance to IT	R	Sensor Node	plug and play	Very closed to R33

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R382	Instant Mobility	Data Collection	Information to gather: traffic volume, car speed, traffic flows, parking space, public transport timetable.	Information to gather first and offer afterwards: traffic volume, car speed, traffic flows, parking space, public transport timetable. Necessary technologies: inductive loops, DSRC, CCTV, ANPR, communications vehicle-infrastructure (3G, Bluetooth), social networks, ... Collaborators able to offer this information: travellers, transport managers, Consumers of the information: mainly Service Providers Possible EPICS inside: DataCollection, DataOffering	I	Sensor Node	data collected	
R383	Instant Mobility	Route and loading optimization	Route and loading optimization based on traffic constraints	Possibility to know where the parcels are in the city in order to transfer them in another trucks to optimize route & loading based on traffic constraints	S			Data collected by sensors and their processing are addressed. This requirement is a specific application of it.

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R384	Outsma rt	Trust	User information should have different trust level	User information should have different trust level	P	Data & Context Management Application Service Delivery	security services	There are security concepts addressed but without making any distinction depending on the source of the information
R385	SAFECI TY	Dynamic prioritization of traffic	Dynamic configuration of different traffic flows	Virtual private communication links to separate traffic from different sub-systems or applications	P	Network components	Support of traffic priority	Traffic prioritization is widely addressed in all the network components, at the moment just with Y/N values. "dynamic/manu al" values can be added.

Require ment-ID	FI-PPP Project	Requirement name	Description	Context / Justification	Status	CDF object associated	CDF attribute Name Proposed	Notes
R387	SAFECI TY	Enough bandwidth	Bandwidth at least enough to cope with existing necessities	- Video Surveillance 8 MB per stream per fixed cameras, 512 kbps per stream for mobile cameras - Optical Character Recognition (OCR) data (license plates, GPS coordinates): 100kbps - Signaling; 25kbps	I	Network components	Bandwidt h	Bandwidth is a concept widely addressed in all the network components