



interiot

INTEROPERABILITY
OF HETEROGENEOUS
IOT PLATFORMS.

D1.4

Risk management v2

June 2017

INTER-IoT

INTER-IoT aim is to design, implement and test a framework that will allow interoperability among different Internet of Things (IoT) platforms.

Most current existing IoT developments are based on “closed-loop” concepts, focusing on a specific purpose and being isolated from the rest of the world. Integration between heterogeneous elements is usually done at device or network level, and is just limited to data gathering. Our belief is that a multi-layered approach integrating different IoT devices, networks, platforms, services and applications will allow a global continuum of data, infrastructures and services that will enhance different IoT scenarios. Moreover, reuse and integration of existing and future IoT systems will be facilitated, creating a de facto global ecosystem of interoperable IoT platforms.

In the absence of global IoT standards, the INTER-IoT results will allow any company to design and develop new IoT devices or services, leveraging on the existing ecosystem, and bring them to market as fast as possible.

INTER-IoT has been financed by the Horizon 2020 initiative of the European Commission, contract 687283.

INTER-IoT

Risk Management v2

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Executive Summary

The aim of Risk Management v2 is to continue with the thoughtful study of potential risks that may affect several aspects of the INTER-IoT project during its realization and threat the achievement of the expected outcomes. This Risk Management v2 is also the update the information and state of the possible risks that were identified during the first stages of the project and to include new potential risks that have been arising during the performance of the project.

This deliverable is the result of the activities carried out in T1.3 and T1.4. And, as its second version, the scope provided by this deliverable goes from M12 to M18. A redesign of the planning strategy to identify potential threats has been performed in order to improve the first approach we present in the initial version of the deliverable. Additionally, to ensure the prevention of critical and non-critical problems in advance, and therefore to be able to avoid negative consequences in the short and long term, that the current development of the INTER-IoT project may suffer.

This deliverable is the continuance of the monitoring and management of possible risks that have arisen and may arise during the evolution of the project. Different risks have occurred and they have been treated as stipulated in the first definition of the Risk management strategy. Still, new potential risks may occur, these has to be solver or mitigated with proper solutions in order to manage them without affecting the current and expected outcomes of the project. This new version includes a new risk section related with Ethical risks as suggested in January by the Ethical Reviewer.

Some risks have occurred since the beginning of the project and minimization and mitigation tasks have been put in practice as planned. Risk Analysis is a complex process, in which it is necessary to draw on detailed information such as project plans, financial data, security protocols, marketing forecasts and other relevant information. For this reason, the Coordinator along with the Project Coordination Committee (PCC) support continuously monitors the INTER-IoT proceeding and the participation of the project beneficiaries in the work carried out within the project, to identify possible risks early, and be able to take fast contingency actions and decisions about them. In addition to the control and mitigation of any risk, the task is devoted to guarantee quality of the different activities and outcomes from the project.

Risk management has been revisited and reoriented after the feedback provided by the technical experts in the technical review of the project held in Vienna (Austria) in October 2016, from the submitted version in June 2016. A modified and improved version of the Risk Management deliverable D1.3 was re-submitted at the end of January 2017. The criteria to classify and prioritize the risks has been updated and more practical risks have been introduced, following the principles recommended by the Project Management Body Of Knowledge (PMBOK®) of the Project Management Institute (PMI). This document is so the second version of the re-submitted deliverable D1.3, with the updates of the risk located between month 12 and month 18, addition of new risks and close of those that are not a threat anymore.

Frequent risk management meetings (15 days periodicity) have been held in order to have tight control of the execution of the project.

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1.3	Internal Review	All	103
1.4	Final version	All	106
1.5	Updated version to be resubmitted	All	105
2.0	Final version	All	104

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Acronyms

AIOTI	Alliance for Internet of Things Innovation
BIP	Best Ideas and Projects
EC	European Commission
IERC	European Research Cluster on the Internet of Things
INTER-LAYER	INTER-IoT Layer integration tools
INTER-FW	INTER-IoT Interoperable IoT Framework
INTER-METH	INTER-IoT Engineering Methodology
INTER-LogP	INTER-IoT Platform for Transport and Logistics
INTER-Health	INTER-IoT Platform for Health monitoring
INTER-META-ARCH	INTER-IoT Architectural meta-model for IoT interoperable platforms
INTER-META-DATA	INTER-IoT Metadata-model for IoT interoperable semantics
INTER-API	INTER-IoT Programming library
INTER-CASE	INTER-IoT Computer Aided Software Engineering tool for integration
IoT	Internet of Things
ITU	International Communications Union
IEEE	Institute of Electrical and Electronics Engineers
ISO	International Organization for Standardization
M2M	Machine to Machine
W3C	World Wide Web Consortium
ETSI	European Telecommunications Standards Institute
DSM	Digital Single Market
AIOTI	Alliance for Internet of Things Innovation
IoT-EPI	IoT European Platform Initiative
ENISA	European Union Agency for Network and Information Security
NIS	network and information security
ICT	Information and Communication Technology

1 Introduction

This document is presented as the risk management plan second version of the INTER-IoT project. The scope of the risk management report, in its second stage, encompass from month 12 until month 18 of the project and its aim is to update the information about the managed risk that has been treated during the realization of the project and to keep identifying new possible risks for the project together with its mitigation plans and actions in order either to eliminate it or to reduce the consequent negative results that derive from them.

The risk management tables provide an analysis of the impact and criticality as a function of likelihood and severity, what has allowed the consortium a more dynamic and flexible reaction when some of the risks have identified and later active.

Risk refers to future conditions or circumstances that exist beyond the control of the project team and that will cause an adverse impact on the project if they happen to occur. Whereas, an *issue* is a current problem that must be dealt with, a *risk* is a potential future problem that has not yet occurred. Risks must not be confused with problems: a *problem* is a risk that has materialized. Therefore, risk management is a proactive process, whereas problem management is reactive.

The Risk Management v2 document is structured and organised as follows:

- Section 2 “Risk Management” introduces a summary of the risk management approach described in the previous version of this deliverable. Additionally, a section of ethical risk has been added to this part to describe the detection and management of ethical risks within this project.
- Section 3 “Identified Risks for the Project” describes the risks that the INTER-IoT consortium has identified and managed and their mitigation plans during the period from month 12 to month 18.
- Section 4 “Conclusion” concludes this deliverable.

The risk management plan has been updated according to the project needs and the risks that the INTER-IoT consortium has identified and treated during the current duration of INTER-IoT project lifetime. Moreover, this risk management plan will remain updated during the whole duration of the project.

2 Risk Management

According to PMBOK¹, a risk is: an uncertain event or condition that, if occurs, has an effect on at least one project objective (objectives can include scope, schedule, cost and quality). The existence of risks is unavoidable in any project, as it is intrinsic to the development and implementation phase, whether those threats arise from external or internal causes.

The following information about risk management comes from the first version of this deliverable (D1.3) but we decide to keep this information, with slight modifications, to facilitate the reading of this deliverable.

Risk management is a proactive process that is invoked in an attempt to eliminate these potential problems before they occur, and therefore increase the likelihood of success of the project.

The goals of risk management are the following:

- Proactively assess what could go wrong with the project,
- Determine which risks are important to deal with,
- Implement strategies to deal with those risks.

In a project with the complexity of INTER-IoT, it is impractical to rely on light analysis in order to determine where risks lie, which risks are acceptable and which require to apply mitigating actions. It is necessary to use a risk management structured approach or procedures in order to expose risks and address them objectively and consistently.

In the INTER-IoT project, the management approach provides mechanisms to identify and resolve various potential project risks, which can be considered as particular internal or external factors, ensuring efficient implementation of necessary corrective actions. Even if it is not possible to predict all possible risks, it is advisable to identify and assess a set of potential risks related to the project. In this respect, the general INTER-IoT philosophy includes the following pillars:

- **Effective project management:** The management structures and procedures ensure that project management can closely supervise the delivery of the expected results. The INTER-IoT Consortium is composed of organisations which have already successfully carried out several EU projects.
- **Contingency planning:** The work plan has been designed to allow for effective contingency planning in case of all major risks. For every risk a strategy will be developed considering the possibility to avoid the risk, the plan for reducing the probability of its occurrence and in the case of materialisation of the risk, the plan for minimizing the impact on the project overall objectives and compromises.
- **Multiple loosely coupled objectives:** Finally, even if the goal of the project is to demonstrate the full operation of the INTER-IoT framework, the remaining extensions and components can be decoupled and exploited independently.

With the use of risk management procedures, the project team is able to mitigate risks, which means that it can take steps to reduce them to a level that is acceptable for the project consortium. These steps may take the form of technical measures to reduce the probability or

¹ <http://www.pmi.org/pmbok-guide-standards/foundational/pmbok>

impact of a risk occurring, or they may take the form of non-technical measures, used to overcome technical limitations.

The use of risk management procedures is very important. Without the use of risk management procedures, the project consortium can take insufficient steps to mitigate a risk and the consequences may include failure to meet the project objectives, commercial and financial harm to the project partners and project results users, loss of reputation and potential legal actions.

On the other hand, it is equally possible that the project consortium takes unnecessarily draconian steps to mitigate risks. The impact of such unnecessary steps and procedures may include incurring additional unnecessary management effort, and from the technical point of view, reducing system performance.

The INTER-IoT project tries to take the necessary steps for all the identified risks, and avoid unnecessary procedures. The next section describes the proposed risk management processes. INTER-IoT uses a traditional approach for risk management and uses well known and established procedures. So the following paragraphs do not include knowledge produced by the project but rather existing procedures that the INTER-IoT project chose to use for managing the risks within the project.

2.1 Risk Management Procedure

The risk management procedure that has being using in the INTER-IoT project is summarized in Figure 1 and consists of the steps:

- **Step 0** –Plan Risk Management.
- **Step 1** – Identify.
- **Step 2** – Estimate.
- **Step 3** – Mitigate.
- **Step 4** – Monitor.

These steps are the ones followed during the first half of the project with all project partners providing information and feedback, both internal and external to the project, relating to the risk activities, as well as identification and mitigation of current and emerging risks. This information and feedback has been used to improve the risk identified in this first stage and to include new identified risk corresponding with need raised by the course of the project.

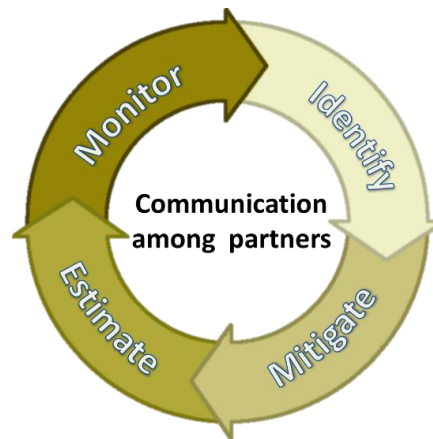


Figure 1: INTER-IoT Risk Management procedure

2.2 Risk Identification

Risk identification is an iterative process that has the aim of determining which risks may affect the project and documenting its characteristics. All INTER-IoT partners are concerned with risk detection and identification. When a risk is detected, it is reported to the Project Coordinator or to the concerned Work Package Leader depending on the context of the risk.

The Project Coordinator or the Work Package leader is responsible for cataloguing the risk according to a defined template, created in a Google sheet for the whole INTER-IoT project. The person responsible for cataloguing the risk is also on duty on performing the risk estimation, mitigation and monitoring processes. Each time a new risk is detected, the Project Coordinator, along with the Project Management Committee, shall manage it.

In order to help the identification process, project risks will be divided into classes listed below:

- **Project Management and Organisation:** Likelihood of failure to meet project milestones. This class of risks will be managed by the Project Coordinator,
- **Technical:** Likelihood of failure of development process. This class of risks will be managed by the Work Package Leader.

Each identified risk refers only to a single class type; nevertheless, the same cause may be at the origin of different risks (within the frame of the above classification).

In addition, the INTER-IoT risk management classifies the risks into the following categories:

- **Technology risks:** Risks derived from the software and hardware technologies, which are being used for developing the system.
- **Usability risks:** Risks that result from the tools, presentation, and use of features that may render the whole system less usable than envisaged or anticipated.
- **Organisation risks:** Risks associated with the people and partner's organisations comprising the project team.
- **Business risks:** Risks related to the market awareness about the project results, competition product acceptance and IPR handling.

The above categories may be updated in the future according to project needs.

Figure 2: Screenshot INTER-IoT Risk Management shared document

Each Work Package has its own sheet, being each Work Package leader responsible for managing the risks related to its Work Package. For each risk, a set of attributes are being used:

- 15 / 105

- Creation Date
- Work Log

In the Risk Identification Process, the following risk attributes are registered:

Table 1: Attributes registered in the Risk Identification Process

ID	Risk ID: RP.N, being P the WP number, e.g. R1.1 is the risk 1 of WP1.
Risk Name	Short name of the risk.
Description	Full description of the risk, in terms of the situation that produces the risk, rather than the consequences.
Consequences	Description of the consequences that may happen if the risk would finally occur.
Handler	Responsible for handling the risk and implementing the appropriate strategies described for the risk.
Status	Pending (nothing done but identification and description), Managed (strategies being implemented), Closed (Risk won't occur).
Creation Date	Date when the risk was recorded.
Work Log	Comments about actions done about the risk.

2.3 Risk Estimation

After the risks are identified, they are assessed in terms of their likelihood, which is the subjective probability of their occurrence; and the risk severity, which is the expected impact the project will suffer if the risk happens. Each risk is classified by a risk level based on its likelihood and severity (with risks with higher likelihood and/or higher severity being on a higher level). For each risk level the INTER-IoT partners will undertake appropriate actions.

From the risk severity and likelihood we have determined two heuristic functions and we have calculated the impact and the criticality what has been used in order to be able to prioritize the risks.

Very low level risks are placed on a watch list or adding a contingency reserve, as they don't deserve more attention because they don't affect the project too much. These risks don't require proactive management action (and are considered again only if their likelihood increases).

All the other risks need to be further considered and mitigation activities need to be planned. For these risks a structured description is formed with the risk description and its impact. The information recorded or updated at this process about each risk is the following:

Table 2: Attributes updated in the Risk Estimation Process

Description	Full description of the risk, in terms of the situation that produces the risk, rather than the consequences
Consequences	Description of the consequences that may happen if the risk would finally occurs
Likelihood	Probability of the risk to occur.

Severity	Level of impact that the project will suffer if the risk finally occur.
Impact	Calculated value on the basis of Likelihood and Severity.
Criticality	Impact categorization.
Handler	Responsible for handling the risk and implementing the appropriate strategies described for the risk
Status	Pending (nothing done but identification and description), Managed (strategies being implemented), Closed (Risk won't occur)
Work Log	Comments about actions done about the risk

The description of the likelihood, severity and impact is shown below.

2.3.1 Risk Likelihood

Risk likelihood is classified in one of the following possible values, attending to the probability of the risk to occur:

- **Very low** (occurrence probability 10%): The probability of the risk is very low or its occurrence is late in relation to the project lifetime.
- **Low** (occurrence probability 30%): The probability of the risk is low and there is a small opportunity to occur.
- **Moderate** (occurrence probability 50%): The risk will occur with a good probability.
- **High** (occurrence probability between 70%): The probability of the risk is high.
- **Very high** (occurrence probability 90%): The probability of the risk is very high or almost certain.

2.3.2 Risk Severity²

Risks are classified with respect to the level of impact that the project will suffer if the risk finally occur. Their seriousness is classified into the following categories:

- **Insignificant**: Impact of the risk for the project is very low and does not affect any of its objectives.
- **Tolerable**: Impact of the risk for the project is low and effects specific modules of the project without affecting its global objectives.
- **Moderate**: Impact of the risk for the project is medium, however the effects in different modules can have a high impact in the objectives of the project.
- **Serious**: The risk impacts the main contractual requirements of the project but without impact on or redefinition of the critical path.
- **Devastating**: The risk impacts the main objectives of the project on the critical path.

² After the technical review and advice from the technical reviewers an assessment of the risk severity has increased the levels from four to five introducing a new severity level "Moderate"

2.3.3 Risk Level

The risk level has been calculated using the following matrix, in order to provide the impact and the risk level. The impact is calculated as a product between the likelihood and the severity (catalogued from 1: insignificant to 5: devastating), and the impact is translated into the risk level. According to the Figure 2 each risk can be classified into one of the following levels (for each of the five risks levels different actions must be taken by the project partners):

- **Risk Level 1** (very low level): These level risks are included in the risk report and reviewed by the Project Coordinator or Work Package Leader concerned, to check possible variation of its estimations. These risks remain in the report to be reviewed for any change in their level. Impact lower than 0,3.
- **Risk Level 2** (low level): A “risk handler” is assigned to the risk to monitor the risk evolution. The “risk handler” reports to the Project Coordinator or Work Package Leader concerned. Actions are evaluated in order to reduce the risk. Impact between 0,3 and 1.
- **Risk Level 3** (moderate level): Same actions as for Level 2. In addition, definitions of specific mitigation plans are created. The Project Coordinator or Work Package Leader concerned with the risk defines these plans and identifies also possible trigger events to start them. The risk handler monitors the risks and these trigger events. Impact between 1 and 2.
- **Risk Level 4** (high level): Same actions as for Level 3. In addition, the Project Coordinator and Work Package Leader concerned with the risk informs the Project Coordination Committee. The Project Coordination Committee is involved in the design of the mitigation plans and directly assigns the “risk handler”. The defined mitigation plans start immediately. Impact between 2 and 3.
- **Risk Level 5** (critical level): Same actions as level 4. Due to the seriousness of these level risks, catastrophic for the project, the Project Coordination Committee plans an extraordinary meeting in a week in order to decide the status of the project and how the project will continue. Impact higher than 3.

The level of each risk is determined using the matrix in Table 3 which has as rows the risk likelihood and as columns the risk severity for the project.

Table 3: Impact/Value Matrix

Likelihood / Severity	1	2	3	4	5
10%	0.1	0.2	0.3	0.4	0.5
30%	0.3	0.6	0.9	1.2	1.5
50%	0.5	1	1.5	2	2.5
70%	0.7	1.4	2.1	2.8	3.5
90%	0.9	1.8	2.7	3.6	4.5

Using the cell values, we have classified the risk impact in the following groups; the impact matrix is depicted in figure 2:

- Very Low: 0.1 – 0.3
- Low: 0.4 - 1

- Moderate: 1.1 – 2
- High: 2.1 - 3
- Critical: >3

Likelihood / Severity	Insignificant	Tolerable	Moderate	Serious	Devastating
Very Low	Very Low	Very Low	Very Low	Low	Low
Low	Very Low	Low	Low	Moderate	Moderate
Moderate	Low	Low	Moderate	Moderate	High
High	Low	Moderate	High	High	Critical
Very High	Low	Moderate	High	Critical	Critical

Figure 3: Risk Levels – Impact/Value Matrix

2.4 Risk Mitigation

Mitigation activities/strategies can be generally either characterised as prevention type activities/strategies or as correction type activities/strategies:

- The term *prevention type* refers to the mitigation activities/strategies, which have as a target the elimination of a possible risk before it occurs. This will also have as a result the elimination of the negative impact for the project.
- The term *correction type* refers to mitigation activities and strategies, which aim at the reduction of the negative results of a risk after it has occurred.

Several risk response strategies are available depending on the risk. The strategies for managing negative risks in the INTER-IoT project are the following:

- **Avoidance strategies** (prevention type): Avoidance strategies are targeting at avoiding the risk or reducing the likelihood that the risk will occur.
- **Transfer strategies** (prevention type): Transferring some or all of the negative impact of the risk to a third party if possible. Transferring a risk simply gives another party responsibility for its management, it does not eliminate the risk. It may be empty in most situations in the project, as it's not easy to transfer risk responsibility.
- **Mitigate strategies** (correction type): Mitigation is the strategy for reducing the effects or impact of a risk if it occurs. Severity mitigation might target linkages that determine the severity. It also may contain the contingency strategies that are targeting at finding a back-up solution if the worst happen.

As the impact and consequently the risk level is the product of two factors (likelihood and severity), the strategies have to affect the two axis.

Unmanageable risks, that is, risks for which the Project Coordinator or concerned Work Package Leader is not able to deal with in a satisfactory way, shall be highlighted and a proper justification on the lack of mitigation actions should be provided.

Mitigation activity shall be followed-up by the Project Coordinator or Work Package Leader concerned, who supervises its accomplishment and verifies the effectiveness of the performed actions.

Risk Mitigation process is performed iteratively by the risk handler, who reports to the Work Package leader or Project Coordinator about changes in the strategies for mitigating risks as described above. This process updates the following risk attributes:

Table 4: Attributes updated in the Risk Mitigation Process

Avoid/Minize Likelihood Strategy	Description of the strategy for avoiding the risk or minimizing the likelihood that it will occur.
Transfer Strategy	Description of the strategy for transferring the risk to a third party if possible. It may be empty.
Mitigate Strategy	Severity Description of the strategy for mitigating the effects of a risk if it occurs
Handler	Responsible for handling the risk and implementing the appropriate strategies described for the risk
Status	Pending (nothing done but identification and description), Managed (strategies being implemented), Closed (Risk won't occur)
Work Log	Comments about actions done about the risk

2.5 Risk Monitoring

Each identified risk, other than Level 1 risks, shall have a handler. A risk handler is responsible for monitoring the risk and reporting about it. The Project Coordinator, Technology Director or Work Package Leader concerned, shall identify the handlers for all the risks that have been identified within Level 2 and Level 3.

The Project Coordination Committee shall identify the handlers for all the risks that have been identified within Level 4 and Level 5. In addition, for Level 5 risks, the Project General Assembly plans an extraordinary meeting in order to decide the status of the project and how the project will continue.

Each risk handler reports periodically to the Project Coordinator, Technology Director, Scientific Director or Work Package Leader concerned about the risks he/she is in charge of. The Project Coordination Committee and the Project General Assembly discuss during their meetings the risks of Level 4 and Level 5 respectively.

Risk management will be continuously handled by the partners. Every periodic telco will have a dedicated section in the agenda devoted to risk management, and at every plenary meeting there will be a session in order to manage and control risk management. Special emphasis is addressed at risks with higher impact. Additionally each risk handler may assess the risk and may take actions addressed to avoid/minimize likelihood and mitigate severity when an individual input related with the risk happens.

2.6 Risk definition and information table

The following table contains the same information present in the shared document used for management flexibility. The representation in table format is used to show the information in a more comprehensive way.

Table 5: Risk information table

Risk subcategory			
<technology, usability, organisation, business>			
Risk N°	Risk Name	Risk Description	Consequences
Rx.y	<Risk Name>	Detailed description of the risk	Description of the consequences of the risk to become true, and not mitigating it.
Likelihood	Severity	Impact	Criticality
<Very Low, Low, Moderate, High, Very High>	<Insignificant, Tolerable, Moderate, Serious, Devastating>	<Likelihood x Severity>	<Following figure 2>
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Describe how to avoid/minimize likelihood of the risk in order to decrease it in order to reduce the impact		Describe how to affect the severity of the risk in order to decrease it in order to reduce the impact	
Handler	Current Status	Creation Date	Transfer Strategy
<Identified person who handles the risk>	<Identified, Managed, Closed>	<Risk Creation Date>	<description of the transfer strategy>
Work Log			
Identification and date of associated events, which the handler of the risk tracks the relevant events associated with the risk, e.g. risk changes status from identified to managed or from managed to closed, or the description and handler of the risk changes.			

2.7 Ethical Risks

Ethics is of great importance to science and technology. There are many developments in science and technology that regularly give rise to ethical questions in European societies – stem cell research, genetically modified food, human enhancement, to name just a few. However it is not so clear in some fundamental ICT research until the piloting phase or demonstrations have to be put into practice. The intense social debate such developments trigger, highlights the importance of high ethics standards for science and technology. These standards reflect our adherence to the ethical values and fundamental rights, such as human dignity, freedom, democracy, pluralism, solidarity, integrity and non-discrimination, on which the EU is founded.

To underline their importance, these values and rights have been reaffirmed at the highest European level with the entry into force on 1 December 2009 of the Lisbon treaty, which makes explicit reference to the European Charter of Fundamental Rights. High ethics standards also add to the quality of research and increase its likely social impact. They promote research

integrity and a better alignment of research with social needs and expectations. They support the societal uptake of the new products, processes and services that are the result of scientific research, because high ethical standards generally merit public trust. This second aspect is equally relevant, as science and technology are vital for addressing the many economic, ecological and social challenges that confront us.

D1.4 adds in comparison with D1.3, a new transversal section of risks, related with ethics as suggested by the EC Ethical review received in January 2017 and in order to cope with the ethical challenges arising from the three pilots (i.e. INTER-LogP, INTER-Health and INTER-DOMAIN). At the same time there is a concern related with the inclusion of third parties in the project in terms of handling personal and private data.

An ethical risk refers to unexpected negative consequences due to unethical actions carried out during the project and in subsequent actions. Identifying this type of risk is not a simple task due to the dual nature of the ethical judgment, where most actions can have both ethical and unethical aspects. Moreover, the people or stakeholders involved on an unethical action tend to be unaware of this aspect due to their self-interest. For that reason, an external and objective Ethical Board has to be in charge of analyze each problematic processes carried out within the project to determine the negatives consequences that those can induce. Additionally, because this unawareness these negative consequences sometime are unexpected and constitute problems for the project that go from a bad image of the project to a legal issues.

To ensure the integrity of the project ethical practices, managing social and environmental risk we must implement a very specific ethical risks prevention or avoiding plans, effective control and posterior correction. The risk management strategy proposed in D1.3 and continued in D1.4 has been applied to the ethical risks. Additionally the key partner related with INTER-HEALTH pilot ASLTO5 has been assessed by the Bio-Ethics Committee of the organization, obtaining a positive response for the trials. UPV and UNICAL will have to get approval from their Ethical Committees due to their involvement in the INTER HEALTH pilot. Several ethical risks have to be considered mainly associated with the safety of the participants (e.g. psychological burden, stigmatization,...). All of them, so as the medical equipment that has been identified and proposed to be used in the INTER-HEALTH pilot will be thoroughly evaluated and the associated risks evaluated.

INTER-LogP pilot will not use monitor sensitive personal data, and the logistic information handled will be fully anonymized, not for ethical reasons but to avoid leaking of sensitive commercial information. Regarding INTER-DOMAIN pilot, the integration of different domains pilots, may include the monitoring of personal data that has not been defined yet, the first approach may include positioning of workers and some vital signals (e.g. ECG or blood pressure), and in that case VPF and NPV will take the role of Data Controllers for the pilot.

Ethical risks are also associated with the entrance of third parties in the project mainly associated with the INTER-DOMAIN use case. The third parties have signed a collaboration agreement and the management and collection of data associated with individuals is not going to be performed by them.

In a transversal structure, the ethical risks will be classified in:

- Privacy control.
- Data management.
- Transparency.
- Abnormal behavior.

2.7.1 Privacy Control

Storage and process of human data will take place towards the detection of activity patterns and flows within pilot trials. To ensure the privacy of that data INTER-IoT will utilize privacy-preserving sensors (if possible) and keeping the anonymity of the users that are being monitored. Any original records will be destroyed in compliance with the legislation of the countries in which the information is collected, stored and analyzed (i.e. Italy for INTER-HEALTH and Spain for INTER-LogP/INTER-DOMAIN). Participants will be monitored either on an aggregated level or individually using INTER-IoT developed components and the deployed IoT platforms. In both cases, privacy will be ensured through using appropriate data formats that will depict only ids and not specific occupants and will not be correlated with other sources.

The pilot supervisor (i.e. UPV-SABIEN for INTER-HEALTH; VPF for INTER-LogP and for INTER-DOMAIN) will notify all people participating when each pilot trial procedure will start and end, providing detailed information about the undertaken procedures. Individual participants have already been informed of the need to be monitored, in order to track some constants and in some cases their location within monitored. The initial interest of all the participants has been stated and they will be further asked to sign a consent form before the actual pilot realization phase. All procedures will be compliant with the local and European legislation and specific requirements of the ASLTO5 Bio-Ethical Committee and will be supervised by the Ethical Board of the project.

2.7.2 Data Management

During the implementation and testing of INTER-IoT pilots, background information about participants will be collected, stored, processed and in some specific cases shared. According to the definition of the current EU Directives these are personal data and their security must be ensured.

To that end, the INTER-IoT consortium has decided to implement Privacy Enhancing Technologies - PET technologies (e.g. encryption or pseudo-anonymization) to ensure the confidentiality of the data collected and prevent breaches in every pilot, the details of such technical measures are not part of this deliverable and will be described in further deliverables associated with WP6. Also, Consortium partners (e.g. UPV project coordinator, VPF and the SMEs) have the capacity and the expertise from similar past and ongoing projects to deal with data security issues if necessary. Ethical guidelines will be delivered in order to be adopted during pilot trials in D6.1 in M21, prior to the start of the deployment. In addition, the local ethical advisory board has been fully informed and with the assistance of the External Ethical Advisor will be monitoring the Pilots so that any declines from the original process will be corrected as soon as possible in order to avoid any risk and if needed apply the mitigation actions.

2.7.3 Transparency

INTER-IoT pilots will take place in the Italian National Health System in Nichelino (TO) hosted by ASLTO5 (INTER-HEALTH) and in Port of Valencia (SPAIN) hosted by Valencia Port Foundation and Noatum Ports (INTER-LogP); these last partners, together with UPV and the support of the Third Parties joining from the open call will be responsible of the INTER-DOMAIN pilot developed also in Valencia (SPAIN).

Any breach or leak of data to irrelevant parties (e.g. supervisors, managers, externals) may lead to transparency issues. To that end, the INTER-IoT Ethical Advisory Board will provide the necessary feedback in order to minimize the impact of that risk or any other similar delivering particular guidelines supervised by the corresponding Data Controllers. Moreover, the consortium will keep track and report during the execution of the pilots of the data collection as part of the research study all collected data will be used ONLY for INTER-IoT research purposes.

2.7.4 Abnormal Individuals Behavior

The INTER-IoT Consortium has taken into consideration the fact that some people may change their behavior and/or their professional performance when they know that they are being monitored. In order to eliminate pretentious behavioral change the project's purpose and intentions have been made perfectly clear to all participants reassuring them that collected data will not be used for any other reason apart from the research needs. Also, any use of IT – equipment will be in ethical compliance with National and European Legislation and every piece of data stored will be available to the respective occupants if requested. Furthermore, all participants will sign a consent form that will ensure confidentiality. Regarding INTER-HEALTH pilot, the project has passed through a through Ethical scrutiny from ASLTO5 Bio-Ethical Committee.

The Ethical Scope of the INTER-IoT project has received significant consideration from the very beginning, and as the projects unfolds and evolves it will be one of the aspects that will guide all the procedures. The ethics of the INTER-IoT components will be carefully treated throughout the full lifecycle of the project, guaranteeing that ethical risks will be appropriately addressed at any moment.

3 Identified Risks for the Project

This section provides information tables of the risks that the Inter-IoT consortium has identified, updated and managed until the date of the delivery of this document. The risks have been classified per WP in order to provide a more dynamic risk management. The objective of organising the risks in this way allows the management of project specific related risks.

The risks have been labelled using the categories described in section 2.2 of the previous version of this document. Risk management is performed in three iterative steps: (i) at task level; (ii) work package level; and (iii) at project level.

Each time the Inter-IoT consortium identifies a new risk, or a new risk changes its state, the corresponding risk information table is added or updated in the online document and a snapshot of this document is presented this deliverable.

The list of risks presented in this document have been updated according to the project needs and the possible threats that the Inter-IoT consortium will identify during the whole Inter-IoT project lifetime. And additionally after the technical review meeting the risks have been revisited in order to make them more project-specific.

The following subsections represent the risk classified per WP in order to group them in a more comprehensive way. The day by day management is being performed by means of shared document accessible by every member of the consortium in which the Project Coordinator, Software Architect, Work Package Leaders, Task Leaders and specifically Risk Handlers update the different risks and consequently the work-log as actions are taken. Periodically as indicated in the risk management procedure, the PCC in plenary meetings, periodical telcos or specifically target events (e.g. workshops or telcos related with a specific activity) risks are assessed as a whole.

In the period that comprises this deliverable (M12-M18), for the general tracking of all risks, several periodical telcos have been done each fortnight. At the same time, two plenary meetings, one in Ljubljana in January 2017 and the other in Valencia on April 2017, have taken place. During these meetings one of the specific points to be addressed has been risk management. Finally, to evaluate concrete risks, Task Leaders and Work Package Leaders have done different telcos to study the state of each risk and, if needed, to take the appropriate measurements (e.g. withdrawal of Telecom Italia or software integration procedures).

Having a brief description of what has happened during this period by WP we found:

- WP1 and WP8 have a duration corresponding the whole life of the project, for that, we put emphasis in reviewing the state of each one of them in terms of coordination, management and impact of the project. The Open Call was one of the main milestones of this period, some risk have been closed due to the successful finalization of the proposal and its evaluation but others are still open to maintain the tracking due to its relation with other tasks in the project.
- WP2 has finished on month 12, at the beginning of this period, so that, some of the risks has been managed and closed but still others have been left open due to the start of WP6 related with the pilots and its relationship with them.
- WP3, WP4 and WP5 were already initiated, therefore, most of the risks were identified in the previous deliverable, even though some of them emerged and were identified in

this period. The main task on this WPs have been the analysis of the state of each risk and the coordination between WP and tasks leaders to manage these risks.

- WP6 and WP7 start on month 19 and month 25 respectively, therefore, in addition to identifying new risks, the main task performed has been to prevent risks that are derived from other WPs.
- Additionally, a new section with new table of ethical risks has been added to identify, analyze and manage the ethical threats that could rise during the project lifetime.

3.1 WP1 Related Risks

Table 6: Underperforming partner

Risk subcategory			
Organisation			
Risk N°	Risk Name	Risk Description	Consequences
R1.1	Underperforming partner	One or more partners are not delivering work as expected	Cascade delay in the activity of other partners, difficulties in integration and management of the project
Likelihood	Severity	Impact	Criticality
Low	Tolerable	0.6	Low
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
It is impossible to control underperformance in real-time, but reducing periods of control allow to recover from underperformance from one or more partners. Additionally in plenary meetings a major control point is released		The flexible project management structure and project CA allow a quick shift of resources to alternative project partners. TL, WPL and PCC are periodically monitoring activity of the different partners through reporting and internal control points.	
Handler	Current Status	Creation Date	Transfer Strategy
Carlos Palau	Managed	13/1/2016	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana for evaluation and report. - 14/2/17 PCC Telco meeting. Regular use of resources assessment. - 2/3/17 PCC Telco meeting. Regular use of resources assessment. - 21/3/17 PCC Telco meeting. Regular use of resources assessment. - 4/4/17 to 6/4/17 PCC Plenary meeting in Valencia for evaluation progress. - 2/5/17 PCC Telco meeting. Regular use of resources assessment. - 23/5/17 PCC Telco meeting. Regular use of resources assessment. - 14/6/17 PCC Telco meeting. Regular use of resources assessment. 			

Table 7: Partners leaving the project

Risk subcategory			
Organisation			
Risk N°	Risk Name	Risk Description	Consequences
R1.2	Partners leaving the project	One of more partners are leaving the project due to change of institution interests or any other reasons	Application of article 50.2 of the GA, workload and expected contributions have to be provided by existing or new partners. Potential delays and adjustment of activities
Likelihood		Severity	Impact
Low		Serious	1.2
			Moderate
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Interests of entities may change from time to time, internal reorganizations, employees reduction,... this means that it is difficult to know when a partner is withdrawing from a project, because it may depends on external reasons		If the risk happens, the withdrawal and disengagement of the partner has to be smoothed in order that activity is not delayed and other partners (new or existing) assume the activities	
Handler	Current Status	Creation Date	Transfer Strategy
Carlos Palau	Managed	13/1/2016	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana consolidation of accepted amendment. - 7/2/17 Telco to follow up reassignment of tasks after TIM withdrawal 			

Table 8: Key-personnel temporally not available

Risk subcategory			
Organisation			
Risk Nº	Risk Name	Risk Description	Consequences
R1.3	Key-personnel temporally not available	Relevant participants in the project from any partner not available due to sick leave or any other reason, not being available to participate in the project	Activity being developed by that partner is affected, and as this is a collaborative project activity of the other partners can be delayed in consequence. Situation can be worse if the key person is leading a Task, WorkPackage or the Project
Likelihood		Severity	Impact
Low		Tolerable	0.6
Criticality			
Low			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
The best way to avoid that aspect is work with a redundant structure, i.e. with a deputy leader in each of the activities. And not centralizing activities in a single person and doing it among a group of people		Individual partners have their internal procedures, however the PCC may decide to swap leaderships in order to mitigate effects	
Handler	Current Status	Creation Date	Transfer Strategy
Carlos Palau	Managed	13/1/2016	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana, monitoring of evaluation and report - 2/3/17 PCC Telco meeting, monitoring of evaluation and report - 21/3/17 PCC Telco meeting, monitoring of evaluation and report - 4/4/17 to 6/4/17 Plenary meeting in Valencia, monitoring of evaluation and report - 2/5/17 PCC Telco meeting, monitoring of evaluation and report - 14/6/17 PCC Telco meeting, monitoring of evaluation and report 			

Table 9: Resources underestimated

Risk subcategory			
Organisation			
Risk N°	Risk Name	Risk Description	Consequences
R1.4	Resources underestimated	Overambitious objectives, and miscalculation of the effort to achieve the objectives	Failure in fulfilling the Description of Activity tasks, due to a lack in manpower. I may affect the success of the project
Likelihood		Severity	Impact
Low		Serious	1.2
Criticality			
Moderate			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
The activity to be performed is monitored periodically by the TL, WPL and the PCC. Monitoring is done in advance, in order to control if future activities will not meet the deadline. Currently in every plenary meeting and in the specific WP workshops the activities and resources have been evaluated		Periodically the reach, of the activities to be developed are evaluated. The objectives have been ambitious since the start of the project, however if there is a miscalculation in the use of resources the PCC reorganizes activity.	
Handler	Current Status	Creation Date	Transfer Strategy
Carlos Palau	Managed	13/1/2016	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana progression control. - 2/3/17 PCC Telco meeting, progression of WP status. - 9/3/17 PCC Telco between WP3 leader and T3.3 and T3.5 leaders. - 4/4/17 to 6/4/17 Plenary meeting in Valencia, progression of WP status - 2/5/17 PCC Telco meeting, progression of WP status. - 23/5/17 WP3 telco progress status, analysis of resources - 25/5/17 WP4 telco progress status, analysis of resources - 14/6/17 PCC Telco meeting, progression of WP status. 			

Table 10: Lower level quality deliverables than the expected

Risk subcategory			
Organisation			
Risk N°	Risk Name	Risk Description	Consequences
R1.5	Lower level quality deliverables than the expected	WP1 is in charge of controlling quality of the content of the deliverables	Low quality of the deliverables may lead to lack of content transfer between WP, lack of knowledge dissemination and not fulfilling commitments related with the Grant Agreement
Likelihood	Severity	Impact	Criticality
Low	Serious	1.2	Moderate
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
The quality control procedure instantiated by the consortium has been used to evaluate and improve the different deliverables. The procedure is detailed in D1.1 (Project Management Handbook)		Produce different versions that are evaluated in terms of content and structure by the partners directly related with the use of the deliverable	
Handler	Current Status	Creation Date	Transfer Strategy
Carlos Palau	Managed	13/1/2016	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 quality control plan for D1.4, D8.5 and D8.7. - 4/4/17 to 5/4/17 Plenary meeting in Valencia for discussion about the futures deliverables' content and quality check - 6/4/17 Workshop D4.2 content specifications. - 31/5/17 meeting telco for writing plan and assignment for D4.2 and D3.2. - 30/6/17 D1.4, D8.5 and D8.7 quality check performed. 			

Table 11: WP interaction not satisfactory, coordination not efficient.

Risk N°	Risk Name	Risk Description	Consequences
R1.6	WP interaction not satisfactory, coordination not efficient.	There are different links between WP in INTER-IoT. The most critical are related between WP2 and WP3-5 and between WP3-5 and WP6. Additionally inter technical WP (WP3-5) is required.	The outcomes from WP2, specially the requirements and the scenarios are needed for the technical WP, if they are not adequate technical WP will not be able to start and produce adequate products for the pilots in WP6. At the same, time WP3 results are needed by WP4, and WP3 and WP4 are both linked with WP5 and methodology. All these communication paths have to be open and clear.
Likelihood	Severity	Impact	Criticality
Low	Serious	1.2	Moderate
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Hold periodical meetings between WP leaders, a part of the plenary meetings. Share documents and intermediate reports and have continuous communication. Hire a senior Software Architect in order to homogenise the development of the components.		The flexible management strategy used in the project allow to detect malfunctions and react placing more effort in a specific task if a problem of communication has existed and some component has not developed or does not fit the required specification for integration. Modification of the schedule of different tasks in order to improve communication	
Handler	Current Status	Creation Date	Transfer Strategy
Carlos Palau/Miguel A. Llorente	Managed	13/1/16	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana for evaluation and report. - 4/2/17 WPL and PC Telco meeting about analysis and evaluation in the relationship of WP3, WP4, and WP5. - 14/2/17 PCC Telco meeting. Coordination assessment. - 2/3/17 PCC Telco meeting. Coordination assessment. - 9/3/17 telco for relationship between WP4: T4.3 and T4.5 inputs from INTER-Layer APIs. - 21/3/17 PCC Telco meeting. Coordination assessment. - 4/4/17 to 6/4/17 PCC Plenary meeting in Valencia for evaluation progress. - 2/5/17 PCC Telco meeting. Coordination assessment. - 23/5/17 PCC Telco meeting. Coordination assessment. - 25/5/17 Synco call telco for WP4 and WP3 front-end analysis. - 14/6/17 PCC Telco meeting. Coordination assessment. 			

Table 12: Gathered open call proposals do not provide adequate contributors

Risk subcategory			
Organisation			
Risk Nº	Risk Name	Risk Description	Consequences
R1.7	Open Call does not attract a critical mass of contributors	INTER-IoT open call requires that a good number and quality of contributors is received by the consortium. The risk exists that due to the high number of open calls launched by H2020 projects, and the publicity means selected not many proposals are received by the consortium	The first consequence is that one goal of the project is not achieved, that is the gathering and creation of an ecosystem around INTER-IoT. The second consequence is that the INTER-DOMAIN use case could not be populated and the third is that the part of the budget of the project could not be executed.
Likelihood		Severity	Impact
Moderate		Devastating	2,5
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
The strategy to minimize the likelihood is to provide as much publicity as possible and promote the open call in different forums and contacts from the partners. Use of the IoT-EPI network and other alternative communication channels. Provide the best information as possible in terms of benefits and clarification of the requested contributions.		The severity cannot be mitigated, as there is only one open call and no budget can be left for as second open call. Not having a high number of proposals may harm the quality of the objectives to be achieved.	
Handler	Current Status	Creation Date	Transfer Strategy
Carlos Palau	Closed	13/1/16	N/A
Work Log			
<ul style="list-style-type: none"> - 13/1/17 1 week extension for the reception of proposals with permission of the PO. - 20/1/17 Close of the open call submission procedure and close of the risk with 63 proposals received. 			

Table 13: Open Call outcomes do not provide adequate results

Risk subcategory			
Organisations			
Risk N°	Risk Name	Risk Description	Consequences
R1.8	Open Call outcomes do not provide adequate results in order to meet the associated objectives defined in DoA.	Although a high critical mass of proposals is received, the quality has to be evaluated in order to fulfil the project requirements.	If the received contributions do not have the needed quality and technical contributions the goal pretended by the open call will not be achieved.
Likelihood		Severity	Impact
Moderate		Serious	2
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Explanation of the needs in a comprehensive format to potential contributors during the elaboration phase. Selection of expert reviewers in order to select the best proposals for the project.		Intervention of the consortium during the different phases of the open call until the third parties start working with the consortium. The PCC will reduce the severity mainly through the negotiation phase with the selected proposals in order to fine tune their contributions to the goals of INTER-IoT	
Handler	Current Status	Creation Date	Transfer Strategy
Carlos Palau	Managed	13/1/16	N/A
Work Log			
<ul style="list-style-type: none"> - 29/3/17 Panel for the selection of the Open Call Third Parties - 10/4/17 to 11/4/17 Bilateral telcos between the third parties and the consortium to fix the content of the collaboration agreement and assignment of mentors. - 1/5/17 Every contract signed by the third parties, activity started - 29/5/17 to 30/5/17 first review of third parties small contributions activity - 29/6/17 to 30/6/17 Periodic monitoring by the mentors to supervise the progression of the work 			

Table 14: Change of the project requirements due to evolution of relevant technology and market landscape

Risk subcategory			
Technology			
Risk N°	Risk Name	Risk Description	Consequences
R1.9	Change of the project requirements due to evolution of relevant technology and market landscape	The market landscape is changed due to an evolution of the different technologies and influence in the market of technology alliances and standardization organisations.	The project may require an extra effort to adapt to this changes, and include or change some technology decisions made during the execution of the project. The consequence will be to adaptation of some requirements
Likelihood		Severity	Impact
Low		Moderate	0.9
Criticality			
Low			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
The selection of the technology and platforms to be integrated in the project have to be consolidated and select the platforms that are most used in the market, but considering the new emergent ones. The consortium will create a market watch in order to monitor in contact with other project within IoT-EPI the market trends.		The development of the different components in INTER-LAYER, INTER-FW and INTER-METH will be as open and flexible as possible in order to be able to adapt to the inclusion of new components.	
Handler	Current Status	Creation Date	Transfer Strategy
Carlos Palau	Managed	13/1/16	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana for evaluation and report. - 14/2/17 PCC Telco meeting. Technology assessment. - 2/3/17 PCC Telco meeting. Technology assessment. - 21/3/17 PCC Telco meeting. Technology assessment. - 4/4/17 to 6/4/17 PCC Plenary meeting in Valencia for evaluation progress. Evaluation of the impact of the migration of NPV technology from SEAMS to open WSO2. - 2/5/17 PCC Telco meeting. Coordination assessment. Technology assessment. - 23/5/17 PCC Telco meeting. Coordination assessment. Technology assessment. - 14/6/17 PCC Telco meeting. Coordination assessment. Technology assessment. 			

Table 15: Legal and regulatory constraints are not taken into account in pilots design

Risk subcategory			
Organisation			
Risk N°	Risk Name	Risk Description	Consequences
R1.10	Legal. Regulatory and ethical constraints are not taken into account when designing INTER-IoT or risk the execution of the pilots.	Legal, regulatory and ethical component is a key factor when humans are involved in a project. In the case of INTER-IoT, the risk of not considering these aspects could harm exploitation, especially in the use case of m-health.	Directly linked with the exploitation of the results in the deployment of the pilots. If legal, regulatory and ethical components are not considered the pilot will have significant drawbacks and the exploitation of the resulting products will not be feasible.
Likelihood		Severity	Impact
Moderate		Serious	2
Criticality			
Moderate			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Consider the different legal and regulatory constraints in the countries of the deploying pilots (i.e. Spain and Italy) and also at European Level to guarantee future scalability. As a first step, analysis will be extended to the countries of the partners. Create an Ethical Advisory Board, including and external Ethical Advisor that support this activity and provide ethical inputs to the consortium from different approaches (health provider, IT developer, security manager...).		Validate the developed products periodically with the different legal, regulatory and ethical recommendations in order that an adaptation to a new one is reducing the severity of the risk. The mitigation measure is critical in INTER-HEALTH use case.	
Handler	Current Status	Creation Date	Transfer Strategy
Carlos Palau	Managed	13/1/16	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana for evaluation and report, definition of the Ethical aspects of the project. - 14/2/17 PCC Telco meeting. Ethical assessment. - 2/3/17 PCC Telco meeting. Ethical assessment. Appointment of the External Ethical Advisor. - 21/3/17 PCC Telco meeting. Ethical assessment. - 4/4/17 to 6/4/17 PCC Plenary meeting in Valencia, first meeting of the Ethical Advisory Board - 2/5/17 PCC Telco meeting. Ethical assessment. - 23/5/17 PCC Telco meeting. Ethical assessment. - 25/5/17 Ethical Advisory Board Telco, including the external Ethical Advisor, definition of the ethical assessment of deliverables - 14/6/17 PCC Telco meeting. Ethical assessment. - 28/6/17 Ethical Advisory Board Telco, including the external Ethical Advisor 			

Table 16: Software Integration

Risk subcategory			
Technology			
Risk N°	Risk Name	Risk Description	Consequences
R1.11	Software Integration	Development of software components by different partners in the consortium may require to manage integration. There is a risk that the integration process requires extra effort.	The main consequence will be lack of effectiveness in the development process and not meeting the deadline. Software integration is a process that in the project is present in the different WP, the technical ones producing the generic products and the pilots in which the products will be integrated with the IoT platforms present in the premises of the stakeholders.
Likelihood		Severity	Impact
Moderate		Serious	2
Criticality			
Moderate			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Define clear development procedures in order that every partner meets them, at project, work package and task level. Nominate a Software Architect that provides clear directives and policies to achieve good integration. Periodically monitor advances of the development in the different components of the project.		Assess the degree of integration quality periodically and create specific task forces if needed. The degree of severity may vary from task to WP and from WP to the whole project. Periodical testing of the software integration as the project evolve. Adequate evaluation of the software interfaces.	
Handler	Current Status	Creation Date	Transfer Strategy
Carlos Palau/Miguel A. Llorente	Managed	20/10/16	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana for evaluation and report. - 4/2/17 Telco meeting about analysis and evaluation in the relationship of WP3, WP4, and WP5. - 9/3/17 telco for relationship between WP4: T4.3 and T4.5 inputs from INTER-Layer APIs. - 17/3/17 telco for components integration at middleware level. - 4/4/17 to 6/4/17 Plenary meeting in Valencia for evaluation progress. - 25/4/17 Telco for integration components on T3.3, T3.4 and T3.5 - 25/5/17 Synco call telco for WP4 and WP3 front-end analysis. - 1/6/17 Meeting for integration and testing of demo's components for Genève. 			

3.2 WP2 Related Risks

Table 17: Legal and regulatory constraints are not taken into account

Risk subcategory			
Technology			
Risk Nº	Risk Name	Risk Description	Consequences
R2.1	Legal and regulatory constraints are not taken into account	Legal and regulatory constraints are not taken into account when designing INTER-IoT or risk the execution of the pilots.	Solutions do not comfort to existing laws and have to be modified or are useless for the selected use cases (transport and mHealth).
Likelihood		Severity	Impact
Low		Tolerable	0.6
Criticality			
Low			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Introduce legal and regulatory assessment in the early phases of the project (D2.5) and take into account the Policy Report published by AIOTI.		In the case any regulatory or legal constraint appears in a scenario during the pilot deployment, provide a simulated approach where this regulatory or legal constraint is not applicable.	
Handler	Current Status	Creation Date	Transfer Strategy
Miguel Llop	Closed	15/1/2016	N/A
Work Log			
<ul style="list-style-type: none"> - 31/12/16 Risk closed when D2.5 was submitted, although new risks were created in association with legal and ethical issues in January 2017. 			

Table 18: Incomplete requirements

Risk subcategory			
Technology			
Risk N°	Risk Name	Risk Description	Consequences
R2.2	Incomplete requirements	Identified requirements for INTER-IoT are not complete, nor relevant, too complex or unfeasible to achieve.	Technical WP cannot start the design and development process because the requirements do not provide the required information.
Likelihood		Severity	Impact
Low		Tolerable	0.6
Criticality			
Low			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Evaluate and re-formulate those requirements which are out of the scope, unfeasible or too complex to attend in INTER-IoT. Remove those requirements which are not related with the objectives of the project.		Perform an analysis of the existing requirements by the task and work package and rewrite them being more concrete and adjusting to the development of the products.	
Handler	Current Status	Creation Date	Transfer Strategy
Miguel Llop	Managed	31/1/2016	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana, requirements revisited. - 14/2/17 PCC Telco meeting. Requirements commented from stakeholders. - 2/3/17 PCC Telco meeting. Requirements commented from stakeholders. - 21/3/17 PCC Telco meeting. Requirements commented from stakeholders. - 4/4/17 to 6/4/17 PCC Plenary meeting in Valencia for evaluation progress. Revisiting the requirements from the exploitation point of view - 2/5/17 PCC Telco meeting. Requirements commented from stakeholders. - 23/5/17 PCC Telco meeting. Requirements commented from stakeholders. - 14/6/17 PCC Telco meeting. Requirements commented from stakeholders. 			

Table 19: Scenarios are not feasible

Risk subcategory			
Usability			
Risk Nº	Risk Name	Risk Description	Consequences
R2.3	Scenarios are not feasible	Scenarios are not real or not feasible to be demonstrated in the pilots.	The scenarios do not fulfil the needs of the project, not being significant for the testing of the solutions.
Likelihood		Severity	Impact
Very Low		Insignificant	0.1
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Propose several scenarios to ensure that at least there will be enough scenarios demonstrated in the pilot deployment to validate all the functional, non-functional, qualitative and quantitative indicators established in the project.		Identify and discard those scenarios that are unfeasible duly justifying the reason and focus on the feasible scenarios for the pilot deployment and validation.	
Handler	Current Status	Creation Date	Transfer Strategy
Miguel Llop	Closed	01/2/2016	N/A
Work Log			
- 4/4/17 to 6/4/17 Plenary meeting in Valencia although the risk was closed the consortium discussed it because of the proximity of the WP6 kick-off.			

Table 20: Stakeholder does not participate in the pilot

Risk subcategory			
Usability/Organisation			
Risk N°	Risk Name	Risk Description	Consequences
R2.4	Stakeholder does not participate in the pilot	Stakeholders identified for participating in the pilot deployments do not engage in the demonstration.	Scenarios, use cases and main interoperability procedures cannot be tested as fixed at the start of the project.
Likelihood		Severity	Impact
Moderate		Devastating	2.5
Criticality			
High			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Keep the key stakeholders that will participate in the pilots informed and take into account their needs.		Seek other equivalent stakeholders to participate in the pilot, obtain their agreement and prepare them for conducting the pilot.	
Handler	Current Status	Creation Date	Transfer Strategy
Carlos Palau/Miguel Llop	Managed	1/2/2016	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana discussion with stakeholders, fully committed with the pilots - 4/4/17 to 6/4/17 Plenary meeting in Valencia to talk with the stakeholders and avoid these type of risks. 			

Table 21: Obsolescence due to changes in the market or user views

Risk subcategory			
Technology			
Risk N°	Risk Name	Risk Description	Consequences
R2.5	Obsolescence due to changes in the market or user views	The market environment or the user views change making the results obsolete.	The solutions will have to be adapted to the new products and standards in the market and may introduce delays.
Likelihood		Severity	Impact
Low		Tolerable	0.6
Criticality			
Low			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Establish contact with the most relevant alliances (e.g. AIOTI); standardization organisations (e.g. ETSI or IEEE) and have a permanent market-watch in order to detect changes in the IoT landscape.		The robust effort on market analysis in WP2 and the development of an appropriate exploitation plan in WP7 including a business analysis will make sure that user needs and wishes as well as market trends are constantly taken into account.	
Handler	Current Status	Creation Date	Transfer Strategy
Pablo Giménez	Managed	15/1/2016	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana, analysing the impact of including UniversAAL instead of eCARE - 17/3/17 Epi-challenge, monitoring of new trends - 4/4/17 Sido event for research on new market technologies, analysing new trends - 4/4/17 to 6/4/17 Plenary meeting in Valencia, NPV description of new IoT platform for the terminal based in WSO2, risk analysed on the impact in the architecture - 5/6/17 to 9/6/17 IoT Week Genève, market trends and technology analysis 			

Table 22: Different business interests

Risk subcategory			
Business			
Risk N°	Risk Name	Risk Description	Consequences
R2.6	Different business interests	Different or concurrent business interests of partners endanger the collaboration and development of the project.	Unsuccessful exploitation of project results failing in achieving a relevant impact.
Likelihood		Severity	Impact
Low		Serious	1.2
Criticality			
Moderate			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Alignment of business interests and exploitation plans during WP2 and WP8.		Mediation and agreement among partners on business conflicting issues that appear and affect the execution of the project. Application of the CA when needed.	
Handler	Current Status	Creation Date	Transfer Strategy
Miguel Llop	Closed	10/2/2016	N/A
Work Log			
- 30/06/16 The task is finished without risk, it was identified, never managed. There were no business conflicting issues			

3.3 WP3 Related Risks

Table 23: Standards Obsolescence

Risk subcategory			
Technical			
Risk N°	Risk Name	Risk Description	Consequences
R3.1	Standards Obsolescence	Due to long project duration the standards selected for the implementation of the INTER-IoT middleware integration at the early stages may become obsolete.	Obsolete standards might not be suitable anymore for the project. New standards have to be selected, extra effort is needed to adapt the interoperability procedures
Likelihood		Severity	Impact
Low		Serious	1.2
Criticality			
Moderate			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
It will be imperative that the selection process takes into account not only the current importance of a standard, but also the mid-term dynamics among them. During the requirements phase a strong analysis and link with AIOTI and other bodies will place INTER-IoT in context of the IoT landscape, and during the execution of the project an iterative and continuous process will detect the new standards and those losing favour from the community.		Include the new standard after an internal debate to consider it, taking into account that INTER-IoT INTER- LAYER product has as a basic requirement extendibility and the easy inclusion of new standards.	
Handler	Current Status	Creation Date	Transfer Strategy
Eneko Olivares	Managed	1/3/2016	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana for evaluation and report. - 14/2/17 PCC Telco meeting. Risk progression control. - 2/3/17 PCC Telco meeting. Risk progression control. - 17/3/17 Epi-challenge. Technological meeting with other EPI projects. - 21/3/17 PCC Telco meeting. Risk progression control. - 4/4/17 to 6/4/17 PCC Plenary meeting in Valencia for evaluation the development progression. - 4/4/17 Sido event for research on new market technologies. - 2/5/17 PCC Telco meeting. Risk progression control. - 5/6/17 to 9/6/17 IoT Week Genève. Informal technological meeting - 23/5/17 PCC Telco meeting. Risk progression control. - 14/6/17 PCC Telco meeting. Risk progression control. 			

Table 24: Finalization of Open Software support

Risk subcategory			
Technical			
Risk N°	Risk Name	Risk Description	Consequences
R3.2	Finalization of Open Software support.	If an Open Source Software implementation is selected for the base implementation of the INTER-IoT middleware integration, there is a risk associated with the solution's community and its continuity, in case that the support for OSS implementation ends prematurely.	If the community abandons an OSS project selected for Inter-IOT, its commercial utilization would be jeopardized, and thus that of the INTER-IoT middleware.
Likelihood		Severity	Impact
Low		Tolerable	0.6
Criticality			
Low			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Looking into the community size and health, as well as the project's history should provide enough information to evaluate the potential of such problems. A continuous activity monitoring of the main contributors of the project and their activity in other similar projects may be enough to detect implementation decline and rise of a new one.		Selecting a new open source implementation associated with the same protocol; adapting a new one to meet the needs of providing support to the OSS implementation from INTER-IoT partners.	
Handler	Current Status	Creation Date	Transfer Strategy
Eneko Olivares	Managed	1/6/2016	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana for evaluation and report. - 14/2/17 PCC Telco meeting. Risk progression control. - 2/3/17 PCC Telco meeting. Risk progression control. - 21/3/17 PCC Telco meeting. Risk progression control. - 4/4/17 to 6/4/17 Plenary meeting in Valencia. - 2/5/17 PCC Telco meeting. Risk progression control. - 23/5/17 PCC Telco meeting. Risk progression control. - 14/6/17 PCC Telco meeting. Risk progression control. 			

Table 25: Bad interoperability design due to poor analysis of other platforms

Risk subcategory			
Technical			
Risk N°	Risk Name	Risk Description	Consequences
R3.3	Bad interoperability design due to poor analysis of other platforms.	Insufficient analysis of existing IoT platforms, leading to a poor design.	INTER-IoT extendibility is reduced, specifically regarding interoperability and integration features
Likelihood		Severity	Impact
Low		Serious	1.2
Criticality			
Moderate			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Make a proper initial identification of successful IoT platforms and existing initiatives and related IoT standards to make a complete definition and analysis of the methods for layer interoperability and integration. Early evaluation of reference IoT platforms with expected contribution from the Advisory Board.		Identify the exact interoperability failures and create new high priority tasks in order to solve them. Deep review of the last stable state of the target IoT platforms.	
Handler	Current Status	Creation Date	Transfer Strategy
Eneko Olivares/ Miguel A. Llorente	Managed	15/1/2016	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana for evaluation and report. - 14/2/17 PCC Telco meeting. Tasks and performance progression control - 2/3/17 PCC Telco meeting. Tasks and performance progression control - 21/3/17 PCC Telco meeting. Tasks and performance progression control - 4/4/17 to 6/4/17 Plenary meeting in Valencia. - 2/5/17 PCC Telco meeting. Selection of the first platforms to present the demos' solution. - 23/5/17 PCC Telco meeting. Tasks and performance progression control. Progression on the demos for IoT Week - Genève. - 14/6/17 PCC Telco meeting. Tasks and performance progression control 			

Table 26: Poor performance of INTER-LAYER

Risk subcategory			
Technical			
Risk N°	Risk Name	Risk Description	Consequences
R3.4	Poor performance of INTER-LAYER.	Low performance of INTER-LAYER regarding scalability, reliability, security, privacy and trust.	INTER-LAYER not having adequate performance in terms of scalability may create bottlenecks. At the same time lack or low performance of reliability, security, privacy and trust may avoid adoption of INTER-LAYER between platforms managed by different stakeholders.
Likelihood		Severity	Impact
Moderate		Devastating	2.5
Criticality			
High			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Special care will be taken to first identify the most crucial requirements, and to monitor them during the entire process of the implementation of INTER-LAYER. Write and review the testing plan before the code. Iterative development and testing process in order to detect bad performance at an early stage.		Common development procedures in the different tasks of the WP Develop new strategies in order to improve performance and reduce software complexity. Feedback from the software architect in order to homogenise the different developments	
Handler	Current Status	Creation Date	Transfer Strategy
Eneko Olivares Miguel A. Llorente	Managed	1/5/2016	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana for evaluation and report. - 14/2/17 PCC Telco meeting. Development progression control. - 2/3/17 PCC Telco meeting. Development progression control. - 21/3/17 PCC Telco meeting. Development progression control. - 4/4/17 to 6/4/17 Plenary meeting in Valencia. - 2/5/17 PCC Telco meeting. Selection of the first platform to present the demos' solution. - 23/5/17 PCC Telco meeting. Development progression control. Progression on the demos for Genève. - 14/6/17 Telco meeting. Development progression control. 			

Table 27: High complexity creating proxy software for additional IoT platforms.

Risk subcategory			
Technical			
Risk Nº	Risk Name	Risk Description	Consequences
R3.5	High complexity creating proxy software for additional IoT platforms.	There might be potential problems to create support for new integrations or supporting new IoT platforms once the project is finished. This will reduce the applicability of the project results.	Once implemented, the INTER-IoT will not be able to adapt to new IoT platforms and standards.
Likelihood		Severity	Impact
Moderate		Serious	2
Criticality			
Moderate			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Study and select a proper development methodology in order to create modular and adaptable software components. Create clear and understandable documentation of the software components.		Rewrite the project structure/codebase is possible and feasible. Once the INTER-LAYER components are in an intermediate or late stage of development rework the API docs, tutorials and guides in order to document better the software components.	
Handler	Current Status	Creation Date	Transfer Strategy
Eneko Olivares Miguel A. Llorente	Managed	1/5/2016	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana for evaluation and report. - 14/2/17 PCC Telco meeting. Development progression control. - 2/3/17 PCC Telco meeting. Development progression control. - 21/3/17 PCC Telco meeting. Development progression control. - 4/4/17 to 6/4/17 Plenary meeting in Valencia. - 2/5/17 PCC Telco meeting. Selection of the first platform to present the demos' solution. - 23/5/17 PCC Telco meeting. Development progression control. Progression on the demos for Genève. - 14/6/17 PCC Telco meeting. Development progression control. 			

Table 28: Integration failure between the different components of INTER-LAYER

Risk subcategory			
Technical			
Risk N°	Risk Name	Risk Description	Consequences
R3.6	Integration failure between the different components of INTER-LAYER	The different software modules fail the integration tests of the whole system. This can occur if developers (especially when not working together) tend to drift apart in implementation.	The whole system or part of it will not properly work.
Likelihood	Severity	Impact	Criticality
Moderate	Serious	2	High
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Software Architect and Work Package Leader have to closely monitor and track the progress of development and keep track that the interfaces match.		Revise the implementation of the failing components and recode the interfaces in order to match with the external components.	
Handler	Current Status	Creation Date	Transfer Strategy
Eneko Olivares Miguel A. Llorente	Managed	1/5/2016	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana for evaluation and report. - 14/2/17 PCC Telco meeting. Development progression control. - 2/3/17 PCC Telco meeting. Development progression control. - 9/3/17 telco for relationship between WP4: T4.3 and T4.5 inputs from INTER-Layer APIs. - 21/3/17 PCC Telco meeting. Development progression control. - 4/4/17 to 6/4/17 Plenary meeting in Valencia. - 2/5/17 PCC Telco meeting. Synchronization WP3-WP4-WP5 - 23/5/17 PCC Telco meeting. Development progression control. Progression on the demos for Genève. - 25/5/17 Synchro call telco for WP4 and WP3 front-end analysis. - 14/6/17 PCC Telco meeting. Development progression control. 			

Table 29: Underperformance of partners

Risk subcategory			
Organisation			
Risk N°	Risk Name	Risk Description	Consequences
R3.7	Underperformance of partners in WP3.	There is a possibility that a partner cannot meet deadlines, or underperforms. So, the task or piece of software that he is in charge will not be properly finished.	A part (or critical part) is missing or fails the unitary tests and integration tests with the rest of the components, causing severe delays to the project.
Likelihood		Severity	Impact
Moderate		Serious	2
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
WP Leader, Task Leaders with the help of the Software Architect must monitor and track the tasks assignments and deadlines. Also, perform periodical unitary and integration tests to ensure that all the components pass them.		Once detected which task/s or component/s is missing or failing identify the impact to the rest of the project. Reassign the task/s and/or component/s, speed up the development and rethink the work-plan to meet the project deadlines.	
Handler	Current Status	Creation Date	Transfer Strategy
Eneko Olivares	Managed	1/5/2016	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana for evaluation and report. - 14/2/17 PCC Telco meeting Tasks and performance progression control - 2/3/17 PCC Telco meeting. Tasks and performance progression control. - 21/3/17 PCC Telco meeting. Tasks and performance progression control - 4/4/17 to 6/4/17 Plenary meeting in Valencia. - 2/5/17 PCC Telco meeting. Tasks and performance progression control. - 23/5/17 PCC Telco meeting. Tasks and performance progression control. - 14/6/17 PCC Telco meeting Tasks and performance progression control 			

Table 30: Breach of deadlines

Risk subcategory			
Organisation			
Risk N°	Risk Name	Risk Description	Consequences
R3.8	Breach of deadlines of WP3 (due to underperformance R3.7) or due to underestimation of software implementation time.	The deadlines cannot be met by several cases (underperformance R3.7) or due underestimation of the time/people that has to be dedicated to a specific development task. If not enough resources (time/people) are designated to a software development task, this could not be accomplished.	The specific software piece may not be ready for the first integration test causing the project to delay.
Likelihood		Severity	Impact
Moderate		Serious	2
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
If have been an underestimation of resources, the WP3 Leader has to identify in the early stages of the development phase and solve it, dedicating more resources or speeding-up the task with an improved organization and time expenditure, or even prioritize critical software pieces over trivial ones.		WP3 Leader and Task leaders have to study the impact and speed-up or prioritize the critical software components.	
Handler	Current Status	Creation Date	Transfer Strategy
Eneko Olivares	Managed	24/1/17	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana for evaluation and report. - 14/2/17 PCC Telco meeting. Development progression control. - 2/3/17 PCC Telco meeting. Development progression control. - 21/3/17 PCC Telco meeting. Development progression control. - 4/4/17 to 6/4/17 Plenary meeting in Valencia. - 2/5/17 PCC Telco meeting. Selection of the first platform to present the demos' solution. - 2/5/17 PCC Telco meeting. For prioritization the development of the demos of middleware semantics and application to show first version of these solutions on IoT-Week. - 23/5/17 PCC Telco meeting. Development progression control. Progression on the demos for Genève. Increase in Severity to Serious - 14/6/17 Telco meeting. Development progression control. 			

Table 31: Performance failure of the development environment tools

Risk subcategory			
Technical			
Risk N°	Risk Name	Risk Description	Consequences
R3.9	Performance failure of the development environment tools. (Including; code repositories, building tools, backup system, etc)	The tools deployed for development, continuous integration and code versioning (Jenkins, Nexus, Git, etc) may suffer a failure in its operation.	The code already generated may be corrupted or lost.
Likelihood		Severity	Impact
Low		Serious	1.2
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
WP3 Leader and Software Architect have to track the correct operation of the tools and quickly identify if there is any malfunction. Comply with the backup strategy plan requirements and create regular backups of the source code and configuration of the tools.		Restore the most recent backup and in the case that there is any source code loss, since the incremental backups are performed daily, search for local copies of the affected source code.	
Handler	Current Status	Creation Date	Transfer Strategy
Eneko Olivares	Managed	24/1/17	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana for evaluation and report. - 14/2/17 PCC Telco meeting. Revision of tools and performance progression control - 2/3/17 PCC Telco meeting. Revision of tools and performance progression control - 21/3/17 PCC Telco meeting. Revision of tools and performance progression control - 4/4/17 to 6/4/17 Plenary meeting in Valencia, re-evaluation of the development environment, introduction of the test environment for WP6 and WP7 by NEWAYS - 2/5/17 PCC Telco meeting. Revision of tools and performance progression control - 23/5/17 PCC Telco meeting. Revision of tools and performance progression control - 14/6/17 PCC Telco meeting. Revision of tools and performance progression control 			

Table 32: Lack of communication and coordination between developers of a software module.

Risk subcategory			
Organisation			
Risk N°	Risk Name	Risk Description	Consequences
R3.10	Lack of communication and coordination between developers of a software module.	Two or more different developers in charge of the same piece of software can misunderstand their duties.	The piece of software may be miss functional or not be ready for the first integration test.
Likelihood		Severity	Impact
Low		Tolerable	0.6
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
The WP3 leaders and Task Leaders should be in charge of organizing the adequate meetings and telcos for communication and use the available organization tools (as ISL, Trello, Horde Calendar, etc.) in order to define correctly the duties assigned to each developer.		If the organization plan is not clear, neither the attributions, a change in the organization system must be carried out, including the rethinking of the use of communication and organization tools. Use of new communication tools like Slack or Trello	
Handler	Current Status	Creation Date	Transfer Strategy
Eneko Olivares	Managed	24/1/17	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana for evaluation and report. - 14/2/17 PCC Telco meeting. Tasks and performance progression control - 2/3/17 PCC Telco meeting. Tasks and performance progression control - 21/3/17 PCC Telco meeting. Tasks and performance progression control - 4/4/17 to 6/4/17 Plenary meeting in Valencia. - 2/5/17 PCC Telco meeting. Tasks and performance progression control - 23/5/17 PCC Telco meeting. Tasks and performance progression control - 14/6/17 PCC Telco meeting. Tasks and performance progression control 			

Table 33: Underestimation of the budget dedicated for this WP

Risk subcategory			
Organisation			
Risk N°	Risk Name	Risk Description	Consequences
R3.11	Underestimation of the budget dedicated for WP3	The agreed budget to carry out the tasks included in this WP is not enough. That is, inability to pay developers, lack of budget for meetings, for the purchase of new HW or SW elements, etc.	Some software pieces will be missing or incomplete. The project will not be able to meet the requirements if any software or hardware piece is missing.
Likelihood	Severity	Impact	Criticality
Low	Serious	1.2	Moderate
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
The project coordinator and the WP3 Leader should carry out an initial complete budget study to finalize all tasks in WP3, with a budget margin for exceptional cases.		If the budget study was not sufficiently precise or the margin is not large enough to palliate the exceptional costs, a redistribution of the budget in the whole project can be performed to minimize the impact of this risk.	
Handler	Current Status	Creation Date	Transfer Strategy
Carlos Palau	Managed	24/1/17	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana for evaluation and report. Assignment of TIM remaining budget after the amendment. - 14/2/17 PCC Telco meeting. Budget progression control - 2/3/17 PCC Telco meeting. Budget progression control - 21/3/17 PCC Telco meeting. Budget progression control - 4/4/17 to 6/4/17 Plenary meeting in Valencia. Budget evaluation and focus on developments. - 2/5/17 PCC Telco meeting. Budget progression control - 23/5/17 PCC Telco meeting. Budget progression control - 14/6/17 PCC Telco meeting. Budget progression control 			

Table 34: Poor description of deployment of different packages.

Risk subcategory			
Organisation			
Risk N°	Risk Name	Risk Description	Consequences
R3.12	Poor description of deployment of different packages	Little or no description of how to install/deploy the applications created during implementation	Deployment and testing will be nearly impossible
Likelihood		Severity	Impact
High		Serious	2.8
Criticality			
High			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Component owner must provide deployment/installation description with the following items: -How to install / deploy -How to configure -Where to find error logs for initial problem solving/service		Appoint a integration manager who gathers and reviews these documents	
Handler	Current Status	Creation Date	Transfer Strategy
Carlos Palau	Identified	9/3/17	Transference to WP6 in M19
Work Log			
<ul style="list-style-type: none"> - 9/3/17 Identification of the risk in a WP telco, in an initial stage the likelihood is fixed as high - 21/3/17 PCC Telco meeting. Analysis of the interfacing with a focus on Geneva meeting - 4/4/17 to 6/4/17 Plenary meeting in Valencia. Parallel packages description meeting - 2/5/17 PCC Telco meeting. Analysis of packages description, presentation of the preliminary integration plan - 23/5/17 PCC Telco meeting. Geneva meeting review - 14/6/17 PCC Telco meeting. Lessons learnt from Geneva meeting. 			

Table 35. Scalability / efficiency of semantic technologies applied in the IPSM.

Risk subcategory			
Technology			
Risk N°	Risk Name	Risk Description	Consequences
R3.13	Scalability / efficiency of semantic technologies applied in the IPSM	It is well-known "urban legend" that semantic technologies are inefficient / slow. However, it is rarely evaluated in real-life scenarios. Obviously, dealing with complex graphs (representing ontologies) will be as time consuming as graph algorithms are. However, the open question is: will these complex situations materialize within the IPSM in real-world (pilot-based) cases.	Lack of efficiency of IPSM may adversely affect processing of stream data that requires (broadly understood) fast translation.
Likelihood		Severity	Impact
Very low		Moderated	0.3
Criticality			
Very Low			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Experiments for a relatively simple case and on a relatively weak equipment suggest that the process of alignment-based translation is relatively efficient. However, more tests are needed. In case of efficiency problems, optimization techniques originating from, broadly understood, high performance computing (including, high-throughput stream processing) will be applied.		In order to mitigate the severity, efficient programming techniques will be used and periodic performance evaluation will be scheduled in order to reduce underperformance and lack of scalability when detected.	
Handler	Current Status	Creation Date	Transfer Strategy
Maria Ganzha	Identified	21/5/17	N/A
Work Log			
<ul style="list-style-type: none"> - 21/5/17 Identification of the risk in a WP telco, in an initial stage the likelihood is fixed as very low - 23/5/17 PCC Telco meeting. Development and design progression control - 14/6/17 PCC Telco meeting. Development and design progression control. 			

Table 36: Complexity of achieving semantic interoperability.

Risk subcategory			
Technology			
Risk Nº	Risk Name	Risk Description	Consequences
R3.14	Complexity of achieving semantic interoperability, in general, and alignment generation in particular may be high; may require expert knowledge	One of important issues in dealing with semantic technologies is lack of specialists who will be capable of completing variety of functions related to use of semantic technologies	Due to the lack of experts in the area of, broadly understood, semantic technologies, high level of complexity of establishing semantic interoperability in general, and alignment generation in particular, may result in limited success of the proposed approach.
Likelihood		Severity	Impact
Low		Moderated	0.9
Criticality			
Low			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Evaluation of real-life use cases suggests that majority of cases will not require establishing complex ontology matching(s) (message streams convey relatively simple data structures). It is, however, possible that complex cases of semantic interoperability will require expert knowledge. If such cases will be discovered, special care will be taken to properly describe them in the INTER-METH		Periodic analysis in order to reduce complex ontology matchings and review of new standards and proposals.	
Handler	Current Status	Creation Date	Transfer Strategy
Maria Ganzha	Identified	23/5/17	N/A
Work Log			
<ul style="list-style-type: none"> - 23/5/17 PCC Telco meeting. Identification of the risk likelihood indicated as Low - 14/6/17 PCC Telco meeting. Development and design progression control. 			

Table 37: Problems with management of ontology alignments management in case of large ecosystem.

Risk subcategory			
Technology			
Risk N°	Risk Name	Risk Description	Consequences
R3.15	Problems with management of ontology alignments management in case of large ecosystem.	As the size of the ecosystem grows, number of interactions that require semantic translations increases as well. Hence, the total number of alignments is also increasing.	Complexity of alignment management may hinder acceptance of the proposed approach to semantic interoperability.
Likelihood	Severity	Impact	Criticality
Low	Moderated	0.9	Low
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
It is very difficult to evaluate this risk in the context on the INTER-IoT project -- as the complexity of its use cases is not large enough to expect its materialization. However, this is a more general risk, for all ICT-30 projects. How to deal with ecosystems of the scale that is much larger than the sample use cases they are dealing with. The complexity considered here does not come from the size of the data stream, but from the growing complexity of interactions when large existing ecosystems are going to be merged into even larger ones. Based on experiences gathered during the pilots we plan to address this in the INTER-METH.		Analyse periodically the situation, and apply simplification mechanisms when possible. Perform periodic testing and analyse the results within the pilots.	
Handler	Current Status	Creation Date	Transfer Strategy
Maria Ganzha	Identified	23/5/17	N/A
Work Log			
<ul style="list-style-type: none"> - 23/5/17 PCC Telco meeting. Identification of the risk likelihood indicated as Low - 14/6/17 PCC Telco meeting. Development and design progression control. 			

Table 38: Problem with management of ontologies that will be used to facilitate semantic interoperability.

Risk subcategory			
Technology			
Risk N°	Risk Name	Risk Description	Consequences
R3.16	Problem with management of ontologies that will be used to facilitate semantic interoperability.	As the size of the ecosystem grows, number of involved ontologies increases as well, even when the proposed "modular ontology" approach is applied.	Due to the lack of experts in ontology management, and relative immaturity of tools for management of "large ontologies" (where large means both: size of individual ontology and number of modules within one), adoption of the proposed approach in the case of large-scale ecosystems may be hindered.
Likelihood	Severity	Impact	Criticality
Low	Moderated	0.9	Low
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Similarly to the risk dealing with management of alignments in large ecosystem, it is difficult to assess as use cases of INTER-IoT (and all remaining ICT-30 projects) is "narrow enough" that ontology management can be kept under control. However, it is important to recognize this risk and assess / estimate it to the best of our ability (in the INTER-METH) on the basis of pilot deployments (the cross-domain one, in particular).		Interact with the different stakeholders owners of IoT platforms and also with the third parties involved in semantic operations in order to be able to manage the alignment problems.	
Handler	Current Status	Creation Date	Transfer Strategy
Maria Ganzha	Identified	23/5/17	N/A
Work Log			
<ul style="list-style-type: none"> - 23/5/17 PCC Telco meeting. Identification of the risk likelihood indicated as Low - 14/6/17 PCC Telco meeting. Development and design progression control. 			

3.4 WP4 Related Risks

Table 39: Focus on a small set of IoT platforms

Risk subcategory			
Technology			
Risk N°	Risk Name	Risk Description	Consequences
R4.1	Focus on a small set of IoT platforms	Design guidelines are focused on specific IoT platforms while there are hundreds of them with different features	INTER-IoT would lose the generic approach of interoperability of IoT platforms, being compatible only with the selected IoT platform range
Likelihood		Severity	Impact
High		Tolerable	1.4
Criticality			
Moderate			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
It's impossible to offer 100% universal interoperability, but we can use the partners' expertise during the design phase of the different components to take into account possible further differences that can be easy to be implemented		Perform a thorough analysis of the IoT platforms so that the widest spread platforms are covered, not only the current platforms, but also the future ones and especially those relevant from the European point of view. Use an extensible approach for the future support of new platforms, so that its support can be easy to implement	
Handler	Current Status	Creation Date	Transfer Strategy
Miguel A. Llorente	Managed	15/6/2016	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana for evaluation and report. - 14/2/17 PCC Telco meeting for tracing of the development WP states - 4/4/17 to 6/4/17 Plenary meeting in Valencia for evaluation progress. - 12/4/17 T4.3 and T4.4 meeting for new tentative task distribution. - 2/5/17 PCC Telco meeting for tracing of the development WP states. - 23/5/17 PCC Telco meeting for tracing of the development WP states - 25/5/17 Telco WP4 follow-up. - 14/6/17 PCC Telco meeting for tracing of the development WP states 			

Table 40: Least common IoT platform feature set

Risk subcategory			
Technology			
Risk Nº	Risk Name	Risk Description	Consequences
R4.2	Least common IoT platform feature set	The wider number of IoT platforms supported, the least common features we may find	A wide IoT platform analysis looking for generic features can cause that only common features are handled. For instance, one IoT platform may offer announcements of new devices, while others may not, or one platform can offer CEP services and another one can have it not available.
Likelihood		Severity	Impact
High		Moderated	2.1
Criticality			
High			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Select a subset of reference IoT platforms important for the project		Focus not only on the least common features, but on the least feature set we decide, adding if necessary new capabilities in the bridges (e.g. measurement filtering) or by supporting different capabilities for the different platforms, having it available for INTER-FW clients	
Handler	Current Status	Creation Date	Transfer Strategy
Miguel Montesinos	Managed	15/6/2016	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana for evaluation and report. - 14/2/17 PCC Telco meeting for tracing of the development WP states - 4/4/17 to 6/4/17 Plenary meeting in Valencia for evaluation progress. - 12/4/17 T4.3 and T4.4 meeting for new tentative task distribution. - 2/5/17 PCC Telco meeting for tracing of the development WP states. - 23/5/17 PCC Telco meeting for tracing of the development WP states - 25/5/17 Telco WP4 follow-up. - 14/6/17 PCC Telco meeting for tracing of the development WP states 			

Table 41: Reference Architecture does not match real IoT architecture

Risk subcategory			
Technology			
Risk N°	Risk Name	Risk Description	Consequences
R4.3	Reference Architecture does not match real IoT architecture	The reference architecture designed in T4.1 may not reflect the real architecture designed in the overall INTER-IoT project and its inner component architecture	D4.1 may be useful as theory exercise but useless for INTER-IoT development
Likelihood		Severity	Impact
High		Moderated	2.1
Criticality			
High			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Establish continuous communication between task leader (Alex) and the Sw Architect to match ongoing architecture design of WP3 with T4.1		Readapt the reference architecture to match with the real architecture of INTER-LAYER and INTER-FW	
Handler	Current Status	Creation Date	Transfer Strategy
Alex Bassi	Closed	15/11/2016	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana for evaluation and report. - 17/2/17 Conversations were made, and Sw Architect aligned D3.1 and D4.1 			

Table 42: D4.1 may be late

Risk subcategory			
Organisation			
Risk N°	Risk Name	Risk Description	Consequences
R4.4	D4.1 may be late	D4.1 is not advancing at the pace it should, remaining a hard work as of mid-November-16	D4.1 may be delivered out of date or it may not contain the necessary information with enough detail and analysis
Likelihood		Severity	Impact
High		Serious	2.8
Criticality			
High			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Weekly review of the status of D4.1 coordinated by Alex Bassi and with all contributors' participation		Further iteration of the deliverable and working in parallel T4.3 with this iteration	
Handler	Current Status	Creation Date	Transfer Strategy
Alex Bassi	Closed	15/11/2016	N/A
Work Log			
- 14/1/2017 Risk was closed after D4.1 submission			

Table 43: Too many configuration helper tools

Risk subcategory			
Usability			
Risk N°	Risk Name	Risk Description	Consequences
R4.5	Too many configuration helper tools	According to the design and development of INTER-LAYER it seems INTER-IoT may have too many configuration to be specified during run-time by INTER-IoT users. INTER-FW should provide helper tools to ease the deployment and usage of INTER-IoT configuration needs, so the number of tools may be big	Impossibility of creating all the expected tools, which in turn may lead to challenges in using INTER-IoT
Likelihood		Severity	Impact
Moderate		Serious	2
Criticality			
Moderate			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Try to reduce the complexity of the work an INTER-IoT user is supposed to do at the design and implementation time in INTER-LAYER		Good technical documentation of INTER-FW with examples	
Handler	Current Status	Creation Date	Transfer Strategy
Miguel Montesinos	Managed	22/11/2016	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana. This risk was studied to simplify the design of the helper tools - 4/4/17 to 6/4/17 Plenary meeting in Valencia for evaluation progress. - 22/5/17 Defined tools to be implemented. Done at the analysis & design of the INTER-FW. 			

Table 44: Security management might be not only exclusive to INTER_FW

Risk subcategory			
Technology			
Risk N°	Risk Name	Risk Description	Consequences
R4.6	Security management might be not only exclusive to INTER_FW	So far, security aspects have been delegated to the INTER-FW, but it can be not valid, as there could be security risks at lower level	Security holes or risks might appear in INTER-LAYER if an external user directly accesses it by-passing INTER-FW
Likelihood	Severity	Impact	Criticality
Moderate	Serious	2	Moderate
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Analyze the impact on security at lower levels under INTER-FW, and if after the assessment it is perceived security aspects will have to be shared all along the different layers of INTER-IoT		Design a security approach to avoid direct usage of INTER-LAYER without the specific security compliances	
Handler	Current Status	Creation Date	Transfer Strategy
Miguel A. Llorente	Managed	17/1/17	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana. Security approach for INTER-Layer solutions and INTER-FW. - 4/4/17 to 6/4/17 Plenary meeting in Valencia for evaluation of the security solution. 			

Table 45: Lack of relationship between INTER-FW and INTER-METH.

Risk subcategory			
Technology			
Risk N°	Risk Name	Risk Description	Consequences
R4.7	Lack of relationship between INTER-FW and INTER-METH	INTER-METH is designed in parallel with INTER-FW. It even started before INTER-FW design. So the methodology might not be tightly linked with the outputs of INTER-LAYER and INTER-FW	Methodology too generic and not specifically focussed at helping to apply INTER-IoT tools (INTER-LAYER and INTER-FW) to INTER-IoT users. Difficulty for using INTER-IoT for potential users.
Likelihood		Severity	Impact
Moderate		Serious	2
Criticality			
Moderate			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Link more the WP4 & WP5 teams		Elaborate very good documentation for the potential users of INTER-IoT to use INTER-FW in an easy way	
Handler	Current Status	Creation Date	Transfer Strategy
Miguel A. Llorente	Managed	30/1/17	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana. Specific session for the integration of WP4 and WP5 outcomes. Risk changed from identified to managed. - 4/4/17 to 6/4/17 Plenary meeting in Valencia with a specific workshop devoted to WP4 and links with WP3 and WP5 - 29/5/17 Helper tools to be done within WP4. Alignment with WP5 done at WP5 			

Table 46. Delay in the framework release for OpenCall newcomers.

Risk subcategory			
Technology			
Risk N°	Risk Name	Risk Description	Consequences
R4.8	Delay in the framework release for OpenCall newcomers.	The framework or API can be late, affecting the new partners coming from open call, and making it difficult for them to work properly in the project	Poor performance of the new partners work and bad results for the project
Likelihood	Severity	Impact	Criticality
Moderate	Moderate	1.5	Moderate
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Try to have an API as soon as possible, and good documentation about the expected interfaces and behaviour of the framework		Special mentoring and help for each partner to help them	
Handler	Current Status	Creation Date	Transfer Strategy
Miguel A. Llorente	Managed	4/4/17	N/A
Work Log			
<ul style="list-style-type: none"> - 4/4/17. Risk identified and strategies defined - 29/4/17 to 30/4/17. Analysing open-call partners needs for their sub-projects together with the third parties. Risk changed from identified to managed. - 29/5/17 to 30/5/17 First evaluation of the Third parties, risk is being managed for the third parties working with the API - 14/6/17 PCC Telco meeting. Open call analysis and situation 			

3.5 WP5 Related Risks

Table 47: Delayed or Insufficient WP outcomes for INTER-METH

Risk subcategory			
Technology			
Risk N°	Risk Name	Risk Description	Consequences
R5.1	Delayed or Insufficient WP outcomes for INTER-METH	WP2, WP3, WP4 and T5.1 provide delayed or incomplete outcomes that can delay the development or even mine the effectiveness of INTER-METH	A delay in providing developments for WP5, will led to a delay in producing INTER-METH CASE tool. In this event, the time to support test end-user groups in evaluation the developed methodology and tools would be drastically reduced affecting the overall validation of the product.
Likelihood		Severity	Impact
Low		Serious	1.2
Criticality			
Moderate			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Continuous monitoring and communication between WP leaders and even Task leaders in order to reduce malfunctions.		INTER-METH is based on an iterative process organized in iterated phases that systematically incorporates and use the outcome of WP2, WP3, WP4 and T5.1, until they are considered suitable. If some delay or potential incompleteness is detected, adjustment measures will be taken to solve the issue in terms of adding more manpower or providing developing solutions.	
Handler	Current Status	Creation Date	Transfer Strategy
Giancarlo Fortino	Managed	28/7/2016	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana for evaluation and report. - 3/3/17 WP5 telco to create strong correlation between WP3 and T5.1 as design patterns should reflect the solutions provided in WP. - 4/2/17 Telco meeting about analysis and evaluation in the relationship of WP3, WP4, and WP5. - 4/4/17 to 6/4/17 Plenary meeting in Valencia for evaluation progress. - 3/5/17 WP5 telco. Clarifications on the way to proceed. - 5/6/17 WP5 telco. Clarification of the on-going instantiation of the abstract INTER-METH into the concrete INTER-METH specifically connected to INTER-LAYER and INTER-FW. - 14/6/17 PCC Telco meeting. INTER-METH evaluation after IoT-Week 			

Table 48: INTER-METH poor Usability and lack of interest

Risk subcategory			
Technology			
Risk N°	Risk Name	Risk Description	Consequences
R5.2	INTER-METH poor usability and lack of interest	INTER-METH is unattractive, harder to use and the integration process results long, costly and complicated.	A non-attractive and usable methodology and associated CASE tool may lead to a reduced impact and scarce interest because users do not want to work with it or does not help interoperability between platforms.
Likelihood		Severity	Impact
Very Low		Serious	0.4
Criticality			
Low			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Run specific usability tests with end-user groups with previous experience on design methodologies, and adapt the HMI and concepts to the requirements specified by them		The consortium has already planned to provide both an appropriate documentation to support different typologies of users/stakeholders and the INTER-METH CASE tools (Task 5.3). The latter has precisely the aim of making the integration of IoT platforms rapid, simple and robust by supporting the automated application of the INTER-METH methodology in all the development phases. Moreover, the development of a user-friendly graphical interface of the CASE tool, will surely reduce the risk of poor usability.	
Handler	Current Status	Creation Date	Transfer Strategy
Giancarlo Fortino	Managed	28/7/2016	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana for evaluation and report. - 3/3/17 WP5 telco for progress control. - 4/2/17 Telco meeting about analysis and evaluation in the relationship of WP3, WP4, and WP5. - 4/4/17 to 6/4/17 Plenary meeting in Valencia for evaluation progress. - 3/5/17 WP5 telco. Clarifications on the way to proceed. - 5/6/17 WP5 telco. Clarification of the on-going instantiation of the abstract INTER-METH into the concrete INTER-METH specifically connected to INTER-LAYER and INTER-FW. - 14/6/17 PCC Telco meeting. INTER-METH evaluation after IoT-Week 			

Table 49: INTER-CASE poor effectiveness and usability.

Risk subcategory			
Technology			
Risk N°	Risk Name	Risk Description	Consequences
R5.3	INTER-CASE poor effectiveness and usability.	INTER-CASE is not able to effectively support ELDA-METH and results also in poor usability so that users are demotivated to use it.	Main consequence is that ELDA-METH is to be applied manually instead of being driven by a tool and this could lead to delays in the integration process
Likelihood		Severity	Impact
Low		Tolerable	0.6
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Run specific functional and usability tests with end-user groups with previous experience on design methodologies and CASE tools, and adapt the HMI and concepts to the requirements specified by them.		The consortium has already planned to provide an appropriate documentation to support the use of the INTER-CASE tool. The organization of the tool in a suite of tools could mitigate the lack of effectiveness as each tool of the suite is able to support a specific phase of the INTER-METH methodology and can be upgraded independently from the other sub-tools. Moreover, the development of a user-friendly graphical interface of the CASE tool, will surely reduce the risk of poor usability.	
Handler	Current Status	Creation Date	Transfer Strategy
Giancarlo Fortino	Managed	15/1/2017	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana for evaluation and report. Risk changed from identified to managed. - 3/3/17 WP5 telco for progress control. - 4/2/17 Telco meeting about analysis and evaluation in the relationship of WP3, WP4, and - 4/4/17 to 6/4/17 Plenary meeting in Valencia for evaluation progress. - 3/5/17 WP5 telco. Clarifications on the way to proceed. - 5/6/17 WP5 telco. Discussion about critical issues and decision of next action points. - 14/6/17 PCC Telco meeting. INTER-METH evaluation after IoT-Week - 14/6/17 PCC Telco meeting. INTER-METH evaluation after IoT-Week 			

3.6 WP6 Related Risks

Table 50: Mismatch in architecture

Risk subcategory			
Technology			
Risk N°	Risk Name	Risk Description	Consequences
R6.1	Mismatch in architecture	A mismatch in architecture has the consequence that system modules do not connect.	Delay in the integration, since software must be adjusted.
Likelihood		Severity	Impact
Moderate		Serious	2
Criticality			
Moderate			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Test parts of the system in advance		Software Architect must be very keen and sharp on interfaces. No deviations on the agreed interfaces are allowed, also the software architect must ensure that all interfaces are fully defined and specified.	
Handler	Current Status	Creation Date	Transfer Strategy
Roel Vossen/Miguel A. Llorente	Managed	22/2/16	N/A
Work Log			
<ul style="list-style-type: none"> - 12/17 to 2/2/17 Plenary Meeting in Ljubljana for evaluation and report. Risk changed from identified to managed. - 14/2/17 Telco meeting for tracing of the development WP states - 4/4/17 to 6/4/17 Plenary meeting in Valencia for evaluation progress. - 4/4/17 to 6/4/17 Workshop for D4.2 and the architecture ongoing. 			

Table 51: Systems at implementation site are not compliant to new architecture

Risk subcategory			
Technology			
Risk N°	Risk Name	Risk Description	Consequences
R6.2	Systems at implementation site are not compliant to new architecture	Systems at the harbour may be different or not (fully) accessible for the new software architecture	Integration cannot take place, no integration possible in the systems
Likelihood		Severity	Impact
Moderate		Serious	2
Criticality			
Moderate			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
A new platform/subsystem can be placed between the original systems to implement the architecture. The original system will be treated as a sensor/actuator		Prepare the integration and map the current systems. Preparation can be done by having some platforms to be placed in-between	
Handler	Current Status	Creation Date	Transfer Strategy
Roel Vossen	Managed	19/5/16	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana, analysing the impact of including UniversAAL instead of eCARE in the architecture - 17/3/17 Epi-challenge, monitoring of new trends - 4/4/17 Sido event for research on new market technologies, analysing new trends - 4/4/17 to 6/4/17 Plenary meeting in Valencia, NPV description of new IoT platform for the terminal based in WSO2, risk analysed on the impact in the architecture - 5/6/17 to 9/6/17 IoT Week Genève, market trends and technology analysis - 14/6/17 PCC Telco meeting. Preparation for WP6 kick off, reassessment of technology and compliance with the architecture 			

Table 52: IoT platform doesn't meet the promised functionalities

Risk subcategory			
Technology			
Risk N°	Risk Name	Risk Description	Consequences
R6.3	IoT platform doesn't meet the promised functionalities	Identified and selected IoT platforms for the pilot does not meet the specifications described in the documentation and has to be changed.	The pilot cannot be developed and it takes more time and effort to finish the prototype.
Likelihood		Severity	Impact
Low		Devastating	1.5
Criticality			
Moderate			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Perform a thorough analysis of each of the specifications of the selected IoT platform. Design the framework so that it is relatively easy to change one platform to another.		Analyse what may be an appropriate alternative platform that has been analysed in the state of the art and develop the necessary bridges.	
Handler	Current Status	Creation Date	Transfer Strategy
Carlos Palau	Managed	19/05/16	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana for evaluation and report. - 14/2/17 Telco meeting for tracing of the development WP states - 4/4/17 to 6/4/17 Plenary meeting in Valencia for evaluation progress. - 4/4/17 to 6/4/17 Workshop for D4.2 and the architecture ongoing. - 5/6/17 to 9/6/17 IoT Week Genève, first demonstration operative with different promised functionalities - 14/6/17 PCC Telco meeting. Preparation for WP6 kick off, reassessment of technology and review of the functionalities of the products. 			

Table 53: System integration bugs may require a lot of time.

Risk subcategory			
Technology			
Risk N°	Risk Name	Risk Description	Consequences
R6.4	System integration bugs may require a lot of time	Mismatch in interfaces between several layers could be missed during demo's and occur when the whole system is integrated	Delay in the integration, since software must be adjusted.
Likelihood		Severity	Impact
High		Serious	2.8
Criticality			
High			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Setup a test system to simulate to integration environment. Each component must be validated by component developer before integration		Software Architect must be very keen and sharp on interfaces. No deviations on the agreed interfaces are allowed, also the software architect must ensure that all interfaces are fully defined and specified.	
Handler	Current Status	Creation Date	Transfer Strategy
Roel Vossen/Miguel A. Llorente	Identified	31/5/17	N/A
Work Log			
- 23/5/17 Telco meeting. Identified in the last plenary telco to prepare the kick-off meeting for WP6			

Table 54: Components are not finished in time for integration.

Risk subcategory			
Technology			
Risk N°	Risk Name	Risk Description	Consequences
R6.5	Components are not finished in time for integration	Components are not finished in time for integration, this will lead to delays during integration	Due to delays some components may not be ready when integration starts
Likelihood		Severity	Impact
Moderate		Serious	2
Criticality			
Moderate			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Stick to deadlines and do pre-releases.		WP leader must stick to deadlines and manage resources.	
Handler	Current Status	Creation Date	Transfer Strategy
Roel Vossen/Miguel A. Llorente	Identified	31/5/17	N/A
Work Log			
- 23/5/17 Telco meeting. Identified in the last plenary telco to prepare the kick-off meeting for WP6			

Table 55: No complete overview of current harbour system.

Risk subcategory			
Technology			
Risk N°	Risk Name	Risk Description	Consequences
R6.6	No complete overview of current harbour system	No complete overview of current harbour system which will lead to unexpected behaviour during integration in the harbour	Subsystems of influence may be unknown and therefore not integrated/replaced by new system.
Likelihood		Severity	Impact
High		Moderated	2.1
Criticality			
High			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Get early involvement of the harbour to create a complete system overview together		VPF should provide harbour information This should be covered during implementation to be sure of proper system integration	
Handler	Current Status	Creation Date	Transfer Strategy
Roel Vossen/Miguel A. Llorente	Identified	31/5/17	N/A
Work Log			
- 23/5/17 Telco meeting. Identified in the last plenary telco to prepare the kick-off meeting for WP6			

Table 56: Instrumentations damage.

Risk subcategory			
Technology			
Risk N°	Risk Name	Risk Description	Consequences
R6.7	Instrumentations damage.	Mobile Devices and electro-medical device doesn't work.	We can perform the decentralized lifestyle monitoring.
Likelihood	Severity	Impact	Criticality
High	Moderated	2.1	High
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Buy more device for pilot development.		Training the final users (subject of pilot).	
Handler	Current Status	Creation Date	Transfer Strategy
Carlos Palau	Identified	15/6/17	N/A
Work Log			
- 23/5/17 Telco meeting. Identified in the last plenary telco to prepare the kick-off meeting for WP6			

Risk subcategory				
Technology				
Risk N°	Risk Name	Risk Description		Consequences
R6.8	Privacy and Security.	Treatment Sensitive Data.		Without the respect in matter of Privacy the pilot cannot be developer.
Likelihood		Severity	Impact	Criticality
Very Low		Serious	0.4	Low
Contingency plan				
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy		
Respect the National law in matter of privacy, in terms of integration and implementation.		Apply all the mitigation measure indicate in the national Law in matter of privacy.		
Handler	Current Status	Creation Date	Transfer Strategy	
Carlos Palau	Identified	15/6/17	N/A	
Work Log				
<ul style="list-style-type: none">- 25/5/17 Telco WP4 follow-up. Treatment of Security and Privacy issues.- 23/5/17 Telco meeting. Identified in the last plenary telco to prepare the kick-off meeting for WP6				

3.7 WP7 Related Risks

Table 57: Complexity of the Evaluation Plan

Risk subcategory			
Technology			
Risk N°	Risk Name	Risk Description	Consequences
R7.1	Complexity of the Evaluation Plan	The evaluation plan contains too much detail to perform the subsequent WP7 tasks.	More work will be required to effectively perform subsequent WP7 tasks.
Likelihood		Severity	Impact
Low		Tolerable	0.6
Criticality			
Low			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Effective task management encouraging communication among project partners and participation in T7.1.		Redefine the Evaluation Plan in order to reduce complexity. Create a Task Force, including the stakeholders in order to determinate the complexity of the evaluation activities. Evaluation Plan is a deliverable that has to be reviewed considering content but also applicability.	
Handler	Current Status	Creation Date	Transfer Strategy
Eric Carlson	Identified	12/07/2016	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana, WP7 not started yet - 4/4/17 to 6/4/17 Plenary meeting in Valencia, WP7 not started yet 			

Table 58: Lack of detail in the Evaluation Plan

Risk subcategory			
Technology			
Risk N°	Risk Name	Risk Description	Consequences
R7.2	Lack of detail in the Evaluation Plan	The evaluation plan contains too little detail to perform the subsequent WP7 tasks.	No good outcome of the WP7 would have been achieved. More work will be required to effectively perform subsequent WP7 tasks.
Likelihood		Severity	Impact
Very Low		Tolerable	0.2
Criticality			
Very Low			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Effective task management encouraging communication among project partners and participation in T7.1.		Redefine the Evaluation Plan in order to provide the required details. Create a Task Force, including the stakeholders in order to determinate the needs of the evaluation activities. Evaluation Plan is a deliverable that has to be reviewed considering content but also applicability.	
Handler	Current Status	Creation Date	Transfer Strategy
Eric Carlson	Identified	12/07/2016	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana, WP7 not started yet - 4/4/17 to 6/4/17 Plenary meeting in Valencia, WP7 not started yet 			

Table 59: Evaluation and assessment out of scope

Risk subcategory			
Technology			
Risk N°	Risk Name	Risk Description	Consequences
R7.3	Evaluation and assessment out of scope	The technical evaluation and assessment does not adequately cover the scope of the project.	Some aspects of the project are not covered in the evaluation and assessment phase. Uncertainty about the quality of the project would appear.
Likelihood		Severity	Impact
Very Low		Serious	0.4
			Low
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Initial buy in on T7.1 to fully understand the evaluation plan and insure that all aspects of the project are covered		Clearly determine the scope of the evaluation procedures and required results, eliminating those that may provide relevant performance and interoperability results that are not defined under the GA.	
Handler	Current Status	Creation Date	Transfer Strategy
Eric Carlson	Identified	12/07/2016	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana, WP7 not started yet - 4/4/17 to 6/4/17 Plenary meeting in Valencia, WP7 not started yet 			

Table 60: Extra trials needed

Risk subcategory			
Organisation			
Risk N°	Risk Name	Risk Description	Consequences
R7.4	Extra trials needed	Additional trials are needed to further evaluate the platform	Additional time will be needed to effectively evaluate these trials.
Likelihood	Severity	Impact	Criticality
Moderate	Tolerable	1	Low
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
The trials to be performed will be set before the onset of M25 to allow adequate time for preparation.		The consortium will endeavour to include all necessary trials to fully evaluate the platform, but will prioritize the trials that offer the most project relevant feedback.	
Handler	Current Status	Creation Date	Transfer Strategy
Eric Carlson	Identified	22/09/16	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana, WP7 not started yet - 4/4/17 to 6/4/17 Plenary meeting in Valencia, WP7 not started yet 			

Table 61: Useless questionnaires

Risk subcategory			
Usability			
Risk N°	Risk Name	Risk Description	Consequences
R7.5	Useless questionnaires	Questionnaires designed to assess process evaluation do not adequately identify drivers and barriers to INTER-IoT adoption.	Questionnaire results do not accurately reflect INTER-IoT process impact.
Likelihood		Severity	Impact
Very Low		Tolerable	0.2
Criticality			
Very Low			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Inclusion of all project partners in the review of T7.4 questionnaires.		Reengaging with end users and project partners to review and refine the questionnaire, adding targeted questions to address barriers and drivers missed during the initial phase.	
Handler	Current Status	Creation Date	Transfer Strategy
Eric Carlson	Identified	22/09/16	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana, WP7 not started yet - 4/4/17 to 6/4/17 Plenary meeting in Valencia, WP7 not started yet 			

Table 62: Simplicity of Interoperability Methodology

Risk subcategory			
Usability			
Risk N°	Risk Name	Risk Description	Consequences
R7.6	Simplicity of Interoperability Methodology	The developed interoperability methodology is too simplified and is not easily applicable for interoperability validation	Impossible to complete overall interoperability validation
Likelihood		Severity	Impact
Low		Tolerable	0.6
Criticality			
Low			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Inclusion of all project partners in the development and review of interoperability methodology		Clearly determine and define the scope of the validation methodology	
Handler	Current Status	Creation Date	Transfer Strategy
Eric Carlson	Identified	22/09/16	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana, WP7 not started yet - 4/4/17 to 6/4/17 Plenary meeting in Valencia, WP7 not started yet 			

Table 63: Complexity of Interoperability Methodology

Risk subcategory			
Usability			
Risk N°	Risk Name	Risk Description	Consequences
R7.7	Complexity of Interoperability Methodology	The developed interoperability methodology is too complex and interoperability validation cannot be tested properly	Impossible to complete overall interoperability validation
Likelihood		Severity	Impact
Low		Serious	1.2
Criticality			
Moderate			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Inclusion of all project partners in the development and review of interoperability methodology		Clearly determine and define the scope of the validation methodology	
Handler	Current Status	Creation Date	Transfer Strategy
Eric Carlson	Identified	22/09/16	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana, WP7 not started yet - 4/4/17 to 6/4/17 Plenary meeting in Valencia, WP7 not started yet 			

Table 64: The results from INTER-IoT are not easily transferred to other IoT domains

Risk subcategory			
Usability			
Risk N°	Risk Name	Risk Description	Consequences
R7.8	The results from INTER-IoT are not easily transferred to other IoT domains	The barriers for transferring the developed results are too high	Impossible to complete the transfer of InterIoT results
Likelihood		Severity	Impact
Low		Tolerable	0.6
Criticality			
Low			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Inclusion of all project partners in the development and review of process evaluation		Clearly determine and define the scope of the process evaluation	
Handler	Current Status	Creation Date	Transfer Strategy
Eric Carlson	Identified	22/09/16	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana, WP7 not started yet - 4/4/17 to 6/4/17 Plenary meeting in Valencia, WP7 not started yet 			

Table 65: The results from impact evaluation and process evaluation are not consistent

Risk subcategory			
Impact			
Risk N°	Risk Name	Risk Description	Consequences
R7.9	The results from impact evaluation and process evaluation are not consistent	The developed evaluation processes do not work together. They will not allow to produce a comprehensive picture of obtained benefits	Impossible to complete overall evaluation
Likelihood		Severity	Impact
Low		Serious	1.2
Criticality			
Moderate			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Inclusion of all project partners in the development and review of process evaluation		Clearly determine and define the scope of the evaluation process	
Handler	Current Status	Creation Date	Transfer Strategy
Eric Carlson	Identified	18/10/2016	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana, WP7 not started yet - 4/4/17 to 6/4/17 Plenary meeting in Valencia, WP7 not started yet 			

3.8 WP8 Related Risks

Table 66: Failed Exploitation

Risk subcategory			
Business			
Risk N°	Risk Name	Risk Description	Consequences
R8.1	Failed Exploitation	Failed or Insufficient exploitation results by partners	Effort spent in the project not useful for Business when the project ends
Likelihood		Severity	Impact
Low		Serious	1.2
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Alignment of business interests and exploitation plans during WP2 and WP8		The Exploitation Plan will identify an exhaustive list of reasonable exploitation opportunities for INTER-IoT results, some of them exploitable on an individual partner basis, but also in the consortium as a whole or by a reduced group of partners.	
Handler	Current Status	Creation Date	Transfer Strategy
Eric Carlson	Managed	13/1/16	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana, half day exploitation workshop. - 2/3/17 PCC Telco meeting. Exploitation assessment. - 21/3/17 PCC Telco meeting. Exploitation assessment. - 4/4/17 to 6/4/17 Plenary meeting in Valencia advance in business models and OSS strategy - 2/5/17 PCC Telco meeting. Exploitation assessment. - 23/5/17 PCC Telco meeting. Exploitation assessment. - 5/6/17 to 9/6/17 IoT Week Genève. Informal technological meeting with demos to show the project outputs. - 14/6/17 PCC Telco meeting. Exploitation assessment. 			

Table 67: Impact generated by the project not significant

Risk subcategory			
Business			
Risk N°	Risk Name	Risk Description	Consequences
R8.2	Impact generated by the project not significant	The project results are largely ignored by our stakeholders, undermining the following exploitation and mid-to-long term sustainability of the project	Effort spent in the project not useful
Likelihood		Severity	Impact
Moderate		Serious	2
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Work with Communication and Marketing professionals. Fluent exchange of information between stakeholders and the consortium. Validate venues for scientific publication.		Monitoring regularly metrics and consulting marketing and communication experts. Additionally track scientific contributions from the partners in order to achieve high impact, and re-visit venues to consider high relevance	
Handler	Current Status	Creation Date	Transfer Strategy
Alessandro Bassi	Managed	13/1/16	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana, analysis of the different impact measures and future planning - 2/3/17 PCC Telco meeting. Impact assessment. - 21/3/17 PCC Telco meeting. Impact assessment. - 4/4/17 to 6/4/17 Plenary meeting in Valencia , analysis of the different impact measures and future planning - 4/4/17 Sido event. Presentation of INTER-IoT project Use Cases. - 2/5/17 PCC Telco meeting. Impact assessment and IoT-EPI joint actions - 23/5/17 PCC Telco meeting. Impact assessment. - 5/6/17 to 9/6/17 IoT Week Genève. - 14/6/17 PCC Telco meeting. Impact assessment. 			

Table 68: Open Source Strategy not adequate

Risk subcategory			
Business			
Risk N°	Risk Name	Risk Description	Consequences
R8.3	Open Source Strategy not adequate	The project fails to create or join an open source community and contribute to it with the corresponding project results.	Effort spent in the project regarding open source software distribution is not useful and the project fails to meet one of the indicated objectives: creation of new business models.
Likelihood		Severity	Impact
Low		Serious	2
Criticality			
Moderate			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Work together with IoT-EPI in order to improve community building models. Grab support from the Open Call partners entering in the project. Merge efforts with existing open source initiatives.		Analyse periodically the open source strategy and check the efforts dedicated to it. Creation of a TF to periodically assess the license policy to be used	
Handler	Current Status	Creation Date	Transfer Strategy
Carlos Palau/Amelia del Rey	Managed	20/10/16	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana, half day exploitation workshop, with special goal in license agreement - 2/3/17 PCC Telco meeting. OSS strategy. - 21/3/17 PCC Telco meeting. OSS strategy. - 4/4/17 to 6/4/17 Plenary meeting in Valencia advance in business models and OSS strategy - 2/5/17 PCC Telco meeting. OSS strategy. - 23/5/17 PCC Telco meeting. OSS strategy. - 14/6/17 PCC Telco meeting. OSS strategy. 			

Table 69: Industrial Dissemination not adequate

Risk subcategory			
Business			
Risk N°	Risk Name	Risk Description	Consequences
R8.4	Industrial Dissemination not adequate	The project fails to create adequate impact in the events associated with the stakeholders interested in INTER-IoT products	Stakeholders are not aware of the products developed and the project fails to create impact in one of the axis of the exploitation policy. The industrial dissemination policy is not adequate.
Likelihood		Severity	Impact
Low		Moderate	1.2
Criticality			
Moderate			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Work together with IoT-EPI in order to identify venues adequate for industrial dissemination. Identify from the stakeholders of the project the most adequate venues. Identify from the stakeholder group identified in WP2 the most adequate venues		Periodically monitor the relevant events/trade fairs of interest for the generic products (INTER-LAYER, INTER-FW and INTER-METH) and for the specific products. Monitor the success of the actions taken in the area of industrial dissemination.	
Handler	Current Status	Creation Date	Transfer Strategy
Amelia del Rey	Managed	20/10/16	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana planning for industrial dissemination - 4/4/17 to 6/4/17 Plenary meeting in Valencia planning for industrial dissemination - 4/4/17 Sido event. Presentation of INTER-IoT project Use Cases. - 5/6/17 to 9/6/17 IoT Week Genève. Informal technological meeting with demos to show the project outputs. 			

Table 70: Stakeholder identification in health scenarios

Risk subcategory			
Business			
Risk Nº	Risk Name	Risk Description	Consequences
R8.5	Stakeholder identification in health scenarios	In this scenarios the product is the "Health" and the primary buyer are national health entity. The introduction of IoT in public National Health body needs more time	The involvement could make a delay between the product evaluation and product impact.
Likelihood		Severity	Impact
Moderate		Tolerable	1
			Low
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Increase the Stakeholder network.		Mediation and collaboration between private and public body	
Handler	Current Status	Creation Date	Transfer Strategy
Miguel Llop / Carlos Palau	Managed	5/4/17	N/A
Work Log			
<ul style="list-style-type: none"> - 4/4/17 to 6/4/17 Plenary meeting in Valencia identification of the risk. With the proximity of WP6 new risk have been identified around pilots with relationship of Deliverables. D2.1 and D2.2, and D2.5 content. - 14/6/17 state changed to managed, collaboration with other initiatives like IoT-EPI ACTIVAGE and EIP-AHA. Risk changed from identified to managed. 			

Table 71: Limited financial resources in healthcare.

Risk subcategory			
Business			
Risk Nº	Risk Name	Risk Description	Consequences
R8.6	Limited financial resources in healthcare.	Healthcare operators demand more relevant, higher quality information about their subjects' health status in time for less cost.	Fast growth in the wearable market of technology solutions.
Likelihood		Severity	Impact
Low		Tolerable	0.6
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Provide healthcare operators with affordable technology which will monitor subjects both in the home and in the outpatient.		Opportunities for manufacturers of healthcare devices to expand the reach of their technologies	
Handler	Current Status	Creation Date	Transfer Strategy
Miguel Llop / Carlos Palau	Identified	14/6/17	N/A
Work Log			
- 14/6/17 PCC Telco, identification of the risk during assessment of impact creation			

3.9 Ethical Related Risks

Table 72: ASLTO5 Bio-ethics committee not accepting pilot

Risk subcategory			
Ethics			
Risk N°	Risk Name	Risk Description	Consequences
RE.1	ASLTO5 Bio-ethics committee is not accepting the pilot	In order to be able to perform the INTER-HEALTH pilot, the consortium requires approval from the Bio-ethics committee. The approval requires a previous detailed report.	Without the approval of the committee it is not possible to start the pilot. It is even not possible to recruit the patients.
Likelihood		Severity	Impact
Low		Devastating	1.5
Criticality			
Moderate			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Prepare a very detailed document for the ASLTO5 Bio-ethics Committee. Consider all the European and Italian normative and legislation currently existing and also the one already foreseen. Use the corresponding templates and recommendations from the Bio-ethics Committee in order to fulfil every possible request		In case of conditional approval, the consortium will encouraged to solve the recommendations and required amendments in a short term, in order to avoid additional delays to the execution of the project.	
Handler	Current Status	Creation Date	Transfer Strategy
Anna Costa	Managed	1/2/2017	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana, analysis of the Ethical Review. - 4/4/17 to 6/4/17 Plenary meeting in Valencia, evaluation of Ethics. Risk changed from identified to managed. - 30/5/17 Ethical Board Telco meeting - 14/6/17 Ethical Board Telco meeting 			

Table 73: Sensitive data management by third parties not adequate

Risk subcategory			
Ethics			
Risk Nº	Risk Name	Risk Description	Consequences
RE.2	Sensitive data management by third parties is not adequate	Third parties will be involved in the INTER-DOMAIN use case, bringing new components to test and validate the INTER-IoT approach. Although not all the third parties may access sensitive data, it is possible that some of the projects propose applications that may access to such data.	Not complying with data privacy and local regulations.
Likelihood		Severity	Impact
Low		Moderated	0.9
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
The INTER-DOMAIN use case will be deployed in Valencia (Spain). The legislation to be used will be EC and Spanish. The proposals from the open call will indicate the need of accessing and using sensitive data. In case the third party applications require it, D2.5 has already reviewed corresponding legislation. The use of data will be monitored by the Joint Data Controller periodically and try to avoid misuse of the data.		The appointment of the Joint Data Controller and the definition of procedures will mitigate severity of the risk.	
Handler	Current Status	Creation Date	Transfer Strategy
Carlos Palau	Managed	1/2/2017	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana, analysis of the Ethical Review. - 4/4/17 to 6/4/17 Plenary meeting in Valencia, evaluation of Ethics. Risk changed from identified to managed. - 29/4/2017 to 30/4/2017 Ethics negotiation with third parties - 30/5/17 Ethical Board Telco meeting - 14/6/17 Ethical Board Telco meeting 			

Table 74: Data protection and anonymization of data not adequate

Risk subcategory			
Ethics			
Risk Nº	Risk Name	Risk Description	Consequences
RE.3	Data protection and anonymization of data not adequate	The procedures to protect, store and handle data during the execution of the project are not correctly defined or executed, violating the regulation and legislation.	The project and the entity in charge of managing the data may receive a fine or a letter from the corresponding Data Protection Authorities.
Likelihood		Severity	Impact
Low		Serious	1.2
Criticality			
Moderate			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Define clear procedures to handle and store the data, including anonymization techniques. Follow the recommendations of the ASLTO5 Bio-ethics Committee for the INTER-HEALTH pilot and adapt the procedures if needed to the other pilots. Special attention will be given to ensure confidentiality and for incorporating PET technologies to ensure protection from data breaches. Consortium SMEs have the capacity and the experience to cope with the delivery of security mechanisms if needed.		Frequent monitoring of the process, self-assessment in order to validate the technical procedures put in place.	
Handler	Current Status	Creation Date	Transfer Strategy
Benjamin Molina/Anna Costa	Managed	1/2/2017	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana, analysis of the Ethical Review. - 4/4/17 to 6/4/17 Plenary meeting in Valencia, evaluation of Ethics. Risk changed from identified to managed. - 30/5/17 Ethical Board Telco meeting - 14/6/17 Ethical Board Telco meeting 			

Table 75: Selection of participants not adequately addressed

Risk subcategory			
Ethics			
Risk Nº	Risk Name	Risk Description	Consequences
RE.4	Selection of participants not adequately addressed	Selection of the participants has to be neutral and the procedures have to be clearly stated. Not following an ethical procedure for the selection of individuals is a risk for the results of the project, as it can introduce a bias.	Periodical evaluation by the bio-ethical committees of supporting stakeholders (e.g. ASLTO5 and VPF) may stop the execution of the pilot.
Likelihood		Severity	Impact
Low		Serious	1.2
Criticality			
Moderate			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Provide a clear protocol for the non biased selection of participants in the trials. Address the requirements stated by the committees and provide clear information to the participants. Keep a uniform distribution that may not bias neither stigmatize any of the participants.		Periodic monitoring of the participants, specifying a protocol of handling individuals throughout the whole trial period.	
Handler	Current Status	Creation Date	Transfer Strategy
Anna Costa/Miguel Llop	Identified	1/2/2017	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana, analysis of the Ethical Review. - 4/4/17 to 6/4/17 Plenary meeting in Valencia, evaluation of Ethics - 30/5/17 Ethical Board Telco meeting - 14/6/17 Ethical Board Telco meeting 			

Table 76: Safety of participants not sufficiently addressed

Risk subcategory			
Ethics			
Risk Nº	Risk Name	Risk Description	Consequences
RE.5	Safety of participants not sufficiently addressed	Individuals suffering from participating in the pilots, creating stress situations, stigmatizing them.	Affecting the quality of the results and also failing to meet the requirements from the regulations and corresponding committees.
Likelihood		Severity	Impact
Low		Moderated	0.9
			Low
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
The different activities and individual management will meet the flow of procedures proposed by the bio-ethical committees. All the procedures try to avoid any negative effect over the individuals. A detailed selection process for individuals, with different tests and clarification of the actions to be developed in the pilots will be carried out. The process of selection and influence on individuals will be critical in case of individuals developing risk works (e.g. truck drivers in INTER-LogP)		Periodical monitoring of individuals may detect situations of stress and psychological effect and prevent severity of the risk. Information about the individuals being under monitoring, and their data will be anonymized and the data will be destroyed at the end of the project. No public information about the participation in the trials will be made public.	
Handler	Current Status	Creation Date	Transfer Strategy
Anna Costa/Miguel Llop	Identified	1/2/2017	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana, analysis of the Ethical Review. - 4/4/17 to 6/4/17 Plenary meeting in Valencia, evaluation of Ethics - 30/5/17 Ethical Board Telco meeting - 14/6/17 Ethical Board Telco meeting 			

Table 77: Failure to identify the adequate personal data

Risk subcategory			
Ethics			
Risk Nº	Risk Name	Risk Description	Consequences
RE.6	Failure to identify the adequate personal data	Information to be monitored has to be identified in advance, not identifying the adequate data will be an ethical risk as the data to be monitored, anonymised and stored has to be identified in advance to comply with regulations, legislation and requirements from the ethical committees.	Delay in the start of the pilots, as an amendment to the requests issued to the ethical committees take time. Effect in the project will be a delay in the execution of the pilot.
Likelihood		Severity	Impact
Low		Serious	1.2
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Detailed analysis of the identification of the data, identification of the agencies and committees and the ethical requirements to be fulfilled, considering the different use cases. Determination of the data to be attended in case of an error in the identification of the data.		Periodical scrutiny and monitoring by the Ethical Advisory Board and the Data Controllers.	
Handler	Current Status	Creation Date	Transfer Strategy
Anna Costa/Miguel Llop	Identified	1/2/2017	N/A
Work Log			
<ul style="list-style-type: none"> - 1/2/17 to 2/2/17 Plenary Meeting in Ljubljana, analysis of the Ethical Review. - 4/4/17 to 6/4/17 Plenary meeting in Valencia, evaluation of Ethics - 30/5/17 Ethical Board Telco meeting - 14/6/17 Ethical Board Telco meeting 			

Table 78: Medical devices safety not sufficiently considered

Risk subcategory			
Ethics			
Risk Nº	Risk Name	Risk Description	Consequences
RE.7	Medical devices safety not sufficiently considered	Damage to the individuals or lack of privacy of the devices. Not safe integration of sensors and devices.	Individuals suffering problems with the equipment and not trusting the pilot making the trial a failure.
Likelihood		Severity	Impact
Low		Moderate	0.9
Criticality			
Low			
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Consortium partners have the expertise to make the appropriate installation for the purposes of the pilots. In addition, they have participated in several National and European projects related to integration of sensors for research purposes and their use in ethical compliance with National and European legislations. The INTER-IoT Ethical Board will monitor pilot realization ensuring the appropriate use of medical devices. Agreement with an insurance company needs to be reached in order to cover any claim from patients derived from the suffered damage due to the pilot.		Check the devices and make them compatible with regulations, standards and requirements from the ethical committees. Check that ASLT05 is paying the invoice due to the service covered by the insurance company.	
Handler	Current Status	Creation Date	Transfer Strategy
Vicente Traver	Managed	6/4/17	N/A
Work Log			
<ul style="list-style-type: none"> - 4/4/17 to 6/4/17 Plenary meeting in Valencia, evaluation of Ethics - 5/5/17 INTER-HEALTH telco to deal with medical devices and the Bio-Ethics Committee request at ASLT05. Risk changed from identified to managed. - 30/5/17 Ethical Board Telco meeting - 14/6/17 Ethical Board Telco meeting 			

Table 79: Extensibility of INTER-HEALTH ethical risks to the other pilots not sufficiently considered

Risk subcategory			
Ethics			
Risk Nº	Risk Name	Risk Description	Consequences
RE.8	Regulatory standards for wearable devices in the healthcare system.	Regulatory standards for medical devices are much more demanding than for general devices for fitness	Fitness devices include disclaimers that they should not be used for medical purposes
Likelihood		Severity	Impact
Moderate		Tolerable	0.6
			Low
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Subjects are becoming more aware of their health through self- monitoring, lifestyle and behaviour changes. Identification of the different standards and dependability issues of wearables and the possibility of using them in a medical environment.		Give to healthcare operators accurate data in order to give the correct advice to the subject as this is a fitness pilot that will affect patient's health but is not considered medical pilot.	
Handler	Current Status	Creation Date	Transfer Strategy
Miguel Llop / Carlos Palau	Identified	6/4/17	N/A
Work Log			
<ul style="list-style-type: none"> - 4/4/17 to 6/4/17 Plenary meeting in Valencia identification of the risk. With the proximity of WP6 new risk have been identified around pilots with relationship of Deliverables. D2.1 and D2.2, and D2.5 content. - 30/5/17 Ethical Board Telco meeting - 14/6/17 Ethical Board Telco meeting 			

Table 80: Regulatory standards for wearable devices in the healthcare system.

Risk subcategory			
Ethics			
Risk N°	Risk Name	Risk Description	Consequences
RE.9	Extensibility of ethical risks from INTER-HEALTH to the other pilots not sufficiently considered.	The most critical pilot in terms of ethics is INTER-HEALTH, but some aspects evaluated in terms of ethics in this pilot can be extended to INTER-LogP and INTER-DOMAIN.	Not extending the ethical risks specifically addressed for INTER-HEALTH may affect the execution of the other pilots, mainly in the case of privacy, tracking of individuals and preserving personal data.
Likelihood	Severity	Impact	Criticality
Moderate	Tolerable	0.6	Low
Contingency plan			
Avoid/Minimize Likelihood Strategy		Mitigate Severity Strategy	
Analyse the common risks between the pilots and identify the ones that are common. The most critical pilot is INTER-HEALTH but some risks of the health application domain can be extended to the other application domains. It is critical to control and extend the risks associated with the third parties in the INTER-DOMAIN pilot.		Analyse the risks appearing in each of the pilots and address them to the Ethical Advisory Board that have a global view of the different pilots and needs.	
Handler	Current Status	Creation Date	Transfer Strategy
Carlos Palau	Identified	14/6/17	N/A
Work Log			
- 14/6/17 Ethical Board Telco meeting			

4 Conclusions

The Risk Management Second Version Document reflects the attention that the Inter-IoT Consortium intends to provide to potential threats and risks for the Inter-IoT Project during the period that encompasses month 12 until month 18. The intention beyond the list of risks is to make all partners involved in the project aware of the importance of meeting project goals and objectives.

The Risk Management procedures constitute an important part of the project management. The current version of the Risk Management Plan/Report is updated according to the outputs generated in the Inter-IoT Consortium meetings and will be followed up during the entire period of the project. It has helped to reduce the probability of some risks to occur, and it also has detected potential risks that finally happened, helping to mitigate their impact when they occurred.

Still no risk identified by the consortium has a critical impact. The likelihood of most risks is low/moderate, which facilitates their management. Although some of the risks have a serious to devastating severity. The corresponding mechanisms to avoid or minimize likelihood and mitigate the severity have allowed the consortium to deal with some of the risks.

The new version of the risk document includes a new section related with Ethics as requested after the ethical review. The creation of the Ethical Advisory Board formed by UPV, UPV-SABIEN, ASLTO5, UniCal and RINI has defined the request to the ASLTO5 Bio-ethical Committee addressing the different aspects that have been identified as risks. Although the project will deal with ethics during the whole execution of the project a detailed analysis under the supervision of the External Ethical Advisor and the Ethical Advisory Board.

Annex: Risk Timeline

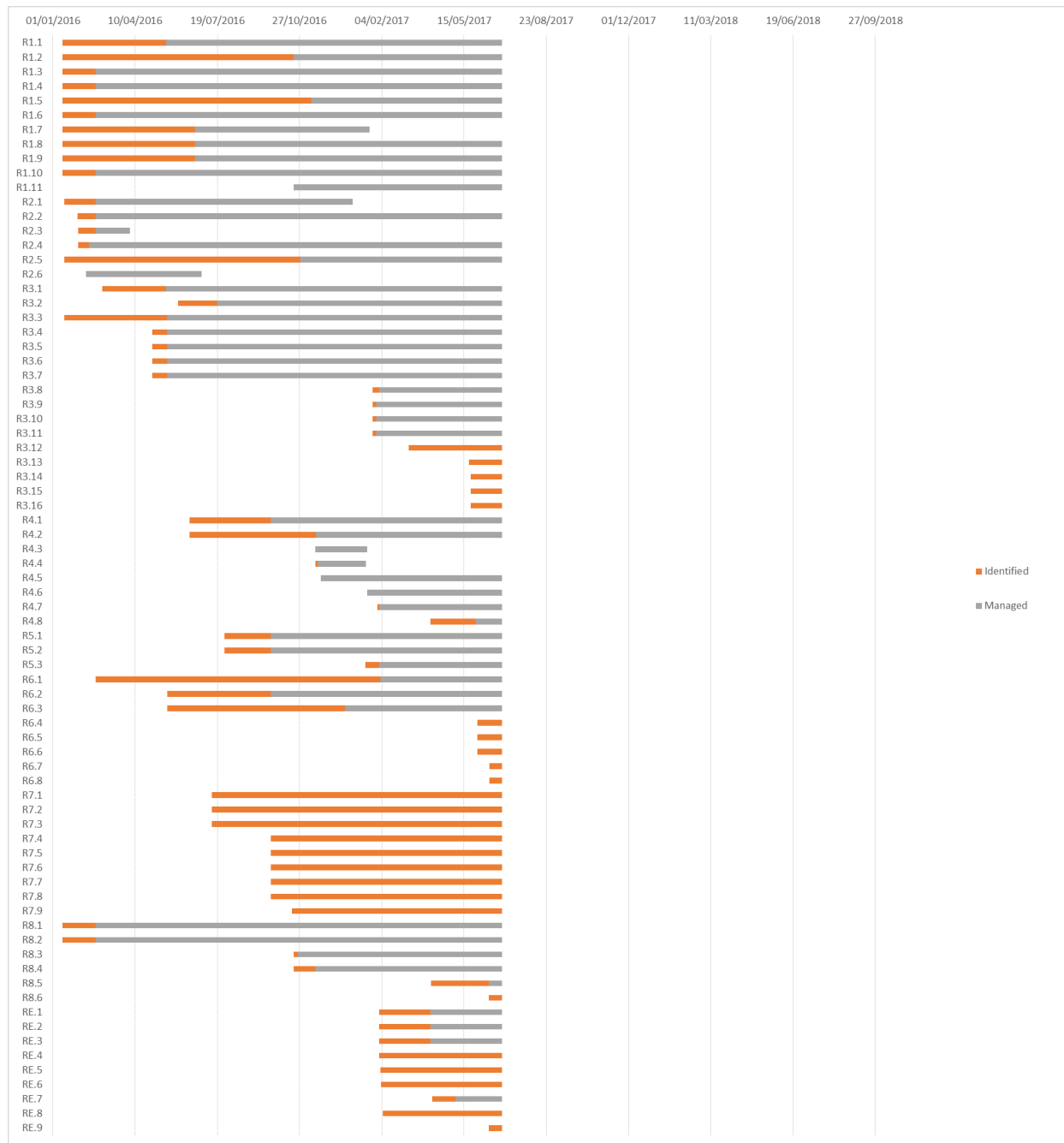


Figure 4: Risk Timeline