D1.1 "PROJECT MANAGEMENT AND QUALITY GUIDELINES"

Version 1.3

Document Information

Contract Number	780681
Project Website	https://legato-project.eu/
Contractual Deadline	28/02/2018
Dissemination Level	PU
Nature	R
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The LEGaTO project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No 780681

Change Log

Version	Description of Change
V 1.0	Initial draft for internal review
V1.1	Changes of the internal reviewer
V1.2	Revision of the document for Interim Review comments
V1.3	Internal review of the document

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Executive Summary

The purpose of this document is to provide an overview of the management and administrative procedures of the LEGaTO Project in order to ensure efficient project execution as well as high quality project results. The document will provide to the Partners (referred to in the EC Grant Agreement as "Beneficiaries") a concise reference to the project management plan, structure, tasks and responsibilities at all levels of project execution.

1. Introduction

The Project Management and Quality Guidelines provide an overview of the internal management procedures inside the LEGaTO project with the main goal to ensure an efficient project execution with high-quality project results.

It describes the governance structure of the project, the project management procedures and tools, as well as the reporting procedures, including roles and responsibilities, and monitoring of project progress.

These guidelines provide information to the project partners needed to facilitate the day-to-day management of the project, ensuring the project outcomes to be delivered in time, according to the budget and with the expected quality.

This document specifically covers the areas:

- Project structure with defined roles and responsibilities,
- Project Management Procedure and Tools,
- Project Monitoring,
- Risk Management,
- Intellectual Property Rights and Knowledge Management.

The Project Management and Quality Guidelines will be regularly updated throughout the lifetime of the LEGaTO project, and the most updated version will always be available at the internal repository.

2. Project Structure

This chapter introduces the Project Structure of the LEGaTO project identifying all the main elements in the coordination and their responsibilities.

2.1 Coordination Team

The Barcelona Supercomputing Center (BSC) will serve as Coordinator of the LEGaTO project. This role is a responsibility shared between the Technical Manager (TM), i.e. Osman Unsal, and the Project Manager (PM), i.e. Sergi Madonar, or the individuals assigned to these roles during any interim absences from the project.

2.1.1 Technical Manager (TM)

The Technical Manager (TM) ensures that the scientific and technical objectives of the project are met. The TM defines the high-level technical strategy and drives the project team to implement according to that strategy. During the implementation, the TM also ensures that the project maintains its relevance to the H2020 ICT Work Programme 2016-2017 and its strategic objectives. Moreover, the TM organizes technical presentations of project progress to external parties and ensures the appropriate involvement and visibility of the members of the project. The Technical Manager is supported by the Project Manager (PM), who is responsible for the day-to-day execution of the project. The TM collaborates closely with the PM to provide clear and accurate Periodic Reports.

2.1.2 Project Manager (PM)

The Project Manager (PM) is responsible for the day-to-day execution of the project. The PM will ensure the timely delivery of project objectives and deliverables by continuously monitoring the project progress against the plan of record. The Project Manager identifies and tracks issues as well as proposes suitable corrective actions (i.e. resource reallocation, etc.) that might require a formal decision by the General Assembly. The PM is also responsible for calling the General Assembly meetings and reviews as well as compiling and distributing Minutes and Actions. The PM defines the procedures for change control (proposed changes to the plan of record), risk management, quality assurance and Intellectual Property Rights management.

The administrative and financial management of the project is also the responsibility of the PM, including internal use of resources monitoring on a six-month basis, the provisioning of Periodic Reports and Financial Statements, and ensuring an efficient distribution of EU funding. The Project Manager will also act as the official point of contact between the Commission and the Beneficiaries.

2.1.3 Innovation Manager

The Innovation Manager (IM) has the task to understand and assess innovations and innovators in a project, as well as commercialization opportunities and related strategies. For a given innovation, the IM should identify the best place for the project partner to take it to market and provide advice on fulfilling the innovation potential. The IM is an expert with a clear affinity for identifying market opportunities and overcoming commercialization hurdles.

The key task of the IM is to collect relevant information on potential innovation and innovators by reading project materials and engaging in discussions with partners at the review meeting. This way, and depending on the stage to project (just started, progressed or nearly finished), the IM assesses how well prepared the consortium/innovator is for entering the market and how they intend to anticipate changing market conditions. At the same time, the interaction between the IM and innovators in the consortium is meant to raise their awareness of the issues at hand and to help them develop a more compelling exploitation attitude.

In order to ensure that the results of the project will not remain confined in academia or research labs but will find their route toward the market, a proper innovation management is of paramount importance. The innovation manager will work closely with the project coordinator and the consortium exploitation team to ensure a proper exploitation path. Innovation management processes include both day-to-day management of knowledge and IPR issues and the iterative

creation of exploitation plan and technology roadmaps. More concrete, it will include the following actions:

- Create an IPR repository.
- Monitor IPR compliance with H2020 and consortium agreement rules.
- Facilitate any related conflict.
- Facilitate the creation of commercial agreements between partners leading to joint exploitation after the end of the project.
- Monitor the project to guarantee consistency between technical and marketing choices.
- Monitor the market during the whole duration of the project, particularly concerning the evolution of the technology, potential customers, and existing and emerging competitors.
- Plan initiatives that combine technical and exploitation objectives to create business models for defining and exploitation path of most relevant innovations within the project.

2.2 Industrial Advisory Board (IAB) and End Users Group

The Industrial Advisory Group (IAG) will be created as a new task force and will be incorporated in the project structure. The Industrial Advisory Board (IAB) will provide an efficient, independent, industry-based mechanism for quickly obtaining real-world feedback on project interim results. Moreover, it will facilitate industry's direct participation in identifying and pursuing exploitation opportunities.

The IAB members have been chosen by the General Assembly (GA) in the first months of the project in order to meet 3 main objectives:

- Evaluating the scientific quality and principally practical application of the work
- Providing expert opinion to the GA and the Coordinator on issues concerning to the development of the research activities
- Assistance and support regarding external communication, dissemination and exploitation.

The IAB will be comprised of expertise areas that reflect the activity state-space of the project. These areas include low-energy computing, heterogeneous architectures, programming models and runtimes, as well as the LEGaTO use-cases of smart home (with the IoT gateway), smart cities, machine learning and healthcare. The IAB will review the project plan and suggest possible additions to better align the project with the needs of industry and user communities. It will also assist in directing the work of the project to ensure the compatibility of the technology planned and developed with industry and user requirements. The feedback will be solicited via Technical IAB Meetings.

Currently, the following Europe-based experts have confirmed their interest to participate as IAB members. The details have been given below:

Sector HW/ SW	Member	Institution	Country	Justification	Industry	Std. Bodies	Policy maker
HW	Michaela Blott	Xilinx Inc.	Ireland	Machine Learning, Data centers and FPGAs.	x		
HW	Stephan Diestelhorst	ARM	UK	Computer architecture, energy monitoring and modelling	x		
HW	Alain Porret	Centre Suisse d'Electronique Microtechnique-CSEM	Switzerland	Low-energy consumption processors, artificial intelligence algorithms requiring minimal resources and sensor portability.			
HW & SW	Marius Feldman	Cloud & Heat	Germany	Energy efficient cloud computing, green computing	x		
HW & SW	Ayal Zaks	Intel	Israel	Compiler Optimizations, Parallel architectures	x	x	
SW	Mariano Lamarca	Barcelona City Council	Spain	Networking, smart cities			x
HW & SW	Prof. Dr. Ingmar Steinhart	Bodelschwingh Foundation Bethel	Germany	Health care, social service	x		

Based on the expertise of the IAB and to acquire enhanced advice from them, it has been divided into two groups: Hardware (HW) expert group and Software (SW) expert group. So the plan is to invite the HW expert group in the first IAB meeting and SW expert group in the second IAB meeting. In the final IAB meeting, both the HW and SW experts will be invited. Therefore, there will be three IAB meetings during the life of the project. To obtain better feedback from the IAB it has been decided that the first IAB meeting will take place after completing the first phase of the project, the second IAB meeting will held during the second phase of the project and the final one will occur at

the last phase of the project. All the IAB feedback will be collected via specific technical IAB meetings during the F2F meetings of the project.

No.	Date (Approximate)	Location	Event	IAB Members	Expertise (HW/SW)
1	9th April, 2019 (Month 17)	Tel Aviv, Israel	Face to face	Ayal Zaks, Stephan Diestelhorst, Michaela Blott	HW
2	October, 2019 (Month 23)	To be decided	Face to face	Mariano Lamarca, Marius Feldman	SW
3	May, 2020 (Month 34)	To be decided	To be decided	All IAB members	HW & SW

End User Group (EUG): At the end of the project, we will organize a workshop inviting community members from the three use cases in order to ensure the wider uptake of the project technologies and the tool-set. In order to invite the most relevant stakeholders, we will utilize the internal database of key company contacts for the three use cases from the RETHINK big project, which was coordinated by BSC. At least 10 European companies from each of the use cases with a potential interest to form a user community will be invited.

2.3 Work Package Leaders

Work Package Leaders (WPL) are responsible for the scientific and technical work of their respective Work Packages. This includes the planning and control of all activities within the Work Package, the preparation of deliverables and the collection of the contributions from other partners participating in the respective Work Packages for internal and external reports. They meet regularly via teleconference or face-to-face as a part of the Grant Agreement and arrange for additional technical meetings when necessary. They are expected to raise critical issues to the General Assembly and to support the Technical Manager in coordinating cross-work package relationships within the appropriate activity area. They should actively participate in the regular project-related meetings and prepare technical and status presentations as required. Each WPL is appointed by the organization responsible for the respective WP. Partners appointed as WPL are indicated in Section 3.1.5 "Work Packages List". The WPLs may nominate separate task leaders when necessary.

The LEGaTO Work Package Leaders are:

WP No	WP Name	WP Leader
1	Project Management and Coordination	BSC
2	Hardware Platform	UNIBI
3	Tool-chain Back End	CHALMERS
4	Tool-chain Front End	UNINE
5	Application development and optimization	CHR
6	Project Dissemination and Exploitation	BSC

2.4 Partners

The project has ten partners from different countries with the responsibility to:

- Execute and deliver the agreed work defined in the DoA.
- Proactively report any problem or unforeseen deviation to WPLs and PM.
- Coordinate the project contributions carried out by their staff.
- Report technical and financial work on time.
- Notify the consortium of changes in the contact data of the partner.

LEGaTO's partners are:

Partner No	Partner name	Country
1	Barcelona Supercomputing Center (BSC)	ES
2	Universitäet Bielefeld (UNIBI)	DE
3	Universite de Neuchatel (UNINE)	CH
4	Chalmers Tekniska Hoegskola AB (CHALMERS)	SE
5	Data Intelligence Sweden AB (DIS)	SE
6	Technische Universität Dresden (TUD)	DE
7	Christmann Informationstechnik + Medien GmbH & Co. KG (CHR)	DE
8	Helmholtz-Zentrum für Infektionsforschung GmbH (HZI)	DE
9	TECHNION - Israel Institute of Technology (TECHNION)	IL
10	Maxeler Technologies Limited (MAXELER)	UK

2.5 General Assembly

The General Assembly shall consist of one representative of each Party. Each General Assembly Member shall be deemed to be duly authorised to deliberate, negotiate and decide on all matters listed below:

Content, finances and intellectual property rights:

- Proposals for changes to Annexes 1 and 2 of the Grant Agreement to be agreed by the Funding Authority.
- Changes to the Consortium Plan.
- Modifications to Attachment 1 (Background Included).
- Additions to Attachment 3 (List of Third Parties).
- Additions to Attachment 4 (Identified Affiliated Entities).

Evolution of the Consortium:

- Entry of a new Party to the consortium and approval of the settlement on the conditions of the accession of such a new Party.

- Withdrawal of a Party from the Consortium and the approval of the settlement on the conditions of the withdrawal.
- Identification of a breach by a Party of its obligations under this Consortium Agreement or the Grant Agreement.
- Declaration of a Party to be a Defaulting Party.
- Remedies to be performed by a Defaulting Party.
- Termination of a Defaulting Party's participation in the Consortium and measures relating thereto.
- Proposal to the Funding Authority for a change of the Coordinator.
- Proposal to the Funding Authority for suspension of all or part of the Project.
- Proposal to the Funding Authority for termination of the Project and the Consortium Agreement.

Members of the General Assembly Committee who are not normally authorised to take legally binding decisions concerning the below-mentioned matters due to internal organizational rules or proxy regulations applicable at their institution shall ensure they consult with their institution's legal office or the relevant department. This way, they should obtain a necessary approval upon receiving the meeting agenda for the General Assembly meetings or a written document according to the agenda and, in any case, prior to participating in any vote at such meeting.

3. Project Management Procedure and Tools

The project management procedure and tools describe the internal communication, quality control and evaluation, the progress monitoring, risk and IPR management.

3.1 Internal Communication

In order to support the cooperation among all Partners and encourage participation in the decision-making process, a set of mailing lists have been created.

- legato@bsc.es – General-purpose communication
- finance-legato@bsc.es - Financial/Reporting issues
- wp1-legato@bsc.es - Coordination, operative representation
- wp2-legato@bsc.es –Related to WP2
- wp3-legato@bsc.es – Related to WP3
- wp4-legato@bsc.es – Related to WP4
- wp5-legato@bsc.es – Related to WP5
- wp6-legato@bsc.es – Related to WP6

An updated version of the subscribers to each of these lists is available at the internal repository. The PM needs to be contacted for any modification in the lists.

3.1.1 Meetings

The consortium decided in general that the hosting partner of a face-to-face meeting pays for conference facilities and catering while each partner pays for accommodation and provisions. The meeting locations will seek to change regularly to share the costs equally. To keep these costs down, the consortium agrees to meet usually at partners' facilities that are free of charge or at reduced costs.

Additionally to the face-to-face meetings, monthly online meetings are being organised by the coordinator to review the progress of the Work Packages on a regular basis. CISCO WebEx software will be provided by the Coordinator to develop these meetings. Other specific online meetings could be also organised. A reminder of the periodic meetings with the agenda is being sent one week before the meetings. According to the CA, in general, the minutes of the meetings will be written by the PM and distributed within the next ten days after the meeting. The minutes shall be considered as accepted if, within 15 days from sending, none of the Partners sends an objection. The minutes of all the meetings will be uploaded to the internal repository.

The Kick-off Meeting was held in BSC's premises in Barcelona on the 14th and 15th of December of 2017 with 32 attendants with the objective to establish the basis of the project and firsts tasks. The presentations from all the partners and the minutes of the meetings are available in the internal repository.

Image 1. The group picture from the Kick-off meeting in Barcelona

3.1.2 Public Project Website

An external website has been created for the project in order to be a channel for uploading all the information and progress of the project for the defined target audience. The public communication and dissemination are described more in detail in the Deliverable 6.1 "Communication and Dissemination Plan". Below you can find two screenshots of the website.

Image 2. The homepage of the website

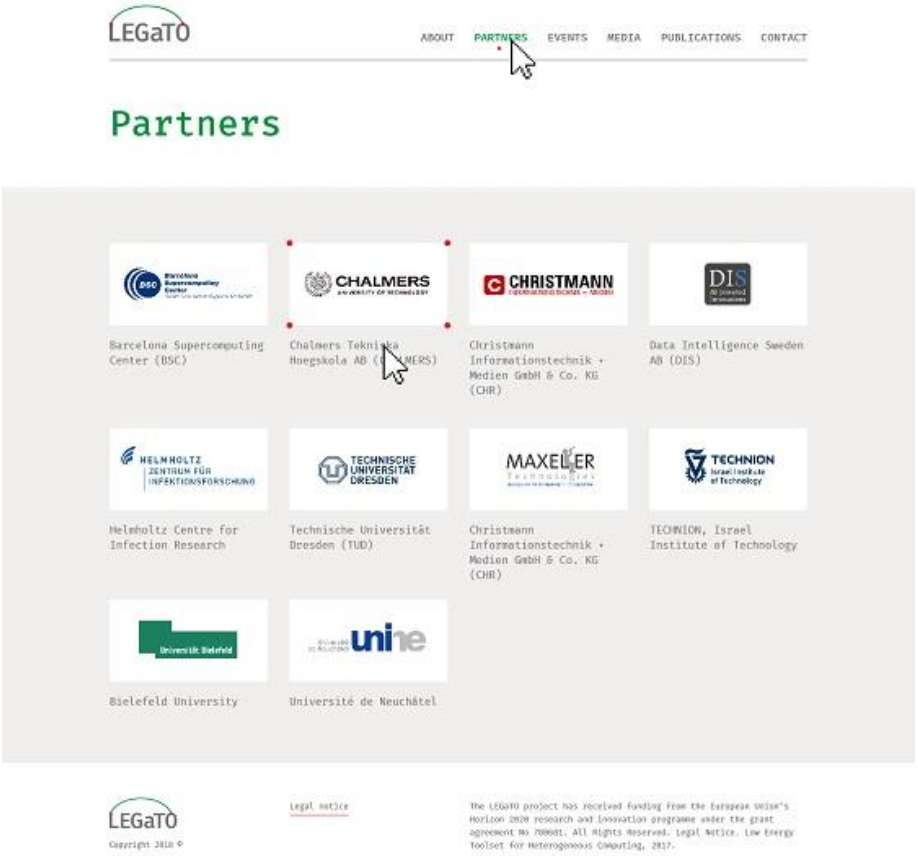

Image 3. The page with Partners on the website

3.1.3 Internal Repository

To facilitate the sharing of documents and information between all the partners, an internal SVN repository has been installed with the website. The content and user management are the responsibility of the Coordinator. The Coordinator will provide support to access to the repository, if necessary. The link to the repository is:

https://legato-project.eu/usvn/svn/LEGaTO/trunk

3.1.4 Conflicts of Interest

It is essential for the LEGaTO project to avoid any conflict of interest and to act in good faith. When Partners identify conflicts of interest, which cannot be resolved through bilateral communication, they should bring the issues to the attention of the Project Manager immediately. The Project Manager working with the Technical Manager as necessary will, in turn, bring the issue to the General Assembly for discussion and a vote if required.

3.1.5 Emergency Procedure

Any event that may jeopardize the overall completion date of the Project should be reported immediately to the Project Manager. The Project Manager working with the Technical Manager will endeavour to resolve the issue as soon as possible by calling an emergency General Assembly Meeting as required in order to determine the next steps.

3.2 Project Monitoring

Progress monitoring will be performed through the set of milestones as part of the work plan structure, and summarized in the List of Milestones:

- MS1: During the first 9 months of the project, all the efforts will be focused on the definition of the specifications of the project to achieve the overall objectives regarding the project optimizations targets, the toolset definition as well as the hardware architecture design.

- MS2: In this milestone at M20, the project will introduce the first porting of the use cases to the project toolset, especially with respect to the task-based programming model and runtime driven by OmpSs and Nanos. The project will also release the first versions of the fault tolerance, security, and productivity solutions as well as the XiTao experimental runtime.

- MS3: In this milestone at M20, the project will introduce a first integration of the toolsets developed in the project: OmpSs programming model, MaxJ compiler, XiTao runtime, and Dfiant language.

- MS4: This milestone at M30 will feature the final integration of the LEGaTO toolset with the LEGaTO hardware including energy-efficient solutions for fault-tolerance, security and programmer productivity

- MS5: This milestone at M36 would be the final integrated release and will additionally include the use case optimized for energy-efficiency running on the integrated toolset and hardware and providing fault tolerance and security.

Milestone number	Milestone name	Related work package(s)	Due date (month)	Means of verification
MS1	Phase 1. Definition/Design	WP1,2,3,4,5,6	M9	All of the deliverables (D1.1, D2.1, D3.1, D4.1, D5.1, D6.1, D6.2) required for the successful achievement of this milestone have been completed.
MS2	Phase 2.1 Implementation/Integration First Release	WP2,3,4,5,6	M20	All of the deliverables (D2.2, D3.2, D4.2, D5.2, D6.3) required for the successful achievement of this milestone have been completed and have met internal quality standards.
MS3	Second (internal) release integration	WP 2,3,4,5,6	M24	All the software required for the successful achievent of this milestone have been completed, tested, documented and pushed in the LEGaTO github on the website.
MS4	Phase 2.2 Implementation/Integration Final Release	WP1,3,4,6	M30	All of the deliverables (D1.2, D1.3, D3.3, D4.3, D6.4) required for the successful achievement of this milestone have been completed and have met internal quality standards.
MS5	Phase 3. Evaluation/Optimization	WP1,2,3,4,5,6	M36	All of the deliverables (D1.4, D2.3, D2.4, D3.4, D4.4, D5.3, D5.4, D5.5, D6.5) required for the successful achievement of this milestone have been completed and have met internal quality standards.

3.2.1 Internal Reporting

The Coordinator will ensure that monitoring the work progress and use of resources is done on a 6-month basis in order to ensure the detection of errors and deviations as early as possible in the project's lifecycle. This will enable the consortium to apply systematically corrective actions or contingency plans, if necessary. WPLs will report to the Coordinator the effort spent on their work packages, the status of achievement of milestones, production of deliverables and completion of tasks within their respective WP. The template for the internal reporting will be available in the internal repository.

3.2.2 EC Reports

There are two official reporting periods (M1-M18 and M19-M36) with two deliverables associated:

- First reporting period: D1.2 Periodic report.
- Second reporting period: D1.3 Final Periodic report.

3.2.3 Reporting Calendar

All the reporting periods (internal and EC) are summarized below:

- M1-M6: First Internal Quarterly Report
- M7-M12: Second Internal Quarterly Report
- **M1-M18: EC Periodic Report**
- M19-M24: Third Internal Quarterly Report
- M25-M30: Fourth Internal Quarterly Report
- **M1-M36: EC Final Periodic Report**

3.2.4 Deliverable Preparation and Review

Project Deliverables to the EC (except the Periodic and Final Report) serve as an outcome of the technical progress of the project. There is a deliverable template in the internal repository that defines a detailed common structure for all the deliverables.

In order to guarantee the quality of the deliverables, for each one:

- The Deliverable Owner must send a first initial draft of the document at least to one reviewer, to the Coordinator and the WPL minimum 15 days before the deadline.
- The reviewers will have to provide their feedback with the possible corrections at least three days before the deadline.
- The owner will gather all the possible corrections, create a final version of the document and send it to the Coordinator at least one day before the deadline.
- The Coordinator will upload the final version of the deliverable in the Participant Portal.

All the reviewers must provide constructive suggestions for improvement in writing to the Deliverable Owner. Upon receiving the suggestions for improvement, the Project Manager works with the Deliverable Owner to determine the schedule to complete the Deliverable.

4. Risk Management

The following table provides a list of potential risks identified per work package. All risks that have been identified to date are classified with low and medium probability but with the potential for high impact. Addressing potential risks will be part of the normal operation of the project, being addressed in the General Assembly meetings. This regular review of potential concerns will ensure the early warning of potential risks and ample time to employ the necessary corrective actions.

Risks considered to be of importance, in particular, risks associated with partners not performing or conflicts between partners will be closely monitored by the Coordinator. In general, risk management will be the responsibility of the Coordinator, and the status of any risk situations will be informed to the EC via the Periodic Reports, except when there is a clear need for earlier EC intervention upon the decision of the General Assembly.

Description of risk			WPs involved	Proposed Risk-mitigation measures
Potential Risk	**Impact**	**Likelihood**		
Possible delays in appointment of personnel	The project start will be slower than planned	Low	WP1	Partners already have personnel with the required expertise. However, partners will start early (before actual project kick-off) to search for qualified personnel.
Key milestones or deliverables are delayed	The project results will be delayed	Low	WP1	The PM will foresee possible problems and take early corrective actions to improve the performance of concerned partners.
Expertise risks	Partners are not capable of performing the planned activities	Low	WP1	Partners have been chosen carefully. Partners will react quickly if replacements are required. The Technical Manager will contribute by identifying alternatives.
Emerging disruptive technology from other suppliers, e.g., new CPU architectures or hardware accelerators	New technology may significantly outperform currently available solutions	Medium	WP2	Scalability and modularity of the hardware platforms enable easy integration of new computing modules. Possible integration into the tool flows can be evaluated within the project.
Techniques from XiTAO runtime cannot be applied/merged into OmpSs	Energy efficient targets may not be met	Low	WP3	We will enable interoperability between OmpSs and XiTAO so that both runtimes can be run

				side-by-side, without the need of integration.
Inability to fully automate the synthesis algorithms required for DFiant code generation within the project's timeframe	The porting of some applications to the DFiant FPGA language will be delayed	Low	WP4	Most of the algorithmic questions have been resolved at Technion, which reduces the risk. Nevertheless, if we encounter hurdles, generated designs will include some manual code tuning to abide by the programmer's constraints. This is the common practice used today in FPGA designs.
GPU and FPGA accelerators are susceptible to errors	System will not operate at the targeted fault tolerance level	Medium	WP4	We will investigate resilient accelerators using such software techniques as having standby ghost tasks for rapid recovery from failure
Inability of application partners to develop and run applications on the testbeds due to difficulties in access or instability of software stack	Unable to showcase benefits on one or more of the use cases.	Medium	WP5	Use cases will be monitored closely throughout the project, and will revert to using the alternative hardware platform, or alternative runtime. Use of multiple hardware and software platforms provide means of mitigating this risk.

5. Intellectual Property Rights and Knowledge Management

For an effective exploitation of the project results and to ensure the proper route to the market a comprehensive IPR and knowledge management process will be applied from the very beginning of the project. It will regulate Intellectual Property (IP) both during and after the project. It aims to protect the interests of each partner, allow good cooperation, and appropriate access. IPR management is based on the following principles:

- Background: Each partner owns the background that it brings to the project. The background IP of each partner has been included in the Attachment 1 of the LEGaTO

Consortium Agreement at the beginning of the project. To collect the information, the PM along with the innovation manager contacted with all the partners to fill in the following table:

Describe Background	Specific limitations and/or conditions for implementation (Article 25.2 Grant Agreement)	Specific limitations and/or conditions for Exploitation (Article 25.3 Grant Agreement)

Table: Background IP

During the project if any partner come with a new unreported background that is needed for the project, it needs to be notified to the innovation manager. The innovation manager will contact with the PM to get it formally included in the corresponding annex of the consortium agreement and with the Technical Manager to understand how they align in the IP flow.

Each partner owns the results, specified in Section 8 of the CA according to the Article 26 of the Grant Agreement. Also, the joint ownership of the results and their dissemination are defined in the same section in the CA.

- Patents: The Innovation Manager will check the compliance of the partners with the IP process and support the partners on questions concerning patents. The process will be that any partner who wants to file a patent has to refer to the Innovation Manager, who will determine if it is a joint foreground or not. In the case of a joint foreground, the General Assembly will decide on the allocation of intellectual property and exploitation modes. In case of conflict, there will be a vote by a majority of two-thirds (2/3) where the Coordinator will have the casting vote.

- Foreground: generated by only one partner. Foreground shall be the property of the partner carrying out the work generating such foreground.

- Joint foreground: Where the generated foreground is the foreground of several partners, the partners concerned shall have joint ownership of such foreground, according to the proportion of their intellectual, human, material and financial contributions unless they establish an agreement regarding the allocation of property rights relating to it and the terms of exercising that joint ownership.

- Access Rights: For the sole purpose of implementing the project, the right to use a partner's background shall be granted to the other partners, if it is needed to enable those partners to carry out their own part of the work. Such use rights shall not be assignable or exclusive. They shall not be subject to sub-licensing and shall be granted on a royalty-free basis.

5.1 IPR and Knowledge Management- The Role of the Innovation Manager

To obtain the maximum outcome from the exploitation of the research results, the proper IPR and knowledge management is essential. Therefore, the role of innovation manager is very significant in the project. The key roles of the innovation manager are provided below:

- Creating and maintaining repository for software component and IP: Two repository table have been created to collect the information on foreground IP. One repository has been created to collect foreground IP related to software component and another has been created to collect other IP e.g. patents, trademarks, registered design, utility model, etc. (IP repository has been created based on the template provided by the European Commission

periodic progress report[1]). All the partners are responsible for updating both the software component and IP repository according to their innovation. The innovation manager will continuously monitor the project and update the repositories with a close interaction with the Technical Manager. He/ she will notify the innovation manager on any missing gaps in the information on the project's IP. The innovation manager will get in contact with the corresponding partner or contact person related to the technology. The software and IP repository tables have been given below:

Software Component	Owner	Protection or Licence Type	Link for Download	TRL
[Name]	[Project Partner]	[Licence Type / Open Source / Proprietary, etc.]	[Link for GitHub or other Repository]	[1-9]

Table: Repository for Software components

Type of IP Rights	Application Reference	Date of the Application	Official Title of the Application	Applicant(s)	Has the IPR protection been awarded	If available, official publication number of award of protection
[Patent/ Trademark/ Registered design/ Utility model/ Other]	[Insert Application Reference code with organisation / country code]	[Insert dd/mm/yyyy]	[Insert title of the application]	[Project Partner]	[YES][NO][No applicable]	[Insert official publication number]

Table: IP Repository

- Monitoring IPR compliance with H2020 and consortium agreement rules.
- Facilitating any related conflict
- Facilitating the creation of commercial agreements between partners leading to joint exploitation after the end of the project.
- Monitoring the project to guarantee consistency between technical and marketing choices.
- Monitoring the market during the whole duration of the project, particularly concerning the evolution of the technology, potential customers, and existing and emerging competitors.
- Planning initiatives that combine technical and exploitation objectives to create business models for defining and exploitation path of most relevant innovations within the project.

The work flow of the innovation manager has been given in the figure below:

[1] http://ec.europa.eu/research/participants/data/ref/h2020/gm/reporting/h2020-tmpl-periodic-rep_en.pdf

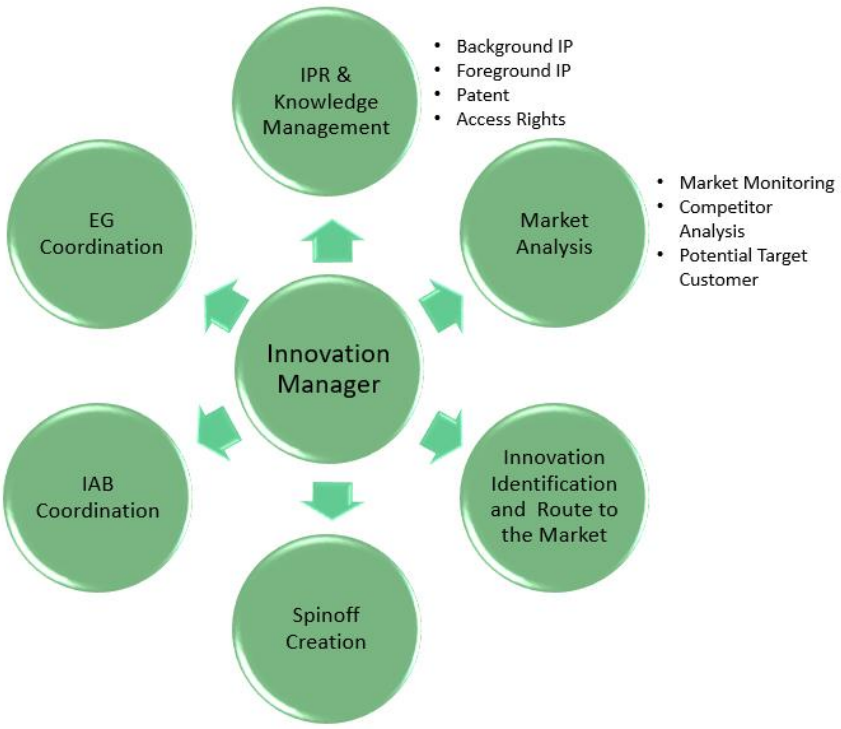

Figure: Workflow for Innovation Manager

Contact details of the Innovation Manager has been provided below:

Zeba S Chowdhury
Phone: +34 934015837
C/ Jordi Girona, 29, Nexus II Building
08034 Barcelona (Spain)

Timeline for Reporting

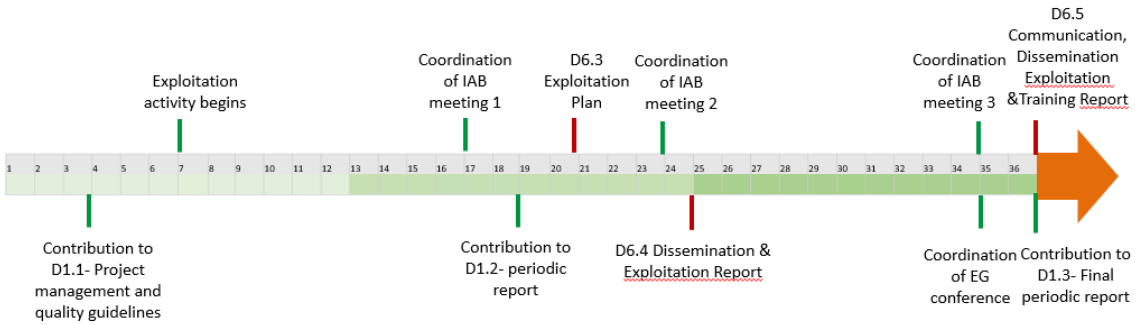

Figure: Timeline for reporting

Main milestones and deliverables:

- D6.3 Exploitation Plan (M20)- End of July 2019
- D6.4 Dissemination and Exploitation Report- End of November 2019

- D6.5 Communication, Dissemination, Exploitation and Training report- End of November 2020

Apart from the main deliverables it is needed to contribute to the project handbook, periodic report and coordination of IAB and EG.

- D1.1 Project Management and quality guidelines (M3)
- D1.2 and D1.3 Periodic Reports (M18, M36)
- Coordination of three IAB meetings (M17, M24, M34) and EG (M34).

6. Software Quality

For all the LEGaTO software packages, we will add appropriate README files that explains how to setup and run the package, as well as including tests for correctness. Wherever applicable, we will add the Jenkins environment for automated continuous integration of the software. For LEGaTO software packages that can be used together, we will include instructions for integrating the packages together.

7. Gender balance

All the consortium is fully aware of the unbalanced number of HPC professionals between men and women, there is clearly a bigger number of men. The partners receive an average of 20% of female candidates to their job offers, so even having strict HR hiring policies, it is difficult to achieve the 50% women in the project.

After asking directly some of our female members of the project in a project meeting about any idea, we all agreed that we cannot afford to hire female candidates only because they are women. This would be discriminatory measure.

Then the compromise that the consortium will acquire is to keep applying the gender balance and equality measures in their respective entities at every possible level. Other initiatives like the "Supergeek" at BSC, that promotes the research careers among the young with special focus on girls, will keep going but the results will be seen in future research generations.

List of Abbreviations

DoA: Document of Action

GA: Grant Agreement

CA: Consortium Agreement

WP: Work Package

WPL: Work Package Leader

TM: Technical Manager

PM: Project Manager

IM: Innovation Manager

IAB: Industrial Advisory Board

EC: European Comission

MS: Milestone

M: Month

SVN: Subversion

QR: Quarterly Report

List of Images

Annex – Addressed Recommendations

Recom. No	Reviewer recommendations:	Action to be taken/Implemented changes
R1	Review all deliverables for basic formatting and quality. All deliverables should have a clearly separate Executive Summary of 1-1.5, a distinct Introduction and a specific Summary or Conclusion section. The project has developed nice branding and colour schemes; these could be considered for use on e.g. the first page of the deliverable or in the header/footer etc. as a means to make the deliverable look more attractive.	For each deliverable (and each chapter in SD), included executive summary, introduction and summary. Improved the format for deliverables. The deliverables template has been updated.
R2	The project needs to quickly clarify the situation concerning the Industrial Advisory Board. While it is recognized that some efforts have been made in this direction, it is not specifically clear how and when the IAB will engage with the project and it is not clear that they will be able to provide useful input.	- Our first IAB meeting took place on 9th April, 2019 at Tel Aviv during the f2f meeting. - We are going to provide a feedback report in D6.3, which is due in M20 - Considering the comments from the reiewers we are now trying to involve more Industrial end users group to our advisory board - So we are renaming it as Industrial and End Users Advisory board The detailed description and plan is included in resubmitted D1.1
R3	The project needs to make its Open Source outputs clearly visible from its web page. It is understood that the project is leveraging previous work and some thought may need to be put into giving appropriate credit to previous work while also giving sufficient credit to LEGATO, but this is not difficult in principle. Appropriate pointers to software documentation should be clear and LEGATO should provide some information on how the disparate components can be integrated/used together.	It has been created a whole new section in the website to cover this recommendation: https://legato-project.eu/software-components
R4	Make specific modification to Deliverable D1.1 based on the comments below. Specifically, changes relating to each of the following points are required: (i)	(i) Industry Advisory Board: please refer to R2 action, (ii) additional milestone added at M24 (please refer to D1.1) (iii) Innovation and IPR management: the detailed description of the role of the Innovation

	Industry Advisory Board, (ii) more fine-grained milestone definition, (iii) innovation and IPR management and (iv) software management and software quality assurance	manager and IPR management has been prepared. Also created two repositories in SVN to collect information from the partners regarding IP and software components (iv) Please refer to R3 action
R5	Make specific modifications to Deliverable D6.2 based on the comments below. Specifically, changes relating to new and potential data sets arising from the work are required.	Partial rewriting of the D1.2 following their comments.
R6	Make specific modification to Deliverable D6.1 based on the comments below. Specifically, changes relating to the following are required: (i) different constituencies with which the project should communicate need to be considered more clearly, including appropriate messages for them, (ii) if developers/engineers are one of the primary constituencies the project is targeting this needs to be given due attention	Update of D6.2 done with target audience table included.
R7	Make specific modifications to Deliverable D2.1 based on the comments below. Specifically, changes relating to the following are required: (i) a summary table highlighting how the applications can benefit from LEGaTO, (ii) more details regarding baseline energy consumption for the use case applications, (iii) clarification regarding the purpose of the energy model devised, (iv) the inclusion of data pertaining to the FPGA undervolting work, (v) an alternative TCO calculation assuming lower power consumption per rack.	(i - iii) Discussion of how applications can benefit from LEGaTO has been added, table for energy for use cases including the baseline has been added, the energy model purpose is clarified, and the section moved to runtime chapter (iv) Data from the FPGA undervolting is made publicly available (v) The TCO calculation in chapter 6 for D2.1 has been updated to include an additional scenario with lower power consumption.
R8	The publication related information on the LEGaTO website needs to be amended as noted below. Slide decks, which have been given relating to talks, should also be made available via the project website, perhaps using a LEGaTO slideshare account.	https://www.slideshare.net/legato-project (Publicatoins have also link to the PDF further to the slideshare, e.g.: https://legato-project.eu/publication/comprehensive-evaluation-supply-voltage-underscaling-fpga-chip-memories)

R9	The project needs to more clearly define groups who could use components of the LEGaTO framework and engage with these communities. The OmpSs community is interesting but it is small; developers of SmartHome applications is more likely a larger community and developers of neural network based application is also large – the project should review which communities have scale, momentum and focus energies on engagement with these communities.	- Meeting with CLASS and ELASTIC projects for potential synergies - LEGATO will try to participate in AI events that will take place in Europe. - Use Cases included on project website: https://legato-project.eu/use-cases
R10	A number of important new development platforms have received significant interest in the last year, including RISC-V (including bespoke processors with e.g. neural network inference extensions), Google EdgeTPU, Intel Myriad X-VPU. The project needs to maintain a watching brief on such new platforms and may be able to obtain early access to some of these platforms for experimentation purposes should it be appropriate. It any case, it should perform a lightweight assessment to determine if LEGaTO is well suited to such newer platforms and in particular if there may be 'easy wins'.	Propose an evaluation mechanism for suitablility of LEGaTO technologies on new and upcoming hardware platforms. Include report for next review and for M36. (WP2): The edge chapter has been updated by a note mentioning the ongoing activities in the project wrt. integration of new form factors.
R11	The project needs to ensure an adequate portion of its work/resources targets development platforms, which have some traction or provide solutions to enable work to be ported from widely used development platforms to the LEGATO framework.	Target development platforms such as Eclipse, present proposal at EclipseCon and similar industry meetings..

Objectives and Workplan

R12	WP6 has been progressing promotion of the project, with visibility in 6 media outlets and having 7 publications, which is commendable for the first 9 months of the project. The project has performed some analysis of market opportunities; while this work is interesting, the focus should shift away from considering LEGaTO as an indivisible unit and focus more on smaller components, which may have commercial potential.	Now our market is divided in horizontal and vertical markets focusing on each components of LEGaTo. The detailed report will be provided in D6.3 Exploitation Plan deliverable.
R13	Risk 4 ("Emerging disruptive technology from other suppliers [...]") needs for periodic monitoring along the project duration, but so far, there is not visibility on the results of this monitoring activity or the potential adoption of these technologies by LEGaTO. This is highlighted in recommendation 10.	Propose an evaluation mechanism for suitablility of LEGaTO technologies on new and upcoming hardware platforms. Include report for next review and for M36
R14	The SmartMirror application is compelling and very demonstrable. Even though the base technology has not been developed specifically by the project, the project can highlight its valuable work on making it more energy efficient and easier to work with. The project should leverage the very interactive nature of this demonstration to maximize its marketing potential.	Participating in industry events such as Teratech to promote the smart mirror application
R15	The Smart City use case has not demonstrated innovative results yet. Further, as noted at the review, a baseline for the typical energy consumption of the CFD models must be provided to assess gains delivered by LEGaTO	Added the energy consumption for the baseline version in the deliverable
R16	The Machine Learning use case has provided basic information on a Deep Learning optimization technique, which delivers 4-5x performance over a baseline. However, limited details have been provided neither in the deliverable content nor at the review. We look forward to hearing about progress in this area in more detail at the next review.	MIS will prepare a deep dive presentation with more details for next review
R17	The Infection use case has provided some basic synthetic analysis, which indicates that significant performance gains of almost 3 orders of magnitude could be possible by porting their R code to code running efficiently on the Maxeler DFE engines. It will be interesting to see if such gains can be attained for even smaller variants of the real calculations to be performed by HZI	At the moment we are still developing the algorithm. Therefore we can not perform calcualtions of real data by now.
R18	The secure IoT Gateway encountered issues in the analysis, which meant that the scope for optimization was very limited. The project adapted somewhat by considering how this could be used for securing other applications sitting on top of it.	The secure IoT Gateway will be used to secure the communication of the Smart Home use-case.

Impact

R19	Smart Home/City use cases: The performed adaptation of ML libraries for the SmartHome use case and the TBC library for the SmartCity to OmpSs (as presented during the review session) is a relevant step for these use cases to benefit from the power-reduction capabilities of the LEGaTO framework.	It is being managed to port darknet to OmpSs and will report the progress in the next review.
R20	Healthcare use case: The use cases is focused on computation power allowing to analyse bigger sets with a pre-selected set of hardware components (§C). While this can be seen as reduction in power consumption, to fully get credit from power saving the project should present an estimation of the power consumption of these bigger sets (e.g. projection for these bigger sets based on the power consumption of the current sets using the currently available hardware).	We have simulated the entropy values for only 3 biomarkers 1e6 times for 66 observations and 4 classes . It took 14,897 hours. The estimated energy consumption for this calculation was 1,26kWh. Real datasets have about 50.000 biomarkers and are not calculable yet.
R21	The current status of the LEGaTO framework is in the right path to have an impact on the availability of low-power technologies for non-experts on the field through the use of OmpSs and its annotations (§4.1 D2.1, §4.2 D2.1) and the synthesis of accelerators by means of High-Level Synthesis (HLS) languages (§DFiant §4.1.5 D2.1, MaxJ §4.1.6).	The HZI will port a second application to OmpSs and plans to publish a well known ML algorithm (lightGBM) adapted to OmpS
R22	However, the dissemination activities of the project should also address non-OmpSs users, specifically for ML healthcare user communities that can benefit from the ML libraries adapted to OmpSs. Given the relatively small user-base of OmpSs, this is a concern with respect to the impact that can be realised by the project.	Dissemination and Exploitation teams will take into account this sector to reach them in future activities.
R23	Progress towards this Expected Impact for the members of the consortium is adequate with the three SMEs and mid-caps in the consortium (Data Intelligence, Christmann and Maxeler) increasing their innovation potential through sound technology development. DI is increasing its innovation potential by realizing more efficient neural network designs, Christmann is increasing its capacity through the development of new server designs with significant emphasis on highly configurable heterogeneous server systems, which have potentially lower TCO, and Maxeler is increasing its capacity by supporting more software development models which can exploit its hardware. This may lead to new opportunities for these three partners.	No action to be taken - just a note.

R25	There has been little demonstrated engagement with SMEs and mid-caps outside the consortium and it remains unclear that the project can have broader impact. This is acceptable for the initial stages of the project, but as the project evolves, the consortium should try to engage with other SMEs and mid-caps outside the consortium.	We will engage more SMEs and mid-caps from different target markets and will report in D6.4.
R26	The work carried out in the project supports increased innovation capacity for the partners involved. For the commercial partners, some specifics are noted directly above. For the non-commercial partners increased innovation capacity is visible for HZI, which could potentially increase significantly the biomarker discovery rate, for UniBe, which has a compelling Smart Mirror demonstrator, and for BSC, which can support application development and management for more heterogeneous hardware in a HPC context. The more experimental work of Technion (DFiant) and Chalmers (XITAO) is progressing and may receive validated within the project as good solutions to their respective problems.	The individual exploitation plan will be provided in M20 D6.3 Exploitation Plan
R27	The current progress of the project is in line with the environmental policy objectives and strategies by contributing to the implementation of measures for the reduction of computational power consumption. The results of the project could be well interesting for policy makers dealing with energy efficiency in smart buildings, including office and public buildings. The results from the smart home use cases can be extrapolated to them. The results from the SmarCity use case may also be interesting for policy makers and public authorities regarding pollution management in big cities.	Add possible explotation of the results obtained in the SmartCity use case by other external projects. We will add that CLASS project might get some benefits from using the LEGaTO SmartCity Use case knowledge and results.
R28	The project has not demonstrated clear efforts to achieve gender balance within the action. The reviewers note that it is notoriously difficult to achieve real gender balance within this heavily male-dominated field, particularly in a project, which has a very strong scientific and technical focus. However, the project team could make more effort to improve the male/female ratio within the consortium.	Project will keep working on this issue. Specific comments added in D1.1.

Implementation

R29	the quality of the deliverables produced to date has been inadequate raising questions about the execution of quality processes	The quality revision process will be applied in every deliverable submission as it was initially defined.
R30	milestone planning is too coarse-grained to understand clearly if a significant milestone or achievement has been made	A new project-internal milestone was added
R31	innovation and IPR management requires more precision and should not follow an approach which focuses solely on LEGATO as a holistic solution	Created two repositories in SVN to collect information from the partners regarding IP and software components and will follow up and manage it accordingly
R32	the interaction with the IAB is not clear.	Addressed in R2
R33	Security, Performance and Energy Trade-off of Hardware-assisted Memory Protection Mechanisms. 15th ACM International Conference on Computing Frontiers. ACM. 2018. However, this appears to have been published at an IEEE conference in Brazil.	Not in Open Access. Neuchatel has been informed.
R34	Salami, B., O. S. Unsal, and A. Cristal Kestelman. Comprehensive Evaluation of Supply Voltage Underscaling in FPGA on-chip Memorie. The 51st Annua lIEEE/ACM International Symposium on Microarchitecture (Micro). 2018. This appears to be a lightning talk rather than a classical publication – this should be made clear.	https://legato-project.eu/publication/comprehensive-evaluation-supply-voltage-underscaling-fpga-chip-memories (the conference opened with a lighting talk session so the attendees could decide which talks were more interesting, the detailed talks were scheduled later and we not publicly available)
R35	Colmant, M., R. Rouvoy, M. Kurpicz, A. Sobe, P. Felber, and L. Seinturier. The next 700 CPU power models. Journal of Systems and Software, Volume 144, 2018, Pages 382-396. Elsevier. 2018. This does not look to be strongly linked to LEGaTO and the preprint available from INRIA has no LEGaTO credit.	The publication has been published in the website: https://legato-project.eu/publication/next-700-cpu-power-models
R36	Salami, B., O. S. Unsal, and A. Cristal Kestelman. On the Resilience of RTL NN Accelerators: Fault Characterization and Mitigation. High Performance	The publication has been published in the website: https://legato-project.eu/publication/resilience-rtl-nn-accelerators-fault-characterization-and-mitigation

	Machine Learning (HPML) Workshop in conjunction with 30th International Symposium on Computer Architecture and High Performance Computing (SBAC-PAD). 2018. This has no DOI on the LEGaTO website.	
R37	Dissemination and communication in social media has been performed through the social media channel of the partners and associated entities, but the project lacks its own social media channels. See comments to D6.1 in Annex A.	LinkedIn and Slideshare accounts created. A social media plan will be prepared in the following months.
R38	A dissemination plan has been prepared (D6.1) which in general fulfil the expectations but needs to be updated according to the comments related to Expected Impact 3 in section 3 and the specific comments to D6.1 in Annex A.	Update of the dissemination plan with the target audiences done.
R39	Concerns exist regarding the current IP and market identification that need to be taken into account in the final exploitation plan:	The exploitation plan will be sent in M20, and will include this information.
R40	A Data Management plan has been provided as a deliverable (D6.2); however, it refers quite exclusively to the data sets that will be used in the use cases but it is expected that other data sets could be generated throughout the project. During the review, a data set relating to the undervolting of the FPGA was discussed, which could be made available; also there will be data sets pertaining to OmpSs graphs produced, perhaps data sets relating to application performance analysis etc.	All the data regarding OmpSs benchmarking will be made accessible openly. The D6.2 has been updated accordingly.

Annex I D1.1 (for deliverable rewrite)

R41	The involvement of the IAB seems relevant and appropriate. However a some of points need to be addressed: ● D1.1 specifically states that the IAB is involved in initially phases of the project, providing advice on the prioritisation of these requirements based on industry roadmaps. However if there has been any contribution in that direction it is not visible in D2.1. ● D1.1 does not provide a precise indication of when the IAB contribution are expected (only a generic indication is provided "In the initial phase of the project") nor how the IAB contributions are to be fed back to the documents (produced or being produced).	Addressed in R2.
R42	Despite reasonable presentation of quality processes (§3.2.4), the documentation produced to date has been inadequate from a quality perspective: ● Executives summaries need to be more concise and limited to highlight the essentials of the deliverable ● Conclusions need to clearly summarize the main points and how they are aligned and contribute to the overall objectives and impacts described in the DoA. ● The project needs to ensure future outputs undergo appropriate review.	Addressed in R1 Past Deliverables will be reshaped in this format and the new ones will strictly follow this structure and indications.
R43	Software quality needs to be addressed: ● The project should also consider how to ensure good quality software is produced; note that it is not expected that the output of an R&D project is necessarily production quality software (with 95%+ test coverage), but we do have an expectation that there is some documentation and some test coverage such that it can be used by others.	HZI will provide documentation and testing through validation of the developed software. CHR has already implemented a continuous testing process for its software development.
R44	While there does not exist a real concern on the management of internal communication (§3.1) using email, the consortium members are encouraged to consider the use of collaborative and team communication tools enabling more effective and immediate communications.	A dedicated Slack channel was opened with different sub-channels.

Annex I D6.1 (for deliverable rewrite)

R45	While the target audience is identified (§4), there is not information on which communication channels (§5) are used to address each of these groups, while this is a key element for the effectiveness of this communication.	The dissemination plan includes an exhaustive table with this information
R46	Social networks (LinkedIn, Twitter, SlideShare, Youtube) are very powerful tools, which are not currently exploited in LEGaTO. They should be incorporated in the project to channel communications produced specifically for other dissemination activities (e.g. scientific publications, press clippings, hackathon, workshops, etc.). Basic mechanisms such as pushing out all slide decks to slideshare and publishing them on linkedin require very little effort and can have reasonable impact. EC's report "H2020 Guidance - Social media guide for EU funded R&I projects" provides useful guidelines for the development of a social media strategy.	SlideShare has been created. A social media plan will be prepared in the following months.
R47	It is clear project has a strong OmpSs focus, but the claimed focus is on application developers and the OmpSs community is not large. The project needs to carefully consider how it can maximize its impact regarding the large set of developers, that is it needs to be more specific with respect to which sets of application developers could obtain benefit from the LEGaTO technologies.	We will expand the focus to larger communities through exploiting existing synergies (for example we will target the OpenMP community, leveraging the role of OmpSs as a testing vehicle for extensions to OpenMP standard)
R48	The project uses a reasonable amount of open source software; however this is not at all apparent from the project website - the project should provide a github repo which forks software repos as necessary, provides some overview on how they can be used together (most probably not fully integrated, but some integration is expected)	LEGaTO Github created, all software is linked to it: https://legato-project.eu/software-components
R49	The project needs to identify an appropriate approach to giving sufficient credit to LEGaTO for work contributing to another code base (e.g. make a dedicated fork for LEGaTO which could get periodically merged with the main codebase)	Will be done for LEGaTO contributed code (this will be the case for example for the FTI checkpointing library)

R50	The consortium could also consider the IAB as a potential ally in the dissemination activities, given their position in the market.	A page has been created: https://legato-project.eu/about/industrial-advisory-board IAB member logos will be added soon.

Annex I D6.2 (for deliverable rewrite)

R51	Project needs to be more open with respect to data sets that it will produce: these do not have to be very large data sets, but the result of their R&D activities should be driven by data and hence this data should default to open unless there are some significant commercial sensitivities.	Each generated data will be questioned to be open and if not, it will be justified.
R52	The document should include a summary table (possibly in a conclusion or introduction section) summarising all the data sets that will be used (collected, produced or already available) and for each of them collect the relevant information provided along the DMP. This information should cover at least: data origin (project task/WP or already available) whether the data will be openly available, where it will be available, interoperation formats (if any) and license.	Included in the Executive Summary.
R53	The license for openly available datasets needs to be clarified. Now the document states “GPL- alike” but misses to identify a specific license. “ODC Open Database License (ODbL)” seems to be a good candidate for that.	Comment and license included in the deliverable.

Annex I D2.1 (for deliverable rewrite)

R54	In general terms, the document quality should be improved according to the comments already provided for D1,1: ● The executive summary is too long and does not fully accomplish its purpose (providing an overall idea of the contents of the documents, the benefits of LEGaTO, and where do they come from). ● A proper summary was missing at the end of the document (an updated version was provided on the day before the the review at the request of the reviewers).	(see R1, R42) Edited the D2.1 Executive Summary to make it more crisp and included discussion about achievements during the period.
R55	There needs to be some summary of the applications at the end of this chapter. We suggest a table which includes application name, language(s) application is written in, which legato components will be used by the application, which components are targeted for optimization,	Table 3.4 added.
R56	There is a clear emphasis in LEGaTO regarding power consumption reduction, however the document does not clearly present which is the current power consumption baseline for all the use cases (an approximation would suffice). The “Smart” use case is an example of that. Having a clear baseline is key to drive the development of the LEGaTO technologies and to evaluate their success.	Table with power baselines were added.
R57	While the DoA specifies an objective of 10x reduction in power consumption, is not clear which uses cases will address that. In the case that a specific one is not going to reach it should provide the intended target.	Updated in the chapter.

R58	The two last points could be addressed by incorporating the necessary information to the table suggested in the first point or be gathered in a different one specifically addressing the power consumption topic.	Done.
R59	Additionally, the “Smart Home” mirror should target a more ambitious power consumption around 50W rather than the 100W target that was discussed at the review.	Done.
R60	The respective sections seem to address all the objectives of the LEGaTO project (power consumption, trusted computing base, MTBF and FPGA designed productivity), but they miss to provide a global view on how they contribute to these objectives. We suggest including a table for each section detailing which component of the LEGaTO technologies contribute to each objective.	Added table 7.1 in the SD conclusion chapter.
R61	The above comment can be extended to the techniques that are meant to contribute to the objectives of LEGaTO (e.g., task replication contributes to MTBF, undervolting contributes to power reduction, OmpSs mapping annotations contributes to FPGA designer productivity, etc.). A summary table can be employed in the same spirit as for the components.	Added table 7.1 in the SD conclusion chapter.
R62	The deliverable presents some energy-related concepts and formulas (§2.3) but they do not seem to be referenced anywhere in the document. They may be of good use related to the concerns described below about power consumption baseline and targets in the uses cases.	We have adapted and moved the energy model to the Backend (WP3) subsection since the model is tightly coupled with the task concept.
R63	Some progress was presented during the review session regarding the aggressive undervolting of FPGA (§2.2, last bullet). It would be nice that D2.1 also gathers these preliminary results.	Section on undervolting added (5.7.4).
R64	D2.1 should include a TCO calculation for the server systems (§6.1.5) that does not involve a 32kW draw on the rack (e.g. reduce the per rack power consumption by half and consider twice the number of racks).	adapted TCO calculation in D2.1.