Technical Report

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Guidelines for the D4Science-II Project Quality Plan

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EXECUTIVE SUMMARY

The objective of this Technical Report is to report the Quality Plan established for the D4Science-II project. This plan focuses on several activities of the project, trying to ensure the achievement of concrete and efficient results.
The different activities of the project are governed by a number of procedures and guidelines described in different project documents: Annex I to the Grant Agreement (Description of Work), Consortium Agreement, individual work package work plans, etc. This deliverable gathers in a single document all this disperse information which together will foster the achievement of the project objectives.
The D4Science-II management structure is based on three **governance and management boards**: Members General Assembly, Project Management Boards, and Technical Board. Other committees with precise mandates are also defined: Quality Assurance Task Force, Technical Management Team, and Technical Committee.
A number of procedures are defined for the preparation of **project meetings.** These meetings are organized several weeks in advance following the rules defined for each meeting type. Other procedures exist to prepare the yearly **project reviews** with EC representatives where the project major achievements are presented. These reviews are evaluated, and a number of recommendations are provided to the project in a review report. Such recommendations are addressed by the project management in an official reply to the EC.
The quality plan defines a **risk management** strategy consisting of two main phases: risk analysis and risk control. A number of possible risks are identified and clear strategies to control them are defined.
The resolution of project conflicts is also controlled. The **conflict resolution** procedure defines which boards are called to intervene when major problems arise.
Concerning **software license**, the default license selected by the project is the EUPL. Other licenses can also be adopted for particular components but must follow a licensing procedure in order to be accepted by the project.
As with any EU funded project, **official reporting** to the EC is an important task. This reporting is based on (1) quarterly reports covering all project work packages describing the main achievements and problems of the project for that period, (2) periodic reports prepared at the end of each year summarizing the work of the year, and (3) effort reports sent every quarter illustrating the effort spent by each partner in each work package.
The preparation of project **deliverables** and **milestones** follows a strict procedure to ensure that all official documents (or others) are of high quality and are made available on time. Deliverables must be ready 15 days before their due date. After a period of official review, all deliverables are sent to the PMB for silent approval. At the end of this process they are dispatched to be EC. These procedures also define rules concerning naming, monitoring, and templates.
The project **dissemination** is governed by a number of guidelines to be applied when a member of the consortium: writes an article, presents the project in conferences, needs to user the project logo, etc.
Also important, are the **technical procedures** that guide the daily technical activities of the project. These procedures cover different aspects, from the development of code to its deployment in production.
The QATF also decided to collect **indicators** related to the main activities and results of the project. These indicators are collected every month and quantify the work done on important tasks of the project. This activity allows to create a more clear vision on how the project is progressing.
To support all these procedures and guidelines, the project decided to adopt a number of **collaboration tools**: BSCW as document repository, TRAC as issue tracking system, Mediawiki for collaborative editing, mailing lists, etc.

1 QUALITY ASSURANCE TASK FORCE

Quality Assurance is a dedicated task under the NA1 "Project Management" work package. To implement all the activities related to Quality Assurance, a special task force has been formed. This task force was called Quality Assurance Task Force (QATF).
The establishment of special task forces is foreseen in the project description of work to create small working teams assigned to work on particular aspects of the project.

1.1 MANDATE

The mandate of the QATF is to ensure that the project processes, services and deliverables are of high quality by continuously monitoring and assessing the progress and results of the project.

1.2 MEMBERS

The QATF is composed by four members involved in the NA1 work package:
- CERN: Pedro Andrade
- CNR: Pasquale Pagano and Leonardo Candela
- NKUA: George Kakaletris

1.3 RESPONSIBILITIES

The main responsibility of the QATF is to manage the project Quality Plan. This includes the definition, elaboration, update, and monitoring of such plan.
The project operation is based on a number of management and administrative procedures defined in various official documents, i.e. the project's Technical Annex (Annex I or Description of Work), other D4Science-II Grant Agreement Annexes, and the project Consortium Agreement. These procedures are complimented by other more finegrained procedures defined to regulate other activities of the project. The QATF is responsible for describing such procedures in the Quality Plan and enforcing its execution to guarantee a successful achievement of the project objectives. Moreover, technical procedures, such as the ones defined by the Service and Joint Research Activities, are also linked to the Quality Plan.
Project reporting, deviations from the work plan, resources spent, deliverable quality, review preparation and post-review follow-up, activity-specific process, and document management are all examples of the activities belonging to the realm of the QATF.
In addition to the above-mentioned responsibilities, the QATF is responsible for defining and monitoring performance indicators to assess the quality of the project results, its progress and impact. This work will be done in close collaboration with the project work package leaders. Finally, the QATF is in charge of the preparation of a statement on the treatment of gender equality.

2 PROJECT GOVERNING BOARDS

The D4Science-II management structure distinguishes between the Governance and the Management of the project:
• The Governance is carried out by the Members General Assembly (MGA). The MGA is responsible for decision-making affecting consortium composition, resource allocation, implementation of the work plan, and all other decisions having a direct legal or financial impact on project beneficiaries;
• The Management is carried out by the Project Management Board (PMB), the External Advisory Board (EAB), and the Technical Board (TB). The PMB is responsible for decision-making affecting project strategy, including risk management. The PMB activity is supported by the EAB that provides valuable recommendations on all project strategies. The TB leads the technological activities encompassed by the development and implementation of the D4Science-II e-Infrastructure.

The following diagram depicts the interaction between Project Governance and Project Management as represented by the various boards.

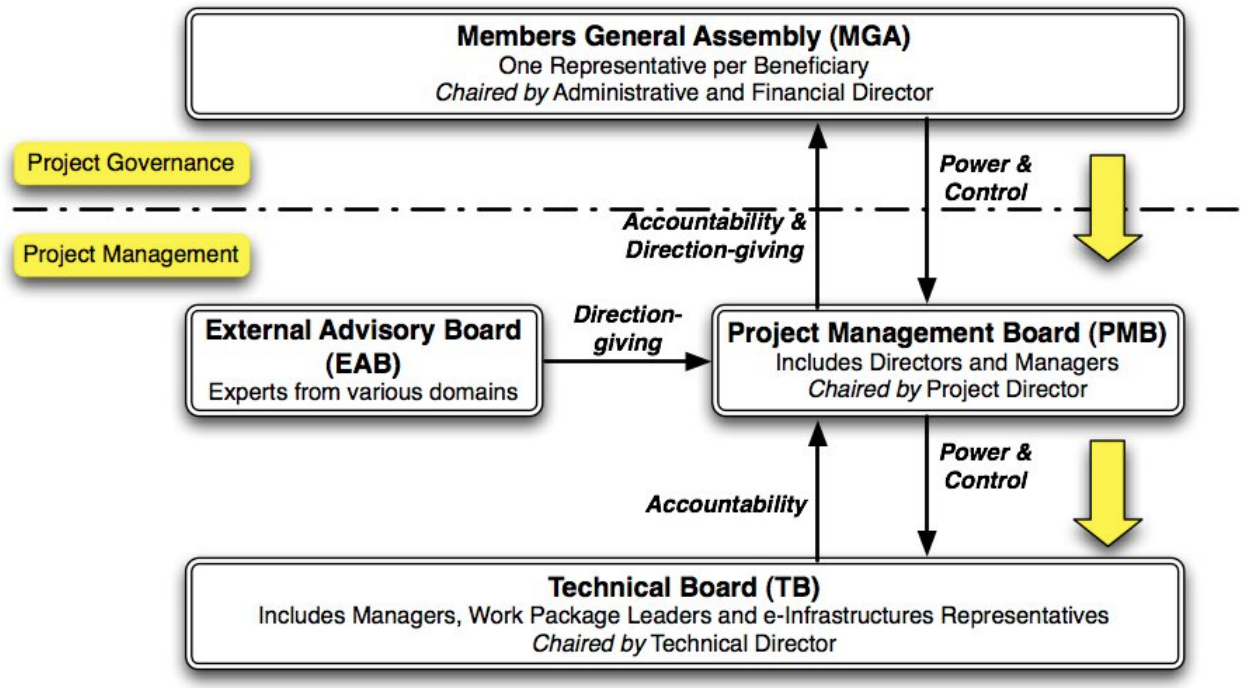

Figure 1. Project Governing Boards

2.1 PROJECT GOVERNANCE

The Project Governance operates through the Member General Assembly (MGA) while the Project Coordination is shared between the Administrative and Financial Director (AFD) and the Project Director (PD).
The Administrative and Financial Director is the recognized project Coordinator and serves as the official contact point for the European Commission. The AFD directs the administrative and financial management across work packages and reporting across partners. The AFD manages the Project Office in Sophia Antipolis where a dedicated staff supervises all administrative and financial operations and provides general project support. The AFD is assigned to Ms. Jessica Michel of ERCIM.
The Project Director leads the scientific and technical coordination of the project by supervising the project across all activities and is responsible for creating the conditions necessary for

successful and effective collaboration of the D4Science-II team. The PD's high-level view permits her to also serve as the ambassador of the project, establishing meaningful cooperation with other projects and initiatives at the national and international level. The PD is also responsible for the monitoring of the time schedule and the timing of related activities in close collaboration with the Technical Director. The role of PD is assigned to Donatella Castelli of CNR.

2.1.1 Members General Assembly

The Members General Assembly is responsible for decision-making affecting consortium composition, resource allocation, implementation of the work plan, and all other decisions having a direct legal or financial impact on consortium members. The MGA ensures that the EU contract is properly executed and that the terms of the agreed Consortium Agreement are properly implemented. It covers all aspects of the relations between partners, their responsibilities, liabilities, ownership of IPR, licensing, and exploitation issues.
The MGA encompasses one representative per partner and is chaired by the Administrative and Financial Director (AFD).
The members of the board will meet in person at least once per year, with telephone conferences convened as relevant issues arise. Electronic voting outside the annual meetings of the MGA is authorised.

2.2 PROJECT MANAGEMENT

The Project Management operates within a hierarchy of delegated responsibility, with all management functions providing support to project activities and for the accomplishment of the goals of the consortium.
The organisational chart depicted in the following figure represents the relationships between the project's boards and operations directors and managers.

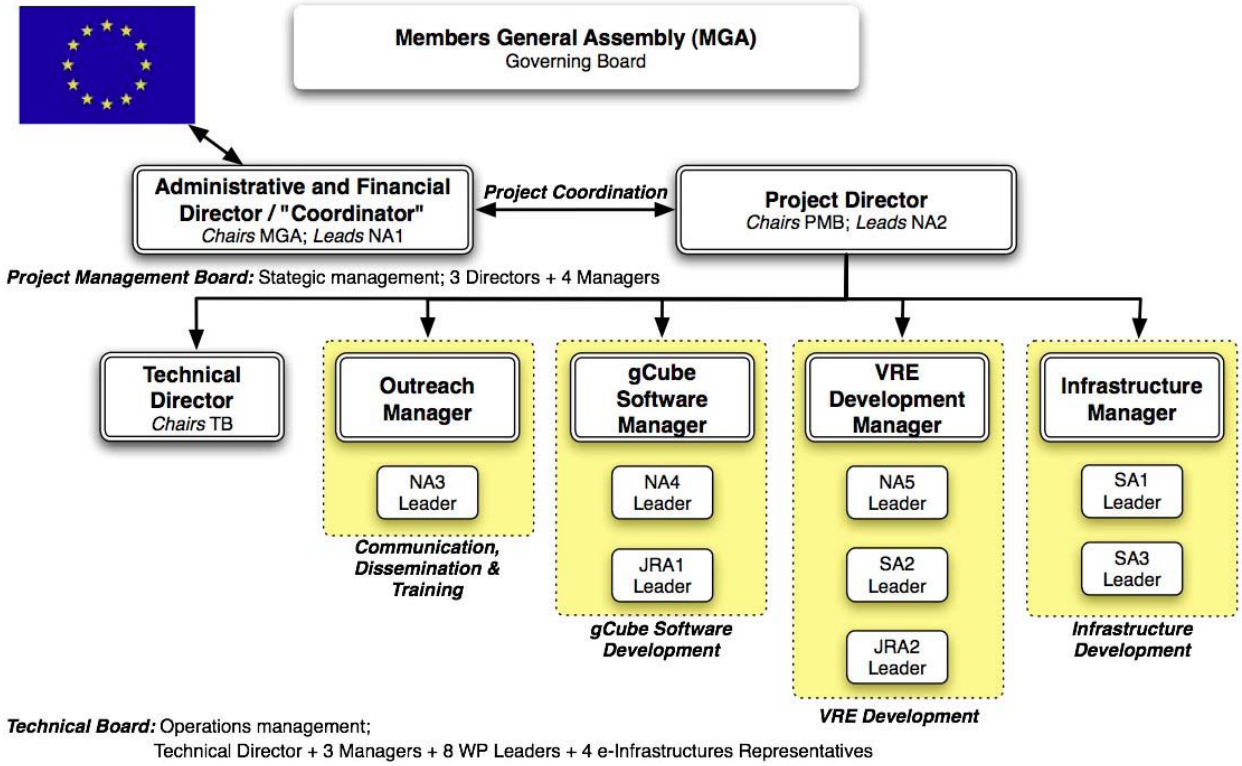

Figure 2. Project Management Structure

The Technical Director (TD) coordinates technical aspects across all activities (i.e., software development, VRE development, infrastructure development and outreach where relevant), surveying to ensure that the project managers provide the proper level of support to all work packages. The engagement of the Technical Director in multiple heterogeneous technical

activities makes him the best person to provide detailed resource allocation and scheduling, while monitoring the time schedule and the timing of related activities. Therefore, the Technical Director becomes a close advisor to the Project Director who employs a high-level approach to the supervision of the project across activities. In particular the TD coordinates on a day-to-day basis the progress of the technical work under the Technical Board following up decisions made by Consortium Bodies insofar as they affect the Activity Areas; communicates any plans, deliverables, documents and information connected with the Technical Board between its members and, if relevant, to the Project Management Board; submits the implementation plan of the Activity Areas to the Project Management Board for review and proposing an update of the Consortium Plan; advises the Coordinator of any discrepancy with the Consortium Plan, including any delay in delivery. The role of Technical Director is assigned to Pasquale Pagano of CNR.

The Outreach, gCube Software, VRE development, and Infrastructure Managers have the following general responsibilities:

- To be informed on the status of the work packages within his/her area;
- To support the TD in coordinating relationships across development areas;
- To advise the PMB on strategic decisions related to his/her activity area;
- To contribute to the tasks of the Technical Board.

Specifically, the Outreach Manager devises D4Science-II outreach strategy, while coordinating and supervising the work performed in the fields of Communication, Dissemination and Training. The role of Outreach Manager is assigned to Johannes Keizer of FAO.
The gCube Software Manager is responsible for gathering the requirements of the D4Science-II knowledge ecosystem, and the subsequent implementation of interoperable solutions. He must investigate and promote the usage of standards supporting several parts of the gCube system, from low-level communication protocols and encoding schemes, to data models to classification systems. Furthermore, the gCube Software Manager will contribute to the implementation of the project quality procedures by monitoring the related quality indicators and ensuring an appropriate management of related risks. The role of gCube Software Manager is assigned to George Kakaletris of NKUA.
The VRE Development Manager coordinates the involvement of the D4Science-II target communities in an iterative process for VRE configuration, testing and providing feedback; supporting and maintaining the resources for providing the VREs of the target scenarios; and providing the design and implementation of the case-specific needs for each scenario. The VRE Development Manager is the facilitator between the various communities, the developing technology and the infrastructure. Furthermore, the VRE Development Manager contributes to the implementation of the project quality procedures by monitoring the related quality indicators and guaranteeing an appropriate management of related risks. The role of VRE Development Manager is assigned to Leonardo Candela of CNR.
The Infrastructure Manager coordinates the operation of the infrastructure by overseeing the planning of the deployment of the infrastructure and the definition and enhancement of the procedures needed to ensure its proper functioning. The Infrastructure Manager coordinates cross work packages relations and issues resolution and report to the PMB on the status of these activities. Furthermore, the Infrastructure Manager contributes to the implementation of the project quality procedures monitoring the related quality indicators and ensuring an appropriate management of related risks. The role of Infrastructure Manager is assigned to Pedro Andrade of CERN.
Project managers are equipped with the necessary quantitative and analytical skills, tools, knowledge and decision-making capabilities to fulfil the functional responsibilities required for the achievement of the project work plan.
To assist them in accomplishing this goal, separate boards for strategy and operations are established. The Project Management Board formulates and leads the implementation of the overarching D4Science-II strategy, including the creation of synergies with other initiatives and long-term sustainability issues on which an External Advisory Board will provide guidance. The Technical Board leads the diverse technological activities encompassing the development and implementation of the D4Science e-Infrastructure, and consequently, the D4Science-II ecosystem.

2.2.1 Project Management Board

The Project Management Board (PMB) is the supervisory body of the project. It is designed to promote continuous sharing of project knowledge across all areas of activity and according to the defined work plan. In this way, the PMB can make informed decisions affecting the project strategy, while proposing and rapidly implementing corrective measures concerning the work plan in the emergence of delays or deviations.
Monitoring risk assessment and partner performance is an essential objective of the PMB and this will be performed through collaboration with the Quality Assurance Task Force.
The PMB is also responsible for the proper execution and implementation of the decisions of the Members General Assembly and it will apply recommendations from the External Advisory Board in order to improve or reorient project strategy.
The PMB is chaired by the Project Director for the duration of the project and includes all "Directors" and "Managers": the Administrative and Financial Director, Technical Director, Outreach Manager, gCube Software Manager, VRE Development Manager and Infrastructure Manager.
The PMB will meet in person at least two times per year, with telephone conferences once per month as a minimum. Electronic voting outside the bi-annual meetings of the PMB is authorised.
The Project Management Board shall prepare the meetings, propose decisions and prepare the agenda of the Members General Assembly.

2.2.2 Technical Board

The Technical Board (TB) manages the numerous technological activities encompassed by the develo3pment and implementation of the Project's Activity Areas, in particular with regard to:

- The timely delivery to the PMB and the Coordinator of:
  - o Reports about the activities and results of the project activities;
  - o Communication of delay in the performance of a project activity;
  - o Communication, analysis, and documentation of breach of responsibilities of any partner and a proposal of remedies;
  - o The proposals for the admission of new partners to the Grant Agreement and to the Consortium Agreement;
  - o Proposal of changes to the Annex I of the Grant Agreement;
- The formulation and approval of:
  - o An implementation plan for the project activities for the future period;
  - o Tasks and related budgets exchange between the partners in an Activity Area when such exchange has no impact beyond the scope of the Activity Area and its budget.

The TB is chaired by the Technical Director for the duration of the project and includes the gCube Software, VRE Development, and Infrastructure Managers; Work Package Leaders; and one representative for each of the interfaced e-Infrastructures (i.e. GENESI-DR, DRIVER, INSPIRE, and AquaMaps).
The TB will meet in person four times per year, with telephone conferences held every two weeks if deemed necessary by the TD. Electronic voting outside the quarterly meeting of the TB is authorised.

2.2.3 Sub-Project Committees

The project's managerial boards (i.e., PMB and TB) have the possibility of proposing to the Members General Assembly the formation of sub-project committees as needs are identified. Sub-project committees are intended to assist in the efficient undertaking of the work plan by bringing together selected representatives from the various consortium members on particular tasks, providing them with a forum for discussion and debate, with the mission of communicating the outcomes to the relevant audience. When approved, sub-project committees become informal bodies that define their own distinct rules for collaboration. At the present, the following D4Science-II sub-project committees have been formed:

• Technical Management Team (TMT): The Technical Management Team is simply comprised of the Technical Director, gCube Software Manager, VRE Development Manager and Infrastructure Manager, i.e., the people primarily responsible for the project's Service and Joint Research Activities. The TMT will meet by telephone on a weekly basis, promoting a very close collaboration between them and facilitating efficient knowledge exchange at all project levels.

The Technical Management Team may invite any person to attend a weekly discussion, depending upon the topic(s) at hand. The TD chairs the activities of the TMT;

• Technical Committee (TCom): The Technical Director leads cross-work package meetings for collaboration and alignment issues related to implementation of the knowledge ecosystem. These meetings between the participants of the project's technical work packages serve to discuss about progress of work and to brainstorm, and to address integration issues by the use of a working group methodology. The TCom is an extension of the Technical Board, and these face to face meetings are held in parallel with the quarterly meetings of the TB.

3 COLLABORATION TOOLS

In order to support the cooperation among the members of a widely distributed consortium such as D4Science-II, a comprehensive and complementary set of tools has been deployed at the beginning of the project. These tools range from mailing lists to shared workspaces, wikis, software repositories and issue trackers. Moreover, multiple instances of the same technology will coexist to properly satisfy the needs arising in different contexts, e.g. multiple instances of wiki will be created to host diverse information and thus serve different clientele. Thus, the same technology will be deployed in multiple instances conceptually leading to multiple tools tailored to serve specific D4science-II application scenarios.
In order to provide D4Science-II members as well as users with a complete, yet concise picture of what is available, a web page giving direct access to all of them has been implemented and made available through the project website.
This set of tools can be clustered in four main groups: *Projects*, *Technology*, *Infrastructure* and *Networking*. In the remainder of this section each group of tools is described.

3.1 PROJECT

The Project group of tools consists of various services strictly related to the operation of the project as a whole. In particular, the following services have been deployed:
• Collaborative Working Space Service
• Mailing List Service
• Research Infrastructures Administration Toolkit
• Quality Assurance Documentation Service

3.2 TECHNOLOGY

The Technology group of tools consists of various services strictly related to the machinery guaranteeing the operation of the D4Science-II Ecosystem, namely gCube and gCore technologies. In particular, the following services have been deployed:
• gCube System Web Site
• Issue Tracker System
• Code Repository Service
• Technology Documentation Service

3.3 INFRASTRUCTURE

The Infrastructure group of tools consists of various services strictly related to the operation of the D4Science-II Ecosystem. In particular, the following services have been deployed:
• Service Activity Documentation Service
• Monitoring Service
• Support Service

3.4 NETWORKING

The Networking group of tools consists of various services strictly related to the operation of the project as a whole. In particular, the following services have been deployed:
• Networking Documentation Service.

In the following paragraphs the principles of risk management are roughly established.

4 REVIEWS AND MEETINGS

4.1 REVIEW PROCEDURE

The aim of a technical audit or review is to assess the work carried out under the project over a project period (i.e. one year) and provide recommendations to the Commission.
Such review covers managerial, scientific, technological and other aspects relating to the proper execution of the project.
The mandate of the project is to ensure that project's external evaluators can review the degree of fulfilment of the project work plan for the period; the continued relevance of the objectives and breakthrough potential with respect to the scientific and industrial state of the art; the resources planned and utilised in relation to the achieved progress, in a manner consistent with the principles of economy, efficiency and effectiveness; the management procedures and methods of the project; the beneficiaries' contributions and integration within the project; the expected potential impact in scientific and technological terms, and the plans for the use and dissemination of results.

4.2 REVIEW RECOMMENDATIONS

At the end of the review meeting, the external evaluators prepare a report with their findings. This report contains an assessment of the facts as well as suggestions for further actions or changes. These recommendations and requested actions have to be properly addressed by the consortium.

4.3 MEETING PROCEDURES

The procedures described in this section apply to all meetings of the project governance and management boards. Meetings of project boards can be held by summit in a location identified by the chairperson of that project board, can be a teleconference, or can be organized by exploiting any other available telecommunication means.
Any member of a project governance or management board should be present or represented at any meeting of such project board. If his/her participation cannot be assured, he/she may appoint a substitute or a proxy to attend and vote at any meeting.
Moreover, the participation has to be cooperative and aimed to meet the needs of the project.
The meetings of the project boards can be ordinary or extraordinary and are convened by the chairperson of the board who shall give notice in writing of a meeting and prepare and send the final agenda to each member of that project board.
Any agenda item requiring a decision by the members of a board must be identified as such on the agenda.

5 RISK MANAGEMENT

The goal of the risk management activity is to provide the consortium with guidelines and instruments for managing the project actual and potential risks that can occur during the project lifetime.
In this report, the principles of risk management are roughly established in Appendix A, aiming to define the procedures that will render the activity an essential tool for safeguarding the project objectives. In accordance to the D4Science-II work plan, the details of risk management methodology are captured in a deliverable dedicated to this activity, DNA1.3 "Risk analysis and risk response" due project-month 3. As such, it is not the objective of the Quality Plan to define precise risk analysis metrics or to perform risk enumeration.
However the procedures described here will exploit Risk Management terms and procedures, whose contextual meaning is given in the aforementioned appendix.

5.1 RISK ANALYSIS

Risk Analysis (§A.2) procedure is carried out as part of DNA1.3 Deliverable production, orchestrated by the QATF. However as several individuals are involved in the preparation of this deliverable, who are also permanent participants of the Risk Management procedures, the tasks and steps of Risk Analysis have to be further defined a-priori. Overall the preparation of the risk management activity is accomplished as follows:
• Risk Methodology Development: QATF;
• Risk Analysis: The Risk Identification and Risk Evaluation require the involvement of a large number of persons in the procedure: activity managers, work package and task leaders, as well as Subsystem Managers[4] can support the collection of risks at their source/target.

The result of risk classification produces a full risk list that is placed at the disposal of D4Science-II consortium members for reference and is periodically updated and included in the Quarterly Reports.

5.2 RISK CONTROL

Risk Control (§A.3) involves three individual steps, starting from Risk Analysis output:
• The Risk Control Plan: should foresee the involvement of Activity Managers, work package and task Leaders, as well as Subsystem Managers. These members of the project work team closely follow all the activities of their area and they are the best candidates to identify the status of a risk and reduce its probability of occurrence or recover by a damage, by implementing the required countermeasures.
• The Risk Monitoring: which is performed continuously and formally tracked in the Quarterly Reports.
• The Risk Resolution: where proposals are led through the PMB and the rest of the project's mechanisms, after being pointed out by the QATF through the Quarterly Reports.

6 CONFLICT RESOLUTION

Conflict resolution in D4Science-II refers to situations that can potentially occur among elements of the project. Cases of conflict resolution can be found below:
- Partner(s) to partner(s) conflict within the scope of a single activity;
- Partner(s) with project management boards;
- Non-voting board conflict;
- Voting board conflict;
- Document conflict.

The above categories are not exhaustive.

6.1 DOCUMENT CONFLICT RESOLUTION

A completely different type of conflict is the one that can occur among documents of the project. In this case the following order is maintained:
- Grant Agreement;
- Consortium Agreement;
- Other document (deliverable, minutes, internal document exchange).

Unless an error is identified, deliverables approved by the project bodies prevail over all other internal documents. Otherwise meeting minutes formally circulated take precedence.

6.2 PARTNER CONFLICT RESOLUTION

The term "conflicting partners" is used but should be read in the sense of a single partner entering conflict with a governing or management board decision.
As D4Science-II is a collaborative project, its main concern is the maintenance of best relationships among its project's members as organizations, teams, and individuals.
Thus the general policy of conflict resolution is to suggest the conversation and smooth diminishment of any disagreement or concern without reaching the top-level project's instruments for final action. As such, voting, also escalated among different boards, is left aside as the last resort of resolution. Although it is a major concern of the project that even voted decisions are taken unanimously, it is enough that 2/3 approval is required for a decision to be taken. Yet, even in the case of non-unanimous voting it is considered that decisions have to be generally welcomed, thus post-voting deliberations
are suggested, if they can drive a full agreement under the light of the majority favored voted decision.
Within this conflict resolution chain, graphically depicted in the following diagram, the Members General Assembly (MGA) is the ultimate decision-making body that a decision can be taken within the project's limits. This board comprises one representative per partner. The Project Management Board (PMB) is the second board usually involved within this escalation procedure.

7 ACTIVITY REPORTING

Activity reporting assists project management, and the European Commission, to monitor project progresses, achievements and difficulties encountered. During the course of the project, activity reporting will be conducted in three forms: (*i*) *Quarterly Reports* prepared every three months by Managers and Directors; (*ii*) *Periodic Reports* prepared annually by Work Package Leaders and MGA members; and (*iii*) *Effort Reporting* prepared per partner and in parallel with Quarterly Report.

It is possible that partners will be requested to participate in other types of reporting throughout the project and after its completion. Examples of additional types of obligations include responding to: questionnaires for socio-economic reporting, implementation of gender actions, and impact on science and society; evaluation and monitoring exercises; contribution to standardization activities; etc.

8 DELIVERABLES

Deliverables are an important channel to communicate to the European Commission the project progresses and results. As a consequence the preparation of such documents is an important activity that should be properly monitored by the QATF.

In the actual Quality Plan, this section will describe the procedure identified to review project deliverables, the naming convention, the templates for such documents, and how to monitor the deliverables preparation.

9 MILESTONES

Project milestones are important tools to inspect the status of the project and the achievement of results. These tools are useful to present to the EC the achievement of results but are also useful to internally monitor the evolution of the project or of individual work packages. As a consequence, the achievement of project milestones should be properly monitored by the QATF.

In the actual Quality Plan, this section will describe the procedure to announce project milestones, the milestone naming convention, and how the QATF monitors the announcement of milestones.

10 APPENDIX A. RISK ANALYSIS METHODOLOGY

In the actual Quality Plan, this section will describe:

- Risk Management Methodology Principles;
- Risk Analysis;
- Risk Identification;
- Risk Evaluation;
- Risk Classification;
- Risk Analysis Plan;
- Risk Control (Planning, Monitoring and Resolution).