



Quality Assurance Plan Work Package 8 Task 8.2 Deliverable 8.2

Authors

Nikos Giatrakos, Antonios Deligiannakis
Athena Research & Innovation Center

 Project supported by the European Commission Contract no. 825070	WP8 T8.2 Deliverable D8.2	Doc.nr.: WP8 D8.2
		Rev.: 1.0
		Date: 28/06/2019
		Class.: Public



Distribution list:

Groups:	Others:
WP Leader: Athena Task Leader: Athena	Internal Reviewer Partner: Barcelona Supercomputing Center (BSC) INFORE Management Board INFORE Project Officer

Document history:

Revision	Date	Section	Page	Modification
0.1	25/05/2019	1,2,3,7 Appendices A, B, C	1-8,20,21-28	Creation
0.2	26/05/2019	4	9-12	Creation
0.3	27/05/2019	1,2,3,4	4-14	Figure, footnote, reference addition
0.5	29/05/2019	5,6	13-19	Creation
0.6	30/05/2019	All	All	Self-review
0.7	03/06/2019	-	-	Submitted for internal review
0.8	17/06/2019	All	All	Internal review comments incorporated
1.0	28/06/2019	All	All	Self-review, Final version

Approvals:

First Author: Nikos Giatrakos (Athena) Date: 03/06/2019

Internal Reviewer: Arnau Montagud (BSC) Date: 12/06/2019

Coordinator: Antonios Deligiannakis (Athena) Date: 28/06/2019
on behalf of the Management Board

 Project supported by the European Commission Contract no. 825070	<h3>WP8 T8.2 Deliverable D8.2</h3>	Doc.nr.:	WP8 D8.2
		Rev.:	1.0
		Date:	28/06/2019
		Class.:	Public



Table of contents:

1	Executive Summary	4
2	Introduction.....	5
3	Towards Quality Assurance: Information Flow, Communication Channels & Reporting Procedures	6
3.1	INFORE Teleconferences.....	6
3.2	INFORE Meetings	7
3.3	INFORE Emailing lists.....	8
4	Quality Assurance Procedures	9
4.1	Quality Assurance of Technical Results	9
4.2	Quality Assurance of Scientific Results.....	10
4.3	Quality Assurance of Project Documentation.....	10
4.3.1	Project Templates.....	11
4.3.2	Naming and Versioning	11
4.3.3	Internal Reviewing Process.....	11
5	Risks and Risk Management Procedures	13
5.1	Roles and Responsibilities in Risk Identification and Management.....	13
5.2	Risk Management Process.....	14
5.3	The Risk Management Registry	15
6	Conclusive Remarks	20
7	References.....	21
	Appendix.....	22
	Appendix A: Sample Meeting Agenda	22
	Appendix B: INFORE Deliverable Template	24
	Appendix C: INFORE Presentation Template	28

 Project supported by the European Commission Contract no. 825070	WP8 T8.2 Deliverable D8.2	Doc.nr.: WP8 D8.2
		Rev.: 1.0
		Date: 28/06/2019
		Class.: Public



1 Executive Summary

In accordance with the objectives of Work Package 8, this deliverable is dedicated to describing the conduction of continuous quality assurance activities for the operation of the project and the production of its scientific and technical results. Task 8.2 is concerned with the management of the quality of the produced deliverables, software, and other project outputs throughout the project's lifespan. Moreover, the current deliverable examines potential risks and risk management procedures.

Quality assurance is about verifying that the project processes are adequate to lead to high-quality outputs. The plan foresees quality assurance procedures of technical results, scientific results, reports and deliverables that are produced by INFORE. Information flow, communication and reporting are described as quality process monitoring tools.

Risk management is also considered as an aspect of quality, since risks that are unforeseen or remain unmanaged can severely affect both technical and scientific progress, let alone its quality. The project risk management methodology includes the steps for conducting risk identification, risk assessment, determination of risk response strategies and risk monitoring processes. The objectives of project risk management are to decrease the probability and impacts of events or circumstances adverse to the project success. Risks are identified and assessed by all partners, while the risk management process is orchestrated by the Project Coordinator. Every identified risk is evaluated and tagged with a probability and impact and is accompanied with a specific avoidance and/or mitigation plan. A Risk Management Registry is created and updated throughout the projects lifespan to systematically document the identified risks together with their assessment and mitigation strategies.

The procedures described in the present document are in line with current best practices in project management and they are well suited to the project, i.e., they are effective and do not require excessive quality control overheads.

 Project supported by the European Commission Contract no. 825070	WP8 T8.2 Deliverable D8.2	Doc.nr.: WP8 D8.2
		Rev.: 1.0
		Date: 28/06/2019
		Class.: Public



2 Introduction

The purpose of the Quality Assurance Plan is to provide a single point of reference on the quality assurance processes during INFORE. The current deliverable describes how the project executes its day-to-day activities from a quality perspective, ensures that uniform quality control procedures are defined, and their execution is continuously monitored. It exposes the proposed risk management approach of the project for managing and controlling all project risks. Moreover, this plan prescribes the roles and responsibilities of the partners with respect to risk management, risk identification, as well as risk assessment and mitigation plans.

The use of the present guidelines ensures better collaboration among the consortium partners during risk identification and mitigation. This deliverable is to be used by all project partners in order to ensure quality assurance of project processes and outputs and prevent possible deviations from the project work plan.

In our quality assurance approach, we consider information flow, well-established communication channels and frequent reporting activities as prerequisites to achieve high quality results in the scope of INFORE. We therefore start our discussion in Section 3 by outlining relevant procedures that have been prescribed and are implemented in INFORE.

In Section 4, we present the quality assurance procedures that are used in delivering technical and scientific results in the scope of the project as well as make sure that high quality documents are produced. In a nutshell, to achieve high quality technical results, an agile development model is used, functional and non-functional requirements are taken into consideration in the scope of the project's use cases, quality checks on software pieces are provisioned in white, grey or (when the other two are not possible to implement) black box fashion. With respect to the scientific results of the project, their quality is measured in terms of the reputation of their publication venues and their documentation within the scope of the respective project deliverables. Finally, the deliverables and presentations of the project abide by respective templates. Deliverables, in particular, undergo a well-defined internal reviewing process. All the above are assisted by project collaboration platforms and tools for creating an open source code repository, perform version control, issue and version tracking.

Section 5 is devoted to risks and risk management procedures. It describes the roles and responsibilities in risk identification and management. It outlines the risk management process and provides a Risk Management Registry for INFORE. Finally, Section 6 includes conclusive remarks.

 Project supported by the European Commission Contract no. 825070	WP8 T8.2 Deliverable D8.2	Doc.nr.: WP8 D8.2
		Rev.: 1.0
		Date: 28/06/2019
		Class.: Public

3 Towards Quality Assurance: Information Flow, Communication Channels & Reporting Procedures

Information flow, throughout the project lifetime, among the project partners is considered as a prerequisite for achieving high quality collaborative work conducted in INFORE. Therefore, in this section we start by describing the channels that have been established at the various levels of project management to make sure that quality control is performed, and potential risks are identified early, as well as appropriate mitigation measures are applied in a timely manner.

3.1 INFORE Teleconferences

The INFORE consortium participates in teleconferences (telcos for short), via the FreeConferenceCall platform¹, typically on a bi-weekly basis. A timeslot has been reserved by all partners which currently corresponds to every second Friday at 10:30 CET. In these telcos, at least one participant per project partner is connected. Typically, the context of each telco involves:

- An agenda that is compiled and disseminated by the Coordinator, four working days before the telco, with topics related to the progress of short- and medium-term objectives of the project as well as administrative and project management issues.
- A progress report by each partner individually with respect to the project tasks they lead and/or participate to, working papers and of software components that are being developed.
- Additional topics per partner request.

The Coordinator keeps notes (minutes) of the main discussion points of each telco and uploads them to the internal project collaboration page that has been set using the cloud version of Atlassian Confluence², immediately after the end of the telco. Figure 1 illustrates a snapshot of bi-weekly telco notes that have been uploaded at Confluence.

In that, the context with respect to all discussed points, including potential risks or conflicts on technical or scientific issues, is tracked and made known to the whole consortium. Minutes shall be deemed to be approved if no objection has been sent to the Coordinator within seven working days from the date of their upload at Confluence.

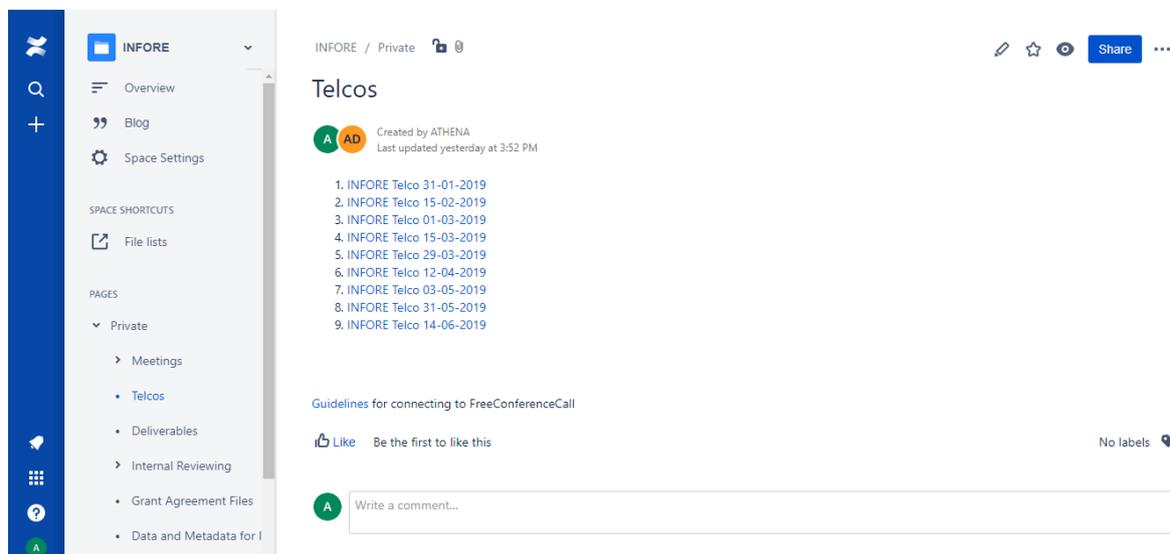


Figure 1: Snapshot of Bi-weekly Telco Notes Uploaded at Confluence

¹ <https://www.freeconferencecall.com/>

² <https://www.atlassian.com/software/confluence>

 <p>Project supported by the European Commission Contract no. 825070</p>	<h2>WP8 T8.2 Deliverable D8.2</h2>	Doc.nr.:	WP8 D8.2
		Rev.:	1.0
		Date:	28/06/2019
		Class.:	Public



Besides regular telcos as described above, every partner retains the right to ask for a bipartite call with other partners of the project. For instance, it is often convenient for technical partners (such as ATHENA, NCSR, RapidMiner) to discuss use-case related, domain-specific issues with use case partners (BSC, MT, Spring). Such calls take place separately at the end of the regular telcos or at another appointed date and time.

3.2 INFORE Meetings

Besides the regular telcos, it is important for the consortium as a whole to meet in person, presenting their work in detail, collaborate on future work according to the workplan or even organize coding camps to more quickly advance on technical matters regarding the INFORE architecture. The INFORE meetings plan has been built since the project's kick-off meeting with all scheduled meetings appointed, approximately, every four months as shown in Figure 2. This meeting plan remains subject to slight modifications per project partner request, but the consortium is aware about it and has approved it.

Meetings: Plan Approved

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	
		1,2,3,7,8			7,8						4,6				1,4,5,6		1,2,3,7,8						6						7		1,4,5,6					ALL
ATHENA (Jan 16-18)				CRG (May 8-10)			SPRING (Sept 2-3)			NCSR (Jan 20-22)			CMIRE (May 11-13)			Review? (Sept 7-11)		RM (Early Dec)		EDBT Work. (Mar 22-26)		MT (MidJune)		BSC (mid Sep)												

Figure 2: INFORE Meetings approximately every four months. The third table row shows deliverables to be submitted per month. M1-M36 of the project are shown in the first table row. Gray/orange cells denote months when deliverables are prepared/submitted. The meeting dates (fourth row) are accompanied by the plenary meeting organizer.

All participants are reminded of plenary meeting dates 30 days in advance. An agenda is compiled and disseminated to project partners by the Coordinator no later than two weeks before the meeting. The template and an exemplary agenda used in INFORE kick-off meeting is included in Appendix A. Each project partner is expected to present the progress made in the WPs they lead and/or the tasks they participate, but the Coordinator also notes desired current topics that the partners should cover in their presentation according to the project's workplan.

At the end of each INFORE meeting and no later than two working days after the completion of a plenary meeting, at least the following files are uploaded at the project's collaboration page at Confluence:

- Presentations (.pptx, .pdf files) given by each participant.
- The meeting agenda, as described above.
- Minutes of the meeting are provided to the partners. Minutes shall be deemed to be approved if no objection has been sent to the Coordinator within seven working days form the date of their upload at Confluence.

 <p>Project supported by the European Commission Contract no. 825070</p>	<h2>WP8 T8.2 Deliverable D8.2</h2>	Doc.nr.:	WP8 D8.2
		Rev.:	1.0
		Date:	28/06/2019
		Class.:	Public



The template for the minutes is the same as for the meeting agenda, i.e., minutes are included for each agenda item. Besides the above files, additional material may become available to the project partners. For instance, the last day of the INFORE's kick-off meeting, a workshop was organized internally, where RapidMiner presented their products and tools that are related to INFORE's vision. Video material about the workshop was made available to all project partners.

3.3 INFORE Emailing lists

To further ease communication within the consortium the following mailing lists have been created and used for relevant matters as noted below:

- General project list: infore-all@googlegroups.com
- Management board list: infore-mb@googlegroups.com
- Financial management board list: infore-finance@googlegroups.com

 Project supported by the European Commission Contract no. 825070	WP8 T8.2 Deliverable D8.2	Doc.nr.: WP8 D8.2
		Rev.: 1.0
		Date: 28/06/2019
		Class.: Public

4 Quality Assurance Procedures

We distinguish the following categories of the quality assurance procedures in the project:

- Procedures related to the quality of technical results
- Procedures related to the quality of scientific results
- Procedures related to the quality of the reports provided throughout the project’s lifespan.

4.1 Quality Assurance of Technical Results

Figure 3 provides a generic illustration of the develop and test approach in the project, which mostly resembles the agile software development model. Use case data and requirements, also accounting for human needs and expectations, are the input to the software development process. Development stages progress according to our workplan so that the intended results are aligned with the specific objectives of INFORE. Throughout the development cycles, outcomes undergo small to large-scale monitoring, testing and evaluation phases. INFORE’s integrated prototypes and pilots, as prescribed in the Grant Agreement, having been qualified via technological evaluation (including benchmarking) and testing, yield the project’s actual results that subsequently undergo human factor evaluation. Overall, the evaluation of the actual results can provide feedback at certain software implementation stages.

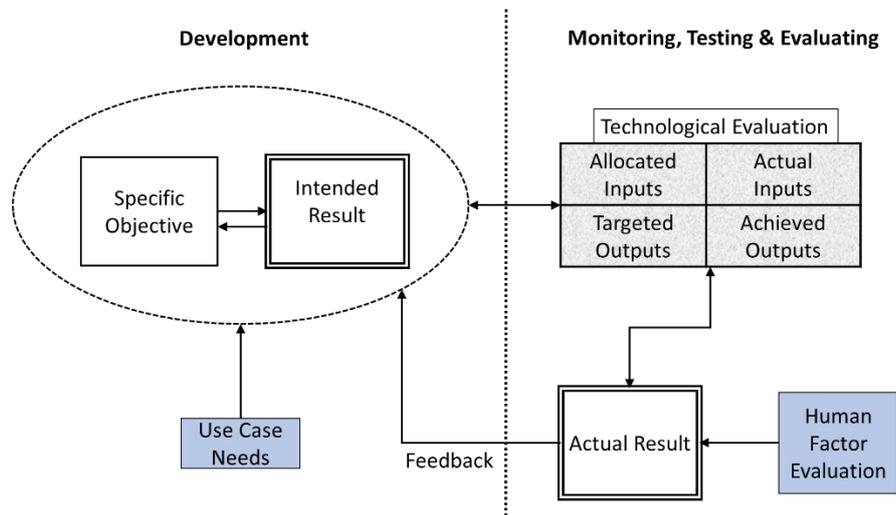


Figure 3: INFORE's Develop and Test Cycles

As shown in Figure 3, the types of testing applied in INFORE involve both functional and non-functional aspects by incorporating human factor evaluation in the iterative development process. Functional and non-functional requirements are included in the software development lifecycle by engaging expert users in the development process. The results of tests related to non-functional requirements are captured both by the dissemination of questionnaires to be filled-in by expert users at different stages of the project and by opting for expert user interviews in their workplace or mimic equivalent. Relevant reports are to be provided in the corresponding deliverables of Work Packages 1-4.

INFORE employs a mixture of testing strategies. For the algorithms that will be invented and developed in the scope of the project a white box strategy will be employed, i.e., quality assessment and evaluation will be performed on the code and the internal structure of an INFORE asset.

For algorithms and pieces of code that are already used by use case partners, which constitute part of well-known (open-source) algorithms in respective fields and where INFORE aims at optimizing their parameterization or their distributed execution over HPC infrastructures and different Big Data platforms, a grey box strategy may be employed, i.e., quality assurance and evaluation will be performed in areas of the code concerning how these algorithms interact with INFORE components, but without deep intervention on their internal program functions and

 <p>Project supported by the European Commission Contract no. 825070</p>	<h2>WP8 T8.2</h2> <h3>Deliverable D8.2</h3>	Doc.nr.:	WP8 D8.2
		Rev.:	1.0
		Date:	28/06/2019
		Class.:	Public



operation. A representative example of where the grey box approach may be applicable are the biological use case scenarios where one of the aims is to predict and cease running cancer evolution simulations yielding unpromising results with respect to the success of applied drug combinations. Respective simulation frameworks such as PhysiCell³ [1], MaBoSS [2], PhysiBoSS⁴ [3] may be treated as grey boxes where appropriate.

Finally, in cases of algorithms or products that may be used within organizations, such as products incorporating respective algorithms used for market analysis in the financial use case, evaluation will be performed using a black box approach, i.e., examine the functionality of the algorithm, inspect its output given a certain input, but without peering into its internal structures or workings. In a nutshell, the above approach ensures that the quality assurance process emphasizes on the outputs of the project itself and does not become chaotic by unnecessarily expanding to every possible algorithm that may be plugged in any given, user-defined workflow.

With respect to version control and tracking tools, a public code repository for INFORE's open source code is available using Atlassian BitBucket⁵, while Atlassian Jira⁶ is used as the version control, issue and project tracking platform. Both these tools easily interplay with the project's collaboration page at Confluence.

Additional measures for improving the quality of technical results involve:

- Coding camps that will be organized on the last day of certain INFORE plenary meetings so as to better coordinate the pluggability and interplay of the various components developed within the scope of the project and more quickly advance on technical matters. The organization of such coding camps will be decided by the General Assembly during the immediately preceding plenary meeting so that targets are set and progress in the various software pieces under development is made in the meantime. At least one expert in technical aspects and a developer per project partner needs to be present in every coding camp.
- Since open source versions of the code will be available and will be continuously updated, the base of potential testers of the quality of technical results is amplified.
- Demonstrations of the functionality of the publicly available open source code will be made at top-tier conferences and at industry related events, as prescribed in INFORE's Grant Agreement and dissemination plan.

The quality of technical results is further guaranteed by the fact that the development of the INFORE architecture is led by RapidMiner, which is a world-class leader with extensive experience in delivering relevant products. INFORE will incorporate such experience applying best practices and guidelines for developing related algorithmic families, infrastructure setup and configuration.

4.2 Quality Assurance of Scientific Results

The scientific results of the project, including novel algorithms and use case specific studies, will be confirmed by their publication to top-tier, peer-reviewed scientific journals and conferences, according to the project's dissemination plan as described in the Grant Agreement and Deliverable D7.2.

In cases when well-known algorithms and models are applied, adapted or extended within the scope of INFORE's use cases, their use will be well-documented and reasoned about within the corresponding deliverables in a per use case manner (WP1 – WP3).

4.3 Quality Assurance of Project Documentation

This section is devoted to the description of the procedures that are followed in order to ensure the high quality of reports produced in INFORE.

³ <https://github.com/MathCancer/PhysiCell>

⁴ <https://github.com/sysbio-curie/PhysiBoSS/wiki>

⁵ <https://bitbucket.org/>

⁶ <https://www.atlassian.com/software/jira>

 Project supported by the European Commission Contract no. 825070	WP8 T8.2 Deliverable D8.2	Doc.nr.:	WP8 D8.2
		Rev.:	1.0
		Date:	28/06/2019
		Class.:	Public



4.3.1 Project Templates

4.3.1.1 Deliverable Templates

A general template for project deliverables has been created and is available for the partners at Confluence. This template is provided in both .docx and latex format and presents a basic common structure to all deliverables, including the mandatory elements: front page, document history, table of contents, executive summary, introduction, conclusions and references. The document provides also a number of heading formats and text formats that must be respected, as well as a unified format for inserting annexes. A sample of the deliverables' template is included in Appendix B.

4.3.1.2 Presentation Templates

A template for the INFORE presentations taking place in plenary meeting and dissemination events has been created and made available to the partners at Confluence. The template is provided both in Microsoft PowerPoint and Latex Beamer format. All INFORE project presentations to any internal or external entity to the project shall adhere to this template. A sample of the presentations' template is included in Appendix C.

4.3.2 Naming and Versioning

In general, the documents shall be named so that the following information can be distinguished: document identifier, title. In particular, the file name of project deliverables will include the deliverable (unique) identifier along with its title, for instance:

D8.1 Ethics Management Plan.docx

for final, submitted versions, and

D8.1 Ethics Management Plan_PartnerShortName.docx

for partner revisions/contributions/comments during the internal reviewing process. In case of successive edits by several partners multiple partner short names shall be appended in the document name. For instance:

D8.1 Ethics Management Plan_Partner1ShortName_Partner1ShortName.docx

Further document versioning is not needed since Confluence keeps versions of documents uploaded under the same name anyway.

4.3.3 Internal Reviewing Process

INFORE deliverables are reviewed and accepted in three stages:

- **Acceptance by WP Leader:** each partner will submit the deliverables assigned to them to the relevant WP Leader. The WP Leader decides either to accept the deliverable and pass it on to the next stage of acceptance discussed below or to provide the partner with instructions for improvement and date for re-submission.
- **Internal review by additional consortium members:** This stage begins at least four weeks before the deliverable submission deadline to the EC. For each of the project WPs, the Project Coordinator has assigned one additional consortium member as the internal reviewer for the deliverables of that WP. The internal reviewer should complete the process, at the latest, two weeks before the deliverable submission deadline, providing comments and suggestions for improvements. In case the deliverable is not accepted by the internal reviewer altogether, the Coordinator forwards comments to the WP Leader responsible for the deliverable, such

 <small>European Commission Horizon 2020 European Union Funding for Research & Innovation</small>	Project supported by the European Commission Contract no. 825070	<h2 style="margin: 0;">WP8 T8.2</h2> <h2 style="margin: 0;">Deliverable D8.2</h2>	Doc.nr.:	WP8 D8.2
			Rev.:	1.0
			Date:	28/06/2019
			Class.:	Public



that the deliverable is updated accordingly. The updated version of the deliverable should be then sent for acceptance to the Project Coordinator.

- **Acceptance by the Project Coordinator.** The project coordinator reviews the deliverables based on their objectives noted on the Grant Agreement (GA) and in accordance with the task, work package and project goals. In case a deliverable is not accepted, the Coordinator will provide, no later than a week before the deliverable submission deadline, the relevant WP Leader with instructions for improvements and a date for its re-submission for another review round by the Coordinator.

The internal review process is completed upon the submission of the corresponding deliverable to the European Commission using the participants' portal. The aforementioned three stage process is visible to the consortium as a whole, being tracked using the projects collaboration page at Confluence, as shown in Figure 4. Confluence supports document versioning and maintains documents' history.

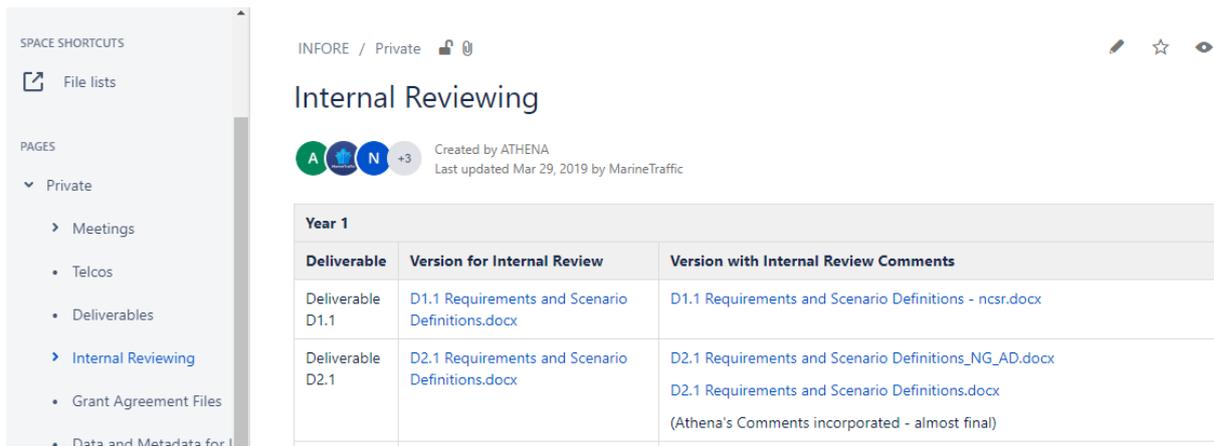


Figure 4: INFORE's Internal Reviewing Process at Confluence

Table 1: Internal reviewer assignment of deliverables per WP

Work Package	Work Package Leader	Internal Reviewer	Final Approval
WP1	Barcelona Supercomputing Center	NCSR Demokritos	ATHENA
WP2	Spring Techno	ATHENA	ATHENA
WP3	MarineTraffic	RapidMiner	ATHENA
WP4	RapidMiner	NATO CMRE	ATHENA
WP5	ATHENA	SpringTechno	ATHENA
WP6	NCSR Demokritos	MarineTraffic	ATHENA
WP7	MarineTraffic	Center for Genomic Regulation	ATHENA
WP8	ATHENA	Barcelona Supercomputing Center	Board

 <p>Project supported by the European Commission Contract no. 825070</p>	<h2>WP8 T8.2 Deliverable D8.2</h2>	Doc.nr.:	WP8 D8.2
		Rev.:	1.0
		Date:	28/06/2019
		Class.:	Public



Table 1 includes information about the WP Leader and the internal reviewer for the deliverables of each WP, according to the current internal reviewer assignment made by the Coordinator.

The internal reviewer has to check the quality of the deliverable concerning the issues listed below.

- Ensure conformance of the Deliverable to the Description of Action
- Check the document for
 - Clear and concise structure
 - Executive summary
 - Introduction / references to related documents
 - Check for references: text copied without reference
 - Formal presentation: document template used consistently
- Recommend corrective actions if necessary in the form of comments on the .docx or .pdf file.

5 Risks and Risk Management Procedures

5.1 Roles and Responsibilities in Risk Identification and Management

As described in the GA, the Project Coordinator is responsible for all risk-related issues; however, each member of the consortium is responsible for informing the Project Coordinator of any contingencies that might have negative impacts on the success of the project.

The General Assembly is composed of senior representatives of each INFORE partner and is chaired by the Project Coordinator. The members of the General Assembly convene at least once in every 6 months. The project coordinator may call for an extra meeting of the General Assembly should any emergencies arise. General Assembly meetings include discussion of the day-to-day activities and progress. Special emphasis is given to the issue of inter-relations between WPs. For the Annual Review and Final Assessment, specific review meetings are organized involving the assembly and representatives of the European Commission.

In each WP, three levels of guidance are deployed in the project: overall technical coordination (by the Project Coordinator), WP coordination (by the WP Leader) and Task coordination (by the Task Leader). The task guidance is implemented by expert scientists in the specific scientific topic of the task. The WP Leaders are responsible for the achievement of the overall WP objectives, enabling that the different tasks match and are coherent with each other. Each WP Leader is obliged to prepare and send an internal partner quarterly report to the Project Coordinator. Each WP Leader oversees the tasks performed in the relevant WPs on the operational level and report to the Project Coordinator. In particular, each WP Leader has the following tasks:

- Inform the Coordinator of the project progress status, results obtained, and problems encountered, work scheduled, decision and questions and to implement decisions taken by General Assembly.
- Collect the information needed for the periodic progress reports and deliver these to the Coordinator.
- Facilitate the exchange of information between the WP participants.
- Organization and chairing of WP meetings at specific timeslots of the INFORE plenary meeting in accordance to the disseminated meeting agenda. WP meetings can be coupled to General Assembly meetings if necessary. Other WP related technical meetings would be organized by the WP leaders, when necessary.

The Project Coordinator along with RapidMiner, WP Leader of WP4, who builds INFORE’s architecture, will be responsible for the alignment of different WPs inputs and outputs and technical coherence.

 <p>Project supported by the European Commission Contract no. 825070</p>	<h2>WP8 T8.2</h2> <h3>Deliverable D8.2</h3>	Doc.nr.:	WP8 D8.2
		Rev.:	1.0
		Date:	28/06/2019
		Class.:	Public

5.2 Risk Management Process

Figure 5 illustrates the Risk Management Process in INFORE. Risk Identification is performed by the Coordinator, General Assembly, WP and Task Leaders according to their management responsibilities as described in Section 5.1.

Risks are issued in a Risk Management Registry by the Project Coordinator. This register will be accessible to all partners through Confluence. The Risk Management Registry contains the following information: Risk Number, Description, concerned WP and proposed risk avoidance or mitigation measures.

Risk assessment for risks that are issued in the register follows by categorizing a risk as of High, Medium or Low Impact as well as estimating the probability of its occurrence. For risks involving the results of the project as a whole, i.e., span multiple WPs, the Project Coordinator and the General Assembly are responsible for Risk Assessment. Risks that are related to particular WP (e.g., at the task/deliverable level), the Project Coordinator works in collaboration with the WP Leaders to estimate their probability and impact. It is the responsibility of all INFORE partners to contact the Coordinator as soon as a previously unforeseen or occurred risk comes to their attention. If any new risks are identified by a partner, they will be analyzed as those on the original risk list and then added in the register.

For foreseen risks, two types of Risk Treatment are applied. Initially, if possible, avoidance measures are prescribed in the Risk Management Registry. Avoidance measures may be accompanied by mitigation measures in case avoidance is not achieved. Foreseen risks that may arise are accompanied by prescribed mitigation measures.

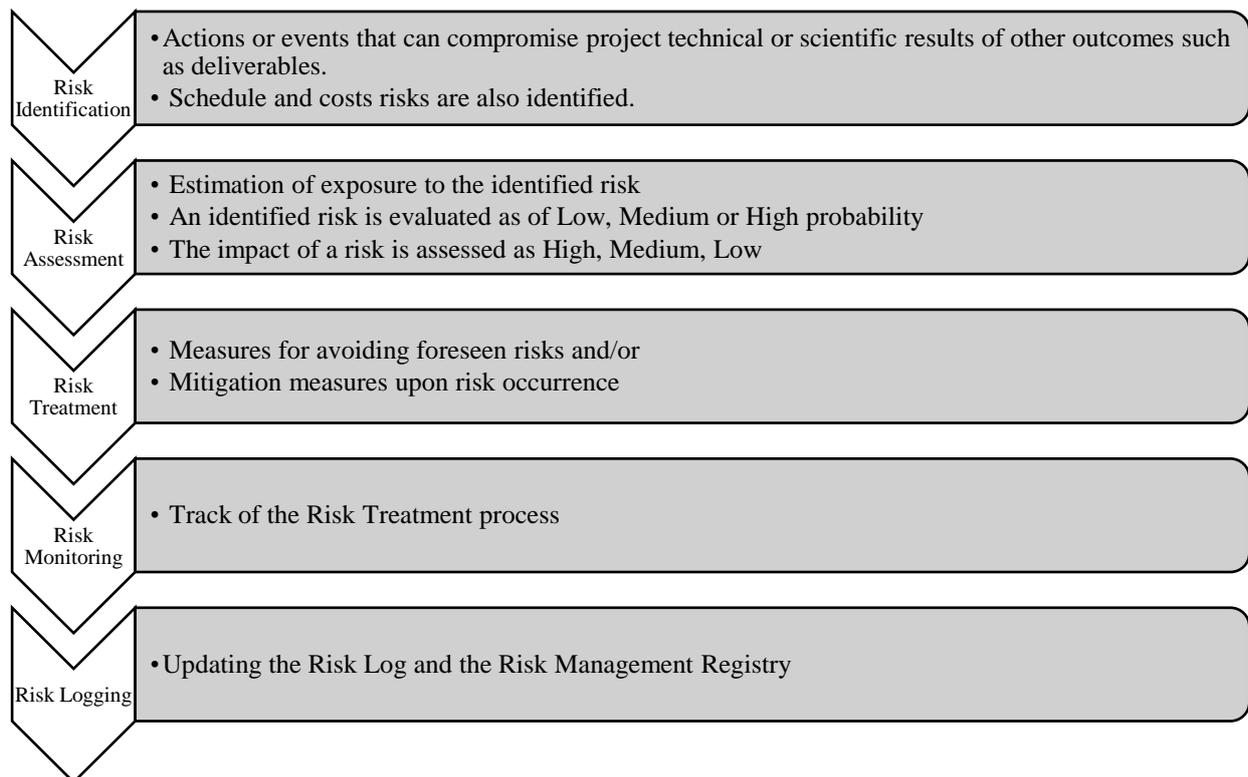


Figure 5: Risk Management Process in INFORE

Risk Monitoring involves the application of the avoidance and/or mitigation measures that are prescribed for each risk issued in the Risk Management Registry. The status and effectiveness of each risk and mitigation are judged and the Coordinator or WP Leader accordingly updates the Risk Management Registry. All responsible partners, as described above, make sure that the avoidance or mitigation measures are implemented. If a prescribed measure is proven not effective, Risk Assessment and Risk Treatment are repeated.

 <p>Project supported by the European Commission Contract no. 825070</p>	<h2>WP8 T8.2</h2> <h3>Deliverable D8.2</h3>	Doc.nr.: WP8 D8.2
		Rev.: 1.0
		Date: 28/06/2019
		Class.: Public



Logs about updates of the Risk Management Registry are automatically maintained by Confluence itself and are visible by all partners.

5.3 The Risk Management Registry

Part of the Risk Management Registry has been submitted, reviewed and approved together with the project proposal and is included in Grant Agreement Annex 1 – Description of the Action (part A). A version of that part of the Risk Management Registry is included here, appropriately updated, given the developments in the project, where needed. The Risk Management Registry is expanded with more detailed risk identification and avoidance/mitigation measures.

Risk Number	Description of risk (indicate level of likelihood & impact: Low/Medium/High)	Work package(s) involved	Proposed risk avoidance and mitigation measures
Generic Risks			
R1	Consortium is not harmonious <i>(high impact, low probability)</i>	All	In such a case, the General Assembly will take actions to ensure that appropriate communication channels are established among the partners. The mitigation of these risks will be the responsibility of the General Assembly (as will be the monitoring of all related situations).
R2	A partner leaves the consortium <i>(low impact, low probability)</i>	Depends on partner and assigned work package(s) /tasks	The assembled consortium has scientific and managerial know-how to permit a seamless coverage. The General Assembly will decide how the non-covered project activities can be carried out by another INFORE partner; if this is not possible, another appropriate partner will be recruited.
R3	Under estimation of project effort <i>(high impact, low probability)</i>	Any	The Coordinator and the General Assembly closely monitor the planned effort in a per WP fashion, while the WP Leader does the same for each task. Internal reports are provided quarterly, and relevant issues are discussed on par with INFORE's plenary meetings to evaluate any such issue and assess its consequences.
R4	Data Sets not available <i>(high impact, -)</i>	WP1, WP2, WP3	Closed: Data has been made available since Day 1 of the project. The use case partners have provided the rest of the consortium with data, descriptions and drivers to download/produce simulation (in WP1), financial (in WP2), AIS and acoustic, Sentinel-1, Sentinel-2 data (in WP3).
R5	Diverging technical objectives <i>(high impact, -)</i>	WP4, WP5, WP6	Closed: all technical partners have agreed on technical matters and currently work on developing low-scale prototypes.
R6	Unexpected difficulties in the implementation efforts or time-schedule <i>(high impact, low probability)</i>	Any	We will ensure that a phased, iterative development is carried out and that software is available early on, and thus delays will not halt progress. The General Assembly will carefully monitor the budget/resource consumption. If needed, budget and resources will be reallocated.
R7	Consensus on technical interoperability issues is not achieved	WP4	The Coordinator and WP leaders are in charge of continuously assuring that all development work is not diverging from the above guidelines (this process is being monitored by the coordinator). For risk avoidance, the INFORE's architecture is

 <p>Project supported by the European Commission Contract no. 825070</p>	<h2>WP8 T8.2</h2> <h3>Deliverable D8.2</h3>	Doc.nr.:	WP8 D8.2
		Rev.:	1.0
		Date:	28/06/2019
		Class.:	Public



	<i>(high impact, low probability)</i>		prescribed as pluggable by design. In case the risk is materialized, it can be mitigated by different lightweight connectors for INFORE's pluggable architectural components can be created so that interoperability is achieved in any case.
R8	INFORE solutions do not meet service provider and/or end user expectations <i>(high impact, low probability)</i>	WP1, WP2, WP3, WP7	For risk avoidance purposes, expert users are engaged in various project phases so as to capture their requirements and expectations. Based on these, feedback is provided in subsequent project implementation rounds. The technical work package leaders are in charge of continuously ensuring that the project's evolutionary approach is respected. They increase the number of expert user participants if needed to mitigate the risk and perform additional implementation-micro-benchmarking-user feedback rounds. The Project Coordinator and the General Assembly are of assistance, if needed.
R9	Deliverables are delayed or are of low quality <i>(high impact, low probability)</i>	All	The internal reviewing process starts four weeks before the deliverable submission deadline to avoid such risks. In case delays occur, telcos are organized under the supervision of the Coordinator, micro-management procedures are applied assigning particular sections of the deliverable to specific, involved partners with short-term, strict deadlines. The internal reviewing process is performed in parallel on versions of the deliverables provided according to these deadlines.
R10	Required computing hours during test and develop phases are not reserved on time <i>(high impact, low probability)</i>	All	Access to MareNostrum is possible through the European programme PRACE, which manages access to 80% of its computing hours. In case applications for reserving computing hours are not timely submitted to PRACE by the INFORE Consortium, there is a low probability of not acquiring enough resources during develop and test phases of the project. The risk will be avoided by submitting respective requests well ahead of time. In case the risk arises, until reserving enough resources at MareNostrum, access rights to alternative HPC infrastructures where the Consortium may have access (such as https://hpc.grnet.gr/en/ , https://www.bsc.es/marenostrom/minotauro) will be exploited.
Life Sciences Use Case			
R11	Simulations' Specification and Scenario Definitions are unclear <i>(high impact, low probability)</i>	WP1	To avoid having the risk affect the project implementation, Deliverable D1.1 has been submitted on Month 3 of the project. Moreover, regarding the utilized datasets a version of the data management plan (Deliverable D8.3) has been created on Month 6 of the project. All partners have gone over the deliverable and have obtained a clear picture of all major use case aspects. In case more questions arise, telcos are organized among the involved project partners and dedicated time slots are devoted during plenary meetings to mitigate the risk.
R12	Multi-cellular Model Calibration and Testing does not improve existing baseline models. <i>(medium, low probability)</i>	WP1	More effort will be put in investigating and extracting features that are the most crucial for model calibration. The number of simulation trials will be increased. More data sources regarding combinational drug therapies will be employed.
R13	Difficulties in incorporating dynamic cell-cycle	WP1	In case this is technically difficult to achieve a work around will be developed where the respective frameworks work in pseudo-parallel mode, i.e., intermediate results of one are fed

 <p>Project supported by the European Commission Contract no. 825070</p>	<h2>WP8 T8.2</h2> <h3>Deliverable D8.2</h3>	Doc.nr.:	WP8 D8.2
		Rev.:	1.0
		Date:	28/06/2019
		Class.:	Public



	models into the simulation process (<i>medium impact, medium probability</i>)		to the other and back.
R14	Use case evaluation does not meet the set KPIs (<i>high impact, low probability</i>)	WP1	Task Leaders will perform additional quality checks on their code. WP Leaders will check if all possible workflow design and execution parameters are appropriately set. Developer telcos will take place every other day. Dedicated coding camps will be appointed if needed. Documentation of the above processes will be created to be provided as lessons learned and/or best practices reports in the scope of INFOR.
Financial Use Case			
R15	Requirement analysis and/or scenario definitions are unclear. (<i>high impact, medium probability</i>)	WP2	To avoid having the risk affect the project implementation, Deliverable D2.1 has been submitted on Month 3 of the project. Moreover, regarding the utilized datasets a version of the data management plan (Deliverable D8.3) has been created on Month 6 of the project. All partners have gone over the deliverable and have obtained a clear picture of all major use case aspects. In case more questions arise, telcos are organized among the involved project partners and dedicated time slots are devoted during plenary meetings to mitigate the risk.
R16	Use case evaluation does not meet the set KPIs (<i>high impact, low probability</i>)	WP2	Task Leaders will perform additional quality checks on their code. WP Leaders will check if all possible workflow design and execution parameters are appropriately set. Developer telcos will take place every other day. Dedicated coding camps will be appointed if needed. Documentation of the above processes will be created to be provided as lessons learned and/or best practices reports in the scope of INFOR.
Maritime Use Case			
R17	Requirement analysis and/or scenario definitions are unclear. (<i>high impact, medium probability</i>)	WP3	To avoid having the risk affect the project implementation, Deliverable D3.1 has been submitted on Month 3 of the project. All partners have gone over the deliverable and have obtained a clear picture of all major use case aspects. In case more questions arise, telcos are organized among the involved project partners and dedicated time slots are devoted during plenary meetings to mitigate the risk.
R18	Technical difficulties of delays in setting the real-world evaluation pilot (<i>high impact, low probability</i>)	WP3	The real-world pilot is already being prepared and the first tests of the acoustic sensors will take place in mid-June. Working on the process of integrating these sensors on autonomous vehicles will follow. In the unlikely event of the risk being materialized, <u>on par with continuing the process of setting up the pilot</u> , as described in Task 3.3, the algorithms in WP3 will be validated using historical data of autonomous vehicles. CMRE will opt for obtaining such data for the project, by following internal organizational procedures
R19	Use case evaluation does not meet the set KPIs (<i>high impact, low probability</i>)	WP3	Task Leaders will perform additional quality checks on their code. WP Leaders will check if all possible workflow design and execution parameters are appropriately set. Developer telcos will take place every other day. Dedicated coding camps will be appointed if needed. Documentation of the above processes will be created to be provided as lessons learned and/or best practices reports in the scope of INFOR.

 <p>Project supported by the European Commission Contract no. 825070</p>	<h2>WP8 T8.2</h2> <h3>Deliverable D8.2</h3>	Doc.nr.:	WP8 D8.2
		Rev.:	1.0
		Date:	28/06/2019
		Class.:	Public

Architecture			
R20	Technical difficulties or delays in system integration. <i>(high impact, low probability)</i>	WP4	The adopted software development process allows early feedback and implements several fallback variants to prevent these difficulties. Detailed integration guidelines will be provided by RapidMiner which has extensive experience to avoid the risk. In case the risk occurs, the WP Leaders and the Coordinator will organize weekly developer telcos and, if needed, intercalary coding maps to overcome potential difficulties and speed up system integration. Dedicated Coordinator, WP Leaders and General Assembly meetings will take place. The Coordinator and the Leader of WP4 will review the prototype.
R21	Technical difficulties or delays in graphical tool or software stack implementation. <i>(high impact, low probability)</i>	WP4	With respect to the graphical tool implementation, RapidMiner's studio will be extended in the scope of INFORE. Given the fact that this is a product with a perfect level of maturity and acceptance, technical difficulties will be avoided or, in case they arise, expert staff from the project partner will be engaged to assist. With respect to software stack implementation, the respective technical similar mitigation measures to the above-mentioned risk shall be implemented.
Optimization and Runtime Adaptation			
R22	Execution plans provided by the optimizer do not considerably improve naive plans. <i>(high impact, low probability)</i>	WP5	Additional optimization parameters and metrics will be incorporated in the optimization models. More statistics will be collected. Feature selection on the most important optimization parameters will be performed. Micro-benchmarks to train machine learning models and predict the performance of large query classes given a certain execution plan will be performed.
R23	Lack of implementations of domain specific algorithms of the use cases for multiple Big Data platforms. <i>(high impact, low probability)</i>	WP5	The issue is that if there is only one way (implementation) to execute an algorithm participating in a use case specific workflow, the optimizer cannot contribute as it will not be able to choose among alternative execution plans. So, then, the effect of WP5 outputs cannot be judged in that practical field. Use case partners will work in close collaboration with technical partners to provide at least one alternative implementation on either a Big Data platform or an HPC infrastructure.
R24	Some existing Big Data platforms do not provide adequate support for execution plan adaptation. <i>(high impact, low probability)</i>	WP5	A patch to well-known cluster managers will be developed to work around this issue.
R25	Some existing Big Data platforms do not provide adequate support for collecting statistics. <i>(high impact, low probability)</i>	WP5	Treat workflow operators as black boxes, obtaining measurements of what goes in and out of them. We will patch custom operator code so that it periodically emits some statistics without overloading the execution of the workflow itself. Platforms like Grafana ⁷ may be of assistance.

⁷ <https://grafana.com/>

 Project supported by the European Commission Contract no. 825070	<h2>WP8 T8.2</h2> <h3>Deliverable D8.2</h3>	Doc.nr.:	WP8 D8.2
		Rev.:	1.0
		Date:	28/06/2019
		Class.:	Public



Interactive Learning and Complex Event Forecasting			
R26	Inaccurate event recognition and forecasting <i>(high impact, low probability)</i>	WP6	We will extend the use of machine learning techniques to refine the event patterns. This will be done in close collaboration between use case and technical partners. We will also expand the utility of probabilistic techniques in the decision-making module.
R27	Inefficient event recognition and forecasting <i>(high impact, low probability)</i>	WP6	Our designed agile development process will reveal this in early phases, which will allow us to detect this risk in the early phase of the project. Mitigation will consist of using approximation methods using the Synopses Data Engine.
R28	Inaccurate learning models <i>(high impact, low probability)</i>	WP6	Engage in more/better training utilizing additional well-known datasets if needed.
Dissemination, Exploitation and Innovation Management			
R29	Dissemination KPIs are not met. <i>(high impact, low probability)</i>	WP7	The reach to scientific communities is already achieved as the technical partners already possess joint high-quality publications in top-tier scientific journals and conferences. Moreover, the Project Coordinator and the leader of WP7 (MarineTraffic, member of BDVA) already participate in BDVA initiatives in presenting INFORE's vision and outcomes to other relevant projects and to the industry. Special care should be taken, though, for achieving the posed KPIs regarding the outreach of the project to social media and Web 4.0 channels. RapidMiner and MarineTraffic with a vast audience base will intensify the efforts in attracting interest to present project. Videos, press releases and/or presentations to relevant communities will be conducted by all partners. The dissemination plan will be periodically evaluated against quantitative measurements related to the impact and visibility of the project. Correction plans will be enacted if needed.
Project Management			
R30	Lack of overall coordination <i>(high impact, low probability)</i>	WP8	Effective coordination is ensured by the managerial structure and through the project workplan. The coordinator has extensive experience in coordinating large EU and national projects. In case of unforeseen events, a deputy has been appointed and if needed other experienced persons at the coordinating institute or at other experienced partners can take over coordination tasks.
R31	Quality assurance procedures are systematically neglected by partner(s) <i>(medium impact, low probability)</i>	WP8	The current document will constitute a common reference point regarding quality assurance and control. These procedures have been agreed by all partners. In case one or more partners systematically ignore the guidelines prescribed in the current document, a General Assembly meeting will be held and the reasons will be investigated. In case there are sound reasons for objecting to the quality assurance process the corresponding partner(s) should device alternatives which will be accepted or not by the General Assembly under majority voting.

 <p>Project supported by the European Commission Contract no. 825070</p>	<h2>WP8 T8.2</h2> <h3>Deliverable D8.2</h3>	Doc.nr.:	WP8 D8.2
		Rev.:	1.0
		Date:	28/06/2019
		Class.:	Public



6 Conclusive Remarks

This deliverable presents the plans for quality assurance and risk management in INFORE. The procedures described are in line with current best practices in quality assurance and they are well suited for the project, i.e., they are effective without rendering quality controls a bottleneck for project progress. The Coordinator and the General Assembly will assure that the processes, techniques and methodologies described will be rigorously applied

No risk identified in this deliverable has a high probability of occurrence and the likelihood of most risks is low. The consortium has proactively treated many of the risks to avoid or reduce the probability of their occurrence. Apart from avoidance, proper mitigation measures are prescribed. In any case, as the project progresses many of the remaining risks will be updated in the Risk Management Registry maintained at INFORE's internal collaboration page.

 Project supported by the European Commission Contract no. 825070	WP8 T8.2 Deliverable D8.2	Doc.nr.: WP8 D8.2
		Rev.: 1.0
		Date: 28/06/2019
		Class.: Public



7 References

- [1] A. Ghaffarizadeh, R. Heiland, S. H. Friedman, S. M. Mumenthaler, and P. Macklin, “PhysiCell: An open source physics-based cell simulator for 3-D multicellular systems,” PLOS Comput. Biol., vol. 14, no. 2, p. e1005991, Feb. 2018.
- [2] Stoll G, Caron B, Viara E, Dugourd A, Zinovyev A, Naldi A, Kroemer G, Barillot E & Calzone L (2017) MaBoSS 2.0: an environment for stochastic Boolean modeling. *Bioinformatics* 33: 2226–2228
- [3] Letort G, Montagud A, Stoll G, Heiland R, Barillot E, Macklin P, Zinovyev A & Calzone L (2018) PhysiBoSS: a multi-scale agent-based modeling framework integrating physical dimension and cell signalling. *Bioinformatics* Available at: <https://academic.oup.com/bioinformatics/advance-article/doi/10.1093/bioinformatics/bty766/5087713> [Accessed February 27, 2019]

 European Commission Horizon 2020 European Union Funding for Research & Innovation	Project supported by the European Commission Contract no. 825070	WP8 T8.2 Deliverable D8.2	Doc.nr.: WP8 D8.2
			Rev.: 1.0
			Date: 28/06/2019
			Class.: Public



Appendix

Appendix A: Sample Meeting Agenda

INFORE – Kick-off Meeting Agenda

Venue: Royal Olympic Hotel Athens

Day 1: 16.1.2019

09:00 – 09:10 Welcome (A. Deligiannakis, ATHENA)

09:10 – 09:30 Introduction of Partners (All)

09:30-10:30 Introduction to the Project (A. Deligiannakis, ATHENA)

- Objectives
- Role of Partners
- Work packages
- Timing
- Discussion

10:30-11:00 Coffee Break

11:00-11:20 Video Conference with Project Officer (Johan Bodenkamp)

11:20-12:10 WP6 – Interactive Learning and Complex Event Forecasting (NCSR)

12:10-13:00 WP5 – Optimization and Runtime Adaptation (N. Giatrakos, ATHENA)

13:00-14:00 Lunch

14:00-15:30 WP4 – Architecture (RM)

15:30-16:00 Coffee Break

16:00-16:40 WP7 – Innovation Management, Dissemination, Exploitation & Business Planning (MT)

Evening: Social Event

Day 2: 17.1.2019

9:00-10:30 WP1 – Life Sciences Use Case (BSC/CRG)

10:30-10:50 Coffee Break

10:50-12:20 WP2 – Financial Use Case (SPRING)

12:20-13:00 Management Board Meeting (All)

- Deciding on next meetings

 <p>Project supported by the European Commission Contract no. 825070</p>	WP8 T8.2 Deliverable D8.2	Doc.nr.:	WP8 D8.2
		Rev.:	1.0
		Date:	28/06/2019
		Class.:	Public



- Timing for preparation of deliverables
- Procedure of internal reviewing
- Other issues (per partner request)

13:00-14:00 Lunch Break

14:00-15:30 WP3 – Maritime Use Case (MT/CMRE)

15:30-16:00 Coffee Break

16:00-16:20 Detailed planning for the first 6 month (All)

16:20-17:00 Discussion and wrap up

Evening: Social Event

Day 3: 18.1.2019

9:00-10:30 Workshop (led by RM, all partners)

10:30-11:00 Coffee Break

11:00-13:00 Workshop continued (led by RM, all partners)

13:00-14:00 Light Lunch Break

14:00-15:15 Workshop continued (led by RM, all partners)

15:15-15:30 Discussion and wrap up

 <p>European Commission Horizon 2020 European Union Funding for Research & Innovation</p>	Project supported by the European Commission Contract no. 825070	WP8 T8.2 Deliverable D8.2	Doc.nr.: WP8 D8.2
			Rev.: 1.0
			Date: 28/06/2019
			Class.: Public



Appendix B: INFORE Deliverable Template



Deliverable Title
Work Package X Task Y Deliverable Z

Authors

 Project supported by the European Commission Contract no. 825070	WPx Ty Deliverable Dz	Doc.nr.: WPx DOCID
		Rev.: 1.0
		Date: 25/01/2019
		Class.: Public

1 of 4

 Project supported by the European Commission Contract no. 825070	WP8 T8.2 Deliverable D8.2	Doc.nr.: WP8 D8.2
		Rev.: 1.0
		Date: 28/06/2019
		Class.: Public



Distribution list:

Group:	Others:
WP Leader Task Leader	INFORE Management Team INFORE Project Officer

Document history:

Revision	Date	Section	Page	Modification
				Creation

Approvals:

First Author: Date:

Internal Reviewer: Date:

Coordinator: Date:

 <p>Project supported by the European Commission Contract no. 825070</p>	<h2>WPx Ty Deliverable Dz</h2>	Doc.nr.: WPx DOCID
		Rev.: 1.0
		Date: 25/01/2019
		Class.: Public

2 of 4

 <p>Project supported by the European Commission Contract no. 825070</p>	<h2>WP8 T8.2 Deliverable D8.2</h2>	Doc.nr.: WP8 D8.2
		Rev.: 1.0
		Date: 28/06/2019
		Class.: Public



Table of contents:

1	Executive Summary	4
2	Introduction	4
3	Section 1	4
4	Conclusions	4
5	References	4

 <p>Project supported by the European Commission Contract no. 825070</p>	<h3>WPx Ty Deliverable Dz</h3>	Doc.nr.: WPx DOCID
		Rev.: 1.0
		Date: 25/01/2019
		Class.: Public

3 of 4

 <p>Project supported by the European Commission Contract no. 825070</p>	<h3>WP8 T8.2 Deliverable D8.2</h3>	Doc.nr.: WP8 D8.2
		Rev.: 1.0
		Date: 28/06/2019
		Class.: Public



- 1 Executive Summary**
- 2 Introduction**
- 3 Section 1**
- 4 Conclusions**
- 5 References**

 <p>Project supported by the European Commission Contract no. 825070</p>	<p>WPx Ty Deliverable Dz</p>	Doc.nr.: WPx DOCID
		Rev.: 1.0
		Date: 25/01/2019
		Class.: Public

4 of 4

 <p>Project supported by the European Commission Contract no. 825070</p>	<p>WP8 T8.2 Deliverable D8.2</p>	Doc.nr.: WP8 D8.2
		Rev.: 1.0
		Date: 28/06/2019
		Class.: Public

27 of 29



Appendix C: INFORE Presentation Template



The title of the paper

Presenter Names
Presenter Affiliation

January 26, 2019



FrameTitle One

- First.
- Second.
- Third.

Example Block

- First.
- Second.

- Fourth.



 <p>Project supported by the European Commission Contract no. 825070</p>	<p>WP8 T8.2 Deliverable D8.2</p>	Doc.nr.:	WP8 D8.2
		Rev.:	1.0
		Date:	28/06/2019
		Class.:	Public



	First Subsection Second Subsection Subsection Three
FrameTitle Two	



 Project supported by the European Commission Contract no. 825070	<h3>WP8 T8.2</h3> <h2>Deliverable D8.2</h2>	Doc.nr.: WP8 D8.2
		Rev.: 1.0
		Date: 28/06/2019
		Class.: Public