Software-Defined Vehicle Support and Coordination Project

D1.2 Quality and Risk Management Plan

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Definitions

Definitions, Acronyms, Abbreviations	Meaning
SDV	Software-Defined Vehicle
SDVoF	Software-Defined Vehicle of the Future
PCA	Project Consortium Agreement
OEM	Original Equipment Manufacturer
GA	General Assembly
R&D	Research and Development
RDI	Research, Development and Innovation
WP	Work Package
CSA	Coordination and Support Action
EC	European Commission

Table 1: Definitions, Acronyms, Abbreviations

1 Executive Summary

The FEDERATE project is a Coordination and Support Action (CSA), which is committed to enhance the global competitiveness of the European mobility and semiconductor industries in delivering the Software-Defined Vehicle of the Future (SDVoF). The project aims to bring together all relevant stakeholders to accelerate the development of a Software-Defined Vehicle (SDV) Ecosystem, to foster a vibrant European community and to orchestrate the SDV research, development and innovation (RDI) activities over a course of 36 months, starting in October 2023. As one result, a common understanding and wording of terms relevant to SDVoF RDI will be summarized in a glossary. A map of existing software building blocks and interfaces will be worked out in collaboration with the stakeholders to identify gaps, urgent needs and issues, which need to be addressed in further research projects. The consortium, represented by 29 partners from seven EU countries, reflects the entire automotive value chain. It consists of major OEMs, automotive tier suppliers, semiconductor companies, relevant industry associations and scientific research institutes.

In order to achieve the project goals, a lean project structure is necessary and project roles and responsibilities need to be clear. Furthermore, the process of stakeholder involvement and engagement is key for the project's success. This deliverable describes the processes, which will be followed to achieve the targeted quality of the project results. In addition, the approach for risk identification, risk assessment, risk response and risk control is described.

The Quality and Risk Management Strategy is part of the coordination work package (WP1) of FEDERATE, VDI/VDE-IT being the Quality & Risk Manager. The purpose of those efforts is to achieve greater consistency and efficiency for better project implementation and outcomes as well as maximized impact.

2 Introduction

2.1 Introduction - Purpose of this document

This deliverable provides an overview of the roles and processes that will be implemented during the execution of the project. The document outlines the selected approach for implementing the project goals. It also highlights the key controlling processes to be employed, the project policies and rules, and the overall quality and risk management approach. In this document, the outputs of the planning are defined.

The Quality and Risk Management Plan becomes the basis for managing the project throughout its lifecycle and is an important point of reference for all project members and stakeholders. The document is updated throughout the project duration as necessary. During the Closing Phase, it provides an important reference framework for the Final Project Review Meeting.

Within this document, quality assurance of deliverables and the management of risks are treated as two separate processes:

1. The internal quality process is established to ensure that all the work carried out during the different stages of the process will be delivered with the expected quality. It is focused on quality control checks to be applied throughout the preparation of any deliverable.

2. Risk identification involves determining whether and to which extent specific risks are likely to have an impact on the project and is supplemented by risk monitoring throughout the further course of the project. Overall risk management enables an assessment of the (potential) impact of any particular risk on the execution of a specific task or activity – not only in terms of quality of content, but also in terms of meeting deadlines.

2.2 Overall Approach

The core of the quality and risk management approach of FEDERATE is two-fold: (a) to continuously observe whether the advancement of the work packages and their deliverables is affected by any of the identified risk factors, and (b) to make sure that the mitigation measures identified in anticipation of those risks are implemented in a proper and timely manner by work package and task leaders as well as deliverable owners.

The quality and risk monitoring will be part of the regular FEDERATE Core Team meetings. A risk log will be created for the project, in which the readiness status of deliverables, from preparation to peer review, will be documented. It will also be used to record any anticipated risks and to follow up on recommended mitigation measures. It also captures recognised effects and potential adjustments of the risk and mitigation measures, or even other processes of the project as required. The log will be organised in the form of an Excel worksheet that is accessible to the entire consortium via the AVL SharePoint, which is the main data exchange platform for the FEDERATE project. The risk and quality management log will be updated by work package leaders ahead of every Full Core Team Meeting with the support of deliverables' lead editors.

Overall, this approach reflects a continuous improvement of processes according to the Plan-Do-Check-Act (PDCA) cycle, which is at the basis of the quality management standards according to ISO 9001.

3 Quality Management

3.1 Project Consortium Agreement

In order to have a common and concrete legal base, the FEDERATE project has set up a Project Consortium Agreement (PCA) in addition to the Grant Agreement of the European Commission. The PCA is a key document, which outlines the common collaboration, respecting legal requirements of each project partner. The existence of this document should impede legal conflicts between the parties by clear definitions of the types of memberships and its rights.

The purpose of the PCA is to specify with respect to the Action the relationship and rights between the Parties, in particular concerning the organisation of the work in the Action between the Parties, the management of the Action and the rights and obligations of the Parties concerning inter alia liability, access rights and dispute resolution.

The PCA further defines legal details in terms of duration of the cooperation, responsibilities of the parties, liability towards each other, governance structure, financial provisions, handling of project results, non-disclosure of confidential information and data privacy.

3.2 Project Stakeholders

The consortium consists of three groups working together to achieve the goals of FEDERATE and is conceived to cover all stages of the automotive value chain as well as all competences and experiences required to achieve the project goals which are: strategic partners, the scientific board and operative partners as funded members and an additional group of non-funded associated members. Non-funded associated members have the same access rights to documents and participation rights to meetings and workshops as funded members in FEDERATE. Only financial project data is excluded from that.

Strategic Partners

The strategic partners are the main stakeholders. They engage via high-level technical representatives in FEDERATE. This group consists of five different subgroups representing the two important parts in the value chain:

a. OEMs bring in the requirements to the SDVoF Ecosystem at the beginning of the value chain and play an essential role in the orchestration of modular building blocks. FEDERATE strategic partners represent the European automotive industry very well.

b. Tiers and tool providers bring in vast experience on how to develop, build, test and maintain middleware. They contributed significantly to the success of AUTOSAR as the globally leading automotive middleware in the last 30 years.

c. The major European semiconductor industry is participating as it plays a crucial role in developing the new necessary high performance automotive processors and accelerators as well as sensor chips. These will be the main building blocks for the hardware layer.

d. The major European automotive industry associations are also members of the strategic

partner group. They have two roles: first, to help to disseminate the SDVoF Ecosystem activities to automotive companies beyond the consortium. And second, to bring in the needs and views of these companies.

e. The major European industrial SDVoF initiatives are also participating in FEDERATE to avoid double/ redundant development. They play a major role to ensure that the SDVoF RDI projects can build on already existing components and development infrastructure. Additionally, a close exchange is planned also with other relevant international automotive middleware initiatives such as Autoware, APEX-OS or SOAFEE.

These five groups represent the complete value chain of the European SDVoF community in all its aspects for all three different layers. All major players are on board and committed to coordinate the SDVoF Ecosystem activities in order to succeed in setting up a new standard in the global market by collaboration.

Scientific Board

The scientific board is responsible for providing information required to ensure a long-term stability and robustness of the SDVoF Ecosystem. It consists of top experts from different European universities and research institutions. It prepares whitepapers with recommendations based on their analysis of relevant technology trends, their expertise and knowledge about ongoing similar developments in other countries, companies, or initiatives.

Operational Partners

The operational partners provide the management and back-office services required for the success of FEDERATE. They cover the three necessary knowledge and expertise areas required. At the same time, these partners bring in sufficient independence to avoid conflicts of interests.

3.3 Funded Members and Associated Members

The project has two main types of partners:

- **Funded project members**, who have submitted a proposal for the Action to the Chips Joint Undertaking as the Funding Authority under Horizon Europe. Funded members are direct participants of the FEDERATE project with full access rights to all information, including financial information of the project. Funded project members are also referred to as the Core Team in this document.

- **Associated members** are not direct participants of FEDERATE and are not funded by the European Commission for their involvement in the project.

However, both types of members have the same access rights to all documents in the project (except financial data). Both types of partners will be invited to workshops and meetings, such as the monthly full consortium meeting, which represents a General Assembly (GA). All the necessary working rules, rights and obligations are defined in the PCA. Funded members receive funding from the European Commission as defined in the grant agreement and are registered in the ECAS system.

Their contribution is defined as follows:

Associated members representing the European automotive industry:

- EUCAR is the European Council for Automotive research and development and is the voice of automobile manufacturers in the field of R&D.
- VDA is the association of the German automotive industry representing more than 650 German companies.
- PFA is the platform automotive industry in France. It defines and implements, on behalf of all partners (manufacturers, equipment manufacturers, sub-contractors and mobility players), the sector's strategy in terms of innovation, competitiveness, employment and skills.
- ANFIA is the Italian platform representing motor-vehicle manufacturers (passenger cars, busses, trucks, etc.).

The tasks of these strategic associated members are:

- The dissemination of information and results from the SDV Ecosystem program to their members in the automotive industry in order to enhance the SDV community.
- The participation in reviews to contribute important aspects from automotive companies, which are currently not part of FEDERATE. This is important for the openness of the SDV initiative.

Associated members representing European industrial SDVoF initiatives:

- AUTOSAR (AUTomotive Open System ARchitecture) is a worldwide development partnership of vehicle manufacturers, suppliers, service providers and companies from the automotive electronics, semiconductor and software industry. In FEDERATE, Mr. Michael Niklas-Hoeret (Steering board member of AUTOSAR) is nominated from the AUTOSAR board to represent AUTOSAR in FEDERATE. He is an employee of Continental.
- COVESA (Connected Vehicle Systems Alliance) is a global, member-driven alliance focused on the development of open standards and technologies that accelerate innovation for connected vehicle systems, resulting in a more diverse, sustainable and integrated mobility ecosystem.

The tasks of strategic associated members are:

- The participation on workshops of WP2 (Technology and high-level requirements solicitation) and WP3 (Common understanding) helping to establish a glossary and layer structure, which creates a common understanding between the SDVoF Ecosystem programs and the industrial SDVoF initiatives, which they represent. It is the goal of FEDERATE and the strategic associated members to identify collaboration opportunities and avoid duplication of already available building blocks.
- The dissemination of the information of the work and roadmap of the SDVoF Ecosystem program into their communities in order to create a common European SDVoF community.
- The participation on the project work in order to make proposals on how to continue the coordination and support work of FEDERATE after the end of its lifetime.

Associated members representing important companies and research institutes in Europe working on software-defined vehicle software and development tools:

- CEA List: Relevant research organization on semiconductor technology in France
- VITESCO: automotive tier in Germany
- ASTAZERO: Relevant research organization in Sweden
- FEV: one of the global automotive engineering companies who are also actively working on software for vehicles

The task of these strategic associated members are:

- The dissemination of information and results from the SDVoF Ecosystem program to their partners in the automotive industry in order to enhance the SDVoF community.
- The participation on reviews and contribution of important aspects from automotive companies, which are currently not part of FEDERATE. This is important for the openness of the SDVoF initiative.

To expand the SDVoF ecosystem and to thereby guarantee that all new players and relevant stakeholders are included in the strategic processes, additional companies will join FEDERATE as associated members during its duration, if they want to contribute actively to the coordination and support of the SDVoF initiative. The FEDERATE general assembly will have to agree on any new associated members.

The participants and the associated members together cover the entire value chain. In Europe, (nearly) all major players in the area of SDVoF are either participants or associated members of FEDERATE. This clearly shows the importance of the needs and the objectives of the SDVoF Ecosystem program. Especially the large number of associated members, who contribute to the coordination and support action similar to the participants without funding clearly underline the large dedication of the industry, which will provide high-value content quality of the project results.

3.4 Project Roles & Responsibilities

A clear structure of roles and responsibilities is one of the key aspects for successful project management, which allows the partners to deliver high quality results. The following abstract describes the roles of the project partners.

WP1 – Project Coordination

The objective of this work package is to ensure a smooth and efficient project flow while adhering to the schedule, budget and overall project objectives. The project coordinator will be supported by a highly qualified back-office experienced in delivering funded research projects. A well-established project management structure with an escalation structure from *task owner* to *work package lead* to *project coordinator* in combination with *project steering members* will provide the foundation for the successful execution of this project.

The coordination of all stakeholders inside and outside the project and their interests as well as an effective conflict and risk management are of highest priority. AVL as the coordinator of FEDERATE is supported by a highly experienced project management team in order to fulfil the main tasks. That role is supported by an experienced co-leading team from VDI/VDE-IT. The main tasks of WP1 are:

- Coordinating technical activities and monitoring the overall technical progress.
- Handling strategic and organizational issues incl. project and annual review meetings.
- Overseeing technical management, legal, contractual, ethical, financial, administrative, and IPR issues.
- Maintaining communication with all partners, stakeholders, funding, and legal authorities at EU and national level.
- Reviewing and ensuring quality of deliverables and achieving milestones.
- Establishing and maintaining conflict resolution and management of the strategic orientation of the project.
- Maintaining and organizing information exchange with each stakeholder group internally and externally.
- Performing quality and risk management assessments.

- Reviewing and submitting cost statements and progress reports.
- Establishing and monitoring appropriate dissemination and external communication in WP5 (Communication and Dissemination).

The WP1 team controls the adequacy of the project plan. The relevance and consistency of the project vision and objectives with the stakeholder needs will be verified by the WP4 (Strategic recommendations) team, with the support of the whole FEDERATE Core Team. The WP1 team also monitors the KPIs identified for the expected outcomes and the strategic impacts as these are key for the quality of the project. Finally, the governance structure enables an ad-hoc information flow between partners and interrelated tasks across the different work packages.

WP2 – Technology and High-level Requirements Solicitation

This work package deals with high-level requirements and technologies solicitation. This is the first step of the strategic process, which feeds into the structuring, alignment, refinement and orchestration of the order of the backlog that follows (WP3, WP4). Solicitation takes place in an iterative, continuous work process, actively identifying potential gaps and addressing these by organizing workshops and other means of information gathering. Furthermore, the WP2 team must funnel inputs from the scientific advisory board on relevant new technology trends as well as on other SDVoF activities outside the linked projects. As a result, the team will define a glossary from these inputs that can be used as a base for further mapping and arranging in the whole SDVoF community.

The work package is led by a team of the Virtual Vehicle Research GmbH (VIF), which consists of highly experienced members with a relevant knowledge in automotive software development. The team is supported by the University of Oulu, which represents the co-lead for the work package and will contribute with high-value scientific knowledge.

Multiple sources of inputs are managed in task T2.1, which is part of the WP2 responsibilities:

- Future trends in the SDV world, which have an impact on our work (e.g., EdgeAI, V2X, automated driving).
- High-level requirements, needs and constraints for SDV building blocks from OEMs and tiers will be collected. Where possible, this is aligned with and benefits from requirement solicitation done in the SDV RDI projects, to avoid redundancy or even inconsistencies. Additionally, FEDERATE also collects requirements not covered by current RDI projects (e.g., due to their multi-annual staged schedule).
- WP2 also collects results from ongoing RDI projects, to monitor the coverage, but also gaps with respect to the requirements.
- WP2 collects inputs from other stakeholders (e.g., road infrastructure and network providers, specifically considering CCAM aspects). This also includes inputs from applicable standardization activities.

Furthermore, the WP2 team will host the scientific advisory board, which will provide technology forecasting in relevant fields as well as on other SDV initiatives and activities external to the CSA community. Information will be provided regularly to the consortium and stakeholder forums to support technical and strategic discussions considering future developments. The solicitation of all these inputs is accompanied by the creation and continuous updating of a glossary in task T2.2 to support the alignment of information from different sources (e.g., regarding abstraction level) and translation into agreed terminology.

WP3 – Common Understanding

The objectives of this work package are to structure, align and refine descriptions of requested modular building blocks, collected in WP2. Subsequently the terms, used in the description, will be harmonized with the terms in the ontology. The planned technology stacks will be mapped and prioritized in a common backlog of modular building blocks. Beyond that, the work package aims to orchestrate the collected information with other running research and development projects, in order to identify building blocks that can be implemented in running projects of the SDVoF initiative. Moreover, an identification of building blocks, that should be part of future RDI calls, will be processed. Completed building blocks, which have been successfully integrated into OEM stacks will be analysed, if interfaces of these blocks shall be standardized.

The work package is led by the ETAS GmbH, which is a subsidiary of the Robert Bosch GmbH with special focus on embedded systems in the automotive industry. The work package leader has broad experience in the field automotive software and hardware development. The role of the co-lead is assumed by AVL, who support the work package with their excellent experience in automotive development and a broad network of stakeholders in the SDV community.

In order to achieve a maximum impact of this work package, the project aims to encourage strategic associated and operative partners, as well as representatives of industry SDV initiatives to contribute actively to the work package results.

WP4 – Strategic Recommendations

The work package has the objective to give strategic recommendations to the European Commission and national funding agencies on how they can contribute to implement the prioritized backlog list of building blocks in upcoming calls in Chips-JU, CCAM, 2Zero or other relevant EC or national programs. A further goal is the development and maintenance of a roadmap for future SDVoF R&D activities.

The role of the work package leader is filled by AVL. As a consequence, the project will profit of a broad network within the SDVoF community as well as national and European policy makers. AVL will be supported by the BMW Group and VDI/VDE-IT, who will contribute their rich experience in the fields of automotive software and hardware development as well as governance and policymaking, respectively.

The WP4 team will analyse the results of WP3 and identify, which parts of the prioritized modular building block backlog require new cooperative projects. This requires alignment workshops with EC funding programs, national funding programs, automotive SDVoF initiatives and relevant representatives of the strategic partner group in FEDERATE. As an outcome, recommendations for SDVoF content in new or planned upcoming calls of the relevant EC or national funding programs are drafted (e.g., proposals for focus topics in Chips JU, CCAM, 2Zero or other relevant EC or national programs). Additionally, a research roadmap is drafted and regularly updated, showcasing the proposed RDI activities leading to a successful implementation of the modular building blocks required to realize the SDV Ecosystem envisioned and described in the SDVoF Ecosystem vision document from WP2.

WP5 – Ecosystem Building & Dissemination

The objective of this work package is to create a sustainable community for knowledge exchange on the topics of SDVoF, using pre-competitive synergies. By establishing and maintaining a website for the FEDERATE project, sharing all relevant information about EU-funded RDI projects, WP5 aims to encourage stakeholders to utilize synergies. The FEDERATE website can leverage the Eclipse Foundation Project's website for all

available open-source projects. Moreover, the work package aims to develop and implement strategies to maximize impact, visibility and promotion of the SDVoF initiative funded by the European Commission.

The role of the work package lead is assumed by VDI/VDE-IT, which is a research funding and consulting agency with broad experience in fostering technical innovation in Europe. MetisBaltic, a company with great experience in communication and event management in Europe, will take the co-lead. The work package is supported by the Eclipse Foundation, which will contribute with a broad network within the open-source developer community.

The WP5 team will organize community solicitation workshops to spread general news about current and upcoming activities of the FEDERATE project to the broad SDV community, including the group of core and associated project partners. Moreover, major annually recurring SDV conferences will be organized and hosted, to foster a strong and vibrant community. In addition, these activities will be complemented by the organization of hackathons that will encourage the developer community to contribute to the success of the SDVoF initiative. Communication and dissemination activities, considering appropriate tools and materials are also part of this work package. As a consequence, the WP5 team is also responsible for the data management of the project.

3.5 Management and Assembly Structure of the Project

To achieve the goals in an efficient way, the project requires logical processes and a clear distribution of the roles within the project team. Therefore, FEDERATE has a very lean structure. This approach is supported by a transparent data management approach, which allows the stakeholders to have access to commonly needed data. This is further detailed in Deliverable D5.8 “Data Management Plan”. In addition, every regular project meeting will be visible to the consortium via a common Consortium Calendar.

The highest decision body is the General Assembly (GA), where all independent partners have votes. Independent partners are defined as parties, which are not already represented through other entities within the consortium. A small Core Team consisting of representatives from OEMs, tiers, scientific board and coordinator will steer the project. The coordinator is supported by the operational team, responsible for the back-office support of the project. The coordination work is done by the WP1 team members, consisting of AVL (project lead) and VDI/VDE-IT (co-lead). Regular GAs, also called Full Consortium Meetings, take place once a month virtually, where the project status is reported to all stakeholders. Furthermore, project partners as well as associated members can use this regular meeting to raise topics, discuss issues or contribute necessary content.

Major project decisions will be made within the virtual Core Team Meeting among the project partners on a monthly basis. The project leaders of each work package will use this format to continuously report the progress to the whole project team and the project leaders. Topics can be raised and tasks will be addressed. In the case that new parties have applied for a participation, the application will be presented to the Core Team of project partners. If no objections are raised, the applicant will be invited to join as associated member – which allows to be an active part of the project and have access to all project documents (except for financial information) and information during the execution.

In addition to the Core Team Meetings, the project partners meet for a virtual Core Team Prep Meetings once a month. This meeting has the purpose to provide an exchange between the project partners and work packages on a working level. Issues and topics that need further clarification with the project team, an information or network building within the work packages can be processed during this meeting. The Core

Team Prep Meeting is also used to prepare solicit content for the Core Team Meeting and the GA.

The work in terms of project content will be performed within the five work packages. In order to have a continuous exchange, a bi-weekly meeting will be performed for each work package. The work package meetings will be used to work out common results, to foster the network of the SDVoF and to organize the project and events. Work package meetings are furthermore used to invite experts from the consortium in order to obtain the required knowledge.

3.6 Conflict Resolution and Escalations

Conflicts are situations in which one or both parties perceive a threat. They are considered to be critical issues and can be raised by any of the project stakeholders. To prevent critical legal issues, a PCA has been set up.

The Project Management team will proactively identify, log and raise such issues for resolution. When required, conflicts are discussed in the bi-weekly Project Status Meetings within the work packages or, if needed, escalated to the project coordination team from WP1.

Conflict resolution activities are registered by the WP1 team, while conflict resolution decisions will be logged as part of meeting minutes, that will be recorded for all meetings.
The escalation procedure for this project is as follows:

- Only issues/changes/risks with very low and low impact can be discussed and solved by each work package team on its own. In any case, the Core Team must be informed and decisions may be registered in the meeting minutes of the Core Team Prep meeting;
- Issues/changes/risks with medium impact are tracked and discussed by the Core Team during the Core Team Prep Meetings or the monthly Core Team Meetings. Decisions are registered in minutes of each of the status meetings.
- Issues/changes/risks with high and very high impact have to be discussed by the project coordination team of WP1. In addition all members of the monthly Core Team meeting must approve the mitigation measures. Decisions are documented in the minutes of the Core Team Meeting;
- When relevant, the project coordination team from WP1 has extraordinary meetings for approving remediation actions related to urgent or very urgent issues with considerable impact or size.

3.7 Project Checklists

Quality control checklists are an essential tool for projects that want to ensure consistent and reliable results. They provide a visual way of tracking progress and reminding the FEDERATE partners of important tasks, allowing the project to streamline its quality assurance processes to achieve the targeted results.

Having quality control and progress checklists helps the team to identify potential problems before they arise and develop strategies to avoid them. Furthermore, these tools create consistency throughout the entire timespan of execution.

The following checklists will be used within the FEDERATE project in order to monitor and control the progress and responsibilities:

- Timeline to monitor the project progress in comparison with the original planning
- Activity tracking list with tasks, responsibilities and target dates

- To-do list for open tasks and topics on working level
- Deliverables list with responsibilities, milestones for reviewing and target dates for submission
- Deliverables log, which indicates the completeness status and reviewing status of each deliverable
- Event list, to monitor upcoming events, in which members of the consortium should participate
- Communication and dissemination list to log activities that have been proceeded to gain visibility
- Publication list that monitors the publications, released by the consortium

The mentioned checklists are available for all project partners and associated members on the common project SharePoint. That approach guarantees full transparency during the entire execution of the project.

3.8 Quality Management Process for Deliverables

The author, defined in the deliverables list, will work out the deliverable. In the development phase, a constant internal review is provided within the work package that is responsible for the creation. For the content quality assignment, the Core Team defines a main reviewer, preferably from another work package and necessarily from another task than the author. The decision will be logged in the meeting minutes of the Core Team meeting, so that it is transparent to the whole consortium.

The deliverable author is obliged to hand out a draft version of the deliverable to the defined reviewer, four weeks before submission. Latest after three weeks the reviewer provides feedback to the author. The author reworks the document with respect to the feedback - where appropriate.

As a next step, the deliverable draft will be sent to the formal quality assignment one week before submission to the Chips JU. VDI/VDE-IT as the quality manager will proceed a final check of the deliverable and do a formatting procedure to provide the final deliverable document.

Following the finalization, the deliverable will submitted to the Chips JU. Furthermore, it will be uploaded to the FEDERATE website in order to make the project results accessible for the public. A notification about new publications will be announced in the quarterly newsletters, which will be prepared by the WP5 team.

4 Risk Management

4.1 Risk Management Process

In order to identify, assess, prioritise, manage and control risks that may affect the execution of the project and the achievement of its outputs, the FEDERATE project utilizes a risk management process that enables the project partners to engage mitigation measures prior as well as after a risk has materialized. The process consists of four steps:

- **Risk Identification:** Risks are continuously identified throughout the project lifecycle by any project stakeholder and documented in the risk log (by any project team member).

- **Risk Assessment:** Risks are assessed based on their likelihood of occurrence and the impact in project scope and constraints. The product of their likelihood and impact (in 10-point scales) defines the Risk Level which is then used as a reference for their prioritisation and risk response development. The product is transferred to a low (L), medium (M) or high (H) risk level. Scores in the 33rd percentile (up to 33) define low and scores between the 33rd and 66th percentile medium risk level. All scores from 67 and above mark a high risk level.

- **Risk Response Development:** Within the project, two main risk responses to threats will be performed:
  (i) Upfront activities to avoid, transfer or reduce a risk.
  (ii) Activities that will be engaged when a risk has materialized and cannot be avoided.
  For both approaches, specific actions to implement the strategy will be defined, described, scheduled and assigned, while a Risk Owner assumes the responsibility for its implementation. These actions will be incorporated into the Project Work Plan.

- **Risk Control:** Core Team Meetings are used to revise the status of risks, probabilities and impacts, and related actions, and to identify new risks. Risks will be revised monthly, but also after the occurrence of any significant event. If any of the identified risks occur, the project management team will implement the contingency plans and communicate the issue to the Core Team and the consortium.

4.2 Risk Classification

The risk log summarizes all critical risks, which might negatively affect the successful implementation of the project. A critical risk is a plausible event or issue that could have a high adverse impact on the ability of the project to achieve its objectives. Every risk has a likelihood that is the estimated probability that the risk will materialize even after taking into account the mitigating measures put in place. In order to minimize the probability that the mentioned risks will materialize, two mitigation measures are foreseen: one, which will be executed upfront to minimize the probability that the risk materializes, and a second to be activated when the risk strikes to minimize the impact of the risk. Each risk also has a level of severity with respect to the success of the project. To perform a risk assessment, the likelihood and the impact of the identified risks are rated on a scale from 0 to 10, from low to high (for likelihood and impact). To obtain a risk index that enables the assessment and comparison of risks, the following formula is used:

[Risk Index] = [Likelihood] * [Impact]

The risk index can thus assume values between 0 and 100 to capture increasing degrees of criticality.

4.3 Identified Project Risks and Mitigation Measures at Project Start

4.3.1 Introduction

The barriers identified at the start of the project are rated in the risk log. In addition, mitigation strategies are presented for the identified project risks. These risks may refer to the management of time, change management, availability and use of resources, quality of project deliverables, inputs and knowledge affecting the insights or advice and stakeholder relations to be delivered by the project. Other risks are related to the implementation of specific work packages.

The risks that are shown in the following two sections have been aligned with the Core Team and WP leaders. The presented general and specific project risks mark a caption of the project start. The risk log will continuously be updated during the execution of the project. The work package leaders will track the risks within their tasks. Newly identified risks will be added and evaluated. Mitigation measures for newly identified risks will be worked out. As the risks have not yet materialized, the affected work packages must be defined as soon as the occurrence of a risk becomes apparent.

4.3.2 General Project Risks

Work Plan Delays and Interdependencies

Delays in the work plan can be seen as a major general project risk. In the case of interdependencies, the delays could affect other activities as well and lead to delays in related deliverables submission and related tasks progress. A major delay is defined by an impact on overall project results within the duration of the project, which will also cause a delay of final project results.

In the risk assessment, the project team has identified a medium risk level for work plan delays, which is based on a medium likelihood of materialisation of the risk and a high impact on the project, if the situation were to occur.

In order to prevent work plan delays, the WP1 team monitors the work progress through regular Core Team meetings, in which work package leaders have to report any issue hindering the progress of a task. An extraordinary virtual Full Consortium meeting can be called to identify solutions.

The response strategy for risk mitigation in the case of a materialization aims for a risk reduction and the shift of resources. If a major delay will occur, the WP1 team is responsible to adjust the work plan in alignment with the Core Team. Actual resources will be analysed, and tasks will eventually be redistributed. A work plan update will be provided, considering actual resources and a realistic timeline. These measures will be implemented in regular WP1 and Core Team meetings.

Lack of Resources

A further general risk is a lack of resources, which eventually could be a result of a shortage on human resources. If, for example an expert, responsible for a task, were to leave the beneficiary organisation the situation could lead to major problems for the project. Delays in the work and the related task(s) work plan or an overconsumption of resources by a beneficiary in specific tasks could lead to a lack of resources.

In the risk assessment, the project team has identified a low risk level for a lack of resources, which is based on a low likelihood of materialisation of the risk and a high impact on the project, if the situation were to occur.

The approach of highly motivated project partners, jointly working to reach the project goals can be seen as an upfront strategy to prevent that risk from materializing. The system of co-leadership within the FEDERATE

project ensures task continuity while a solution (within the same or another beneficiary) is worked out. The WP1 team provides an overview of the resource distribution in the project. Each contributing partner has to track its own resources and compare it to the initial distribution. The status will be checked regularly by the WP1 team. If a lack of resources is foreseeable, a shift in alignment with the WP1 team and the consortium is possible.

The response strategy aims for a risk reduction. In the case that an expert and their representative is not available for the project anymore, the WP1 team is responsible of informing the Core Team and initiate a process, where an appropriate expert can be found. New members need to be confirmed by the Core Team. If an overconsumption of resources will be identified, budget can be shifted from other tasks or cost categories (e.g., travel costs) where under-consuming, or from other under-consuming beneficiaries. Eventually, an adjustment of the work plan needs to be made and reflected to the consortium. The mitigation strategy will be implemented in regular WP1 and Core Team meetings.

Bad Performance

A beneficiary non-performing in a task could lead to a major progress delay or overload and overconsumption by other contributing beneficiaries. This type of risk automatically affects other work packages and stakeholders.

In the risk assessment, the project team has identified a low risk level for bad performing beneficiaries, which is based on a low likelihood of materialisation of the risk and a high impact on the project, if the situation were to occur.

As an upfront prevention strategy, the system of co-leadership ensures task continuity while a solution (within the same or another beneficiary) is worked out. The fact that the Core Team and all work package leads have actively applied for the FEDERATE membership, ensures a high level of engagement and the contribution of topics and the willingness to contribute.

The risk mitigation aims for a risk reduction and eventually a shift of resources. In the case of non-performing in a task and work progress delay, the WP1 team is responsible to solve the issue in alignment with the Core Team. A support of the affected work package through other resources of the project is a first step to provide the needed progress. A work plan adjustment, considering an updated distribution of resources is a following step. The measures will be implemented in the regular WP1 and Core Team meetings.

Quality of Work

This general risk describes a low quality of deliverables leading to additional work to implement corrective action before the submission to the European Commission, or after, in case of deliverable rejection. Beyond that, this could lead to major work plan delays and an overconsumption of resources.

In the risk assessment, the project team has identified a medium risk level for a low quality of work, which is based on a medium likelihood of materialisation of the risk and a high impact on the project.

As an upfront prevention approach, the project has implemented quality control measures as part of WP1, including a detailed review process by changing project partners and the whole Core Team. Before submission, all deliverables will additionally be checked and finally formatted by the quality management team.

In the case of materialization of a low quality of deliverables, the mitigation action will include an additional validation of the distribution of resources. The resources will be analysed and eventually shifted. The quality control measures will also be revised, if an accumulation of quality issues occurs. The mitigation actions will be implemented in the regular WP1 and Core Team meetings.

4.3.3 Specific Project Risks

Limited Uptake and Adoption of Building Blocks

A limited uptake of the SDVoF Ecosystem is one of the major specific project risks, which describes a lack of acceptance within the community. A limited uptake can be identified by the status of building blocks and interfaces in the backlog. An insufficient number of defined building blocks indicates that greater contribution from the community is necessary. Moreover, the number of projects, which are implementing the results in their processes can be seen as an indicator for a limited uptake as well as for a limited adoption.

In the risk assessment, the project team has identified a medium risk level for a limited uptake and adoption of building blocks, which is based on a medium likelihood of materialisation of the risk and a high impact on the project, if the situation were to occur.

As an upfront strategy to avoid the risk, the project carries out effective dissemination, hackathons, workshops and conferences that should encourage the stakeholders to take on an active role in the community. A jointly developed vision of the SDVoF will help to involve relevant stakeholders from the beginning. An anonymized collection of building blocks and technical workshops, as well as (high-level) conferences will help to initiate a mind-set shift among strategic and technical stakeholders towards a common understanding. The map of building blocks and interfaces will be jointly elaborated and updated while including the whole community. Issues will be discussed, and ambiguities will be clarified. A continuous exchange with the stakeholders will allow constant feedback possibilities. This will encourage the stakeholders to adopt the jointly worked out results.

In case the risk of a limited uptake and a missing adoption of building blocks will materialize, the whole consortium will try to identify and analyse reasons as a first step. A dialogue must be started with the addressed stakeholders by the WP3 and WP4 team to explore the reasons for the limited engagement. The Core Team will then work out measures to increase the attractiveness of the SDVoF Ecosystem for the addressed stakeholders. The WP5 team can support the activities addressing potentially relevant stakeholders. A further escalation can be the involvement of the SDV Sherpa Group. The mitigation measures will be implemented in the regular meetings of all work packages and the Core Team meeting.

Role Inconsistencies

Inconsistencies in the roles within the project can lead to interfering activities and unsolved tasks within the execution of the project. An overconsumption of resources can be a result of role inconsistencies due to work that is performed twice by the partners. The overconsumption on the other hand can lead to a significant lack of resources in other parts of the project.

Another aspect are role inconsistencies between external stakeholders, projects and initiatives within the

SDVoF community. As FEDERATE is a CSA, one of the main tasks is to orchestrate the stakeholders within the SDVoF initiative. Interfering or even counterproductive activities of the research and innovation actions (RIA) and other projects of the stakeholders can inflict major damage to the initiative.

In the risk assessment, the project team has identified a low risk level for role inconsistencies, which is based on a low likelihood of materialisation of the risk and a medium impact on the project, if the situation were to occur.

In order to prevent the project and the initiative of role inconsistencies, several upfront measures have been defined. Role inconsistencies within the FEDERATE project can be prevented by regular Core Team Meetings and reporting from the different work packages. The roles and tasks of each partner are clearly defined in the activity tracking list. Within the SDVoF initiative, a regular exchange and coordination with the main projects will help to clarify the roles. Community and stakeholders should provide a clear task structure and a permanent clarification of eventually occurring inconsistencies. The roles will be furthermore clarified in workshops and conferences, which will be organized by FEDERATE to bring projects and stakeholders together.

In the case that the risk of role inconsistencies will materialize, the project has defined mitigation measures to reduce the impact of the risk. If role inconsistencies are notable within the project, the WP1 team will start a dialogue with the work package leaders of the interfering work packages. Clear measures for clarification will be worked out. The work plan will be adjusted, if necessary. In the case that FEDERATE will note role inconsistencies within the SDVoF projects, the project will get the interfering parties into a dialogue in order to clarify the roles. The WP4 team will give advice to stakeholders and perform a continuous exchange with the SDV Sherpa Group. The measures will be implemented in the regular WP1, WP4 and Core Team meetings.

Visibility

A high visibility of FEDERATE is necessary to reach all relevant stakeholders within the SDVoF community and to derive a common understanding. Consequently, a lack of visibility can cause a limited success of the SDVoF initiative and must be prevented.

In the risk assessment, the project team has identified a medium risk level for a low visibility of FEDERATE, which is based on a medium likelihood of materialisation of the risk and a high impact on the project, if the situation were to occur.

The project has defined upfront activities to prevent the materialization of the risk. An ongoing participation of FEDERATE members on a wide field of conferences will highlight the relevance of a common understanding and collaboration of the stakeholders within the SDVoF community. An aggregation of knowledge for targeted communication in synergy with the Eclipse Foundation will help to reach a broad audience. Transparent communication and dissemination, providing an open platform, also for new participants will help the SDVoF initiative to grow. A quarterly newsletter and ongoing activities on social media, such as LinkedIn, will help to create a high visibility for the project.

In the case that low visibility will materialize, the project has identified measures to lower the impact of the risks and activities to enhance the visibility. The WP1 team will identify reasons in collaboration with the WP5 (Ecosystem Building & Dissemination) team who are supported by the rest of the Core Team. Eventually communication and dissemination activities will be ramped up, to reach better visibility for the project. An adoption of the communication and engagement strategy can be seen as further measures to eliminate the risk of low visibility. The measures will be implemented in the regular WP5 and Core Team meetings.

Stakeholder Engagement

One of the main objectives of FEDERATE is to orchestrate projects and initiatives and to derive a common understanding within the SDVoF community. As the coordination and support of the SDVoF initiative is a main objective of FEDERATE, a limited motivation of stakeholders to engage in and contribute to project activities is a major risk.

In the risk assessment, the project team has identified a low risk level for limited stakeholder engagement, which is based on a low likelihood of materialisation of the risk and a high impact on the project, if the situation were to occur.

As upfront activities to ensure the stakeholder engagement, the project has defined several measures. FEDERATE aims to produce high-quality tailored content for the SDVoF stakeholders. This gives relevant stakeholders a high motivation to collaborate in a pre-competitive environment and to join forces to keep up with the global pace of innovation. Direct contacts with key experts allow addressing matching issues and solutions. FEDERATE will act as a main hub for contact establishing and network building in the community.

The project has various options to mitigate the risk of a low stakeholder engagement. The Core Team will enter into dialogue with the consortium to identify reasons for the situation. A further stakeholder analysis can help improve the knowledge about the addressed target groups. If valid issues are identified, the work plan eventually needs to be adjusted. These activities will be implemented in the regular meetings of WP1, WP4 and WP5 as well as in the Core Team meeting of the project.

Acceptance within the Automotive Community

As the European automotive industry is facing a technological change, which is accompanied by a rising software complexity, it is important that the automotive and open-source community join forces to keep up with the international development pace. A limited acceptance of the jointly worked out approaches within the automotive community would mean a substantial setback on the path to a competitive industry.

In the risk assessment, the project team has identified a medium risk level for a limited acceptance of open-source within the automotive community, which is based on a high likelihood of materialisation of the risk and a medium impact on the project, if the situation were to occur.

As an upfront approach FEDERATE will actively encourage the automotive community to collaborate with open-source stakeholders. The FEDERATE Coordination and Support Action will help lift the barriers, supporting the Research and Innovation Action (RIA) projects to succeed. The projects aim is to work towards a change of mind-set, encouraging the automotive industry to adopt open-source approaches. A frequent exchange with automotive OEMs and Tiers should raise the acceptance and provide an understanding of barriers.

If a limited acceptance in the automotive industry is notable, the project will enter into dialogue with OEMs and Tiers to identify valid reasons. Measures to foster a stronger collaboration between the open-source and the automotive community will be worked out. The identified results need to be considered in further projects of the SDVoF initiative. These measures will be implemented in the regular WP4 meetings and the Core Team meetings.

Acceptance within the Open-Source Community

The rising software complexity and shorter development cycles require a consideration of open-source approaches. Consequently, it is important that the open-source and automotive community join forces to keep up with the international development pace. A limited acceptance of the collaboration platform within the open-source community would mean a substantial setback on the path to a competitive industry.

In the risk assessment, the project team has identified a medium risk level for a limited acceptance of the SDVoF activities within the open-source community, which is based on a medium likelihood of materialisation of the risk and a high impact on the project, if the situation were to occur.

To ensure the acceptance within the open-source community, an effective community management, using synergies with Eclipse, should encourage the stakeholders to contribute. This will also increase the acceptance of further members of the open-source community. Developer-focused SDVoF conferences, workshops and hackathons in alignment with Eclipse should provide a regular exchange and involve all relevant stakeholders.

If a limited acceptance in the open-source community is notable, the project will enter into dialogue with the developer community to identify valid reasons. Measures to foster a stronger collaboration between the open-source and the automotive community will be worked out. The identified results need to be considered in further projects of the SDVoF initiative. These risk mitigation measures will be implemented in regular WP4 meetings and Core Team meetings.

Missing Glossary

A glossary with a common wording of technical terms, reflecting a common understanding, is one of the key outputs of the FEDERATE project. The perspective that the glossary cannot be delivered within the execution of the project due to insurmountable barriers in understanding can be seen as major risk.

In the risk assessment, the project team has identified a low risk level for a missing glossary, which is based on a low likelihood of materialisation of the risk and a high impact on the project, if the situation were to occur.

As upfront activity to ensure that a glossary will definitely be part of the project outputs, the project has defined this as a result of WP2. Technical meetings will lead to constant input by the stakeholders. The WP2 team will add jointly worked out descriptions, wordings and translations into the glossary in order to derive a common understanding.

The project has defined a mitigation strategy in case a common wording cannot be found. If the barriers for a common wording cannot be overcome, more project resources can be shifted to this task. The principle could also be shifted to a dictionary-approach, where the different wordings and the translations towards each other can be shown. The measures will be implemented in the regular meetings of WP1, WP2 and the Core Team meetings.

Missing Reference Architecture

Another key element, which must be worked out until the end of the project period is the reference architecture of building blocks for the SDVoF. FEDERATE has the task to enable the development by orchestrating the relevant stakeholders. Consequently, one of the major risks is that the reference architecture cannot be delivered due to high ambiguities and non-contributing stakeholders.

In the risk assessment, the project team has identified a medium risk level for a missing reference architecture, which is based on a low likelihood of materialisation of the risk and a high impact on the project, if the situation were to occur.

Upfront measures to avoid the risk have been defined by the project team. Technical meetings with universities and the scientific community as contributors should speed up the development process. The WP2 team will propose building block structure fragments, which shall be put into bigger structures. These proposals can be taken as a base for a reference architecture, which can be finalized with the contribution of the OEMs, Tiers and universities.

As a risk response strategy for the case that OEMs and Tiers will not contribute enough to derive a reference architecture, the project aims for a reduction of the risk through an approach, which takes universities and the scientific community into responsibility. If OEMs and Tiers do not develop reference structures, which lead to a reference architecture from the proposed structure pieces by WP2, universities and the scientific community will be encouraged to build a demonstrator. These measures will be implemented in the regular WP1, WP2 and Core Team meetings.

5 Conclusion

D1.2 provides a detailed description of the methodology of processes and responsibilities that are necessary to ensure the quality of the project results. Furthermore, this document demonstrates the risk identification and mitigation process that is used within the execution of the project.

The roles of the project partners and stakeholders are clarified in the first part of the deliverable. This is necessary in order to prevent insufficient work quality due to role inconsistencies and resulting conflicts. The management and assembly structure is reflected with the purpose of underlining the reasonable organization of the project. Consequently, the process of conflict resolution is explained in this deliverable. This should enable the project to remain capable of acting even in complex conflict situations. Project checklists ensure a high quality level of work and project results. The quality management process for deliverables, which is explained in this document, ensures high-value project outputs that will help the SDVoF initiative to achieve its full effect.

The second part of D1.2 describes the risk management process of the FEDERATE project. The process from risk identification through risk assessment and risk mitigation to risk control is outlined. Moreover, possible risk categories identified at the beginning of the project and upfront activities for risk prevention and measures for risk mitigation are presented.

In conclusion, it is important to mention that the quality management and the risk management should not be considered finalized processes. Both are continuously revised and updated during the implementation of the project in order to meet the current challenges and threats to the success of the project.

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