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Architecture for Scalable, Self-human-centric, Intelligent, Secure, and Tactile next generation IoT

D2.10 – Advisory Board Minutes – Third Meeting

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Executive Summary

This Advisory Board Meeting Minutes report is written in the framework of WP2 of the H2020-funded project ASSIST-IoT (Grant No. 958257). This deliverable constitutes the third out of three deliverables aiming at describing feedback from AB. D2.8 and D2.9 direct this document, which will be updated by the Final Project Report at the end of the action.

The content of this deliverable orbits around the organisation of the 3rd Meeting 2nd with the Advisory Board of ASSIST-IoT (a set of 7 people expert in different fields such as 5G, standardisation, edge computing, maritime ports and overall Industry digitalisation or Next Generation IoT) with the partners of the Consortium.

The document starts with the update in the meetings plan that has been applied already in this 3rd Meeting. ASSIST-IoT has been formally extended 5 months through an amendment to the Grant Agreement. The plan of meeting has been readjusted.

The core of the document describes the results of the discussion that took place during the two sub-meetings in which the 3rd Meeting was structured. Such results directly draw from specific questions established by the Consortium and the answers by AB members, together with their genuine feedback provided by the latter.

The meeting and the previous actions redounded in a set of recommendations and results that have already had an impact in the project. According to this document, a total of 9 new recommendations were drawn (separated into 3 global management consideration, 3 global research direction, 2 technical additions and 2 exploitation points).

The deliverable can be considered closed and complete as it also embeds a rounded-up conclusion accompanied by an analysis of the expected indicators associated to the interaction with the AB members and by a set of next actions to be performed.

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List of acronyms

Acronym	Explanation
AB	Advisory Board
ABECI	Advisory Board Expected Contributions Indicators
AI	Artificial Intelligence
CSA	Coordination and Support Action
CTO	Chief Technology Officer
Dx.y	Deliverable No. x of Work Package y
FPGA	Field Programmable Gate Array
HPC	High Performance Computing
IoB	Internet of Bodies
IoT	Internet of Things
KPI	Key Performance Indicator
MEC	Mobile Edge Computing
NDA	Non-Disclosure Agreement
NFV	Network Function Virtualization
NGIoT	Next Generation IoT
P2P	Peer-to-Peer
SD-WAN	Software Defined Wide Area Network
SDN	Software Defined Network
WP	Work Package

1. About this document

This document is the third of a series of three deliverables associated to the interaction of ASSIST-IoT Consortium with the selected Advisory Members. This third version, following the plan set out in deliverable D2.8 and that was updated in D2.9, reports about the advance in the interactions between the Advisory Board and the ASSIST-IoT Consortium, focusing on the results of the 3rd Meeting with the AB, that was divided in two sub-meetings (one taking place virtually and another one face-to-face).

1.1. Deliverable context

Table 1. Deliverable context

Item	Description
Objectives	Directly linked with Objective O8, specifically towards achieving KVIs of the communities joined and professional attracted, together with innovative business models delivered. Although not directly related to other objectives, the recommendations provided by AB members are expected to enhance the overall quality of ASSIST-IoT research.
Exploitable results	N/A. Although not directly generating any KER, the recommendations provided by AB members are expected to enhance the quality and impact of those.
Work plan	This deliverable is directly linked to task T2.5 – Advisory Board Management, serving both as guidelines/plan and as an execution report. Indirectly, this deliverable is linked with tasks T2.1, T2.2, T9.2, T9.3 and T9.4, as the interaction/contribution with/from AB members has considerable influence on the global management of the project and its associated dissemination impacts.
Milestones	N/A
Deliverables	This deliverable constitutes the third out of three deliverables aiming at describing feedback from AB. D2.8 and D2.9 direct this document, which content will be enhanced and the final AB reporting will be culminated in the final Periodic Project Report of ASSIST-IoT.
Risks	Risk#2.5 – Advisory Board members are not able to conduct satisfactorily the required assessment and/or advisory roles. Risk Mgt13 – Advisory Board plan adjustment – due to the project extension, the plan of the AB meetings was modified, entailing some risks about involvement and feedback timing. This deliverable describes the actions and results from the interaction with AB members, which should contribute to minimise that risk.

1.2. The rationale behind the structure

The content of the deliverable is organized into seven main sections:

- **Section 2** describes the update of the plan based on the amendment to the project's Grant Agreement. .
- **Section 3** depicts the actual minutes of the two sub-meetings of the 3rd Plenary Meeting, indicating the agenda that was followed, the participants and the interventions.
- **Section 4** summarises the outcomes obtained from the interaction with the AB, including recommendations and other results like feedback for risks or requirements of the project.
- **Section 5** lists the actions ahead towards D2.10 (3rd Meeting).

  Finally, **Section 6** concludes the document by reflecting on the advances obtained so far.

2. Advisory Board meeting plan update

During the latest execution period of the project, an amendment to the Grant Agreement has been launched, discussed and, finally, come into force in ASSIST-IoT. One of the modifications included in such amendment is the extension of the duration of the action. As per the original timeplan, ASSIST-IoT was expected to last 36 months, finalizing on October 2023. As per the new GA, the finalization of the project will take place on March 2023 (41 total months of execution). This facts directly affect task T2.5 – Advisory Board management.

This change of the global plan has required an adjustment of the meetings scheduled with the members of the Advisory Board, starting by the specific action covered by this document: the 3rd meeting.

The original plan of meetings is depicted in Figure 1, and was composed by 8 formal interactions with the AB member during the project. As set out in the Grant Agreement, **two formal physical AB meetings** were planned to be conducted during the action, with other additional two feedbacks to be requested in key moments of the action. Apart from those, it is planned that continuous mutual feedback will be conducted via scheduled teleconferences and P2P meetings.

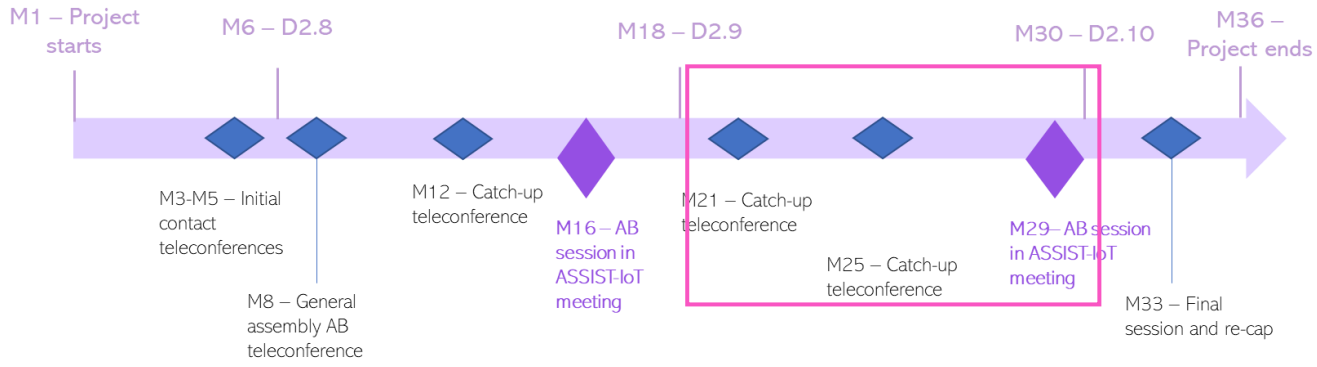

Figure 1. Original Advisory Board Meetings plan

However, up to M18 (when last deliverable about AB – D2.9, was generated) the restrictions (associated to COVID-19) were still applied across Europe, preventing physical meetings to be organised. Thus, no face-to-face meetings were organized. It was only from then (around April 2022) that in-person sessions could start being resumed for research projects, so the original plan could start being re-taken from that point on (not precluding further pandemic outbreaks that could revert the situation back again).

Nonetheless, reflecting on the aforementioned update of the Grant Agreement, two decisions were made that affected the global schedule of meetings:

1. A new meeting has been scheduled for the end of the project, in a face-to-face nature, to be held in M41 of the project. This way, the extension of the project will favour a new encounter with the members, that will have now the opportunity to guide the final results towards the final review AND also retakes the opportunity to catch up with the original plan (i.e., **holding the committed two face-to-face meetings**).
2. The three sessions expected in the period M18-M30 have been condensed in two encounters that form, indeed, the 3rd Meeting reported in this deliverable. The rationale under this change was the need to adapt the reality of the project to the expectations of such meetings. The period M18-M30 has been extremely intense in development of ASSIST-IoT enablers, testing them, advancing on pilots and working on the implementation and evaluation of the solution in the proposed scenarios. In order not to report partial deltas, the Consortium decided to concentrate the exposure of information to the AB in the whole period in just two occasions:
    a. **A virtual meeting in M27** – January 2023 (catch-up conference).
    b. **A face-to-face meeting in M30** – April 2023, co-located with the 6th Plenary Meeting of ASSIST-IoT.

All in all, the "updated planning" (by M30) iterates over the one described in M18 as follows (in blue the updated plan – D2.9 schedule is maintained in black for reference):

- Virtual meetings: Teleconference calls will be (are being) properly scheduled to keep track of advances and to get feedback and other contribution from AB members. Planned dates for these meetings are:
  - Initial: first contact. Individually with each member (done before M6).
  - General assembly with all Advisory Board members and several representatives of ASSIST-IoT Consortium (done after M6).
  - Globally, each 3/4 months, in order to keep continuous feedback with enough time to steer direction of research/impact (done via email mostly).
  - Coinciding with key moments of the project: e.g., launch of Open Calls, before/after project review, before/after pilot demonstrations… (AB members were informed about the Open Call opening and the results, together with the publication of documentation – readthedocs, relevant deliverables, etc.).
- Face-to-face meetings: ASSIST-IoT partners plan to have two physical meetings with the Advisory Board, coinciding with Plenary/Technical Meetings of the project. Planned dates for these meetings are:
  - ASSIST-IoT Technical Meeting – M16 – February 2022 (Done in M16 – virtually – 2nd AB meeting)
  - ASSIST-IoT Plenary Meeting – M29 – March 2023 (done in M30 – 6th Plenary Meeting Thessaloniki)
  - ASSIST-IoT Final Event – M41 (AB members will be invited to this event).

The accomplishment of this new plan will be reviewed in the Final Project Report, to be delivered after the completion of the action.

The next figure shortly summarises the aforementioned action, briefly discussing how those meetings were conducted and how they have contributed to ASSIST-IoT deliverables (like this document).

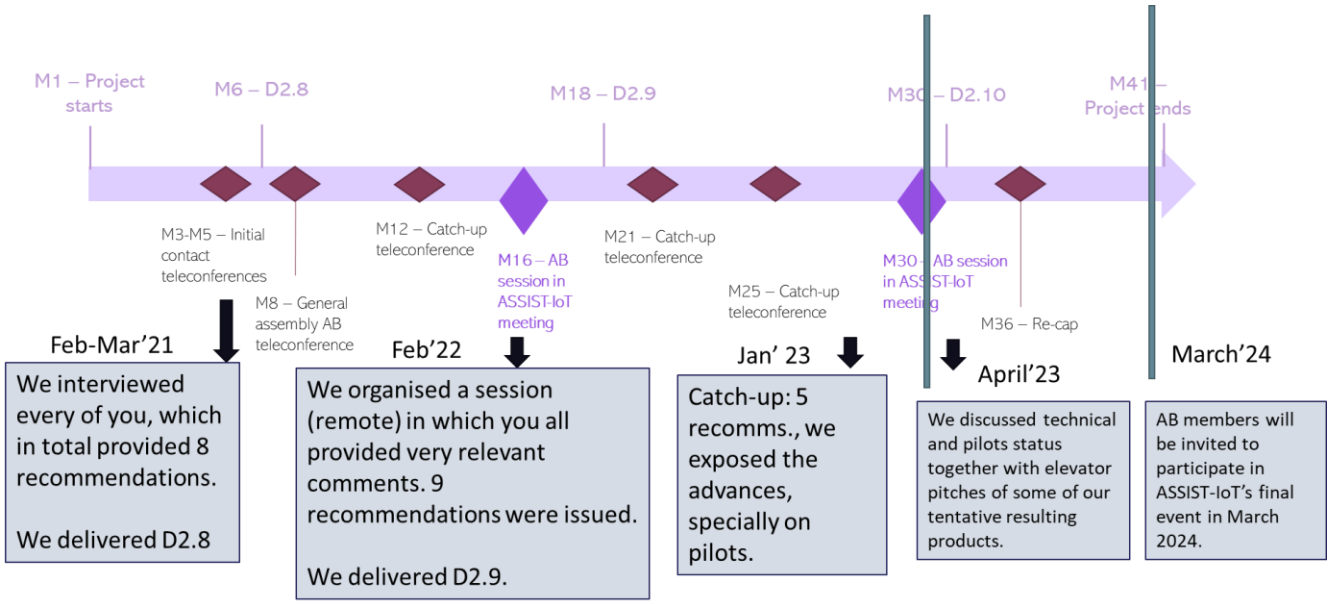

Figure 2. Current Advisory Board Meeting plan

As it can be seen, the plan is being followed despite the difficulties, and the Consortium is committed to enhancing its interaction with AB members, as their inputs are proving to be useful to maximise outcomes of the project and good evolution of technical developments.

3. 3rd Meeting with the Advisory Board

As indicated in the previous section, due to the possibility of face-to-face encounters in the last period, it was decided to split the 3rd Advisory Board Meeting in two different sessions (or sub-meetings). The next sections relate what was discussed and concluded in each of those.

3.1. Virtual sub-meeting – January 2023

This first sub-meeting was organized in a virtual session in month M27 of the project (**that took place on January 20th, 2023 and lasted 3h**). This was a specific session devoted to this only purpose (not other ASSIST-IoT commitments or teleconferences taking place that day), therefore partners had the opportunity to interact with the Advisory Board, ensuring a successful collaboration.

This meeting substituted two previously planned encounters due to the reality of the project in that moment. Focus was, by the vast majority of partners, in: (i) finalise development of enablers, (ii) encapsulation of enablers in Helm charts, (iii) testing of the enablers, (iv) establishment of the CI/CD automated procedures - over the Gitlab of the project, (v) implementation of pilot activities – especially end of procurement, installation and components integration and (vi) early evaluation of technical results.

Thus, the meeting was as well organised later than expected in order to offer a proper delta of information that would maximize the utility of the feedback to be received.

The goals of the meeting were established as follows:

- Summarise advances of the project in 2022
- Relate on the main novelties and key pilot activities taking place
- Obtain feedback on research directions
- Explain ASSIST-IoT methodology towards cascade funding
- Plan a physical meeting for upcoming months

3.1.1. Agenda

Considering the previous, the agenda was defined as follows:

11:00 – 11:10 Welcome (UPV)

- Welcome address
- Agenda for the session

11:10 – 11:50 Advances of the project technology in 2022

- Summary of the project advances (UPV) – 5'
- Architecture, installation, technologies, documentation (SRIPAS) – 10'
- Key advances and novelties – 20'
  - Smart Orchestrator, Broker, LTSE (UPV) – 7'
  - Federated Learning, self mechanisms, Manageability (SRIPAS) - 7'
  - Helm generator, scripting and automation in GitLab- DevOps (UPV) – 6'
- Open Calls – present and future (UPV) – 5'

11:50 – 12:20 Turn for the AB for questions and debate about technical advance

- Q&A
- Specific discussion points brough by ASSIST-IoT

12:20 – 12:30 Coffee break

12:30 – 13:15 Advances in our pilots

- Global status of our pilots (PRO) -5'
- Advances in P1 (PRO) – 10'
- Advances in P2 (SRIPAS) – 10'
- Advances in P3a (UPV) – 10'
- Advances in P3b (TWOT) – 10'

13:15 – 13:45 Open questions and feedback about pilots' advance

- Conducted by: UPV
- Addressed to: AB members
- Intervention from ASSIST-IoT partners accepted.

13:45 – 14:00 Information about the next session: physical meeting for the AB

- Information to be provided by UPV

Figure 3. Virtual sub-session of 3rd Meeting

3.1.2.Relevant topics discussed

The main topics discussed in this meeting were the following:

- The Consortium exposed to the AB members the most relevant advances and actions performed in the year 2022:
  - Resume of physical meetings (Valencia, May 2022 and Warsaw, October 2022).
  - Mid-term review. The results of this relevant action were already discussed in emails and in virtual sessions with the AB member, as well as some preparatory actions were debated months before. However, an update was made.
  - Completion of the architecture and overall technical perspective.
  - Advances in pilots.
  - Events and conferences attended in 2022 (IoTWeek2022, DataWeek 2022 and many more).
  - Explanation of details of the amendment that was, by then, in preparation.
- Thorough technical explanation of the advances in the most prominent ASSIST-IoT technological novelties (over selected enablers):
  - Smart Orchestrator:
    - Custom components developed over ETSI OSM (base technology), multi-cluster networking strategy and cluster grouping without static IP addresses.
    - Integration with Edge Data Broker and deployment over different clusters.
    - Deployment over our own IoT Gateway (GWEN); which is a relevant and novel outcome by its own means.
  - Federated Learning mechanisms
    - Components that form our novel approach integrated in the global ASSIST-IoT architecture.
    - Model averaging strategies and the incorporation of DLT in the whole process.
  - Overall advances of WP4 and WP5
  - Customized CI/CD scripts and enabler encapsulation wizard developed by the project.
- Detailed explanation of the on-boarding and implementation results (so far) of the first round of Open Call projects, that were by then in their last months of execution.
- Advances in the four pilots of the project

3.1.3.Minutes

The meeting took place in a virtual fashion, below some evidences of the discussion and, afterwards, the detail of the conversations and debates kept:

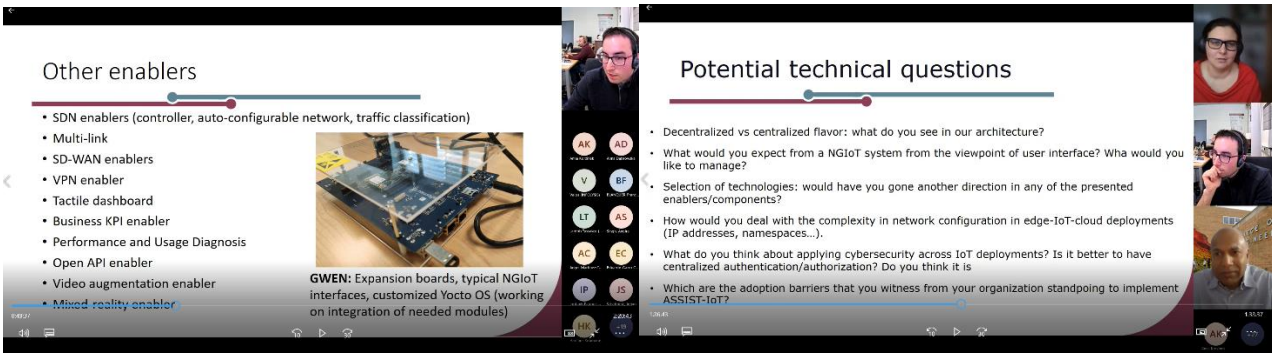

Figure 4. Some screenshots of the first session (virtual) of the 3rd Meeting

The Project Coordinator (UPV – Professor Carlos E. Palau) presented the agenda and then the debate started:

Block #1: Technical advances of the project

Q1 (made by the consortium): What is the perspective on the enablers separation approach and the advances overtaken in WP4 and WP5?

Dr. Harilaos Koumaras asked about the separation of enablers in essential and complementary. UPV and SRIPAS took over and detailed the dual strategy: (i) useful for prioritization and (ii) a simple way to express that some enablers conform what can be considered the "baseline" of ASSIST-IoT; those that would be present in any case that could be considered ASSIST-IoT compliant. The other enablers would directly require the presence of the former, and are more oriented to provide specific functionalities.

Q2 (made by Dr. Koumaras): If I were the customer of ASSIST-IoT and I would like ASSIST-IoT service to support the tools, how can I select the specific enablers that will be deployed in the infrastructure. Is there any browse of enablers? Is there any martketplace?

UPV and SRIPAS: This has not been originally included in ASSIST-IoT's workplan. This would be a very good addition to increase the exploitation capacity of the solution. Up to now, enablers can be browses in the ReadTheDocs, but there is not framework or technology can support market or direct plug and play.

Q3 (made by Prof. Ivana Godnic): Have you thought in giving an example installation of ASSIST-IoT in a sample, simple example – that would clearly foster adoption. It would be nice to list the essential list so that people know which tools they need to use.

UPV answered: The demo showcased to the reviewers in the mid-term review had exactly this purpose (usage of 5 or 6 enablers combined together to solve a use case also involving some sensors in order to move data, store data and even with AR). An already planned action is to provide video material in order to see how to use the orchestrator deploys enablers, EDBE moves data, etc. There is also the idea to provide the documentation material in the last phases of the project (there is a task for that, T6.4). Regarding specific installation instructions, there is now an internal script which basically contains all the main tools and required tools. This will be made public at the end of the project. In addition, in task T8.4 we are designing a transferability and adoption methodology that will work towards this example. However, this is taken globally as a valid recommendation (example installation of ASSIST-IoT in a sample, simple case).

Q4 (made by Prof. Joydeep Mitra): Have any of the self-* frameworks/platforms advanced? Have they been implemented in any of the pilots?

PRO answered to the question, with additions by UPV: Not right now, due to the exact moment of the project, but they will be tested on real industry scenario, depending of the willingness of the pilot customers it is possible to put it into production. However, for now those have been tested in virtual, integrated environments before going to the pilot. AB members will be kept posted about advances.

Q5 (made by Prof. Joydeep Mitra): I am curious about the Software Defined Networks/programmable networks that you are implementing. May I ask If it is possible to implement the self start framework on this too just that makes the network more resilient and robust?. Can SDN be managed to add features to make the network more resilient and robust?

UPV answered: SDN In ASSIST-IoT, the SDN enabler is composed of a SDN controller in which we are able to apply automatically some policies on the top of that are subsequently applied over the controlled SDN network. This is validated in lab and partner OPL (Orange Poland) published a paper on this. Also from the specific self we have other elements that provides that kind of feature you mention for instance for Kubernetes. We have a specific self enabler that when it is installed it control the way the replicas of a service need to be scaled up or down. This might help make the network more resilient and robust. For now, the enablers are deployed only over Kubernetes integration environment, not tested yet in pilots. Undoubtedly, other resiliency and robustness features can be employed through the controller.

Q6 (made by Dr. Koumaras): What is the common/basis infrastructure, that is used to integrate the ASSIST-IoT functionality? What is the basis infrastructure? The basic components.

UPV answered: The baseline is to run these nodes in Kubernetes or lightweight distributions with the orchestrator using the API taking advantage of using it. Some blocks are necessary because for instance to manage some aspects in different language distributions of it or how to manage the communication of enablers that use different protocols all of this has been designed to work in a Kubernetes cluster. The Smart Orchestrator is used to deploy the rest of the enablers in the correct place, providing tools to interface one enabler with others. It is worth mentioning that ASSIST-IoT, through its technological designs, has wished to make the amounts of installations and dependencies as minimal as possible. Regarding interoperability, all enablers provide an API following an interoperable format. Most of They expose their service so that the integration can be done in different ways. We also have some manageability tools that can be used in order to make bridges between enablers in the case of ingested data from MQTT Edge Data Broker to LTSE (that use different protocols). In some cases we try to make it as standard as possible but in others like for protecting the API with identification and authorization we have needed to implement some code.

Q7 (made by Dr. Koumaras): Have you planned an engagement process? For instance, market exploration leveraging the work with, for instance, Open Callers… It would be a really nice addition to the project to define a general engagement process with ASSIST-IoT and overall IoT community.

Overall feedback gathered: Within the guideline of OC applicants we explained the architecture, provide a list of the enablers and what they look like so they had to read this document, check what were suits better for the use case or potential project. During their preparation and execution, more questions appeared that also served us to extract some lessons learned toward the second round. About the transferability analysis and the methodology to deliver and develop the results, there is a task in command of this action (T8.4). The greater bulk of the task is expected for later in the project, so we will deal with that once things have been completed in the pilots. In that moment we will be more prepared to answer specific questions. But it is true that a technological guide with some interfaces as could be very beneficial, creating a general engagement process.

Q8 (made by Dr. Koumaras): Is the nature of these enablers open source? all/some of them? How are they expected to be made public?

UPV: In general those are open source because are either ours completely or are using open-source technologies available for the community. But we are still under a process of IP definition, protection definition, etc. we have specific tasks in the project in which we have to take care of that (T9.4). So it might be the case that in some specific enablers we might apply specific protection. In general yes, but we will have a clear view of this topic later. With regards to the publication, we already have a GitHub account, were those will be uploaded with proper licenses:

Block #1: Advances in the pilots of ASSIST-IoT

The different pilots exposed their advances in procurement, execution of activities, installation and implementation (validation is expected to take place later in the project).

Q9 (made by Dr. Koumaras): Are you planning to organize or invite the open callers to any of the future meetings or events of the project in order to present the outcomes?

UPV Yes, however….once they finalize their projects and have the outcomes they do not have more resources to continue performing. So it could be on their behave to travel to their facilities to revies this outcomes or do it in a virtual meeting. As a conclusion yes, we are planning to do so, but we do not know how for the moment.

Q10 (made by Jari Collin): Regarding Pilot 1 (Smart Port)… as you are using this video analytics basically the real time data need to be manage with low latency… thus, how did you deal with this connectivity layer, it was with 5G private network?

PRO answered: The main access is Fluid-Mesh network, a sort of a private Wi-Fi system developed by CISCO, it has their own band frequencies and it is not 5G. They have some requirements, for example the network latency required is 20 ms and the capabilities of the Fluid-Mesh network meet this requirement. 5G will be explored to be used if the conditions of the pilot allow it so.

Q11 (made by Dr. Koumaras): Is the data collected in Pilot 3A (when the car is moving) transmitted in real time or the process of transmission takes place later? Are mobile communications (LTE) used?

UPV and FORD answered: What we actually doing is quite interesting, We are currently measuring data at 1.000.000 Hz rate, so we have 100 HZ every 10 ms like 200 channels. But also we have very high speed sensors that go to kHz and we cannot transmit that in real time. What we do is a kind of batch processing, so we process the data on the edge so we have either in the real time chasis or in the GWEN we process the data. We compact that data and we create a single input into the database. This allows also to envisage scalability and replicability, extrapolating to a fleet with several thousands of vehicles. And yes, we are using 4G LTE communications from the car to the central cloud clusters. Later, when the GWEN will be completely functional, the communication will be switched to 5G.

Q12 (made by Dr. Koumaras): About the bunch of data recollected by the edge, are you using any AI predict something?. For example to advertise the driver to adapt the driving style or change something in the parameters of the car.

UPV and FORD answered: Yes, but not for the driving style but for more technical questions like engine or emission diagnostics. In this regard, - We are using is adaptive tables and adaptive models for detecting where the vehicle is and compared with the nominal values in a normal behaviour.

Q13 (made by Pawel Gepner): How is AI involved in the process of Pilot 3A? New AI algorithms to be applied?

UPV answered: Developing AI for detecting things and making sure those models work properly is out of the scope of this project, the project is to provide a place in which a module that does it can be localized and then the rest will work. ASSIST-IoT is not about AI in the car is about facilitating running the car right assuming that AI is right. But if AI is as simple as a decision tree or a rule base expert system or even more complex like neural networks, chatGPT, it is not what is checked in the pilot.

Q14 (made by Dr. Koumaras): The plan for the final presentation of this pilot. What is the plan for the final presentation if Pilot 3B? Which is the expected timeline to have a tangible result to be presented?

TWOT answered:: Our intention is to have a final running system with all the functionalities by September 2023 and 3 to 4 months to acquire the experience, the results, interfacing with the developers and writing the reports. This is the plan for the project. In a global perspective, this should be expected by last month of 2023 and first two months of 2024.

Q15 (made by Dr. Koumaras): after the conclusion of the pilot P3B are you planning to produce some learnt from the trials?

PRO and TWOT answered: All the deliverables of the project have a specific section with the lessons learned and for sure it will be extended a little bit more for the final deliverables. Thus, we are not waiting till the end of the project to add this typical lessons learned section, we decided to have an AGILE approach and the feedback is continuous over the time of execution of the pilots..

3.1. Face-to-face sub-meeting – April 2023

The second sub-session of the 3rd meeting with the Advisory Board took place at the end of M30, co-located with the 6th Plenary Meeting. It was held at CERTH's premises in **Thessaloniki (Greece) on 26th April 2023**.

Here, all members of the AB were invited. However, due to several circumstances (personal or health reasons, vicinity of Easter holidays, etc.), only one member (out of the seven of the AB). Notwithstanding, a remote access connection link was established where the event was webcasted so that other members could join and participate.

Figure 5. 3rd Meeting with the AB within Plenary Meeting of ASSIST-IoT in Thessaloniki

The stage of the project facing this meeting was slightly advanced in comparison to the first sub-session of the 3rd Meeting:

- Amendment now has been finally signed by the Consortium and the EC and, thus, a new Grant Agreement is available.
- Open Calls #1 are finalised (all of them successfully)
- Open Calls #2 evaluation process was concluded and the new projects are ready to start (winners selected – that were exposed in the meeting).
- New dissemination events have been attended.

The goals of the meeting were:

- "Formalise" our showcasing of advances
- Gather your feedback as educated external agents
- Launch our products definition activities (exploitation, etc.)
- Obtain AB's perspective and feedback to fulfil deliverable D2.10
- Informally audit our global advance towards the final review
- Know first-hand how the technology is advancing outside of ASSIST-IoT

3.1.1. Agenda

Considering the previous, the agenda was defined as follows:

10:45 – 11:00 Presentation of AB session (UPV)

- Agenda and goals explanation

11:00 – 11:30 Coffee break

11:30 – 13:30 AB Session part 1

- Global situation since last meeting presentation (UPV)
- Technical advances since last meeting (SRIPAS)
- Interventions by AB: Q/A + discussion
- Technical KPIs explanation (NEWAYS)
- Technical KPIs feedback by AB members

13:30 – 14:30 Lunch

14:30 – 16:30 AB Session part 2

- Elevator pitch by key ASSIST-IoT products (PRO, TWOT, MOW, FORD, UPV)
- Interventions by AB: Q/A + discussion
- 10 mins explanation of the status of each pilot + pilot KPIs presentation
- Pilots feedback by AB members

16:30 – 17:30 AOB and *buffer*

Figure 6. 3rd AB meeting (second session) agenda

3.1.2.Questions posed and answered provided

The session consisted of a series of presentations made by ASSIST-IoT partners (technology, technical KPIs, status of pilots and elevator pitches), after (and during) which the members of the Open Call (both Dr. Koumaras, present in the event and those connected remotely) were asked to provide feedback while keeping in mind a series of questions that were formulated at the beginning of the event.

Special mention is deserved for the sub-part in which the elevator pitches were presented. Here, following the action taking place in task T9.4, the Consortium prepared a 7-10 minutes presentation of the currently most prominent results identified that will be promoted to the Horizon Results Booster platform. The following were presented:

- Pilot 1 (PRO / TL)
- Pilot 2 (CIOP / MOW / SRIPAS)
- Pilot 3A (FORD)
- Pilot 3B (TWOT)
- GWEN (NEW)
- Cybersecurity (S21SEC)
- Joint KER - ASSIST-IoT platform (UPV)

In this case, instead of dialogue transcription, the T2.5 team found more interesting to reflect on the conclusions reached upon every of those questions.

Q1 (made by the consortium): Decentralized vs centralized flavor: what do you see in our architecture?

Overall feedback gathered: The architecture looks good, same as in previous occasions where we met. Currently, the Smart Orchestrator centralized deployment and decentralized execution is clear, although more emphasis should be put on the possibility of adding other “edge controllers” not managed by the centralized

Kubernetes entity. In addition, a focus should be put in comparing our technical architecture to other similar ones (e.g., improvements over OSM).

Q1 (made by the consortium): What would you expect from a NGIoT system from the viewpoint of user interface? What would you like to manage?

Overall feedback gathered: Simplicity and coverage of the basic features must be sought. In addition, flexibility and capacity of adding new characteristics is relevant. As a global recommendation, for the sake of presenting the results to the user and potential adopters of the solution, the results and innovations should also be presented using a dynamic format pointing to the different parts of ASSIST-IoT architecture.

Q1 (made by the consortium): Which are the adoption barriers that you witness from your organization standpoint to implement ASSIST-IoT?

Overall feedback gathered: After several discussions in the meeting and offline, some impressions were gathered:

- Easiness of use is necessary.
- Resiliency mechanisms (in case the network is down, there is no communication between clusters…)
- Scalability is required and could be a barrier if not addressed properly.
- Security and privacy must be ensured.

In addition, AB members are being involved in the creation and diffusion of the adoption barriers survey, delivered under the framework of T8.4 of ASSIST-IoT.

Q1 (made by the consortium): Do you think ASSIST-IoT is aligned with the challenges ahead in the IoT field?

Overall feedback gathered: There was overall positive feedback. ASSIST-IoT has created a series of KPIs very useful to represent the stickiness to the current challenges of NGIoT deployments. In relation with these KPIS, for them to be better understood and accepted, should be presented per layer of the architecture and per component. With that, it will be clear how ASSIST-IoT is addressing the current research and application challenges in the field.

Q1 (made by the consortium): Exploitation results: should they focus on pilots and actual drift to Industry or focus on open source, architecture, community, generic...?

Overall feedback gathered:. Special mention went to the GWEN (hardware result of ASSIST-IoT designed, implemented, printed and encapsulated by NEWAYS). According to AB members, this result should be mentioned upfront in any forum where ASSIST-IoT innovation will be presented. A relevant note here was that this result (GWEN) should always be brought together with a clear and simple explanation of the novelties that it provides in comparison to other similar solutions for IoT gateways (RPis, SIMATIC, SMC, others…). Here, the key will be in clearly exposing: (i) the scalability characteristics (new physical modules can be added easily), (ii) the own-created, customizable operating system (based on Yocto Linux), (iii) the native incorporation of ASSIST-IoT essential baseline components necessary in a gateway (K3s, Docker, chartmuseum, Helm, etc) and (iv) the built-in mounted interfaces for very versatile communication, downwards and upwards (WiFi, Ethernet, 5G, BLE, UWB).

Q1 (made by the consortium): What would you focus on … in each pilot… to be highlighted / shown in the final review?

Overall feedback gathered: Global opinion was that the way that T9.4 is focusing the explanation of products (as Elevator Pitch) is correct and this should be the line to be followed. Other mechanisms validated by the EC should be further explored. In this regard, we should use the Pitch Elevator presentations as prominent format towards the review.

Q1 (made by the consortium): What are you missing as NGIoT project from ASSIST-IoT?

Overall feedback gathered: As NGIoT project ASSIST-IoT covers the expectations, although guidance on the usability, installation and adaptation would be needed. It meets the objectives committed. Regarding the technology, the AI capacities of the Smart Orchestrator are clearly not yet there and this must be reinforced and put upfront during the next few months of project execution.

Figure 7. Interview with Advisory Board member

Finally, within the activities scheduled in this meeting, an interview was performed. Mr. Ignacio Lacalle (UPV) interviewed (on behalf of ASSIST-IoT) the only member of the AB present in the meeting (Dr. Harilaos Koumaras). A series of questions were formulated directlgy drawing from the conclusions above.

The recorded interview is currently under a post-editing process and will be uploaded within the next days in the YouTube channel of the project: https://www.youtube.com/@assist-iot

4. Feedback and outcomes

4.1. Recommendations

Drawing from the discussions taking place in the two sub-sessions of the 3rd meeting, the T2.5 team of the task made a synthesis and interpretation effort to translate the observations from AB members into recommendations fitted to ASSIST-IoT workplan. The objective of this action was to come up with a set of actionable indications that should drive (or fine-tune) the execution of the project. The results of this activity were the following:

Table 2. Recommendations from AB third meeting to be considered in ASSIST-IoT workplan

Topic	Recommendation	Potential impact in the workplan
Global management considerations	ASSIST-IoT should use the Pitch Elevator presentations as prominent format towards the review.	The activity of elevator pitch of every result (and pilot) will be reinforced in T9.4, aligning with in plenary sessions to agree on the material to be shown in the final review of the project.
	Results and innovations should also be presented using a dynamic format pointing to the different parts of ASSIST-IoT architecture.	Material will be created in the context of WP8 to pinpoint every KPI to a specific horizontal or vertical slice of the architecture. Evaluations are now one of the main focus of the project, therefore this comment will be bore in mind.
	KPIs should be presented per layer of the architecture (or per component).	
Global research directions	A focus should be put in comparing our technical architecture to other similar ones (e.g., improvements over OSM).	Last stages of development and integration of WP4 and WP5 will consider this comment, especially when documenting and licensing the software results (e.g., Smart Orchestrator).
	The AI capacities of the Smart Orchestrator are clearly not yet there and this must be reinforced and put upfront.	Focus in T4.2 is now diverted to apply AI techniques to utilize the historic status of enablers, clusters and networks in order to apply policies in a predictive and prescriptive fashion

		after the application of AI methods. Next presentations to the AB will bear this aspect in mind and will explain upfront the results achieved in this regard.
Technical additions	Recommender: a market of enablers in which you can just select and deploy them into your application	The interface being developed in T5.5 (Manageability) will include a guidance (drop-down, wizard…) to suggest potential enabler deployments to the viewer/user of the system, depending on their expressed application case.
	Example installation of ASSIST-IoT in a sample, simple case	The front page, both in readthedocs and in the Github repository of ASSIST-IoT architecture will include a clear, simple guide with the first steps and how to implement the software to specific cases (and generic descriptions).
Exploitation	But it is true that a technological guide with some interfaces as could be very beneficial, creating a general engagement process.	The outcome proposed for the previous recommendation will be distilled into a cookbook, that will be part of T8.4's output in D8.3.
	The GWEN is a fabulous result that should be mentioned upfront, always remembering to highlight the necessity of such a hardware when other similars "may exist".	Effort will be put in the description of the result in T9.4 to highlight the differences and the need of having a GWEN instead of other available solutions.

4.2. ABECI Analysis

Paying attention to the directives created in D2.8 and updated in D2.9, the ASSIST-IoT managing team created a set of specific KPIs to formalise the goals and expectations related to the Advisory Board participation in the project. The so-called Advisory Board Expected Contributions Indicators (ABECIs) are used to track and monitor the influence (and level of support) that the project is receiving from its AB members. This is also conceived as a tool for improving the relationship with the members, as it is a live asset being enhanced during the project. The evolution of those KPIs after M30 of the project is:

Table 3. Advisory Board Expected Contributions Indicator

Advisory Board Expected Contributions Indicator (ABECI)	**After 1st Meeting (M6)**	**After 2nd Meeting (M18)**	**After 3rd Meeting (M30)**	**Expected (final) value**
Risks identified from AB members and added to ASSIST-IoT risk mgmt. procedure.	0	2	4 (highlighting differences with existing tools, project extension)	4 risks
Pre-normative doc. of ASSIST-IoT outcome following standardisation template	0	0	0	1 doc.
Participation in standardisation working groups introduced by AB member	0	1 (AIOTI)	2 (ITU-T)	2 contributions
Recommendations of AB members becoming actions in ASSIST-IoT workplan	8	17	26	20 recommendations

Requirements (technological) coming from AB members included in ASSIST-IoT	0	3	5 (recommender, cookbook)	4 requirements
Requirements (stakeholders') coming from AB members included in ASSIST-IoT	0	4	4	10 requirements
Liaison actions with external projects driven by AB-ASSIST-IoT interaction	0	0	3 (EVOLVED-5G, AIoTWin, IoT4Us)	4 actions
Attendance to events driven/guided/conducted by AB members	0	0	2 (by 5G-EVOLVED)	3 events

Reflecting about the numbers above, the interaction with AB members is meeting the expectations but some work is still needed to be performed with regards to leveraging their networks/knowledge/expertise/experience in both research and commercial projects with the goal of enlarging ASSIST-IoT presence (in events, standardization fora, other actions).

It is worth remarking, that, apart from the attendance of ASSIST-IoT organized meetings and providing required feedback, the members of the AB (in particular, Dr. Harilaos Koumaras and Prof. Ivana Podnar) have facilitated the acquaintance with the activities of project like EVOLVED-5G, AIoTWin and IoT4us.

5. Next actions

According to the plan and the recommendations provided in the third meeting(s), and following the original plan and committed activities, the most immediate actions are the following:

- To share the next round of technical deliverables (being completed in M30 and expected by M36).
- To share the next round of test and integration deliverables expected by M36).
- To share the conclusions out of the Code-camp in July (Eindhoven) and the 7th Plenary Meeting in Malta (October 2023).
- To keep virtual communications with them in order to enlarge/enhance requirements, KPIs and workplan of the project.
- To arrange a virtual general assembly (with all AB members and ASSIST-IoT representatives) for October/November 2023 (M36/37 of the project).
- To prepare documentation, next actions and update of the plan settled in this document towards the catch-up meetings (virtual).
- To share the results by the 2nd round of Open Call projects.
- To apply recommendations in Table 2 in the different points of the workplan. These hints must be shared by the Project Coordination with all WP leaders to ensure proper addressing across parallel tasks.
- To apply conclusions realised after Table 3 to improve the settled ABECIs.
- To keep continuous communication with AB members in case of potential joint-collaboration opportunities (e.g., dissemination events, EU-IoT organised calls, etc.).
- Elaborate over the suggested discussion points that were not deepened enough during the meeting and aftermath actions.
- To engage AB members more in the actions of task T8.4
- To prepare the Final Event (in March 2024) and invite the AB members to attend to such occasion.

6. Conclusions

After 30 months (out of the new total of 41) have been conducted, it could be said that the interaction with Advisory Board members has been fruitful so far. A total of 26 recommendations that have translated into actual additions to the project work plan have been counted, as well as their influence on different actions like risk identification, potential adoption barriers definition, requirement elicitation and KPI listing.

In addition, several official meetings have been conducted, including both virtual and now one face-to-face, where valuable feedback has been obtained, ensuring technical developments and innovative approach of ASSIST-IoT to be kept sound also from an external set of eyes. In addition, some relevant conclusions have been extracted on how to move forward, generating a reasonably healthy list of actions to be tackled during the next months. These conclusions will help the Consortium to prepare ahead of the 4th AB meeting (in October/November 2023 together with the final event in March 2024).

Regarding reporting, there is not another deliverable expected for the task. However, the final information about the next meeting will be provided in the Final Project Report after the finalisation of the action.

The Consortium expects to keep up with the good work in this regard and perform a successful, mutually beneficial interchange with AB members throughout the project duration.