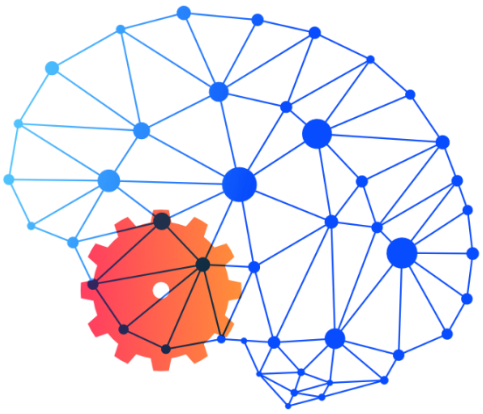

capri

Cognitive Automation Platform for European PRocess Industry digital transformation

Deliverable

D1.8 Minutes of project management meetings (M24)

Deliverable Lead: CARTIF

Deliverable due date: 31/03/2022

Actual submission date: Minutes of project management meetings (M24)

Version: V2

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Document Control Page	
Title	D1.8 Report 4 Minutes of project management meetings
Lead beneficiary	CARTIF
Description	This deliverable provides minutes of discussions held. Once every six months there will be a periodic meeting of all partners to assess progress on ongoing tasks, review next steps, and adjust the work plan accordingly if necessary
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EXECUTIVE SUMMARY

This document belongs to the framework of WP1 (Coordination and Management) of the CAPRI project and provides minutes of discussions held in the Third periodic meeting (month 24). As stated in the GA once every six months there will be a periodic meeting of all partners to assess progress on ongoing tasks, evaluate potential risks, review next steps, and adjust the work plan if necessary.

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RELATED DELIVERABLES

Number	Full name
D1.1	Kick-off meeting result report, financial and technical agreements (M1)
D1.3	Report 1-Minutes of project management meetings (M12)
D1.6	Report 2-Minutes of project management meetings (M18)
D1.7	Report 3-Minutes of project management meetings (M18)
D1.9	Report 5-Minutes of project management meetings (M30)
D1.10	Report 6-Minutes of project management meetings (M36)
D1.11 (final version)	Final Report: Minutes of project management meetings (M42)

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1 Deliverable Description

The present document gathers the main conclusions of the different points of the agenda of the third Consortium Meeting of the project, which was held by online means via Microsoft Teams in 3rd March 2022.

CARTIF, acting as project coordinator arranged the details of the project meetings (including the agenda) in a timely manner. At least one representative from each consortium members assisted to the meeting and shared their experience concerning the development of CAPRI project. They evaluated the actions taken in the previous six months (M18-M24) of the project and also study the upcoming activities.

The presentations of each partner were previously uploaded to Alfresco shared repository, and could be seen by all the members of CAPRI consortium.

Below is presented the whole list of partners.

Table 1: List of Partners

No	Name	Short name
1	FUNDACION CARTIF	CAR
2	ENGINEERING – INGEGNERIA INFORMATICA SPA	ENG
3	RESEARCH CENTER PHARMACEUTICAL ENGINEERING GMBH	RCPE
4	POLITECNICO DI MILANO	POLIMI
5	VDEH-BETRIEBSFORSCHUNGSINSTITUT GMBH	BFI
6	EIFFAGE INFRAESTRUCTURAS SA	EIF
7	SIDENOR ACEROS ESPECIALES SL	SID
8	MONDRAGON SISTEMAS DE INFORMACION SOCIEDAD COOPERATIVA	MSI
9	ASOCIACION DE INVESTIGACION METALURGICA DEL NOROESTE	AIMEN
10	CORE INNOVATION AND TECHNOLOGY OE	CORE
11	PRIVREDNO DRUSTVO ZA PRUZANJE USLUGA ISTRAZIVANJE I RAZVOJ NISSATECH INNOVATION CENTRE DOO	NISSA
12	APPLIED MANUFACTURING SCIENCE SPOLKA Z OGRANICZONA ODPOWIEDZIALNOSCIA	AMS

2 Agenda schedule

Below it can be found attached the agenda of the meeting. There were slots for each WP and extended time dedicated to the three pilots involved in the project (asphalt plant, steel plant and pharma pilot plant). The duration of different sessions included a slot of time about the status of the upcoming deliverables and next steps for the first six-month period of the second year of the project (M25-M30).

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Table 2: Review Meeting M24 agenda

ITEM	start	end	PRESENTER
Welcome, telco guidelines and agenda	9:00	9:05	CAR
WP1 – General explanation, Advisory Board, 2nd Amendment process status	9:05	9:10	CAR
WP3+WP4+WP5 – CS's/CAP	9:10		
• General explanation	9:10	9:15	CAR
• **ASPHALT:** ○ **CAS1** 5-7mins ○ **CAS2** 5-7mins ○ **CAC1** 5-7mins ○ **CAP1** 5-7mins ○ **CAO1** 5-7mins	9:15	9:45	CAR/AIMEN/CORE
• **STEEL:** ○ **CSS1** 5-7mins ○ **CSS2** 5-7mins ○ **CSS3** 5-7mins ○ **CSS4** 5-7mins ○ **CSS5** 5-7mins ○ **CSO1** 5-7mins	9:45	10:20	BFI
• **PHARMA:** ○ **CPS1** 5-7mins ○ **CPS2** 5-7mins ○ **CPS3** 5-7mins ○ **CPS4** 5-7mins ○ **CPS5** 5-7mins ○ **CPC1** 5-7mins ○ **CPO1** 5-7mins ○ **CPP1** 5-7mins	10:20	11:10	RCPE
• **CAP - software / data analysis -COGNITION**	11:10	11:30	ENG/NISSA
WP6 – Review last 6M, Pending actions, Next steps	11:30	11:45	CORE/POLIMI
WP7 - Review last 6M, Pending actions, Next steps	11:45	12:15	MSI/CAR/POLIMI
DELIVERABLES M24	12:15	12:55	

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D1.8 Report 4: Minutes of project management meetings. **WP1—REW:** AMS/CAR— **(R, PU)**	1'		CAR
D3.2 CAPRI Industrial IoT Platform and Data Space. **WP3—REW:** AIMEN / CAR— **(O, PU)**	5'		ENG
D3.3 CAPRI Industrial Analytics Platform and Data Space. **WP3—REW: AMS / CAR— (O, PU)**	5'		NISSA
D3.4 CAPRI Smart knowledge and semantic data models. **WP3—REW: ENG / CAR— (O, PU)**	5'		CAR
D3.5 CAPRI Smart decision support **WP3—REW: POLIMI / CAR— (O, PU)**	5'		NISSA
D3.6 Reference Implementation of Cognitive Process Plants and Alignment with other **cognitive initiatives** **WP3—REW: NISSA / CAR— (R, PU)**	5'		POLIMI
D6.8 Report 3 Dissemination and Communication Strategy. **WP6—REW: EIFFAGE / CAR— (R, CO)**	5'		CORE
D7.1 Initial Report: Plan for Dissemination and Exploitation of Results. **WP7—REW: CORE/CAR— (R, CO)**	5'		MSI
D7.3 Initial Report: Training and Education program report. **WP7—REW: BFI / CAR — (R, PU)**	5'		POLIMI
AoB??		13:00	

2.1 Introduction: WP1

The presentation of WP1, about management and coordination, was held by Ms. Cristina Vega, from CAR and coordinator of the project.

The coordinator presented the risks associated to this WP, and the future plan to work in the project to mitigate the risks, offering a summary of the expected deliverables in the next 6 months and the prevision of a meeting with the Advisory Board team to diffuse the project. Finally, the coordinator reminded that an amendment of the Grant Agreement was submitted to the European Commission covering some issues such as small changes about CAS2 cognitive solution and updated the date of deliverable D1.8 (this one). In addition, CAR stated that conversations with the project officer had been held about a patent grant of AIMEN in CAS1 and how to avoid revealing confidential information in the D3.2 that could deny that patent. This issue is still pending to be clarified with the project officer.

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2.2 WP3+WP4+WP5 status review

For each project use case, current status of the different developed CS (cognitive solutions) were shown at the meeting, focusing above all on the problems, risks and delays encountered during their development and explaining the next steps to be taken.

2.2.1 Asphalt use case

2.2.1.1 CAC1 (CARTIF)

A brief description, main objectives and the work performed so far was explained. Divided in the different WP (work packages) the following points were stated:

WP3: Dryer drum model is still being identified and there are pending some experiments yet based on changing its rotary speed and the MPC controller design. The main associated risk is the quality of the identified model.

WP4: There are still some problems with the plant connection and the used FIWARE IoT Agent, CAR has identified some data-frames loss problems and there is a slight FIWARE integration delay. Still working on how to solve this unexpected problem.

WP5: The only possible identified risk for CAC1 is the reliability of the output set points sent to the plant.

Next steps to be performed are: New experiments to be run at the plant for fine tuning of the model to be identified, online CAC1 data ingestion from the FIWARE platform and WP5 CAC1 outputs to be integrated in the CAP platform.

During the presentation of CAC1 status, also the global Asphalt CAP platform based on standard FIWARE modules for ALL asphalt CS was presented and explained. This platform is being commissioned at CAR facilities for the time being.

2.2.1.2 CAS2 (CARTIF)

For this CS, also a brief description about this cognitive solution based on two types of sensors, main objectives and work performed so far were also identified.

It was also stated that this CS has a new name to match its final objective which is the measurement of the amount of filler. For each WP regarding CAS2, the following topics were pointed out:
WP3: The main problem is the depressure of aspiration. No delays and risks were identified.
WP4: Only Wi-Fi & connections problems were stated.
WP5: For this WP, there can be some delay in the sent materials and a possible risk is to obtain a real depressure value at work and that the filler can damage the sensors.
Next steps: to finish the laboratory work and to solve, at WP4 level, the connection to the database at CAR Server for integration with actual plant data. Regarding WP5 tasks, installation of the final sensor at the plant and data process in auto mode are the points to be taken in this WP.

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2.2.1.3 CAS1 (AIMEN)

A brief description regarding the sensor, its objectives and work performed so far (both on the basic research using multispectral cameras and evolution of the laboratorial prototype) were present during the meeting.
During the status analysis of WP3: more time than what it had been foreseen in the Gannt was needed for optimal basic research, there were some delays in the delivery of the goods due to COVID-19 restrictions, but the stated ongoing risks were overcome.

2.2.1.4 CAO1 (CORE)

Current status and work progress so far were presented at the meeting regarding the following topics:

Exploratory data analysis for the time being, development of an anomaly detection model based on machine learning techniques and its application on actual asphalt plant data to generate warnings and alarms is explained.

In addition, the next steps to be performed for this CS are also presented, based on optimization of model performance.

2.2.2 Steel use case

2.2.2.1 CSS1 (SIDENOR)

It was provided a brief description of the cognitive solution and the work performed so far. An explanation of the encountered issues about the revamping activities and maintenance work were described were some contingency plan has also been defined and commissioned were it was mentioned that those revamping activities are still going on, experiencing an important delay. This implies WP3 activities. For these reasons, WP4 and WP5 activities can be compromised because of the relation of this CS with the rest of the Steel use case CS.

2.2.2.2 CSS2 (BFI)

CSS2 relates to steel solidification sensor. Activities and work performed so far were described. It was stated the relation with CSO1 and CSS5 for their development and this could be an issue if not properly finished.
Next steps to be performed are the collection of much more data to validate and fine tune calibrate the sensor at WP3 level, the connection with the CAP platform in streaming mode for WP4 level and the eventual plant integration at WP5 level.

2.2.2.3 CSS3 (BFI)

CSS3 concerns the development of a steel temperature cognitive sensor. Its development has suffered from a problem in the calibration of the pyrometers which seems to be inconsistent.
Next steps to be performed are the recalibration of the pyrometers at WP3 level, the connection with the CAP platform in streaming mode for WP4 level and the eventual plant integration at WP5 level.

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2.2.2.4 CSS4 (BFI)

CSS4, based on the development of a cognitive scale soft sensor. The work performed so far has been described, based on the development of a user interface visualization and the transformation of raw input data into product-related data.

Regarding WP3 identified problems, delays and risks so far are that its results cannot be validated, the model is still too simple and the impact on the bar surface quality is still unclear. For WP4 and WP5 issues, once the sensor is fully developed there should not be any issue for these WP.
Next steps to be performed are the development of a better model regarding the different steel alloys at WP3 level, the connection with the CAP platform in streaming mode for WP4 level and the eventual plant integration at WP5 level.

2.2.2.5 CSS5 (BFI)

About CSS5, cognitive steel risk and anomalies sensor, performed tasks so far have been made up of data collection, preprocessing and development of a first model version based on machine learning techniques. There have been identified some problems and delays concerning CS results and missing data still not available at this time, so that a risk about not detecting steel defects with this CS may rise. About WP4 and WP5 tasks, this CS is being developed and adapted using Spark platform.

About next steps to be followed are: A contingency plan is already set in place so that these delays don't affect due dates. CSS5 work is still in progress, where data analysis must go on at WP3 level. At WP4 level, algorithm and data spec for the CAP must be done along with the adaptation with the Spark platform and the eventual plant integration and visualization of results are tasks still to be done at WP5.

2.2.2.6 CSO1 (BFI)

This CS, digital twins for steel production, current status comprises the following points: Its database has been already set up alongside the development of an API and a user interface. Also, it has been pointed out the strong dependence of this CS with the final development of the previous CSs. The main identified problem is that current development of the CS is not using the defined API.

Next steps regarding this CS are the API integration with the final CAP platform at WP4 level and the plant integration and development of the corresponding decision support system at WP5 level.

2.2.3 Pharma use cases

The last use case to be explained was the pharma. Main responsible explained their work done and developed during these last six months.

2.2.3.1 CPS1 (RCPE)

The work done so far within this CS for the estimation of granule uniformity detection was described, specifying the different used data ingestion and regression algorithms. This CS is considered to already be finished.

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2.2.3.2 CPS2 (RCPE)

The work done so far within this CS for the estimation of granule size was described alongside the description of the different used data input – output data and calculation algorithms. This CS is also considered to already be finished.

2.2.3.3 CPS3 (RCPE)

Description of the status of this CS for the measurement of the granules moisture was described, again, specifying the different methods used for input-output process data, the mathematical model for the estimation. This CS development is still ongoing. No problems, risks or delays were identified at the meeting.

2.2.3.4 CPS4 (RCPE)

Description of the status of this CS for the estimation and prediction of the dissolution profile from process settings and sensor data was described, again, specifying the different algorithms and methods used for input-output process data, and parametric and prediction models. This CS development is still ongoing, where improvement and validation of a basic solution is in progress. No problems, risks or delays were identified at the meeting.

2.2.3.5 CPS5 (RCPE)

It was described the work done so far of this CS for the detection of faults at the process line. Different algorithms and methods are being used. This CS development is still ongoing. No problems, risks or delays were identified at the meeting.

2.2.3.6 CPC1 (RCPE)

A presentation of the current status of this CS to control the in-specification tablets in order to monitor critical quality attributes during production. A production model has been identified and an MPC controller has been designed and fine-tuned. It is already made a basic setup and its development is still in progress. No problems, risks or delays were identified at the meeting.

2.2.3.7 CPO1 (RCPE)

The progress so far of this CS based on operation concept is still ongoing. The different algorithms and methods that are being used for the development of this solution were presented at the meeting. No problems, risks or delays were identified at the meeting.

2.2.3.8 CPP1 (RCPE)

The progress so far of this CS based on planning concept is still ongoing. The different algorithms for optimal sequence of experiments and used methods for the development of this solution were shown at the meeting. No problems, risks or delays were identified at the meeting.

2.3 CAP - software / data analysis - COGNITION

2.3.1 CAP (ENGINEERING)

The main results so far, the latest updates and the next steps for the main goal of CAPRI project, the CAP platform, was presented. A review of the Reference Architecture for Cognitive Process Plants that is being implemented in the project was shown. As a reminder, this was theoretically set in D2.1 and in WP3 and WP4 is being implemented and commissioned. The different modules that

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are being used in the different use cases (mainly based on FIWARE open standard) were described. This way the Reference Implementation has been shaped and described in D3.1, further improvements have been done later, with the integration of Kafka (to support the Steel domain CSs) and Superset (to improve the reporting and visualization capabilities).

During these past 6 months a CAP Server has already been commissioned based on a cloud instance which has been installed and running. Also, a webinar showing the use of the CAP with a ML example has been provided and this server has been extended with Matlab compiler to support Matlab based cognitive solutions to run them as Spark jobs.

Also, within this context, there has been a consolidation of roadmaps for T4.1 – T4.4 of WP4. And it has been agreed the use of GitHub to version, tag and release software artifacts for all CSs (cognitive solutions).

Regarding the integration of all CS in the CAP platform within WP4 context, the following points have been agreed to be followed on:

Each partner developing CSs will create and manage their GitHub Repository.

The software source will be versioned, major releases will be tagged, with technical documentation related to the software artifacts, part of them to be included in D4.x deliverables.

Each repository owner will grant access to interested partners for the CAP integration.

ENG will create a GitHub repo linking all other repos, in order to build the final Capri software release.

Some Zenodo registrations will be done referencing the objects in GitHub.

There is still pending an agreement among all partners on a procedure for eventual development/integration.

In addition, it was explained that several dedicated calls among ENG and the different use case pilots partners responsible for the development of the different CSs were held during this time period.

The latest issues on this topic are the integration of different CS of the pharma sector in the CAP platform and the integration of different external tools in it to match the necessities of different CSs. Also, an approach to start integrating the different steel CSs has also been set up.

The next steps to be taken are to continue the ongoing work of integrating the different CSs in the CAP platform and the optimization of that integration based on different programming languages used in the development of those CSs.

In addition, a webinar describing the integration of each domain is being prepared and will be held in a near future.

2.3.2 COGNITION (NISSA)

A review of the motivation, hypotheses and how to monitor and control the behavior of an industrial process based on cognition was presented. Mainly, the use of the sensor data from the point of view of sensing and perceiving the context and the environment and how to control them analyzing the impact of changes was explained. The model based architecture of the cognition applied to industrial processes was also shown.

It was also explained in more detail the challenges of the cognitive sensing, the application of the concept of fast thinking using multivariate analysis and residual-based control charts.

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The PICO architecture was also explained, defining its different modules and the application of all these concepts for different CSs of the Steel and Pharma Use Cases was also presented.

2.4 WP6 review

CORE explained the WP about Communication, Dissemination and Community Building covering tasks 6.1 and 6.2.

She mentioned that 6 deliverables have been submitted (no new ones in this six-month period).

A full update of the webpage has been addressed in this time. This new content helped to boost the interaction with stakeholders via our social media. Additionally, she provided the website analytics (explaining the impact reached) and summarized other dissemination activities such as the launch of our third press release or the participation of different partners in several events (held online) such as the Big Data Value Association Conference or Fiware Smart Fest.

The social media foreseen for this period has been followed by the elected partners and the upcoming one for month 24-month 30 was explained, mentioning again how to monitor the dissemination activities with the tools provided by the Microsoft Teams.

Committed CAPRI project with the open access approach (mandatory for publications and also for research data as we opted-in to be part of the pilot) we have used the repository Zenodo[1], as a way to share the datasets created inside the project. The information was uploaded in the account created in the last period and is directly linked to OpenAire.

All the activities mentioned above will continue in the upcoming year (month 24-36 of the project) with an expected focus on upload videos by the leaders of the Work Package, spreading the work done via events or publications and updating the stakeholders database.

Finally, CORE explained the Key Performance Indicators: the project material, the dissemination channel…

POLIMI explained task 6.3 pointed that this task started in month 8 running until the end of the project. D6.5 providing the initial report of SPIRE digital transformation ecosystem. Silvia explained the threefold objective to be achieved in the whole task:

-clustering with other projects

-building a community of experts in the domain of Cognitive Process Plant

-identification of innovation hubs

This task led by POLIMI is directly related with exploitation interacting with other initiatives such as INEVITABLE[2] and COGNITWIN[3] to enhance our strategy to clustering with other projects, being currently under evaluation develop collaboration with AI CUBE[4].

2.5 WP7 review

The WP7 was explained by MSI, leader of this Work Package. They explained the part related to

[1] https://zenodo.org/communities/capri_project/
[2] https://inevitable-project.eu/
[3] https://cordis.europa.eu/project/rcn/224854/factsheet/en
[4] https://www.ai-cube.eu/

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exploitation, training and replicability. After provide an overview with the help of GANTT chart, the first three tasks have started previous to this period, and the fourth & final one not yet (expected at the end of the next six-month period- September 2022). After the identification of the key exploitable results in the previous period (a technical definition of them), the work done in this half year was to implement a CANVAS model. A questionnaire to every partner was sent at month 19 providing the business plan related to each key exploitable result. Later a workshop was held for all the partners involved classified per sector and a final CANVAS business was generated. At month 22 MSI proceed to concrete the market definition (an activity that will run until month 32). In this analysis it must evaluated the key trends, industry & market & macro-economic forces and a risk assessment. After knowing this it is expected to contrast the feedback received and improve the exploitation strategy.
Part of task 7.2 CAPRI project continued offering support to the Open Research Data Pilot depositing the dataset in repositories (Zenodo) fully compliant with the FAIR principles and keeping the Data Management Plan updated.
In task 7.3 She encourages the partner to be actively involved in the identification of training opportunities. The trainings will start in the next period dealing with the main CAPRI assets being a useful instrument for new roles and professions required in industry 4.0. These trainings are expected to involve digital innovation hubs (related to process industry) as a way to share the lessons learnt in the use cases of the project and also as demonstrative mean of the main results achieved.
Task 7.4 (develop of a replication plan) is only mentioned under this meeting because it will start in the last month (month 30) of the upcoming period.

2.6 Deliverables M24

Cristina Vega provided an overview of the tasks/deliverables carried out in this period and the expected timetable for the upcoming deliverables for this month 24 (March 2022). The coordinator provided tips for the reviewers of the deliverables on March. She shared a file with the reviewers of each deliverable to ensure that appointed partners reserve time in advance to perform the review and avoiding the risk of a review without the due expected quality. All the draft versions and their review by the responsible partners are hosted in the internal repository of the project (Alfresco) being need to agree some issues for all of them such as the use common format for video/data content contents for the deliverables of WP3.
Cristina reminded the schedule date for all the deliverables (sharing the draft with the reviewers, double review of the selected partners and last day to upload in time the information).

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