

ONE4ALL PROJECT

PERIODIC UPDATE ON OUR ACTIVITIES

Project Review Meeting M18

In October 2024, the ONE4ALL consortium held its first virtual **review meeting** with our Project Officer and Reviewer, marking an important project milestone.

This meeting was a valuable chance to showcase the progress we've made and gather **insightful feedback** to guide our next steps. The partners reported technical advancements, barriers met during the implementation, next phases of the project and steps planned, financial situation. The first suggestions and recommendations have been shared by the experts right after the meeting, whereas a detailed report has been later submitted.

The effort and participation of our partners has been invaluable in preparing for this review, and their commitment was key to achieving this successful outcome.

We're excited to keep the momentum going and look forward to sharing more updates as we work toward the ONE4ALL objective!

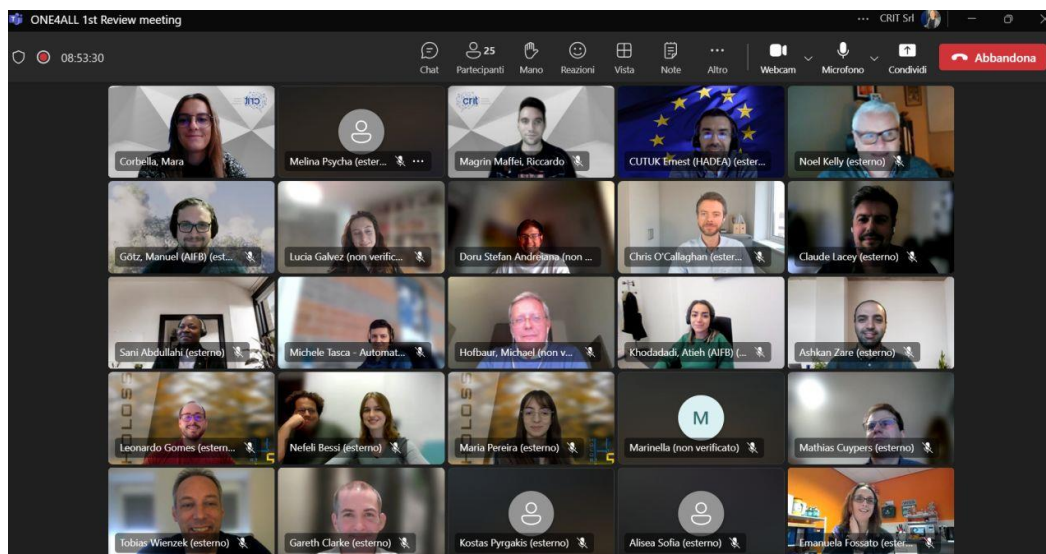


Figure 1: Partners during virtual Review Meeting M18

Technical progress of ONE4ALL

The ONE4ALL project is reaching significant milestones with new developments that enhance robotics control, real-time data integration, and intelligent systems for manufacturing industries.

Below some updates about what we have done until M24.

IOP-Backend Module: A Data Fusion Pipeline for Robust Integration

The ONE4ALL team has successfully developed an adaptable Data Fusion Pipeline powered by a Python API utilizing FastAPI. This pipeline seamlessly interfaces with a Kafka queue, facilitating high-level command operations and data transmission across various platforms. Designed for maximum adaptability, it integrates effortlessly with diverse data sources and communication channels through custom connectors.

This system enables access to both real-time and historical data, allowing detailed monitoring and command feedback for enhanced operational oversight.

Frontend Development: Scalable and Secure User Interface

The frontend module of the ONE4ALL project is also advancing rapidly. [Idener](#) (Coordinator of the project) has developed a versatile template, which includes essential features such as:

- **Authentication and Authorization** for secure access
- **API Connectivity** for seamless backend communication
- A **repository pattern** that allows efficient, scalable data management

Additionally, a generic controller streamlines API calls, automatically manages errors, and caches responses, delivering an efficient, unified interface. The design integrates core project components like Reconfigurable Cyber-Physical Production Modules (RCPM), Digital Twins (DTs), Manufacturing Line Monitoring, and Decision Support Systems (DSS), ensuring the interface can scale and evolve as project needs grow.

AI-based Vision System for Enhanced Object Recognition

The ONE4ALL project team has also developed an advanced AI-based vision system for collaborative robots (cobots), bringing sophisticated object recognition capabilities to the manufacturing floor. This system enables cobots to identify, classify, and accurately position objects within their workspace.

- Using a **high-resolution camera**, the cobot captures images in both color and grayscale, with each pixel value determining object depth.
- A **Computer Vision model** built on the open-source YOLOv8 architecture detects and identifies objects, leveraging fine-tuned datasets created on the Roboflow platform.
- The system then translates detected object positions into **3D coordinates**, enabling cobots to accurately interact with objects, enhancing automation and precision in complex tasks.

Cobot Remote Controller: Expanding Global Accessibility

In a groundbreaking achievement, the ONE4ALL team has developed a remote-control tool within the IOP-backend module, enabling real-time cobot operation from any location. Key functionalities include:

1. **Command Sending:** Through the front-end API, specific commands are sent to the cobot, enabling precise control and seamless integration with other systems such as the Vision System and DSS.
2. **Real-Time Data Monitoring:** The system gathers and relays essential data, such as the cobot's position, movement trajectory, and feedback on command execution, allowing performance assessment in real-time.
3. **Global Accessibility:** This feature allows team members to monitor and control the cobot remotely, facilitating operations from anywhere in the world.

ONE4ALL focus on sustainability

Sustainability has been a topic of increasing interest in different industries and political discussions. In the technological field, we quite often witness new promising innovations having little consideration for sustainable goals.

In the ONE4ALL project, the **sustainable and human factors** have been considered since the very beginning, by the responsible partner [HOLOSS](#). The team began its efforts by conducting a thorough **literature review** of the legislation and frameworks of assessment applied to the **LCSA** (Life Cycle Sustainability Assessment) methodology.

As a second step, they requested the help of the ONE4ALL industrial partners to share information about their processes, to identify the aspects to be included in the assessment.

The third step included an initial construction of the data collection process, called **Life Cycle Inventory**. In this step a survey was developed by HOLOSS, to collect information on the use cases, such as materials and chemicals used, working hours, manufacturing costs.

Thanks to this initial work, at a later stage the Consortium will be able to measure and evaluate the real impacts involving the sustainability of the ONE4ALL project.

Want to know more about the project?

More details on the project activities, results, consortium are available on the official website: <https://one4allproject.eu/>

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