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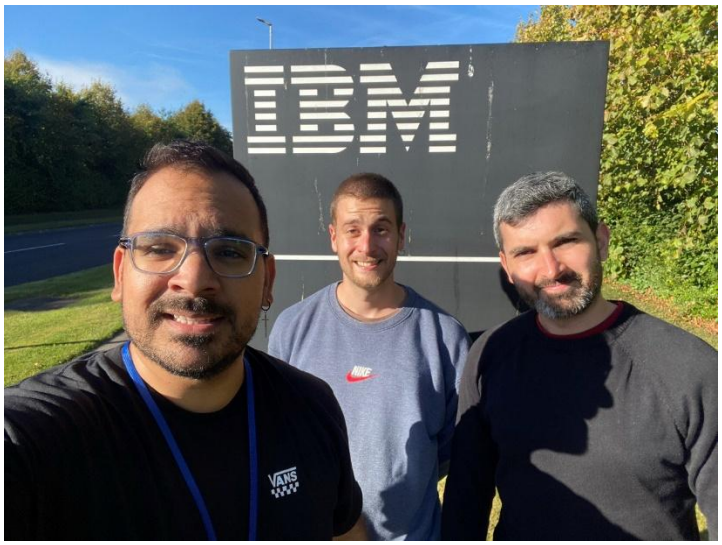

The UMU team strengthens its collaborations with IBM Ireland.

by Valentina Tomat (University of Murcia)

After the fruitful experience of the UMU team in IBM research center in New York, as covered in the newsletter of October 2023, the collaboration between

UMU and IBM continued to grow. In 2024, four researchers successfully realized their secondments at IBM center of Dublin, within the CLOUDSTARS project.

The seconded researchers worked on several projects but converging on a shared vision: making computing across the cloud-to-edge continuum smarter, more privacy-aware, more efficient, and better aligned with real-world deployment needs.

One common thread has been the work on orchestration in private repositories. One of the seconded researchers, Diego Sánchez, concentrated his efforts on the integration between IBM and UMU orchestrators. It involved several steps to ensure that the intents could be correctly used within the system and that both orchestrators could operate independently while maintaining synchronization. On the other hand, Jose Manuel Bernabe worked on the development of orchestration of services from cloud to edge for seamless continuous computing. He proposed reactive orchestration using telemetry and intent-based alert mechanisms. The real-time metric collection and the monitoring of the resources enabled intelligent acquisition and reservation, while prioritizing security and privacy.

Another major focus was the research into federated learning mechanisms. In this context, Carlos Hernández concentrated on optimization techniques implementation on federated learning models, intended for intrusion or anomaly detection, with the activation of real-time alerts on edge devices. The work prioritized both performance and efficiency, to ensure the deployment of the quantized models also in environment with limited computational resources. In parallel, Eduardo Cánovas proposed a secure and decentralized framework for federated learning in distributed environments by integrating blockchain, smart contracts, and decentralized identifiers. The core of the work was a novel mechanism for secure and private model updates in fully distributed systems, that follows Zero Trust principles and ensure confidentiality and privacy.

The seconded researchers shared that their experience at IBM Ireland was incredibly enriching, both professionally and academically. It gave them valuable insight into how a large company operates and into tools and frameworks used in the industry. Besides, some of them highlighted that they felt encouraged to actively participate in discussions and meetings, gaining confidence in their ideas and improving their ability to communicate effectively.

To confirm the positive effects of this collaboration, two of the seconded researchers will return for a second secondment this year. In addition, two new researchers of the UMU team will join the initiative for the first time, opening the path for new research lines.

cloudstars.eu | twitter.com/Cloudstars_2023 | github.com/cloudstars-eu

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