PhD position – Edge-based confidential computing

IDLab-UGent-IMEC

IDLab is a research group of UGent, as well as a core research group of imec. IDLab performs fundamental and applied research on data science and internet technology, and counts over 300 members (40 professors, 50 post docs, 200 researchers, 15 support staff members). Our major research areas are machine learning and data mining; semantic intelligence; multimedia processing; distributed intelligence for IoT; cloud and big data infrastructures; wireless and fixed networking; electromagnetics, RF and high-speed circuits and systems. The research for this PhD position will be conducted in the cloud and big data infrastructure track.

Job description

You will be performing research in the domain of edge-based confidential computing. Confidential computing allows to secure data in use (i.e. being processed by applications) from being maliciously accessed or manipulated.

- You will investigate and extend edge-based confidential computing solutions that offer different degrees of confidentiality with regards to data in use (using ARM Trustzone, Intel TDX or AMD SEV trusted computing extensions). The aim is for the solutions to be deployable on systems that are embedded in future homes / offices and which can operate independently without a continuous cloud back-end.
- The research will apply these confidential computing techniques to SOLID-based data storage at the edge, extending on IDLab's open-source Kvasir (KSS) and will investigate how confidential computing principles can be embedded in edge Kubernetes solutions (e.g. KubeEdge).
- You will build up hands-on experience by designing and prototyping distributed software solutions that offer various degrees of confidentiality and will evaluate the performance of these prototypes. The Homelab infrastructure at IDLab will serve as a use case (https://homelab.ilabt.imec.be/).
- You will work closely with industry partners and organizations such as the World Wide Web Consortium (W3C) to ensure wide applicability, uptake and standardization of these solutions.
- You will apply your work to use-cases such as privacy-focussed edge LLMs in homes and offices.
- You publish and present results both at international conferences and in scientific journals, using open science practices.
- This research will lead to a PhD degree. Throughout the complete PhD period, you receive a full-time, attractive salary.

Your profile

We are looking for candidates with the following qualifications and skills.

- You must have a Master's degree in Computer Science Engineering, Master of Science in Information Engineering Technology, Master of Science in Computer Science, or a related field.
- You are proficient technically and have an affinity with container-based software and Kubernetes.
- Capable of rapidly absorbing knowledge about new software solutions, as the related field is moving at a fast pace (e.g. confidential compute solutions, edge container management frameworks like KubeEdge)
- A strong interest in methods for building scalable and secure edge/cloud data handling systems is a must.
- Previous hands-on experience with containerised applications / cloud-edge / Kubernetes is a plus

- You can plan and carry out your tasks in an independent way. You have strong analytical skills to interpret the obtained research results.
- You are a team player and have strong communication skills.
- You can commit to timing and milestones set forward by different research projects.
- Your English is fluent, both speaking and writing. Ideally you also speak Dutch (both speaking and writing) fluently

Our offer

We offer a fully funded PhD position in a challenging, stimulating and pleasant research environment, where you can contribute to the worldwide research on confidential computing for edge-based applications. The work is done in close collaboration with national and international industry players. You will join an enthusiastic team of researchers, post-docs and professors.

Interested?

Applicants should bundle the following

- Motivation letter
- Curriculum Vitae including scientific resume, academic results and relevant publications
- Two reference contacts

Send your application bundle to Prof. bruno.volckaert@ugent.be, indicating "Application: PhD position – edge-based confidential computing" in the subject. Incomplete applications will not be considered. Selected candidates will be contacted for an interview (remote interview possible for international applicants).

![imec - embracing a better life]