

Open Edge and HPC Initiative (OEHI)

The Vision Statement

Version 1

What are the key challenges and target markets?

The digitalization of our society is rapidly progressing, and many industries are changing dramatically due to the ongoing adoption of information and communication technologies and their integration with operation technologies building the next generation intelligent control platforms in various application domains. We can also witness a convergence of (distributed) data and communications in these platforms due to the need to integrate and analyze information for building smarter applications in emerging Smart Cities and the Internet of Things.

New processor generations, cheaper mass storage and seamless broadband connectivity as well as the ongoing virtualization of networks and services enable the development of new system architectures and applications, in which among others particularly edge computing and high performance computing are key enabling technologies. Examples of industry sectors include manufacturing, energy, automotive, aerospace, logistics, utilities, healthcare, as well as sciences.

Why are we doing this?

Coincidentally, business models are changing and new, more complex, value chains are emerging in which global standards and open ecosystems based on consent and technology knowhow are becoming important enablers for realizing efficient, competitive and innovative solutions to address future challenges. In the past specific chip manufactures have created to a large extent vendor-centric ecosystems, which have partially led to technological limitations and strong business dependencies. With technology based on the Arm instruction set architecture being broadly accessible, the founding members of the Initiative believe that there is the need for creating a feature-rich ecosystem and developing solutions according to and tailored at the needs of industrial and scientific users. Therefore, **the main mission of this Initiative is to make the Arm®-based technology well suited for different IT segments including but not limited to edge computing as well as High Performance Computing (HPC), High Performance Data Analytics (HPDA), Artificial Intelligence (AI).**

Mission summary

The mission of the Open Edge and HPC Initiative is to foster the development of an open and feature-rich ecosystem for Arm®-based technologies to support the evolving needs of the various industries undergoing digitalization and of all their respective stakeholders. This ecosystem will complement and enrich the existing ecosystems, not substitute it and is open to all relevant players, including ISVs, solution providers as well as key customers of such solutions.

Rationale for the initial focus on edge and HPC

Addressing future challenges requires scaling to extreme performance levels by means of HPC solutions as well as bringing compute closer to data sources, i.e. enabling computing at the edge. New opportunities will arise from bringing both together, e.g. for the realization of digital twins or enabling of smart cities. While both technologies domains have been identified by the founding members of the Initiative as crucial, the Initiative welcomes other domains.

Outline of the document

This Open Edge and HPC Initiative' Vision Statement defines the overarching goals of the initiative. The founding members of the Initiative furthermore provide outlines for the specific steps the Initiative plans to take in the domain of edge computing and HPC, in order to create such an ecosystem, and the benefits for the end user community.

Overarching goals for all tracks of this initiative

Goals

The Open Edge and HPC Initiative is being established as an industry-led, non-profit organization focusing on enabling technologies that pursues the following goals:

- Facilitate **shorter time to market** by joining efforts on reference architectures and supporting the realization and demonstration of end-to-end solutions.
- Create an environment where members can **integrate solutions coming from different suppliers** and thus to nurture the innovation potential of all its members.
- **Create an open environment for sharing information**, experience and lessons learned between members.
- **Raise awareness for capabilities of Arm®-based solutions** and create new market opportunities.

The Open Edge and HPC Initiative has the ambition of playing a major role in enabling the scientific and societal revolutions that is underway. The first and second industrial revolution not only transformed technology but also led to fundamental societal changes. The ubiquitous data processing may be equally significant.

Activities and planned deliverables for edge computing to explain better value to be created from the perspective of a given track

Edge Computing

The edge computing (EC) group is motivated by the need for secure distributed data processing and low latency communications in emerging 5G and industry 4.0 environments. Major activities will include:

- The publication of best practices and white papers illustrating the industry challenges and requirements to be mastered by means of Arm-based EC.

- The development of a reference framework and end to end architecture integrating Edge and server architectures, identifying the key stake holders, system components and application programming interfaces, as well as optional software libraries helping in developing fast and efficient (interoperable) high performant scalable solutions in the respective domain.
- The definition and establishment of independent open as well as application specific Arm-based EC testbeds and the provision of appropriate benchmarking and interoperability toolkits should help in enabling component and solution providers, as well as potential customers to understand the technological capabilities. Also support for interoperability testing and certification will be envisaged.
- The initiation of so called “pathfinder projects” to validate the reference framework in different application sectors and to obtain new requirements for the future.

Activities and planned deliverables for HPC to explain better value to be created from the perspective of a given track

High Performance Computing

In the area of high-performance computing (HPC), the Open Edge and HPC Initiative will focus on **establishing the value of Arm®-based solutions** in this domain. For this purpose, the members of this Initiative will work together on the following:

- Identifying a list of computing kernels that can benefit strongly from Arm®-based systems that are becoming available. Together we will generate and share knowledge on what needs to be done to deliver competitive performance on such systems.
- The Initiative will work on enabling commercial **offerings from ISVs**, e.g. by providing quick and easy access to Arm®-based HPC systems to explore the capabilities of these new solutions.
- Provide its members with a unique opportunity to collaborate on **identifying market needs for Arm®-based HPC solutions**. The broad scope of this Initiative will allow exploring new market segments not yet occupied by established technologies and solutions.