

Smarter computing systems make society better

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Smarter computing systems can help give our lives a big boost - in education, healthcare, transportation, security and even the environment. But these computing systems need to be adjusted constantly, to help meet the changes that emerge every year. The HIPEAC ('High performance and embedded architecture and compilation') project is driving innovative computing systems, effectively making our lives much easier.

The HIPEAC partners presented their vision in a report at the European Future in Computing Systems during the recent Architecture of Computing Systems (ARCS) conference in Munich, Germany.

Elements that form part of smarter computing systems include smart houses and smart grids. Professor Koen De Bosschere from Ghent University in Belgium, who is also coordinator of HIPEAC, says computing systems can meet the challenges that impact society. With this in mind, the HIPEAC network is supported by more than 1 000 researchers from European universities and companies working to identify and evaluate the problems that computing systems will face in the coming decade.

"To continue to be a source for new and innovative solutions, the computing systems community must dramatically improve the efficiency, complexity, and dependability of the future computing systems," Professor De Bosschere says.

In the report, the HIPEAC consortium highlights how clear trends are emerging: "An unseen data explosion in all domains (much faster than the explosion in [computing power](#)), an increased demand for connectivity and for dependable and reliable systems across all fields."

According to the project partners, the big challenge is to convert the increasing transistor density (Moore's law) into similar performance improvements required to bring new and innovative solutions out in the open. They add that there is a fast-growing gap between the raw performance of hardware devices, and the actual performance triggered by the use of common tools and practices.

The report also notes that specialising computing devices is probably a good solution for both the short and medium terms, but it could prove challenging for improving the performance of future computing systems. Keeping this in mind, the HIPEAC partners have identified seven concrete research objectives related to the design and the exploitation of specialised heterogeneous [computing systems](#) for the data deluge and for reliable ubiquitous computing.

Tools that can automatically use and optimize the resources of such heterogeneous computing devices is key, according to the partners. In the longer term, according to the HIPEAC vision, new devices and new computing paradigms including bio-inspired systems, stochastic computing and swarm computing, will be important.

If the challenges posed by such novel resources are not met, the result will be a drop in the European ability to leverage computing systems' potential to boost global competitiveness and make it better for society.

More information: HIPEAC www.hipeac.net/

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