Hastlayer - turning software into hardware for faster computing

Results in Brief

The sky is the limit for flexible, easy-to-use software innovation

A solution to achieving faster computation is creating new possibilities on software development platforms. The innovation could also make space exploration more accessible in the future.

DIGITAL ECONOMY

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Demand for faster, more efficient computing that consumes less power is dramatically increasing in numerous sectors. Social media platforms for example, must deal with millions of pictures being uploaded every second, while satellites beam terabytes of information back to Earth.

As a result, the skills of software developers are increasingly being spread very thinly. “Using compute accelerators for High-Performance Computing (HPC) tasks is very complicated,” explains Hastlayer project coordinator Zoltán Lehóczky, co-founder and managing director of Lombiq Technologies, Hungary.

“ .NET is one of the biggest platforms used by software developers. Very often though, developers have to abandon .NET and leverage other technologies that require specialised hardware knowledge to meet HPC requirements.”

More efficient software

Lehóczky and his team were interested in finding ways of making software more efficient, without requiring this specialised knowledge. This is not software that you would typically find in your PC or smartphone; rather it is software to support online services or scientific simulations, where a lot of computation is involved.

“Software is flexible; specialised hardware is extremely fast,” he says. “So we thought: why not write software, then turn it into a computer chip?”

This is what the Hastlayer innovation does. It transforms software into electronic circuits. The result, says Lehóczky, is faster computation with less power. Software developers write and update code, with no hardware skills required.

What began as an engineering curiosity turned into a prototype. The 6-month EU-funded Hastlayer project enabled the company to develop a production-ready version of their technology, and to identify possible market opportunities.

“We developed our technology from a software developers perspective,” notes Lehóczky. “They are the end user, so we wanted to make sure that ordinary software developers on the .NET platform find it easy to use.”

The software is currently available on the cloud for web application development.

Reach for the stars

An even more ambitious application for Hastlayer is in the space industry. Satellites record images and send terabytes of data back to Earth, which must then be processed on the ground.

“We recognised that Hastlayer could add value to satellite platforms by offering a safe and convenient software environment, usable by ordinary .NET developers,” adds Lehóczky. “We saw real potential here, because the space sector is an industry that really needs to be made more accessible.”

Lehóczky notes that mega-constellations of satellites are currently being built. Sending a satellite into orbit is becoming radically cheaper each year. Owning satellites could be within the R&D budget of an SME within 5 years.

“This will mean more spacecraft, and increased demand for software developers. It won’t be enough to have just a few specialists. Hastlayer will help to democratise the sector and open it up, because millions of .NET developers could create apps for satellites the barrier to entry will be much lower.”

In terms of next steps, Lehóczky and his team are looking to install Hastlayer

software directly into satellites. “This is not as far-fetched as it might sound,” he says. “Lightweight nano-satellites are becoming cheaper, and they already fly the hardware we need. Adding Hastlayer would be just another small step.”

The company is currently working with the Wigner Research Centre for Physics in Hungary on this ambition. The idea would be to eventually put a small Earth observation satellite into orbit, using installed Hastlayer software to process information and demonstrate the viability of the concept.

Keywords

Hastlayer, software, .NET, satellite, hardware, HPC, computing

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Hastlayer

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