Europe invests realising next-generation green computing for micro-servers and scalable compute

Barcelona, 28 March 2014.- The EUROSERVER project brings together under the support of the European FP7 ICT funding program world-class industrial and academic expertise to design and prototype technology, architecture and systems software for the future generations of energy-efficient reduced-cost micro-servers and scalable compute platforms.

Data centres, and computing in general, are driving the Information Society worldwide and are one of the

key resources for innovation and leadership of European industry. As data centre traffic and workloads continue to grow, data centre scaling is increasingly constrained by existing server technology due to insufficient server density, high power consumption and high total cost of ownership (TCO). This is why EUROSERVER has taken to reconsider the basic components and fundamental system architecture of future technology and the resulting server platforms, by architecting and proving their suitability through delivering into a full prototype system.

There are three key axes to the EUROSERVER approach. Firstly, the project will use the low-power 64-bit ARM Cortex™ processors fabricated using the FDSOI fabrication technology, an ideal silicon platform for data centre workloads. Secondly, the project will advance the state-of-the-art in 3D silicon-on-silicon and multichip module package integration, placing multiple silicon "compute chiplets" on a active silicon interposer, while also integrating multiple gigabytes of memory within package together improving fabrication yields, compute density, reduced energy consumption and significantly reducing the cost of acquisition and ownership. Thirdly, EUROSERVER proposes a new backwards compatible system software architecture that allows resource virtualisation and sharing of global memory and I/O between multiple compute nodes while delivering new memory models that will enable the future generation of more efficient and high-performance software paradigms.

Launched in September 2013, EUROSERVER is a three-year project coordinated by *Commissariat à l'énergie atomique et aux énergies alternatives* (CEA) with a managed budget of 12.9 million euros, including 8.6 million euros funded by the European Commission's FP7 Programme plus significant indirect support from the industrial partners.

The three main project objectives are:

- To reduce energy consumption by: (a) using low-power 64-bit ARM cores, (b) reducing the core-to-memory distance through silicon interposer and packaging technology, and (c) while improving energy proportionality.

- To reduce the cost to manufacture, build and operate, by: (a) improved manufacturing yield through 3D integration of multiple chiplets on an active silicon interposer, (b) small size of the packaged interposer module, and (c) and energy-efficient semiconductor process (FDSOI).
- To improve software efficiency through next-generation system software that (a) manages the resources in a server with a common global address space and (b) isolates and protects multiple workloads from each other when they share resources such as I/O, storage, memory, and interconnects.

"The EUROSERVER prototype will demonstrate how the proposed approach can improve energy efficiency by a factor of ten, by 2020" says Yves Durand, EUROSERVER project coordinator. The prototype will be evaluated using workloads for (a) data centres and cloud computing (LAMP, WAMP, HADOOP, MySQL), (b) telecom infrastructures (network communications), and (c) high-end embedded systems (vehicle onboard computer, automatic vehicle location tracking [AVL], advanced security and surveillance).

EUROSERVER brings together a European consortium, joining industrial technology providers, universities and research centres: Eurotech (Italy) as the system integrator, ARM (UK) as the world leader in embedded high-performance processor IP, and STMicroelectronics (France), Europe's leading semiconductor

company, as well as OnApp (Gibraltar), which provides a complete IaaS platform for hosts, telcos and MSPs. In addition to the technology providers and users, EUROSERVER brings application and computer and memory architecture expertise from Barcelona Supercomputing Center (Spain), TU Dresden (Germany), FORTH (Greece) and Chalmers (Sweden).

More information is available at the project's website at www.euroserver-project.eu .

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