



eltic-Plus⁺

Smart Connected World



Celtic-Plus Proposers Day
June 20, 2017, Helsinki

Flexible edge cloud computing initiative (FECCL)

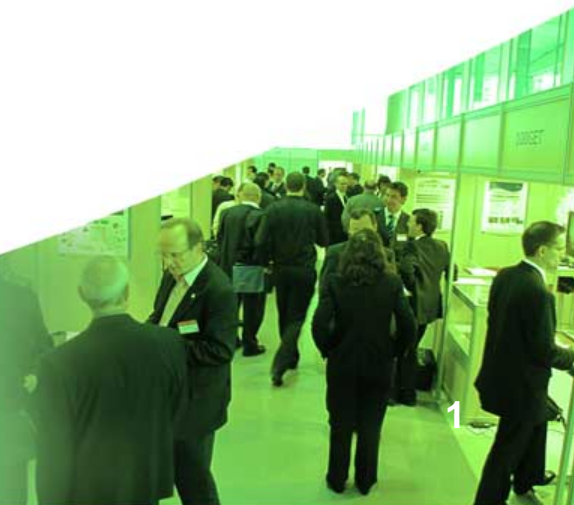
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Edge Computing HW & SW challenges

- **Low-latency computational power** is needed to serve new Machine Learning (ML), Augmented Reality (AR), Internet of Things (IoT), Machine-to-Machine (M2M) applications
- **Huge amount of simultaneous requests** generated by resource-hungry IoT, M2M systems
- **Scalability** (highly dynamic load caused by mobile devices in use cases ranging from crowds to total isolation) and **flexibility** (required by multiple kinds of requests from very different sources)
- **Easy-to-use SW methodology** to exploit this new level of software distribution with ML, AR, IoT, M2M

The solution & gain

- **Hybrid multicore architecture** combining the best parts of vector and general purpose processing
- The core edge cloud solutions of the project enable partners to better **penetrate to evolving Edge Computing markets**

Trends in Edge Computing (EC)

- Stringent performance per power requirements can be addressed only by **increasing parallelism /heterogeneity**
- Software development for increasingly **parallel but also heterogeneous** platforms is difficult and getting even worse with new levels of SW distribution required by ML, AR, IoT and M2M.
- **Gathering functionality to larger entities** (than a sole basestation) benefits some very demanding EC related functionalities, e.g. baseband processing.

Organisation Profile

VTT Technical Research Centre of Finland Ltd is the leading research and technology company in the Nordic countries. We provide expert services for our domestic and international customers and partners, and for both private and public sectors. We use 4,000,000 hours of brainpower a year to develop new technological solutions.

We develop new smart technologies, profitable solutions and innovative services. We cooperate with our customers to produce technology for business and build success and well-being for the benefit of society.

VTT is a non-profit organisation and a crucial part of Finland's innovation eco-system. VTT operates under the mandate of the Ministry of Employment and the Economy.



- Turnover 277 M€ (VTT Group 2014), personnel 2,600 (VTT Group 1.1.2015)
- Unique research and testing infrastructure
- Wide national and international cooperation network

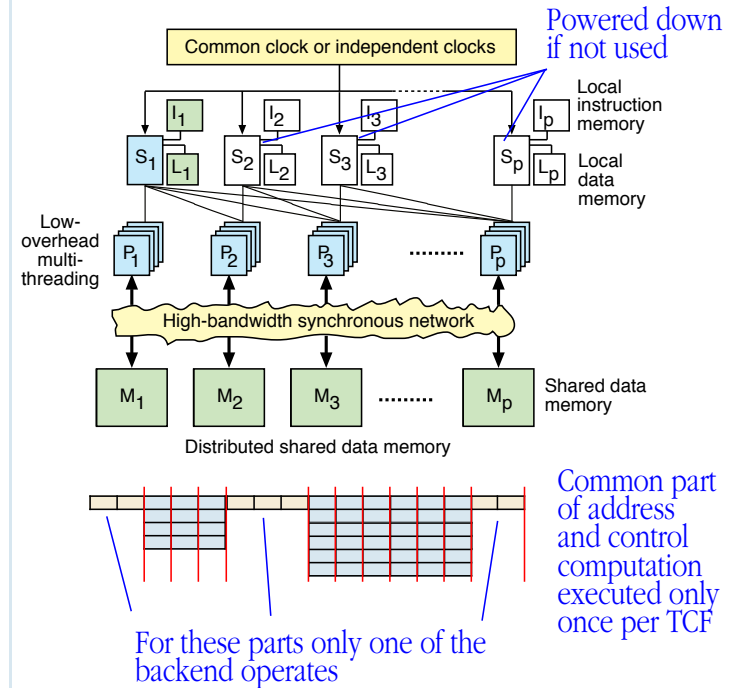
*) Source: Roles, effectiveness, and impact of VTT, VTT & Technopolis Group, 2013.

Vision and motivation

- *Optimized hybrid multicore architecture can address the performance/energy and programmability/flexibility challenges of introduced by edge computing (EC) and new demanding use cases ML, AR, IoT, M2M*
- *The proposed technology raises the level of abstraction of EC solutions making development more manageable, easier to debug and migrate to new HW.*

Content

1. *Requirement specifications for the edge system*
2. *Methodology and EC organization optimization*
3. *EC architecture modelling (and FPGA implementation) & Proof-of-Concept modelling*
4. *Implementation of target functionalities on PoC*
5. *Evaluation of the architecture (performance, energy efficiency, flexibility) & EC methodology*
6. *Supportive actions (marketing, exploitation)*



Proposal Introduction (2)

Outcome

- *Optimized EC architecture for selected use cases*
- *PoC, related EC methodology*
- *Architecture & methodology eval. (energy efficiency, flexibility)*
- *Application/use case-level improvements*

Impact

- *The core building block/architecture for scalable and flexible edge cloud computing enforcing partners' penetration to emerging markets*
- *Higher quality EC solutions for EU citizens via better support for ML, AR, IoT, M2M*

Schedule (fall 2017 shown, spring 2018 also possible)

- *August 2017* *Core consortium/partner seeking*
- *September 2017 -* *Proposal writing*
- *Fall 2017* *Submission*
- *End of 2017* *CELTIC Plus label*
- *Spring 2018* *Project start, duration 3 years*

- *Architecture developer/provider* *VTT, Finland*
- *Telecom infrastructure/handset providers*
- *Telecom operator*
- *Processor/computing platform manufacturer*
- *Cloud software infrastructure provider*
- *Appliers in fields of ML, AR, IoT, M2M*
- *Research partners on EC*
 - *Edge cloud methodology*
 - *Architectural implementation issues*
 - *Low-power computing experts*

Contact Info

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