Disaggregated Computing

dRedBox aims to innovate the way we build datacentres today, shifting to employing disaggregated datacenter-in-a-box instead of the monolithic today’s datacenter.

Summary

“Disaggregated Recursive Datacentre-in-a-Box”, called dRedBox, takes on the challenge of revolutionizing the low-power computing market by breaking server boundaries through materialization of the concept of disaggregation. It takes on addressing this challenge in next generation, low-power, across form-factor “datacentres”, departing from the paradigm of the mainboard-as-a-unit and enabling the creation of “function block–as–a-unit” having as the baseline disaggregated building blocks: a) SoC-based micro-server card, b) high performance RAM card and c) accelerator (FPGA/SoC) card. Besides proposing a highly modular software-defined architecture for the next generation datacentre, dRedBox will specify, design and prototype a novel hardware architecture where SoC based micro-servers, memory modules and accelerators, will be placed in separated modular server trays interconnected via a high-speed, low-latency opto-electronic system fabric, and be allocated in arbitrary sets, as driven by fit-for-purpose resource/power management software.

Objectives

- To design and develop a vertical approach for a flexible modular datacentre-in-a-box architecture
starting from the hardware platform by creating mainboard trays with multiple units with different functionality such as computing, memory, storage and peripheral.

- To deliver enhanced elasticity and improved process/Virtual Machine migration within the datacentre. Any available set of processor cores and peripherals can be interconnected in the datacenter to improve elasticity and minimize migration cost.
- To decrease datacentre Total Cost of Ownership by employing low-cost, commodity, densely integrated, modular SoC-based compute blocks with low-power optical interconnect switching technology.

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