

EXTOLL's Network chip enables network attached accelerators of any kind

Mannheim, 16.06.2016 – EXTOLL's network chip TOURMALET not only shows excellent performance in terms of latency and message rate, but now also supports direct attachment of all current types of accelerators to the network. By this, it is possible to set up HPC cluster/booster configurations, where any number N of accelerators can dynamically be allocated by any number M of scalar cores. This renders maximum flexibility and a perfect match of hardware resources and application demands. Since the TOURMALET PCI-Express board provides 6+1 links, accelerators can be attached to the network without breaking up the network topology. This technique has been proven already with Intel® XEON Phi™ 7120D (Knights Corner), NVIDIA Tesla GPU and FPGA-based accelerators.

EXTOLL has released its high-performance network chip TOURMALET that has been holistically designed and optimized for HPC. The key demands of HPC are – besides a sufficient peak bandwidth – low latency and high message rate. The TOURMALET PCI-Express gen3 x16 board shows an MPI-latency of 850ns and a message rate of 75M messages per second. The message rate value is CPU-limited, while TOURMALET is designed for well above 100M msg/s.

HPC applications typically require both scalar and vector performance for different parts of a problem to be solved. Within the scope of the DEEP-Project, the Juelich Supercomputing Center has set up a tandem of a cluster (scalar) and a booster (vector) system, where EXTOLL provides the network technology for the booster part. The special features of EXTOLL's TOURMALET enable direct attachment of the Intel XEON Phi (Knights Corner) accelerators to the network without the need for a host CPU per node.

In the successor project DEEP-ER, EXTOLL network technology will build a homogeneous network all over the cluster and the booster parts of the system. As in DEEP, applications may arbitrarily and dynamically assign any number of accelerators to any other number of CPUs. The difference here is that the translation between cluster and booster network protocols required in DEEP is obsolete, and the communication bandwidth between both sides of the systems will be increased. Additionally, the DEEP-ER booster will be built with the second generation, self-booting Intel's Xeon Phi processors, code-named Knights Landing, which are also already supported by the EXTOLL TOURMALET board..

There are two more types of accelerators suitable for HPC applications depending on the preferred application profile: GPU- and FPGA. EXTOLL very recently managed to directly attach NVIDIA's TESLA GPU to the network. For FPGAs, EXTOLL provides implementations and boards based on XILINX Virtex 7.

This makes the EXTOLL network the first choice for HPC clusters with both scalar and vector performance and renders the following benefits to the end-user:

- **Cost savings:** No host CPU per node required. No central switches required.
- **Speed:** Superior performance indices for HPC
- **Flexibility:** Accelerators are attached while keeping the network topology
- **Universality:** All kinds of accelerators are supported

Live demos will be showcased at booth# 610 of the International Supercomputing Conference ISC16 taking place June 20 to 22 in Frankfurt/Main, Germany.



About EXTOLL GmbH:

EXTOLL GmbH is a Mannheim, Germany, based privately held company dedicated to high-performance computing (HPC). Its core product is an HPC networking solution including in-house designed ASICs, PCIe Boards, cabling solutions and software stack. EXTOLL offers design IP related to its core products. Additionally, EXTOLL GmbH provides extremely efficient and dense 2-phase immersion cooling solutions.

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- [1] EXTOLL TOURMALET: <http://www.extoll.de/products/tourmalet>
- [2] DEEP brochure: <http://www.deep-project.eu/brochure>
- [3] DEEP-ER project: <http://www.deep-er.eu/>

Further Information:

The DEEP (Dynamical Exascale Entry Platform) and DEEP-ER (Extended Reach) projects have received funding from the European Commission's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 287530 and no 610473.

[Jülich Supercomputing Centre \(JSC\)](#)

[EU-Projekt DEEP – Extended Reach \(DEEP-ER\)](#)

[EU-Projekt Dynamical ExaScale Entry Platform \(DEEP\)](#)