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FRAUNHOFER INSTITUTE FOR INDUSTRIAL MATHEMATICS

| RAM | RAM | | RAM | RAM |
| **GLOBAL** | **ADDRESS** | | **SPACE** | |

RDMA interconnect

| Threads | Threads | Threads | Threads |
| NUMA System | Co-Processor | NUMA System | Co-Processor |

**NEW RELEASE
v1.4.0**

GPI-2: Programming the next generation of supercomputers

- Implements the GASPI specification
- Open source → www.gpi-site.com

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What is GPI?

- GPI: **G**lobal Address Space **P**rogramming **I**nterface
- GPI is an industry-quality API to replace MPI for future parallel applications
- One-sided, asynchronous, zero-copy communication with perfect overlap to computation
- GPI is not a new language, it is an API supporting C++, Fortran, C
- GPI is threadsafe and manycore ready
- GPI works with Pthreads, OpenMP or any other threads package

Advantages of GPI

- Communication at wire speed
- Separation of data synchronization from data transfer
- GPI is fault tolerant
- Robust and industry proven
- **Supports hybrid systems**
- **Zero-copy communication between NVIDIA GPUs**
- **Available for Infiniband, Cray Gemini and Aries, Ethernet, Intel Omnipath Architecture (OPA)**

New users

GPI is easy to use. Optimal scalability is guaranteed for algorithmic designs exploiting GPIs one-sided communication primitives with minimal synchronization overhead and full overlap of communication and computation.

PRE-STACKPRO

Full Survey Pre-Stack Visualization
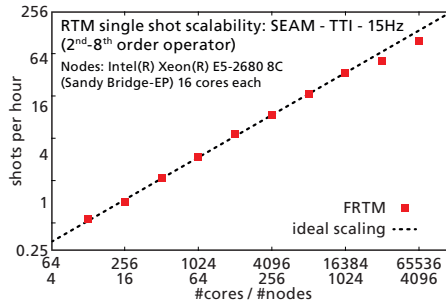and Data Analysis

Statoil

3D High Resolution
Angle Migration

DLR

Aerospace simulations
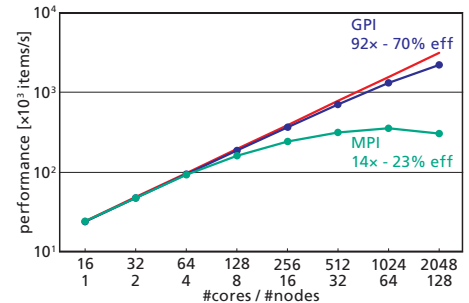Deutsches Zentrum für Luft- und Raumfahrt

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GPI is superior to MPI in performance and scalability

Strong Scalability

Scalability of the FRTM at the SuperMUC cluster at LRZ

Perfect communication hiding

Scaling of matrix factorization technique in machine learning (thanks to the ExaScience Lifelab at imec)

GaspiCxx - The GPI productivity layer

GaspiCxx is a zero overhead C++ abstraction layer for GPI. In contrast to the native GPI interface, the underlying communication resources do not need to be managed explicitly by the application. This often turns out to be tedious and error-prone. Instead, the GaspiCxx interface provides objects with a transparent management of communication resources. These include groups, queues, segments, data allocation and data synchronization. As such, GaspiCxx increases the productivity of GPI. It allows for a fast and convenient development of new applications and/or porting of existing applications.

GaspiCxx features

- GPI C++ interface
- Transparent management of GPI communication resources
- High productivity
- Full performance
- Easy to use

Contact us at **gpi@scapos.com** for more information on commercial GPI licences and special support for compute centers.

Free download at **www.gpi-site.com**

GPI: Efficient – Scalable – Multicore