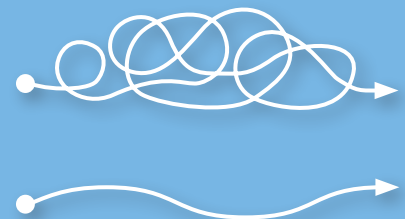




Make it  
simple!



## GaspiCxx: THE GPI-2 PRODUCTIVITY LAYER

### What is GaspiCxx?

- C++ Interface for GPI-2
- Class representation of
  - Segments
  - Queues
  - Groups
  - PGAS allocations
- Collectives beyond GPI-2
- Open source GPLv3

### Advantages of GaspiCxx

- High Productivity
- Full Performance
- Easy to use
- Transparent management of GPI-2 communication resources
- Exclusive resource usage

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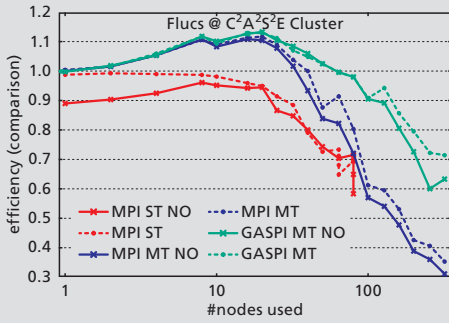
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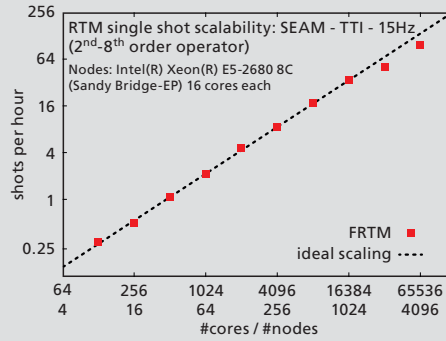
### Speed up your development

GaspiCxx allows for a prompt and easy development of new applications and/or porting of existing applications to GPI-2. For example, using GaspiCxx, a shared memory parallel TD-DG solver for Maxwell's equations could be extended to a scalable distributed memory implementation within an afternoon. Using the native GPI-2 interface, this would have taken more than two weeks otherwise.

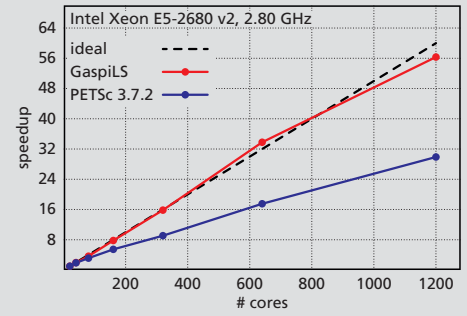
**Leveraging the full GPI-2 performance has never been so easy!**



1



2



3

1 *Parallel scalability of FLUCS (by courtesy of German Aerospace Center (DLR)): parallel efficiency over number of HPC cluster nodes used. One cluster node consists of two 12-core Intel Ivy Bridge EP CPUs running 48 hyper threads. (NO = No overlap, ST = single threaded, MT = multi threaded).*

2 *Scalability of the FRTM at the SuperMUC cluster at LRZ*

3 *Jacobi preconditioned Richardson, 3D Poisson equation (2<sup>nd</sup> order FD discretization), cubic grid (359<sup>3</sup>)*

## GPI-2 for scalability and performance

GPI-2 is enabling scalable and efficient applications. It is the right way to program the next generation of supercomputers. This has been proven by many applications, also on the industrial level (c.f. figures). However, to leverage the performance provided by GPI-2, the application has to manage the memory layout in the local partition of the global address space and the other resources for communication itself, for example synchronization primitives or communication queues. This may be tedious and error prone. Moreover, this has to be repeated by every new application, again and again. Gaspicxx is resolving these issues and yields more productivity in the development of GPI-2 applications.

## Gaspicxx for productivity

Gaspicxx is a C++ interface for the communication library GPI-2. The C++ interface aims at an abstraction for the native C based communication interface of GPI-2 without an impact on the underlying performance. The interface design makes the explicit management of communication resources required by the native C interface fully transparent to the application. They do not need to be managed explicitly any more. Instead, objects with exclusive and auto-managed resources for groups, queues, segments are provided by Gaspicxx. The dynamic management of segment memory and segment synchronization primitives follow the allocator concept. The single-sided and the passive communication are built on top of that. Allocations within the partitioned global address space and the respective synchronization primitives can be easily connected with each other on the source and the target side for efficient communication.

The effort for the development of the GPI-2 based communication infrastructure of an application can be significantly reduced. As such, the productivity is increased whereas the performance of the native GPI-2 interface is maintained.

**Contact us and get your instance of Gaspicxx today!**