



# TOPOLOGIES WORKING GROUP

**2021-10-07 Meeting**

# Working Group Organization

- **Expanded scope** : from “Hardware Topologies” to “Topologies” (HW + virtual)
- **Meetings frequency** : every other week?
- **Meeting time** : Thursdays, 3pm (Paris Time)?
  - May change in the future
  - Busy schedule for me until Jan/Feb 2022
- **Meeting link** :  
<https://bigblue.bordeaux-inp.fr/b/gui-jx6-edc>

# Items to handle in short/medium term

- **Introduce MPI\_COMM\_TYPE\_ADDRESS\_SPACE**

- Issue #32, no PR yet, created by Jeff Hammond
- A new split type for MPI\_Comm\_split\_type
- Useful for thread-based MPI implementations
- Already exists in MPC (at least)
- Shouldn't be as controversial as GUIDED/UNGUIDED ☹️

- **Improve MPI\_COMM\_TYPE\_HW\_UNGUIDED description**

- Issue #326, no PR yet
- Moot issue since change of MPI\_COMM\_TYPE\_SHARED description?

# Items to handle in short/medium term

- **Deprecate MPI\_Graph** (and other stuff)
  - Issue #89, no PR yet
- **Rolf's PR ?**
  - Seems to have disappeared from GitHub
- **Create new functions to query HW resource names**
  - Issue #154, old PR exists, needs updating
  - Two functions :
    - `MPI_Get_hw_resource_types(MPI_Info *hw_info)`
    - `MPI_Get_hw_resource_status(char *name, int *status)`
  - Forum was OK at Albuquerque meeting, but prototypes needs modification:  
`MPI_Info` → `MPI Data Struct`
  - Fortran version?

# Long term items (MPI 5.X)

- **Explicit access to underlying HW topology**
  - HW comms are implicit, topo is not described explicitly
  - Split = Top → bottom approach
  - How does/shall it interact with Sessions?
    - Use Psets
    - Bottom → Top approach (more scalable)
  - Distance Function?

# Overhaul for Topologies and Collective Communication Interfaces

- **Three topological structures**

- No virtual topological attached (ie fully connected + unweighted) → intracomms
  - Could be used to perform Processes to CPU mapping
- Unweighted, bipartite → intercomms
- Virtual topology attached (weighted, directed graph) → neighborhood intracomm

- **Remove Cartesian and (non-scalable) random graph interfaces**

- **The topological structure dictates the behaviour of collectives**

- No communication allowed between non-neighbor processes

- **What about physical topologies?**

- Fully-connected communicators used for process mapping
- Introduce two classes of topologies (virtual vs. hw)