MPI Tools Proposals

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MPI DLL Locations

- In conjunction with other proposals
  - Message queue query
  - MPI handle query (possible)
- Specify DLL location to debuggers
- "Old" way was a single compile-time filename string
  - Not sufficient – what if I have multiple DLLs?
  - E.g., 32 and 64 bit
- "New" way: provide an argv-style array of filename strings

MPI DLL Locations

- Old way:

```
char MPIR_dll_name[] = "/path/to/my/dll";
```

- New way

```
char **mpimsgq_dll_locations = NULL;
int MPI_Init(…) {
    char **foo = malloc(…);
    foo[0] = "/path/to/first/dll";
    foo[1] = "/path/to/next/dll";
    foo[2] = NULL;
    mpimsgq_dll_locations = foo;
}
```

- No filename conventions
- Values may be filled in at any time during the process
- Tool examines each filename in the array until it finds a suitable one (if any!)

MPI Handle Introspection

- Have a tool be able to query an MPI implementation for meta information about MPI handles
- Example: hover over MPI_Comm variable in debugger
  - Instead of showing its handle value (e.g., 0x239f2b00)
  - Show "This is <communicator_name>, <rank> of <size>, an <inter|intra|cartesian|graph> communicator, …etc."
  - Tool can get public information about the back-end object
  - Can display the info however it wants to (or not)
- MPI implementations are free to not implement some or all of this functionality
  - Query includes "what can you tell me?"
  - Answer may be "nothing!" (or something very basic, like comm name, rank, size)

MPI Handle Introspection

- Infrastructure similar to message queue interface
- Sample communicator query functions:

```
int mpidbg_comm_query(mqs_image *image, mqs_image_info *image_info,
                      mqs_process *process, mqs_process_info *process_info,
                      mqs_taddr_t comm, struct mpidbg_comm_handle_t **ch)

int mpidbg_comm_handle_free(struct mpidbg_comm_handle_t *ch)
```

MPI Handle Introspection

- Infrastructure similar to message queue interface
- Sample communicator query functions:

```
int mpidbg_comm_query_basic(struct mpidbg_comm_handle_t *ch,
                            char comm_name[MPIDBG_MAX_OBJECT_NAME],
                            enum mpidbg_comm_info_bitmap_t *comm_bitflags,
                            int *comm_rank,
                            int *comm_size,
                            int *comm_fortran_handle,
                            mqs_taddr_t *comm_cxx_handle)

int mpidbg_comm_query_procs(struct mpidbg_comm_handle_t *ch,
                            int *comm_num_local_procs,
                            struct mpidbg_process_t **comm_local_procs,
                            int *comm_num_remote_procs,
                            struct mpidbg_process_t **comm_remote_procs)
```