How do I use MPI?

**MPICH** is a freely available, portable implementation of MPI, the standard for message-passing libraries.

### Building Your Applications

To build applications with MPICH, you should replace direct references to compilers (gcc, g77, etc.) with references to the appropriate MPICH wrapper scripts (mpicc, mpif77, etc.). The wrapper scripts are intended to supply correct include and library paths and options automatically. The wrapper script names are:

- **mpicc** the C compiler wrapper for gcc, pgcc, icc.
- **mpif77** the Fortran 77 compiler wrapper for f77, pgf77, ifc.
- **mpif90** the Fortran 90 compiler wrapper for pgf90, f90com.
- **mpiCC** the C++ compiler wrapper for g++, pgCC, icc.

To troubleshoot problems compiling with a wrapper script, use the `-show` argument to see what commands it is executing, and try executing those commands manually. Try running `mpicc -show` alone to see the general effect of the wrapper script. Here's an example:

```
% mpicc -show test.c -o test
gcc -DUSE_STDARG -DHAVE_STDLIB_H=1 -DHAVE_STRING_H=1 -DHAVE_UNISTD_H=1 -DUSE_STDARG=1
-DMALLOC_RET_VOID=1 -L/usr/local/mpich/1.2.5.2/gcc/i686/lib test.c -o test -lmpich
```

### Running Your Applications

Start MPICH programs using the **mpirun** wrapper script.

The most common `mpirun` arguments are briefly described below:

<table>
<thead>
<tr>
<th>Argument</th>
<th>Purpose</th>
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<tr>
<td><code>-np N</code></td>
<td>Request quantity N processors.</td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
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<td>-nolocal</td>
<td>Do not run the job on the local node (example: master).</td>
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<tr>
<td>-show</td>
<td>Show what mpirun would do, but don't actually do it. Useful for troubleshooting.</td>
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For more information, please read `man mpirun`. Also note that some options have no effect on execution because they don't apply to the cluster's configuration.