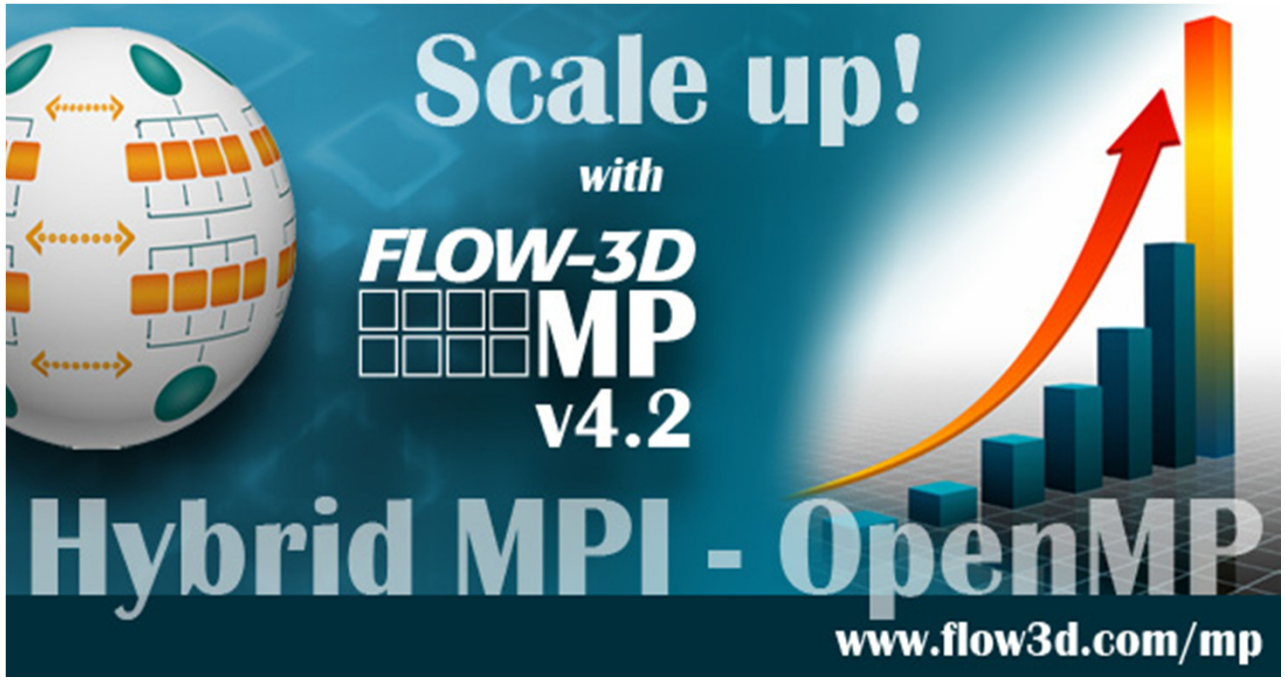
FLOW-3D/**MP** v4.2 – Running a Simulation



***FLOW-3D*/MP** manual present in `$F3D_HOME/docs/FLOWDMP_manual`

Scope of Tutorial

- Running ***FLOW-3D*/MP** on;
  - Linux Cluster
    - Cluster composed of 8 compute nodes with Intel Xeon 5500 series processors (2 quad-core per Node).
    - Operating System - Red Hat Enterprise Linux version 4.
    - MPI Library - Intel MPI Runtime Environment Library v4.0 (INCLUDED in the Installation).
  - Windows Cluster
    - Cluster composed of 2 compute nodes with AMD Opteron 265 (2 dual-core per node).
    - Operating System – Windows Server 2008 R1
    - MPI Library – MS MPI
- Running ***FLOW-3D*/MP** from;
  - GUI
  - Command-line
  - Scheduler (Linux-clusters)
- Focus on important parameters required to run the parallel version.

Prerequisites to run *FLOW-3D*/MP v4.2

- To run ***FLOW-3D*/MP** the working directory must contain;
  - `prepin.<ext>`, the project input file.
  - STL geometry file(s) (if needed to define the model geometry).
  - Block distribution data (if required in prepin file).
  - `machines` file (**required on Linux only**, if not using a scheduler).

- ***FLOW-3D*/MP** uses a multi-block model for domain decomposition.
- To execute a parallel code using `<np>` MPI ranks, the simulation must be set up with a minimum of `<np>` mesh blocks.
- Automatic Decomposition Tool (ADT) can be used to pre-process input file to be able to distribute the simulation across `<np>` MPI ranks.
- To achieve efficient usage of processors, the work load in different domains should be similar.
- This is automatically taken care of by the ADT and is reflected in the Blocks Distribution Table created in the prepin file.

Running *FLOW-3D*/**MP** on a Linux Cluster

Running *FLOW-3D*/MP v4.2 on Linux

Command Line

- Remember to source the FLOW-3D/MP installation and MPI Libraries.
- License file check.
- Users running simulations from their user accounts without a scheduler need to create a `machines` file in the simulation directory to specify the nodes on which the simulation needs to be run.
- In order to create the machines file, the mpd ring needs to be started on the relevant nodes by using the `mpdboot` command.

```
mpdboot -v -n <np> -f mpd.hosts -r ssh
```

- The `machines` file can then be created by using `mpdtrace` and redirecting the output;

```
mpdtrace > machines
```

Running *FLOW-3D*/MP v4.2 on Linux

Command Line

- Once the user sets up an input file and machines file, ADT can be run from the command-line by;

  `runpre_par -9 <np> <ext>`

- Once the ADT is completed a new `prepin.<ext>_<np>` will be created which can be run on `<np>` MPI processors.
- To run the simulation from the command line, the following commands can be used;

  `runhyd_par <ext>_<np>` (to run the pre-processor and solver)

  `runpost_par <ext>_<np>` (to run the post-processor)

- ***FLOW-3D*/MP** can be launched as a background process detached from the shell using the following command;

  `runhyd_par <ext> -b`

Running *FLOW-3D*/MP v4.2 on Linux

GUI

- Remember to source the ***FLOW-3D*/MP** installation and MPI Libraries.
- License file check.
- Type `flow3d` in a terminal to open the GUI.
- GUI run can be better understood by following the visual demonstration.
- Please feel free to consult the manual for further explanation regarding the steps taken by the presenter in the video.

Job Schedulers (Linux)

- In order to submit a job through a scheduler it is best to use the command-line instead of the GUI.
- A sample pbs script is provide in the installation folder in `$F3D_HOME/docs/pbs_sample.script`.
- Contact your Administrator for more information regarding job schedulers.

Running *FLOW-3D*/**MP** on a Windows Cluster

Running *FLOW-3D*/MP v4.2 on Windows

GUI

- User Permissions need to be set by the Administrator.
- Simulations can be run only from **inside user directories** (e.g., C:\Users\<username>).
- GUI run can be better understood by following the visual demonstration.
- Please feel free to consult the manual for further explanation regarding the steps taken by the presenter in the video.

Thank You!

For more information refer the ***FLOW-3D*/MP** manual present in
`$F3D_HOME/docs/FLOWDMP_manual`