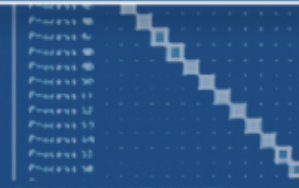




SOFTWARE

+  19.56 updatex  
+  399.70 updateien  
+  0.00 gene  
-  0.00 <<iteration loop>>  
+  447.52 genbc

PRODUCTIVITY



FAST SOLUTIONS

- PAPI\_L1\_ICM
- PAPI\_L2\_DCM
- PAPI\_L2\_ICM
- PAPI\_L1\_TCM

# Marmot MPI Correctness Tool: Exercise

For the 4th VI-HPS Tuning Workshop

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- The following tutorial steps will be similar for all the tools
- Use the provided NPB3.3-MPI tutorial directory
  - Previously used to build and run normal version of BT

```
% cd workshop-vihps/NPB3.3-MPI; ls
BT/      CG/      DT/      EP/      FT/      IS/      LU/      MG/      SP/
bin/     common/ config/  Makefile  README  README.tutorial  sys/
```

- Edit [config/make.def](#) to adjust build configuration
  - Adjust [MPIF77](#) compiler specification
- Make clean and build new tool-specific executable

```
% make clean
% make bt CLASS=W NPROCS=16
...
Built executable ../bin.$(TOOL)/bt_W.16
```

- Change to the directory containing the new executable and run it as directed

```
% cd bin.$(TOOL)
% mpiexec -np 16 bt_W.16
```

- Keep in mind:
  - The following steps will be similar for all of the other tools
- Select the Marmot compiler wrappers

```
% gedit config/make.def
-> comment out line 32, resulting in:
    ...
    32: #MPIF77 = mpif77
    ...
-> remove the comment from line 35, resulting in:
    ...
    35: MPIF77 = marmotf77
    ...
-> comment out line 86, resulting in:
    ...
    86: #MPICC = mpicc
    ...
-> remove the comment from line 89, resulting in:
    ...
    89: MPICC = marmotcc
    ...
```

- No further modifications needed to build with Marmot

```
% make clean; make bt NPROCS=16 CLASS=W
cd BT; make NPROCS=16 CLASS=W SUBTYPE= VERSION=
gmake: Entering directory 'BT'
cd ../sys; cc -o setparams setparams.c
../sys/setparams bt 16 W
marmotf77 -c -O bt.f
...
marmot77 -O -o ../bin.marmot/bt_W.16 \
bt.o make_set.o initialize.o exact_solution.o exact_rhs.o \
set_constants.o adi.o define.o copy_faces.o rhs.o solve_subs.o \
x_solve.o y_solve.o z_solve.o add.o error.o verify.o setup_mpi.o \
../common/print_results.o ../common/timers.o btio.o
Built executable ../bin.marmot/bt_W.16
gmake: Leaving directory 'BT'
```

- Marmot-instrumented executable(s) installed in dedicated **bin.marmot** subdirectory
- Running the executable(s) in that directory will keep output files generated by Marmot together

- Keep in mind to use one more process:

```
% cd bin.marmot
% mpiexec -np 17 bt_W.16
NAS Parallel Benchmarks 3.3 -- BT Benchmark
Size: 24x 24x 24
Iterations: 200 dt: 0.0008000
Number of active processes: 16

Time step 1
Time step 20
Time step 40
Time step 60
Time step 80
Time step 100
Time step 120
Time step 140
Time step 160
Time step 180
Time step 200
Verification Successful

BT Benchmark Completed.
Time in seconds = 30.40
```

- Open the Marmot output:

```
% konqueror Marmot_Fortran_Init_<TIMESTAMP>.html
```

MARMOT HTML Logfile - Konqueror						
/home/livetau/tutorial/bin/Marmot_Fortran_Init_20090807_183318.html						
				Call: MPI_FINALIZE		
				Text: WARNING: MPI_FINALIZE: There are still 3 communicators left ! Listing of information for all remaining Communicators:		
				Information for Resource of type MPI_Comm: created at setup_mpi.f line: 50 Last 5 calls that used this resource (most recent first): bt.f line: 228 error.f line: 94 error.f line: 49 bt.f line: 187 bt.f line: 148 not yet freed.		
				Information for Resource of type MPI_Comm: created at setup_mpi.f line: 54 depends upon the following resources: setup_mpi.f line: 50 Last 5 calls that used this resource (most recent first):		
29872	2	0	<b>Warning</b>	z_solve.f line: 290 z_solve.f line: 233 z_solve.f line: 318 z_solve.f line: 190 z_solve.f line: 200	bt.f line: 275	Infos see MPI-Standard

- The code contains no severe errors
- (Is to be expected from a widely used benchmark)
- However:
  - Marmot detects that three communicators are not freed
  - A quality application should free all MPI resources
  - Marmot also lists details for each of these communicators:
    - Where is it created
    - Where was it used last