



HPC2002 Result

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Hewlett-Packard Company
hp server rx2600 cluster (1500MHz Itanium2)

SPECenvM2002 = 399

SPEC license #: HPG2116 | Tested by: Hewlett-Packard Company | Test site: Richardson, Texas | Test date: Feb-2004 | HW Avail: May-2004 | SW Avail: May-2004

Benchmark	Reference Time	Runtime	Ratio	100	200	300	400	500
361.wrf_m	86400	217	399					

Hardware

CPU: Intel Itanium 2
 CPU MHz: 1500
 FPU: Integrated
 CPU(s) enabled: 48
 CPU(s) orderable: 1 to 2 per node, up to 64 nodes
 Primary Cache: L1 Inst/Data: 16 KB, associativity = 4
 Secondary Cache: L2 Unified: 256 KB, associativity = 8
 L3 Cache: L3 Unified: 6144 KB, associativity = 24
 Other Cache: None
 Memory: 12GB per node (12 x 1 GB DDR 266 DIMMS)
 Disk Subsystem: 1x36GB 10k RPM SCSI system disk per node
 Other Hardware: See Notes section below.

Software

Parallel: MPI
 Processes-Threads: 48
 MPI Processes: 48
 OpenMP Threads: N/A
 Operating System: HP-UX11i-TCOE B.11.23
 Compiler: HP C/ANSI C Compiler B.11.23
 HP aC++ Compiler B.11.23
 HP Fortran 90 Compiler B.11.23
 HP LIBF90 PHSS_29620
 HP F90 Compiler PHSS_29663
 HP aC++ Compiler PHSS_29655
 HP C Compiler PHSS_29656
 u2comp/be/plugin library PHSS_29657
 HP MPI 02.00.01.00 B6060B
 File System: vxfs (system), vxfs through NFS (benchmark files)
 System State: Multi-user
 Other Software: NetCDF 3.5.0, HP MPI v2.00.01

Notes/Tuning Information

CPU(s) enabled: 48 (two per node, 24 nodes)

Other Hardware:

Computation Network:

AB286A PCI-X 2-port Infiniband HCA for HPC
 AB346A 5m copper cable PCI-X Infiniband
 AB353A 7m copper cable PCI-X Infiniband
 AB291A PCI-X 12-port InfiniBand Copper Switch
 Topspin 96-port IB copper switch 99-00020-01 TS170
 98-00045-01 12-port leaf boards (8)
 98-00047-01 power supply
 98-00044-01 controller module

GigaBit on-board adapter for Administration and NFS
 PCI GigaBit card for NFS traffic (GigE-TX adapter A6825A)

NFS file server:

rp5470 (PA-RISC) NFS File Server
 4 PA8700 CPUs 750 MHz. 16 GB of memory
 4 internal disks 73 GB Ultra2 SCSI
 20 external disks 18 GB U160 SCSI striped with LVM across 4 SCSI controllers
 15 external disks 73 GB FibreChannel mirrored with LVM across 2 FC controllers which contain the NFS filesystems accessed by the benchmark. These NFS filesystems are optimized for security rather than performance.

File Server Network:

HP ProCurve 9308 64-port copper Gigabit Ethernet Switch
 Built-in Gigabit Ethernet Adapters (one per node)



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Notes/Tuning Information (Continued)

Peak Flags: MPI

```
mpif90 +DD64 +noppu +Ofast +Oinfo +U77
mpicc -Ae +DD64 +Ofast -DNOUNDERSCORE -DSPEC_HPG_MPI2
OPTIMIZE =
ENV_SPEC_HPG_PARALLEL=MPI
CPPFLAGS = -I. -C -P
EXTRA_LIBS= -minshared -L${NETCDF}/lib/hpux64 -lnetcdf
NETCDF = /home/clpack/netcdf-3.5.0
FPORABILITY= -I${NETCDF}/include
```

Alternate Source used for Peak:

```
361.wrf_m: module_big_step_utilities_em.F90
Improve data locality via loop interchange.
Available as SPEC HPC2002 Source: env2002-src_hp-20040303.tar.gz
```

Kernel Parameters (/stand/system):

```
maxdsiz      0x7b03a000
maxdsiz_64bit 0x4000000000
maxssiz      0x10000000
maxssiz_64bit 0x40000000
maxtsiz      1073741824
maxtsiz_64bit 4294967296
vps_pagesize 4
vps_ceiling  64
dbc_min_pct  3
dbc_max_pct  3
```

Peak User Environment:

```
use_submit_for_speed=1
submit = /home/f90pack/clust_mpirun $command
```

clust_mpirun:

```
mpirun -ITAPI -f appfile
```

appfile:

```
-h rx17 -np 2 -e MPI_FLAGS=y -e MPI_WORKDIR=$cwd $command
...
-h rx40 -np 2 -e MPI_FLAGS=y -e MPI_WORKDIR=$cwd $command
```

LSF used to initiate batch job submissions.

Appfile is generated from within the LSF run.

Netcdf source obtained from

```
http://www.unidata.ucar.edu/packages/netcdf/
```

Netcdf built for HPUNIX 64 bit mode with:

```
#!/bin/csh
setenv CC '/opt/ansic/bin/cc +DD64'
setenv CPPFLAGS "-D_HPUX_SOURCE -D_FILE_OFFSET_BITS=64 -Dextname"
setenv FC '/opt/fortran90/bin/f90 +DD64'
setenv FFLAGS -w
setenv FLIBS -lU77
setenv CXX '/opt/aCC/bin/aCC +DD64'
./configure
```