CFP2000 Result

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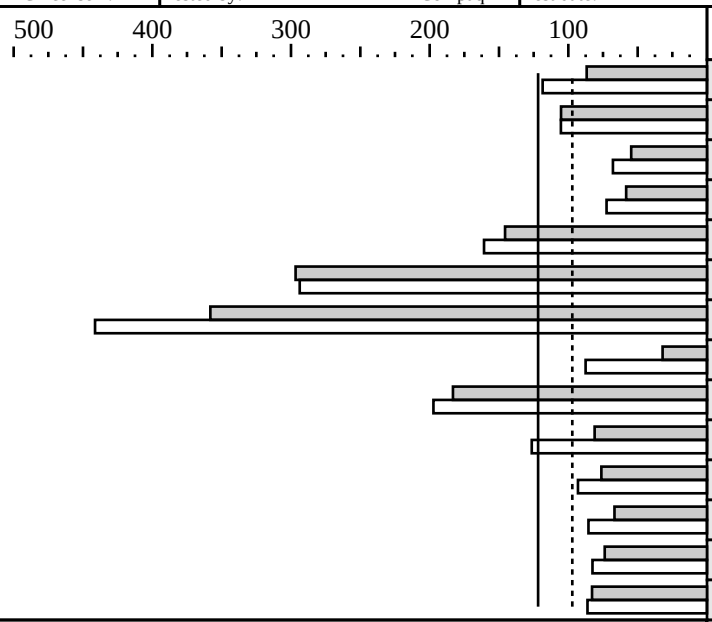
Compaq Computer Corporation
AlphaServer GS160 Model 16 68/1001

SPECfp_rate2000 = 122

SPECfp_rate_base2000 = 97.1

SPEC license #: 2 | Tested by: Compaq NH | Test date: Jun-2001 | Hardware Avail: Jun-2001 | Software Avail: Aug-2001



Benchmark	Base Copies	Base Runtime	Base Ratio	Copies	Runtime	Ratio
168.wupwise	16	342	86.8	16	251	119
171.swim	16	547	105	16	546	105
172.mgrid	16	611	54.7	16	492	67.8
173.applu	16	669	58.3	16	538	72.4
177.mesa	16	178	146	16	162	161
178.galgel	16	181	297	16	183	294
179.art	16	135	358	16	109	441
183.equake	16	753	32.0	16	276	87.5
187.facerec	16	192	183	16	179	197
188.ammp	16	504	81.0	16	323	126
189.lucas	16	487	76.2	16	399	93.1
191.fma3d	16	584	66.7	16	456	85.5
200.sixtrack	16	277	73.8	16	247	82.6
301.apsi	16	582	82.9	16	560	86.2

Hardware

CPU:	Alpha 21264C
CPU MHz:	1001
FPU:	Integrated
CPU(s) enabled:	16 cores, 16 chips, 1 core/chip
CPU(s) orderable:	1 to 16
Parallel:	No
Primary Cache:	64KB(I)+64KB(D) on chip
Secondary Cache:	8MB off chip per CPU
L3 Cache:	None
Other Cache:	None
Memory:	128GB
Disk Subsystem:	mfs (Memory File System)
Other Hardware:	None

Software

Operating System:	Tru64 UNIX V5.1 +Patch Kit 2
Compiler:	Compaq C V6.4-214-46B59 Program Analysis Tools V2.0 Spike V5.2 DTK (1.461 46B5P) Compaq Fortran V5.4A-1472-46B2F Compaq Fortran 77 V5.4A-196-46B2F KAP Fortran V4.3 000607 KAP Fortran 77 V4.1 980926 KAP C V4.1 000607
File System:	mfs
System State:	Single-user

Notes/Tuning Information

```
Baseline   C: cc  -arch ev6 -fast -O4 ONESTEP
     Fortran: f90 -arch ev6 -fast -O5 ONESTEP


Peak:
  All use -g3 -arch ev6 -non_shared ONESTEP
  Individual benchmark tuning:
   168.wupwise: kf77 -fast -O4 -pipeline -unroll 2 +PFB
      171.swim: f90 -fast -O5
     172.mgrid: kf77 -O5 -transform_loops -tune ev6 -unroll 8
     173.applu: f90 -fast -O5 +PFB
      177.mesa: cc -fast -O4 +CFB +IFB
    178.galgel: f90 -fast -O5
       179.art: kcc -fast -O4 -unroll 10 -ckapargs='-arl=4
                -ur=4' +PFB
    183.equake: cc -fast -xtaso_short -assume
                restricted_pointers -all -ldensemalloc -none +PFB
```

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Notes/Tuning Information (Continued)

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    187.facerec: f90 -fast -O4 +PFB
       188.ammp: cc -fast -O4 -xtaso_short -assume
                 restricted_pointers
      189.lucas: kf90 -O5 -fkapargs='-ur=1' +PFB
      191.fma3d: kf90 -O4 -transform_loops +PFB
  200.sixtrack: f90 -fast -O5 -assume accuracy_sensitive
                 -notransform_loops +PFB
       301.apsi: kf90 -O5 -transform_loops -unroll 8
                 -fkapargs='-ur=1' +PFB

Most benchmarks are built using one or more types of
profile-driven feedback.  The types used are designated
by abbreviations in the notes:

+CFB: Code generation is optimized by the compiler, using
      feedback from a training run.  These commands are
      done before the first compile (in phase "fdo_pre0"):

           mkdir /tmp/pp
           rm -f /tmp/pp/${baseexe}*

      and these flags are added to the first and second compiles:

           PASS1_CFLAGS = -prof_gen_noopt -prof_dir /tmp/pp
           PASS2_CFLAGS = -prof_use       -prof_dir /tmp/pp

     (Peak builds use /tmp/pp above; base builds use /tmp/pb.)

+IFB: Icache usage is improved by the post-link-time optimizer
      Spike, using feedback from a training run.  These commands
      are used (in phase "fdo_postN"):

           mv ${baseexe} oldexe
           spike oldexe -feedback oldexe -o ${baseexe}

+PFB: Prefetches are improved by the post-link-time optimizer
      Spike, using feedback from a training run.  These
      commands are used (in phase "fdo_post_makeN"):

           rm -f *Counts*
           mv ${baseexe} oldexe
           pixie -stats dstride oldexe 1>pixie.out 2>pixie.err
           mv oldexe.pixie ${baseexe}

      A training run is carried out (in phase "fdo_runN"), and
      then this command (in phase "fdo_postN"):

           spike oldexe -fb oldexe -stride_prefetch -o ${baseexe}

When Spike is used for both Icache and Prefetch improvements,
only one spike command is actually issued, with the Icache
options followed by the Prefetch options.

Portability: galgel: -fixed

Information on UNIX V5.1 Patches can be found at
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Notes/Tuning Information (Continued)

```
http://ftp1.service.digital.com/public/unix/v5.1/

submit = runon <cpu #> $command
sysconfigtab settings:
           max_proc_per_user = 4096
        max_threads_per_user = 4096
      per_proc_data_size     = 21474836480
   max_per_proc_data_size    = 21474836480
      per_proc_address_space = 21474836480
   max_per_proc_address_space = 21474836480

Spike, and the Program Analysis Tools, are part of the Developers'
Tool Kit Supplement, http://www.tru64unix.compaq.com/dtk/ .  The
features used in this SPEC submission will be available at the web
site as a beta kit in August, 2001, and as a production release in
October, 2001.  The C compiler for this SPEC submission has been
available at the same location, as a production release, since
May, 2001.
```