CFP2000 Result

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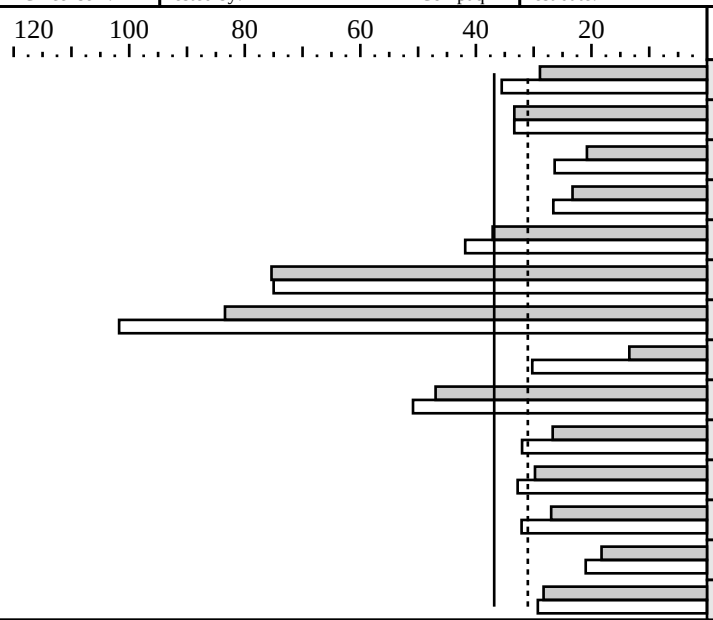
Compaq Computer Corporation
AlphaServer ES45 Model 68/1000

SPECfp_rate2000 = 36.8

SPECfp_rate_base2000 = 31.0

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



Benchmark	Base Copies	Base Runtime	Base Ratio	Copies	Runtime	Ratio
168.wupwise	4	257	28.9	4	209	35.5
171.swim	4	431	33.3	4	431	33.4
172.mgrid	4	402	20.8	4	317	26.4
173.applu	4	419	23.3	4	366	26.6
177.mesa	4	175	37.1	4	155	41.8
178.galgel	4	179	75.4	4	179	75.0
179.art	4	145	83.4	4	119	102
183.equake	4	449	13.4	4	199	30.2
187.facerec	4	188	47.0	4	173	50.9
188.ammp	4	382	26.7	4	319	32.0
189.lucas	4	312	29.8	4	283	32.8
191.fma3d	4	361	27.0	4	304	32.1
200.sixtrack	4	280	18.3	4	243	21.0
301.apsi	4	427	28.3	4	412	29.3

Hardware

CPU:	Alpha 21264C
CPU MHz:	1000
FPU:	Integrated
CPU(s) enabled:	4 cores, 4 chips, 1 core/chip
CPU(s) orderable:	1 to 4
Parallel:	No
Primary Cache:	64KB(I)+64KB(D) on chip
Secondary Cache:	8MB off chip per CPU
L3 Cache:	None
Other Cache:	None
Memory:	32GB
Disk Subsystem:	2x 10000 RPM: BD018635C4 BD0186349B
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:	AdvFS
System State:	Multi-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/

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.