



CFP2000 Result

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Compaq Computer Corporation
AlphaServer ES45 Model 68/1000

SPECfp_rate2000 = 21.1
SPECfp_rate_base2000 = 17.1

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	2	248	15.0	2	199	18.7
171.swim	2	264	27.2	2	264	27.2
172.mgrid	2	364	11.5	2	254	16.4
173.applu	2	330	14.8	2	266	18.3
177.mesa	2	175	18.6	2	155	21.0
178.galgel	2	178	37.8	2	179	37.6
179.art	2	146	41.4	2	119	50.5
183.equake	2	410	7.35	2	161	18.8
187.facerec	2	186	23.7	2	171	25.7
188.amp	2	374	13.6	2	315	16.2
189.lucas	2	251	18.5	2	203	22.8
191.fma3d	2	322	15.1	2	249	19.6
200.sixtrack	2	277	9.21	2	241	10.6
301.apsi	2	411	14.7	2	400	15.1

Hardware

CPU: Alpha 21264C
CPU MHz: 1000
FPU: Integrated
CPU(s) enabled: 2 cores, 2 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)

```
187.facerec: f90 -fast -O4 +PFB
188.amp: 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.