



CFP2000 Result

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Compaq Computer Corporation
AlphaServer GS160 Model 16 68/1001

SPECfp2000 = 756
SPECfp_base2000 = 585

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

Benchmark	Reference Time	Base Runtime	Base Ratio	Runtime	Ratio
168.wupwise	1600	332	482	239	669
171.swim	3100	345	898	345	898
172.mgrid	1800	525	343	385	468
173.applu	2100	511	411	370	568
177.mesa	1400	178	785	159	881
178.galgel	2900	184	1577	184	1574
179.art	2600	131	1987	105	2469
183.quake	1300	726	179	240	542
187.facerec	1900	191	996	176	1081
188.amp	2200	465	473	323	681
189.lucas	2000	392	511	288	693
191.fma3d	2100	505	415	389	539
200.sixtrack	1100	272	404	242	455
301.apsi	2600	514	506	489	531

Hardware

CPU: Alpha 21264C
CPU MHz: 1001
FPU: Integrated
CPU(s) enabled: 1 core, 1 chip, 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: 16GB
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: 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.quake: 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.

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
```