### CFP2000 Result

**Compaq Computer Corporation**  
**AlphaServer GS160 Model 16 68/1001**  

**SPECfp2000 =** 756  
**SPECfp_base2000 =** 585

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<th>Benchmark</th>
<th>Reference</th>
<th>Base</th>
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#### 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 -ckargs='-arl=4 -ur=4' +PFB  
183.equate: cc -fast -xtaso_short -assume restricted_pointers -all -ldensemalloc -none +PFB

Standard Performance Evaluation Corporation  
info@spec.org  
http://www.spec.org
Notes/Tuning Information (Continued)

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
-transform_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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SPECfp_base2000 = 585

Notes/Tuning Information (Continued)


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