## CFP2000 Result

**Compaq Computer Corporation**  
**AlphaStation XP1000 Model 6/667**  
**SPECfp2000 =** 532  
**SPECfp_base2000 =** 452

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**Hardware**

- **CPU:** Alpha 21264A  
- **CPU MHz:** 667  
- **FPU:** Integrated  
- **CPU(s) enabled:** 1 core, 1 chip, 1 core/chip  
- **CPU(s) orderable:** 1  
- **Parallel:** No  
- **Primary Cache:** 64KB(I)+64KB(D) on chip  
- **Secondary Cache:** 4MB off chip  
- **L3 Cache:** None  
- **Other Cache:** None  
- **Memory:** 512MB  
- **Disk Subsystem:** 1x 8GB RZ2DC-KA  
- **Other Hardware:** None

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**Software**

- **Operating System:** Compaq Tru64 UNIX V5.1 (Rev. 732)  
- **Compiler:**  
  - Compaq C V6.4-215-46B7O  
  - Program Analysis Tools V2.0 BETA  
  - Spike V5.2 DTK (1.471.2.2 46B5P) BETA  
  - Compaq Fortran V5.4A-1472-46B2F  
  - Compaq Fortran 77 V5.4A-196-46B2F  
  - KAP Fortran V4.3 000607  
  - KAP Fortran 4.1 980926  
  - KAP C V4.1 000607  
- **File System:** AdvFS  
- **System State:** Multi-user

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**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 -split_threshold .90 -noporder  
- 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

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Notes/Tuning Information (Continued)

restricted_pointers -all -ldensemalloc -none +PFB
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
Process limits are set to maximum using csh "unlimit" command
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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.