



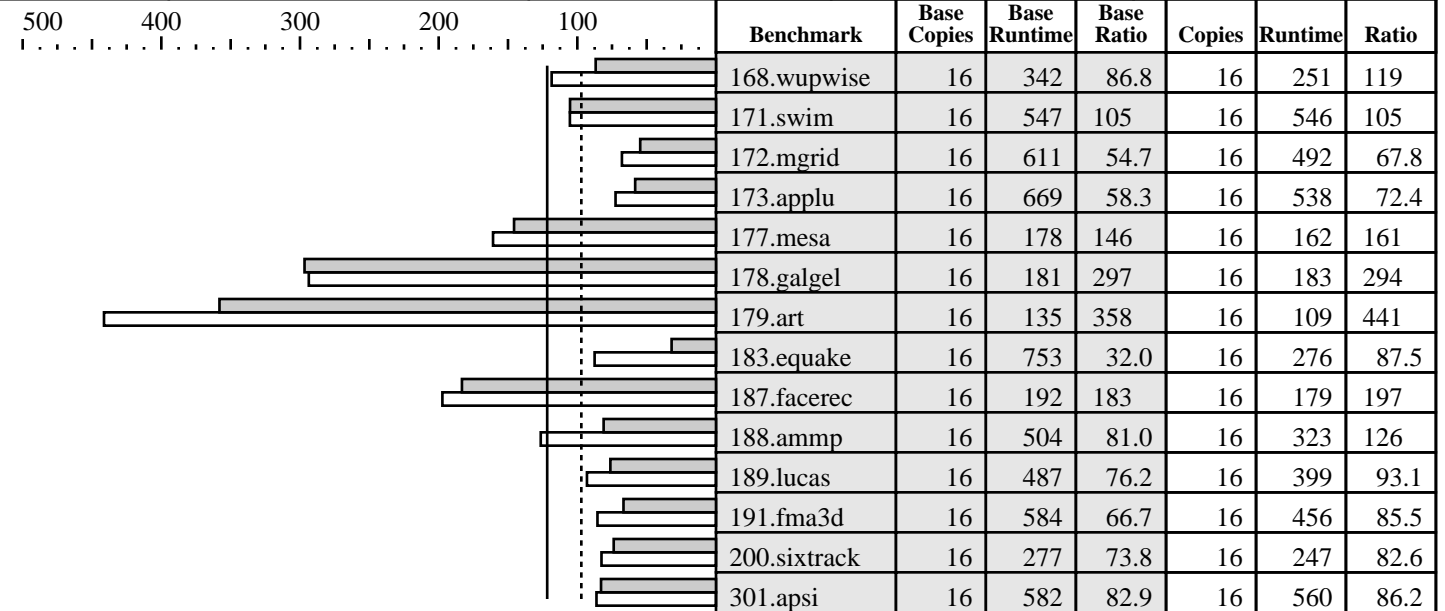
# CFP2000 Result

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Compaq Computer Corporation  
AlphaServer GS160 Model 16 68/1001

SPECfp\_rate2000 = 122  
SPECfp\_rate\_base2000 = 97.1

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



### Hardware

CPU: Alpha 21264C  
 CPU MHz: 1001  
 FPU: Integrated  
 CPU(s) enabled: 16 cores, 16 chips, 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: 128GB  
 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: Single-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://ftpl.service.digital.com/public/unix/v5.1/>

```
submit = runon <cpu #> $command
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
```

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.