



# CFP2000 Result

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Compaq Computer Corporation  
AlphaServer DS20L Model 68/833

SPECfp2000 = 724  
SPECfp\_base2000 = 583

SPEC license #: 2 Tested by: Compaq NH Test date: Feb-2002 Hardware Avail: Mar-2002 Software Avail: Oct-2001

Benchmark	Reference Time	Base Runtime	Base Ratio	Runtime	Ratio
168.wupwise	1600	308	519	247	647
171.swim	3100	306	1012	306	1012
172.mgrid	1800	459	392	317	569
173.applu	2100	409	514	322	652
177.mesa	1400	217	645	192	729
178.galgel	2900	222	1308	223	1302
179.art	2600	155	1682	120	2169
183.quake	1300	551	236	210	620
187.facerec	1900	271	702	248	767
188.amp	2200	552	398	450	489
189.lucas	2000	327	612	279	717
191.fma3d	2100	401	524	305	689
200.sixtrack	1100	331	332	292	377
301.apsi	2600	531	490	514	506

### Hardware

CPU: Alpha 21264B  
CPU MHz: 833  
FPU: Integrated  
CPU(s) enabled: 1 core, 1 chip, 1 core/chip  
CPU(s) orderable: 1 to 2  
Parallel: No  
Primary Cache: 64KB(I)+64KB(D) on chip  
Secondary Cache: 4MB off chip per CPU  
L3 Cache: None  
Other Cache: None  
Memory: 2GB  
Disk Subsystem: 1x40GB Maxtor 5T040H4  
Other Hardware: None

### Software

Operating System: Tru64 UNIX V5.1A (Rev. 1885)  
Compiler: Compaq C V6.4-215-46B7O  
Program Analysis Tools V2.0  
Spike V5.2 DTK (1.471.2.2 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.quake: cc -fast -xtaso\_short -assume restricted\_pointers -all -ldensemalloc -none +PFB



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```

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

Spike, and the Program Analysis Tools, are part of the Developers'



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## Notes/Tuning Information (Continued)

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 production release as of October, 2001. The C compiler for this SPEC submission has been available at the same location, as a production release, since August 15, 2001.