



# CFP2000 Result

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Hewlett-Packard Company  
AlphaServer GS1280 7/1150

SPECfp\_rate2000 = 33.9

SPECfp\_rate\_base2000 = 25.7

SPEC license #: 2 | Tested by: HP | Test date: Dec-2002 | Hardware Avail: Jan-2003 | Software Avail: Jan-2003

Benchmark	Base Copies	Base Runtime	Base Ratio	Copies	Runtime	Ratio
168.wupwise	2	182	20.4	2	75.7	49.0
171.swim	2	86.9	82.8	2	86.9	82.8
172.mgrid	2	256	16.3	2	168	24.9
173.applu	2	139	35.0	2	137	35.7
177.mesa	2	152	21.4	2	127	25.6
178.galgel	2	138	48.6	2	137	49.1
179.art	2	130	46.4	2	80.7	74.7
183.quake	2	252	12.0	2	82.5	36.6
187.facerec	2	173	25.5	2	155	28.5
188.amp	2	301	17.0	2	261	19.6
189.lucas	2	132	35.2	2	121	38.3
191.fma3d	2	207	23.5	2	155	31.4
200.sixtrack	2	261	9.77	2	241	10.6
301.apsi	2	210	28.7	2	197	30.7

### Hardware

CPU: Alpha 21364  
 CPU MHz: 1150  
 FPU: Integrated  
 CPU(s) enabled: 2 cores, 2 chips, 1 core/chip  
 CPU(s) orderable: 2 to 16  
 Parallel: No  
 Primary Cache: 64KB(I)+64KB(D) on chip  
 Secondary Cache: 1.75MB on chip per CPU  
 L3 Cache: None  
 Other Cache: None  
 Memory: 8GB  
 Disk Subsystem: 36GB SCSI  
 Other Hardware: None

### Software

Operating System: Tru64 UNIX V5.1B (Rev. 2650)  
 +IPK  
 Compiler: Compaq C V6.5-011-48C5K  
 Spike V5.2 (506A)  
 Compaq Fortran V5.5-2602-48C8L  
 Compaq Fortran 77 V5.5-2602-48C8L  
 KAP Fortran V4.3 k3105171 000607  
 KAP Fortran 77 V4.1 k310440 980926  
 KAP C V4.1 k010726 000607  
 File System: ufs  
 System State: Multi-user

## Notes/Tuning Information

Baseline C: cc -arch ev7 -fast -O4 ONESTEP  
 Fortran: f90 -arch ev7 -fast -O5 ONESTEP

### Peak:

All use: -arch ev7 -non\_shared ONESTEP  
 except these (which use only the tunings shown below):  
 173.applu 188.amp 191.fma3d

### Individual benchmark tuning:

168.wupwise: kf77 -call\_shared -inline all -tune ev67  
 -unroll 12 -automatic -align commons -arch ev67  
 -fkapargs=' -aggressive=c -fuse  
 -fuselevel=1 -so=2 -r=1 -o=1 -interleave  
 -ur=6 -ur2=060 ' +PFB  
 171.swim: same as base  
 172.mgrid: kf90 -call\_shared -arch generic -O5 -inline  
 manual -nopipeline -transform\_loops -unroll 9 -automatic



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## Notes/Tuning Information (Continued)

```

-fkparms='-aggressive=a -fuse -interleave
-ur=2 -ur3=5 -cachesize=128,16000 ' +PFB
173.applu: kf90 -O5 -transform_loops
-fkparms='-o=0 -nointerleave -ur=14
-ur2=260 -ur3=18' +PFB
177.mesa: kcc -fast -O4 +CFB +IFB
178.galgel: f90 -O5 -fast -unroll 5 -automatic
179.art: kcc -assume whole_program -ldensemalloc
-call_shared -assume restricted_pointers
-unroll 16 -inline none -ckparms='
-fuse -fuselevel=1 -ur=3' +PFB
183.equake: cc -call_shared -arch generic -fast -O4
-ldensemalloc -assume restricted_pointers
-inline speed -unroll 13 -xtaso_short +PFB
187.facerec: f90 -O4 -nopipeline -inline all
-non_shared -speculate all -unroll 7
-automatic -assume accuracy_sensitive
-math_library fast +IFB
188.amp: cc -arch host -O4 -ifo -assume nomath_errno
-assume trusted_short_alignment -fp_reorder
-readonly_strings -ldensemalloc -xtaso_short
-assume restricted_pointers -unroll 9
-inline speed +CFB +IFB +PFB
189.lucas: kf90 -O5 -fkparms='-ur=1' +PFB
191.fma3d: kf90 -arch ev6 -non_shared -O4 -transform_loops
-fkparms='-cachesize=128,16000 ' +PFB
200.sixtrack: f90 -fast -O5 -assume accuracy_sensitive
-notransform_loops +PFB
301.apsi: kf90 -O5 -inline none -call_shared -speculate all
-align commons -fkparms=' -aggressive=ab
-tune=ev5 -fuse -ur=1 -ur2=60 -ur3=20
-cachesize=128,16000'

```

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

```



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## Notes/Tuning Information (Continued)

```
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.

vm:

```
vm_bigpg_enabled = 1  
vm_bigpg_thresh=16  
vm_swap_eager = 0
```

proc:

```
max_per_proc_address_space = 0x4000000000  
max_per_proc_data_size = 0x4000000000  
max_per_proc_stack_size = 0x4000000000  
max_proc_per_user = 2048  
max_threads_per_user = 0  
maxusers = 16384  
per_proc_address_space = 0x4000000000  
per_proc_data_size = 0x4000000000  
per_proc_stack_size = 0x4000000000
```

Portability: galgel: -fixed

Information on UNIX V5.1B Patches can be found at <http://ftpl.service.digital.com/public/unix/v5.1b/>

Processes were bound to CPUs using 'runon'.