



# CFP2000 Result

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Hewlett-Packard Company  
AlphaServer GS1280 7/1150

SPECfp\_rate2000 = 536

SPECfp\_rate\_base2000 = 405

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

Benchmark	Base Copies	Base Runtime	Base Ratio	Copies	Runtime	Ratio
168.wupwise	32	187	317	32	77.8	763
171.swim	32	89.0	1293	32	89.0	1293
172.mgrid	32	263	254	32	171	390
173.applu	32	142	547	32	140	559
177.mesa	32	155	336	32	130	401
178.galgel	32	141	761	32	140	767
179.art	32	134	718	32	83.1	1161
183.equake	32	262	184	32	84.8	569
187.facerec	32	178	397	32	160	440
188.amp	32	309	265	32	268	304
189.lucas	32	133	560	32	117	637
191.fma3d	32	212	367	32	159	490
200.sixtrack	32	236	173	32	218	187
301.apsi	32	217	445	32	202	478

### Hardware

CPU: Alpha 21364  
 CPU MHz: 1150  
 FPU: Integrated  
 CPU(s) enabled: 32 cores, 32 chips, 1 core/chip  
 CPU(s) orderable: 2 to 32  
 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: 256GB  
 Disk Subsystem: HSV  
 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: AdvFS  
 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.ampp: 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'.

HSV controller with 8 striped 36GB disks.