



# CFP2000 Result

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Hewlett-Packard Company  
AlphaServer ES47 7/1150

SPECfp2000 = 1494

SPECfp\_base2000 = 1134

SPEC license #: 2 Tested by: HP Test date: Jun-2004 Hardware Avail: Jul-2004 Software Avail: Jul-2004

Benchmark	Reference Time	Base Runtime	Base Ratio	Runtime	Ratio	
168.wupwise	1600	180	887	75.0	2133	
171.swim	3100	86.1	3600	86.1	3600	
172.mgrid	1800	252	715	167	1081	
173.applu	2100	138	1519	128	1637	
177.mesa	1400	152	923	132	1059	
178.galgel	2900	137	2113	136	2136	
179.art	2600	129	2018	80.6	3225	
183.earthquake	1300	245	531	81.4	1597	
187.facerec	1900	170	1114	152	1247	
188.amp	2200	297	740	258	854	
189.lucas	2000	129	1545	118	1696	
191.fma3d	2100	204	1028	153	1368	
200.sixtrack	1100	225	488	208	529	
301.apsi	2600	207	1258	195	1334	

### Hardware

CPU: Alpha 21364  
 CPU MHz: 1150  
 FPU: Integrated  
 CPU(s) enabled: 1 core, 1 chip, 1 core/chip  
 CPU(s) orderable: 2 to 4  
 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: 4GB per CPU; 512MB RIMMs  
 Disk Subsystem: AdvFS  
 Other Hardware: None

### Software

Operating System: Tru64 UNIX V5.1B + IPK  
 Compiler: Compaq C V6.5-011-48C5K  
 Program Analysis Tools V2.0  
 Spike V5.2 (510 USG)  
 HP Fortran V5.5A-3548-48D88  
 HP Fortran 77 V5.5A-3548-48D88  
 KAP Fortran V4.3 000607  
 KAP Fortran 77 V4.1 980926  
 KAP C V4.1 000607  
 File System: MFS, 8GB  
 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 -g3 -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)

```

-fkpargs='-aggressive=a -fuse -interleave
-ur=2 -ur3=5 -cachesize=128,16000 ' +PFB
173.applu: kf90 -O5 -transform_loops
-fkpargs=' -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 -ckpargs='
-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 -fkpargs='-ur=1' +PFB
191.fma3d: kf90 -O4 -transform_loops -fkpargs='-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 -fkpargs=' -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_feedback -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}

```



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## Notes/Tuning Information (Continued)

+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 = 6
vm_swap_eager = 0
ubc_maxpercent = 50
```

proc:

```
max_per_proc_address_space = 34359738368
max_per_proc_data_size = 34359738368
max_per_proc_stack_size = 34359738368
max_proc_per_user = 2048
max_threads_per_user = 4096
maxusers = 2048
per_proc_address_space = 34359738368
per_proc_data_size = 34359738368
per_proc_stack_size = 34359738368
```

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".

This result was measured on model ES80.  
Model ES47 and model ES80 are electronically equivalent.