



CFP2000 Result

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Hewlett-Packard Company
AlphaServer ES47 7/1000

SPECfp_rate2000 = 58.9
SPECfp_rate_base2000 = 44.4

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	4	212	35.1	4	87.3	85.0
171.swim	4	101	143	4	101	143
172.mgrid	4	296	28.2	4	193	43.3
173.applu	4	162	60.3	4	157	61.9
177.mesa	4	174	37.2	4	146	44.4
178.galgel	4	161	83.8	4	158	85.4
179.art	4	157	76.8	4	94.8	127
183.equake	4	294	20.5	4	96.2	62.7
187.facerec	4	200	44.0	4	180	49.0
188.amp	4	348	29.4	4	302	33.8
189.lucas	4	154	60.4	4	140	66.5
191.fma3d	4	241	40.5	4	178	54.7
200.sixtrack	4	293	17.4	4	268	19.0
301.apsi	4	242	49.8	4	227	53.2

Hardware

CPU: Alpha 21364
 CPU MHz: 1000
 FPU: Integrated
 CPU(s) enabled: 4 cores, 4 chips, 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: 16GB
 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



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Notes/Tuning Information (Continued)

```

manual -nopipeline -transform_loops -unroll 9 -automatic
-fkapargs='-aggressive=a -fuse -interleave
-ur=2 -ur3=5 -cachesize=128,16000 ' +PFB
173.applu: kf90 -O5 -transform_loops
-fkapargs=' -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 -ckapargs='
-fuse -fuselevel=1 -ur=3' +PFB
183.quake: 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.ammp: 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 -fkapargs='-ur=1' +PFB
191.fma3d: kf90 -arch ev6 -non_shared -O4 -transform_loops
-fkapargs='-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 -fkapargs=' -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"):



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Notes/Tuning Information (Continued)

```
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.

vm:

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

proc:

```
max_per_proc_address_space = 0x40000000000
max_per_proc_data_size = 0x40000000000
max_per_proc_stack_size = 0x40000000000
max_proc_per_user = 2048
max_threads_per_user = 0
maxusers = 16384
per_proc_address_space = 0x40000000000
per_proc_data_size = 0x40000000000
per_proc_stack_size = 0x40000000000
```

Portability: galgel: -fixed

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