



CFP2000 Result

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Hewlett-Packard Company
AlphaServer ES80 7/1000

SPECfp2000 = 1288

SPECfp_base2000 = 975

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

Benchmark	Reference Time	Base Runtime	Base Ratio	Runtime	Ratio	
168.wupwise	1600	210	760	86.7	1846	
171.swim	3100	99.1	3130	99.1	3130	
172.mgrid	1800	293	614	192	938	
173.applu	2100	159	1318	156	1345	
177.mesa	1400	173	808	145	965	
178.galgel	2900	158	1830	157	1851	
179.art	2600	149	1741	92.4	2814	
183.earthquake	1300	290	449	94.2	1381	
187.facerec	1900	198	961	178	1069	
188.amp	2200	345	638	299	735	
189.lucas	2000	150	1331	138	1453	
191.fma3d	2100	238	883	177	1186	
200.sixtrack	1100	272	404	252	437	
301.apsi	2600	241	1078	225	1158	

Hardware

CPU: Alpha 21364
CPU MHz: 1000
FPU: Integrated
CPU(s) enabled: 1 core, 1 chip, 1 core/chip
CPU(s) orderable: 2 to 8
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
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/>

In the ES80, there are two cpus per shelf. Each cpu has its own 4GB of memory. Neither of the cpus can be physically removed. For 1 cpu results measured on a 2 cpu system, one cpu was turned off at boot time using the /etc/sysconfigtab setting "cpu_enabled_mask=0". The cpu's 4GB of memory was also physically removed.