



CFP2000 Result

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Hewlett-Packard Company
AlphaServer GS1280 7/1150

SPECfp2000 = 1482
SPECfp_base2000 = 1124

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	181	883	75.3	2124	
171.swim	3100	86.4	3590	86.4	3590	
172.mgrid	1800	254	708	167	1079	
173.applu	2100	138	1518	136	1546	
177.mesa	1400	151	928	126	1109	
178.galgel	2900	138	2105	136	2126	
179.art	2600	129	2014	80.3	3237	
183.earthquake	1300	250	519	82.2	1581	
187.facerec	1900	172	1105	154	1234	
188.amp	2200	299	735	260	847	
189.lucas	2000	131	1522	120	1664	
191.fma3d	2100	206	1019	154	1364	
200.sixtrack	1100	234	469	216	510	
301.apsi	2600	209	1242	195	1331	

Hardware

CPU: Alpha 21364
CPU MHz: 1150
FPU: Integrated
CPU(s) enabled: 1 core, 1 chip, 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: 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
manual -nopipeline -transform_loops -unroll 9 -automatic



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Notes/Tuning Information (Continued)

```

-fkparags='-aggressive=a -fuse -interleave
-ur=2 -ur3=5 -cachesize=128,16000 ' +PFB
173.applu: kf90 -O5 -transform_loops
-fkparags=' -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 -ckparags='
-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.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 -fkparags='-ur=1' +PFB
191.fma3d: kf90 -arch ev6 -non_shared -O4 -transform_loops
-fkparags='-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 -fkparags=' -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'.

In the GS1280, 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 result measurements, one CPU was turned off at boot time using the /etc/sysconfigtab setting "cpu_enabled_mask=0". The second CPU's 4GB of memory was also physically removed.