



CFP2000 Result

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Hewlett-Packard Company
AlphaServer GS1280 Model 64

SPECfp_rate2000 = 1068

SPECfp_rate_base2000 = 813

SPEC license #: 2 | Tested by: HP | Test date: Jun-2003 | Hardware Avail: Oct-2003 | Software Avail: Oct-2003

Benchmark	Base Copies	Base Runtime	Base Ratio	Copies	Runtime	Ratio
168.wupwise	64	184	647	64	77.3	1537
171.swim	64	88.9	2588	64	88.9	2588
172.mgrid	64	257	519	64	171	781
173.applu	64	141	1106	64	139	1123
177.mesa	64	155	669	64	131	796
178.galgel	64	140	1538	64	139	1546
179.art	64	141	1372	64	84.5	2284
183.equake	64	256	377	64	84.0	1149
187.facerec	64	174	809	64	157	897
188.amp	64	307	532	64	267	611
189.lucas	64	133	1115	64	123	1209
191.fma3d	64	209	745	64	158	984
200.sixtrack	64	242	338	64	223	367
301.apsi	64	218	884	64	207	932

Hardware

CPU: Alpha 21364
CPU MHz: 1150
FPU: Integrated
CPU(s) enabled: 64 cores, 64 chips, 1 core/chip
CPU(s) orderable: 2 to 64
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 (64 * 10 * 512MB RIMMs, both controllers populated)
Disk Subsystem: MFS 16GB (Memory File System)
Other Hardware: None

Software

Operating System: Tru64 UNIX V5.1B (Rev. 2650) +PK3
Compiler: Compaq C V6.5-011-48C5K
Program Analysis Tools V2.0
Spike V5.2 (509 DTK)
Compaq Fortran X5.5-2602-48C8L
Compaq Fortran 77 X5.5-2602-48C8L
KAP Fortran V4.3 000607
KAP Fortran 77 V4.1 980926
KAP C V4.1 000607
File System: MFS 16GB
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 -v -g3 -arch ev7 -non_shared ONESTEP
except these (which use only the tunings shown below):
173.applu 188.amp 191.fma3d 200.sixtrack
Individual benchmark tuning:
168.wupwise: kf77 -g3 -arch ev7 -non_shared ONESTEP
-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 (f90...)
172.mgrid: kf90 -g3 -arch ev7 -non_shared ONESTEP



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Notes/Tuning Information (Continued)

```

-call_shared -arch generic -O5 -inline
manual -nopipeline -transform_loops -unroll 9 -automatic
-fkpargs='-aggressive=a -fuse -interleave
-ur=2 -ur3=5 -cachesize=128,16000 ' +PFB
173.applu: kf90 ONESTEP -O5 -transform_loops
-fkpargs=' -o=0 -nointerleave -ur=14
-ur2=260 -ur3=18' +PFB
177.mesa: kcc -g3 -arch ev7 -non_shared ONESTEP -fast -O4 +CFB +IFB
178.galgel: f90 -g3 -fixed -arch ev7 -non_shared ONESTEP
-O5 -fast -unroll 5 -automatic
179.art: kcc -g3 -arch ev7 -non_shared ONESTEP
-assume whole_program -ldensemalloc
-call_shared -assume restricted_pointers
-unroll 16 -inline none -ckpargs='
-fuse -fuselevel=1 -ur=3' +PFB
183.quake: cc -g3 -arch ev7 -non_shared ONESTEP
-call_shared -arch generic -fast -O4
-ldensemalloc -assume restricted_pointers
-inline speed -unroll 13 -xtaso_short +PFB
187.facerec: f90 -g3 -arch ev7 -non_shared ONESTEP
-O4 -nopipeline -inline all
-non_shared -speculate all -unroll 7
-automatic -assume accuracy_sensitive
-math_library fast +IFB
188.ammp: cc ONESTEP -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 -g3 -arch ev7 -non_shared ONESTEP
-O5 -fkpargs='-ur=1' +PFB
191.fma3d: kf90 -arch ev6 -non_shared ONESTEP
-O4 -transform_loops -fkpargs='-cachesize=128,16000 ' +PFB
200.sixtrack: f90 -arch ev7 -non_shared ONESTEP
-fast -O5 -assume accuracy_sensitive
-notransform_loops +PFB
301.apsi: kf90 -g3 -arch ev7 -non_shared ONESTEP
-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
```



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Notes/Tuning Information (Continued)

```
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
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 = 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".