Hewlett-Packard Company
AlphaServer ES80 7/1150

SPECfp_rate2000 = 68.4
SPECfp_rate_base2000 = 52.0

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AlphaServer ES80 7/1150

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

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<th>Base Ratio</th>
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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.ammp 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

Hardware
CPU: Alpha 21364
CPU MHz: 1150
FPU: Integrated
CPU(s) enabled: 4 cores, 4 chips, 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 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
KAP Fortran V4.3 000607
KAP Fortran V4.4 980926
KAP C V4.1 000607
File System: MFS, 8GB
System State: Multi-user
Notes/Tuning Information (Continued)

- fkapargs='--aggressive=a -fuse -interleave
- ur=2 -ur3=5 -cachesize=128,16000 ' +PFB

173.applu: kf90 -O5 -transform_loops
- fkapargs=' -o=0 -nopointerleave -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.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 -fkapargs='-ur=1' +PFB

191.fma3d: kf90 -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_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

Processes were bound to CPUs using "runon".

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