## CFP2000 Result

**Hewlett-Packard Company**

**hp AlphaServer GS80 68/1224**

**SPECfp_rate2000 = 11.7**

**SPECfp_rate_base2000 = 8.67**

### Software

- Operating System: Tru64 UNIX T5.1B
- Compiler: Compaq C V6.5-011-48C5K
  - Spike V5.2 (506 48C5K)
  - Compaq Fortran V5.5-1877-48BBF
  - KAP Fortran V4.4 k340504 20010517
  - KAP Fortran 77 V4.1 k340504 20010517
- File System: ufs
- System State: Multi-user

### Hardware

- CPU: Alpha 21264C
- CPU MHz: 1224
- FPU: Integrated
- CPU(s) enabled: 1 core, 1 chip, 1 core/chip
- CPU(s) orderable: 1 to 8
- Parallel: No
- Primary Cache: 64KB(I)+64KB(D) on chip
- Secondary Cache: 16MB off chip per CPU
- L3 Cache: None
- Other Cache: None
- Memory: 16GB
- Disk Subsystem: 9 GB SCSI
- Other Hardware: None

### Notes/Tuning Information

**Baseline**
- C: cc -arch ev6 -fast -O4 ONESTEP
- Fortran: f90 -arch ev6 -fast -O5 ONESTEP

**Peak**
- All use -arch ev6 -non_shared ONESTEP (except applu and ammp)
- Individual benchmark tuning:
  - 168.wupwise: kf77 -call_shared -inline all -tune ev67
    - unroll 12 -automatic -align commons -arch ev67
    - -fkapargs=' -aggressive=c -fuse
    - -fusel level=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 -unroll 9 -automatic -transform_loops
    - -fkapargs=' -aggressive=a -fuse -interleave
    - -ur=2 -ur3=5 -cache=128,16000 ' +PFB
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Notes/Tuning Information (Continued)

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 -fkapargs=''
- fuse -fuselvel=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 -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
Notes/Tuning Information (Continued)
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
submit = runon cpu
System is single QBB (4-cpu) with only 1 cpu enabled at console