CFP2000 Result

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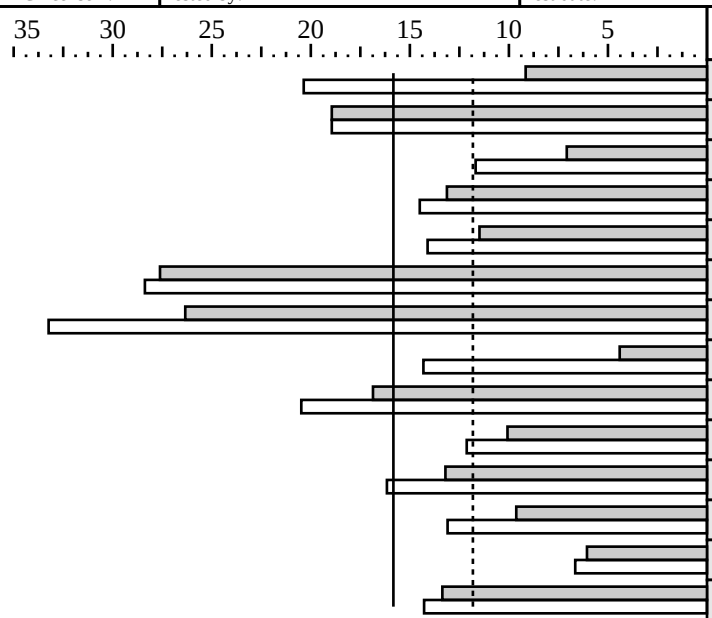
Hewlett-Packard Company
hp AlphaServer ES45 68/1250

SPECfp_rate2000 = 15.8

SPECfp_rate_base2000 = 11.8

SPEC license #: 2 | Tested by: HP | Test date: Nov-2002 | Hardware Avail: Aug-2002 | Software Avail: Dec-2002



Benchmark	Base Copies	Base Runtime	Base Ratio	Copies	Runtime	Ratio
168.wupwise	1	203	9.15	1	91.2	20.4
171.swim	1	190	18.9	1	190	18.9
172.mgrid	1	295	7.08	1	179	11.7
173.applu	1	186	13.1	1	168	14.5
177.mesa	1	141	11.5	1	115	14.1
178.galgel	1	122	27.6	1	119	28.4
179.art	1	115	26.3	1	90.7	33.2
183.equake	1	342	4.41	1	105	14.3
187.facerec	1	131	16.9	1	108	20.5
188.ammp	1	253	10.1	1	210	12.1
189.lucas	1	176	13.2	1	144	16.2
191.fma3d	1	253	9.63	1	186	13.1
200.sixtrack	1	211	6.06	1	192	6.65
301.apsi	1	226	13.4	1	211	14.3

Hardware

CPU:	Alpha 21264C
CPU MHz:	1250
FPU:	Integrated
CPU(s) enabled:	1 core, 1 chip, 1 core/chip
CPU(s) orderable:	1 to 4
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

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 Compaq Fortran 77 V5.5-1877-48BBF KAP Fortran V4.4 k340504 20010517 KAP Fortran 77 V4.1 k310440 980926 KAP C V4.2 k010737S 010515
File System:	ufs
System State:	Multi-user

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
               -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 -unroll 9 -automatic -transform_loops
                -fkapargs='-aggressive=a -fuse -interleave
                -ur=2 -ur3=5 -cachesize=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 -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       -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
```

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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
```