# CFP2000 Result

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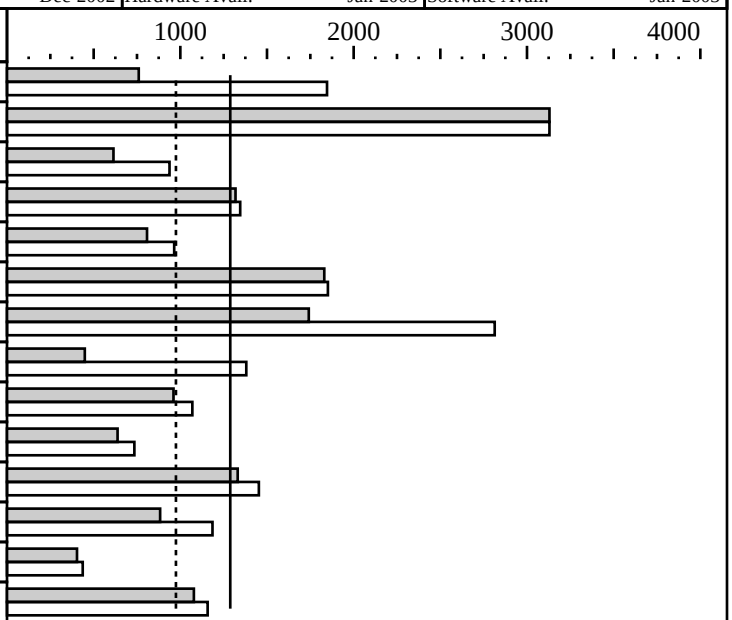
## Hewlett-Packard Company
## AlphaServer ES80 7/1000

SPECfp2000 = 1288

SPECfp_base2000 = 975

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 | 210 | 760 | 86.7 | 1846 |
| 171.swim | 3100 | 99.1 | 3130 | 99.1 | 3130 |
| 172.mgrid | 1800 | 293 | 614 | 192 | 938 |
| 173.applu | 2100 | 159 | 1318 | 156 | 1345 |
| 177.mesa | 1400 | 173 | 808 | 145 | 965 |
| 178.galgel | 2900 | 158 | 1830 | 157 | 1851 |
| 179.art | 2600 | 149 | 1741 | 92.4 | 2814 |
| 183.equake | 1300 | 290 | 449 | 94.2 | 1381 |
| 187.facerec | 1900 | 198 | 961 | 178 | 1069 |
| 188.ammp | 2200 | 345 | 638 | 299 | 735 |
| 189.lucas | 2000 | 150 | 1331 | 138 | 1453 |
| 191.fma3d | 2100 | 238 | 883 | 177 | 1186 |
| 200.sixtrack | 1100 | 272 | 404 | 252 | 437 |
| 301.apsi | 2600 | 241 | 1078 | 225 | 1158 |




### Hardware

| | |
|---|---|
| CPU: | Alpha 21364 |
| CPU MHz: | 1000 |
| FPU: | Integrated |
| CPU(s) enabled: | 1 core, 1 chip, 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 |
| Disk Subsystem: | 36GB SCSI |
| Other Hardware: | None |

### Software

| | |
|---|---|
| Operating System: | Tru64 UNIX V5.1B (Rev. 2650)<br>+IPK |
| Compiler: | Compaq C V6.5-011-48C5K<br>Spike V5.2 (506A)<br>Compaq Fortran V5.5-2602-48C8L<br>Compaq Fortran 77 V5.5-2602-48C8L<br>KAP Fortran V4.3 k3105171 000607<br>KAP Fortran 77 V4.1 k310440 980926<br>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.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
```

## Notes/Tuning Information (Continued)

```
                 manual -nopipeline -transform_loops -unroll 9 -automatic
                 -fkapargs='-aggressive=a -fuse -interleave
                 -ur=2 -ur3=5 -cachesize=128,16000 ' +PFB
     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 -arch ev6 -non_shared -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"):
```

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## Notes/Tuning Information (Continued)

```
            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=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

Information on UNIX V5.1B Patches can be found at
http://ftp1.service.digital.com/public/unix/v5.1b/

In the ES80, 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 results measured on a 2 cpu
system, one cpu was turned off at boot time using the
/etc/sysconfigtab setting "cpu_enabled_mask=0".  The cpu's
4GB of memory was also physically removed.
```