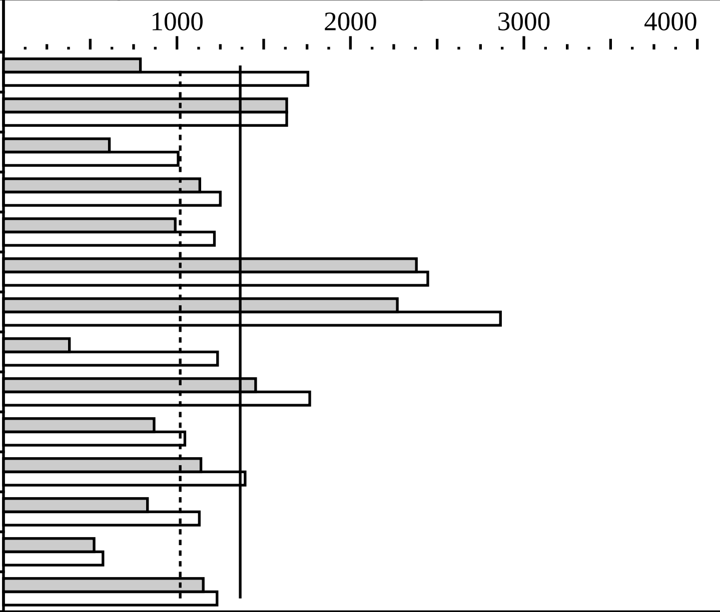
CFP2000 Result

Hewlett-Packard Company
hp AlphaServer ES45 68/1250

SPECfp2000 = 1365
SPECfp_base2000 = 1019

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

Benchmark	Reference Time	Base Runtime	Base Ratio	Runtime	Ratio
168.wupwise	1600	203	789	91.2	1755
171.swim	3100	190	1633	190	1633
172.mgrid	1800	295	610	179	1007
173.applu	2100	186	1132	168	1250
177.mesa	1400	141	990	115	1216
178.galgel	2900	122	2380	119	2446
179.art	2600	115	2270	90.7	2865
183.equake	1300	342	380	105	1234
187.facerec	1900	131	1454	108	1766
188.ammp	2200	253	868	210	1046
189.lucas	2000	176	1138	144	1393
191.fma3d	2100	253	830	186	1129
200.sixtrack	1100	211	522	192	573
301.apsi	2600	226	1152	211	1231



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
```

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

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
```