# CFP2000 Result

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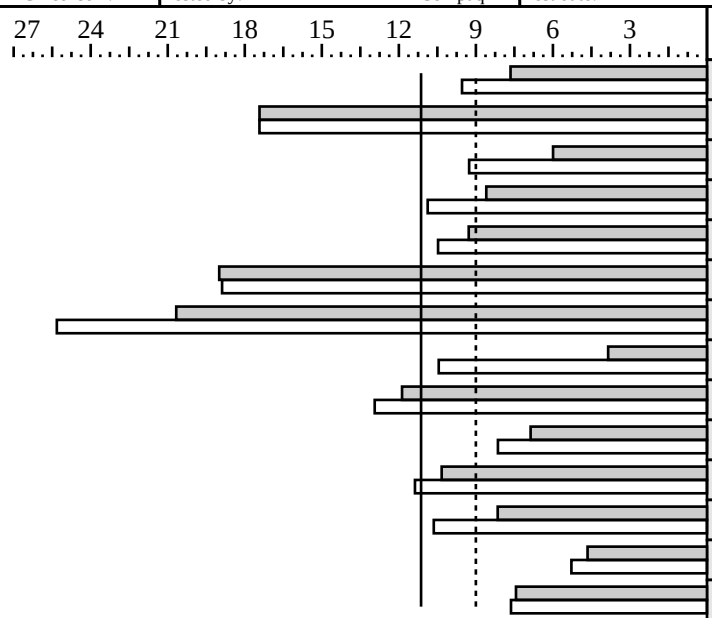
## Compaq Computer Corporation
## AlphaServer ES45 Model 68/1000

SPECfp_rate2000 = 11.1

SPECfp_rate_base2000 = 9.00

SPEC license #: 2 | Tested by: Compaq NH | Test date: Jun-2001 | Hardware Avail: Oct-2001 | Software Avail: Aug-2001




| Benchmark | Base Copies | Base Runtime | Base Ratio | Copies | Runtime | Ratio |
|---|---|---|---|---|---|---|
| 168.wupwise | 1 | 243 | 7.65 | 1 | 195 | 9.54 |
| 171.swim | 1 | 206 | 17.4 | 1 | 206 | 17.4 |
| 172.mgrid | 1 | 348 | 5.99 | 1 | 225 | 9.26 |
| 173.applu | 1 | 283 | 8.60 | 1 | 224 | 10.9 |
| 177.mesa | 1 | 175 | 9.28 | 1 | 155 | 10.5 |
| 178.galgel | 1 | 177 | 19.0 | 1 | 178 | 18.9 |
| 179.art | 1 | 146 | 20.7 | 1 | 119 | 25.3 |
| 183.equake | 1 | 392 | 3.85 | 1 | 144 | 10.4 |
| 187.facerec | 1 | 186 | 11.9 | 1 | 170 | 12.9 |
| 188.ammp | 1 | 372 | 6.87 | 1 | 313 | 8.14 |
| 189.lucas | 1 | 225 | 10.3 | 1 | 204 | 11.4 |
| 191.fma3d | 1 | 299 | 8.15 | 1 | 229 | 10.6 |
| 200.sixtrack | 1 | 274 | 4.65 | 1 | 242 | 5.28 |
| 301.apsi | 1 | 405 | 7.44 | 1 | 395 | 7.63 |

### Hardware

| | |
|---|---|
| CPU: | Alpha 21264C |
| CPU MHz: | 1000 |
| 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: | 8MB off chip per CPU |
| L3 Cache: | None |
| Other Cache: | None |
| Memory: | 32GB |
| Disk Subsystem: | 2x 10000 RPM: BD018635C4 BD0186349B |
| Other Hardware: | None |

### Software

| | |
|---|---|
| Operating System: | Tru64 UNIX V5.1<br>+Patch Kit 2 |
| Compiler: | Compaq C V6.4-214-46B59<br>Program Analysis Tools V2.0<br>Spike V5.2 DTK (1.461 46B5P)<br>Compaq Fortran V5.4A-1472-46B2F<br>Compaq Fortran 77 V5.4A-196-46B2F<br>KAP Fortran V4.3 000607<br>KAP Fortran 77 V4.1 980926<br>KAP C V4.1 000607 |
| File System: | AdvFs |
| 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 -g3 -arch ev6 -non_shared ONESTEP
  Individual benchmark tuning:
   168.wupwise: kf77 -fast -O4 -pipeline -unroll 2 +PFB
      171.swim: f90 -fast -O5
     172.mgrid: kf77 -O5 -transform_loops -tune ev6 -unroll 8
     173.applu: f90 -fast -O5 +PFB
      177.mesa: cc -fast -O4 +CFB +IFB
    178.galgel: f90 -fast -O5
       179.art: kcc -fast -O4 -unroll 10 -ckapargs='-arl=4
                -ur=4' +PFB
    183.equake: cc -fast -xtaso_short -assume
                restricted_pointers -all -ldensemalloc -none +PFB
```

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## Notes/Tuning Information (Continued)

```
   187.facerec: f90 -fast -O4 +PFB
      188.ammp: cc -fast -O4 -xtaso_short -assume
                restricted_pointers
     189.lucas: kf90 -O5 -fkapargs='-ur=1' +PFB
     191.fma3d: kf90 -O4 -transform_loops +PFB
 200.sixtrack: f90 -fast -O5 -assume accuracy_sensitive
                -notransform_loops +PFB
      301.apsi: kf90 -O5 -transform_loops -unroll 8
                -fkapargs='-ur=1' +PFB

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
      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.

Portability: galgel: -fixed

Information on UNIX V5.1 Patches can be found at
```

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## Notes/Tuning Information (Continued)

http://ftp1.service.digital.com/public/unix/v5.1/

Spike, and the Program Analysis Tools, are part of the Developers' Tool Kit Supplement, http://www.tru64unix.compaq.com/dtk/ . The features used in this SPEC submission will be available at the web site as a beta kit in August, 2001, and as a production release in October, 2001. The C compiler for this SPEC submission has been available at the same location, as a production release, since May, 2001.