Compaq Computer Corporation
AlphaServer DS20L Model 68/833

SPECfp2000 = 724
SPECfp_base2000 = 583

Benchmark | Reference Time | Base Runtime | Base Ratio | Runtime | Ratio
---|---|---|---|---|---
168.wupwise | 1600 | 308 | 519 | 247 | 647
171.swim | 3100 | 306 | 1012 | 306 | 1012
172.mgrid | 1800 | 459 | 392 | 317 | 569
173.applu | 2100 | 409 | 514 | 322 | 652
177.mesa | 1400 | 217 | 645 | 192 | 729
178.galgel | 2900 | 222 | 1308 | 223 | 1302
179.art | 2600 | 155 | 1682 | 120 | 2169
183.equake | 1300 | 551 | 236 | 210 | 620
187.facercc | 1900 | 271 | 702 | 248 | 767
188.ammp | 2200 | 552 | 398 | 450 | 489
189.lucas | 2000 | 327 | 612 | 279 | 717
191.fma3d | 2100 | 401 | 524 | 305 | 689
200.sixtrack | 1100 | 331 | 332 | 292 | 377
301.apsi | 2600 | 531 | 490 | 514 | 506

Hardware
- CPU: Alpha 21264B
- CPU MHz: 833
- FPU: Integrated
- CPU(s) enabled: 1 core, 1 chip, 1 core/chip
- CPU(s) orderable: 1 to 2
- Parallel: No
- Primary Cache: 64KB(I)+64KB(D) on chip
- Secondary Cache: 4MB off chip per CPU
- L3 Cache: None
- Other Cache: None
- Memory: 2GB
- Disk Subsystem: 1x40GB Maxtor 5T040H4
- Other Hardware: None

Software
- Operating System: Tru64 UNIX V5.1A (Rev. 1885)
- Compiler:
  - Compaq C V6.4-215-46B7O
  - Program Analysis Tools V2.0
  - Spike V5.2 DTK (1.471.2.46B5P)
  - Compaq Fortran V5.4A-1472-46B2F
  - Compaq Fortran 77 V5.4A-196-46B2F
  - KAP Fortran V4.3 000607
  - KAP Fortran 77 V4.1 980926
  - 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

Spike, and the Program Analysis Tools, are part of the Developers'
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Notes/Tuning Information (Continued)

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 production release as of October, 2001. The C compiler for this SPEC submission has been available at the same location, as a production release, since August 15, 2001.