



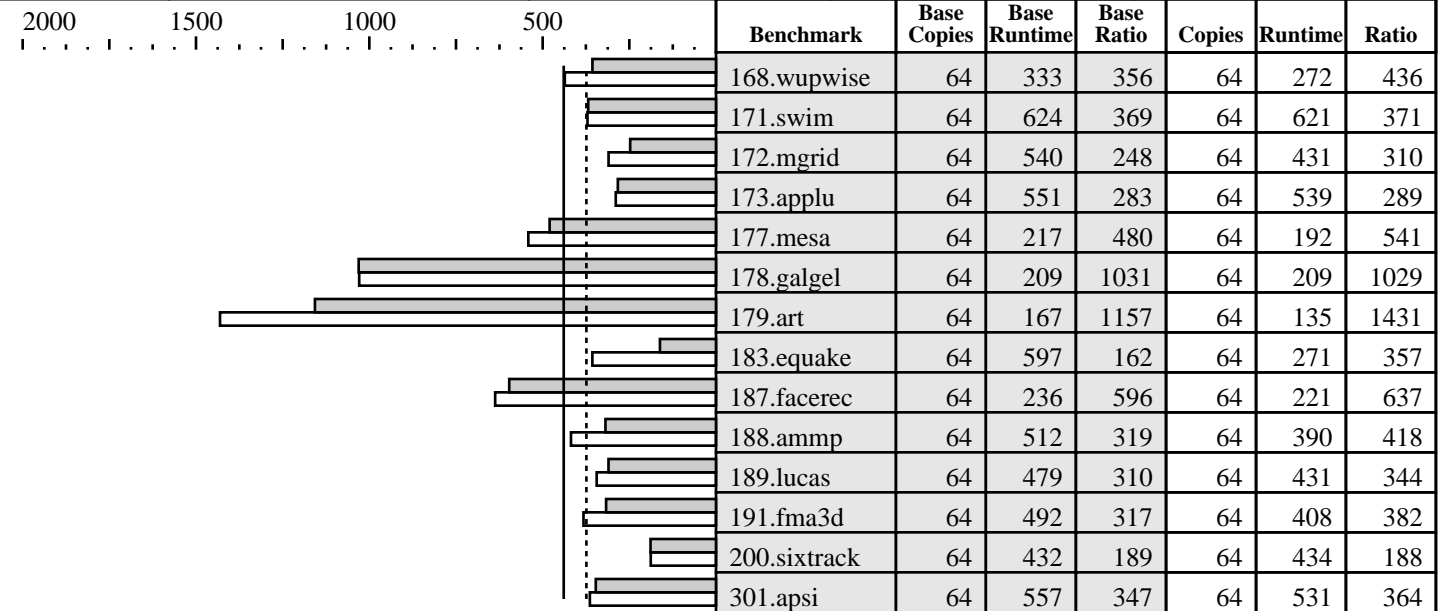
CFP2000 Result

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Compaq Computer Corporation
AlphaServer SC40 Cluster (16 Nodes)

SPECfp_rate2000 = 439
SPECfp_rate_base2000 = 374

SPEC license #: 2 | Tested by: Compaq NH | Test date: Apr-2002 | Hardware Avail: Jan-2002 | Software Avail: Jan-2002



Hardware

CPU: Alpha 21264B
 CPU MHz: 833
 FPU: Integrated
 CPU(s) enabled: 64 cores, 64 chips, 1 core/chip
 CPU(s) orderable: 1 to 4 per node
 Parallel: No
 Primary Cache: 64KB(I)+64KB(D) on chip
 Secondary Cache: 8MB off chip per CPU
 L3 Cache: None
 Other Cache: None
 Memory: Node 0 = 16GB, Nodes 1-15 = 4GB
 Disk Subsystem: 6x18GB 10K RPM disks,
 in a RAID-0 HSG80 stripe,
 attached to node 0
 Other Hardware: None

Software

Operating System: Tru64 UNIX V5.1
 Tru64 5.1 Patch Kit 2 - SC V2.0-PK1
 Compiler: Compaq C V6.4-215
 Program Analysis Tools V2.0
 Spike V5.2 DTK (1.471.2.2 46B5P)
 Compaq Fortran V5.5-1877-48BBF
 Compaq Fortran 77 V5.5-1877-48BBF
 KAP Fortran V4.4 k340504 20010517
 KAP Fortran 77 V4.1 980926
 KAP C V4.2 k010737s 010515
 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



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Notes/Tuning Information (Continued)

```

183.equake: cc -fast -xtaso_short -assume
             restricted_pointers -all -ldensemalloc -none +PFB
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



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Notes/Tuning Information (Continued)

Information on UNIX V5.1 Patches can be found at
<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 have been available at the web site as a production release since October, 2001. The C compiler for this SPEC submission has been available at the same location, as a production release, since August, 2001.

Users are distributed across the nodes of the cluster via:

```
submit= echo "$command" > dobmk; prun -n 1 sh dobmk  
command_add_redirect=1
```