CINT2000 Result

Compaq Computer Corporation
AlphaServer ES45 Model 68/1000

SPECint_rate2000 = 30.8
SPECint_rate_base2000 = 28.3

Benchmark | Base Copies | Base Runtime | Base Ratio | Copies | Runtime | Ratio
---|---|---|---|---|---|---
164.gzip | 4 | 304 | 21.4 | 4 | 300 | 21.7
175.vpr | 4 | 266 | 24.4 | 4 | 267 | 24.4
176.gcc | 4 | 165 | 31.0 | 4 | 146 | 35.0
181.mcf | 4 | 354 | 23.6 | 4 | 269 | 31.0
186.crafty | 4 | 123 | 37.9 | 4 | 123 | 37.9
197.parser | 4 | 432 | 19.3 | 4 | 345 | 24.2
252.eon | 4 | 162 | 37.2 | 4 | 159 | 37.9
253.perlbmk | 4 | 287 | 29.1 | 4 | 274 | 30.5
254.gap | 4 | 258 | 19.8 | 4 | 218 | 23.4
255.vortex | 4 | 227 | 38.9 | 4 | 209 | 42.1
256.bzip2 | 4 | 229 | 30.4 | 4 | 217 | 32.1
300.twolf | 4 | 380 | 36.7 | 4 | 373 | 37.4

Hardware

CPU: Alpha 21264C
CPU MHz: 1000
FPU: Integrated
CPU(s) enabled: 4 cores, 4 chips, 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 +Patch Kit 2
Compiler: Compaq C V6.4-214-46B59
Program Analysis Tools V2.0
Spike V5.2 DTK (1.461 46B5P)
Compaq C++ V6.3-010-46B2F
File System: AdvFS
System State: Multi-user

Notes/Tuning Information

Baseline C : cc -arch ev6 -fast +CFB ONESTEP
C++: cxx -arch ev6 -O2 ONESTEP

Peak:

All but 252.eon: cc -g3 -arch ev6 ONESTEP
164.gzip: -fast -04 -non_shared +CFB
175.vpr: -fast -04 -assume restricted_pointers +CFB
176.gcc: -fast -04 -xtaso_short -all -ldensemalloc -none +CFB +IFB
181.mcf: -fast -xtaso_short +CFB +IFB +PFB
186.crafty: same as base
197.parser: -fast -04 -xtaso_short -non_shared +CFB
252.eon: cxx -arch ev6 -O2 -all -ldensemalloc -none
253.perlbmk: -fast -non_shared +CFB +IFB
254.gap: -fast -04 -non_shared +CFB +IFB +PFB
255.vortex: -fast -non_shared +CFB +IFB
256.bzip2: -fast -04 -non_shared +CFB
300.twolf: -fast -04 -assume restricted_pointers -all -ldensemalloc -none +CFB +IFB
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Notes/Tuning Information (Continued)

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"):

```bash
mkdir /tmp/pp
rm -f /tmp/pp/${baseexe}*
```

and these flags are added to the first and second compiles:

```bash
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"):

```bash
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"):

```bash
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"):

```bash
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: gcc: -Dalloca=__builtin_alloca; crafty: -DALPHA
perlbmk: -DSPEC_CPU2000_DUNIX; vortex: -DSPEC_CPU2000_LP64
gap: -DSYS_HAS_CALLOC_PROTO -DSYS_IS_BSD -DSYS_HAS_IOCTL_PROTO
     -DSPEC_CPU2000_LP64

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 will be available at the web site as a beta kit in August, 2001, and as a production release in

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**Notes/Tuning Information (Continued)**

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