## CINT2000 Result

**Compaq Computer Corporation**

**AlphaServer GS80 Model 8 68/1001**

### SPECint_rate2000 = 56.0

### SPECint_rate_base2000 = 51.1

**Benchmark** | **Base** | **Copies** | **Runtime** | **Base** | **Ratio** | **Copies** | **Runtime** | **Ratio**
---|---|---|---|---|---|---|---|---
164.gzip | 8 | 300 | 43.4 | 8 | 297 | 43.8 
175.vpr | 8 | 297 | 43.8 | 8 | 312 | 41.6 
176.gcc | 8 | 177 | 57.5 | 8 | 155 | 65.6 
181.mcf | 8 | 501 | 33.3 | 8 | 374 | 44.6 
186.crafty | 8 | 125 | 74.1 | 8 | 125 | 74.1 
197.parser | 8 | 435 | 38.4 | 8 | 341 | 49.0 
252.eon | 8 | 162 | 74.3 | 8 | 159 | 76.0 
253.perlbmk | 8 | 301 | 55.6 | 8 | 309 | 54.1 
254.gap | 8 | 372 | 27.4 | 8 | 310 | 32.9 
255.vortex | 8 | 280 | 62.9 | 8 | 226 | 78.1 
256.bzip2 | 8 | 248 | 56.1 | 8 | 229 | 60.7 
300.twolf | 8 | 363 | 76.6 | 8 | 366 | 76.0

### Hardware

- **CPU:** Alpha 21264C
- **CPU MHz:** 1001
- **FPU:** Integrated
- **CPU(s) enabled:** 8 cores, 8 chips, 1 core/chip
- **CPU(s) orderable:** 1 to 8
- **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:** mfs (Memory File System)
- **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:** mfs
- **System State:** Single-user

### Notes/Tuning Information

**Baseline C:**
- `cc` `-arch ev6` `-fast` `+CFB` **ONESTEP**
- `c++` `-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` `-PFB`
- `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"):

```
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:
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/

submit = runon <cpu #> $command

sysconfigtab settings:

```
max_proc_per_user = 4096
max_threads_per_user = 4096
per_proc_data_size = 21474836480
```
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Notes/Tuning Information (Continued)

max_per_proc_data_size = 21474836480
per_proc_address_space = 21474836480
max_per_proc_address_space = 21474836480

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.