### CINT2000 Result

**Compaq Computer Corporation**  
**AlphaServer GS80 Model 8 68/1001**

**SPECint_rate2000** = 7.20  
**SPECint_rate_base2000** = 6.51

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base Copies</th>
<th>Base Runtime</th>
<th>Base Ratio</th>
<th>Copies</th>
<th>Runtime</th>
<th>Ratio</th>
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<tbody>
<tr>
<td>164.gzip</td>
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<td>5.40</td>
<td>1</td>
<td>297</td>
<td>5.47</td>
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<td>175.vpr</td>
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<td>5.60</td>
<td>1</td>
<td>289</td>
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<tr>
<td>176.gcc</td>
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<td>173</td>
<td>7.38</td>
<td>1</td>
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<td>8.64</td>
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<tr>
<td>181.mcff</td>
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<td>5.91</td>
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<td>186.crafty</td>
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<td>9.32</td>
<td>1</td>
<td>124</td>
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<td>197.parser</td>
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<td>254.gap</td>
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</tbody>
</table>

**Hardware**

- CPU: Alpha 21264C
- CPU MHz: 1001
- FPU: Integrated
- CPU(s) enabled: 1 core, 1 chip, 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: 16GB
- 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: 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 -O4 -non_shared +CFB
175.vpr: -fast -O4 -assume restricted_pointers +CFB
176.gcc: -fast -O4 -xtaso_short -all -ldensemalloc -none
         +CFB +IFB
181.mcff: -fast -xtaso_short +CFB +IFB +PFB
186.crafty: same as base
197.parser: -fast -O4 -xtaso_short -non_shared +CFB
252.eon: cxx -arch ev6 -O2 -all -ldensemalloc -none
253.perlbmk: -fast -non_shared +CFB +IFB
254.gap: -fast -O4 -non_shared +CFB +PFB
255.vortex: -fast -O4 -non_shared +CFB +IFB
256.bzip2: -fast -O4 -non_shared +CFB
300.twolf: -fast -O4 -assume restricted_pointers -all
         -ldensemalloc -none +CFB +IFB
```
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.


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 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
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Notes/Tuning Information (Continued)

available at the same location, as a production release, since May, 2001.

Sysconfigtab settings:

max_proc_per_user = 4096
max_threads_per_user = 4096
per_proc_data_size = 21474836480
max_per_proc_data_size = 21474836480
per_proc_address_space = 21474836480
max_per_proc_address_space = 21474836480