## CINT2000 Result

### Compaq Computer Corporation

**AlphaServer GS320 Model 32 68/1001**

**SPECint2000 =** 621

**SPECint_base2000 =** 561

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<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Reference Time</th>
<th>Base Runtime</th>
<th>Base Ratio</th>
<th>Runtime</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>164.gzip</td>
<td>1400</td>
<td>300</td>
<td>466</td>
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<td>471</td>
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<tr>
<td>175.vpr</td>
<td>1400</td>
<td>290</td>
<td>482</td>
<td>289</td>
<td>485</td>
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<td>176.gcc</td>
<td>1100</td>
<td>173</td>
<td>636</td>
<td>148</td>
<td>745</td>
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<tr>
<td>181.mcf</td>
<td>1800</td>
<td>481</td>
<td>374</td>
<td>353</td>
<td>509</td>
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<tr>
<td>186.crafty</td>
<td>1000</td>
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<td>124</td>
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<td>197.parser</td>
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<td>405</td>
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<td>519</td>
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<tr>
<td>252.eon</td>
<td>1300</td>
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<td>798</td>
<td>159</td>
<td>818</td>
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<tr>
<td>253.perlbmk</td>
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<td>605</td>
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<td>633</td>
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<td>254.gap</td>
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<tr>
<td>255.vortex</td>
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<td>752</td>
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<td>852</td>
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<tr>
<td>256.bzip2</td>
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<td>606</td>
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<td>300.twolf</td>
<td>3000</td>
<td>366</td>
<td>821</td>
<td>356</td>
<td>843</td>
</tr>
</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 32
- **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 -q3 -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 -non_shared +CFB +IFB`
- `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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Standard Performance Evaluation Corporation
info@spec.org
http://www.spec.org
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/

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
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- SPEC license #: 2
- Tested by: Compaq NH
- Test date: Jun-2001
- Hardware Avail: Jun-2001
- Software Avail: Aug-2001

### 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
```