Compaq Computer Corporation
AlphaServer ES40 Model 6/833

SPECint_rate2000 = 25.8
SPECint_rate_base2000 = 23.5

<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>
</tr>
</thead>
<tbody>
<tr>
<td>164.gzip</td>
<td>4</td>
<td>358</td>
<td>18.2</td>
<td>4</td>
<td>354</td>
<td>18.4</td>
</tr>
<tr>
<td>175.vpr</td>
<td>4</td>
<td>319</td>
<td>20.4</td>
<td>4</td>
<td>319</td>
<td>20.3</td>
</tr>
<tr>
<td>176.gcc</td>
<td>4</td>
<td>193</td>
<td>26.5</td>
<td>4</td>
<td>172</td>
<td>29.7</td>
</tr>
<tr>
<td>181.mcf</td>
<td>4</td>
<td>438</td>
<td>19.1</td>
<td>4</td>
<td>332</td>
<td>25.1</td>
</tr>
<tr>
<td>186.crafty</td>
<td>4</td>
<td>146</td>
<td>31.8</td>
<td>4</td>
<td>146</td>
<td>31.8</td>
</tr>
<tr>
<td>197.parser</td>
<td>4</td>
<td>501</td>
<td>16.7</td>
<td>4</td>
<td>405</td>
<td>20.6</td>
</tr>
<tr>
<td>252.eon</td>
<td>4</td>
<td>195</td>
<td>30.9</td>
<td>4</td>
<td>191</td>
<td>31.6</td>
</tr>
<tr>
<td>253.perlbmk</td>
<td>4</td>
<td>343</td>
<td>24.3</td>
<td>4</td>
<td>322</td>
<td>26.0</td>
</tr>
<tr>
<td>254.gap</td>
<td>4</td>
<td>329</td>
<td>15.5</td>
<td>4</td>
<td>273</td>
<td>18.7</td>
</tr>
<tr>
<td>255.vortex</td>
<td>4</td>
<td>278</td>
<td>31.7</td>
<td>4</td>
<td>250</td>
<td>35.2</td>
</tr>
<tr>
<td>256.bzip2</td>
<td>4</td>
<td>279</td>
<td>25.0</td>
<td>4</td>
<td>260</td>
<td>26.8</td>
</tr>
<tr>
<td>300.twolf</td>
<td>4</td>
<td>442</td>
<td>31.5</td>
<td>4</td>
<td>431</td>
<td>32.3</td>
</tr>
</tbody>
</table>

**Hardware**

- CPU: Alpha 21264B
- CPU MHz: 833
- 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: 4GB
- Disk Subsystem: 1x18GB
- 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

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"):

```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 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
### CINT2000 Result

<table>
<thead>
<tr>
<th>Compaq Computer Corporation AlphaServer ES40 Model 6/833</th>
<th>SPECint_rate2000 = 25.8</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SPECint_rate_base2000 = 23.5</td>
</tr>
</tbody>
</table>

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

### 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.