# CINT2000 Result

**Compaq Computer Corporation**

**AlphaServer ES45 Model 68/1000**

**SPECint_rate2000** = 7.87

**SPECint_rate_base2000** = 7.20

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### Hardware

- **CPU:** Alpha 21264C
- **CPU MHz:** 1000
- **FPU:** Integrated
- **CPU(s) enabled:** 1 core, 1 chip, 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:**

```bash
cc -arch ev6 -fast +CFB ONESTEP
```

**C++:**

```bash
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.mcf: -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 +CFB +IFB`
- `253.perlbmk: -fast -non_shared +CFB +IFB`
- `254.gap: -fast -O4 -non_shared +CFB +IFB +PFB`
- `255.vortex: -fast -O4 -non_shared +CFB +IFB +PFB`
- `256.bzip2: -fast -O4 -non_shared +CFB +IFB`
- `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"):

```
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 -fb oldexe -fb_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 -fb_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
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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.