Hewlett-Packard Company
AlphaServer DS15/1000

SPEClnt2000 = 631
SPEClnt_base2000 = 572

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<th>Benchmark</th>
<th>Reference Time</th>
<th>Base Runtime</th>
<th>Base Ratio</th>
<th>Runtime</th>
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<td>175.vpr</td>
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<td>597</td>
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<td>300.twolf</td>
<td>3000</td>
<td>490</td>
<td>612</td>
<td>495</td>
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</tbody>
</table>

**Hardware**

- **CPU:** Alpha 21264C
- **CPU MHz:** 1000
- **FPU:** Integrated
- **CPU(s) enabled:** 1 core, 1 chip, 1 core/chip
- **CPU(s) orderable:** 1
- **Parallel:** No
- **Primary Cache:** 64KB(I)+64KB(D) on chip
- **Secondary Cache:** 2MB
- **L3 Cache:** None
- **Memory:** 2GB; 512MB RIMMs
- **Disk Subsystem:** 36GB Ultra 160 10KRPM
- **Other Hardware:** None

**Software**

- **Operating System:** Tru64 UNIX V5.1B (Rev. 2650) +IPK
- **Compiler:** Compaq C V6.5-011-48C5K
- **Program Analysis Tools V2.0**
- **Spike V5.2 (510 USG)**
- **Compaq C++ V6.5-041**
- **File System:** UFS
- **System State:** Multi-user

**Notes/Tuning Information**

Baseline C : cc -arch ev7 -fast +CFB ONESTEP
C++: cxx -arch ev7 -O2 ONESTEP

Peak:

- All but 252.eon: cc -g3 -arch ev7 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 ev7 -O2 -all -ldensemalloc -none
- 253.perlbmk: -fast -non_shared +CFB +IFB
- 254.gap: -fast -O4 -non_shared +CFB +IFB +PFB
- 255.vortex: -fast -non_shared +CFB +IFB
- 256.bzip2: -fast -O4 -non_shared +CFB
- 300.twolf: -fast -O4 -ldensemalloc -non_shared +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_feedback -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.

vm:

```
vm_bigpg_enabled = 1
vm_bigpg_thresh = 6
vm_swap_eager = 0
ubs_maxpercent = 50
```

proc:

```
max_per_proc_address_space = 34359738368
max_per_proc_data_size = 34359738368
max_per_proc_stack_size = 34359738368
max_proc_per_user = 2048
max_threads_per_user = 4096
maxusers = 2048
```
CINT2000 Result

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AlphaServer DS15/1000

SPECint2000 = 631
SPECint_base2000 = 572

Notes/Tuning Information (Continued)

per_proc_address_space = 34359738368
per_proc_data_size = 34359738368
per_proc_stack_size = 34359738368

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 V5.1B Patches can be found at

Processes were bound to CPUs using "runon".