Hewlett-Packard Company
AlphaServer ES47 7/1000

**SPECint_rate2000** = 34.6
**SPECint_rate_base2000** = 31.5

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**Benchmark** | **Base Copies** | **Base Runtime** | **Base Ratio** | **Copies** | **Runtime** | **Ratio**
---|---|---|---|---|---|---
164.gzip | 4 | 284 | 22.9 | 4 | 279 | 23.3
175.vpr | 4 | 198 | 32.8 | 4 | 193 | 33.6
176.gcc | 4 | 156 | 32.8 | 4 | 142 | 36.0
181.mcf | 4 | 294 | 28.4 | 4 | 183 | 45.5
186.crafty | 4 | 118 | 39.3 | 4 | 118 | 39.3
197.parser | 4 | 405 | 20.6 | 4 | 318 | 26.2
252.eon | 4 | 160 | 37.7 | 4 | 161 | 37.6
253.perlbmk | 4 | 278 | 30.0 | 4 | 268 | 31.2
254.gap | 4 | 199 | 25.6 | 4 | 177 | 28.9
255.vortex | 4 | 206 | 42.7 | 4 | 187 | 47.2
256.bzip2 | 4 | 214 | 32.5 | 4 | 202 | 34.5
300.twolf | 4 | 339 | 41.0 | 4 | 342 | 40.7

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**Hardware**
- CPU: Alpha 21364
- CPU MHz: 1000
- FPU: Integrated
- CPU(s) enabled: 4 cores, 4 chips, 1 core/chip
- Parallel: No
- Primary Cache: 64KB(I)+64KB(D) on chip
- Secondary Cache: 1.75MB on chip per CPU
- L3 Cache: None
- Other Cache: None
- Memory: 16GB
- Disk Subsystem: 36GB SCSI
- 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 (506A)
- 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**: The following use: -g3 -arch ev7 ONESTEP
175.vpr 181.mcf 197.parser 253.perlbmk

The following use: -g3 -arch ev6 ONESTEP
164.gzip 176.gcc 254.gap 255.vortex 256.bzip2 300.twolf

Individual benchmark tuning:
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: -arch ev7 -O2 -all -ldensemalloc -none
253.perlbmk: -fast -non_shared +CFB +IFB
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Notes/Tuning Information (Continued)

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

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.

gap: -DSYS_HAS_CALLOC_PROTO -DSYS_IS_BSD -DSYS_HAS_IOCTL_PROTO

Information on UNIX V5.1B Patches can be found at http://ftp1.service.digital.com/public/unix/v5.1b/
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Notes/Tuning Information (Continued)

vm:
  vm_bigpg_enabled = 1
  vm_bigpg_thresh=16
  vm_swap_eager = 0

proc:
  max_per_proc_address_space = 0x400000000000
  max_per_proc_data_size = 0x400000000000
  max_per_proc_stack_size = 0x400000000000
  max_proc_per_user = 2048
  max_threads_per_user = 0
  maxusers = 16384
  per_proc_address_space = 0x400000000000
  per_proc_data_size = 0x400000000000
  per_proc_stack_size = 0x400000000000