Hewlett-Packard Company
AlphaServer GS1280 7/1150

SPECint_rate2000 = 20.3
SPECint_rate_base2000 = 18.4

Benchmark | Base | Base | Base | Copies | Runtime | Ratio
--- | --- | --- | --- | --- | --- | ---
164.gzip | 2 | 241 | 13.5 | 2 | 237 | 13.7
175.vpr | 2 | 170 | 19.1 | 2 | 166 | 19.5
176.gcc | 2 | 129 | 19.8 | 2 | 115 | 22.1
181.mcf | 2 | 254 | 16.4 | 2 | 159 | 26.3
186.crafty | 2 | 102 | 22.8 | 2 | 102 | 22.8
197.parser | 2 | 352 | 11.9 | 2 | 277 | 15.1
252.eon | 2 | 136 | 22.1 | 2 | 138 | 22.8
253.perlbmk | 2 | 237 | 17.6 | 2 | 226 | 18.5
254.gap | 2 | 174 | 14.7 | 2 | 154 | 16.6
255.vortex | 2 | 174 | 25.3 | 2 | 159 | 27.7
256.bzip2 | 2 | 183 | 19.0 | 2 | 173 | 20.1
300.twolf | 2 | 296 | 23.5 | 2 | 293 | 23.7

Hardware
- CPU: Alpha 21364
- CPU MHz: 1150
- FPU: Integrated
- CPU(s) enabled: 2 cores, 2 chips, 1 core/chip
- CPU(s) orderable: 2 to 16
- 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: 8GB
- 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)
- Compaq C++ V6.5-028
- 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 -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: -arch ev7 -02 -all -ldensemalloc -none
253.perlbmk: -fast -non_shared +CFB +IFB


![HS.png](data:image/png;base64,iVBORw0KGgoAAAANSUhEUgAAAEAAAABbAQAAAAearoAAAACUlEQVR42mP8D2DgAAAABJRU5ErkJggg==)

**CINT2000 Result**

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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 -ldensemalloc -non_shared +CFB +IFB`  

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.

**vm:**

- `vm_bigpg_enabled = 1`
- `vm_bigpg_thresh=16`
- `vm_swap_eager = 0`

**proc:**
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Notes/Tuning Information (Continued)

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

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'.