



# CINT2000 Result

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Hewlett-Packard Company  
hp AlphaServer ES45 68/1250

SPECint\_rate2000 = 10.8  
SPECint\_rate\_base2000 = 9.80

SPEC license #: 2 | Tested by: HP NH | Test date: Jul-2002 | Hardware Avail: Aug-2002 | Software Avail: Dec-2002

Benchmark	Base Copies	Base Runtime	Base Ratio	Copies	Runtime	Ratio
164.gzip	1	243	6.68	1	240	6.76
175.vpr	1	163	9.97	1	159	10.2
176.gcc	1	122	10.5	1	112	11.4
181.mcf	1	160	13.0	1	123	17.0
186.crafty	1	98.4	11.8	1	98.4	11.8
197.parser	1	316	6.60	1	256	8.17
252.eon	1	137	11.0	1	132	11.5
253.perlbnk	1	228	9.16	1	208	10.0
254.gap	1	199	6.40	1	164	7.78
255.vortex	1	164	13.4	1	145	15.2
256.bzip2	1	162	10.7	1	150	11.6
300.twolf	1	292	11.9	1	292	11.9

### Hardware

CPU: Alpha 21264C  
 CPU MHz: 1250  
 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: 16MB off chip per CPU  
 L3 Cache: None  
 Other Cache: None  
 Memory: 16GB  
 Disk Subsystem: 9 GB SCSI  
 Other Hardware: None

### Software

Operating System: Tru64 UNIX V5.1B  
 Compiler: Compaq C V6.5-011-48C5K  
 Spike V5.2 (506 48C5K)  
 Compaq C++ V6.3-010  
 File System: ufs  
 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 -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  
 253.perlbnk: -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



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## 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 -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:

```
max_per_proc_address_space = 0x4000000000
max_per_proc_data_size = 0x4000000000
max_per_proc_stack_size = 0x4000000000
max_proc_per_user = 2048
max_threads_per_user = 0
maxusers = 16384
per_proc_address_space = 0x4000000000
```



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```
per_proc_data_size = 0x400000000000
per_proc_stack_size = 0x400000000000
Portability: gcc: -Dalloca=__builtin_alloca; crafty: -DALPHA
perlbnk: -DSPEC_CPU2000_DUNIX; vortex: -DSPEC_CPU2000_LP64
gap: -DSYS_HAS_CALLOC_PROTO -DSYS_IS_BSD -DSYS_HAS_IOCTL_PROTO
      -DSPEC_CPU2000_LP64
```