



# CINT2000 Result

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## Hewlett-Packard Company AlphaServer ES80 7/1000

SPECint\_rate2000 = 34.6

SPECint\_rate\_base2000 = 31.5

SPEC license #: 2 | Tested by: HP | Test date: Dec-2002 | Hardware Avail: Jan-2003 | Software Avail: Jan-2003

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.perlbnk	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

### Hardware

CPU: Alpha 21364  
 CPU MHz: 1000  
 FPU: Integrated  
 CPU(s) enabled: 4 cores, 4 chips, 1 core/chip  
 CPU(s) orderable: 2 to 8  
 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)  
 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.perlbnk

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.perlbnk: -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
          -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.

```
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
```

Information on UNIX V5.1B Patches can be found at  
<http://ftpl.service.digital.com/public/unix/v5.1b/>



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vm:

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

proc:

```
max_per_proc_address_space = 0x40000000000  
max_per_proc_data_size = 0x40000000000  
max_per_proc_stack_size = 0x40000000000  
max_proc_per_user = 2048  
max_threads_per_user = 0  
maxusers = 16384  
per_proc_address_space = 0x40000000000  
per_proc_data_size = 0x40000000000  
per_proc_stack_size = 0x40000000000
```