



# CINT2000 Result

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Hewlett-Packard Company  
AlphaServer GS1280 7/1150

SPECint\_rate2000 = 10.2  
SPECint\_rate\_base2000 = 9.22

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.zip	1	240	6.77	1	236	6.87
175.vpr	1	170	9.54	1	165	9.81
176.gcc	1	128	9.96	1	115	11.1
181.mcf	1	253	8.26	1	157	13.3
186.crafty	1	102	11.4	1	102	11.4
197.parser	1	351	5.96	1	277	7.54
252.eon	1	136	11.1	1	137	11.0
253.perlbnk	1	234	8.91	1	224	9.34
254.gap	1	173	7.38	1	153	8.33
255.vortex	1	174	12.7	1	158	13.9
256.bzip2	1	182	9.56	1	172	10.1
300.twolf	1	295	11.8	1	292	11.9

Hardware	Software
CPU: Alpha 21364	Operating System: Tru64 UNIX V5.1B (Rev. 2650) +IPK
CPU MHz: 1150	Compiler: Compaq C V6.5-011-48C5K Program Analysis Tools V2.0 Spike V5.2 (506A) Compaq C++ V6.5-028
FPU: Integrated	File System: UFS
CPU(s) enabled: 1 core, 1 chip, 1 core/chip	System State: Multi-user
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: 4GB	
Disk Subsystem: 36GB SCSI	
Other Hardware: None	

## 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.zip 176.gcc 254.gap 255.vortex 256.bzip2 300.twolf

Individual benchmark tuning:  
164.zip: -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.

vm:

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

proc:



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```
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
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/>

Processes were bound to CPUs using 'runon'.  
In the GS1280, there are two CPUs per shelf. Each CPU  
has its own 4GB of memory. Neither of the CPUs can be  
physically removed. For 1 CPU result measurements,  
one CPU was turned off at boot time using the  
/etc/sysconfigtab setting "cpu\_enabled\_mask=0". The  
second CPU's 4GB of memory was also physically removed.