



CINT2000 Result

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Hewlett-Packard Company
AlphaServer GS1280 7/1150

SPECint2000 = 877
SPECint_base2000 = 795

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

Benchmark	Reference Time	Base Runtime	Base Ratio	Runtime	Ratio	
164.gzip	1400	240	583	236	592	
175.vpr	1400	170	822	165	846	
176.gcc	1100	128	859	115	960	
181.mcf	1800	253	712	157	1147	
186.crafty	1000	102	982	102	982	
197.parser	1800	351	514	277	650	
252.eon	1300	136	958	137	947	
253.perlbmk	1800	234	768	224	805	
254.gap	1100	173	636	153	718	
255.vortex	1900	174	1094	158	1201	
256.bzip2	1500	182	824	172	872	
300.twolf	3000	295	1018	292	1028	

Hardware

CPU: Alpha 21364
 CPU MHz: 1150
 FPU: Integrated
 CPU(s) enabled: 1 core, 1 chip, 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: 4GB
 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 -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
          -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
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.