



CINT2000 Result

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Hewlett-Packard Company
AlphaServer ES47 7/1000

SPECint2000 = 761
SPECint_base2000 = 689

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	276	507	272	515	
175.vpr	1400	196	713	191	734	
176.gcc	1100	147	746	132	834	
181.mcf	1800	291	619	182	988	
186.crafty	1000	117	856	117	856	
197.parser	1800	404	446	318	566	
252.eon	1300	156	831	158	822	
253.perlbnk	1800	273	660	256	703	
254.gap	1100	199	553	177	621	
255.vortex	1900	201	947	183	1041	
256.bzip2	1500	210	715	199	755	
300.twolf	3000	341	881	336	892	

Hardware

CPU: Alpha 21364
 CPU MHz: 1000
 FPU: Integrated
 CPU(s) enabled: 1 core, 1 chip, 1 core/chip
 CPU(s) orderable: 2 to 4
 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:
 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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SPECint2000 =	761
SPECint_base2000 =	689

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Notes/Tuning Information (Continued)

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
```

In the ES47, 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 results measured on a 2 cpu system, one cpu was turned off at boot time using the /etc/sysconfigtab setting "cpu_enabled_mask=0". The cpu's 4GB of memory was also physically removed.