



# CINT2000 Result

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Compaq Computer Corporation  
AlphaServer GS320 Model 32 68/1001

SPECint\_rate2000 = 7.20  
SPECint\_rate\_base2000 = 6.51

SPEC license #: 2 | Tested by: Compaq NH | Test date: Jun-2001 | Hardware Avail: Jun-2001 | Software Avail: Aug-2001

Benchmark	Base Copies	Base Runtime	Base Ratio	Copies	Runtime	Ratio
164.zip	1	300	5.40	1	297	5.47
175.vpr	1	290	5.60	1	289	5.63
176.gcc	1	173	7.38	1	148	8.64
181.mcf	1	481	4.34	1	353	5.91
186.crafty	1	124	9.32	1	124	9.32
197.parser	1	445	4.69	1	347	6.02
252.eon	1	163	9.26	1	159	9.49
253.perlbnk	1	298	7.02	1	285	7.34
254.gap	1	356	3.58	1	291	4.39
255.vortex	1	253	8.73	1	223	9.88
256.bzip2	1	248	7.03	1	232	7.51
300.twolf	1	366	9.52	1	356	9.78

### Hardware

CPU: Alpha 21264C  
 CPU MHz: 1001  
 FPU: Integrated  
 CPU(s) enabled: 1 core, 1 chip, 1 core/chip  
 CPU(s) orderable: 1 to 32  
 Parallel: No  
 Primary Cache: 64KB(I)+64KB(D) on chip  
 Secondary Cache: 8MB off chip per CPU  
 L3 Cache: None  
 Other Cache: None  
 Memory: 16GB  
 Disk Subsystem: mfs (Memory File System)  
 Other Hardware: None

### Software

Operating System: Tru64 UNIX V5.1  
 +Patch Kit 2  
 Compiler: Compaq C V6.4-214-46B59  
 Program Analysis Tools V2.0  
 Spike V5.2 DTK (1.461 46B5P)  
 Compaq C++ V6.3-010-46B2F  
 File System: mfs  
 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.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: 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 -assume restricted\_pointers -all  
 -ldensemalloc -none +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.

Portability: gcc: -Dalloca=\_\_builtin\_alloca; crafty: -DALPHA  
perlbmk: -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 V5.1 Patches can be found at  
<http://ftpl.service.digital.com/public/unix/v5.1/>

Spike, and the Program Analysis Tools, are part of the Developers' Tool Kit Supplement, <http://www.tru64unix.compaq.com/dtk/>. The features used in this SPEC submission will be available at the web site as a beta kit in August, 2001, and as a production release in October, 2001. The C compiler for this SPEC submission has been



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available at the same location, as a production release, since May, 2001.

Sysconfigtab settings:

```
max_proc_per_user = 4096
max_threads_per_user = 4096
per_proc_data_size = 21474836480
max_per_proc_data_size = 21474836480
per_proc_address_space = 21474836480
max_per_proc_address_space = 21474836480
```