



# CINT2000 Result

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Compaq Computer Corporation  
AlphaServer ES40 Model 6/833

SPECint2000 = 565  
SPECint\_base2000 = 515

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

Benchmark	Reference Time	Base Runtime	Base Ratio	Runtime	Ratio
164.gzip	1400	358	391	353	397
175.vpr	1400	315	444	314	446
176.gcc	1100	186	590	166	662
181.mcf	1800	411	438	313	575
186.crafty	1000	146	686	146	686
197.parser	1800	502	358	407	442
252.eon	1300	196	662	191	679
253.perlbnk	1800	343	525	322	559
254.gap	1100	311	353	255	432
255.vortex	1900	272	699	244	779
256.bzip2	1500	279	537	258	582
300.twolf	3000	441	681	432	694

### Hardware

CPU: Alpha 21264B  
 CPU MHz: 833  
 FPU: Integrated  
 CPU(s) enabled: 1 core, 1 chip, 1 core/chip  
 CPU(s) orderable: 1 to 4  
 Parallel: No  
 Primary Cache: 64KB(I)+64KB(D) on chip  
 Secondary Cache: 8MB off chip per CPU  
 L3 Cache: None  
 Other Cache: None  
 Memory: 4GB  
 Disk Subsystem: 1x18GB  
 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: AdvFS  
 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.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: 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  
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 V5.1 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



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## Notes/Tuning Information (Continued)

October, 2001. The C compiler for this SPEC submission has been available at the same location, as a production release, since May, 2001.