### Hardware
- **CPU Name:** Dual-Core Intel Itanium 2 9050
- **CPU Characteristics:** 1.6GHz/24MB, 400MHz FSB
- **CPU MHz:** 1600
- **FPU:** Integrated
- **CPU(s) enabled:** 2 cores, 1 chip, 2 cores/chip
- **CPU(s) orderable:** 1-4 chips
- **Primary Cache:** 16 KB I + 16 KB D on chip per core
- **Secondary Cache:** 1 MB I + 256 KB D on chip per core

### Software
- **Operating System:** HPUX11i-TCOE B.11.23.0609
- **Compiler:** HP C/aC++ Developer's Bundle C.11.23.12
- **Auto Parallel:** No
- **File System:** vxfs
- **System State:** Multi-user
- **Base Pointers:** 32-bit
- **Peak Pointers:** 32-bit
- **Other Software:** None

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**SPECfp<sup>©</sup>2006** = 16.8

**SPECfp<sub>base</sub>2006** = 16.0

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**Hewlett-Packard Company**

**HP Integrity rx4640 (1.6GHz/24MB Dual-Core Intel Itanium 2)**

- **CPU2006 license:** 03
- **Test sponsor:** Hewlett-Packard Company
- **Tested by:** Hewlett-Packard Company

**Test date:** Sep-2006

**Hardware Availability:** Sep-2006

**Software Availability:** Sep-2006

---

### Benchmark Results

<table>
<thead>
<tr>
<th>Benchmark</th>
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<tr>
<td>410.bwaves</td>
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<tr>
<td>416.gamess</td>
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<td>437.leslie3d</td>
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**SPECfp<sub>base</sub>2006 = 16.0**

**SPECfp2006 = 16.8**

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*Continued on next page*
**Hewlett-Packard Company**

HP Integrity rx4640 (1.6GHz/24MB Dual-Core Intel Itanium 2)

**SPECfp2006** = **16.8**  
**SPECfp_base2006** = **16.0**

**CPU2006 license:** 03  
**Test sponsor:** Hewlett-Packard Company  
**Tested by:** Hewlett-Packard Company  
**Test date:** Sep-2006  
**Hardware Availability:** Sep-2006  
**Tested by:** Hewlett-Packard Company  
**Software Availability:** Sep-2006

- **L3 Cache:** 12 MB I+D on chip per core  
- **Other Cache:** None  
- **Memory:** 32 GB (16x2GB DIMMs)  
- **Disk Subsystem:** 36GB 15K RPM SCSI  
- **Other Hardware:** None

### Results Table

<table>
<thead>
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<th>Seconds</th>
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<th>Seconds</th>
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</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

### Operating System Notes

The system had the September 2006 HP-UX 11i v2 Technical Computing Operating Environment (TCOE) and compilers installed, along with the following patches:

- PHSS_34858 linker + fdp cumulative patch
- PHSS_34853 Math Library Cumulative Patch
- PHSS_34854 Integrity Unwind Library
- PHSS_34855 HP C Compiler (A.06.12)
- PHSS_34856 aC++ Compiler (A.06.12)
- PHSS_34857 u2comp/be/plugin library patch
- PHSS_34395 FORTRAN I/O Library [libIO77]
- PHSS_34397 FORTRAN Intrinsics [libF90 B.11.23.17]
- PHSS_34399 Fortran Product Patch, v3.1 to v3.1.1
- PHKL_34020 Perfmon enhancements and Itanium Dual-Core

Continued on next page
# SPEC CFP2006 Result

## Hewlett-Packard Company

HP Integrity rx4640 (1.6GHz/24MB Dual-Core Intel Itanium 2)

<table>
<thead>
<tr>
<th>SPECfp2006</th>
<th>16.8</th>
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</thead>
<tbody>
<tr>
<td>SPECfp_base2006</td>
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</table>

- **CPU2006 license:** 03
- **Test sponsor:** Hewlett-Packard Company
- **Tested by:** Hewlett-Packard Company
- **Test date:** Sep-2006
- **Hardware Availability:** Sep-2006
- **Software Availability:** Sep-2006

### Operating System Notes (Continued)

The following kernel tunables were set, in addition to the defaults set by the Technical Computing OE:

- `dbc_max_pct=20`
- `dbc_min_pct=20`
- `maxdsiz=3221225472`
- `maxssiz=401604608`

### Platform Notes

The "cpuconfig" EFI command was used prior to booting to deconfigure processors.

Although two cores were enabled during testing, the SPEC CPU2006 benchmarks used only one core.

### Base Compiler Invocation

- **C benchmarks:**
  
  `/opt/ansic/bin/cc -Ae`

- **C++ benchmarks:**
  
  `/opt/acc/bin/acc -Aa`

- **Fortran benchmarks:**
  
  `/opt/fortran90/bin/f90`

- **Benchmarks using both Fortran and C:**
  
  `/opt/ansic/bin/cc -Ae /opt/fortran90/bin/f90`

### Base Portability Flags

- 453.povray: `-DSPEC_CPU_NEED_INVHYP`
- 454.calculix: `-DSPEC_CPU_NOZMODIFIER`
- 481.wrf: `-DNOUNDERSCORE` `+noppu`

### Base Optimization Flags

- **C benchmarks:**
  
  `+O faster +Otype_safety=ansi -Wl,-a,archive_shared -Wl,+pd,64M -Wl,+pi,64M -Wl,-N`

- **C++ benchmarks:**
  
  `+O faster +Otype_safety=ansi -Wl,-a,archive_shared -Wl,+pd,64M -Wl,+pi,64M -Wl,-N`
SPEC CFP2006 Result

Hewlett-Packard Company
HP Integrity rx4640 (1.6GHz/24MB Dual-Core Intel Itanium 2)

SPECfp2006 = 16.8
SPECfp_base2006 = 16.0

CPU2006 license: 03  Test date: Sep-2006
Test sponsor: Hewlett-Packard Company  Hardware Availability: Sep-2006
Tested by: Hewlett-Packard Company  Software Availability: Sep-2006

Base Optimization Flags (Continued)

Fortran benchmarks:
+Ofaster -Wl,-a,archive_shared -Wl,+pd,64M -Wl,+pi,64M -Wl,-N

Benchmarks using both Fortran and C:
+Ofaster(-hp_cc) +Otype_safety=ansi -Wl,-a,archive_shared -Wl,+pd,64M
-Wl,+pi,64M +Ofaster(-hp_f90) -Wl,-N

Peak Compiler Invocation

C benchmarks:
/opt/ansic/bin/cc -Ae

C++ benchmarks:
/opt/aCC/bin/aCC -Aa

Fortran benchmarks:
/opt/fortran90/bin/f90

Benchmarks using both Fortran and C:
/opt/ansic/bin/cc -Ae /opt/fortran90/bin/f90

Peak Portability Flags

453.povray: -DSPEC_CPU_NEED_INVHYP
454.calculix: -DSPEC_CPU_NOZMODIFIER
481.wrf: -DNOUNDERSCORE +noppu

Peak Optimization Flags

C benchmarks:

433.milc: +Oprofile=collect:all(pass 1) +Oprofile=use(pass 2) +Ofaster
+Otype_safety=ansi -Wl,-a,archive_shared -Wl,+pd,64M
-Wl,+pi,64M +Onoparmsoverlap -Wl,-N

470.lbm: basepeak = yes

482.sphinx3: +Oprofile=collect:all(pass 1) +Oprofile=use(pass 2) +Ofaster
+Otype_safety=ansi -Wl,-a,archive_shared -Wl,+pd,64M
-Wl,+pi,64M +Onoparmsoverlap

Continued on next page
Peak Optimization Flags (Continued)

C++ benchmarks:

444.namd: basepeak = yes
447.dealII: basepeak = yes
450.soplex: +Oprofile=collect:all(pass 1) +Oprofile=use(pass 2) +Ofaster +Otype_safety=ansi -Wl,-a,archive_shared -Wl,+pd,64M -Wl,+pi,64M +Onoparmsoverlap -Wl,-N

453.povray: +Oprofile=collect:all(pass 1) +Oprofile=use(pass 2) +Ofaster +Otype_safety=ansi -Wl,-a,archive_shared -Wl,+pd,64M -Wl,+pi,64M

Fortran benchmarks:

410.bwaves: basepeak = yes
416.gamess: +Ofaster -Wl,-a,archive_shared -Wl,+pd,64M -Wl,+pi,64M +Odataprefetch=direct -Wl,-N

434.zeusmp: basepeak = yes
437.leslie3d: basepeak = yes
459.GemsFDTD: +Oprofile=collect:all(pass 1) +Oprofile=use(pass 2) +Ofaster -Wl,-a,archive_shared -Wl,+pd,64M -Wl,+pi,64M +Odataprefetch=direct -Wl,-N

465.tonto: +Oprofile=collect:all(pass 1) +Oprofile=use(pass 2) +Ofaster -Wl,-a,archive_shared -Wl,+pd,64M -Wl,+pi,64M +Odataprefetch=direct

Benchmarks using both Fortran and C:

435.gromacs: +Oprofile=collect:all(pass 1) +Oprofile=use(pass 2) +Ofaster(-hp_cc) +Otype_safety=ansi -Wl,-a,archive_shared -Wl,+pd,64M -Wl,+pi,64M +Onoparmsoverlap +Ofaster(-hp_f90)

436.cactusADM: basepeak = yes
454.calculix: basepeak = yes
481.wrf: basepeak = yes

The flags file that was used to format this result can be browsed at http://www.spec.org/cpu2006/flags/CPU2006_flags.20090715.06.html
SPEC CFP2006 Result

Hewlett-Packard Company

HP Integrity rx4640 (1.6GHz/24MB Dual-Core Intel Itanium 2)

SPECfp2006 = 16.8
SPECfp_base2006 = 16.0

CPU2006 license: 03
Test sponsor: Hewlett-Packard Company
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Test date: Sep-2006
Hardware Availability: Sep-2006
Software Availability: Sep-2006

You can also download the XML flags source by saving the following link:
http://www.spec.org/cpu2006/flags/CPU2006_flags.20090715.06.xml

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For other inquiries, please contact webmaster@spec.org.

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