

Appendix B

Test Equipment

For reference, we provide the details of the equipment used in the benchmarks of Chapters 5 and 6.

B.1 Computers

We use three different computers for our tests. They are categorized as a Pentium 4, a Pentium 3 and a MIPS 10000 computer. Their specifications are as follows, according to [HSU⁺01], [MPS02], and vendor web sites:

Processor type	Pentium 4	Pentium 3	MIPS 10000
Workstation	Dell PC	Delta PC	SGI Octane
Operating system	GNU/Linux Kernel version 2.4.18	GNU/Linux Kernel version 2.4.18	IRIX version 6.5
Clock rate	2400 MHz	800 MHz	175 MHz
Address space	32 bit	32 bit	64 bit
Integer pipeline stages	20	12	6
L1 data cache size	8 KB	16 KB	32 KB
L1 line size	128 Bytes	32 Bytes	32 Bytes
L1 associativity	4 way	4 way	2 way
L2 cache size	512 KB	256 KB	1024 KB
L2 line size	128 bytes	32 bytes	32 bytes
L2 associativity	8 way	4 way	2 way
TLB entries	128	64	64
TLB associativity	Full	4 way	Full
TLB miss handler	Hardware	Hardware	Software
Main memory	512 MB	256 MB	128 MB

B.2 Compilers

The following compilers were used to build the executables available as described in Appendix A and used in the tests of Chapters 5 and 6

- *GNU Compiler Collection* version 3.1.1. Common compiler flags:

```
-DNDEBUG -O6 -fomit-frame-pointer -funroll-loops -fthread-jumps -ansi  
-Wall -Winline -pedantic
```

- *Intel C++ Compiler* version 7.0. Common compiler flags:

```
-D NDEBUG -O3 -IPA -Ofast=ip30 -LANG:std -ansi -64 -mips4 -r10000
```

- *MIPS Pro C++ Compiler* version 7.3.1. Compiler flags:

```
-DNDEBUG -O3 -rcd -ipo -unroll -vec -w1
```

- *Microsoft Visual C++ Compiler* version 13.1. Compiler flags:

```
/Ox /Og /Oi /Ot /Oy /G6 /GA /D "WIN32" /D "NDEBUG" /D "_CONSOLE" /D  
"_MBCS" /GF /FD /EHsc /ML /arch:SSE /Za /Zc:forScope /Fo"Release/"  
/Fd"Release/vc70.pdb" /W4 /nologo /c /Wp64 /Zi /TP /wd4290
```

For compiling Windows executables, the WIN32 macro needs to be defined and when using PAPI, the PAPI macro is defined. When building Pentium 3 executables the flag `-march=pentium3` was used with the GCC and `-tpp6 -xiMK` with the Intel compiler. When building Pentium 4 executables, `-march=pentium4` and `-tpp7 -xiMKW` was used.

As discussed in Section 6.1.2, the TPIE library is not written in C++, so we had to use version 2.96 of the GCC to build the `ami_sort` executable.