Aktuelle Übersicht: (4/97)

Tabelle 1.4: RISC-CPUs im Vergleich zu Intel 80x86-CPUs

	MIPS 4400	SPARC SS20	DEC-Alpha	Intel Pentium P5	HP PA7100	IBM Power 6264	MIPS R4000SC	SPARC SS10	Intel 486DX2
Taktrate (MHz)	200	75	nom.200	66	100	62,5	100	40	66
# Pipelinestufen		4	7		5	6	8	4	5
max # Instr./Zyklus		3	2		2	4	1	3	1
Cache Instr.	16 KB	20 KB	8 KB	16 KB	—	32 KB	8 KB	20 KB	8 KB
Cache Data	16 KB	16 KB	8 KB	gemeinsam	—	—	8 KB	16 KB	gemeins.
max Durchsatz (MB/s)			3200		k.A.	1000	1200	960	1067
sek. Cache Instr.	1 MB	1 MB	32 MB	256 KB	1 MB	–	4 MB	2 MB	512 KB
sek. Cache Data	insges.	insges.	insges.	gemeinsam	2 MB	64 KB	insges.	gemeins.	gemeins.
max Durchsatz (MB/s)			1067	k.A.	1600	500	800	320	133
Bus-Taktrate (MHz)			67		67	62,5	50	40	33
Bus-Durchsatz (MB/s)	1200		1067		267	1000	400	320	133
SPECint92	140	125,8	69,6	64,5	80,0	59,2	61,7	53,2	32,2
SPECfp92	131	121,2	182,1	56,9	150,6	124,8	63,4	63,4	16,0
SPECint95		3,11			3,13			1,0	
SPECfp95		3,10			4,0			1,0	

Tabelle 1.5: 64 Bit RISC-CPUs

	UltraSPARC II	Ultra-SPARC I	MIPS R10000	DEC-alpha 21164	HP PA8200	IBM PowerPC 604e
Taktrate (MHz)	336	200	250	533	240	332
Cache Instr.	16 KB	16 KB	32 KB	8 KB	2 MB	32 KB
Cache Data	16 KB	16 KB	32 KB	8 KB	2 MB	32 KB
sek. Cache	4 MB	1 MB	4 MB	96 KB + 4 MB	—	256 KB
SPECint95	14,9	7,81	14,7	16,9	17,4	14,4
SPECfp95	37,6	10,4	62,5	56,7	28,5	12,6

Zum Vergleich:

Der MPC620 ist ein 64 Bit-Prozessor, der MPC604e hat zwar einen 64 Bit-Datenbus, aber nur einen 32 Bit-Adreßbus.

Tabelle 1.6: PC-Bussysteme und Durchsatzraten

	ISA	MCA 1.0	EISA	EISA EMB-133	VL-Bus	VL-Bus 64-bit	PCI 32	PCI 64
Datenbus-breite (bit)	16	32	32	64	32	64	32	64
Taktrate (MHz)	8	4	8	8	33	50	33	33
Bus-Durchsatz (MB/s)	8	16	33	125	75	160	117	234

Tabelle 1.7: RISC PC-CPUs: PowerPC (Apple und IBM)

	MPC620	PowerPC „G3“	MPC604e	MPC604	MPC603e	MPC603	MPC601
Taktrate (MHz)	∼133	250	332	166	200 ... 240	66/80	50/60/66/80
Cache Instr.	32 KB	32 KB	32 KB		16 KB	8 KB	32 KB
Cache Data	32 KB	32 KB	32 KB		16 KB	8 KB	gemeins.
sek. Cache	1 ... 128 MB	256 ... 1024 KB	256 KB		1 MB	1 MB	1 MB
SPECint92	∼225					∼60/75	∼62 ... 85
SPECfp92	∼300					∼70/85	∼72 ... 105
SPECint95	∼5,6	∼10	14,4	5,2	7,1		
SPECfp95	∼5,6		12,6	4,3	4,2		

Tabelle 1.8: CISC PC-CPUs: i80x86

	i486DX2	i486DX4	Pentium	Pentium	Pentium	Pentium MMX	PentiumPro
Taktrate (MHz)	66	100	100	133	200	200	200
Cache Instr.	8 KB	16 KB	8 KB	8 KB	8 KB	8 KB	8 KB
Cache Data	gemeins.	gemeins.	8 KB	8 KB	8 KB	8 KB	8 KB
sek. Cache	256 KB	256 KB	512 KB	512 KB	512 KB	512 KB	512 KB
SPECint92	32,2	51,4	100,0				
SPECfp92	16,0	26,6	80,6				
SPECint95			3.05	4,1	5,5	6,41	8,58
SPECfp95			2,07	2,5	3,92	4,66	6,48

Tabelle 1.9: CISC PC-CPUs: i80x86 (Forts.)

	Pentium II	„Deschutes“
	MMX, AGP, SDRAM	MMX, AGP
Taktrate (MHz)	333	300 ...
Cache Instr.	16 KB	
Cache Data	16 KB	
sek. Cache	512 KB	
SPECint95	12,8	∼12
SPECfp95	9,25	∼10

MMX („matrix manipulation extensions“) stellt eine Erweiterung des Befehlssatzes für Bild/Audio/Video zu Lasten der FloatingPoint-Befehle dar.
Der PentiumPro (P6) ist intern ein RISC-Prozessor mit eingebautem „CISC-RISC translator“ (Kompatibilität!). Für den Pentium II wird ein schnelleres Motherboard mit SDRAM („synchr. dyn. RAM“) benötigt; die Graphikkarte wird aus Geschwindigkeitsgründen nicht mehr über den PCI-Bus sondern über den dedizierten AGP („accelerated graphics ports“) angeschlossen.

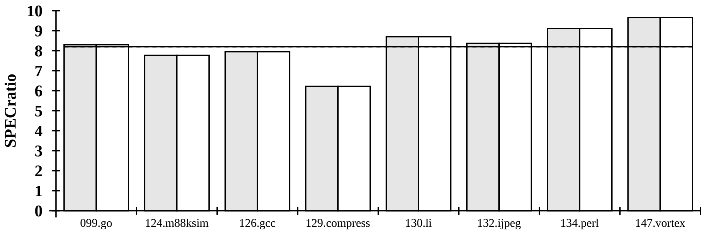
Aktuelle Daten entnehme man dem WWW:
`http://www.specbench.org`, `http://www.ibm.org`, `http://www.intel.com`, ...

Eine Präsentation Intels vom 24. März 1997 enthält etwa folgende interessante Pentium II Informationen:
`http://www.intel.com/intel/march24/foils/yu/sld001.htm`

SPEC CINT95 Results

Dell Computer Corporation Dell Dimension XPS Pro200n	SPECint95 = 8.20 SPECint_base95 = 8.20

SPEC license # 14	Tested By: Intel	Test Date: May-96	Hardware Avail: Jun-96	Software Avail: Mar-96



Hardware/Software Configuration for:
Dell Dimension XPS Pro200n

Hardware

Model Name: XPS
CPU: 200MHz Pentium Pro processor
FPU: Integrated
Number of CPU(s): 1
Primary Cache: 8KBI+8KBD
Secondary Cache: 256KB(I+D)
Other Cache: None
Memory: 64MB(EDO)
Disk Subsystem: 1MB IDE Quantum Fireball
Other Hardware: Integrated EIDE disk controller

Software

Operating System: UnixWare 2.0, UnixWare SDK
Compiler: Intel C Reference Compiler V2.3
File System: UFS
System State: Single User

Benchmark # and Name	Reference Time	Base Run Time	Base SPEC Ratio	Run Time	SPEC Ratio
099.go	4600	554	8.30	554	8.30
124.m88ksim	1900	244	7.77	244	7.77
126.gcc	1700	214	7.95	214	7.95
129.compress	1800	289	6.22	289	6.22
130.li	1900	218	8.70	218	8.70
132.ijpeg	2400	287	8.37	287	8.37
134.perl	1900	209	9.11	209	9.11
147.vortex	2700	280	9.66	280	9.66
SPECint_base95 (G. Mean)			8.20		
		SPECint95 (G. Mean)			8.20

Notes/Tuning Information

```
Base and peak flags are the same and use Feedback Directed Optimization
Pass1: -tp p6 -ipo  -prof_gen -ircdb_dir /proj/tmp/IRCDB
Pass2: -tp p6 -ipo  -prof_use -ircdb_dir /proj/tmp/IRCDB
-ircdb_dir is a location flag and not an optimization flag
Portability: 124: -DSYSV -DLEHOST 130, 134, 147: -lm  132: -DSYSV  126: -lm -lc -L/usr/ucblib -lucb -lmalloc
```

For More Information Contact: SPEC, 10754 Ambassador Drive, Suite 201, Manassas, VA 22110, (703) 331-0180, info@specbench.org, http://www.specbench.org

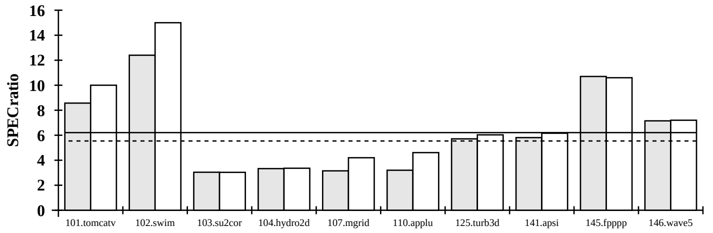
-- Prepared By: --

SPEC CFP95 Results

Dell Computer Corporation
Dell Dimension XPS Pro200n

SPECfp95	=	6.21
SPECfp_base95	=	5.54

SPEC license #	14	Tested By:	Intel	Test Date:	May-96	Hardware Avail:	Jun-96	Software Avail:	Mar-96



Hardware/Software Configuration for:
Dell Dimension XPS Pro200n

Hardware

Model Name:	XPS
CPU:	200MHz Pentium Pro processor
FPU:	Integrated
Number of CPU(s):	1
Primary Cache:	8KBI+8KBD
Secondary Cache:	256KB(I+D)
Other Cache:	None
Memory:	64MB(EDO)
Disk Subsystem:	1MB IDE Quantum Fireball
Other Hardware:	Integrated EIDE disk controller

Software

Operating System:	UnixWare 2.0, UnixWare SDK
Compiler:	Intel C/FORTRAN Reference Compiler V2.3
File System:	UFS
System State:	Single User

Benchmark # and Name	Reference Time	Base Run Time	Base SPEC Ratio	Run Time	SPEC Ratio
101.tomcatv	3700	432	8.57	369	10.0
102.swim	8600	695	12.4	572	15.0
103.su2cor	1400	461	3.04	462	3.03
104.hydro2d	2400	720	3.33	715	3.36
107.mgrid	2500	793	3.15	595	4.20
110.applu	2200	687	3.20	478	4.61
125.turb3d	4100	718	5.71	679	6.03
141.apsi	2100	361	5.81	341	6.16
145.fpppp	9600	901	10.7	902	10.6
146.wave5	3000	420	7.15	417	7.20
SPECfp_base95 (G. Mean)			5.54		
		SPECfp95 (G. Mean)			6.21

Notes/Tuning Information

```
Flags: Base: -tp p6 -ipo -pc 64 -mem
Peak:
101: -tp p6 -ipo -mem -pad -distype -fcon -pc 64
102: -tp p6 -ipo -pad -fcon -pc 64
103: Pass1: -tp p6 -prof_gen -ircdb_dir /proj/tmp/IRCDB
Pass2: -tp p6 -ip -mem -mil1 -pad -fcon -pc 64 -prof_use -ircdb_dir /proj/tmp/IRCDB
104: Pass1: -tp p6 -prof_gen -ircdb_dir /proj/tmp/IRCDB
Pass2: -tp p6 -ip -mem -mil1 -pc 64 -prof_use -ircdb_dir /proj/tmp/IRCDB
107: -tp p6 -pad -fcon -pc 64
110: -tp p6 -ipo -mem -mP2OPT_opt_bblock_stat_limit=10000 -pc 64
125: -tp p6 -ip -mem -mil1 -pad -fcon -pc 64
141: Pass1: -tp p6 -w -prof_gen -ircdb_dir /proj/tmp/IRCDB
Pass2: -tp p6 -pc 64 -prof_use -ircdb_dir /proj/tmp/IRCDB
145: -tp p6 -ipo  -pc 64
146: Pass1: -tp p6 -prof_gen -ircdb_dir /proj/tmp/IRCDB
Pass2: -tp p6 -ipo -mem -pad -distype -pc 64 -prof_use -ircdb_dir /proj/tmp/IRCDB
```

For More Information Contact:
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10754 Ambassador Drive, Suite 201
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info@specbench.org
http://www.specbench.org

Tabelle 1.10: Marktallianzen im RISC-Bereich

Das HP-PRO-Lager: HP PA (Power Architecture)

- HP
- Hitachi
- Mitsubishi
- Hughes
- Oki
- Yokogawa
- Prime
- Convex
- Sequoia

Das Sparc-Lager (unter anderem): SPARC

- Sun Microsystems
- Amdahl
- Cray
- Fujitsu
- ICL
- Solbourne
- Toshiba
- Xerox
- Matsushita
- Tadpole Technology
- Goldstar
- Hyundai
- Tatung
- Force Computers
- LSI Logic
- Tulip Computers
- Meiko

Das Motorola-Lager (88-Open unter anderem): 88000 (siehe auch Power-PC)

- Motorola
- Data General
- Omron
- Encore Computer
- Dolphin Server Technology
- Sanyo/Icon International Inc.
- Cetia (Thomson CSF)
- Harris Computer Systems Division
- McDonnell Douglas Information Systems
- Micro Focus
- Philips Information Systems
- SAS Institute
- Tadpole Technology
- Unify
- Wordperfect
- Oracle
- Unix International

Das Power-Open-Lager: POWER (siehe auch Power-PC)

- IBM
- Apple
- Bull HN Information Systems Inc.
- Harris Corp.
- Motorola
- Tadpole Technology
- Thomson CSF

Das Digital-Lager: Alpha

- DEC
- Kubota
- Olivetti
- Raytheon
- Encore Computer
- Advanced Computer Research International
- Carrera Computers
- Cray Research

Das Mips-Lager (unter anderem): MIPS

- Silicon Graphics (Mips)
- DEC
- Pyramid
- SNI
- Siemens
- Olivetti
- Tandem
- NEC
- Sony
- AT&T
- Sumitomo
- Control Data
- Microsoft
- LSI Logic
- Integrated Device Technology
- Toshiba
- Acer
- Carrera Computers

Intel: (i860)

- PentiumPro (nur im Kern ?!)

Das Power-PC-Lager: POWER-PC

- IBM
- Apple
- ASI
- Bull HN Information Systems Inc.
- Canon
- Ford (für den Einsatz in Kraftfahrzeugen)
- Harris Corp.
- Motorola
- Peacock
- Tadpole Technology
- Taiwan New PC Consortium (24 Hersteller)
- Thomson CSF
- Vobis