Appendix

Reference Characteristics								
Trace	Refs (millions)	Inst	Locks	Data	Private Read	Private Write	Shared Read	Shared Write
		(fraction of all references)						
arc3d	20.0	0.652	0.002	0.346	0.051	0.052	0.187	0.057
bmk1	20.0	0.740	0.000	0.260	0.119	0.089	0.052	0.001
bmk11a	20.0	0.550	0.003	0.447	0.029	0.014	0.264	0.140
flo82	20.0	0.626	0.004	0.370	0.042	0.035	0.217	0.077
lapack	20.0	0.760	0.001	0.239	0.106	0.036	0.050	0.048
simple	20.0	0.649	0.003	0.348	0.048	0.022	0.212	0.066
wake	20.0	0.600	0.001	0.399	0.078	0.078	0.186	0.058
mp3d	7.0	0.607	0.000	0.393	0.258	0.029	0.073	0.033
p-thor	7.1	0.497	0.000	0.503	0.314	0.103	0.081	0.006
locus route	7.7	0.514	0.000	0.486	0.336	0.118	0.031	0.001
fft64	7.4	0.420	0.002	0.578	0.324	0.118	0.068	0.068
weather64	31.4	0.430	0.079	0.491	0.395	0.076	0.019	0.000
speech64	11.8	0.000	0.000	1.000	0.342	0.201	0.441	0.016
Arithmetic Averages								
Ardent	20.0	0.654	0.002	0.344	0.067	0.046	0.167	0.064
VAX T-bit	7.3	0.538	0.000	0.462	0.304	0.085	0.061	0.013
MIT	19.4	0.428	0.064	0.508	0.382	0.085	0.028	0.013

Table A-1: Reference characteristics

This table lists the total number of references in each trace, along with the fraction of instruction, synchronization, private-read, private-write, shared-read, and shared-write references. A reference is a *shared* reference if it accesses data used by more than one processor during the trace. Averages for the MIT workload do not include *speech64*, as speech64 contains no instruction references due to limitations in the Mul-T tracing environment.

Address Space Breakdown							
Trace	Total Kbytes	Inst Kbytes	Data Kbytes	*Percent (%) of Data Bytes*			
				Private Read	Private Write	Shared Read	Shared Write
arc3d	1712.3	64.4	1647.9	0.1	36.1	2.4	61.4
bmk1	110.2	3.8	106.4	0.6	77.5	0.0	21.9
bmk11a	364.4	11.4	353.0	0.0	11.9	0.0	88.1
flo82	240.4	82.7	157.7	2.4	30.0	3.3	64.3
lapack	4413.2	0.8	4414.5	0.0	25.9	0.0	74.1
simple	228.7	51.7	177.0	0.3	4.9	5.4	89.4
wake	183.2	18.3	165.0	0.1	3.3	5.1	91.5
mp3d	449.1	3.1	446.0	43.7	46.8	1.4	8.1
p-thor	435.5	3.7	431.8	48.9	27.5	12.0	11.6
locus route	174.8	7.1	167.7	20.8	53.7	17.3	8.2
fft64	132.5	2.7	129.8	0.5	2.4	0.0	97.1
speech64	479.9	0.0	479.9	2.3	49.4	36.8	11.5
weather64	2518.1	2.2	2515.9	23.9	64.3	11.8	0.0
Geometric Averages							
Ardent	437.3	15.0	385.2	0.0	17.0	0.0	64.5
VAX T-bit	324.6	4.3	318.5	35.4	41.0	6.6	9.2
MIT	543.0	0.0	539.1	2.9	19.7	0.0	0.0
Arithmetic Averages							
Ardent	1036.1	33.3	1003.0	0.1	27.4	1.0	71.5
VAX T-bit	353.1	4.6	348.5	42.2	39.9	8.3	9.6
MIT	1043.5	1.6	1041.9	19.6	59.5	15.1	5.8

Table A-2: Address space breakdown in kilobytes

This table lists total, instruction, and data address space in kilobytes. Data space is also broken down (percentages) into Private Read, Private Write, Shared Read, and Shared Write categories. Shared data is defined as data referenced by more than one processor during the course of the trace. Write data is defined as data written during the trace. The address space was measured using a block size of 4 bytes.

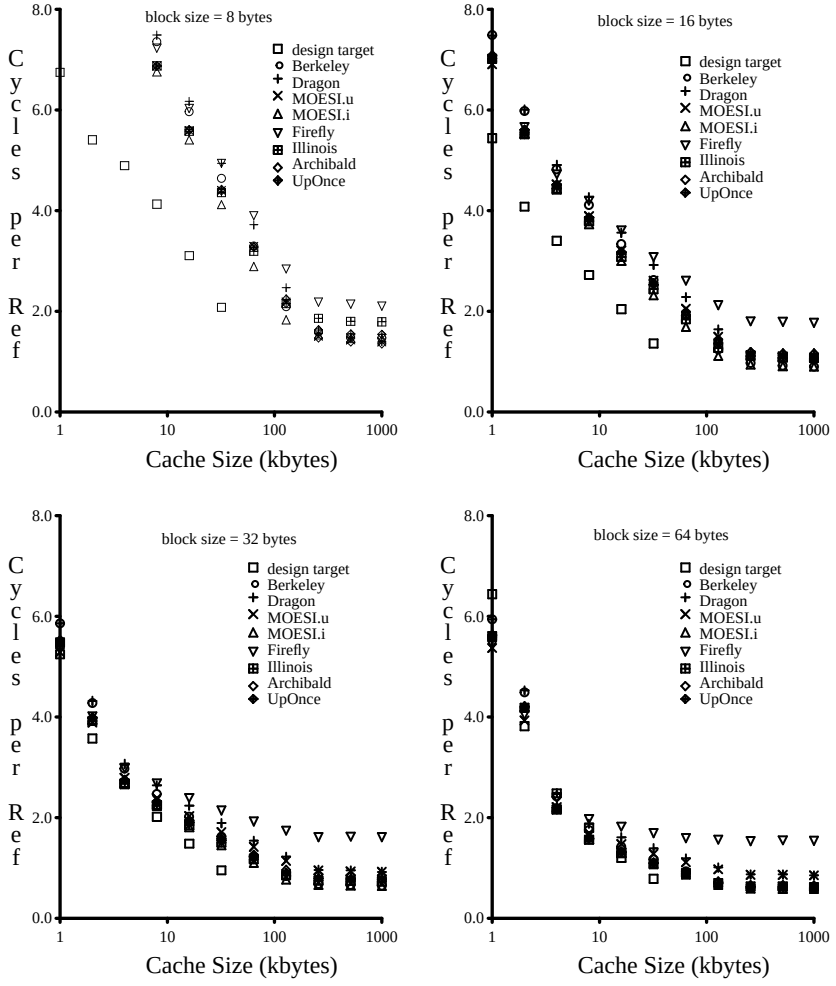

Figure A-1. Vector workload bus cycles.
(snooping-caches, 30 cycle memory latency)

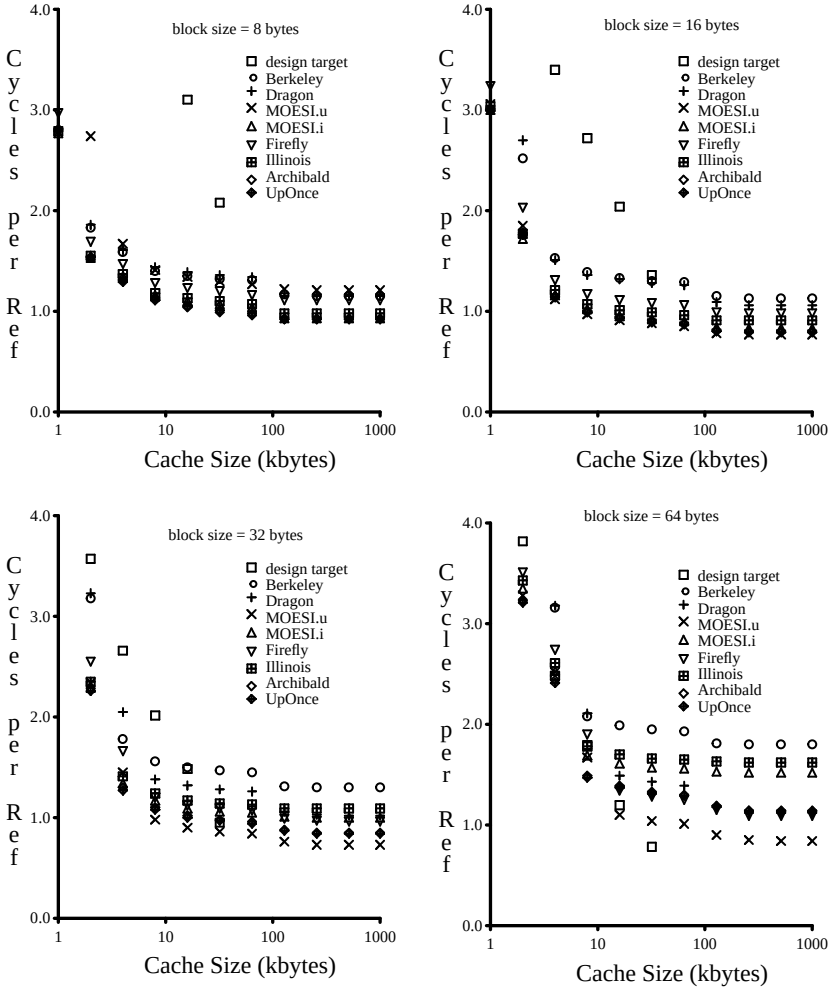

Figure A-2. Scalar workload bus cycles
(snooping-caches, 30 cycle memory latency)

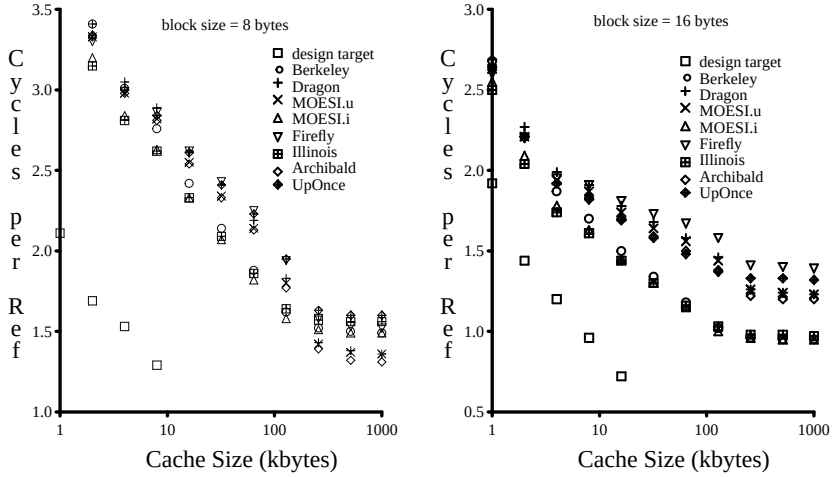

Figure A-3. Vector workload bus cycles.
(directory implementation, 8 cycle memory latency)

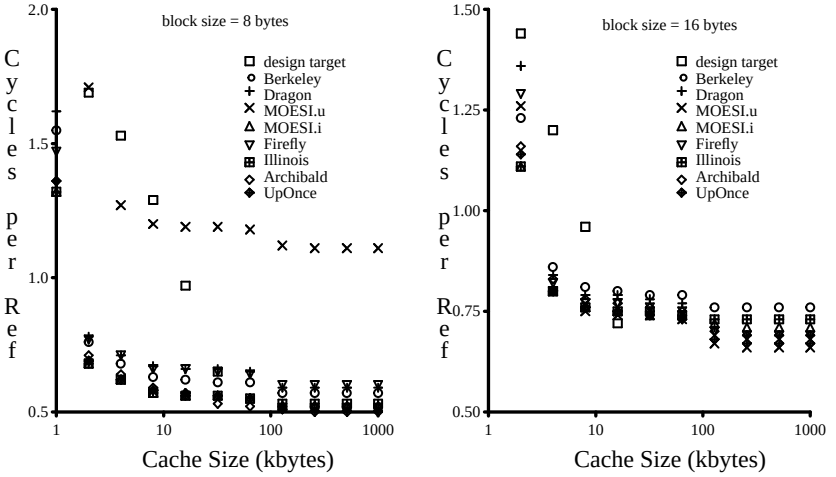

Figure A-4. Scalar workload consistency cycles.
(directory implementation, 8 cycle memory latency)

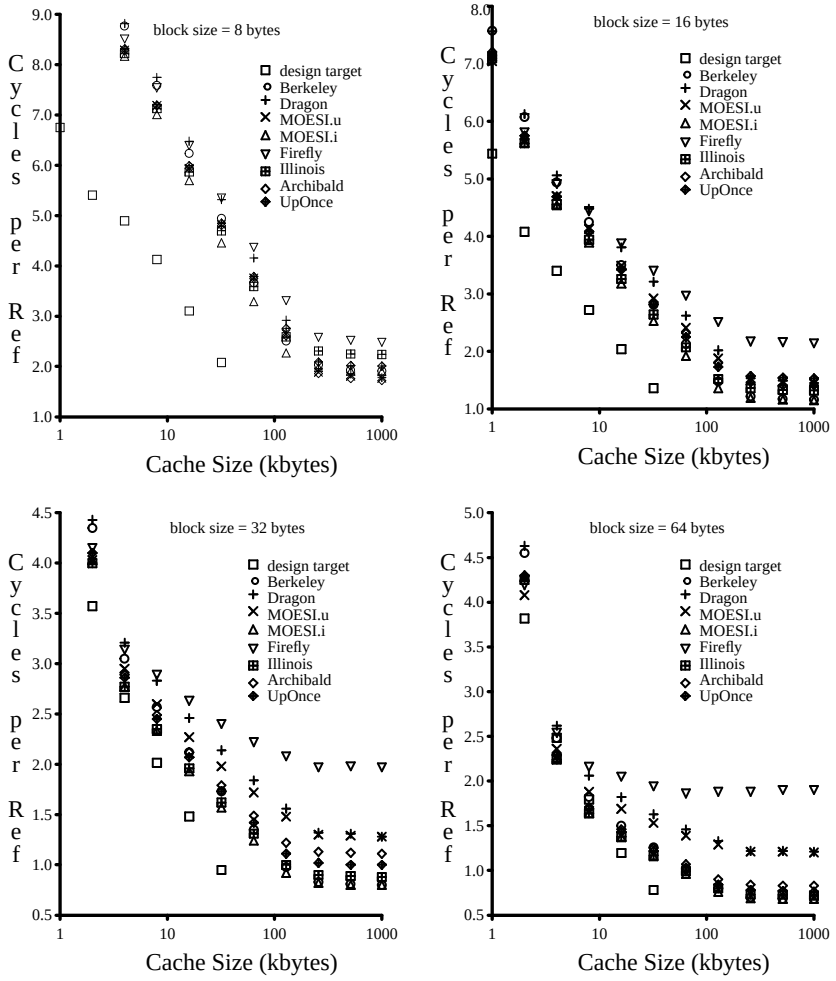

Figure A-5. Vector workload bus cycles.
(directory implementation, 30 cycle memory latency)

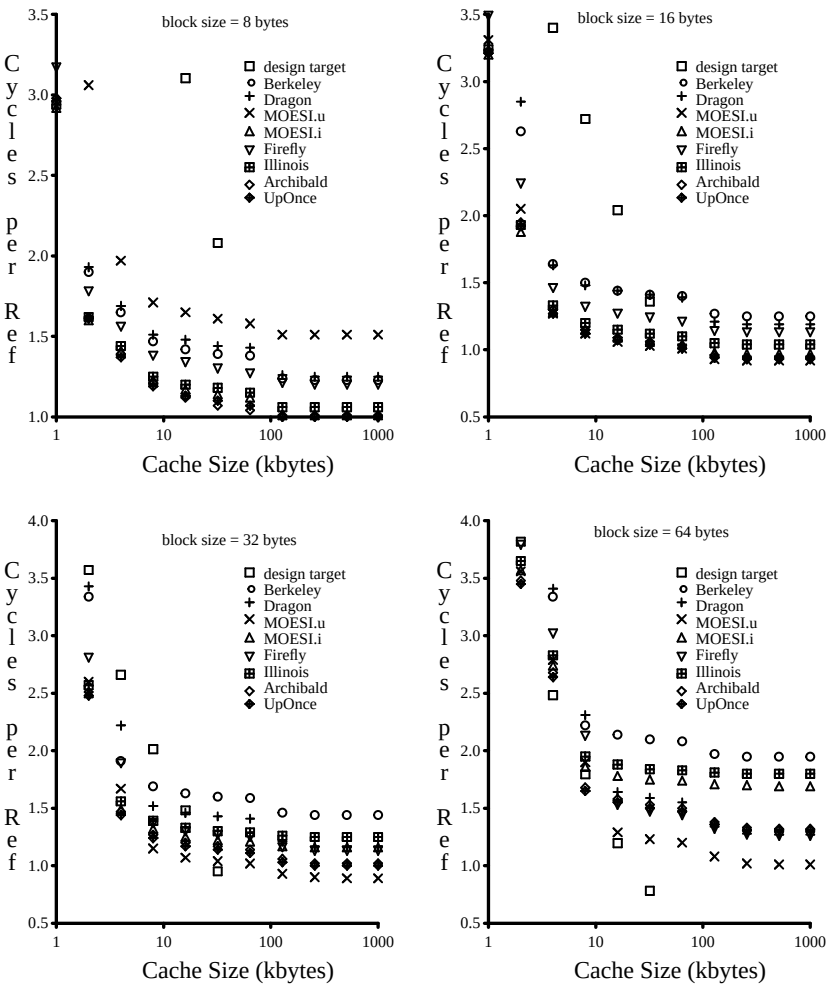

Figure A-6. Scalar workload bus cycles.
(directory implementation, 30 cycle memory latency)

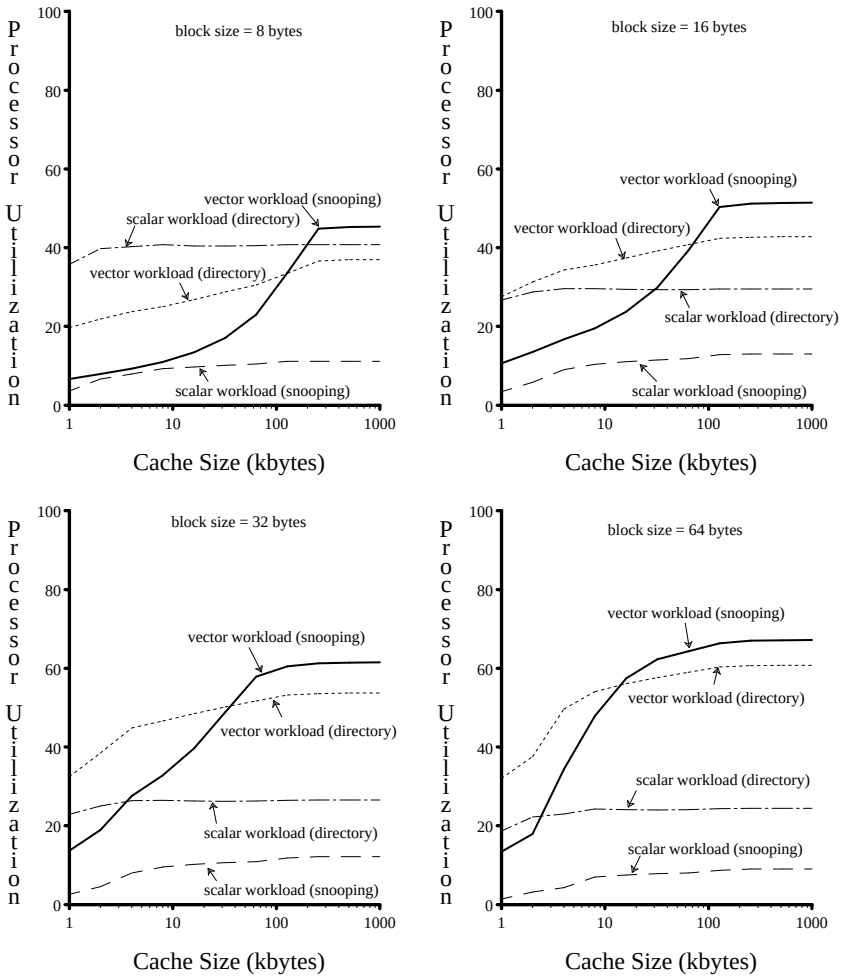

Figure A-7. Processor utilizations (%) for the UpOnce protocol. Results are provided for both workloads in snooping and directory environments. Memory latency is 30 cycles.