B

Experimental Comparison of Quality of service Systems

Figures B.1 to B.22 depict the results obtained for the various experiments of Chapter 8. The average and the 95% confidence interval are marked in the figures. *s_TCP* stands for short-lived TCP flows and *l_TCP*, for long-lived TCP connections respectively. *CBR* stands for constant bit-rate and *VBR* for variable bit-rate traffic. The abbreviations for the different Quality of service (QoS) systems are listed in Table B.1.

Table B.1 Abbreviations for the Different Quality of service Systems

QoS System	Abbreviation	Parameters
Intserv	$IS - \alpha_{GS}$	α_{GS} = Maximum proportion of the link resources available for the guaranteed service class
Standard Diffserv	$sDS - bb - p$	bb = Bandwidth broker type (c = central, d = decentral, n = none) p = Bandwidth broker parameters for the central BB: p = Overbooking factor ob for the decentral BB: p = Overbooking factor times scaling factor ($ob \cdot \gamma$)
Olympic Diffserv	$oDS - bb - p$	bb = Bandwidth broker type (c = central, d = decentral, n = none) p = Bandwidth broker parameters, same as above
Best-Effort	$BE - OF$	OF = Overprovisioning factor

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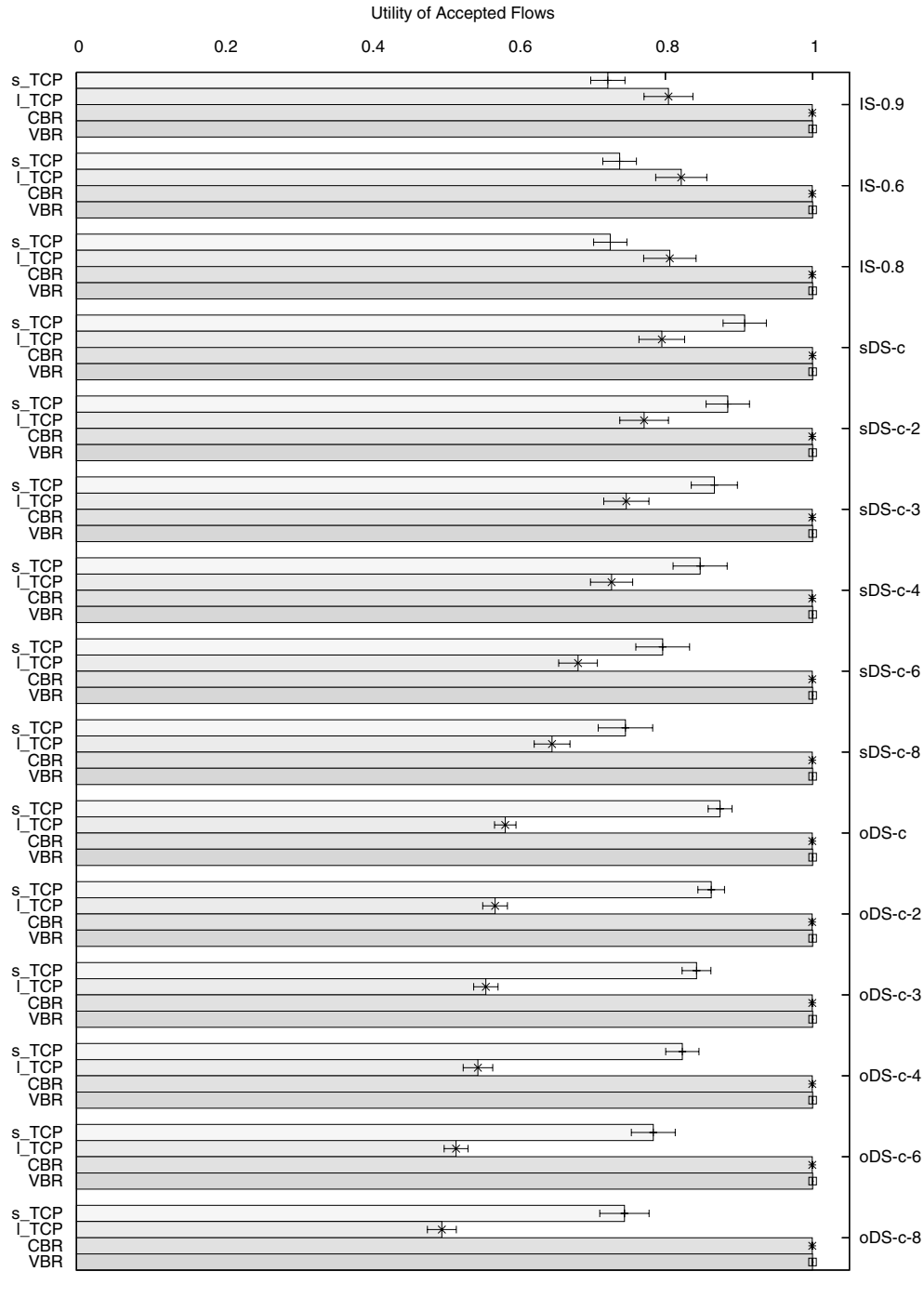

Figure B.1 Per-flow versus Per-class Scheduling, DFN Topology, Utility of the Accepted Flows

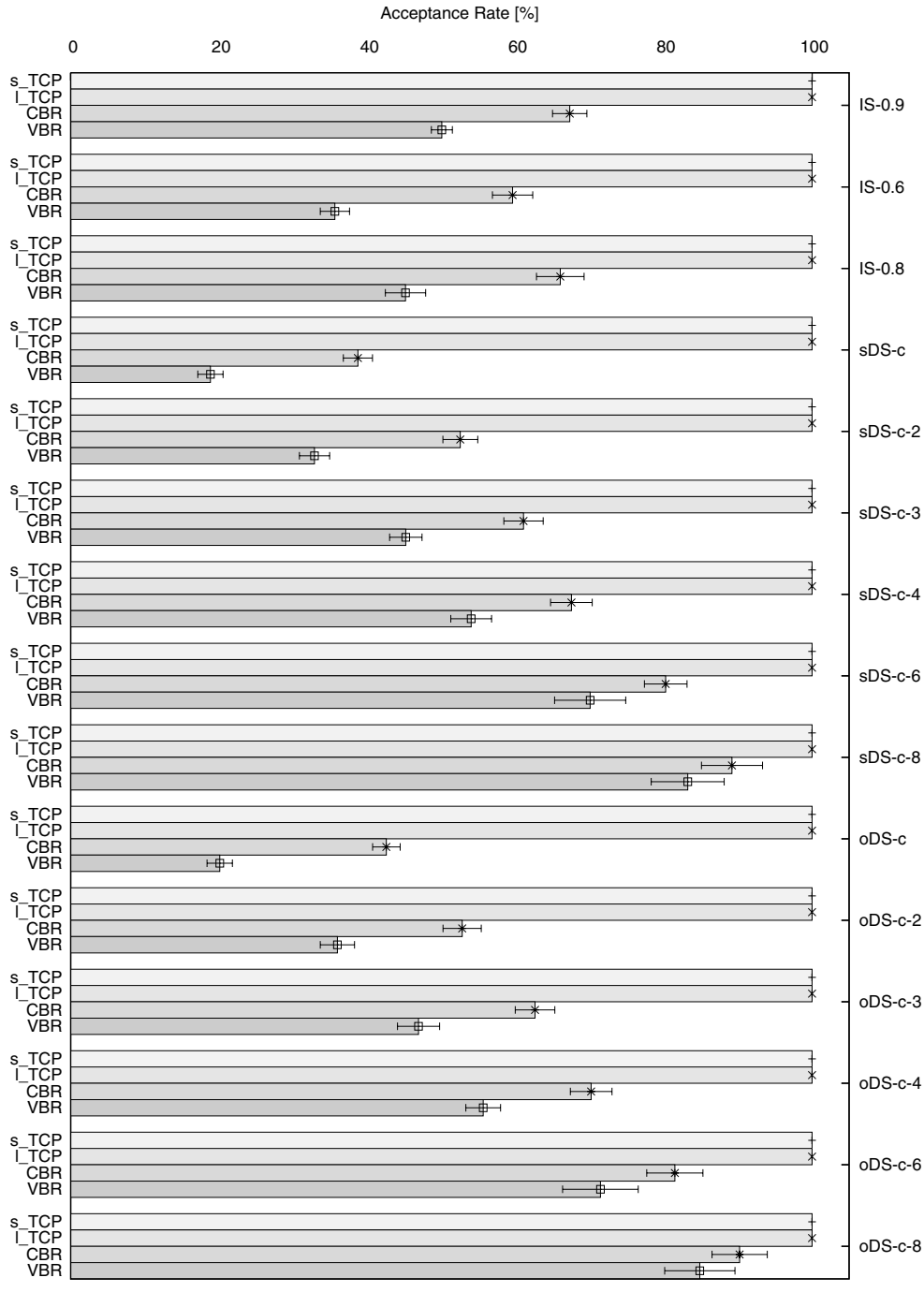

Figure B.2 Per-flow versus Per-class Scheduling, DFN Topology, Acceptance Rate

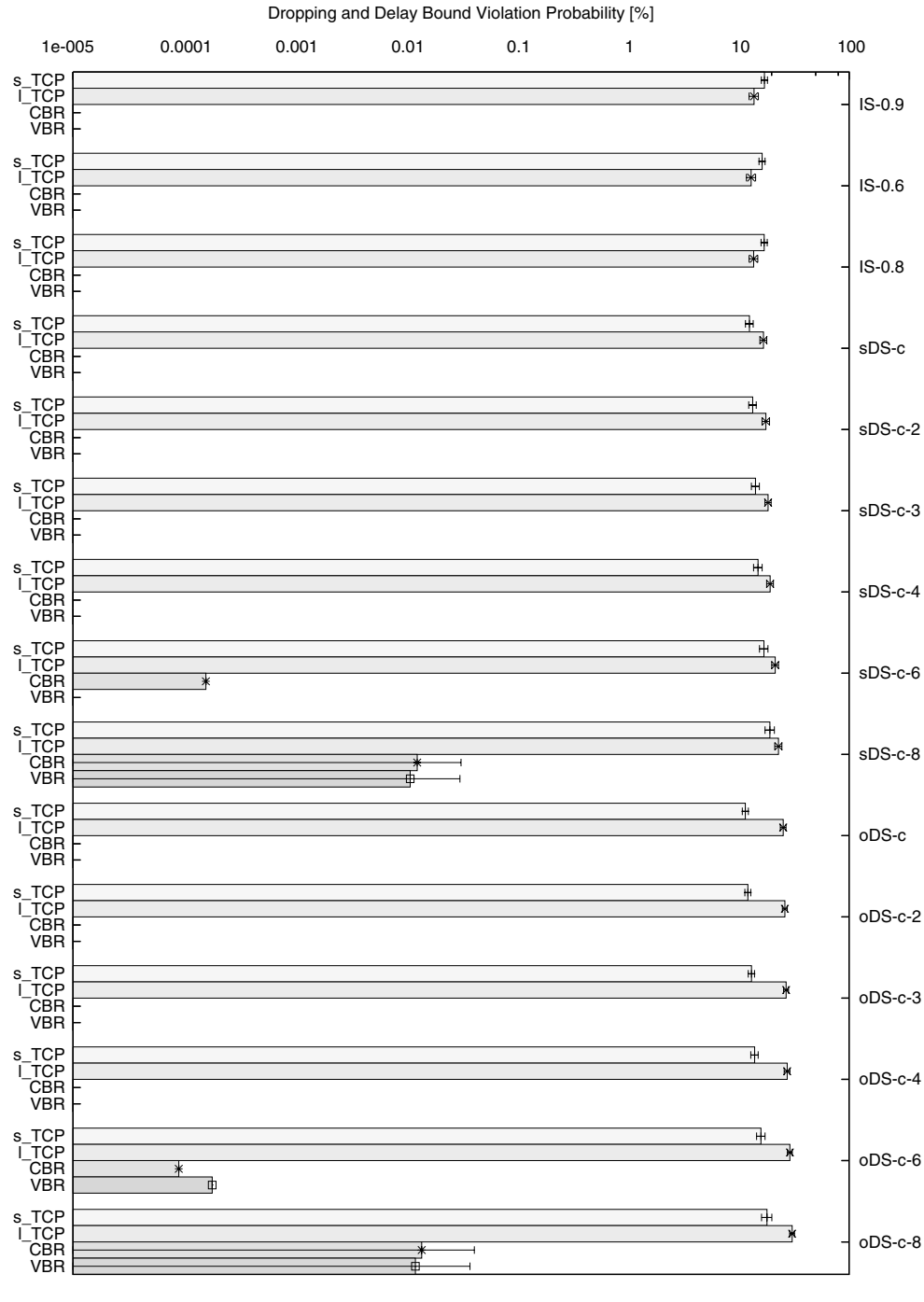

Figure B.3 Per-flow versus Per-class Scheduling, DFN Topology, Dropping and Delay Bound Violation Probability

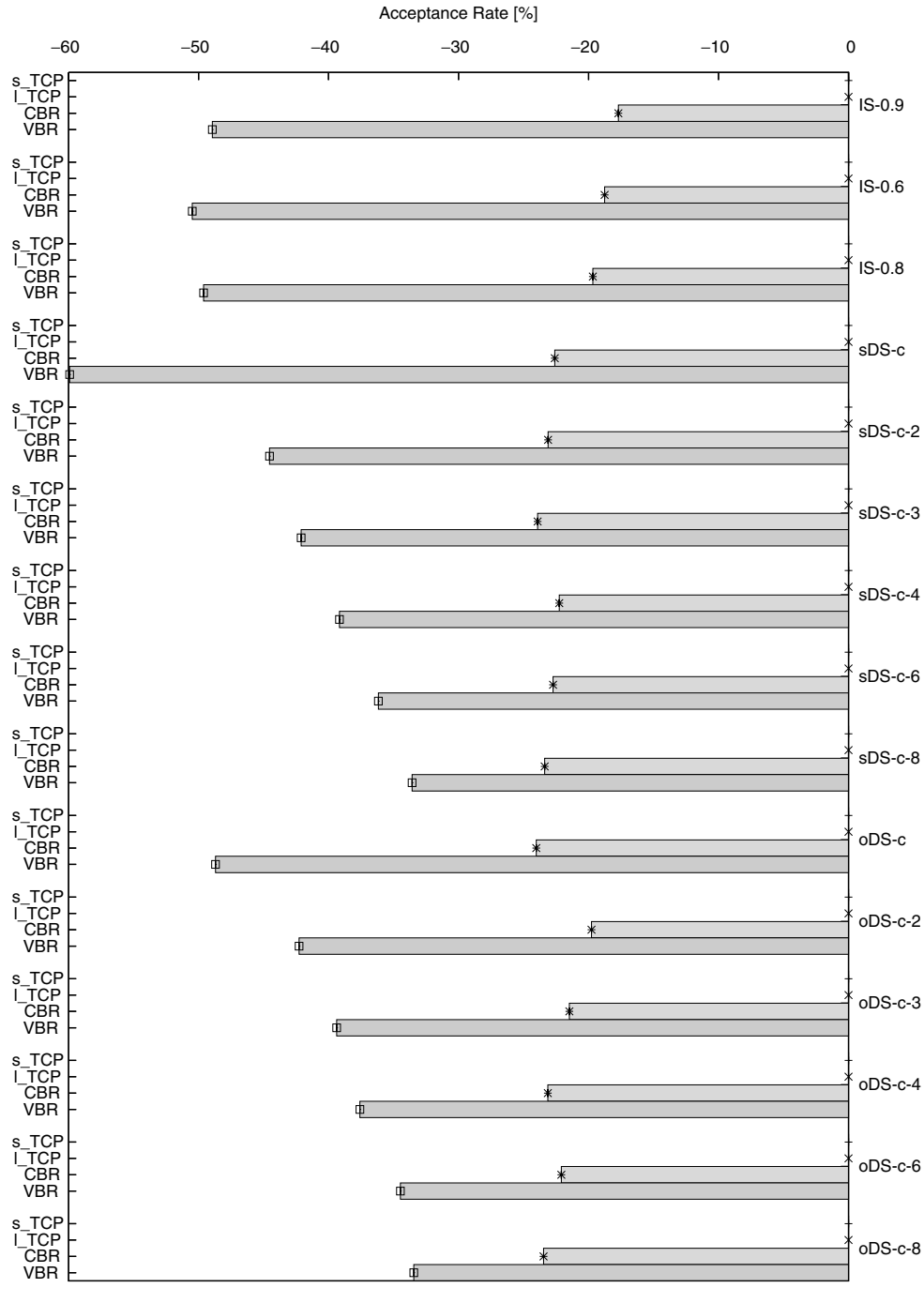

Figure B.4 Per-flow versus Per-class Scheduling, DFN Topology, Change of the Acceptance Rate when Decreasing the Delay Bound to 10 ms/hop

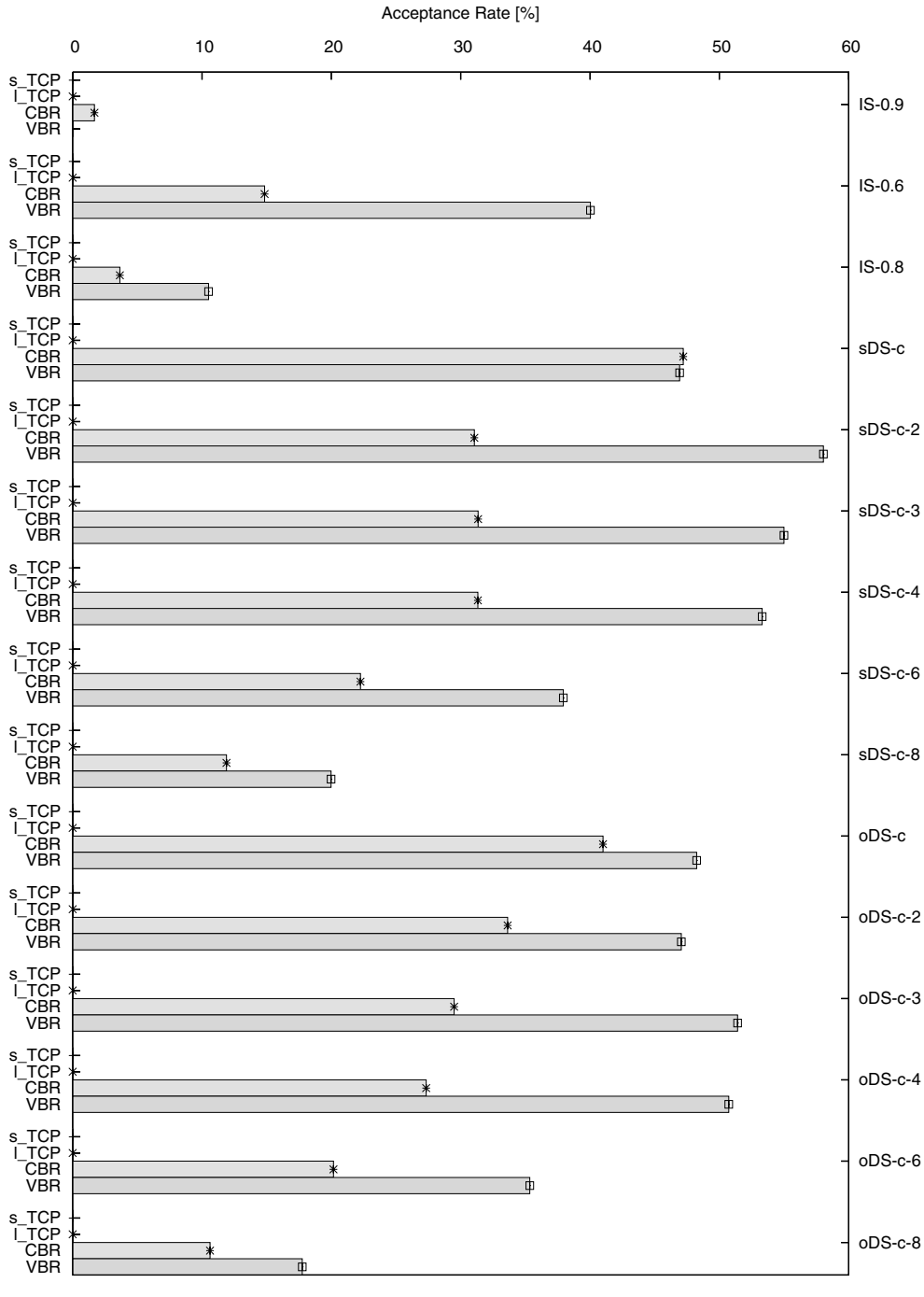

Figure B.5 Per-flow versus Per-class Scheduling, DFN Topology, Change of the Acceptance Rate when Increasing the Delay Bound to 40 ms/hop

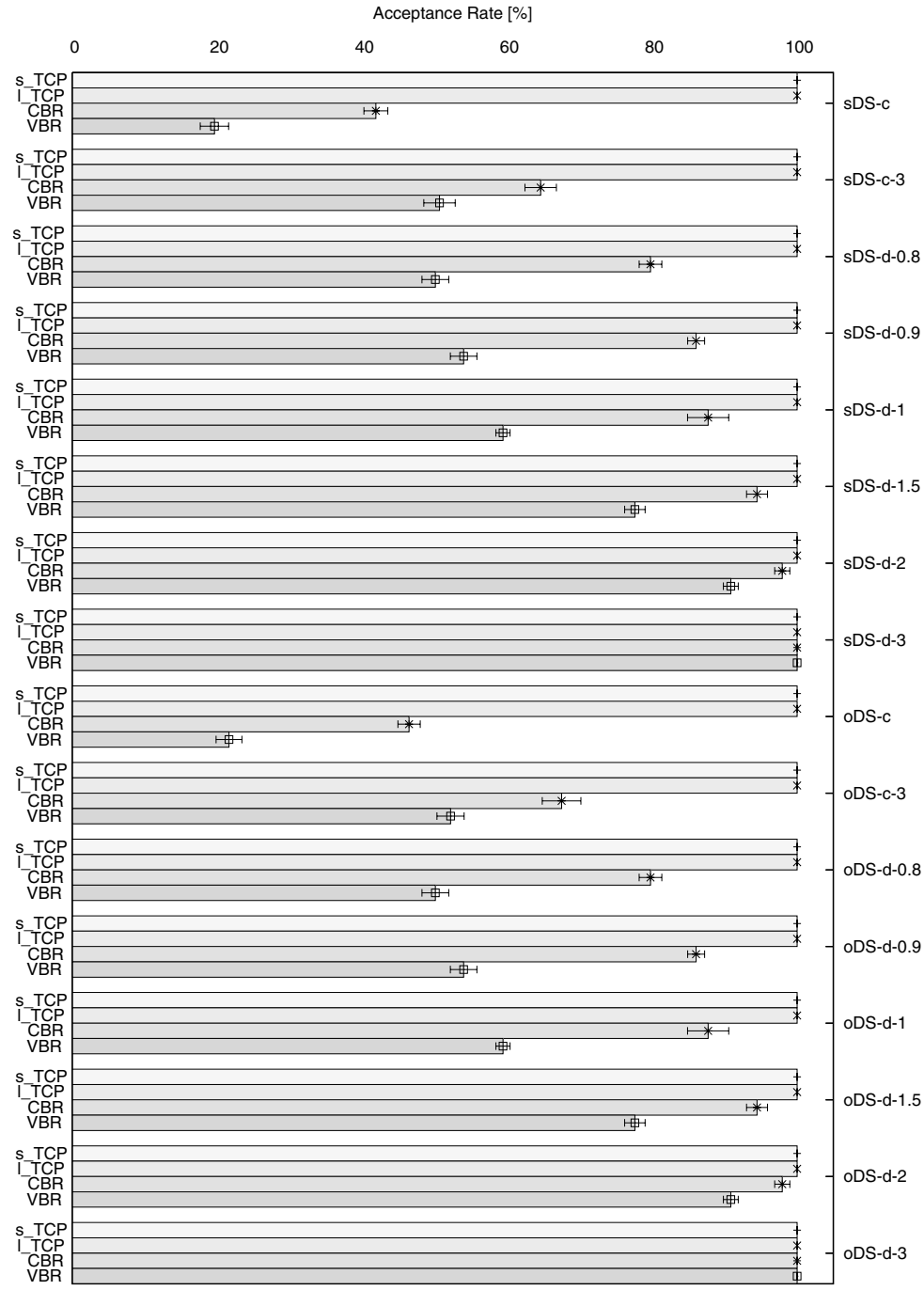

Figure B.6 Central versus Decentral Admission Control, DFN Topology, Acceptance Rate in Situation A (Contingents Match Flow Distribution)

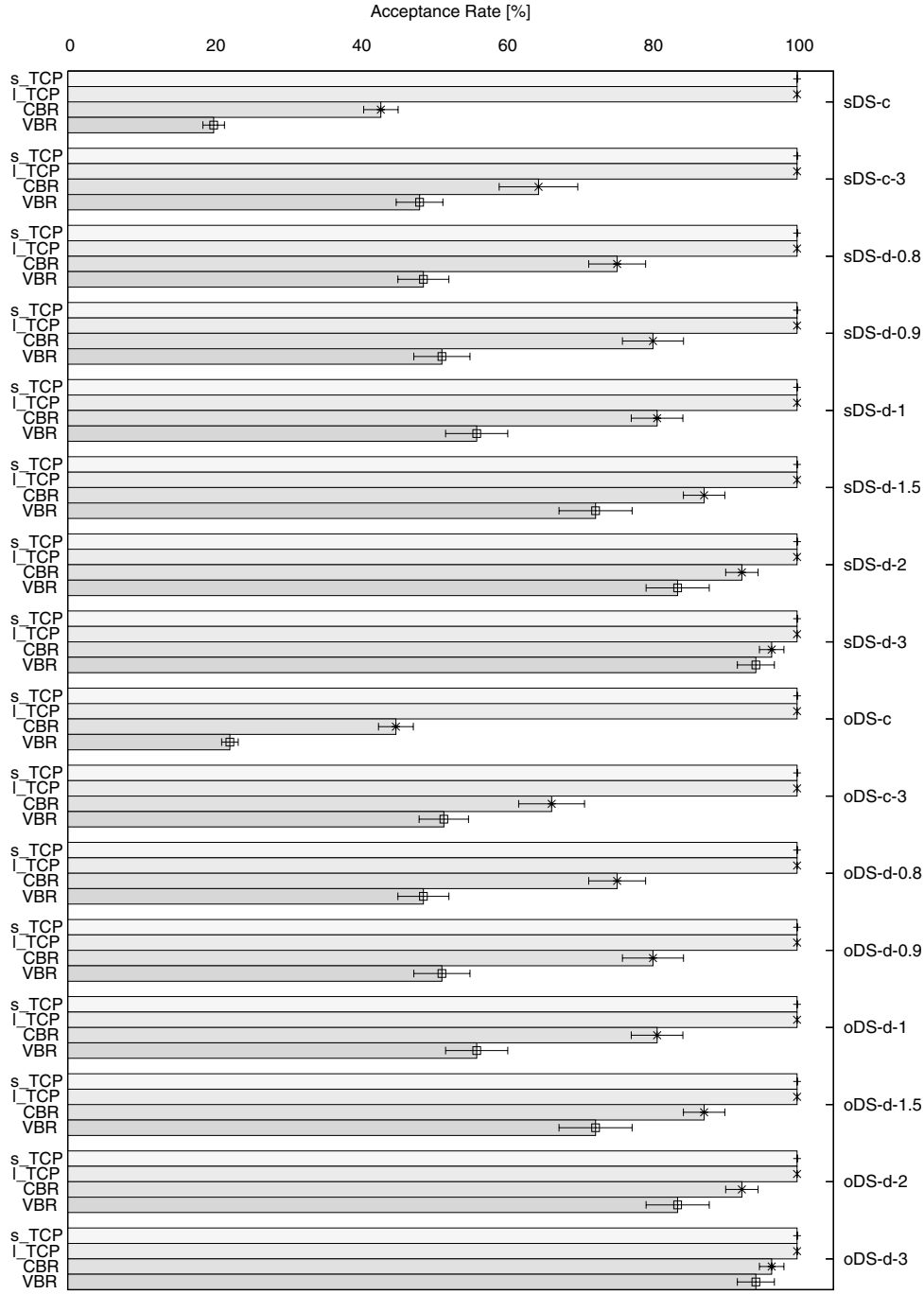

Figure B.7 Central versus Decentral Admission Control, DFN Topology, Acceptance Rate in Situation B (Contingents do not Match Flow Distribution)

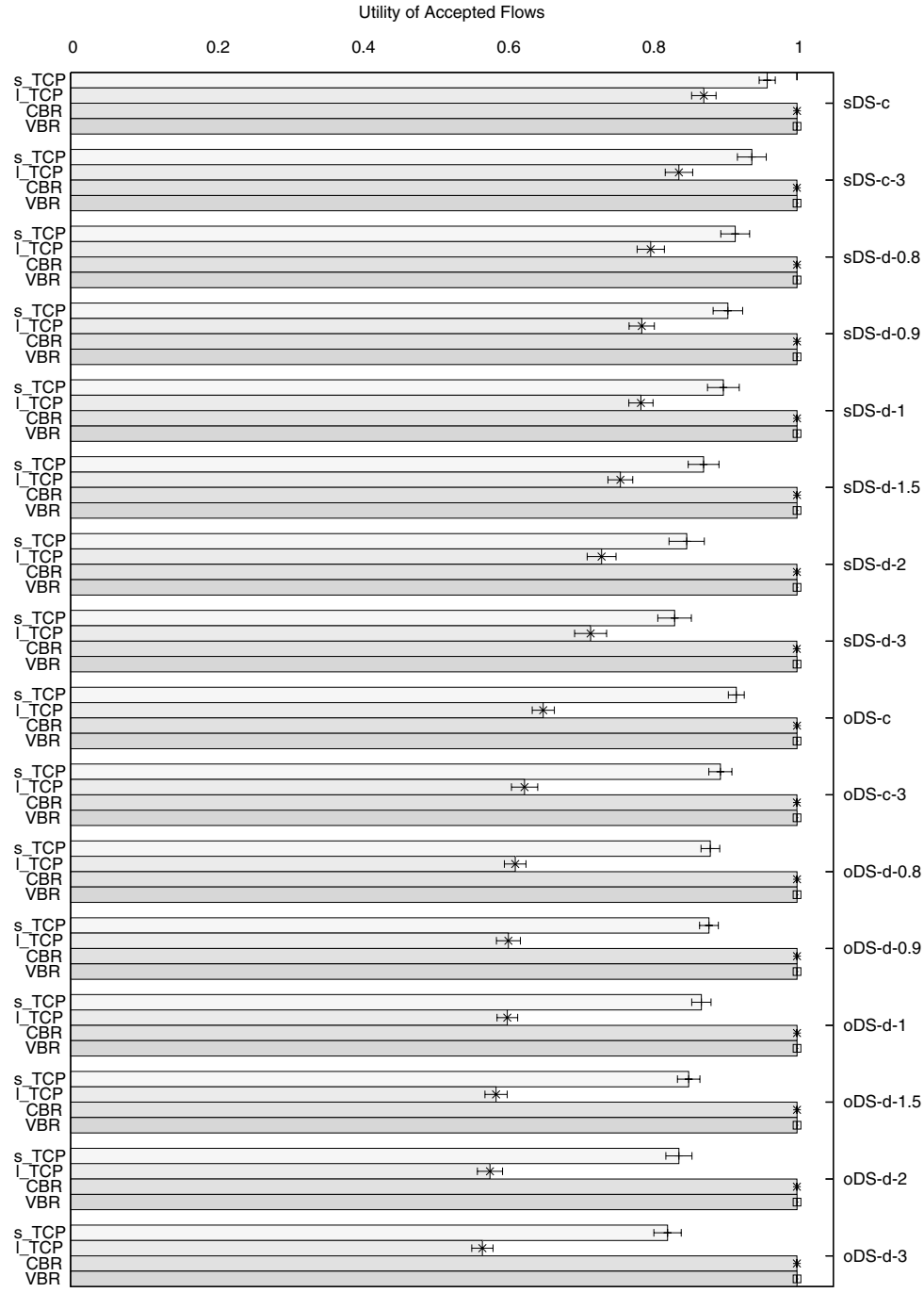

Figure B.8 Central versus Decentral Admission Control, DFN Topology, Utility of the Accepted Flows in Situation A (Contingents Match Flow Distribution)

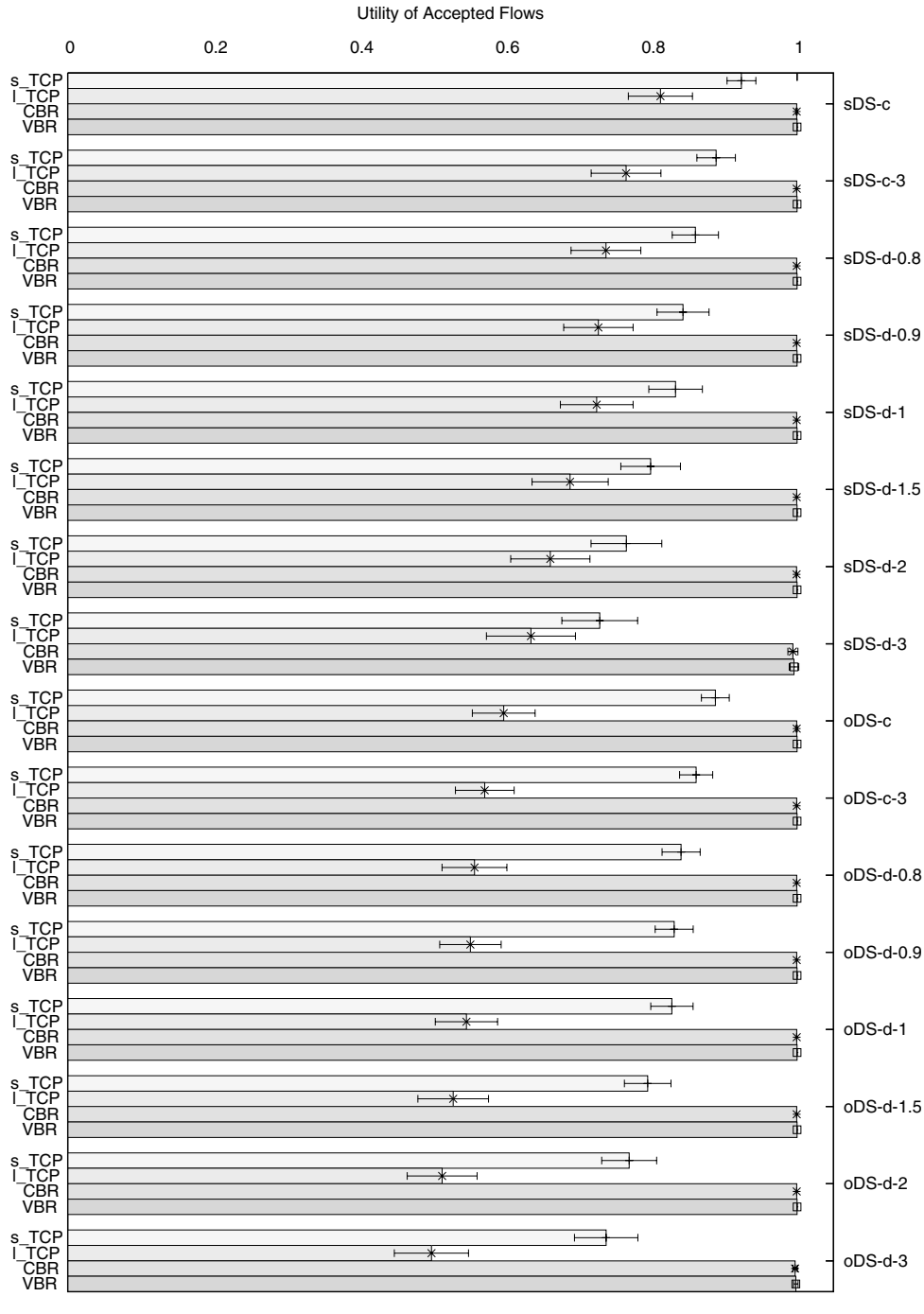

Figure B.9 Central versus Decentral Admission Control, DFN Topology, Utility of the Accepted Flows in Situation B (Contingents do not Match Flow Distribution)

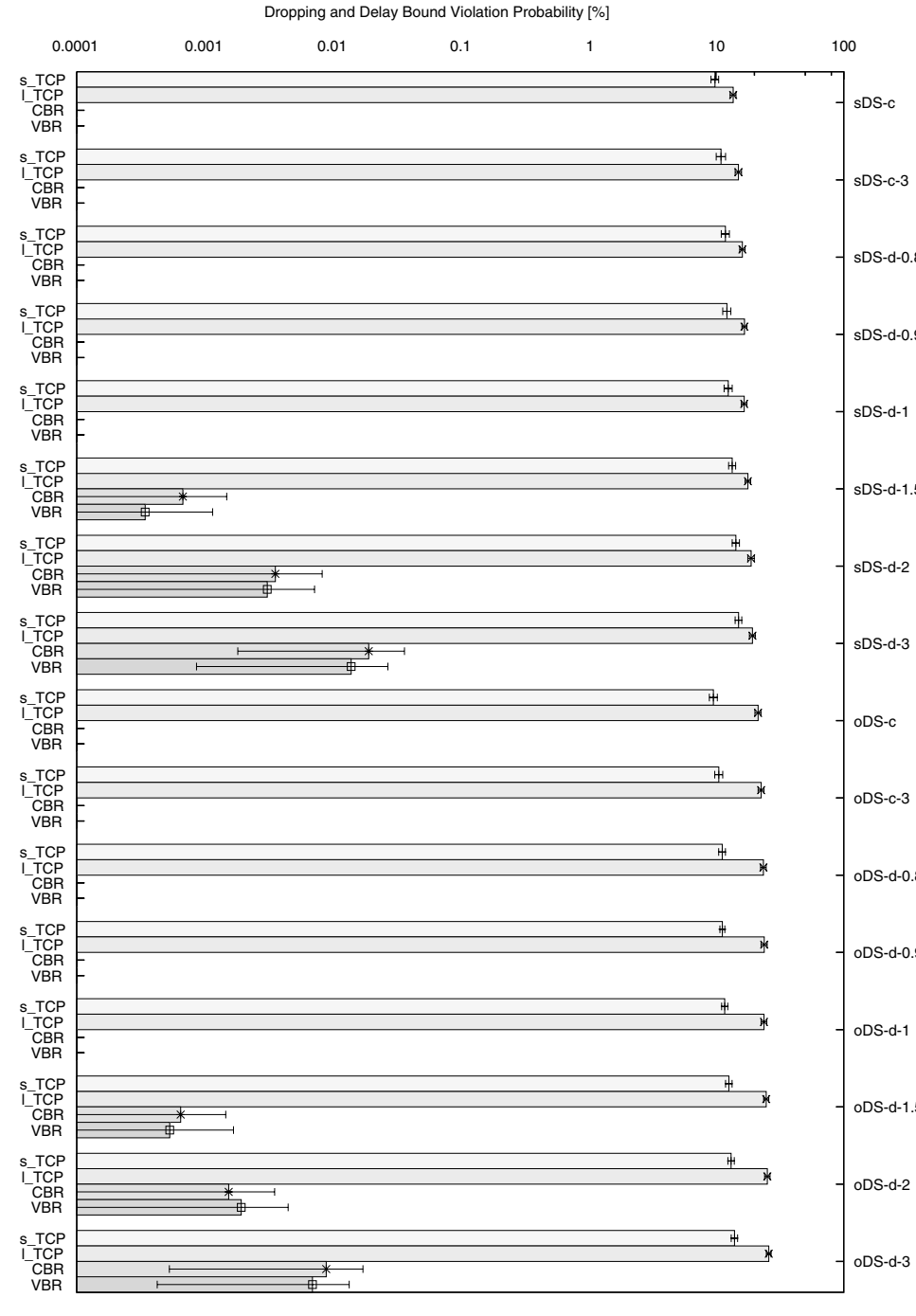

Figure B.10 Central versus Decentral Admission Control, DFN Topology, Dropping and Delay Bound Violation Probability in Situation A (Contingents Match Flow Distribution)

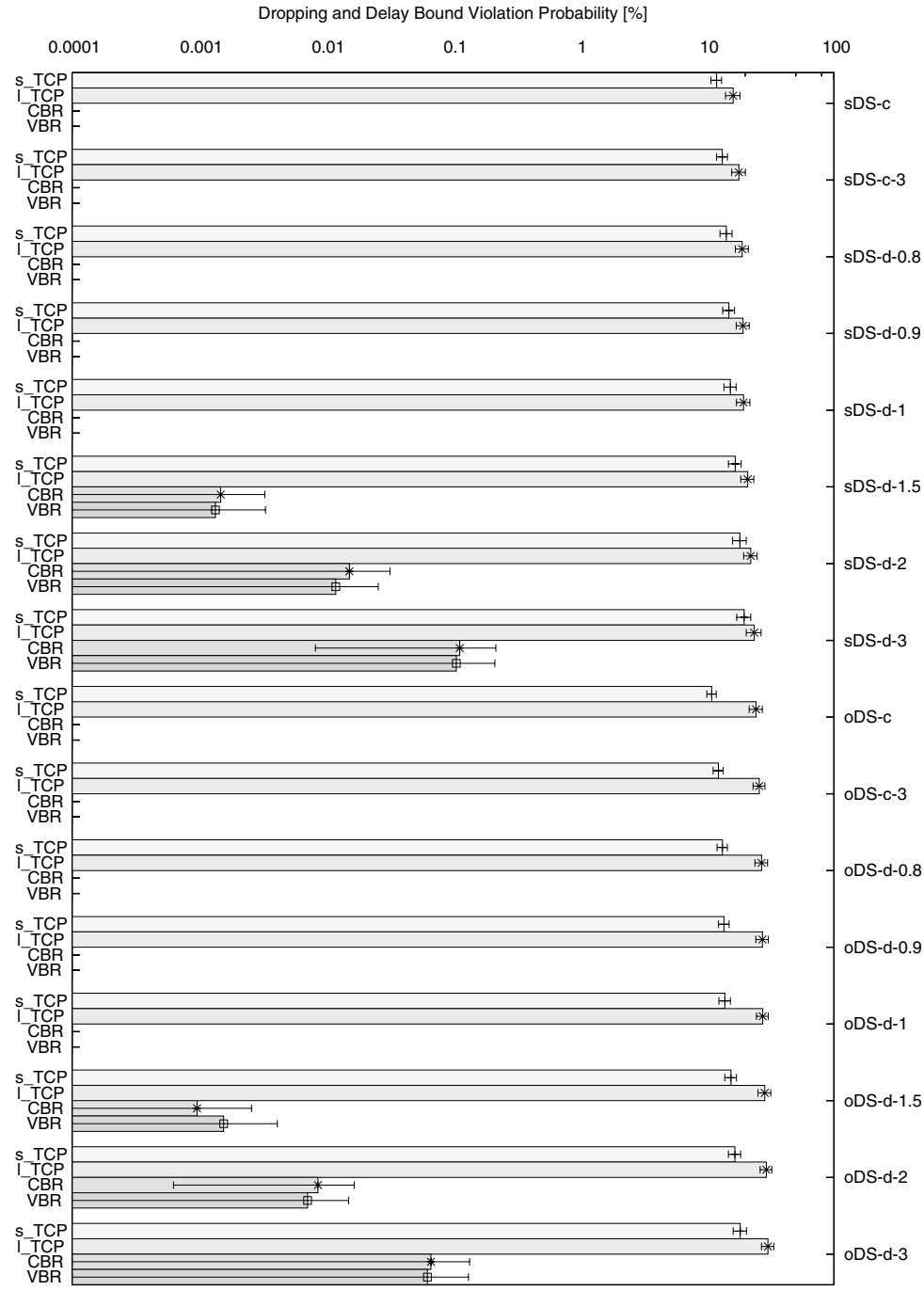

Figure B.11 Central versus Decentral Admission Control, DFN Topology, Dropping and Delay Bound Violation Probability in Situation B (Contingents do not Match Flow Distribution)

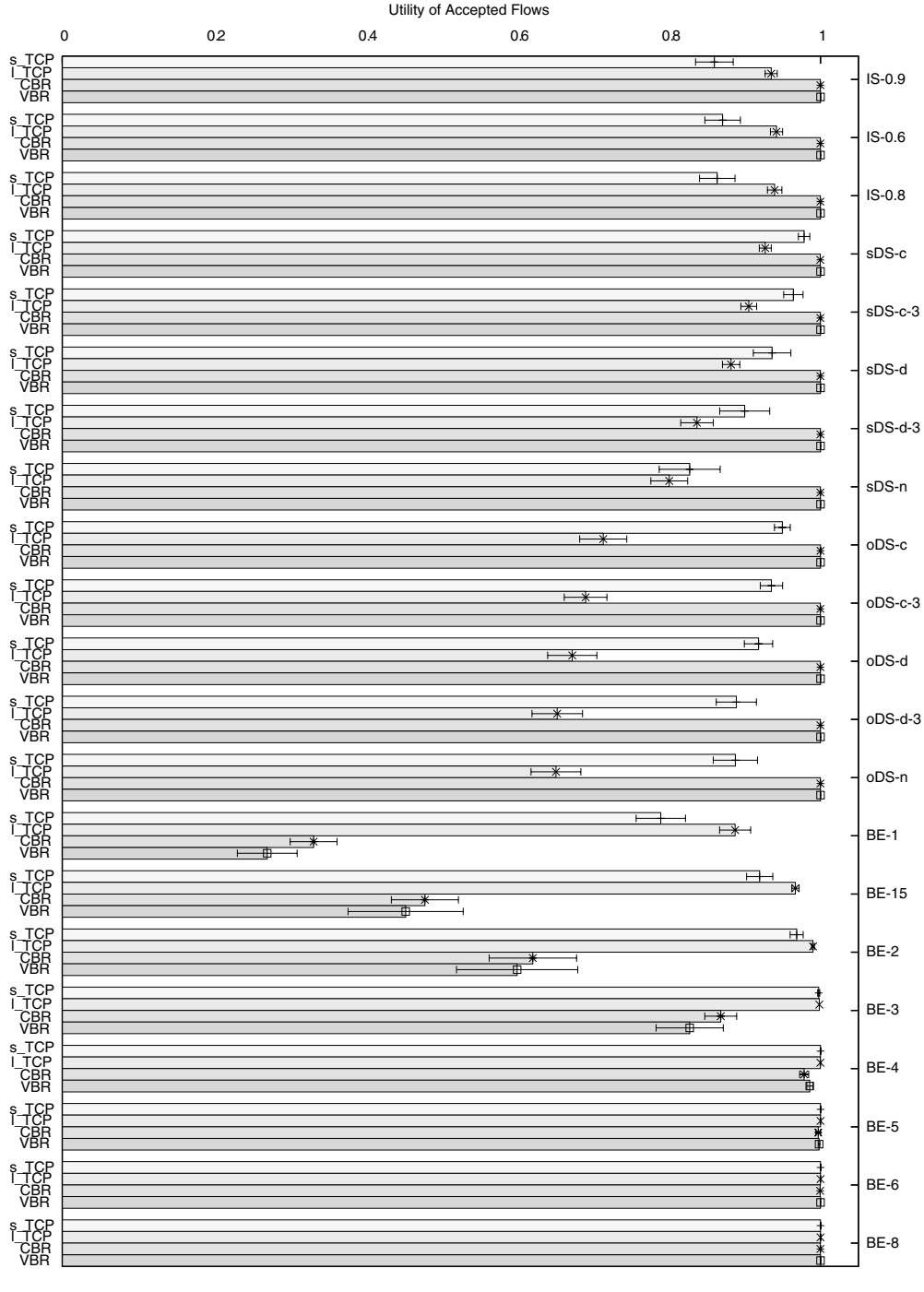

Figure B.12 Direct Comparison, DFN Topology, Traffic Mix A, Utility of the Accepted Flows

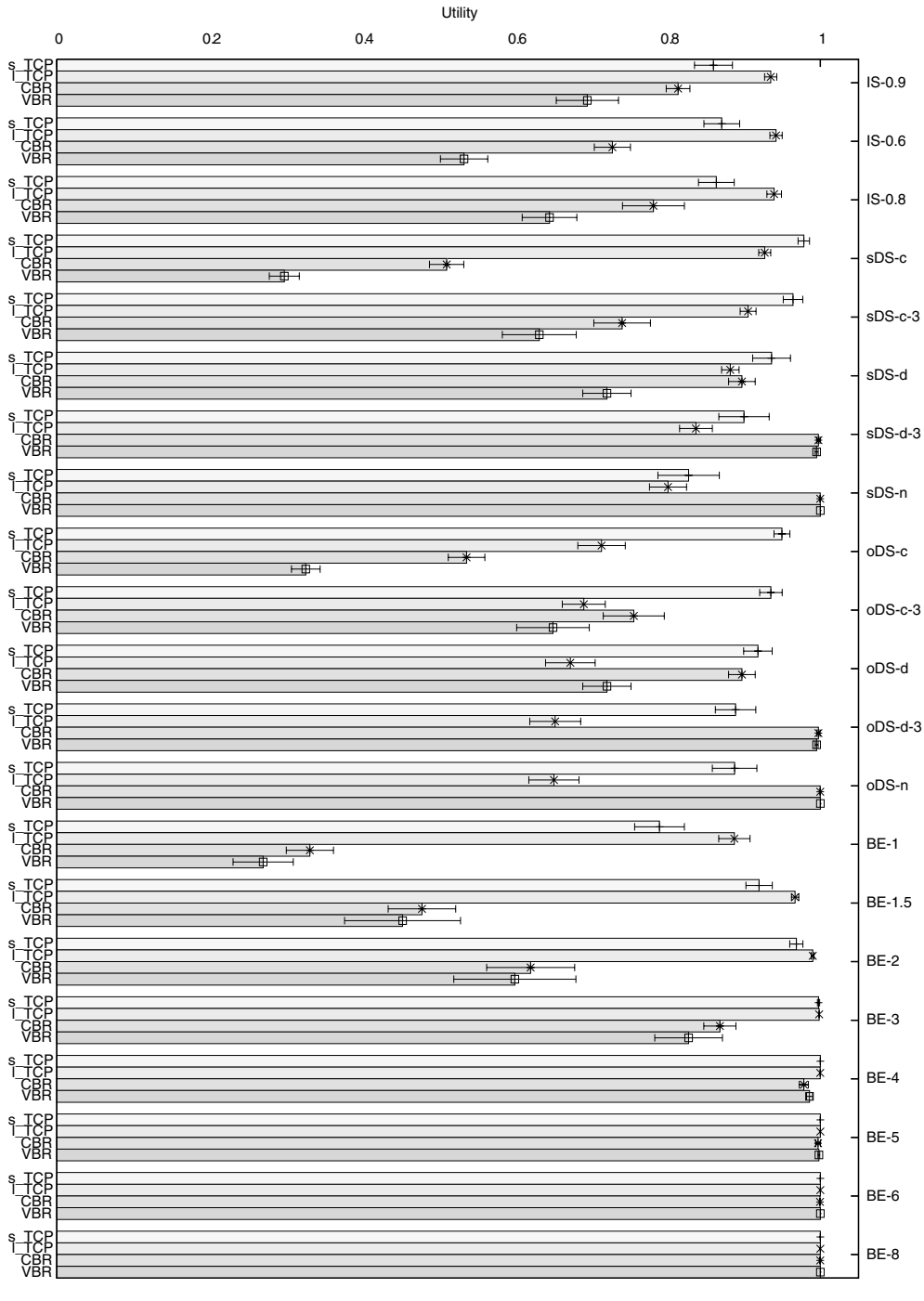

Figure B.13 Direct Comparison, DFN Topology, Traffic Mix A, Overall Utility

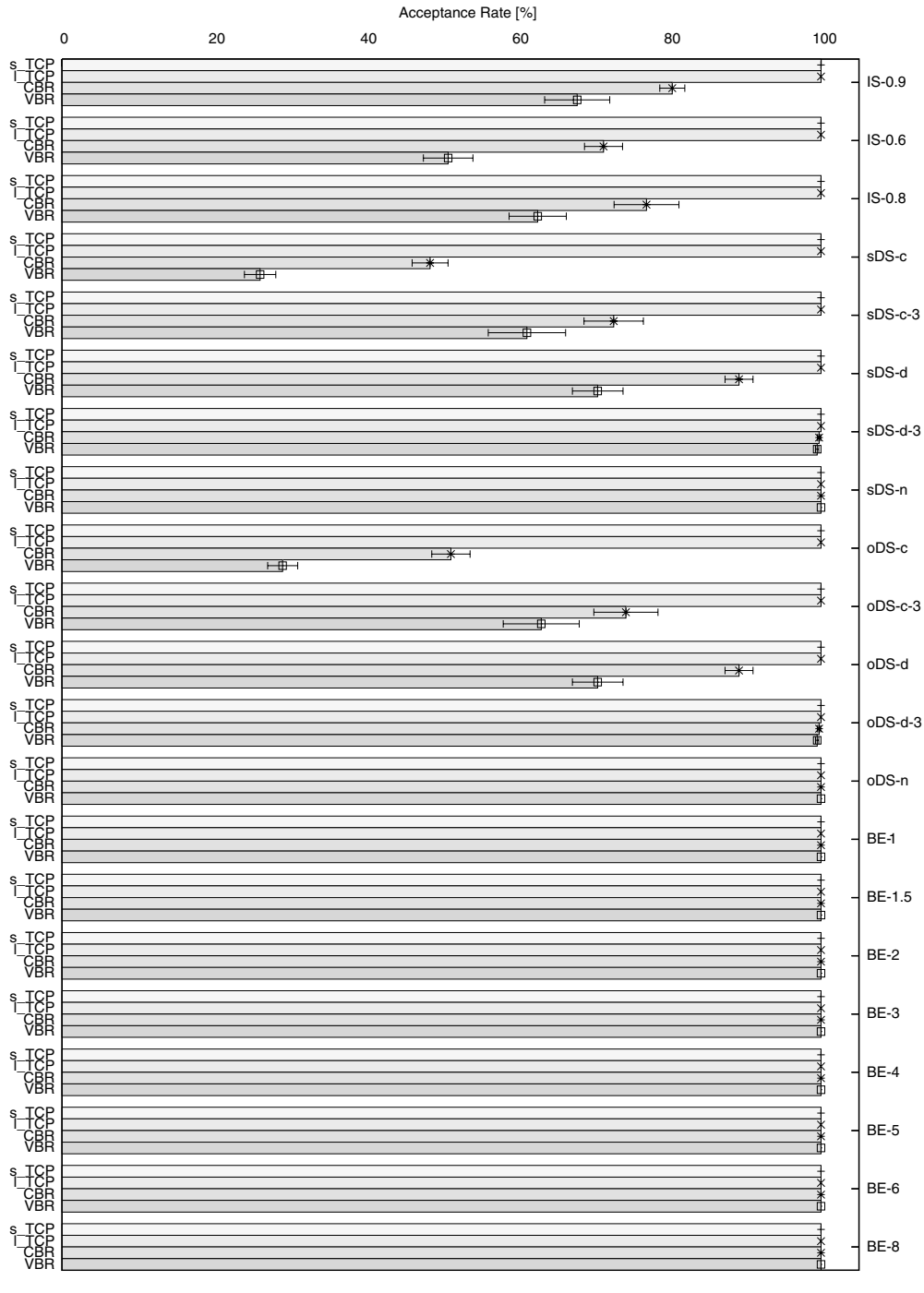

Figure B.14 Direct Comparison, DFN Topology, Traffic Mix A, Acceptance Rate

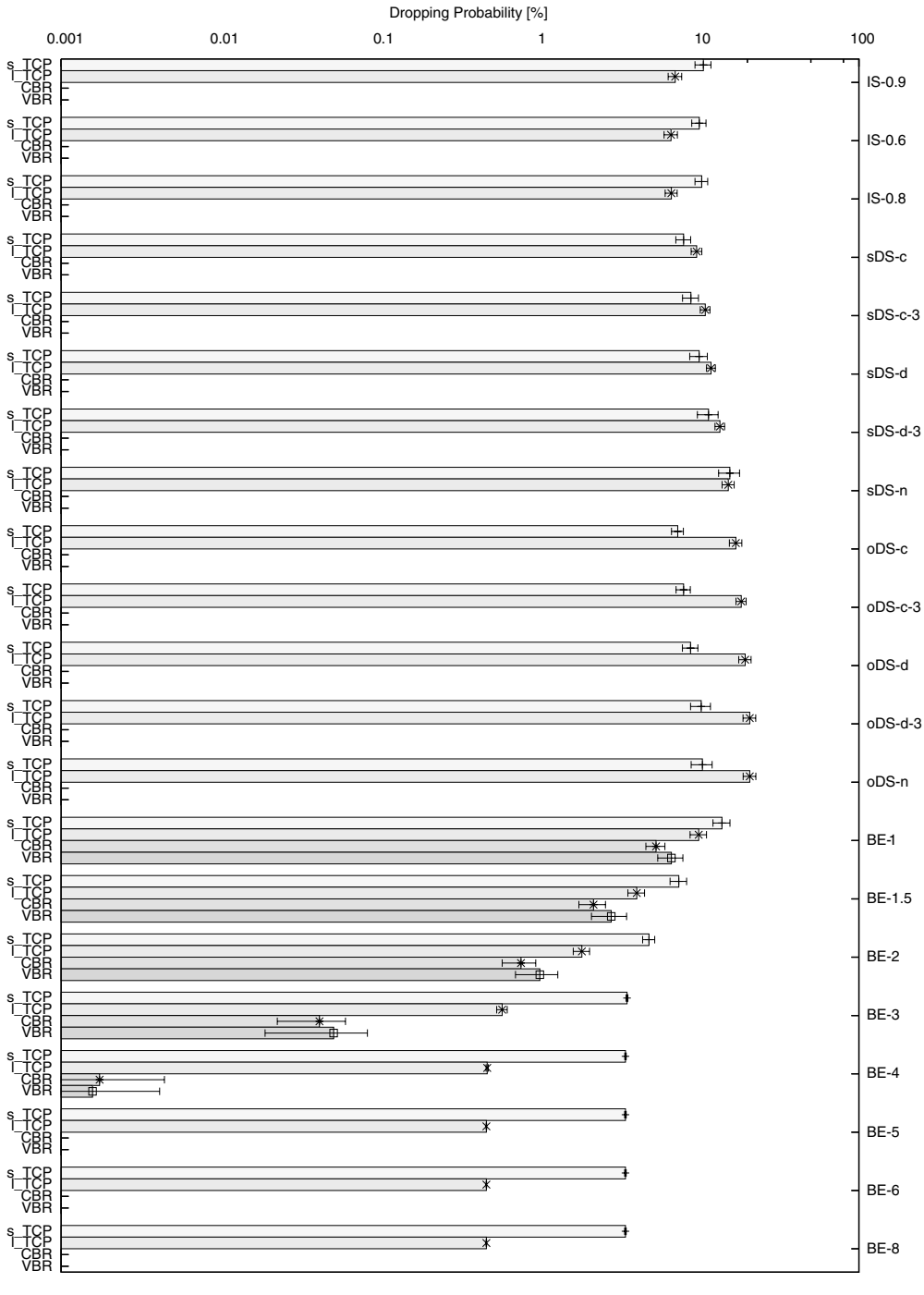

Figure B.15 Direct Comparison, DFN Topology, Traffic Mix A, Dropped Packets

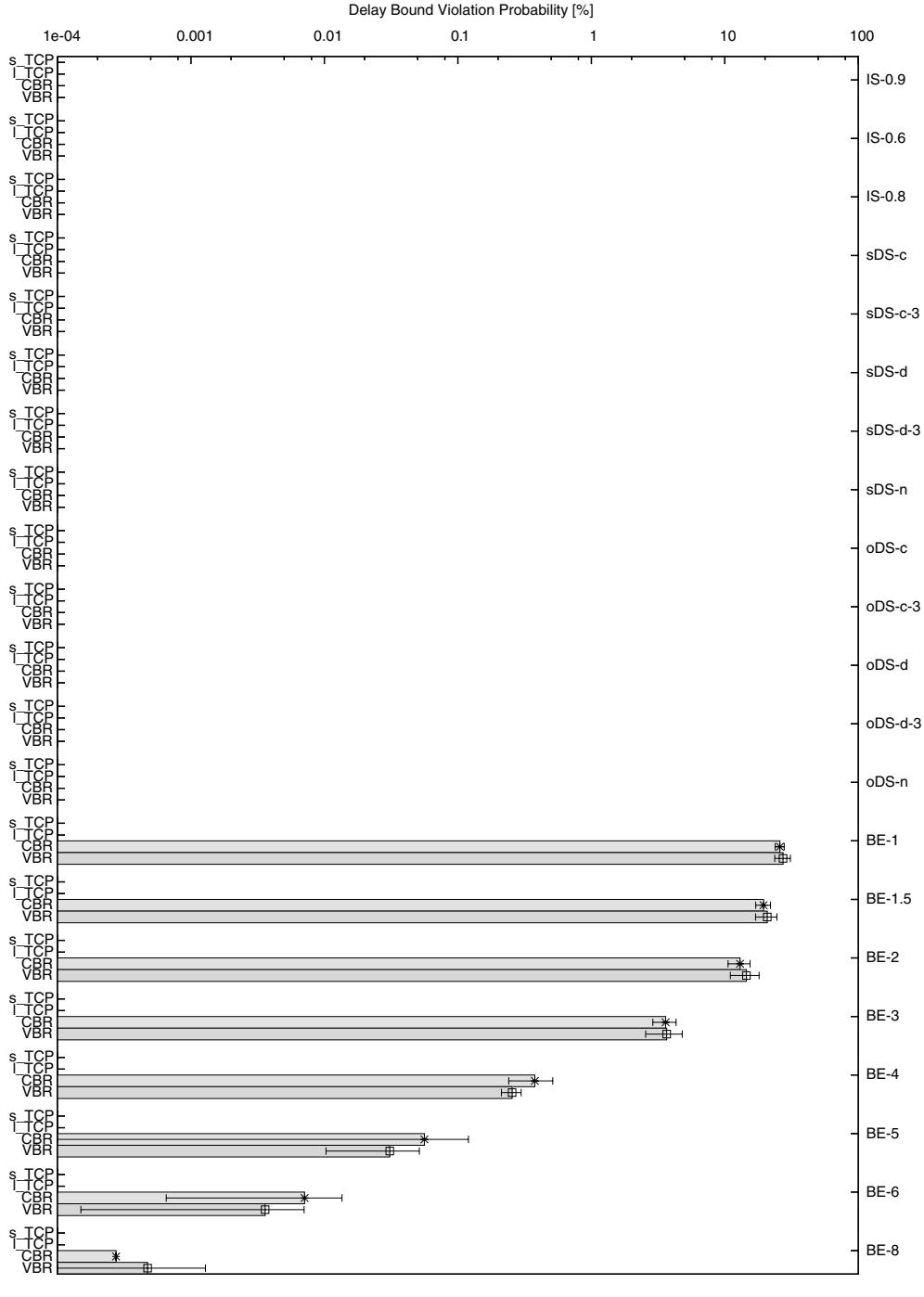

Figure B.16 Direct Comparison, DFN Topology, Traffic Mix A, Delayed Packets

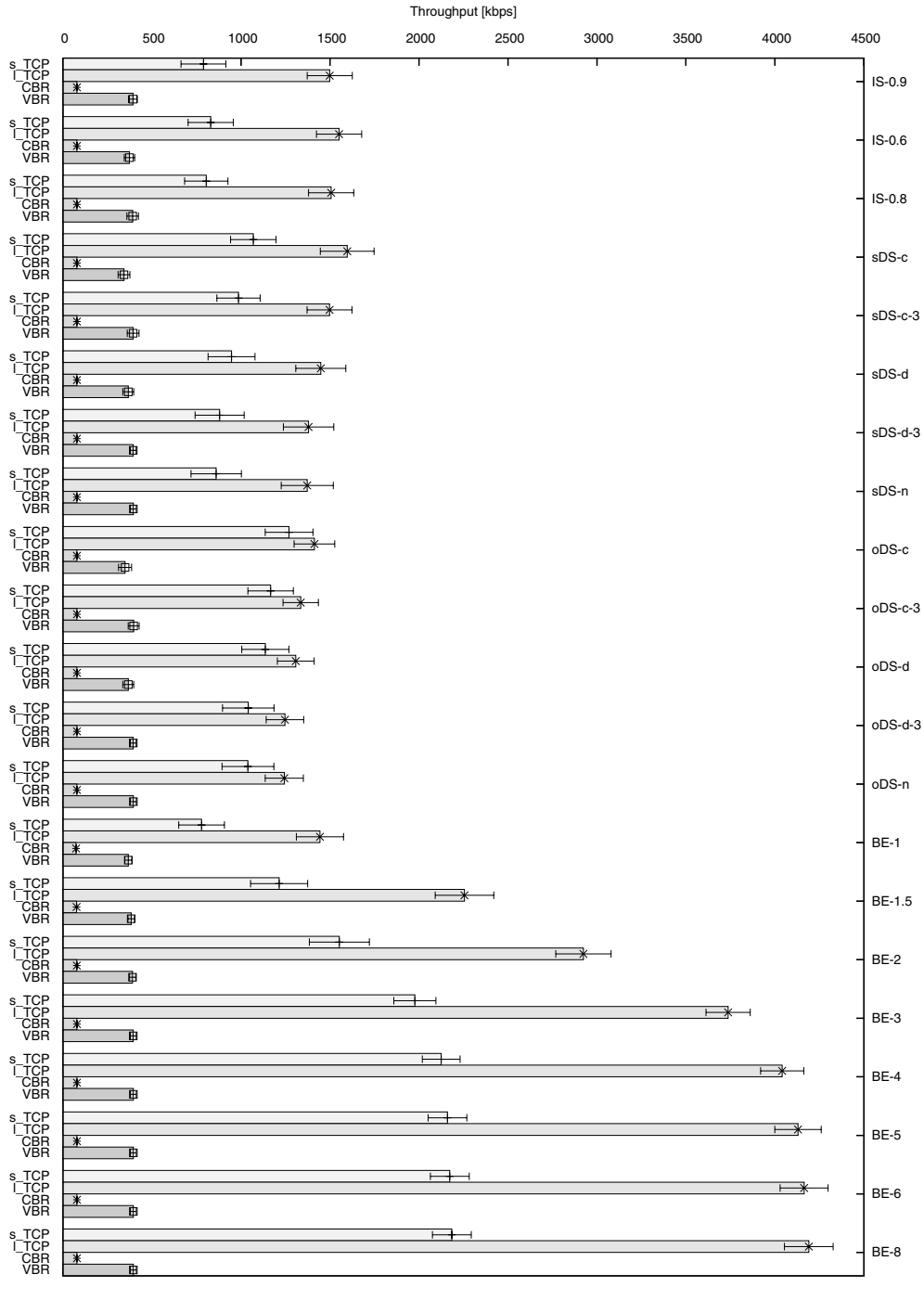

Figure B.17 Direct Comparison, DFN Topology, Traffic Mix A, Throughput

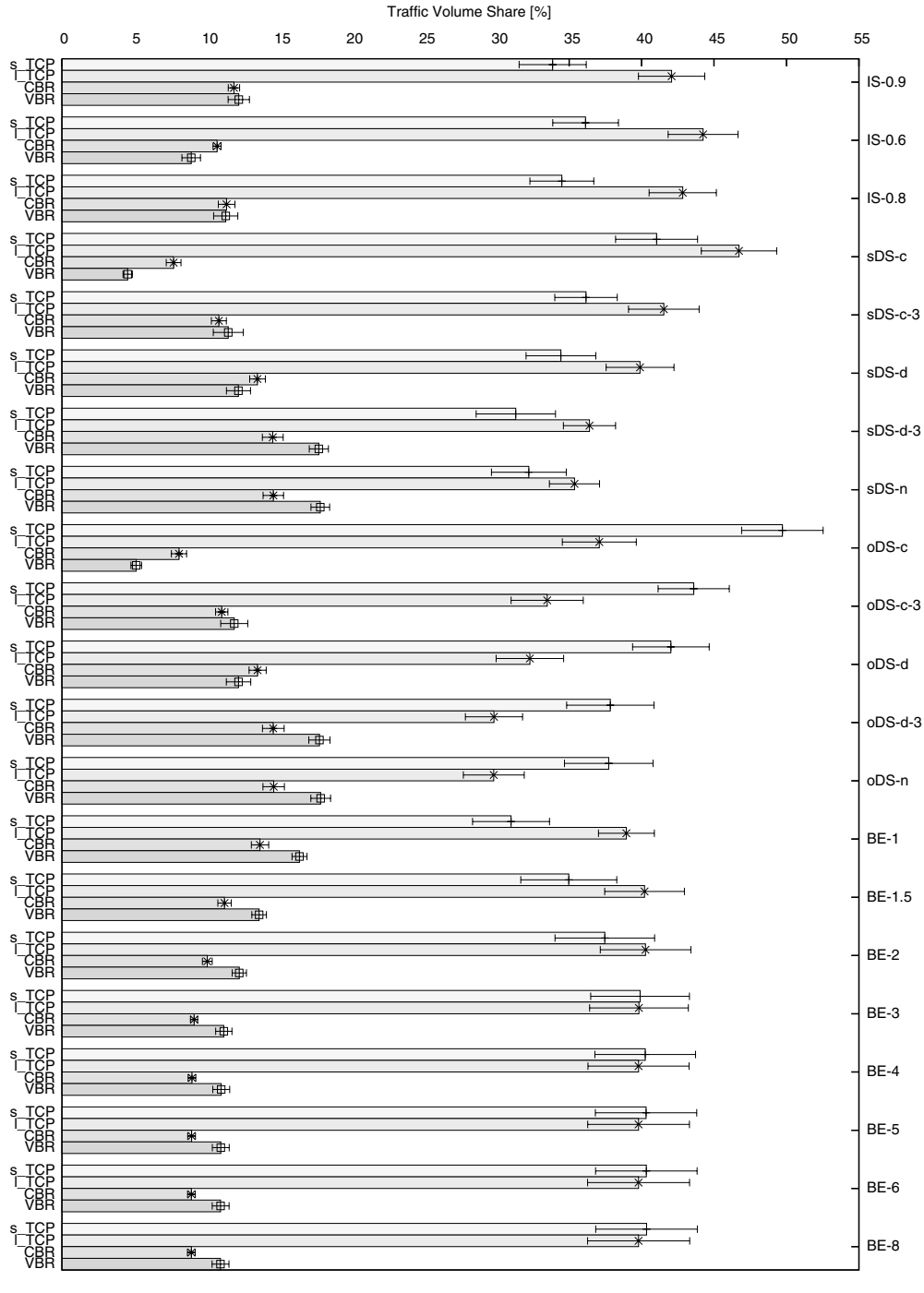

Figure B.18 Direct Comparison, DFN Topology, Traffic Mix A, Share of Traffic Volume

Table B.2 Direct Comparison, DFN Topology, Traffic Mix B and C Utility of the Accepted Flows and Overall Utility

Utility of Accepted Flows									
		Traffic Mix B				Traffic Mix C			
System		s_TCP	l_TCP	CBR	VBR	s_TCP	l_TCP	CBR	VBR
IS	0.8	0.87	0.95	1.00	1.00	0.93	0.97	1.00	1.00
sDS	c	0.98	0.94	1.00	1.00	1.00	0.95	1.00	1.00
	c-3	0.97	0.91	1.00	1.00	0.99	0.94	1.00	1.00
	n	0.67	0.61	0.94	0.94	0.99	0.94	1.00	1.00
oDS	c	0.96	0.71	1.00	1.00	0.99	0.81	1.00	1.00
	c-3	0.94	0.76	1.00	1.00	0.99	0.78	1.00	1.00
	n	0.73	0.51	0.95	0.95	0.99	0.78	1.00	1.00
BE	1	0.66	0.75	0.31	0.26	0.92	0.97	0.35	0.30
	1.5	0.86	0.95	0.47	0.42	0.98	0.99	0.58	0.51
	2	0.95	0.98	0.61	0.57	1.00	1.00	0.67	0.70
	3	1.00	1.00	0.86	0.84	1.00	1.00	0.78	0.97
	4	1.00	1.00	0.97	0.97	1.00	1.00	1.00	1.00
	5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Overall Utility									
		Traffic Mix B				Traffic Mix C			
System		s_TCP	l_TCP	CBR	VBR	s_TCP	l_TCP	CBR	VBR
IS	0.8	0.87	0.95	0.59	0.45	0.93	0.97	0.99	0.93
sDS	c	0.98	0.94	0.36	0.22	1.00	0.95	0.76	0.56
	c-3	0.97	0.91	0.55	0.42	0.99	0.94	0.98	0.98
	n	0.66	0.61	0.94	0.94	0.99	0.94	1.00	1.00
oDS	c	0.96	0.71	0.38	0.23	0.99	0.81	0.77	0.61
	c-3	0.92	0.67	0.56	0.44	0.99	0.78	0.98	0.98
	n	0.73	0.51	0.95	0.95	0.99	0.78	1.00	1.00
BE	1	0.66	0.75	0.31	0.26	0.92	0.97	0.35	0.30
	1.5	0.86	0.95	0.47	0.42	0.98	0.99	0.58	0.51
	2	0.95	0.98	0.61	0.57	1.00	1.00	0.78	0.70
	3	1.00	1.00	0.86	0.84	1.00	1.00	0.97	0.97
	4	1.00	1.00	0.97	0.97	1.00	1.00	1.00	1.00
	5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Table B.3 Direct Comparison, DFN Topology, Traffic Mix B and C Acceptance Rate and Dropping respectively Delay Bound Violation Probability

Acceptance Rate [%]									
System		Traffic Mix B				Traffic Mix C			
		s_TCP	l_TCP	CBR	VBR	s_TCP	l_TCP	CBR	VBR
IS	0.8	100	100	57	42	100	100	99	93
sDS	c	100	100	32	18	100	100	75	54
	c-3	100	100	53	39	100	100	98	98
	n	100	100	100	100	100	100	100	100
oDS	c	100	100	35	19	100	100	76	58
	c-3	100	100	53	41	100	100	98	98
	n	100	100	100	100	100	100	100	100
BE	1	100	100	100	100	100	100	100	100
	1.5	100	100	100	100	100	100	100	100
	2	100	100	100	100	100	100	100	100
	3	100	100	100	100	100	100	100	100
	4	100	100	100	100	100	100	100	100
	5	100	100	100	100	100	100	100	100
	6	100	100	100	100	100	100	100	100
	8	100	100	100	100	100	100	100	100

Dropping and Delay Bound Violation Probability [%]									
System		Traffic Mix B				Traffic Mix C			
		s_TCP	l_TCP	CBR	VBR	s_TCP	l_TCP	CBR	VBR
IS	0.8	9.99	6.89	0.00	0.00	6.76	4.29	0.00	0.00
sDS	c	7.52	9.05	0.00	0.00	5.06	7.87	0.00	0.00
	c-3	8.55	10.85	0.00	0.00	5.23	8.42	0.00	0.00
	n	22.96	23.59	0.87	0.89	5.65	8.44	0.00	0.00
oDS	c	6.71	16.84	0.00	0.00	4.31	12.46	0.00	0.00
	c-3	7.83	18.68	0.00	0.00	4.39	13.32	0.00	0.00
	n	18.74	28.11	0.76	0.78	4.41	13.26	0.00	0.00
BE	1	21.56	17.06	29.88	32.69	7.16	4.59	30.09	32.97
	1.5	10.19	6.34	21.42	22.77	4.18	1.62	16.21	17.25
	2	5.88	2.65	13.87	14.52	3.58	0.76	7.05	6.72
	3	3.66	0.67	3.76	3.75	3.46	0.47	0.63	0.47
	4	3.48	0.47	0.55	0.56	3.46	0.46	0.06	0.05
	5	3.48	0.46	0.04	0.04	3.46	0.46	0.01	0.01
	6	3.48	0.46	0.01	0.01	3.46	0.46	0.00	0.00
	8	3.47	0.46	0.00	0.00	3.46	0.46	0.00	0.00

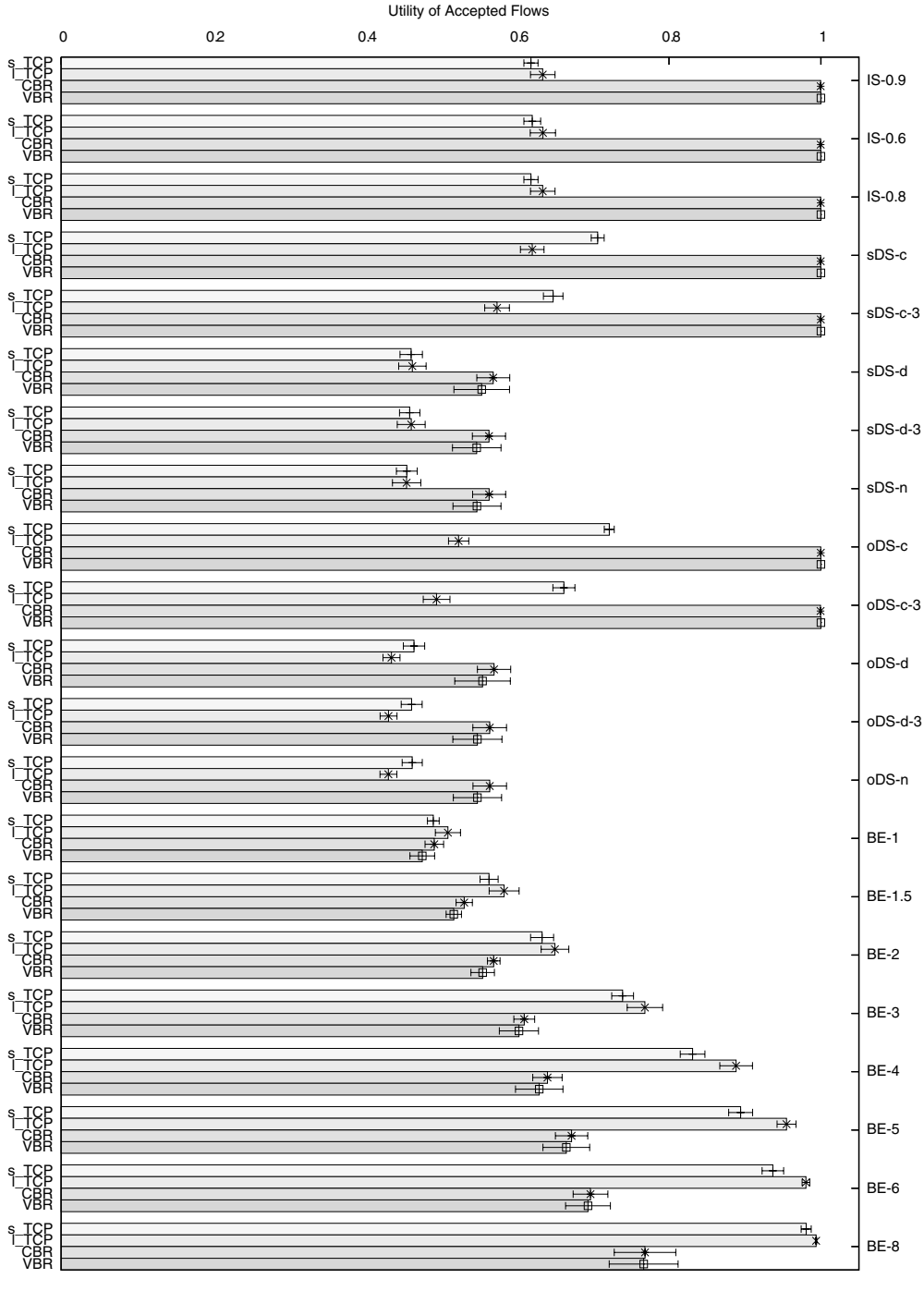

Figure B.19 Direct Comparison, Artificial-3 Topology, Traffic Mix A, Utility of the Accepted Flows

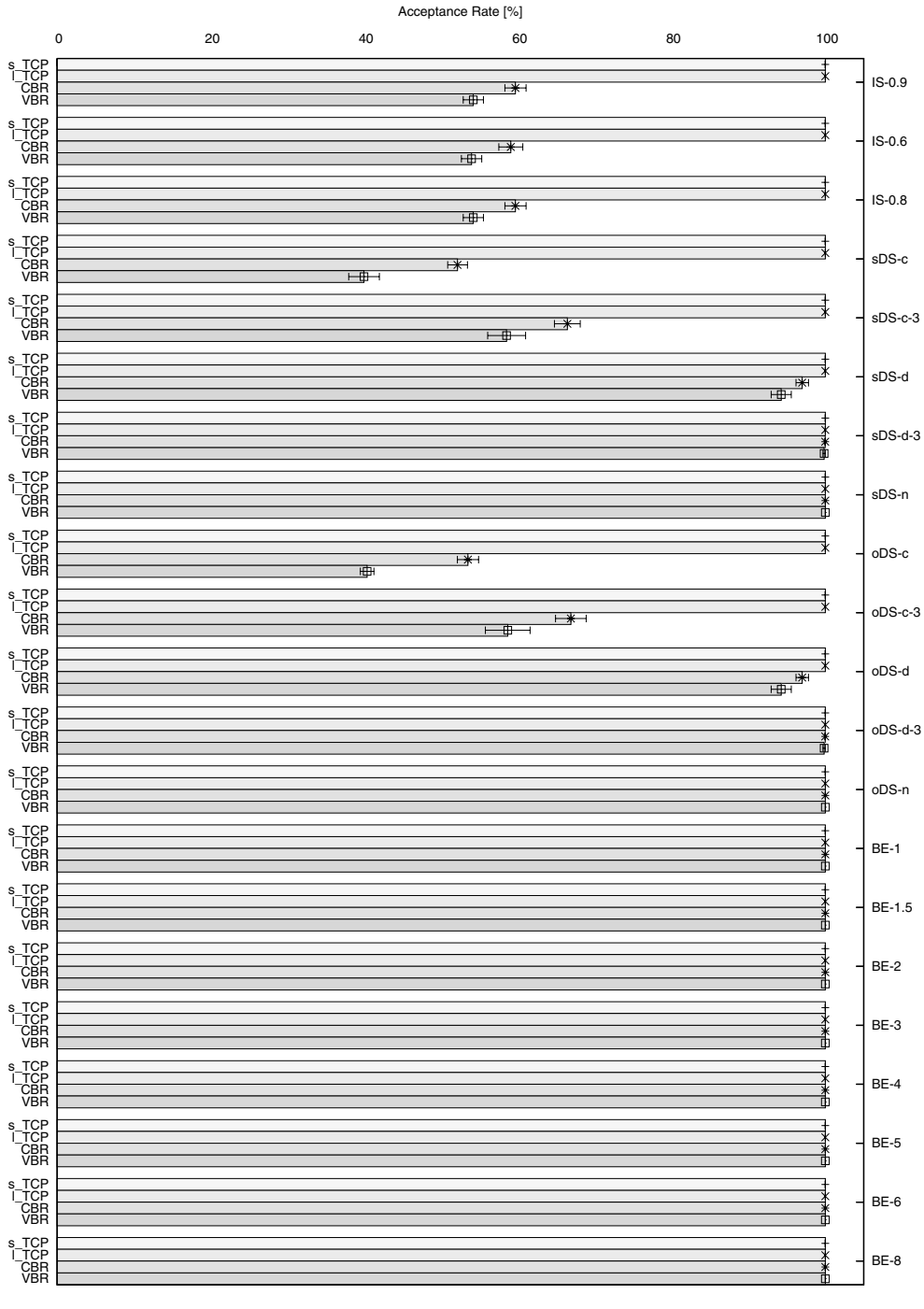

Figure B.20 Direct Comparison, Artificial-3 Topology, Traffic Mix A, Acceptance Rate

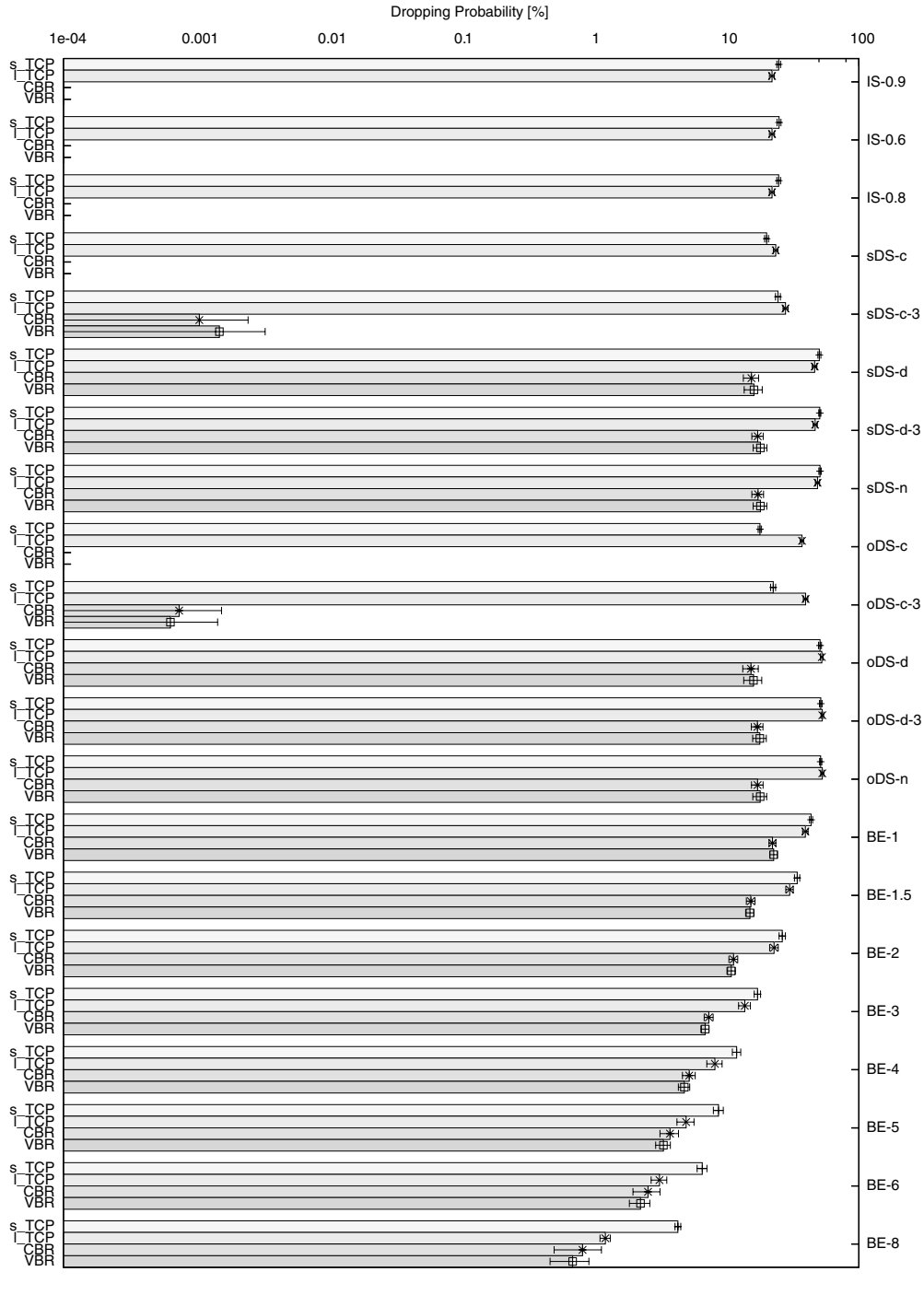

Figure B.21 Direct Comparison, Artificial-3 Topology, Traffic Mix A, Dropped Packets

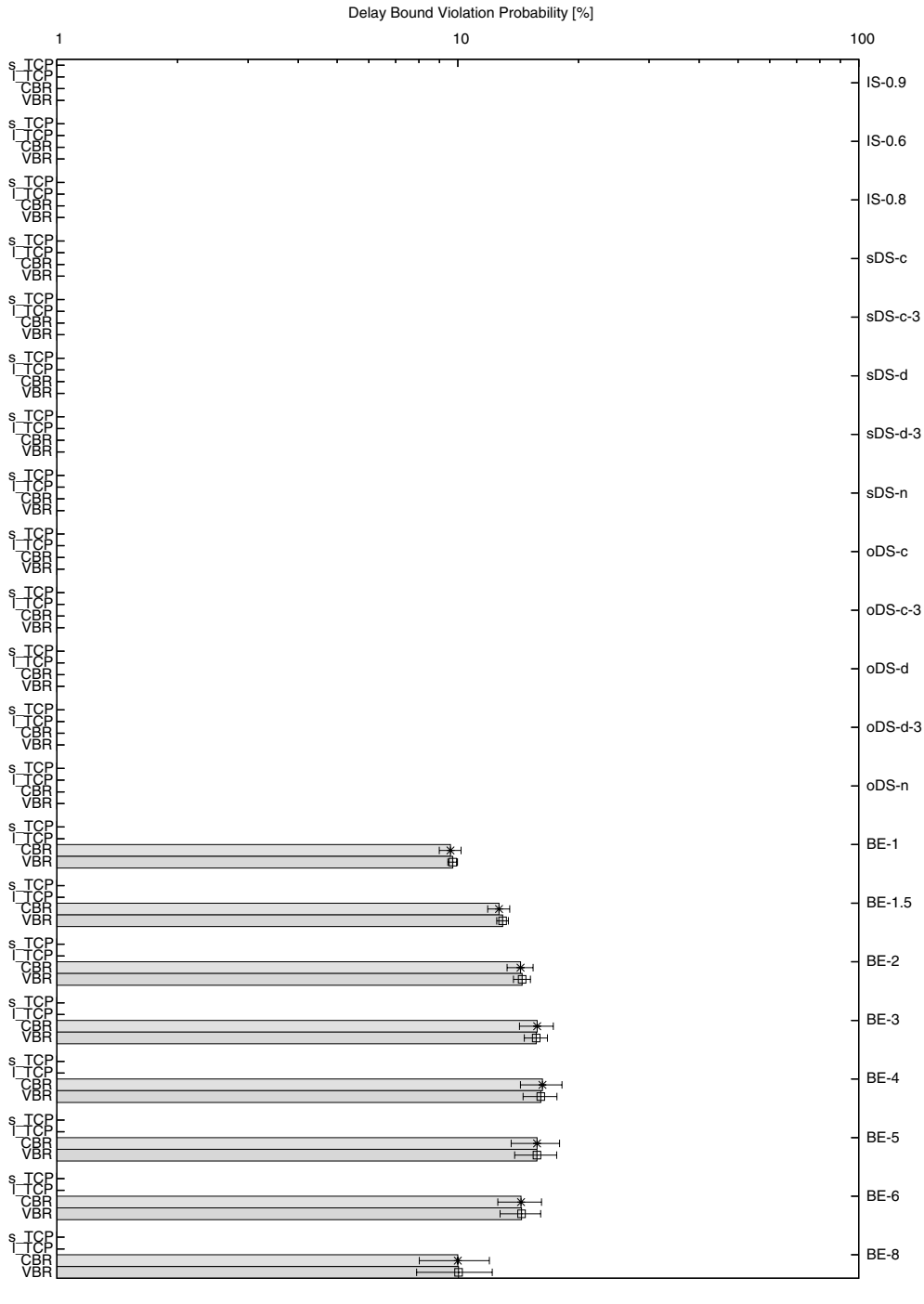

Figure B.22 Direct Comparison, Artificial-3 Topology, Traffic Mix A, Delayed Packets