

MACAW

MACAW: A media Access Protocol for Wireless
LAN's

SIGCOMM 1994

V. Bharghavan, A Demers, S. Shenker, L. Zhang

Background: CSMA (1970)

- Carrier sense multiple access
- Hidden terminal
- Exposed terminal
-



Background: MACA (1990)

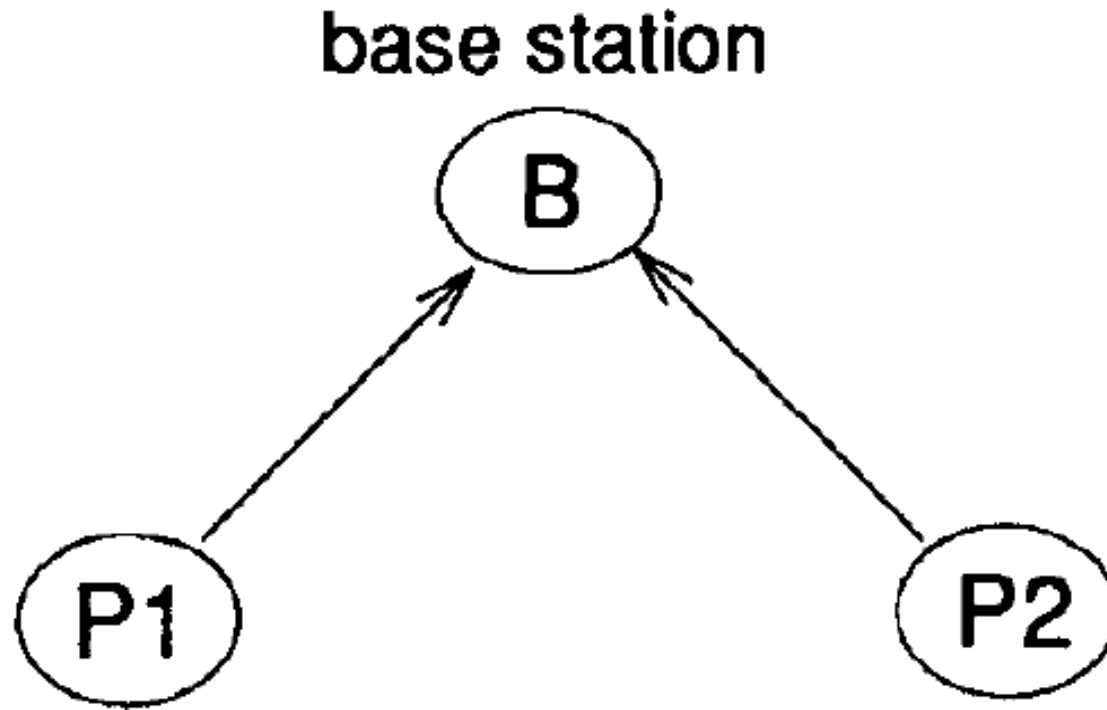
- RTS-CTS-DATA
-
- RTS: Request To Send
- CTR: Clear To Send
- BEB: Binary Exponential Backoff

MACAW

- Packet level simulator
- RTS, CTS: 30 bytes
- Slot time = RTS or CTS
- Data packets: 512 bytes
- Rate: 32 or 64 packets per second
- 500 – 2000 seconds
-

MACAW

- BEB vs. BEB with copy
-



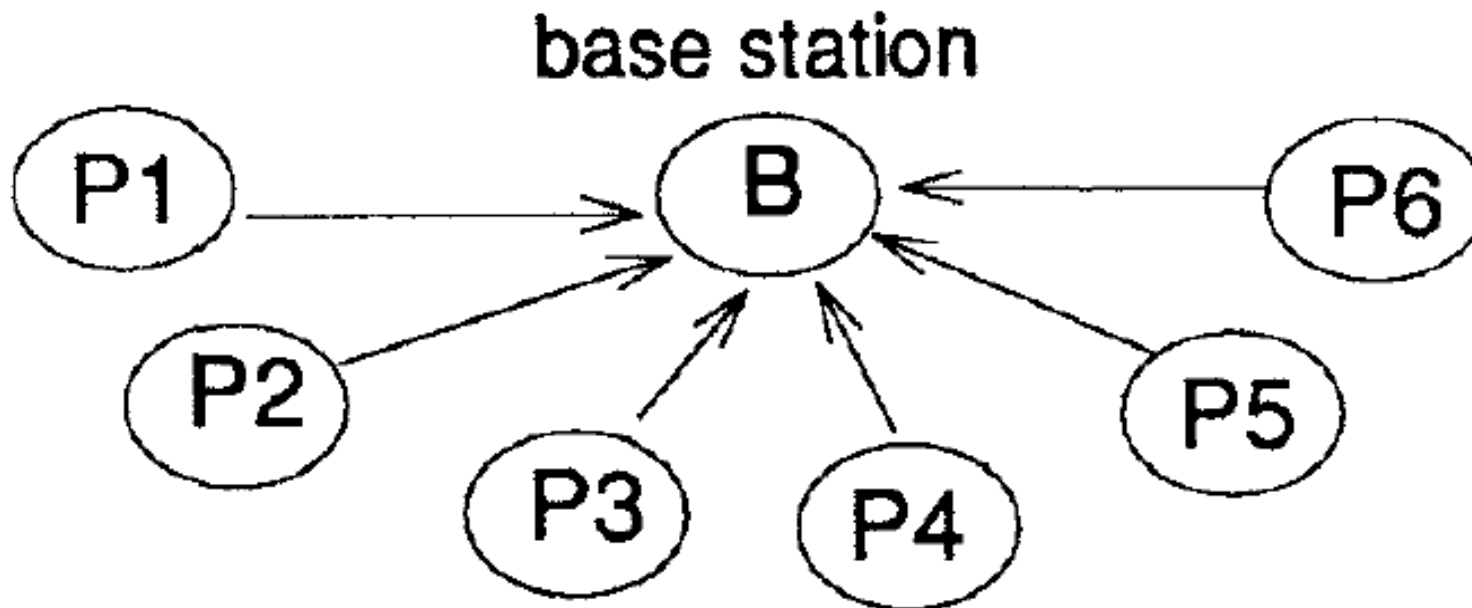
MACAW

- BEB vs. BEB with copy, results

	BEB	BEB copy
P1-B	48.5	23.82
P2-B	0	23.32

MACAW

- MILD: Multiplicative Increase Linear Decrease



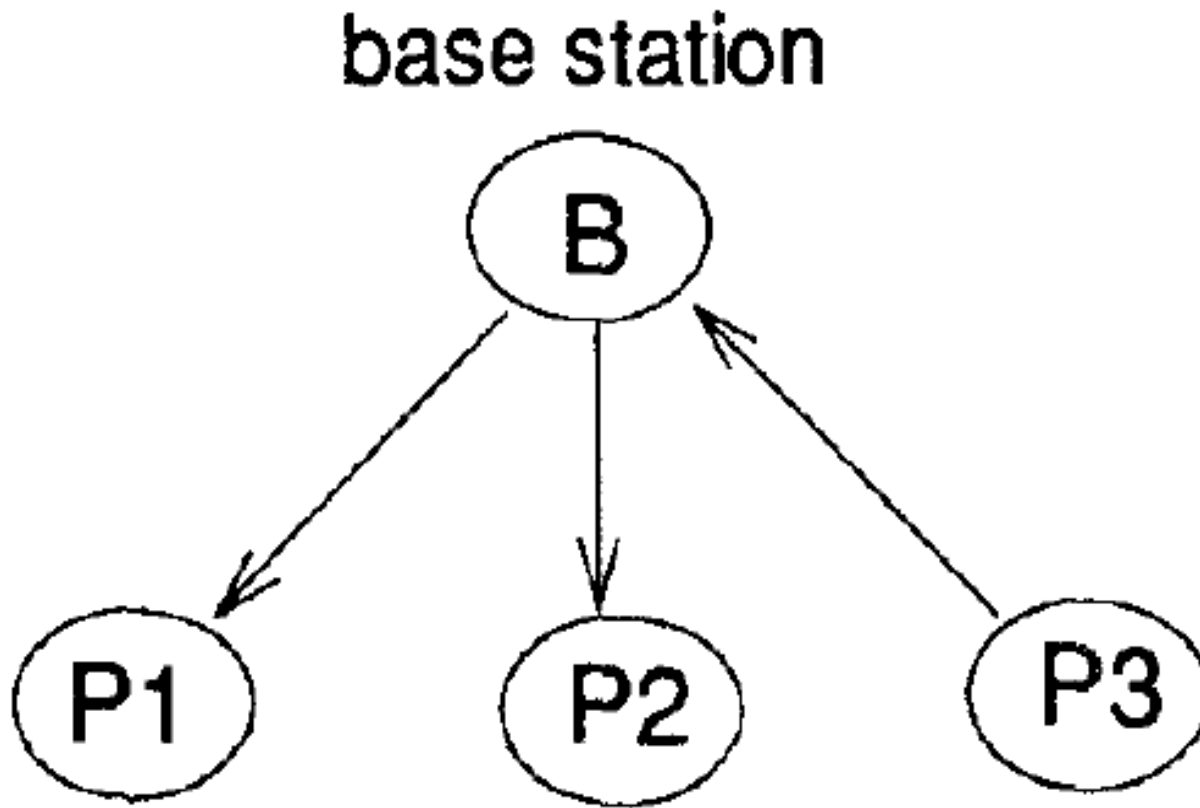
MACAW

- MILD: Multiplicative Increase Linear Decrease

	BEB copy	MILD copy
P1-B	2.96	6.10
P2-B	3.01	6.18
P3-B	2.84	6.05
P4-B	2.93	6.12
P5-B	3.00	6.14
P6-B	3.05	6.09

MACAW

- Multiple Streams



MACAW

- Multiple Streams

	Single Stream	Multiple Stream
B-P1	11.42	15.07
B-P2	12.34	15.82
P3-B	22.74	15.64

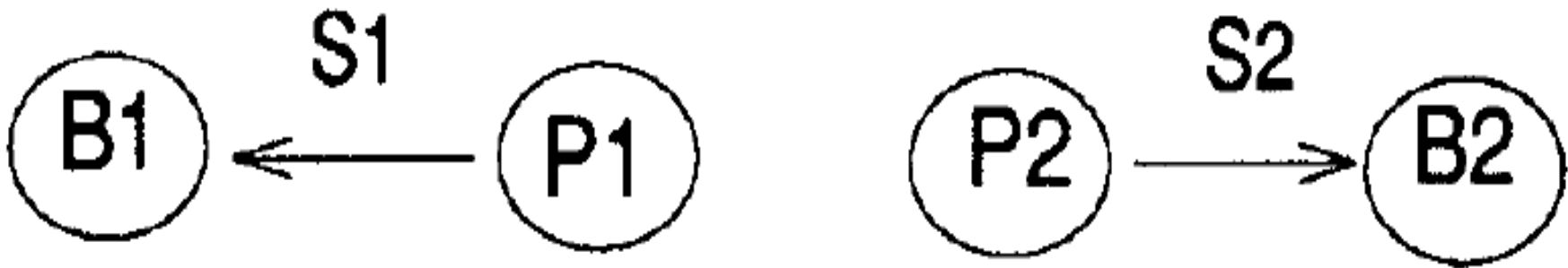
MACAW

- Basic Message Exchange

Error Rate	RTS-CTS-DATA	RTS-CTS-DATA-ACK
0	40.41	36.76
0.001	36.58	36.67
0.01	16.65	35.52
0.1	2.48	9.93

MACAW

- DS (Data-Sending), control packet



MACAW

- DS (Date-Sending), control packet

	RTS-CTS-DATA-ACK	RTS-CTS-DS-DATA-ACK
P1-B1	46.72	23.35
P2-B2	0	22.63

MACAW

- RRTS (Request Request-to-Send)



	no RRTS	RRTS
B1-P1	0	20.39
P2-B2	42.87	20.53

MACAW

- Unresolved?



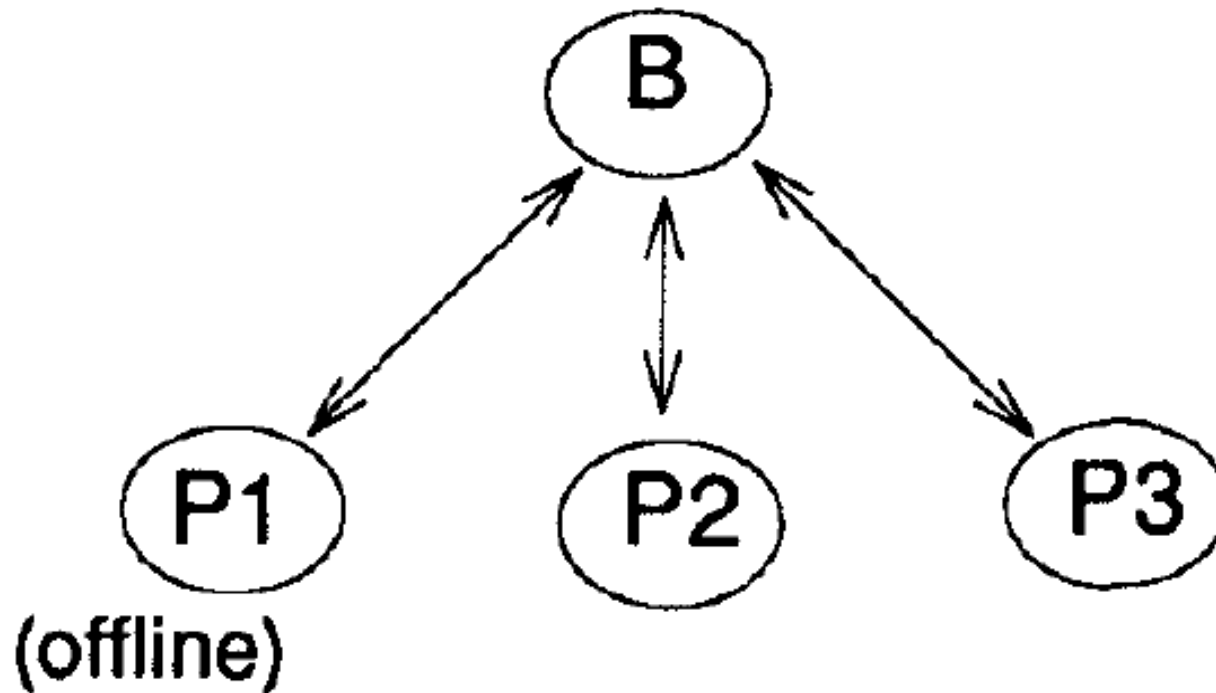
B1-P1	0
P2-B2	43.93

MACAW

- Multicast?
-

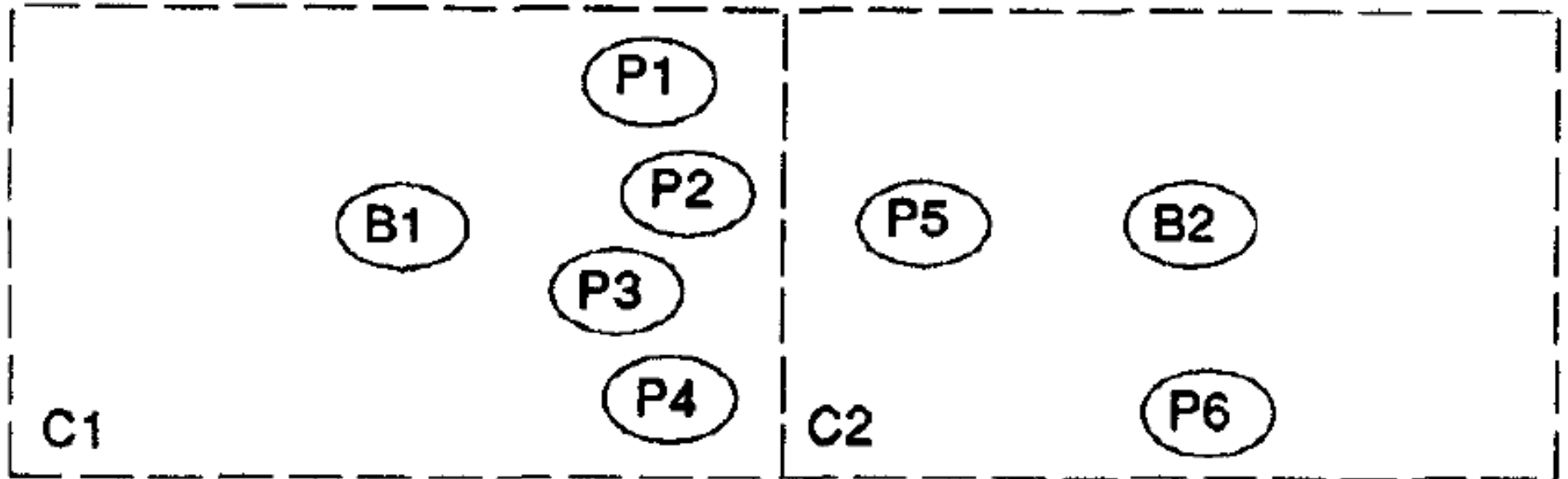
MACAW

- Backoff revisited



MACAW

- Backoff revisited



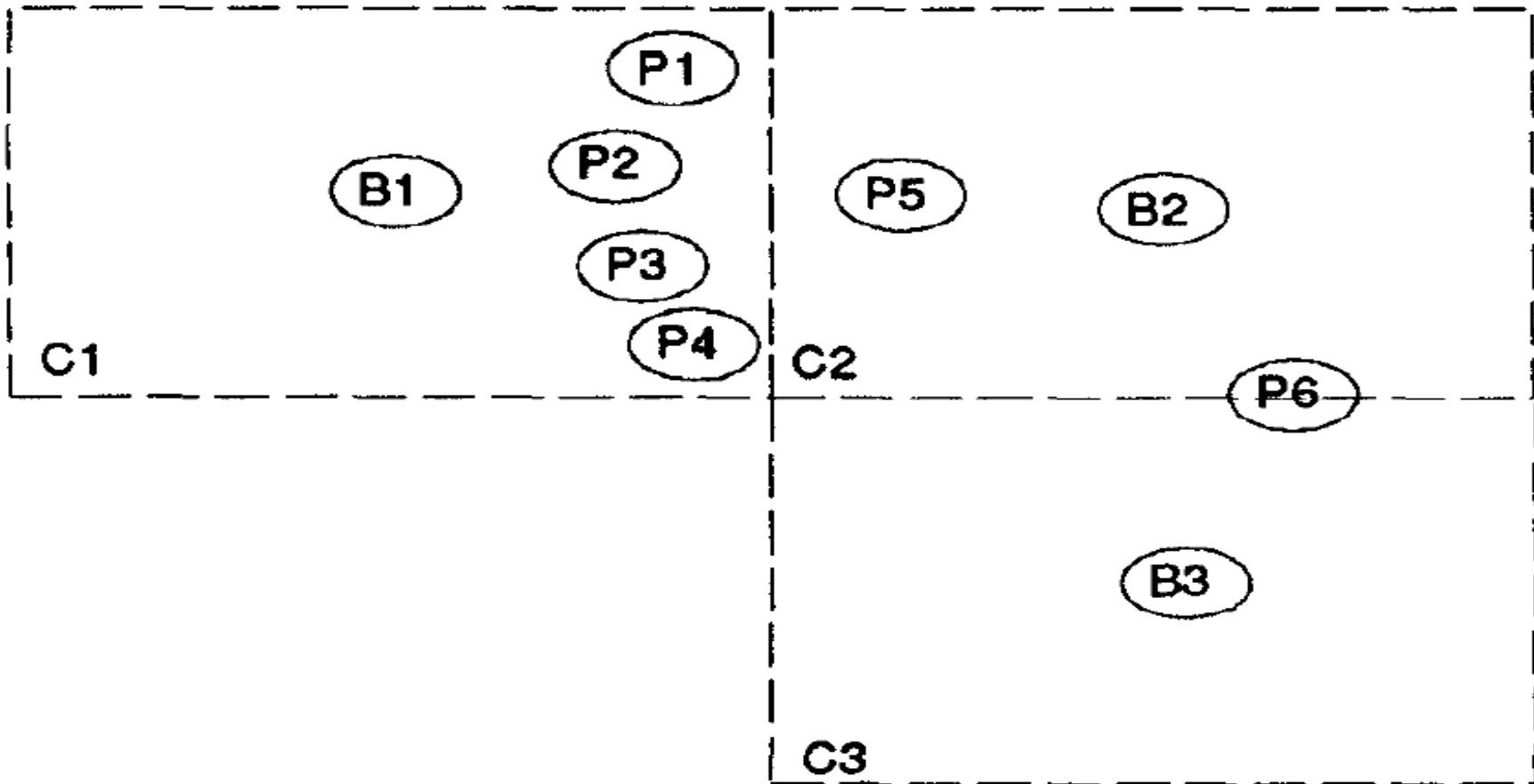
MACAW

- Backoff revisited

	Single backoff	Per-destination backoff
B1-P2	3.79	8.98
P2-B1	3.78	8.84
B1-P3	3.62	8.68
P3-B1	3.43	8.41

MACAW

- Preliminary evaluation



MACAW

- Preliminary evaluation

	MACA	MACAW
P1-B1	9.61	3.45
P2-B1	2.45	3.84
P3-B1	3.70	3.27
P4-B1	0.46	3.80
B1-P1	0.12	3.83
B1-P2	0.01	3.72
B1-P3	0.20	3.72
B1-P4	0.66	3.59
P5-B2	2.24	7.82
B2-P5	3.21	7.80
P6-B3	28.40	25.16