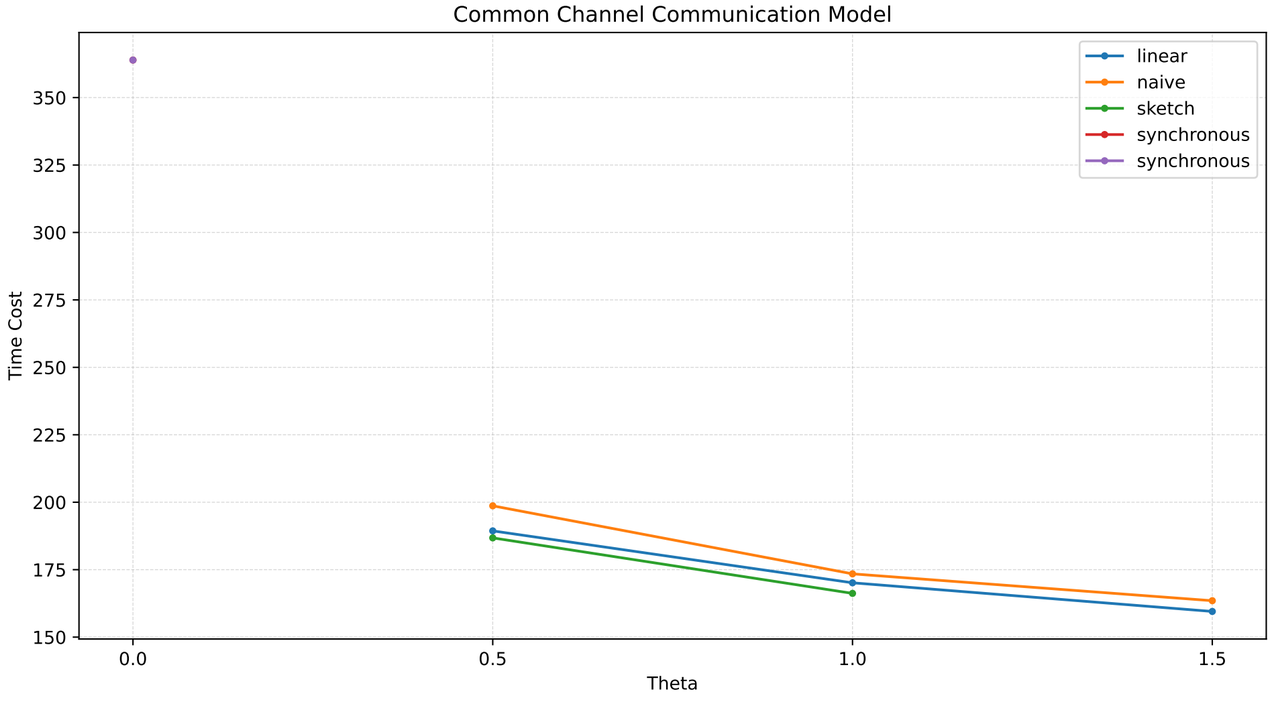
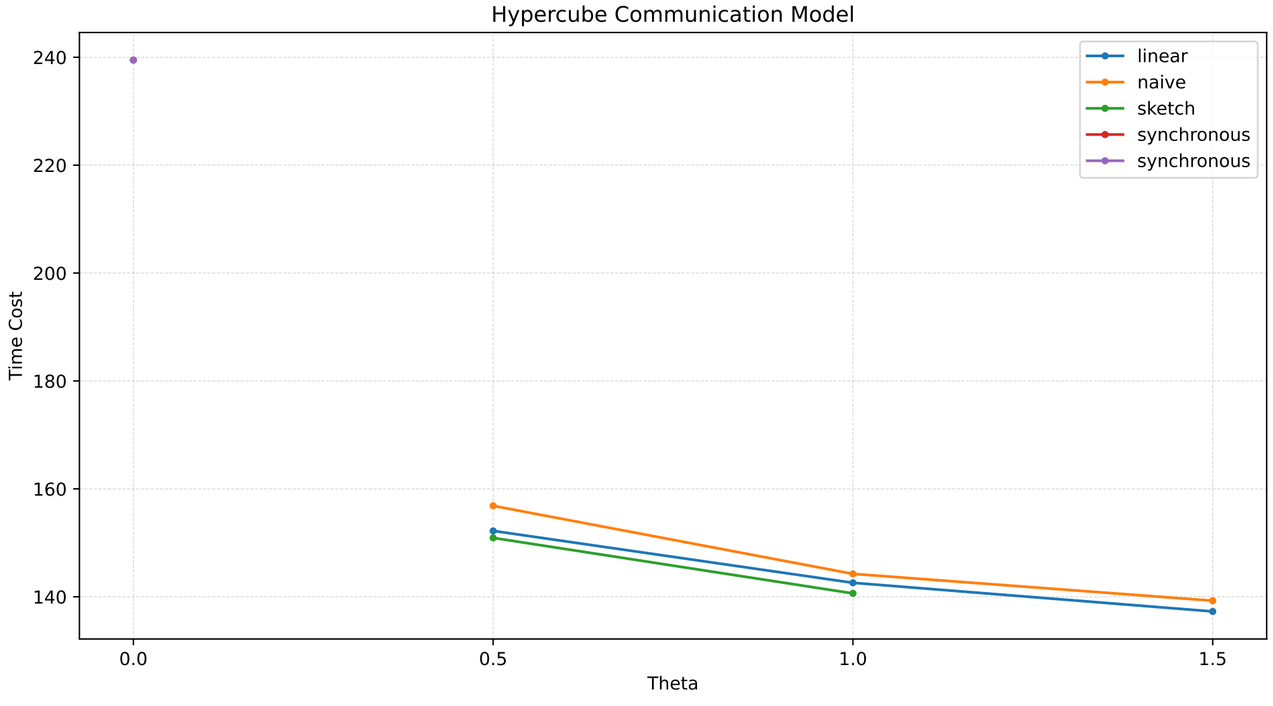
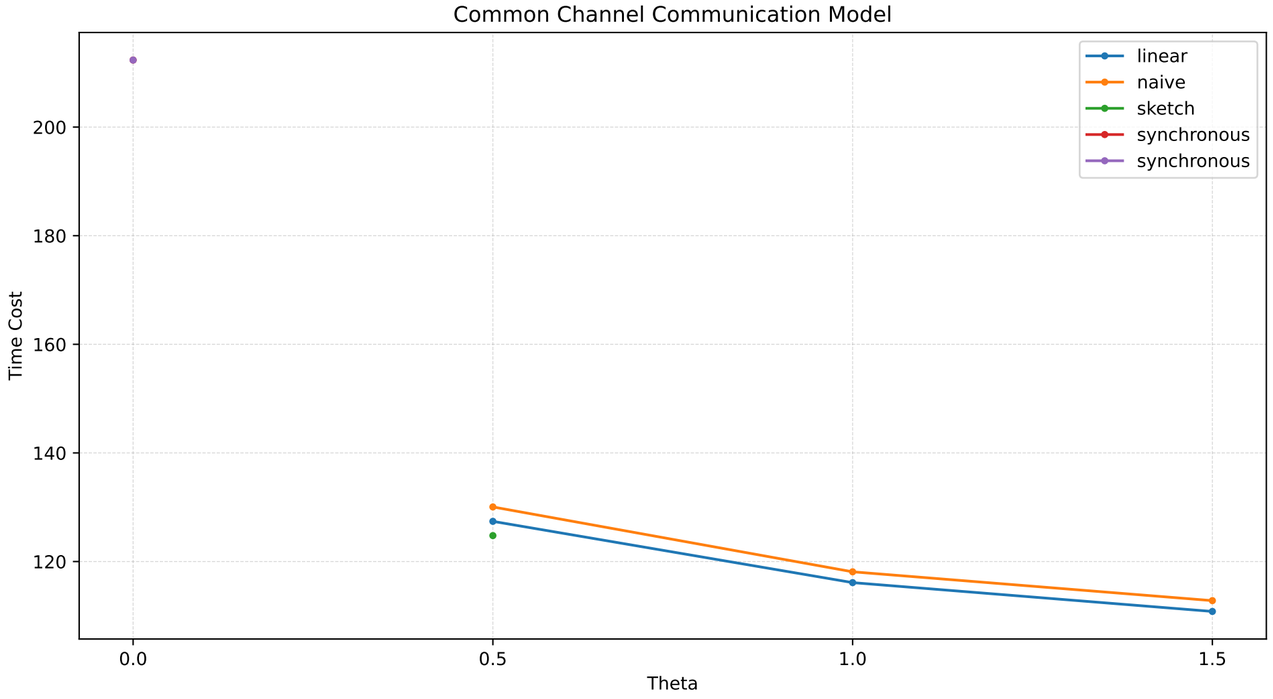
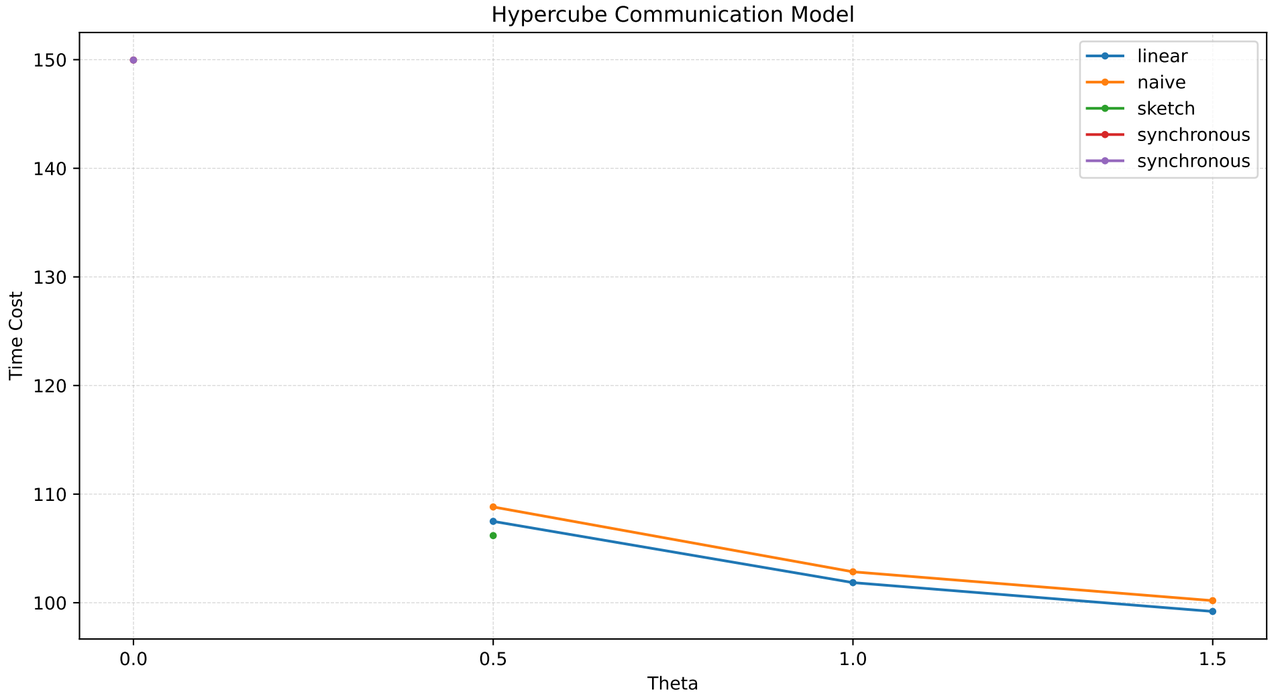
Num Clients : 5 , Batch Size : 32



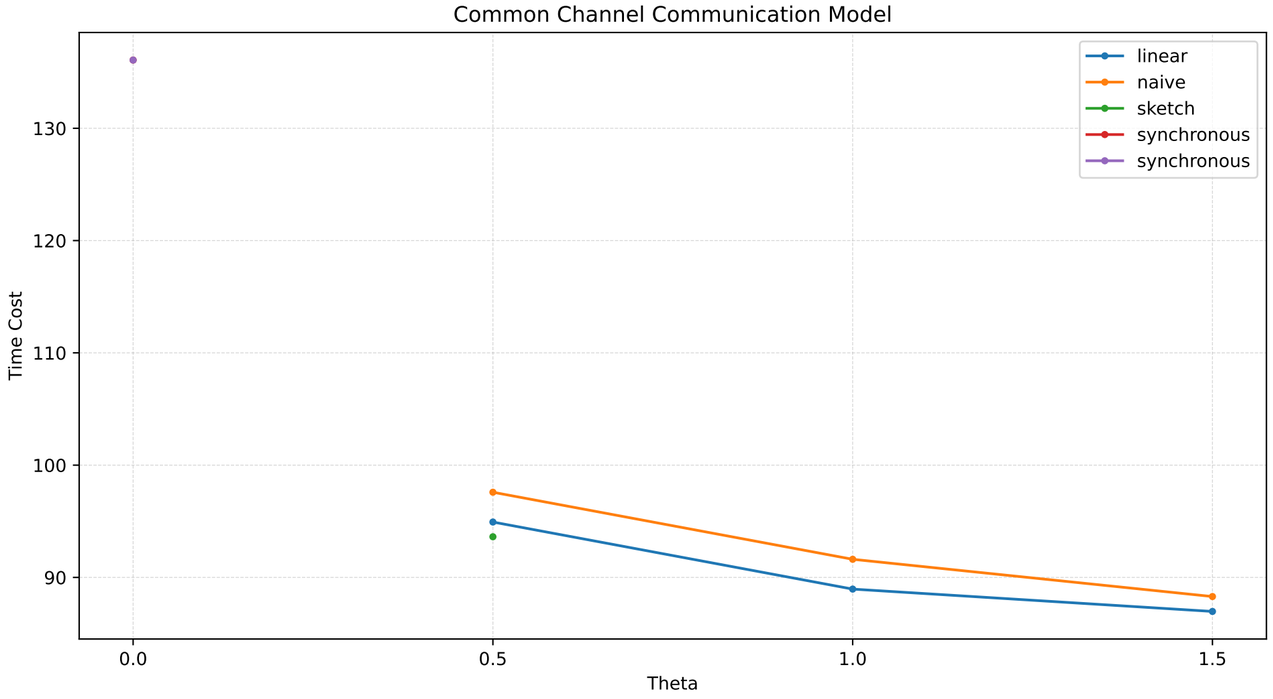


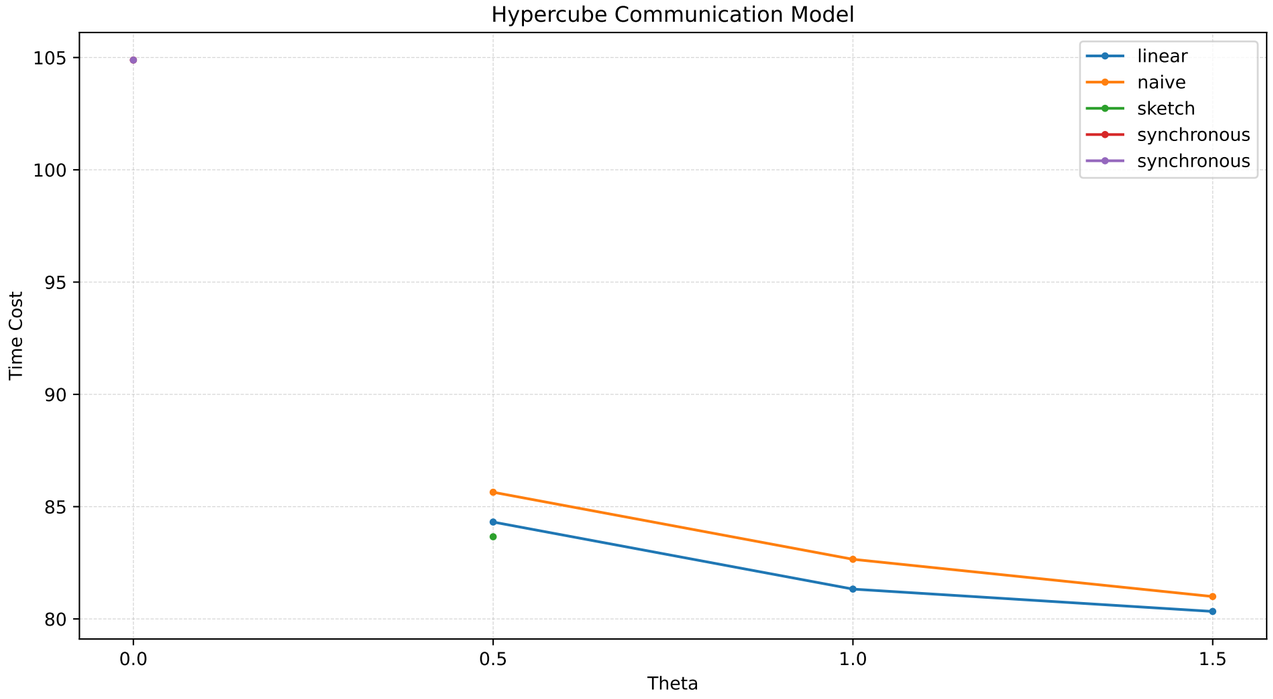
Num Clients : 5 , Batch Size : 64



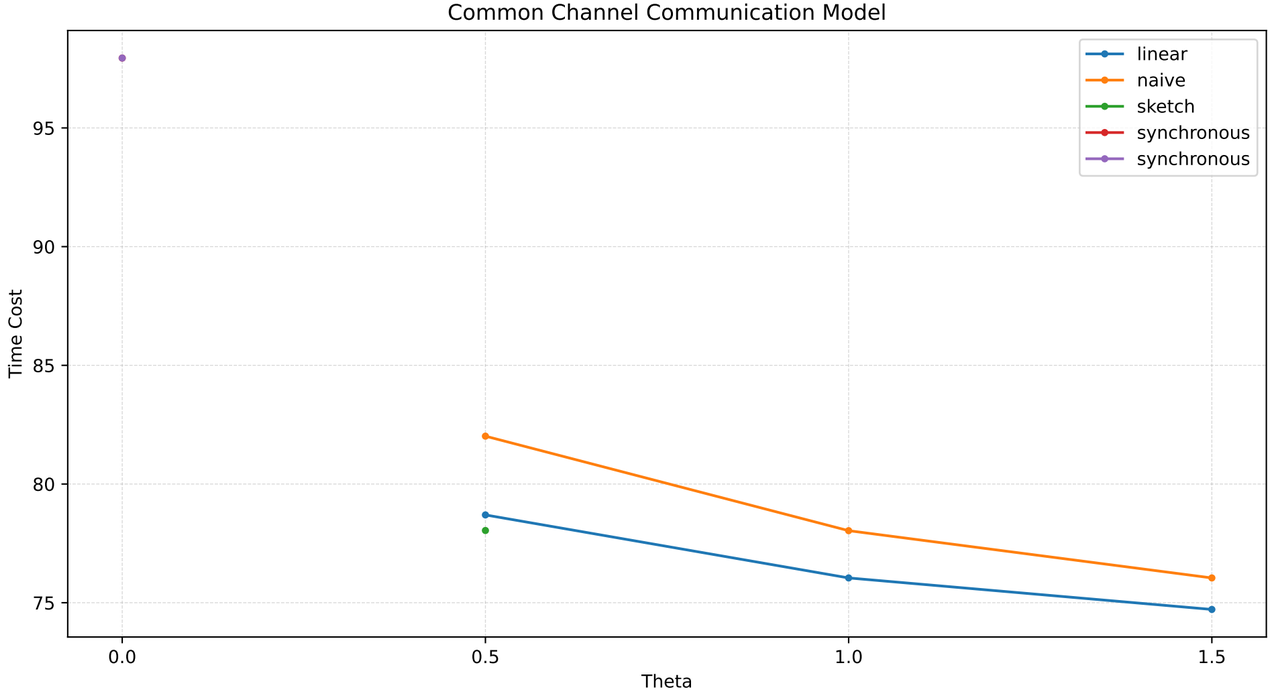


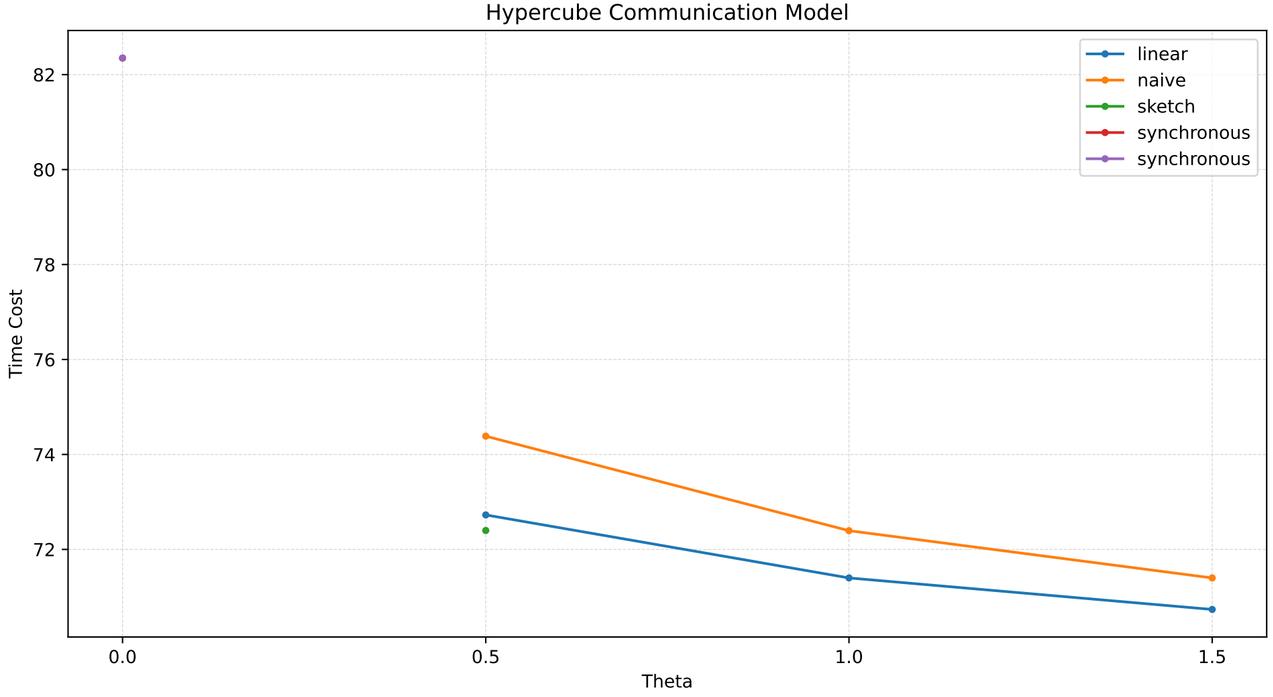
Num Clients : 5 , Batch Size : 128



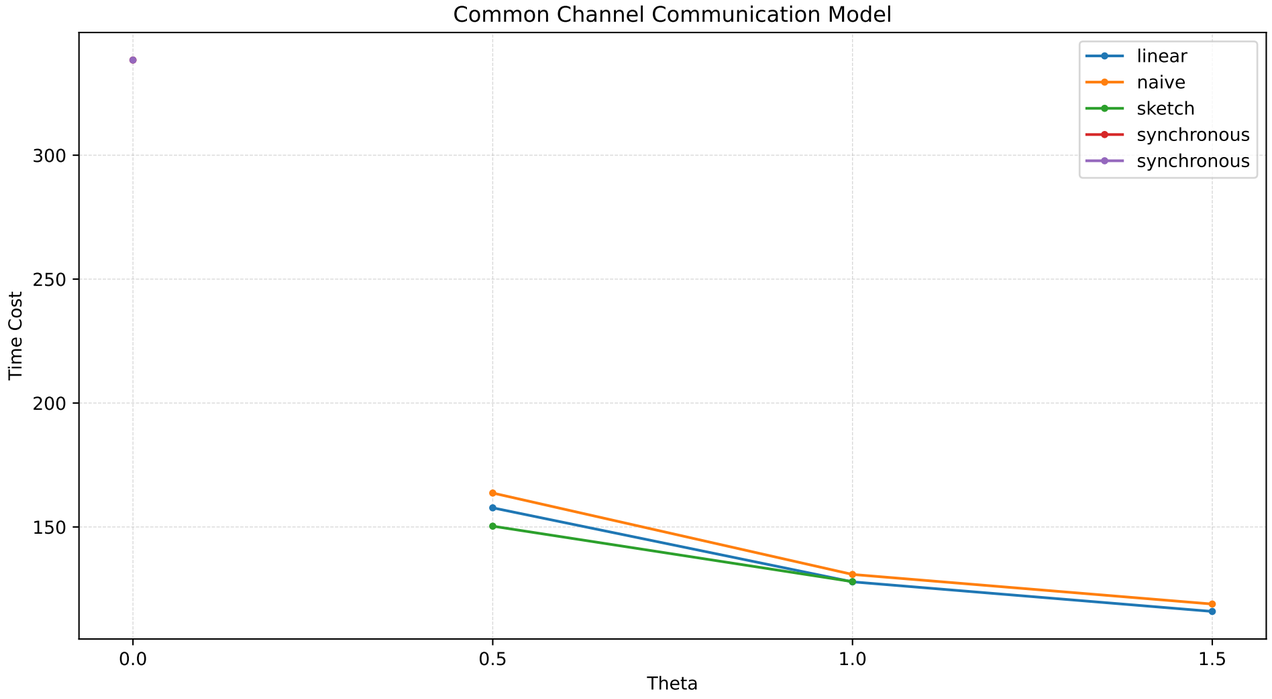


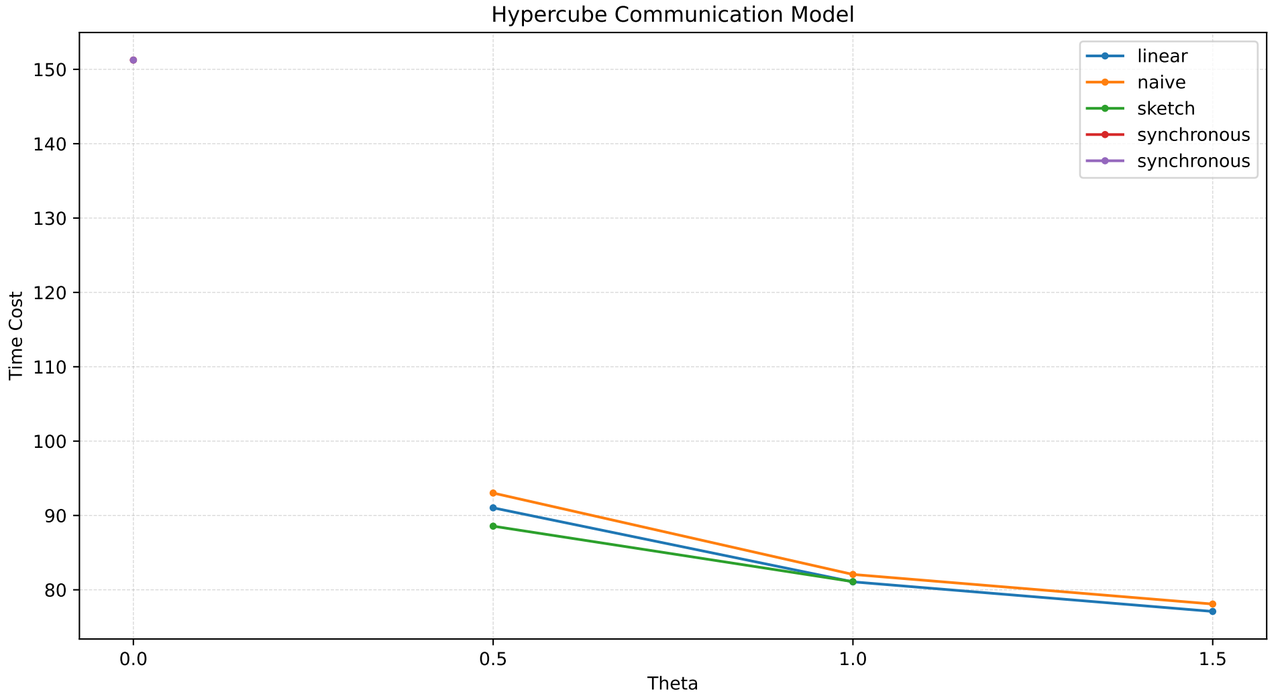
Num Clients : 5 , Batch Size : 256



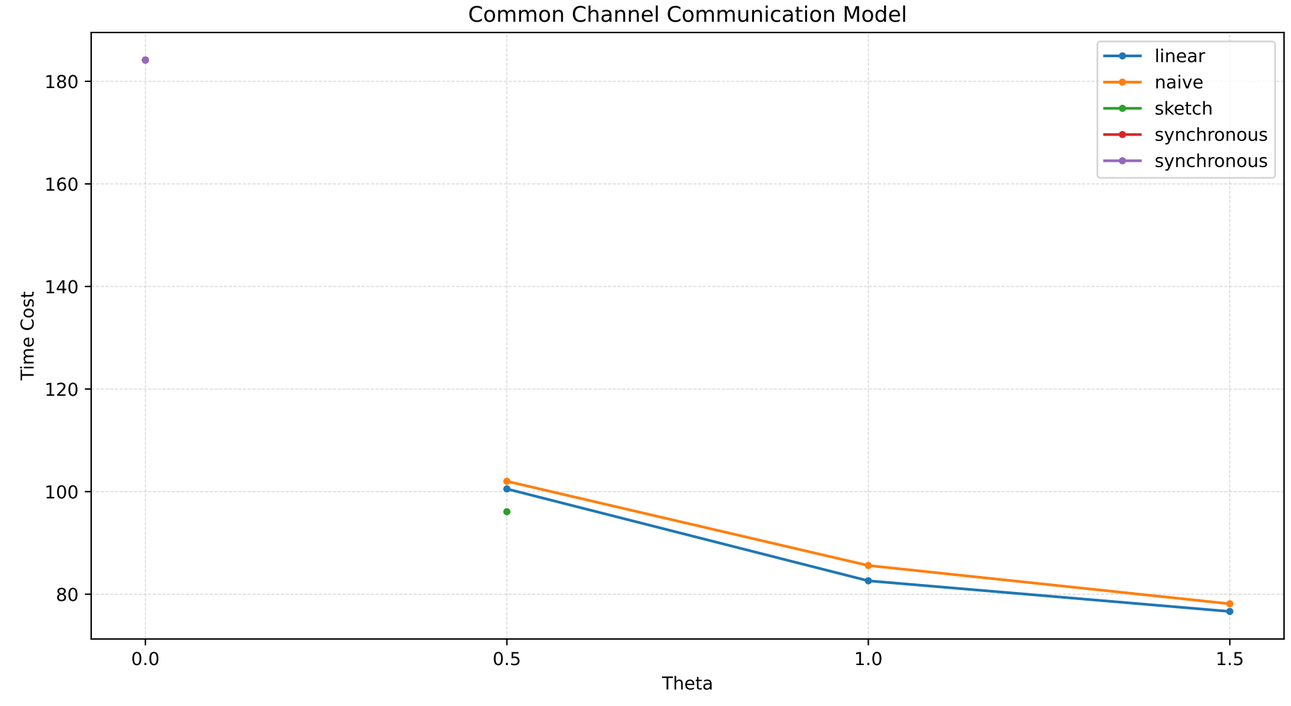


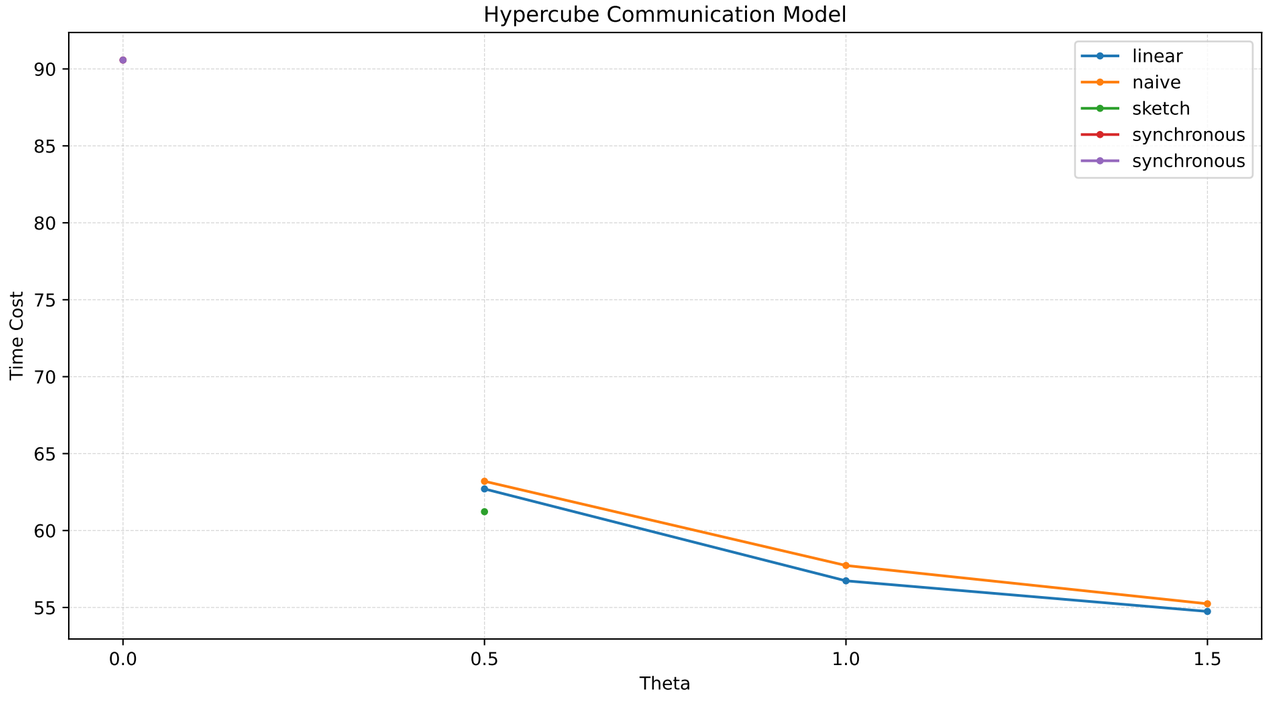
Num Clients : 10 , Batch Size : 32



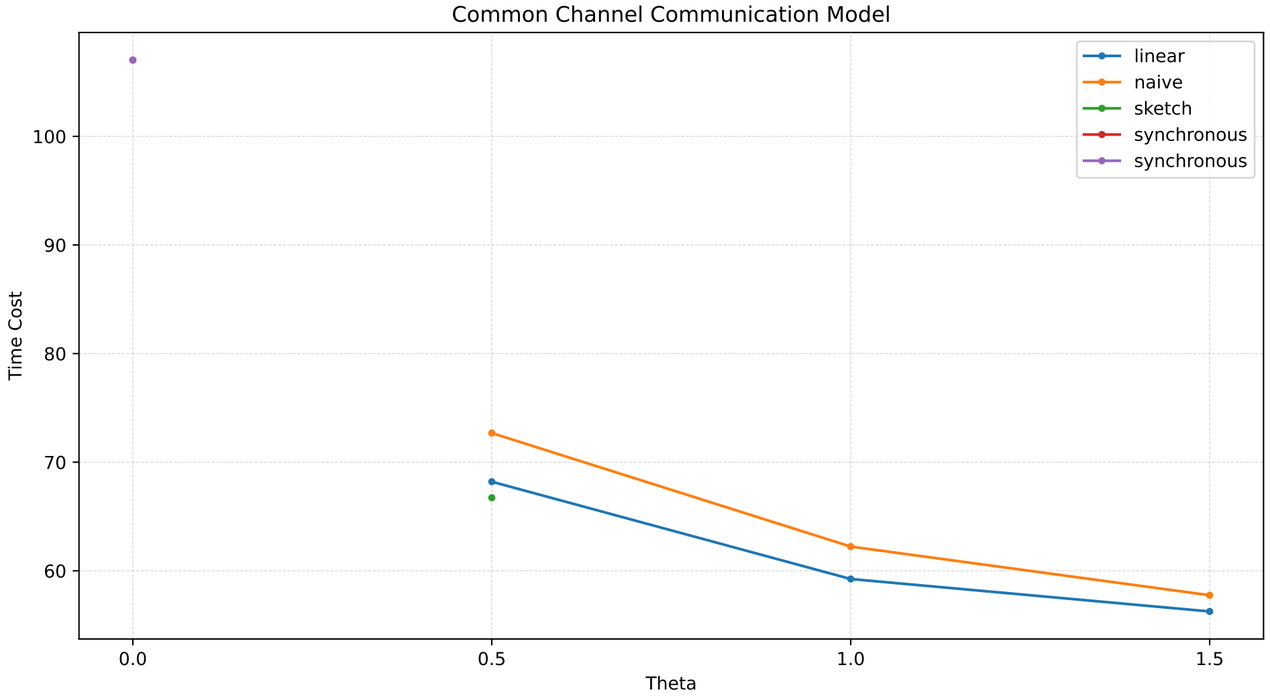


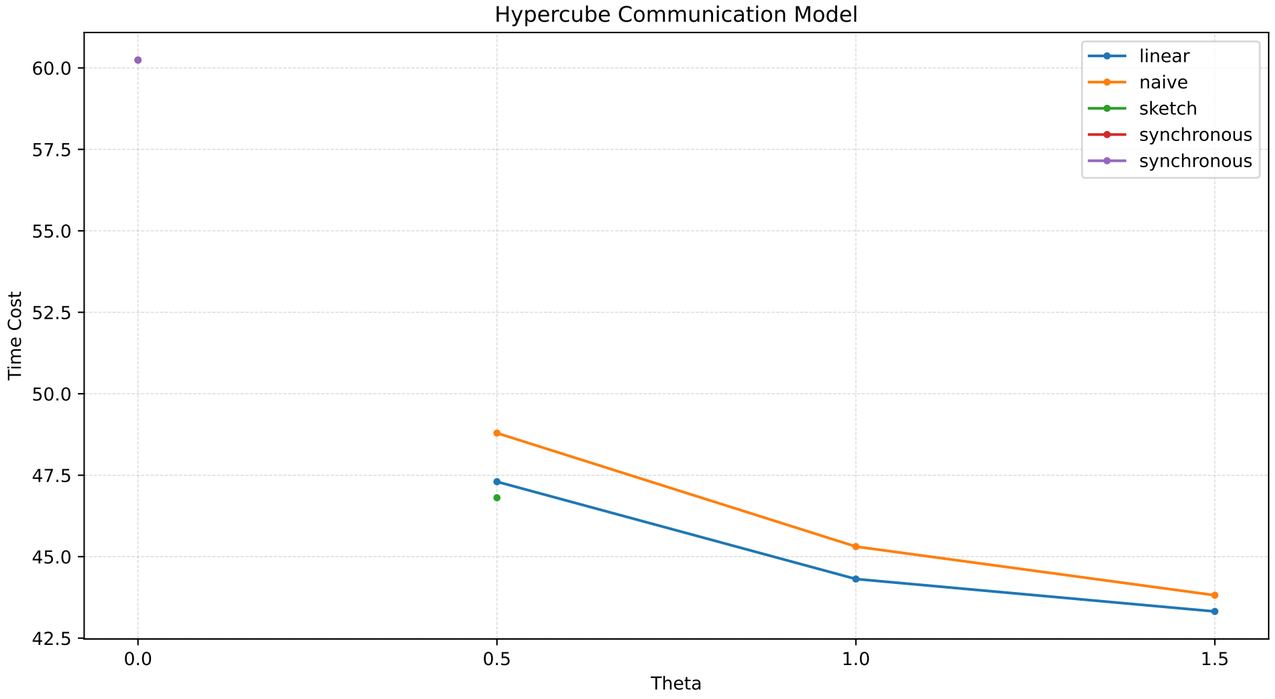
Num Clients : 10 , Batch Size : 64

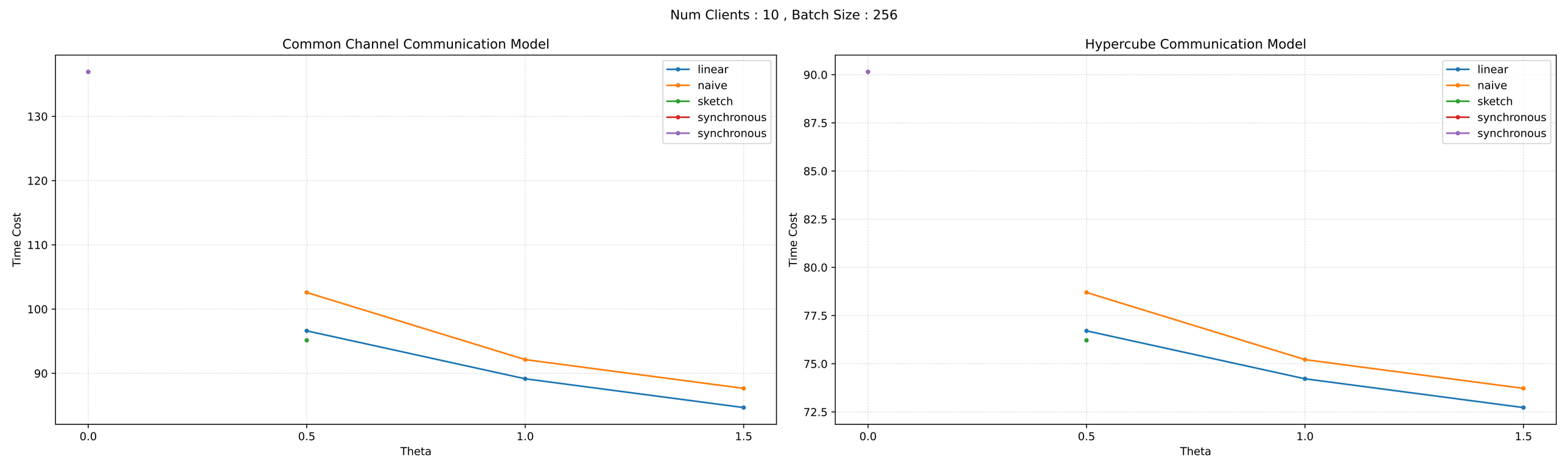




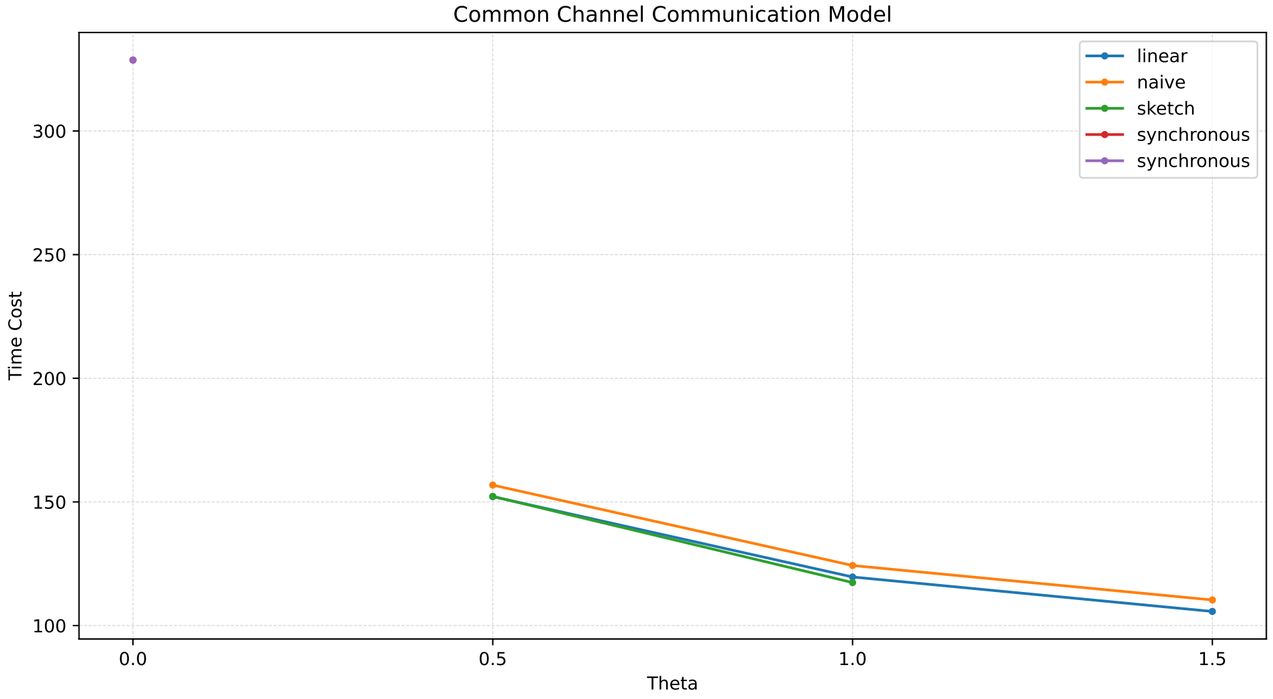
Num Clients : 10 , Batch Size : 128

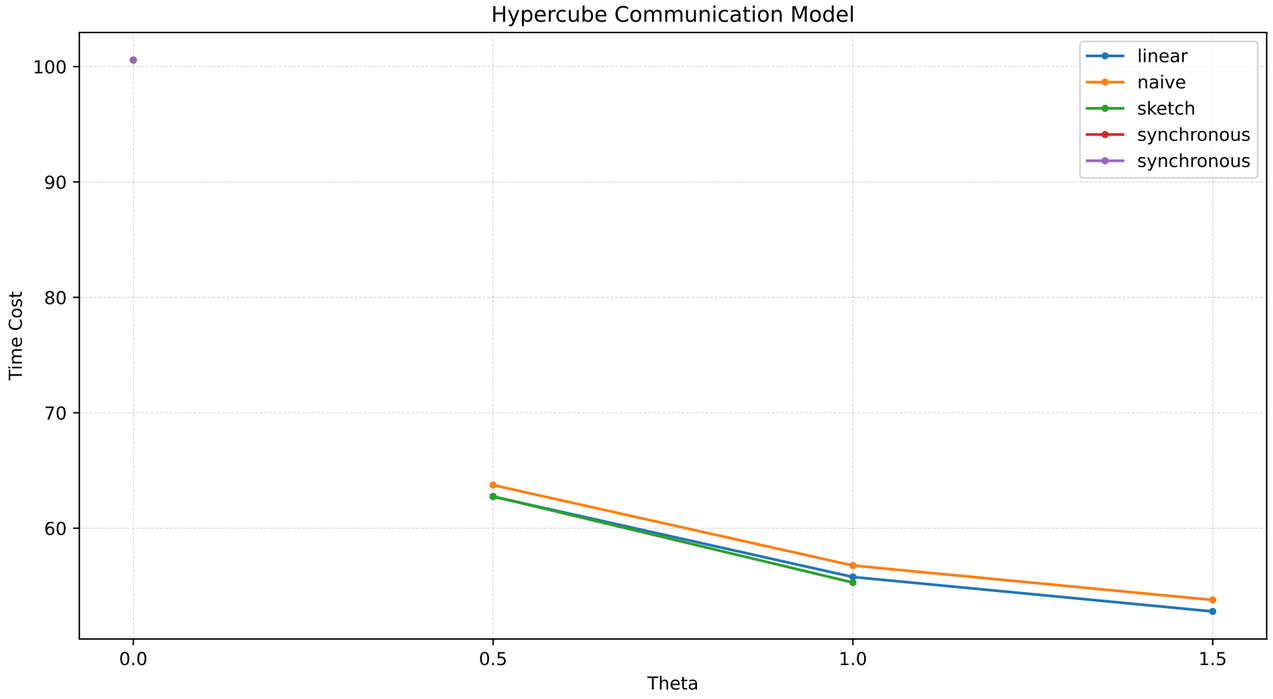




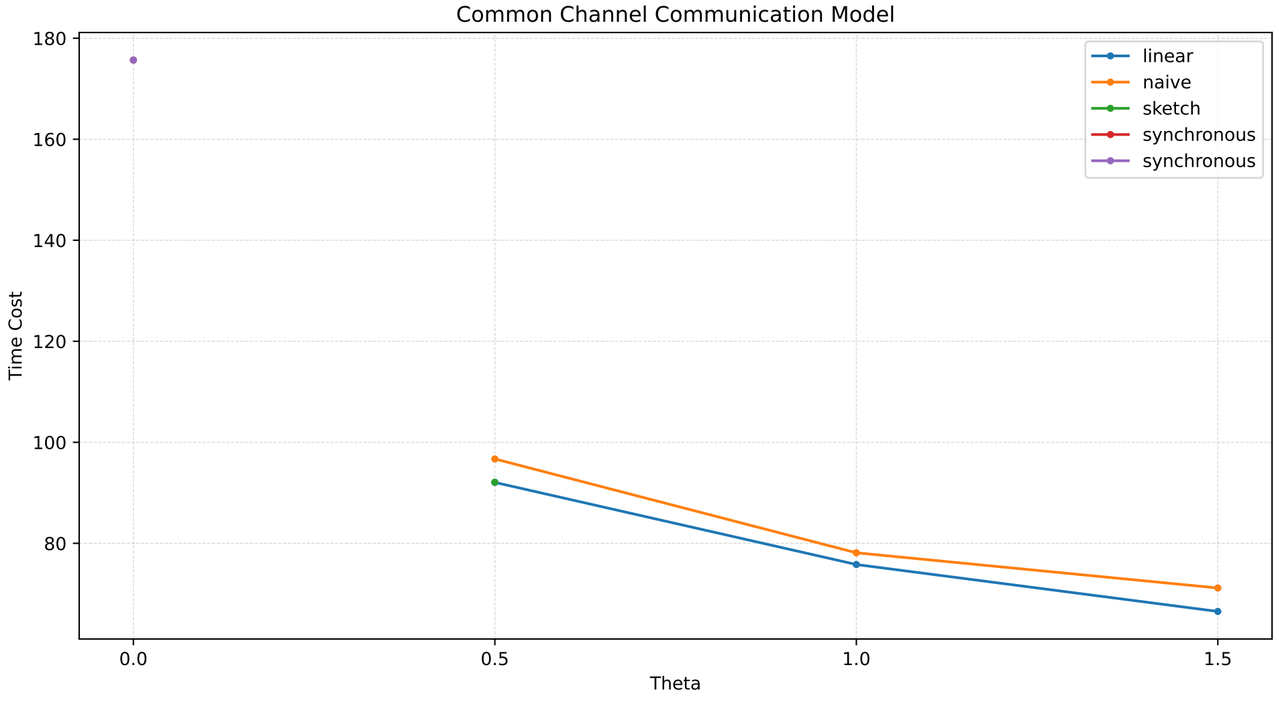

Num Clients : 10 , Batch Size : 256
Common Channel Communication Model
Hypercube Communication Model
linear
naive
sketch
synchronous
synchronous
Time Cost
Theta
130
120
110
100
90
90.0
87.5
85.0
82.5
80.0
77.5
75.0
72.5
0.0
0.5
1.0
1.5

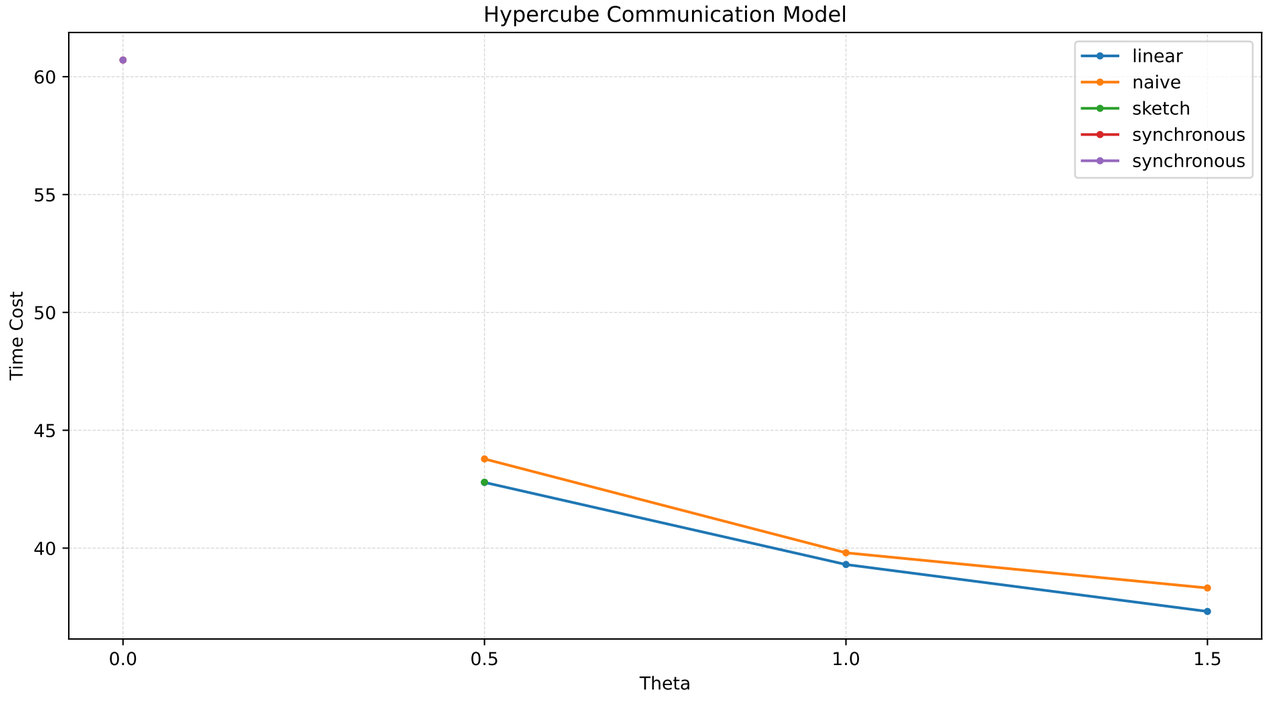
Num Clients : 15 , Batch Size : 32



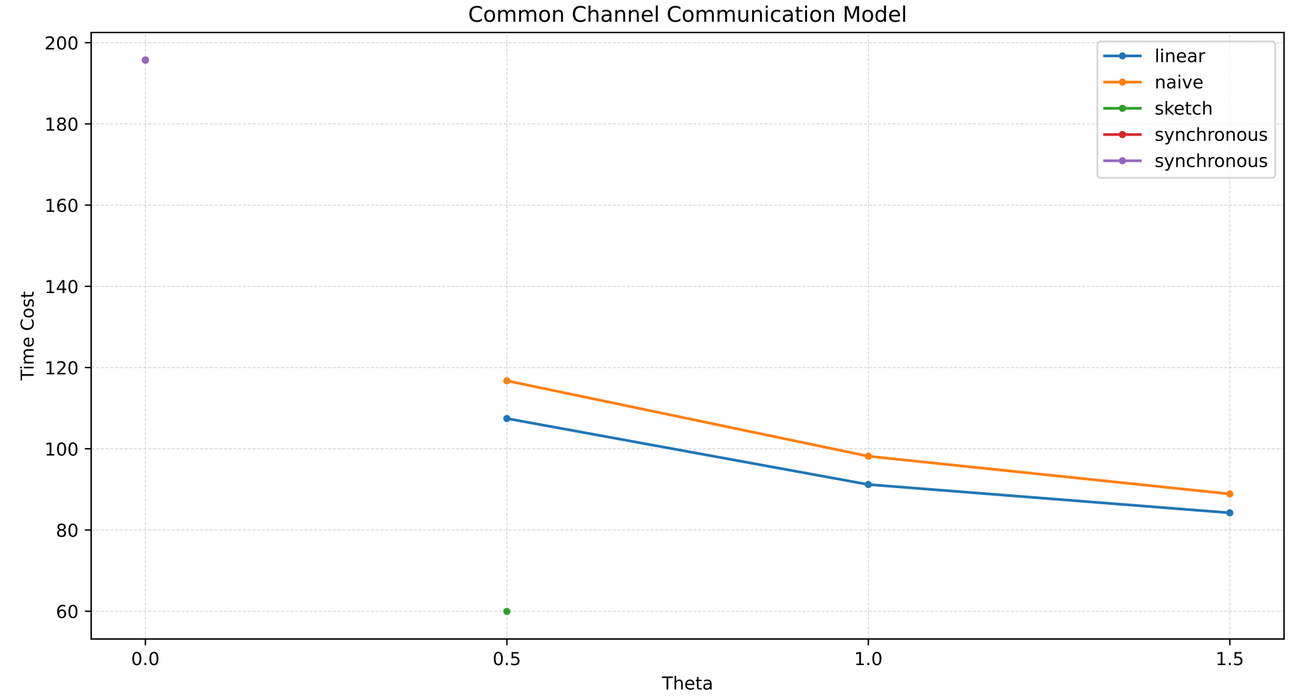


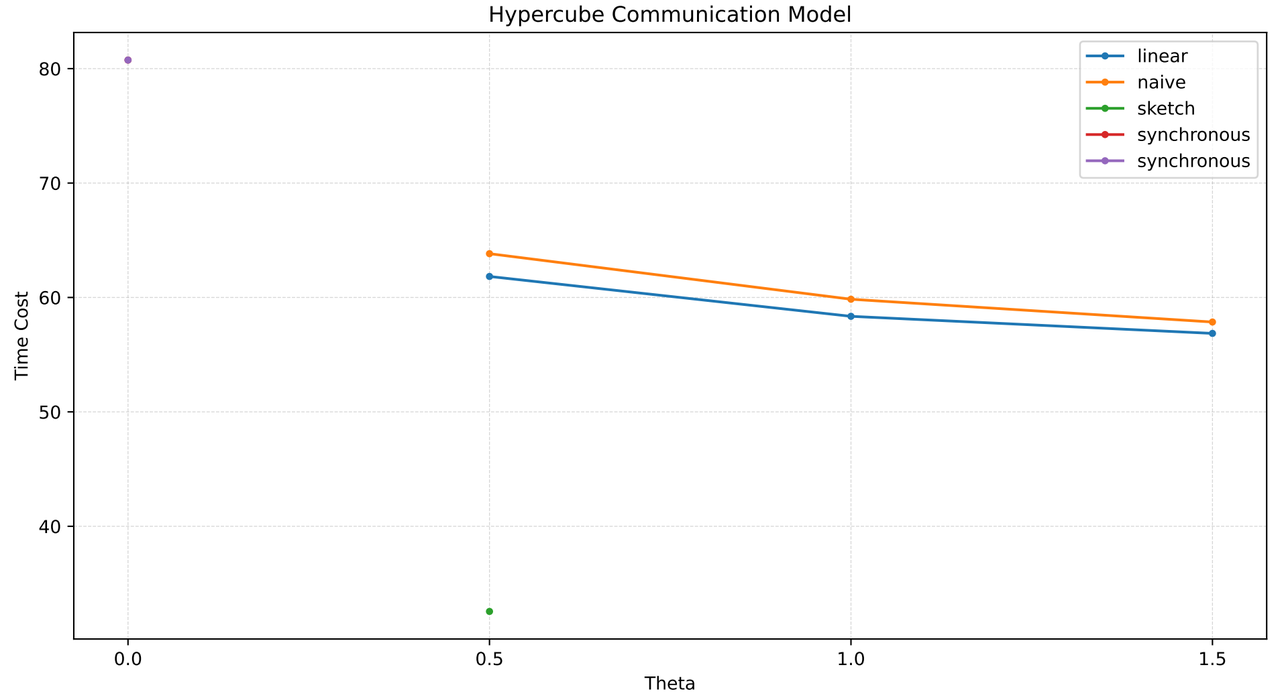
Num Clients : 15 , Batch Size : 64



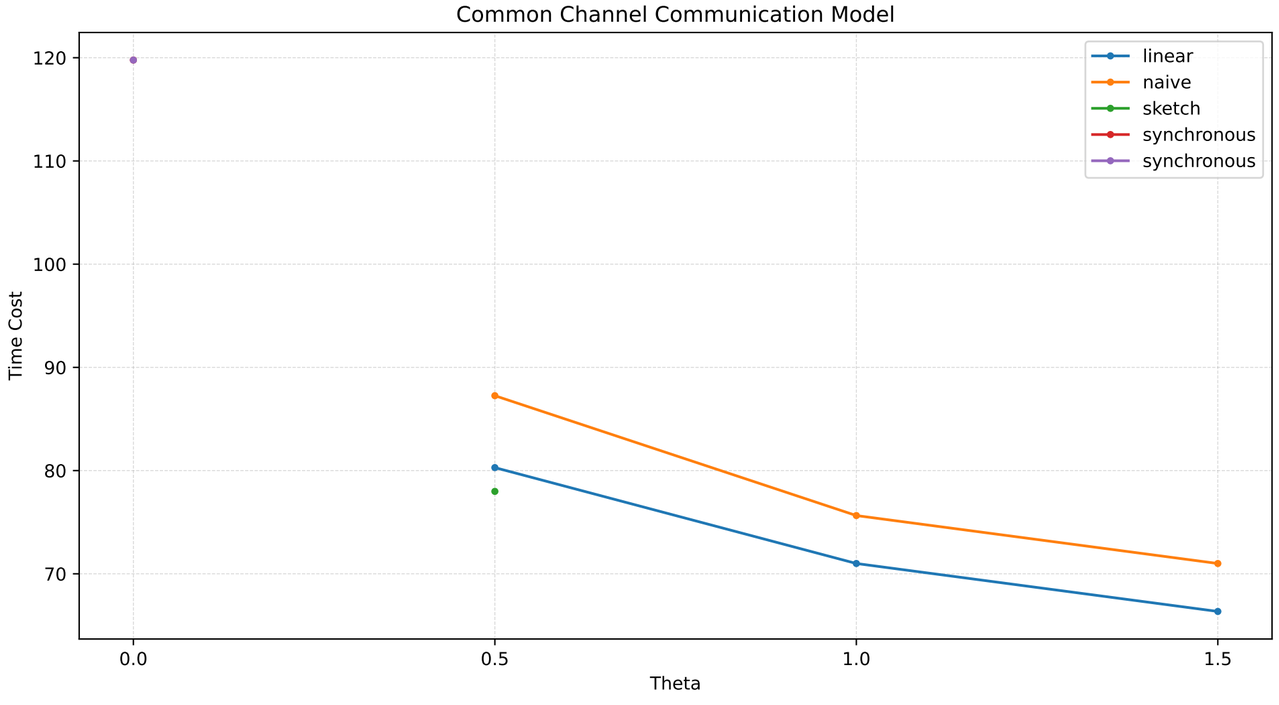


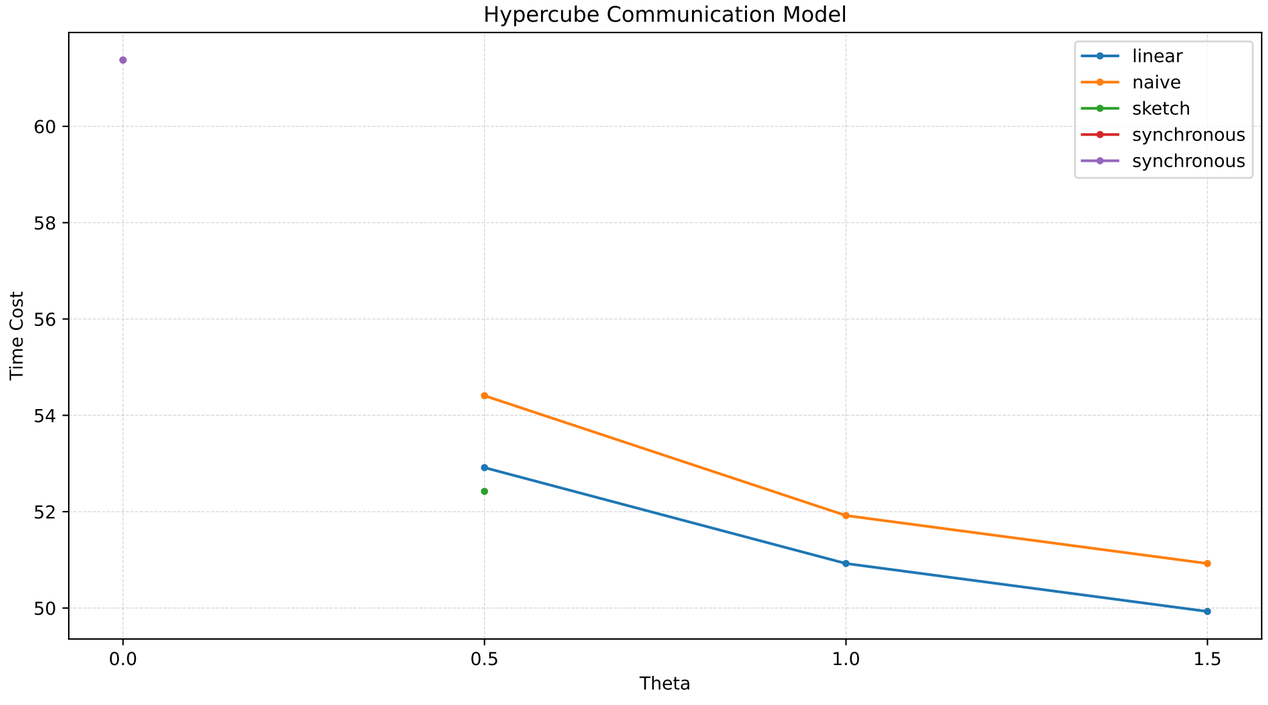
Num Clients : 15 , Batch Size : 128

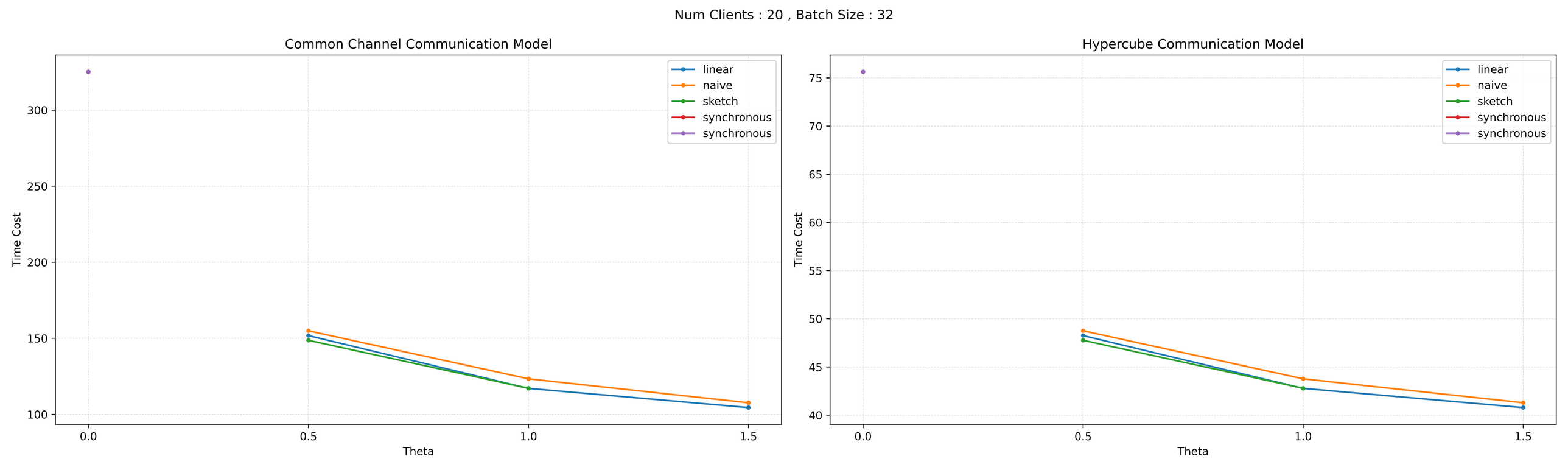




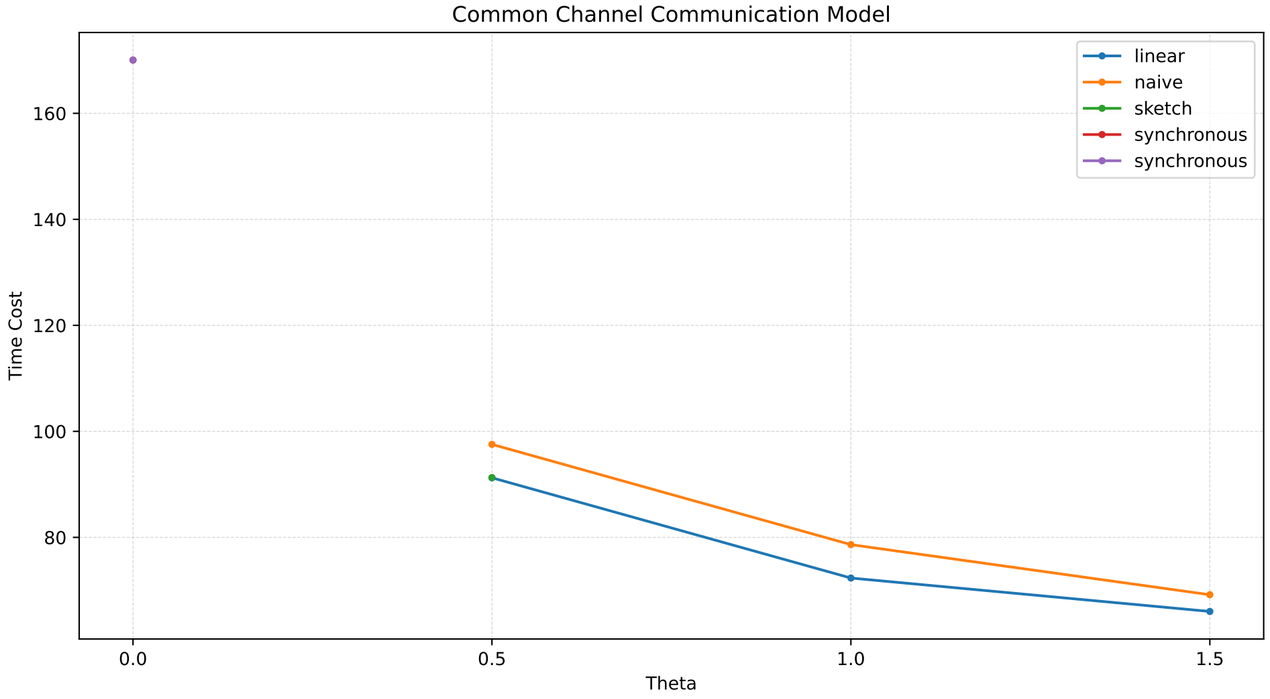
Num Clients : 15 , Batch Size : 256

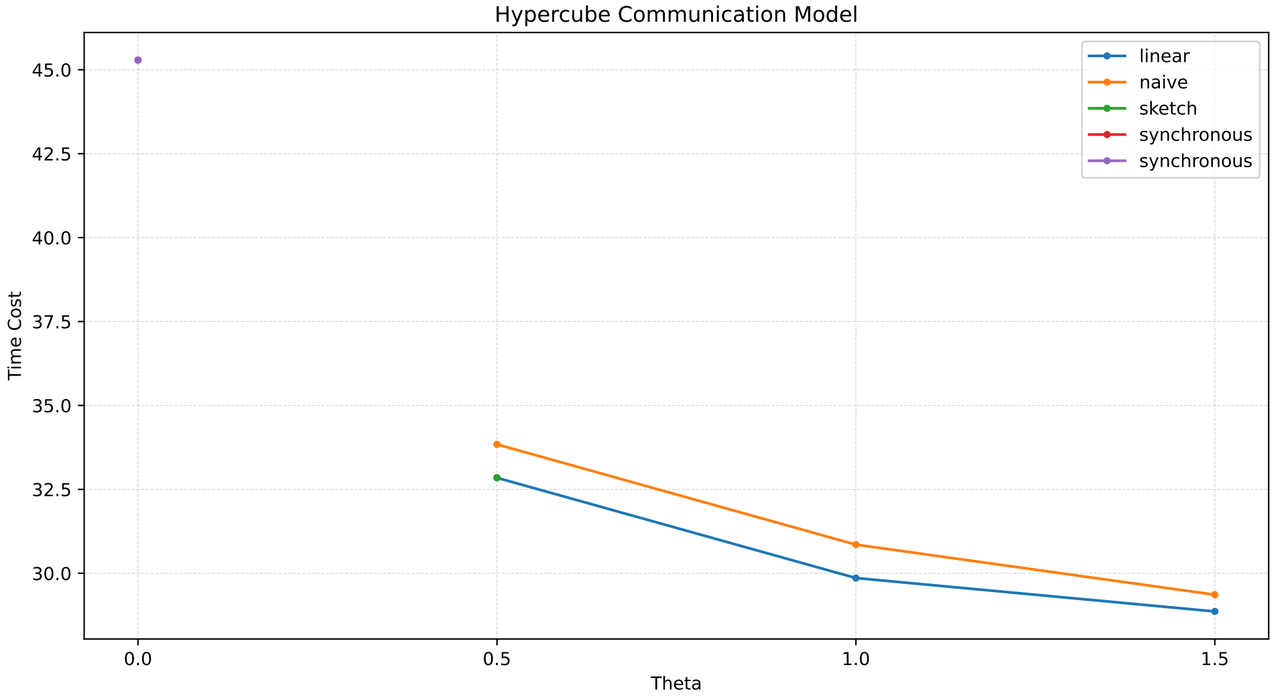




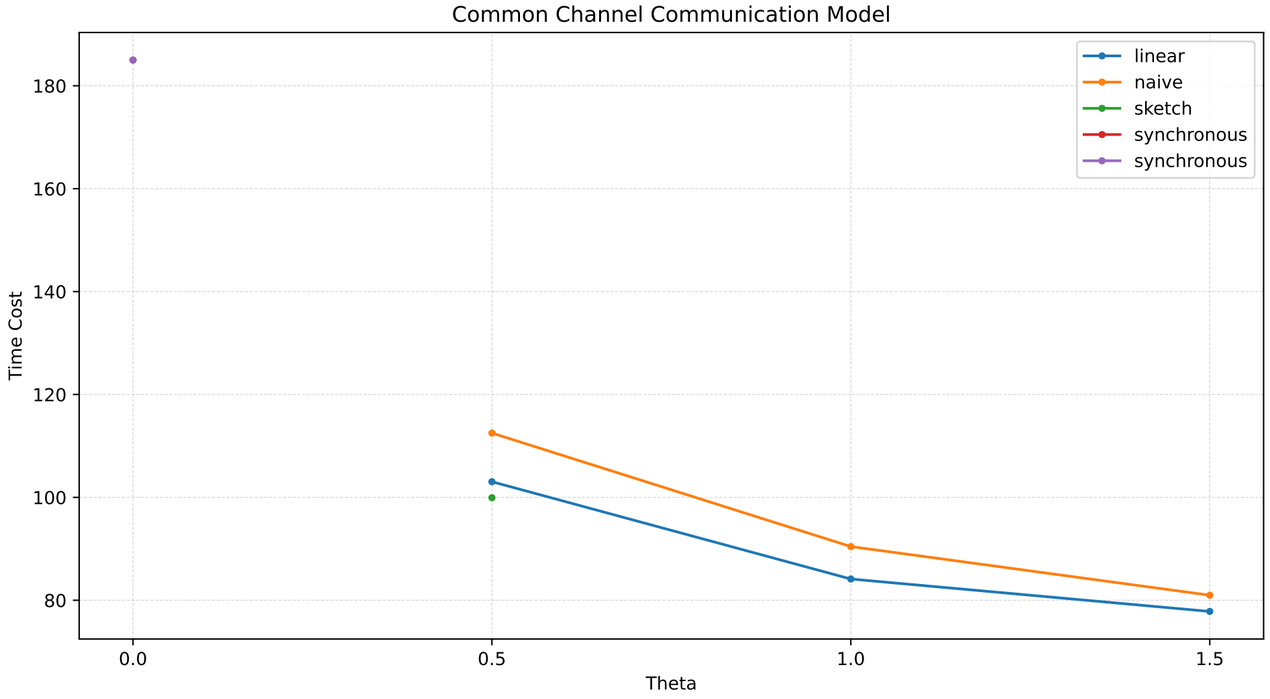

Num Clients : 20 , Batch Size : 32
Common Channel Communication Model
Hypercube Communication Model
Time Cost
Theta
linear
naive
sketch
synchronous
synchronous
0.0
0.5
1.0
1.5
100
150
200
250
300
40
45
50
55
60
65
70
75

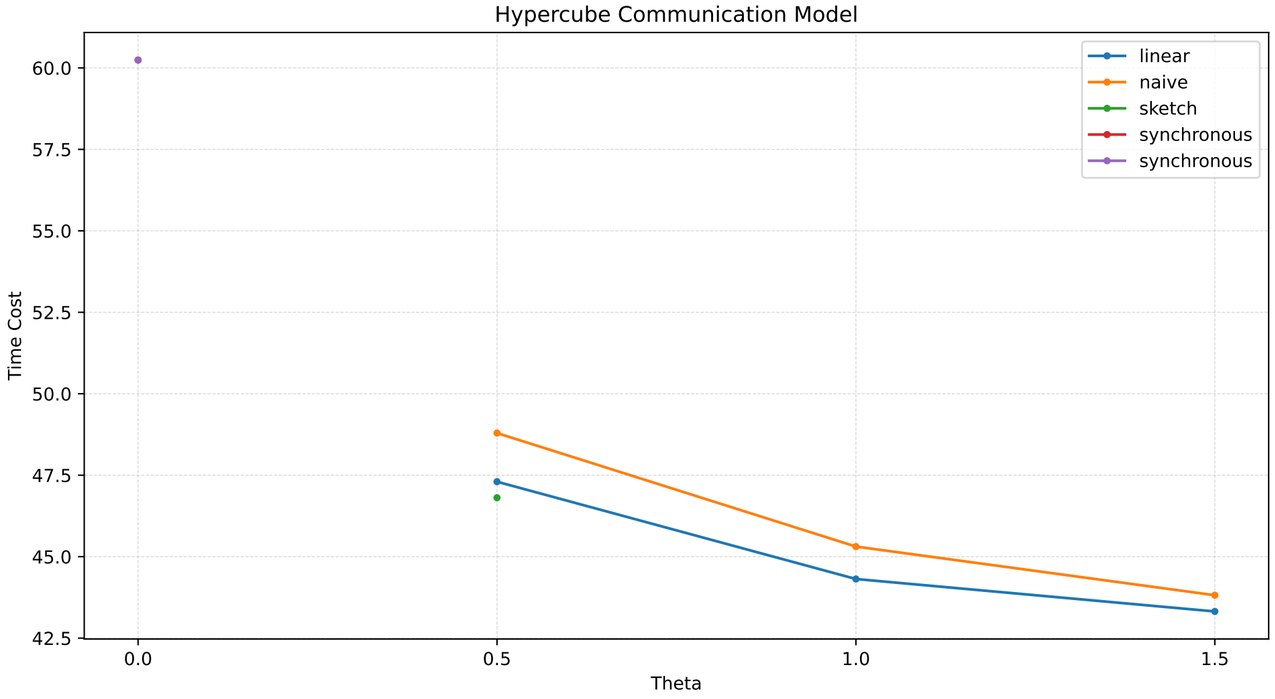
Num Clients : 20 , Batch Size : 64

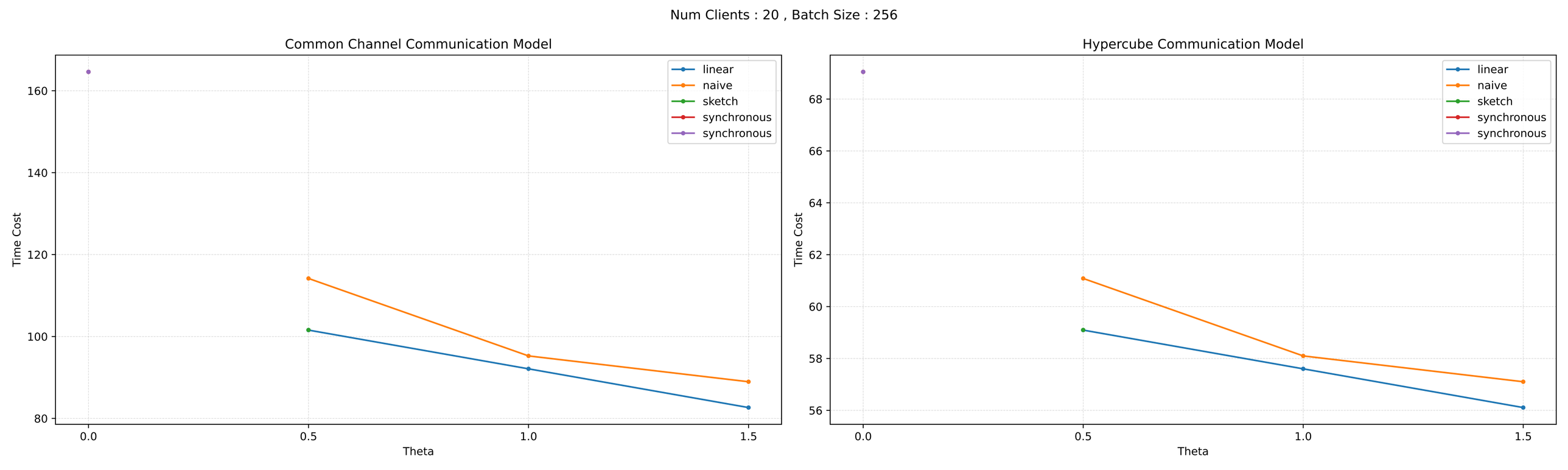




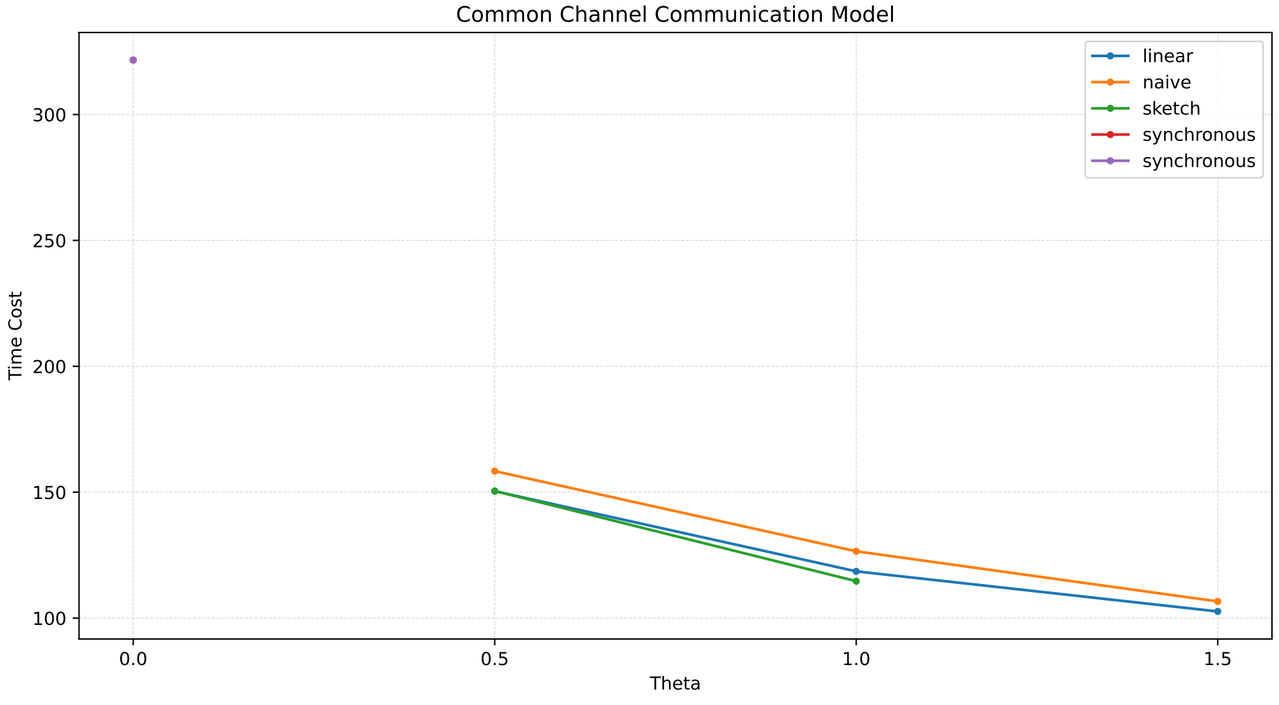
Num Clients : 20 , Batch Size : 128

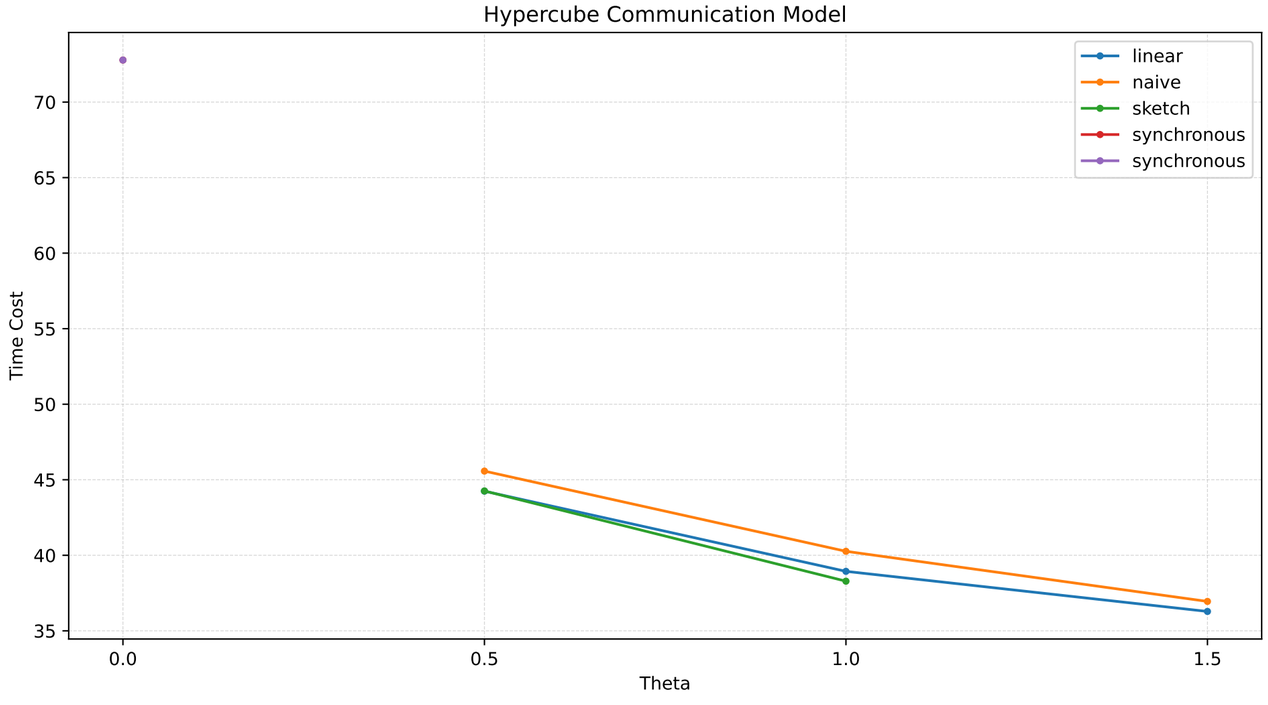




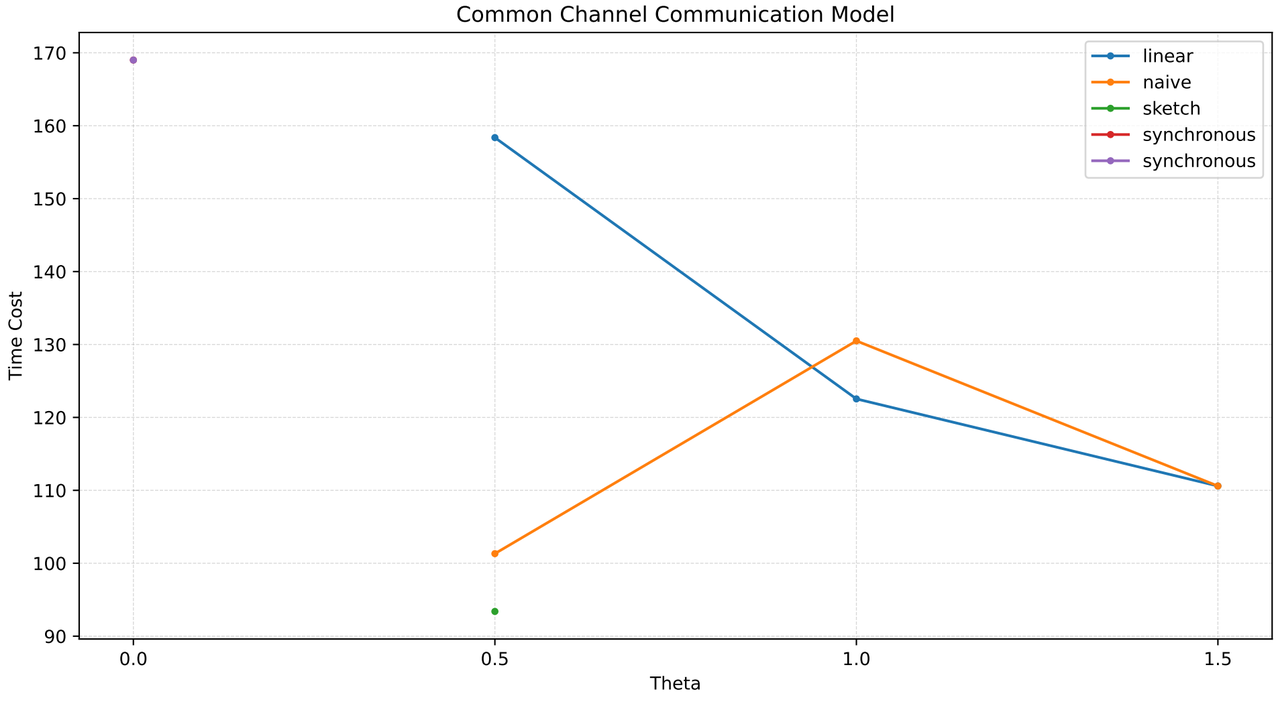

Num Clients : 20 , Batch Size : 256
Common Channel Communication Model
Hypercube Communication Model
Time Cost
Theta
linear
naive
sketch
synchronous
synchronous
160
140
120
100
80
68
66
64
62
60
58
56
0.0
0.5
1.0
1.5

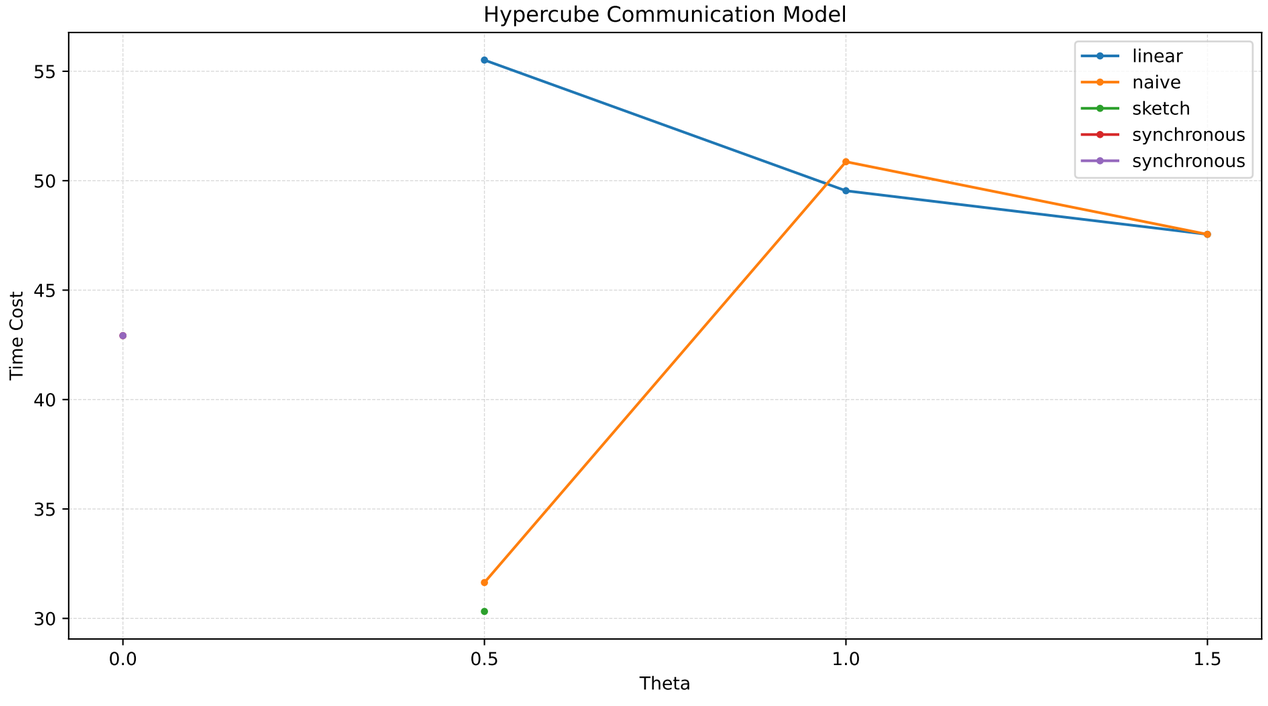
Num Clients : 25 , Batch Size : 32



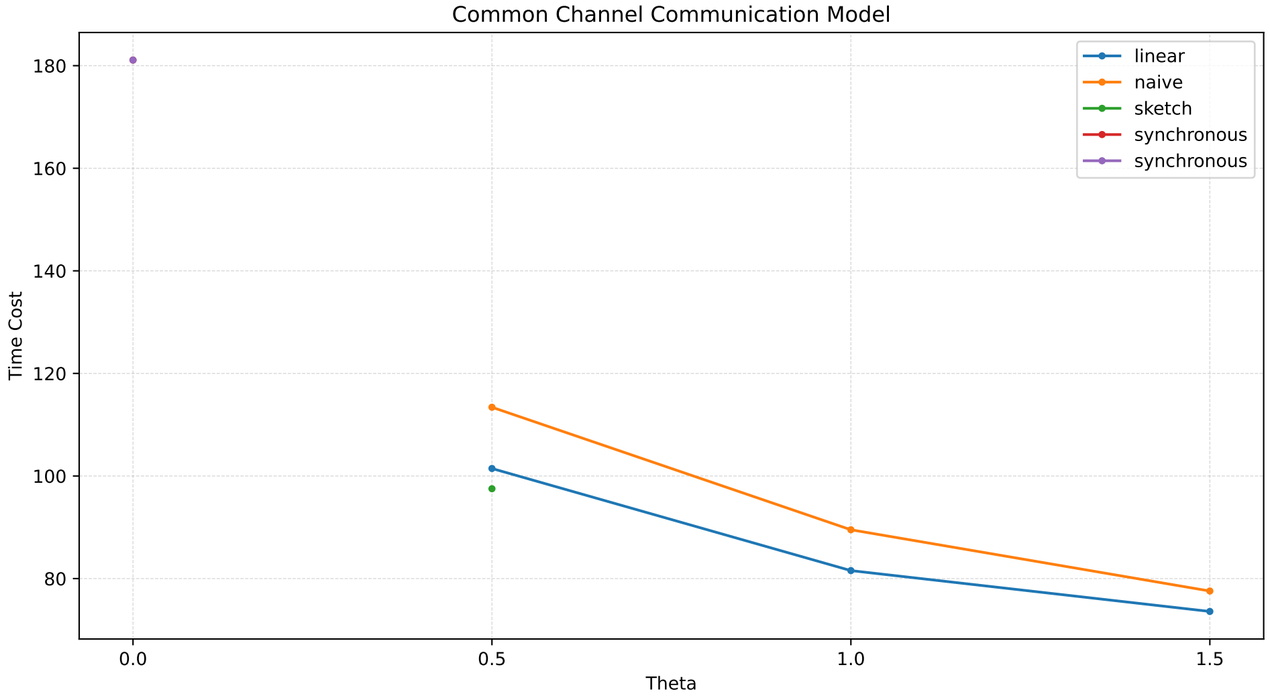


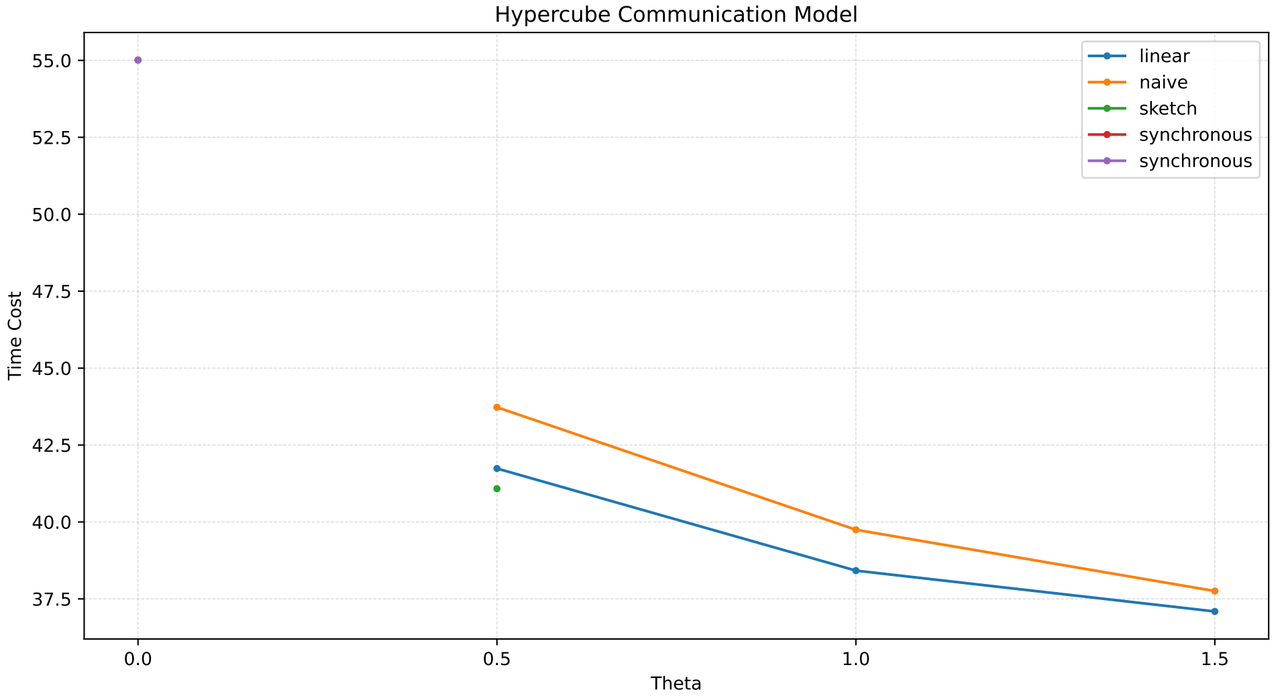
Num Clients : 25 , Batch Size : 64



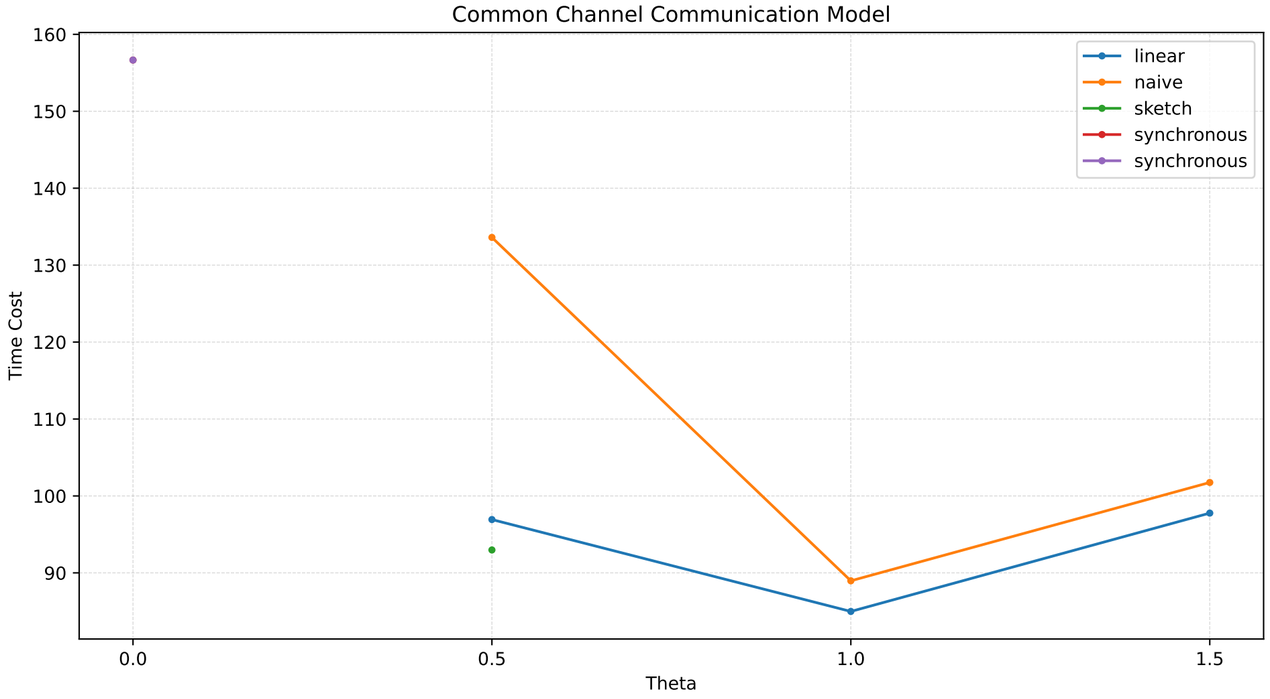


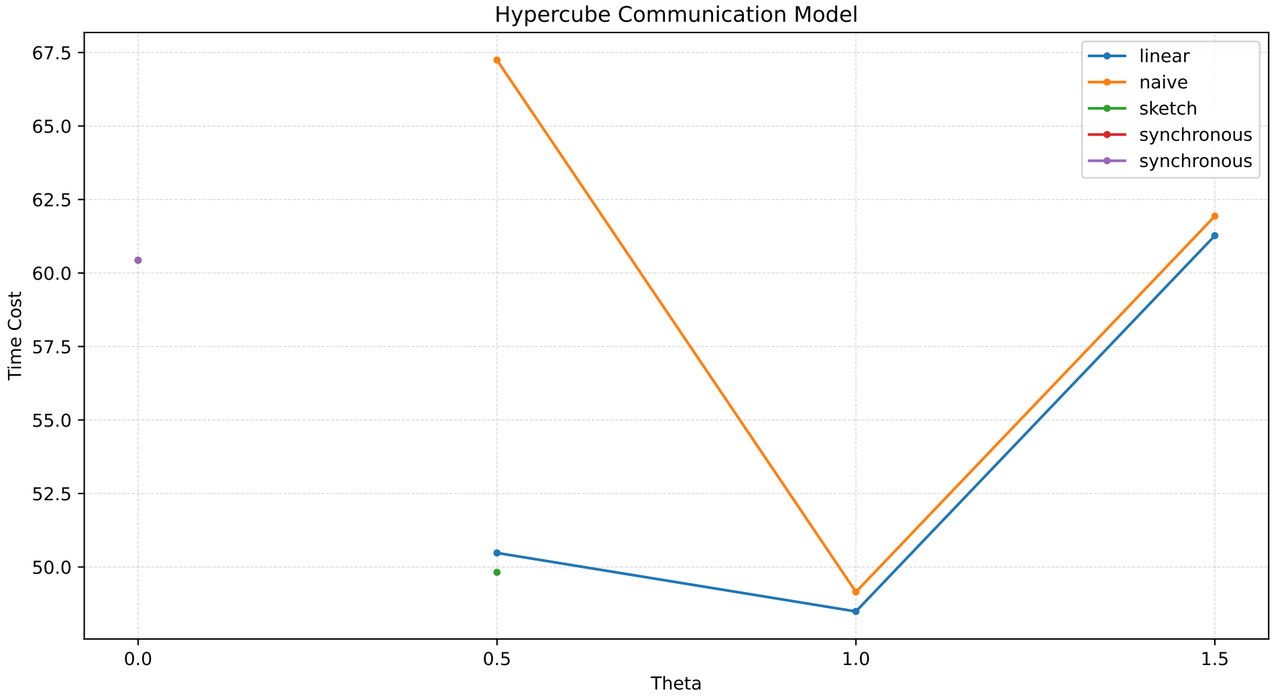
Num Clients : 25 , Batch Size : 128

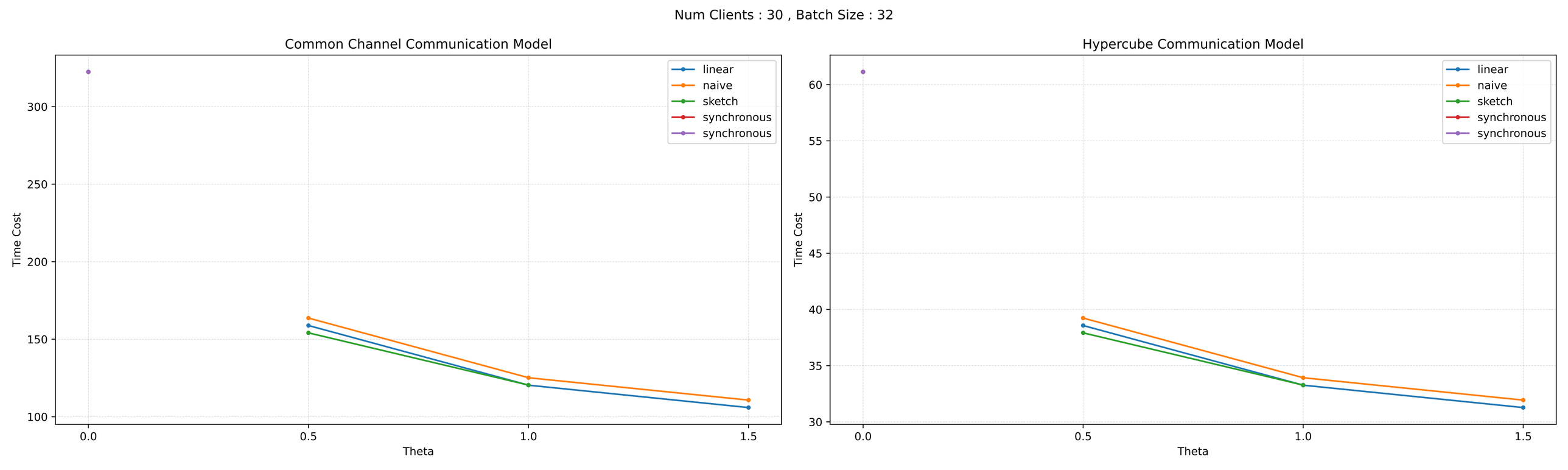




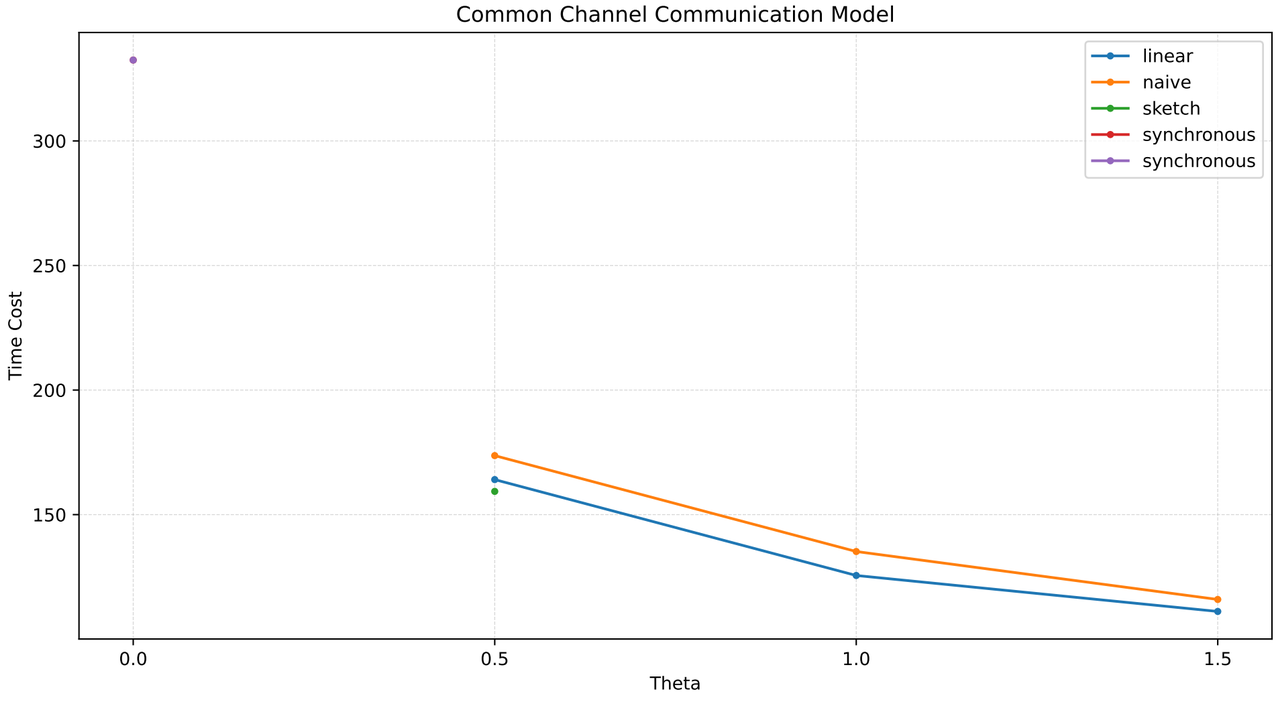
Num Clients : 25 , Batch Size : 256

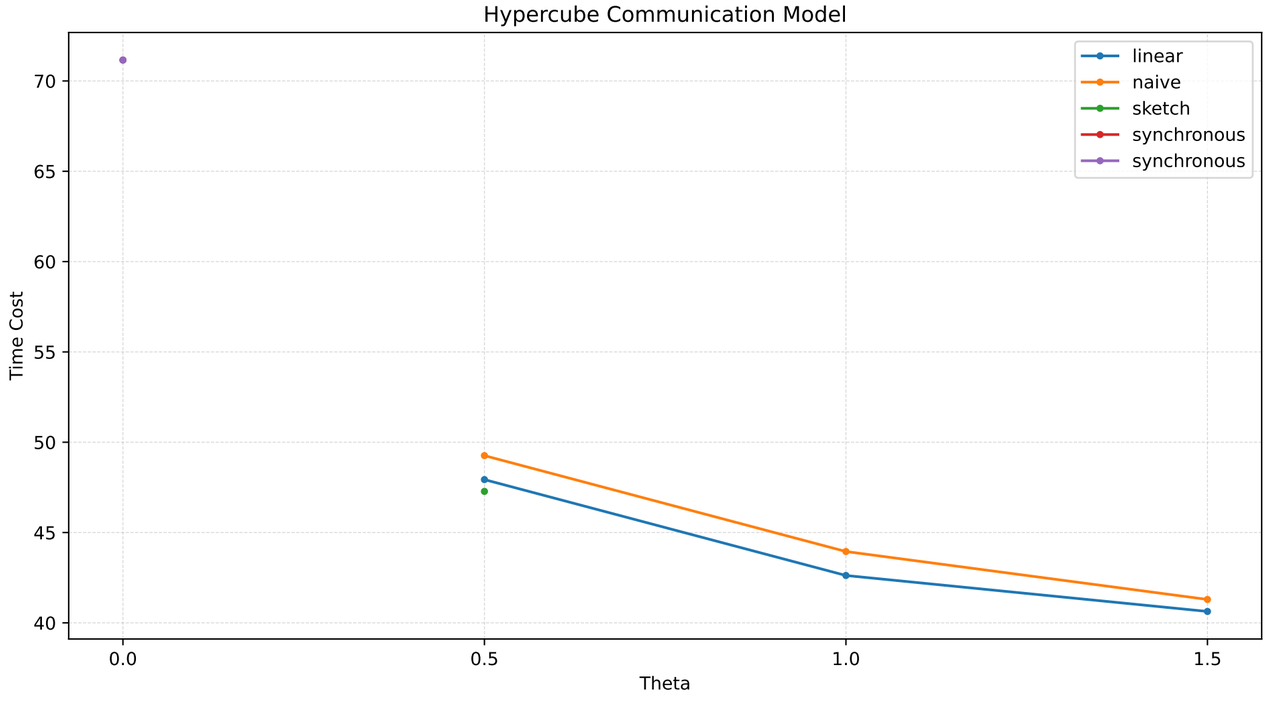




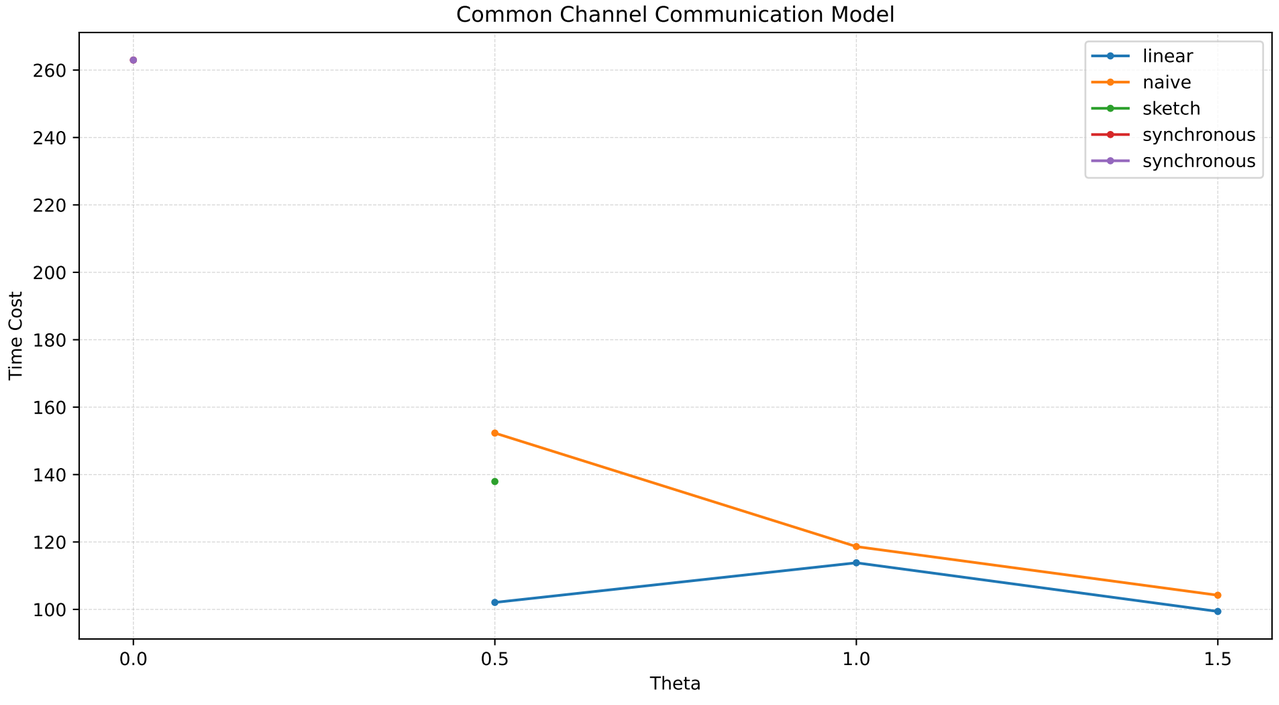

Num Clients : 30 , Batch Size : 32
Common Channel Communication Model
Hypercube Communication Model
linear
naive
sketch
synchronous
synchronous
Time Cost
Theta
0.0
0.5
1.0
1.5
100
150
200
250
300
30
35
40
45
50
55
60

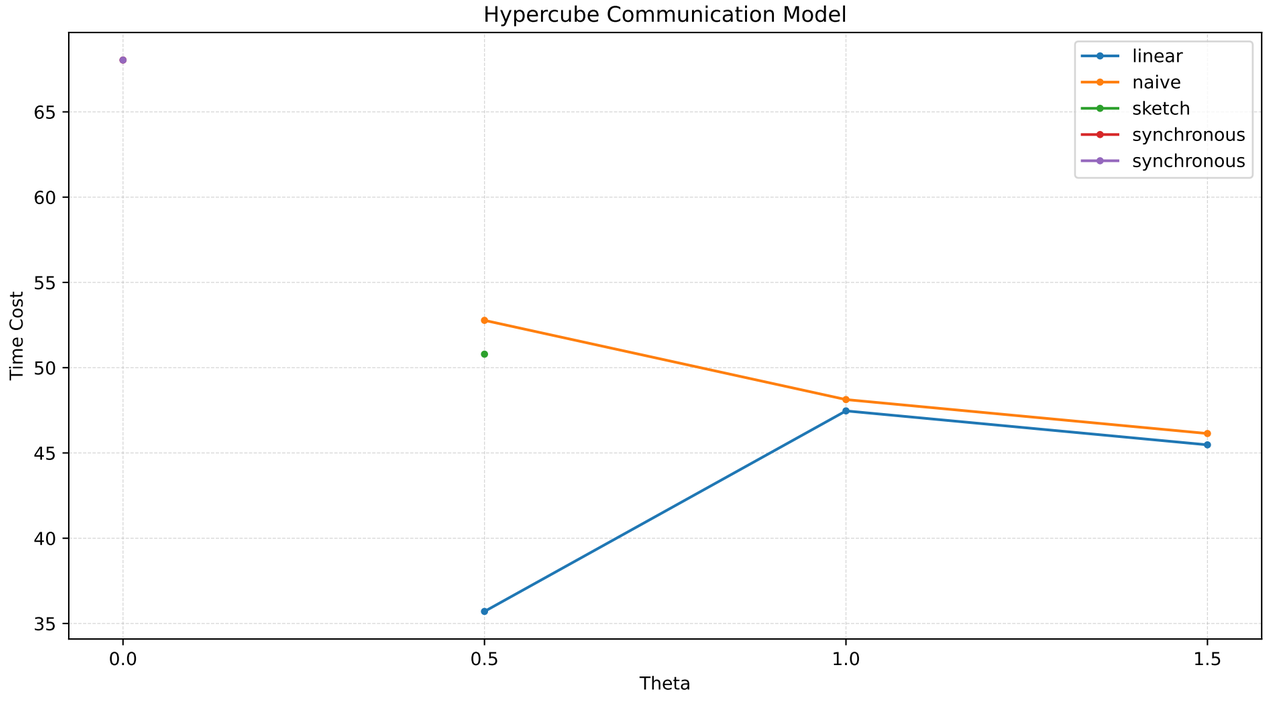
Num Clients : 30 , Batch Size : 64



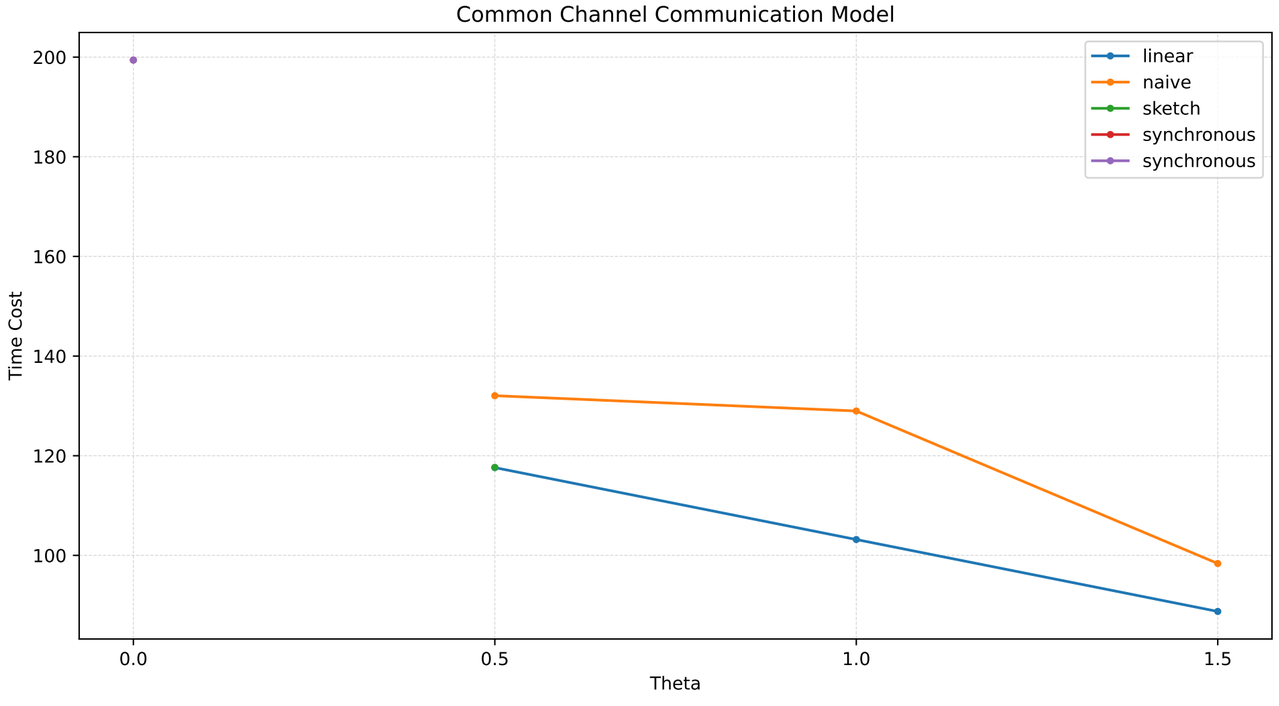


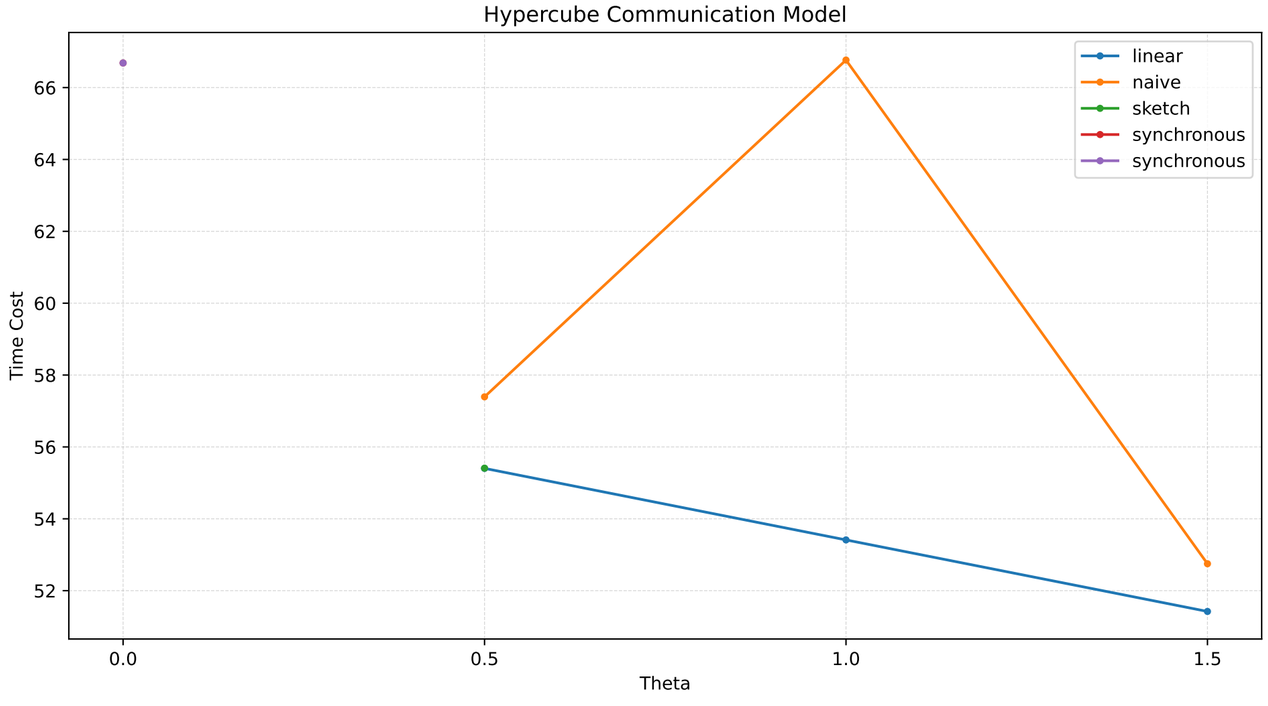
Num Clients : 30 , Batch Size : 128



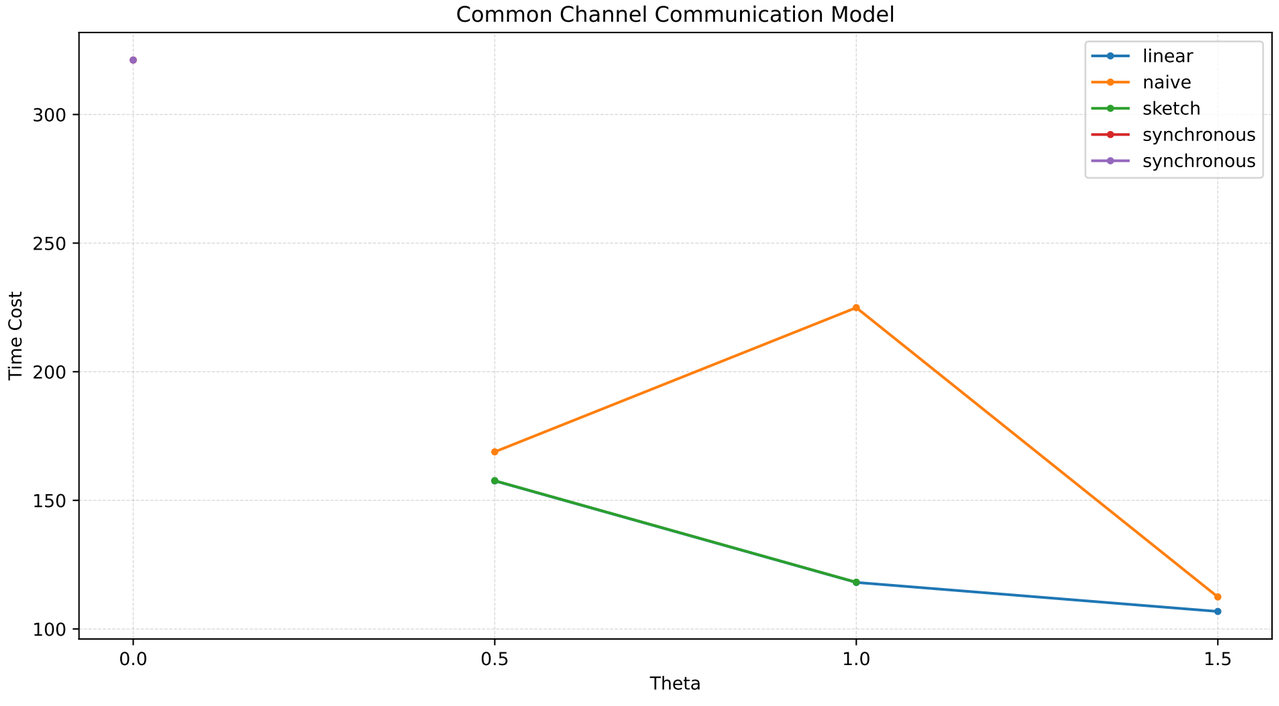


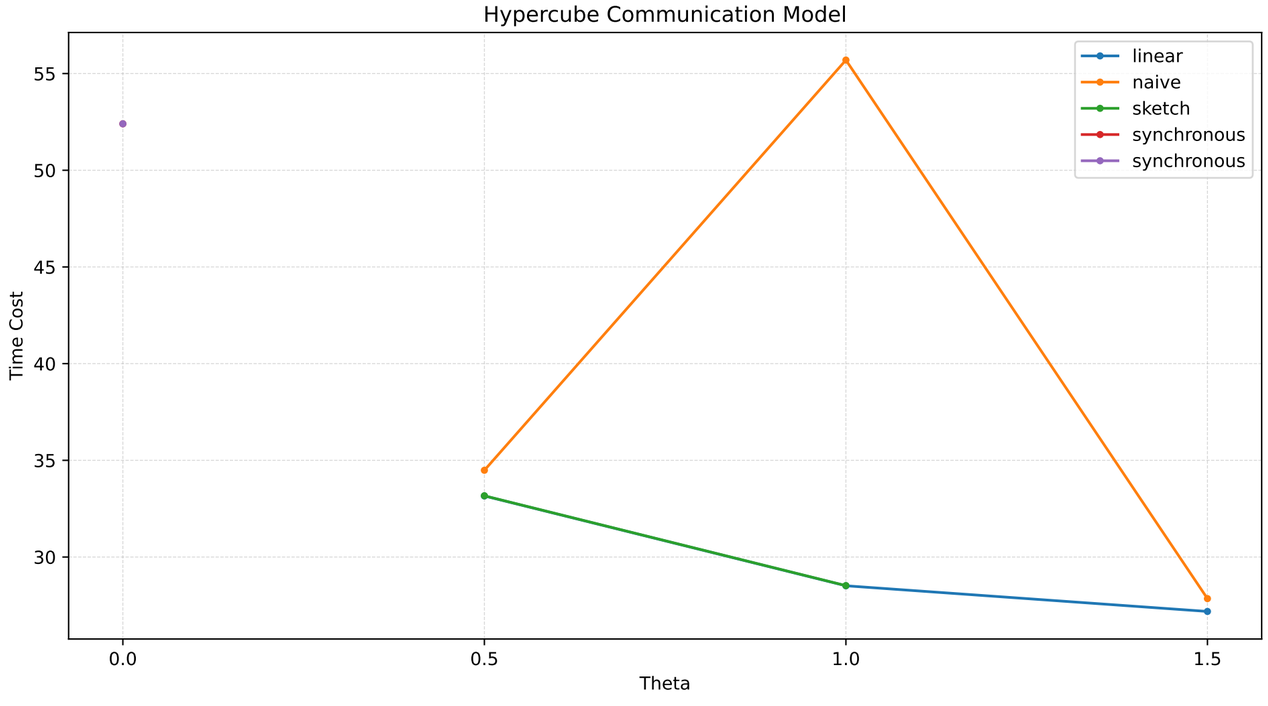
Num Clients : 30 , Batch Size : 256



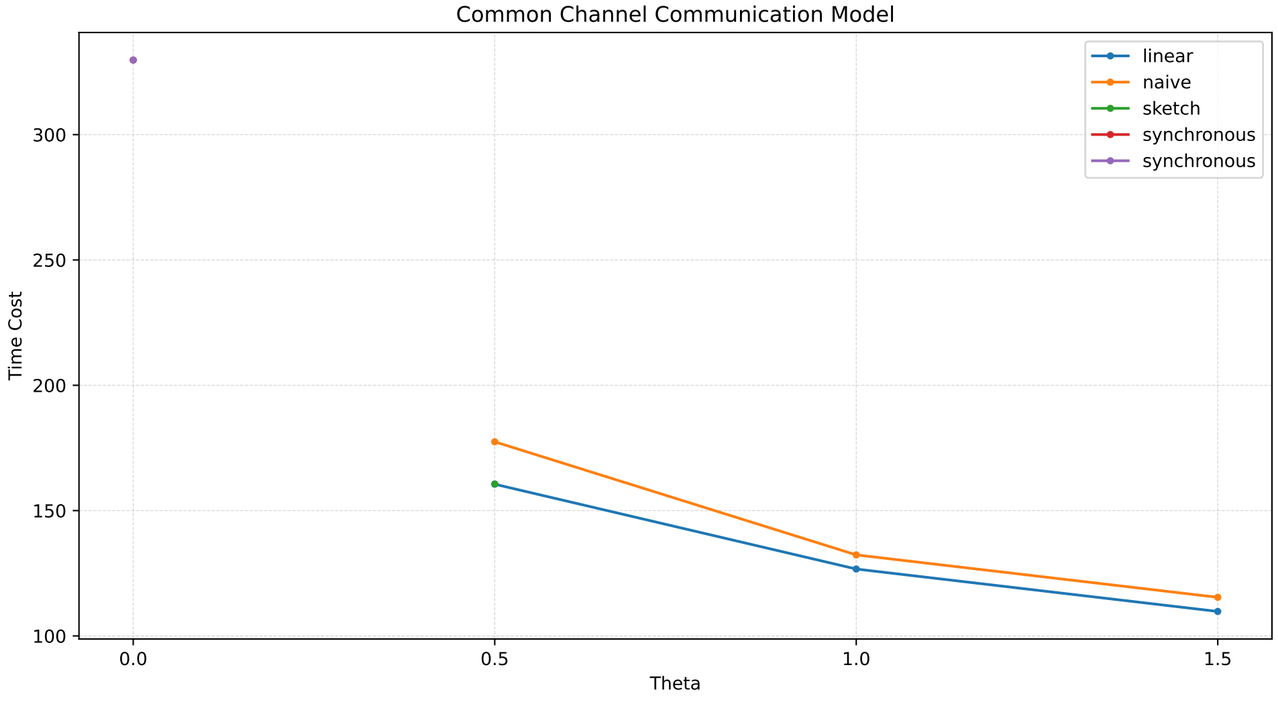


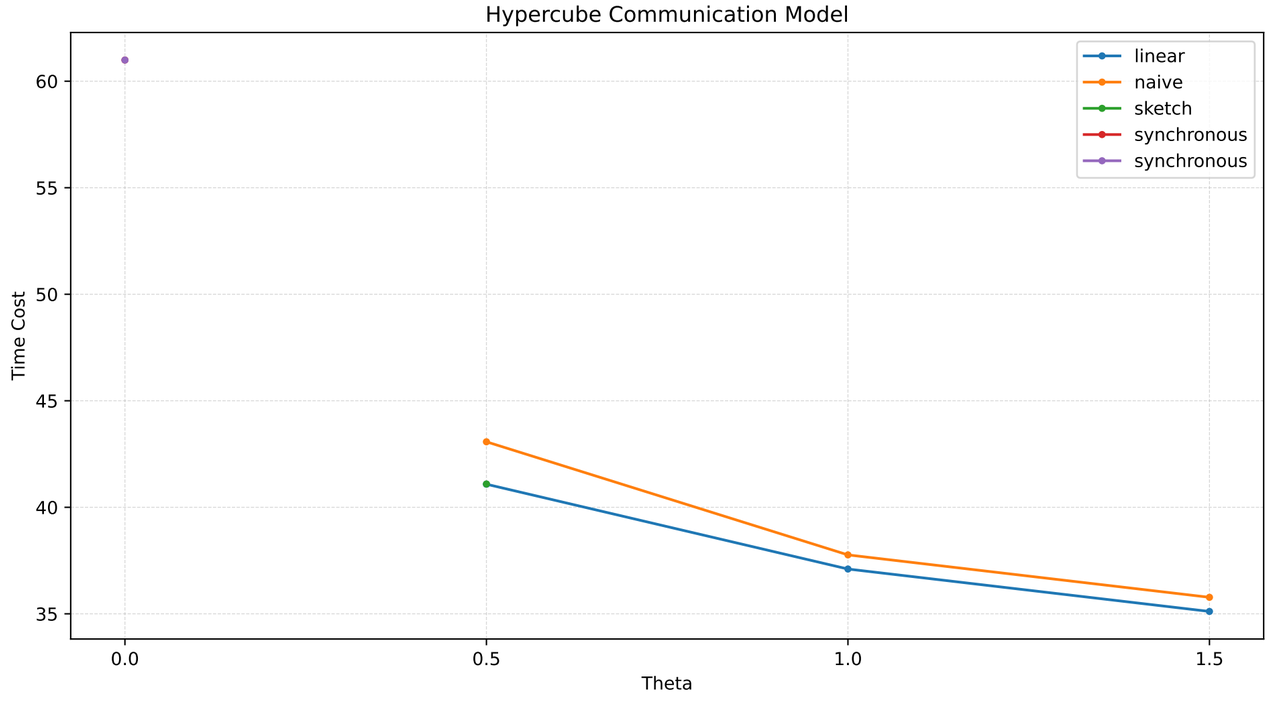
Num Clients : 35 , Batch Size : 32



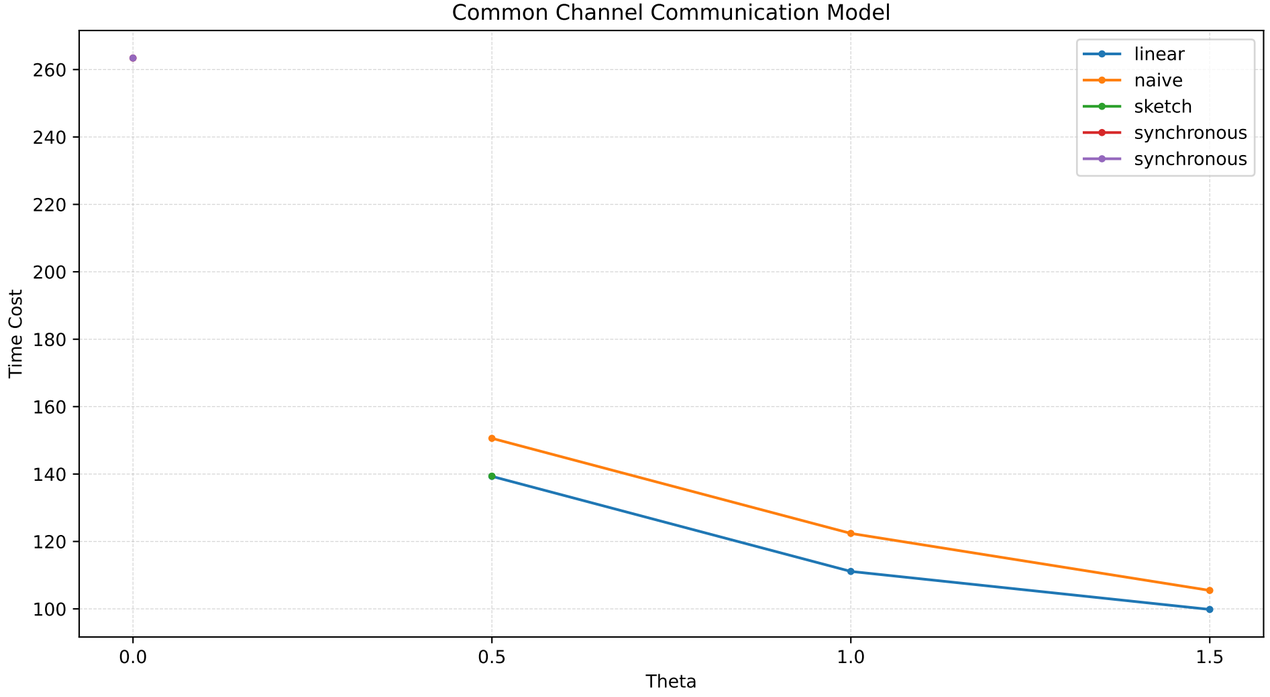


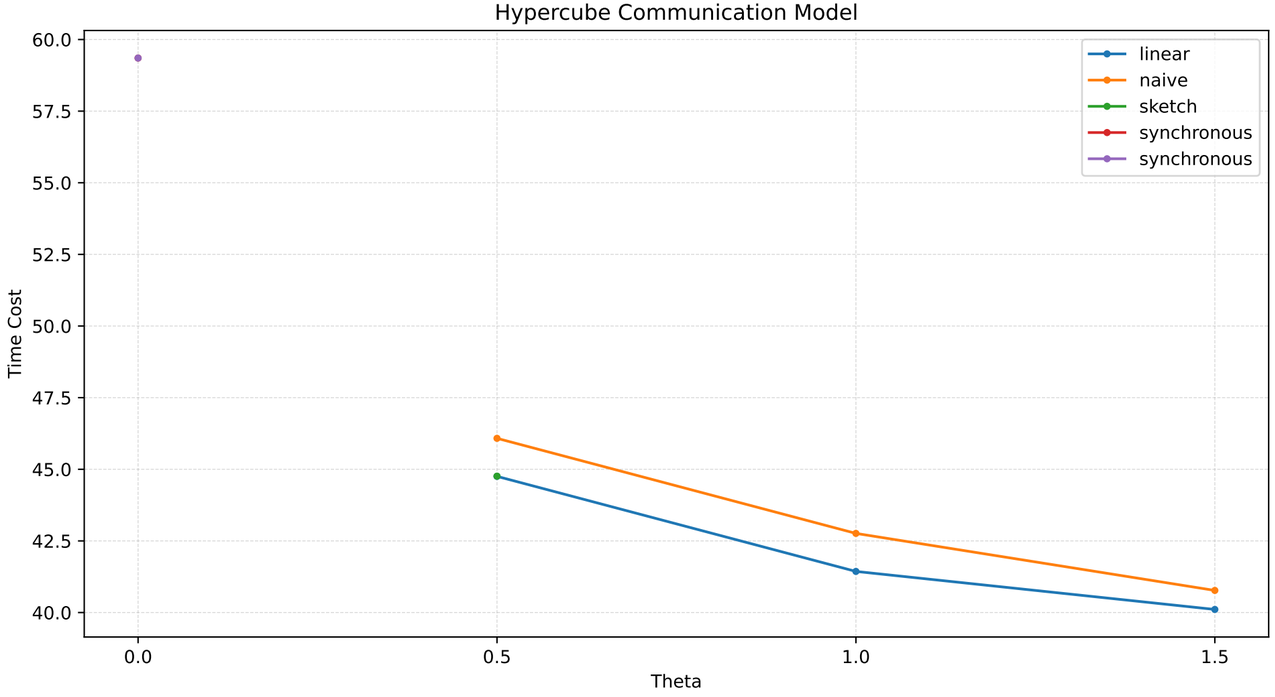
Num Clients : 35 , Batch Size : 64



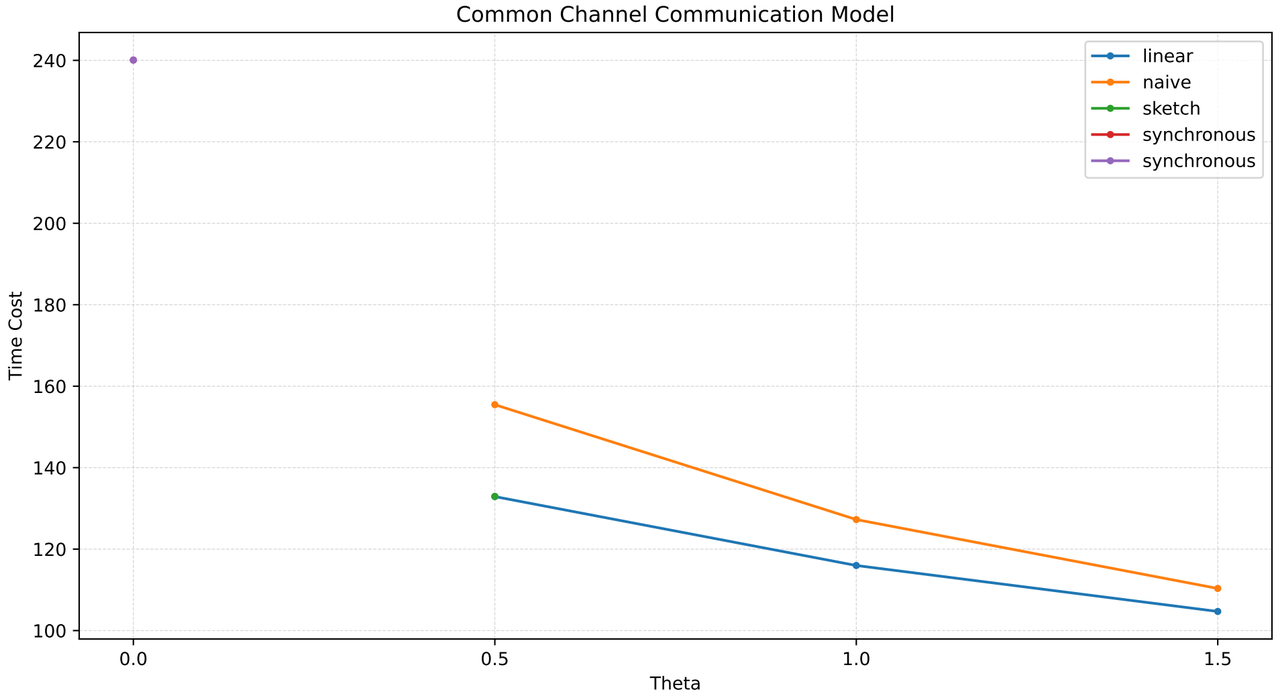


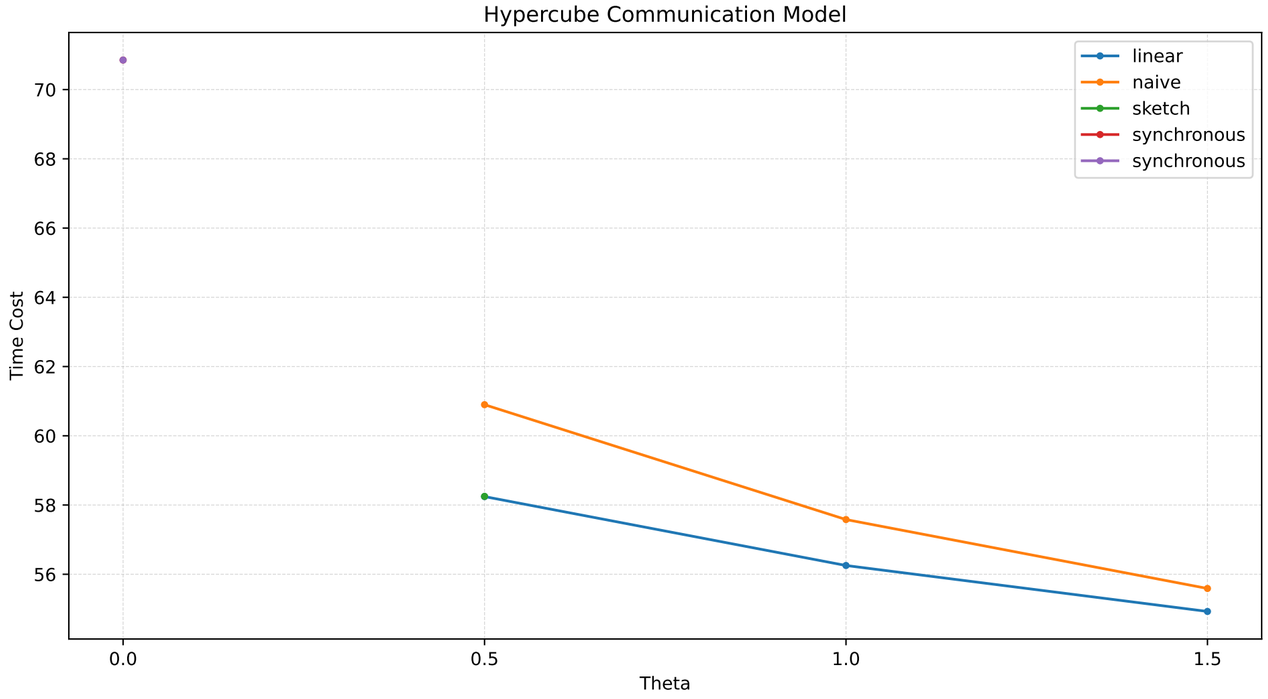
Num Clients : 35 , Batch Size : 128



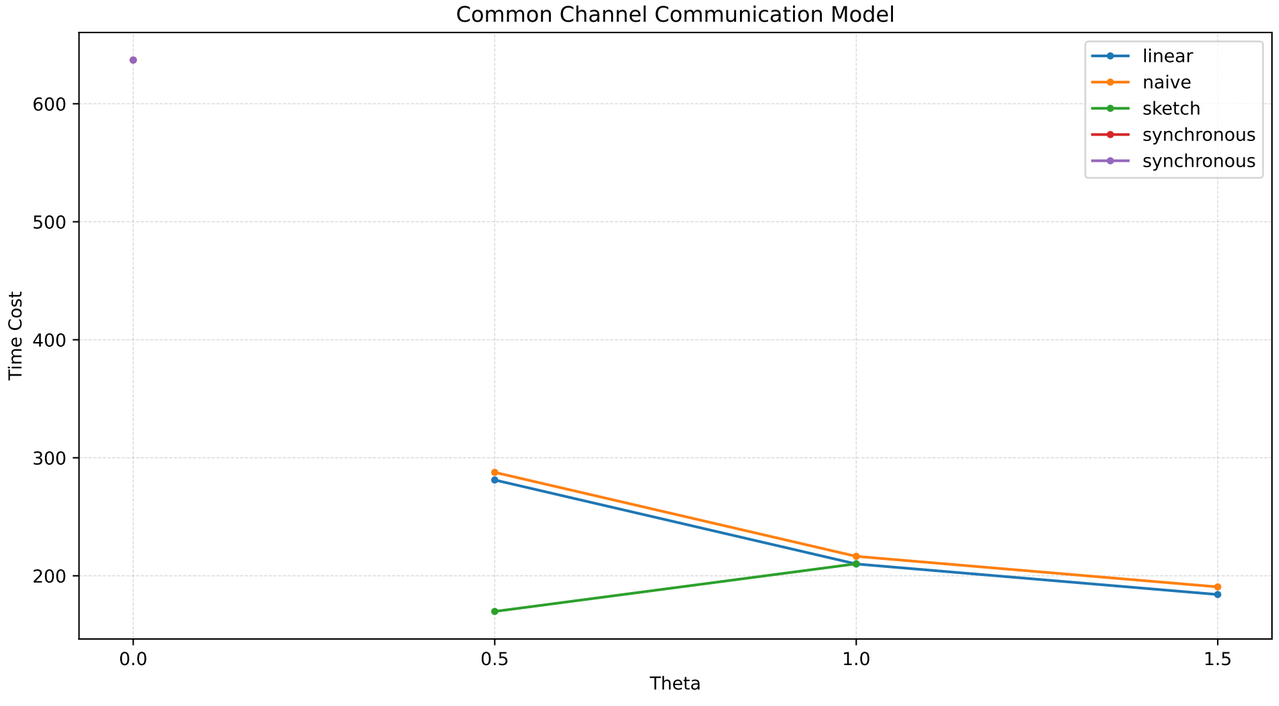


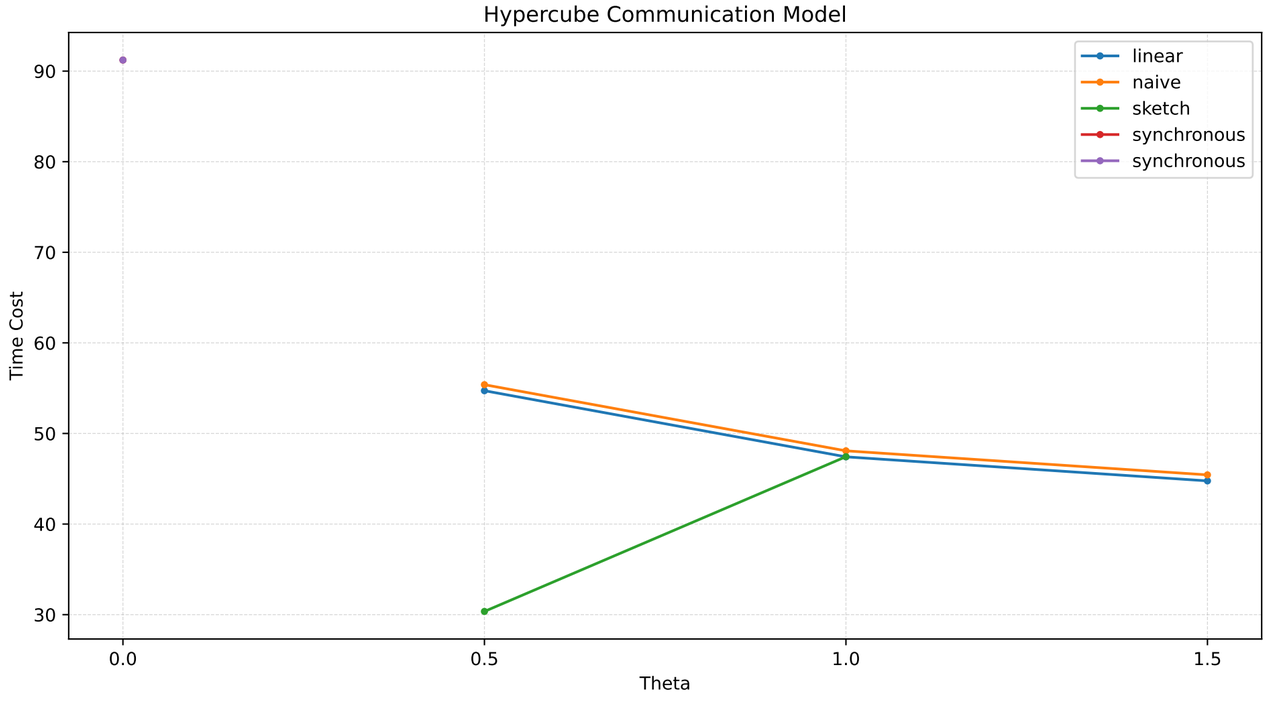
Num Clients : 35 , Batch Size : 256



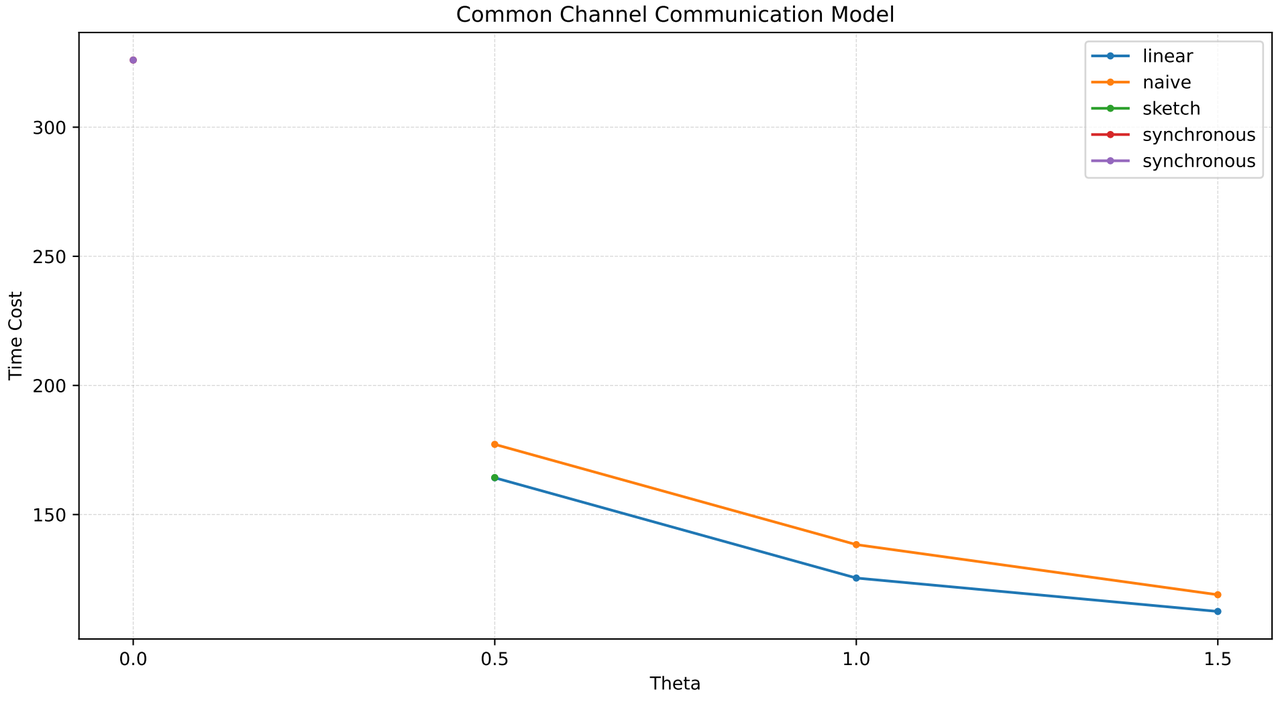


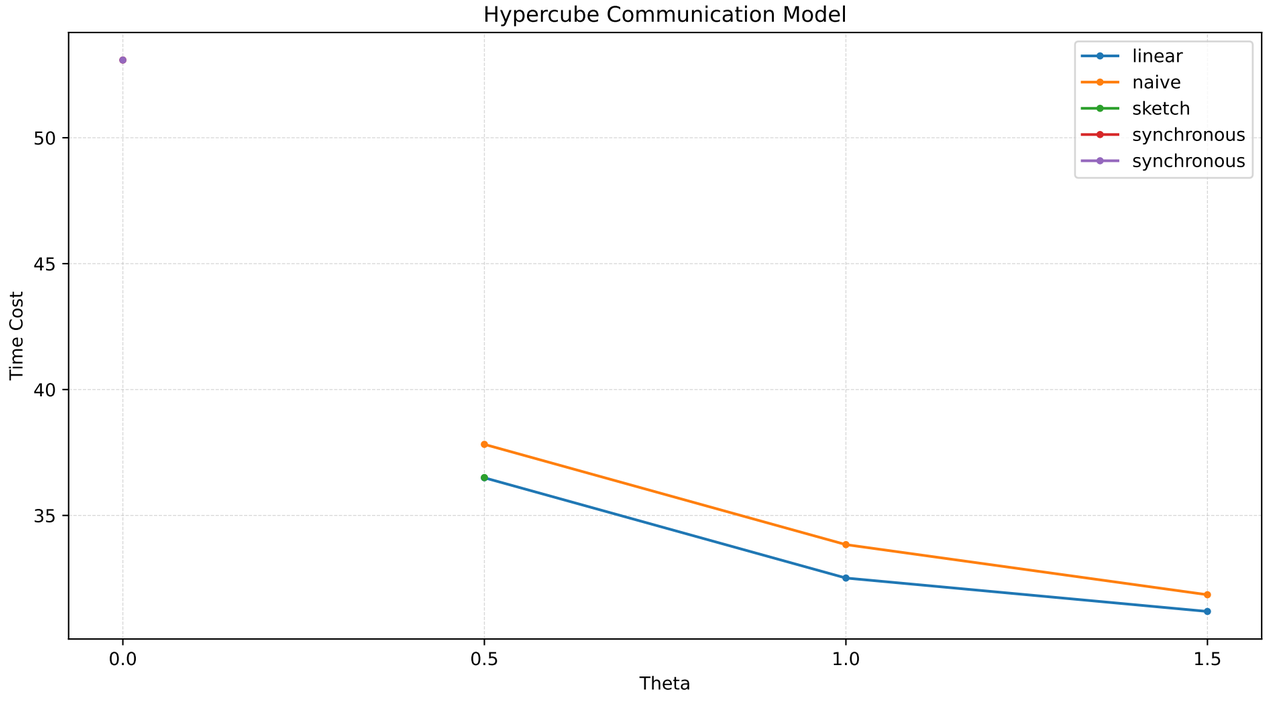
Num Clients : 40 , Batch Size : 32



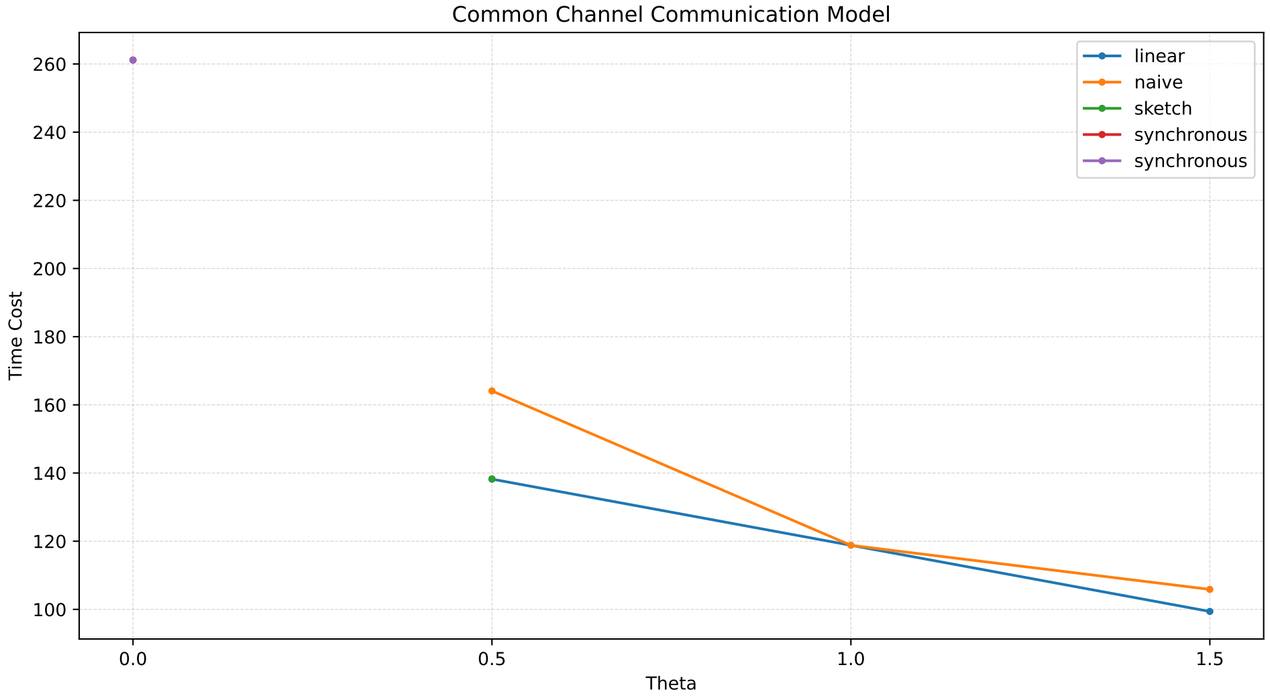


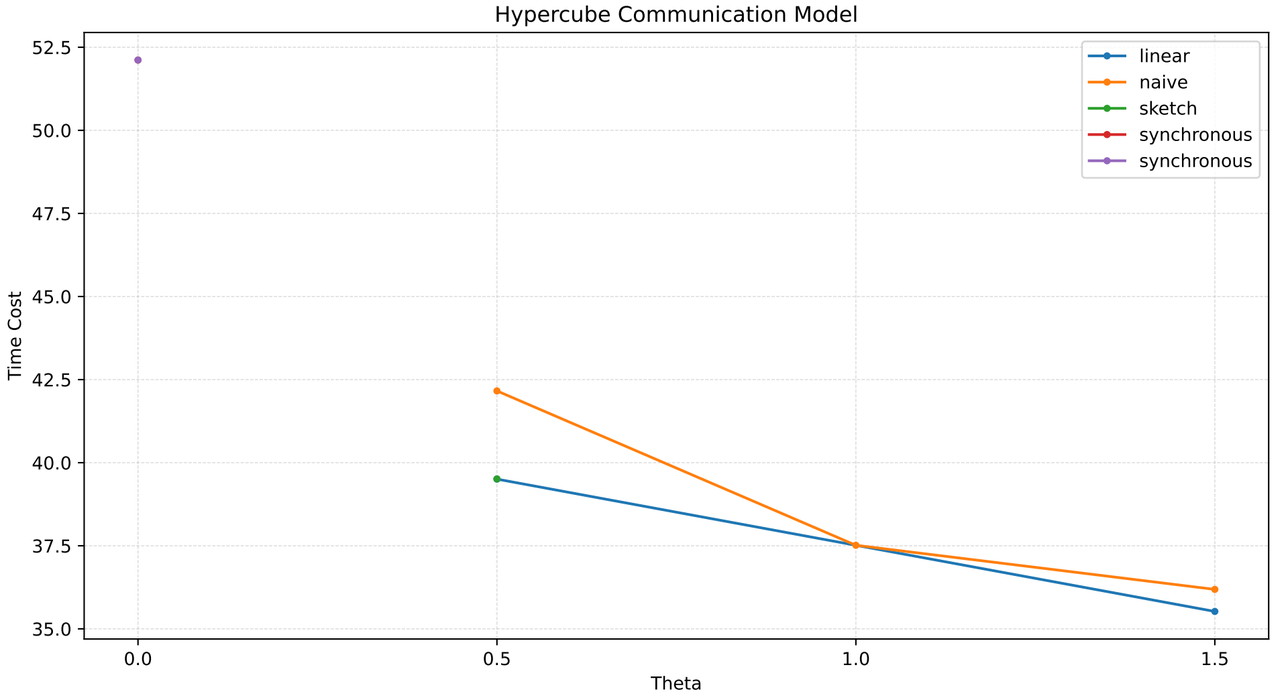
Num Clients : 40 , Batch Size : 64



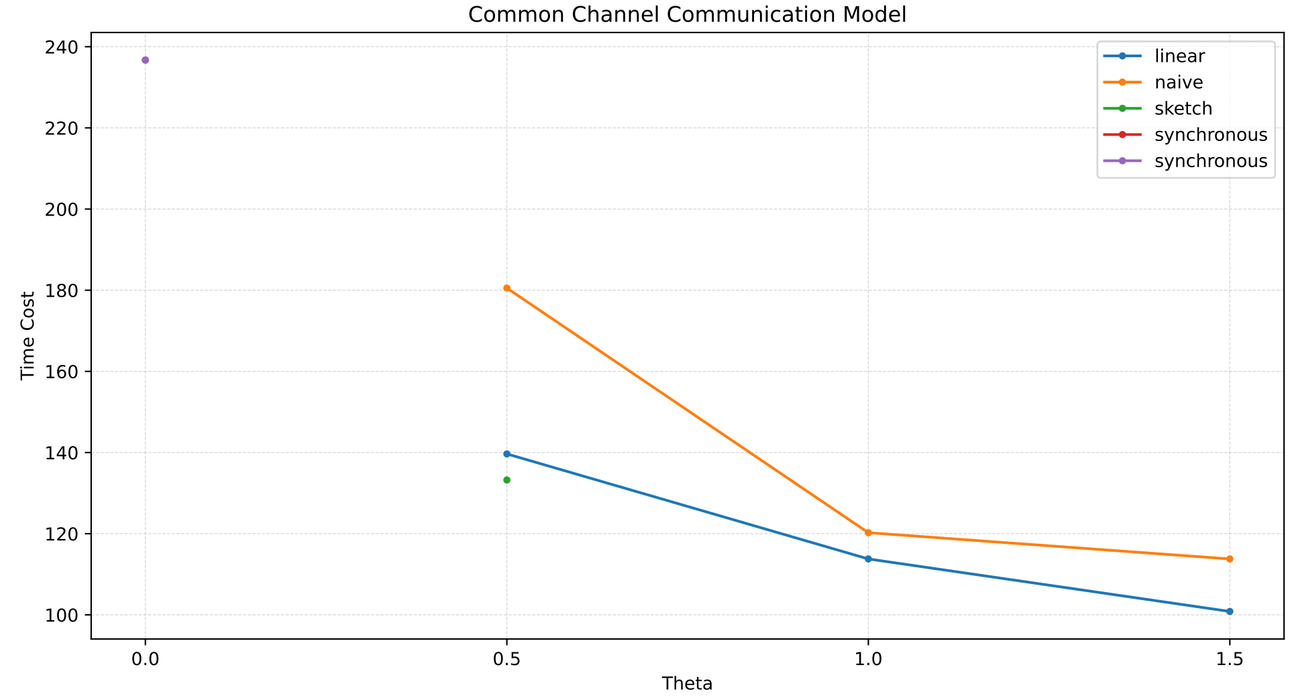


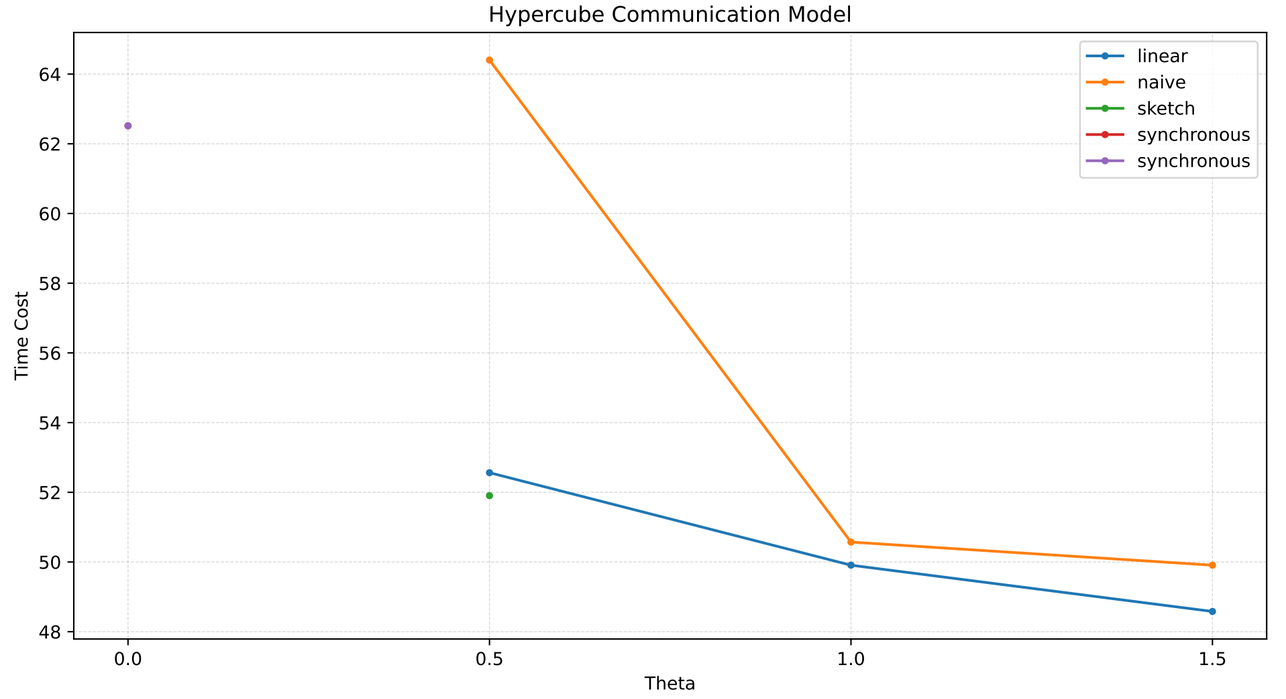
Num Clients : 40 , Batch Size : 128



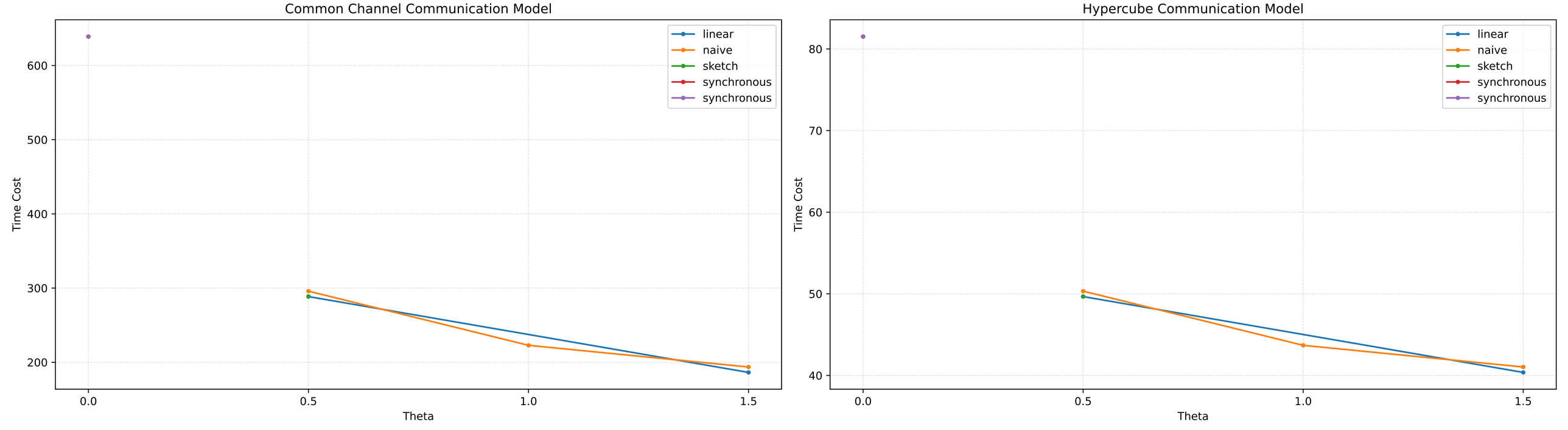


Num Clients : 40 , Batch Size : 256

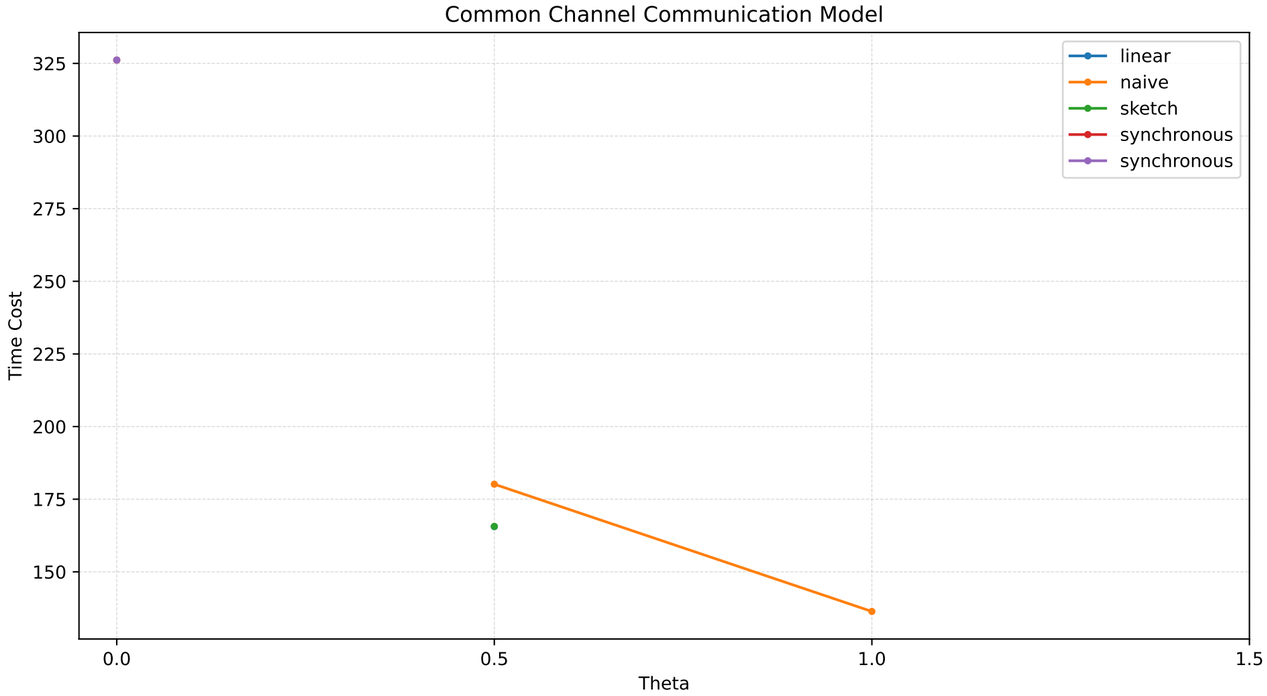


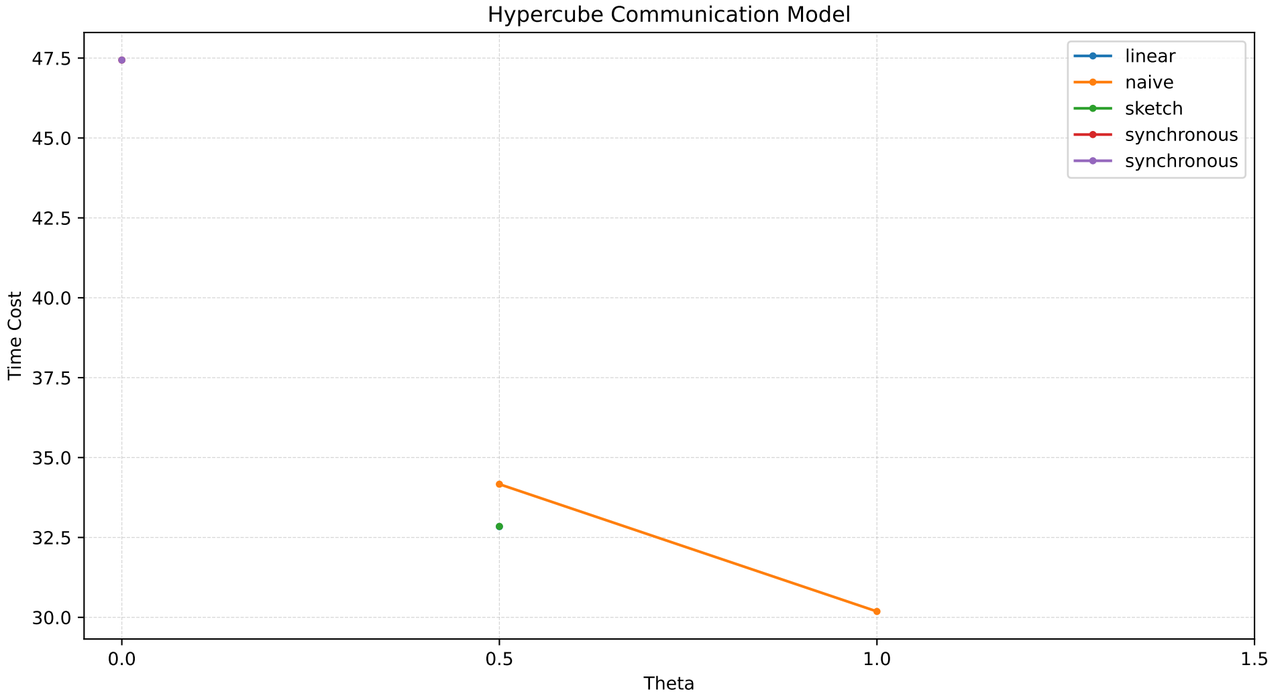


Num Clients : 45 , Batch Size : 32

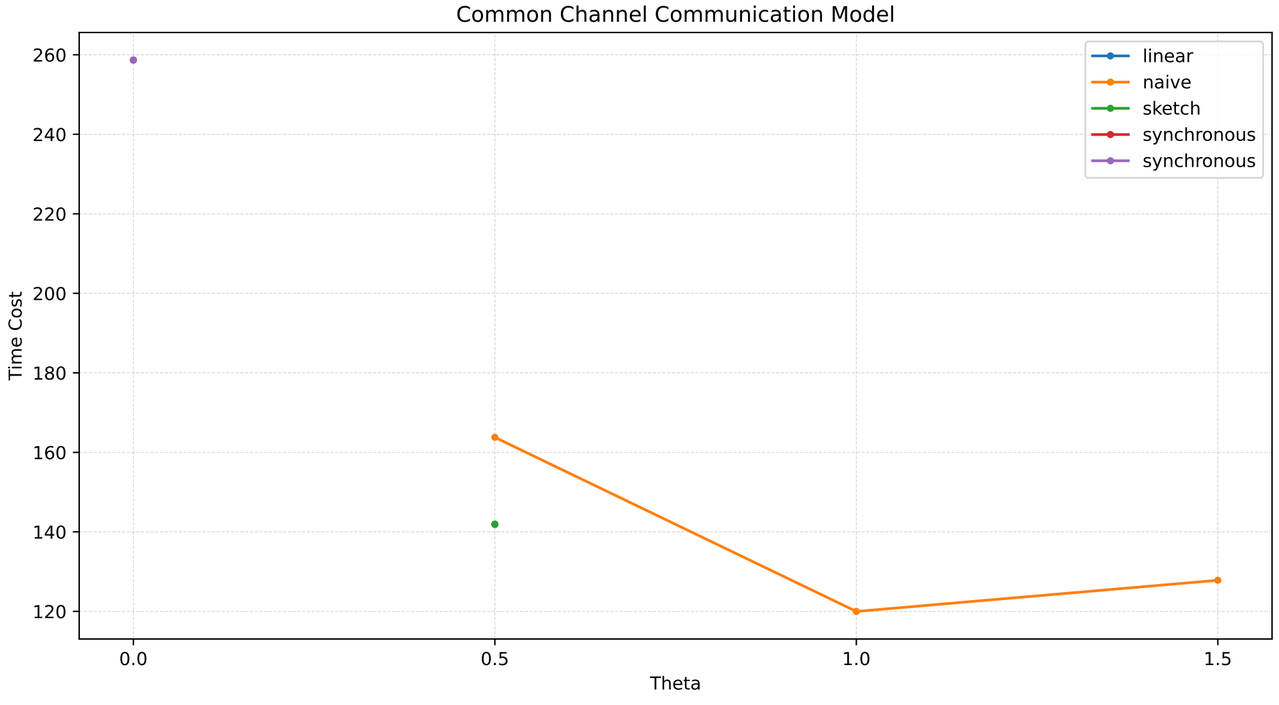


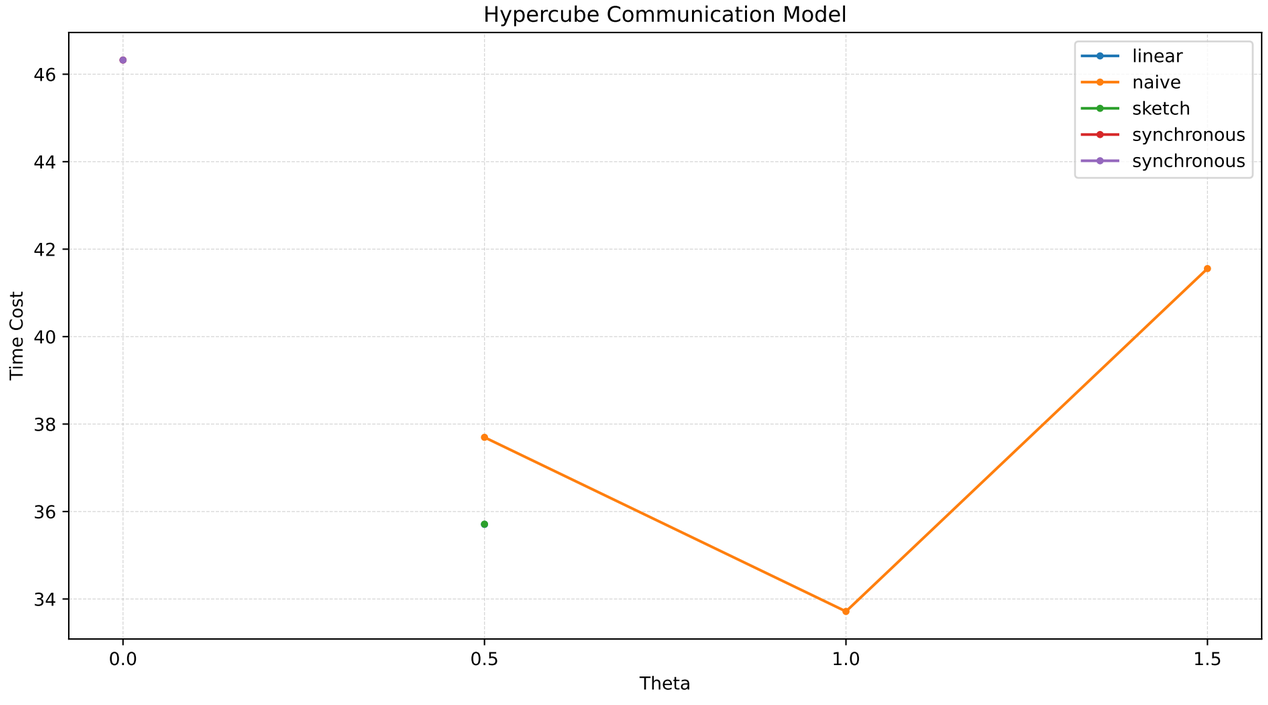
Num Clients : 45 , Batch Size : 64



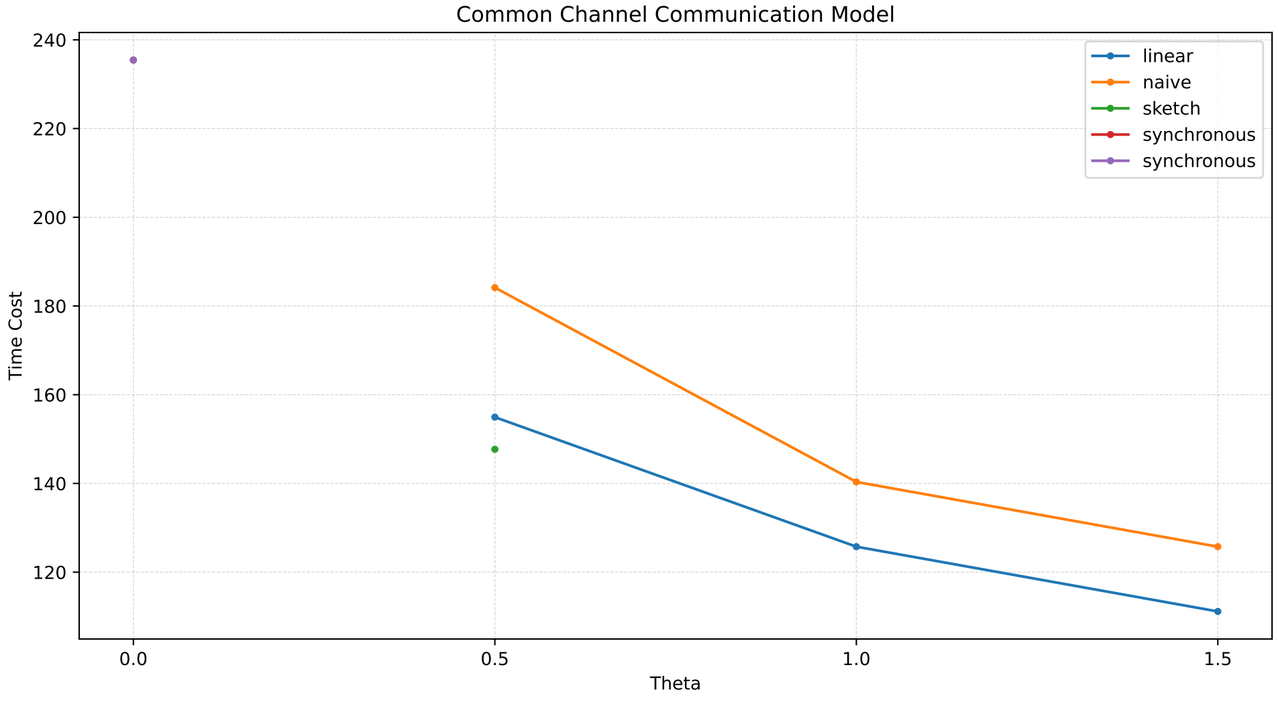


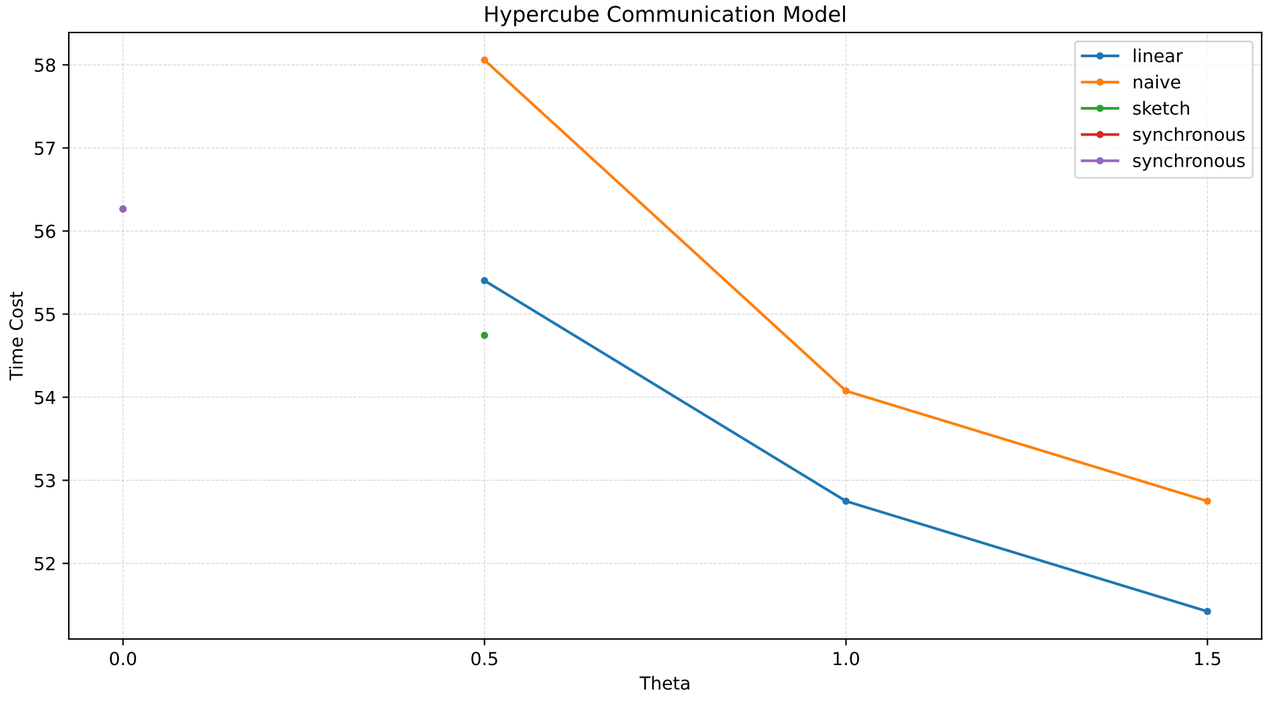
Num Clients : 45 , Batch Size : 128

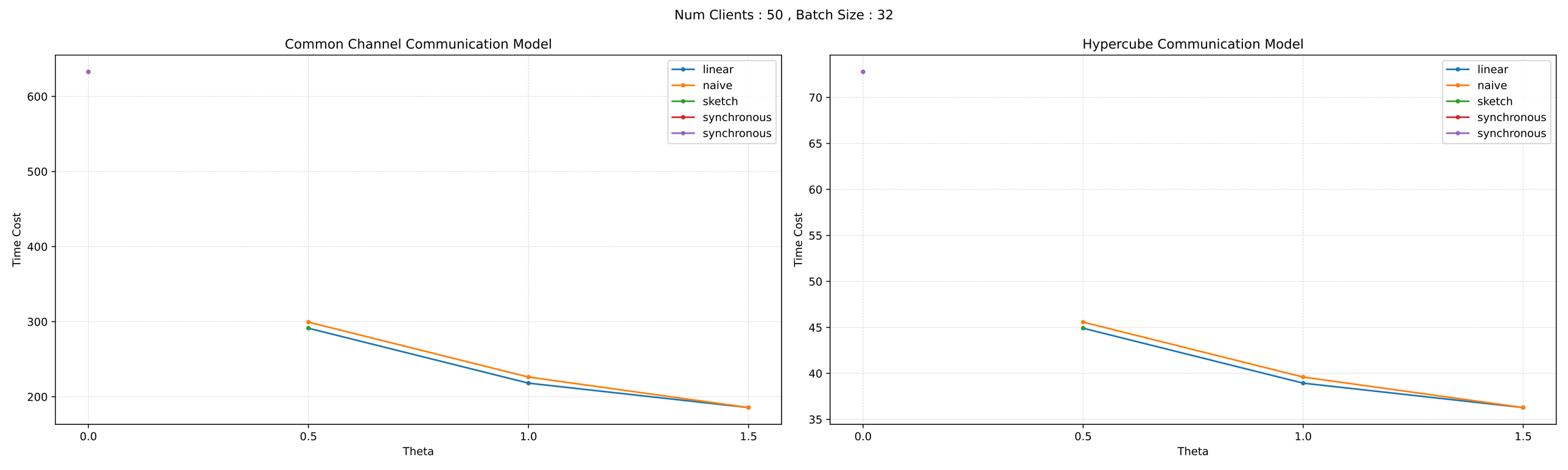




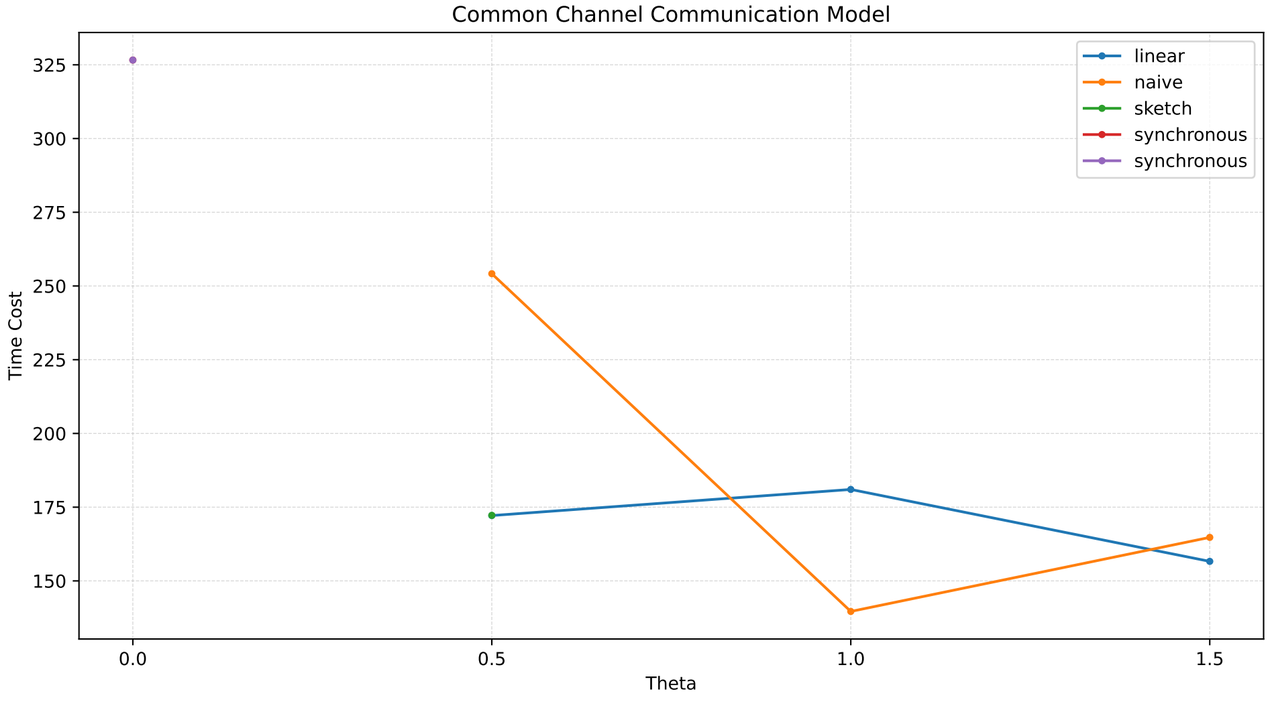
Num Clients : 45 , Batch Size : 256

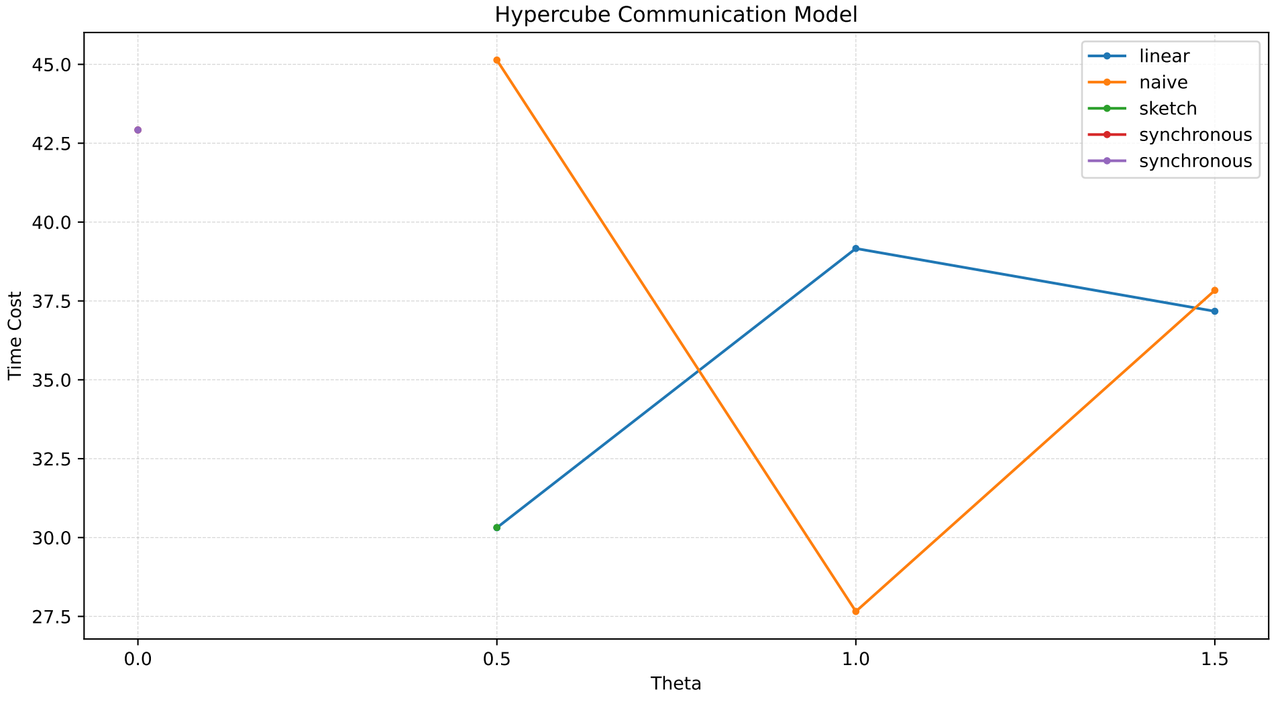




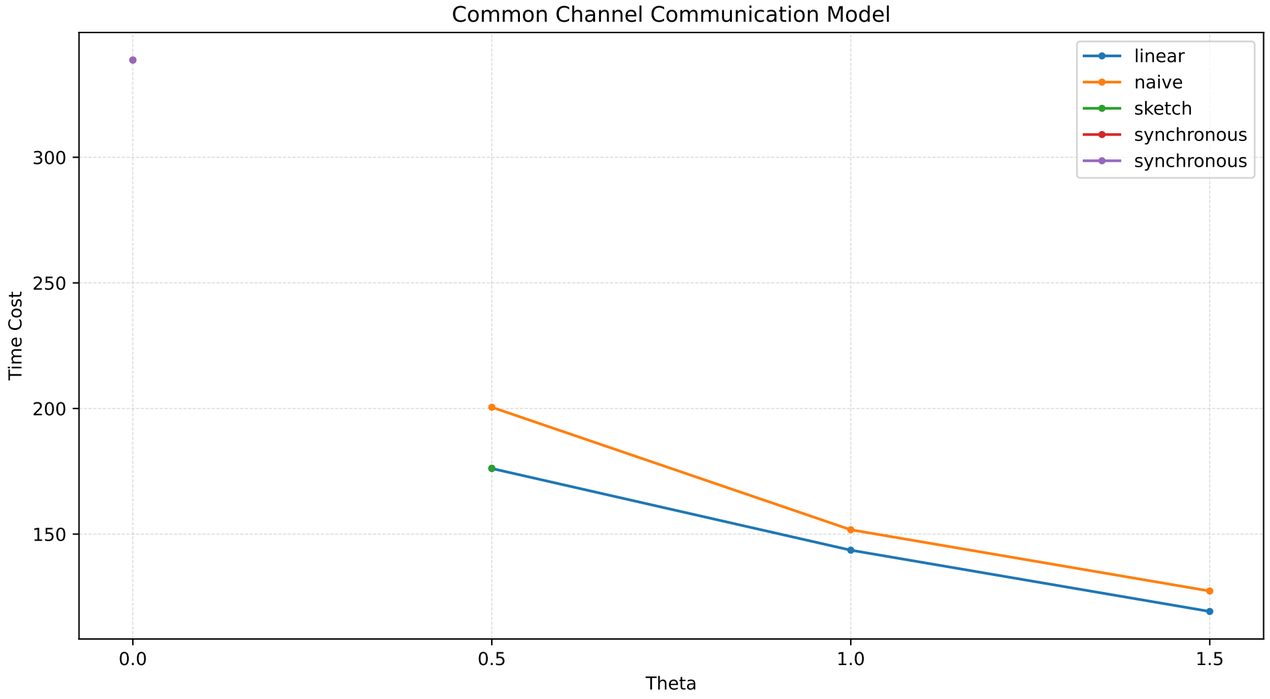

Num Clients : 50 , Batch Size : 32
Common Channel Communication Model
Hypercube Communication Model
Time Cost
Theta
linear
naive
sketch
synchronous
synchronous
0.0
0.5
1.0
1.5
200
300
400
500
600
35
40
45
50
55
60
65
70

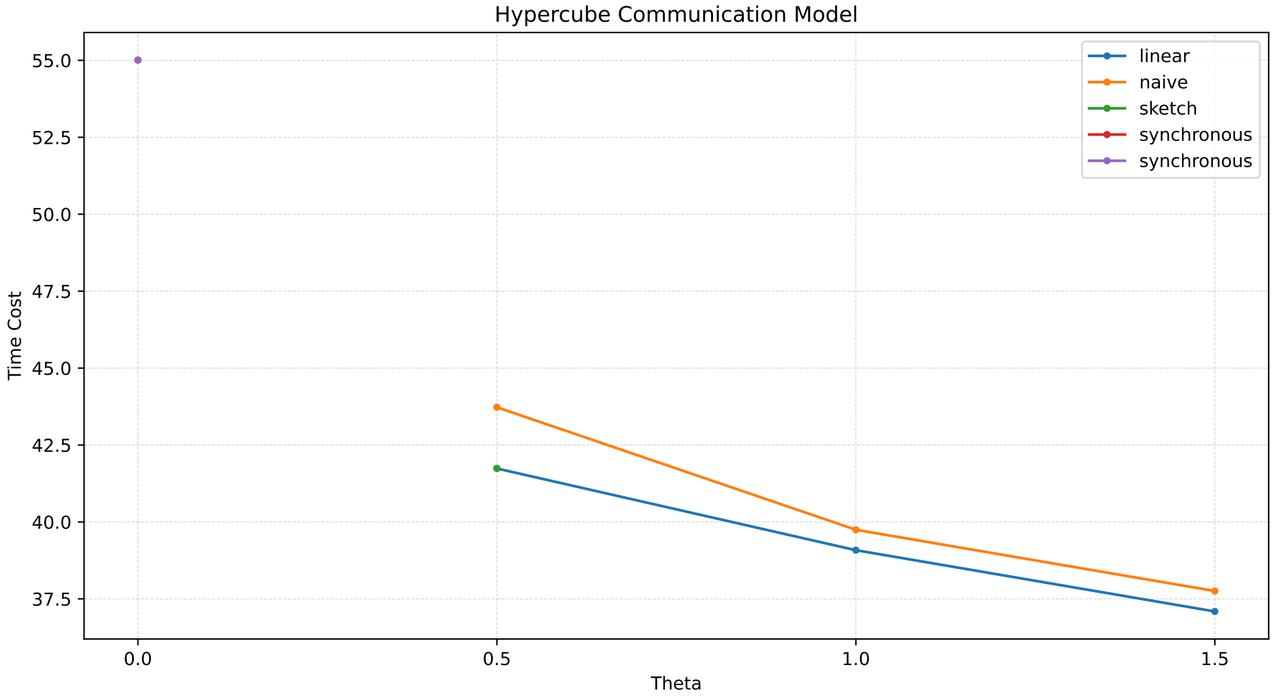
Num Clients : 50 , Batch Size : 64



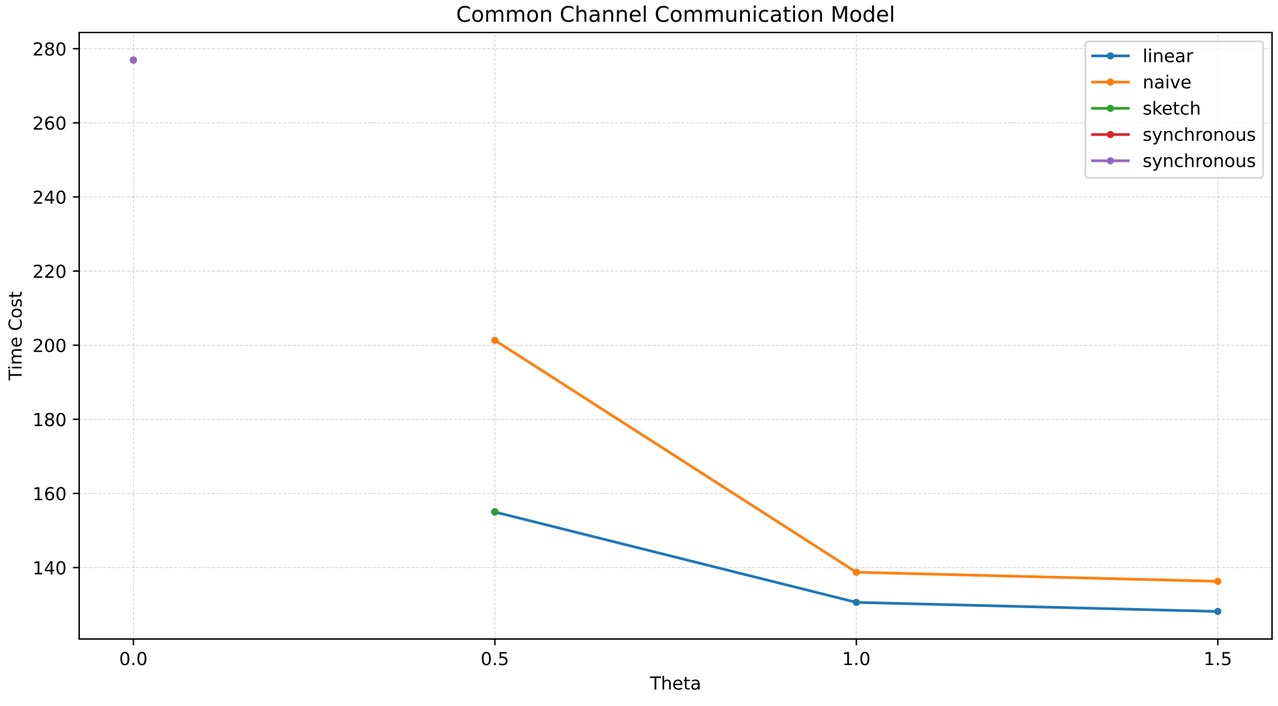


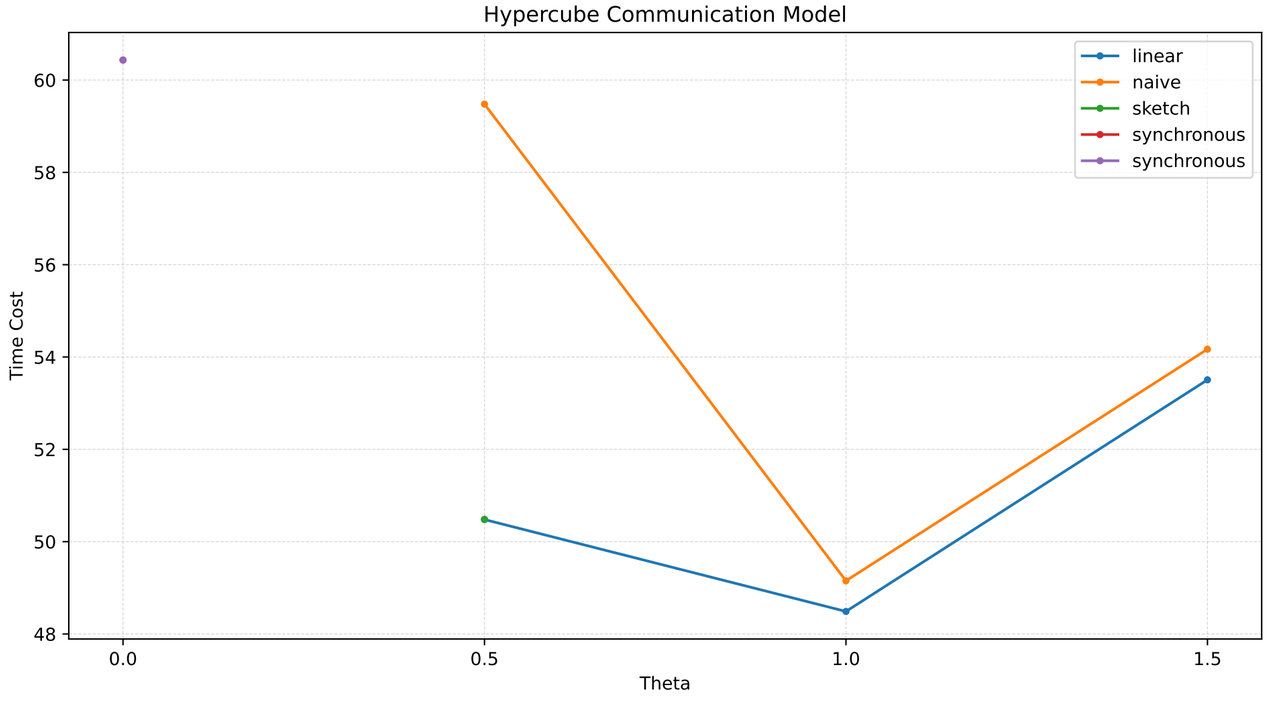
Num Clients : 50 , Batch Size : 128



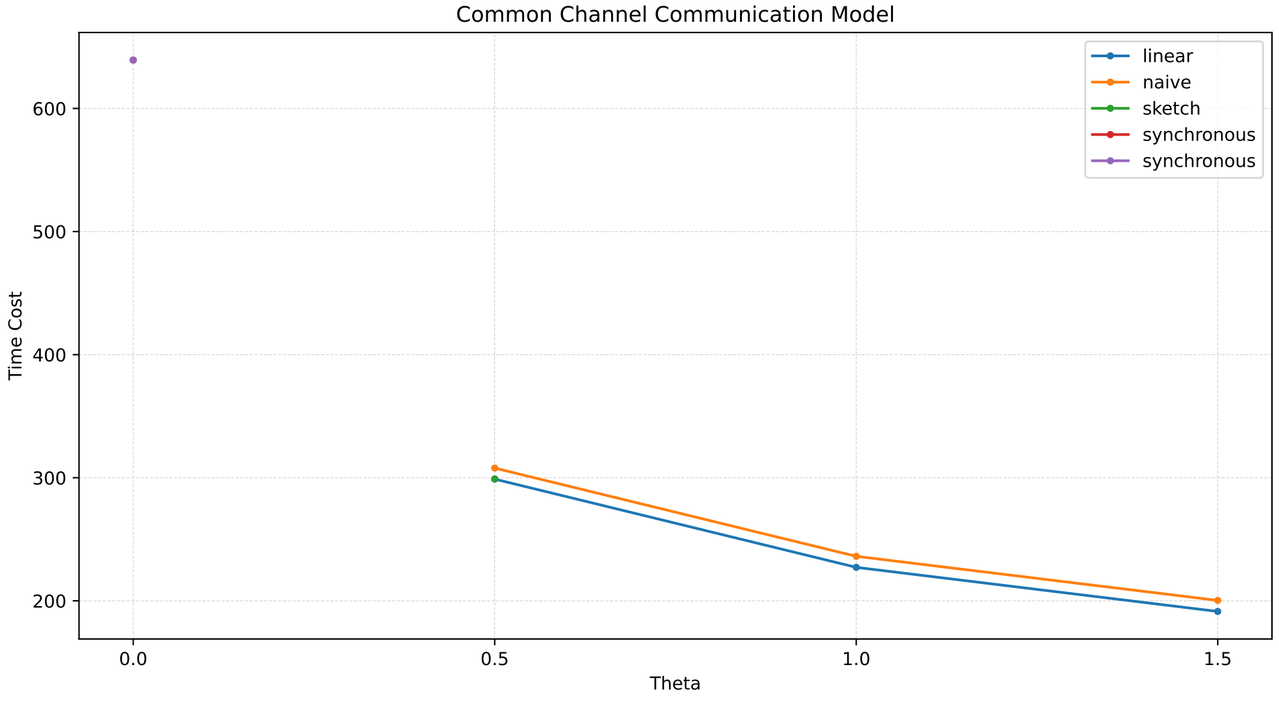


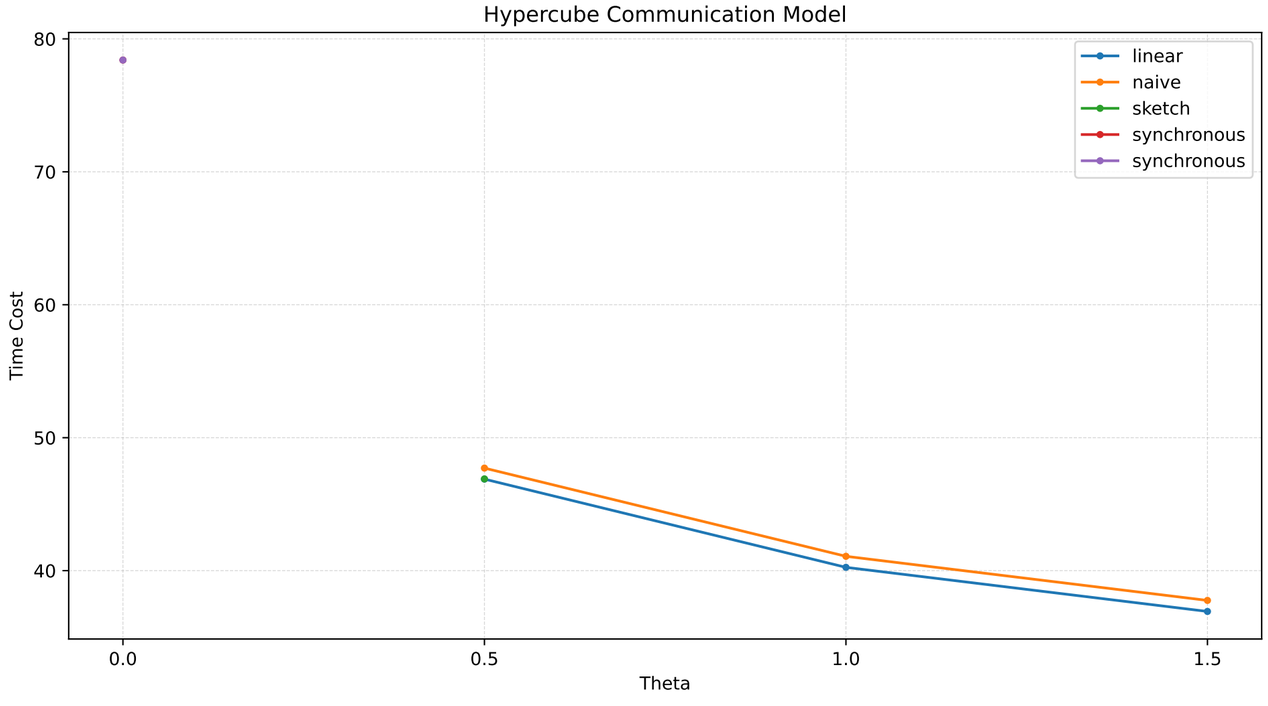
Num Clients : 50 , Batch Size : 256



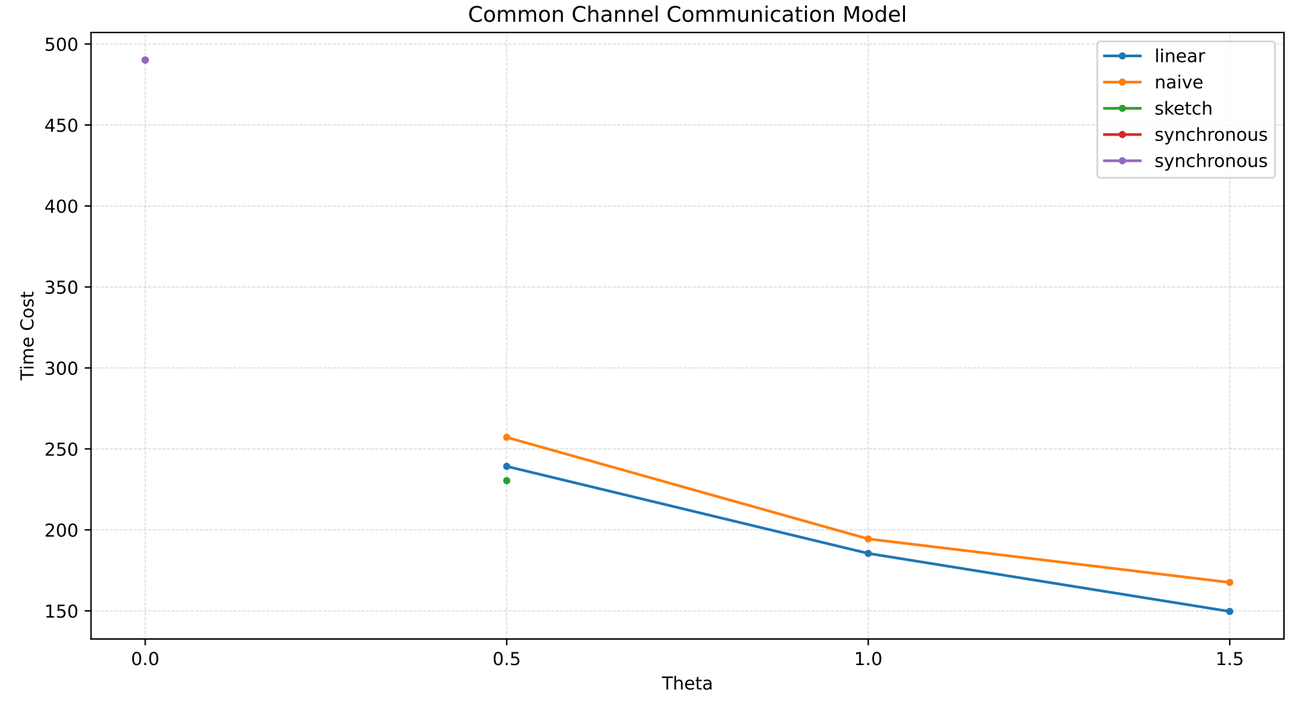


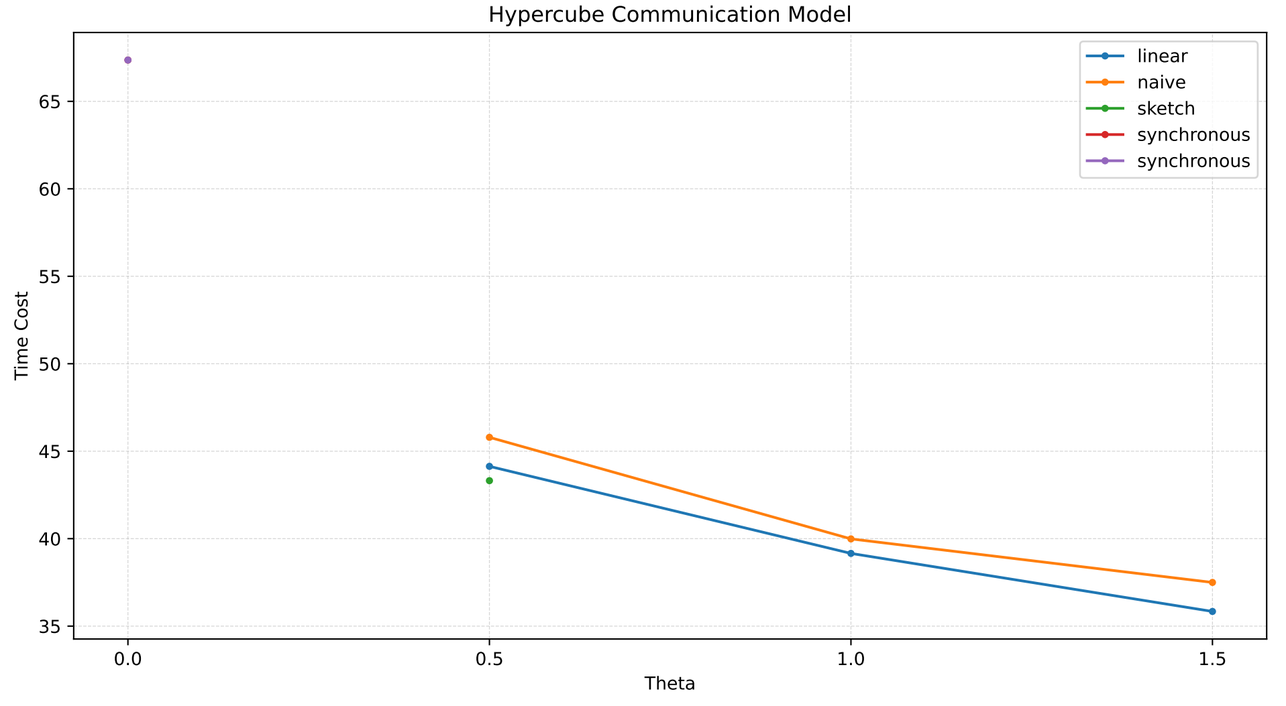
Num Clients : 55 , Batch Size : 32



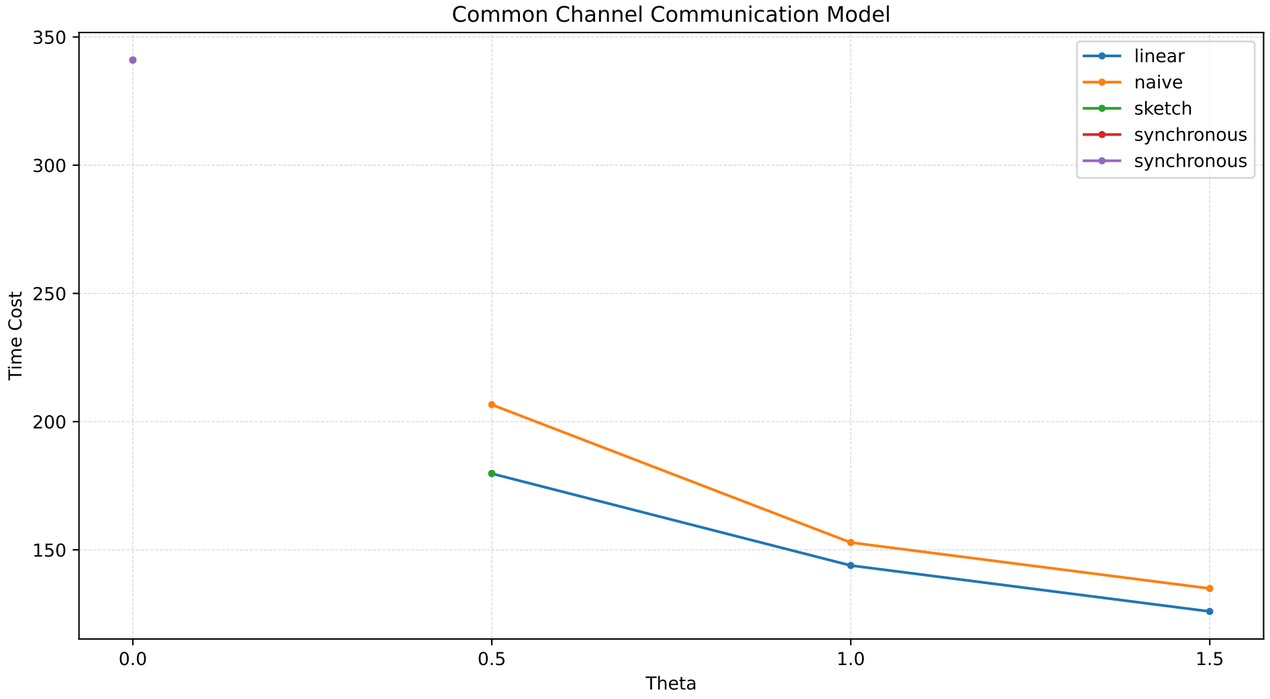


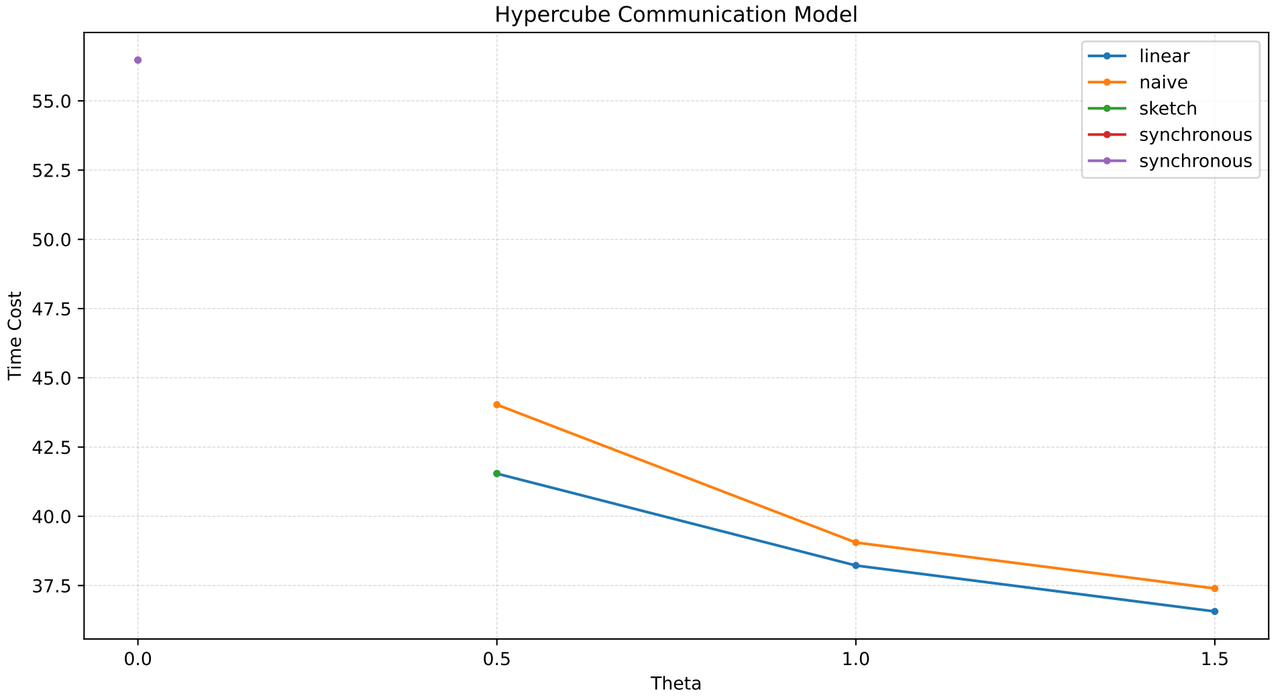
Num Clients : 55 , Batch Size : 64



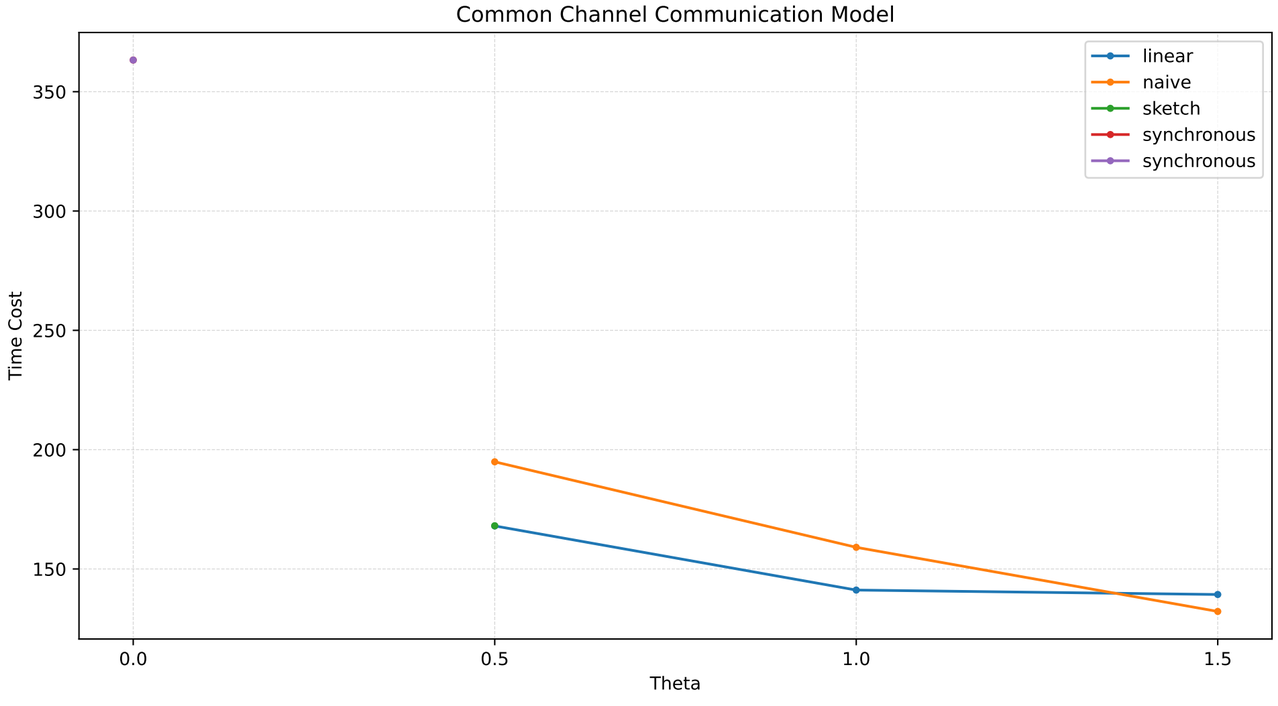


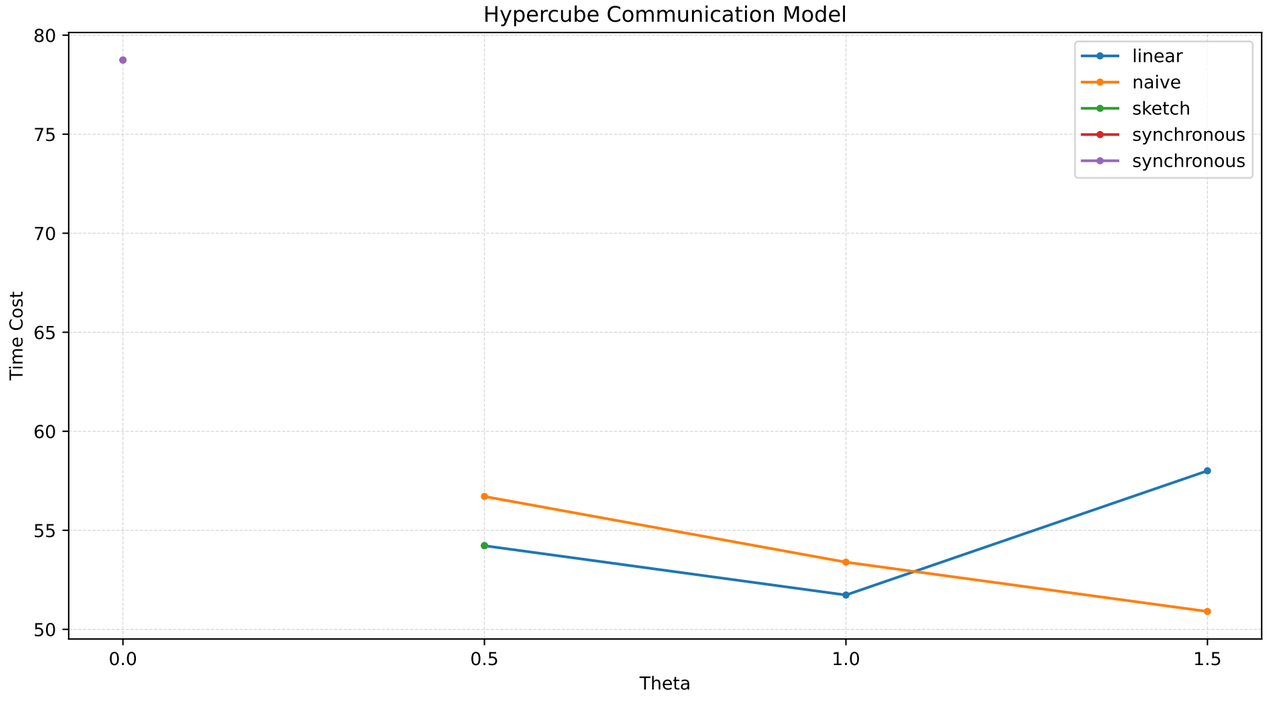
Num Clients : 55 , Batch Size : 128



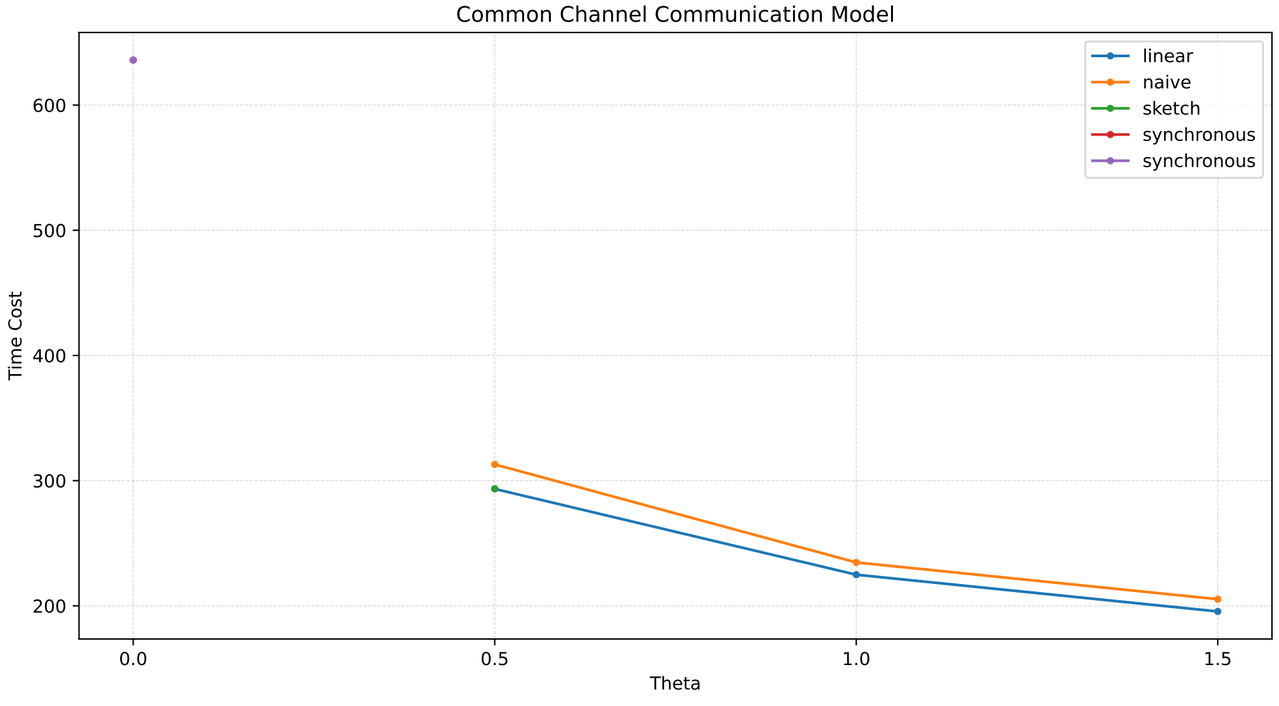


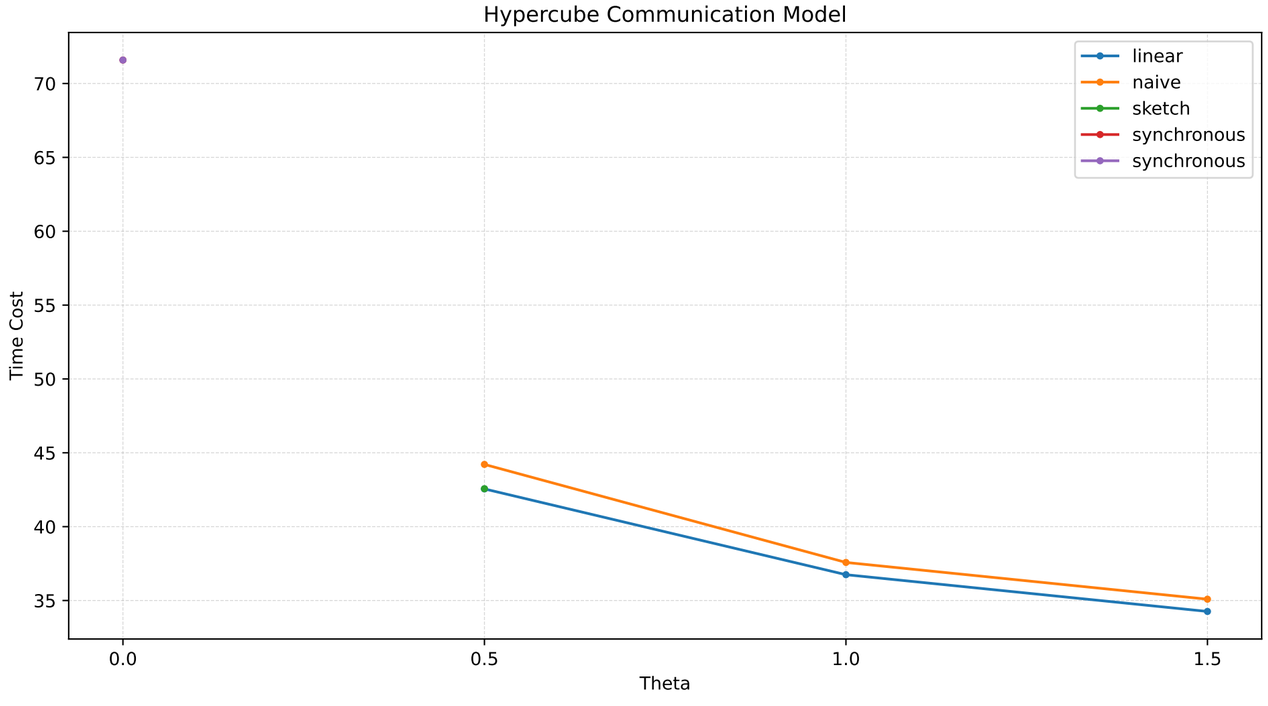
Num Clients : 55 , Batch Size : 256



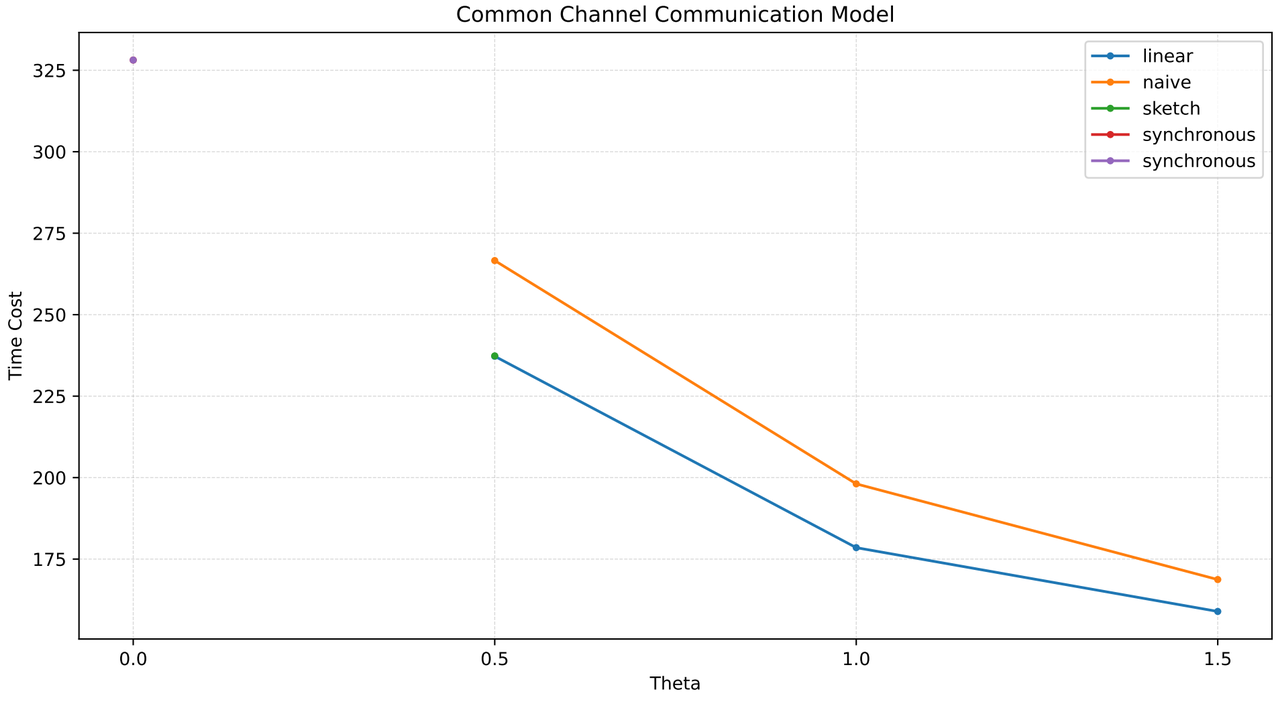


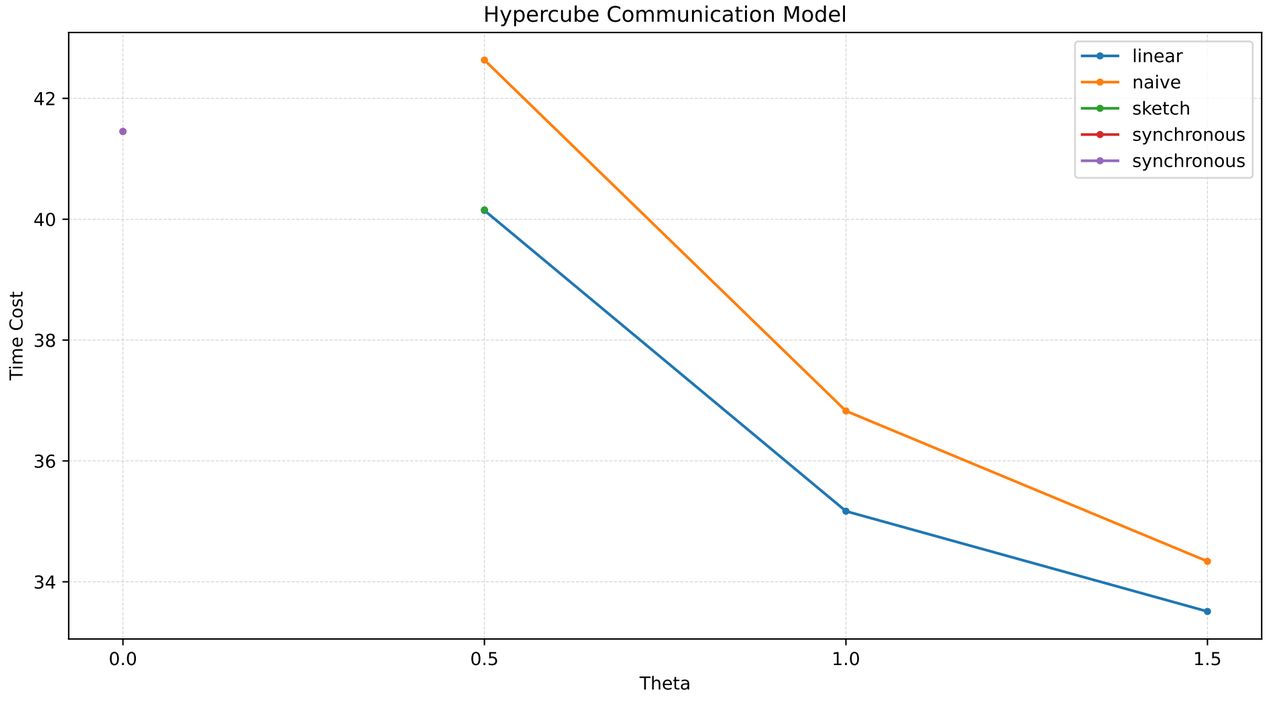
Num Clients : 60 , Batch Size : 32



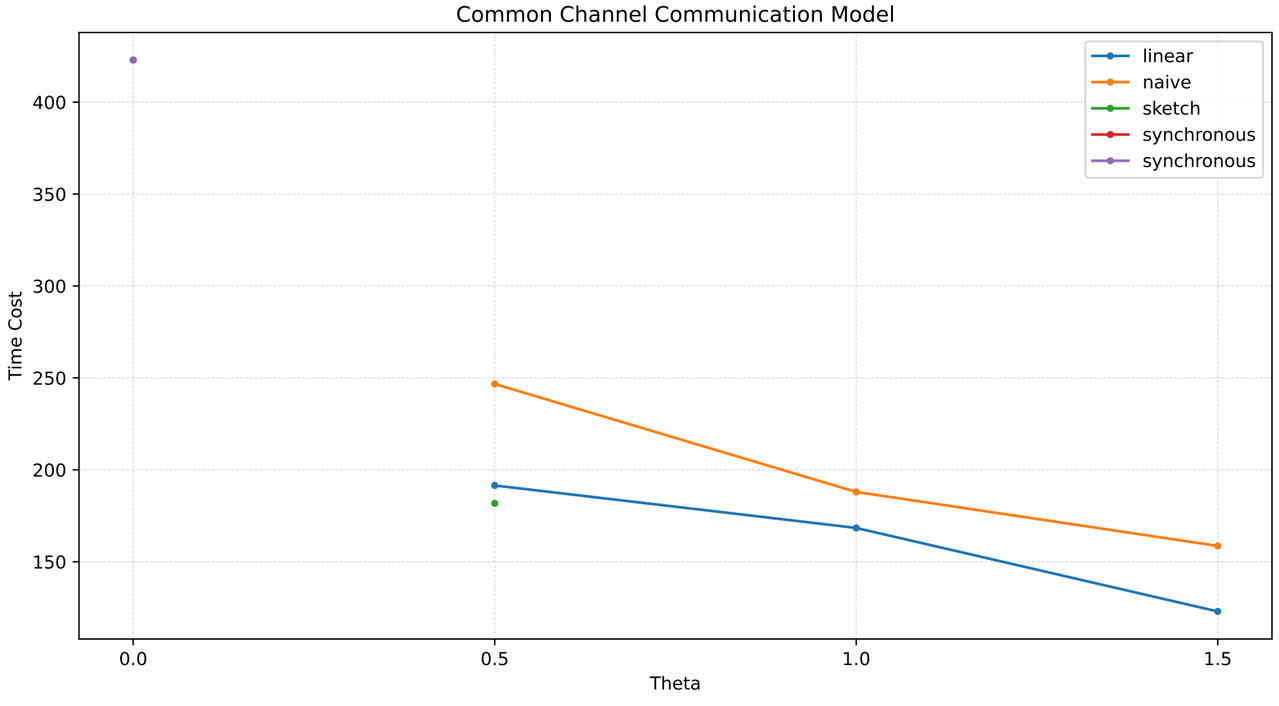


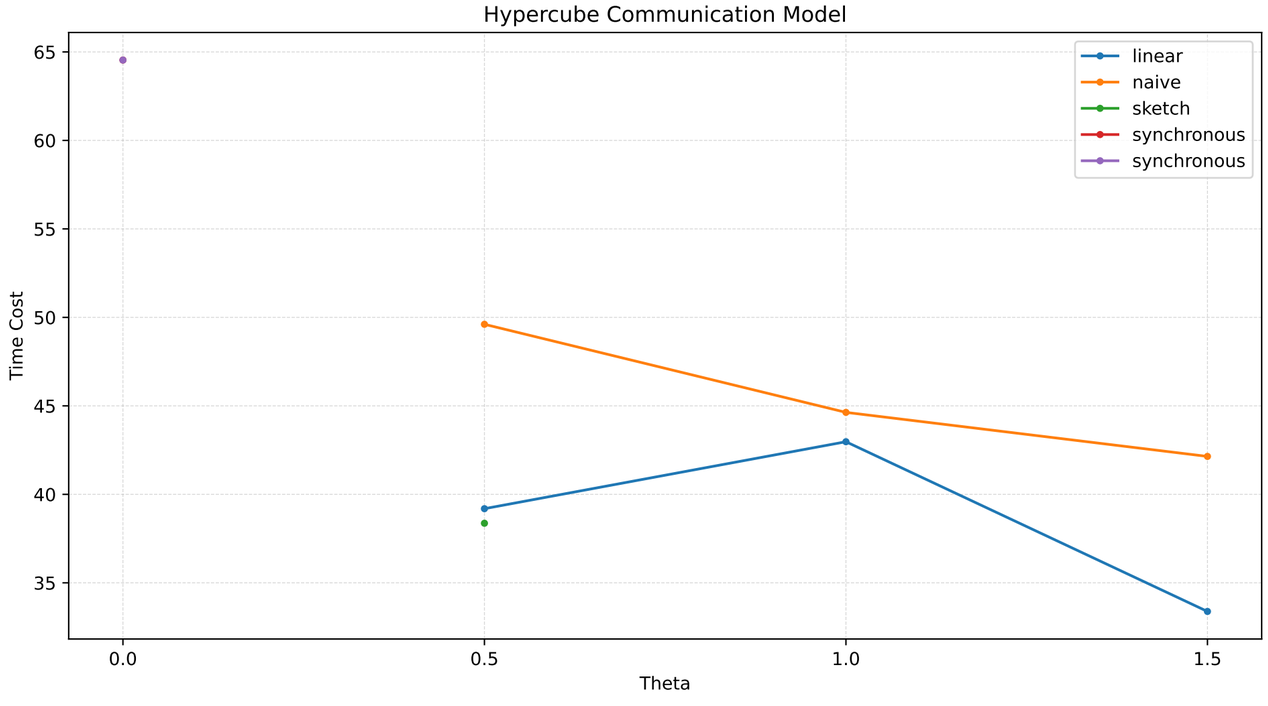
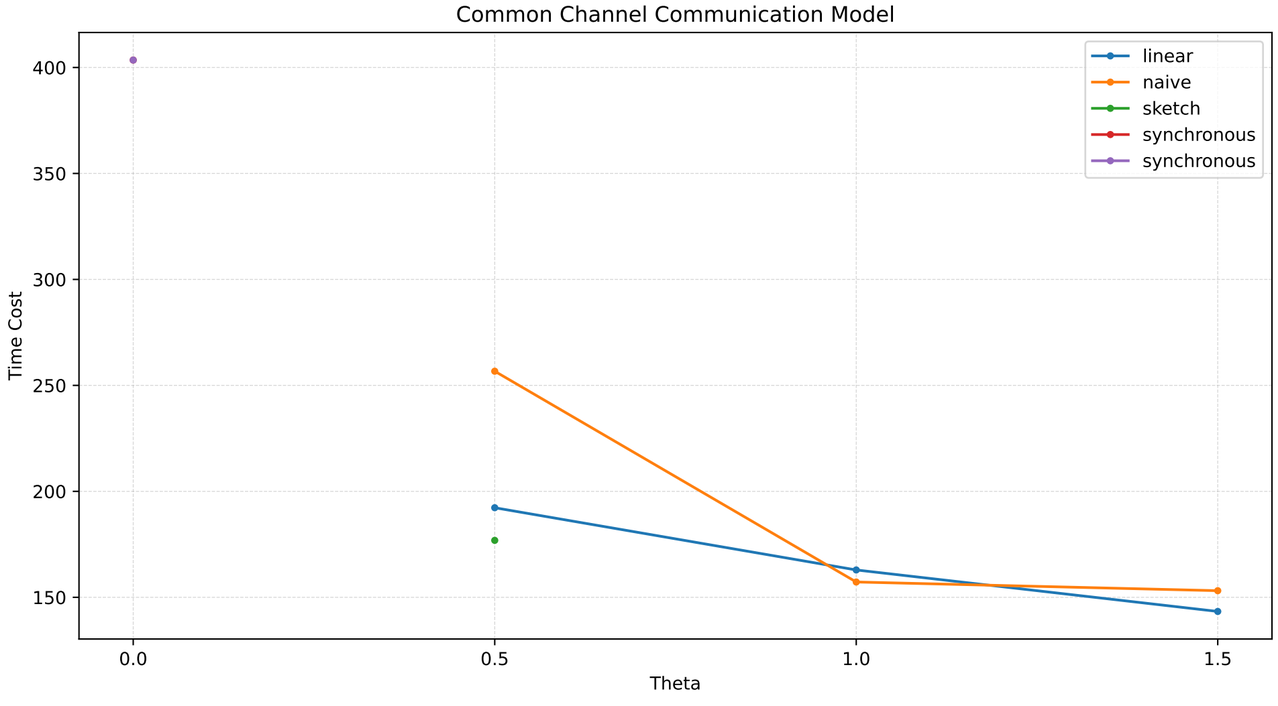
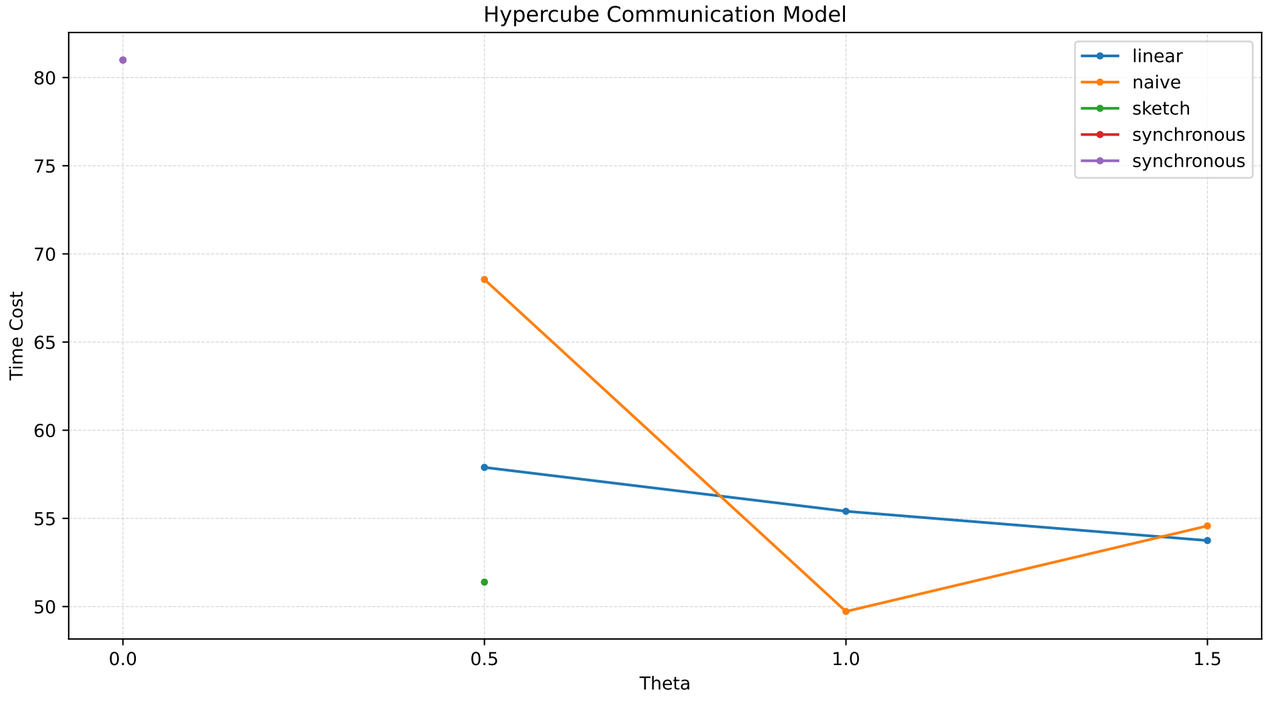
Num Clients : 60 , Batch Size : 64





Num Clients : 60 , Batch Size : 128





Num Clients : 60 , Batch Size : 256