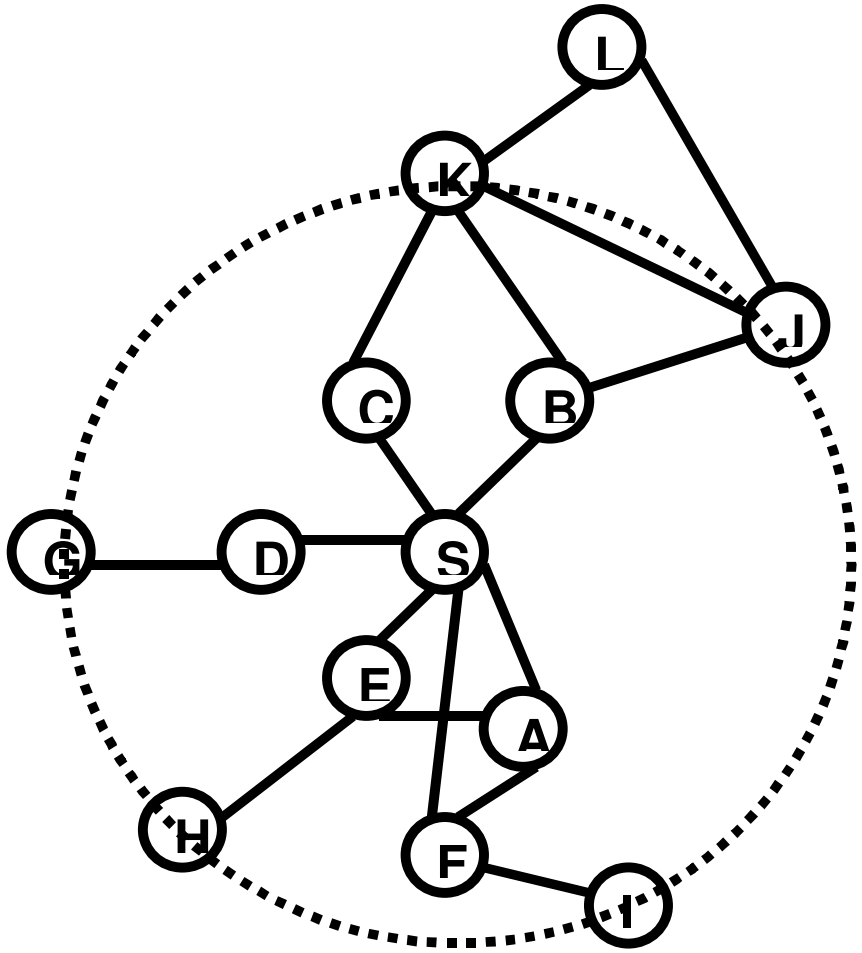

Figure 1

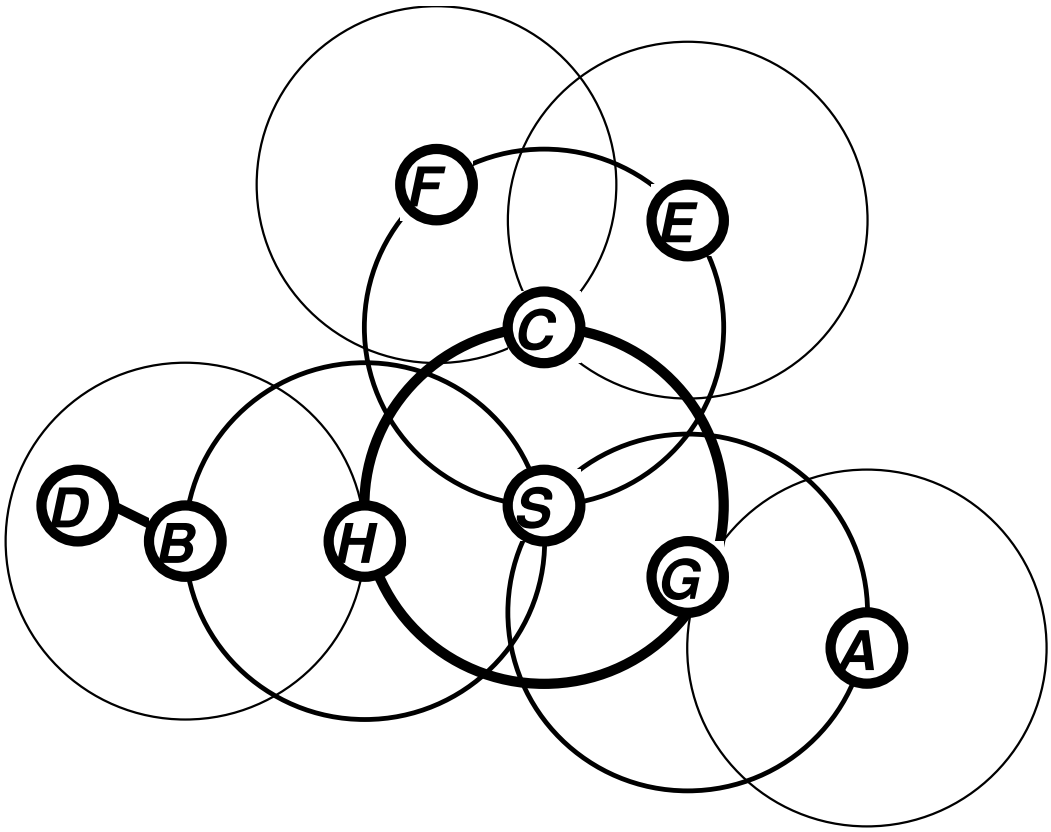

Figure 2

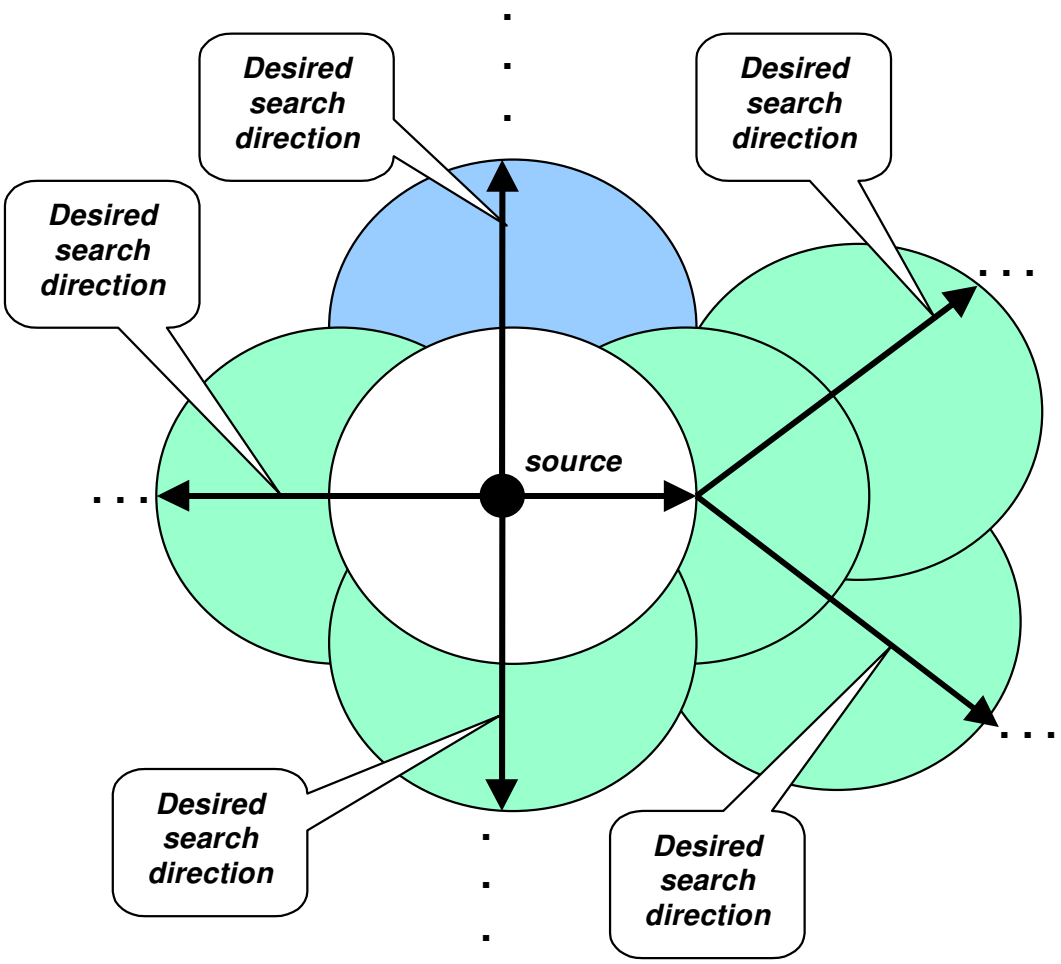
Desired search direction
Desired search direction
Desired search direction
source
Desired search direction
Desired search direction

Figure 3

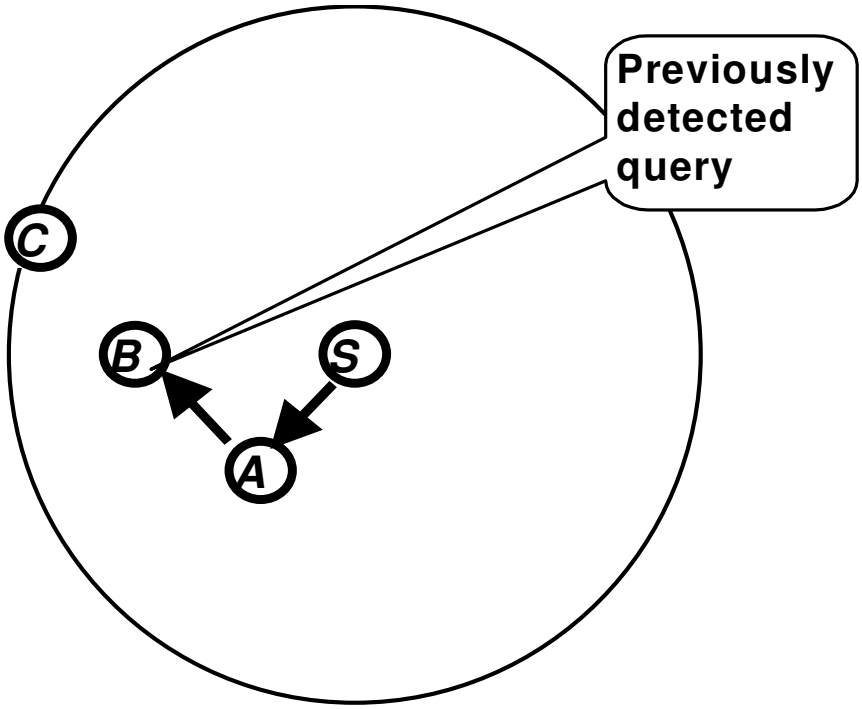

Figure 4

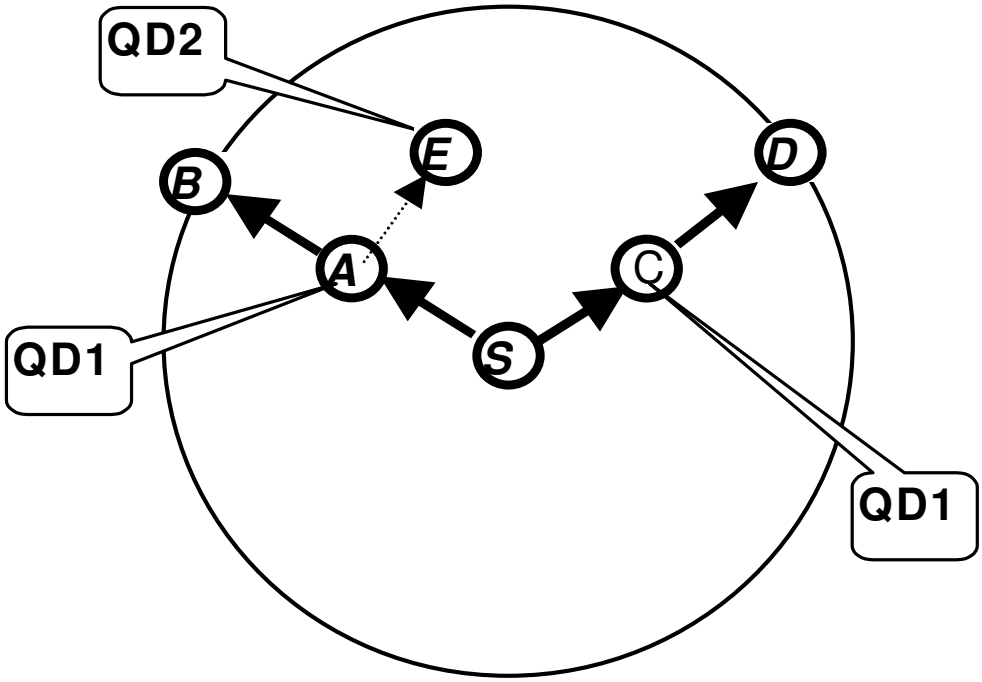

Figure 5

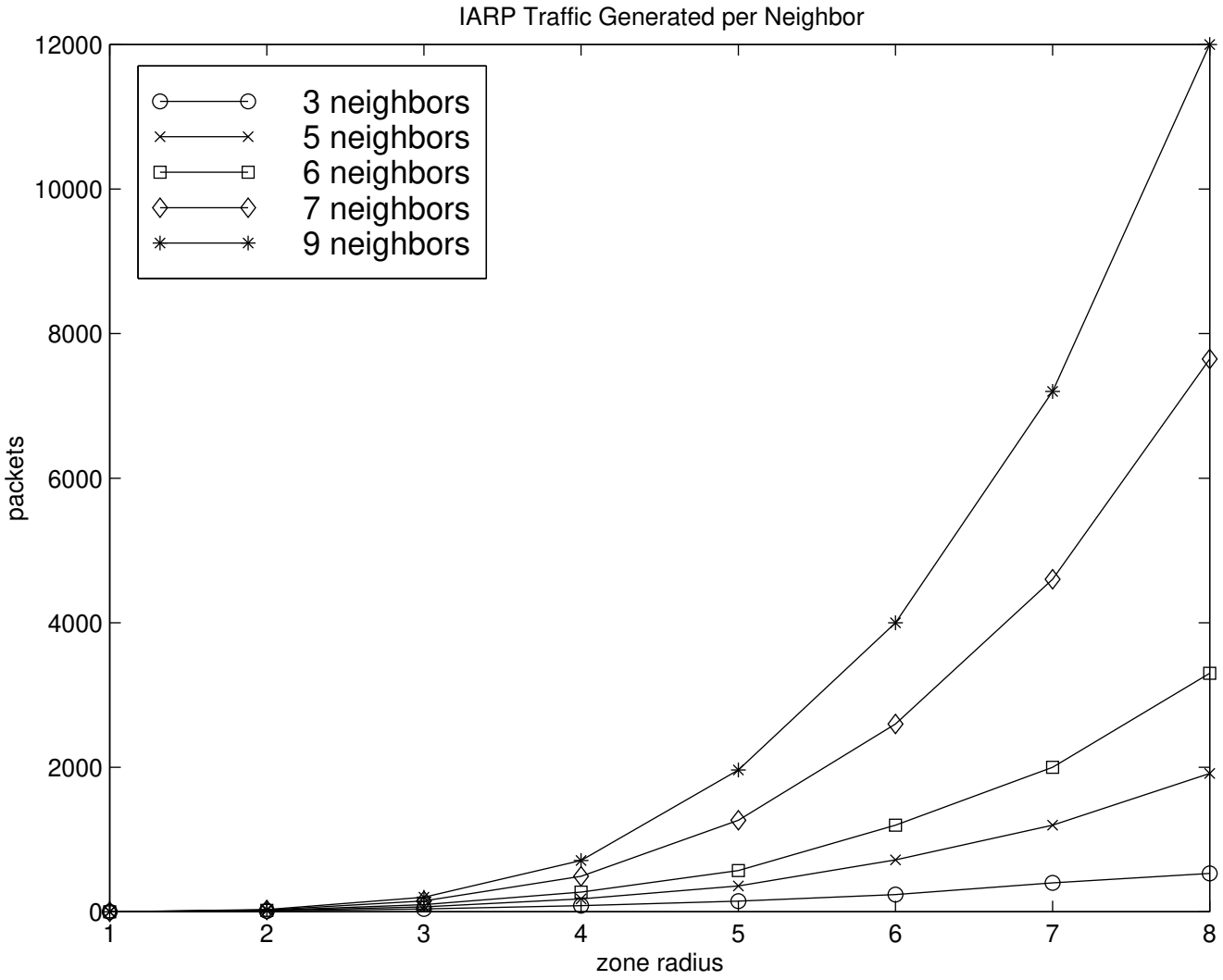
IARP Traffic Generated per Neighbor
3 neighbors
5 neighbors
6 neighbors
7 neighbors
9 neighbors
packets
zone radius
0
2000
4000
6000
8000
10000
12000
1
2
3
4
5
6
7
8

Figure 6

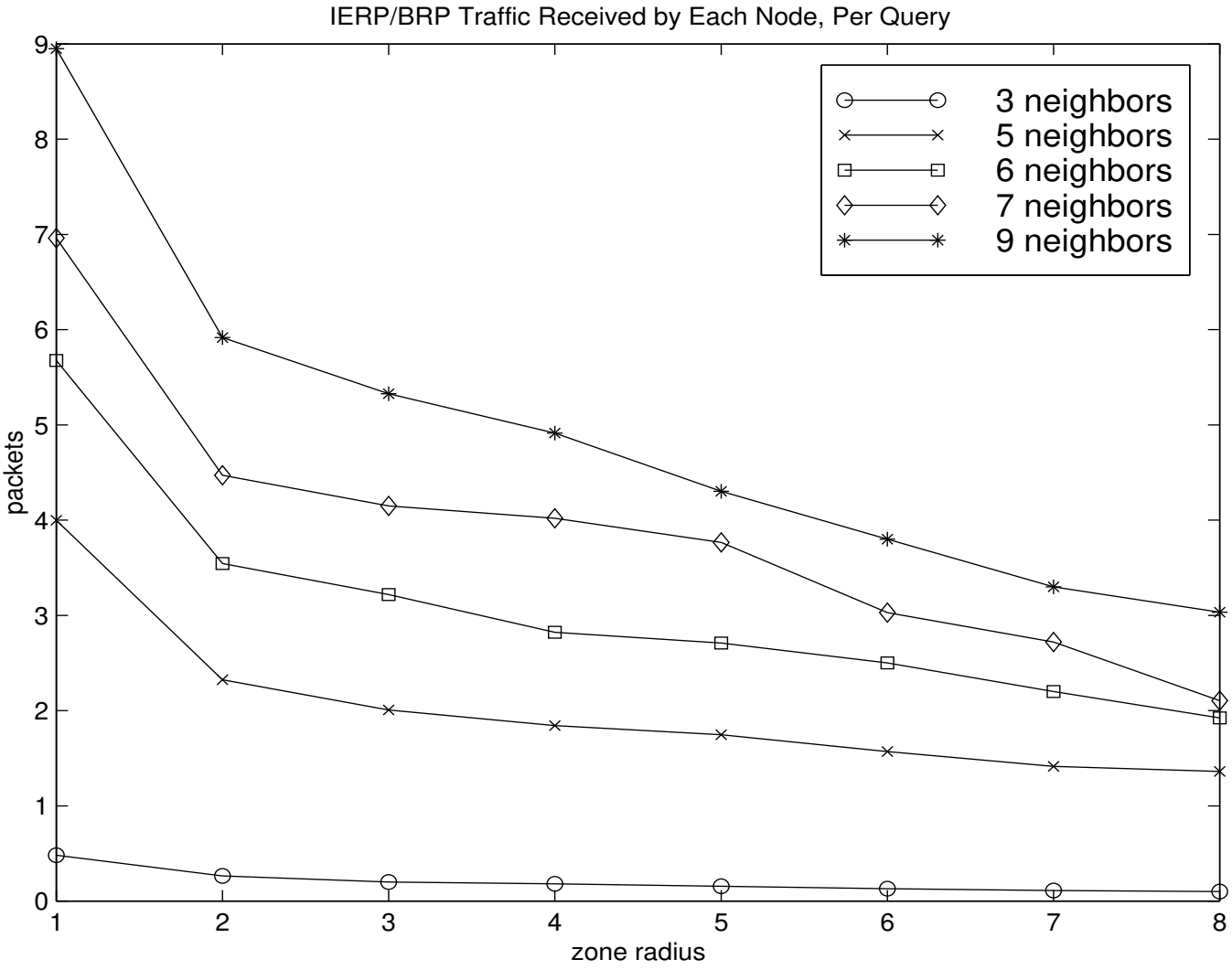
IERP/BRP Traffic Received by Each Node, Per Query
packets
zone radius
3 neighbors
5 neighbors
6 neighbors
7 neighbors
9 neighbors
0
1
2
3
4
5
6
7
8
9
1
2
3
4
5
6
7
8

Figure 7

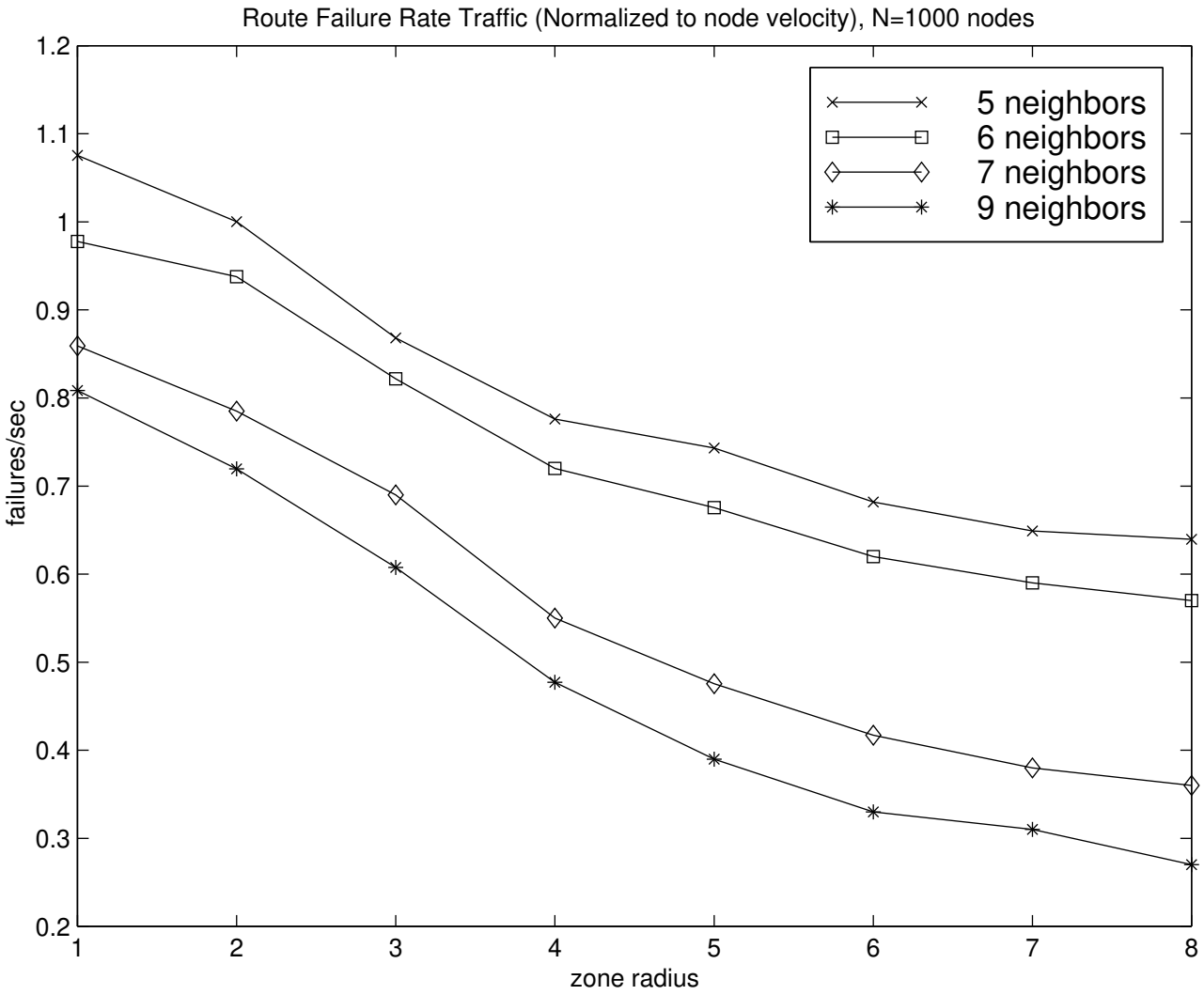
Route Failure Rate Traffic (Normalized to node velocity), N=1000 nodes
failures/sec
zone radius
5 neighbors
6 neighbors
7 neighbors
9 neighbors
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
1
2
3
4
5
6
7
8

Figure 8a

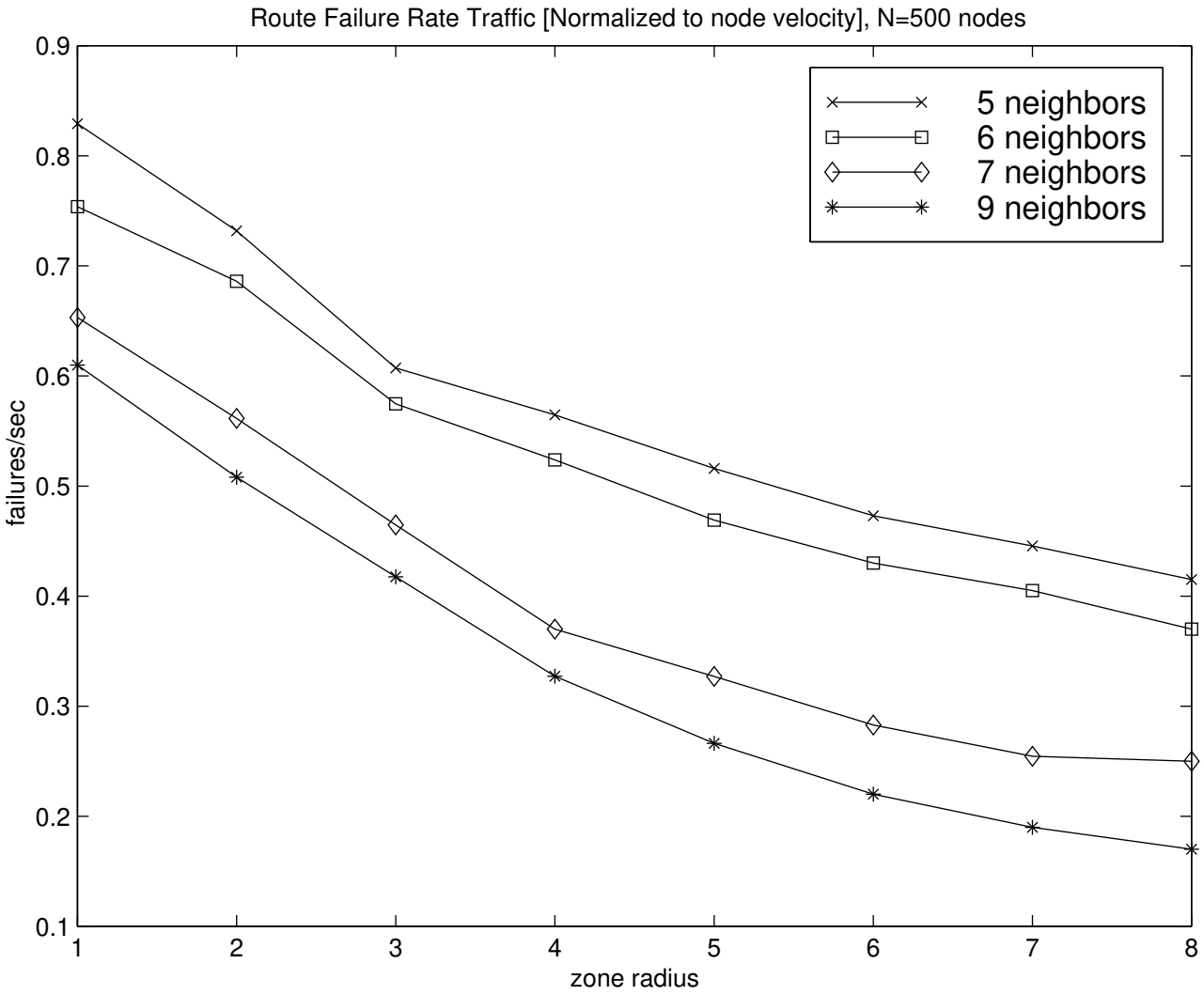
Route Failure Rate Traffic [Normalized to node velocity], N=500 nodes
failures/sec
zone radius
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
1
2
3
4
5
6
7
8
5 neighbors
6 neighbors
7 neighbors
9 neighbors

Figure 8b

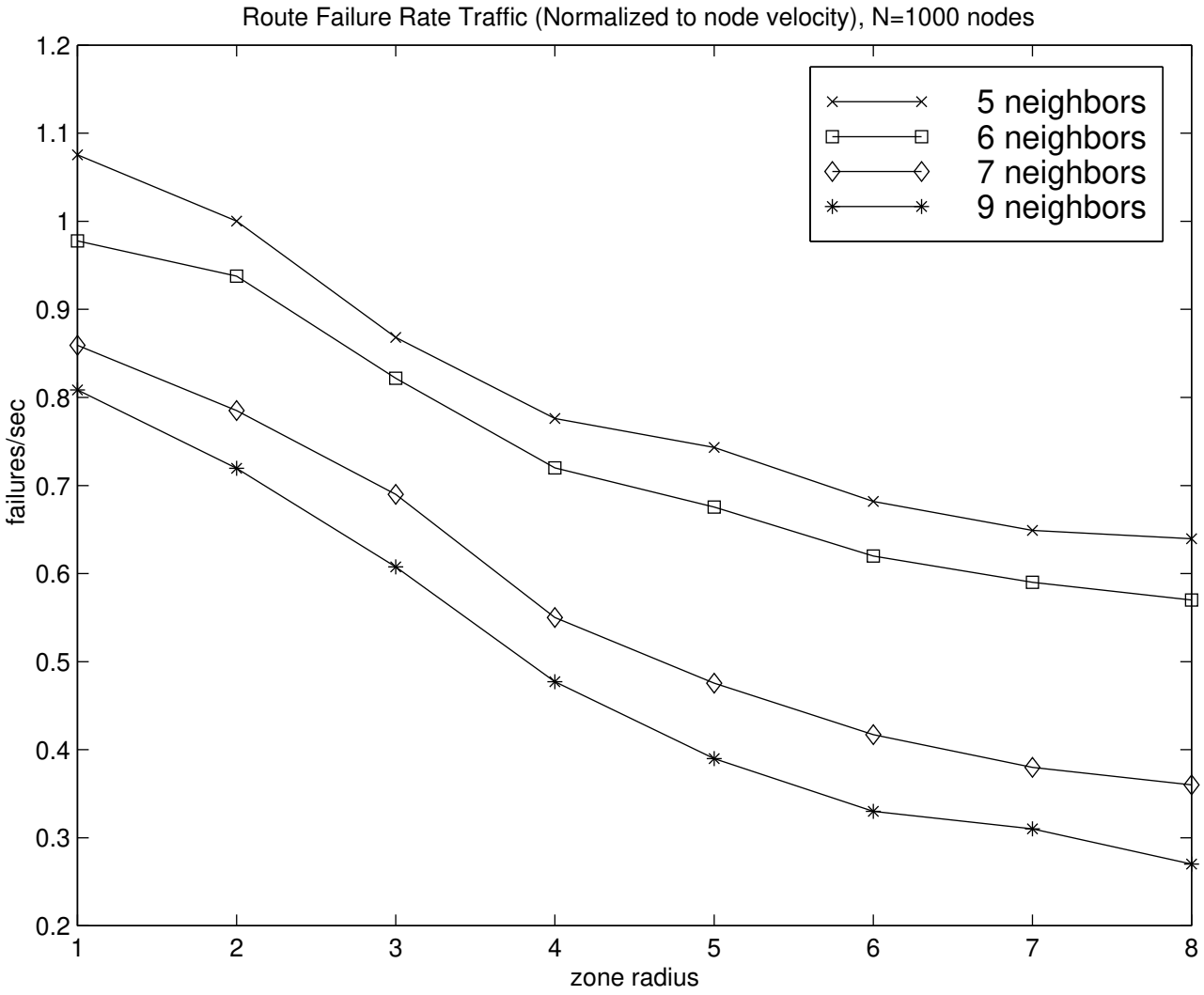
Route Failure Rate Traffic (Normalized to node velocity), N=1000 nodes
failures/sec
zone radius
5 neighbors
6 neighbors
7 neighbors
9 neighbors
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
1
2
3
4
5
6
7
8

Figure 8c

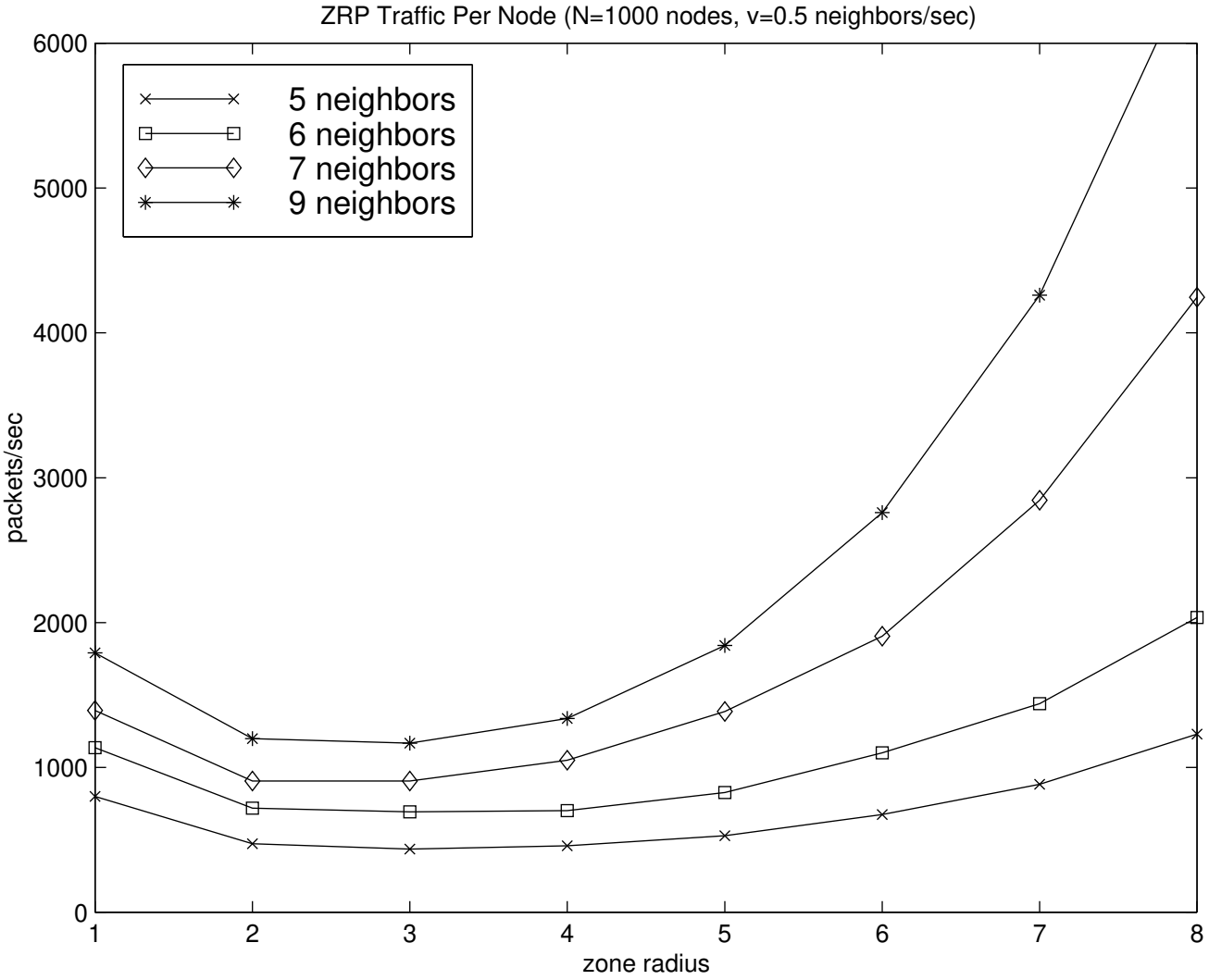
ZRP Traffic Per Node (N=1000 nodes, v=0.5 neighbors/sec)
5 neighbors
6 neighbors
7 neighbors
9 neighbors
packets/sec
zone radius
0
1000
2000
3000
4000
5000
6000
1
2
3
4
5
6
7
8

Figure 9a

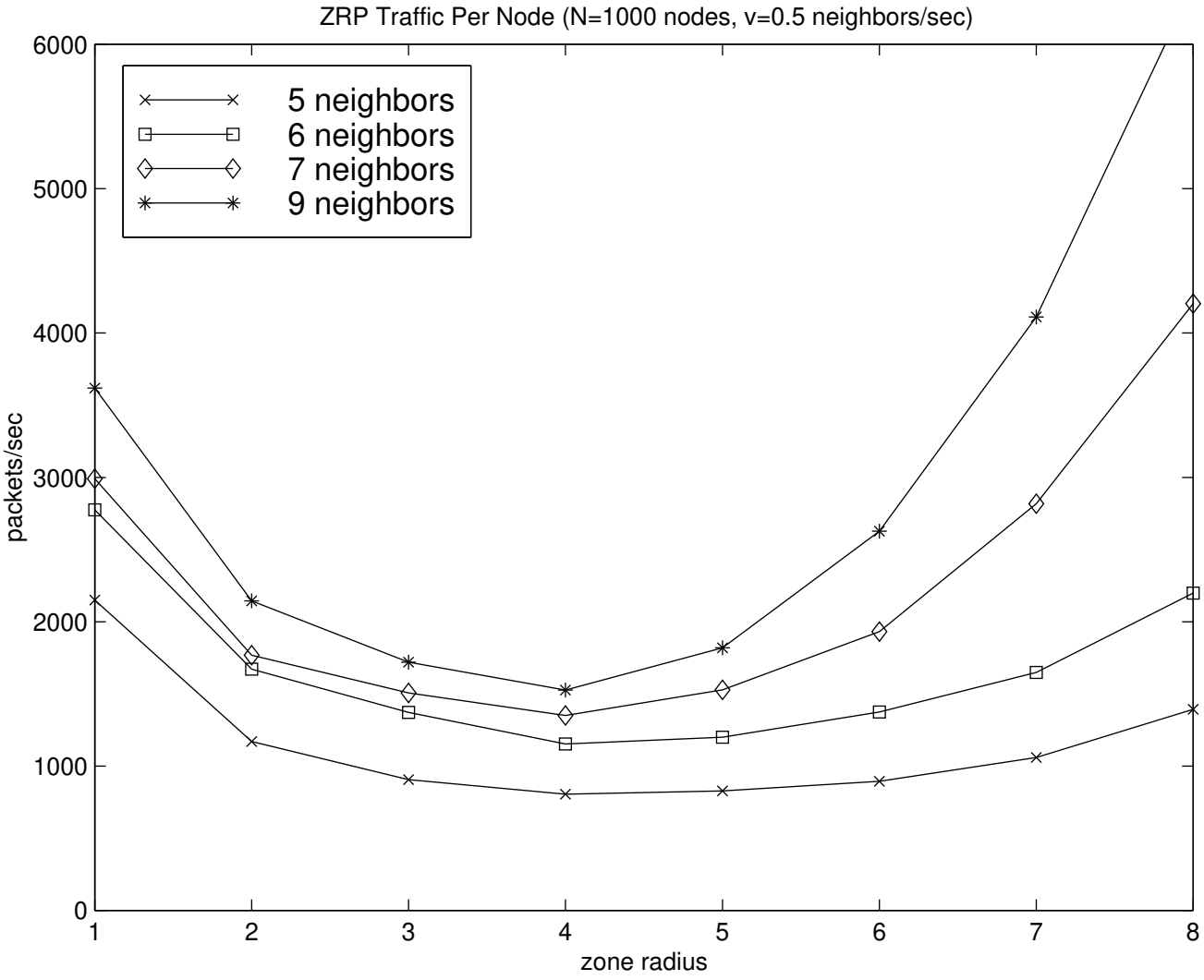
ZRP Traffic Per Node (N=1000 nodes, v=0.5 neighbors/sec)
5 neighbors
6 neighbors
7 neighbors
9 neighbors
packets/sec
zone radius
0
1000
2000
3000
4000
5000
6000
1
2
3
4
5
6
7
8

Figure 9b

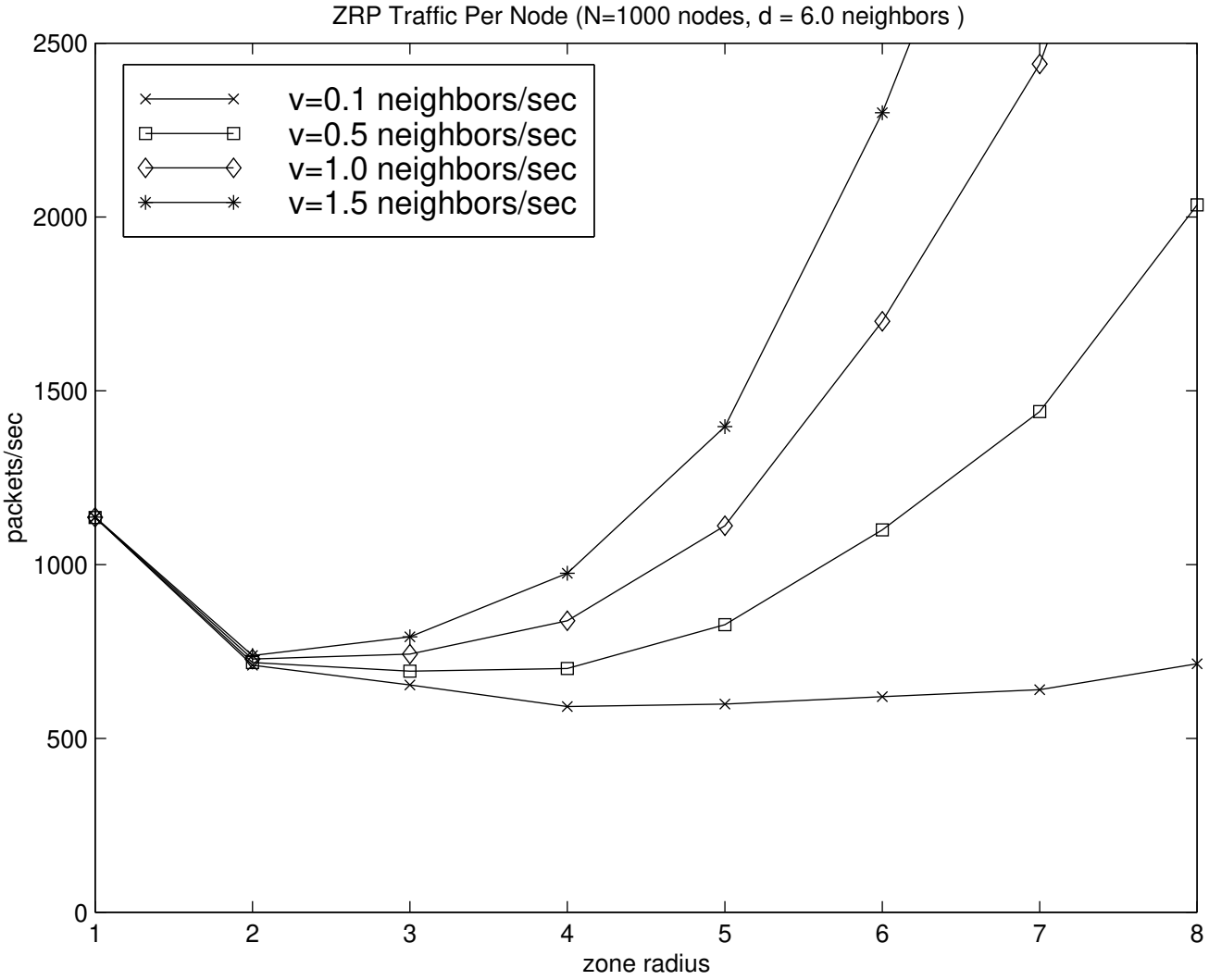
ZRP Traffic Per Node (N=1000 nodes, d = 6.0 neighbors)
v=0.1 neighbors/sec
v=0.5 neighbors/sec
v=1.0 neighbors/sec
v=1.5 neighbors/sec
packets/sec
zone radius
0
500
1000
1500
2000
2500
1
2
3
4
5
6
7
8

Figure 9c

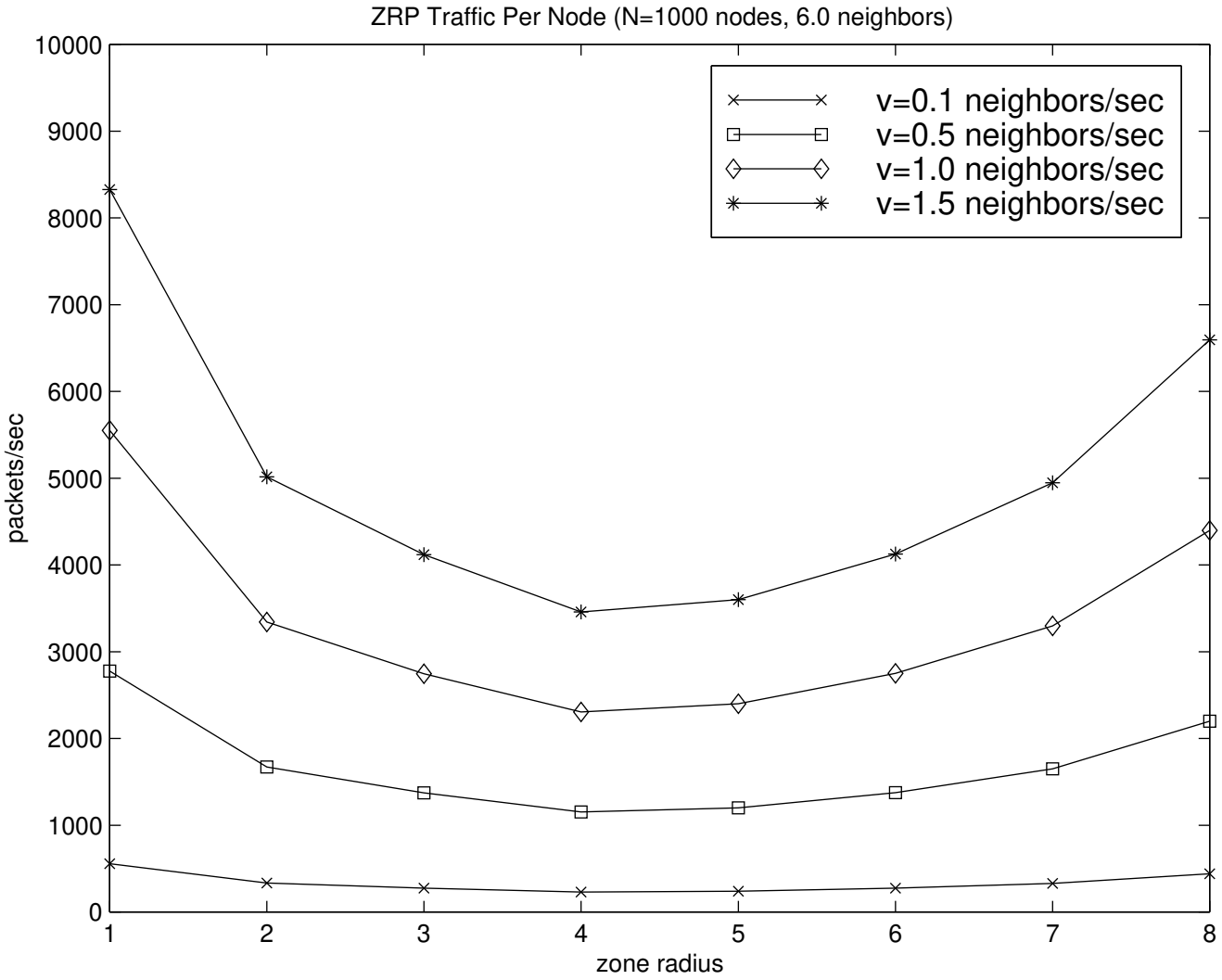
ZRP Traffic Per Node (N=1000 nodes, 6.0 neighbors)
packets/sec
zone radius
v=0.1 neighbors/sec
v=0.5 neighbors/sec
v=1.0 neighbors/sec
v=1.5 neighbors/sec
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
1
2
3
4
5
6
7
8

Figure 9d

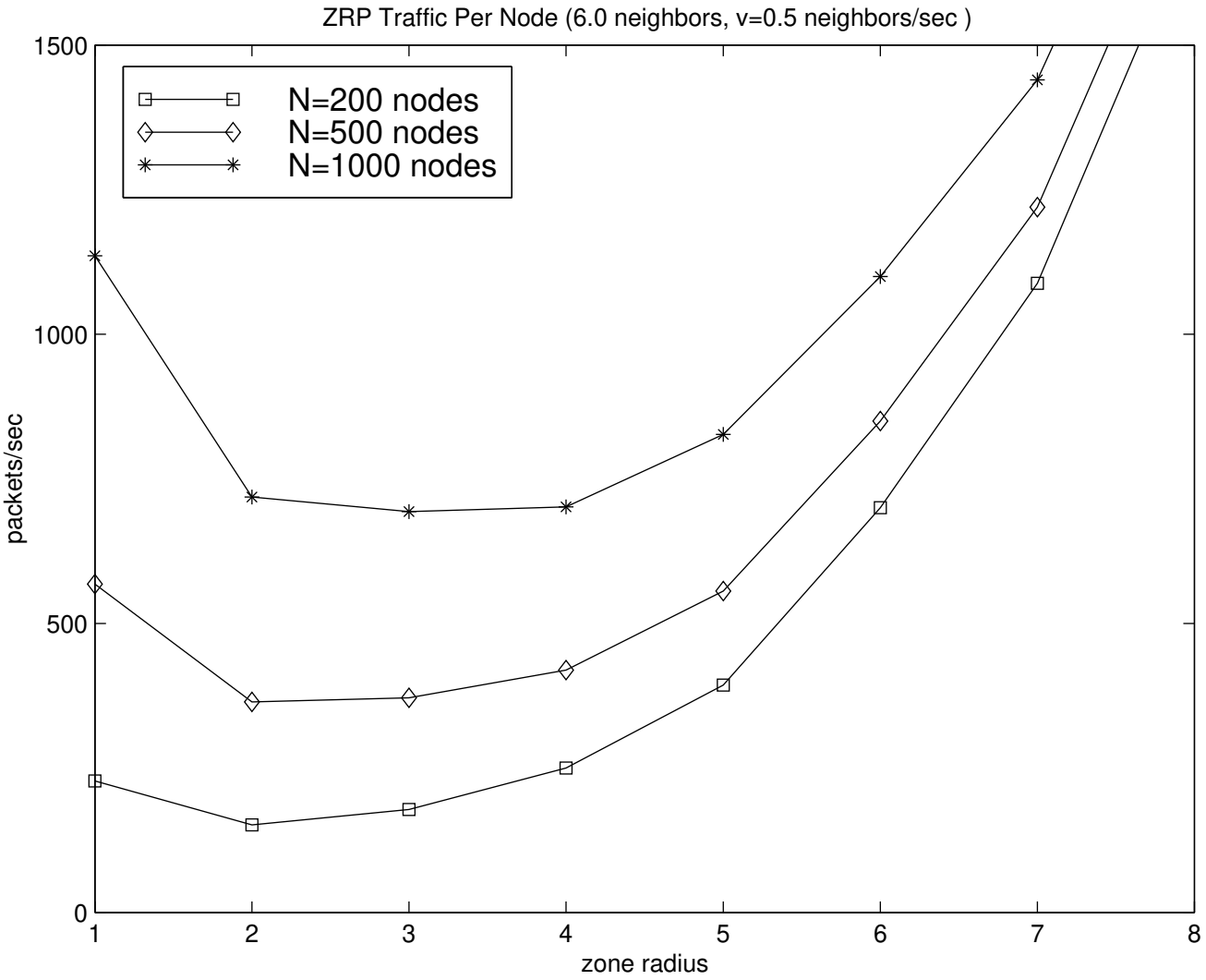
ZRP Traffic Per Node (6.0 neighbors, v=0.5 neighbors/sec)
N=200 nodes
N=500 nodes
N=1000 nodes
packets/sec
zone radius
0
500
1000
1500
1
2
3
4
5
6
7
8

Figure 9e

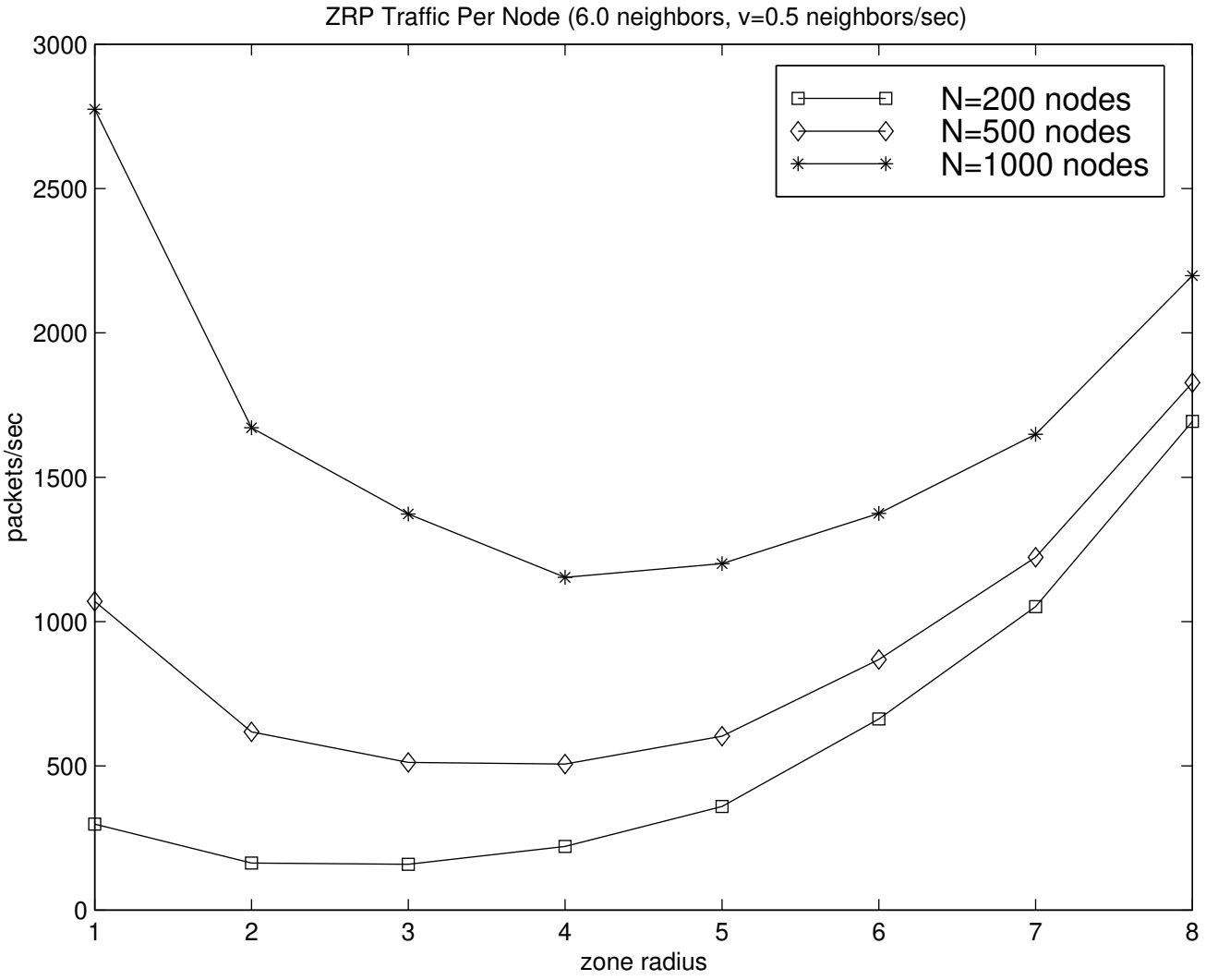
ZRP Traffic Per Node (6.0 neighbors, v=0.5 neighbors/sec)
N=200 nodes
N=500 nodes
N=1000 nodes
packets/sec
zone radius
0
500
1000
1500
2000
2500
3000
1
2
3
4
5
6
7
8

Figure 9f

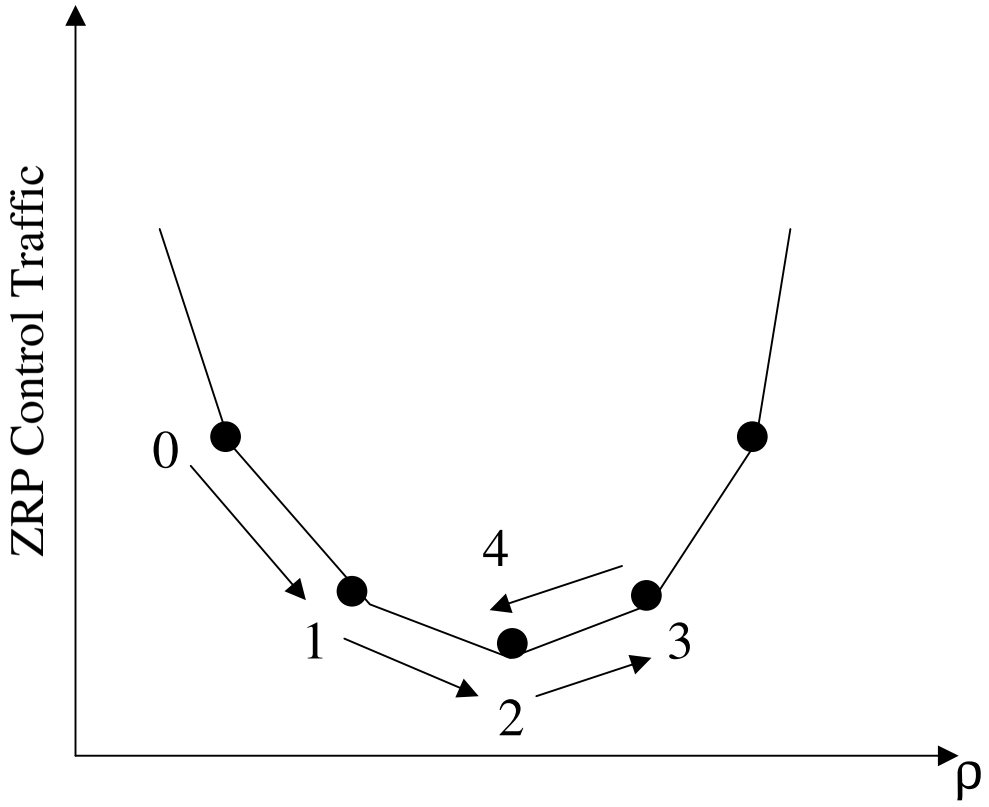

Figure 10

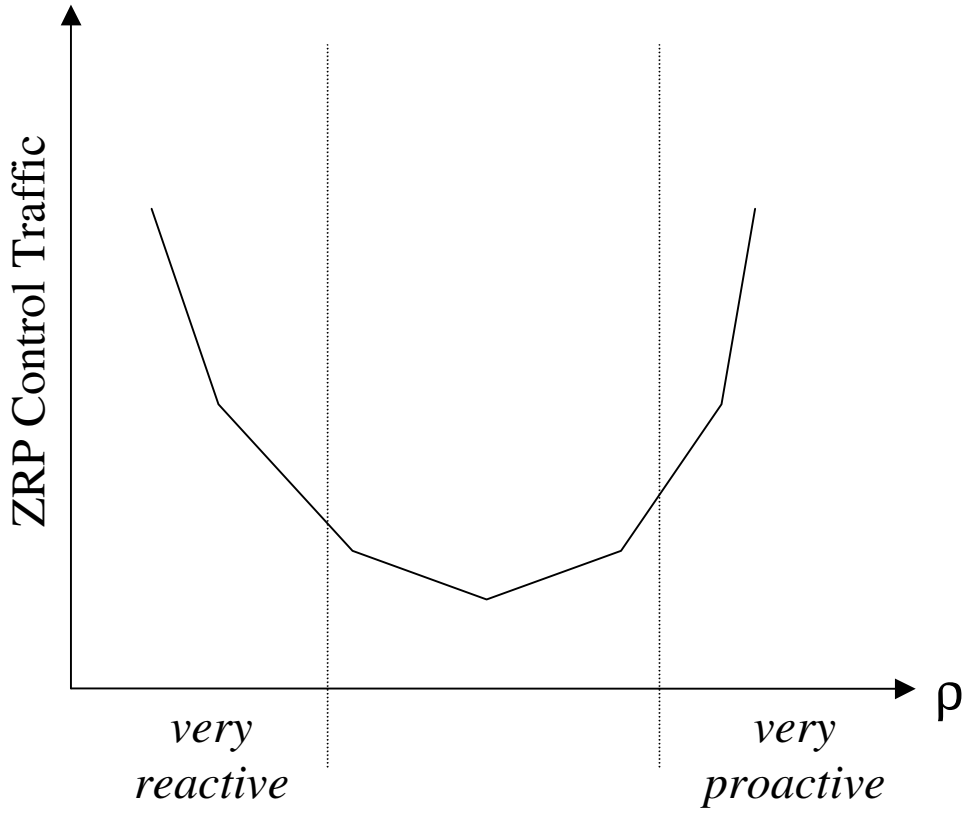

Figure 11

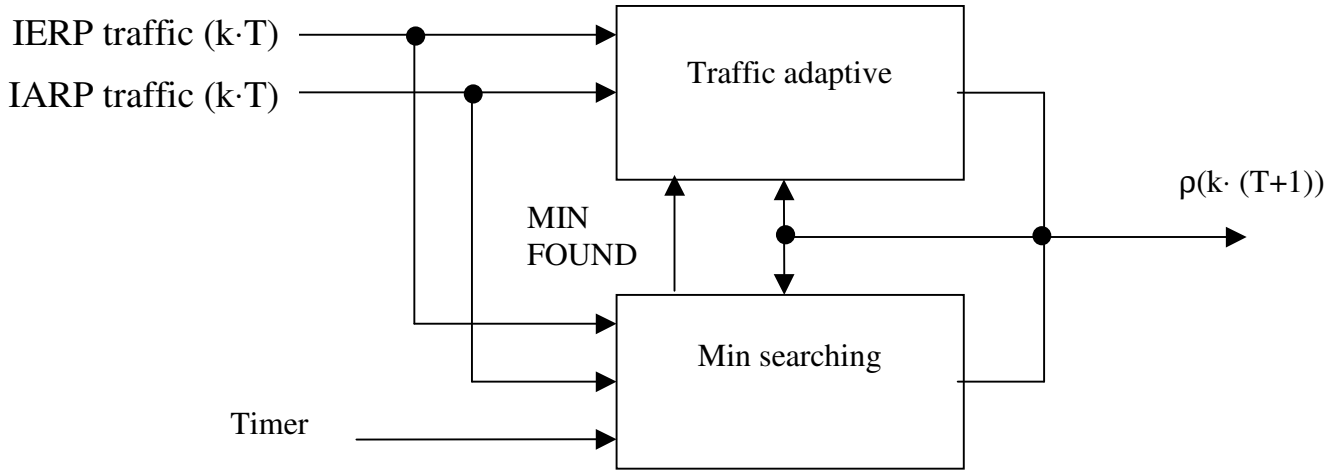
IERP traffic (k·T)
IARP traffic (k·T)
Traffic adaptive
ρ(k· (T+1))
MIN
FOUND
Min searching
Timer

Figure 12

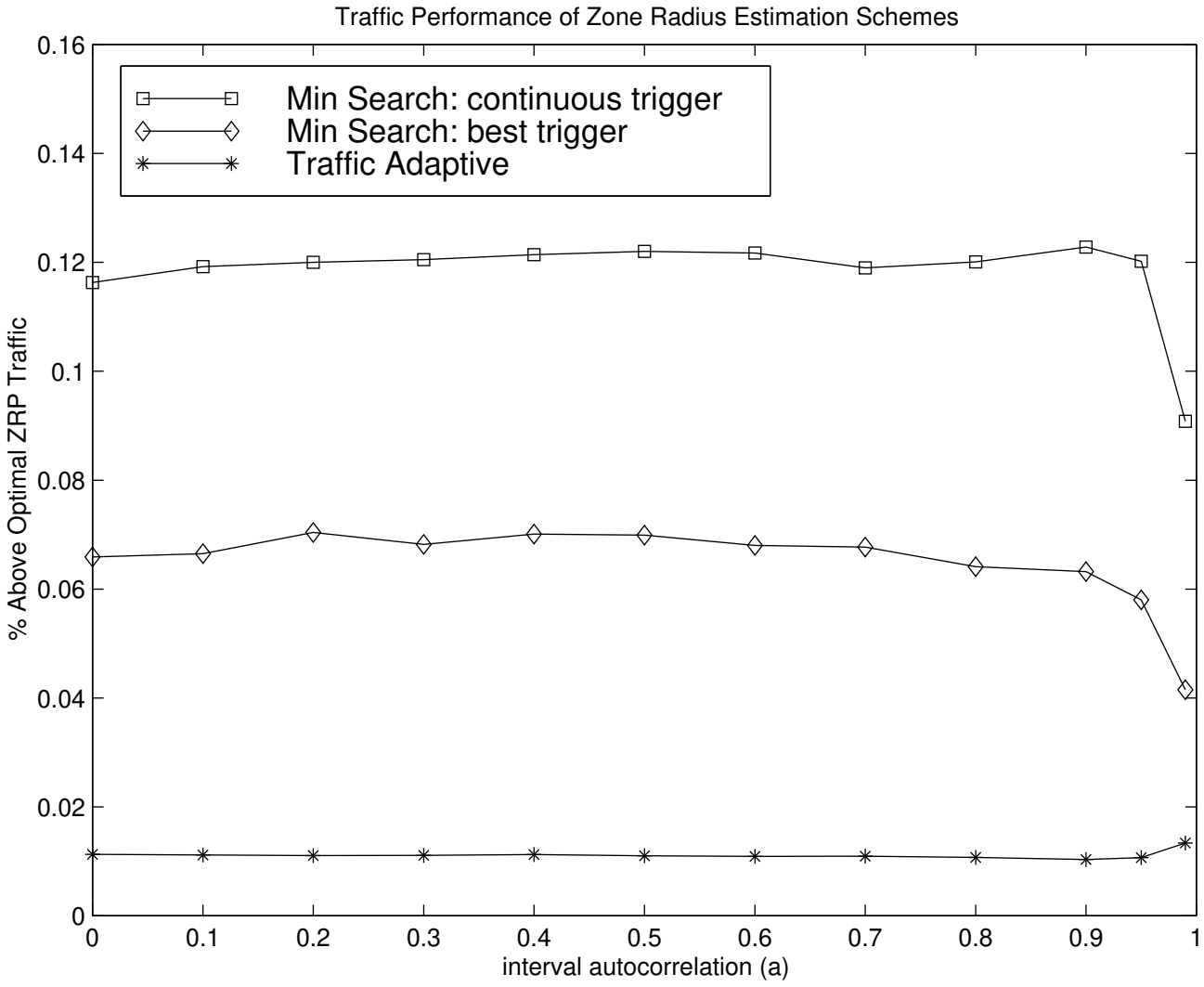
Traffic Performance of Zone Radius Estimation Schemes
Min Search: continuous trigger
Min Search: best trigger
Traffic Adaptive
% Above Optimal ZRP Traffic
interval autocorrelation (a)
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

Figure 13

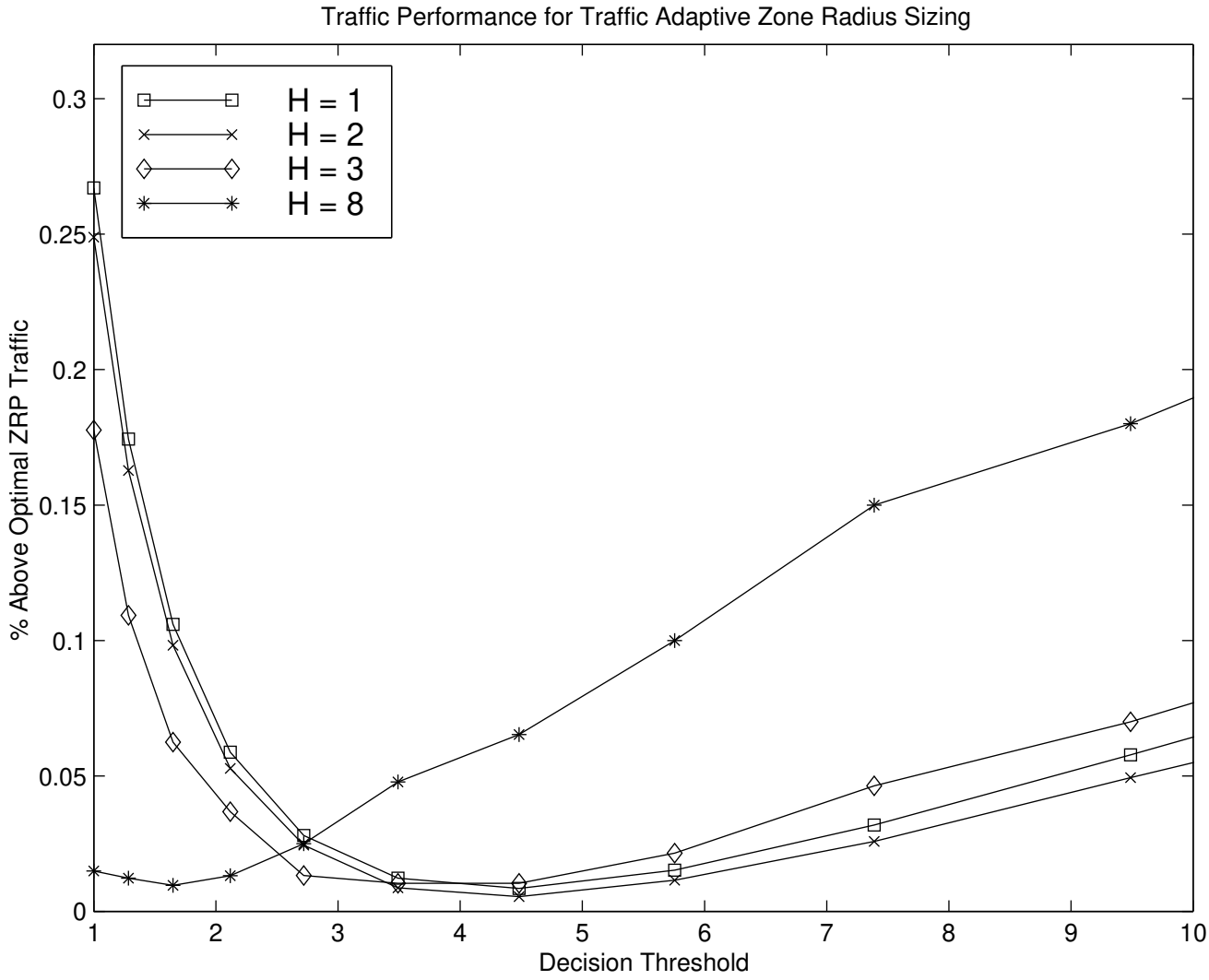
Traffic Performance for Traffic Adaptive Zone Radius Sizing
H = 1
H = 2
H = 3
H = 8
% Above Optimal ZRP Traffic
Decision Threshold
0
0.05
0.1
0.15
0.2
0.25
0.3
1
2
3
4
5
6
7
8
9
10

Figure 14

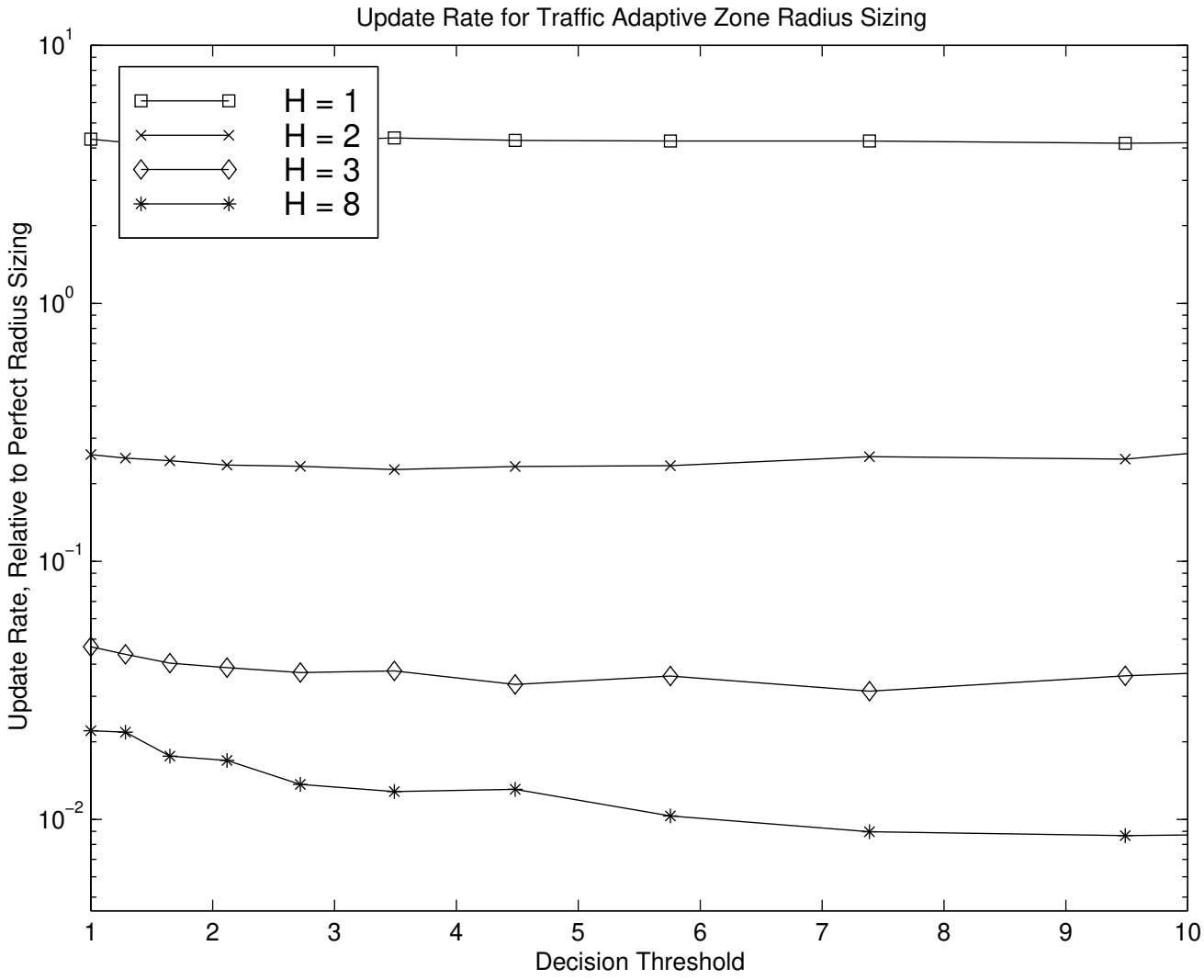
Update Rate for Traffic Adaptive Zone Radius Sizing
Update Rate, Relative to Perfect Radius Sizing
Decision Threshold
H = 1
H = 2
H = 3
H = 8
10^1
10^0
10^-1
10^-2
1
2
3
4
5
6
7
8
9
10

Figure 15