Feasibility Study of Mesh Networks for All-Wireless Offices

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Motivations

- Are mesh networks feasible for real world applications?
  - What about all-wireless offices first?
  - Synthesis vs. actual traffic load
  - Throughput vs. delay

Approaches

- Capture actual traffic!
  - MS research offices
  - Who’s traffic?
  - How to capture?
    - Packet level
    - Socket level
    - Application level

Socket level traffic capture

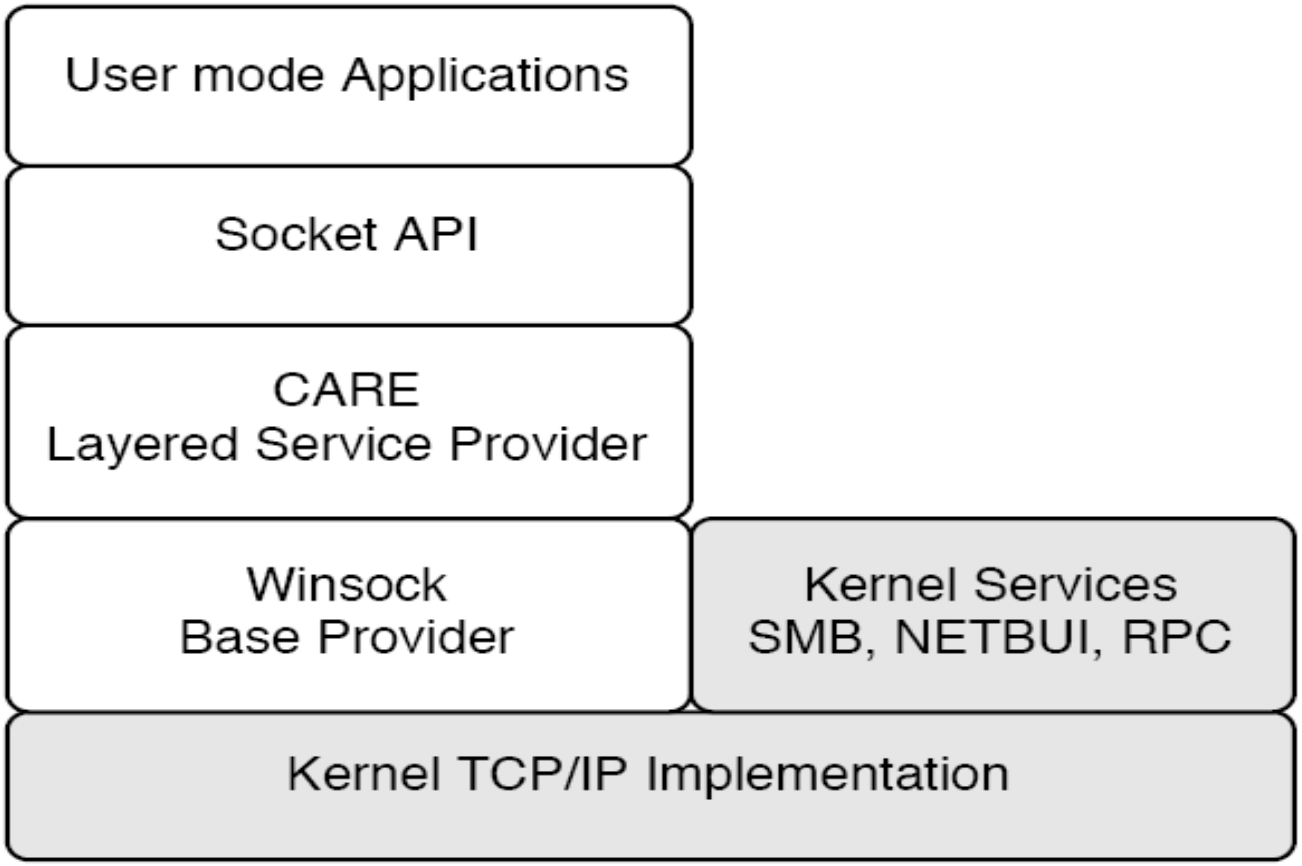


Figure 1: Layered Service Provider in Windows XP Stack

Actually captured traffic

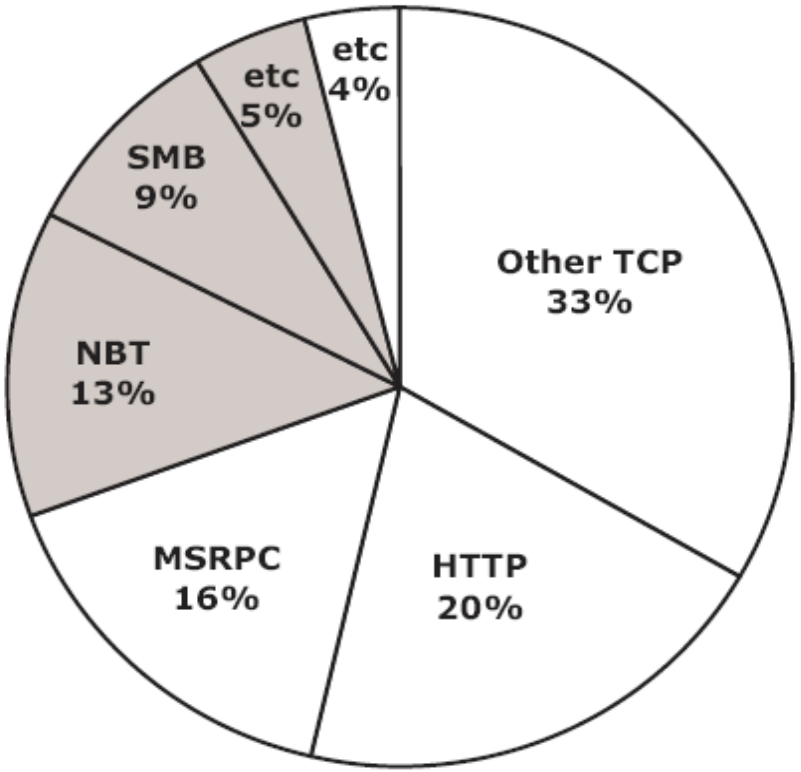


Figure 2: Traffic Volume Distribution on Sample User Machine (gray slices not captured)

Replay of the captured traffic

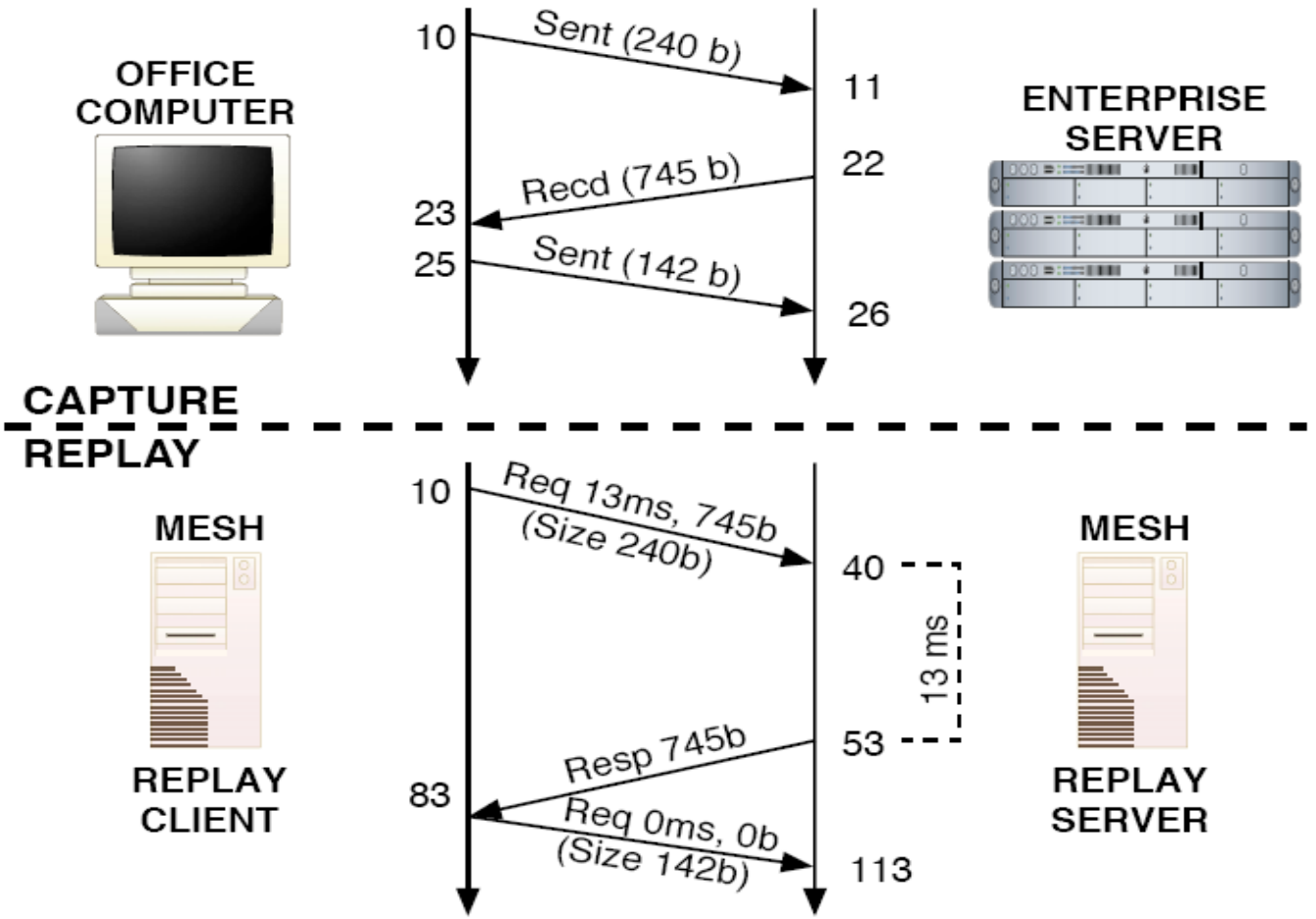


Figure 4: Replay of Captured Trace

Replay performance

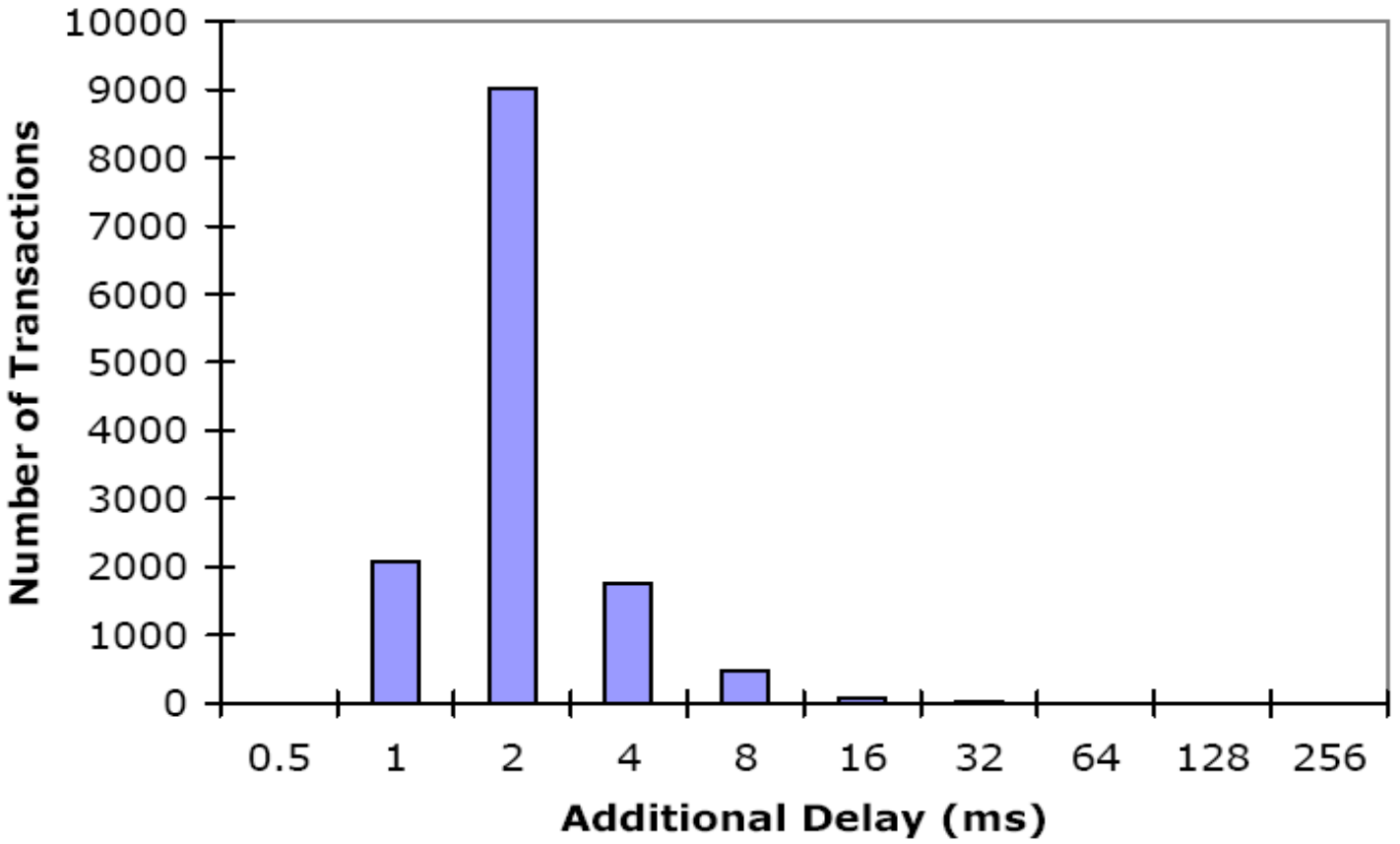


Figure 5: Replay Performance Between 2 Machines over Ethernet (rounding up to next delay bin)

Traces of office machines

Capture Period	Aug. 2005 to Sep. 2005
Capture Hosts	11
Unique IP Addresses	1490
Total Traffic	16.8 GB
Average Traffic per IP	11900 KB
Median Traffic per IP	34 KB

Table 1: Characteristics of Captured Traffic

Traffic periods

Name	Day / Time	Load (MB)	Session Count	Transaction Count
Heavy	Fri 18:00-19:00	587.51	306	9600
Medium	Tue 10:00-11:00	83.27	969	38757
Light	Tue 13:00-14:00	19.72	415	2970

Table 2: Traffic Periods Employed

Traffic distribution

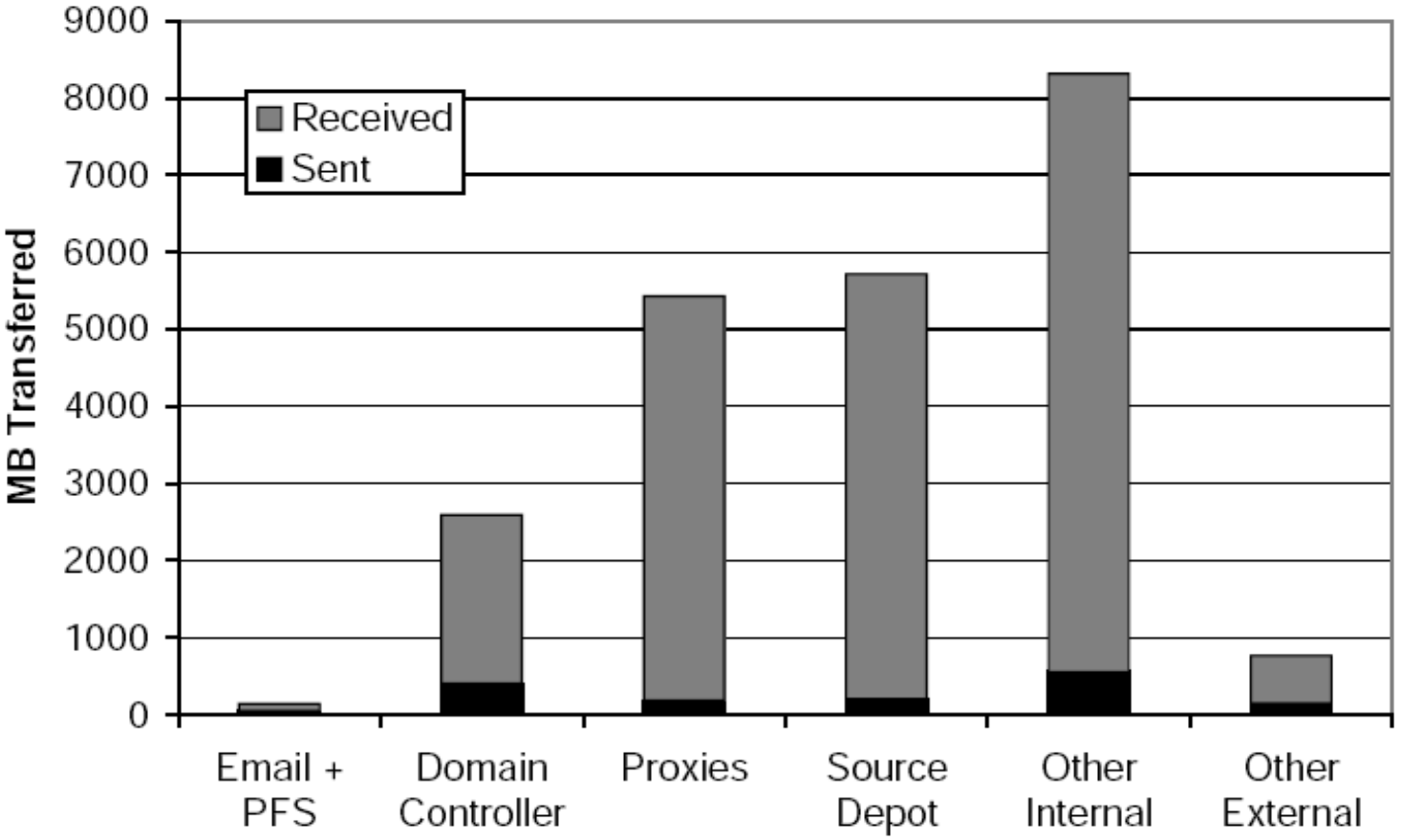
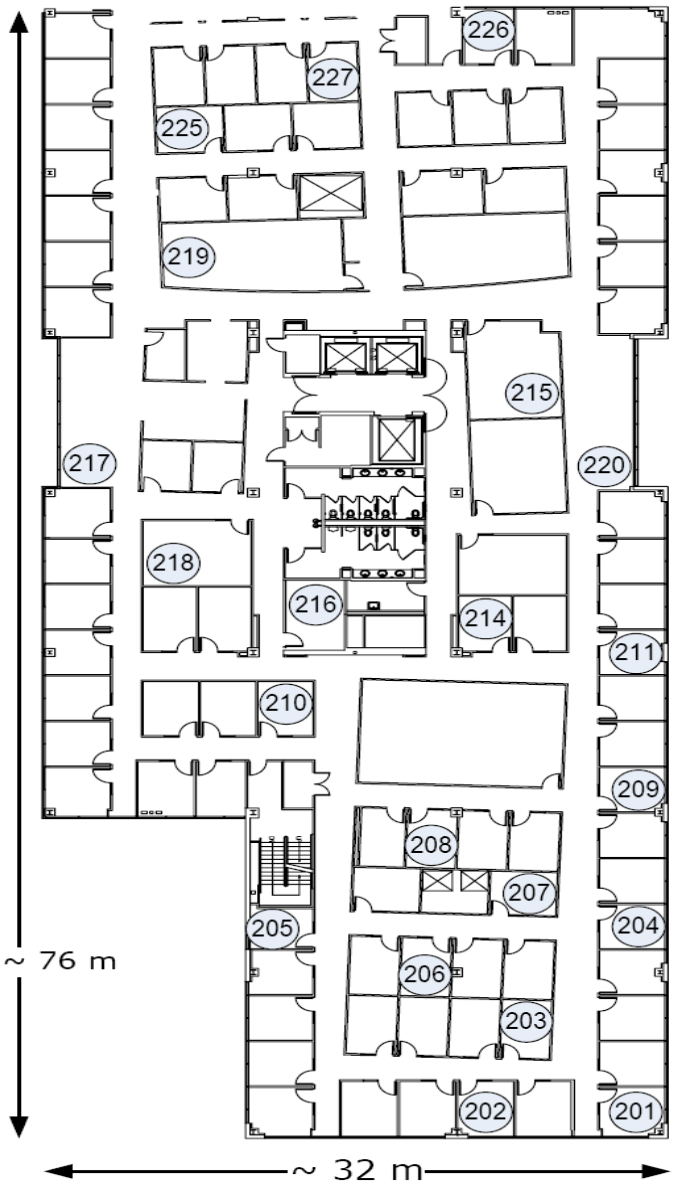


Figure 6: Distribution of Traffic by Type

Office testbed deployment



Configurations

Name	WG	WAG/ WAB	Proxim	Xmit Power	RTS
A	a 56	a 36	off	100%	Off
B	a 56	a 36	off	100%	On
C	a 56	g 10	off	100%	Off
D	off	g 10	a 56	100%	Off
E	off	g 10	a 56	50%	Off
F	off	g 10	a 56	12.5%	Off

Table 3: Testbed Configurations (a,g are IEEE 802.11 bands and 10,36,56 are channels)

Throughput synthesis traffic

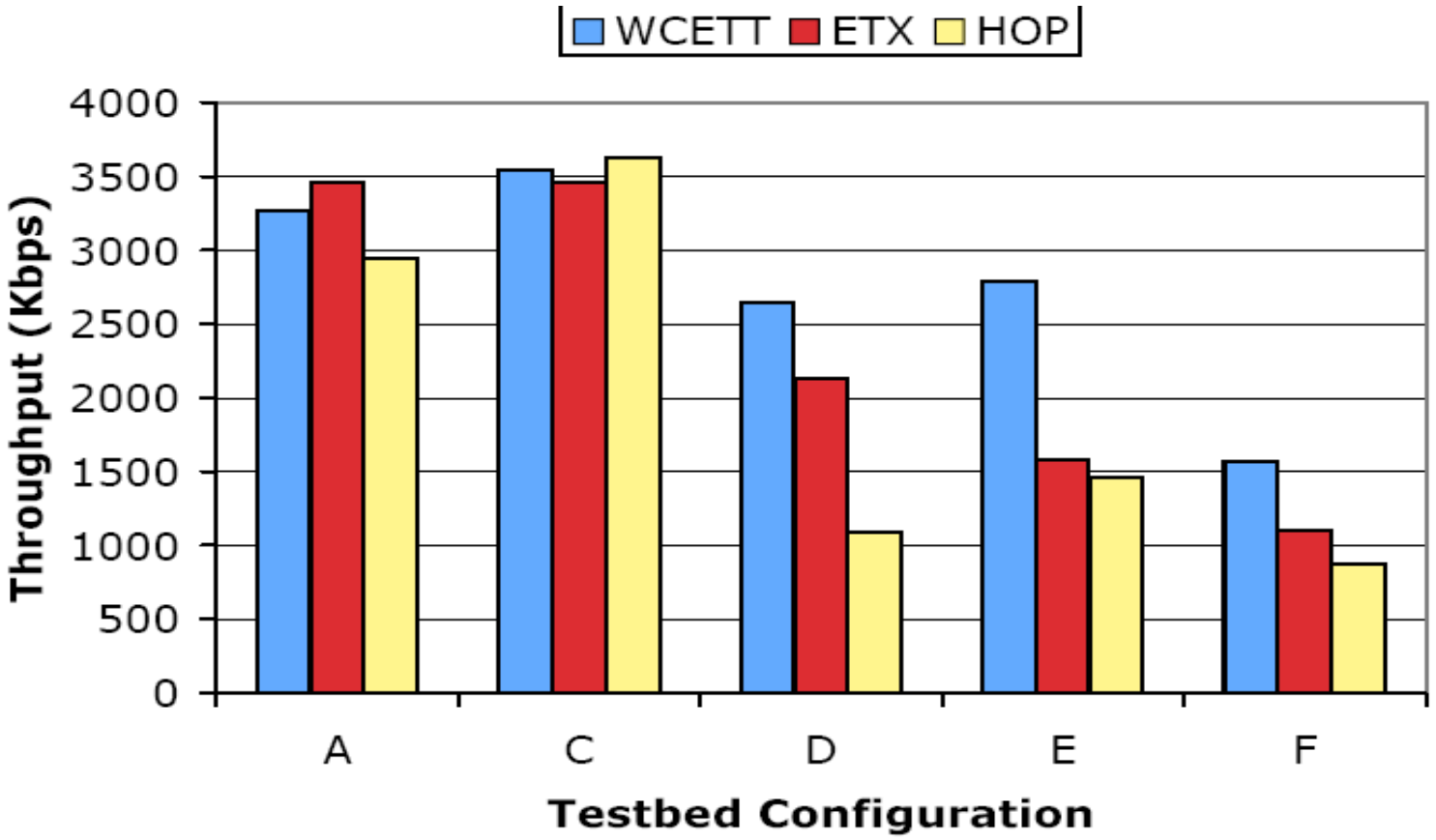


Figure 11: Median Throughput using Synthetic Traffic

Route length, synthesis traffic

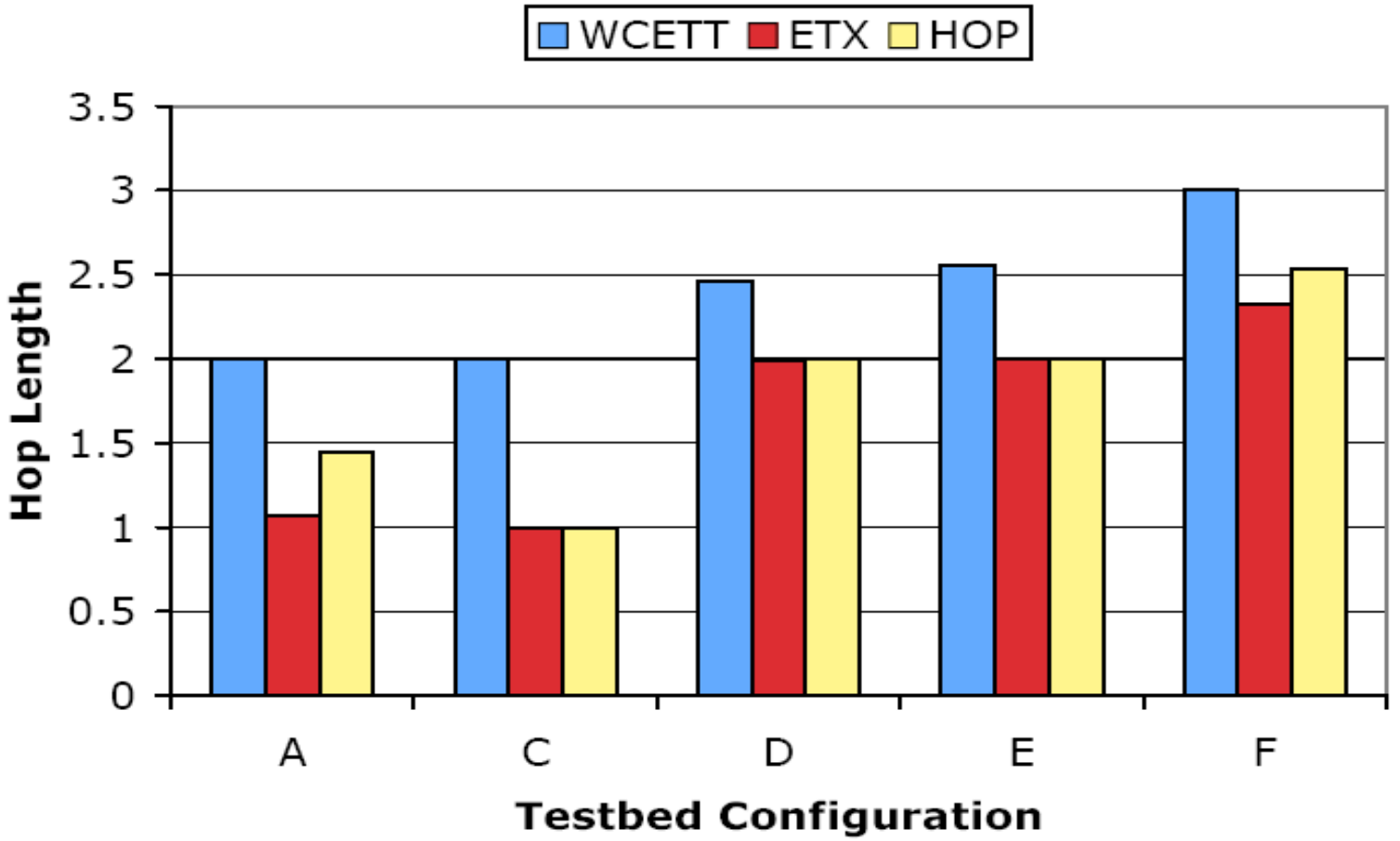


Figure 12: Median Route Length using Synthetic Traffic