Lucent WaveLan Equipment — Troughput Measurements

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Overall throughput measurements of FTP file transfers using Lucent's WaveLan XS-Router and XS-Point.

The following experiments were conducted on March 16, 2000.

Equipment Used

- 4 WaveLan PCMCIA wireless adapter (silver card, firmware/driver release as of 2000-02-16, 11Mbps Version), one for each notebook and two for the XS-Point or XS-Router correspondingly
- 2 Notebooks (Sony Vario NB) running Window 98
- 1 WaveLan XS-Router
- 1 WaveLan XS-Point
- FTP-Server
  (triangel, Sun U60, SunOS 5.6; FTP client coming along with OS distribution)
- 2 antenna extensions
  (used in conjunction with two PCMCIA cards in the XS-Router or XS-Point correspondingly)
- Standard FTP client coming along with Windows 98

Set-Up

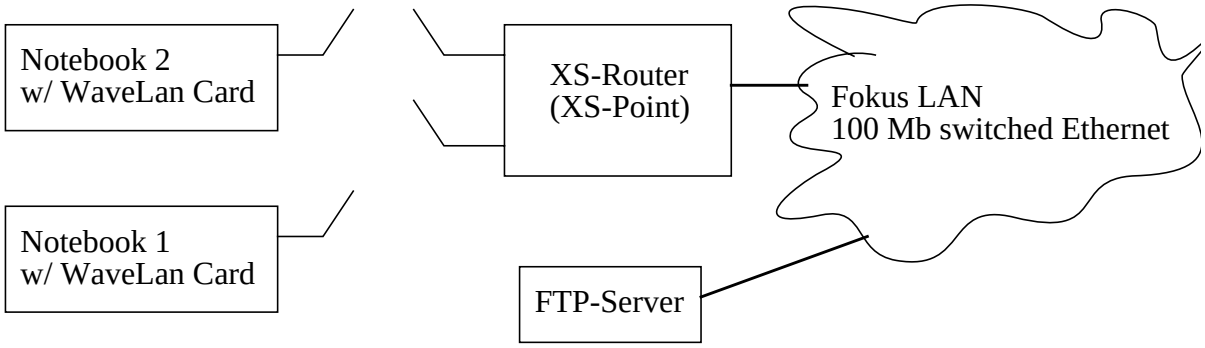
Notebooks and XS-Router (2nd phase XS-Point) were equipped with the PCMCIA cards.
The overall throughput of an ftp connection downloading a 50MB file from the server to the notebooks was measured. The following scenarios were considered:

1. Only one PCMCIA card in the XS-Router (XS-Point) and one notebook were active.
2. Only one PCMCIA card in the XS-Router (XS-Point) was active. One notebook produced background traffic by downloading a 1GB

file from the server while the other was used to receive the 50MB probe. Both notebooks used the same PCMCIA card of the XS-Router (XS-Point)

3. Both PCMCIA cards in the XS-Router (XS-Point) were active. Each notebook used an other interface card of the XS-Router. While one notebook produced background traffic via one interface by downloading a 1GB file, the other got the 50MB probe.

Measurements using set-up one, two, and three were gained with and without the encryption option of the WaveLan card.
In addition, scenarios one and three were conducted with antenna extensions for the PCMCIA cards in the XS-Router (XS-Point).



Measurements

Parameters			Scenario 1 [kB/s]	Scenario 2 [kB/s]	Scenario 3 [kB/s]
XS-Point	without encryption	internal antenna	598	NB1: 303 NB2: 298	NB1: 520 NB2: 319
		external (separate) antenna	584	n/a	NB1: 532 NB2: 533
	with encryption	internal antenna	480	NB1: 263 NB2: 262	NB1: 450 NB2: 275
		external (separate) antenna	485		NB1: 466 NB2: 479

Parameters			Scenario 1 [kB/s]	Scenario 2 [kB/s]	Scenario 3 [kB/s]
XS-Router	without encryption	internal antenna	556	NB1: 298[a] NB2: was starved out	n/a
		external (separate) antenna		Both NBs starved out each other	n/a
	with en-cryption	internal antenna	470	NB1: 229[b] NB2: was starved out	n/a
		external (separate) antenna		Both NBs starved out each other	n/a

a. Both notebooks achieved an approximate overall throughput of 300 kBps but only one was active at a given time; the other was starved out.

b. Both notebooks achieved an approximate overall throughput of 230 kBps but only one was active at a given time; the other was starved out.

The measurements with two PCMCIA cards in the XS-Router were not performed due to the observed results of scenario 2 (starvation of one notebook while the other was communicating). One measurement was made and the same effects as in scenario 2 were observed.