Wireless Troubleshooting

TEK5110- Building Mobile and Wireless Networks Department of Technology Systems University of Oslo

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Why do we need troubleshooting?

- Wi-Fi networks operate on unlicensed frequency bands, so the medium is changing constantly
- Interference
- Poor design of Wi-Fi networks
- Client incompatibility/software issues
- AP misconfiguration

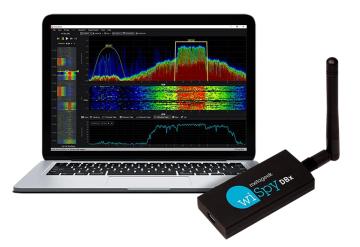
Wireless troubleshooting tools

• Protocol analyzer

• Wireshark, TamoSoft's comm view

	ionly a d	display filter <0	*#L/>					Expression.	
				at the lat					-
-	_		9618F5 V Channel 36 (5Ghz)						_
No.		Time	Source	Destination		Length Info			
		94.926974	6e:3a:0e:33:58:1e	Broadcast	802.11		frame, SN=2165, FN=0,		
		94.928030	62:3a:0e:33:58:1e	Broadcast	802.11		frame, SN=2977, FN=0,		,
		94.965247	IntelCor_68:ee:49	Broadcast	802.11		SN=2300, FN=0, Flags=.p	F.C	
		94.988661	56:3a:0e:33:58:1e	Broadcast	MDP	253 MDP			
		95.020816	62:3a:0e:33:58:1e (IntelCor_8c:c9:c7			NDP Announcement, Flag		
		95.028149	6a:3a:0e:33:58:1e		802.11		frame, SN=3720, FN=0,		
		95.028149		Broadcast	802.11		frame, SN=2166, FN=0,		
		95.029114	62:3a:0e:33:58:1e	Broadcast	802.11		frame, SN=2978, FN=0,		
		95.127615	56:3a:0e:33:58:1e	Broadcast	LLC		c=UI; SNAP, OUI 0x00000		en
		95.128993	62:3a:0e:33:58:1e (IntelCor_8c:c9:c7 Broadcast			NDP Announcement, Flag		
		95.131135	6a:3a:0e:33:58:1e	Broadcast Broadcast	802.11		frame, SN=3721, FN=0,		
		95.131135	6e:3a:0e:33:58:1e	Broadcast Broadcast	802.11		frame, SN=2167, FN=0,		
		95.131465 95.233516	62:3a:0e:33:58:1e	Broadcast	802.11		frame, SN=2979, FN=0, frame, SN=3722, FN=0,		
		95.233516	6e:3a:0e:33:58:1e	Broadcast	802.11 802.11				
		95.233516	62:3a:0e:33:58:1e	Broadcast	802.11		frame, SN=2168, FN=0, frame, SN=2980, FN=0,		
		95.234295	62:3a:0e:33:58:1e (NDP Announcement, Flag		,
	4000	99.244909	02:38:00:33:30:10 (=	Intercor_oc:co:co	(002.11	67 VH1/HE	NDF Announcement, Fiag	s=c	
<									
>	came	1: 376 bytes	on wire (3008 bits),	376 bytes cantured	(3008 bits)	on interface	0		
			Length 44		(5000 0105)		•		

- Spectrum analyzer
 - MetaGeek's Wi-Spy



Protocol analyzer troubleshooting

- Retransmission
 - Retransmission should be Less than 10%
- Interference
 - Causes high levels of retransmissions
- Low SNR
 - SNR of 25 dB or greater is considered good quality while SNR of 10 dB or lower considered poor quality
- Hidden nodes
 - Mobile devices usually become hidden nodes when they move around, and obstruction hinders their signal to be heard by all associated stations
 - RTS/CTS can be used to avoid hidden nodes
- Power mismatch between AP and stations
- Authentication problem
- Channel utilization
 - Some APs provide channel utilization in their beacon advertisement

Wi-Fi packet capture equipment

- USB network adapter
 - Mediatek MT7612u, Realtek RTL8822bu
- Raspberry Pi
- Script capturing Wi-Fi frames on the desired channel
- Wireshark to analyze frames

Demo 1: Capture Wi-Fi frames

https://download.schneider-electric.com/files?p_enDocType=User+guide&p_File_Name=DOCA0157EN-06.pdf&p_Doc_Ref=DOCA0157EN

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Demo 2: Capture Wi-Fi beacons

Demo 3: Analyze Wi-Fi retransmission

Demo 4: Analyze Wi-Fi signal strength

