CSCI 4406 Computer Networks Lab2_60L

WiFi Traffic Analysis

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Downloading the PCAP File

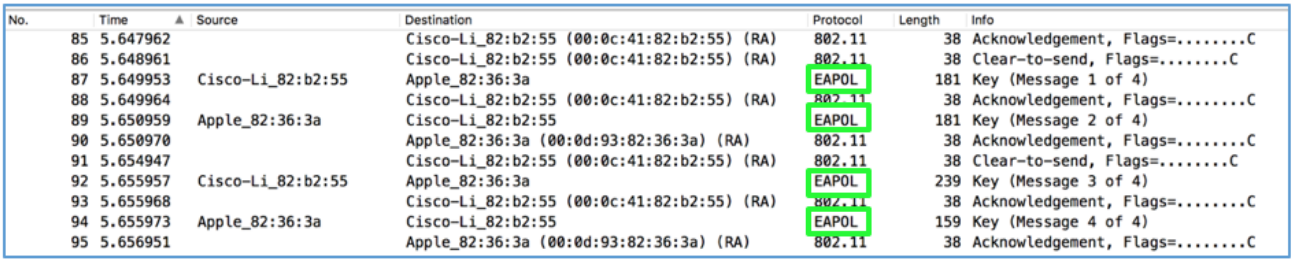
Right-click the link below and save the file somewhere you can find it, such as your desktop:

https://wiki.wireshark.org/SampleCaptures?action=AttachFile&do=get&target=wpa-Induction.pcap

Viewing the EAPOL Handshake

Double-click the **wpa-Induction.pcap** file. It opens in Wireshark.

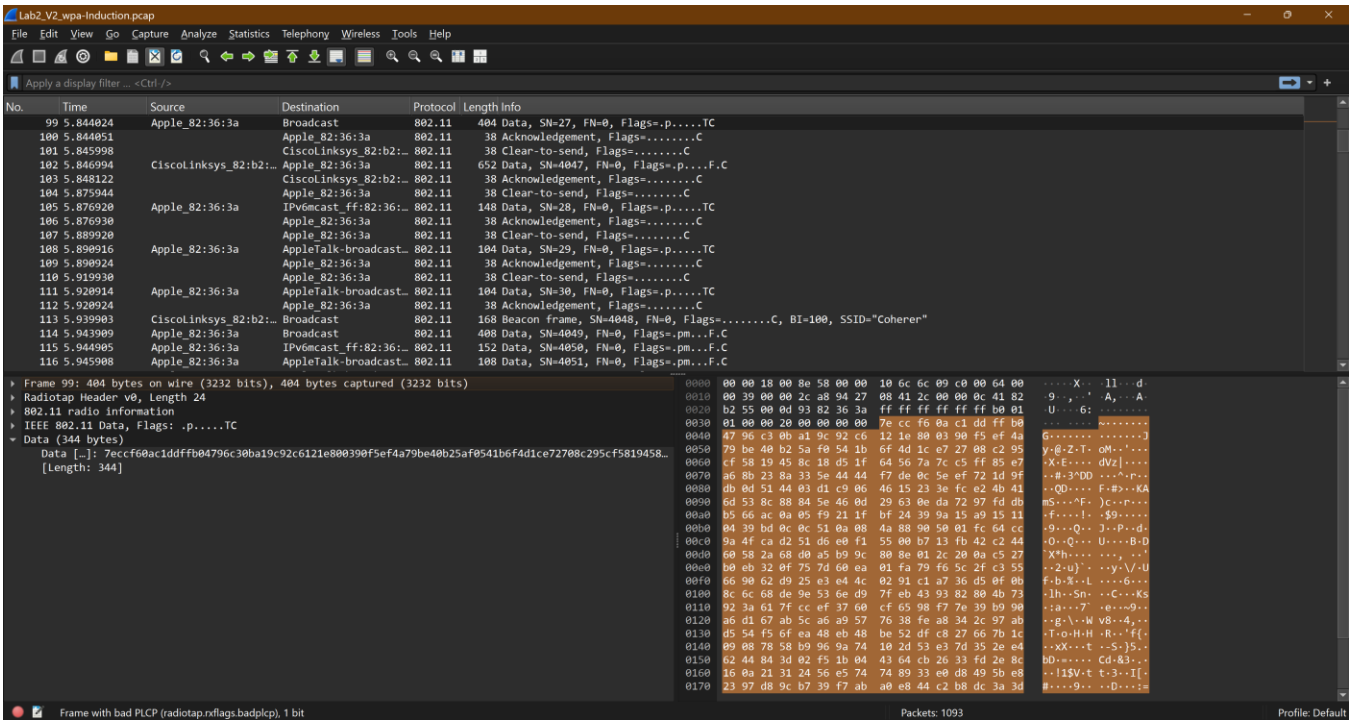
Scroll down to find the four frames with a Protocol of "EAPOL", as shown below. Here an Apple device is joining a Cisco wireless network, and the four EAPOL packets are used to negotiate a private key for that user.



No.	Time	Source	Destination	Protocol	Length	Info
85	5.647962		Cisco-Li_82:b2:55 (00:0c:41:82:b2:55) (RA)	802.11	38	Acknowledgement, Flags=........C
86	5.648961		Cisco-Li_82:b2:55 (00:0c:41:82:b2:55) (RA)	802.11	38	Clear-to-send, Flags=........C
87	5.649953	Cisco-Li_82:b2:55	Apple_82:36:3a	EAPOL	181	Key (Message 1 of 4)
88	5.649964		Cisco-Li_82:b2:55 (00:0c:41:82:b2:55) (RA)	802.11	38	Acknowledgement, Flags=........C
89	5.650959	Apple_82:36:3a	Cisco-Li_82:b2:55	EAPOL	181	Key (Message 2 of 4)
90	5.650970		Apple_82:36:3a (00:0d:93:82:36:3a) (RA)	802.11	38	Acknowledgement, Flags=........C
91	5.654947		Cisco-Li_82:b2:55 (00:0c:41:82:b2:55) (RA)	802.11	38	Clear-to-send, Flags=........C
92	5.655957	Cisco-Li_82:b2:55	Apple_82:36:3a	EAPOL	239	Key (Message 3 of 4)
93	5.655968		Cisco-Li_82:b2:55 (00:0c:41:82:b2:55) (RA)	802.11	38	Acknowledgement, Flags=........C
94	5.655973	Apple_82:36:3a	Cisco-Li_82:b2:55	EAPOL	159	Key (Message 4 of 4)
95	5.656951		Apple_82:36:3a (00:0d:93:82:36:3a) (RA)	802.11	38	Acknowledgement, Flags=........C

Viewing Encrypted Traffic

Scroll down to frame 99. Wireshark is unable to decrypt the contents of this frame--all it can say is that it contains "Data", as shown below.



No.	Time	Source	Destination	Protocol	Length	Info
85	5…		Cisco-Li_82…	802.11	38	Acknowledgement, Flags=........C
86	5…		Cisco-Li_82…	802.11	38	Clear-to-send, Flags=........C
87	5…	Cisco-Li_82:b2:55	Apple_82:36…	EAPOL	181	Key (Message 1 of 4)
88	5…		Cisco-Li_82…	802.11	38	Acknowledgement, Flags=........C
89	5…	Apple_82:36:3a	Cisco-Li_82…	EAPOL	181	Key (Message 2 of 4)
90	5…		Apple_82:36…	802.11	38	Acknowledgement, Flags=........C
91	5…		Cisco-Li_82…	802.11	38	Clear-to-send, Flags=........C
92	5…	Cisco-Li_82:b2:55	Apple_82:36…	EAPOL	239	Key (Message 3 of 4)
93	5…		Cisco-Li_82…	802.11	38	Acknowledgement, Flags=........C
94	5…	Apple_82:36:3a	Cisco-Li_82…	EAPOL	159	Key (Message 4 of 4)
95	5…		Apple_82:36…	802.11	38	Acknowledgement, Flags=........C
96	5…	Cisco-Li_82:b2:55	Broadcast	802.11	168	Beacon frame, SN=4045, FN=0, Flags=...
97	5…	Cisco-Li_82:b2:55	Broadcast	802.11	168	Beacon frame, SN=4046, FN=0, Flags=...
98	5…		Apple_82:36…	802.11	38	Clear-to-send, Flags=........C
99	5…	Apple_82:36:3a	Broadcast	802.11	404	Data, SN=27, FN=0, Flags=.p.....TC
100	5…		Apple_82:36…	802.11	38	Acknowledgement, Flags=........C
101	5…		Cisco-Li_82…	802.11	38	Clear-to-send, Flags=........C

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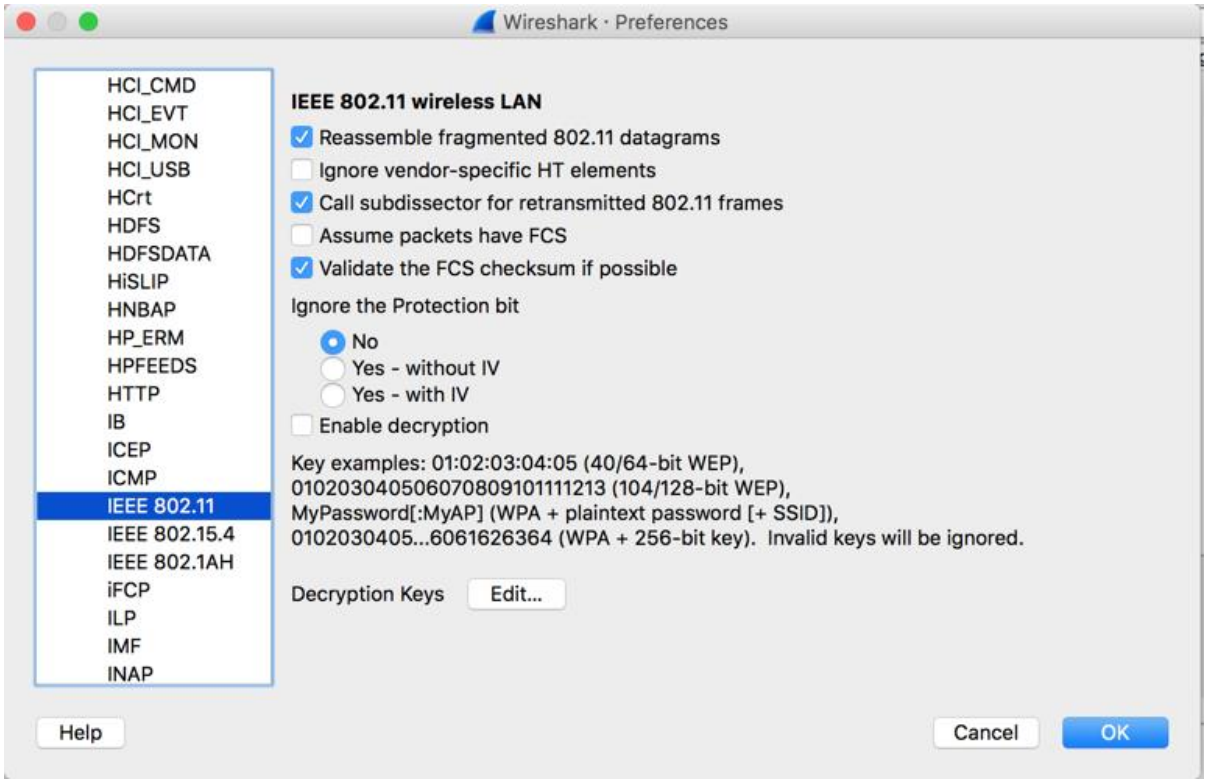
▶ Frame 99: 404 bytes on wire (3232 bits), 404 bytes captured (3232 bits)
▶ Radiotap Header v0, Length 24
▶ 802.11 radio information
▶ IEEE 802.11 Data, Flags: .p.....TC
▼ Data (344 bytes)
    Data: 7eccf60ac1ddffb04796c30ba19c92c6121e800390f5ef4a...
    [Length: 344]
```

Entering the WPA Key

The precise steps vary, depending on which version of Wireshark you are using.

For Wireshark 2.0.0 on Mac OS X:

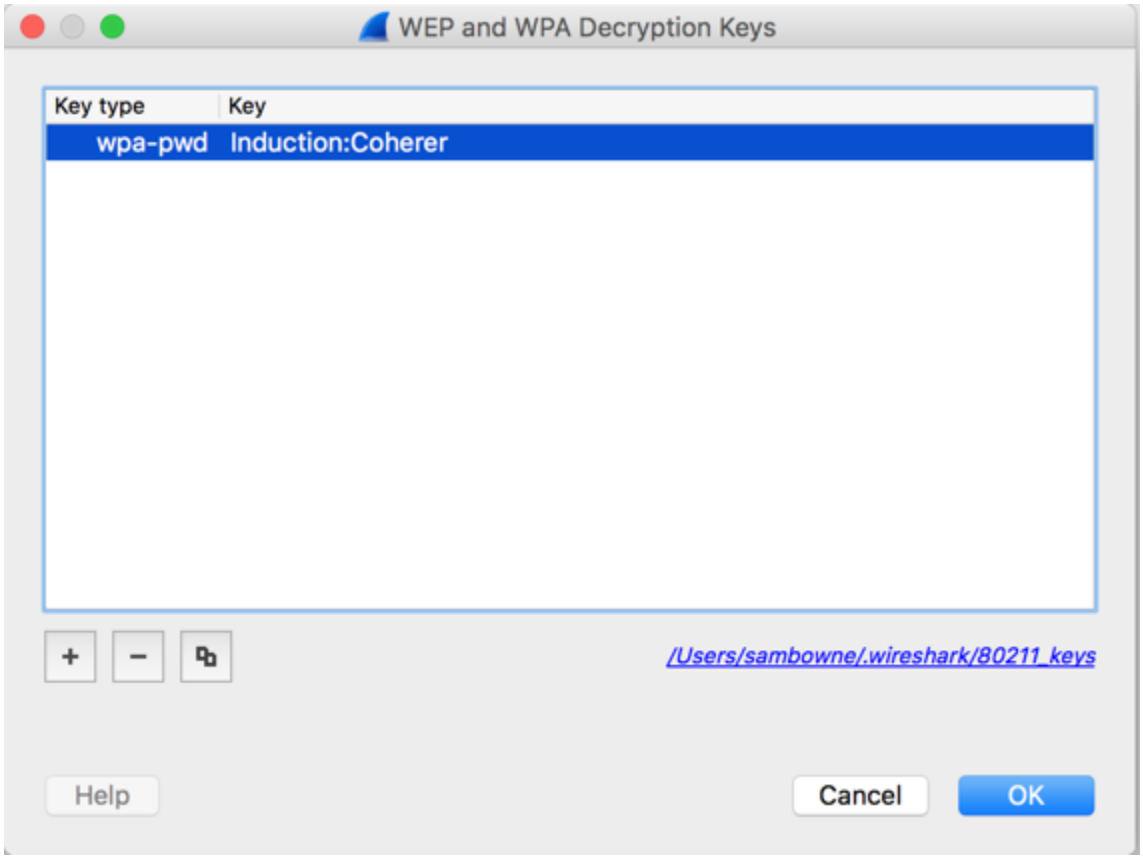
From the menu bar, click **Wireshark**, **Preferences**. In the left pane, expand **Protocols**. Scroll down and click "**IEEE 802.11**", as shown below.



In the "Decryption Keys" line, click the **Edit...** button.

Enter a key of type **wpa-pwd**, with the value **Induction:Coherer**, as shown below.

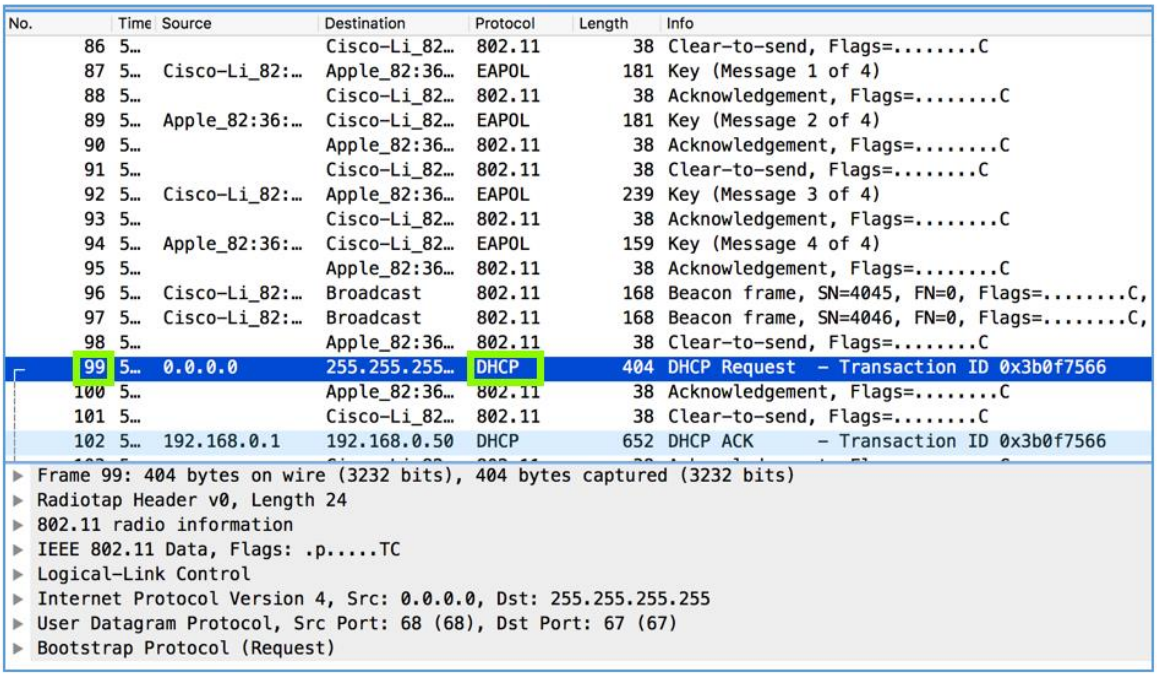
The key is "Induction" and the SSID of the network is "Coherer".



In the "WEP and WPA Decryption Keys" box, click the **OK** button.

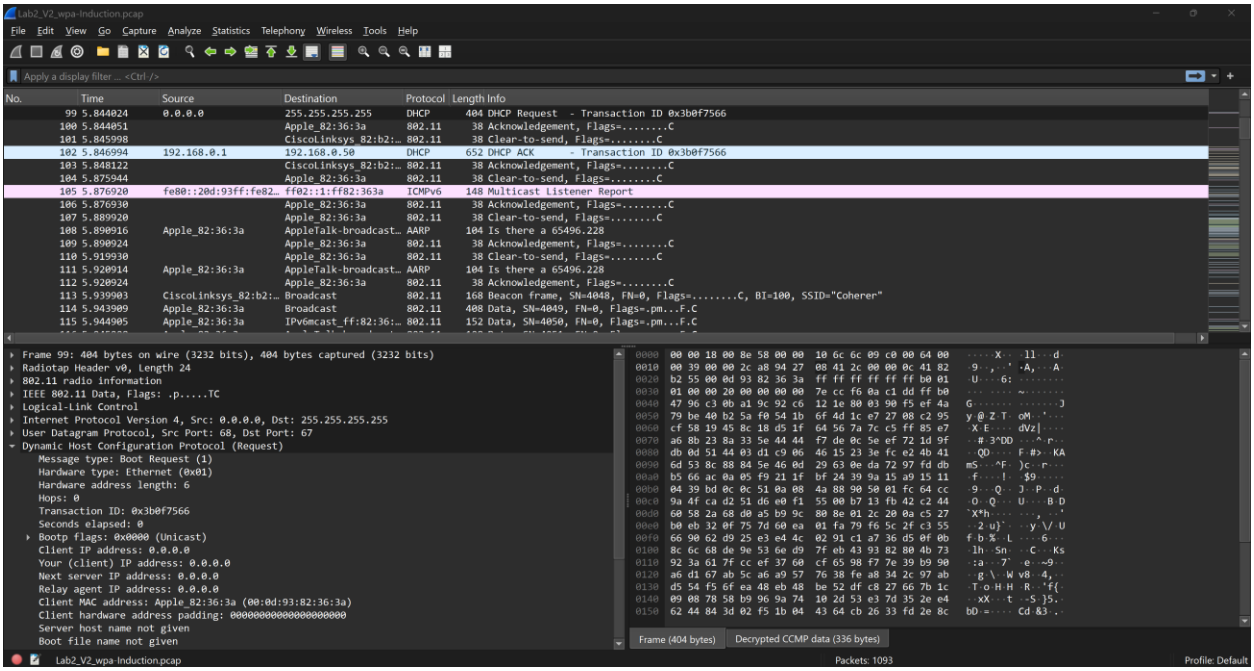
In the "Wireshark Preferences" box, check the "**Enable decryption**" box. Click the **OK** button.

Frame 99 is now decrypted, revealing that it contains a **DHCP** packet, as shown below.



Saving the Screen Image

Make sure you can see the frame number of **99** and the Protocol of **DHCP**, as shown above.



Things that I learned from this lab:

Wireshark is an application that can be used to decrypt a protocol and learned about “Packet Sniffing” which is to analyze network traffic. Wi-Fi Protected Access (WPA) is a security standard for wireless networks that uses encryption and authentication to safeguard data. Wired Equivalent Privacy (WEP) is meant to protect Wi-Fi transmissions by encrypting it from outsiders who are not inside the encrypted network.