

Session 1 exercise

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WLAN windows 7/8

Let's examine your windows 7/8 laptop WLAN capabilities. Open a commando prompt as administrator, and issue the *netshell* command shown in Figure 1.

```

Administrator: Windows Kommandolinjefortolker
C:\windows\System32>netsh wlan show interfaces

Der er 1 grænseflade på computeren:

    Navn                : Trådløs netværksforbindelse
    Beskrivelse         : Intel(R) Centrino(R) Ultimate-N 6300 AGN
    GUID                : 676eed6-b42c-4b93-8d53-0c87dc522195
    Fysisk adresse      : 24:77:03:70:da:e0
    Tilstand            : forbindelsen er afbrudt

    Status for værtsbaseret netværk : Ikke startet
    
```

Figure 1 - Wireless interface on writer's computer. Text is in Danish

The interface in the example is an Intel 6300 AGN which support 802.11a, 802.11b, 802.11g and 802.11n. There are a 2,4 GHz radio supporting 802.11b/g/n and a 5 GHz radio supporting 802.11a/n. Many "cheap" WLAN interfaces only support 802.11b, 802.11g and 802.11n using a 2,4 GHz radio.

Which WLAN interface is embedded in your computer? ___

Which 802.11 standards does your WLAN interface support? It might be necessary to "google" your adapter to get the vendors specifications.

WLAN interface driver

Misbehaving WLAN interfaces often need a driver software update. Or even in some cases a software downgrade. You can see the driver version using *netsh wlan show driver* or by showing the properties of your WLAN interface.

Which driver version is installed on your WLAN interface?

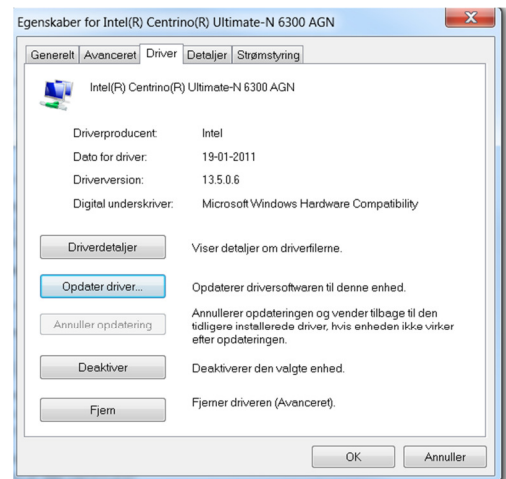


Figure 2 - WLAN interface properties

Windows Profiles

Using the netshell command “*netsh wlan show profiles*” you can see which WLAN’s you have been connected to.

To see a specific profile and the secret key in clear text use ‘*netsh wlan show profile name=“SSID_NAME” key=clear*’ command. Same information is available in windows WLAN management.

Windows signal strength

The signal strength offered by Windows is not that detailed.

To see a detailed list of nearby access point use the ‘*netsh wlan show networks mode=bssid*’ command as seen below.



Figure 3 - Windows WLAN locator

```
Administrator: Windows Kommandolinjefortolker
C:\Users\heth\Downloads>netsh wlan show networks mode=bssid
Interface : Wireless network connection

SSID 1 : HomeBox-80F9
  Networktype      : Infrastruktur
  Authentication   : WPA2-Personal
  Encryption       : CCMP
  BSSID 1         : 7c:03:4c:d4:80:ff
  Signal strength  : 71%
  Radio type       : 802.11n
  Channel          : 11
  Basic data rates (Mbps) : 1 2 5.5 11
  Other data rates (Mbps) : 6 9 12 18 24 36 48 54
```

Figure 4 - detailed view of nearby access points.

The access point shown in Figure 4 shows a signal strength of 71%. Microsoft – like most vendors – do not show signal strength directly in dBm but as a percentage. 0% = -100 dBm and 100% = -50 dBm

71% signal strength corresponds to $-100 \text{ dBm} + \frac{71\%}{2\%/dBm} = -100 \text{ dBm} + 35,5 \text{ dBm} = -64,5 \text{ dBm}$

What is the signal strength in percent and dBm of the Wireless network you are associated to?

—

—

Windows data rate

Because a WLAN offers high data rates doesn't mean you are connected at a high data rate. Your WLAN interface uses lower and lower data rates as the signal strength decreases. To see the actual data rate your WLAN interface use to connect to the access point, you can use the 'status for Wireless connection' window. Remember the connected data rate is not equal to the actual data transfer, as your WLAN interface has to share the frequency with all other radios, using the same channels.

My WLAN interface connected with 144 Mbps to my access point with 92% signal strength. As I moved my laptop further and further away from the access point it dropped down through the data rates until it reached 1 Mbps. Then it lost connection.

Which data rates and signal strengths does your adapter use as you increase the distance to your access point.

Estimate the distance and notice the effect of concrete walls or other objects in the path between your laptop and your access point.

Write down your notes below:

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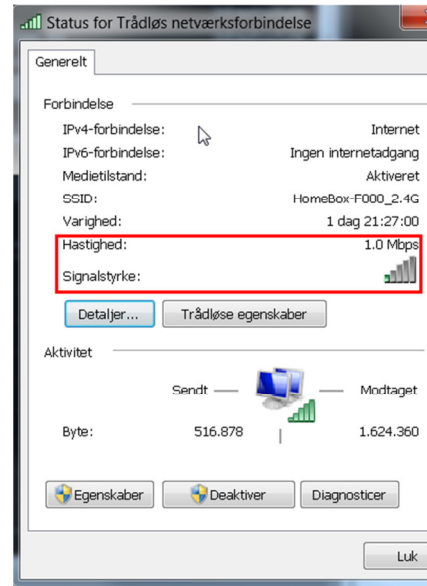


Figure 5 - Just before losing connection

Wireless survey and troubleshooting tools

There are numerous different WLAN survey and wireless troubleshooting tools on the market. Some are free and others very expensive. There are tools for different purposes.

In this section you will explore which Wi-Fi tools you and your colleges use to make site surveys and troubleshooting. If you don't know the answer to some of the tools, you might have to ask a college.

Wi-Fi Network scanners

A network scanner is used to scan the Wi-Fi networks in the proximity of the device running the scanner such as a Laptop or a smartphone. The scanner often show signal strength 802.11 generation, data rates and authentication type.

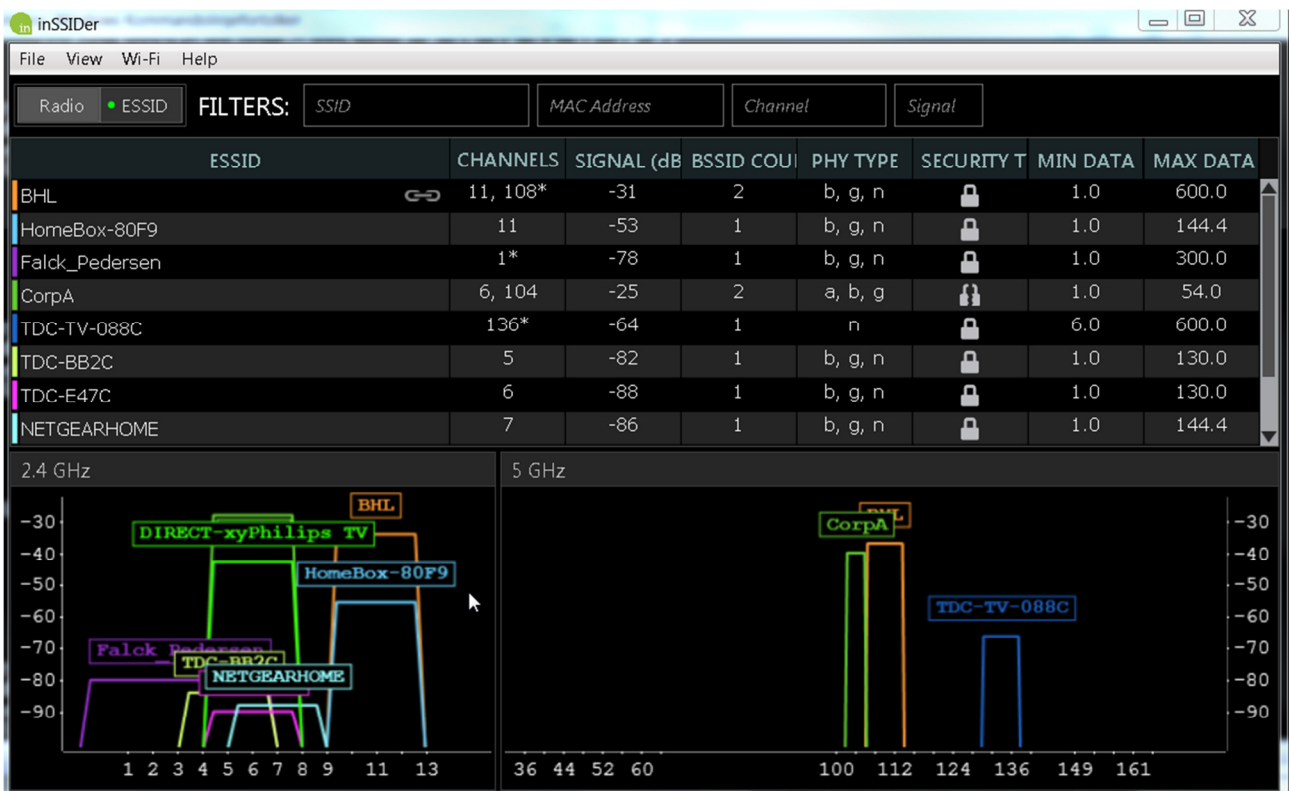


Figure 6 - inSSIDer a very popular Wi-Fi scanner, showing Wi-Fi networks, channels and signal strength in dBm

Which Wi-Fi scanner(s) do you and/or Ascom use: __

Wi-Fi network sniffers

A network sniffer or packet capture program is a program that sniffs packets from one or more Wi-Fi channels for analysis. Many network sniffers need one or more dedicated Wi-Fi interface adapters to capture the raw radio frames. Popular sniffers are Wireshark, Commview and Eye P.A.

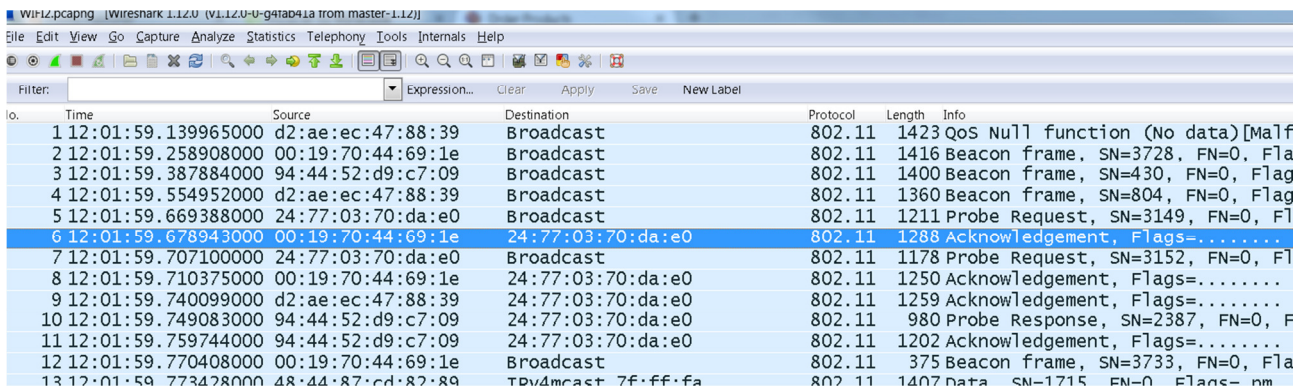


Figure 7 – Analysing captured Wi-Fi traffic with Wireshark

Which Wi-Fi sniffer(s) do you and/or Ascom use: __

Spectrum analysers

When troubleshooting poor performance on a Wi-Fi network a Spectrum Analyser is a great tool locating radio noise sources interrupting Wi-Fi communication. There are several popular spectrum analysers on the market.

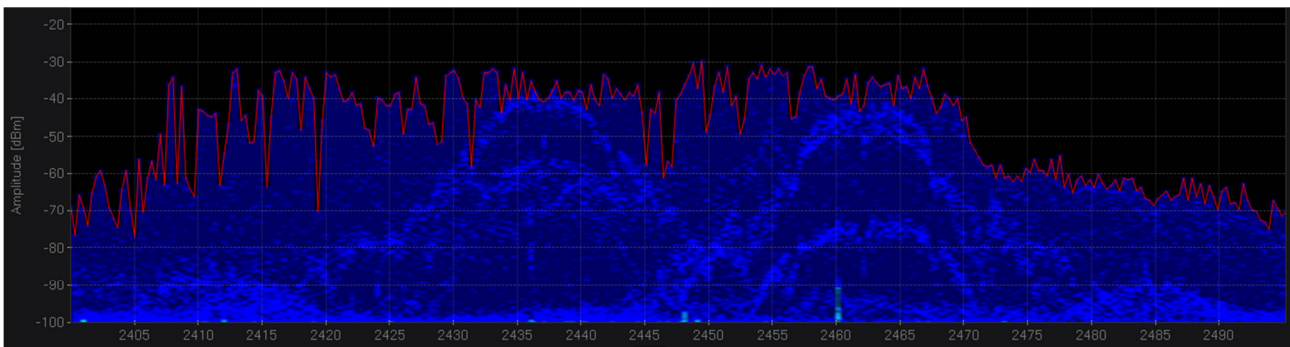


Figure 8 - The spectrum analyzer "Chanalyzer" show spectrum from 2,4 GHz to 2,5 GHz indicating signal levels in dBm

Which spectrum analyser(s) do you and/or Ascom use: __

Site survey tools

When planning a major Wi-Fi network site survey tools are used on-site to plan for access point coverage. There are several site survey tools.

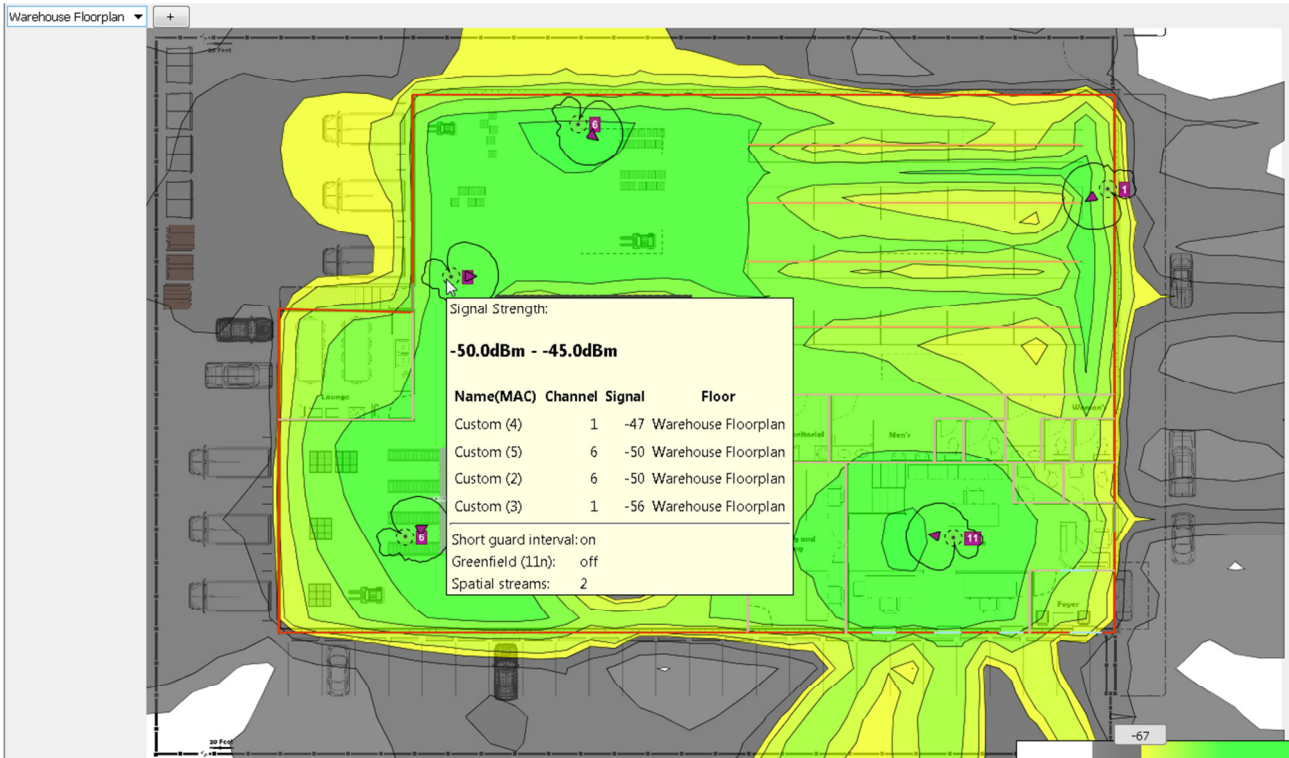


Figure 9 - Ekahau Site Survey tool showing access point coverage.

Which Wi-Fi site survey tool(s) do you and/or Ascom use: ___

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