Using Wireshark™ to View Protocol Data Units

Background

Wireshark is a software protocol analyzer, or "packet sniffer" application, used for network troubleshooting, analysis, software and protocol development, and education. Before June 2006, Wireshark was known as Ethereal.

A packet sniffer (also known as a network analyzer or protocol analyzer) is computer software that can intercept and log data traffic passing over a data network. As data streams travel back and forth over the network, the sniffer "captures" each protocol data unit (PDU) and can decode and analyze its content according to the appropriate RFC or other specifications.

Wireshark is programmed to recognize the structure of different network protocols. This enables it to display the encapsulation and individual fields of a PDU and interpret their meaning.

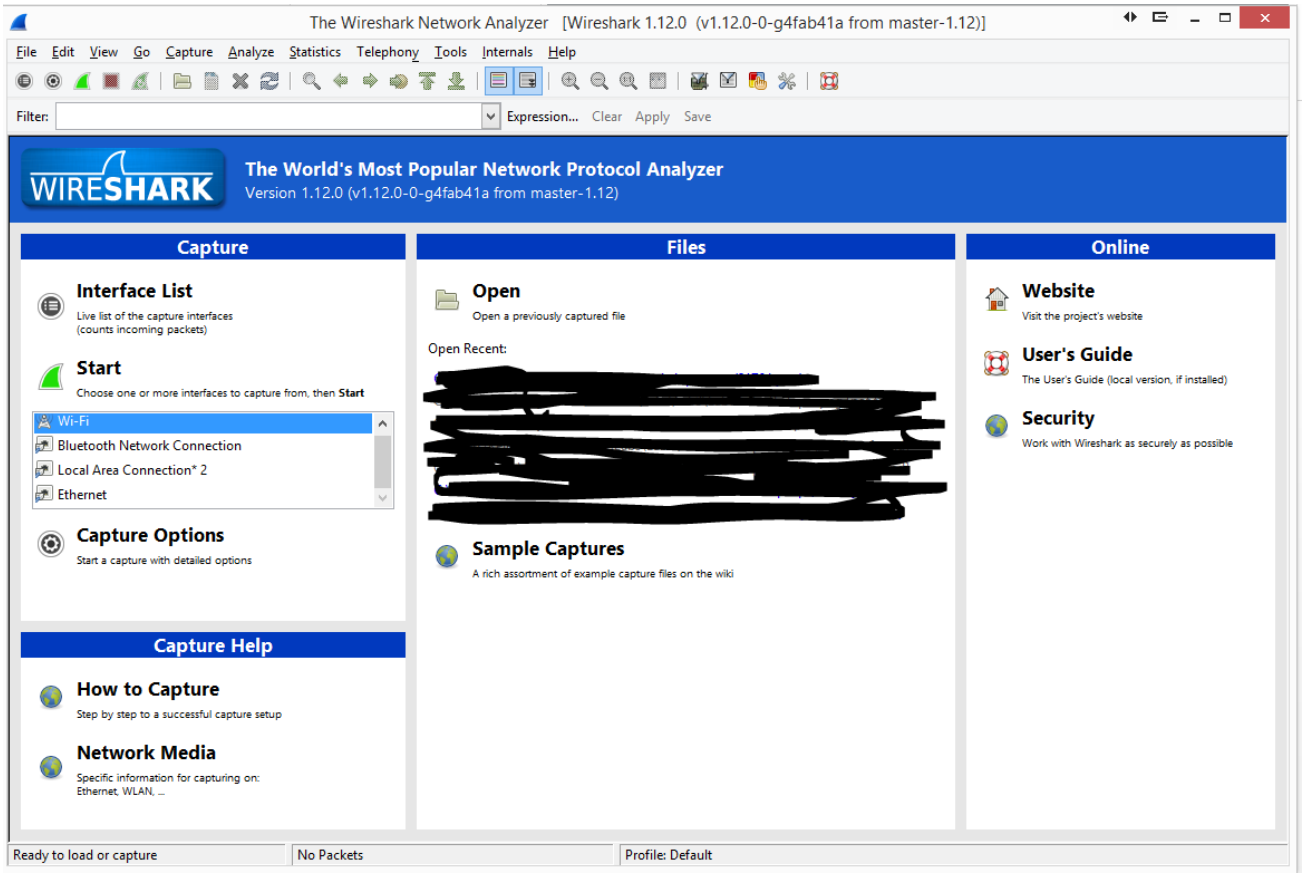
It is a useful tool for anyone working with networks and can be used with most labs in the CCNA courses for data analysis and troubleshooting.

For information and to download the program go to - http://www.Wireshark.org

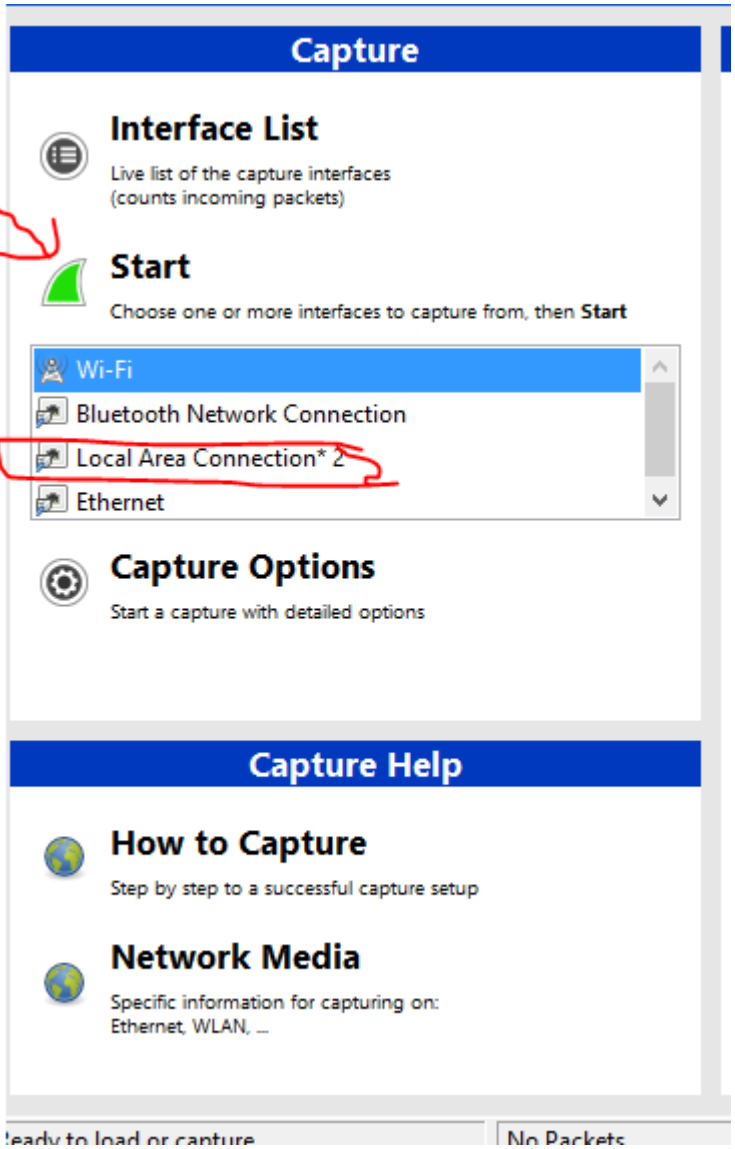
Scenario

To capture `PDUs` the computer on which **Wireshark** is installed must have a working connection to the network and Wireshark must be running before any data can be captured.

When Wireshark is launched, the screen below is displayed.



To start data capture it is first necessary to select which interface (or interfaces) you want to capture from. There are several ways to do this but the easiest way is to find the “Start” button. Under the button click to select the interface you want to use then click start



Typically, for a computer this will be the connected Ethernet Adapter.

Setting Wireshark to capture packets in promiscuous mode

Clicking the “Options” button will allow you to setup options for the capture. Ensure “Use promiscuous mode on all interfaces” is checked. If this feature is NOT checked, only PDUs destined for this computer will be captured. If this feature is checked, all PDUs destined for this computer AND all those detected by the computer NIC on the same network segment (i.e., those that "pass by" the NIC but are not destined for the computer) are captured.
Note: The capturing of these other PDUs depends on the intermediary device connecting the end device computers on this network. As you use different intermediary devices (hubs, switches, routers) throughout these courses, you will experience the different Wireshark results.

Setting Wireshark for network name resolution

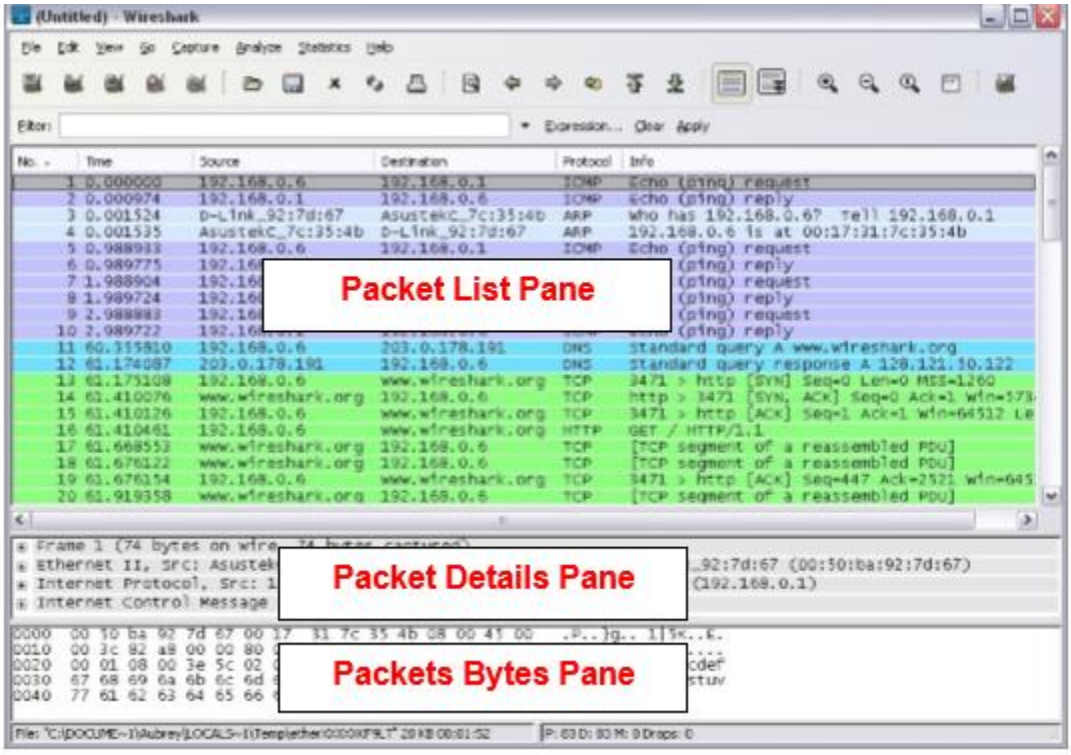
This option allows you to control whether or not Wireshark translates network addresses found in PDUs into names. Although this is a useful feature, the name resolution process may add extra PDUs to your captured data perhaps distorting the analysis.

There are also a number of other capture filtering and process settings available.

Clicking on the **Start** button starts the data capture process and the main screen is displayed.

The examples below show the capture of a ping process and then accessing a web page.

When the **Stop** button is clicked, the capture process is terminated.



This main display window of Wireshark has three panes.

The PDU (or Packet) List Pane at the top of the diagram displays a summary of each packet captured. By clicking on packets in this pane, you control what is displayed in the other two panes.

The PDU (or Packet) Details Pane in the middle of the diagram displays the packet selected in the Packet List Pane in more detail.

The PDU (or Packet) Bytes Pane at the bottom of the diagram displays the actual data (in hexadecimal form representing the actual binary) from the packet selected in the Packet List Pane, and highlights the field selected in the Packet Details Pane.

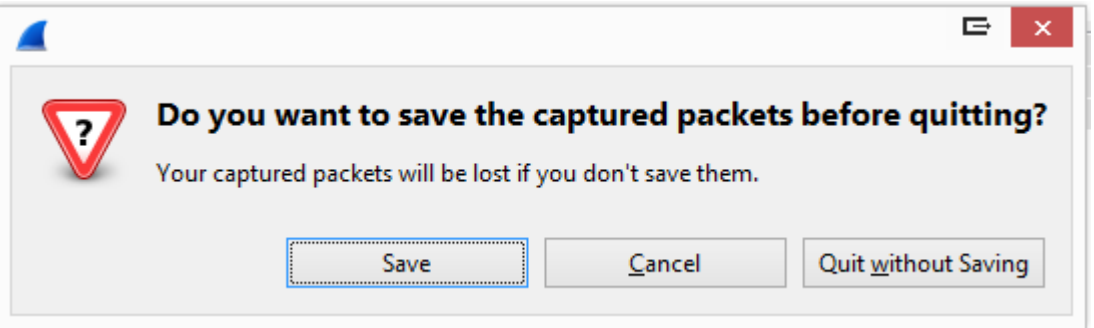
Each line in the Packet List corresponds to one PDU or packet of the captured data. If you select a line in this pane, more details will be displayed in the "Packet Details" and "Packet Bytes" panes. The example above shows the PDUs captured when the ping utility was used and http://www.Wireshark.org was accessed. Packet number 1 is selected in this pane.

The Packet Details pane shows the current packet (selected in the "Packet List" pane) in a more detailed form. This pane shows the protocols and protocol fields of the selected packet. The protocols and fields of the packet are displayed using a tree, which can be expanded and collapsed.

The Packet Bytes pane shows the data of the current packet (selected in the "Packet List" pane) in what is known as "hexdump" style. In this lab, this pane will not be examined in detail. However, when a more in-depth analysis is required this displayed information is useful for examining the binary values and content of PDUs.

The information captured for the data PDUs can be saved in a file. This file can then be opened in Wireshark for analysis some time in the future without the need to re-capture the same data traffic again. The information displayed when a capture file is opened is the same as the original capture.

When closing a data capture screen or exiting Wireshark you are prompted to save the captured PDUs.



Clicking on **Continue without Saving** closes the file or exits Wireshark without saving the displayed captured data.

