CommView®
Tutorial

Packet Sniffing Is Fun!

About This Tutorial

This informal tutorial was created to address the frequently asked questions posed by users who are either new to network analyzing tools or those professionals who haven't had experience with the packet analyzer that we're going to describe: CommView by TamoSoft. If you are looking for the formal, detailed help documentation – it's included with the product; just click F1. This tutorial is not intended to cover all aspects of the product's functionality. Rather, it's a brief walk-through that will familiarize you with CommView.

While CommView is probably the most user-friendly packet analyzer on the market, getting acquainted with it still takes some time. The good news is the learning curve is short; so let's get started.

What's a Packet Analyzer Anyway?

It only sounds scary

A packet analyzer is a program (or sometimes, a device) that monitors the data traveling between computers on a network. A packet analyzer is also commonly referred to as a *network analyzer*, *packet decoder*, *network monitor*, *protocol decoder*, or, more frequently, as a *packet sniffer*.

When you plug the cable into your computer's network adapter or dial up your Internet Service Provider, you join a network, which allows your computer to "talk" to many other computers, be it the Web server of your favorite search engine, your friend's PC running an instant messenger such as ICQ, or a mail server that stores your e-mail. Just like people, computers need to "talk" to exchange information. That's what your computer does almost every second that you are online. The last time that happened was only a few seconds ago, when you downloaded this page from our Web server.

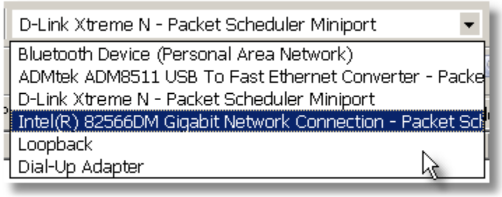
Again, just like people use different languages and dialects to exchange information, computers converse using "protocols," which are mutually agreed standards that allow computers to "understand" each other. The problem is that computer conversations usually look like random binary data. That's why you need a packet analyzer: It decodes network traffic, makes sense of it, and performs many other interesting functions.

Well, it's time to look at CommView. Download it if you haven't done so already, run the installation on your Windows 2000/XP/2003/Vista/2008 system (32- or 64-bit), and let's get started.

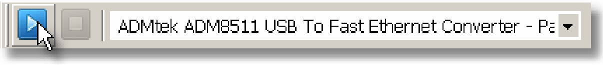
CommView: Click & Go!

Starting a Packet Capture for the First Time

Ok, CommView has been launched and you see the application window in front of you. All you need to do to start your first packet capture is to select the adapter you want to monitor from the drop-down list. You may have one or several adapters. If you're on a corporate LAN, you typically have only one adapter, and if you're at home, one of the adapters may connect you to the cable modem, another one to the second PC, and the dial-up adapter (it's a virtual adapter) may be used to connect to the Internet via the telephone line using an ADSL or old analog modem.


D-Link Xtreme N - Packet Scheduler Miniport
Bluetooth Device (Personal Area Network)
ADMtek ADM8511 USB To Fast Ethernet Converter - Packe
D-Link Xtreme N - Packet Scheduler Miniport
Intel(R) 82566DM Gigabit Network Connection - Packet Sch
Loopback
Dial-Up Adapter

Made your choice? Good, let's click **Start Capture**; you won't have a difficulty finding it on the program's toolbar:

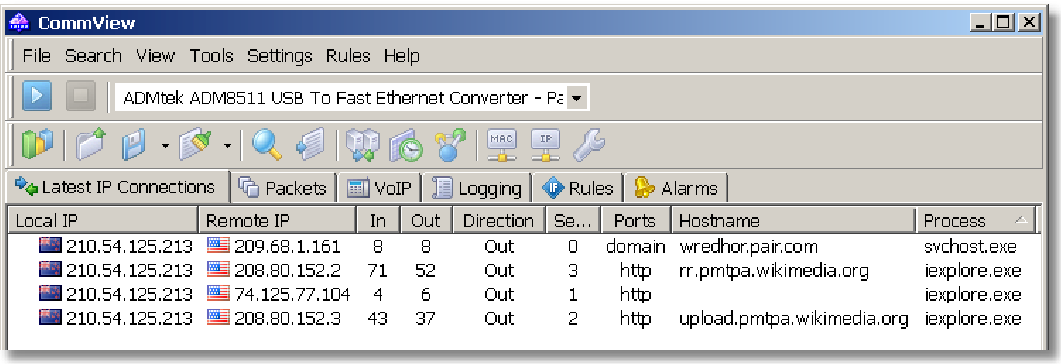


If you accidentally select the wrong adapter – it's ok. You will quickly notice that you selected the wrong adapter because you won't see any packets after clicking **Start Capture**.

I Have Connections!

Latest IP Connections Overview

Let's open the browser and visit a Web site, for example Wikipedia, www.wikipedia.org. Then come back to the CommView main window to look at what has been logged by the program:


CommView
File Search View Tools Settings Rules Help
ADMtek ADM8511 USB To Fast Ethernet Converter - Pa
MAC
IP
Latest IP Connections
Packets
VoIP
Logging
Rules
Alarms

Local IP	Remote IP	In	Out	Direction	Se...	Ports	Hostname	Process
210.54.125.213	209.68.1.161	8	8	Out	0	domain	wredhor.pair.com	svchost.exe
210.54.125.213	208.80.152.2	71	52	Out	3	http	rr.pmtpa.wikimedia.org	iexplore.exe
210.54.125.213	74.125.77.104	4	6	Out	1	http		iexplore.exe
210.54.125.213	208.80.152.3	43	37	Out	2	http	upload.pmtpa.wikimedia.org	iexplore.exe

You can now click **Stop Capture** and take time to understand what you see. The picture on your screen may be a bit different because your browser may not be the only application sending or receiving packets and because of factors that will be explanted below. The most important thing is that you're looking at your PC's network connections!

Now let's try to make sense of what we see. **Local IP** shows your computer's Internet Protocol (IP) address, and **Remote IP** shows the IP address of the computer you've made a connection to. **In** and **Out** are packet counters, **Direction** shows the connection direction, **Ports** shows the TCP or UDP port(s) involved in the conversation, **Hostname** shows the user-friendly name of the host that corresponds to the remote IP address, if available, and **Process** displays the name of the executable file responsible for the connection (it may not be available in some cases.)

So, what happened when we visited this Web site, and why are we seeing all these connections? When you typed www.wikipedia.org into your browser's address field, your PC had to convert this hostname into the IP address. While hostnames are useful for people (they are easy to remember), they are useless for computers, as they need to know the exact IP address of the other computer to establish a connection. That's why your PC contacted a Domain Name System (DNS) server (wredhor.pair.com in our example, yours will be different) to find out the IP address that corresponds to www.wikipedia.org. How do we know that? Because the **Ports** column shows *domain* for this connection, which is a port name used for DNS queries.

Now that our PC has learned the IP address for www.wikipedia.org, it immediately establishes a connection with that Web server and downloads the main page that you can see in your Web browser. *Http* in the **Ports** column is what tells us that this was a HyperText Transfer Protocol (HTTP) connection.

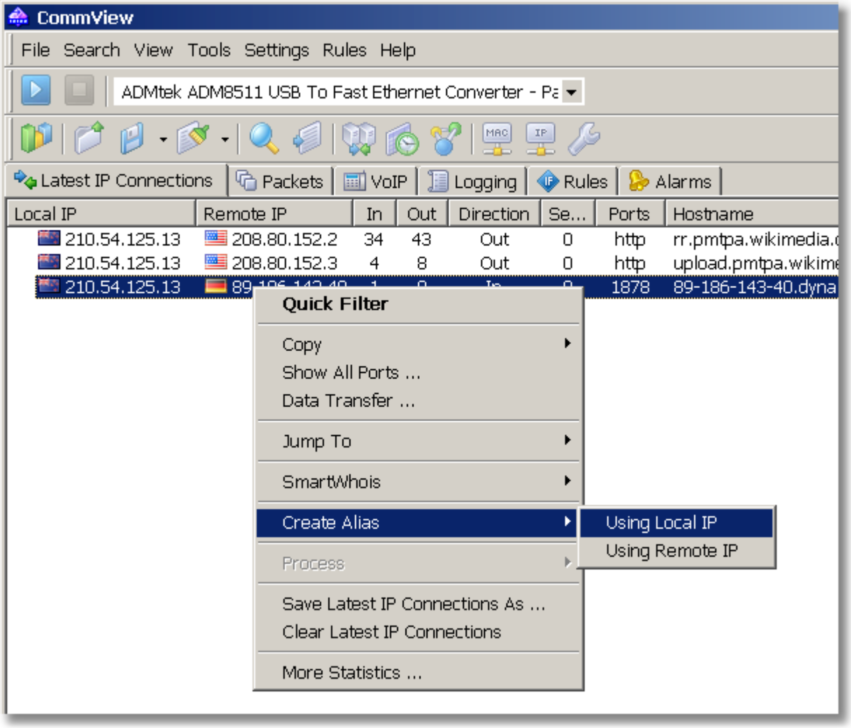
These two connections may be followed by a few others, but we can talk about that later. For now, we've learned that the **Latest IP Connections** tab displays a snapshot of the current connections.

Notice that the IP addresses are accompanied by country flags. This cool feature is called "geolocation." It helps you identify the geographic location of the IP addresses. In our case, as the flags suggest, we're contacting the US-based Wikipedia server from a New Zealand-based PC. If you're not very good at flags, CommView can use country names and two-letter country codes instead; just open the **Options** window to configure this the way you like it.

Making Things Easier

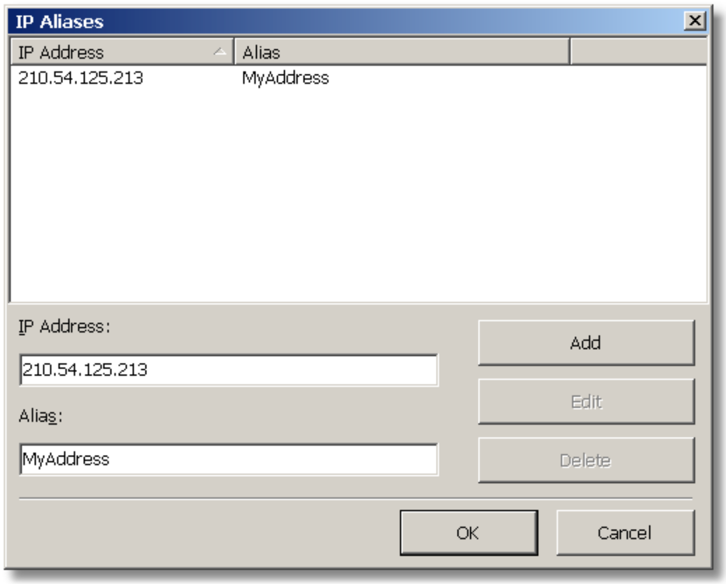
Using Aliases and Friendly Port Names

Let's face it: Numeric IP addresses are hard to remember. Luckily, you don't have to remember them. Right-click on any of the lines in the **Latest IP Connections** table and select **Create Alias => Using Local IP**.



Local IP	Remote IP	In	Out	Direction	Se...	Ports	Hostname
210.54.125.13	208.80.152.2	34	43	Out	0	http	rr.pmtpa.wikimedia.c
210.54.125.13	208.80.152.3	4	8	Out	0	http	upload.pmtpa.wikime
210.54.125.13	89.186.143.40	1	0	In	0	1878	89-186-143-40.dyna

This will bring up a window where you can assign an easy-to-remember alias to any IP address shown by CommView:

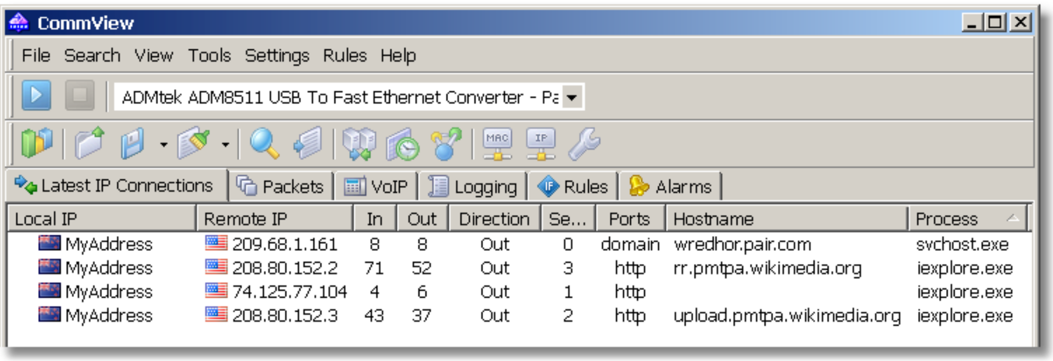


IP Address	Alias
210.54.125.213	MyAddress

IP Address: 210.54.125.213

Alias: MyAddress

Enter any alias name (we chose *MyAddress*). Close this dialog and…



ADMtek ADM8511 USB To Fast Ethernet Converter - Pa

Local IP	Remote IP	In	Out	Direction	Se...	Ports	Hostname	Process
MyAddress	209.68.1.161	8	8	Out	0	domain	wredhor.pair.com	svchost.exe
MyAddress	208.80.152.2	71	52	Out	3	http	rr.pmtpa.wikimedia.org	iexplore.exe
MyAddress	74.125.77.104	4	6	Out	1	http		iexplore.exe
MyAddress	208.80.152.3	43	37	Out	2	http	upload.pmtpa.wikimedia.org	iexplore.exe

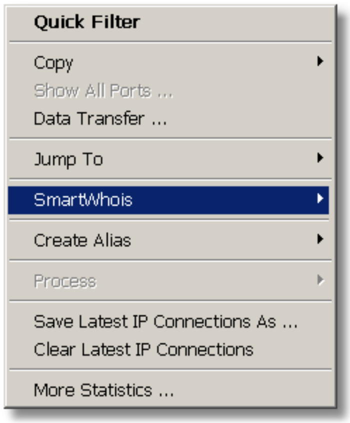
See, the data looks much more understandable, especially if you're monitoring a LAN segment with dozens of computers. When looking at the connection list, we see that the first connection was a DNS query while the second and fourth ones were HTTP sessions with Wikipedia. Just what we expected? Well, not quite…what's that connection to 74.125.77.104? Why did my PC make it? Let's try to find out.

Some Data Mining

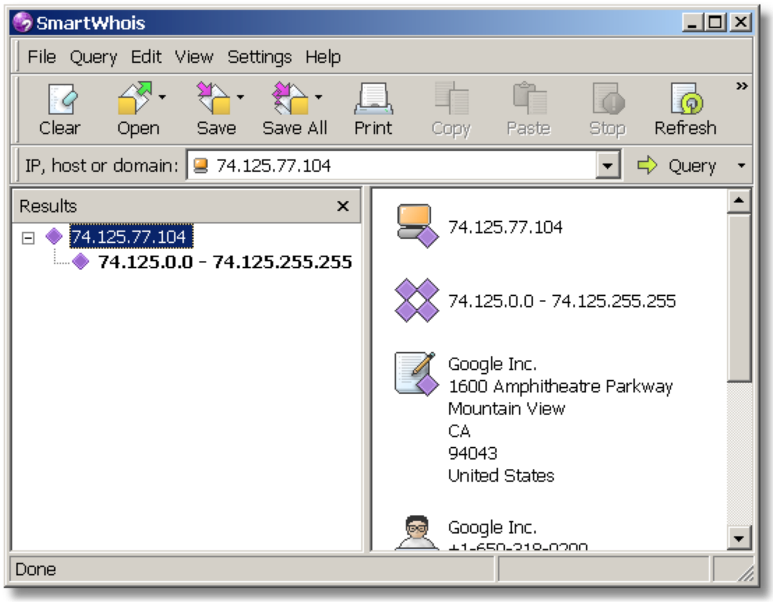
Finding Out More About Current Connections

The reality is that your computer makes more connections than you expect. Common sense tells you that loading a Web page entails just one HTTP session, but that's not always so. First, remember DNS queries? These add at least one connection. If your first DNS server was slow to reply or down, there will be another connection to the second DNS server. Second, many Web sites store Web pages and pictures on two different servers, so when you load a page with graphics, several severs are contacted. There are thousands of reasons why your PC may connect to other computers. Most of these connections are quite legitimate, but it's not uncommon to see an application that sends out sensitive data unbeknownst to you. That might be a spyware or adware program, or even a commercial product that has certain unadvertised functions. That might be even a Trojan horse that allows someone to control your computer.

Well, before getting too scared, we should remember that we have the right tool in our hands. Not a single network packet will enter or leave your computer unnoticed by CommView. In our example, we need to find who is behind the IP address, 74.125.77.104, and why our computer made a connection to it. We can, of course, look at exactly what has been sent using the **Packets** tab, but we'll do that later on. For now, right-click on the IP address in question and select **SmartWhois:**



SmartWhois by TamoSoft is a useful network information utility that allows you to find all the available information about an IP address, hostname, or domain, including country, state or province, city, name of the network provider, administrator and technical support contact information. If you haven't tried it, you can download the evaluation version. SmartWhois has many useful features, but in this particular situation we need only one of them: Finding out who owns that IP address. Once you've clicked **SmartWhois**, you will see the application window with the following information about the IP address in question:


SmartWhois
File Query Edit View Settings Help
Clear Open Save Save All Print Copy Paste Stop Refresh
IP, host or domain:
Query
Results
Done

74.125.77.104

74.125.77.104
74.125.0.0 - 74.125.255.255

74.125.77.104

74.125.0.0 - 74.125.255.255

Google Inc.
1600 Amphitheatre Parkway
Mountain View
CA
94043
United States

Google Inc.
+1-650-318-0200

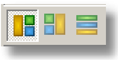
Google? But why Google? We were accessing the Wikipedia Web site! Right. But let's think for a second…your copy of Internet Explorer might be equipped with a nifty little utility called Google Toolbar. And Google Toolbar connects to the Google server to check the popularity rank of the page being visited. We've found the answer.

Naturally, your mileage may vary. You may be using a different browser, you may have visited a different Web site for our experiment, you may have a dozen of other network-related applications running in the background, so your **Latest IP Connections** tab may look different, but we hope that the basic principle is clear: With CommView, you always have the full picture of your network connections, and this is very useful information.

Packets, Packets, Packets…

Looking at the Captured Packets

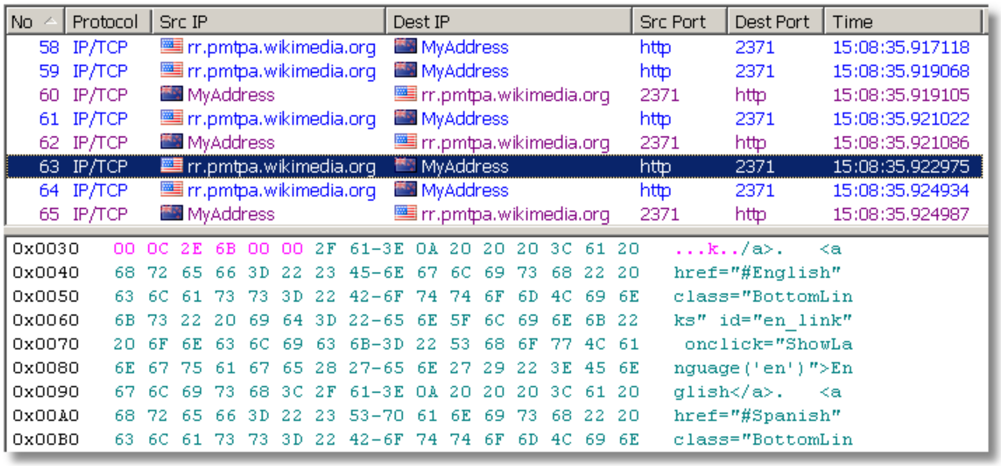
Now that we've learned about the first tab of the CommView main window, let's move to the second one, **Packets**. This three-pane tab allows you to see every single packet that passes through your network adapter in any direction. The packet list shows packet summaries and lets you browse the packet list, the data window displays the packet contents, and the decoder tree does just what the name suggests – it decodes packet headers to display every detail. These panes can be aligned in three different ways using this little tool bar:



We didn't include the decoder tree in the illustrations below to make them more compact, but you can always play with the decoder using your copy of CommView.

The data being sent across a network is "packetized," i.e. broken down into multiple packets that are each sent individually across the network and then reassembled on the other side. In our example, loading the main page of the Wikipedia Web site involved one packet from our PC to the Web server (the browser had to request the page), and several packets from the Web server to our PC (the Web server had to send the requested page, but since the Web page is about 10,000 bytes in size and the typical packet size is 1,500 bytes, it had to be broken down into about 7 packets).

Now, let's select one of the HTTP packets:



No	Protocol	Src IP	Dest IP	Src Port	Dest Port	Time
58	IP/TCP	rr.pmtpa.wikimedia.org	MyAddress	http	2371	15:08:35.917118
59	IP/TCP	rr.pmtpa.wikimedia.org	MyAddress	http	2371	15:08:35.919068
60	IP/TCP	MyAddress	rr.pmtpa.wikimedia.org	2371	http	15:08:35.919105
61	IP/TCP	rr.pmtpa.wikimedia.org	MyAddress	http	2371	15:08:35.921022
62	IP/TCP	MyAddress	rr.pmtpa.wikimedia.org	2371	http	15:08:35.921086
63	IP/TCP	rr.pmtpa.wikimedia.org	MyAddress	http	2371	15:08:35.922975
64	IP/TCP	rr.pmtpa.wikimedia.org	MyAddress	http	2371	15:08:35.924934
65	IP/TCP	MyAddress	rr.pmtpa.wikimedia.org	2371	http	15:08:35.924987

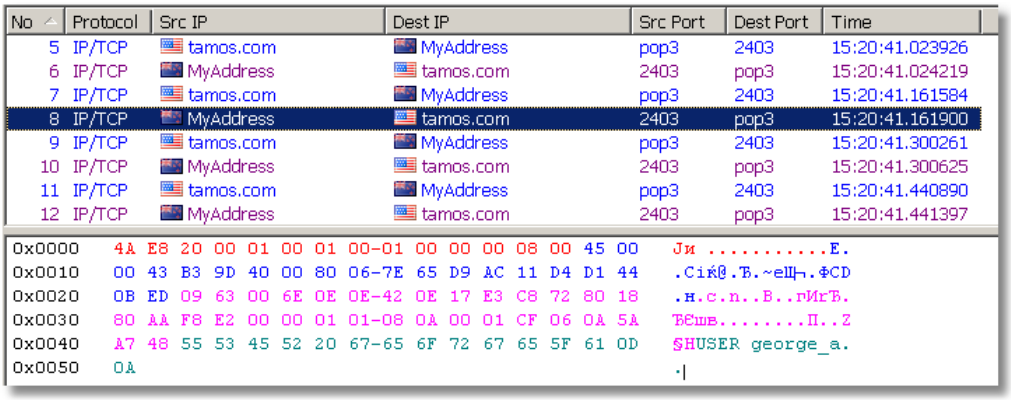
```
0x0030   00 0C 2E 6B 00 00 2F 61-3E 0A 20 20 20 3C 61 20   ...k../a>.   <a
0x0040   68 72 65 66 3D 22 23 45-6E 67 6C 69 73 68 22 20   href="#English"
0x0050   63 6C 61 73 73 3D 22 42-6F 74 74 6F 6D 4C 69 6E   class="BottomLin
0x0060   6B 73 22 20 69 64 3D 22-65 6E 5F 6C 69 6E 6B 22   ks" id="en_link"
0x0070   20 6F 6E 63 6C 69 63 6B-3D 22 53 68 6F 77 4C 61    onclick="ShowLa
0x0080   6E 67 75 61 67 65 28 27-65 6E 27 29 22 3E 45 6E   nguage('en')">En
0x0090   67 6C 69 73 68 3C 2F 61-3E 0A 20 20 20 3C 61 20   glish</a>.   <a
0x00A0   68 72 65 66 3D 22 23 53-70 61 6E 69 73 68 22 20   href="#Spanish"
0x00B0   63 6C 61 73 73 3D 22 42-6F 74 74 6F 6D 4C 69 6E   class="BottomLin
```

Depending on which packet you have selected, you may be looking at the browser page request or the server reply that contains the Web page source. The picture above shows the latter. If you know what HTML is, you'll surely recognize the HTML code of a typical Web page!

What you see in the data window is the standard hexadecimal representation of the packet. The first column shows the offset of each line, the second column shows the packet contents in hexadecimal representation, and the third one shows the ASCII (plain text) equivalent. Why do we need both hexadecimal and ASCII data? Because sometimes, one is easier to read than the other. Congratulations, you've just looked into your first network packet.

We'll talk more about the more things you can do with this information, but for now let's try something cool. Imagine…it's Sunday night, and you've just downloaded and installed a new e-mail program. Surprisingly enough, it's better than the one you're currently using! So you decide to start using it immediately. You import your database and settings from the old program, but…you can't import your e-mail password. And you forgot it, of course (who can remember that *JKH667RtfS* word that you chose a year ago and never had to type since then, right?). And your ISP's technical support doesn't work on Sunday night.

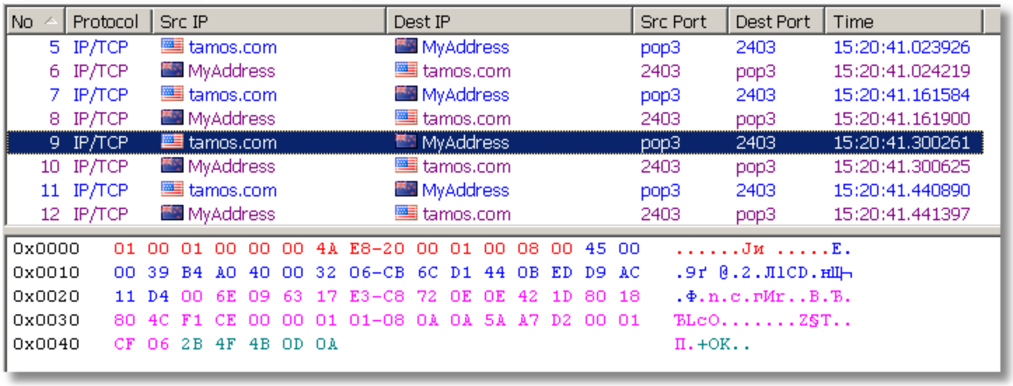
Here is a work-around. Check your e-mail box using your old e-mail program and capture that session with CommView. Now, browse through the POP3 packets:



No	Protocol	Src IP	Dest IP	Src Port	Dest Port	Time
5	IP/TCP	tamos.com	MyAddress	pop3	2403	15:20:41.023926
6	IP/TCP	MyAddress	tamos.com	2403	pop3	15:20:41.024219
7	IP/TCP	tamos.com	MyAddress	pop3	2403	15:20:41.161584
8	IP/TCP	MyAddress	tamos.com	2403	pop3	15:20:41.161900
9	IP/TCP	tamos.com	MyAddress	pop3	2403	15:20:41.300261
10	IP/TCP	MyAddress	tamos.com	2403	pop3	15:20:41.300625
11	IP/TCP	tamos.com	MyAddress	pop3	2403	15:20:41.440890
12	IP/TCP	MyAddress	tamos.com	2403	pop3	15:20:41.441397

```
0x0000   4A E8 20 00 01 00 01 00-01 00 00 00 08 00 45 00   Jи ...........E.
0x0010   00 43 B3 9D 40 00 80 06-7E 65 D9 AC 11 D4 D1 44   .Ciќ@.Ђ.~eЩ┐.ФCD
0x0020   0B ED 09 63 00 6E 0E 0E-42 0E 17 E3 C8 72 80 18   .н.c.n..B..гИrЂ.
0x0030   80 AA F8 E2 00 00 01 01-08 0A 00 01 CF 06 0A 5A   ЂЄшв........П..Z
0x0040   A7 48 55 53 45 52 20 67-65 6F 72 67 65 5F 61 0D   §HUSER george_a.
0x0050   0A                                                .
```

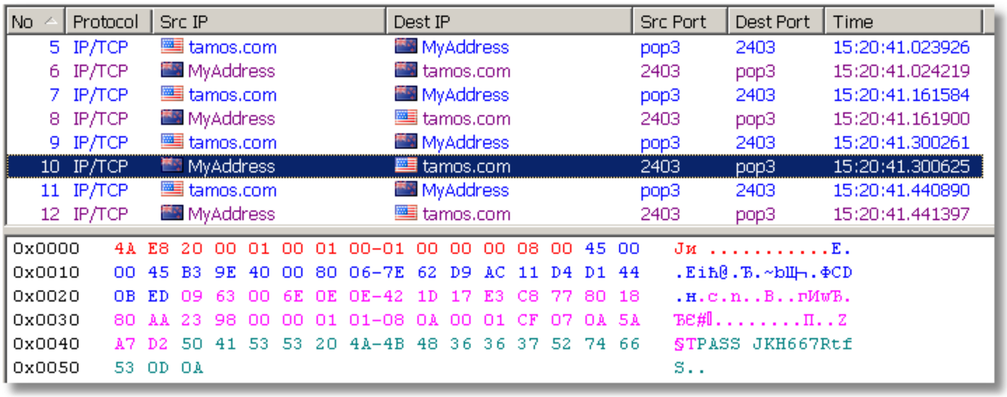
That was the user name …



No	Protocol	Src IP	Dest IP	Src Port	Dest Port	Time
5	IP/TCP	tamos.com	MyAddress	pop3	2403	15:20:41.023926
6	IP/TCP	MyAddress	tamos.com	2403	pop3	15:20:41.024219
7	IP/TCP	tamos.com	MyAddress	pop3	2403	15:20:41.161584
8	IP/TCP	MyAddress	tamos.com	2403	pop3	15:20:41.161900
9	IP/TCP	tamos.com	MyAddress	pop3	2403	15:20:41.300261
10	IP/TCP	MyAddress	tamos.com	2403	pop3	15:20:41.300625
11	IP/TCP	tamos.com	MyAddress	pop3	2403	15:20:41.440890
12	IP/TCP	MyAddress	tamos.com	2403	pop3	15:20:41.441397

```
0x0000   01 00 01 00 00 00 4A E8-20 00 01 00 08 00 45 00   ......Jи .....E.
0x0010   00 39 B4 A0 40 00 32 06-CB 6C D1 44 0B ED D9 AC   .9ґ @.2.ЛlСD.нЩ┐
0x0020   11 D4 00 6E 09 63 17 E3-C8 72 0E 0E 42 1D 80 18   .Ф.n.c.гИr..B.Ђ.
0x0030   80 4C F1 CE 00 00 01 01-08 0A 0A 5A A7 D2 00 01   ЂLсО.......Z§Т..
0x0040   CF 06 2B 4F 4B 0D 0A                              П.+OK..
```

… and that's the mail server requesting the password …



No	Protocol	Src IP	Dest IP	Src Port	Dest Port	Time
5	IP/TCP	tamos.com	MyAddress	pop3	2403	15:20:41.023926
6	IP/TCP	MyAddress	tamos.com	2403	pop3	15:20:41.024219
7	IP/TCP	tamos.com	MyAddress	pop3	2403	15:20:41.161584
8	IP/TCP	MyAddress	tamos.com	2403	pop3	15:20:41.161900
9	IP/TCP	tamos.com	MyAddress	pop3	2403	15:20:41.300261
10	IP/TCP	MyAddress	tamos.com	2403	pop3	15:20:41.300625
11	IP/TCP	tamos.com	MyAddress	pop3	2403	15:20:41.440890
12	IP/TCP	MyAddress	tamos.com	2403	pop3	15:20:41.441397

```
0x0000   4A E8 20 00 01 00 01 00-01 00 00 00 08 00 45 00   Jи ...........E.
0x0010   00 45 B3 9E 40 00 80 06-7E 62 D9 AC 11 D4 D1 44   .Eiћ@.Ђ.~bЩ┥.ФCD
0x0020   0B ED 09 63 00 6E 0E 0E-42 1D 17 E3 C8 77 80 18   .н.c.n..B..гИwЂ.
0x0030   80 AA 23 98 00 00 01 01-08 0A 00 01 CF 07 0A 5A   ЂЄ#▯........П..Z
0x0040   A7 D2 50 41 53 53 20 4A-4B 48 36 36 37 52 74 66   §TPASS JKH667Rtf
0x0050   53 0D 0A                                          S..
```

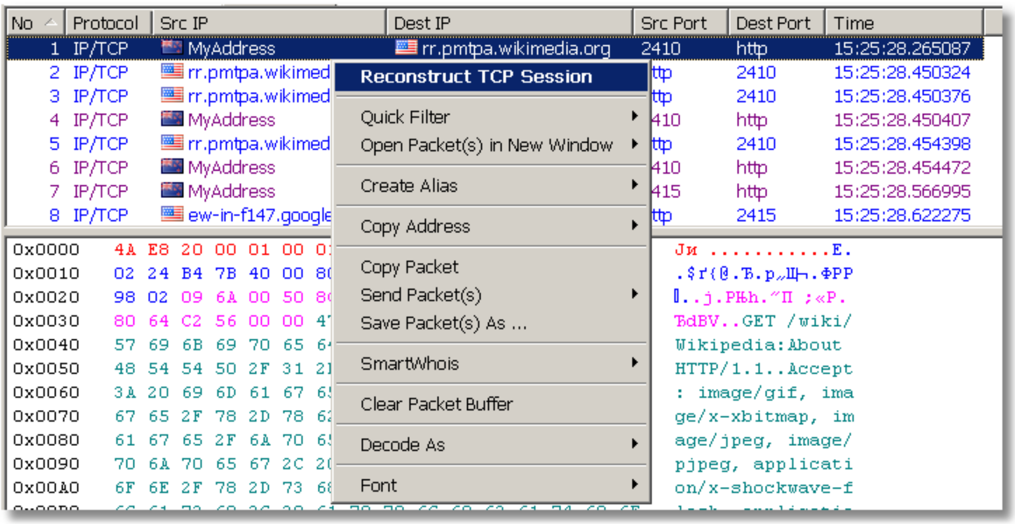
… and here is the password we were looking for!

By the way, if you need to look at the packets related to a particular connection listed on the **Latest IP Connections** tab, you can do so by simply double-clicking on the line representing that connection.

Let's Take a Look at This Session

TCP Data Streams

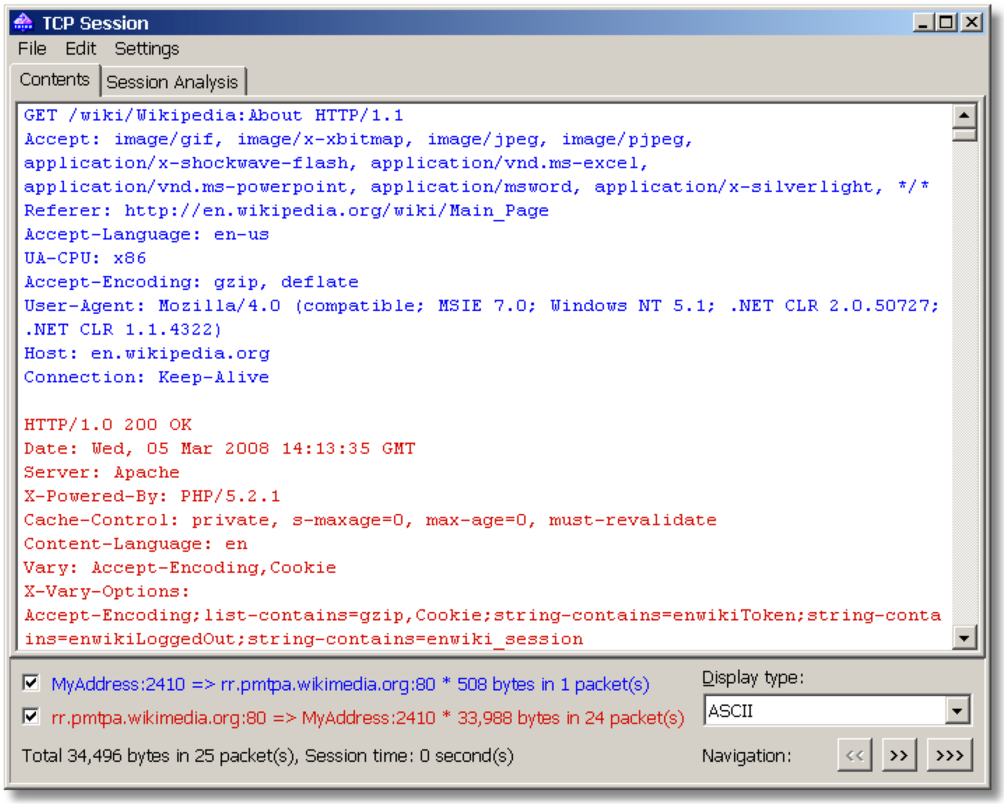
We can see the data broken into multiple packets, but is it possible to reassemble TCP sessions? Yes, with CommView this is possible. Select the first packet in a session (for example, the one where the browser requests a page from the Web server), right-click on it, and select **Reconstruct TCP Session** or simply double-click on the selected line:



No	Protocol	Src IP	Dest IP	Src Port	Dest Port	Time
1	IP/TCP	MyAddress	rr.pmtpa.wikimedia.org	2410	http	15:25:28.265087
2	IP/TCP	rr.pmtpa.wikimed		ttp	2410	15:25:28.450324
3	IP/TCP	rr.pmtpa.wikimed		ttp	2410	15:25:28.450376
4	IP/TCP	MyAddress		410	http	15:25:28.450407
5	IP/TCP	rr.pmtpa.wikimed		ttp	2410	15:25:28.454398
6	IP/TCP	MyAddress		410	http	15:25:28.454472
7	IP/TCP	MyAddress		415	http	15:25:28.566995
8	IP/TCP	ew-in-f147.google		ttp	2415	15:25:28.622275

```
0x0000   4A E8 20 00 01 00 0                                Jи ...........E.
0x0010   02 24 B4 7B 40 00 8                                .$ґ{@.Ђ.p„Щ┥.ФPP
0x0020   98 02 09 6A 00 50 8                                ▯..j.PЊh.″П ;«P.
0x0030   80 64 C2 56 00 00 4                                ЂdBV..GET /wiki/
0x0040   57 69 6B 69 70 65 6                                Wikipedia:About
0x0050   48 54 54 50 2F 31 2                                HTTP/1.1..Accept
0x0060   3A 20 69 6D 61 67 6                                : image/gif, ima
0x0070   67 65 2F 78 2D 78 6                                ge/x-xbitmap, im
0x0080   61 67 65 2F 6A 70 6                                age/jpeg, image/
0x0090   70 6A 70 65 67 2C 2                                pjpeg, applicati
0x00A0   6F 6E 2F 78 2D 73 6                                on/x-shockwave-f
```

There we go, the "conversation" between our PC and the Wikipedia Web server is in front of us, the page request is in blue, and the server's reply is in red:



```
GET /wiki/Wikipedia:About HTTP/1.1
Accept: image/gif, image/x-xbitmap, image/jpeg, image/pjpeg,
application/x-shockwave-flash, application/vnd.ms-excel,
application/vnd.ms-powerpoint, application/msword, application/x-silverlight, */*
Referer: http://en.wikipedia.org/wiki/Main_Page
Accept-Language: en-us
UA-CPU: x86
Accept-Encoding: gzip, deflate
User-Agent: Mozilla/4.0 (compatible; MSIE 7.0; Windows NT 5.1; .NET CLR 2.0.50727;
.NET CLR 1.1.4322)
Host: en.wikipedia.org
Connection: Keep-Alive

HTTP/1.0 200 OK
Date: Wed, 05 Mar 2008 14:13:35 GMT
Server: Apache
X-Powered-By: PHP/5.2.1
Cache-Control: private, s-maxage=0, max-age=0, must-revalidate
Content-Language: en
Vary: Accept-Encoding,Cookie
X-Vary-Options:
Accept-Encoding;list-contains=gzip,Cookie;string-contains=enwikiToken;string-conta
ins=enwikiLoggedOut;string-contains=enwiki_session
```

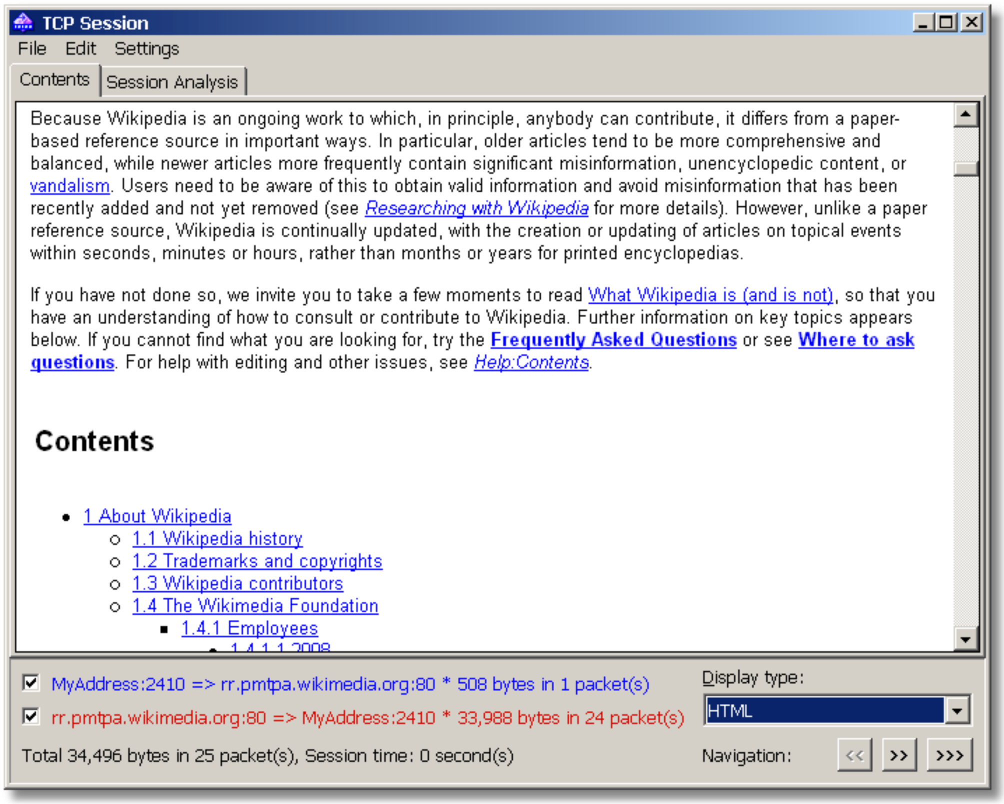
☑ MyAddress:2410 => rr.pmtpa.wikimedia.org:80 * 508 bytes in 1 packet(s)

☑ rr.pmtpa.wikimedia.org:80 => MyAddress:2410 * 33,988 bytes in 24 packet(s)

Total 34,496 bytes in 25 packet(s), Session time: 0 second(s)

Display type: ASCII

If you scroll down that window, you will see the full HTML source code of the page that was loaded in the browser. Ok, that was the ASCII (plain text) representation of this session. But the browser doesn't display plain text; it displays nice-looking HTML pages, right? Right, and we can do the same with CommView. Just select **HTML** in the **Display type** drop-down list, and the data will be shown as a Web page:



Because Wikipedia is an ongoing work to which, in principle, anybody can contribute, it differs from a paper-based reference source in important ways. In particular, older articles tend to be more comprehensive and balanced, while newer articles more frequently contain significant misinformation, unencyclopedic content, or vandalism. Users need to be aware of this to obtain valid information and avoid misinformation that has been recently added and not yet removed (see *Researching with Wikipedia* for more details). However, unlike a paper reference source, Wikipedia is continually updated, with the creation or updating of articles on topical events within seconds, minutes or hours, rather than months or years for printed encyclopedias.

If you have not done so, we invite you to take a few moments to read What Wikipedia is (and is not), so that you have an understanding of how to consult or contribute to Wikipedia. Further information on key topics appears below. If you cannot find what you are looking for, try the **Frequently Asked Questions** or see **Where to ask questions**. For help with editing and other issues, see *Help:Contents*.

Contents

- 1 About Wikipedia
  - 1.1 Wikipedia history
  - 1.2 Trademarks and copyrights
  - 1.3 Wikipedia contributors
  - 1.4 The Wikimedia Foundation
    - 1.4.1 Employees
      - 1.4.1.1 2008

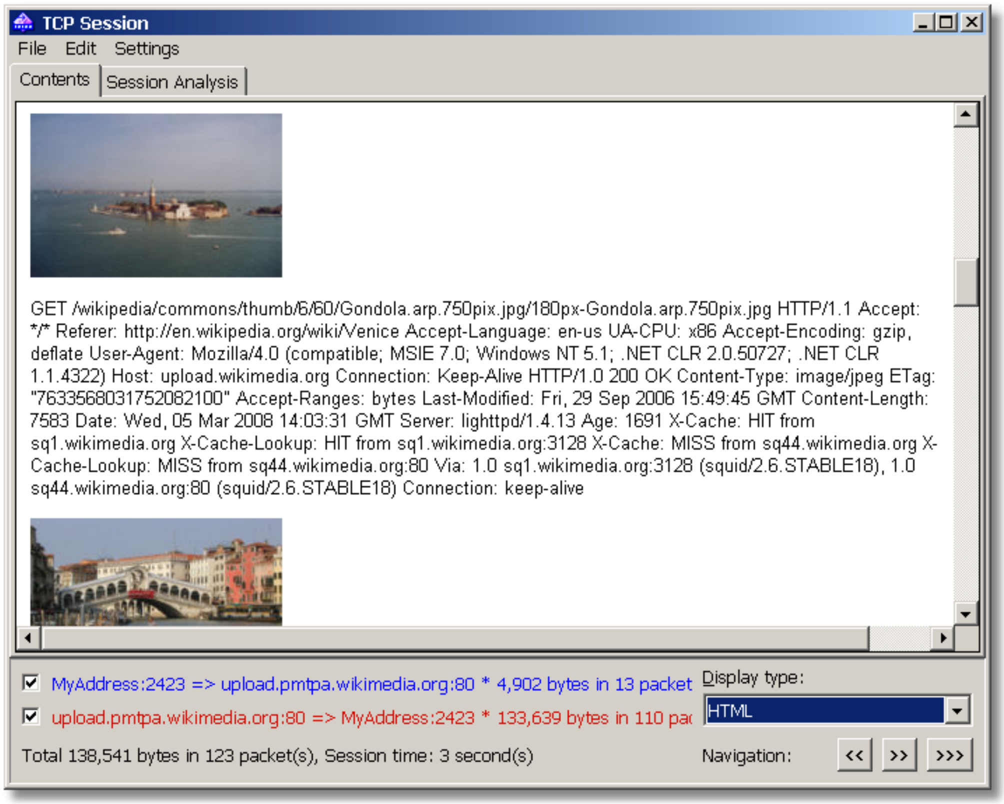
☑ MyAddress:2410 => rr.pmtpa.wikimedia.org:80 * 508 bytes in 1 packet(s)

☑ rr.pmtpa.wikimedia.org:80 => MyAddress:2410 * 33,988 bytes in 24 packet(s)

Total 34,496 bytes in 25 packet(s), Session time: 0 second(s)

Display type: HTML

This is fine, but why no pictures? Because pictures are usually transferred in a different TCP session, and sometimes from a different server. By clicking on the **>>>** button you can navigate to the next TCP session and find pictures (or totally different TCP session, your computer might have already made several connections):



GET /wikipedia/commons/thumb/6/60/Gondola.arp.750pix.jpg/180px-Gondola.arp.750pix.jpg HTTP/1.1 Accept: */* Referer: http://en.wikipedia.org/wiki/Venice Accept-Language: en-us UA-CPU: x86 Accept-Encoding: gzip, deflate User-Agent: Mozilla/4.0 (compatible; MSIE 7.0; Windows NT 5.1; .NET CLR 2.0.50727; .NET CLR 1.1.4322) Host: upload.wikimedia.org Connection: Keep-Alive HTTP/1.0 200 OK Content-Type: image/jpeg ETag: "7633568031752082100" Accept-Ranges: bytes Last-Modified: Fri, 29 Sep 2006 15:49:45 GMT Content-Length: 7583 Date: Wed, 05 Mar 2008 14:03:31 GMT Server: lighttpd/1.4.13 Age: 1691 X-Cache: HIT from sq1.wikimedia.org X-Cache-Lookup: HIT from sq1.wikimedia.org:3128 X-Cache: MISS from sq44.wikimedia.org X-Cache-Lookup: MISS from sq44.wikimedia.org:80 Via: 1.0 sq1.wikimedia.org:3128 (squid/2.6.STABLE18), 1.0 sq44.wikimedia.org:80 (squid/2.6.STABLE18) Connection: keep-alive

☑ MyAddress:2423 => upload.pmtpa.wikimedia.org:80 * 4,902 bytes in 13 packet

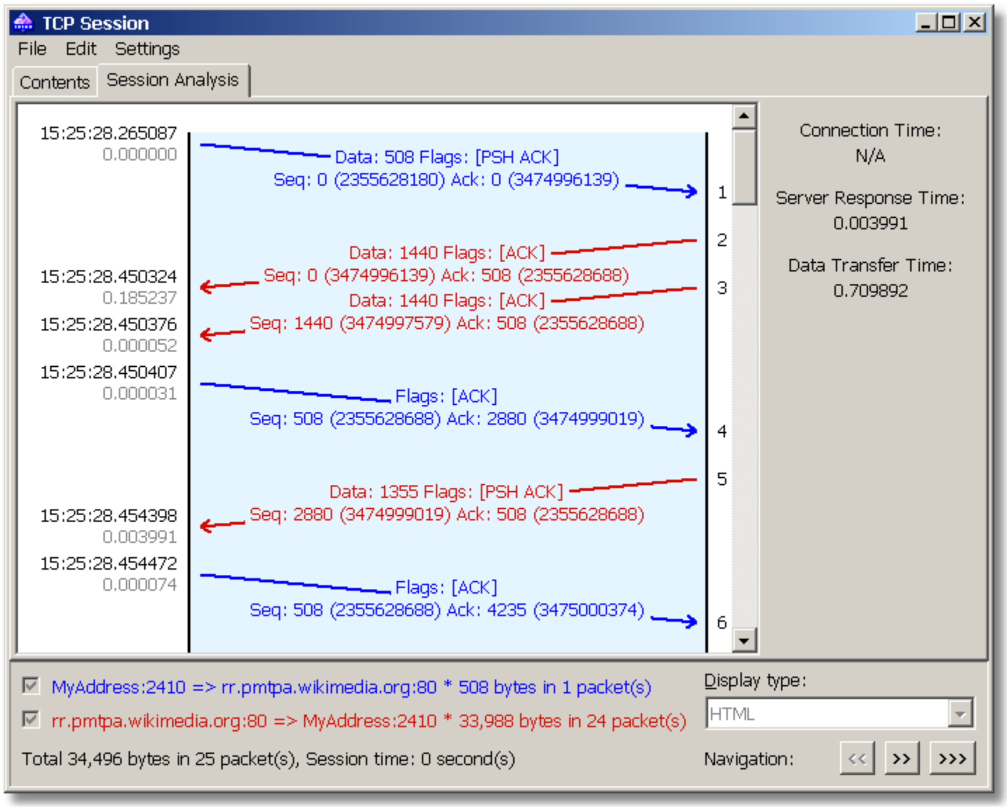
☑ upload.pmtpa.wikimedia.org:80 => MyAddress:2423 * 133,639 bytes in 110 pac

Total 138,541 bytes in 123 packet(s), Session time: 3 second(s)

Display type: HTML

In this example, we used CommView to reconstruct HTTP sessions, but you can use this tool to look at the TCP streams of any nature, be it a POP3 session between your e-mail client and server or FTP download.

If you are a networking professional and you'd like to see the TCP session flow as a "ladder" diagram, switch to the **Session Analysis** tab:



```
15:25:28.265087
       0.000000   Data: 508 Flags: [PSH ACK]
                  Seq: 0 (2355628180) Ack: 0 (3474996139)
                  Data: 1440 Flags: [ACK]
15:25:28.450324   Seq: 0 (3474996139) Ack: 508 (2355628688)
       0.185237   Data: 1440 Flags: [ACK]
15:25:28.450376   Seq: 1440 (3474997579) Ack: 508 (2355628688)
       0.000052
15:25:28.450407
       0.000031   Flags: [ACK]
                  Seq: 508 (2355628688) Ack: 2880 (3474999019)
                  Data: 1355 Flags: [PSH ACK]
15:25:28.454398   Seq: 2880 (3474999019) Ack: 508 (2355628688)
       0.003991
15:25:28.454472
       0.000074   Flags: [ACK]
                  Seq: 508 (2355628688) Ack: 4235 (3475000374)
```

Connection Time:
N/A

Server Response Time:
0.003991

Data Transfer Time:
0.709892

☑ MyAddress:2410 => rr.pmtpa.wikimedia.org:80 * 508 bytes in 1 packet(s)

☑ rr.pmtpa.wikimedia.org:80 => MyAddress:2410 * 33,988 bytes in 24 packet(s)

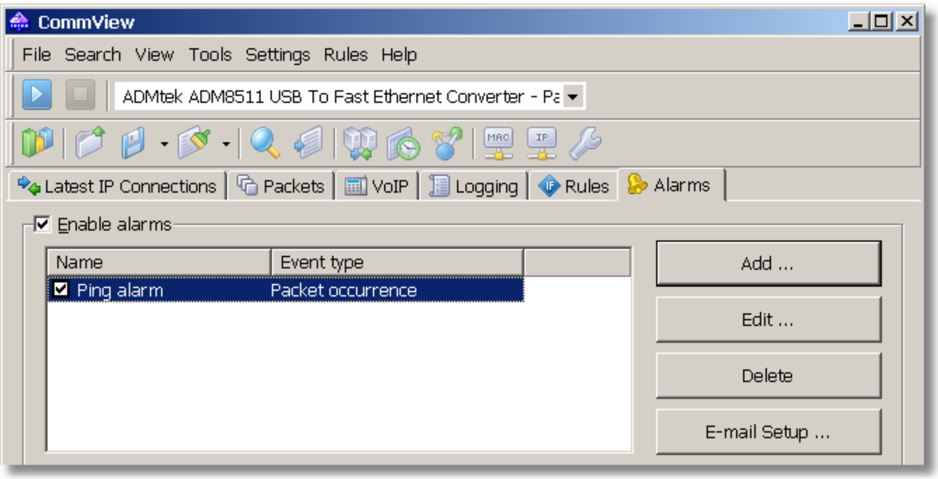
Display type: HTML

Total 34,496 bytes in 25 packet(s), Session time: 0 second(s)

Alarm!

An Alarm Function Primer

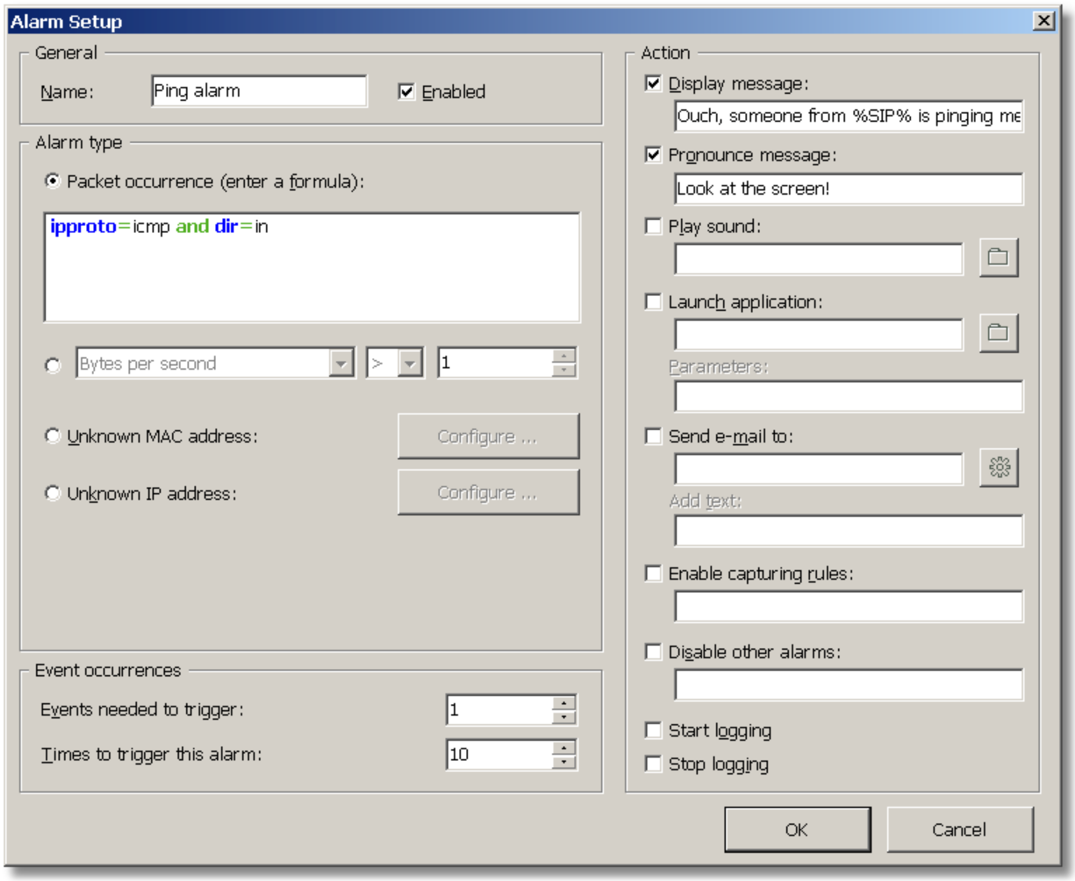
In addition to passive monitoring, CommView can notify you about important network events. That's what the **Alarm** tab is for. Switch to this tab, check the **Enable alarms** box, and click **Add**.



☑ Enable alarms

Name	Event type
☑ Ping alarm	Packet occurrence

You will see a large alarm setup window with many check boxes and buttons, but don't get scared; we'll do something very basic for starters. Suppose that we want to be notified every time someone pings our PC or we ping someone's PC. For that, we'll create a new alarm named *Ping Alarm* that will be triggered once an incoming ICMP packet is received.



Alarm Setup

General

Name: Ping alarm ☑ Enabled

Alarm type

● Packet occurrence (enter a formula):

ipproto=icmp and dir=in

○ Bytes per second > 1

○ Unknown MAC address:

○ Unknown IP address:

Event occurrences

Events needed to trigger: 1

Times to trigger this alarm: 10

Action

☑ Display message: Ouch, someone from %SIP% is pinging me

☑ Pronounce message: Look at the screen!

☐ Play sound:

☐ Launch application:

Parameters:

☐ Send e-mail to:

Add text:

☐ Enable capturing rules:

☐ Disable other alarms:

☐ Start logging

☐ Stop logging

CommView has a built-in language that allows you to use a formula to specify an alarm event or capturing rule. The explanation of this language is beyond the scope of this manual, but you can find a detailed description in the **Advanced Rules** chapter of the help file. For now, just use a "pre-canned" formula:

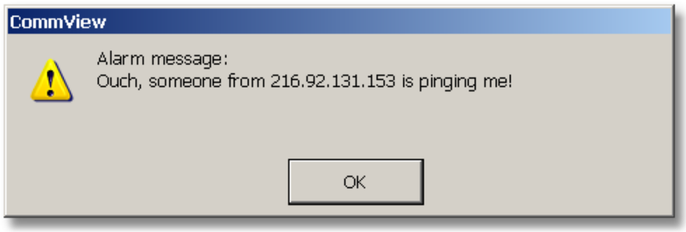
ipproto=icmp and dir=in

In human language, this means that we're interested in any incoming ICMP packets (because ping uses the ICMP protocol). In the **Even occurrences** frame we can specify how many times we want CommView to alert us before deactivating the alarm. We chose ten. Finally, we should choose a method by which CommView will notify us. How about a pop-up window? Good, we're checking the **Display message** box and entering the following text:

Ouch, someone from %SIP% is pinging me!

What's "*%SIP%*"? This will be replaced by the actual IP address of the computer that pinged you (SIP = Source IP Address). You don't necessarily have to use such a placeholder, but it's nice to know who is pinging you. The **Alarms** chapter of the help file will tell you more about the syntax of alarm messages. We'll also check the **Pronounce message** box to receive an audible alarm.

Ok, we're all set. Click **OK** to close the alarm setup box, and we're ready for the test. Don't forget to start capturing and go to a Web site that allows you to ping an IP address, for example, this one: http://www.all-nettools.com/toolbox. Enter your IP address in the **Ping** tool field, and click "Go!" In a few seconds CommView will notify you about this incoming ping packet:



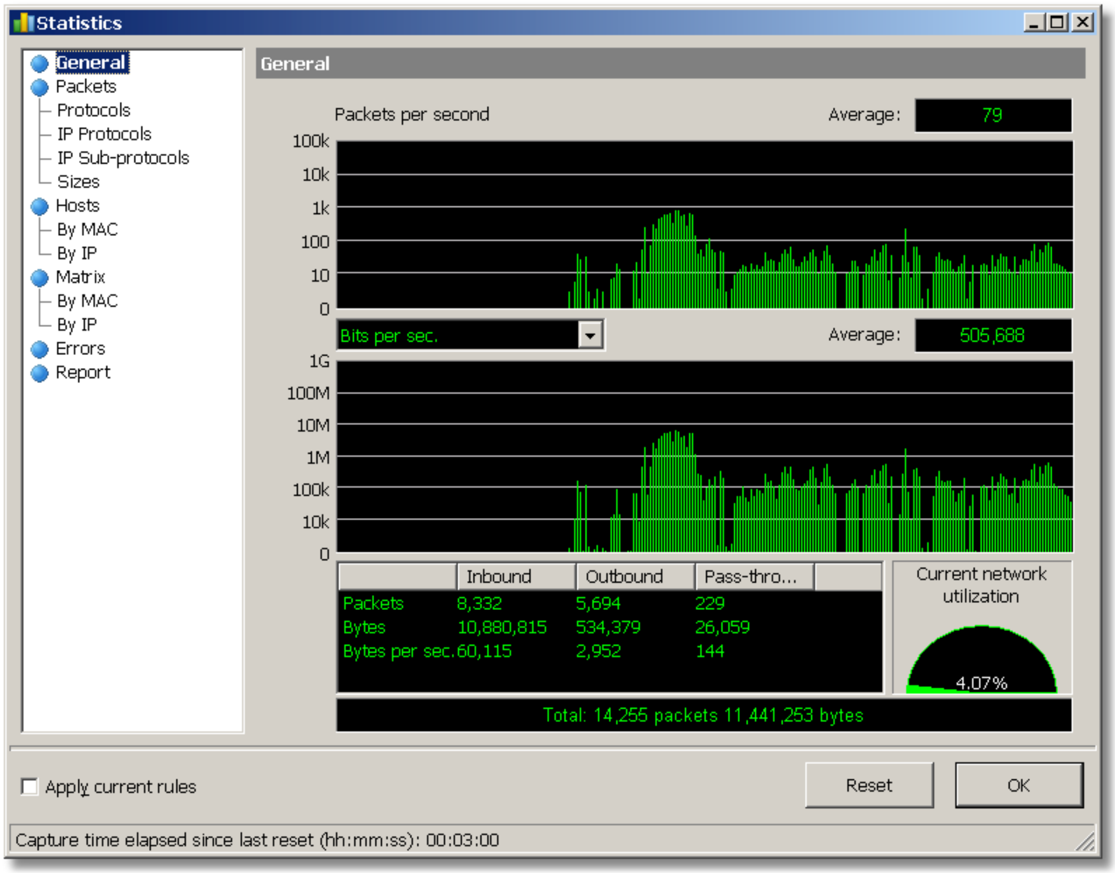
Alarm message:
Ouch, someone from 216.92.131.153 is pinging me!

Additionally, your computer's text-to-speech engine will actually pronounce, "Look at the screen" using your headset or PC speaker with a pleasant (ok, ok, not so pleasant) robotic voice. A pop-up window and audible alarm are only two of the possible ways of notification. You can have CommView send an e-mail message to your box, launch an application, and so on.

How Is My Connection Doing?

Watching Network Utilization

It's time to look at the **Statistics** window, which gives you a wealth of statistical information on the network status. You can invoke this window by clicking this tool bar button: . Then select the **General** tab to check how your network connection is doing.



Packets per second Average: 79

Bits per sec. Average: 505,688

	Inbound	Outbound	Pass-thro...
Packets	8,332	5,694	229
Bytes	10,880,815	534,379	26,059
Bytes per sec.	60,115	2,952	144

Current network utilization 4.07%

Total: 14,255 packets 11,441,253 bytes

☐ Apply current rules

Capture time elapsed since last reset (hh:mm:ss): 00:03:00

These graphs show you real-time information on packets and bytes transferred over your network. Why is this important for many users? If you are on a LAN, these are important indicators of your LAN segment health. If the network utilization in your segment is too high, it's a good reason to investigate the situation, find traffic hogs, or upgrade your hardware. If you have a broadband connection at home, these graphs will let you see the actual data transfer rate and compare it to the officially advertised numbers. You can also check download speeds or monitor traffic volume, although if you need an application especially designed for traffic accounting, you may want to check out CommTraffic by TamoSoft.

The Protocols My Network Speaks

Protocol Charts

Curious about what applications use up your bandwidth? Switch to the **IP Sub-protocols** tab and take a look:

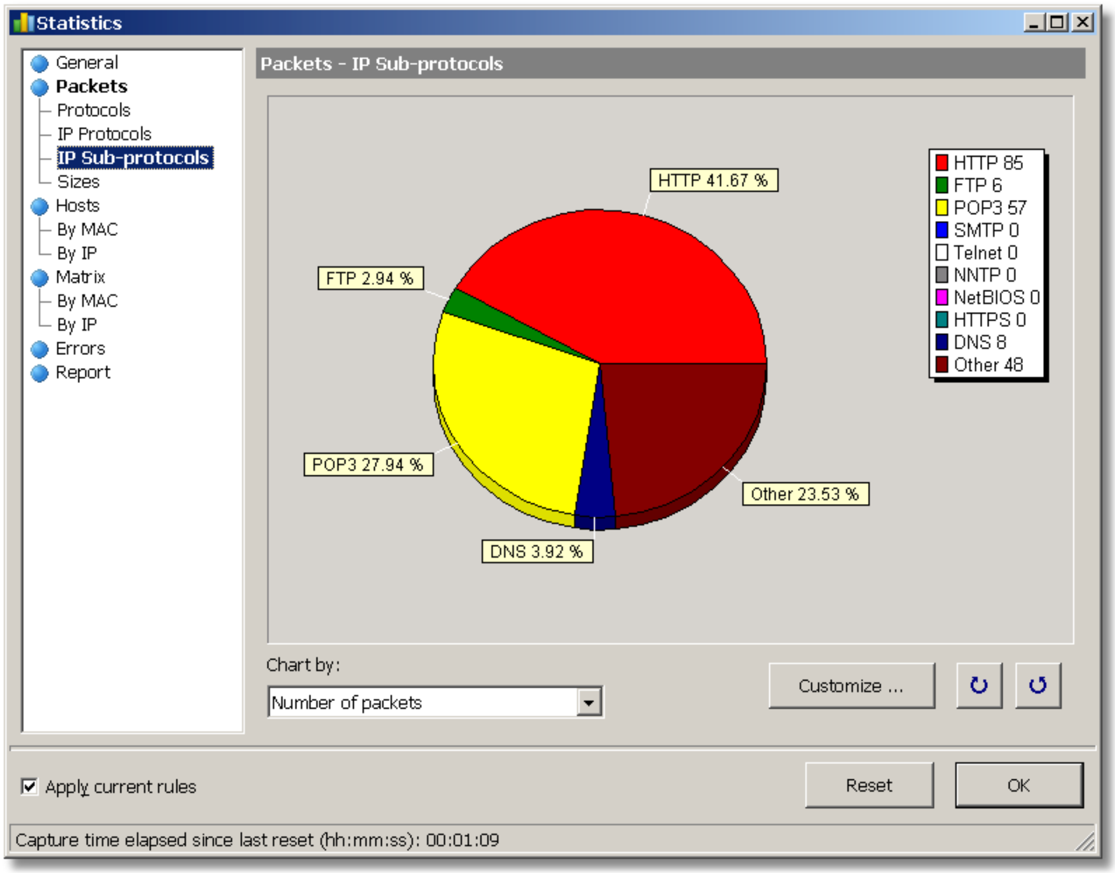


Chart by: Number of packets

☑ Apply current rules

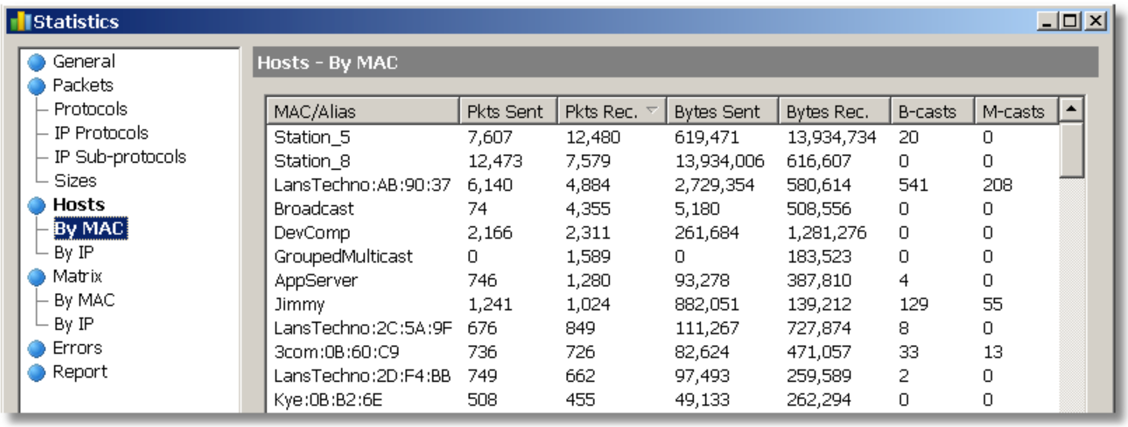
Capture time elapsed since last reset (hh:mm:ss): 00:01:09

This pie chart lets you quickly identify the protocols "spoken" on your network. Too much SMTP traffic? Your PC or other computers in your LAN segment send a high volume of e-mail correspondence. Too much FTP traffic? Perhaps because of many software downloads. While the chart displays only the most popular protocols by default, you can always click **Customize** and enter a new protocol and port number, for example, to have information on a popular peer-to-peer client or chat program.

Who Is Talking on My LAN?

Identifying Traffic Hogs

Now that we've learned about the protocols, we may want to learn about the top talkers by looking at the **Hosts (By MAC)** tab. If your computer is not a part of a LAN, you won't see much useful information in this table, but if you monitor a LAN segment being connected to the monitoring port of a switch (or a good old hub), you can quickly identify traffic hogs or the stations responsible for "broadcast storms."

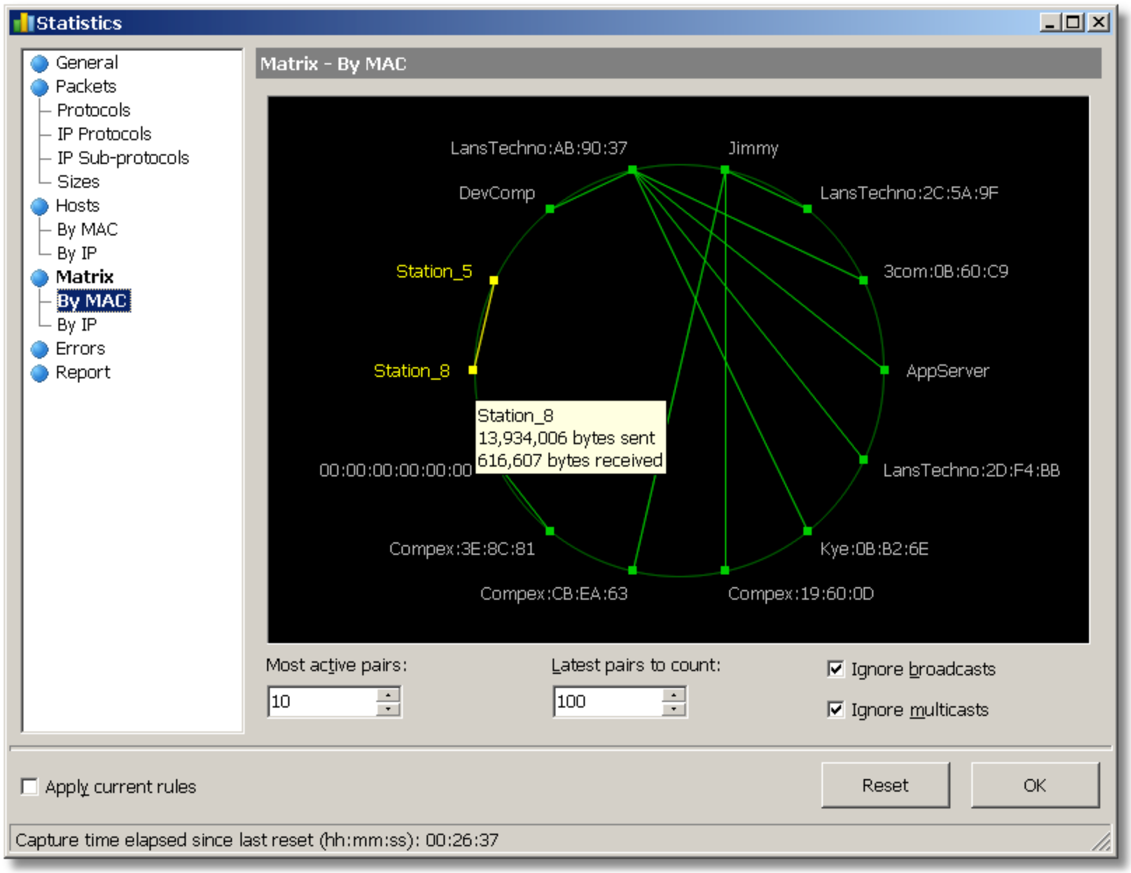


MAC/Alias	Pkts Sent	Pkts Rec.	Bytes Sent	Bytes Rec.	B-casts	M-casts
Station_5	7,607	12,480	619,471	13,934,734	20	0
Station_8	12,473	7,579	13,934,006	616,607	0	0
LansTechno:AB:90:37	6,140	4,884	2,729,354	580,614	541	208
Broadcast	74	4,355	5,180	508,556	0	0
DevComp	2,166	2,311	261,684	1,281,276	0	0
GroupedMulticast	0	1,589	0	183,523	0	0
AppServer	746	1,280	93,278	387,810	4	0
Jimmy	1,241	1,024	882,051	139,212	129	55
LansTechno:2C:5A:9F	676	849	111,267	727,874	8	0
3com:0B:60:C9	736	726	82,624	471,057	33	13
LansTechno:2D:F4:BB	749	662	97,493	259,589	2	0
Kye:0B:B2:6E	508	455	49,133	262,294	0	0

As you probably know, a network analyzer puts your card in so-called "promiscuous mode," which allows you to capture not only the packets addressed to your machine, but also all other packets being sent or received in your LAN segment.

Note that some of the entries in the first column are MAC addresses, while others are user-friendly names. Remember how we assigned aliases to IP addresses in one of the previous chapters? You can do the same with MAC addresses, just right-click on any of them and select **Aliases** to assign or edit an alias.

Another way of looking at the nodes that are active in your LAN segment is through the **Matrix** tab. This tab is a peer map that displays the traffic flow between different hosts. Using the matrix, you can immediately see who is talking to whom:



Statistics

Matrix - By MAC

Station_8
13,934,006 bytes sent
616,607 bytes received

Most active pairs: 10

Latest pairs to count: 100

☑ Ignore broadcasts

☑ Ignore multicasts

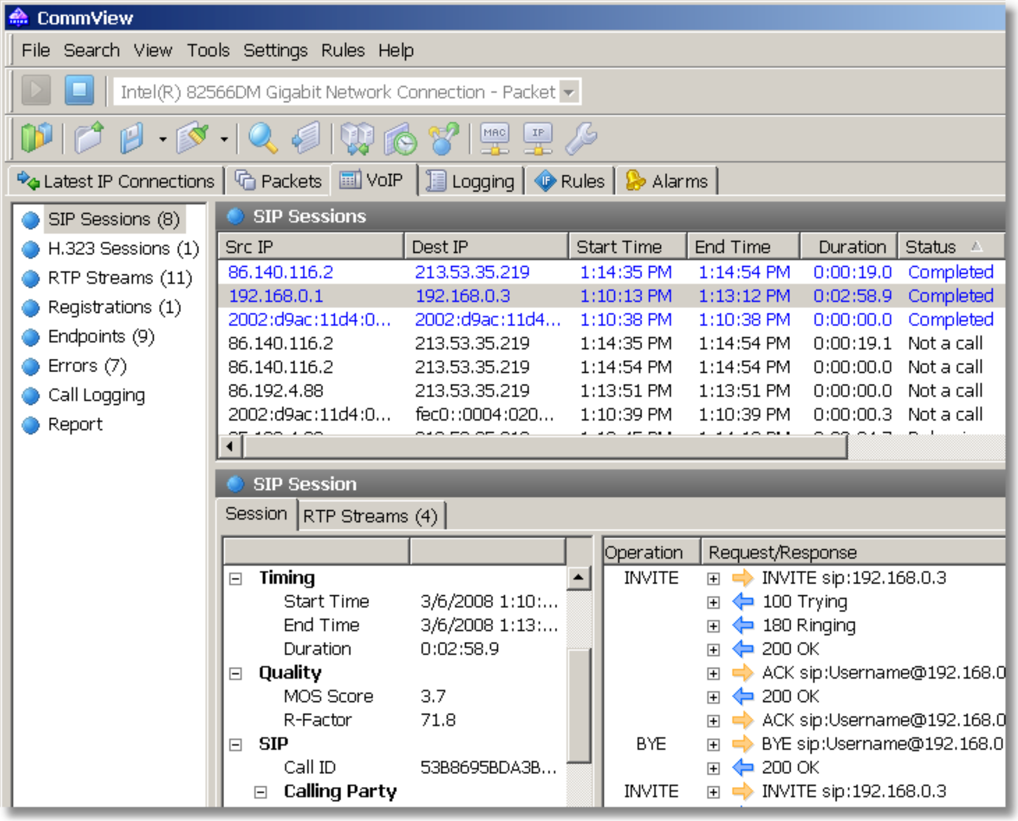
□ Apply current rules

Capture time elapsed since last reset (hh:mm:ss): 00:26:37

Raise Your Voice

Using the VoIP Analysis Module

Those network engineers who deal with the deployment and management of IP telephony networks know how instrumental a network analyzer may be for troubleshooting and monitoring VoIP. CommView comes to rescue with its VoIP analysis engine for SIP and H.323 protocols. VoIP analysis is a topic that goes far beyond the scope of this brief manual, but we thought it important to mention this functionality.



Src IP	Dest IP	Start Time	End Time	Duration	Status
86.140.116.2	213.53.35.219	1:14:35 PM	1:14:54 PM	0:00:19.0	Completed
192.168.0.1	192.168.0.3	1:10:13 PM	1:13:12 PM	0:02:58.9	Completed
2002:d9ac:11d4:0...	2002:d9ac:11d4...	1:10:38 PM	1:10:38 PM	0:00:00.0	Completed
86.140.116.2	213.53.35.219	1:14:35 PM	1:14:54 PM	0:00:19.1	Not a call
86.140.116.2	213.53.35.219	1:14:54 PM	1:14:54 PM	0:00:00.0	Not a call
86.192.4.88	213.53.35.219	1:13:51 PM	1:13:51 PM	0:00:00.0	Not a call
2002:d9ac:11d4:0...	fec0::0004:020...	1:10:39 PM	1:10:39 PM	0:00:00.3	Not a call

Timing	
Start Time	3/6/2008 1:10:...
End Time	3/6/2008 1:13:...
Duration	0:02:58.9
Quality	
MOS Score	3.7
R-Factor	71.8
SIP	
Call ID	53B8695BDA3B...
Calling Party	

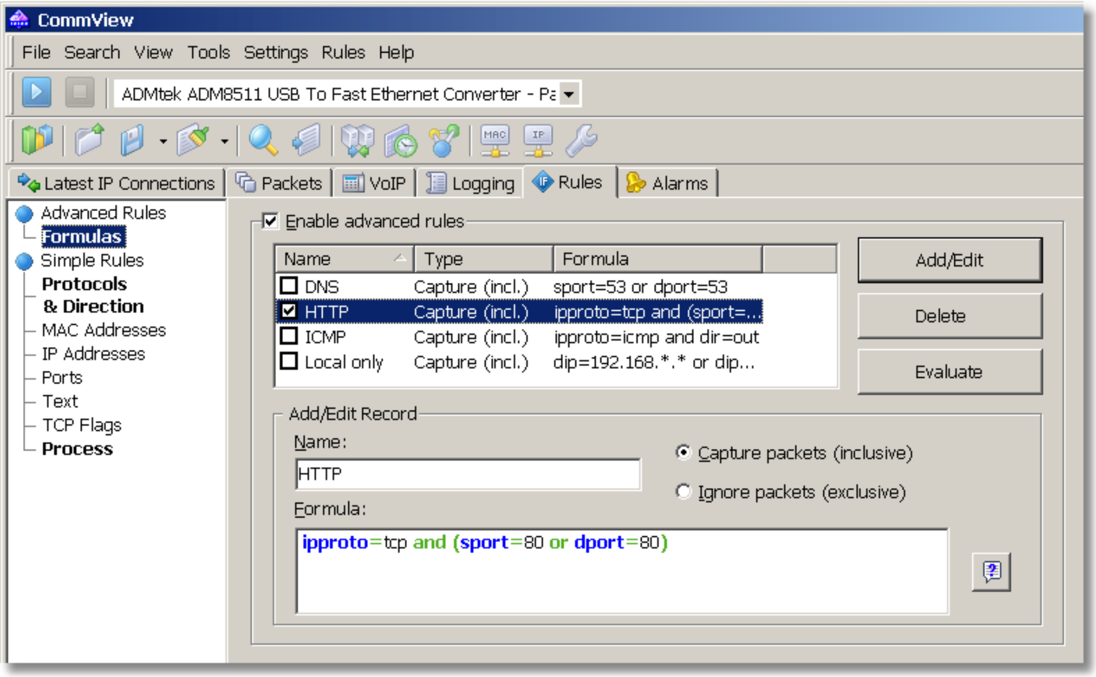
Operation	Request/Response
INVITE	INVITE sip:192.168.0.3
	100 Trying
	180 Ringing
	200 OK
	ACK sip:Username@192.168.0
	200 OK
	ACK sip:Username@192.168.0
BYE	BYE sip:Username@192.168.0
	200 OK
INVITE	INVITE sip:192.168.0.3

Using CommView, you can analyze signaling sessions and RTP streams in real time, watch the charts and diagrams to understand the quality problems that may affect your VoIP network (packet loss, jitter, or sequence errors), monitor MoS and R-factor for every call, and even listed to the actual calls. Yes, CommView can record and play back them for you.

Focusing on the Essentials

Using Advanced Filters

Exploring the network traffic may be difficult if the useful pieces of information are buried under countless unimportant connections and packets. If you are trying to focus on, say, troubleshooting an e-mail session, you probably don't want CommView to capture and display a few thousand packets related to a whole different FTP download that is going on simultaneously, probably not even on your own PC. The good news is that a good network analyzer allows you to use capturing rules (often called "filters"). By applying rules, you can filter out unimportant packets to focus on the essential ones. The **Rules** tab is the place where you can mange your capturing rules, and the **Advanced Rules** tab allows you to create very flexible formula-based filters:



☑ Enable advanced rules

Name	Type	Formula
☐ DNS	Capture (incl.)	sport=53 or dport=53
☑ HTTP	Capture (incl.)	ipproto=tcp and (sport=...
☐ ICMP	Capture (incl.)	ipproto=icmp and dir=out
☐ Local only	Capture (incl.)	dip=192.168.*.* or dip...

Name: HTTP

● Capture packets (inclusive)

○ Ignore packets (exclusive)

Formula: ipproto=tcp and (sport=80 or dport=80)

You are free to use other types of rules (Ports, Text, etc.), but the **Advanced** rules offer much more flexibility, so we'll use this type of rule in our example. To create a new rule, you need to first enter an arbitrary name in the **Name** field and then select the rule type: **Capture** or **Ignore**. The former will make CommView display only those packets that match your formula, while the latter will make CommView display all the captured packets except those ones that match your formula. Finally, you need to enter a formula describing your packet. Suppose that we want to capture HTTP traffic only.

As we mentioned above, the **Advanced Rules** chapter of the help file provides detailed information on the formulae syntax.

In this example, we're going to use an intuitively understandable formula to save time:

ipproto=tcp and (sport=80 or dport=80)

In human language, this means that we're interested in TCP packets going to or coming from port 80, i.e. the port used for HTTP connections. Now click **Add/Edit** and we're done! CommView will display only HTTP packets until you disable this rule by clicking on the check box next to its name. It’s as simple as that. Oh…and you can save rules to a file and load them from a file by using the **Rules** menu on the main window.

Moving On

We hope that this tutorial helped you to better understand this great tool that you have purchased or are planning to purchase. This tutorial is by no means a comprehensive manual. We just wanted to show that packet sniffing is fun, especially with CommView!

As you learn more about its functionality, network analysis and protocol decoding tasks will become easier to deal with. If you are into wireless networking, be sure not to miss out on the special wireless edition of this product, CommView for WiFi.

Visit us today at www.tamos.com for more information, excellent technical support, instant online ordering, and more!