Network Traffic Exploration Application

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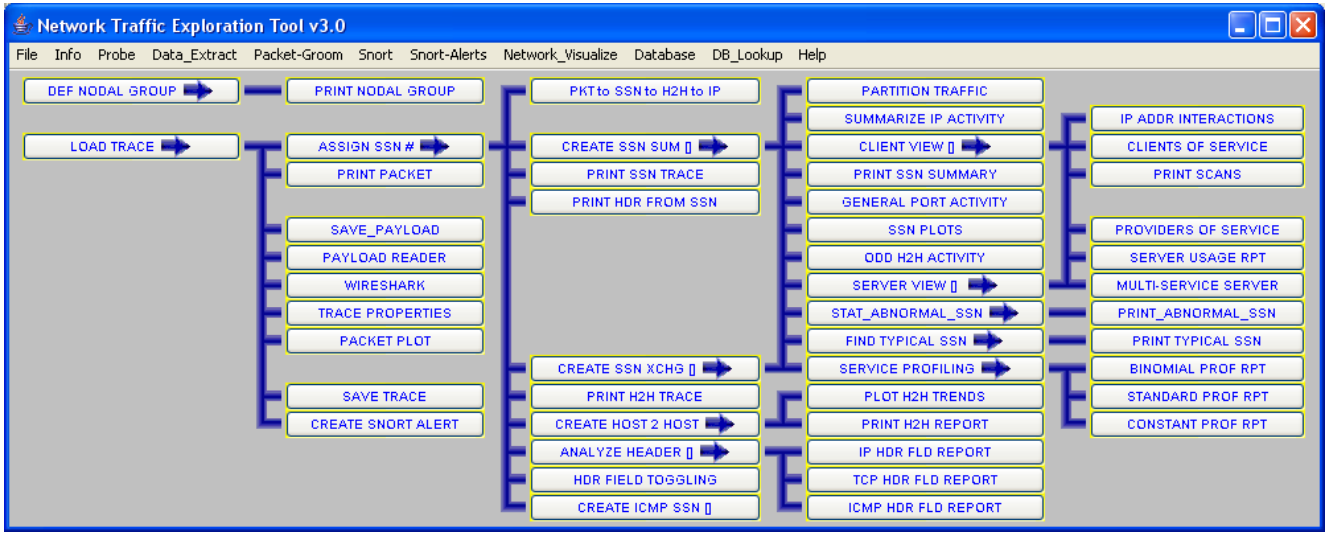
Introducing the NTE

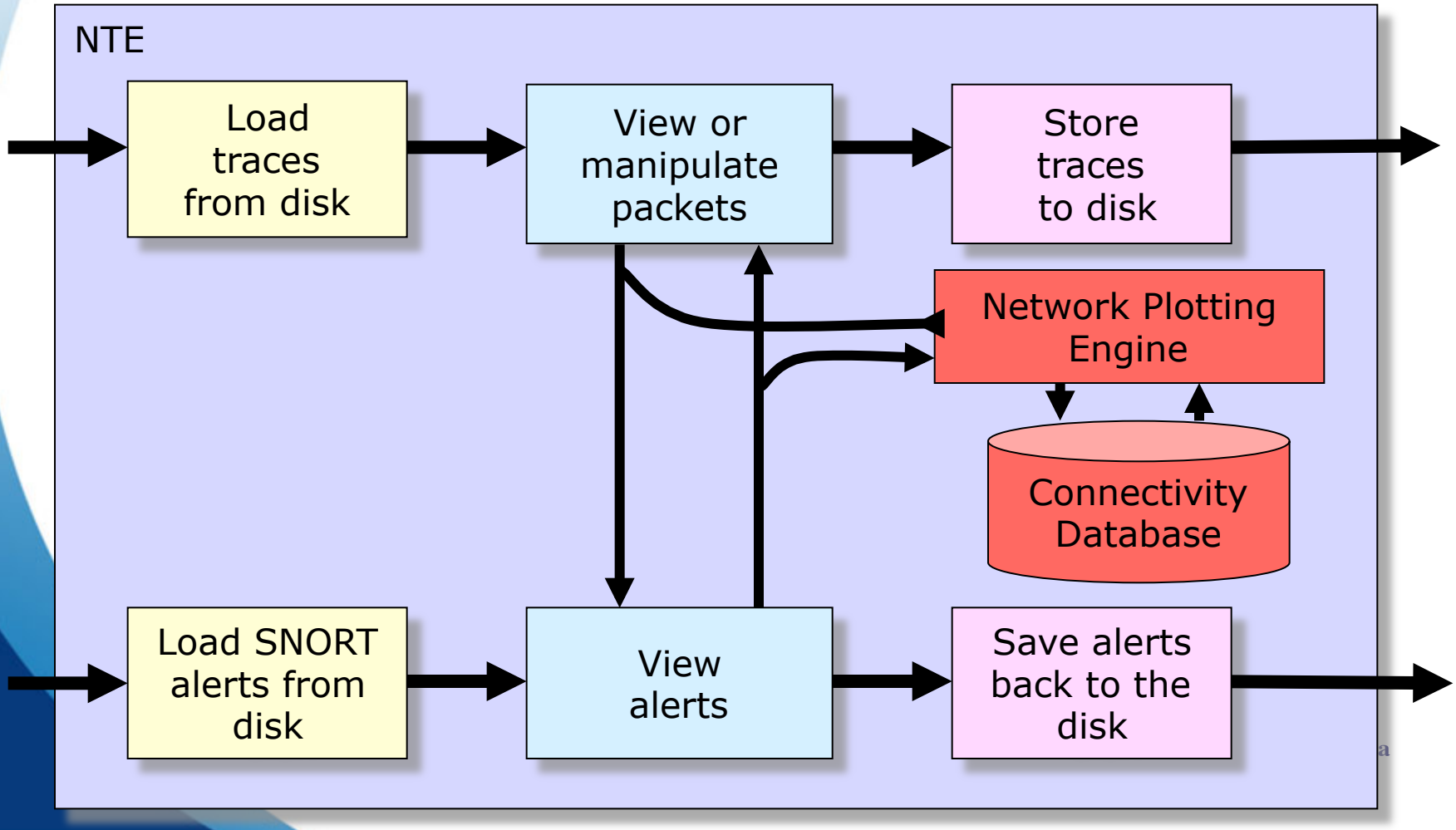
The Network Traffic Exploration (NTE) application allows the user to explore network traces and prototype new detection algorithms.

The NTE is useful for security analysts because of its varied and flexible presentation capabilities.



NTE Architecture

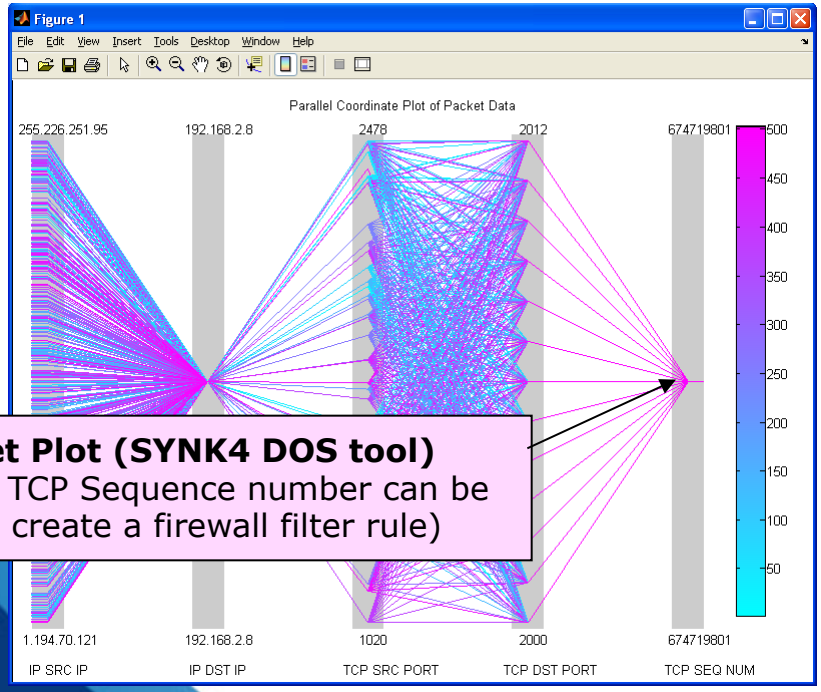
The NTE is a MATLAB application has been developed on top of an open library of packet analysis functions.



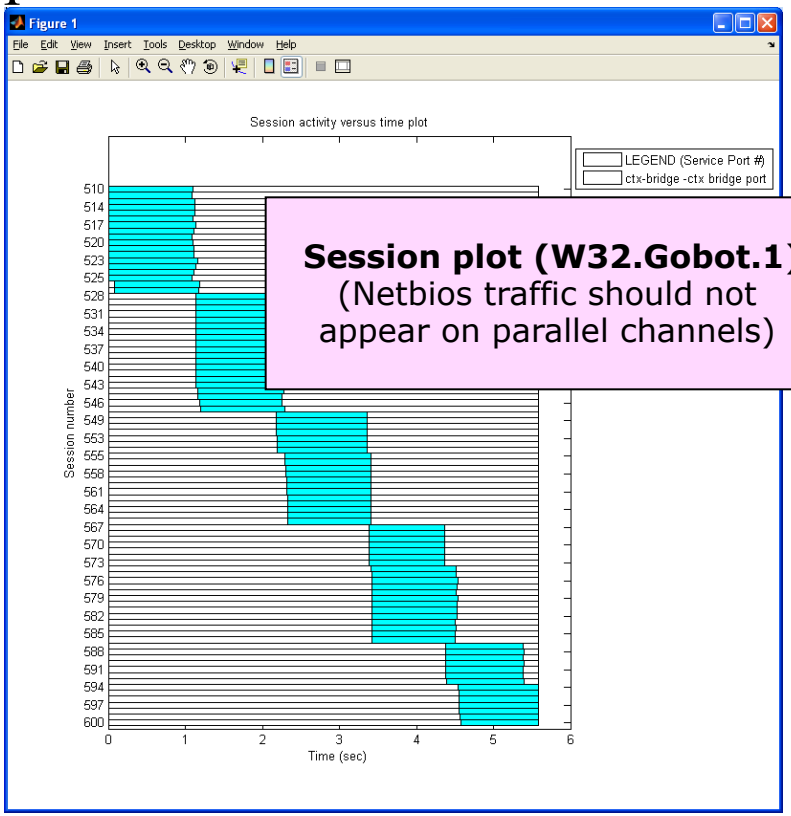
Loading and Viewing Packets

One or more traces can be loaded into the NTE and the packets can be selectively viewed .

The user can explore the data from both a packet, session or host-to-host perspective



Packet Plot (SYNK4 DOS tool)
(The fixed TCP Sequence number can be used to create a firewall filter rule)

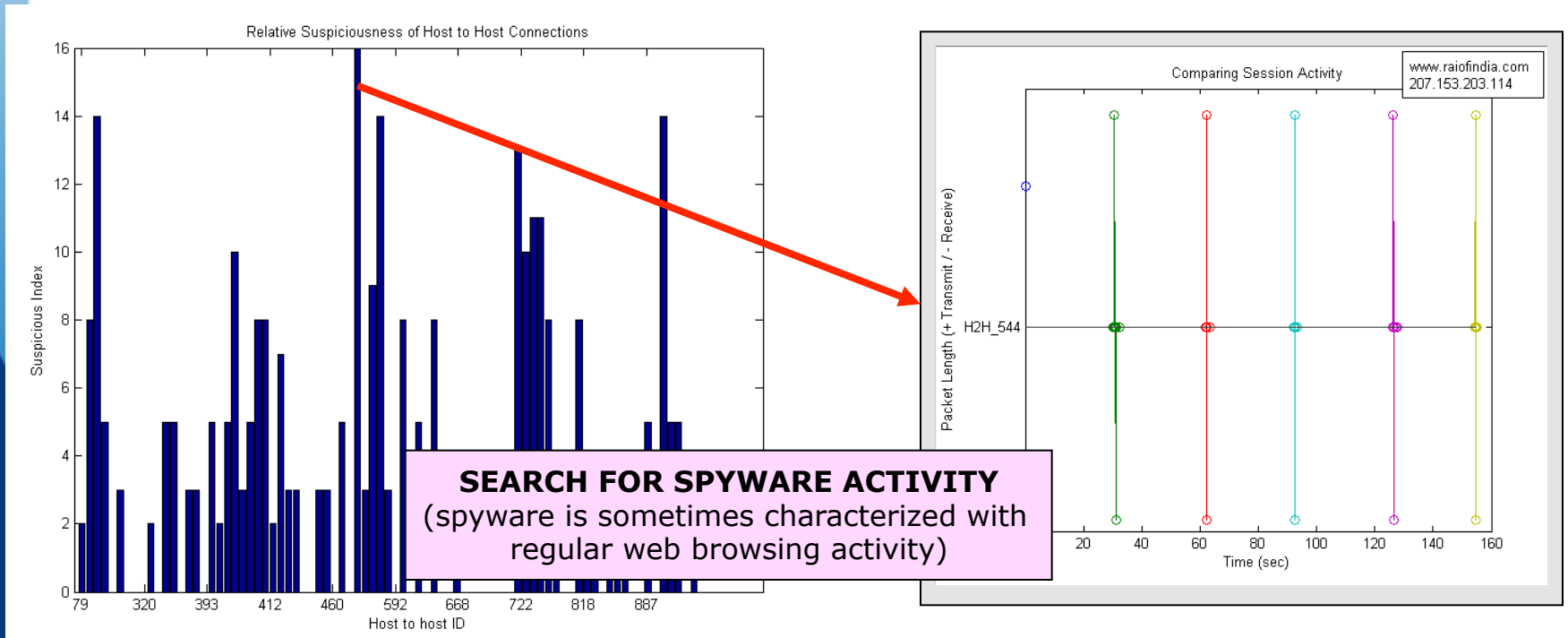


Session plot (W32.Gobot.1)
(Netbios traffic should not appear on parallel channels)

Evaluating A Situation

The NTE includes functions to help determine if a set of packets are "suspicious". Among these are:

- Heuristic Analysis
- Statistical Analysis
- Signature-Based

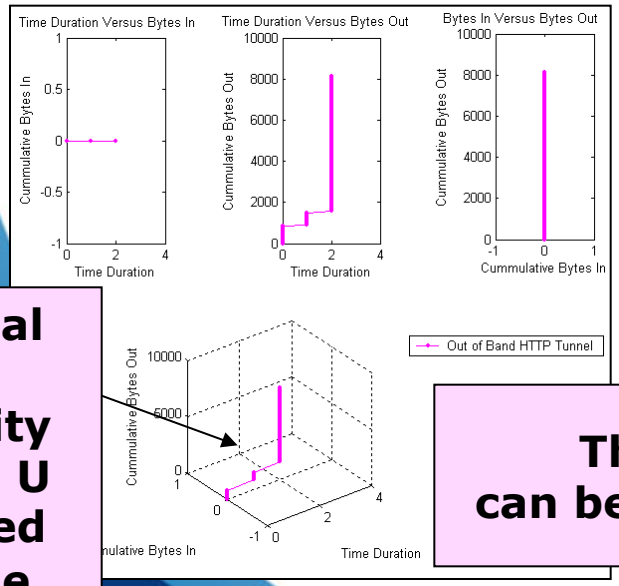


Automating Analysis and Recording An Investigation

Some events are true while others are false alarms.

The NTE has the ability to create a script on the fly to detect an attack or filter a false alarm.

The script's capability can be used to log the steps taken in performing an investigation.



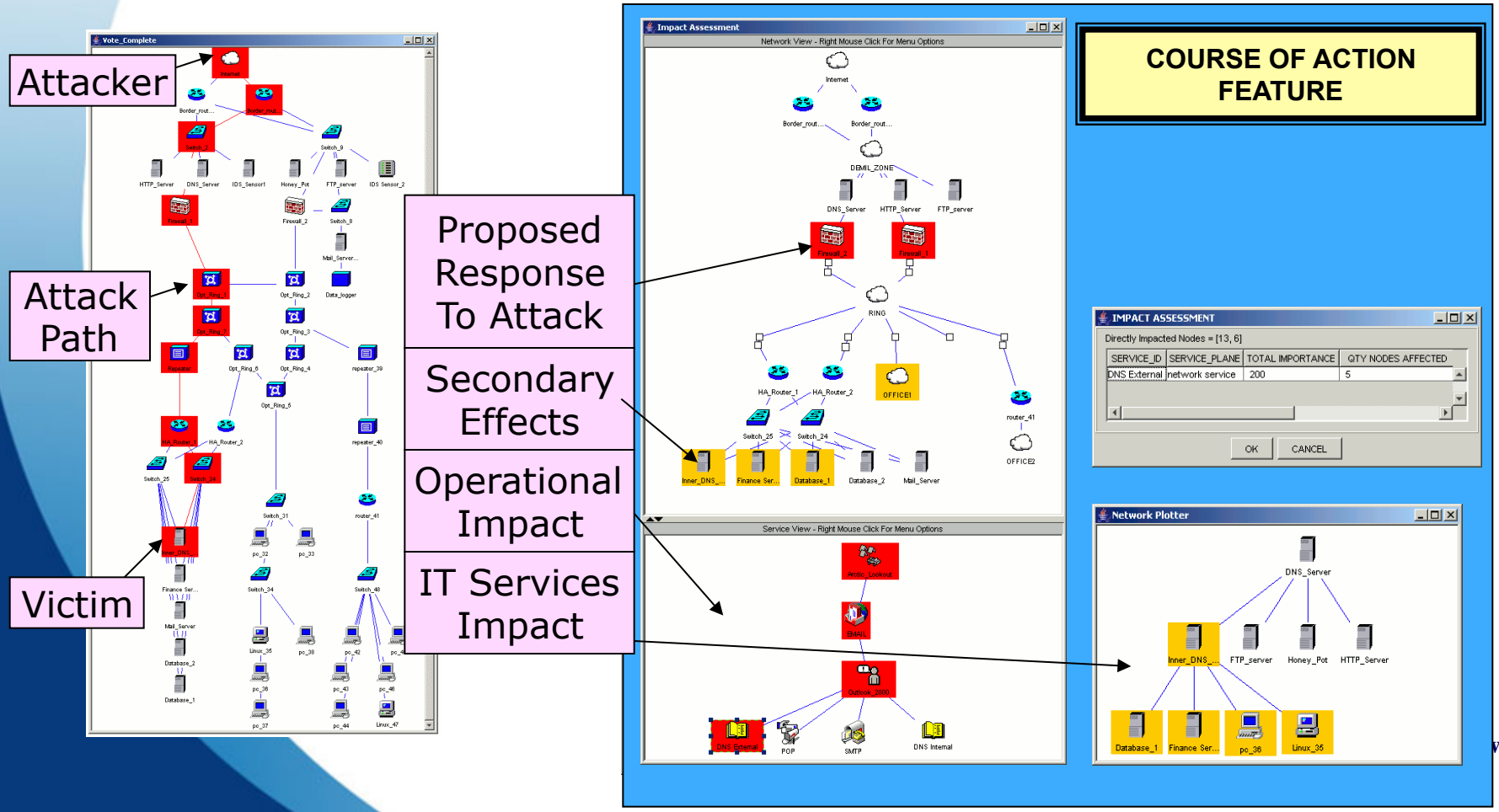

```
% Load the the PCAP trace array
%
[PKT_DATA,IP_OPT,TCP_OPT,PAYLOAD]=load_pcap_file_plus_ev('C:\DATA \good_bad_2.dmp',...
     'TRACE_NUMBER','','BPF','ip');

% Assign session id numbers and host-2-host id numbers to the trace array
%
PKT_IDX=assign_session_number(PKT_DATA,PAYLOAD);

% Create the host to host array
%
[H2H_SUM,H2H_LIST]=create_h2h_array(PKT_DATA,PKT_IDX);

% Print a summary of the host to host connections
% [the filter embedded this is the print function also detects the HTTP tunnel].
%
[SSN_NUM,H2H_NUM]=print_host_to_host_details(H2H_SUM,H2H_LIST,'ALL',5,...
   'TTL_PKTS=1&SERV_PORT=80&PROTOCOL=6');

% Convert host to host connections back to packets
%
[PKT_REF_NUM]=find_pkt_from_h2h(PKT_IDX,H2H_NUM);
```

Typical http activity has a U shaped profile

This out-of-band HTTP tunnel can be detected by the adjacent script

Relating This Small Event To The Bigger Picture

Packet events and exchanges can be overlaid onto network diagrams.

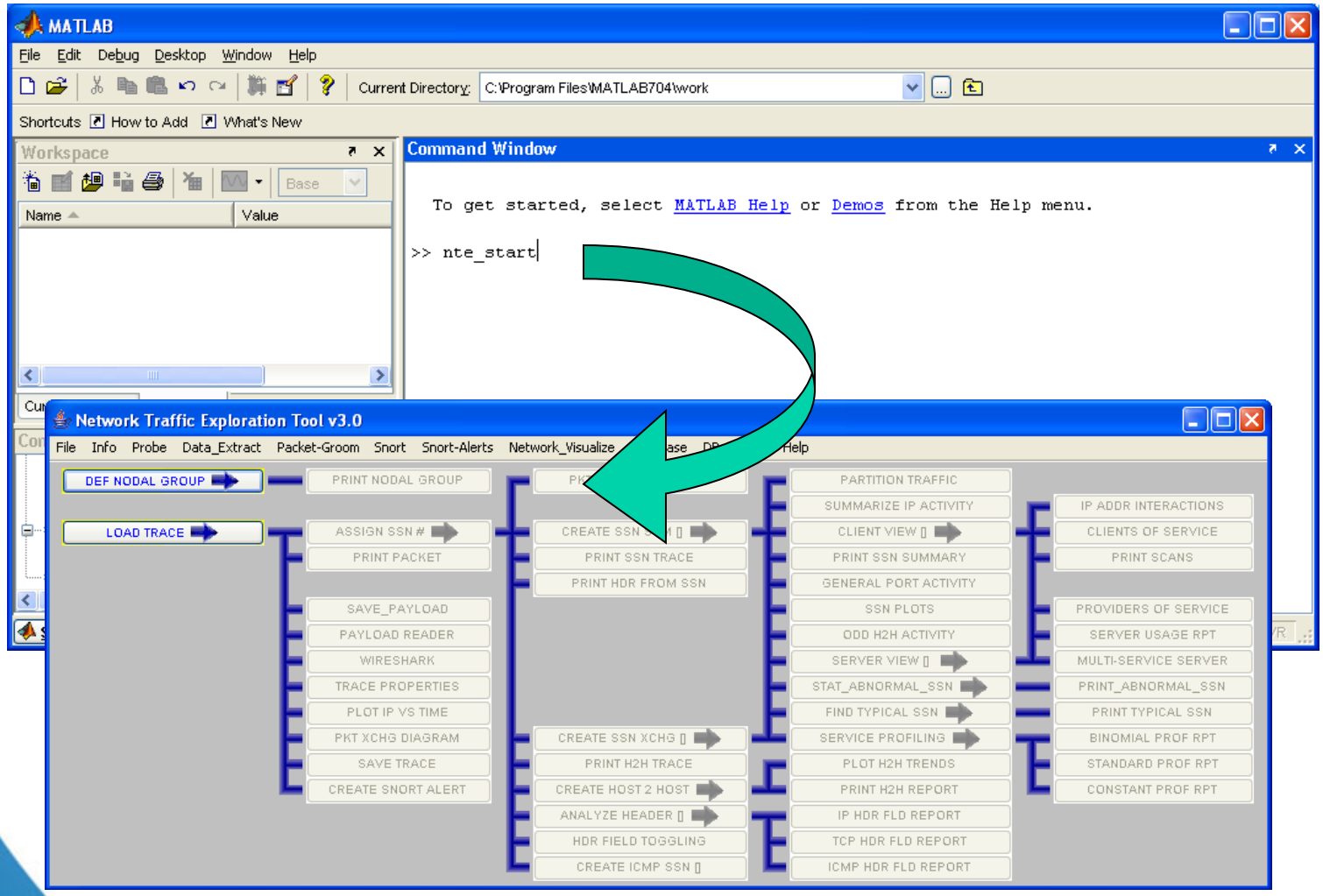


DEMONSTRATION

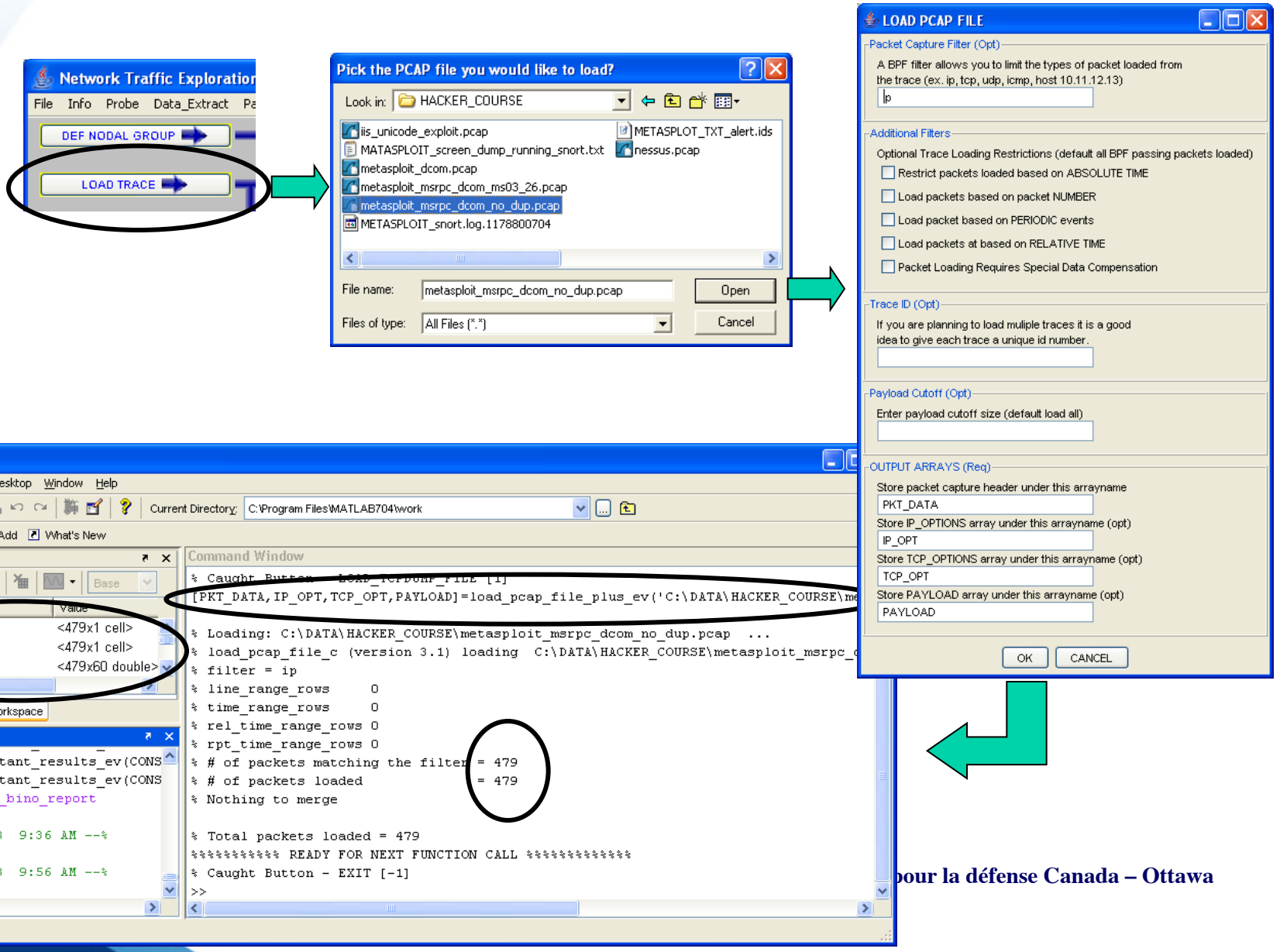
Starting Premise

You are handed a trace containing suspicious traffic.

Starting the NTE



Load Packets Associated with Alert

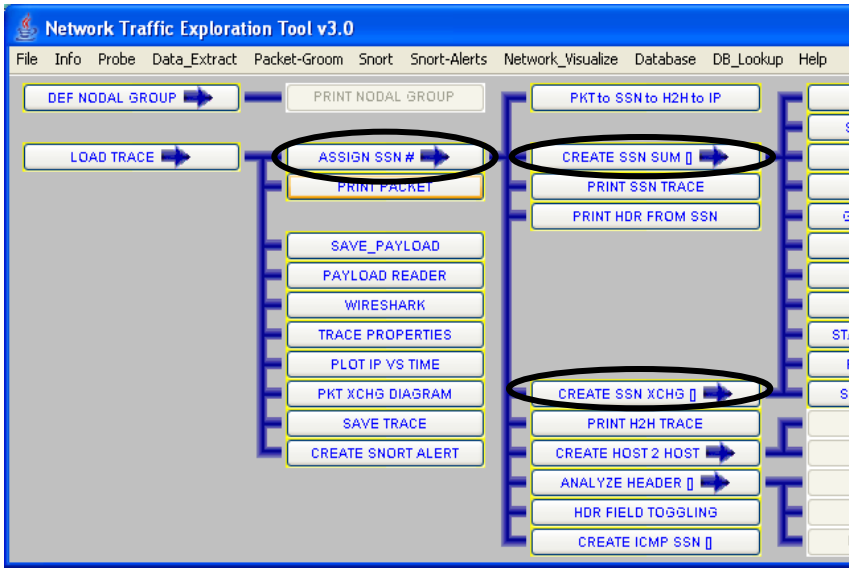


Steps Not Shown

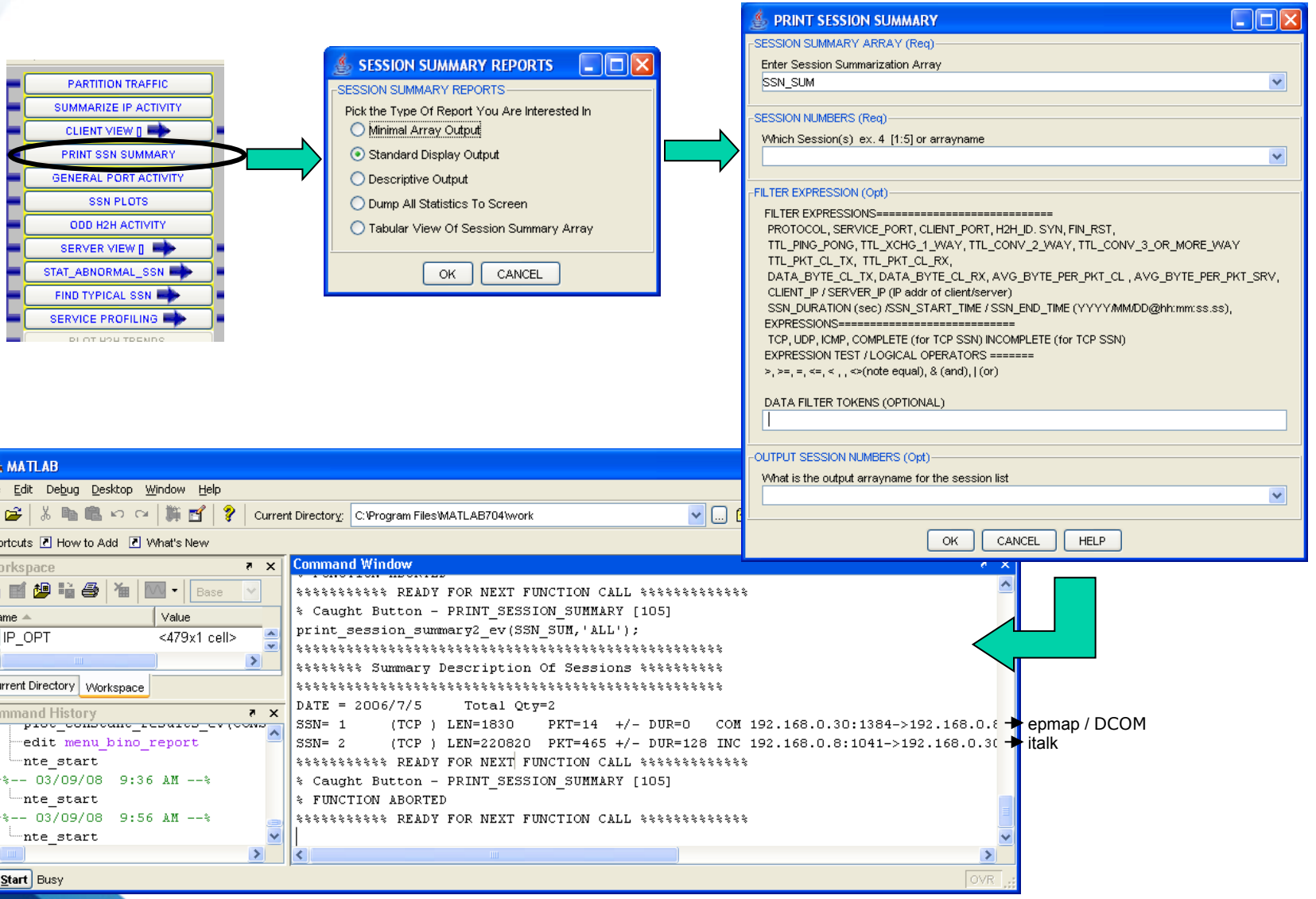
Assign Session Number To Each Packet In Trace

Summarize each session using 90 different statistical measurements

Summarize The Session Information Exchange

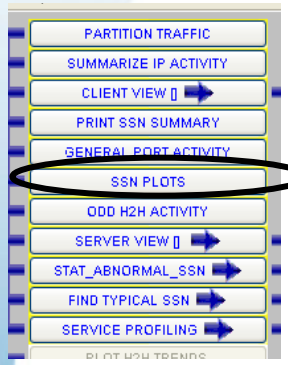


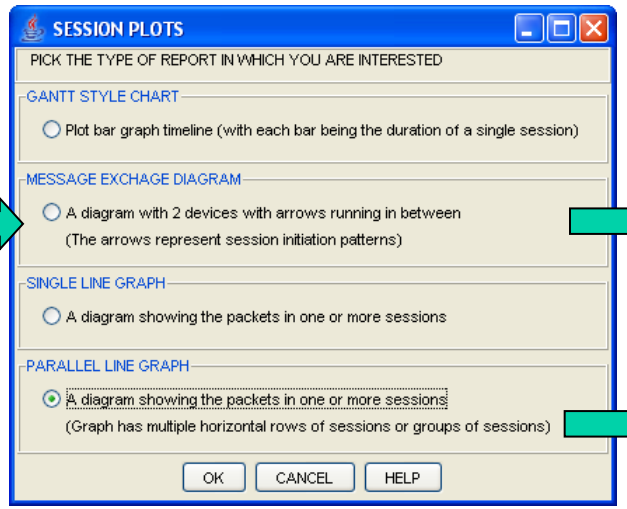
View Summary Of Trace Session Activity

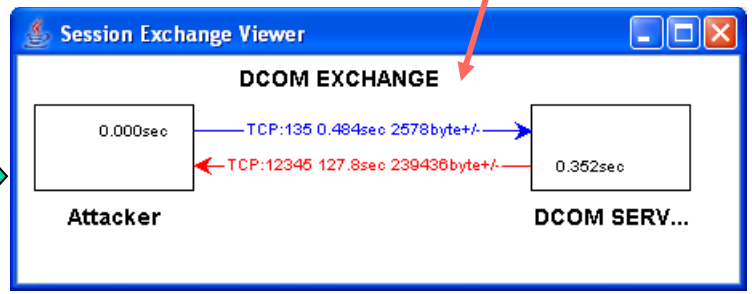


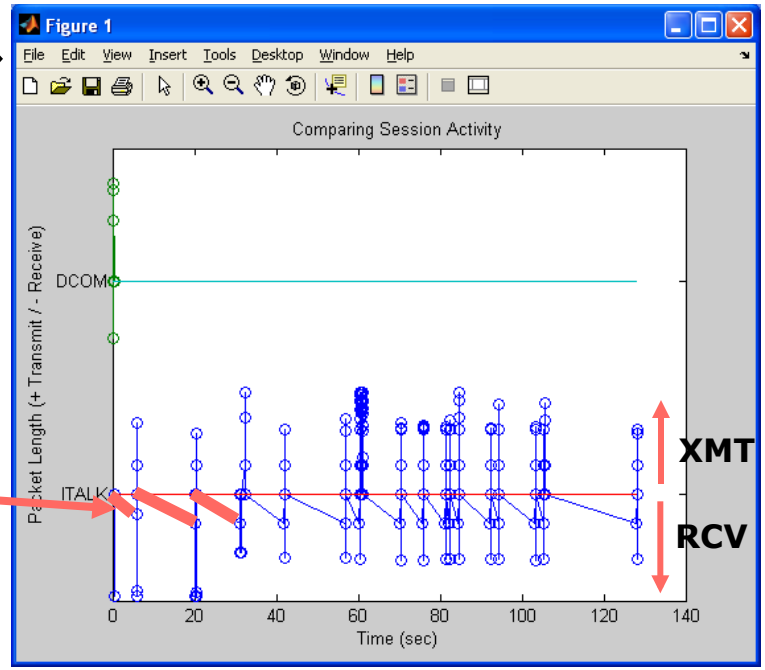
Plot Session Activity

Note the change in direction









Note the silence is broken in one direction

Steps Not Shown

Convert Session #1 Into A List of Packets

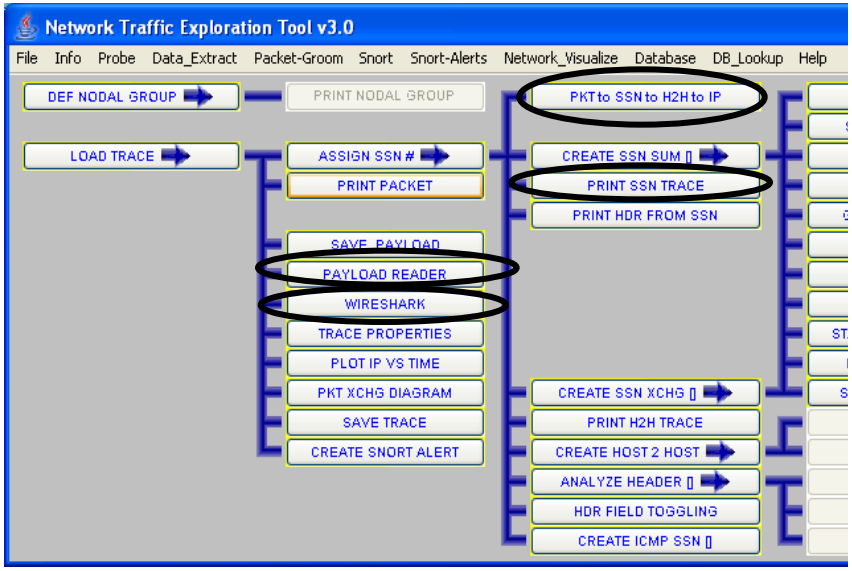
View Packet In Wireshark

✗ **Wireshark cannot decode the protocol**

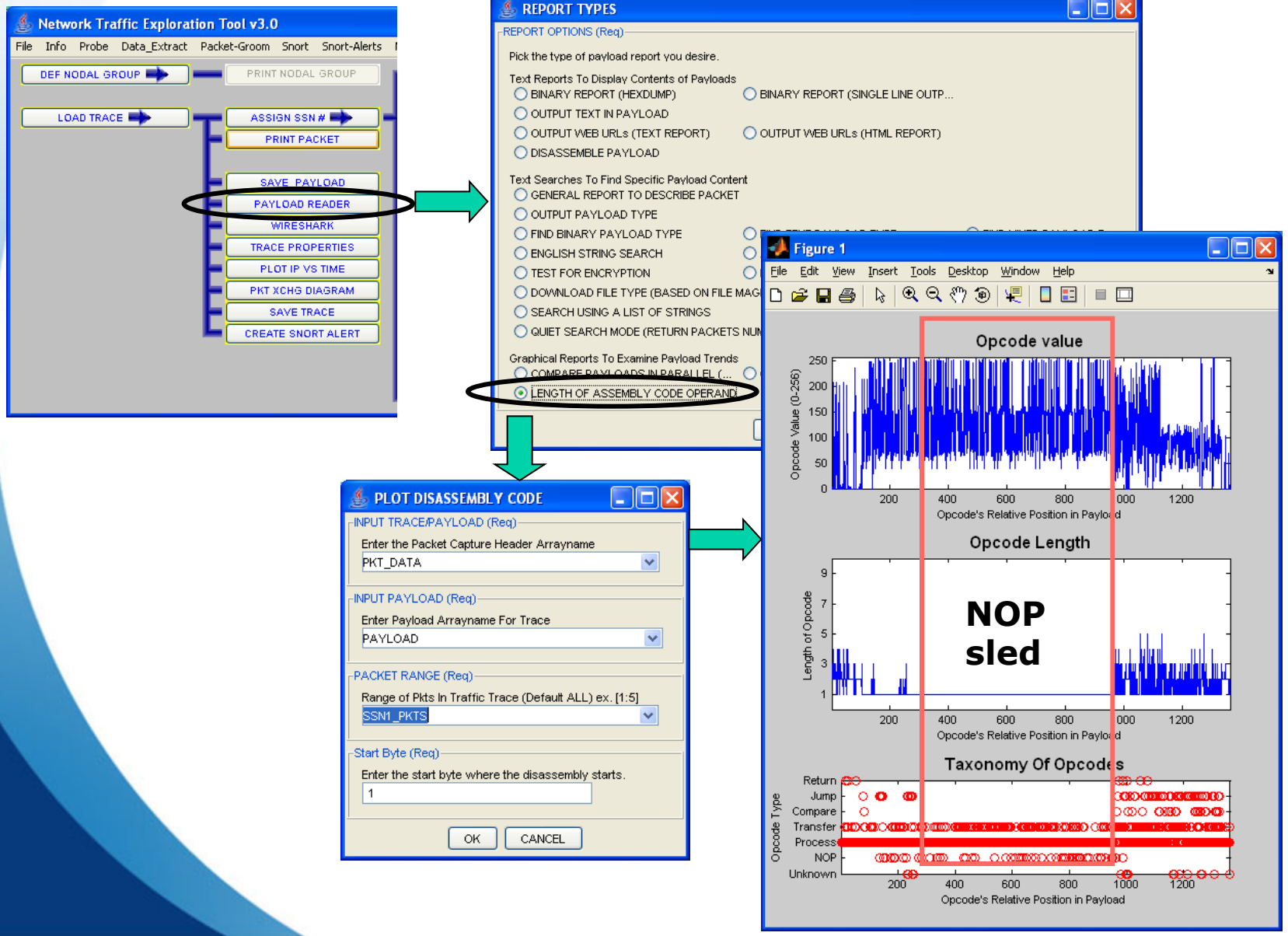
Payload Type Analysis

✓ **Payload is binary but not random**

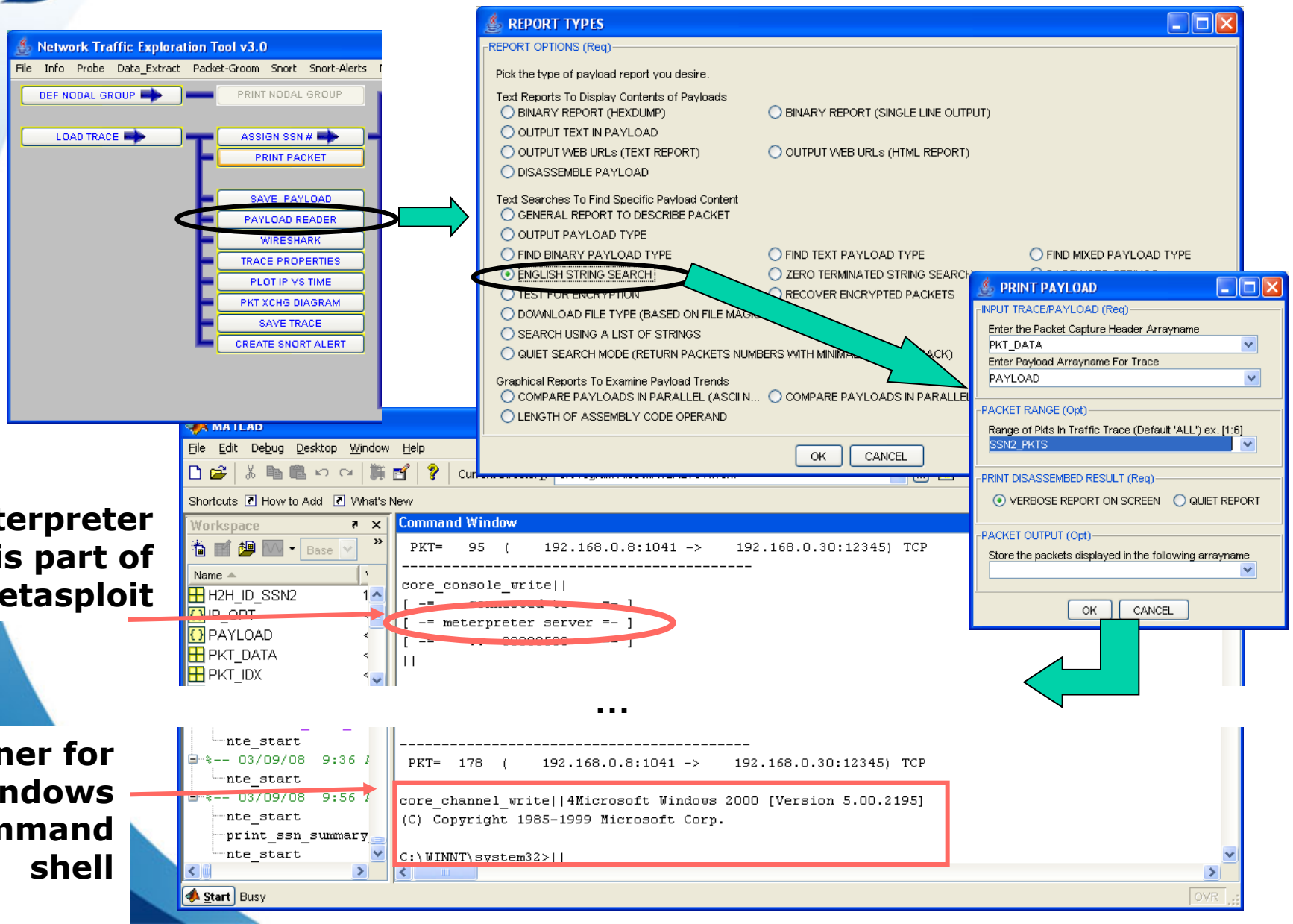
Isolate All Packets In Session #1 Running From Client To Server



Plot Payload Bytes Based On Machine Language Opcodes



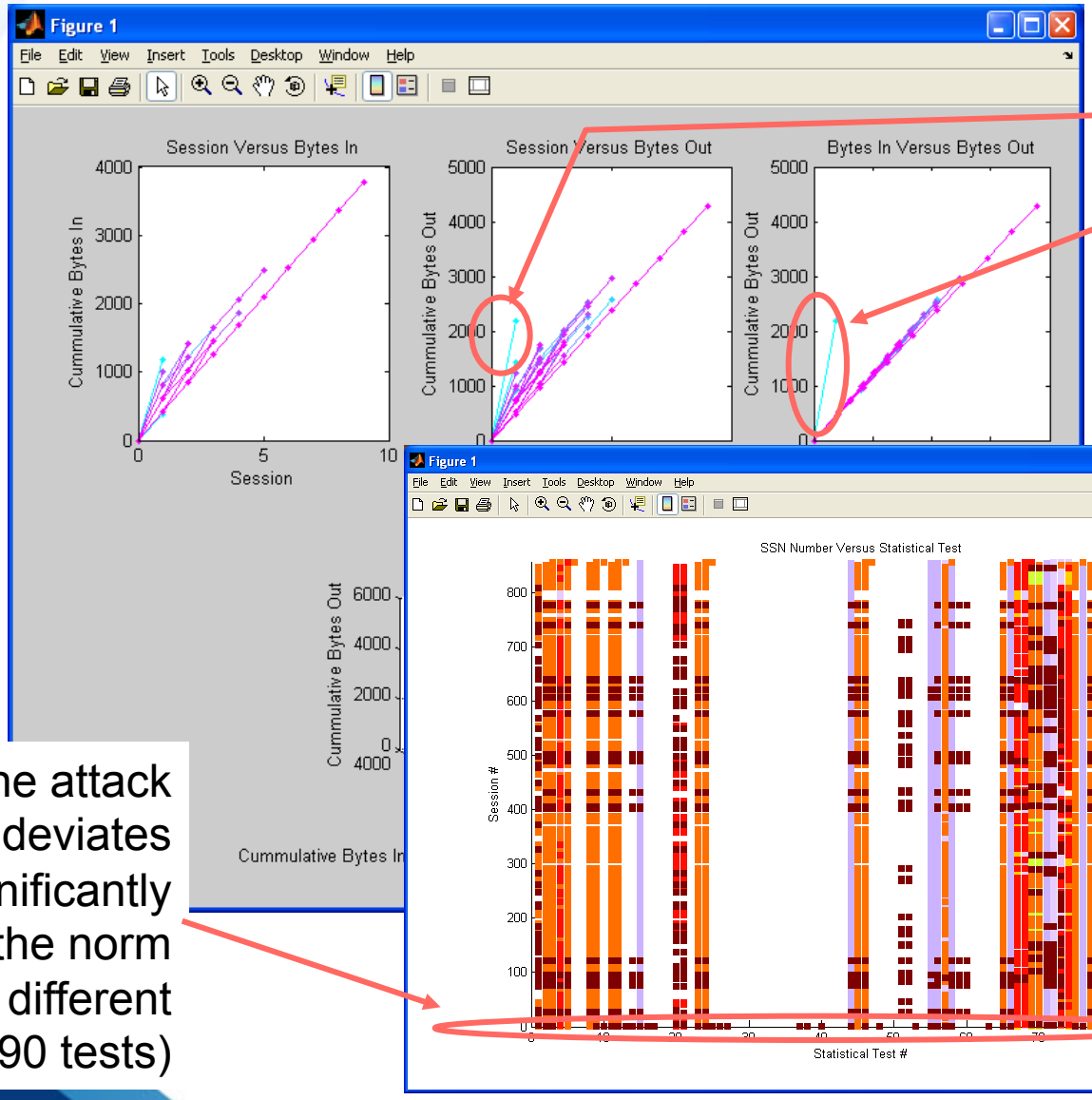
Search For English Strings In Packets



Meterpreter is part of Metasploit

Banner for windows command shell

Statistical Detection of the Attack



The DCOM Attack Session

The attack session deviates significantly from the norm (in 37 different out of 90 tests)

Closing Remarks

Key benefits of NTE

- **Flexible analysis of security events and network based attacks**
- **Broad range of features (300)**
- **Scripting capability**

For more information about the tool you can contact.

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