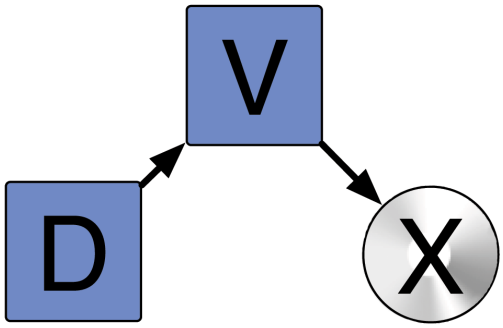
DAVIX



The Data Analysis and Visualization Linux®

Version 1.0.1

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1. DAVIX - Visualize Your Logs!

1.1. Introduction

Need help understanding gigabytes of logs? Your OS performance metrics do not make sense? You want to analyze your SAP user permissions? Then DAVIX, the live CD for visualizing IT data, is your answer!

DAVIX - the Data Analysis & Visualization Linux® - brings the most important free tools for data processing and visualization to your desk. There is no hassle with installing an operating system or struggle to build the necessary tools to get started with visualization. You can completely dedicate your time to data analysis.

The DAVIX CD is based on SLAX 6.0.x[1] by Tomáš Matějíček and features broad out-of-the-box hardware support for graphic cards and network adapters. SLAX is based on Slackware and follows a modularized approach. Thus, the SLAX ISO image can easily be customized for various purposes. It can even be installed on USB sticks and provide you with mobile analysis capabilities.

The product is shipped with a comprehensive manual that gives you a quick start for all tools and provides information on how-to tailor DAVIX to your needs. All tools are accessible through the KDE start menu and accompanied with links to external manuals and tutorials. Therefore, all information to get started with the tools is available at a click of a button.

DAVIX is also part of Raffael's upcoming book *Applied Security Visualization* that will be published by Addison Wesley Professional[2].

1.2. Roadmap

The first release of DAVIX is just the start. In the future, we would like establish DAVIX as the number one choice for log analysts. In particular we will improve following areas:

- More parser support for specific log formats,
- Data format converters for the visualization tools,
- More visualization tools,
- Support for distributed log processing,
- Integrated UI that will allow easy orchestration of the different tools.

[1] SLAX: http://www.slax.org/
[2] Applied Security Visualization: http://www.informit.com/store/product.aspx?isbn=0321510100

2. Quick Start Guide

Starting to use DAVIX is as simple as counting from 1 to 4:

1. Download the ISO image,
2. Burn it onto a CD-ROM or DVD,
3. Boot the CD on your PC,
4. Analyze your data.

2.1. Download

The DAVIX ISO image can be downloaded from several locations around the world. Please select one of the mirrors closest to you. Since web browsers on occasion corrupt large downloads, we recommend using *wget*[3] for downloading the ISO.

Main Server:

- Switzerland: http://82.197.185.121/davix/release/davix-1.0.1.iso.gz

Mirrors

- Switzerland: ftp://mirror.switch.ch/mirror/DAVIX/davix-1.0.1.iso.gz
- Germany: http://bastard.codenomad.com/davix/davix-1.0.1.iso.gz
- United States: http://www.noaccess.com/davix/davix-1.0.1.iso.gz
- United States: http://www.geekceo.com/davix/davix-1.0.1.iso.gz
- United States: http://depot.unixfoo.ch/davix/davix-1.0.1.iso.gz

As a nice side effect of using wget, you can resume downloads by using the *-c* command line option when the connection got interrupted:

```
wget -c http://mirror.foo.bar/ davix-1.0.1.iso.gz
```

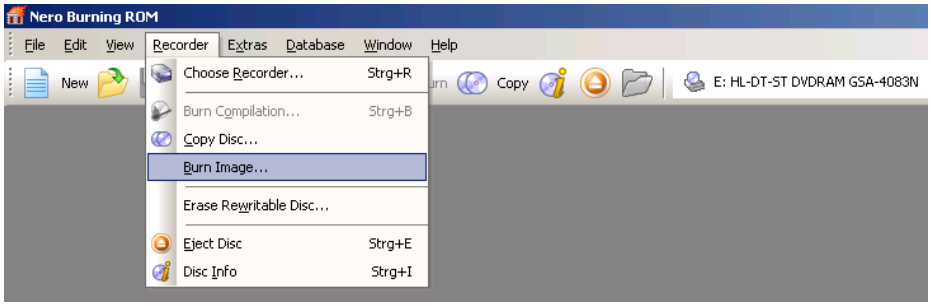
After download check the size and the integrity[4] of the ISO image. The MD5 hash and the file size are published on the DAVIX homepage[5].

[3] For Win32 wget can found as part of the GNU utilities for Win32: http://unxutils.sourceforge.net/
[4] The UNIX tool md5sum can be used to calculate the MD5 hash. The utility is also part of the GNU utilities for Win32.
[5] DAVIX Homepage: http://davix.secviz.org/

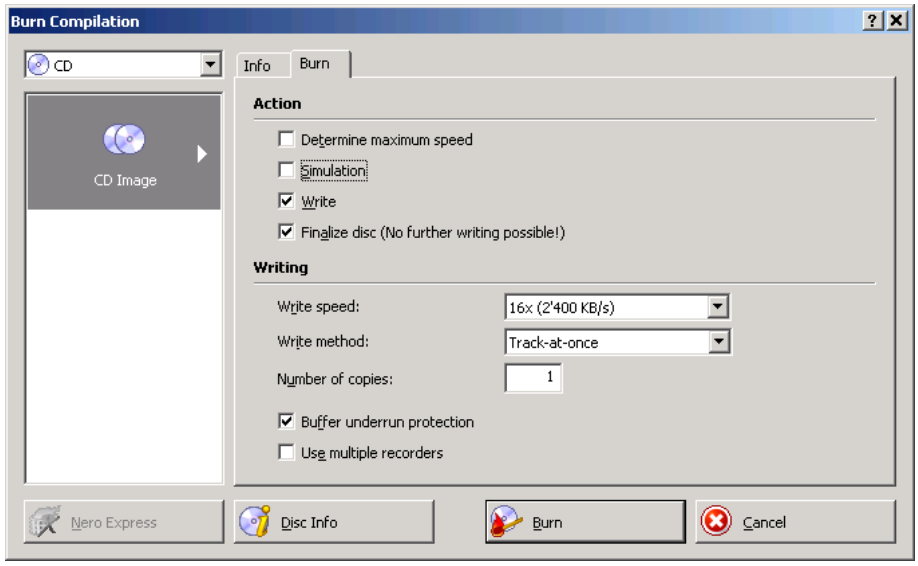
2.2. Burn

Utilize any CD or DVD burning software of your liking and burn the ISO image on to a CD-ROM or DVD. The following screenshots show how to use *Nero Burning ROM*[6] for this task.

- Open Nero Burning ROM from the Windows start menu.
- In the Windows menu choose *Recorder\Burn Image...* and select in the file dialog the ISO image you want to burn.



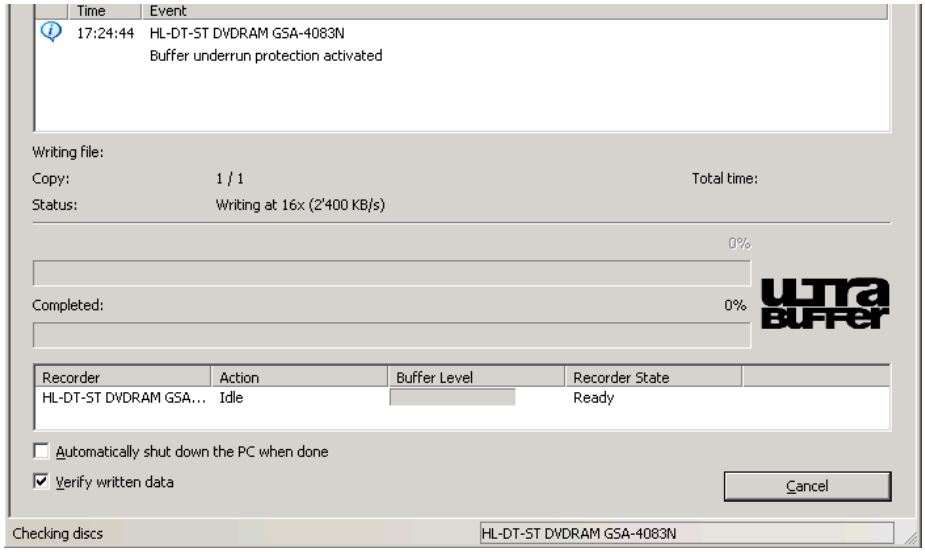
- To achieve highest compatibility with CD/DVD readers, we recommend burning with the slowest speed possible.



- Select the burn options and press the button *Burn*.

[6] Nero Burning ROM: http://www.nero.com/

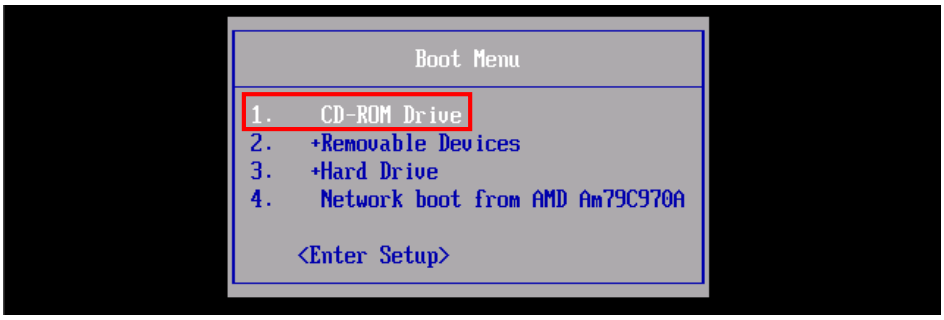
- When the burning progress dialog is shown, select the option *Verify written data*.



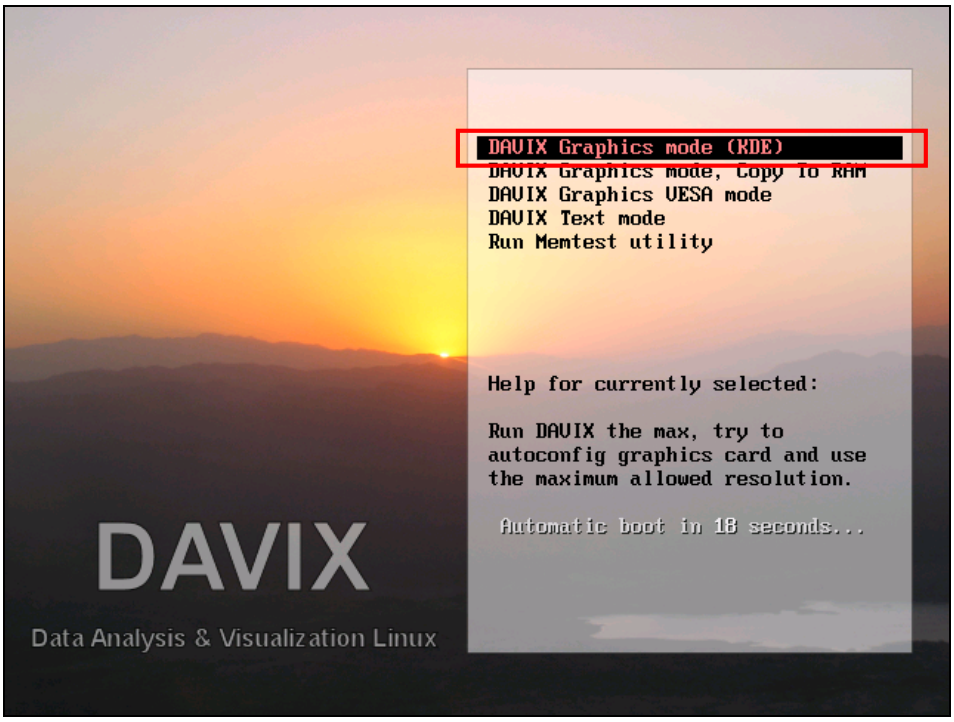
- The CD or DVD will now be burned. This can take a while to finish.

2.3. Boot

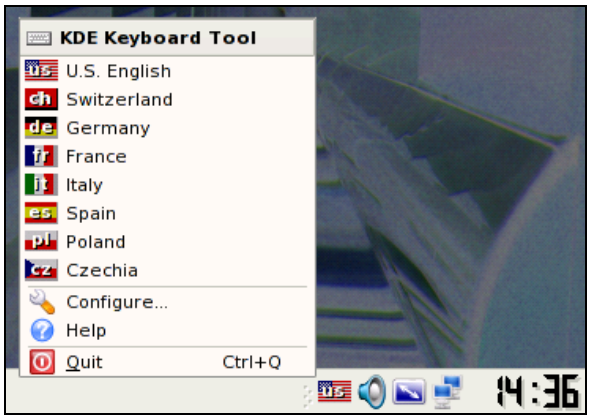
After CD creation reboot the computer. On some systems the BIOS is configured to boot directly from CD or DVD when a disk is located in the drive. On other systems it might be necessary to press a key during the BIOS boot screen for a displaying a boot menu, e.g. on a Dell Inspiron 6000 or Lenovo ThinkPad T60 you have to press *F12*. If you do not like the default boot behavior you can change it in the BIOS setup menu.



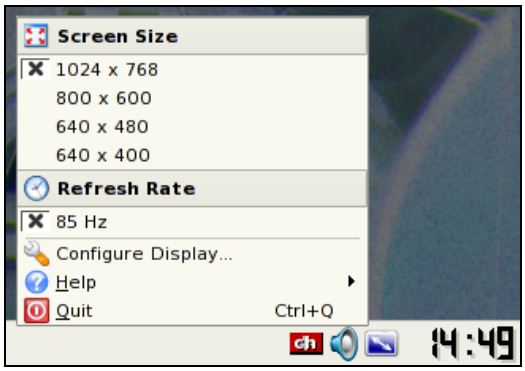
When DAVIX starts a boot menu is displayed. Here you can select the boot option. In most cases the first option *DAVIX Graphics mode (KDE)* will be the one to go for. It will take you directly to the KDE desktop.



To change the keyboard layout in KDE, you have to right click on the US icon in the lower left corner of the system tray and either select on of the predefined layouts in the menu or use *Configure...* to set any other layout.

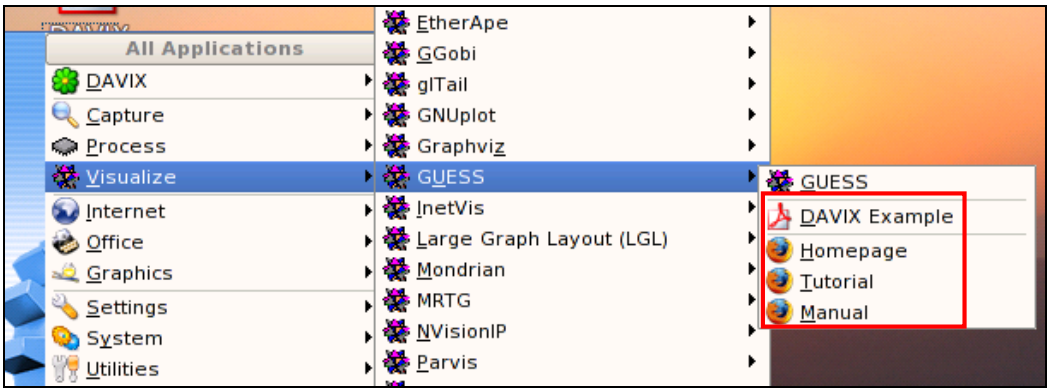


To switch between different screen resolutions, you can right click on the screen icon and select the size you like to use.



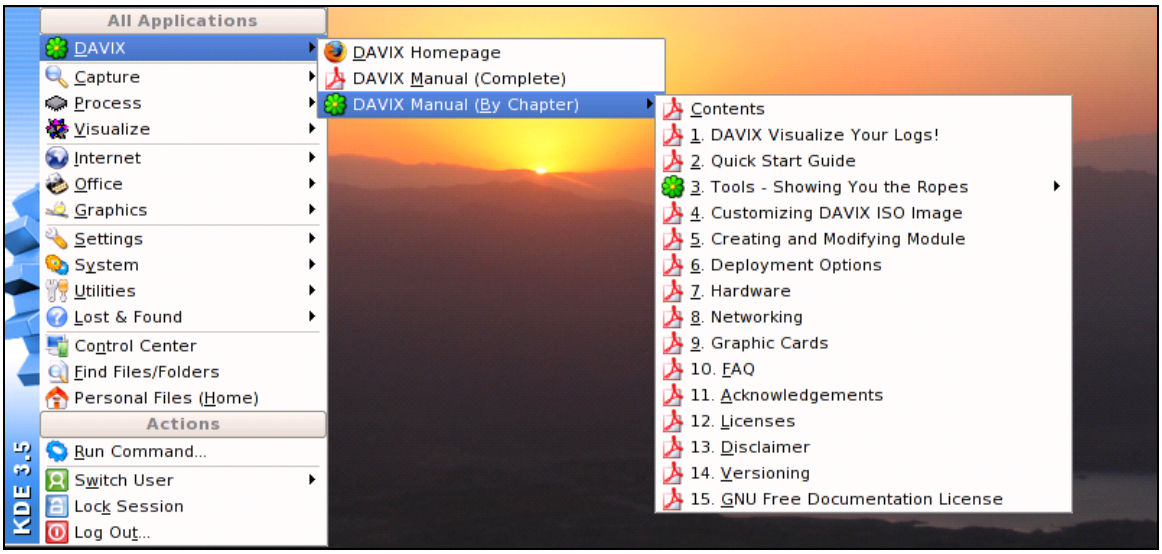
2.4. Analyze

To find out what tools are available on DAVIX, take a look at the KDE start menu. The top four entries contain the modules provided by DAVIX. To simplify documentation access we have provided the links to the tool homepages and tutorials in the KDE start menu. Additionally, each tool menu offers direct access into DAVIX manual for a quick start example.

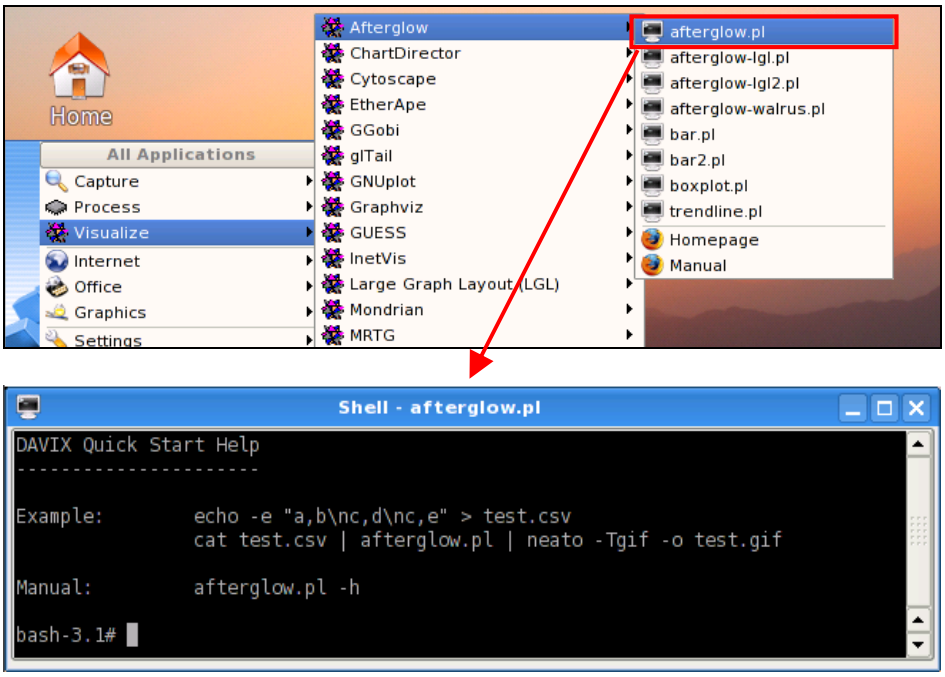


You can access the manual through the desktop short cut:

Alternatively, you can access the manual chapter wise through the KDE start menu:



If you see a console symbol next to the tool it means that selecting the menu will cause a console to open and some form of help is shown. The tool itself is not executed. You will be required to do that yourself.



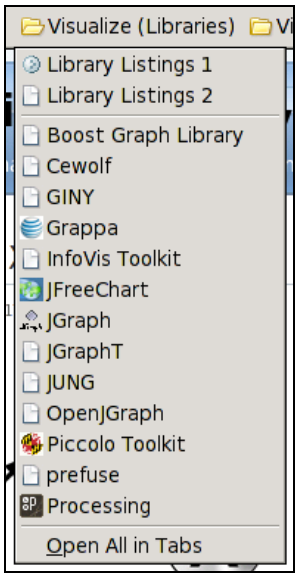
It is your turn now to find out what all these tools can do and start analyzing your logs. If you do not know what you can analyze or visualize, check the tool tutorials or get inspired by visiting secviz.org[7]. We have included usage examples for each of the tools in the chapter Tools - Showing You the Ropes.

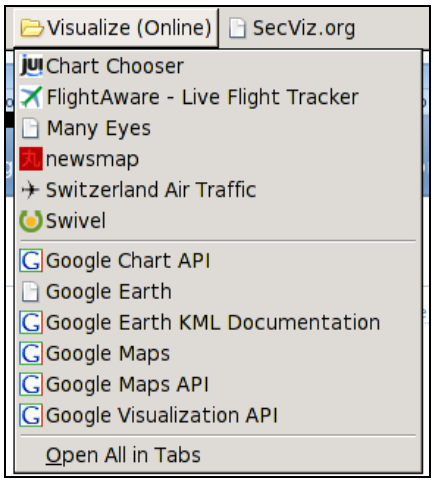
[7] SecViz - Security Visualization: http://www.secviz.org/

2.5. What to Do Next?

The chapter Tools - Showing You the Ropes gives an overview of the most important tools found on the DAVIX CD as well as a quick start example for each tool.

Apart from the tools on the CD, Firefox contains bookmarks to online tools for visualization as well as for libraries to write your visualization tools.





If you are requiring information on an intermediate level, we recommend reading Raffael's book *Applied Security Visualization*[8]. A rough cuts version of the book is available on the Internet[9]. The book gives a very good introduction to visualization and introduces a use-case driven approach. It offers various case examples and shows you hands-on how to get from the log file to the visualization. Another good book on the topic is Greg Conti's book *Security Data Visualization*[10]. It shows you many samples on how security data can be visualized.

Most likely you will stumble over a thing or two in DAVIX that you would like to tweak. Or some of your favorite tools are not included with DAVIX. Well then it is time to read the following chapters Customizing the DAVIX ISO Image and Creating and Modifying Modules.

To get informed about the newest development of DAVIX, we recommend you registering with the Google Group *davix-announce*[11]. For support questions, register with Google Group *davix-support*[12].

[8] Applied Security Visualization: http://www.informit.com/store/product.aspx?isbn=0321510100
[9] Rough Cuts Version of the book Applied Security Visualization: http://safari.informit.com/9780321585530
[10] Security Data Visualization: http://www.amazon.com/Security-Data-Visualization-Greg-Conti/dp/1593271433?ie=UTF8&s=books&qid=1183891229&sr=8-1
[11] DAVIX Announcement Google Group: http://groups.google.ch/group/davix-announce
[12] DAVIX Support Google Group: http://groups.google.ch/group/davix-support

3. Tools - Showing You the Ropes

The important tools in DAVIX are organized in three categories depending on their use within the analysis process:

- Capture (C)
- Process (P)
- Visualize (V)

Some tools have the ability to cover several parts of the analysis process. In the following chapters the tool and its categories are noted in the chapter title.

All tools described in this manual are accessible through the system PATH. Therefore it is generally not required to know the install location. To run a tool open a console and then enter the first character of the tool's name and then press the *tabulator* key for auto completion.

```
root@slax:~# ru<TABULATOR>
ruby            rumint          run-with-aspell
rubyforge       run-parts       runlevel
```

The entry point binaries of most tools are installed in */usr/local/bin*. For others see the section *important install locations* in the following tool chapters.

3.1. AfterGlow (PV)

Purpose

- Tool to convert CSV input to a DOT graph description. AfterGlow takes a configuration file that configures how the nodes and edges are represented in the DOT file. The DOT file can then be graphed via Graphviz.
- In addition to the main tool, AfterGlow ships a set of tools to convert CSV data into data formats that can be used with other visualization tools.
- Includes capper.pl script from Raffael Marty's book "Applied Security Visualization".

Links

- Homepage http://afterglow.sourceforge.net/
- Manual http://afterglow.sourceforge.net/manual.html

Important installation locations

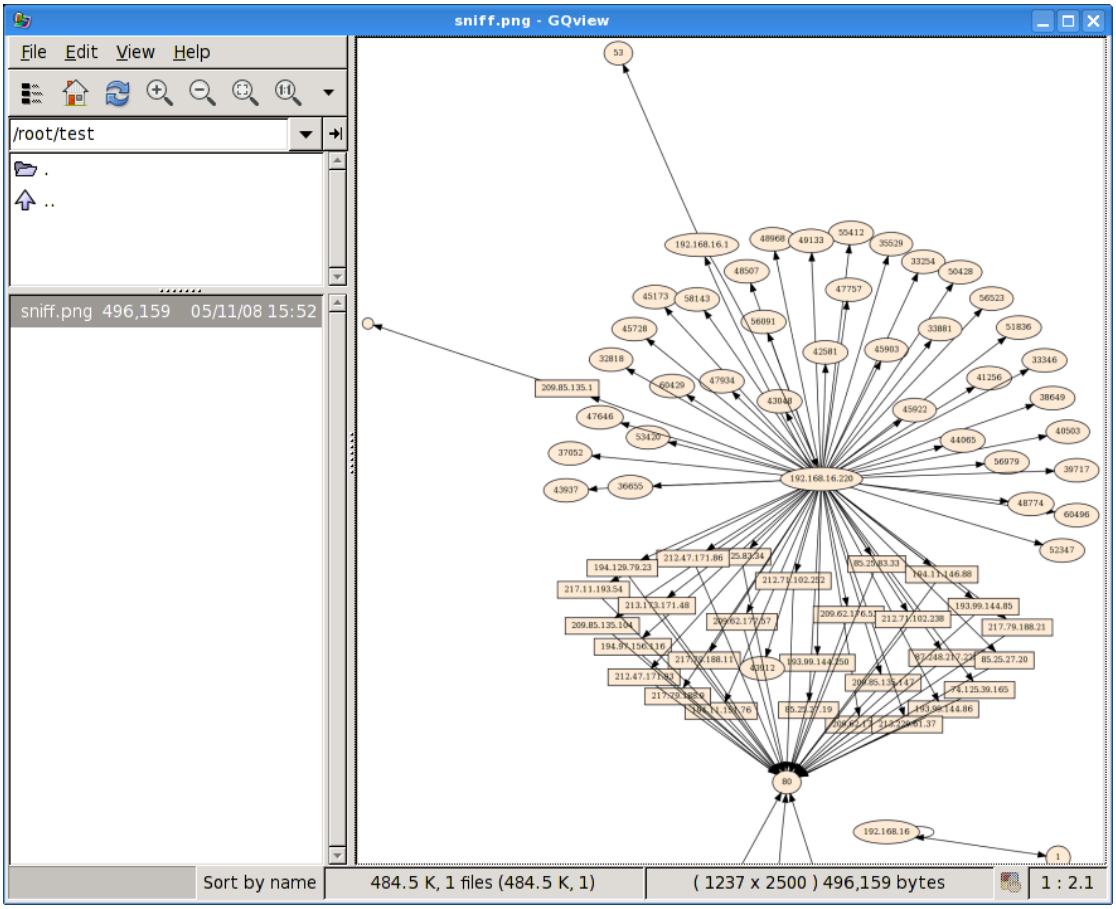
- /usr/local/bin
- /usr/local/share/afterglow

Example[13]

- Open a console.
- First a CSV file of sniffed network traffic has to be generated using the command:
  tcpdump -vtttnneli eth0 | tcpdump2csv.pl "sip dip dport" > sniff.csv
- Open Firefox and do some extended surfing.
- Press *Ctrl-C* in the console window where *tcpdump* is running.
- To transform the CSV file to a GraphViz dot file execute:
  cat sniff.csv | afterglow.pl > sniff.dot
- To render the *sniff.dot* into a GIF file use the command:
  neato -Tpng -o sniff.png sniff.dot

[13] Example partly taken from AfterGlow manual: http://afterglow.sourceforge.net/

- To view the result open GQview with command: *gqview*



3.2. ARGUS (CP)

Purpose

- Captures and analyze network transaction information.

Links

- Homepage http://qosient.com/argus/
- Manual http://qosient.com/argus/manuals.htm

Important installation locations

- /etc/argus.conf
- /etc/rc.d/rc.argus
- /usr/local/bin
- /usr/local/sbin
- /usr/local/share/afterglow

Log directory

- /var/log/argus

Example

- Open a console.

- To start the ARGUS daemon execute the command:
  sh /etc/rc.d/rc.argus start

- For live monitoring use the following command to connect to the daemon:
  ra -S 127.0.0.1

- Generate some traffic with Firefox to get log entries.

```
   00:15:29.748387  e         udp     192.168.16.150.38246    <->
192.168.16.1.domain        2        152   CON
   00:15:29.748438  e         tcp     192.168.16.150.54920     ->
216.92.177.115.http        491     476787   CON
   00:15:29.748465  e         tcp     192.168.16.150.54921     ->
216.92.177.115.http        405     388328   CON
   00:15:29.750016  e d       tcp     192.168.16.150.54522     ->
64.191.203.30.http         59      42903   CON
   00:15:30.744245  e         udp     192.168.16.150.48256    <->
192.168.16.1.domain        2        452   CON
   00:15:30.824766  e         tcp     192.168.16.150.57185     ->
209.85.161.127.http         18       9758   CON
   00:15:32.169042  e         tcp     192.168.16.150.54524     ->
64.191.203.30.http         10       3943   CON
   00:15:32.447994  e         tcp     192.168.16.150.43754     ->
...
```

- To stop the ARGUS daemon execute the command:
  sh /etc/rc.d/rc.argus stop

3.3. Chaosreader (P)

Purpose

- The tool allows reassembly of content in network traffic capture files. The extracted information is then made available as HTML report where the individual content elements can be accessed.

Links

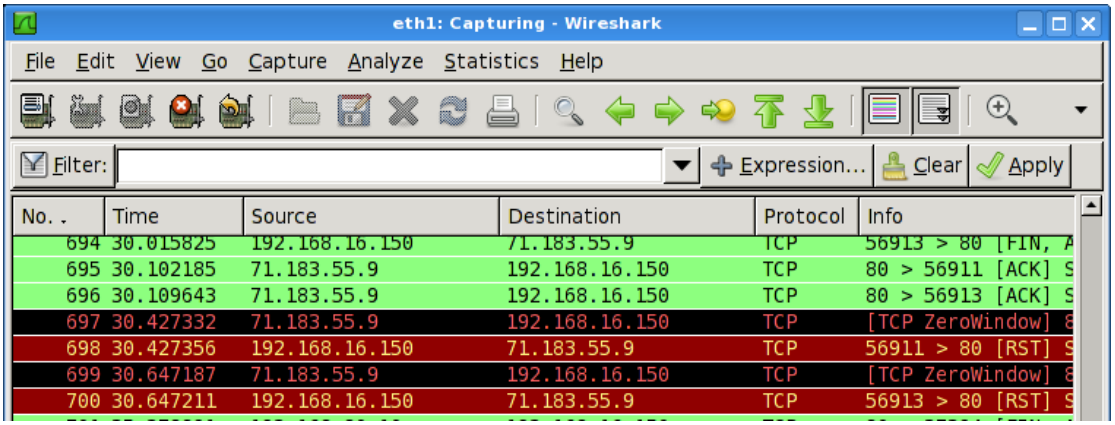
- Homepage http://chaosreader.sourceforge.net/

Important installation locations

- /usr/local/bin

Example

- Sniff some network traffic as described in tool chapters tcpdump (C) or Wireshark (CV) and save it as *sniff.cap*



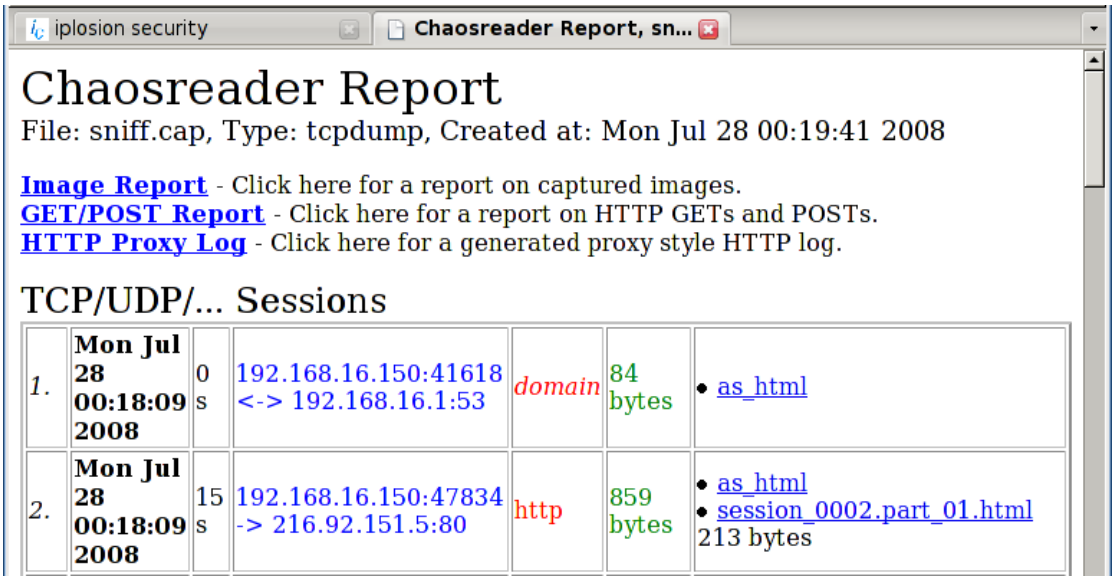
- Open a console.

- To reassemble content from traffic execute:
  chaosreader sniff.cap

```
root@slax:~# chaosreader sniff.cap
Chaosreader ver 0.94

Opening, sniff.cap

Reading file contents,
 100% (464470/464470)
Reassembling packets,
 100% (713/741)

Creating files...
   Num  Session (host:port <=> host:port)              Service
  0016  192.168.16.150:48184,74.125.39.103:80          http
  0035  192.168.16.140:1163,192.168.16.150:22          ssh
  0008  192.168.16.150:47506,209.85.161.127:80         http
```

```
  0002  192.168.16.150:47834,216.92.151.5:80          http
  0011  192.168.16.150:56912,71.183.55.9:80           http
...
  0014  192.168.16.150:47322,192.168.16.1:53          domain
  0007  192.168.16.150:59449,192.168.16.1:53          domain
  0025  192.168.16.150:514,192.168.16.1:514           syslog
  0009  192.168.16.150:49664,192.168.16.1:53          domain
...
  0015  192.168.16.150:51945,192.168.16.1:53          domain
  0031  192.168.16.150,192.168.16.1                   ICMP Destination
Unreachable
...
root@slax:~#
```

- Then open the generated report in Firefox using:
  firefox index.html



- To get an overview of all reassembled images press the ink *Image Report*.

3.4. ChartDirector (V)

Purpose

- Programming library to generate a wide variety of charts.

Links

- Homepage http://www.advsofteng.com/
- Manual file:///usr/local/share/chartdirector/doc/cdperl.htm

Important install locations

- /usr/lib/perl5/site_perl/5.8.8
- /usr/local/share/chartdirector

Example

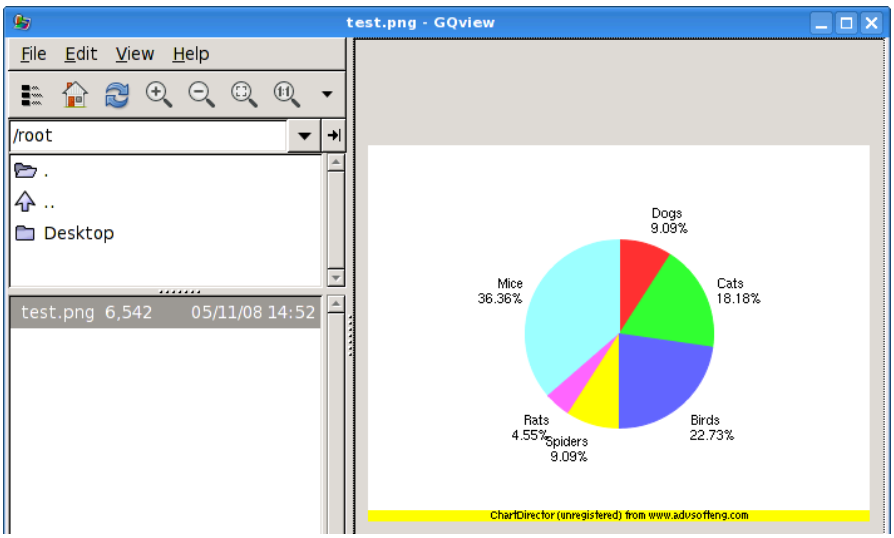
- To generate a pie chart create a Perl script *test.pl* with the following contents:

```
#!/usr/bin/perl
use perlchartdir;
my $data = [10,20,25,10,5,40];
my $label = ["Dogs","Cats","Birds","Spiders","Rats","Mice"];
my $c = new PieChart(400, 300);
$c->setPieSize(200, 150, 75);
$c->setData($data, $label);
$c->makeChart("test.png");
```

- Open a console.

- Then execute the script with the command: *perl test.pl*

- To view the result open GQview with the command: *gqview*



3.5. Cytoscape (V)

Purpose

- Generation and display of two-dimensional link graphs.

Links

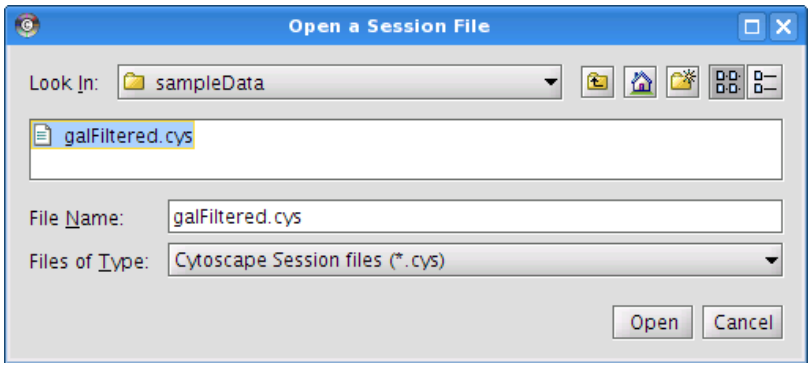
- Homepage: http://www.cytoscape.org/
- Tutorial: http://cytoscape.org/cgi-bin/moin.cgi/Presentations

Important install locations

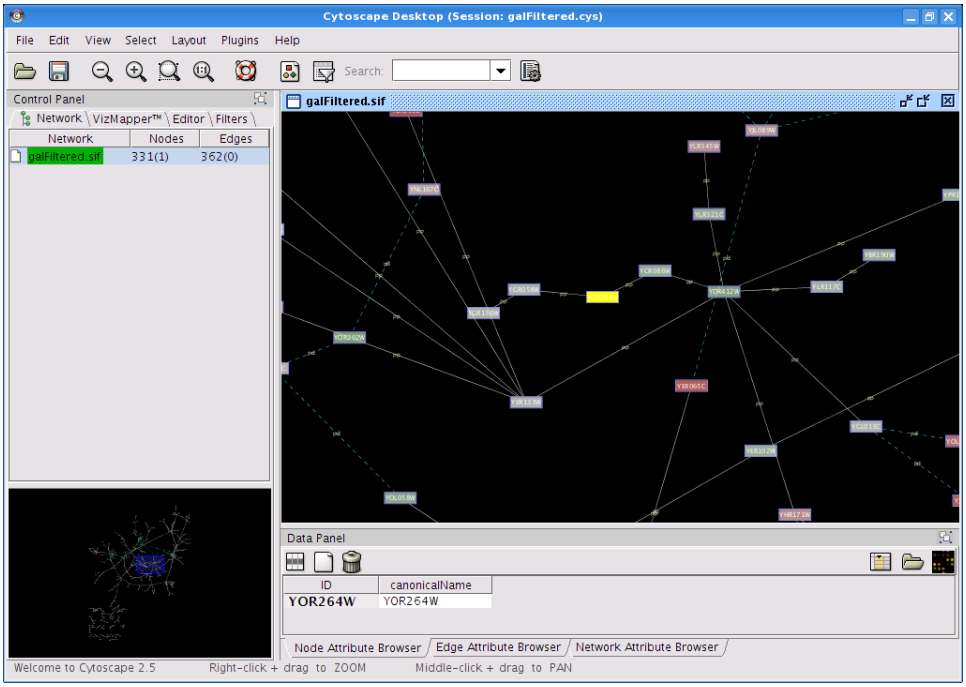
- /usr/local/bin
- /usr/local/lib/cytoscape
- /usr/local/share/cytoscape

Example

- Start *Cytoscape* through the KDE start menu.
- In the file open dialog navigate to: */usr/local/share/cytoscape/sampleData*
- Open the sample graph in this directory, e.g. *galFiltered.cys*



- The data is then rendered.



3.6. EtherApe (V)

Purpose

- Real-time visualization of network traffic.

Links

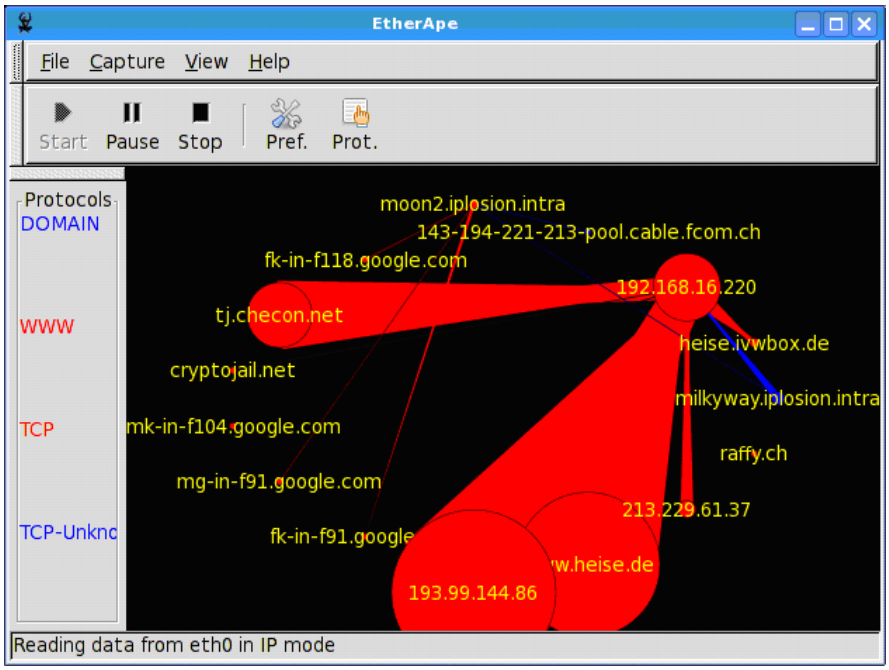
- Homepage: http://etherape.sourceforge.net/

Important install locations

- /usr/local/bin
- /usr/local/etc/etherape
- /usr/local/share/etherape

Example

- Start *EtherApe* through the KDE start menu.
- EtherApe will go directly into monitoring mode.
- Open Firefox and generate some network traffic. EtherApe will then visualize your network connections.



3.7. GeoIP (P)

Purpose

- Lookup of country information for an IP address or a host name.
- When the extended geo coding databases are purchased from MaxMind latitude and longitude information are displayed.

Links

- Homepage http://www.maxmind.com/app/ip-location

Important installation locations

- /usr/local/bin

Example

- Open a console.
- To lookup the country information for an IP address or a host name use: *geoiplookup davix.secviz.org*

```
root@slax:~# geoiplookup davix.secviz.org
GeoIP Country Edition: US, United States
```

3.8. GGobi (V)

Purpose

- Visualizes data with different graphs and allows brushing.

Links

- Homepage: http://www.ggobi.org/
- Manual: /usr/local/share/ggobi/manual/manual.pdf
- XML Input Format: /usr/local/share/ggobi/manual/xml.pdf

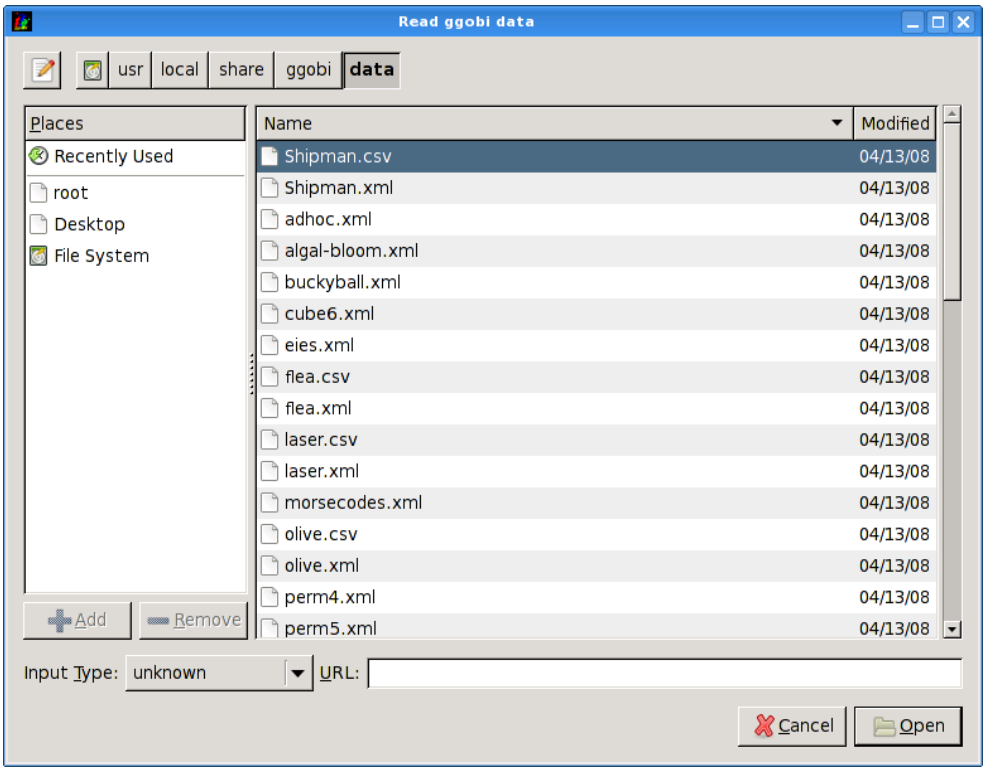
Important install locations:

- /etc/xdg/ggobi
- /usr/local/bin
- /usr/local/share/ggobi

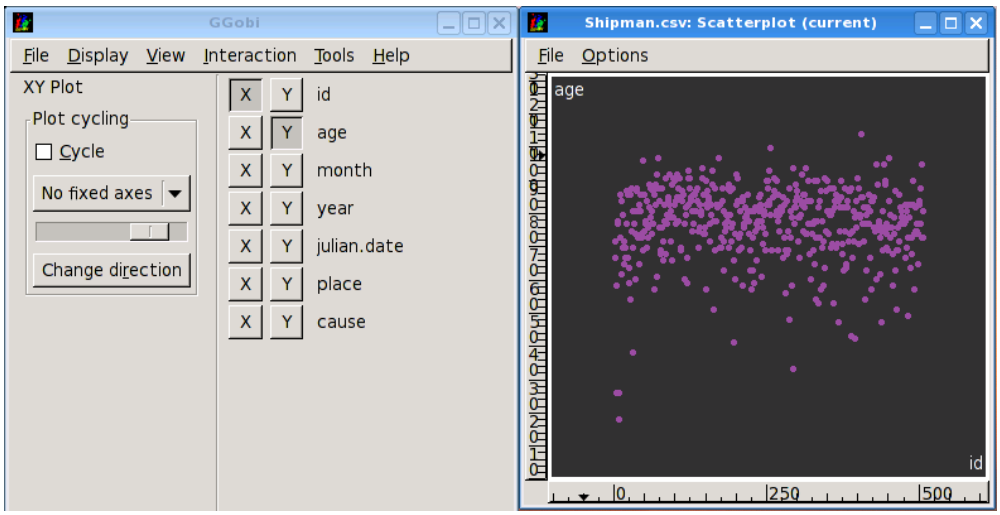
Example

- Start *GGobi* through the KDE start menu.

- In the file open dialog navigate to: */usr/local/share/ggobi/data*



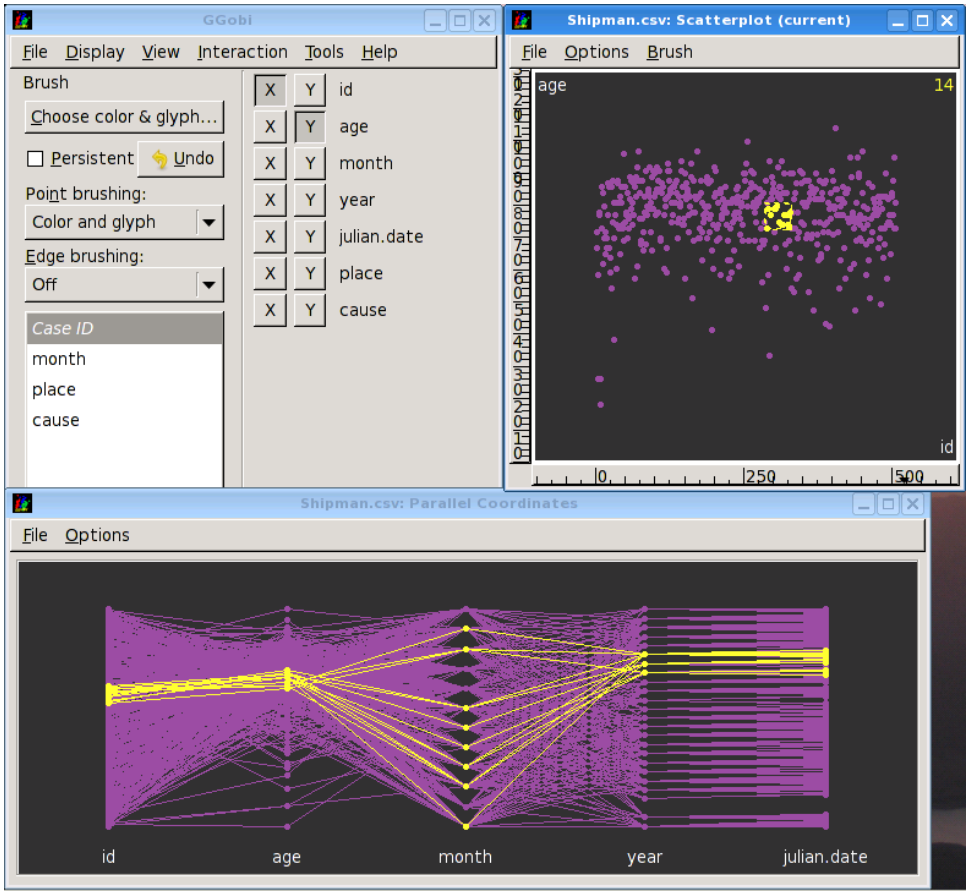
- Open one of the graphs in this directory, e.g. *Shipman.csv*



- In the window menu select *Display\New Parallel Coordinate Display*.

- Activate the scatter plot window and the select *Interaction\Brush* in the main window menu.

- Now you can move the yellow box around in the scatter plot and see how the selection behaves in the other graph.



3.9. glTail (V)

Purpose

- Real-time visualization of web server traffic.

Links

- Homepage: http://www.fudgie.org/

Important install locations

- /usr/bin/
- /usr/lib/ruby/gems/1.8/doc/gltail-0.0.7

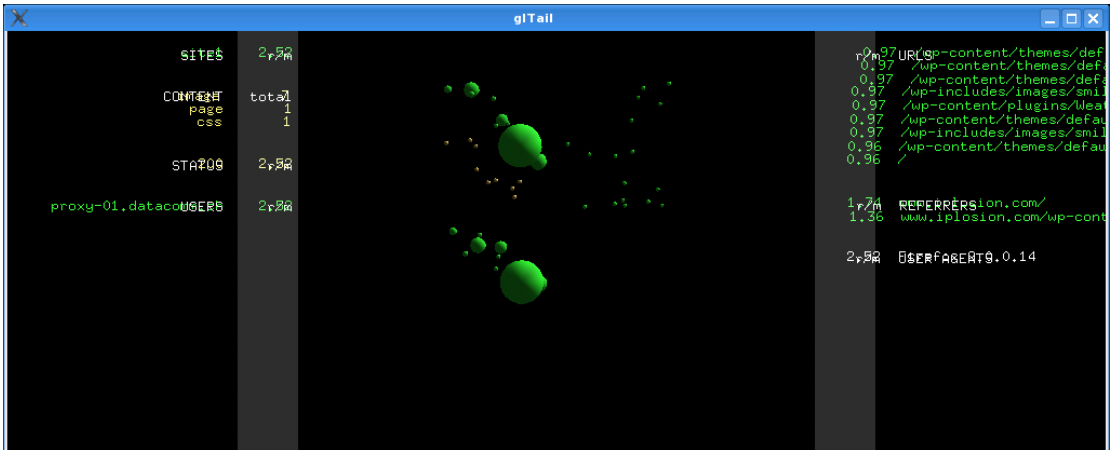
Example

- Open a console.
- Start the Apache daemon by executing the command:
  sh /etc/rc.d/rc.httpd start
- Start the SSH daemon by executing the command:
  sh /etc/rc.d/rc.sshd start
- Execute the following command to generate a configuration file template:
  gl_tail --new foobar.yaml
- Adjust the configuration file to your needs.

```
servers:
    foobar:
        host: 127.0.0.1
        port: 22
        user: root
        password: toor
        command: tail -f -n0
        files: /var/log/httpd/access_log
        parser: apache
        color: 0.2, 1.0, 0.2, 1.0
config:
...
```

- Execute the following command to start the visualization: *gl_tail foobar.yaml*
- Open Firefox and access the URL *http://127.0.0.1/* and press the reload button as much as you like.

- In the glTail window the visualization should now appear.



- To stop the SSH daemon execute the command:
  sh /etc/rc.d/rc.httpd stop

- To stop the Apache daemon execute the command:
  sh /etc/rc.d/rc.httpd stop

3.10. GNUplot (V)

Purpose

- Generation of various types of charts. Mainly used for simple charting.

Links

- Homepage: http://www.gnuplot.info/
- Tutorial: http://t16web.lanl.gov/Kawano/gnuplot/intro/basic-e.html
- Manual: http://www.gnuplot.info/docs/gnuplot.html

Important install locations

- /usr/local/bin
- /usr/local/libexec/gnuplot
- /usr/local/share/gnuplot

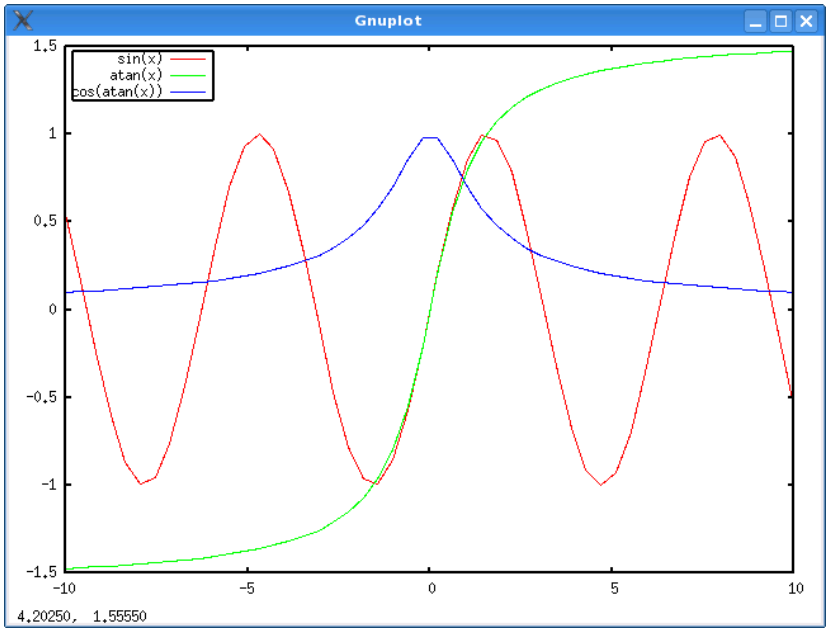
Example

- Open a console.
- Change to the following directory: *cd /usr/local/share/gnuplot/demo/*
- Execute the following command: *gnuplot*

```
root@slax:/usr/local/share/gnuplot/demo# gnuplot

        G N U P L O T
        Version 4.2 patchlevel 2
        last modified 31 Aug 2007
        System: Linux 2.6.24.4

        Copyright (C) 1986 - 1993, 1998, 2004, 2007
        Thomas Williams, Colin Kelley and many others

        Type `help` to access the on-line reference manual.
        The gnuplot FAQ is available from http://www.gnuplot.info/faq/

        Send bug reports and suggestions to
<http://sourceforge.net/projects/gnuplot>


Terminal type set to 'x11'
```

- In the gnuplot command line enter: *load "all.dem"*

```
gnuplot> load "all.dem"
******************** file simple.dem ********************
Hit return to continue
```



- You can step through the different examples by pressing *ENTER* in the gnuplot command line window. You can stop the interactive tour by pressing *Ctrl-C*.

3.11. Graphviz (V)

Purpose

- Generation of two-dimensional of link graphs.

Links

- Homepage http://www.graphviz.org/
- Manual http://www.graphviz.org/Documentation.php
- Tutorial dot /usr/local/share/graphviz/doc/pdf/dotguide.pdf
- Tutorial neato /usr/local/share/graphviz/doc/pdf/neatoguide.pdf

Important install locations

- /usr/local/bin
- /usr/local/lib/graphviz
- /usr/local/share/graphviz

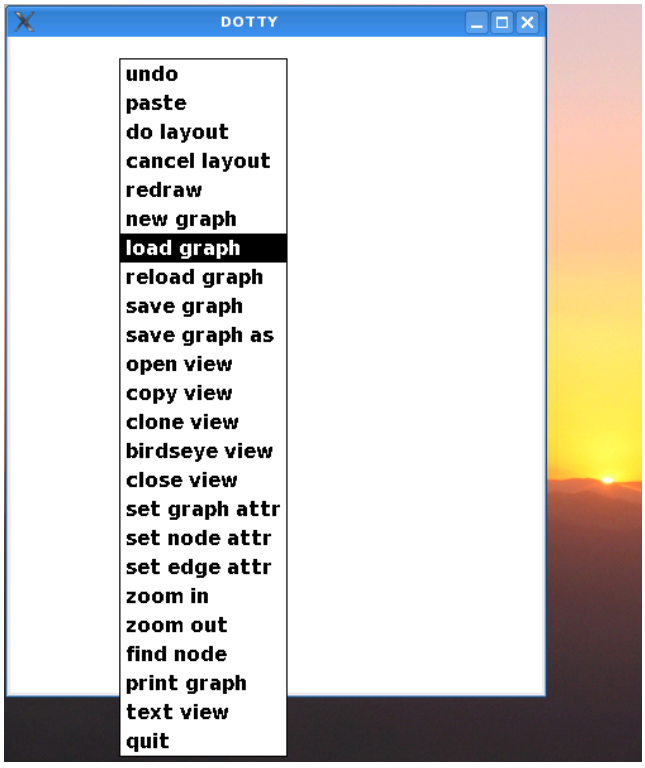
Example

- Open a console.

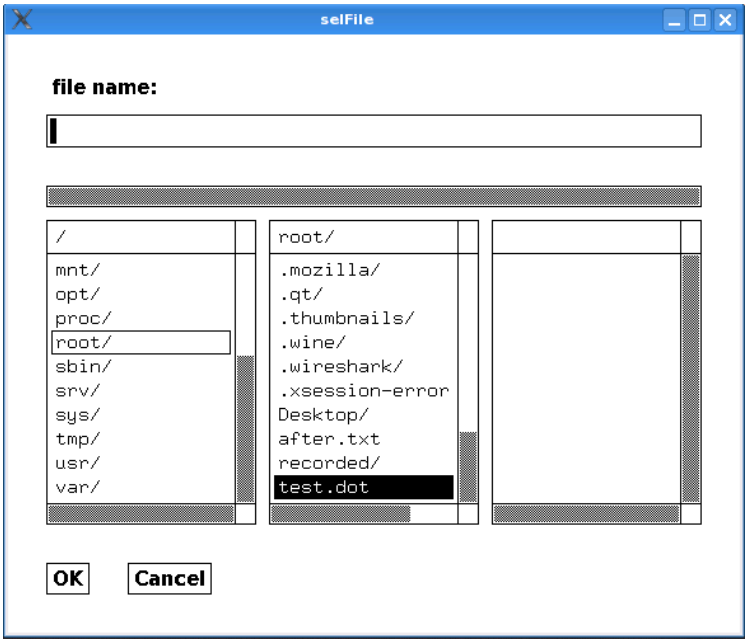
- Generate a sample afterglow file with:
  echo -e "a,b\nc,d\nc,e" | afterglow.pl > test.dot

- Execute the following command to start the interactive mode of neato: *lneato*

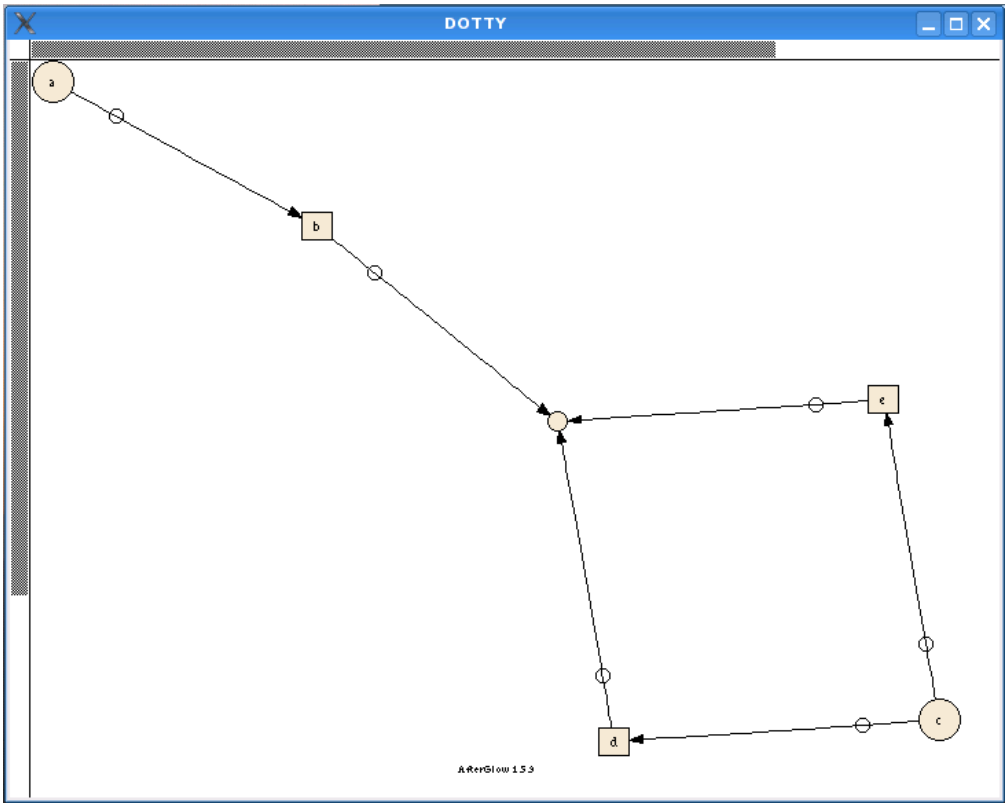
- Right click on the window and select *load graph*.



- In the file open dialog navigate to *test.dot* and open it.



- Then the link graph is displayed.



- Try the other options in the right click menu, e.g. *birdseye* view.

3.12. GUESS (V)

Purpose

- Display and interaction with two-dimensional link graphs. Has the capability to use a scripting language to process graphs.

Links

- Homepage http://graphexploration.cond.org/documentation.html
- Tutorial http://guess.wikispot.org/Tutorial
- Manual http://guess.wikispot.org/manual

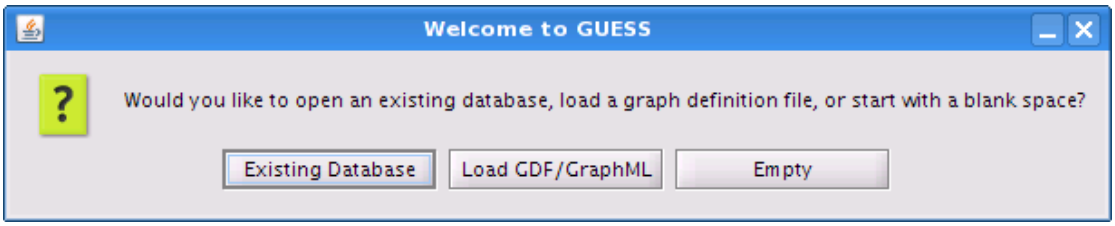
Important install locations

- /usr/local/bin
- /usr/local/lib/guess/lib
- /usr/local/share/guess

Example

- Start *GUESS* through the KDE start menu.

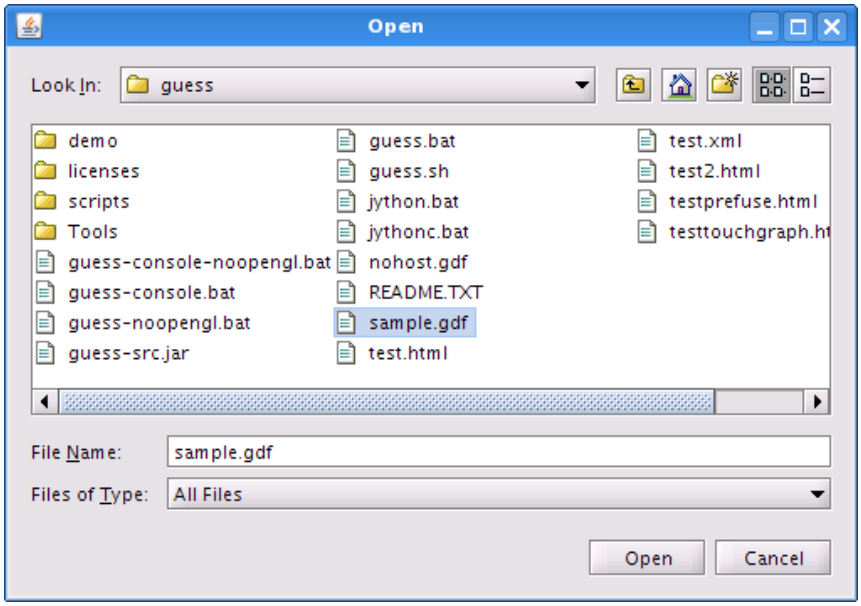
- Click the button *Load GDF/GraphML*.



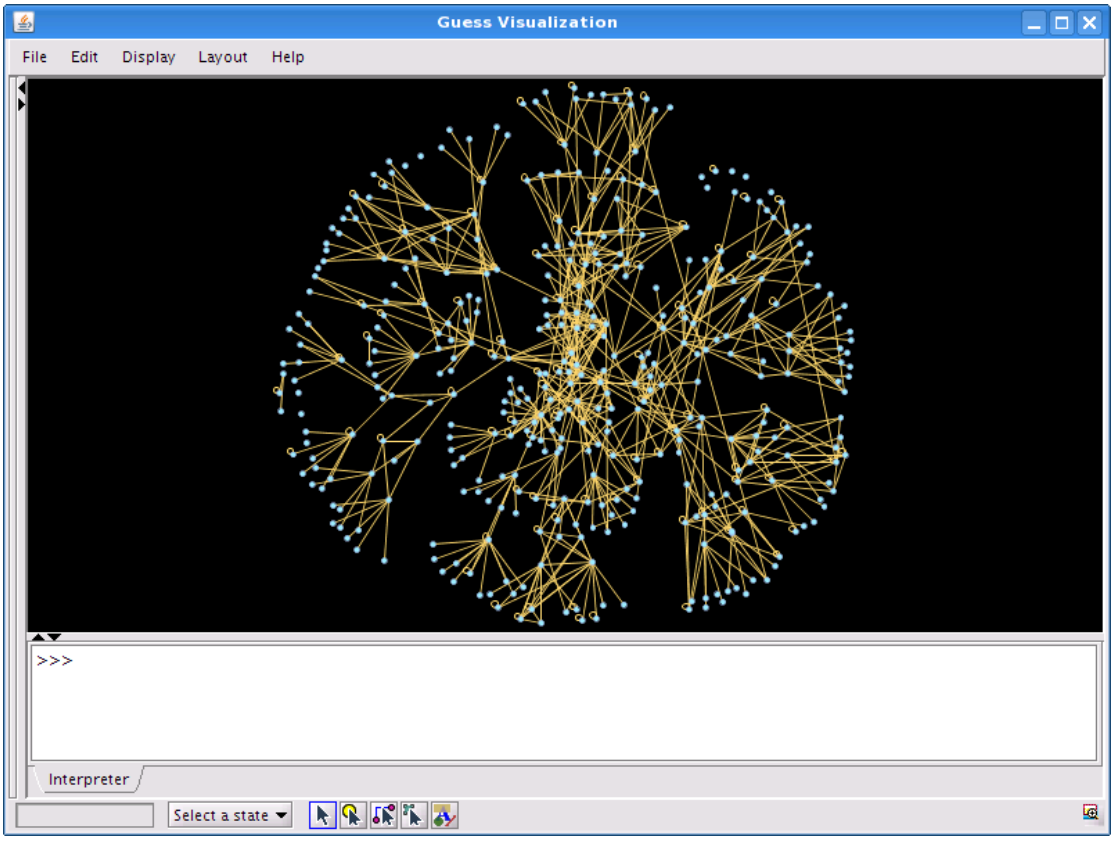
- In the file dialog click the browse button (the one with the three dots) and navigate to: */usr/local/share/guess/*

- In the drop down list *Files of Type* select *All Files*.

- Open one of the graphs in this directory, e.g. *sample.gdf*.



- Acknowledge all the dialogs and wait for the graph to be loaded.



3.13. gwhois (P)

Purpose

- A generic whois client that can handle web site based whois services.

Links

- Homepage http://freshmeat.net/projects/gwhois/

Important installation locations

- /usr/local/bin

Example

- Open a console.
- To lookup the country information for an IP address or a host name use: *geoiplookup davix.secviz.org*

```
root@slax:~# gwhois gnu.org
Process query: 'gnu.org'
Querying whois.pir.org:43 with whois.
...
Domain ID:D899661-LROR
Domain Name:GNU.ORG
Created On:24-Nov-1995 05:00:00 UTC
Last Updated On:05-Sep-2006 15:50:42 UTC
Expiration Date:23-Nov-2008 05:00:00 UTC
Sponsoring Registrar:Gandi SAS (R42-LROR)
Status:CLIENT TRANSFER PROHIBITED
Registrant ID:0-443631-Gandi
Registrant Name:GNU/FSF Hostmaster
Registrant Organization:Free Software Foundation
....
Admin ID:GH297-GANDI
Admin Name:GNU/FSF Hostmaster
Admin Organization:Free Software Foundation
...
Tech ID:AR41-GANDI
Tech Name:CONTACT NOT AUTHORITATIVE see http://www.gandi.net/whois
Tech Organization:GANDI SARL
...
Name Server:NS1.GNU.ORG
Name Server:NS2.GNU.ORG
Name Server:NS3.GNU.ORG
Name Server:NS4.GNU.ORG
...
root@slax:~#
```

3.14. InetVis (V)

Purpose

- Real-time visualization of network traffic as a three-dimensional scatter plot.

Links

- Homepage http://www.cs.ru.ac.za/research/g02v2468/inetvis.html

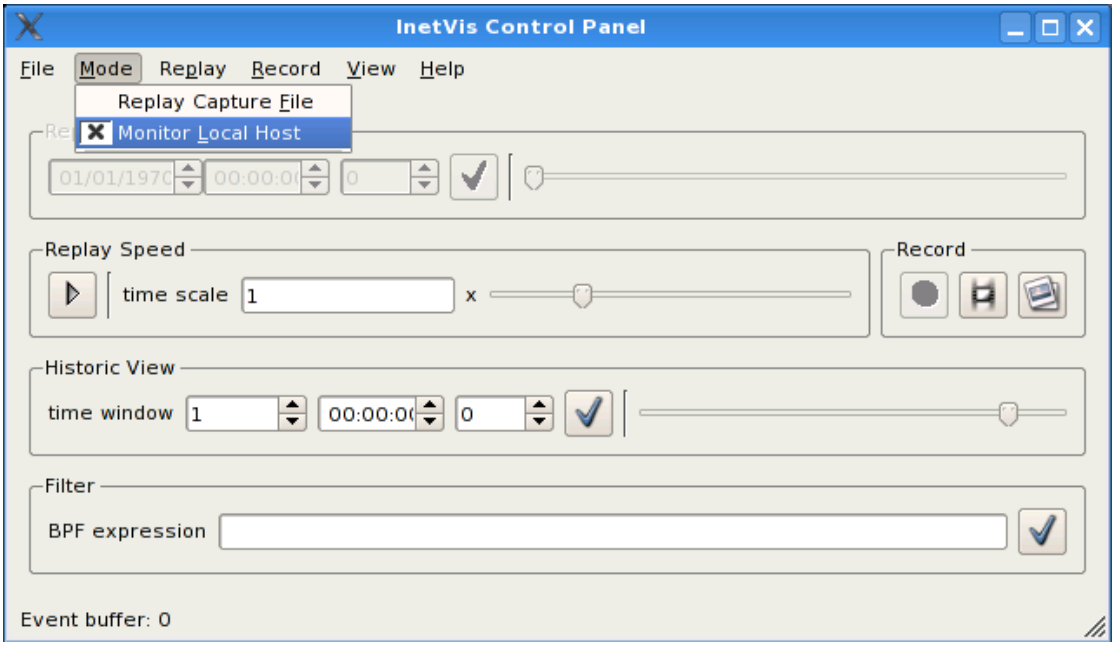
Important install locations

- /usr/local/bin
- /usr/local/share/inetvis

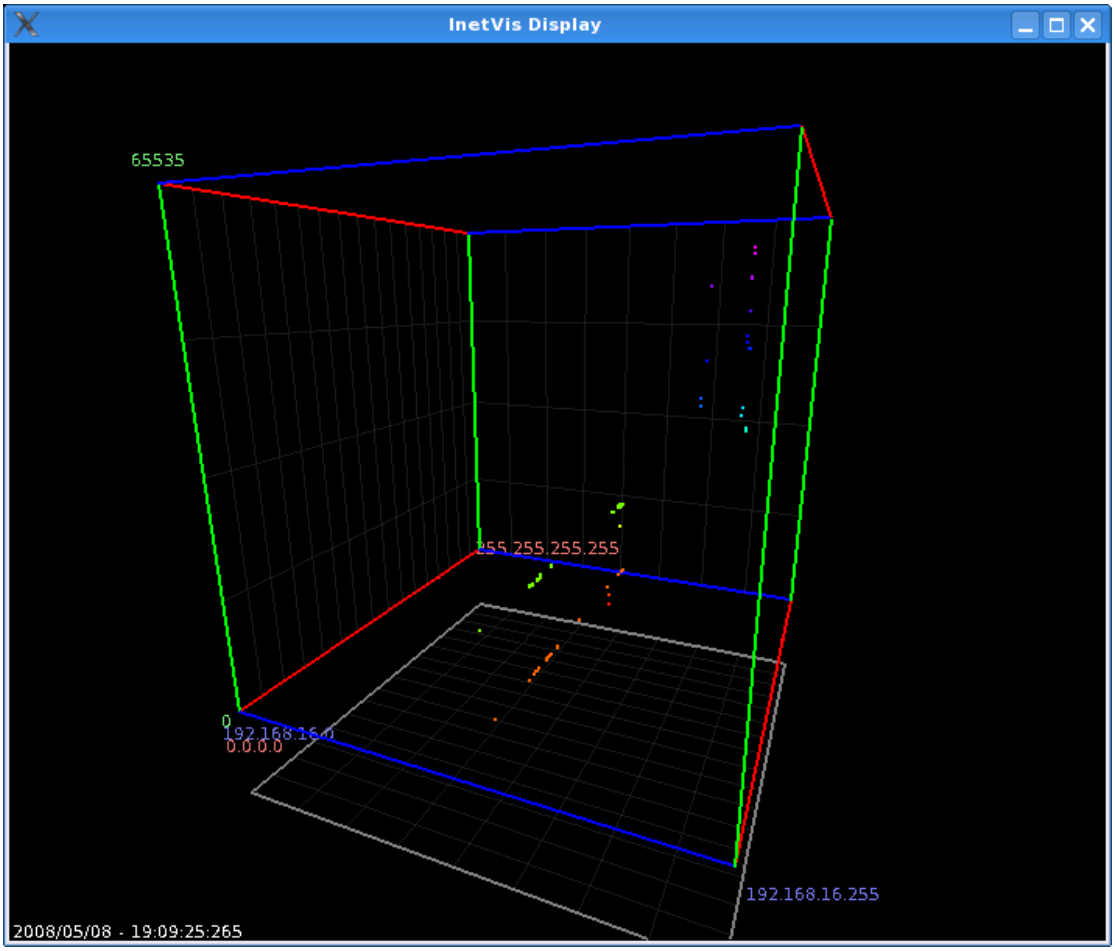
Example

- Start *InetVis* through the KDE start menu.

- In the *InetVis Control Panel* select the menu *Mode\Monitor Local Host*. Due to a bug in the application you have to select the menu even when the flag is already set. Otherwise you will not be able to monitor live traffic.



- Then open the browser and do some surfing in the Internet. In the 3D scatter plot window you will see dots appear.



3.15. Large Graph Layout - LGL (V)

Purpose

- Generation of two- and three-dimensional link graphs.

Links

- Homepage http://lgl.sourceforge.net/

Important install locations

- /usr/lib/perl5/site_perl/5.8.8
- /usr/local/bin
- /usr/local/etc
- /usr/local/lib/lgl
- /usr/local/share/lgl

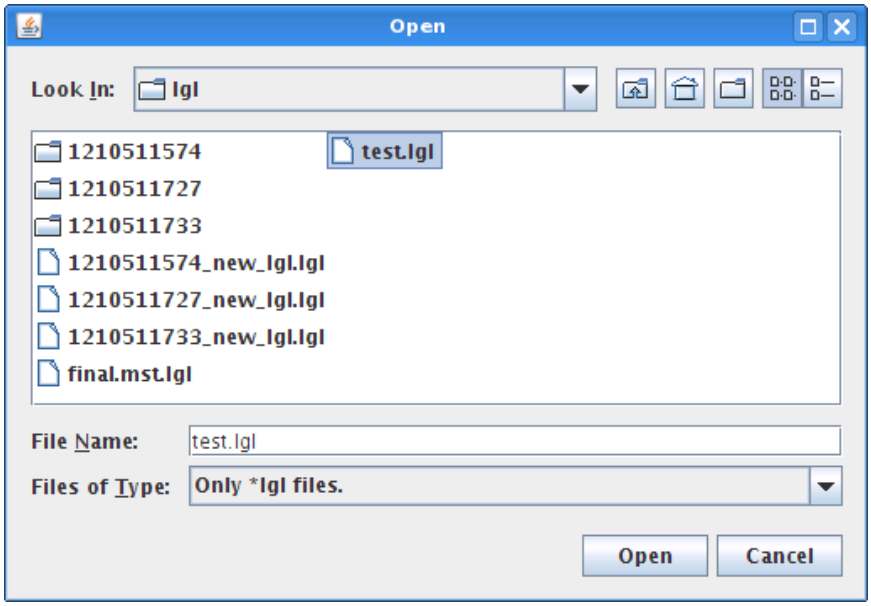
Example 2D

- Open a console.
- First a space separated file with the data has to be prepared:
  echo -e "a b\nc d\nc e\ne d\nb e" > test.ncol
- Then the graph can be generated using the following command:
  lgl2d test.ncol

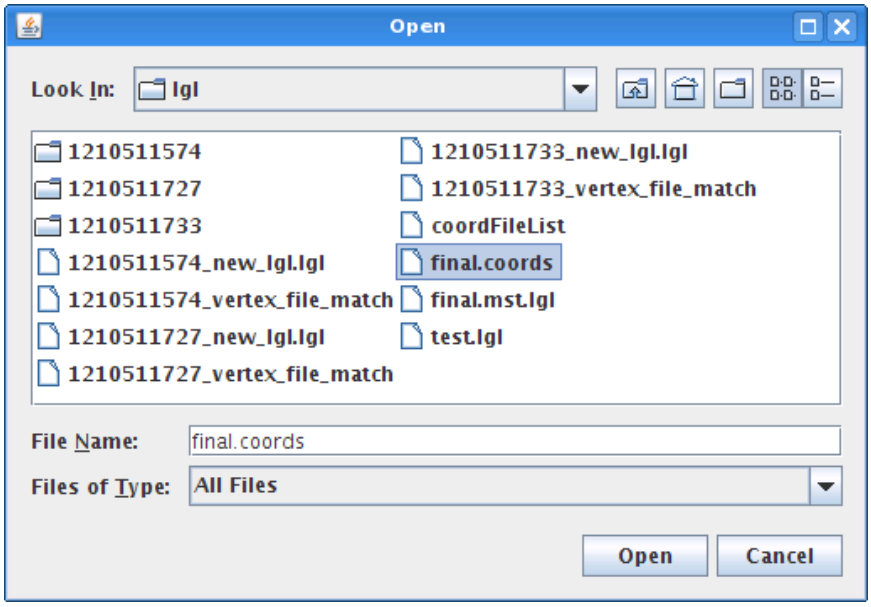
```
root@slax:~# lgl2d test.ncol
LGLBREAKUP: /usr/local/bin//lglbreakup -d ./lgl/1210511733 ./lgl/test.lgl
Loading ./lgl/test.lgl...Done.
5 : Total Vertex Count
5 : Total Edge Count
Determining connected sets...
Found 1 connected sets.
Writing ./lgl/1210511733/0.lgl
5 : Vertex Count
5 : Edge Count
LGLAYOUT: /usr/local/bin//lglayout2D -o ./lgl/1210511733/0.coords -e -
l ./lgl/12
10511733/0.lgl
Reading in Graph from ./lgl/1210511733/0.lgl...
Vertex Count: 5
Edge Count: 5
Outer radius is set to 2.23607
Initializing 5 particles...Done.
Initializing grid and placing particles...Done.
Initializing handlers...Done.
Generating Tree and checking for root.
Nodes Checked:        6
Root Node: e
There are 2 levels.
Initializing 1 thread(s)...Done.
Iteration:    303 Dx:   0.724267 Level:    2
Final Settle
Iteration:    455 Dx:   0.745508 Level:    2
```

```
LGLREBUILD: /usr/local/bin//lglrebuild -o ./lgl/final.coords  -
c ./lgl/coordFile
List
Total Total Connected Sets :        0
root@slax:~#
```

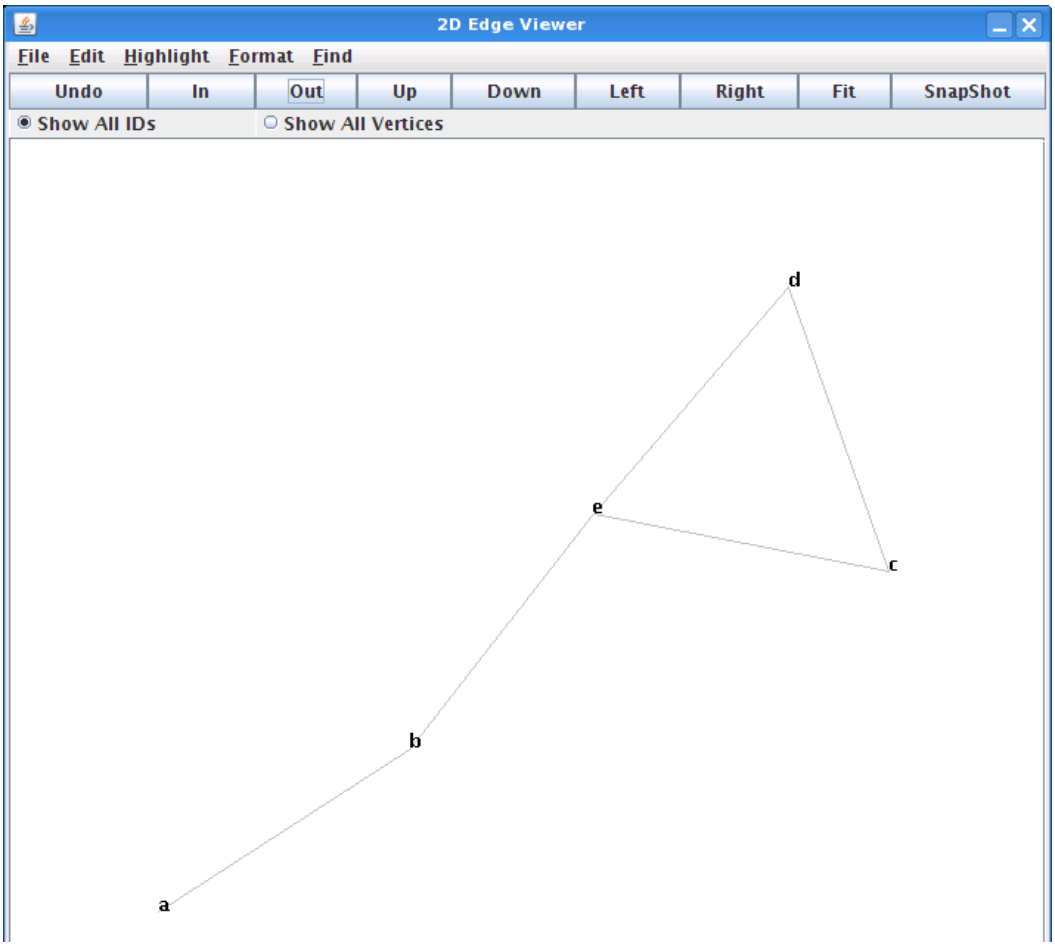
- To view the graph start *LGL Viewer* through the KDE start menu.
- In the window menu select *File\Open .lgl file*.
- From the directory where your *test.ncol* is located navigate down to the subdirectory *lgl* and select *test.lgl*.



- In the window menu select *File\Open 2D Coords file*.
- From the directory where your *test.ncol* is located navigate down to the subdirectory *lgl* and select *final.coords*.



- The graph should now be drawn.
- To display the node ids press in the tool bar section the radio button *Show All IDs*.



Example 3D

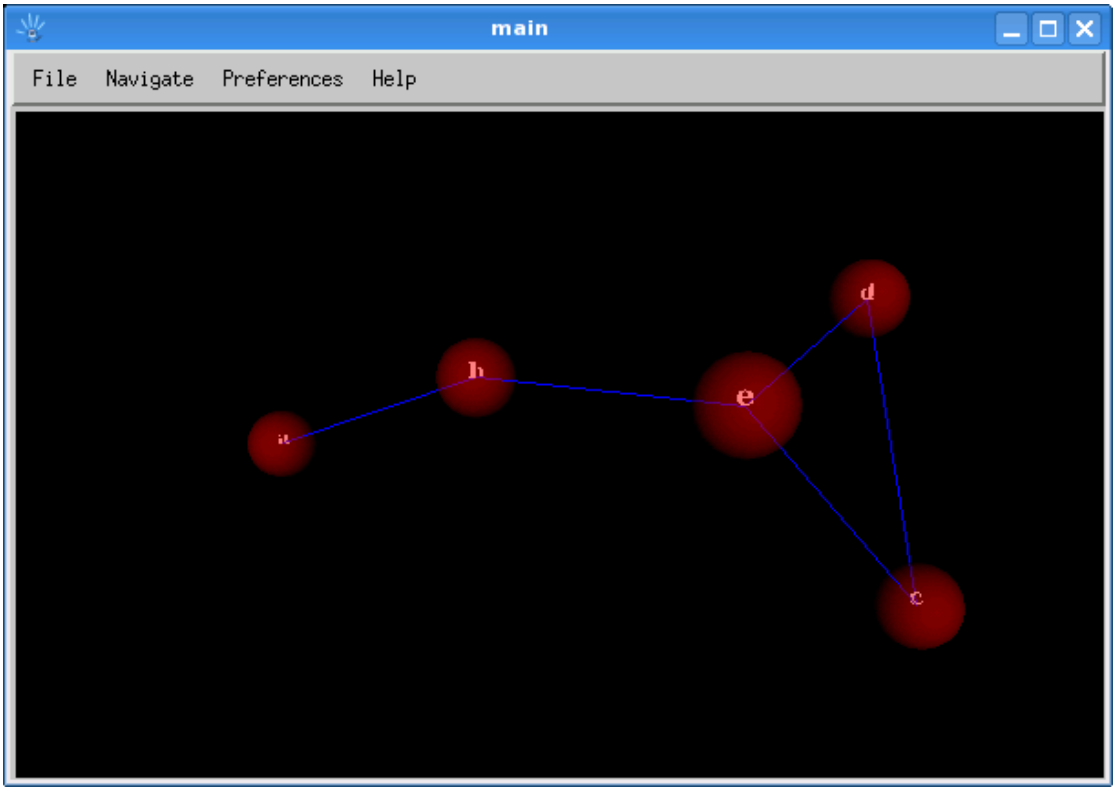
- Open a console.
- First a space separated file with the data has to be prepared:
  echo -e "a b\nc d\nc e\ne d\nb e" > test.ncol
- Then the graph can be generated using the following command:
  lgl3d test.ncol

```
root@slax:~# lgl3d test.ncol
LGLBREAKUP: /usr/local/bin//lglbreakup -d ./lgl/1210512148 ./lgl/test.lgl
Loading ./lgl/test.lgl...Done.
5 : Total Vertex Count
5 : Total Edge Count
Determining connected sets...
Found 1 connected sets.
Writing ./lgl/1210512148/0.lgl
5 : Vertex Count
5 : Edge Count
LGLAYOUT: /usr/local/bin//lglayout3D -o ./lgl/1210512148/0.coords -e -
l ./lgl/1210512148/0.lgl
Reading in Graph from ./lgl/1210512148/0.lgl...
Vertex Count: 5
Edge Count: 5
Outer radius is set to 1.70997
Initializing 5 particles...Done.
Initializing grid and placing particles...Done.
Initializing handlers...Done.
Generating Tree and checking for root.
Nodes Checked:        6
Root Node: e
There are 2 levels.
Initializing 1 thread(s)...Done.
Iteration:    303 Dx:   0.731679 Level:    2
Final Settle
Iteration:    455 Dx:   0.747695 Level:    2
 - Done -
LGLREBUILD: /usr/local/bin//lglrebuild -o ./lgl/final.coords  -
c ./lgl/coordFileList
Total Total Connected Sets :        0
Current Connected Set      :        1
```

- To generate the VRML file use the following command:
  genVrml.pl lgl/test.lgl lgl/final.coords

```
root@slax:~# genVrml.pl lgl/test.lgl lgl/final.coords
Loading coords...Done.
Generating node/text coordinates in VRML...Done.
Loading edges from file...Done.
Generating lines in VRML...Done.
Writing to lgl/final.coords.wrl...Done.
```

- To view the result start FreeWRL:
  freewrl lgl/final.coords.wrl



3.16. Mondrian (V)

Purpose

- Generation and display of a variety of charts that are linked.

Links

- Homepage http://rosuda.org/Mondrian/

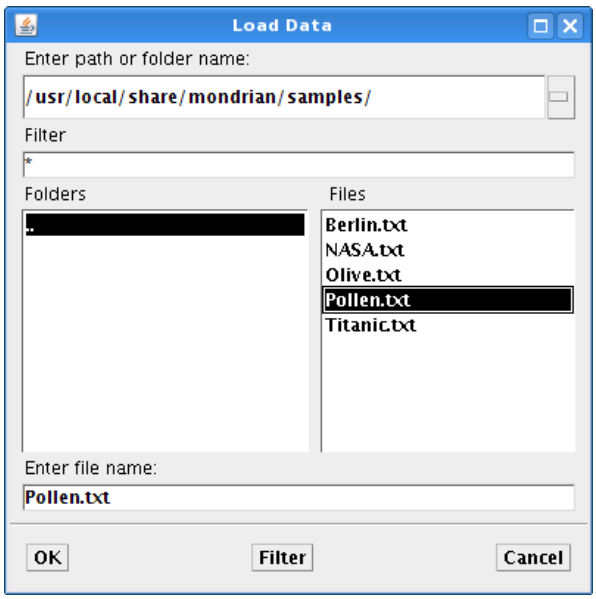
Important install locations

- /usr/local/bin
- /usr/local/lib/mondrian
- /usr/local/share/mondrian

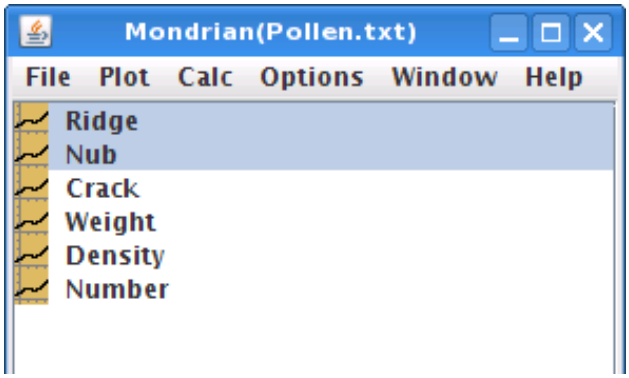
Example

- Start *Mondrian* through the KDE start menu.

- From the window menu select *File\Open* and open any one of the files found in the directory */usr/local/share/mondrian/*, e.g. *Pollen.txt*.



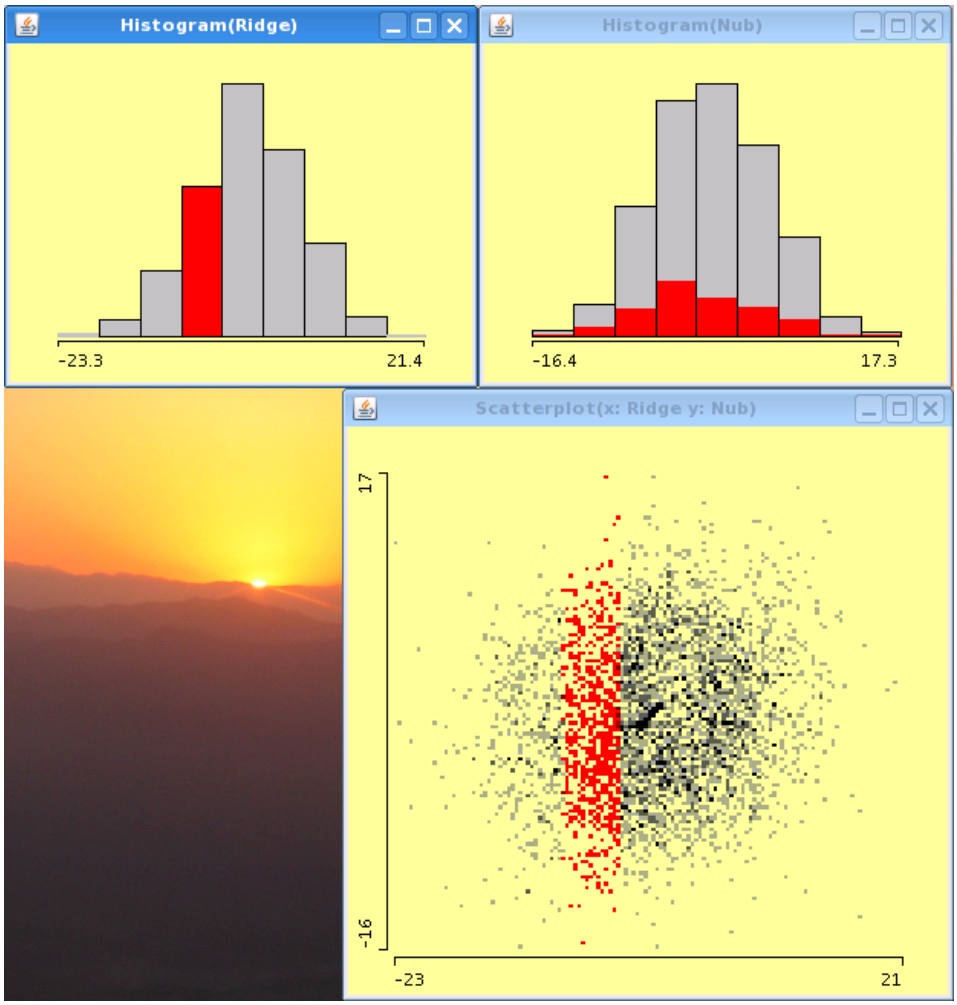
- In the Mondrian main window select any columns you like.



- In the window menu select *Plot\Histogram*. Two histogram windows should appear.

- In the window menu select *Plot\Scatterplot*. A graph with a scatter plot should appear.

- You can now select a bar in the histogram and see how the selected data is represented in the other graphs.



3.17. MRTG (V)

Purpose

- Visualization of traffic load on network devices using SNMP queries.

Links

- Homepage http://oss.oetiker.ch/mrtg/
- Installation Guide http://oss.oetiker.ch/mrtg/doc/mrtg-unix-guide.en.html

Important install locations

- /usr/local/bin
- /usr/local/lib/mrtg2
- /usr/local/share/mrtg2

Example

- Open a console.

- First you have to create a configuration file for you network device you want to monitor. In our example we have chosen *192.168.16.5*.

```
cfgmaker --global 'WorkDir: /tmp' --global 'Options[_]: bits,growright' --
output /tmp/mrtg.cfg public@192.168.16.5
```

- To initialize the database we have to run the following *mrtg* command a couple of times. The error messages during the first two runs are normal.

```
mrtg /tmp/mrtg.cfg
mrtg /tmp/mrtg.cfg
mrtg /tmp/mrtg.cfg
```

- Create a cron job which calls mrtg every now and then using the command:

```
mrtg /tmp/mrtg.cfg
```

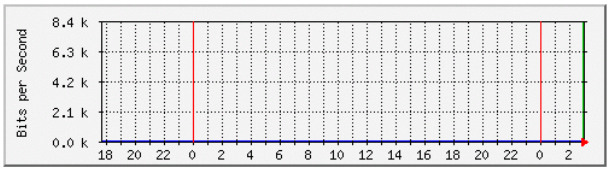
- After a couple of runs open *file:///tmp/192.168.16.5_1.html* in Firefox to view the graph.

Traffic Analysis for 1 -- DEIMOS1

System: DEIMOS1 in
Maintainer:
Description: HP-ETHERNET-MULTI-ENVIRONMENT,ROM-H.08.08,JETDIRECT-EX,JD34,EEPROM-H.08.49
ifType: ethernetCsmacd (6)
ifName:
Max Speed: 10.0 Mbits/s
Ip: 192.168.16.5 ()

The statistics were last updated **Sunday, 18 May 2008 at 3:02**,
at which time **'DEIMOS1'** had been up for **9:52:22**.

`Daily' Graph (5 Minute Average)



	Max	Average	Current
In	8304.0 b/s (0.1%)	8304.0 b/s (0.1%)	8304.0 b/s (0.1%)
Out	208.0 b/s (0.0%)	208.0 b/s (0.0%)	208.0 b/s (0.0%)

3.18. NVisionIP (V)

Purpose

- Animated two-dimensional scatter plot of ARGUS files.

Links

- Homepage
  http://security.ncsa.uiuc.edu/distribution/NVisionIPDownLoad.html
- Quick Start Guide
  http://security.ncsa.uiuc.edu/distribution/NVisionIPDownLoad.html#Run

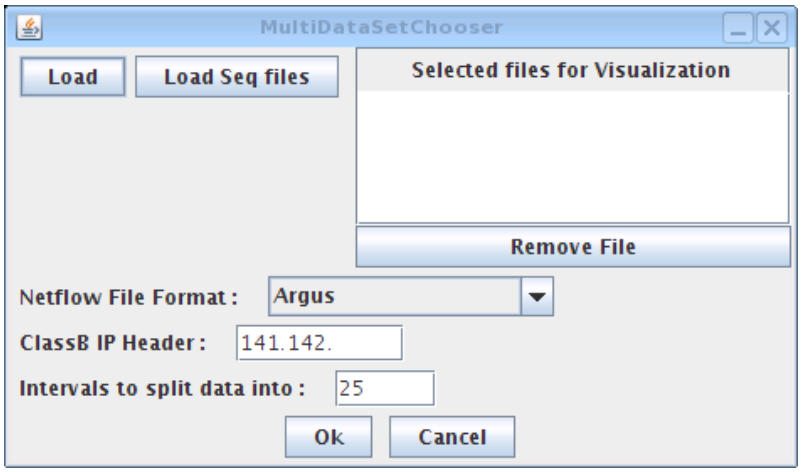
Important install locations

- /usr/local/bin
- /usr/local/lib/NVisionIP
- /usr/local/share/NVisionIP

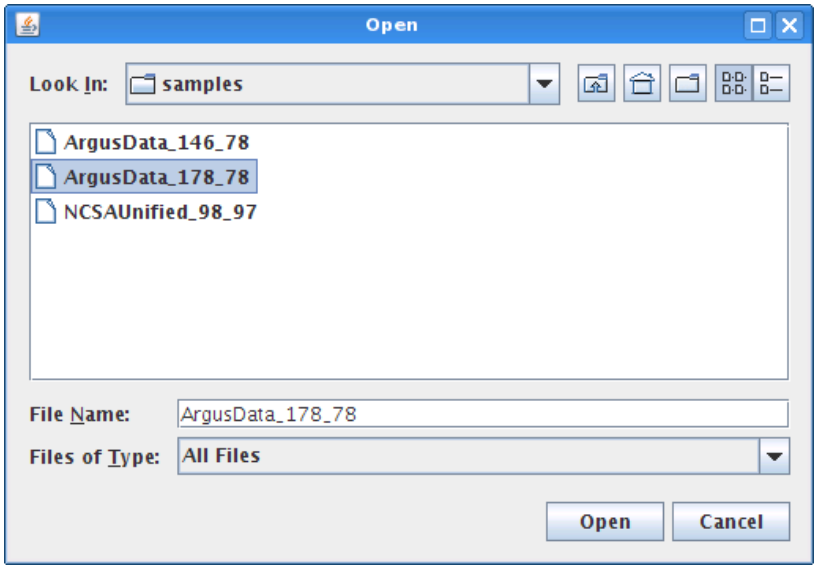
Example

- Start *NVisionIP* through the KDE start menu.

- In the window *MultiDataSetChooser* press the button *Load*.

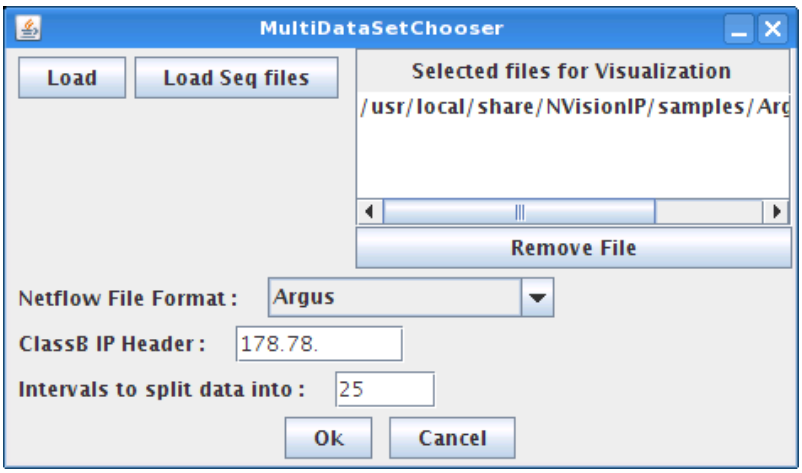


- In the file open dialog navigate to: */usr/local/share/NVisionIP/samples*



- Open one of the file in this directory, e.g. *ArgusData_178_78*.

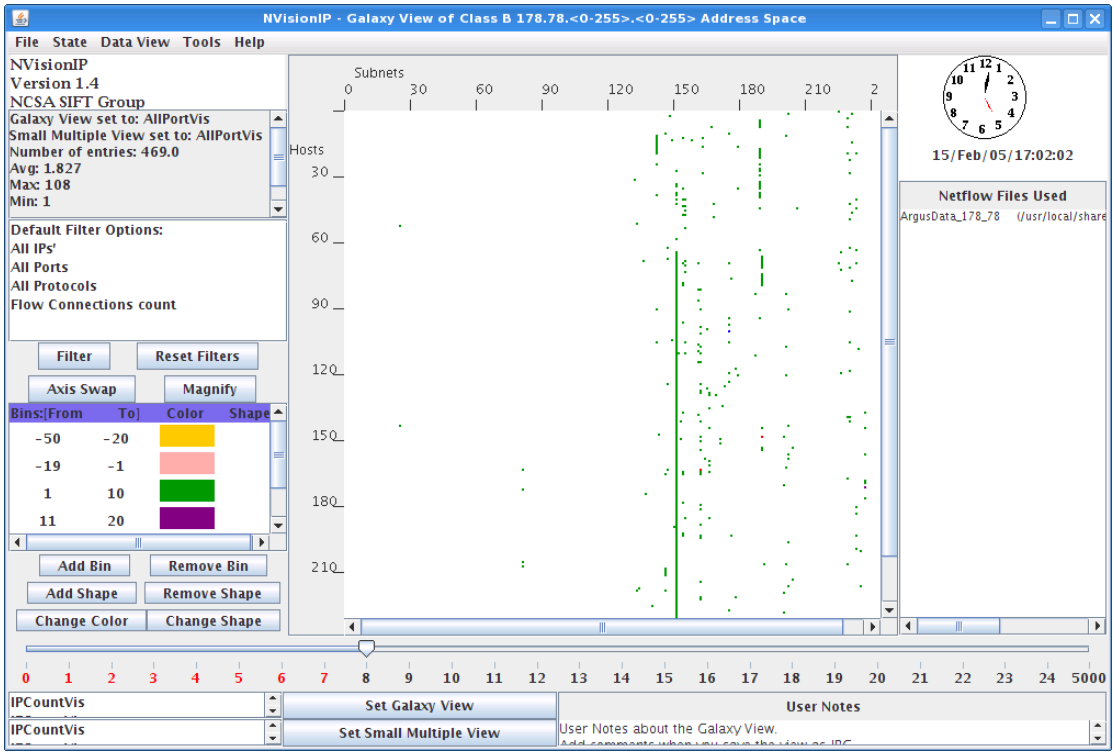
- In the window *MultiDataSetChooser* enter into the field *ClassB IP Header* the following value: *178.78.*



- Press the button *OK*.

- The data set is now loaded.

- Move the slider bar at the bottom of the window to advance the scatter plot across the time line.



3.19. Parvis (V)

Purpose

- Rendering of data as parallel coordinate display.

Links

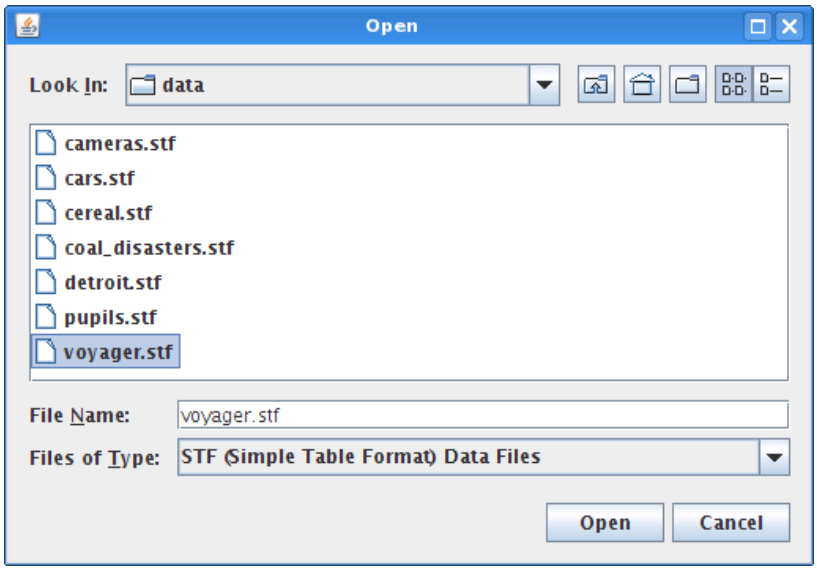
- Homepage http://home.subnet.at/flo/mv/parvis/
- Introduction http://home.subnet.at/flo/mv/parvis/introduction.html
- User Manual http://home.subnet.at/flo/mv/parvis/documentation.html

Important install locations

- /usr/local/bin
- /usr/local/lib/parvis
- /usr/local/share/parvis

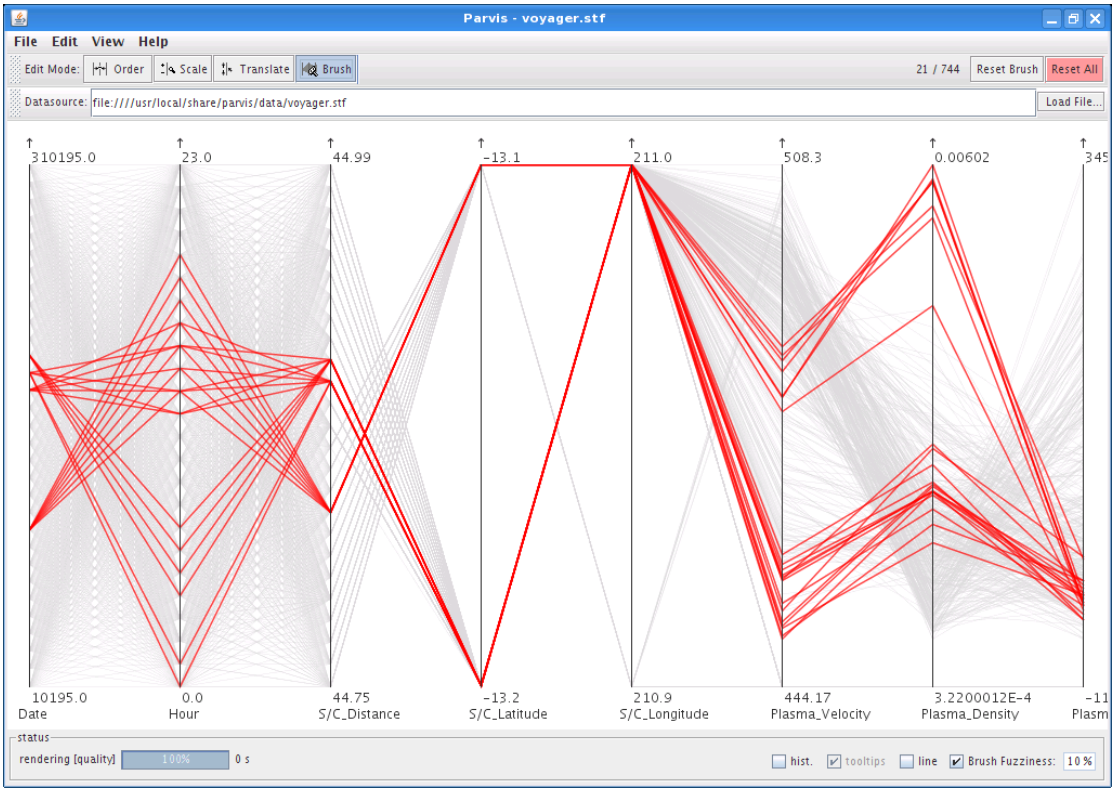
Example

- Start *Parvis* through the KDE start menu.
- In the window menu select *File\Open*.
- In the file open dialog navigate to: */usr/local/share/parvis/data*
- Open one of the graphs in this directory, e.g. *voyager.stf*.



- In the toolbar press the *Brush* button.
- Now you can select lines you want to inspect in more detail. When you select you do not select single lines. Instead you define an angle.

- To make a new selection, press the *Reset All* button in the toolbar.



3.20. Passive Asset Detection System - PADS (CP)

Purpose

- PADS allows to passively instrument hosts on the network and their services.

Links

- Homepage http://passive.sourceforge.net/

Important installation locations

- /etc/rc.d/rc.pads
- /usr/local/etc
- /usr/local/bin
- /usr/local/share/pads/

Log directory

- /var/log/pads

Example

- Open a console.

- To start the PADS daemon execute the command:
  sh /etc/rc.d/rc.pads start

- The assets are recorded in a log file. To view the assets, tail this log file with following command: *tail -f /var/log/pads/assets.csv*

```
root@slax:~# tail -f /var/log/pads/assets.csv
asset,port,proto,service,application,discovered
74.125.39.103,80,6,www,gws,1217205195
74.125.39.99,80,6,www,gws,1217205195
```

- Generate some traffic with Firefox to get the PADS log file populated with information.

- To stop the PADS daemon execute the command:
  sh /etc/rc.d/rc.pads stop

3.21. Ploticus (V)

Purpose

- Generation of all kinds of charts.

Links

- Homepage http://ploticus.sourceforge.net/doc/welcome.html
- Prefab Handbook http://ploticus.sourceforge.net/doc/prefabs.html

Important install locations

- /usr/local/bin
- /usr/local/share/ploticus

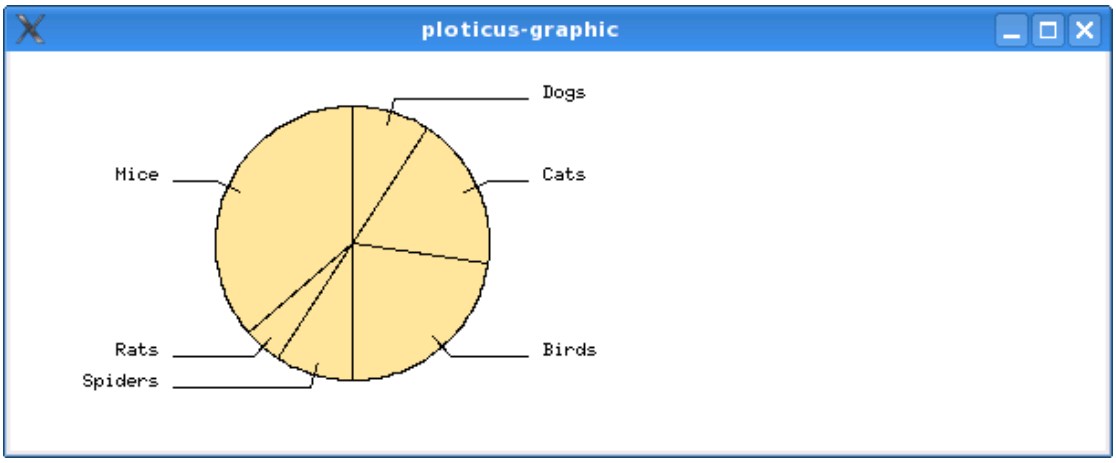
Example

- Open a console.

- Create a file *data.csv* with following content:

```
Dogs,10
Cats,20
Birds,25
Spiders,10
Rats,5
Mice,40
```

- To generate a pie chart execute the command:
  pl -prefab pie values=2 labels=1 data=data.csv delim=comma



3.22. p0f (C)

Purpose

- Identification of a remote host's operating system.

Links

- Homepage http://lcamtuf.coredump.cx/p0f.shtml

Important install locations

- /etc/p0f
- /usr/sbin

Example

- Open a console.
- Execute command: *p0f*
- Open Firefox and surf to some site.
- The output of *p0f* reads as follows:

```
p0f - passive os fingerprinting utility, version 2.0.8
(C) M. Zalewski <lcamtuf@dione.cc>, W. Stearns <wstearns@pobox.com>
p0f: listening (SYN) on 'eth0', 262 sigs (14 generic, cksum 0F1F5CA2), rule:
'all'.
192.168.16.220:36390 - Linux 2.6 (newer, 2) (up: 4 hrs)
  -> 216.92.151.5:80 (distance 0, link: ethernet/modem)
192.168.16.220:35442 - Linux 2.6 (newer, 2) (up: 4 hrs)
  -> 216.92.177.115:80 (distance 0, link: ethernet/modem)
192.168.16.220:50819 - Linux 2.6 (newer, 2) (up: 4 hrs)
  -> 209.85.161.147:80 (distance 0, link: ethernet/modem)
...
```

3.23. Processing (V)

Purpose

- A visualization framework that allows you to program visualizations in Java style language and provides a runtime environment to view these programs.

Links

- Homepage http://processing.org/

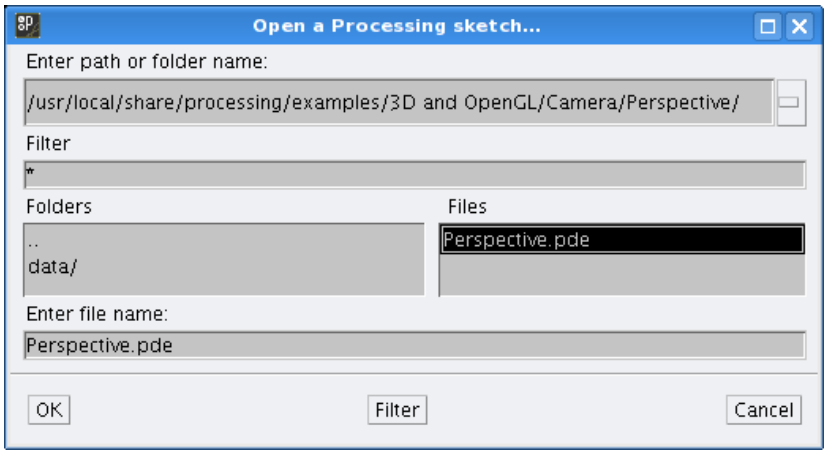
Important installation locations

- /usr/local/bin
- /usr/local/lib/processing/
- /usr/local/share/processing/

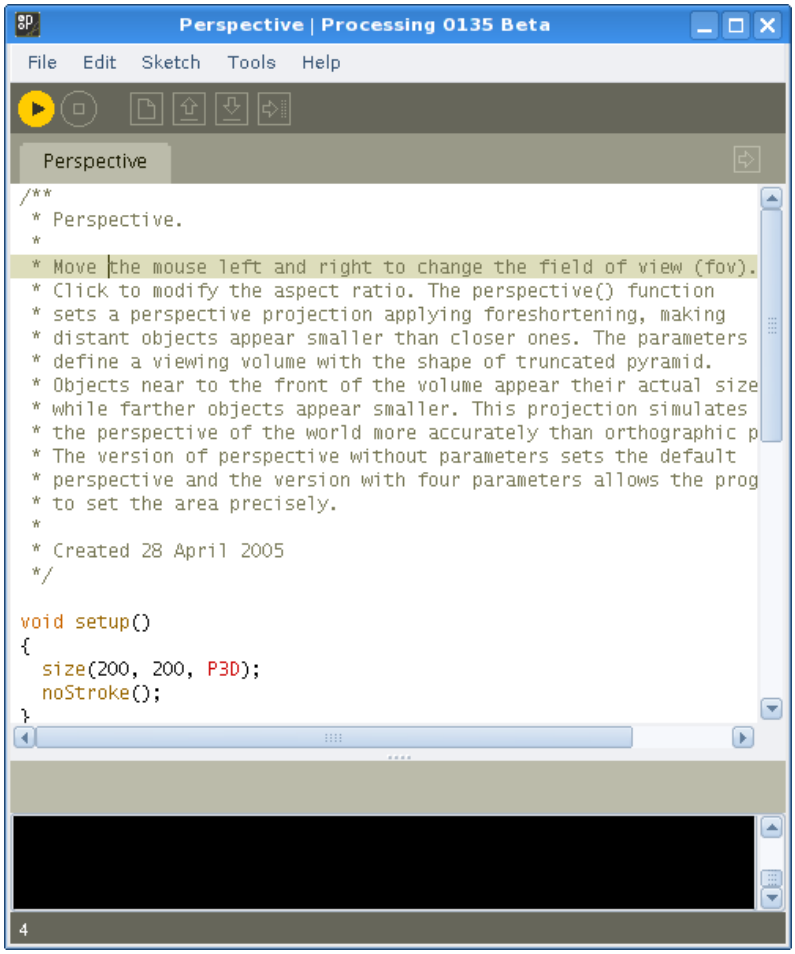
Example

- Start *Processing* through the KDE start menu.

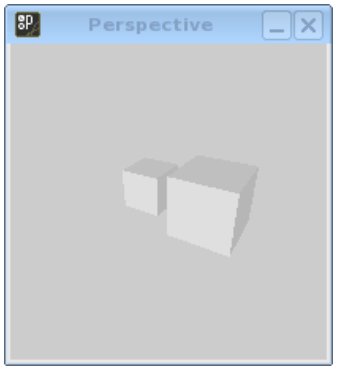
- From the window menu select *File\Open...* and open any one of the PBE files found in the subdirectories of */usr/local/share/processing/examples*, e.g. *Perspective.pde*



- The source code is now loaded into the Processing workbench.



- Press the Play button in the workbench tool bar to start visualization.



- Press the Stop button in the workbench tool bar to stop visualization.

3.24. R Project (V)

Purpose

- Tool for statistical analysis that offers a great variety of graphing capabilities.

Links

- Homepage http://www.r-project.org/
- Introduction http://cran.r-project.org/doc/manuals/R-intro.html
- Manual http://cran.r-project.org/manuals.html

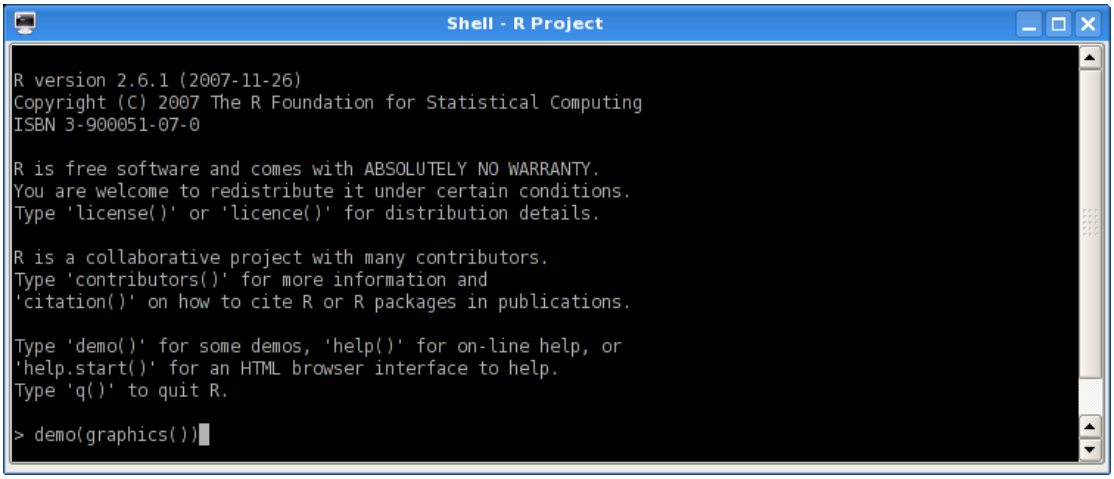
Important install locations

- /usr/local/bin
- /usr/local/lib/R

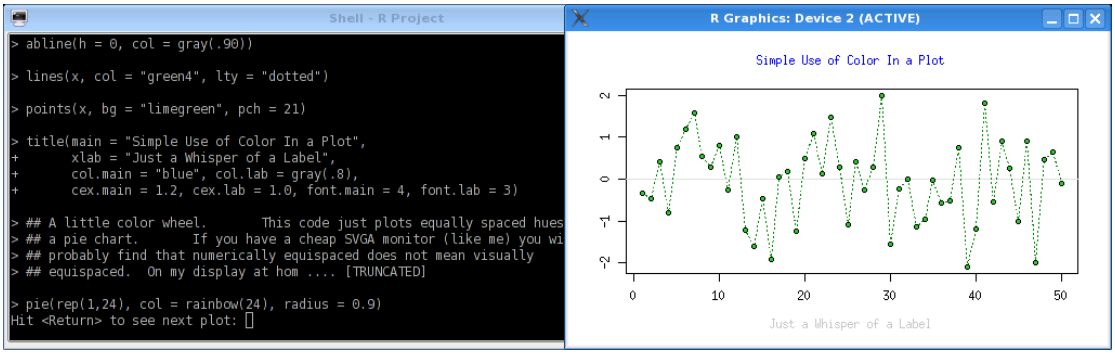
Example

- Start *R Project* through the KDE start menu.

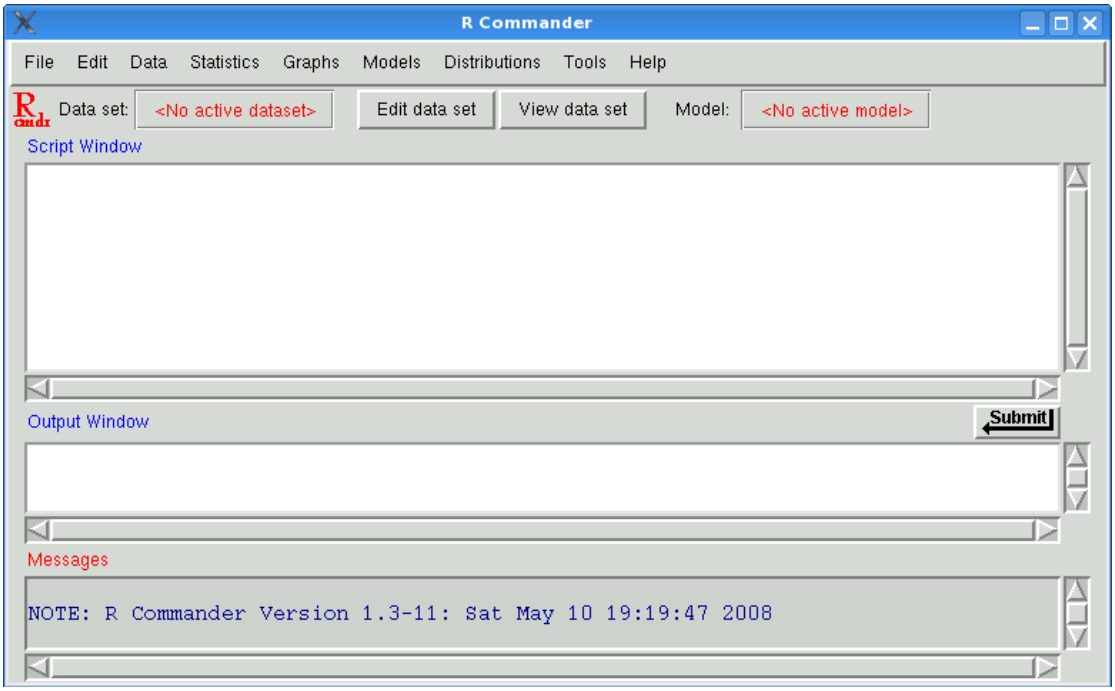
- After receiving the R command prompt you can start the demo by executing: *demo(graphics())*



- Step through the demo by pressing *ENTER*.

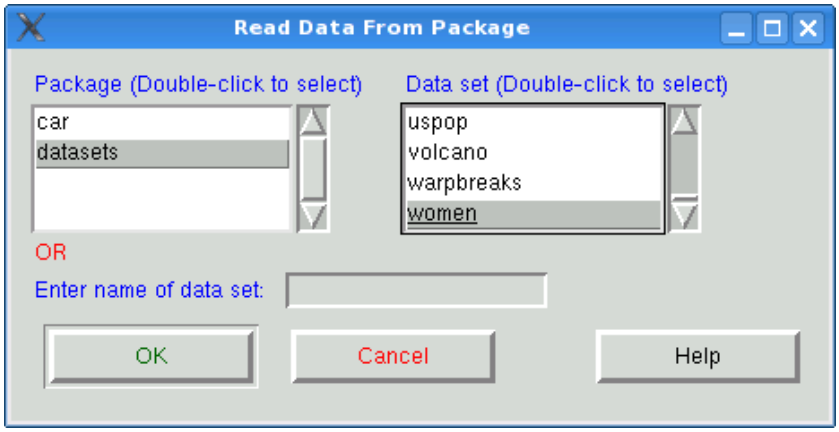


- When you are back on the R command prompt you can start R Commander by executing the command: *library("Rcmdr")*



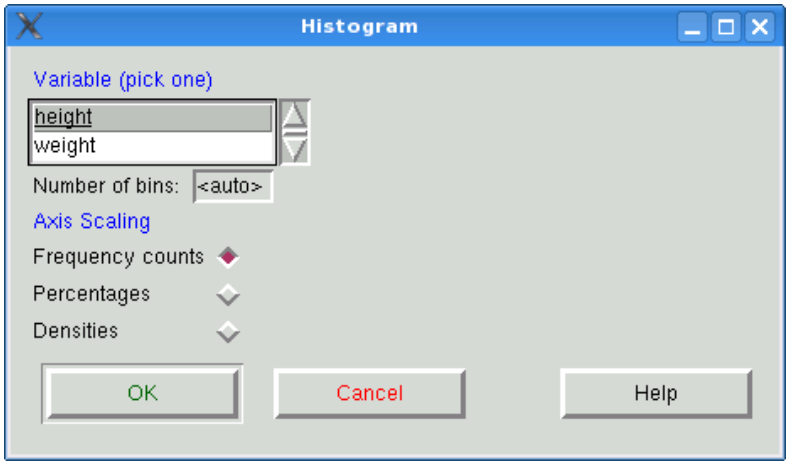
- To load some sample data set select in the window menu *Data\Data in packages\Read data set from an attached package...*

- Double click on the entry *datasets*.

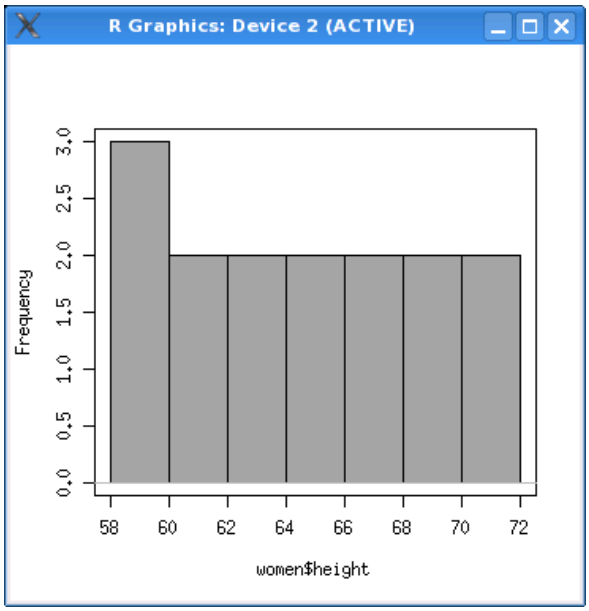


- To visualize, select *Graph\Histogram...* in the main window menu.

- In the *Histogram* configuration dialog select the variable you want to visualize, e.g. *height*, and then acknowledge the dialog.



- The histogram is now plotted.



3.25. RRDtool (V)

Purpose

- A tool for graphing time series data.

Links

- Homepage http://oss.oetiker.ch/rrdtool/
- Tutorial http://oss.oetiker.ch/rrdtool/tut/rrdtutorial.en.html

Important install locations

- /usr/local/bin
- /usr/local/lib
- /usr/local/rrdtool-1.2.26
- /usr/local/share/rrdtool

Example[14]

- Open a console.

- To set up the round robin database use the following command:

```
rrdtool create test.rrd --start 920804400 DS:speed:COUNTER:600:U:U
RRA:AVERAGE:0.5:1:24 RRA:AVERAGE:0.5:6:10
```

- To update the database with data use the following commands:

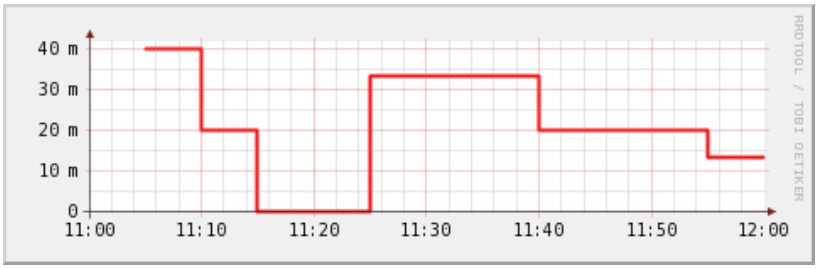
```
rrdtool update test.rrd 920804700:12345 920805000:12357 920805300:12363
rrdtool update test.rrd 920805600:12363 920805900:12363 920806200:12373
rrdtool update test.rrd 920806500:12383 920806800:12393 920807100:12399
rrdtool update test.rrd 920807400:12405 920807700:12411 920808000:12415
rrdtool update test.rrd 920808300:12420 920808600:12422 920808900:12423
```

- The following command generates a PNG file with the graph:

```
rrdtool graph speed.png --start 920804400 --end 920808000
DEF:myspeed=test.rrd:speed:AVERAGE LINE2:myspeed#FF0000
```

[14] Partly taken from RRDtool Tutorial: http://oss.oetiker.ch/rrdtool/tut/rrdtutorial.en.html

- Open *GQview* and view image *speed.png*



3.26. RT Graph 3D (V)

Purpose

- Real-time 3D visualization of linked graphs.

Links

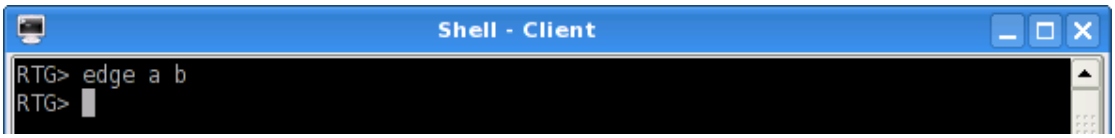
- Homepage http://www.secdev.org/projects/rtgraph3d/

Important install locations

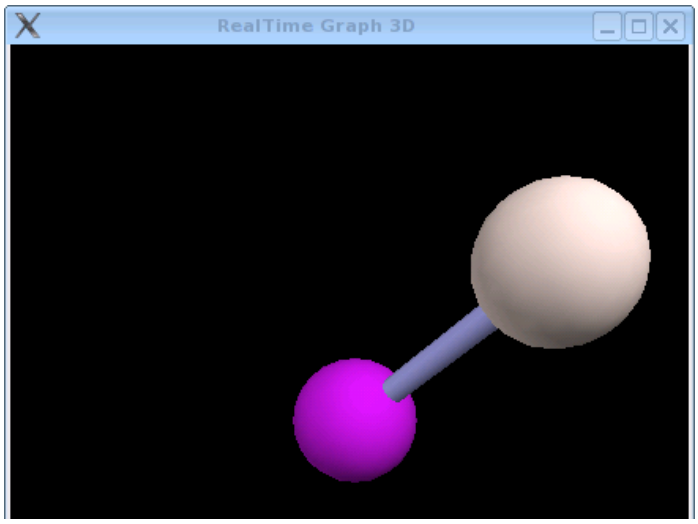
- /usr/local/bin
- /usr/local/lib/rtgraph3d

Example

- Start *RT Graph 3D Server* through the KDE start menu.
- Wait until the window named *RealTime Graph 3D* appears.
- Start *RT Graph 3D Client* through the KDE start menu.
- On the *RTG* prompt of the client enter: *edge a b*



- The linked graph should now be shown.



- On the *RTG* prompt of the client enter: *help*

- A list of possible commands is shown.

3.27. rumint (V)

Purpose

- Visualization of real-time and recorded network captures. Since rumint is running in Wine sniffing of real-time traffic is not supported.

Links

- Homepage http://www.rumint.org/

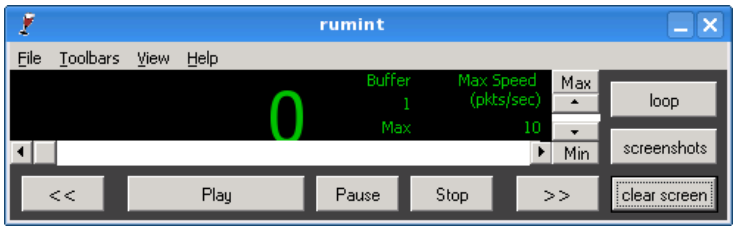
Important install locations

- ./root/.wine/drive_c/Program Files/rumint

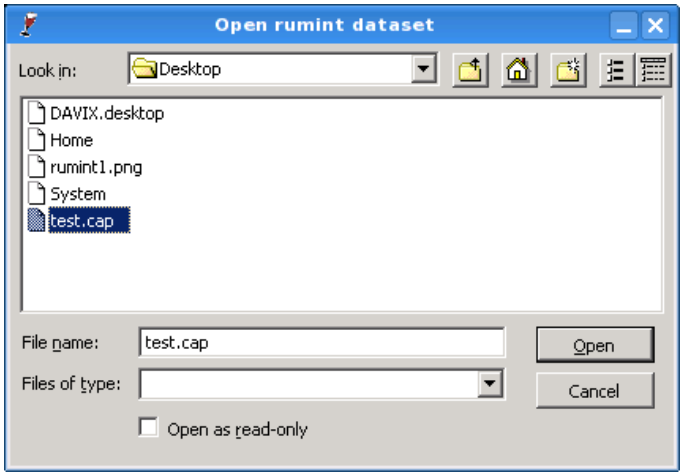
Example

- Since rumint is running in Wine, it is not possible to capture live network traffic. Therefore you have to capture the traffic with *Wireshark* or *tcpdump*.

- Start *rumint* through the KDE start menu.



- In the window menu select *File\Load PCAP Dataset*.



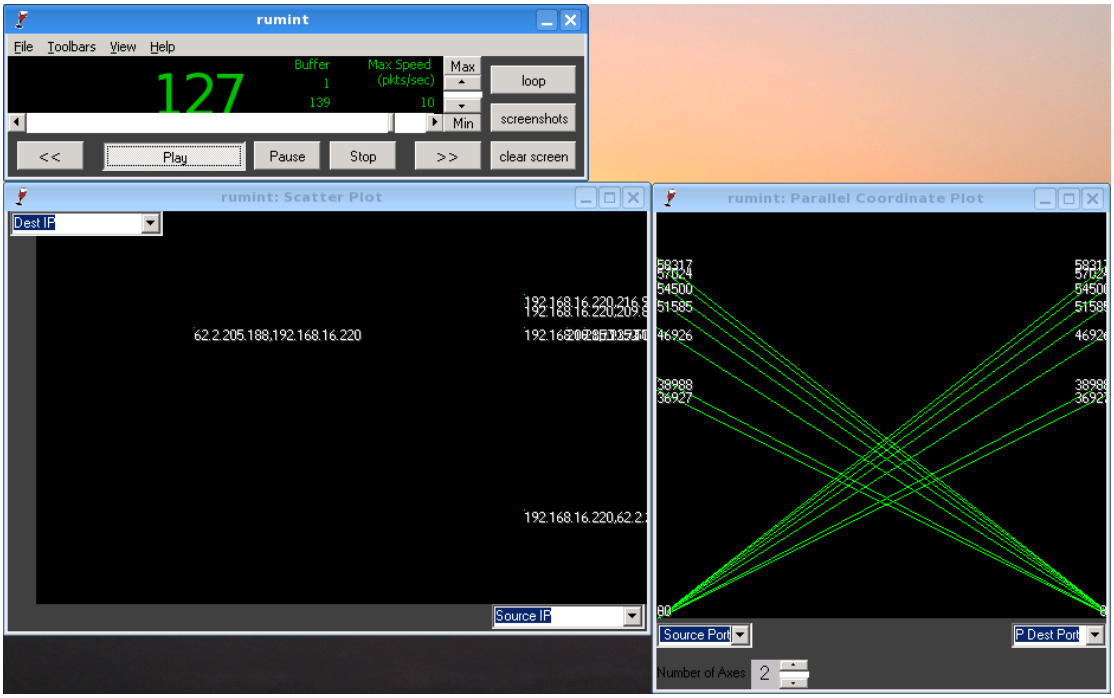
- In the file open dialog navigate to your capture file and open it.

- In the window menu select *View\Scatter Plot* and then *View\Parallel Plot*.

- In the window *Scatter Plot* select *Source IP* in the X-axis and *Dest IP* in the Y-axis.

- In the window *Parallel Coordinate Plot* select *TCP Source Port* on the left hand side and *TCP Dest Port* on right hand side.

- Press the play button to start visualizing the network traffic.



3.28. Scapy (CPV)

Purpose

- Capture and manipulation of TCP/IP traffic.
- Visualization of traceroutes.

Links

- Homepage http://www.secdev.org/projects/scapy/
- Tutorial http://www.secdev.org/projects/scapy/demo.html

Important install locations

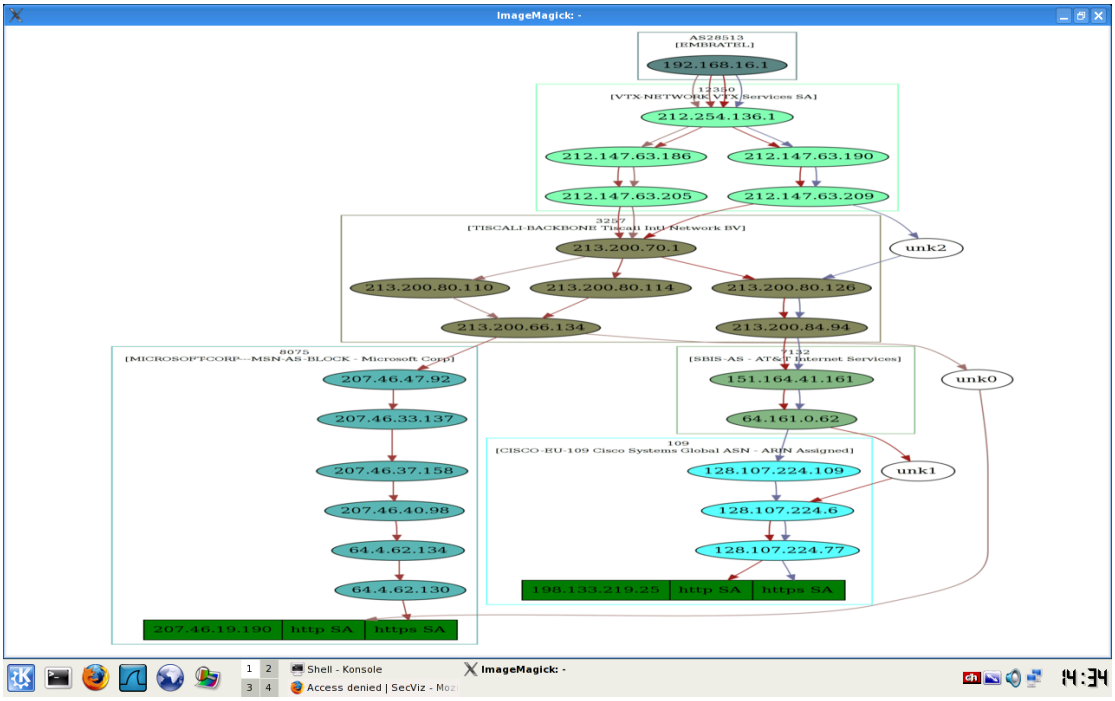
- /usr/lib/python2.5
- /usr/local/bin

Example traceroute

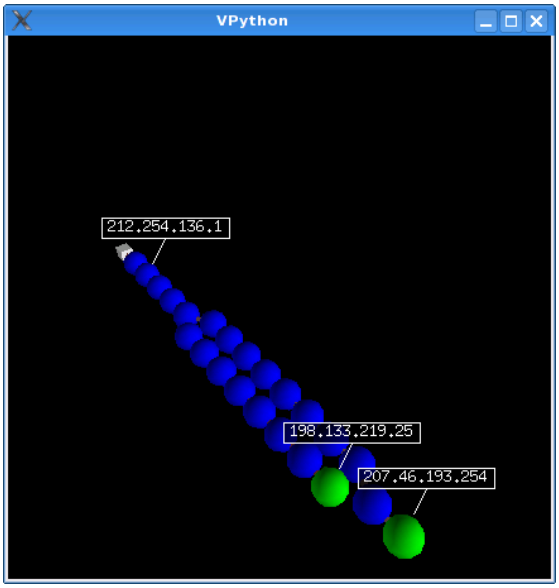
- Open a console.
- Execute the command: *scapy*
- Execute the following command to traceroute a series of hosts: *res,unans = traceroute(["www.microsoft.com","www.cisco.com"], dport=[80,443],maxttl=20,retry=-2)*

```
root@slax:~# scapy
Welcome to Scapy (1.2.0.2)
>>> res,unans = traceroute(["www.microsoft.com","www.cisco.com"],
... dport=[80,443],maxttl=20,retry=-2)
Begin emission:
*********************************************************************Finish
ed to send 80 packets.
*******Begin emission:
Finished to send 3 packets.
*Begin emission:
Finished to send 2 packets.
Begin emission:
Finished to send 2 packets.

Received 78 packets, got 78 answers, remaining 2 packets
   198.133.219.25:tcp443 198.133.219.25:tcp80 207.46.19.190:tcp443
207.46.19.190:tcp80
1  192.168.16.1    11    192.168.16.1    11   192.168.16.1    11
192.168.16.1    11
2  212.254.136.1   11    212.254.136.1   11   212.254.136.1   11
212.254.136.1   11
...
```

- To plot the graph use the command: *res.graph()*



- To generate a three-dimensional plot use the command: *res.trace3D()*



Example Sniffing

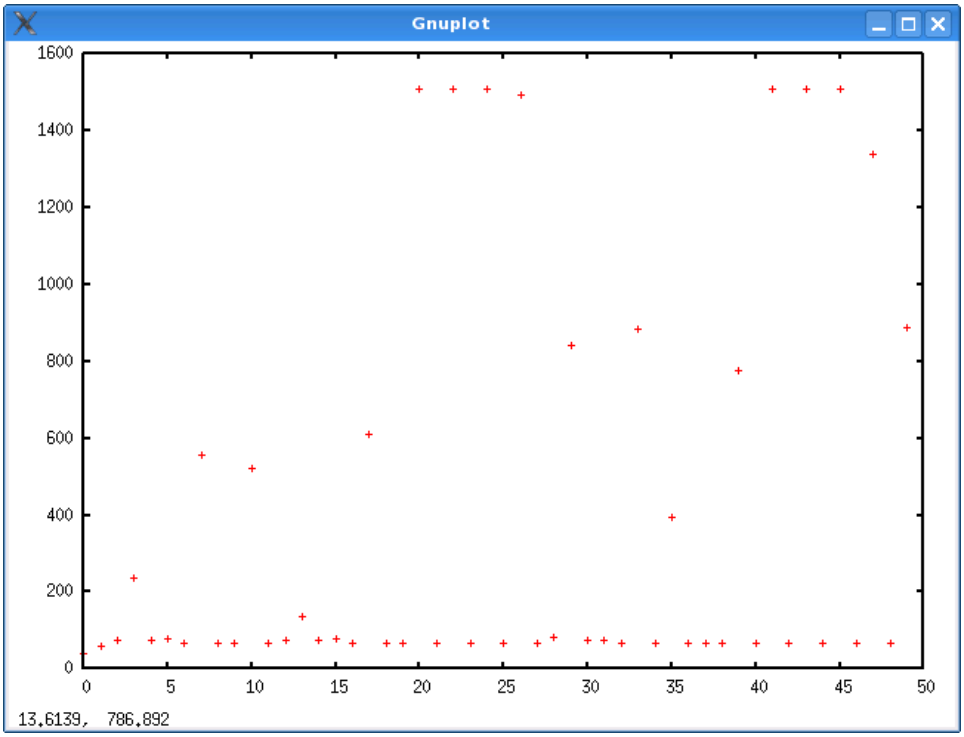
- Open a console.
- Execute the command: *scapy*
- Sniff some network traffic: *p=sniff(count=50)*

```
root@slax:~# scapy
Welcome to Scapy (1.2.0.2)
>>> p=sniff(count=50)
```

- Plot some statistics using the command: *p.plot(lambda x:len(x))*

```
>>> p.plot(lambda x:len(x))
<Gnuplot._Gnuplot.Gnuplot instance at 0x84cf0ec>
```

- The graph is plotted.



3.29. Shell Tools (P)

Purpose

- Common UNIX tools for processing text files.

Links

- Tutorial awk: http://www.grymoire.com/Unix/Awk.html
- Tutorial grep: http://www.panix.com/~elflord/unix/grep.html
- Tutorial sed: http://www.grymoire.com/Unix/Sed.html

Important install locations

- /usr/bin

Example

- Open a console.

- To extract the first column of a colon separated text file use:
  awk -F\: '{print $1}' /etc/passwd

```
root@slax:~# awk -F\: '{print $1}' /etc/passwd
root
bin
daemon
adm
lp
...
```

- To grep a single line from a text file use:
  grep "^root" /etc/passwd

```
root@slax:~# grep "^root" /etc/passwd
root:x:0:0::/root:/bin/bash
```

- To egrep lines for multiple patterns use:
  egrep "^root|^apache" /etc/passwd

```
root@slax:~# egrep "^root|^apache" /etc/passwd
root:x:0:0::/root:/bin/bash
apache:x:80:80:User for Apache:/srv/httpd:/bin/false
```

3.30. Shoki Packet Hustler (V)

Purpose

- Visualization of network traffic as a three-dimensional scatter plot.

Links

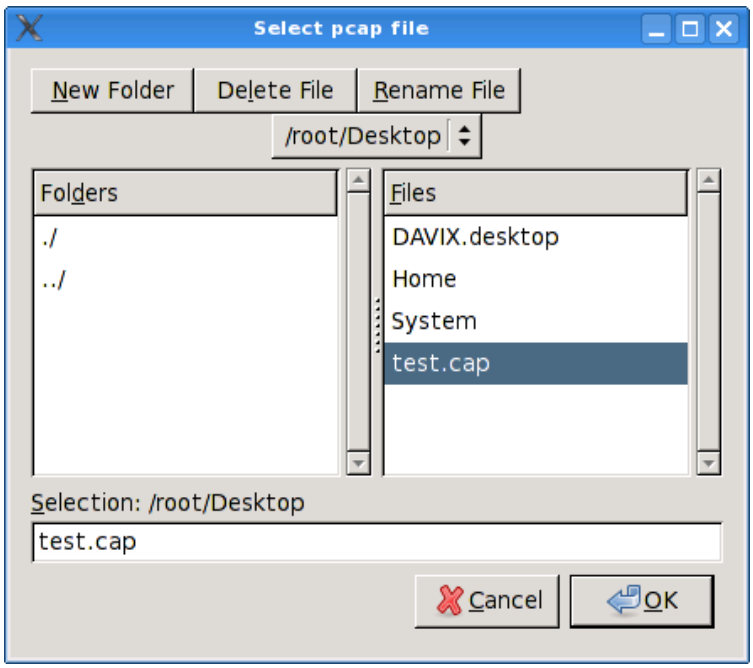
- Homepage http://shoki.sourceforge.net/
- Manual http://shoki.sourceforge.net/hustler/manual.html

Important install locations

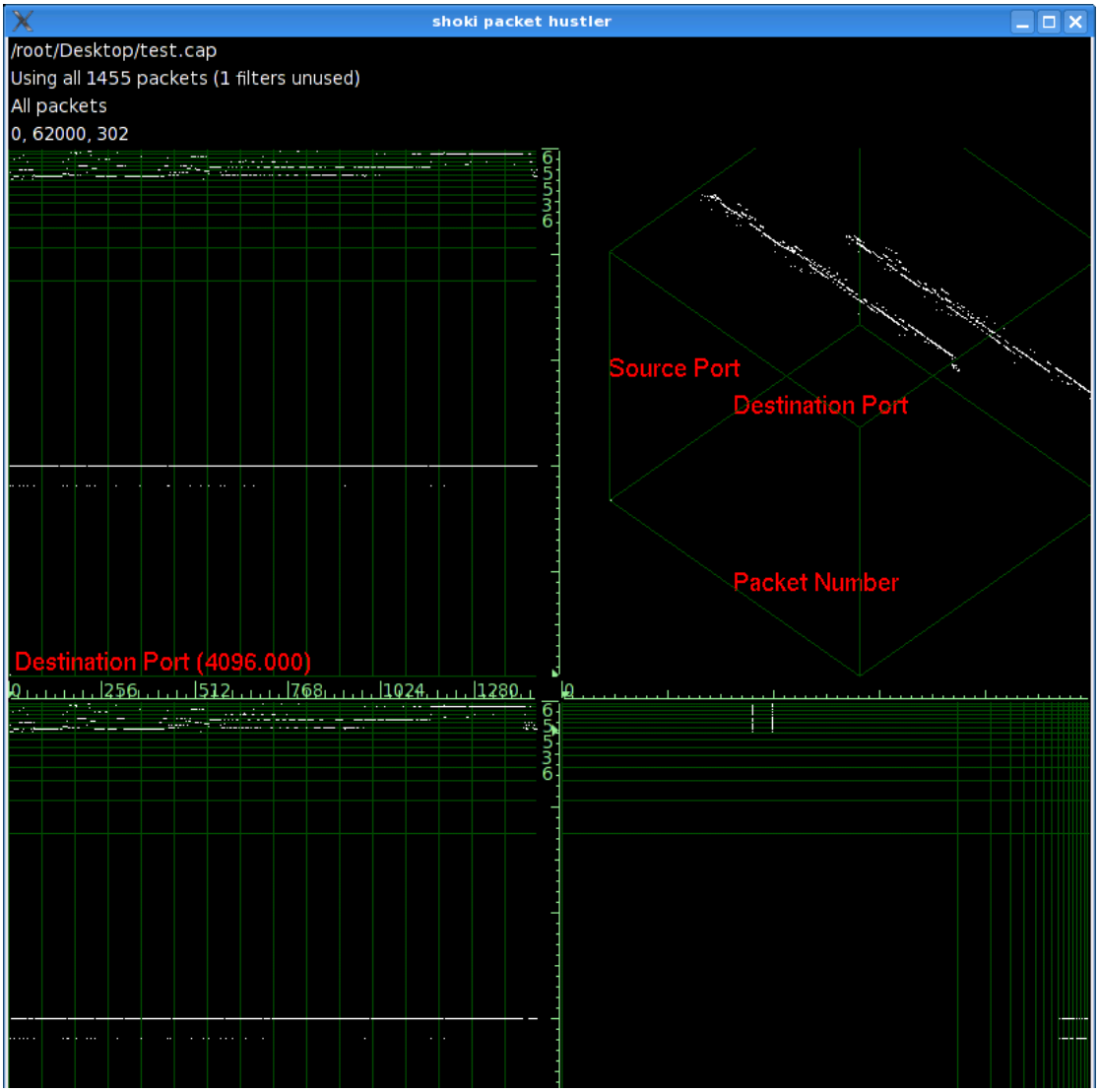
- /usr/local/shoki

Example

- First you have to create a capture file with Wireshark.
- Next, Start *Shoki Packet Hustler* through the KDE start menu.
- In the file open dialog select the capture file.



- The scatter plot of the network traffic is shown.



3.31. Snort (CP)

Purpose

- Intrusion Detection System to analyze life traffic or network capture files.
- DAVIX comes with the Bleeding Edge Threads rules. Since the Bleeding Edge Threats[15] project is currently inactive, the rules are not current. We suggest you to register at Snort and get current VRT and install them into DAVIX.

Links

- Homepage http://www.snort.org/
- Manual http://www.snort.org/docs/snort_htmanuals/htmanual_282/
- VRT Rules http://www.snort.org/pub-bin/downloads.cgi

Important installation locations

- /etc/rc.d/rc.snort
- /etc/rules
- /etc/snort
- /usr/local/bin
- /usr/local/share/doc/snort

Log directory

- /var/log/snort

Example

- Open a console.
- To start the Snort daemon execute the command:
  sh /etc/rc.d/rc.snort start
- The Snort alerts are recorded in a log file. To view the alerts, tail this log file with following command: *tail -f /var/log/snort/eth0/alert*
- Open Firefox and access following URL:
  http://www.iplosion.com/davix/..%255..%255..%255..%255cmd.exe
- In the snort alert log the attack should now be visible as *Double Decoding Attack*.

```
root@slax:~# tail -f /var/log/snort/eth1/alert
07/28-00:35:55.048842  [**] [119:2:1] (http_inspect) DOUBLE DECODING ATTACK
[**] [Priority: 3] {TCP} 192.168.16.150:49785 -> 192.168.80.10:80
```

- To stop the Snort daemon execute the command:
  sh /etc/rc.d/rc.snort stop

[15] Bleeding Edge Threats: http://www.bleedingthreats.net/

3.32. syslog-ng (CP)

Purpose

- New generation syslog daemon that allows for easy post processing of log events.
- In DAVIX syslog-ng is configured to receive remote syslog data through the UDP and TCP ports 514. Local syslog events are not handled through syslog-ng. They are dealt with the standard syslog daemon.

Links

- Homepage http://www.balabit.com/network-security/syslog-ng/
- Manual http://www.balabit.com/dl/html/syslog-ng-admin-guide_en.html/bk01-toc.html

Important installation locations

- /etc/rc.d/rc.syslog-ng
- /etc/syslog-ng
- /usr/local/bin
- /usr/local/sbin

Log directory

- /var/log/syslog-ng

Example

- Open a console.
- To start the syslog-ng daemon execute the command:
  sh /etc/rc.d/rc.syslog-ng start
- The syslog messages are recorded in a log file. To view the messages, tail this log file with following command: *tail -f /var/log/syslog-ng/syslog-ng*
- Redirect your device syslog to DAVIX to populate the log file.
- The syslog messages should now be shown in the console where you are tailing.

```
root@slax:/var/log/syslog-ng# tail -f syslog-ng
Jul 28 00:41:38 milkyway ipmon[93]: 00:41:38.084572 sis3 @0:58 b
192.168.48.10,1761 -> 123.123.123.123,443 PR tcp len 20 48 -S IN
Jul 28 00:41:41 milkyway ipmon[93]: 00:41:41.002881 sis3 @0:58 b
192.168.48.10,1761 -> 123.123.123.123,443 PR tcp len 20 48 -S IN
Jul 28 00:41:47 milkyway ipmon[93]: 00:41:47.018679 sis3 @0:58 b
192.168.48.10,1761 -> 123.123.123.123,443 PR tcp len 20 48 -S IN
```

- To stop the syslog-ng daemon execute the command:
  sh /etc/rc.d/rc.syslog-ng stop

3.33. tcpdump (C)

Purpose

- Command line tool for sniffing network traffic.

Links

- Homepage: http://www.tcpdump.org/
- Manual: http://www.tcpdump.org/tcpdump_man.html

Important install locations

- /usr/sbin

Example

- Open a console.

- To capture network traffic into a file from the network interface eth0, use the following command: *tcpdump -s0 -i eth0 -w test.cap*

3.34. tcpreplay (P)

Purpose

- Actually a suite of three tools, which allows to replay capture network traffic back to the network (tcpreplay), rewrite packets in capture files (tcprewrite) and a pre-processing tool for both mentioned tools (tcpprep).

Links

- Homepage http://tcpreplay.synfin.net/trac/
- Manual http://tcpreplay.synfin.net/trac/wiki/Documentation

Important install locations

- /usr/local/bin/

3.35. Timesearcher 1 (V)

Purpose

- Analysis of time series data.

Links

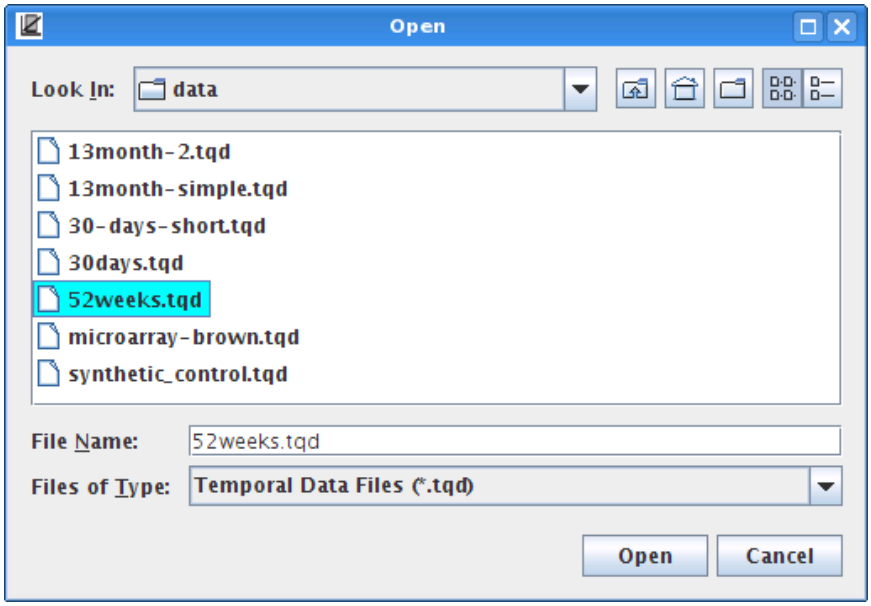
- Homepage http://www.cs.umd.edu/hcil/timesearcher/
- Manual http://www.cs.umd.edu/hcil/timesearcher/docs/index.html

Important install locations

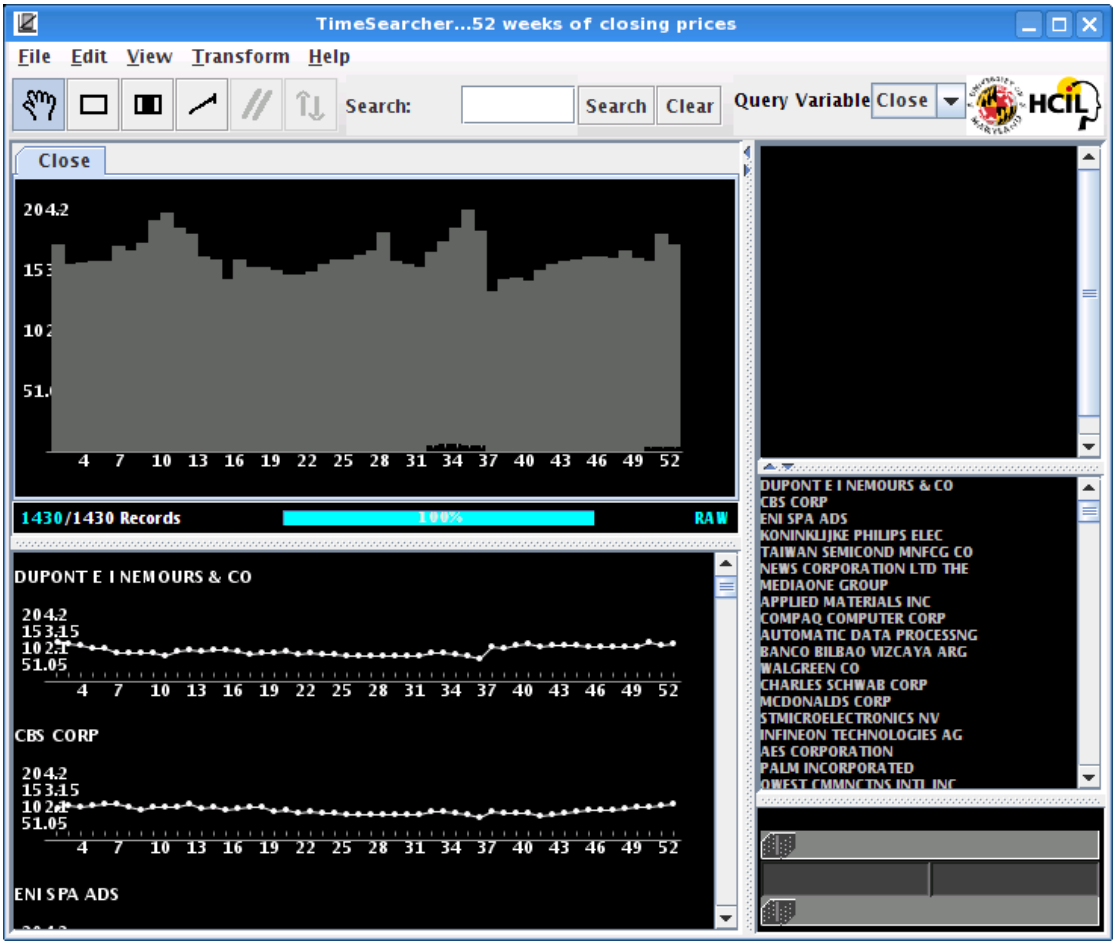
- /usr/local/bin
- /usr/local/lib/timesearcher1
- /usr/local/share/timesearcher1

Example

- Start *Timesearcher 1* through the KDE start menu.
- In the file dialog click the browse button and navigate to: */usr/local/share/timesearcher1/data*
- Open one of the graphs in this directory, e.g. *52weeks.tqd*.



- The graph is shown.



3.36. tnv (V)

Purpose

- Time based analysis of network traffic.

Links

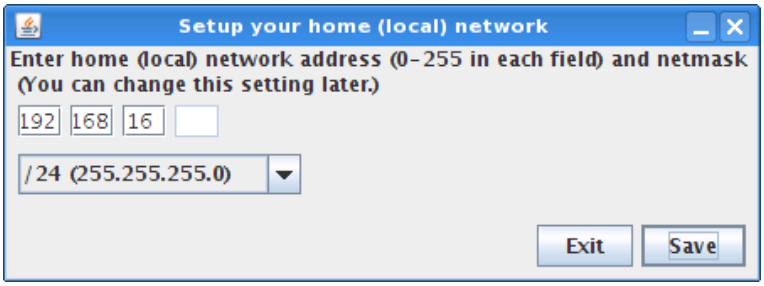
- Homepage http://tnv.sourceforge.net/
- Tutorial http://tnv.sourceforge.net/start.php

Important install locations

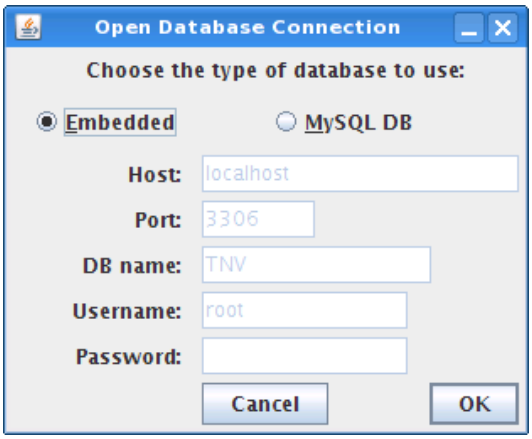
- /usr/local/bin
- /usr/local/lib/tnv
- /usr/local/share/tnv/

Example

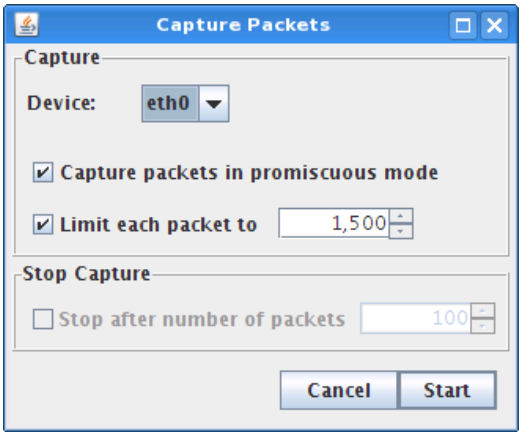
- Start *tnv* through the KDE start menu.
- Acknowledge the startup dialog by pressing the button *Begin using TNV*.
- In the upcoming dialog set your local network IP range, in our example it is *192.168.16.0* with the network mask *255.255.255.0*.



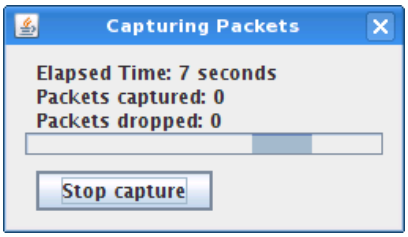
- In the *Open Database Connection* dialog select *Embedded*.



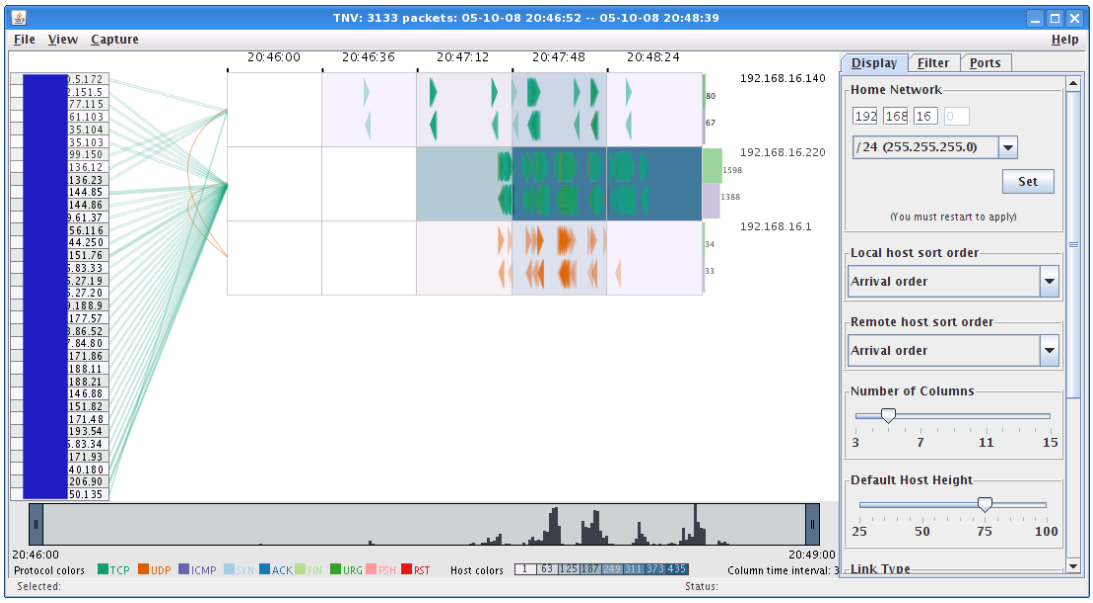
- In the window menu select *Capture\Capture Packets...*
- In the *Capture Packets* dialog select the network interface you want to monitor, e.g. *eth0*.



- Open Firefox and do some surfing.
- When you are done press the *Stop capture* button in tnv.



- The graph is rendered.



3.37. Treemap (V)

Purpose

- Visualization of hierarchical data as treemaps.

Links

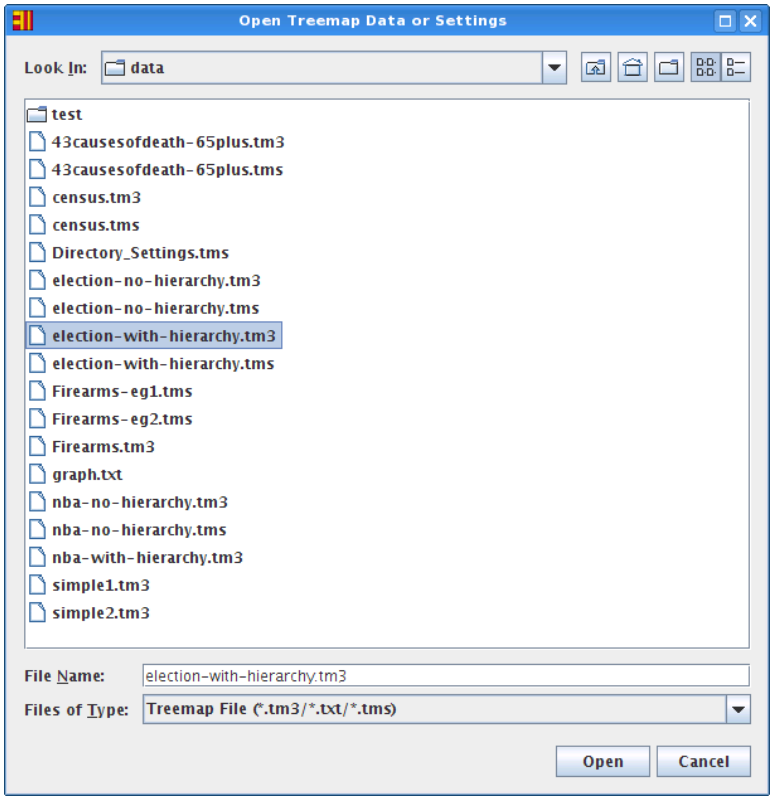
- Homepage http://www.cs.umd.edu/hcil/treemap/
- Manual http://www.cs.umd.edu/hcil/treemap/doc4.1/toc.html

Important install locations

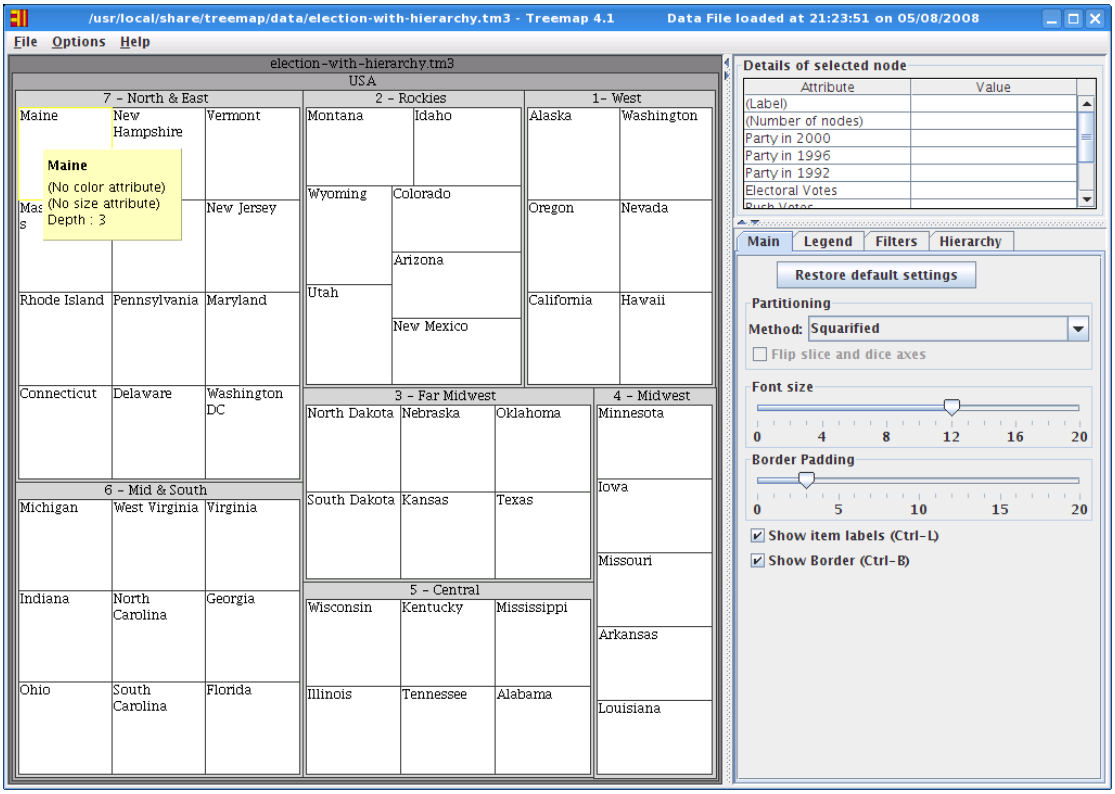
- /usr/local/bin
- /usr/local/lib/treemap
- /usr/local/share/treemap

Example

- Start *TreeMap* through the KDE start menu.
- The tool gives give a license warning that it can only be used for non commercial purposes. If you agree to the license conditions press *Agree*, otherwise *Exit*.
- In the file open dialog navigate to: */usr/local/share/treemap/data*.
- Open one of the graphs in this directory, e.g. *election-with-hierarchy.tm3*.



- The treemap is then rendered.



- By clicking into single boxes you can drill down the hierarchy.

3.38. Tulip (V)

Purpose

- Visualization tool for linked graphs that supports several layout algorithms.

Links

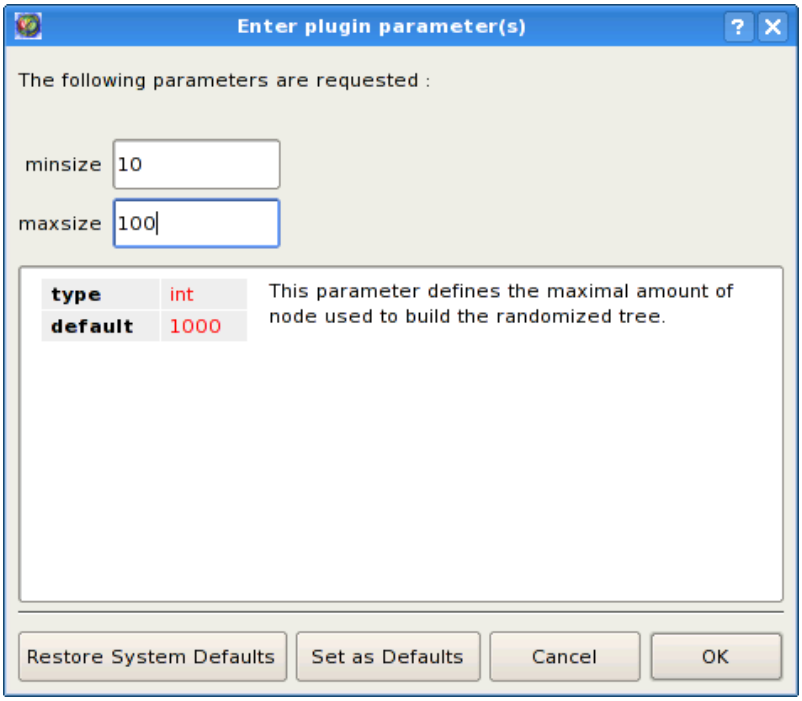
- Homepage http://www3.labri.fr/perso/auber/projects/tulip/
- Manual http://www3.labri.fr/perso/auber/projects/tulip/userHandbook.php

Important install locations

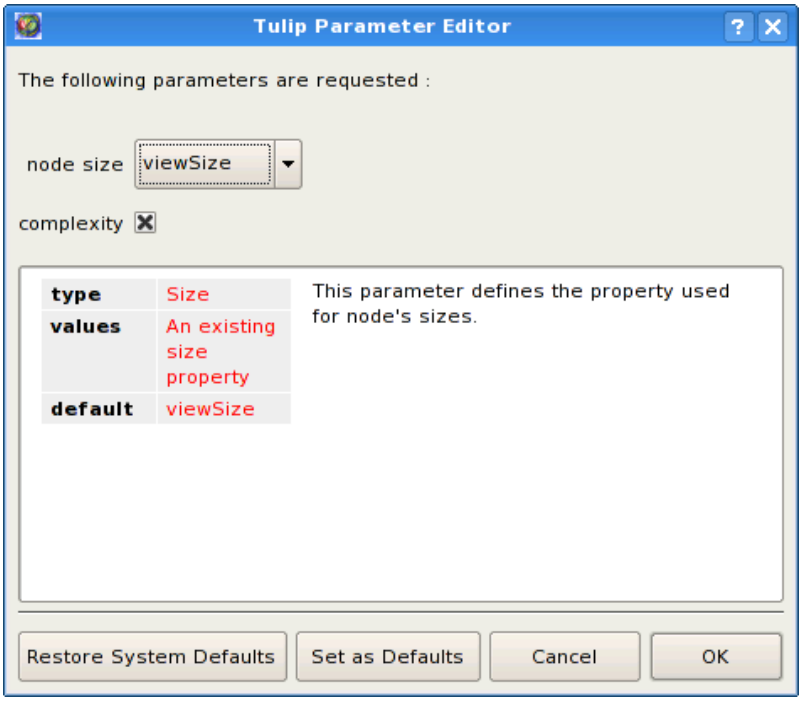
- /usr/local/bin
- /usr/local/lib
- /usr/local/lib/tlp
- /usr/local/share/tulip

Example

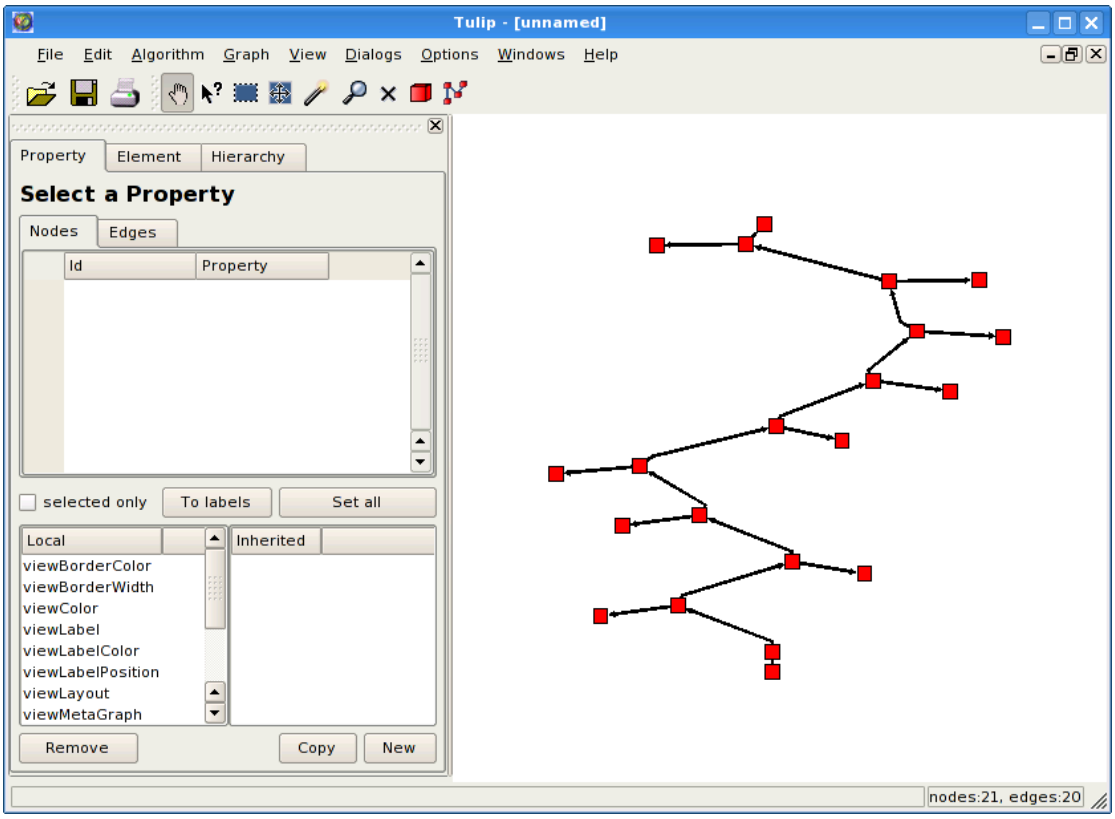
- Start *Tulip* through the KDE start menu.
- In the window menu select *File\Import\Graphs\Uniform Random Binary Tree*.
- In the dialog box enter for *minsize 10* and for *maxsize 100*.



- To layout the graph, use the window menu *Algorithm\Layout\Tree\Bubble Tree*.



- Just acknowledge the upcoming dialog and the tree gets laid out.



3.39. Walrus (V)

Purpose

- Visualization hierarchical data as three-dimensional link graphs.

Links

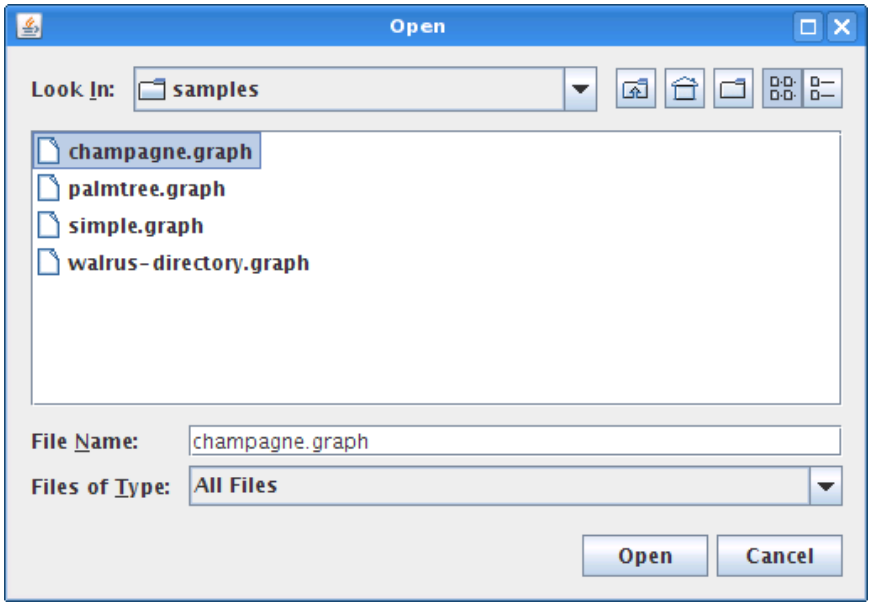
- Homepage http://www.caida.org/tools/visualization/walrus/

Important install locations

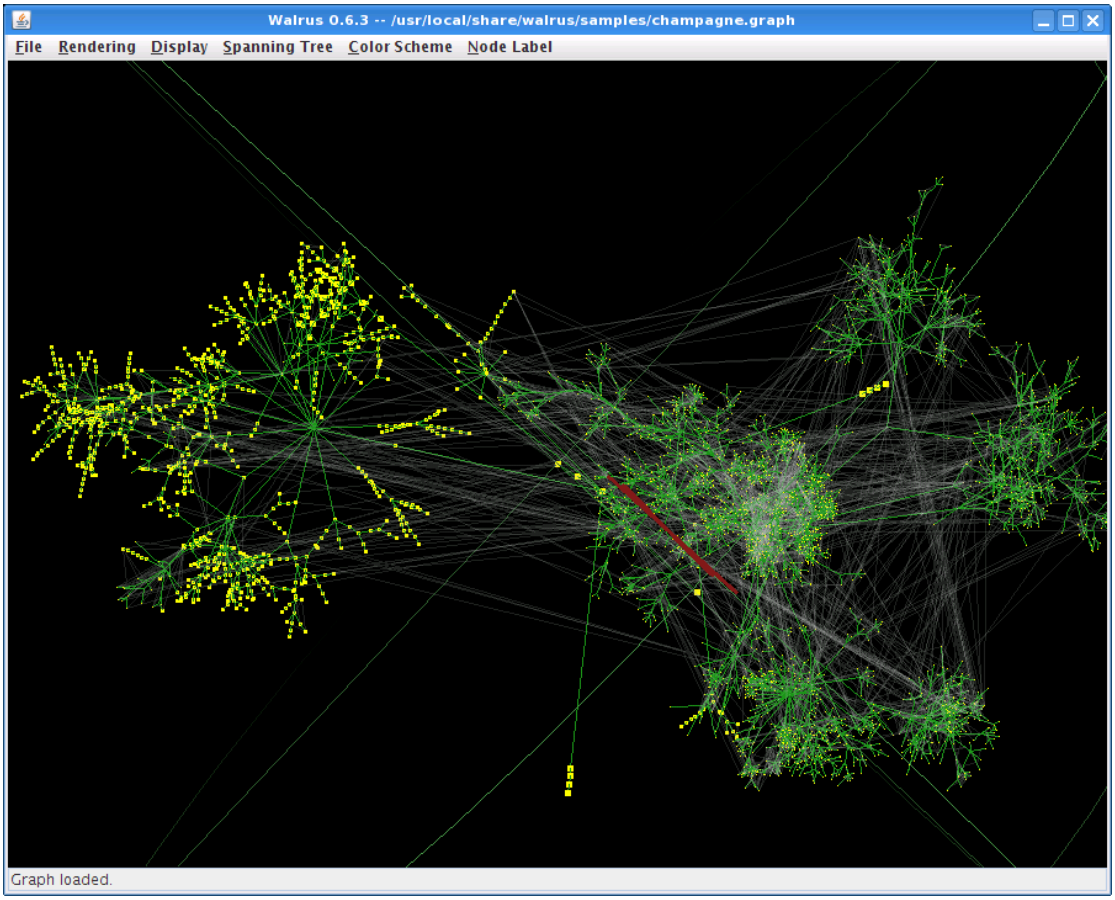
- /usr/local/bin
- /usr/local/lib/walrus
- /usr/local/share/walrus

Example

- Start *Walrus* through the KDE start menu.
- In the window menu select *File\Open*.
- In the file open dialog navigate to: */usr/local/share/walrus/samples*
- Open one of the graphs in this directory, e.g. *champagne.graph*.



- In the window menu select *Rendering\Start* to display the graph.



3.40. Wireshark (CV)

Purpose

- Capturing and dissecting network traffic.

Links

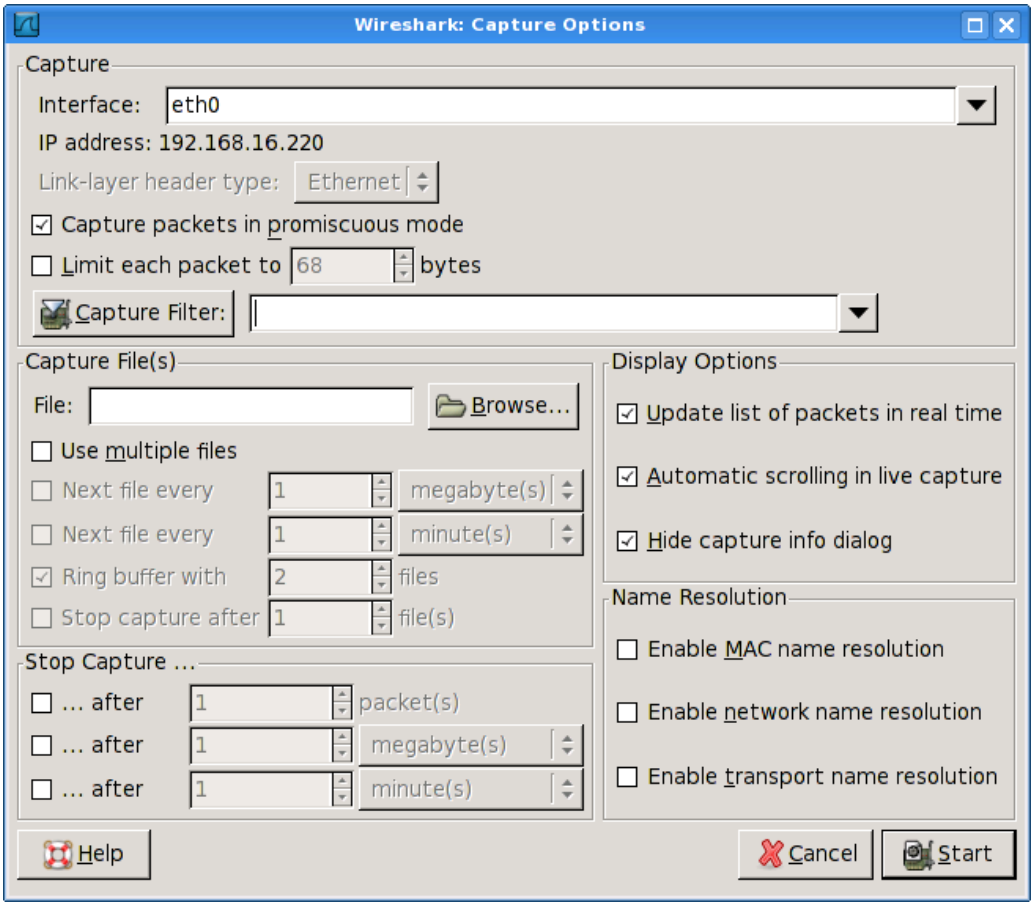
- Homepage: http://www.wireshark.org/
- Manual: http://www.wireshark.org/docs/wsug_html/

Important install locations

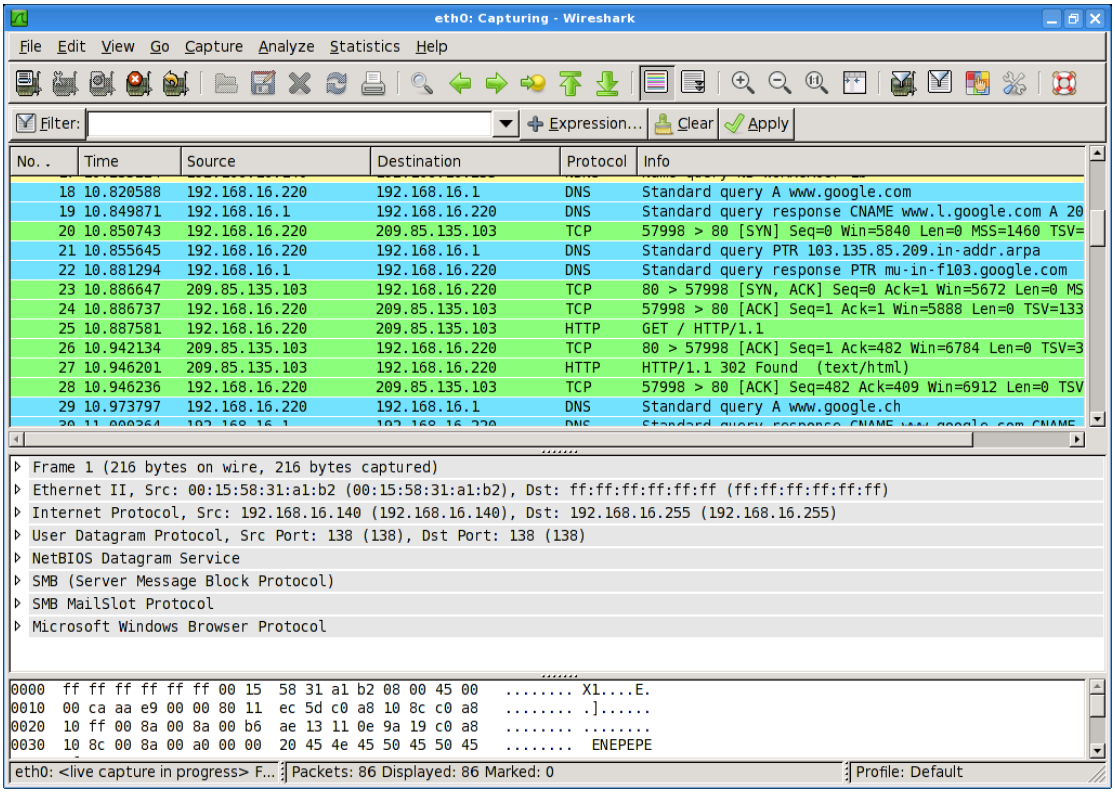
- /usr/local/bin
- /usr/local/lib
- /usr/local/lib/wireshark
- /usr/local/share/wireshark

Example

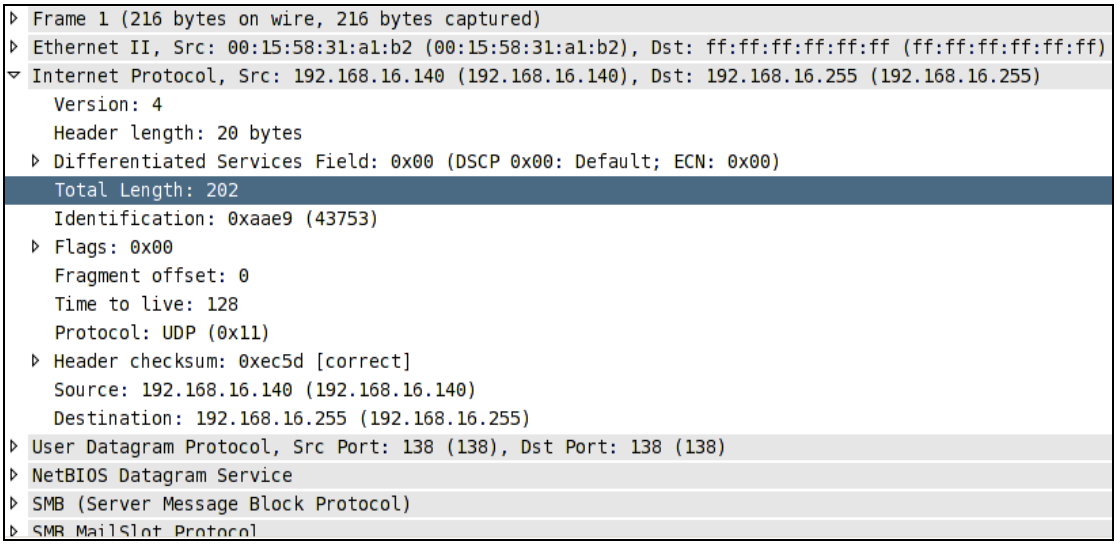
- Start *Wireshark* through the KDE start menu.
- Select menu *Capture\Options*.
- In the field *Interface* select the network interface you want to sniff.



- Press the *Start* button.
- The network traffic is now recorded.



- To stop recording select the window menu *Capture\Stop*.
- In the center window frame you can now navigate through the dissected protocol layers.



4. Customizing the DAVIX ISO Image

You will most likely get quickly to a point where you want to modify the DAVIX image to suit your particular requirements. Thanks to SLAX customizing your CD with your own configuration and adding or removing modules is really easy. This chapter shows you how to do that. Customizing can either be done under Linux or Windows.

4.1. Windows

The general steps for modifying the DAVIX ISO under Windows are the following:

- Create a new directory on your hard drive, e.g. *D:\mydavix*
- Copy the *boot* and *slax* directory to the newly created directory.
- Make your changes according to the instructions in the following chapters.
- Open a DOS prompt.
- Navigate to the *slax* directory on your hard drive using the command:
  cd /d D:\mydavix\slax
- Execute the following command to build the ISO image:
  make_iso.bat d:\mydavix\mydavix.iso

```
D:\mydavix\slax>make_iso.bat D:\mydavix\mydavix.iso
mkisofs 2.01 (i686-pc-cygwin)
Scanning .
Scanning ./boot
Scanning ./boot/dos
Scanning ./boot/isolinux
Excluded by match: ./boot/isolinux/isolinux.boot
Scanning ./boot/syslinux
Scanning ./slax
Scanning ./slax/base
Scanning ./slax/devel
Scanning ./slax/modules
Scanning ./slax/optional
Scanning ./slax/rootcopy
...
Scanning ./slax/rootcopy/usr/share/wallpapers
Scanning ./slax/tools
Scanning ./slax/tools/WIN
...
Writing:   Initial Padblock                        Start Block 0
Done with: Initial Padblock                        Block(s)    16
Writing:   Primary Volume Descriptor               Start Block 16
Done with: Primary Volume Descriptor               Block(s)    1
Writing:   Eltorito Volume Descriptor              Start Block 17
Size of boot image is 4 sectors -> No emulation
Done with: Eltorito Volume Descriptor              Block(s)    1
Writing:   Joliet Volume Descriptor                Start Block 18
```

```
Done with: Joliet Volume Descriptor                Block(s)    1
Writing:   End Volume Descriptor                   Start Block 19
Done with: End Volume Descriptor                   Block(s)    1
Writing:   Version block                           Start Block 20
Done with: Version block                           Block(s)    1
Writing:   Path table                              Start Block 21
Done with: Path table                              Block(s)    4
Writing:   Joliet path table                       Start Block 25
Done with: Joliet path table                       Block(s)    4
Writing:   Directory tree                          Start Block 29
Done with: Directory tree                          Block(s)    82
Writing:   Joliet directory tree                   Start Block 111
Done with: Joliet directory tree                   Block(s)    69
Writing:   Directory tree cleanup                  Start Block 180
Done with: Directory tree cleanup                  Block(s)    0
Writing:   Extension record                        Start Block 180
Done with: Extension record                        Block(s)    1
Writing:   The File(s)                             Start Block 181
  1.74% done, estimate finish Thu May  1 17:23:51 2008
...
 99.16% done, estimate finish Thu May  1 17:23:34 2008
Total translation table size: 2048
Total rockridge attributes bytes: 48022
Total directory bytes: 166354
Path table size(bytes): 860
Done with: The File(s)                             Block(s)    287089
Writing:   Ending Padblock                         Start Block 287270
Done with: Ending Padblock                         Block(s)    150
Max brk space used 64000
287420 extents written (561 MB)

New ISO should be created now.
Press any key to continue . . .
```

- Either burn the created ISO image *mydavix.iso* to a CD-ROM/DVD or use any other deployment method as document in the chapter Deployment Options.

4.2. Linux

The general steps for modifying the DAVIX ISO under Linux are the following. Note that *hdc* is used here as a sample. On you system it could be on another device ID.

- Open a console.
- Insert DAVIX CD into your CD or DVD drive. On some Linux system the CD will automatically be mounted into */mnt/hdc*.
- If DAVIX CD or DVD does not mount automatically you can mount it manually: *mount /dev/hdc /mnt/hdc*
- Create a new directory on your hard drive, e.g.: *mkdir -p /tmp/mydavix*
- Copy the *boot* and *slax* directory to the newly created directory: *cp -pvR /mnt/hdc/boot /mnt/hdc/slax /tmp/mydavix*
- Make your changes according to the instructions in the following chapters.

- Navigate to the *slax* directory on your hard drive using the command:
  cd /tmp/mydavix/slax

- Execute the following command to build the ISO image:
  ./make_iso.sh /tmp/mydavix/mydavix.iso

- Either burn the created ISO image *mydavix.iso* to a CD-ROM/DVD or use any other deployment method as documented the chapter Deployment Options.

4.3. Adding and Removing Modules

After copying all the SLAX files to the hard drive you can customize the SLAX content. Modules can be found in following directories:

- *slax\base* SLAX core modules. Will be loaded on every boot.
- *slax\modules* Standard modules. Will be loaded on every boot.
- *slax\optional* Optional modules which can be specified in the boot menu.

You can add or remove modules from these directories as you like.

4.4. Overriding Files with rootcopy

If you just want to override a specific file in one of the modules you can use the *slax\rootcopy* directory. The content of *rootcopy* will be applied to the union file system as the last step and it allows you to override any file in the file system.

This feature is very useful when you want to tweak single configuration files, like */etc/X11/xorg.conf*. But for larger changes the use of modules is encouraged.

4.5. Modifying the Boot Menu

The boot menu can be modified through the file *slax.cfg*, which can be found in the *boot* directory. Here you can add or remove additional entries in the boot menu. To add a new one just append following section to the file:

```
LABEL myconf
MENU LABEL DAVIX Graphics mode (KDE)
KERNEL /boot/vmlinuz
APPEND initrd=/boot/initrd.gz ramdisk_size=6666 root=/dev/ram0 rw
changes=slax autoexec=xconf;kdm
TEXT HELP
                                        Help for currently selected:

                                        Run DAVIX the max, try to
                                        autoconfig graphics card and use
                                        the maximum allowed resolution.
ENDTEXT
```

Due to the width limitation in this document the line with the keyword *APPEND* is wrapped to form two lines. In your *slax.cfg* it needs to be on one line to work correctly.

The available boot options are documented in the chapter Boot Cheat Codes.

4.6. Boot Cheat Codes

SLAX has many useful boot options that allow you to tweak boot and kernel behavior. The following list shows an extract of the most important ones. For a complete list check the SLAX boot parameter page[16].

- *nodma* — Disable DMA for CD-ROM and hard drives.
- *noauto* — Hard disk are not mounted automatically.
- *nohd* — Hard disks are not mounted.
- *nocd* — CD-ROMs are note mounted.
- *nosound* — Disable sound.

- *password=foobar* — Set root password to foobar.
- *password=ask* — Ask for new password during boot.

- *changes=/dev/hdx* — Stores changes to the specified device.
- *changes=/foo/bar* — Stores changes to the specified directory.
- *changes=/foo.dat* — Stores changes to the specified file.

- *toram* — Copy all CD files to RAM
- *copy2ram* — Same as toram

- *load=module* — Loads the specified module from *slax\optional*.
- *noload=module* — Disable loading of specified module

- *autoexec=xconf;kdm* — After boot auto-configures X and starts KDM.

[16] Boot Parameters in SLAX: http://www.slax.org/documentation_boot_cheatcodes.php

5. Creating and Modifying Modules

This chapter shows you the different ways for getting your hands on additional SLAX modules for DAVIX.

5.1. Leverage Existing SLAX Modules

The easiest way to get a new SLAX module is by checking the SLAX website itself. The modules page offers a wide range of contributed ready to use SLAX modules[17]. These modules in general come with all the required libraries and should work right away.

5.2. Create New Modules from Slackware Packages

Another fast way to get additional modules is to search and download existing Slackware packages[18] and convert them to SLAX modules using following command:

```
tgz2lzm foo-bar-1.0.tgz foo-bar-1.0.lzm
```

[17] SLAX modules: http://www.slax.org/modules.php
[18] Search Slackware Packages: http://packages.slackware.it/

This approach does no dependency checking and requires you to investigate the package dependencies yourself and convert all required packages to SLAX modules as well. The pragmatic approach is to convert the particular module you want to run and integrate it into the DAVIX ISO. Then you boot DAVIX and try to execute one of the binaries in your module. If there is an error that a specific library is missing then you have found an unsatisfied dependency. You then have to identify the Slackware package where the library can be found and convert it to a SLAX module. And then the testing starts again...

5.3. Customize Existing SLAX or DAVIX Modules

If you want to tweak a single SLAX or DAVIX package a just little, it is possible to extract a SLAX module using following command:

```
lzm2dir foo-bar-1.0.lzm /foo/bartarget/dir
```

You can then modify the extracted files to your needs and repack the directory to a SLAX module with following command:

```
dir2lzm /foo/bartarget/dir foo-bar-1.0.lzm
```

6. Deployment Options

The following options show you the different ways to install DAVIX on different types of media. The step-by-step guides are generic and also apply to other SLAX distributions.

6.1. VMware

DAVIX can be run inside VMware without any problems. Even OpenGL is supported.

The procedures were successfully tested with:

- VMware Workstation 6.0.3 Build 80004

6.1.1. Virtual Machine Setup

For all the described VMware deployments the following procedure is common to all:

- Start VMware Workstation.
- Through the Windows menu *File\New...\Virtual Machine...* start the *New Virtual Machine Wizard*.
- In the Virtual machine configuration step select *Custom*.
- In the Virtual machine hardware compatibility step select *Workstation 6*.
- As guest operating system select *Linux* and select *Other Linux 2.6.x kernel*.
- Choose virtual machine name and storage location.
- Choose *One* as the number of processors.
- Allocate at least *512 MB* of memory. The optimal value is *1024 MB*.
- Select *Use bridged networking*.
- Select I/O adapter type SCSI adapter *LSI Logic*.
- Select *Create a new virtual disk*.
- Select virtual disk type *SCSI (Recommended)*.

- Choose disk size of *8 GB* without allocating disk space.

- Choose disk file name and press Finish.

The basic virtual machine is now set up. Continue with one of the chapters CD-ROM based Boot or Installation on Virtual Hard Drive.

6.1.2. CD-ROM based Boot

Before continuing with this chapter please setup the basic virtual machine as described in chapter Virtual Machine Setup.

Edit virtual machine settings:
- Select tab *Hardware*
- Select *CD-ROM* drive.
- Select option *Use ISO image* and browse for the DAVIX image.
- Close the settings dialog.

On first startup the CD-ROM will not boot as default. Therefore following steps have to be taken:
- Start virtual machine.
- When the BIOS screen is shown press *F2*.
- Navigate to menu *Boot*.
- Move the entry *CD-ROM Drive* to the first position in boot order.
- Press F10 and confirm changes by selecting *Yes*.

6.1.3. Installation on Virtual Hard Drive

Before continuing with this chapter please setup the basic virtual machine as described in chapter Virtual Machine Setup.

Start the virtual machine and continue with the steps set out in chapter Hard Drive.

6.2. Other Virtualization Environments

Our testers have reported that DAVIX works with the following other virtualization suites:

- Parallels 3.0 Build 5584
- QEMU 0.9
- VirtualBox 1.6.0
- VMware Fusion 1.1.2 Build 87978

For the exact environments, which the virtualization suites have been tested with, see chapter Virtual Machines.

6.3. USB Stick

It is possible to run DAVIX from a USB stick. This has the advantages that booting from stick in general is faster and it allows for changes to be made persistent. The following step-by-step instructions will help you to achieve this.

The procedures were successfully tested with following USB sticks:

- Corsair FlashVoyager 16GB
- Kingston 1GB
- SanDisk Cruzer TITANIUM, 4GB
- SanDisk Cruzer Micro, 4 GB
- SONY Micro Vault, 1 GB
- Pretec 02GB Cha Cha, 2 GB

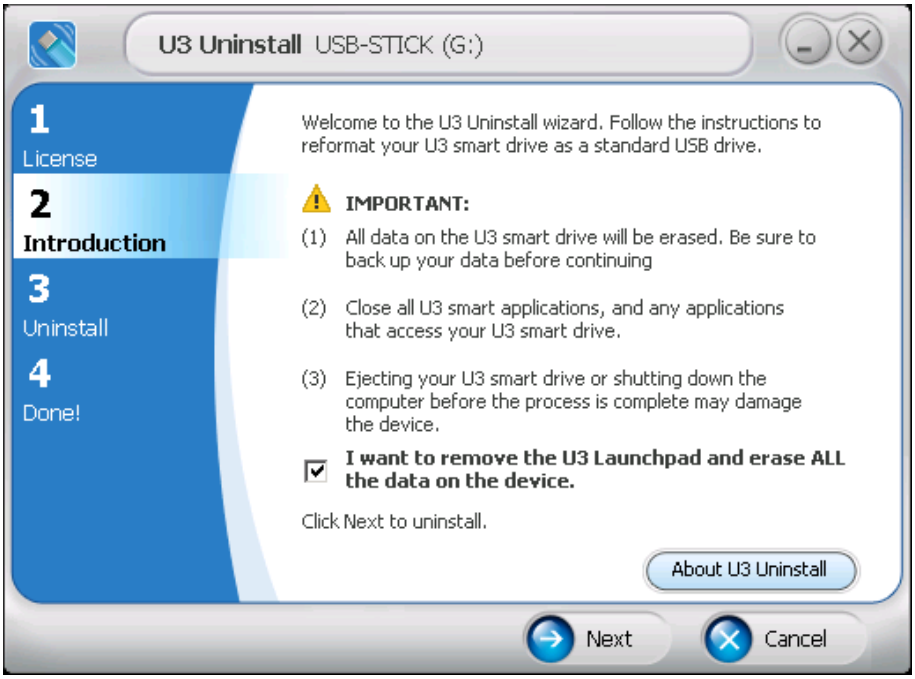
A word of warning:

- To avoid data loss the system should be shutdown properly before removing the USB stick. In particular the VFAT is quite prone to such abuse. If you want to have a robust solution use xfs as file system instead. For details see xfs instruction below.

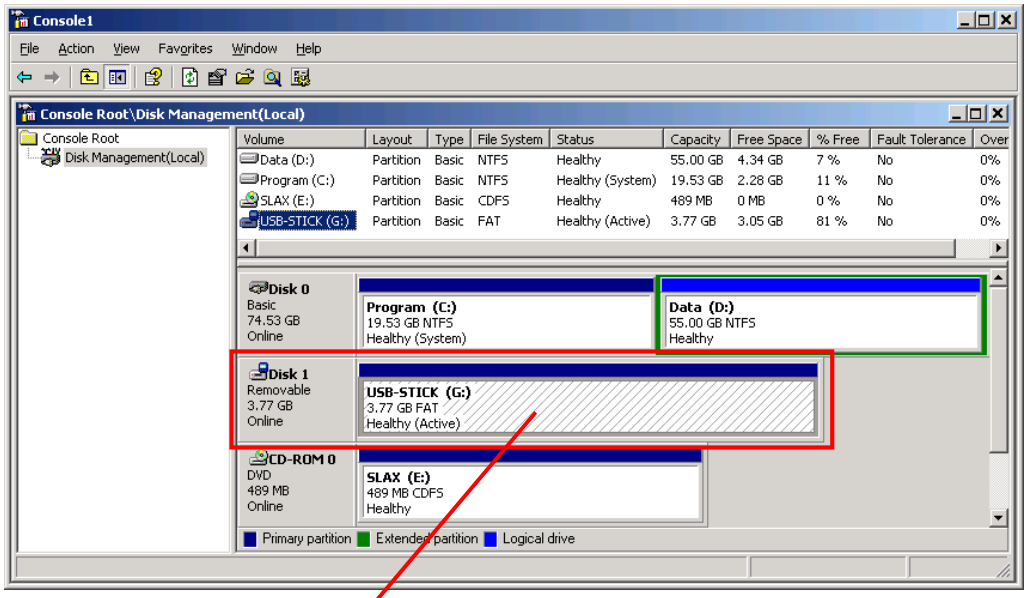
6.3.1. On Windows with VFAT Formatted USB Stick

- First of all you have to get a USB stick. Currently a USB stick with at least 1 GB is recommended. If you have more it should work as well.

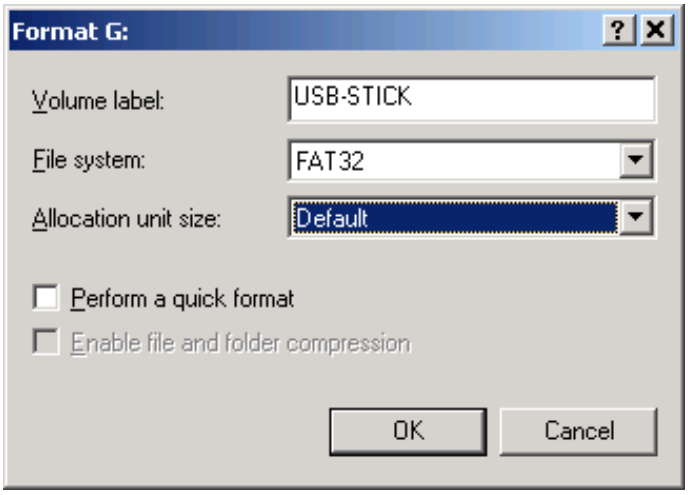
- If the USB stick supports U3 it is necessary to uninstall the U3 feature using the tool provided by following web-site: http://www.u3.com/uninstall/.



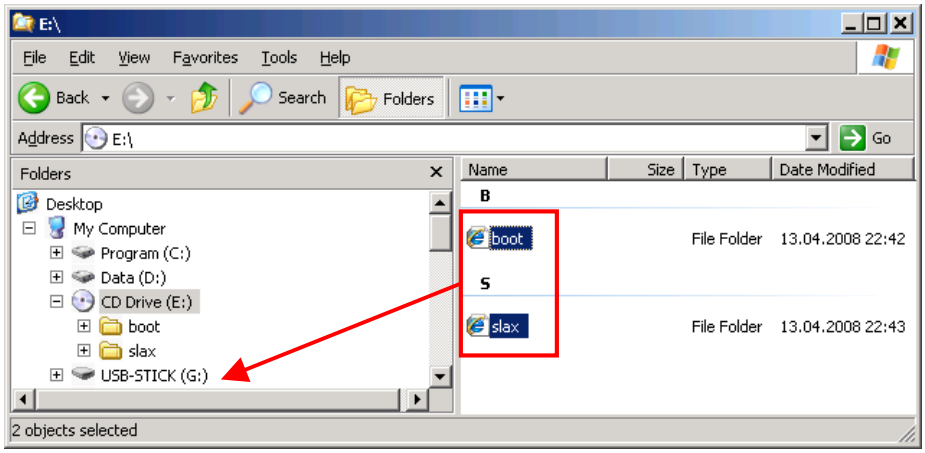
- Then open the MMC console and add the *Disk Management* Snap-in.



- Format the USB stick partition with *FAT32* and the default *allocation unit size*.



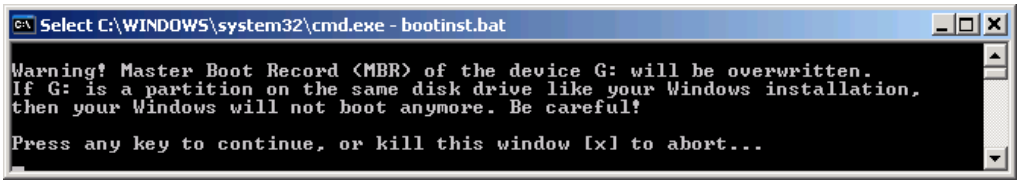
- Copy the directories boot and slax from the DAVIX CD/DVD to the USB stick.



- Writing to the flash memory will take a while. So grab a coffee. **J**

- Open the DOS prompt and navigate to the *boot* directory on the USB stick.

- Execute *bootinst.bat* and acknowledge the messages. The USB stick is now made bootable.



- Reboot your system and boot from USB stick. When you are seeing the DAVIX boot menu you are done!

6.3.2. On Linux with VFAT Formatted USB Stick

Although VFAT is supported by the SLAX kernel the *mkfs.vfat* is missing on the SLAX image. Therefore the first steps have to done in Windows.

- First of all you have to get a USB stick. Currently a USB stick with at least 1 GB is recommended. If you have more it should work as well.
- If the USB stick supports U3 it is necessary to uninstall the U3 feature using the tool provided by following web-site: http://www.u3.com/uninstall/.
- Then open the MMC console and add the *Disk Management* Snap-in.
- Format the USB stick partition with *FAT32* and the *default allocation size*.
- Leave the USB inserted in the computer.
- Boot DAVIX from CD-ROM.
- Open a console.
- The USB should have been mounted automatically to */mnt/sda1*. Execute *mount* to cross-check.

```
root@slax:~# mount
aufs on / type aufs (rw)
proc on /proc type proc (rw)
sysfs on /sys type sysfs (rw)
usbfs on /proc/bus/usb type usbfs (rw)
/dev/sda1 on /mnt/sda1 type vfat
(rw,noatime,quiet,umask=0,check=s,shortname=mixed)
root@slax:~# .
```

- Then copy the directories *boot* and *slax* to the USB stick.
  cp -pvR /mnt/live/mnt/hdc/boot /mnt/live/mnt/hdc/slax /mnt/sda1
- Writing to the flash memory will take a while. So grab a coffee. **J**
- Change to the *boot* directory on the USB stick: *cd /mnt/sda1/boot*
- Execute *./bootinst.sh* and acknowledge the messages. The USB stick is now made bootable.

```
-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-
                        Welcome to Slax boot installer
-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-

This installer will setup disk /dev/sda1 to boot only Slax.

Warning! Master boot record (MBR) of /dev/sda will be overwritten.
If you use /dev/sda to boot any existing operating system, it will not work
```

```
anymore. Only Slax will boot from this device. Be careful!

Press any key to continue, or Ctrl+C to abort...
```

```
Flushing filesystem buffers, this may take a while...
Setting up MBR on /dev/sda...
The Master Boot Record of  /dev/sda  has been updated.
Activating partition /dev/sda1...
No partition table modifications are needed.
Updating MBR on /dev/sda...
Setting up boot record for /dev/sda1...
Disk /dev/sda1 should be bootable now. Installation finished.

Read the information above and then press any key to exit...
```

- Reboot your system and boot from USB stick. When you are seeing the DAVIX boot menu you are done!

6.3.3. On Linux with xfs Formatted USB Stick

- First of all you have to get a USB stick. Currently a USB stick with at least 1 GB is recommended. If you have more it should work as well.
- If the USB stick supports U3 it is necessary to uninstall the U3 feature using the tool provided by following web-site: http://www.u3.com/uninstall/.
- Leave the USB inserted in the computer.
- Boot DAVIX from CD-ROM in KDE mode.
- Open a console.
- To find out which device ID your hard disk has execute the command: *sfdisk --list*. For simplicity of this example *sda* has been chosen. Your device ID may be different. So watch out!

```
root@slax:~# sfdisk --list

Disk /dev/sda: 1019 cylinders, 127 heads, 62 sectors/track
Units = cylinders of 4031488 bytes, blocks of 1024 bytes, counting from 0

   Device Boot Start     End   #cyls    #blocks   Id  System
/dev/sda1   *      0+   1018    1019-   4011772   83  Linux
/dev/sda2          0       -       0         0    0  Empty
/dev/sda3          0       -       0         0    0  Empty
/dev/sda4          0       -       0         0    0  Empty
```

- Use *mount* to make sure that all file systems on the USB stick are unmounted.

```
root@slax:~# mount
aufs on / type aufs (rw)
proc on /proc type proc (rw)
sysfs on /sys type sysfs (rw)
```

```
usbfs on /proc/bus/usb type usbfs (rw)
/dev/hda1 on /mnt/hda1 type ext3 (rw,noatime)
/dev/hda3 on /mnt/hda3 type ext3 (rw,noatime)
/dev/sda1 on /mnt/sda1 type xfs (rw,noatime)
```

- If there is still a file system (e.g. sda1) mounted then unmount it: *umount /dev/sda1*

- Wipe the USB stick to avoid later problems when installing the boot loader: *dd if=/dev/zero of=/dev/sda bs=1M*

```
root@slax:~# dd if=/dev/zero of=/dev/sda bs=1M
dd: writing `/dev/sda': No space left on device
3920+0 records in
3919+0 records out
4110227968 bytes (4.1 GB) copied, 557.438 s, 7.4 MB/s
```

- Then we have to partition the hard drive. Execute: *fdisk /dev/sda*

```
root@slax:~# fdisk /dev/sda
Device contains neither a valid DOS partition table, nor Sun, SGI or OSF
disklabel
Building a new DOS disklabel with disk identifier 0x66b7eb5d.
Changes will remain in memory only, until you decide to write them.
After that, of course, the previous content won't be recoverable.

Warning: invalid flag 0x0000 of partition table 4 will be corrected by
w(rite)
```

- Create partition according to the options below:

```
Command (m for help): n
Command action
   e   extended
   p   primary partition (1-4)
p
Partition number (1-4): 1
First cylinder (1-1019, default 1): {ENTER}
Using default value 1
Last cylinder or +size or +sizeM or +sizeK (1-1019, default 1019): {ENTER}
Using default value 1019
```

- Activate the partition as bootable:

```
Command (m for help): a
Partition number (1-4): 1
```

- Create xfs file system on first partition: *mkfs.xfs /dev/sda1*

- Create a mount point for the third partition: *mkdir /mnt/sda1*

- Mount the third partition to the newly created mount point:
  mount /dev/sda1 /mnt/sda1

- Copy the *boot* and *slax* directory to the newly created directory:
  cp -pvR /mnt/live/mnt/hdc/boot /mnt/live/mnt/hdc/slax /mnt/sda1

- Writing to the flash memory will take a while. So grab a coffee. **J**

- Change to the *boot* directory on the USB stick: *cd /mnt/sda1/boot*

- Execute *./liloinst.sh* and acknowledge the messages. The USB stick is now made bootable.

```
-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-
=-=-
                        Welcome to Slax boot installer
-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-
=-=-

This installer will setup disk /dev/sda to boot only Slax from /dev/sda1.
Warning! Master boot record (MBR) of /dev/sda will be overwritten.
If you use /dev/sda to boot any existing operating system, it will not work
anymore. Only Slax will boot from this device. Be careful!

Press any key to continue, or Ctrl+C to abort...
```

```
Flushing filesystem buffers, this may take a while...
Updating MBR to setup boot record...
Warning: /dev/sda is not on the first disk
Warning: The initial RAM disk is too big to fit between the kernel and
   the 15M-16M memory hole.  It will be loaded in the highest memory as
   though the configuration file specified "large-memory" and it will
   be assumed that the BIOS supports memory moves above 16M.
Added Slax ? *
Disk /dev/sda should be bootable now. Installation finished.

Read the information above and then press any key to exit...
```

- Reboot your system and boot from USB stick. When you are seeing the DAVIX boot menu you are done!

6.4. Hard Drive

DAVIX can also be installed on hard disk where all SLAX modules have been extracted. These instructions are based in parts on the paper published by *Offensive Security*[19].

A word of warning:

- According to BackTrack the BackTrack Installer is experimental and has not yet been tested! It is therefore highly recommended to work with an empty hard drive or use VMware.

Here is the procedure for installing DAVIX on hard disk:

- Boot DAVIX from CD or DVD in KDE mode. Make sure there are no other hard drive devices attached than the one you want DAVIX onto.

- To find out which device ID your hard disk has execute the command: *sfdisk --list*. For simplicity of this example *hda* has been chosen. Your device ID may be different. So watch out!

```
root@slax:~# sfdisk --list

Disk /dev/hda: 9733 cylinders, 255 heads, 63 sectors/track
Units = cylinders of 8225280 bytes, blocks of 1024 bytes, counting from 0

   Device Boot Start     End   #cyls    #blocks   Id  System
/dev/hda1          0       -       0          0    0  Empty
/dev/hda2          0       -       0          0    0  Empty
/dev/hda3          0       -       0          0    0  Empty
/dev/hda4          0       -       0          0    0  Empty
```

- First we have to partition the hard drive. Execute: *fdisk /dev/hda*

```
root@slax:~# fdisk /dev/hda

The number of cylinders for this disk is set to 9733.
There is nothing wrong with that, but this is larger than 1024,
and could in certain setups cause problems with:
1) software that runs at boot time (e.g., old versions of LILO)
2) booting and partitioning software from other OSs
   (e.g., DOS FDISK, OS/2 FDISK)
```

- Create first partition according to the options below:

```
Command (m for help): n
Command action
   e   extended
   p   primary partition (1-4)
p
Partition number (1-4): 1
First cylinder (1-9733, default 1): {ENTER}
```

[19] BackTrack Hard Drive Installation: http://www.offensive-security.com/documentation/backtrack-hd-install.pdf

```
Using default value 1
Last cylinder or +size or +sizeM or +sizeK (1-9733, default 9733): +50M
```

- Create second partition according to the options below:

```
Command (m for help): n
Command action
   e   extended
   p   primary partition (1-4)
p
Partition number (1-4): 2
First cylinder (8-9733, default 8): {ENTER}
Using default value 8
Last cylinder or +size or +sizeM or +sizeK (8-9733, default 9733): +512M
```

- Create third partition according to the options below:

```
Command (m for help): n
Command action
   e   extended
   p   primary partition (1-4)
p
Partition number (1-4): 3
First cylinder (71-9733, default 71): {ENTER}
Using default value 71
Last cylinder or +size or +sizeM or +sizeK (71-9733, default 9733): {ENTER}
Using default value 9733
```

- Activate the first partition as bootable:

```
Command (m for help): a
Partition number (1-4): 1
```

- Change the partition type of partition #2 to *82* for *Linux Swap*:

```
Command (m for help): t
Partition number (1-4): 2
Hex code (type L to list codes): 82
Changed system type of partition 2 to 82 (Linux swap)
```

- Now we have to write the partition table to disk:

```
Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.
Syncing disks.
root@slax:~#
```

- Now we have to initialize the swap partition: *mkswap /dev/hda2*

```
root@slax:~# mkswap /dev/hda2
```

```
Setting up swapspace version 1, size = 518184 kB
no label, UUID=4964f425-7308-4f41-bc1a-b7b6c2ff4a3c
```

- Create ext3 file system on first partition: *mkfs.ext3 /dev/hda1*

```
root@slax:~# mkfs.ext3 /dev/hda1
mke2fs 1.40.8 (13-Mar-2008)
Filesystem label=
OS type: Linux
Block size=1024 (log=0)
Fragment size=1024 (log=0)
14056 inodes, 56196 blocks
2809 blocks (5.00%) reserved for the super user
First data block=1
Maximum filesystem blocks=57671680
7 block groups
8192 blocks per group, 8192 fragments per group
2008 inodes per group
Superblock backups stored on blocks:
        8193, 24577, 40961

Writing inode tables: done
Creating journal (4096 blocks): done
Writing superblocks and filesystem accounting information: done

This filesystem will be automatically checked every 24 mounts or
180 days, whichever comes first.  Use tune2fs -c or -i to override.
```

- Create ext3 file system on third partition: *mkfs.ext3 /dev/hda3*

```
root@slax:~# mkfs.ext3 /dev/hda3
mke2fs 1.40.8 (13-Mar-2008)
Warning: 256-byte inodes not usable on older systems
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
4857856 inodes, 19404511 blocks
970225 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=0
593 block groups
32768 blocks per group, 32768 fragments per group
8192 inodes per group
Superblock backups stored on blocks:
     32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632, 2654208,
     4096000, 7962624, 11239424

Writing inode tables: done
Creating journal (32768 blocks): done
Writing superblocks and filesystem accounting information: done

This filesystem will be automatically checked every 23 mounts or
180 days, whichever comes first.  Use tune2fs -c or -i to override.
```

- Create a mount point for the third partition: *mkdir /mnt/hda3*

- Mount the third partition to the newly created mount point: *mount /dev/hda3 /mnt/hda3*

- In the KDE start menu *System* select *BackTrack Installer (Experimental)*.
- Configure BT Installer as follows:

```
Source (BackTrack CD):            /mnt/live/mnt/sda1/slax
Install BackTrack to:             /mnt/hda3
Write New MBR (lilo.mbr) to:      /dev/hda
Installation method:              Real
Restore Original MBR after lilo   unchecked
```

- Press the *Install* button.
- Installing DAVIX on hard drive will take a while. So grab a coffee. **J**
- Press the *Close* button.
- Shutdown DAVIX.
- Remove install media, like CD or USB stick.
- Boot your system. When you are seeing the DAVIX boot menu you are done!

7. Hardware

SLAX and therewith DAVIX runs on normal PCs as well as in virtual machines. This chapter show which environments are known to work with DAVIX and which ones not.

7.1. Physical Machines

7.1.1. Hardware Known to Work

In general DAVIX should work on any Intel and AMD based architecture. Following hardware setups were reported by testers to work with DAVIX:

PC Brand & Type	**Compaq Evo**
CPU Type	Intel(R) Pentium(R) 4 CPU 2.40GHz
Memory	1 GB
Graphic Card	nVidia Corporation G73 [GeForce 7600 GS] (rev a2)
LAN Network Card	Intel Corporation 82801DB PRO/100 VM (LOM) Ethernet Controller (rev 81)
Wireless Network Chipset	-

PC Brand & Type	**Dell Dimension 3100c**
CPU Type	Intel P4 Celeron
Memory	-
Graphic Card	-
LAN Network Card	-
Wireless Network Chipset	-

PC Brand & Type	**DELL Latitude D620**
CPU Type	Intel Core 2 Duo, 2.33 GHz
Memory	2 GB
Graphic Card	NVIDIA Quadro NVS 110M [Display adapter]
LAN Network Card	Broadcom NetXtreme 57xx Gigabit Controller
Wireless Network Chipset	Intel(R) PRO/Wireless 3945ABG (Was not tested)

PC Brand & Type	**Dell Inspiron 6000**
CPU Type	Intel Pentium M, 1.86 GHz
Memory	1 GB
Graphic Card	ATI Mobility Radeon X300
LAN Network Card	Broadcom 440x 10/100
Wireless Network Chipset	Intel PRO/Wireless 2200BG

PC Brand & Type	**Fujitsu-Siemens Lifebook T Series T4215**
CPU Type	Intel Core2 CPU T5500 1.66GHz
Memory	1GB
Graphic Card	Intel Corporation Mobile 945GM/GMS, 943/940GML Express Integrated Graphics Controller
LAN Network Card	Marvell Technology Group Ltd. 88E8055 PCI-E Gigabit Ethernet Controller
Wireless Network Chipset	Atheros Communications Inc. AR242x 802.11abg Wireless PCI Express Adapter

PC Brand & Type	**Lenovo ThinkPad T60**
CPU Type	T2400, 1.83 GHz
Memory	1 GB
Graphic Card	ATI Mobility Radeon X1400
LAN Network Card	Intel PRO/1000 PL
Wireless Network Chipset	Intel PRO/Wireless 3945ABG

PC Brand & Type	**Lenovo ThinkPad T60**
CPU Type	Intel(R) Core(TM)2 CPU T5600 @ 1.83GHz
Memory	2 GB
Graphic Card	ATI Radeon Mobility X1400
LAN Network Card	Intel Corporation 82573L Gigabit Ethernet Controller
Wireless Network Chipset	Intel Corporation PRO/Wireless 3945ABG Network Connection

PC Brand & Type	**HP dv9000**
CPU Type	AMD 64 TL-56
Memory	2 GB
Graphic Card	NVIDIA 6150
LAN Network Card	NVIDIA MCP51 LAN
Wireless Network Chipset	Not supported directly. Requires ndiswrapper.

PC Brand & Type	**HP nx7400**
CPU Type	Intel Centrino Duo
Memory	-
Graphic Card	-
LAN Network Card	-
Wireless Network Chipset	-

PC Brand & Type	**HP nc6320**
CPU Type	Intel Centrino Duo
Memory	-
Graphic Card	-
LAN Network Card	-
Wireless Network Chipset	-

PC Brand & Type	**HP Pavilion Slimline s7710**
CPU Type	AMD Athlon 64 X2 Dual Core Processor 3800+
Memory	1GB
Graphic Card	nVidia GeForce 6150 LE
LAN Network Card	nVidia MCP51 Ethernet Controller
Wireless Network Chipset	-

PC Brand & Type	**No-Name AMD PC**
CPU Type	AMD Sempron(tm) 2600+
Memory	0.5 GB
Graphic Card	ATI Technologies Inc Radeon RV250 [Radeon 9000] (Secondary) (rev 01)
LAN Network Card	Digital Equipment Corporation DECchip 21142/43 (rev 30)
Wireless Network Chipset	-

PC Brand & Type	**Shuttle SK22G2**
CPU Type	Dual Core AMD 2500
Memory	1 GB
Graphic Card	NVIDIA GeForce 7300 LE
LAN Network Card	VIA Compatible Fast Ethernet Adapter
Wireless Network Chipset	Intel PRO/Wireless 2200BG

PC Brand & Type	**Toshiba Satellite A10-S169**
CPU Type	P4M at 2.2GHz
Memory	0.5 GB
Graphic Card	Intel 82852/855GM
LAN Network Card	Intel PRO/100 VE
Wireless Network Chipset	Netgear WG511T (Atheros-based) Intel PRO/Wireless 2200BG (does not work)

PC Brand & Type	**Custom built PC**
CPU Type	Intel Core 2 6600 Dual Core, 2.4 GHz
Memory	2 GB
Graphic Card	NVIDIA 7950 GT
LAN Network Card	Marvel Yukon 88E8056 / Gigabit
Wireless Network Chipset	No wireless adapter

PC Brand & Type	**Custom built PC based on Gigabyte GA-K8NF-9 motherboard**
CPU Type	AMD Athlon 64 X2 Dual Core Processor 4400+, 2.21 GHz
Memory	2 GB
Graphic Card	Matrox Millennium P650 PCIe 128
LAN Network Card	NVIDIA nForce Networking Controller
Wireless Network Chipset	No wireless adapter

PC Brand & Type	**Custom built PC based on Gigabyte GA-K8NF-9 motherboard**
CPU Type	AMD Athlon 64 X2 Dual Core Processor 4400+, 2.21 GHz
Memory	2 GB
Graphic Card	NVIDIA GeForce 6500
LAN Network Card	NVIDIA nForce Networking Controller
Wireless Network Chipset	No wireless adapter

7.1.2. Incompatible Hardware

The hardware listed here is known to have problems.

PC Brand & Type	**Dell Dimension E521**
CPU Type	AMD
Memory	-
Graphic Card	-
LAN Network Card	-
Wireless Network Chipset	-
Issue	Graphic card and USB not detected.

PC Brand & Type	**lenovo 3000 n200**
CPU Type	Intel® Core 2 Duo
Memory	-
Graphic Card	NVIDIA GeForce Go 7300 with Turbo Cache
LAN Network Card	-
Wireless Network Chipset	-
Issue	Under KDE the start menu does not show text and icons.

7.2. Virtual Machines

DAVIX runs as guest operating system on several different virtualization platforms. Following configurations are known to work.

Host OS	**Windows XP SP2**
Virtualization Software	**VMware Workstation 6.0.3 Build 80004**
Guest OS Type	Other Linux 2.6 Kernel

Host OS	**Ubuntu(Gutsy/Herdy)**
Virtualization Software	**VMware Server 1.0.4 Build 56528**
Guest OS Type	Other Linux 2.6 Kernel

Host OS	**Ubuntu(Gutsy/Herdy)**
Virtualization Software	**Virtualbox 1.5.6**
Guest OS Type	Other Linux 2.6 Kernel

Host OS	**Ubuntu(Gutsy/Herdy)**
Virtualization Software	**Qemu 0.9.0**
Guest OS Type	Other Linux 2.6 Kernel

Host OS	**FreeBSD 7.0 Stable**
Virtualization Software	**Qemu 0.9.1**
Guest OS Type	Other Linux 2.6 Kernel

Host OS	**Mac OS 10.5.2**
Virtualization Software	**Parallels 3.0 Build 5584**
Guest OS Type	Other Linux

Host OS	**Mac OS 10.5.2**
Virtualization Software	**VirtualBox 1.5.51**
Guest OS Type	Linux 2.6

Host OS	**Mac OS 10.5.2**
Virtualization Software	**VirtualBox 1.6.0**
Guest OS Type	Linux 2.6

Host OS	**Mac OS 10.5.3**
Virtualization Software	**VMware Fusion 1.1.2 Build 87978**
Guest OS Type	Other Linux 2.6 Kernel

8. Networking

8.1. LAN Networking

Wired LAN with DHCP should work out of the box on most systems. In some cases, e.g. under VMware, it can sometimes happen that the interface eth0 is not up after booting. The following procedure shows you how to troubleshoot connectivity problems. For simplicity reasons the example shown here are based on the network interface ID *eth0*. For your particular system it can be different.

- First check if your network cable is attached and if the LEDs on your network card or switch port are turned on.
- See if *eth0* is listed: *ifconfig*
- If in the resulting list *eth0* is missing then try to start up the interface: *ifconfig eth0 up*
- Check again if *eth0* is up: *ifconfig*
- When the interface is showing up you can start the DHCP agent: *dhcpcd eth0*
- Check if a dynamic IP address was assigned: *ifconfig*
- If no IP address was assigned, repeat the previous four steps.

8.2. Wireless Networking

8.2.1. Kernel Supported Drivers

Since not every wireless card has open source drivers, setting up wireless LAN can be difficult. But the first thing is to try if any the kernel supported drivers work. For simplicity reasons the example shown here are based on the network interface ID *eth0*. For your particular system it can be different, e.g. it can be *wlan0* or *ath0*.

- First make sure that wireless is enabled in your BIOS and activated. On some systems, like the Lenovo ThinkPad T60, it is required to turn on wireless by moving the switch located on the outside of you notebook into the *On* position. On others you can use a keyboard function shortcut to enable wireless, e.g. on a Dell Inspiron it is *Fn-F2*.
- Boot DAVIX in KDE mode and open a console.

- Then check if a wireless interface is available: *iwconfig*

```
root@slax:~# iwconfig
lo        no wireless extensions.

eth0      unassociated  ESSID:off/any
          Mode:Managed  Channel=0  Access Point: Not-Associated
          Bit Rate:0 kb/s   Tx-Power=20 dBm   Sensitivity=8/0
          Retry limit:7   RTS thr:off   Fragment thr:off
          Encryption key:off
          Power Management:off
          Link Quality:0  Signal level:0  Noise level:0
          Rx invalid nwid:0  Rx invalid crypt:0  Rx invalid frag:0
          Tx excessive retries:0  Invalid misc:218   Missed beacon:0

eth1      no wireless extensions.
```

- Before being able to scan you have to startup the wireless device with the command: *ifconfig eth0 up*

- Then you can scan for wireless LANs using: *iwlist eth0 scan*

- After a while a list of available Wireless access points will be visible. If you favorite on is missing redo the scan.

```
root@slax:~# iwlist eth0 scan
eth0      Scan completed :
          Cell 04 - Address: 00:DE:AD:BE:EF:00
                    ESSID:"xxx"
                    Protocol:IEEE 802.11b
                    Mode:Master
                    Frequency:2.412 GHz (Channel 1)
                    Encryption key:off
                    Bit Rates:1 Mb/s; 2 Mb/s; 5.5 Mb/s; 11 Mb/s
                    Quality=83/100  Signal level=-83 dBm
                    Extra: Last beacon: 184ms ago
```

- If your access point requires a WEP key then enter:
  iwconfig eth0 key dead-beaf-dead-beaf-dead-beaf-de

- To attach to your desired access point with ESSID *xxx* use the following command: *iwconfig eth0 essid "xxx"*

- Then start the DHCP agent: *dhcpcd eth0*

- Check if dynamic IP address was assigned: *ifconfig*

- If it does not work retry the previous 7 steps.

8.2.2. NDISwrapper

If the steps in the previous chapters do not work out for you, you can try to get wireless running with the NDIS Drivers. DAVIX supports the *ndiswrapper*, which allows you using the Windows NDIS Drivers.

For details on you particular wireless card see NDISwrapper home page[20] and other third party websites.

Known issues:

- Not all vendor drivers support the promiscuous mode in their wireless drivers. Therefore, it can be that sniffing network traffic of other system on the network is not possible.

[20] NDISwrapper: http://ndiswrapper.sourceforge.net/

9. Graphic Cards

9.1. OpenGL

The underlying SLAX distribution supports many graphic cards. Thus, DAVIX should work on most systems. There is one big limitation: As Open GL runs in simulation mode only, it is possible that applications, which heavily rely on OpenGL, perform poorly. GoogleEarth is one example. For most visualization tools found on DAVIX, no problems should be expected though.

If you want to have better performance you have to install the vendor supported graphic card drivers. Check the vendor web sites for details[21]:

3DLabs	http://www.3dlabs.com/support/drivers/
ATI	http://ati.amd.com/support/driver.html
Elsa	http://www.elsa.com/EN/Support/driver_gladiac.asp
Intel	http://support.intel.com/support/graphics
Matrox	http://www.matrox.com/mga/support/drivers/latest/home.cfm
NVIDIA	http://www.nvidia.com/content/drivers/drivers.asp
S3	http://www.s3graphics.com/drivers.jsp
SIS	http://www.sis.com/support/support_prodid.htm

Since these vendor drivers have very stringent licensing conditions it is not possible to distribute them with DAVIX.

9.2. Multi-Head Support

If you want to run DAVIX with two or more screens it is most of the time required using the vendor supplied graphic card driver. For vendor web sites see the URL list in chapter OpenGL.

For configuration hints check the *README* and *INSTALL* files coming along the vendor driver packages.

[21] List taken from GoogleEarth Help: http://earth.google.com/support/bin/answer.py?answer=21462

10. FAQ

10.1. General

Q: What does DAVIX stand for?

A: DAVIX is an abbreviation for "**D**ata **A**nalysis and **VI**sualization Linu**X**®".

Q: Which Linux distribution is DAVIX based on?

A: DAVIX utilizes the SLAX 6.0.x as a base.

Q: What is the difference between DAVIX and BackTrack?

A: BackTrack is focused on penetration testing. Although several tools can be found in both distributions, DAVIX concentrates on the aspects of data mining and visualization.

Q: Why is GoogleEarth not distributed with DAVIX?

A: Google has a very stringent license that prohibits redistribution of GoogleEarth. Although we love to distribute it with DAVIX, we are not allowed to.

10.2. Troubleshooting

Q: When booting DAVIX from CD/DVD I get the following message: “Cannot read module data. Corrupted download?”. How can I fix it?

A: Most likely you burned the CD/DVD with a high burning speed. Some CD/DVD readers have problems reading this kind of media. We recommend burning the CD/DVD with the lowest speed available.

Q: When booting DAVIX in KDE mode the menus are missing text. How can I fix it?

A: This is most likely a graphic driver issue. We recommend you installing the vendor driver and try again. As an alternative you can boot DAVIX in VESA compatibility mode, but I will lake support for high resolutions.

Q: LAN is not available after booting under VMware. How can I fix it?

A: Open a console and execute "ifconfig". If the interface eth0 is missing then execute "ifconfig eth0 up". Then execute "dhcpcd eth0" and check by executing ifconfig that the IP address is assigned. If not, try to execute "dhcpcd eth0" again. If this does not solve your issue reboot the VM and/or physical machine.

Q: After using one of the network capture tools within VMware the network stack is dead. What can I do?

A: First shutdown the network interface with "ifconfig eth0 down". Then execute "dhcpcd eth0" and check by executing ifconfig that the IP address is assigned. If not, try to execute "dhcpcd eth0" again. If this does not solve your issue reboot the VM and/or physical machine.

10.3. Support

Q: I have a problem with DAVIX. Where can I discuss it?

A: We have created a Google Group *davix-support*[22]. Check for answer there first. If your problem is new, register and post your questions there.

Q: Where can I report a bug or a feature request?

A: We utilize Google Code[23] for bug tracking. To report a bug you are required to create a Google account and contact us such that we can put you on the project member list. If this to much fuss for you can report bugs directly to us: jan.monsch ät iplosion.com.

10.4. Build Environment

Q: Which OS did you use as a build system for your modules?

A: A full installation of *Slackware 12.0* and *dropline Gnome 2.20.0* was used for compiling applications from source code. Several DAVIX packages have been directly taken from the Slackware and dropline GNOME distribution and have been converted with *tgz2lzm* to SLAX packages.

Q: Can I build DAVIX from ground up?

A: Currently, the build scripts do not allow automated building of the CD. Therefore we refrain from publishing the scripts. When we have fixed the build environment we will certainly publish the build scripts.

10.5. Image Distribution

Q: How can I provide a download mirror for DAVIX?

A: Create a cron job with following command and report the HTTP or FTP download URL to us: jan.monsch ät iplosion.com

```
rsync -av 82.197.185.121::davix /to/wherever/it/goes/on/your/sever
```

[22] DAVIX Support Google Group: http://groups.google.ch/group/davix-support
[23] DAVIX Google Code Project: http://code.google.com/p/davix/

11. Acknowledgements

We would like to thank all people who have contributed to DAVIX in one form or another. Without them DAVIX would not have been possible. Thank you!

In particular we would like to thank Gabriel Mueller for his regression testing efforts, which tremendously help improving lots of details on the CD as well as in the manual.

A very big thanks to Greg Conti for his encouraging feedback, which showed us, that we are on the right track. Above all Greg and John Goodall have given us a platform at the vizSEC 2008 conference in Boston[24] for presenting DAVIX to the research community. We feel very honored and thank you both for this.

Beta-Testers for DAVIX in alphabetic order of their last names or nicknames:

- Alexander Bochmann
- Greg Conti
- Eric Deschamps
- Olga Gelbart
- Mirko Kildani
- Benjamin Kohler
- C. S. Lee (geek00L)
- Jean-Philippe Luiggi
- Joseph M Lanier
- Zach Lanier
- David Libershal
- Kevin Liston
- mfs
- mOODy
- Gabriel Mueller
- Jose M. Pavón (chmeee)
- Izar Tarandach
- Stefano Zanero
- ... many others who want to stay anonymous ...

Mirror & bandwidth providers in alphabetic order of their last names:

- Kord Campbell
- Benjamin Kohler
- Martin Winter

A special thanks to Ben Shneiderman from the *University of Maryland Human-Computer Interaction Lab* for allowing us to integrate *Treemap* and *Timesearcher 1* in DAVIX.

[24] vizSEC:http://www.vizsec.org/

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[25] Linux Mark Institute: http://www.linuxmark.org/
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14. Versioning

0.1.0	Initial document
0.2.0	Beta 2 Release
0.5.0	Final release for Raffael's Applied Security Visualization book
0.5.1	Fixed several bugs and added documentation for newly added tools
1.0.0	Release version of document
1.0.1	No change in content. Just updated version information

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