Network performance overview

TEIN2 – Bangkok – September 2005

Agenda

- Network performance
- RRDtool
- Cacti (RRDtool Front-end)

Network performance monitoring

- **MRTG**
  - The first, open-source, easy to use performance monitoring tool
  - Limitations : file oriented data storage, graphics continually generated and stored, unique graphic representation
- **RRDtool**
  - Logging & Graphing
  - Database oriented storage and on-demand enhanced graphics production. Include also a poller.
- **Cacti**
  - A Web portal for monitoring, include RRDtool,and everything else (Nagios access, looking-glass access, trouble ticketing access, documentation access)

Network performance monitoring: RRDtool

- **Official support available on**
  - http://people.ee.ethz.ch/~oetiker/webtools/rrdtool/
  - http://www.caida.org/tools/utilities/rrdtool/
- **RRDtool (Round Robin Database tool) is:**
  - A system to store and display time-series data (e.g. network bandwidth, machine-room temperature, server load average, or even the height of surfing waves on La Jolla Shores).
  - It stores the data in a very compact way, aggregating at stepwise coarser granularity as it archives further back in time, so as to maintain manageable archive size,
- **RRDtool presents useful graphs by processing the data to enforce a certain data density.**
- **RRDtool can be used either via simple wrapper scripts (from shell or Perl) or via user-friendly frontends that poll network devices.**
- **Tobi Oetiker developed part of RRDtool during his summer 1999 sabbatical with CAIDA. He continues to support it from his home institution, the Swiss Federal Institute of Technology.**

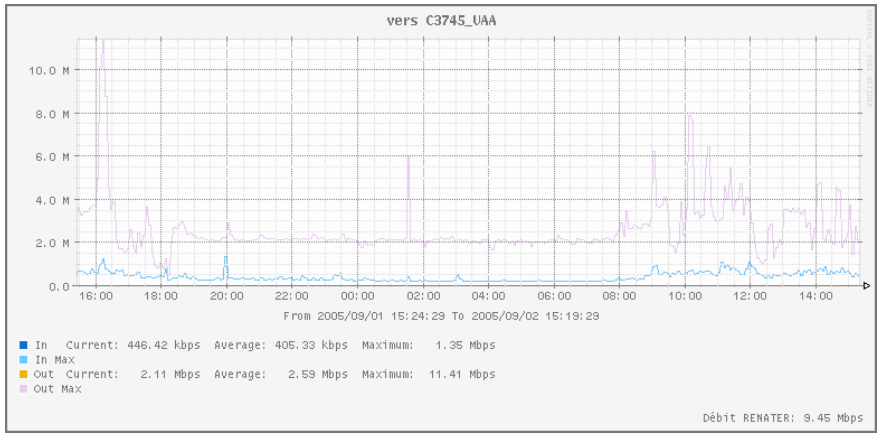
RRD World:

http://people.ee.ethz.ch/~oetiker/webtools/rrdtool/rrdworld/index.en.html

- Drraw
- RRD merger
- WeatherMap4RRD
- rrdUtils
- Big Sister system and network monitor
- Cacti
- Mailgraph
- rrd.cgi
- RRDutil
- SICM – Simple Infrastructure Capacity Monitor
- SnmpGraph
- Serverstats
- Tinygraph
- Torrus
- Tstat
- …

RRDTOOL (Round Robin Database Tool): configuration file

```
/usr/local/rrdtool-1.0.49/bin/rrdtool graph - \
--imgformat=PNG \
--start=1125581069 \
--end=1125667169 \
--title="vers C3745_UAA" \
--rigid \ --base=1000 \
--height=220 \
--width=700 \ -c CANVAS#FDFDFD -c BACK#F5F5F5 -c SHADEA#777777 -c SHADEB#777777 -c FONT#777777 -c GRID#DDDDDD -c MGRID#888888 -c FRAME#FFFFFF -c
    ARROW#000000
--alt-autoscale-max \
--lower-limit=0 \
COMMENT:"From 2005/09/01 15:24:29 To 2005/09/02 15:19:29\c" \
COMMENT:"\n" \
--vertical-label="" \
DEF:a="/logiciels/cacti/cacti-0.8.6c/rra/c7606_lille_i_traffic_in_216.rrd":traffic_in:AVERAGE \
DEF:b="/logiciels/cacti/cacti-0.8.6c/rra/c7606_lille_i_traffic_in_216.rrd":traffic_in:MAX \
DEF:c="/logiciels/cacti/cacti-0.8.6c/rra/c7606_lille_i_traffic_in_216.rrd":traffic_out:AVERAGE \
DEF:d="/logiciels/cacti/cacti-0.8.6c/rra/c7606_lille_i_traffic_in_216.rrd":traffic_out:MAX \
CDEF:cdefa=a,8,* \
CDEF:cdefd=b,8,* \
CDEF:cdeff=c,8,* \
CDEF:cdefi=d,8,* \
LINE1:cdefa#096FD5:"In" \
GPRINT:cdefa:LAST:" Current\:%7.2lf %sbps" \
GPRINT:cdefa:AVERAGE:"Average\:%7.2lf %sbps" \
GPRINT:cdefd:MAX:"Maximum\:%7.2lf %sbps\n" \
LINE1:cdefd#6DC8FE:"In Max\n" \
LINE1:cdeff#E9B80C:"Out" \
GPRINT:cdeff:LAST:"Current\:%7.2lf %sbps" \
GPRINT:cdeff:AVERAGE:"Average\:%7.2lf %sbps" \
GPRINT:cdefi:MAX:"Maximum\:%7.2lf %sbps\n" \
LINE1:cdefi#E8CDEF:"Out Max\n" \
COMMENT:"\n"
```



Web Portal: Cacti

- **Official support available on http://www.cacti.net/**
- **Cacti is:**
  - A complete network graphing solution (Web Portal) designed to harness the power of RRDTool's data storage and graphing functionality.
- **Cacti provides a fast poller, advanced graph templating, multiple data acquisition methods, and user management features out of the box. All of this is wrapped in an intuitive, easy to use interface that makes sense for LAN-sized installations up to complex networks with hundreds of devices.**
- **Cacti could be used to consolidate everything else (Nagios access, looking-glass access, trouble ticketing access, documentation access)**

Web Portal: Cacti

Data Sources

To handle data gathering, you can feed cacti the paths to any external script/command along with any data that the user will need to "fill in", cacti will then gather this data in a cron-job and populate a MySQL database/the round robin archives.
Data Sources can also be created, which correspond to actual data on the graph. For instance, if a user would want to graph the ping times to a host, you could create a data source utilizing a script that pings a host and returns it's value in milliseconds. After defining options for RRDTool such as how to store the data you will be able to define any additional information that the data input source requires, such as a host to ping in this case. Once a data source is created, it is automatically maintained at 5 minute intervals.

Graphs

Once one or more data sources are defined, an RRDTool graph can be created using the data. Cacti allows you to create almost any imaginable RRDTool graph using all of the standard RRDTool graph types and consolidation functions. A color selection area and automatic text padding function also aid in the creation of graphs to make the process easier.
Not only can you create RRDTool based graphs in cacti, but there are many ways to display them. Along with a standard "list view" and a "preview mode", which resembles the RRDTool frontend 14all, there is a "tree view", which allows you to put graphs onto a hierarchical tree for organizational purposes.

User Management

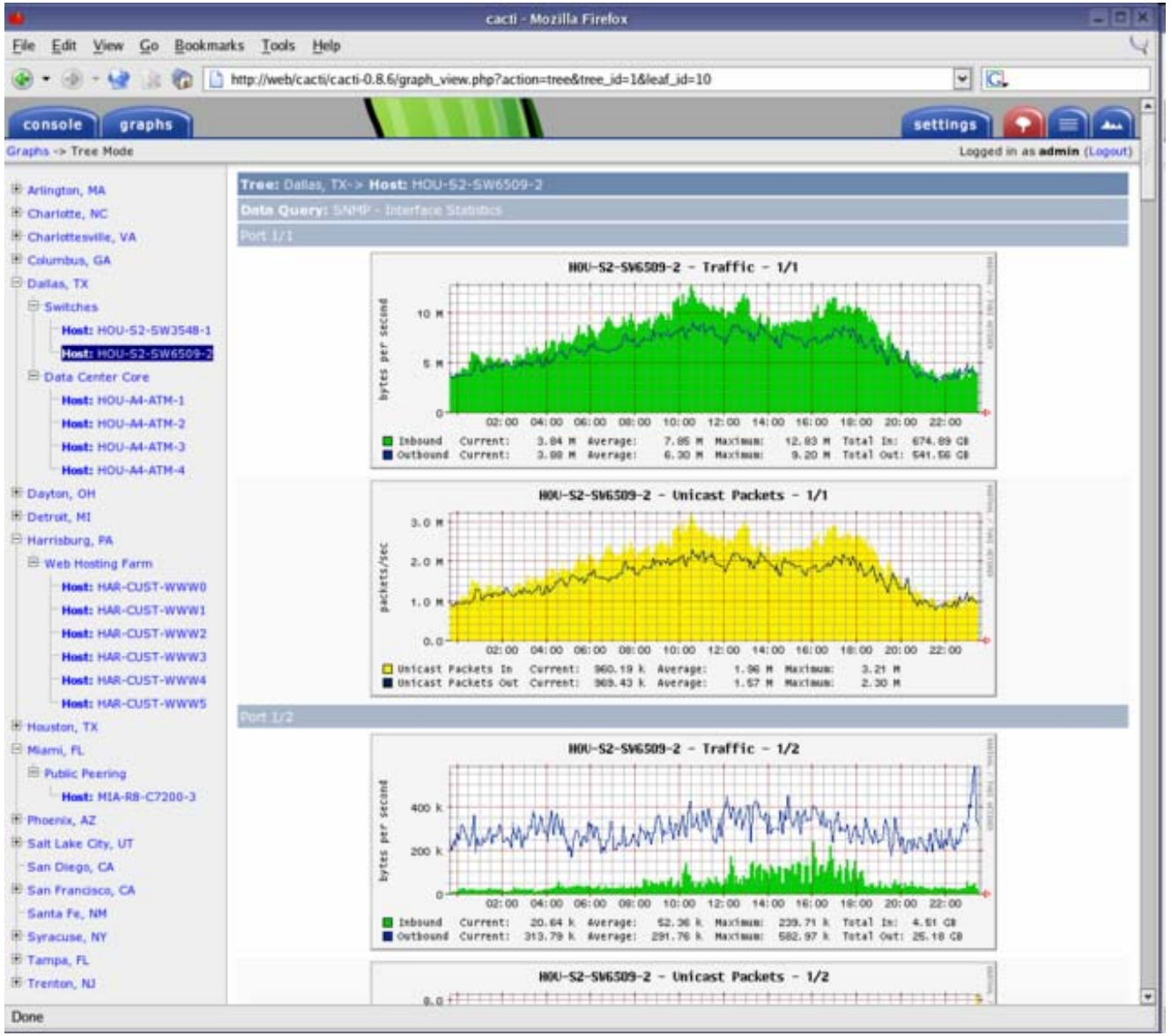
Due to the many functions of cacti, a user based management tool is built in so you can add users and give them rights to certain areas of cacti. This would allow someone to create some users that can change graph parameters, while others can only view graphs. Each user also maintains their own settings when it comes to viewing graphs.

Templating

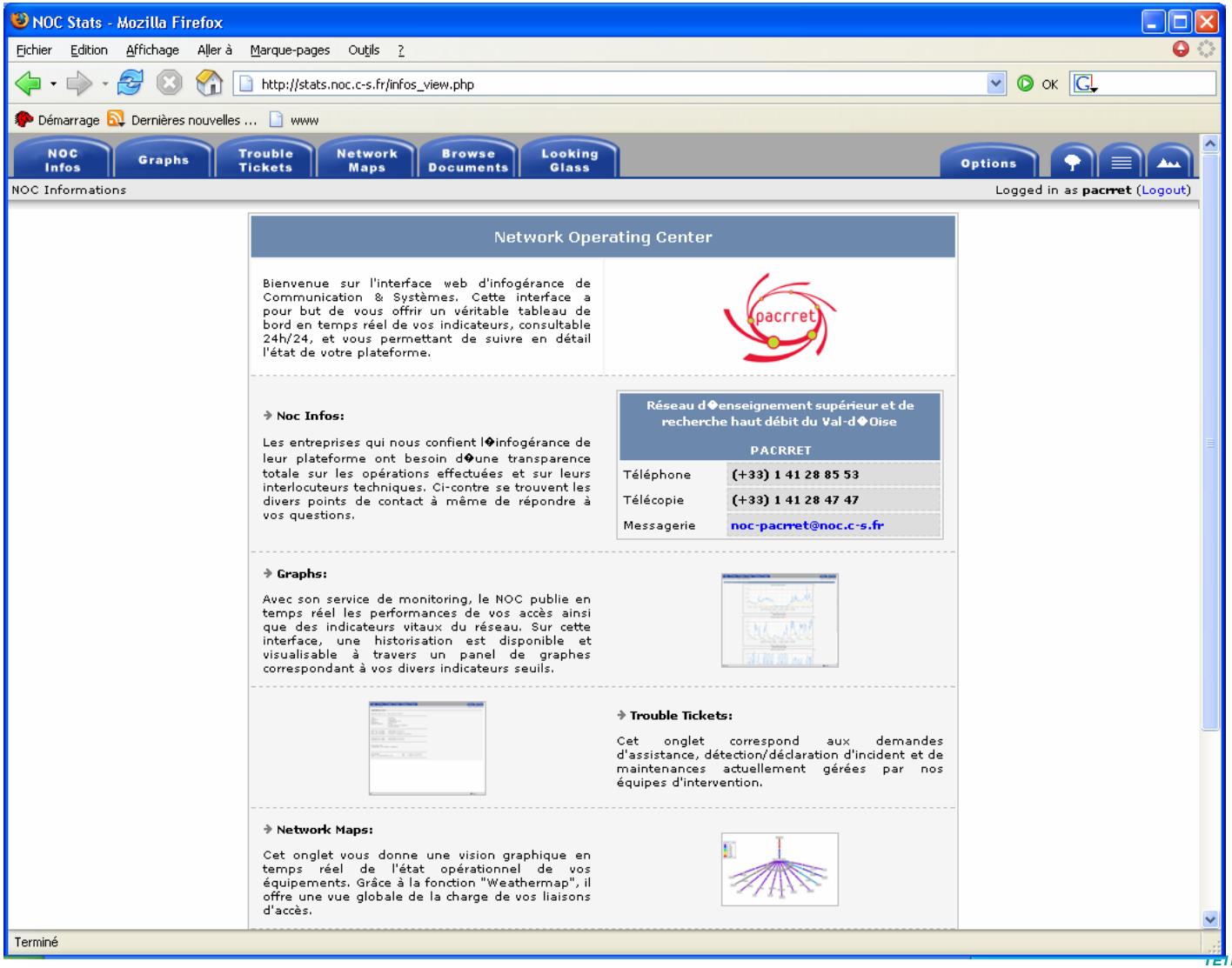
Lastly, cacti is able to scale to a large number of data sources and graphs through the use of templates. This allows the creation of a single graph or data source template which defines any graph or data source associated with it. Host templates enable you to define the capabilities of a host so cacti can poll it for information upon the addition of a new host.

Cacti Web portal

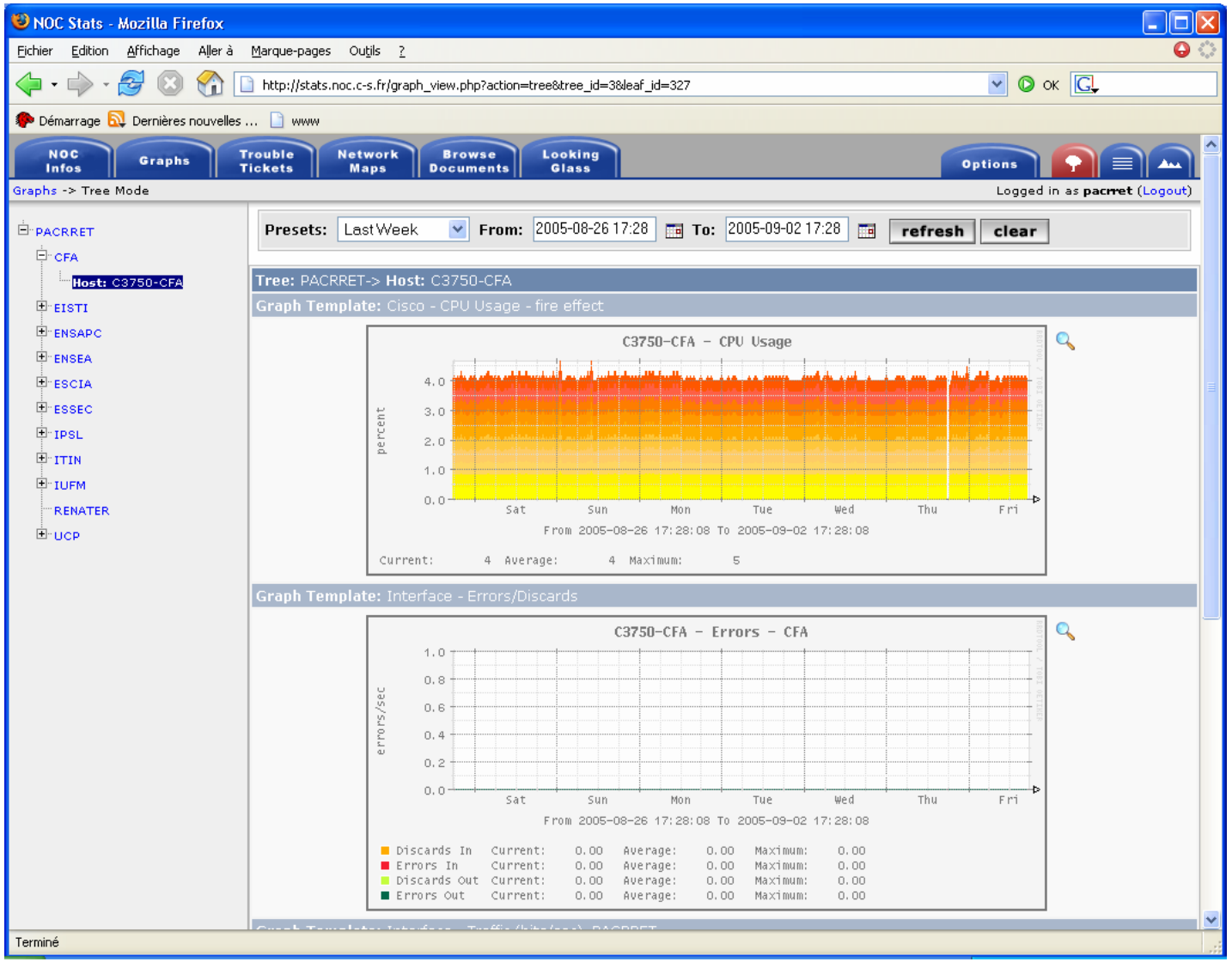
- **Web portal (Front-end) based on RRDTOOL and MySQL**



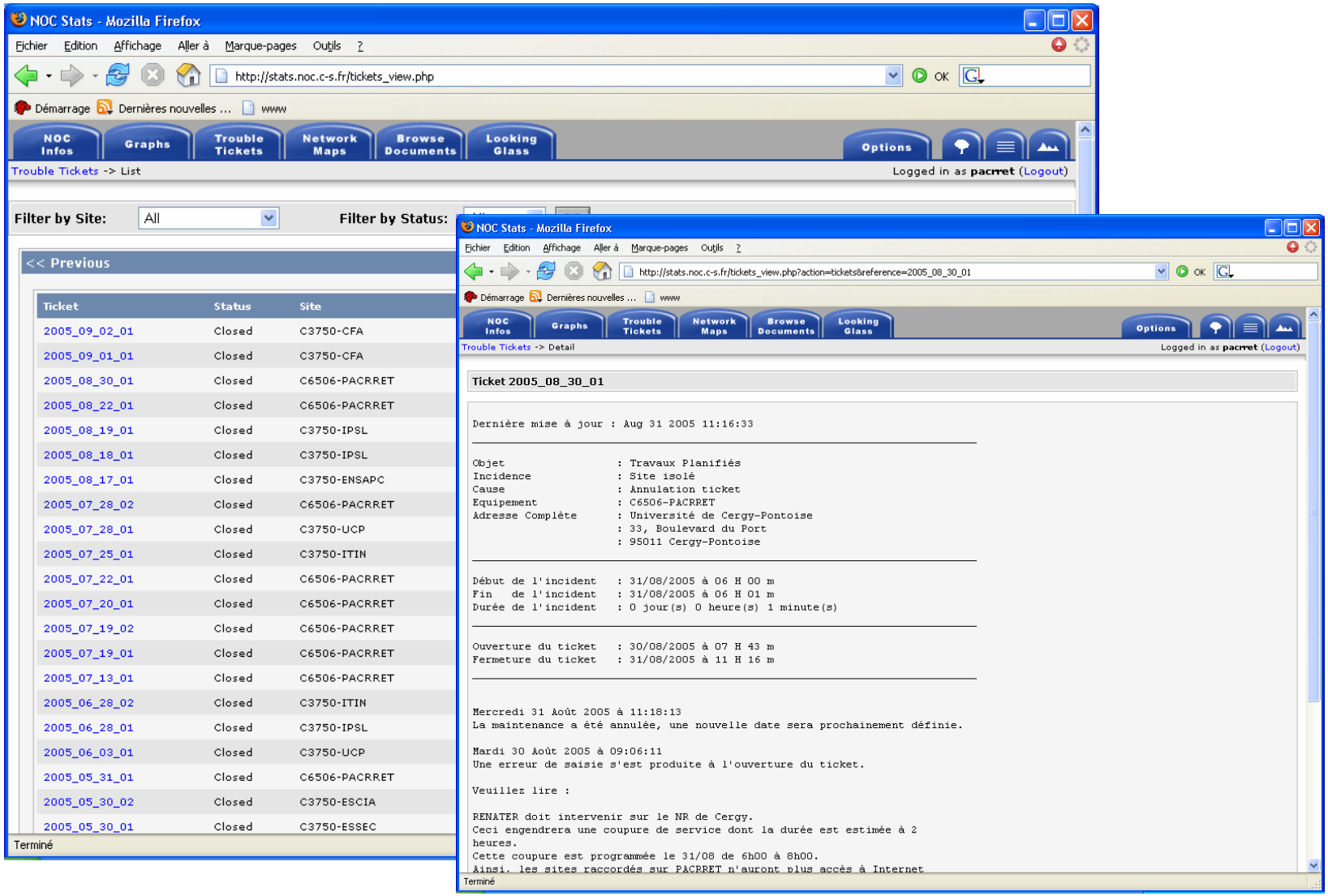
Cacti: NOC infos



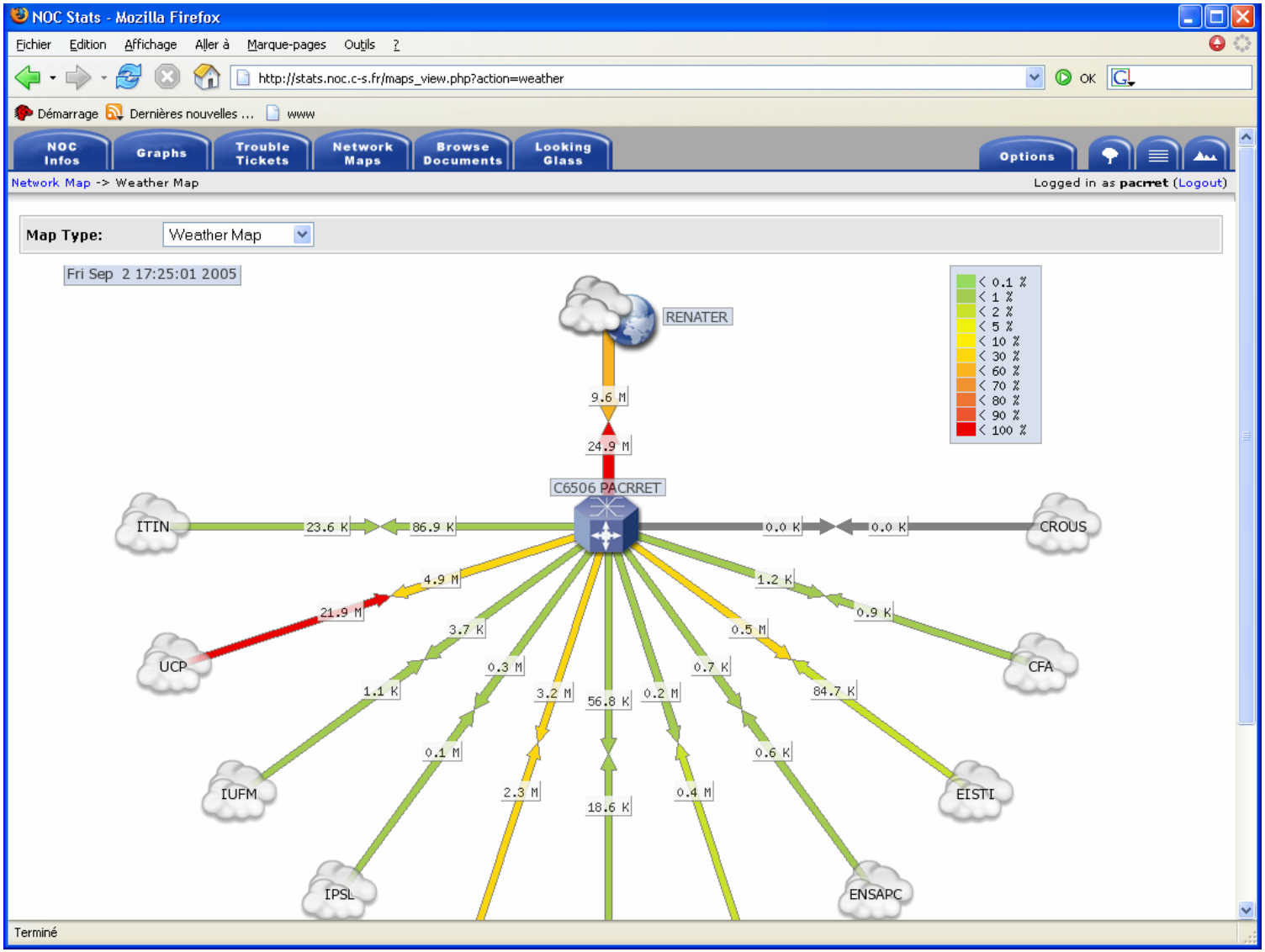
Cacti: graphics presentation



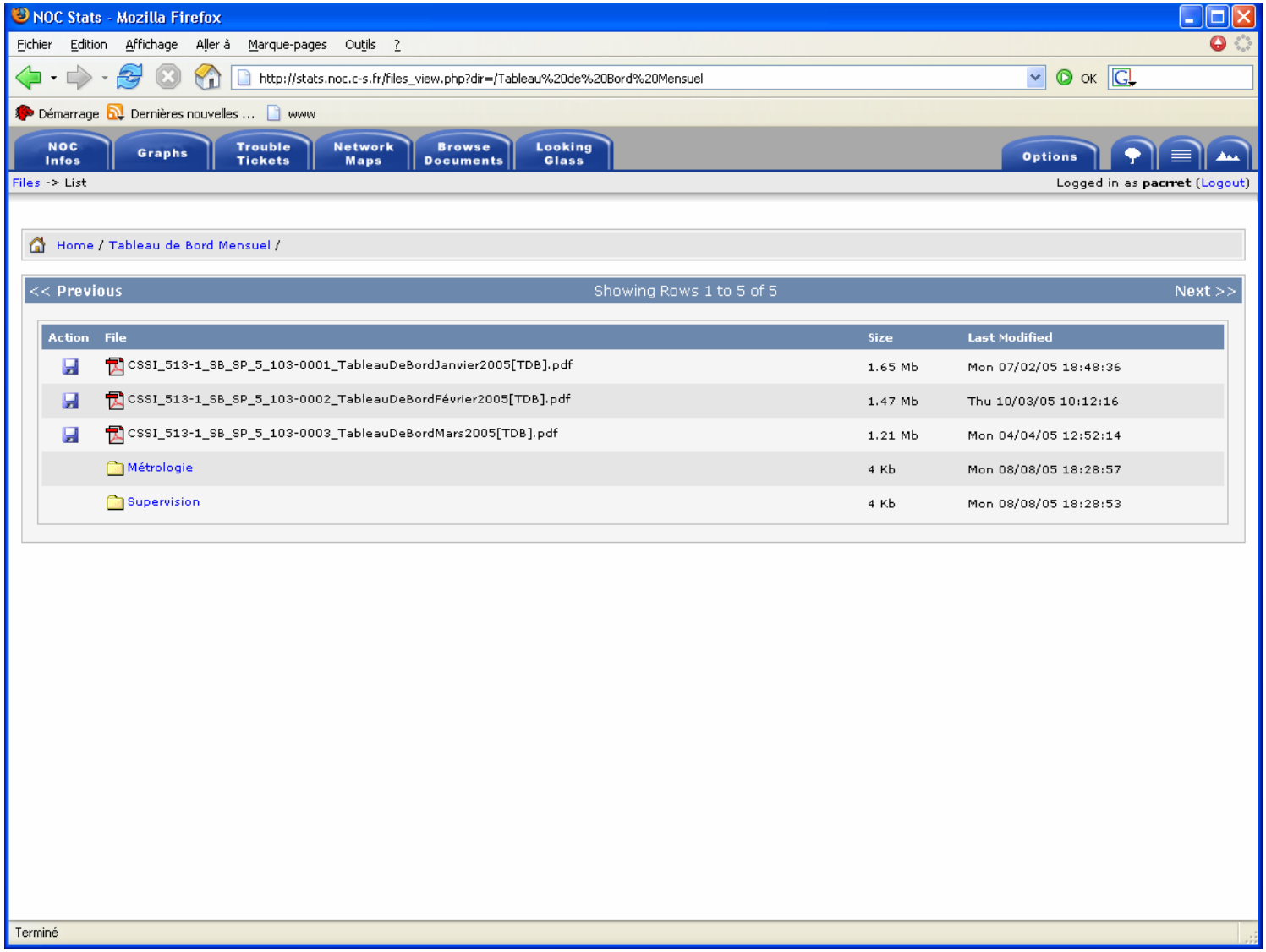
Cacti: trouble tickets presentation



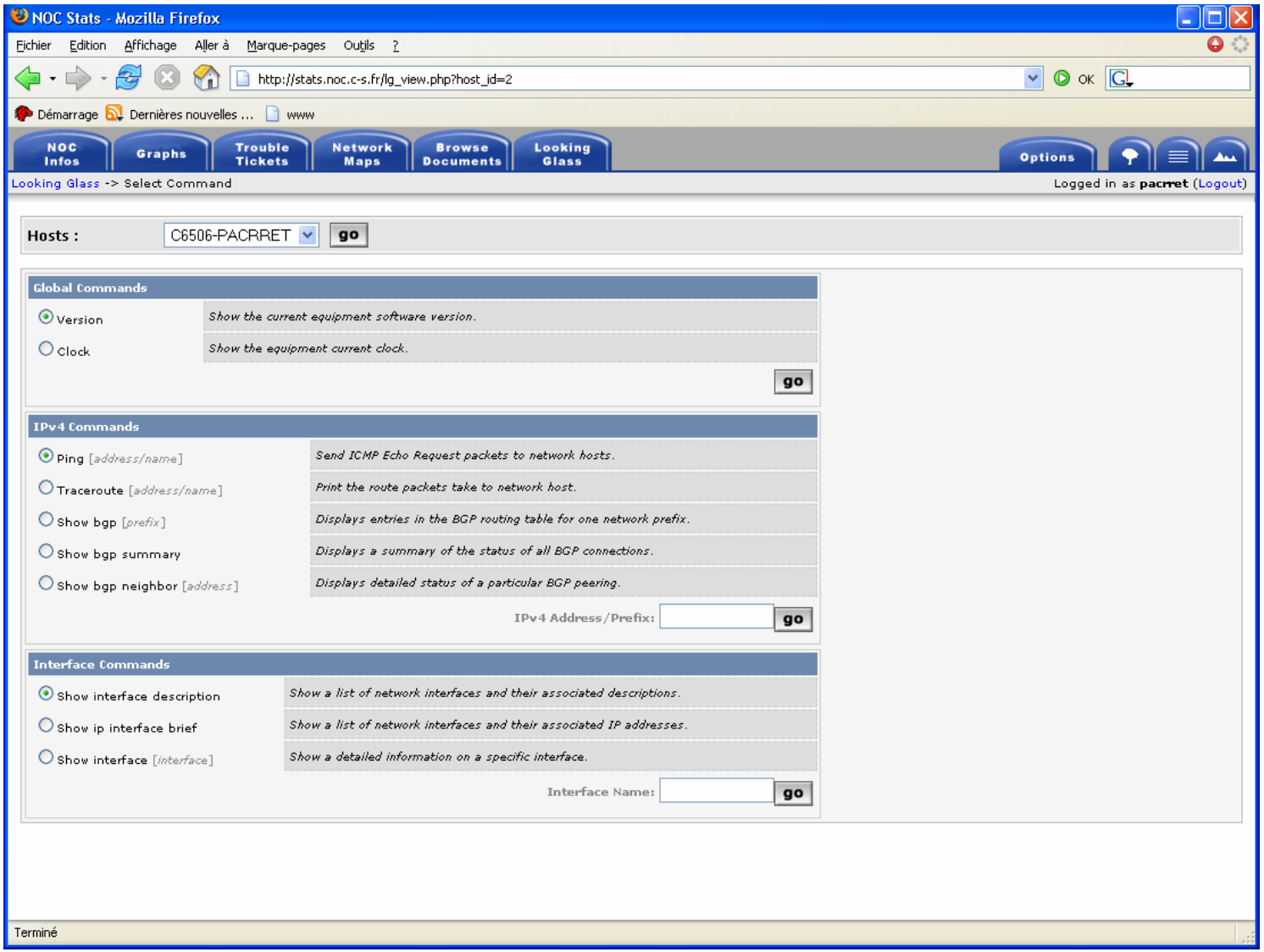
Cacti: network map presentation



Cacti: documentation access



Cacti: looking glass access



THE END

Thank you for your attention