Network and Server Statistics using Cacti

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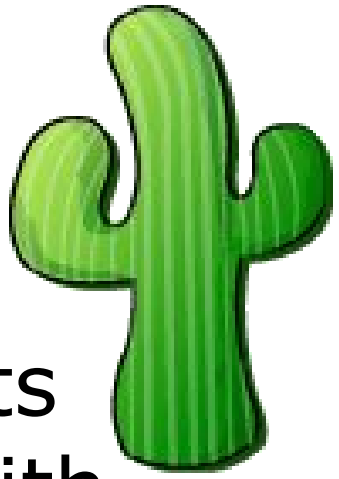
Introduction

- A tool to monitor, store and present network and system/server statistics
- Designed around RRDTool with a special emphasis on the graphical interface
- Almost all of Cacti's functionality can be configured via the Web.

Introduction Cont.



Cacti: Uses RRDtool, PHP and stores data in MySQL. It supports the use of SNMP and graphics with MRTG.

"Cacti is a complete frontend to RRDTool, it stores all of the necessary information to create graphs and populate them with data in a MySQL database. The frontend is completely PHP driven. Along with being able to maintain Graphs, Data Sources, and Round Robin Archives in a database, cacti handles the data gathering. There is also SNMP support for those used to creating traffic graphs with MRTG."

Advantages

- Graphics
  - Allows the use of all the functions of rrdgraph to define graphics and to automate some of them
  - Allows you to organize information in hierarchical trees.
- Date sources
  - Allows you to use all the rrdcreate and rrdupdate functions, including defining multiple data sources for RRD files
- Data collection
  - Data sources can be updated via SNMP or by defining scripts
  - SNMP support included using php-snmp or net-snmp
  - An optional component, *cactid*, implements SNMP routines in C with multi-threading for increased efficiency. This can be critical if you have lots of devices.
- Templates
  - You can create templates to reuse graphics definitions, data sources and devices.
- User management
  - You can manage authentication (locally or via LDAP) having distinct levels of authorization for users (if you so wish).

Installation

- Available in RPMs and packages for Gentoo, Debian, etc.
- It's necessary to install *cactid* separately if you wish to use it for faster SNMP calls.
- Starting in Ubuntu 8.10 the cacti package install is complete. Prior to 8.10 additional steps were required after doing:
  - `apt-get install cacti`

Configuration

- Cacti uses MySQL to store configurations. In older Ubuntu versions it was necessary to manually create the cacti MySQL database and set the permissions:

```
# mysqladmin --user=root create cacti
# mysql cacti < cacti.sql
# mysql --user=root mysql

mysql> GRANT ALL ON cacti.* TO cactiuser@localhost IDENTIFIED BY 'cacti_pass';
mysql> flush privileges;
```

- It was, also, sometimes necessary to manually specify the cacti connection parameters in /etc/cacti/db.php:

```
$database_type = "mysql";
$database_default = "cacti";
$database_hostname = "localhost";
$database_username = "cactiuser";
$database_password = "cacti_pass";
$database_port = "3306";
```

Configuration

- Make sure that there is a cron job that has been configured as well – Likely in /etc/cron.d/cacti.
- This will be something like:

```
*/5 * * * * www-data php /usr/share/cacti/site/poller.php >/dev/null \
    2>/var/log/cacti/poller-error.log
```

- This is not necessary with the Debian package in Ubuntu 8.10.

cactid

```
# tar xvzf cacti-cactid-0.8.6.tar.gz
# cd cactid-0.8.6
# ./configure
# make
# make install
```

```
# vi /usr/local/cactid/bin/cactid.conf
DB_Host         localhost
DB_Database     cacti
DB_User         cactiuser
DB_Pass         cacti_pass
DB_Port         3306
```

In the web interface:

- Go to **Configuration -> Settings -> Paths -> Cactid Poller File Path** and specify the location of cactid
- Go to **Poller** and in **Poller Type**, select **cactid**

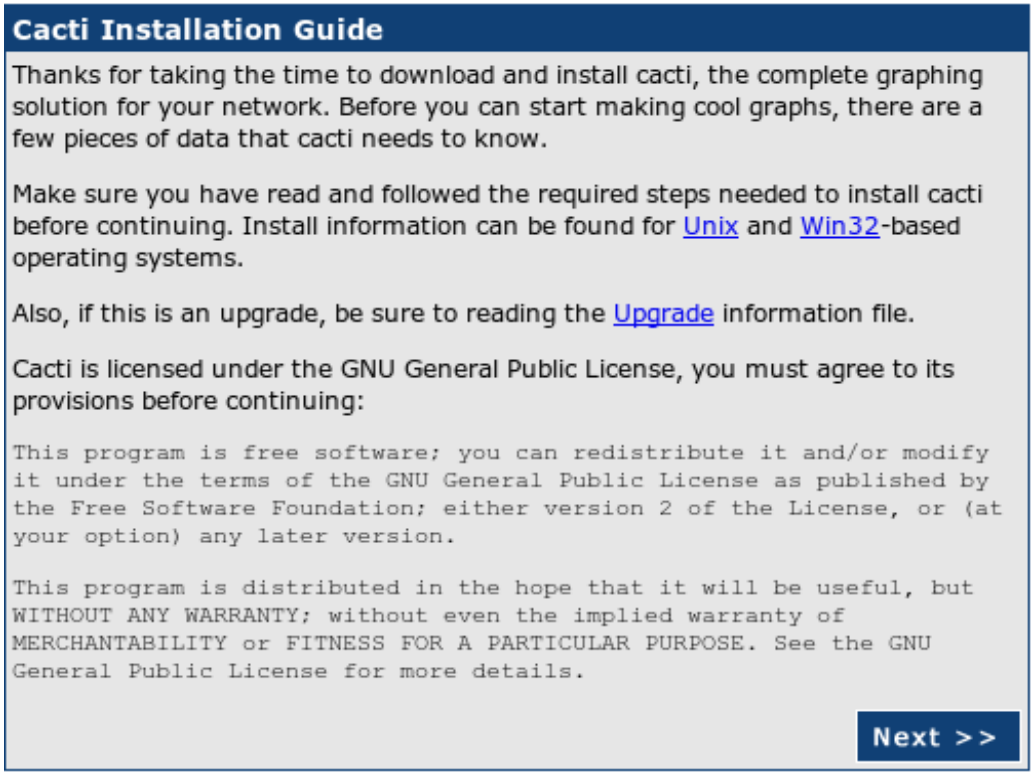
cacti: Installation

Now, use your web browser and open:

```
http://localhost/cacti
```

You'll see the following...

cacti: Installation

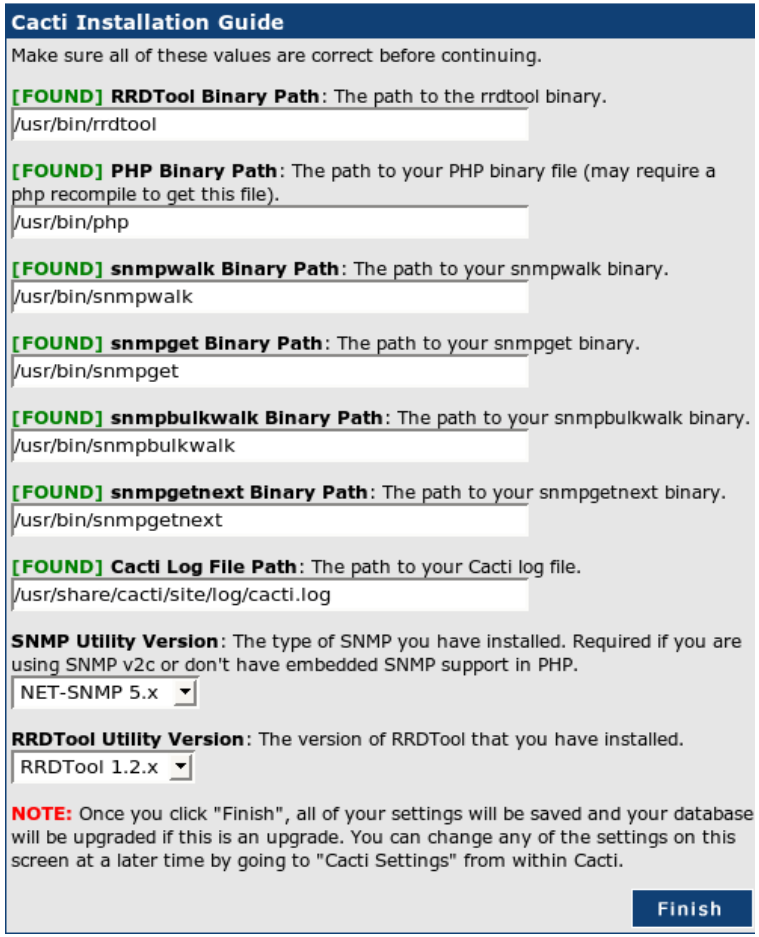


Press “Next >>”

cacti: Instalación

Choose “New Install” and press “Next >>” again.

cacti: Instalación



Should screen should look like this. If not, ask for help from your instructor.

Press “Finish”

cacti: First Login

Log in the first time using:

User Name: *admin*

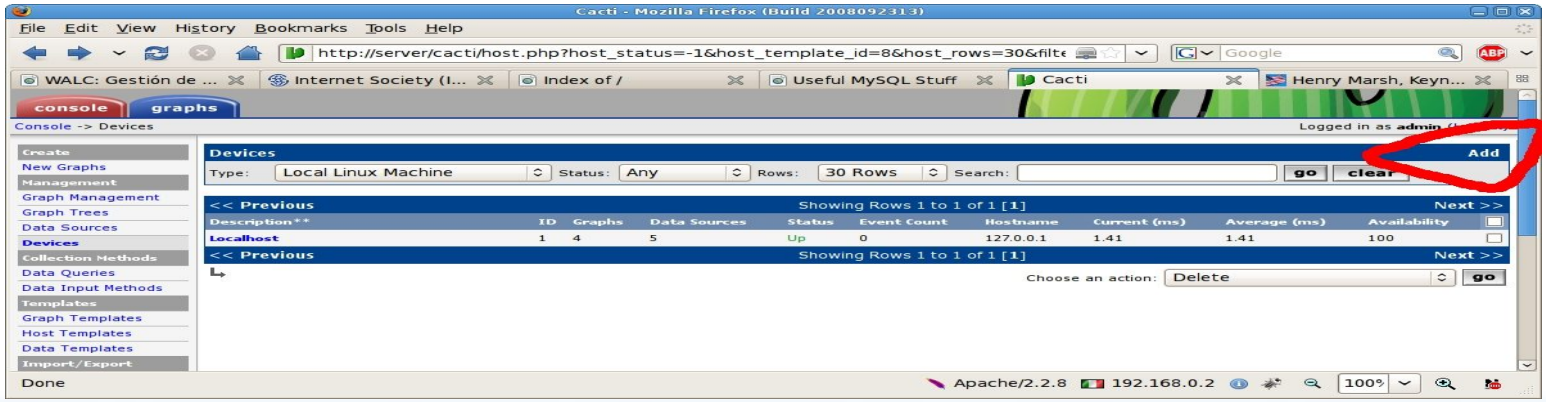
Password: *admin*

cacti: Password Change

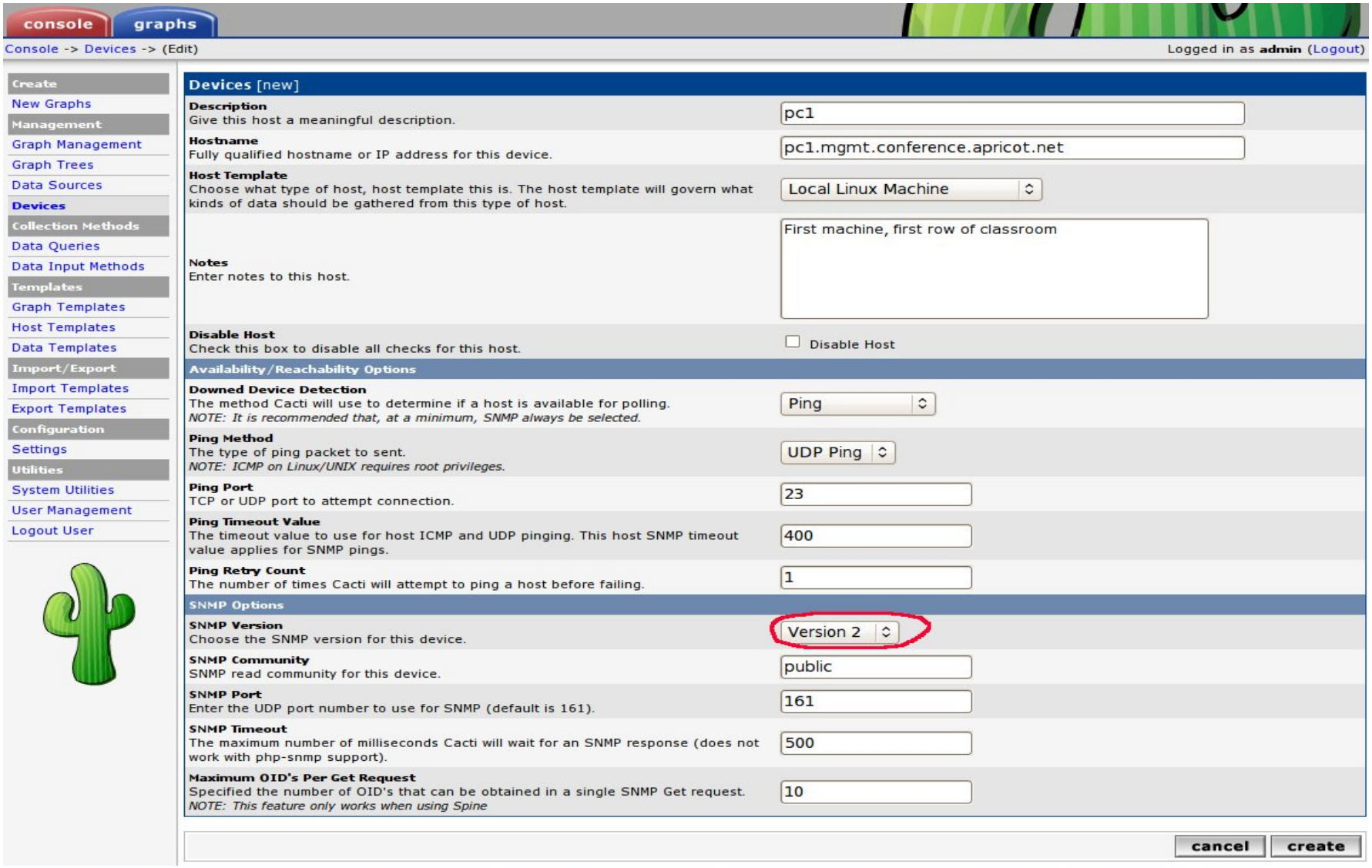
Now you must change the admin password. Please *use the workshop password* when you do this.

Add Devices

- **Management -> Devices -> Add**
- Specify device attributes
  - Select a device template and this will automatically provide you with several device templates as well as ask for information about the device.
  - You can add additional templates when/if you wish.



Add devices


console
graphs
Console -> Devices -> (Edit)
Logged in as admin (Logout)
Create
New Graphs
Management
Graph Management
Graph Trees
Data Sources
Devices
Collection Methods
Data Queries
Data Input Methods
Templates
Graph Templates
Host Templates
Data Templates
Import/Export
Import Templates
Export Templates
Configuration
Settings
Utilities
System Utilities
User Management
Logout User
Devices [new]
Description
Give this host a meaningful description.
pc1
Hostname
Fully qualified hostname or IP address for this device.
pc1.mgmt.conference.apricot.net
Host Template
Choose what type of host, host template this is. The host template will govern what kinds of data should be gathered from this type of host.
Local Linux Machine
Notes
Enter notes to this host.
First machine, first row of classroom
Disable Host
Check this box to disable all checks for this host.
Disable Host
Availability/Reachability Options
Downed Device Detection
The method Cacti will use to determine if a host is available for polling.
NOTE: It is recommended that, at a minimum, SNMP always be selected.
Ping
Ping Method
The type of ping packet to sent.
NOTE: ICMP on Linux/UNIX requires root privileges.
UDP Ping
Ping Port
TCP or UDP port to attempt connection.
23
Ping Timeout Value
The timeout value to use for host ICMP and UDP pinging. This host SNMP timeout value applies for SNMP pings.
400
Ping Retry Count
The number of times Cacti will attempt to ping a host before failing.
1
SNMP Options
SNMP Version
Choose the SNMP version for this device.
Version 2
SNMP Community
SNMP read community for this device.
public
SNMP Port
Enter the UDP port number to use for SNMP (default is 161).
161
SNMP Timeout
The maximum number of milliseconds Cacti will wait for an SNMP response (does not work with php-snmp support).
500
Maximum OID's Per Get Request
Specified the number of OID's that can be obtained in a single SNMP Get request.
NOTE: This feature only works when using Spine
10
cancel
create

Add Devices

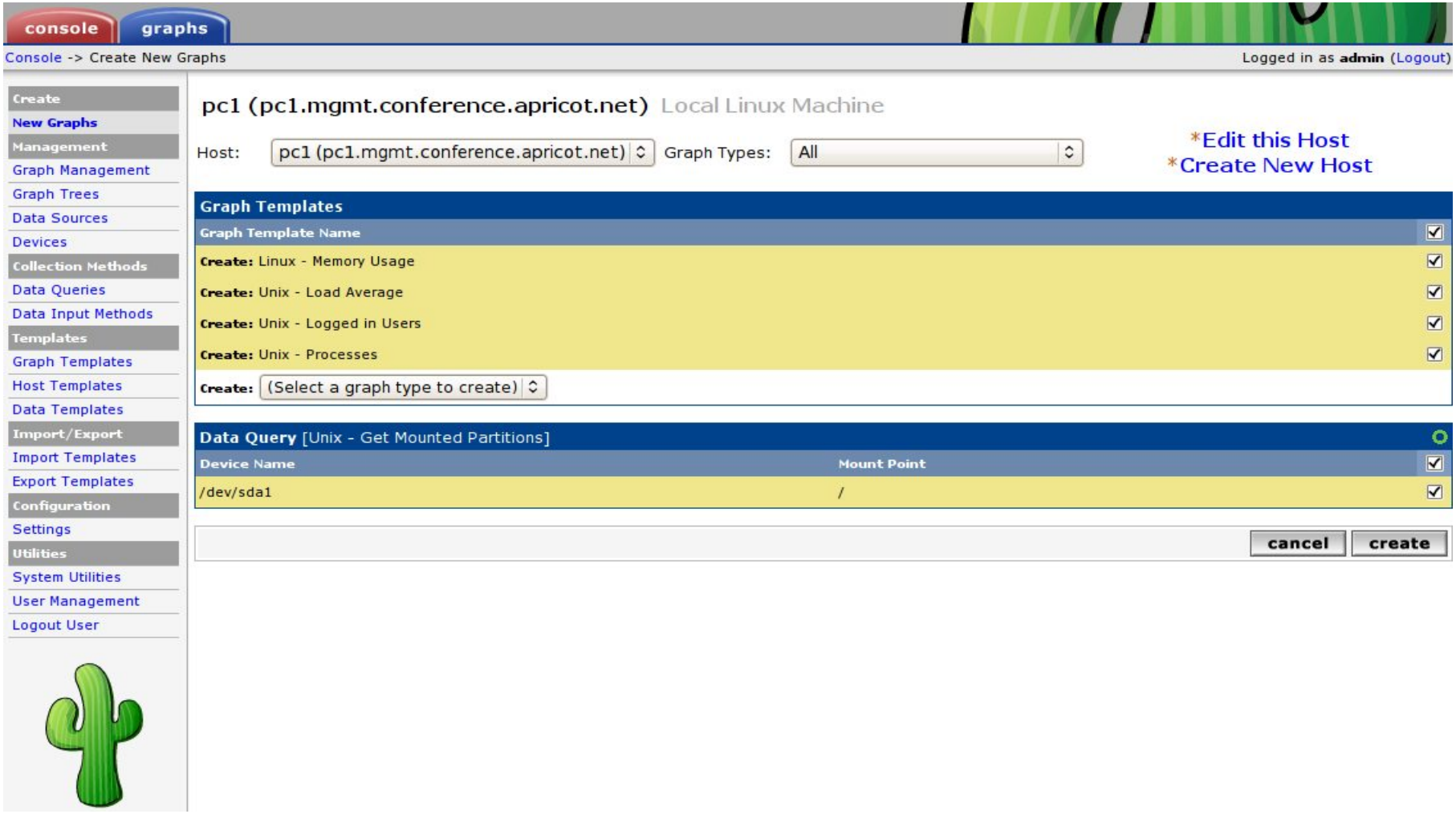
Be sure you choose SNMP Version 2 for class.

You can, of course, use SNMP Version 3 in your own environment.

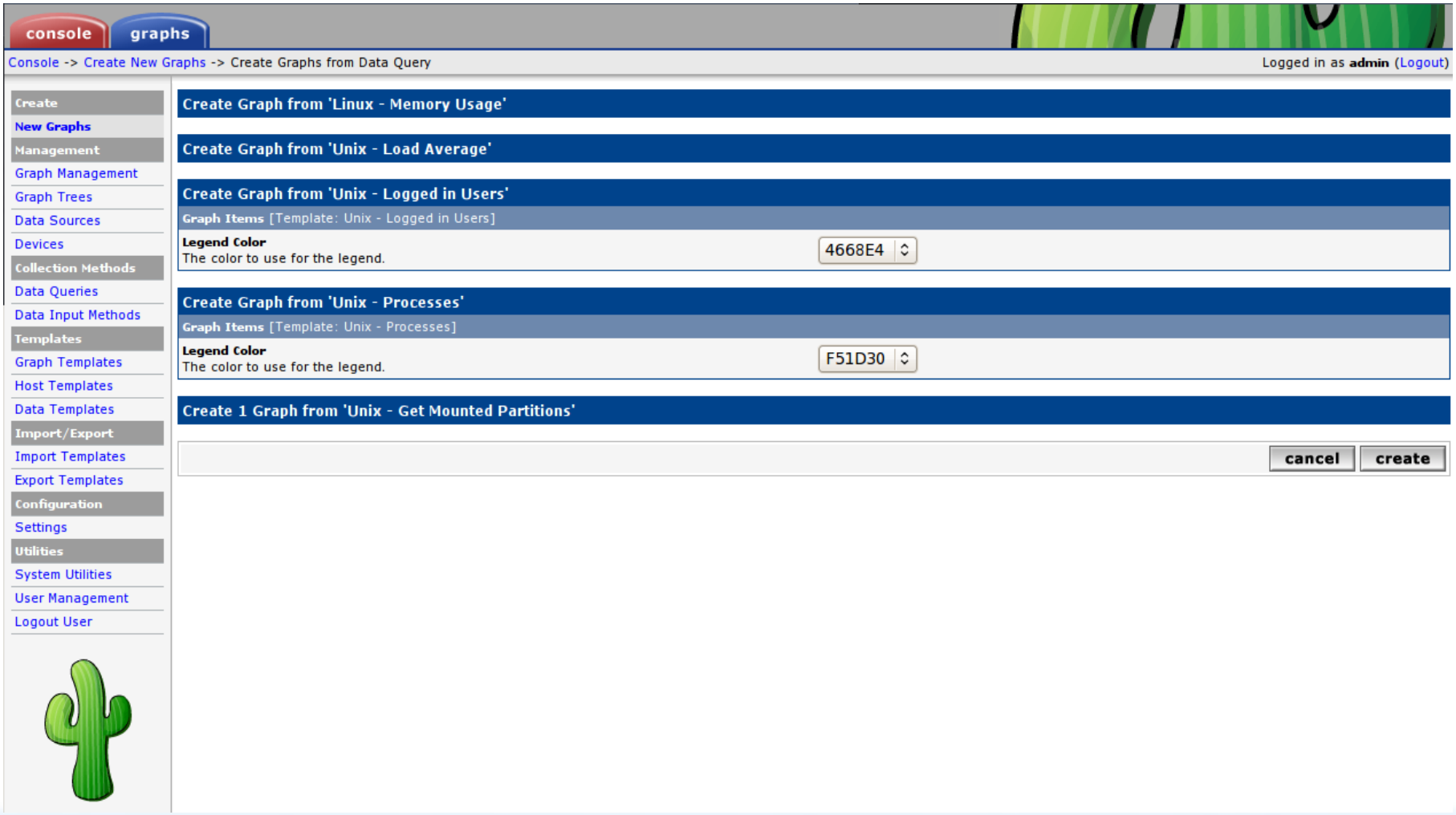
Create graphics

- Go to the “Create graphs for this host” choice.
- Choose the graph templates and date queries you want, then press “Create”.
- You can change the default color schemes for the graphs if you wish, but the predefined ones seem pretty reasonable.

Create graphics: Step 1



Create graphics: Step 2



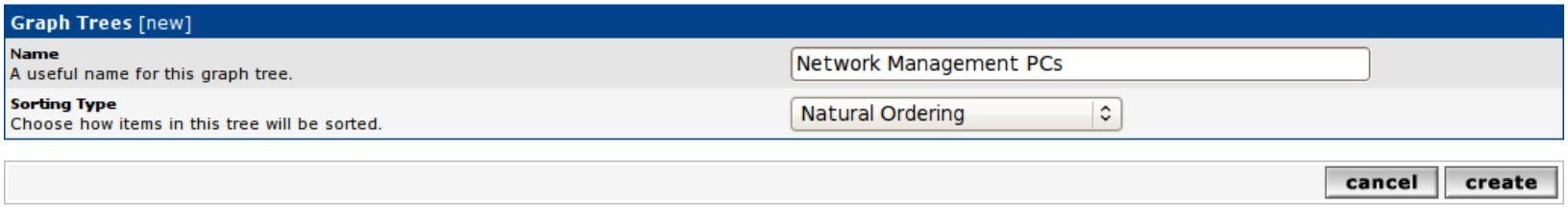
See the Graphics

- Place the new device on the tree hierarchy that corresponds to where it belongs.
- This is up to you, but, perhaps, draw this out on a sheet of paper first.
  - In Management -> Graph Trees select the default graph tree (or create your own)

Graph Trees

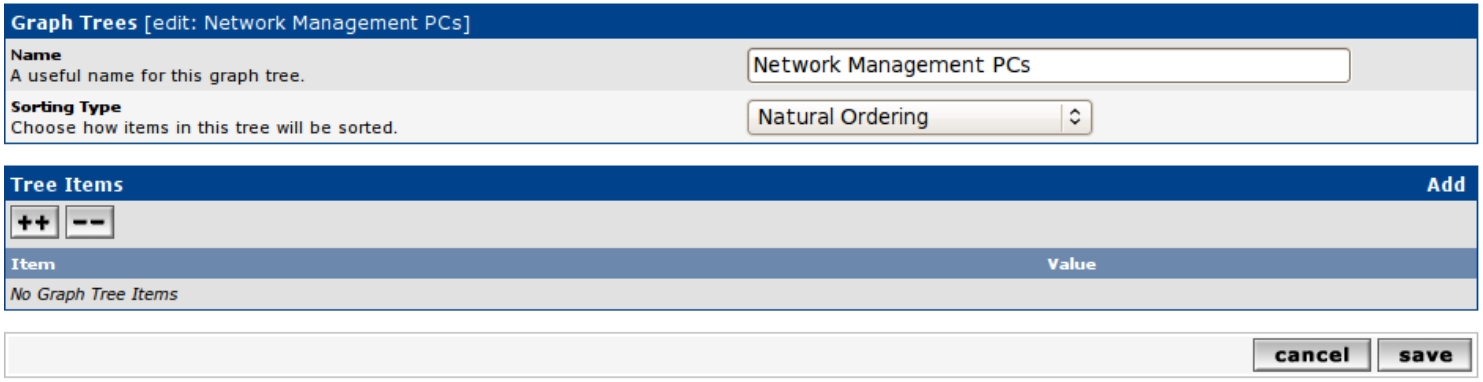
First, press “Add” if you want a new graphing tree:

Second, name your tree, choose the sorting order (author likes Natural Sorting and press “create”:

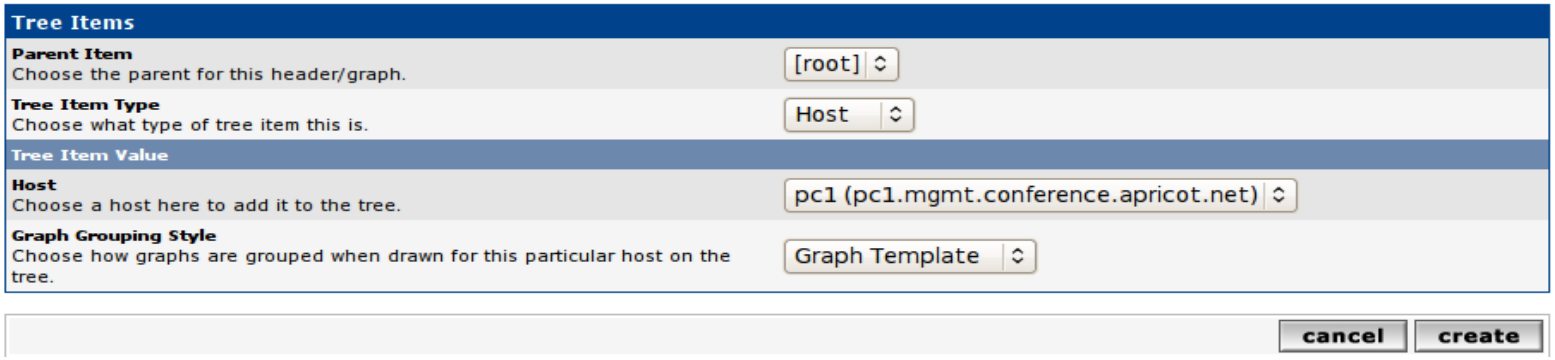


Graph Trees

Third, add devices to your new tree:

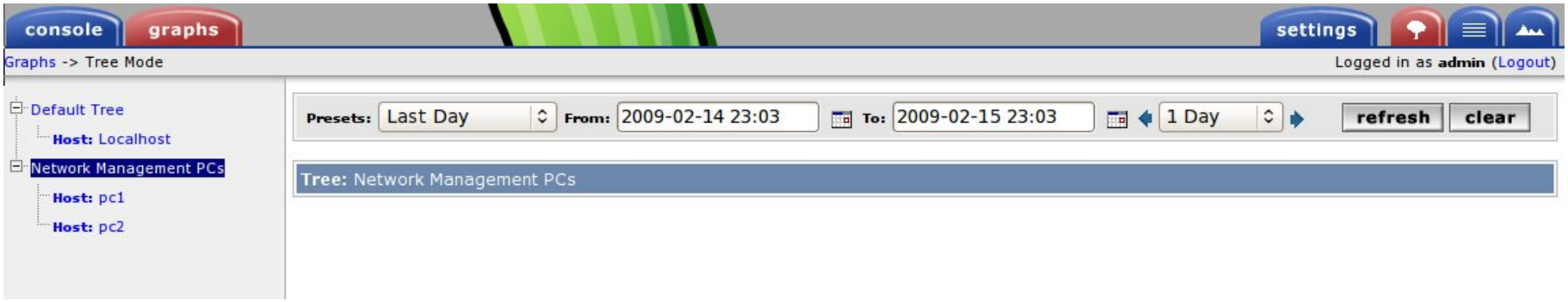


Once you click "Add" you can add "Headers" (separators), graphs or hosts. Now we'll add Hosts to our newly created graph tree:



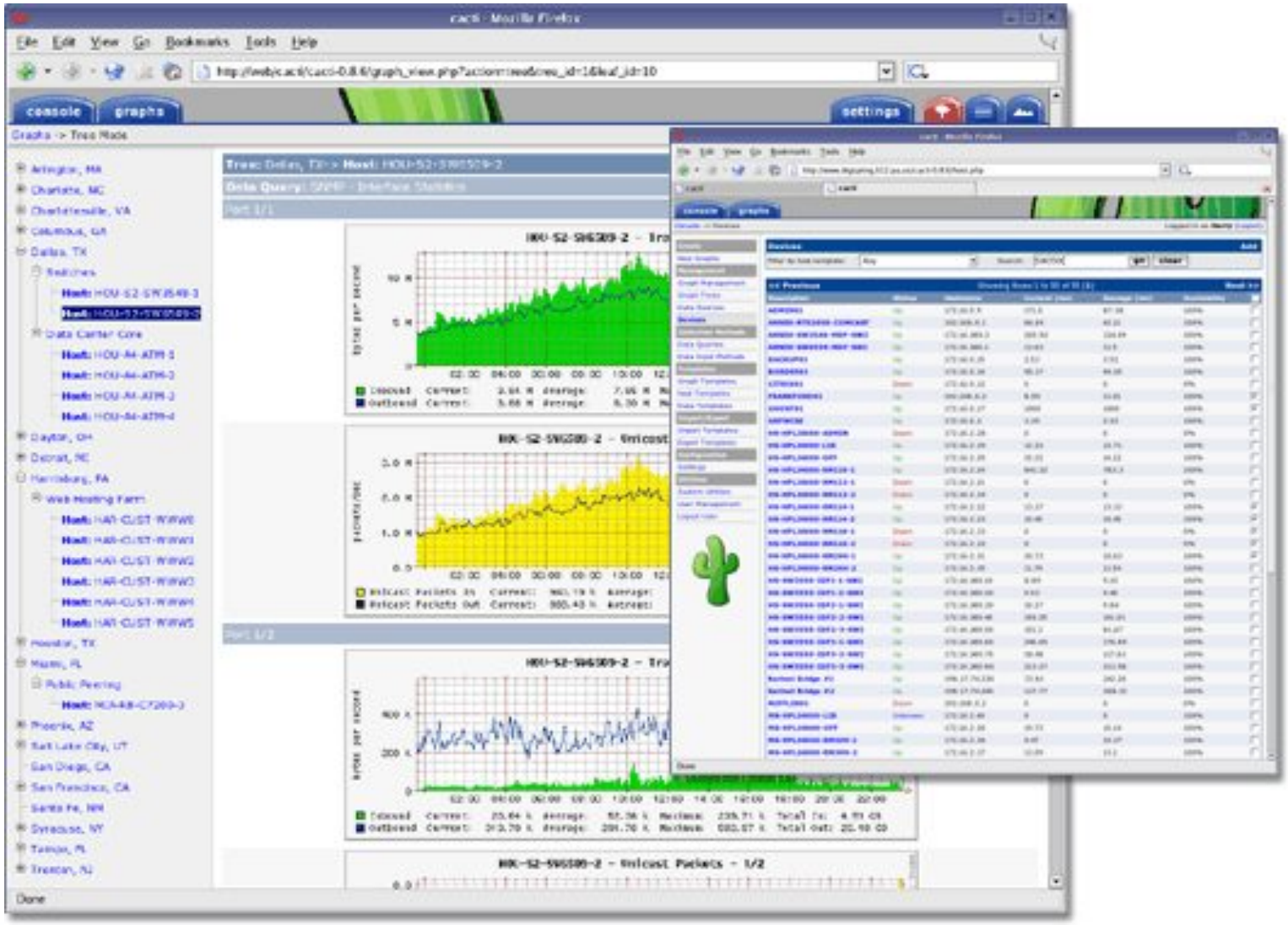
Graph Tree with 2 Devices

Our graph tree after our first two devices have been added. No graphs are displayed yet. This can take up to 5 minutes (remember the Cacti cron job?):



Next a much larger example with graphs being displayed ==>

An Example...


cacti - Mozilla Firefox
File Edit View Go Bookmarks Tools Help
console
graphs
settings
Graphs -> Tree Mode
Done

To Complete in Class

- Attempt to configure each device in the classroom, including pcs, routers, switches and the classroom NOC as well.
- Use SNMP settings to take advantage of the information you can gather on each device.
- Note that you can choose “Cisco Router” as a device template, and “Generic SNMP-enabled Host” as well.

Workshop Network

Our workshop consists of two routers and three switches and the various pcs attached to each switch.

Refer to our network diagram for the details:

http://noc/trac/netmanage/wiki/network

Machine Names

Row 1	**Row 2**
pc1	pc9
...	...
pc8	pc15
sw1	sw2
net1-gw	net2-gw

- **Use "`dig -x IP`" to see the name of each device. Use names instead of Ips in Cacti (and Smokeping, nagios, etc)**
- **Our domain is mgmt.conference.apricot.net.**

Device Templates

- Go to Templates -> Host Templates
- Select one of the templates and then “Duplicate”
- Edit the new template and add the graphs and data queries you want to use.
- Create new devices using the new template. Very simple.

Graphing Templates

- You can modify already existing templates.
- Go to Templates –> Graph Templates
- Choose the desired template
- Modify any of the attributes that you wish.
- Once you save changes to an existing template, then these will be reflected in the graphs of all devices that use the updated template.

Installing additional templates

- You can install templates and scripts from third parties for specific statistics, such as:
  - MySQL: http://www.faemalia.net/mysqlUtils/

Conclusiones

- Cacti is very flexible due to the idea of templates.
- Once you understand the concepts behind RRDTool, then using Cacti should be intuitive.
- The hierarchical visualization of devices helps to organize and find devices very quickly.
- There are no (or very little) available statistics about the performance of *cactid* (anyone want to collect some?)
- It's not easy to do rediscovery of devices.
- To add lots of devices requires lots of time and effort. Tools like Netdot and Netdisco can help – or, home-grown MySQL scripts.

Referencias

- Cacti web site. http://www.cacti.net
- Forums. http://forums.cacti.net/