Network and Server Statistics using Cacti

PacNOG5 17 June 2009

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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: Ubuntu Server 8.1

- 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.

apt-get install cacti



Use our class password

Configuring mysql-server-5.0
Repeat password for the MySQL "root" user:
<0k>
· · · · · · · · · · · · · · · · · · ·

Use our class password, again



For your information. Generally not a problem.

Which kind of web server	Configuring cacti should be used by o	
Select "None" if you woul	ld like to configure	e your webserver by hand.
Webserver type		
	Apache Apache-SSL <mark>Apache2</mark> All None	₽
	<0k>	

We are using Apache2, be sure to choose this.

Configuring cacti
cacti must have a database installed and configured before it can be used. If you like, this can be handled with dbconfig-common.
If you are an advanced database administrator and know that you want to perform this configuration manually, or if your database has already been installed and configured, you should refuse this option. Details on what needs to be done should most likely be provided in /usr/share/doc/cacti.
ರಗಿerwise, you should probably choose this option.
Configure database for cacti with dbconfig-common?
<yes> <no></no></yes>

Choose "Yes". If you choose "No", then you will need to do database configuration by hand at a later time.



Use our class password. Same as earlier.



Enter the class password, again.

Configur	ing cacti
Password conf	irmation:
<0k>	<cancel></cancel>

Enter the class password, one final time.

Now, use your web browser and open:

http://localhost/cacti

You'll see the following...

Cacti Installation Guide

Thanks for taking the time to download and install cacti, the complete graphing solution for your network. Before you can start making cool graphs, there are a few pieces of data that cacti needs to know.

Make sure you have read and followed the required steps needed to install cacti before continuing. Install information can be found for <u>Unix</u> and <u>Win32</u>-based operating systems.

Also, if this is an upgrade, be sure to reading the Upgrade information file.

Cacti is licensed under the GNU General Public License, you must agree to its provisions before continuing:

This program is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 2 of the License, or (at your option) any later version.

This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details.

Next >>

Press "Next >>"

Cacti Installation Guide	
Please select the type of installation	
New Install	
The following information has been determined from Cacti's configuration is not correct, please edit 'include/config.php' before continuing.	ation file. If it
Database User: cacti	
Database Hostname:	
Database: cacti	
Server Operating System Type: unix	
	Next >>

Choose "New Install" and press "Next >>" again.

Cacti Installation Guide

Make sure all of these values are correct before continuing.

[FOUND] RRDTool Binary Path: The path to the rrdtool binary.

/usr/bin/rrdtool

[FOUND] PHP Binary Path: The path to your PHP binary file (may require a php recompile to get this file).

/usr/bin/php

[FOUND] snmpwalk Binary Path: The path to your snmpwalk binary. /usr/bin/snmpwalk

[FOUND] snmpget Binary Path: The path to your snmpget binary. /usr/bin/snmpget

[FOUND] snmpbulkwalk Binary Path: The path to your snmpbulkwalk binary. /usr/bin/snmpbulkwalk

[FOUND] snmpgetnext Binary Path: The path to your snmpgetnext binary. /usr/bin/snmpgetnext

[FOUND] Cacti Log File Path: The path to your Cacti log file. /usr/share/cacti/site/log/cacti.log

SNMP Utility Version: The type of SNMP you have installed. Required if you are using SNMP v2c or don't have embedded SNMP support in PHP.

RRDTool Utility Version: The version of RRDTool that you have installed.

NOTE: Once you click "Finish", all of your settings will be saved and your database will be upgraded if this is an upgrade. You can change any of the settings on this screen at a later time by going to "Cacti Settings" from within Cacti.

Finish

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

Press "Finish"



Please enter your Cacti user name and password below:

User Name:	
Password:	

Login

Log in the first time using: User Name: *admin* Password: *admin*

cacti: Password Change



*** Forced Password Change ***

Please enter a new password for cacti:

Password:	Nototototok
Confirm:	*****

Save

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.

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Add devices: 2

console graphs

Console -> Devices -> (Edit)

Logged in as admin (Logout)

Greate	Devices [new]			
New Graphs	Description	pc1		
lanagement	Give this host a meaningful description.	(PSA		
Graph Management	Pully qualified hostname or IP address for this device.	pc1.mgmt.conference.apricot.net		
Staph Trees	Host Template			
Data Sources	Choose what type of host, host template this is. The host template will govern what	Local Linux Machine		
Devices	kinds of data should be gathered from this type of host.			
ollection Hetheds		First machine, first row of classroom		
Data Queries				
Data Input Methods	Enter notes to this hest.			
ferrigi la tie s				
Graph Templates				
Host Templates	Disable Hest			
Data Templates	Check this box to disable all checks for this host.	Disable Host		
Import/Export	Availability/Reachability Options			
Import Templates	Dewned Device Detection	(1977)		
Esport Templates	The method Cacti will use to determine if a host is available for polling. NOTE: It is recommended that, at a minimum, SMMP always be selected.	Ping 0		
enfiguration				
Settings	Ping Method The type of ping packet to sent	UDP Ping 0		
Itilities	NOTE: ICMP on Linux/UNIX requires root privileges.	(
System Utilities	Pag Port TCP or UDP port to attempt connection.	23		
/ser Hanagement				
ogout User The Immediat Value The Immediate of use for host ICMP and UDP pinging. This host SNM 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			
9 P	SNHP Version Choose the SNHP version for this device.	Version 2 0		
	SNMP read community for this device	public		
	Enter the UDP port number to use revenue (default is 161).	161		
	SNHP Timeout The maximum number of milliseconds Cacti will welt 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 SNNP Get request. NOTE: This feature only works when using Spine	10		

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

console gra	phs		
Console -> Create New	Graphs		Logged in as admin (Logout)
Greate New Graphs	pc1 (pc1.mgmt.conference.apricot.net) Local Linu	IX Machine	
Management Graph Management	Host: pcl (pcl.mgmt.conference.apricot.net) Graph Types	: All	*Edit this Host *Create New Host
Graph Trees	Graph Templates		
Data Sources Devices	Graph Template Name		N I
Collection Methods	Greate: Linux - Nemory Usage		R
Data Queries	Create: Unix - Load Average		R.
Data Input Nethods			R
Templates	Create: Unix - Logged in Users		
Graph Templates	Creates Unix - Processes		R
Host Templates	Create: (Select a graph type to create) 0		
Data Templates			
Import/Export	Data Query [Unix - Get Mounted Partitions]		0
Import Templates	Device Name	Hount Point	×
Export Templates Configuration	/dev/sda1	7	82
Settings			
Utilities	1		cancel create
System Utilities			
User Management			
Logout User			
e			

Create graphics: Step 2

console grag	phs	
Console -> Create New	Graphs -> Create Graphs from Data Query	Logged in as admin (Lo
Create	Create Graph from 'Linux - Memory Usage'	
New Graphs		
Nanagement	Create Graph from 'Unix - Load Average'	
Graph Management		
Graph Trees	Create Graph from 'Unix - Logged in Users'	
Data Sources	Graph Items [Template: Unix - Logged in Users]	
Devices	Legend Color The color to use for the legend.	4668E4 C
Collection Methods		
Data Queries	Create Graph from 'Unix - Processes'	
Data Input Nethods	Graph Items [Template: Unix - Processes]	
Templates	Legend Color	F51D30 \$
Graph Templates Host Templates	The color to use for the legend.	134030 4
Data Templates	Create 1 Graph from 'Unix - Get Mounted Partitions'	
Import/Export	Create 1 Graph from Unix - Get Nountea Partitions	
Inport Templates		cancel creat
Export Templates		
Configuration		
Settings		
Utilities		
System Utilities		
User Nanagement	·	
Logout User		
Ŷ		

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:

Graph Trees	Add
Name	
DefaultTree	×

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

Graph Trees [new]	
Name A useful name for this graph tree.	Network Management PCs
Sorting Type Choose how items in this tree will be sorted.	Natural Ordering 0
	cancel create

Graph Trees

Third, add devices to your new tree:

Graph Trees [edit: Network Management PCs]		
Name A useful name for this graph tree.	Network Management PCs	
Sorting Type Choose how items in this tree will be sorted.	Natural Ordering 0	
Tree Items		Add
++		
Item	Vahao	
No Graph Tree Items		
		cancel save

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

Tree Items	
Parent Item Choose the parent for this header/graph.	[root] C
Tree Item Type Choose what type of tree item this is.	Host C
Tree Item Value	
Hest Choose a host here to add it to the tree.	pc1 (pc1.mgmt.conference.apricot.net) 0
Craph Crouping Style Choose how graphs are grouped when Nawn for this particular host on the tree.	Graph Template 0
	cancel create

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...



Conclusions

- 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, homegrown MySQL scripts.

References

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

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:

• 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

<pre># vi /usr/local/cactid/bin/cactid.conf</pre>		
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