



# Présentation de PFE

*Administration et sécurisation de l'implémentation  
GNU/Linux du protocole NFSv4 (Network File System)*

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# The NFSv4 protocol

- A new version of the Network File System
- Caching and delegation
  - Client-side caching
  - Open delegation
  - Client callbacks
- Locking
- Attributes
  - Mandatory
  - Recommended
  - Named (ACL)
- Security model
- Negotiation of security flavors
- Migration and replication
- Minor versioning
- Modifications for use on WAN/Internet

# Bull's contribution

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- **Team managed by Tony Reix**
- **Aurélien Charbon**
  - Currently : Development of IPv6 client and server
  - Before : Test of the ACL implementation
- **Aimé Le Rouzic**
  - Test of kernel patched with latest CITI's NFSv4 support
    - Functional
    - Stress
    - Performances
    - WAN
    - Interoperability

# NFSv4 community

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- **Center for Information Technology Integration (CITI) - University of Michigan**
  - Development of NFSv4 client and server
- **Open Source Development Lab (OSDL)**
  - Regression testing of all kernel patches
- **Linux distributors**
  - Red Hat (Fedora Core and RHEL)
  - Novell (SLES)
- **NFSv4 community**
- **The IETF working group**

# Administration of NFSv4

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- **Needs and goals**
- **Writing of a specification**
- **Evaluation of existing solutions**
  - Webmin
  - Nagios
  - SBLIM - CIM/WBEM

# NFS module for Webmin



- **What is Webmin ?**
- **Test and functional evaluation**
- **Development of the mount and the export module (CGI scripts in Perl)**
- **Validation**
- **Integration with Jamie Cameron**
- **Technical and functional skills acquired**

# Mount module

## Create Mount

Network Filesystem v4 Mount Details

Mounted As  ...

Save Mount?  Save and mount at boot  Save  Don't save

Mount now?  Mount  Don't mount

NFS Hostname  ... NFS Directory  ...

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**Mount Options**

**Common mount options**

Read-only?  Yes  No  Yes  No  Yes  No

Allow device files?  Yes  No  Yes  No  Yes  No

Disallow setuid programs?  Yes  No  Yes  No  Yes  No

**NFS specific options**

NFS version  4  Default  NFS Port

Retry mounts in background?  Yes  No  Yes  No  Return error on timeouts?  Yes  No

Timeout  Default   Number of Retransmissions

Allow user interrupt?  Yes  No  RPC/Transfer Protocol

Read buffer size  Default   Write buffer size

Authentication mode  sys  krb5  lipkey  spkm-3

Security level  None  Integrity  Privacy (including Integrity)

# Export module

## Edit Export

**Export details**

**NFS Version**  4  3 (or lower)

**Directory to export** /export6  NFSv4 root

**Active?**  Yes

**Host selection**

Everyone  Host(s)

WebNFS clients  NIS Netgroup

IPv4 Network gss/spkm3,gss/sp Netmask lkeyp.sys.\*

IPv6 Address

**Ordered list of security flavors allowed for this host**

Supported  kerberos 5 (i) kerberos 5 (p)

Enabled  sys kerberos 5 (i) kerberos 5 (p)

**Export options**

**Read-only?**  Yes  No **Clients must be on secure port?**  Yes  No

**Disable subtree checking?**  Yes  No **Hide the filesystem?**  Yes  No

**Immediately sync all writes?**  Yes  No

**Trust remote users**  Everyone  Everyone except root  Nobody

**Treat untrusted users as**  Default  ... **Treat untrusted groups as**  Default  ...



# RPC and NFSv4 plugins for Nagios

- **What is Nagios ?**
- **Tests and functional validation**
- **Documentation**
  - Nagios configuration
  - NRPE
  - RPC plugin (Perl)
  - NFSv4 plugin (Perl)
- **Support for early adopters**
- **Technical and functional skills acquired**

**Nagios**

# Nagios : monitoring of NFSv4 and RPC

**Nagios**

**General**

- Home
- Documentation

**Monitoring**

- Tactical Overview
- Service Detail
- Host Detail
- Hostgroup Overview
- Hostgroup Summary
- Hostgroup Grid
- Servicegroup Overview
- Servicegroup Summary
- Servicegroup Grid
- Status Map
- 3-D Status Map
- Service Problems
- Host Problems
- Network Outages

Show Host:

- Comments
- Downtime

**Current Network Status**  
 Last Updated: Wed Aug 9 09:31:09 CEST 2006  
 Updated every 90 seconds  
 Nagios® - [www.nagios.org](http://www.nagios.org)  
 Logged in as nagiosadmin

[View History For all hosts](#)  
[View Notifications For All Hosts](#)  
[View Host Status Detail For All Hosts](#)

**Host Status Totals**

Up	3	Down	0	Unreachable	0	Pending	0
<a href="#">All Problems</a> <a href="#">All Types</a>							
				2		11	

**Service Status Totals**

Ok	9	Warning	0	Unknown	1	Critical	1	Pending	0
<a href="#">All Problems</a> <a href="#">All Types</a>									
					2		11		

## Service Status Details For All Hosts

Host	Service	Status	Last Check	Duration	Attempt	Status Information
localhost	Current Load	OK	08-09-2006 09:46:56	85d 13h 0m 57s	1/4	OK - load average: 0.81, 0.05, 0.70
	Current Users	OK	08-09-2006 09:46:56	85d 16h 24m 15s	1/4	USERS OK - 10 users currently logged in
	NFSv4 stable	OK	08-09-2006 09:46:56	0d 0h 10m 3s	1/1	OK: nfsd cpu = 0% : nfsd used freeds = 8 : nfsd used freeds <= 10% : Server badbuft = 572 : Server badbuft = 572
	PNG	OK	08-09-2006 09:46:56	85d 16h 23m 27s	1/4	PNG OK - Packet loss = 0%, RTA = 0.11 ms
	RPC stable	OK	08-09-2006 09:46:56	19d 17h 19m 35s	1/4	OK: RPC program nfs version 2 version 3 version 4 udp running
	Host Partition	CRITICAL	08-09-2006 09:46:56	45d 8h 56m 36s	4/4	DISK CRITICAL - free space: / 656 MB (10%):
	Total Processes	UNKNOWN	08-09-2006 09:46:56	85d 16h 24m 13s	4/4	check_procs: Unknown argument: (null)
nfs1	NFSv4 stable	OK	08-09-2006 09:50:06	0d 0h 6m 3s	1/1	OK: nfsd cpu = 0% : nfsd used freeds = 8 : nfsd used freeds <= 10% : Server badbuft = 342 : Server badbuft = 342
	PNG	OK	08-09-2006 09:46:57	0d 15h 4m 12s	1/4	PNG OK - Packet loss = 0%, RTA = 0.05 ms
	RPC stable	OK	08-09-2006 09:46:57	0d 15h 4m 12s	1/4	OK: RPC program nfs version 2 version 3 version 4 udp running
nfs2	PNG	OK	08-09-2006 09:49:46	0d 15h 6m 23s	1/4	PNG OK - Packet loss = 0%, RTA = 4.06 ms

# Nagios : Alarms, Notifications...

**Contact Notifications**  
 Last Updated: Wed Aug 9 10:02:41 CEST 2006  
 Nagios® - [www.nagios.org](http://www.nagios.org)  
 Logged in as nagiosadmin

**All Contacts**

Log File Navigation  
 Wed Aug 9 00:00:00 CEST 2006  
 to Present L.

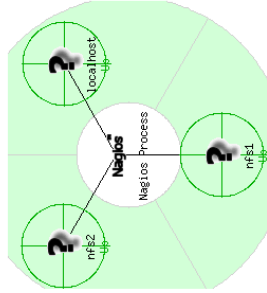
Latest Archive

Notification detail level for all contacts: All notifications

Older Entries First:

File: /usr/local/nagios/var/nagios.log

Host	Service	Type	Time	Contact	Notification Command	Information
<a href="#">nfe1</a>	<a href="#">NFSv4 status</a>	OK	08-09-2006 09:43:16	<a href="#">lylar-admin</a>	<a href="#">notify-by-email</a>	OK: nfiled cpu = 0% : nfiled freads = 8 : nfiled used freads = 10% : Server badbauf = 341 : Server badbauf = 341
<a href="#">nfe1</a>	<a href="#">NFSv4 status</a>	OK	08-09-2006 09:43:16	<a href="#">nagios-admin</a>	<a href="#">notify-by-email</a>	OK: nfiled cpu = 0% : nfiled freads = 8 : nfiled used freads = 10% : Server badbauf = 341 : Server badbauf = 341
<a href="#">localhost</a>	<a href="#">NFSv4 status</a>	OK	08-09-2006 09:41:17	<a href="#">lylar-admin</a>	<a href="#">notify-by-email</a>	OK: nfiled cpu = 0% : nfiled freads = 8 : nfiled used freads = 10% : Server badbauf = 570 : Server badbauf = 570
<a href="#">localhost</a>	<a href="#">NFSv4 status</a>	OK	08-09-2006 09:41:16	<a href="#">nagios-admin</a>	<a href="#">notify-by-email</a>	OK: nfiled cpu = 0% : nfiled freads = 8 : nfiled used freads = 10% : Server badbauf = 570 : Server badbauf = 570
<a href="#">nfe1</a>	<a href="#">NFSv4 status</a>	CRITICAL	08-09-2006 08:57:16	<a href="#">lylar-admin</a>	<a href="#">notify-by-email</a>	Connection refused by host
<a href="#">nfe1</a>	<a href="#">NFSv4 status</a>	CRITICAL	08-09-2006 08:57:16	<a href="#">nagios-admin</a>	<a href="#">notify-by-email</a>	Connection refused by host
<a href="#">localhost</a>	<a href="#">NFSv4 status</a>	CRITICAL	08-09-2006 08:53:17	<a href="#">lylar-admin</a>	<a href="#">notify-by-email</a>	Connection refused by host
<a href="#">localhost</a>	<a href="#">NFSv4 status</a>	CRITICAL	08-09-2006 08:53:16	<a href="#">nagios-admin</a>	<a href="#">notify-by-email</a>	Connection refused by host

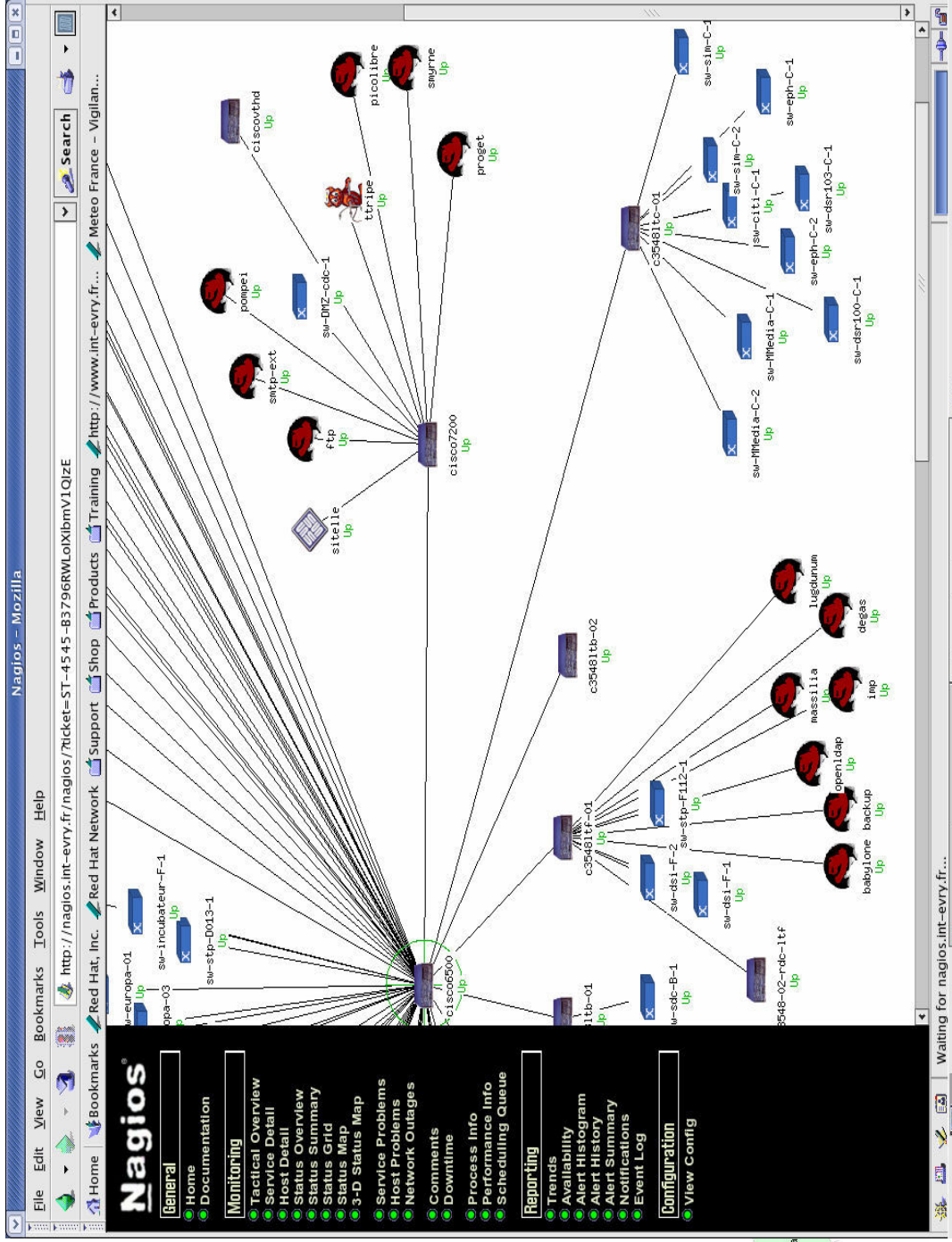


[NFSv4 test configuration \(nfsv4config\)](#)

Host	Services	Actions
<a href="#">localhost</a>	<a href="#">NFSv4 status</a> <a href="#">Configuration</a> <a href="#">NFSv4 test</a> <a href="#">NFSv4 test</a> <a href="#">Badbauf</a> <a href="#">Test Process</a>	
<a href="#">nfe1</a>	<a href="#">NFSv4 status</a> <a href="#">NFSv4 test</a> <a href="#">NFSv4 test</a>	
<a href="#">nfe2</a>	<a href="#">NFSv4 status</a>	

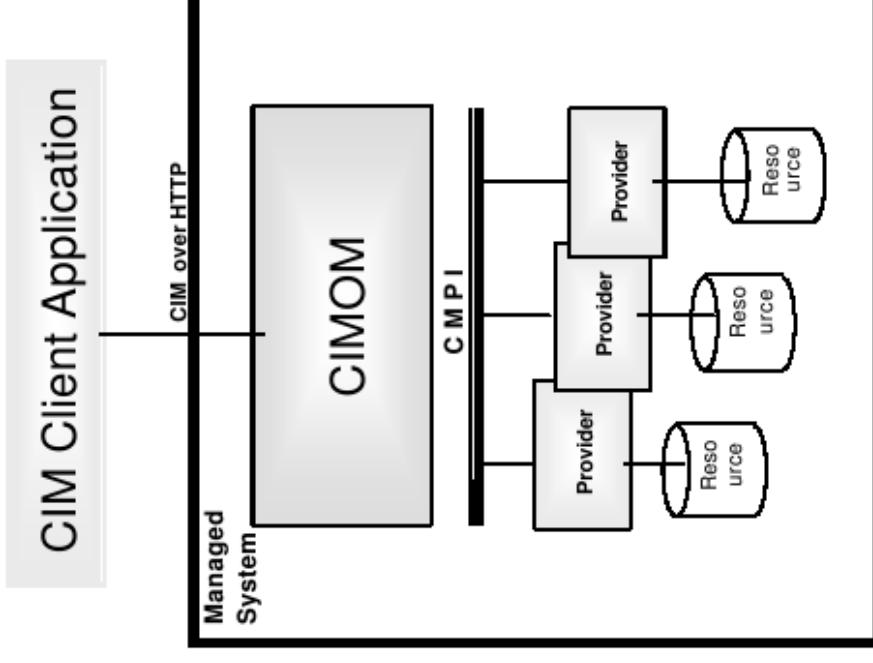


# Nagios : a real world example Nagios

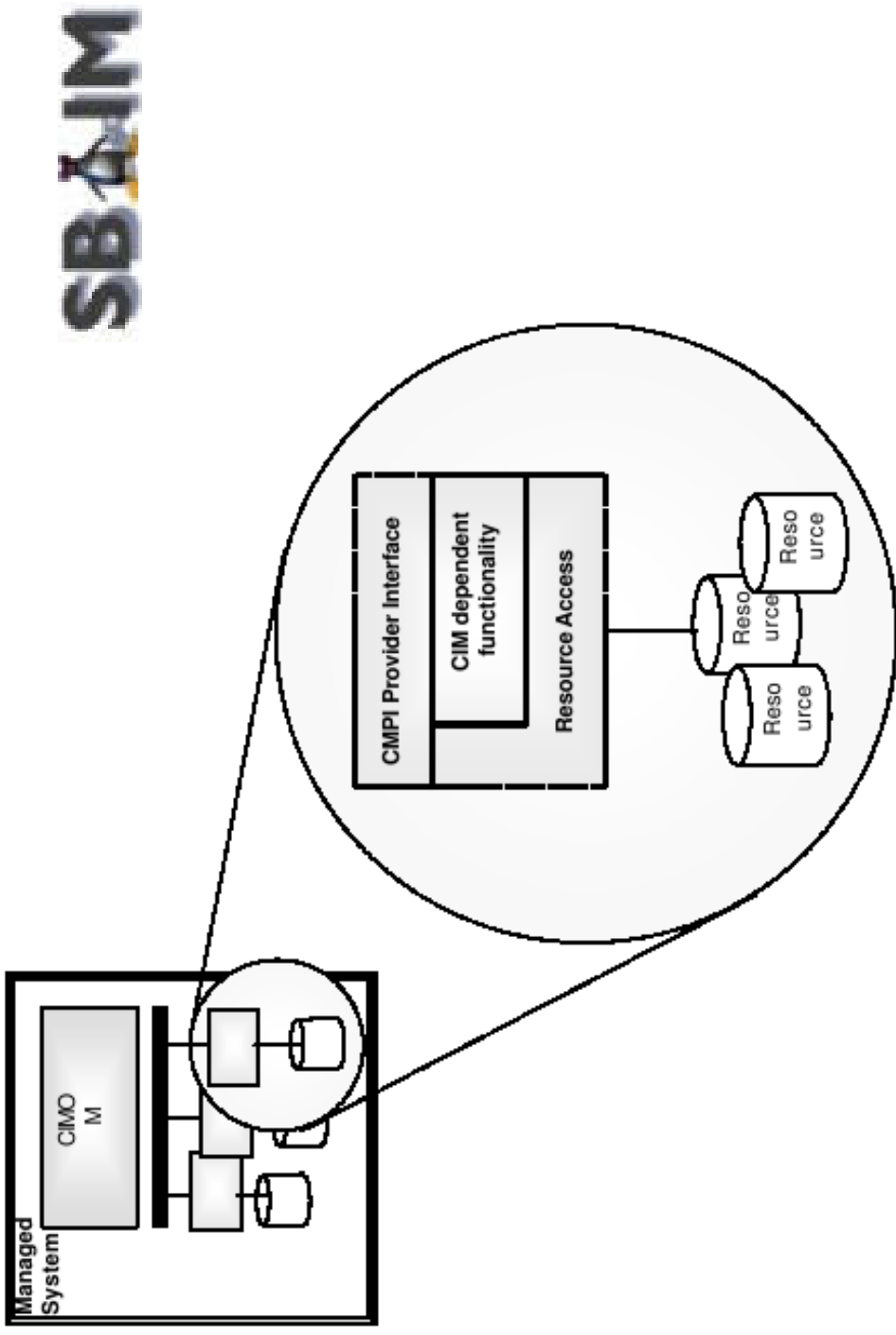


# CIM/WBEM administration

- **WBEM (Web-based Enterprise Management)**
  - A set of management standards normalized by DMTF (Distributed Management Task Force)
- **CIM (Common Information Model)**
  - A data model for WBEM
    - Classes, instances, associations, methods...
- **3 levels in WBEM administration :**
  - Management application (*IBM Director, WbemCli*)
  - CIM Object Manager (*OpenPegasus, OpenWBEM, OpenCimon...*)
  - Providers



# SBAIM : 3 layers in a provider architecture



SBAIM

3.1 Three-Layered Provider Architecture





# The daemons provider

- **Specification**
  - **Monitoring and action on services (nfs, svcgss, gss, idmap)**
  - **Monitoring of NFSv4-related processes (nfsd4, nfsd, svcgssd, gssd, idmapd)**
- **CIM Schema**
- **Development**
- **Tests and validation**
- **Conclusion about SBLIM development**