Monitoring Novell® Open Enterprise Server with Nagios and Ganglia

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Agenda

- Introduction and Overview
- Novell Remote Manager monitoring mash-up
- Ganglia
  - Architecture
  - Web Interface
  - Module Development
- Nagios
  - Architecture
  - Web Interface
  - Plugin development

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Introduction and Overview

- Novell Remote Manager (NRM) and Monitoring
  - Novell Remote manager is a web based tool
    - DST configuration
    - Storage access
    - Other minor server configuration and monitoring
  - In OES2 and OES11/OES11 sp1, NRM used openwbem and sfcb for monitoring the health of the server
  - Small amounts of data are tracked for trending purposes
  - We are moving to an industry standard for monitoring the health of the server and processes on the server

How will the new monitoring change Novell® Remote Manager?

- NRM will no longer gather the server and process information
- Monitoring will be easier to extend and add to through industry standard interfaces and plugins
- NRM will be the place that links the admin to the server monitoring
- Health monitoring will have a new look and feel

The NEW Novell® Remote Manager Look and Feel

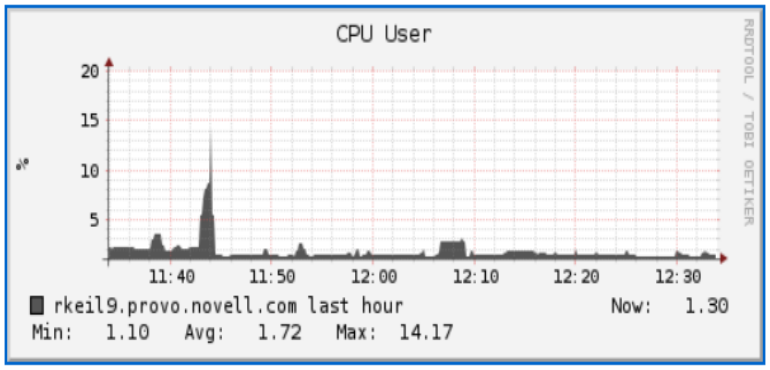
The OLD NRM

Operating System							
Status	Description	Current	Peak	Max	Info	Include	Notify
	CPU Utilization	0	0	100			
	Process Count	248	248	N/A			
	Physical Memory	0 MB	* 0 MB	0 MB			
	Swap Memory	1 MB	* 1 MB	1 MB			
	Virtual Memory	1 MB	* 1 MB	2 MB			
	LAN Collisions	0	0	N/A			

*Low Value

Services					
Status	Description	Mode	Info	Include	Notify
	micasad	Running			
	namcd	Running			
	cron	Running			
	novell-smdrd	Running			
	nscd	Running			
	cups	Running			
	novell-tomcat6	Running			
	mcelog	Running			
	atd	Stopped			
	xinetd	Running			
	saslauthd	Stopped			
	apache2	Running			
	xdm	Running			
	java.binfmt_misc	Running			
	alsasound	Stopped			
	novell-shadowfs	Stopped			

The NEW NRM



Host	Service	Status
localhost	Current Load	OK
	Current Users	OK
	HTTP	WARNING
	PING	OK
	Root Partition	OK
	SSH	OK
	Swap Usage	OK
	Total Processes	OK

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Traffic Light will now indicate the status from Nagios

- Ganglia and Nagios will now be used to monitor OES11 sp2 servers

Host	Service	Status	Last Check	Duration	Attempt	Status Information
localhost	Current Load	OK	11-16-2012 13:08:22	1d 1h 28m 9s	1/4	OK - load average: 0.17, 0.17, 0.17
	Current Users	OK	11-16-2012 13:10:59	29d 21h 28m 2s	1/4	USERS OK - 4 users currently logged in
	HTTP	WARNING	11-16-2012 13:11:23	28d 4h 34m 25s	4/4	HTTP WARNING: HTTP/1.1 403 Forbidden
	PING	OK	11-16-2012 13:06:23	11d 6h 10m 10s	1/4	PING OK - Packet loss = 0%, RTA = 0.03 ms
	Root Partition	OK	11-16-2012 13:11:23	29d 21h 26m 10s	1/4	DISK OK - free space: / 32219 MB (87% inode=93%):
	SSH	OK	11-16-2012 13:11:23	29d 21h 25m 32s	1/4	SSH OK - OpenSSH_5.1 (protocol 2.0)
	Swap Usage	OK	11-16-2012 13:08:17	29d 21h 24m 55s	1/4	SWAP OK - 97% free (1411 MB out of 1458 MB)
	Total Processes	OK	11-16-2012 13:08:18	29d 21h 24m 17s	1/4	PROCS OK: 79 processes with STATE = RSZDT

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How Ganglia and Nagios provide the monitoring service

- Ganglia will monitor and track
  - CPU utilization
  - Server load
  - Memory usage
  - Network traffic
  - Disk space usage
  - All of these will also have trending data for 1 hour, 2 hours, 4 hours, 1 day, 1 week, 1 month and 1 year
- Lets look at how ganglia does this

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Ganglia

- Scalable Distributed Monitoring System
- Targeted at monitoring clusters and grids
- Multicast-based Listen/announce protocol
- Depends on open standards
  - XML
  - XDR compact portable data transport
  - RRDTool – Round Robin Database
  - APR – Apache Portable Runtime
  - PHP based web interface
- http://www.ganglia.info

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Ganglia Architecture

- Gmond – Metric gathering agent installed on individual servers
- Gmetad – Metric aggregation agent installed on one or more specific task oriented servers
- Apache Web Frontend – Metric presentation and analysis server
- Attributes
  - Multicast – All gmond modes are capable of listening to and reporting on the status of the entire cluster
  - Failover – Gmetad has the ability to switch which cluster node it polls for metric data
  - Lightweight and low overhead metric gathering and transport
  - Ported to various platforms (Linux, FreeBSD, Solaris, others)

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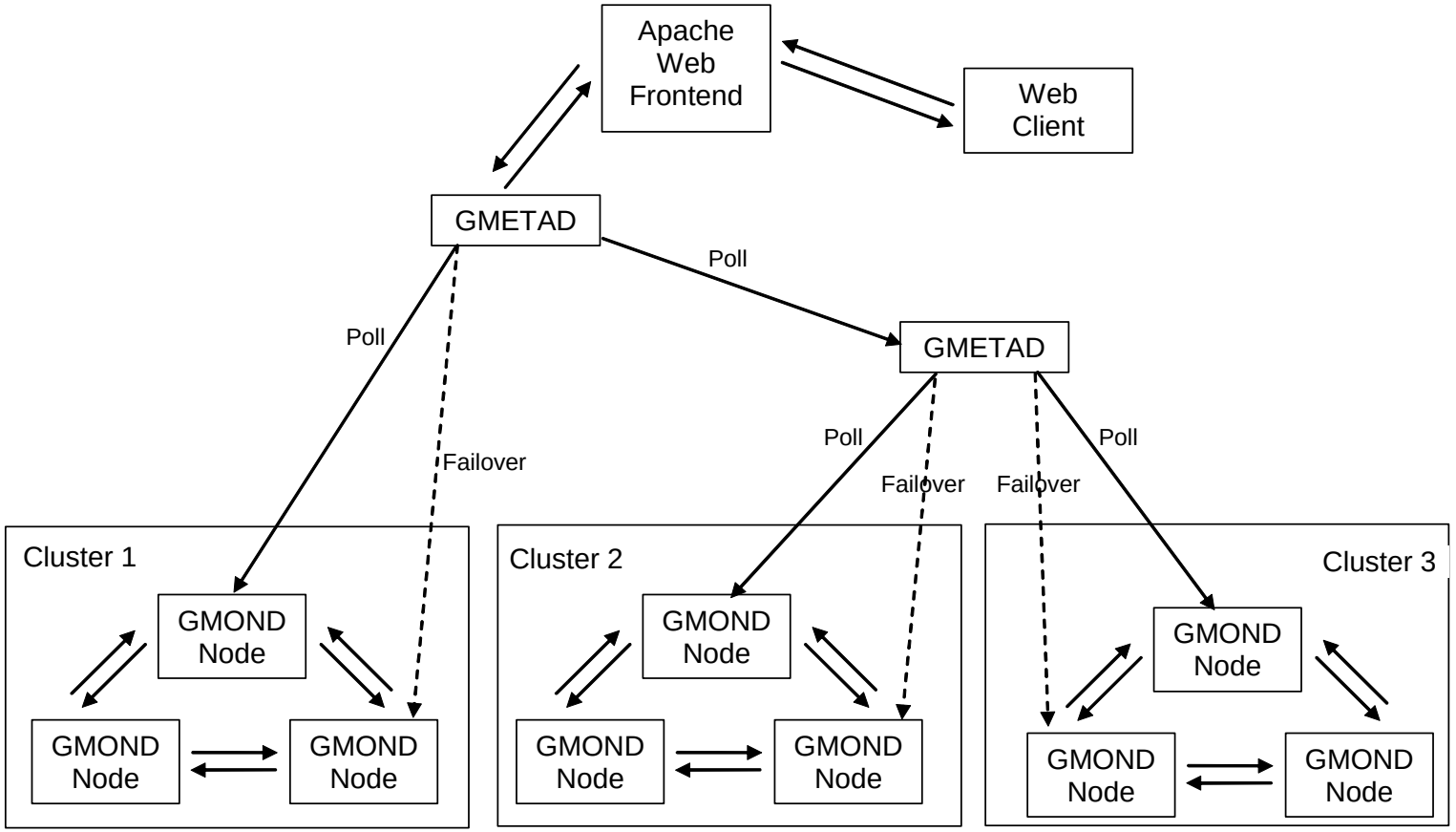
Ganglia Architecture



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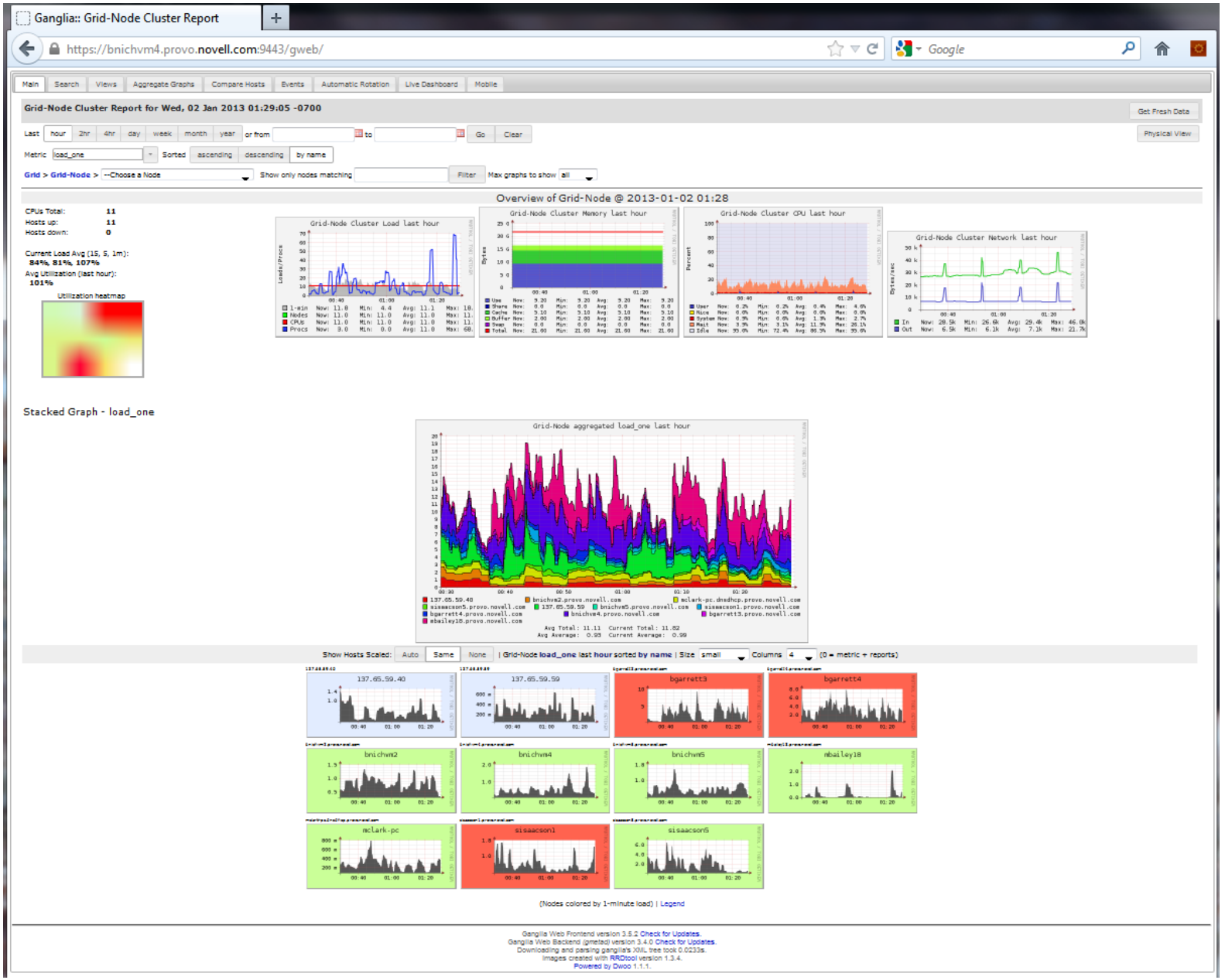
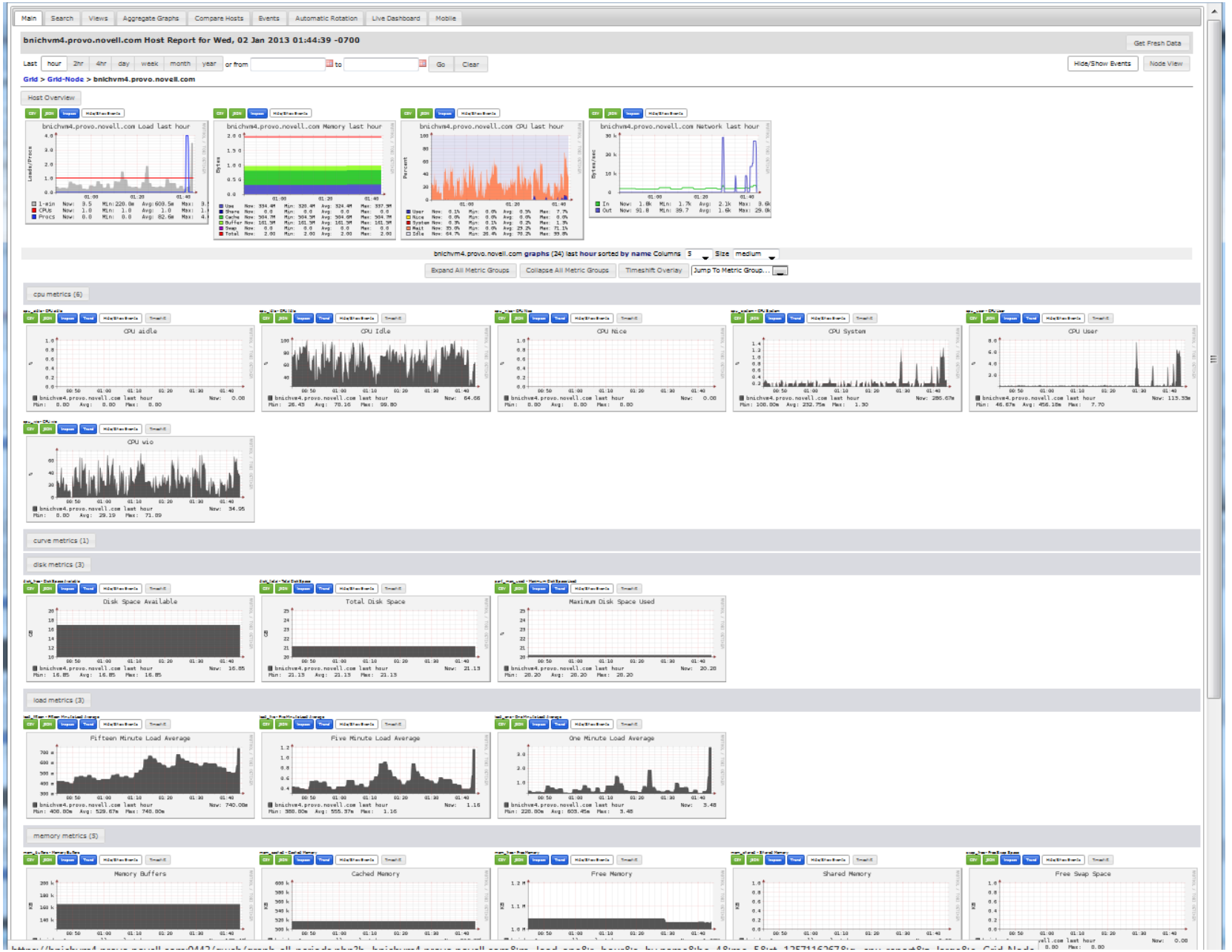
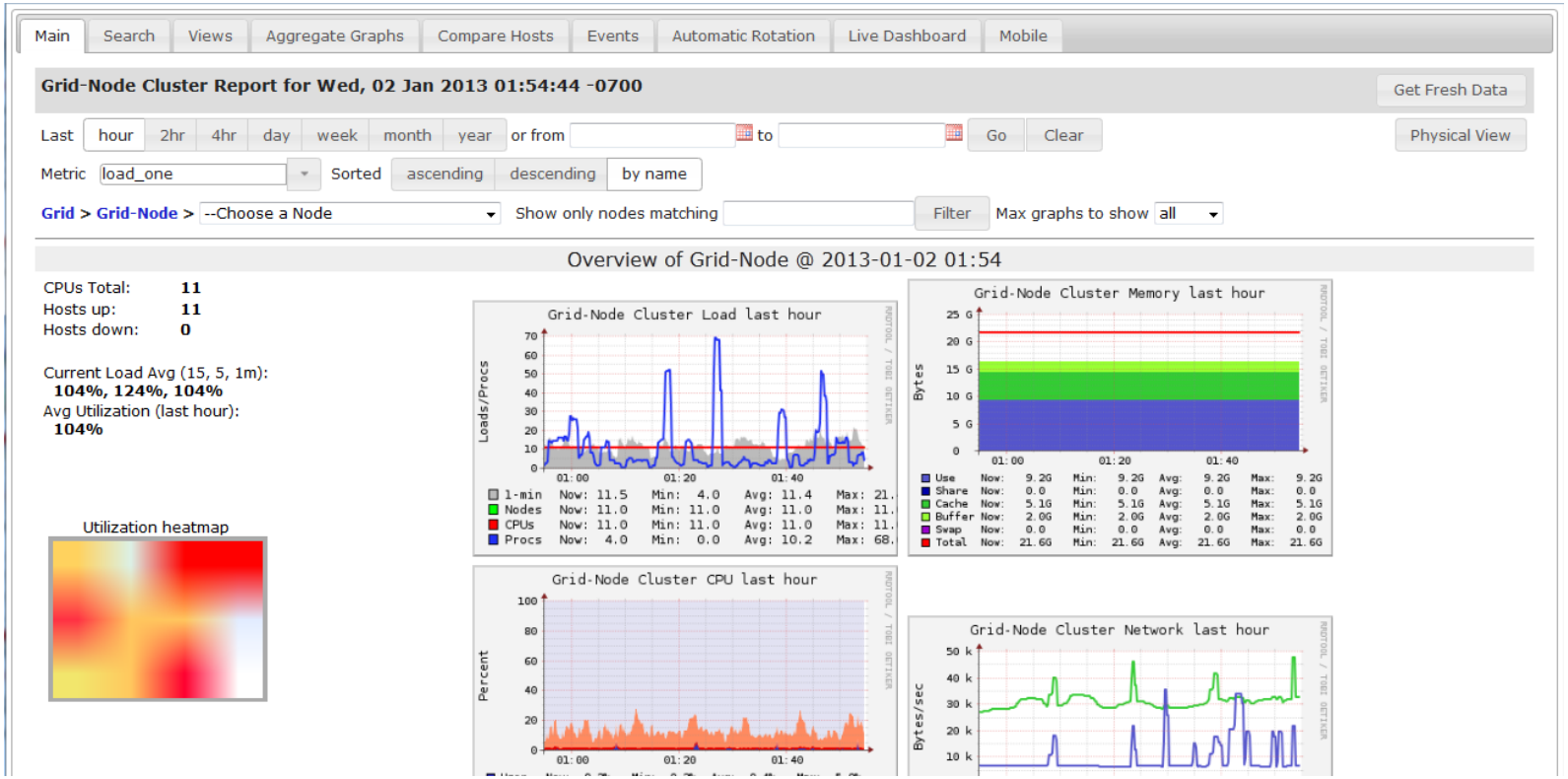
Ganglia Web Frontend

- Built around Apache HTTPD server using mod_php
- Uses presentation templates so that the web site "look and feel" can be easily customized
- Presents an overview of all nodes within a grid vs all nodes in a cluster
- Ability to drill down into individual nodes
- Presents both textual and graphical views







Ganglia Metric Gathering

- Built-in Metrics
  - 23 metrics - CPU, Network I/O, Disk I/O, Process and Memory
- Extensible
  - Loadable modules capable of gathering multiple metrics or using advanced metric gathering APIs
  - Gmetric – Out-of-process utility capable of invoking command line based metric gathering scripts
- Metric Gathering Plug-ins
  - Extend the available metrics that can be gathered by Gmond
  - Provided as dynamically loadable modules
  - Two types of modules: C/C++ or Python

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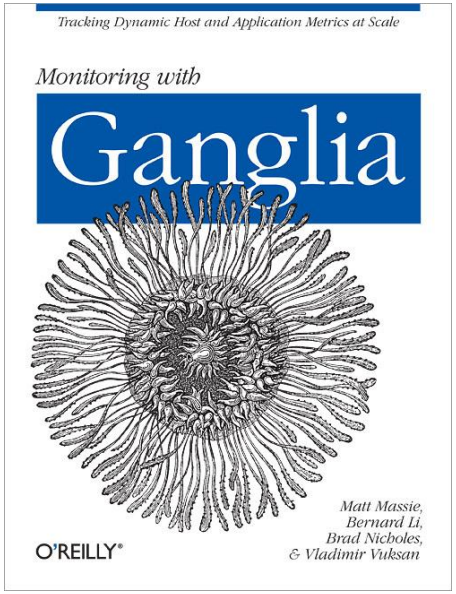
Ganglia Plug-in Development

- Two types of modules: C/C++ or Python
- http://sourceforge.net/apps/trac/ganglia/wiki/ganglia_gmond_python_modules
- Monitoring with Ganglia – O'Reilly Books



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Ganglia Plug-in Development Environment

- Python interpreter – Install the latest
- Any code editor or Python aware IDE
  - Eric4 (Linux)
- Testing can be done as a standalone python script
- Final testing requires deployment into Ganglia

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Ganglia Plug-in Development

```
Curve_Max = 15
v = int(1)
inc = int(1)
count = 0

def metric_init(params):
 global Curve_Max

 if 'CurveMax' in params:
   Curve_Max = int(params['CurveMax'])

 d = {'name': 'Curve_Metric',
      'call_back': curve_handler,
      'time_max': int(60),
      'value_type': 'uint',
      'units': 'Seconds',
      'slope': 'both',
      'format': '%u',
      'description':
            'Shows a uniform curve'}

 return d
```

```
def curve_handler(name):
  global v,count,inc,Curve_Max
  v += inc
  count += 1
  if count > Curve_Max:
    count = 0
    inc = -inc
  return int(v)

def metric_cleanup():
  pass

if __name__ == '__main__':
  params = {'Curve_Metric': '15'}
  metric_init(params)
  for d in _descriptors:
    v = d['call_back'](d['name'])
    print 'value for %s is %u'
       %(d['name'], v)
```

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Ganglia Plug-in Configuration

```
modules {
  module {
    name = "curve"
    language = "python"
    param MetricPath {
      value = "15"
    }
  }
}

# Collection groups for the
#    example python module
collection_group {
  collect_every = 10
  time_threshold = 50

  metric {
    name = "Curve_Metric"
    title = "Curve Metric"
    value_threshold = 1.0
  }
}
```

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Ganglia Plug-in Deployment

- Copy the .py file to the gmond module directory
  - /opt/novell/ganglia/monitor/lib64/ganglia/python_modules
- Copy the .pyconf file to the gmond configuration directory
  - /etc/opt/novell/ganglia/monitor/conf.d
- Restart Gmond – rcnovell-gmond restart
- Resolve loading issues by starting gmond in debug mode
  - gmond –d10 –c /etc/opt/novell…/gmond.conf

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Nagios

- Monitors hosts and services
- Daemon collects information using plugins
- Determines system status from plugin response
- Stores information in database
- Web interface to view stored data
- Can send notification through multiple channels (SMS, email and even push to mobile devices
- Very configurable and extendable

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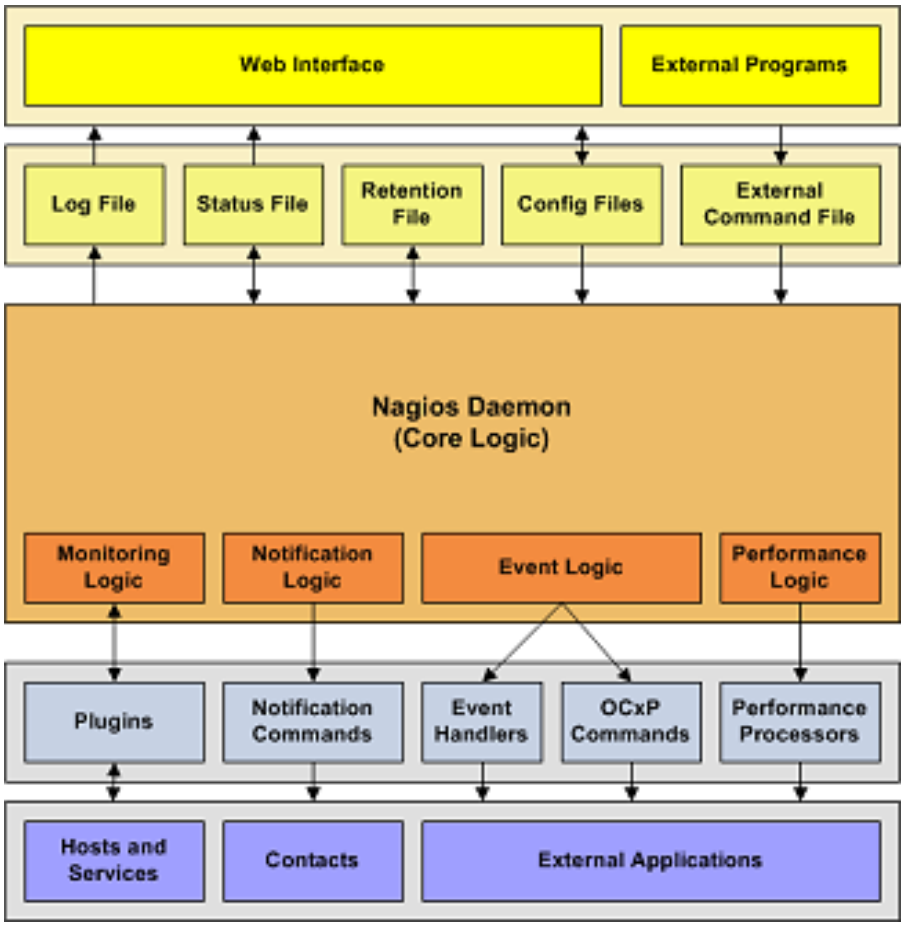
Nagios Architecture



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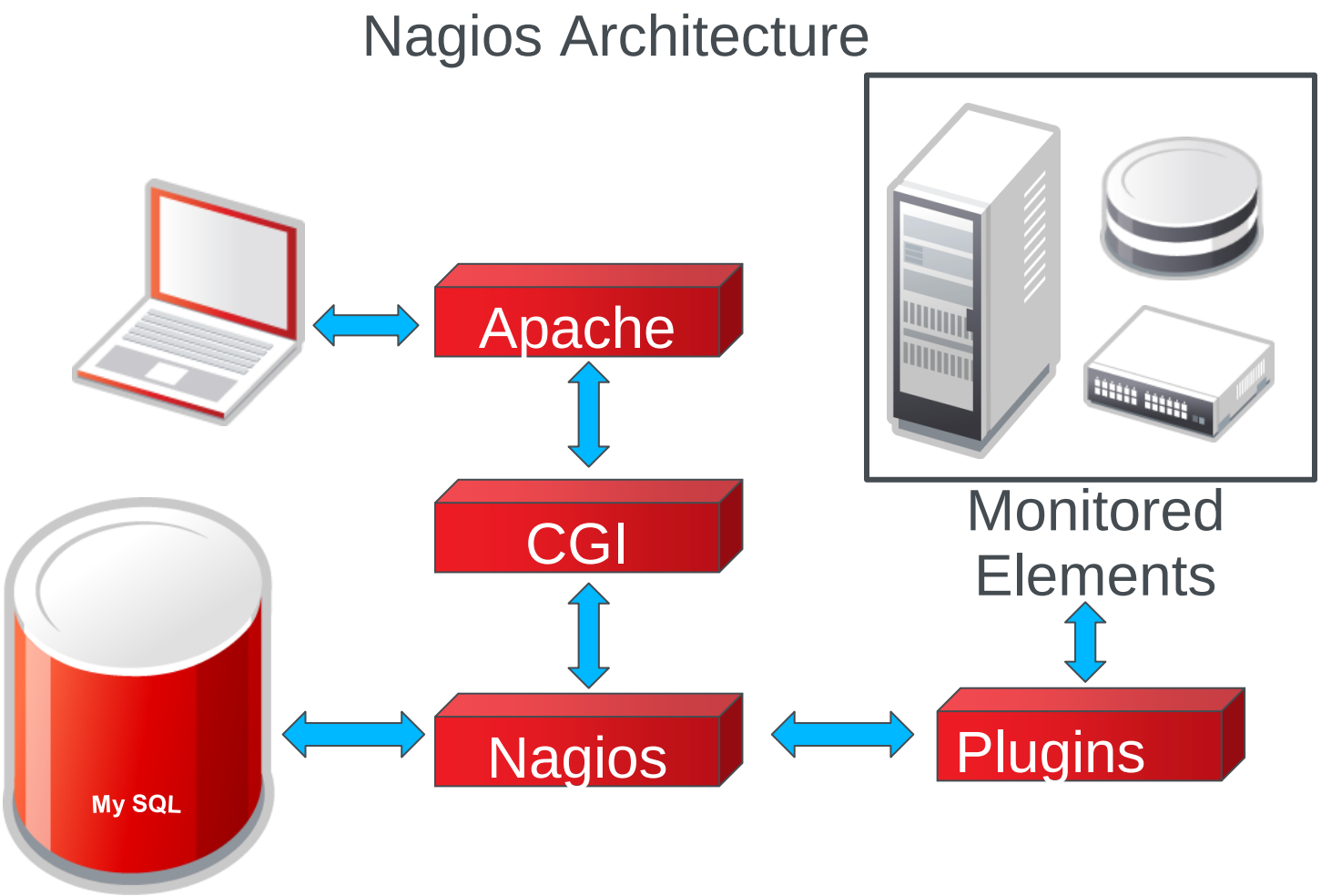
Nagios Architecture simplified



Build specialized Nagios plugins

- Build a Linux executable that check something for a status.
  - Output a status message and return the corresponding status value.
  - 0 = good, 1 = warning, 2 = critical and 3 unknown status

Sample Nagios Plugin

```
int main (int argc, char **argv)
{
    FILE *handle;
    handle = fopen(/var/run/httpstkd.pid", "r");
    if(handle) {
        printf("SERVICE STATUS: Nrm is running");
        return(0);   // Status is good.
    }
    else {
        printf("SERVICE STATUS: NRM is not running");
        return(1);
    }
}
```

Build and activating specialized Nagios plugins (continued)

- Edit the command.cfg
  - command[check_nrm]=/usr/lib/nagios/plugins/nrm_check
- Edit the objects/command.cfg
  - define command{
    - command_name check_nrm (name of defined commanf)
    - command_line (local path)/nrm_check (executable name)
    - }
- Edit the objects/localhost.cfg
  - define service{
    - use local-service
    - host_name localhost
    - service_description NRM Check
    - check_command check_nrm
    - }

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Including the new plugin in the nagios status

- Build executable
- Modify necessary *.cfg files
- Restart nagios
- The new plugins will show up in the nagios list of “Service Detail” listing

Host	Service	Status	Last Check	Duration	Attempt	Status Information
localhost	Current Load	OK	11-16-2012 13:08:22	1d 1h 28m 9s	1/4	OK - load average: 0.17, 0.17, 0.17
	Current Users	OK	11-16-2012 13:10:59	29d 21h 28m 2s	1/4	USERS OK - 4 users currently logged in
	HTTP	WARNING	11-16-2012 13:11:23	28d 4h 34m 25s	4/4	HTTP WARNING: HTTP/1.1 403 Forbidden
	PING	OK	11-16-2012 13:06:23	11d 6h 10m 10s	1/4	PING OK - Packet loss = 0%, RTA = 0.03 ms
	Root Partition	OK	11-16-2012 13:11:23	29d 21h 26m 10s	1/4	DISK OK - free space: / 32219 MB (87% inode=93%):
	SSH	OK	11-16-2012 13:11:23	29d 21h 25m 32s	1/4	SSH OK - OpenSSH_5.1 (protocol 2.0)
	Swap Usage	OK	11-16-2012 13:08:17	29d 21h 24m 55s	1/4	SWAP OK - 97% free (1411 MB out of 1458 MB)
	Total Processes	OK	11-16-2012 13:08:18	29d 21h 24m 17s	1/4	PROCS OK: 79 processes with STATE = RSZDT

Host	Service	Status	Last Check	Duration	Attempt	Status Information
localhost	Current Load	OK	12-04-2012 12:49:53	6d 0h 26m 56s	1/4	OK - load average: 0.42, 0.28, 0.20
	Current Users	OK	12-04-2012 12:50:31	40d 19h 35m 25s	1/4	USERS OK - 7 users currently logged in
	HTTP	WARNING	12-04-2012 12:49:23	39d 2h 41m 48s	4/4	HTTP WARNING: HTTP/1.1 403 Forbidden
	NRM Check	OK	12-04-2012 12:49:51	0d 1h 1m 58s	1/4	SERVICE STATUS: NRM is running
	PING	OK	12-04-2012 12:50:01	22d 4h 17m 33s	1/4	PING OK - Packet loss = 0%, RTA = 0.03 ms
	Root Partition	OK	12-04-2012 12:50:39	40d 19h 33m 33s	1/4	DISK OK - free space: / 32061 MB (86% inode=93%):
	SSH	OK	12-04-2012 12:51:16	40d 19h 32m 55s	1/4	SSH OK - OpenSSH_5.1 (protocol 2.0)
	Swap Usage	OK	12-04-2012 12:46:53	40d 19h 32m 18s	1/4	SWAP OK - 97% free (1404 MB out of 1458 MB)
	Total Processes	OK	12-04-2012 12:51:08	40d 19h 31m 40s	1/4	PROCS OK: 79 processes with STATE = RSZDT

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Nagios Plugin Development

- http://nagiosplug.sourceforge.net/developer-guidelines.html
- http://nagios.sourceforge.net/docs/3_0/pluginapi.html
- http://nagiosplugins.org/
- http://benedmunds.com/2012/04/25/writing-a-nagios-plugin-with-php/

Novell® Remote Manager the window to Ganglia and Nagios monitoring display

- Continue to use NRM for the features that you always have in the past, storage, configuration information, cron job scheduling, storage inventory…..etc
- Now added are the Ganglia and Nagios monitoring access
- Greater monitoring configuration and notification options
- More extendable and flexible for your specific needs
- Mobile browser viewing and notification now available.

What do I gain as the customer ??

- Industry accepted monitoring tools
- Monitoring configurable to my specific needs
- Real-time notification of things that matter to me
- Mobile device notification of problems
- Features in Novell Remote Manager that help me manage my storage
- One stop view to manage storage and monitor my system
- All of these features and more from an interface that I am familiar with.

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Questions

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and call to action line two
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Thank you.

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