All in one network graphing and monitoring

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LibreNMS

- SNMP-based auto-discover network monitoring
- Derived from another project (Observium)
- Written in PHP as a web application
- Includes support for a wide range of hardware:
  - Cisco, Linux, FreeBSD, Juniper, Brocade, Foundry, HP and many more
    - See http://docs.librenms.org/Support/Features/
  - Over 100 supported!
  - Routers, Switches, Access Points, Security gateways, Hosts, Printers, …

Available metrics

- CPU, memory and storage statistics
- Interface traffic, packet and detailed error statistics (L2 and L3)
- Temperature, fan speed, voltage, amperage, power humidity and frequency sensors
- Users, processes, load average and uptime statistics

Available metrics cont.

- Linux distribution detection
- Real-time interface traffic graphing
- Device inventory collection (useful!)
- Detailed IPv4, IPv6, TCP and UDP stack statistics
- BGP and OSPF information
- MAC <-> IP address lookup
  - Find which port an IP/MAC was last seen on

Features

- Dashboard
- Status Map
- Many extensions, including:
  - Host monitoring well supported using check_mk and support scripts. Also, support for Nagios plugins.
  - Billing module
- Integration with other tools:
  - Smokeping, collectd, syslog (receive logs from devices)/graylog, Rancid/Oxidized (config management)

Philosophy

LibreNMS' approach is that the network monitoring shouldn't take long to set up

- You've already worked hard to build your network and configure it
- LibreNMS is easier to understand if you understand its philosophy

Philosophy (2)

Configure equipment correctly…

- community
- xDP (CDP or LLDP)
- sysName
- sysLocation (geo mapping)

... and LibreNMS will do the rest

- Auto discovery of devices and resources
- Optional use of sysServices to map which services (ports) are running on a device

Philosophy (3)

Concept of enabled vs. ignored

- By default, LibreNMS will monitor (collect data) all ports/interfaces it finds.
- If a port is configured to be up, but it's operationally down, LibreNMS will complain about it
- You can tell LibreNMS to ignore these ports – or better, shut them down if they're not used
- When they're used, bring them up

How it Works

1. Add a device:
   - Via the GUI, or…
   - … `php /opt/librenms/addhost.php`
2. Runs cronjob: /etc/cron.d/librenms every 5 minutes that updates each device information:
   - `/opt/librenms/discovery.php -h new >> /dev/null 2>&1`
   - `/opt/librenms/cronic /opt/librenms/poller-wrapper.py 16`
3. Runs other jobs during the day

How it Works (2) - Details

```
# Using this cron file requires an additional user on your system, please see install docs.

33   */6  * * *   librenms    /opt/librenms/cronic /opt/librenms/discovery-wrapper.py 1
*/5  *    * * *   librenms    /opt/librenms/discovery.php -h new >> /dev/null 2>&1
*/5  *    * * *   librenms    /opt/librenms/cronic /opt/librenms/poller-wrapper.py 16
*    *    * * *   librenms    /opt/librenms/alerts.php >> /dev/null 2>&1
# Can turn off billing ítems if you are not using this
*/5  *    * * *   librenms    /opt/librenms/poll-billing.php >> /dev/null 2>&1
01   *    * * *   librenms    /opt/librenms/billing-calculate.php >> /dev/null 2>&1
# If you have service checks defined
*/5  *    * * *   librenms    /opt/librenms/check-services.php >> /dev/null 2>&1

# Daily maintenance script. DO NOT DISABLE!
# If you want to modify updates:
# Switch to monthly stable release: https://docs.librenms.org/General/Releases/
# Disable updates: https://docs.librenms.org/General/Updating/

15   0    * * *   librenms    /opt/librenms/daily.sh >> /dev/null 2>&1
```

SNMP or nothing

- Be aware that for LibreNMS to function, ***SNMP must be enabled***
- LibreNMS makes use of CDP/LLDP/OSPF information to detect neighbors and automatically scan for neighboring devices and add them to the monitoring
  - … but this information is fetched using SNMP!
  - If SNMP isn't enabled or available (or wrongly configured), LibreNMS won't function.

Availability

LibreNMS

Fork of Observium. Open Source, Free and GPL

https://github.com/librenms/librenms

History

https://github.com/librenms/librenms/blob/master/doc/General/Welcome-to-Observium-users.md

Documentation

http://docs.librenms.org/

Screenshots

These are from LibreNMS. This is the version we will use in class and in our labs.

localhost

Sitting on the Dock of the Bay

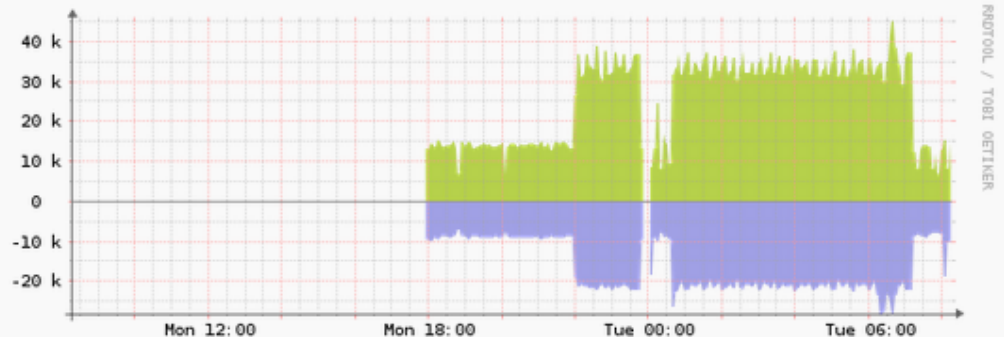
Storage Usage | Memory Usage | Processor U

Overview | Graphs | Health | Ports | Map | Inventory | Logs | Alerts | Alert Stats | Performance | Notes

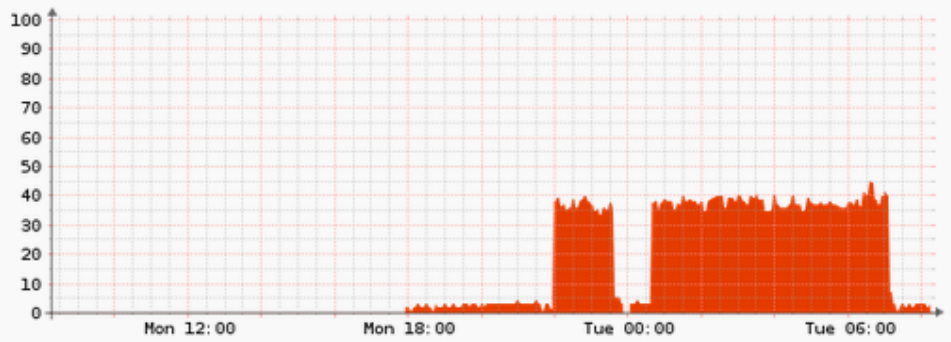
Linux noc.ws.nsrc.org 3.13.0-91-generic #138-Ubuntu SMP Fri Jun 24 15:58:13 UTC 2016 i686

System Name	noc.ws.nsrc.org
Resolved IP	127.0.0.1
Hardware	Generic x86
Operating System	Linux 3.13.0-91-generic
Object ID	enterprises.8072.3.2.10
Contact	Me <me@example.org>
Location	Sitting on the Dock of the Bay
Uptime	1h 6m 28s

Overall Traffic



Processors



QEMU Virtual version 2.0.0 x1

Memory Pools

Physical memory

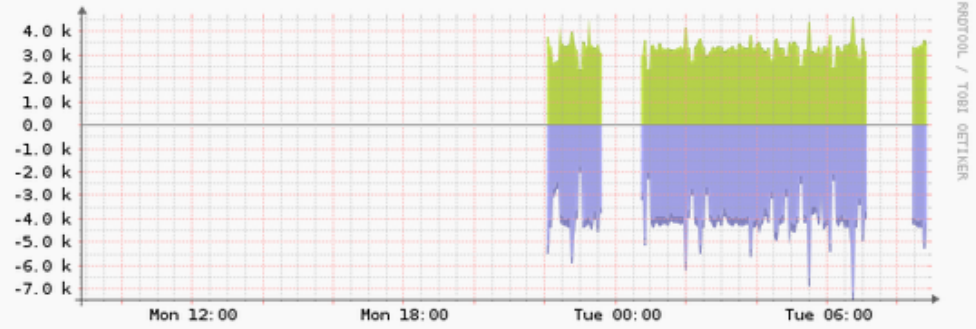
Virtual memory

Swap space

Cisco IOS Software, 7200 Software (C7200-ADVIPSERVICESK9-M), Version 15.1(4)M4, RELEASE SOFTWARE (fc1) Technical Support: http://www.cisco.com/techsupport Copyright (c) 1986-2012 by Cisco Systems, Inc. Compiled Tue 20-Mar-12 22:36 by prod_rel_team

System Name	rtr1
Resolved IP	10.10.0.221
Hardware	cisco7206VXR
Operating System	Cisco IOS 15.1(4)M4 (ADVIPSERVICESK9)
Serial	4279256517
Object ID	enterprises.9.1.222
Uptime	34m 1s

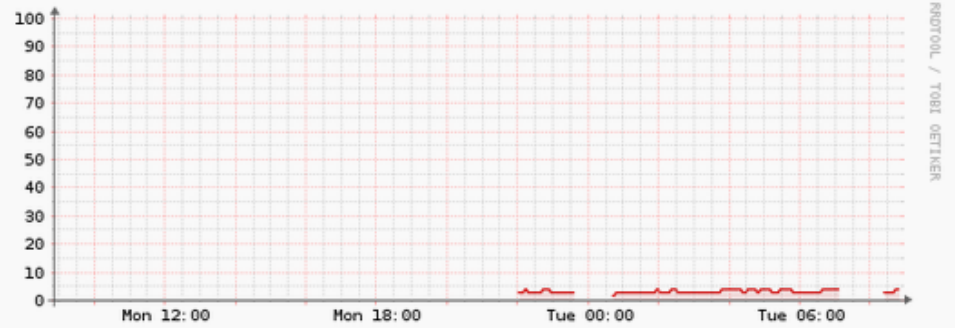
Overall Traffic



3 3 0 0

Fa0/0, Fa0/1, Null0

Processors



Processor 1 x1 4%

Memory Pools

Processor 76%

I/O 18%

Temperature

I/O Cont Inlet	22°C
I/O Cont Outlet	22°C
NPE Inlet	22°C
NPE Outlet	22°C
I/O Cont Inlet 0	22°C

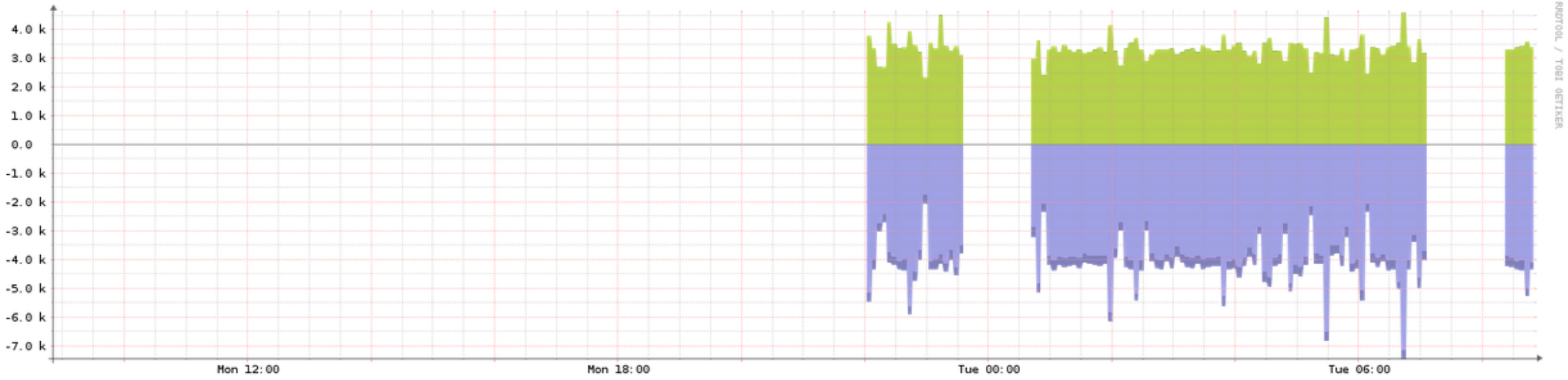
rtr1-fa0-0.ws.nsrc.org :: Total Traffic

Bits

6 Hours | 24 Hours | 48 Hours | One Week | Two Weeks | One Month | Two Months | One Year | Two Years

From 2016-07-11 10:50 To 2016-07-12 10:50 Update

Show Legend | Show Previous | Show RRD Command



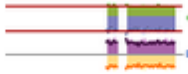
Overview Graphs Health Ports

- **CISCO7206VXR** (Chassis)
  Cisco 7206VXR, 6-slot chassis
  Serial No. 4279256517
  - **1. I/O and CPU Slot 0**
    I/O and Processor Slot Container
    - **1. NPE-400** (NPE400 0)
      Cisco 7200VXR Network Processing Engine NPE-400
      Serial No. 11111111
      - **2. C7200-I/O-2FE/E** (module 0)
        I/O Dual FastEthernet Controller
        Serial No. 00000000
  - **2. PA Slot 1**
    PA Slot Container
  - **3. PA Slot 2**
    PA Slot Container
  - **4. PA Slot 3**
    PA Slot Container
  - **5. PA Slot 4**
    PA Slot Container
  - **6. PA Slot 5**
    PA Slot Container
  - **7. PA Slot 6**
    PA Slot Container
  - **8. PEM 0**
    Power Supply Container
  - **9. PEM 1**
    Power Supply Container

1. FastEthernet0/0

FastEthernet0/0

10.10.0.221/24



3.22kbps
3.9kbps
3pps
2pps

100Mbps *Ethernet*
fullDuplex -

ca:00:64:6b:00:08
MTU 1500

FastEthernet0/0 on rtr8 v4
FastEthernet0/0 on rtr5 v4
FastEthernet0/0 on rtr6 v4
[...]

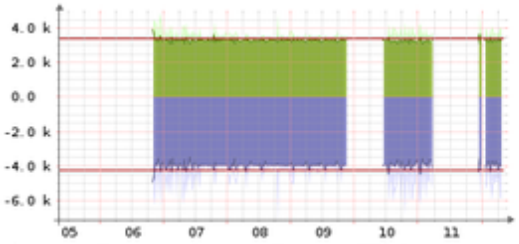
Graphs | Real time | ARP Table | Eventlog | Notes

Create Bill

Interface Traffic

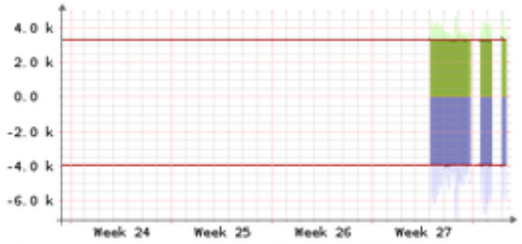
bps	Now	Ave	Max	95th %
In	3.22k	3.34k	4.87k	3.68k
Out	3.90k	3.97k	6.06k	4.86k

Total 26.56MB (In 12.13MB Out 14.43MB)



bps	Now	Ave	Max	95th %
In	3.35k	3.31k	4.87k	3.42k
Out	4.06k	3.97k	7.17k	4.27k

Total 327.56MB (In 148.87MB Out 178.69MB)



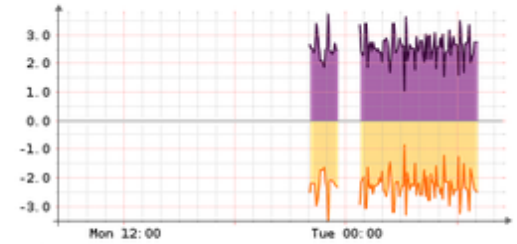
bps	Now	Ave	Max	95th %
In	3.31k	3.30k	4.87k	3.30k
Out	3.98k	3.96k	7.17k	3.98k

Total 353.00MB (In 160.58MB Out 192.42MB)

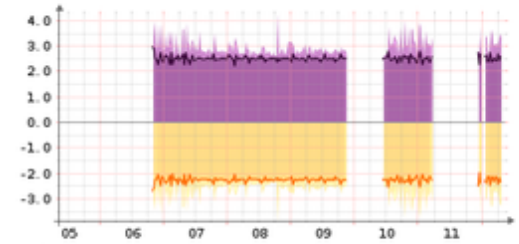
bps	Now	Ave	Max	95th %
In	3.26k	3.29k	4.72k	-nan
Out	3.94k	3.96k	7.17k	-nan

Total 470.01MB (In 213.48MB Out 256.54MB)

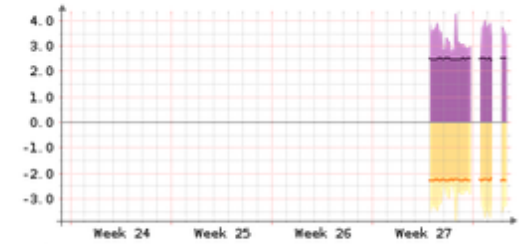
Interface Packets



Packets	Now	Ave	Max
In	2.51	2.53	3.73
Out	2.19	2.26	3.53



Packets	Now	Ave	Max
In	2.57	2.52	4.25
Out	2.30	2.26	3.88



Packets	Now	Ave	Max
In	2.54	2.52	4.25
Out	2.27	2.25	3.88

Packets	Now	Ave	Max
In	2.52	2.52	4.25
Out	2.25	2.25	3.88

Online LibreNMS demo

Is available at:

- https://demo.librenms.org/
- Log on as demo / demo

Workshop installation at:

- http://librenms.ws.nsrc.org/
- Log on as admin / <CLASS PASSWORD>

Questions/Discussion?

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