

Working around LibreNMS dashboard limitations using nagios, APIs, and Imagemagick

ChrisA – MUUG Meeting - January 2nd 2024

Slides and scripts: <https://muug.ca/meetings/23-24.html#jan>

Event feedback form: <https://forms.office.com/r/DahDXjy3c6>



What is this presentation about

- Goal of this demo is to shine light on some of the limitations I've come across while running LibreNMS dashboards in production (along with potential solutions and workarounds)
- Presentation will cover:
 - Overview of pain points with LibreNMS, its dashboards, and SNMP
 - How to use service checks (nagios) to query APIs and get non-SNMP data into LibreNMS
 - How to use ImageMagick + LibreNMS external image widget to display whatever data you want in a LibreNMS dashboard
 - **Demo 1: Helpdesk ticket dashboard**
 - **Demo 2: Unifi client location dashboard**

Who is this presentation for

- Primary target audience is current LibreNMS users
 - Ideally you already use LibreNMS, and service checks (nagios)
- Secondary target audiences
 - Users of other monitoring or dashboard software
 - People who like TV dashboards
 - People curious about LibreNMS
 - People who enjoy janky workarounds 🙄

Timeline of LibreNMS usage

- 2015 to 2022 – Used PRTG, Connectwise, Tactical RMM
- January 2022 – [Gilbert MUUG LibreNMS presentation](#)
- February 2022 – Begin evaluating, implement email alerts
- June 2022 – Start using LibreNMS [dashboards](#) for our NOC TVs
- August 2022 – Start using [service monitoring](#) (nagios plugin)
- August 2022 – Replace email alerts with [API created helpdesk tickets](#)
- September 2022 – Join LibreNMS forum ([@rocko](#))
- June 2023 – Implement helpdesk queue monitoring
- August 2023 – Start using [remote syslog](#) with all routers and switches
- September 2023 – Implement Unifi client location monitoring
- January 2024 – You are here

Problem Description

- LibreNMS is designed around monitoring network stuff using SNMP
- The further away you move from this, the more jank you encounter
- Examples: WMI/Powershell, websites, Docker, dynamically scaling apps, application performance monitoring
- The pain point this presentation is focused on is being **unable to display the most recent sensor measurement as a dashboard widget**. You can only display graphs or alerts, it's not so flexible
- Examples:
 - Most recent server room temperature measurement in celcius
 - Current number of unclaimed helpdesk tickets
 - Displaying the text returned from a REST API health check

Workaround

- Only workaround I can find that lets you display arbitrary info (other than developing new LibreNMS dashboard widgets) is to use the **"External Images" dashboard widget**
- But we need a way to update the image displayed by the widget with new information 🙄

Workaround

- LibreNMS service check (nagios)
- <https://docs.librenms.org/Extensions/Services/>

Installed the plugins package:

```
dnf config-manager --set-enabled epel-testing  
dnf config-manager --set-enabled powertools  
dnf install nagios-plugins-all
```

Enabled plugins in /opt/librenms/config.php:

```
$config['show_services'] = 1;  
$config['nagios_plugins'] = "/usr/lib64/nagios/plugins";
```

Workaround

- Service intended usage is something like **check_http** to verify a website loads and has a valid SSL certificate:

```
/usr/lib64/nagios/plugins/check_http --hostname=muug.ca --sni --  
certificate=1 --continue-after-certificate
```

```
SSL OK - Certificate 'muug.ca' will expire in 47 days on 2024-02-17  
14:25 -0600/CST.
```

```
HTTP OK: HTTP/1.1 200 OK - 26550 bytes in 0.230 second response  
time |time=0.230176s;;;0.000000 size=26550B;;;0
```


Workaround

- But Nagios checks are just scripts, you can do whatever you want 🙄
- When the check runs, we can use ImageMagick to create a new image in the LibreNMS images directory:

```
convert -size 550x275 -background none -fill white -gravity center -font  
Courier-Bold label:hello /opt/librenms/html/images/dash_hello.png
```

Workaround

- Using curl to query a REST API, and then displaying an ImageMagick tile has prevented us from needing to implement a second dashboard software (for now)

Demo 1: Helpdesk ticket dashboard

```
cat /usr/lib64/nagios/plugins/check_zammadhelpdeskqueue.sh
#!/bin/bash
# https://gist.github.com/maxcnunes/9f77afdc32df354883df
# https://www.howtoforge.com/tutorial/write-a-custom-nagios-check-plugin/
URL="https://helpdesk.example.com/api/v1/tickets/search?query=owner.id%3A1%20AND%20group.id%3A1%20AND%20state.name%3A(%22new%22%20OR%20%22open%22%20OR%20%22pending%20reminder%22)"
BEARER="blablablatokengoeshere"

# store the whole response with the status at the end
HTTP_RESPONSE=$(curl --url $URL --header "Authorization: Bearer $BEARER" --silent --write-out "HTTPSTATUS:%{http_code}")
# extract the body, then extract ticket_count value from the JSON
HTTP_BODY=$(echo $HTTP_RESPONSE | sed -e 's/HTTPSTATUS:.*//g' | jq '.tickets_count')

# extract the status
HTTP_STATUS=$(echo $HTTP_RESPONSE | tr -d '\n' | sed -e 's/.*HTTPSTATUS://')

# if HTTP status is 200 OK, then return ticket_count
if [ $HTTP_STATUS -eq 200 ]; then
    convert -size 550x275 -background none -fill white -gravity center -font Courier-Bold label:$HTTP_BODY /opt/librenms/html/images/helpdesk_queue.png
    convert -size 550x275 -gravity center -font Courier-Bold label:$HTTP_BODY /opt/librenms/html/images/helpdesk_queue.svg echo "$HTTP_BODY tickets in Helpdesk
queue with no Owner | 'tickets'=$HTTP_BODY"
    exit 0
fi

# if HTTP status is not 200 OK, exit with warning state
if [ ! $HTTP_STATUS -eq 200 ]; then
    echo "Error [HTTP status: $HTTP_STATUS]"
    exit 2
fi
```

Demo 2: Unifi client location dashboard

```
cat /usr/lib64/nagios/plugins/check_locations.sh
#!/bin/bash
# use home folder as working folder
cd ~

# auth against the unifi controller and save the cookie
curl -s -o /dev/null -k -X POST --data '{"username": "api", "password": "actualuserpasswordherebecauseunifidoesntdobearetokens"}' --header 'Content-Type: application/json' --cookie-jar cookie.txt
https://unifi.example.com:8443/api/login

# Save a list of AP names and MAC addresses to disk
curl -k -X GET --silent --cookie cookie.txt https://unifi.example.com:8443/api/site/default/stat/device-basic | jq --raw-output '.data[] | {name,mac}' > device-basic.txt

# Query Unifi controller for locations, and generate a bunch of images to display in LibreNMS dashboard
# Employee1
curl -k -X GET --silent --cookie cookie.txt https://unifi.example.com:8443/api/site/default/stat/sta/2C:54:91:88:C9:E3 | jq --raw-output '.data[] | .ap_mac' > ap.txt
ap=$(cat ap.txt)
location=$(jq --arg ap "$ap" --raw-output 'select(.mac == $ap) | .name' device-basic.txt)
if [[ -z "$location" ]]; then
    location="Offline" # need to check whether location is empty, because if the laptop is not connected to any AP the var will be blank and convert command will fail
fi
location=$(echo $location | sed 's/ //g') # trim whitespace because label: is finicky and I can't figure out how to to :label to accept spaces
convert -size 550x275 -background none -fill white -gravity center -font Courier-Bold label:$location /opt/librenms/html/images/location_employee1.png

# Employee2
curl -k -X GET --silent --cookie cookie.txt https://unifi.example.com:8443/api/site/default/stat/sta/2C:54:91:88:C9:E4 | jq --raw-output '.data[] | .ap_mac' > ap.txt
ap=$(cat ap.txt)
location=$(jq --arg ap "$ap" --raw-output 'select(.mac == $ap) | .name' device-basic.txt)
if [[ -z "$location" ]]; then
    location="Offline" # need to check whether location is empty, because if the laptop is not connected to any AP the var will be blank and convert command will fail
fi
location=$(echo $location | sed 's/ //g') # trim whitespace because label: is finicky and I can't figure out how to to :label to accept spaces
convert -size 550x275 -background none -fill white -gravity center -font Courier-Bold label:$location /opt/librenms/html/images/location_employee2.png

exit 0
```

Questions + Feedback Form

- Door prizes: <https://muug.ca/dpview.php>
- Event feedback form: <https://forms.office.com/r/DahDXjy3c6>



BONUS SLIDE

- If you're looking for software to set up PCs as digital signage on TVs, **Porteus Kiosk** is excellent
- <https://porteus-kiosk.org/>
- Other software that works well:
- [Windows 10/11 with kiosk mode enabled](#)
- [Fully Kiosk Browser \(Android\)](#)
- [FullPageOS \(Raspi\)](#)
- Disclaimer: The "best" solution will depend on your requirements 🤔
- Also, [Brightgauge Blog](#) is my reference point for what an excellent dashboard should look like. Tons of sample dashboards