On-Demand Network Management with NMaaS: Network Management as a Service

Vojdan Kjorveziroski (UKIM)
Pavle Vuletić (UoB)
Łukasz Łopatowski (PSNC)
Fréderic Loui (Renater)

NOMS 2022
25-29 April 2022
Budapest, Hungary
Agenda

Introduction to NMaaS
- NMaaS in a Nutshell
- Reasons for using NMaaS
- Deployment Options

NMaaS Demo
- Discovering the NMaaS Web Interface
- Deploying a new Application
- Accessing the new Application
- Application Configuration Workflow

Q&A
What?
A catalog of open-source applications, with a focus on Network Management
A platform developed and maintained within the GÉANT Project
Allows on-demand deployment of applications present in the catalog on the infrastructure where NMaaS is installed

For whom?
NRENs and NREN end institutions, GÉANT Project teams, private institutions

Why?
To ease network management and monitoring software deployment, configuration and maintenance
To allow users to focus solely on using their services
NMaaS in a Nutshell

• Kubernetes container orchestrator
• Applications added to the NMaaS catalog are represented by Helm charts
• GitOps principle for configuring deployed applications
Deployment Options

• Demo instance available on https://nmaas.geant.org
• Production instance managed by the GÉANT Project available on https://nmaas.eu
  • Limited to GÉANT Project partners
• Running your own instance on-premise
  • Free software (as in beer)
    • Open sourcing of all the components underway
  • Installation documentation available online
    • https://wiki.geant.org/display/NMAAS/NMaaS+Installation+Guide
    • https://wiki.geant.org/display/NMAAS/NMaaS+User+Guide
    • https://wiki.geant.org/display/NMAAS/Local+NMaaS+Testing+Environment
Demo: Using NMaaS – Initial Login

Network Management as a Service (NMaaS) provides a pool of network management applications run as dedicated per-instance in the cloud.

GÉANT’s NMaaS service includes three aspects: providing, managing and maintaining the infrastructure of the NMaaS service portal, platform and selected tools, supporting users in using the system, and the selected tools for monitoring their networks via NMaaS, as well as supporting users that contribute their software to NMaaS system.

Target users
NMaaS users are organisations that do not want to own NMS infrastructure themselves and/or want to outsource network management, as well as organisations and/or individuals that are searching for quality network management software or who want to share their software within the community.

NMaaS Marketplace
NMaaS Marketplace is a catalogue of available open source tools, supported by community, distributed free, chosen by administration. There is also place for your application choice - you can propose new
Demo: Using NMaaS – The Application Catalog

<table>
<thead>
<tr>
<th>App</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WiFiMon</td>
<td>Wireless Crowdsourced Performance Monitoring and...</td>
</tr>
<tr>
<td>Jenkins</td>
<td>Leading open-source automation server</td>
</tr>
<tr>
<td>InfluxDB</td>
<td>Time series database</td>
</tr>
<tr>
<td>CodiMD</td>
<td>Collaborative Markdown Editor</td>
</tr>
<tr>
<td>Debian repository</td>
<td>Debian package repository based on Reprepo</td>
</tr>
<tr>
<td>Statping</td>
<td>Status Page &amp; Monitoring Server</td>
</tr>
<tr>
<td>Grafana</td>
<td>Open source analytics &amp; monitoring solution for every database</td>
</tr>
<tr>
<td>Prometheus</td>
<td>Monitoring system &amp; time series database</td>
</tr>
<tr>
<td>Icinga2</td>
<td></td>
</tr>
<tr>
<td>SPA Inventory</td>
<td></td>
</tr>
<tr>
<td>Routinator</td>
<td></td>
</tr>
<tr>
<td>WebDAV Server</td>
<td></td>
</tr>
</tbody>
</table>
Demo: Using NMaaS – Deploying an Application on NMaaS

Prometheus

Screenshots

Description
Prometheus collects metrics from monitored targets by scraping metrics HTTP endpoints on these targets. Since Prometheus also exposes data in the same manner about itself, it can also scrape and monitor its own health.
Prometheus’s main features are:
- a multi-dimensional data model with time series data identified by metric name and key-value pairs
- a flexible query language to leverage this dimensionality
- no reliance on distributed storage; single server nodes are autonomously
- time series collection happens via a pull model over HTTP
- pushing time series is supported via an intermediary gateway
- targets are discovered via service discovery or static configuration
- multiple modes of graphing and dashboarding support
Demo: Using NMaaS – First Step of the Deployment Wizard

Description
Prometheus collects metrics from monitored targets by scraping metrics HTTP endpoints on these targets. Since Prometheus also exposes data in the same manner about itself, it can also scrape and monitor its own health.
Demo: Using NMaaS – Initial Configuration Wizard
Demo: Using NMaaS – Status of a Deployed Application

noms-demo (Prometheus)

Your application is now active. You can access it using the Access option from the Actions menu. Use the Configure and Members options to update the configuration and the list of application users respectively.

Installation progress:
1. Subscription validation
2. Environment creation
3. Verifying connectivity
4. Application deployed
5. Activation
6. Application active

Actions:
- Access
- Configure
- Members
- Undeploy
Demo: Using NMaaS – Validating the Status of a Deployed Application

Targets

<table>
<thead>
<tr>
<th>Endpoint</th>
<th>State</th>
<th>Labels</th>
<th>Last Scrape</th>
<th>Scrape Duration</th>
<th>Error</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://192.168.56.10:9100/metrics">http://192.168.56.10:9100/metrics</a></td>
<td>UP</td>
<td>instance=“192.168.56.10:9100”</td>
<td>11.876s ago</td>
<td>63.2ms</td>
<td></td>
</tr>
</tbody>
</table>
Demo: Using NMaaS – Integration with a Git Repository

Use the following command to clone the Git repository containing configuration files used by this application instance. Each change applied to any of the files and pushed back to the repository will be used to update the running application.

```
  git clone ssh://git@gitlab.nmaas.eu/groups-finkilab/finkilab-prometheus-628.git
```

Access credentials

Prometheus access username:

Prometheus access password:

Apply configuration
Demo: Using NMaaS – Altering an Application’s Configuration Locally
Demo: Using NMaaS – Pushing Configuration Changes Upstream

Changes not staged for commit:
(use "git add <file>..." to update what will be committed)
(use "git restore <file>..." to discard changes in working directory)

modified: prometheus.yml

no changes added to commit (use "git add" and/or "git commit -a")

vojdan@ottovm:/Data/noms-demo/finkl-lab-prometheus-626$ git add .
vojdan@ottovm:/Data/noms-demo/finkl-lab-prometheus-626$ git commit -m "add device2"

[master 717c71e] add device2
1 file changed, 1 insertion(+), 1 deletion(-)

vojdan@ottovm:/Data/noms-demo/finkl-lab-prometheus-626$ git push

Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 4 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (3/3), 317 bytes | 317.00 KiB/s, done.
Total 3 (delta 1), reused 0 (delta 0)
To ssh://gitlab.nmaas.eu/groups-finkl-lab/finkl-lab-prometheus-626.git
  8bb4e3c..717c71e  master -> master

vojdan@ottovm:/Data/noms-demo/finkl-lab-prometheus-626$
Demo: Using NMaaS – Validating the New Configuration

**Targets**

<table>
<thead>
<tr>
<th>Endpoint</th>
<th>State</th>
<th>Labels</th>
<th>Last Scrape</th>
<th>Scrape Duration</th>
<th>Error</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://102.168.56.10:9100/metrics">http://102.168.56.10:9100/metrics</a></td>
<td>UP</td>
<td>instance=&quot;102.168.56.10:9100&quot;</td>
<td>2.813s ago</td>
<td>14.8ms</td>
<td></td>
</tr>
<tr>
<td><a href="http://192.168.56.11:9100/metrics">http://192.168.56.11:9100/metrics</a></td>
<td>UP</td>
<td>instance=&quot;192.168.56.11:9100&quot;</td>
<td>1.271s ago</td>
<td>119.9ms</td>
<td></td>
</tr>
</tbody>
</table>
Demo: Using NMaaS – Deploying a Second Application, Grafana
Demo: Using NMaaS – Configuration Wizard for Grafana
Demo: Using NMaaS – Validating the Grafana Deployment (1)
Demo: Using NMaaS – Validating the Grafana Deployment (2)
Thank you

Any questions?

nmaas@lists.geant.org