

Network Management as a Service



Platform for Multi-Tenant Network Management

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GÉANT (GN4-3) WP6 T3 in brief



WP6 – Network technologies and services development

Task 1 – Network technology evolution

Task 2 – Network services evolution and development

Task 3 – Monitoring and Management

perfSONAR

PMP – Performance Measurement Platform

NMaaS – Network Management as a Service

WiFiMon

CNaaS – Campus Network management as a Service

Streaming telemetry

High speed monitoring (100 Gbps and beyond)

P4-based unsampled flow monitoring on high speed links

NMaaS in a nutshell



What?

“Market place” offering Network Management ... in the cloud

Production service developed and maintained by the GÉANT Project







For whom?

NREN End Institutions, GÉANT Project teams, and NRENs

Why?

To **ease** network management and monitoring software **deployment**, **configuration** and **maintenance**

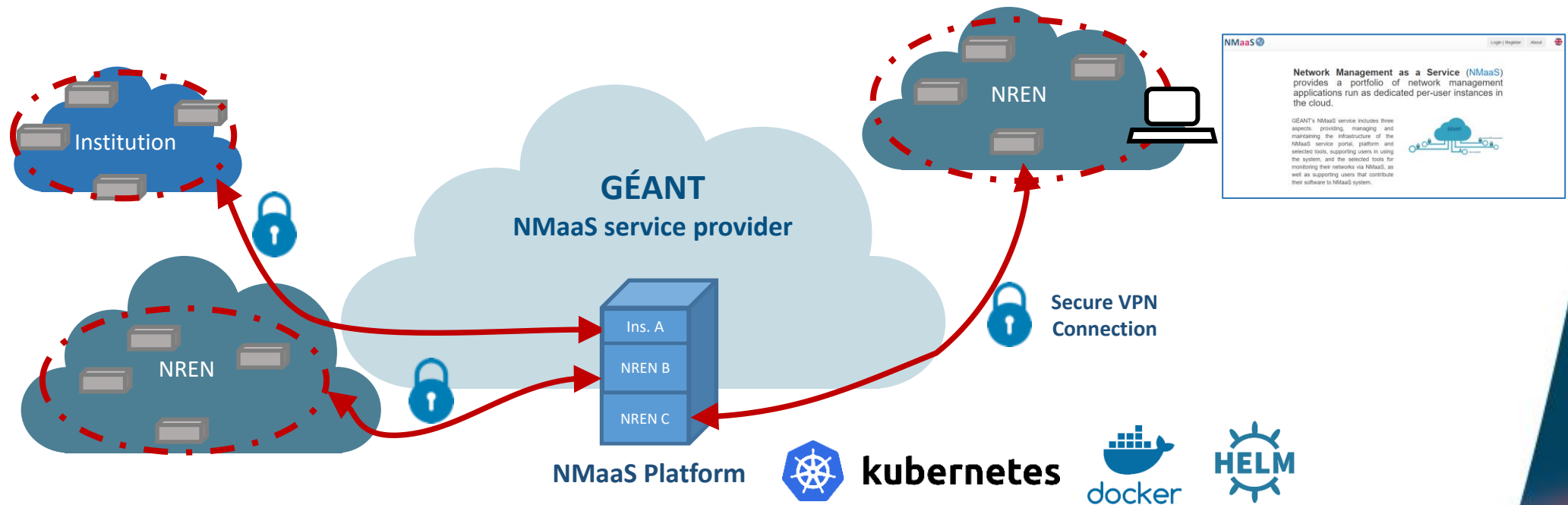
To allow users to focus solely on managing their services

 <p>ELK Stack ★★★★★0 Elasticsearch, Logstash and Kibana</p>	 <p>WiFiMon ★★★★★0 Wireless Crowdsourced Performance Monitoring and...</p>	 <p>Statping ★★★★★0 Status Page & Monitoring Server</p>	 <p>Booked ★★★★★5 Web-based calendar and schedule</p>	 <p>InfluxDB ★★★★★0 Time series database</p>	 <p>Jenkins ★★★★★0 Leading open-source automation server</p>
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How NMaaS works



Shared **cloud platform** managed by the GÉANT Project

Each user gets an **isolated** tenant environment connected over a secure **VPN** to his network

Tool deployment and access via a **web portal**

NMaaS Portal



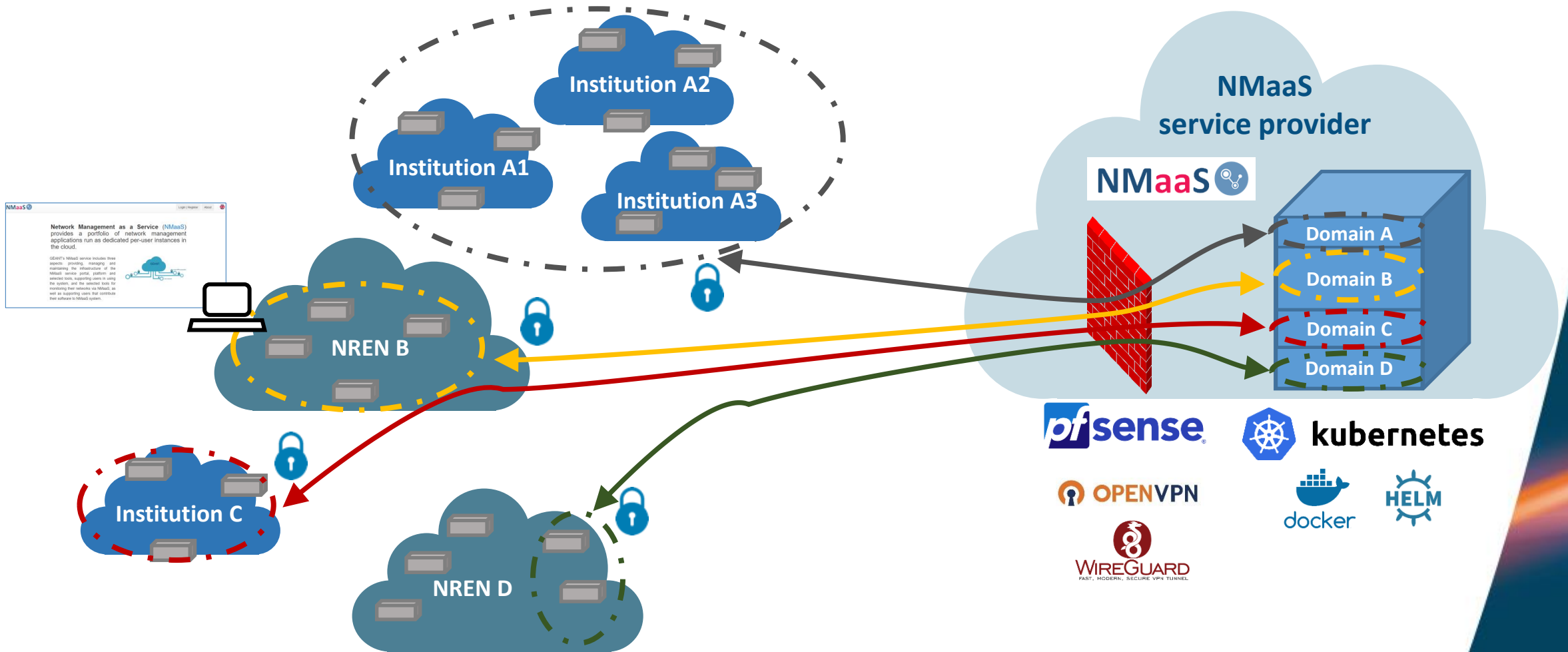
NMaaS Applications Subscriptions Instances Domain: PL-LAB Send notification Settings admin

Search Tags: all Sort: Top rated

 Oxidized ★★★★★5 Network device configuration backup tool	 Booked ★★★★★5 Web-based calendar and schedule	 LibreNMS ★★★★★5 Autodiscovering SNMP based network monitoring tool	 Grafana ★★★★★5 Open source analytics & monitoring solution for every database
 Statping ★★★★★5 Status Page & Monitoring Server	 Prometheus ★★★★★5 Monitoring system & time series database	 Bastion ★★★★★5 Bastion server based on Ubuntu OS	 esmond ★★★★★0 Central Measurement Archive
 Central Management ★★★★★0 perfSONAR Central Management	 SPA Inventory ★★★★★0 Topology database with TMF-compliant API	 ELK Stack ★★★★★0 Elasticsearch, Logstash and Kibana	 WiFiMon ★★★★★0 Wireless Crowdsourced Performance Monitoring and...



NMaaS Multi-Tenancy Support



NMaaS System



Software components

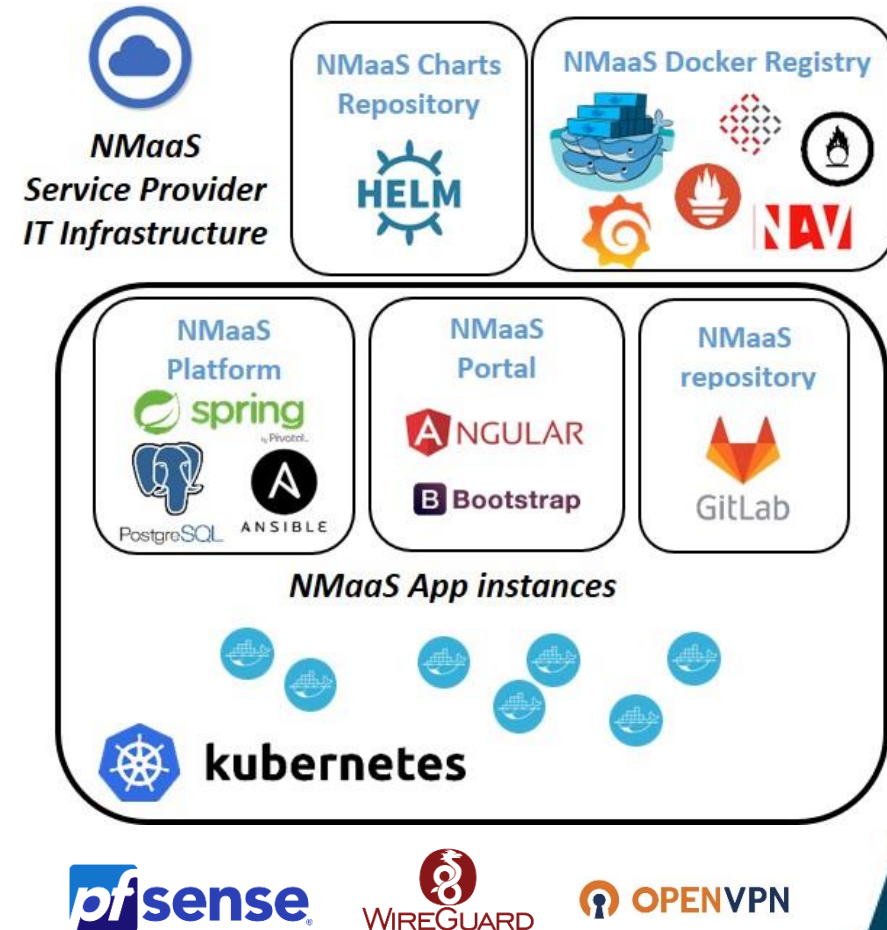
- NMaaS Platform
- Domain and user management
- Tool deployment process orchestration
- NMaaS Portal
- Web-based user front-end

Tools (packaged applications)

- Docker images
- Helm charts

Infrastructure

- Kubernetes
- VPN
- Networking



NMaaS Tools

23 applications available in the marketplace

Oxidized

Bastion

perfSONAR 

LibreNMS

Statping



4 components

NAV 

SPA Inventory 

WiFiMon 

ROUTINATOR 

ICINGA  perfSONAR 

Prometheus

Debian

InfluxDB

Grafana

repository

Jenkins

Booked

ELK Stack

Icinga

statping 

Routinator

Synapse

Victoria Metrics

[matrix]  WiFiMon  InfluxDB

CodiMD


VICTORIA
METRICS

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Adding new Tools

- ...or new versions
- At the moment done by the NMaaS team
- **Possible** based on user request
- Requirements
 - Docker image(s)
 - Helm chart
 - Metadata and information about the application

NMaaS 



NMaaS Tool Deployment Process



Login Register

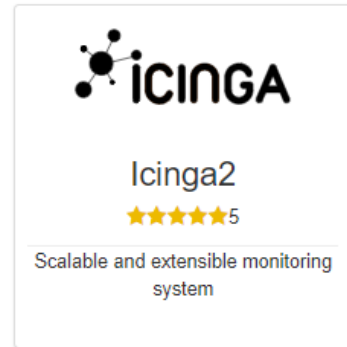
Username
Username

Password
Password

Login

Federated login

Forgot password



Deploy new instance of Icinga2

Instance name
icing-demo

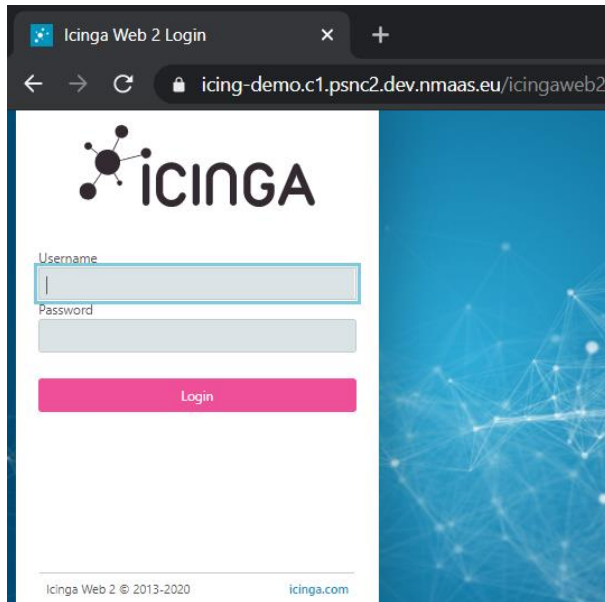
Select version
2.11.4

Domain: Customer 1

Close Deploy

Installation progress

- 1 Subscription validation
- 2 Environment creation



View application access methods Update configuration

Add members Undeploy

- 5 App container deployment
- 6 App running

Configuration

Detailed field descriptions are available at [NMaaS Tools Page](#).

Base

Default web admin user *
llopat@nmaas.eu

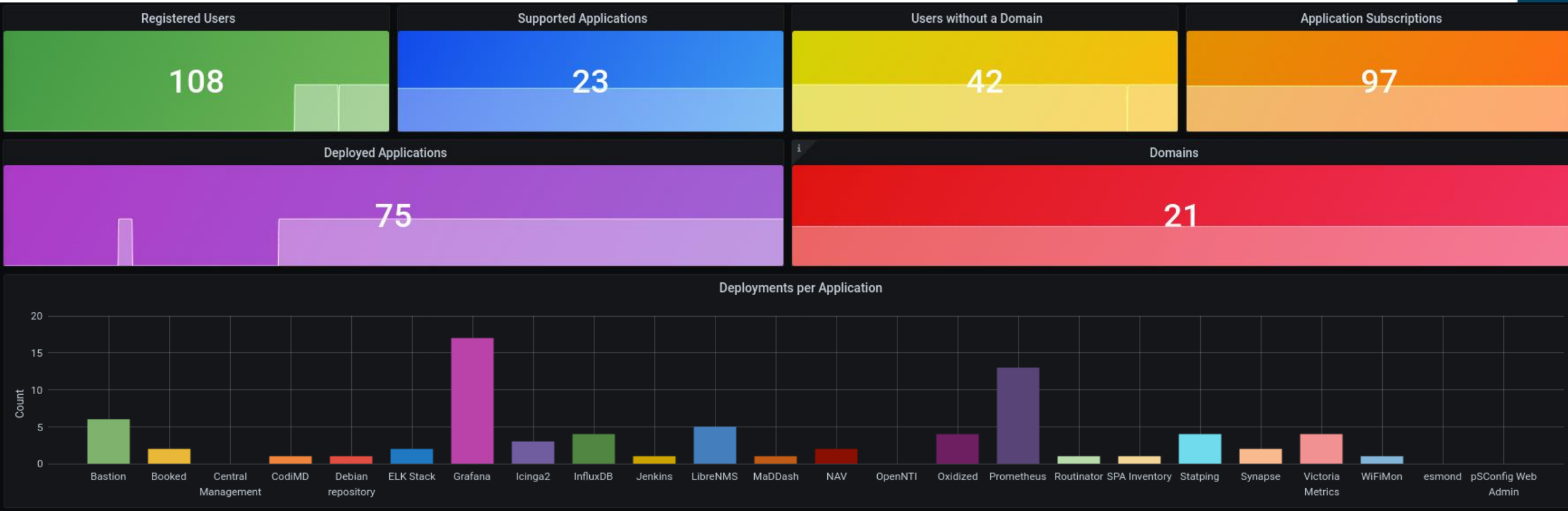
Default web admin password *
.....

Allocated configuration directory storage (GB) *
1Gi

Allocated SQL database storage (GB) *
16Gi

Apply configuration

NMaaS Service Usage Statistics



<https://nmaas-metr.pllab.nmaas.eu>



<https://a8e91173-eabd-4bac-a882-8856338eaaea.public.nmaas.eu>

Who is using NMaaS?



• NRENs + GÉANT

- CYNET
- HEANET
- PSNC
- ARNES
- SURFnet

• End institutions

- Franja Malgaja Primary School / ARNES
- University of Murcia / RedIRIS
- Friedrich Alexander Universität / DFN

• GÉANT Project teams

- Performance Measurement Platform (PMP)
- RARE project
- perfSONAR development team

• Tool developers

- perfSONAR
- WiFiMon
- SPA Inventory

How can you use NMaaS service?



To try NMaaS out or test offered applications
use NMaaS sandbox instance: <https://nmaas.geant.org>
(no configuration overhead, demo applications already deployed)

To set up your own NMS on the central GÉANT NMaaS
NMaaS production instance: <https://nmaas.eu>
(secure, fully supported)

To run your own instance of NMaaS
visit NMaaS Installation Guide:
<https://wiki.geant.org/display/NMAAS/NMaaS+Installation+Guide>

Northwestern
University



K3S



NMaaS next steps



- **Add IPv6 support** (doable after Kubernetes 1.21)
- **Build the community** - define the process of having application maintainers from outside of the NMaaS team with some automated processes of publishing new versions of applications on the Portal
- **Further technical improvement:**
 - this possibility to deploy local K8s cluster + NMaaS with few clicks to ease the testing process (mention above)
 - enabling federation between multiple instances of NMaaS mostly to share the application portfolio

Thank you

Any questions?

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