NMaaS by GÉANT

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Agenda

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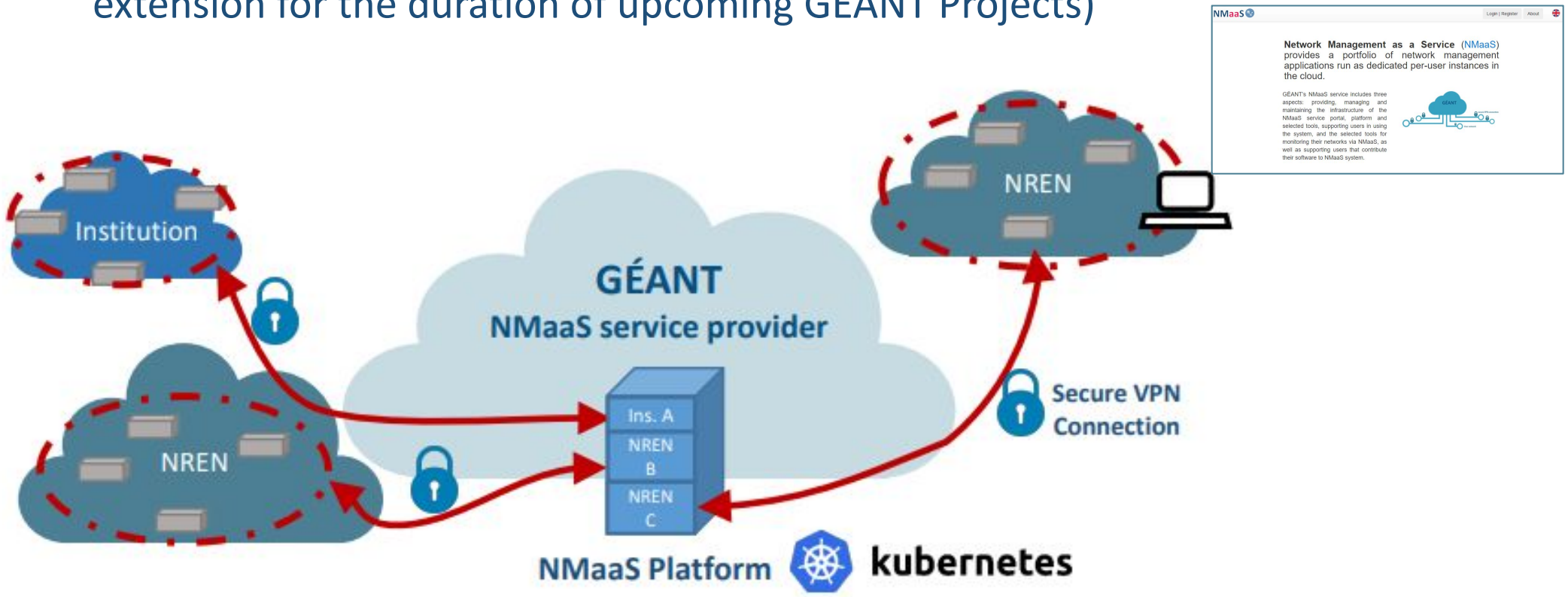
What is NMaaS (Network Management as a Service)

- NMaaS (Network Management as a Service) was developed within the GÉANT project as an **effective** and **efficient open-source network and service management platform in the cloud**
  - Enables management and monitoring of user networks through **on-demand deployment** of network management tools **in a cloud infrastructure**
  - A **catalog** (“central marketplace”) of **open-source applications** focused on network management
    - Application deployment and access via a **web portal**
  - Uses **VPN connections** for traffic between the **NMaaS** and the **network devices**
- Not limited to network management: can be considered as **a general-purpose application catalog**
  - NMaaS Virtual Lab use-case is aimed to educational communities

What is NMaaS (continued)

- Production service offered by the GÉANT Project since December 2018.
  - Offered free of charge within current project phase GÉANT 5-1 (with expected extension for the duration of upcoming GÉANT Projects)

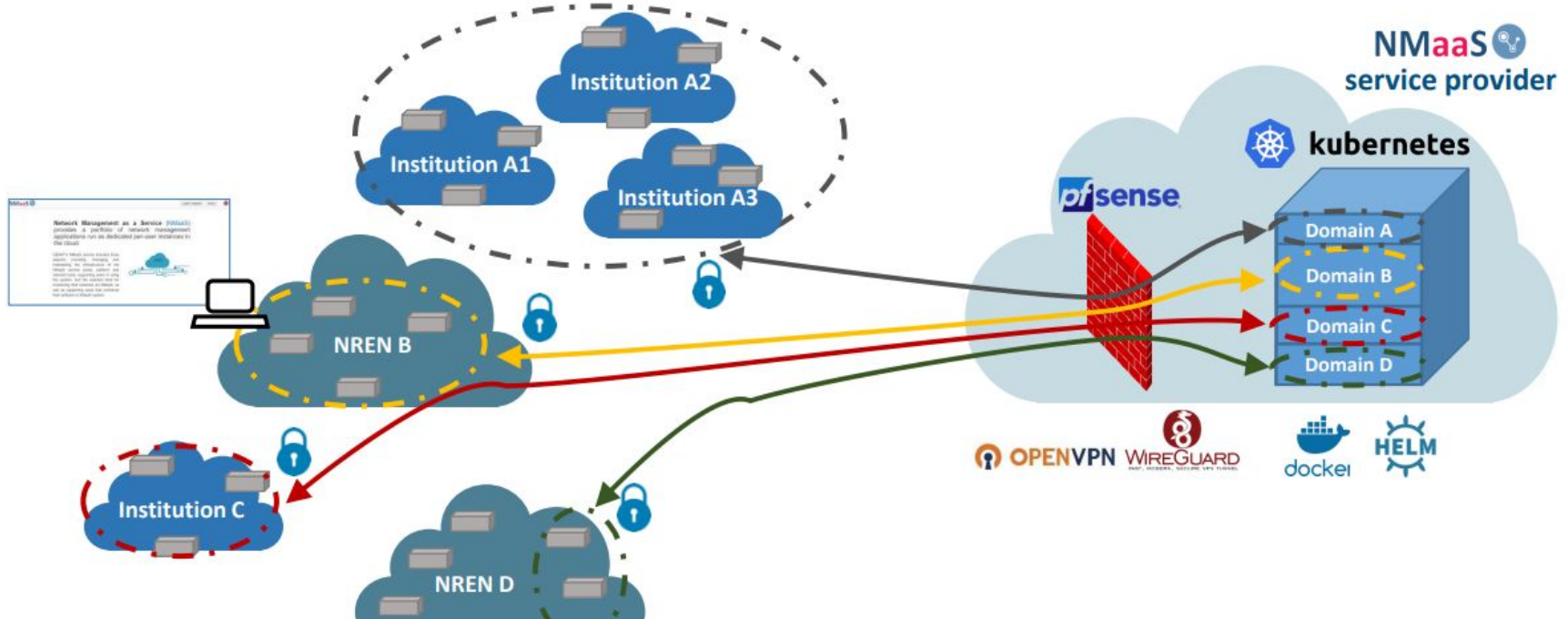


Who is using NMaaS

- NRENs
  - CYNET
  - HEANET
  - ARNES
  - PSNC / PIONIER
  - RENATER
  - SURFnet
  - URAN
- End institutions
  - GÉANT
  - From: France, Germany, Slovenia, Ireland, Brazil, Spain, Serbia, North Macedonia, Italy, Cyprus
- GÉANT Project teams
  - Performance Measurement Platform (PMP)
  - RARE project
  - MP-LS domain
  - perfSONAR development team
- Tool developers
  - perfSONAR
  - WiFiMon
  - SPA Inventory

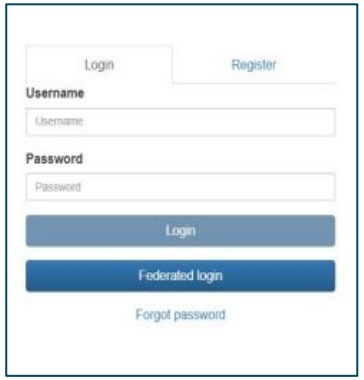
How NMaaS Works

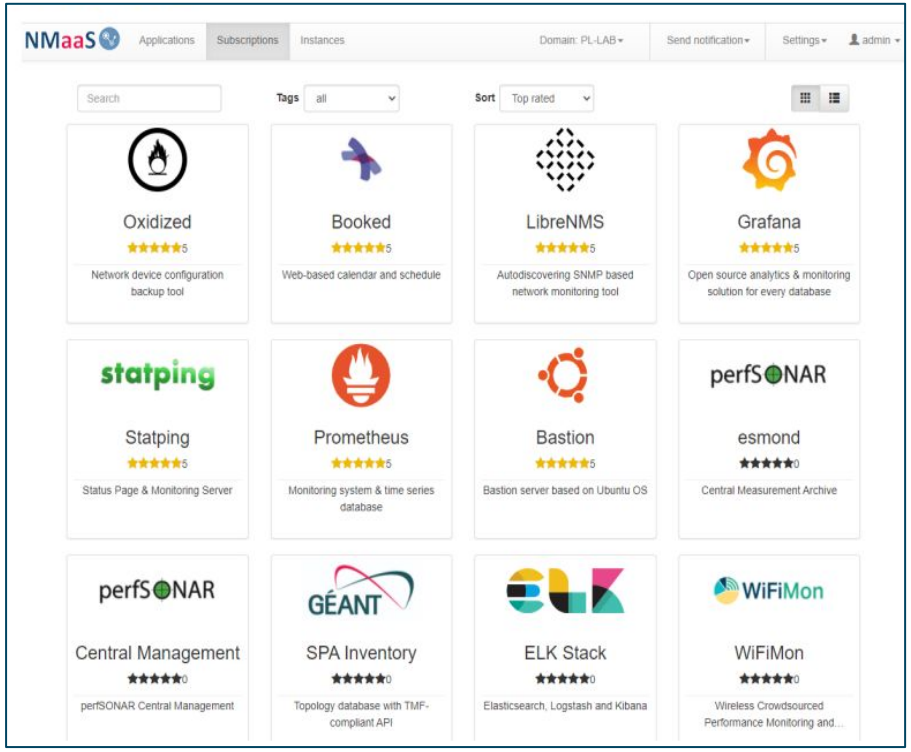
- Shared **cloud platform** managed by the GÉANT Project or another entity
- Each user gets **an isolated tenant environment** connected over a **secure VPN** to his network
- Users can deploy and access **network management** applications via a **web portal**

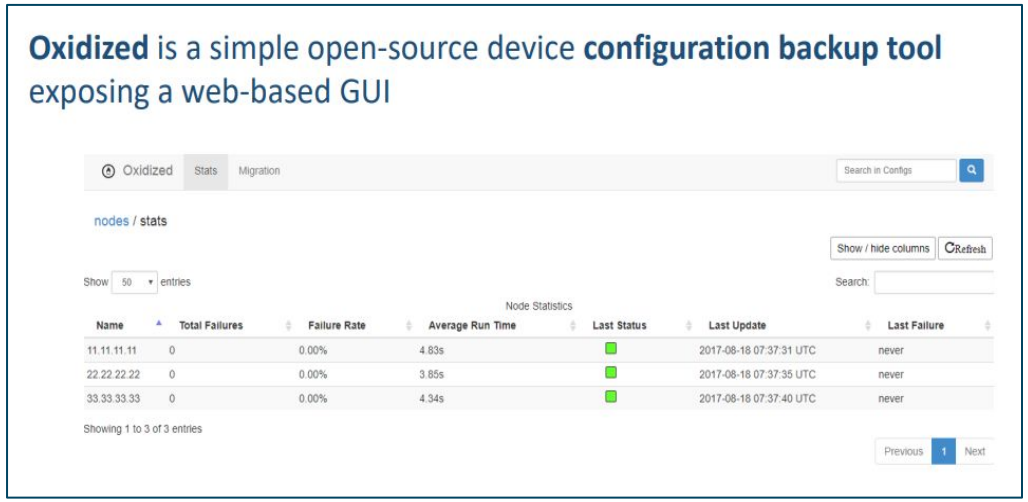


How NMaaS works for end-user

- A web portal which acts as a catalog for (selection and) deployment of various types of applications within an isolated tenant environment assigned to a given institution or team

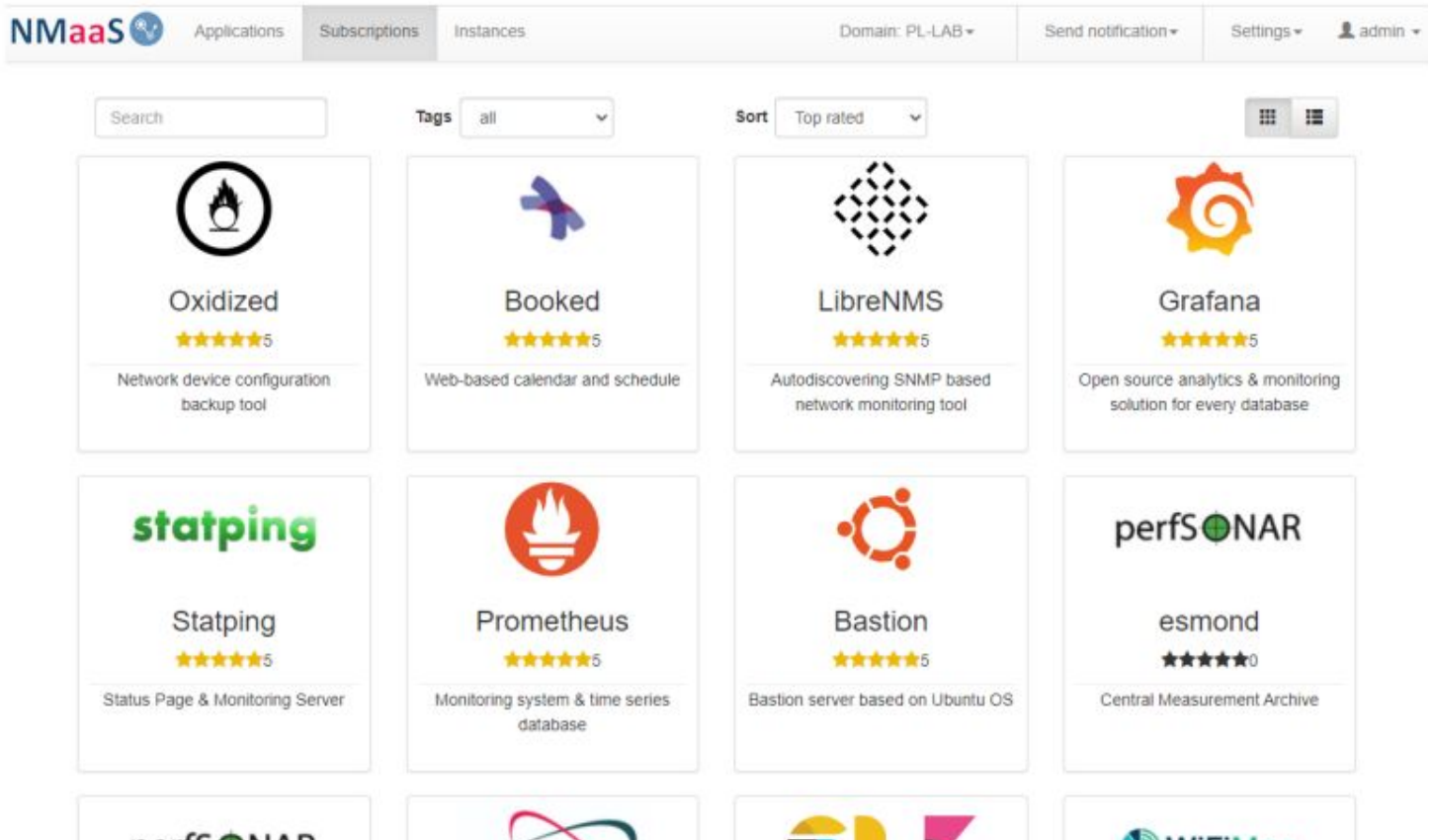






NMaaS application portfolio

- Offers about 30 applications (mostly tools to support network management)
  - List of supported applications as available at https://network.geant.org/nmaas-tools



What is NMaaS for a customer

- Open source framework for orchestration of on-demand deployment of applications in a Kubernetes-based cloud environment
  - Apache 2.0 License
- NMaaS use-cases
  - Network Management use-case
  - Elearning virtual lab use-case

Who can use and benefit from using NMaaS (NM use-case)?

WHO

- All who have limited resources to develop and/or maintain their own NMS infrastructure or planned to outsource these activities
  - Smaller and emerging NRENs, NREN end institutions, small organisations, distributed research projects, …
  - Organisations and/or individuals that are searching for quality network management software or who want to share their software within the community

WHY

- To ease network management and monitoring software deployment, configuration and maintenance
- By using a shared and supported platform, institutions can focus solely on the monitoring and management of their service components

Who can use and benefit from using NMaaS (elearning virtual lab use-case)?

WHO

- By developing and implementing virtual lab usecase NMaaS is trying to support educational communities
  - Universities, schools, training and certification providers, ...

WHY

- To easily organize hands-on exercises where all students can participate in isolated and/or shared environments/workspaces
- To minimize hardware requirements and isolate needed technical know-how
- Benefits for educational staff
  - Reusable infrastructure across multiple courses or even institutions
  - Granular management of users and scenarios
  - Tight access control
- Benefits for students
  - Deployment of complex applications, bypassing hardware requirements
  - Eliminating configuration overhead
  - Playground for testing new software

How to use NMaaS?

GÉANT project managed NMaaS service

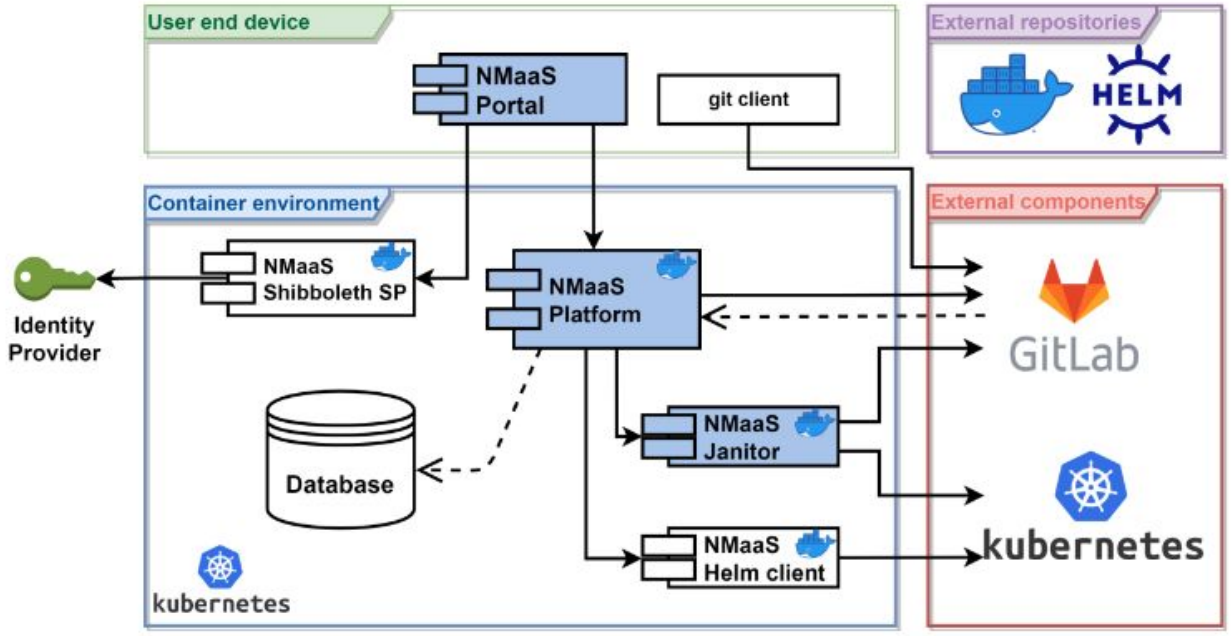
- Production instance is available at https://nmaas.eu
- Playground instance is available at https://nmaas.geant.org
  - Can be used by anyone interested in testing latest versions of NMaaS.
  - It is important to note that the NMaaS Playground is tailored to enable users to browse and deploy NMaaS tools right away without any unnecessary overhead. However, this implies that the user isolation, access and data security rules applied on this NMaaS installation are not so strict as in the case of the official NMaaS production service (e.g. no dedicated VPNs are deployed).

Self-hosted NMaaS

- Interested users can run NMaaS on their own infrastructure (Kubernetes cluster required!)
- Two installation options:
  - The production installation guide - provides instructions on installing NMaaS on a full-fledged Kubernetes cluster involving multiple cluster nodes.
  - The local installation guide - provides instructions on installing NMaaS for evaluation purposes in smaller environments, consisting even of a single Kubernetes node

NMaaS Under the Hood

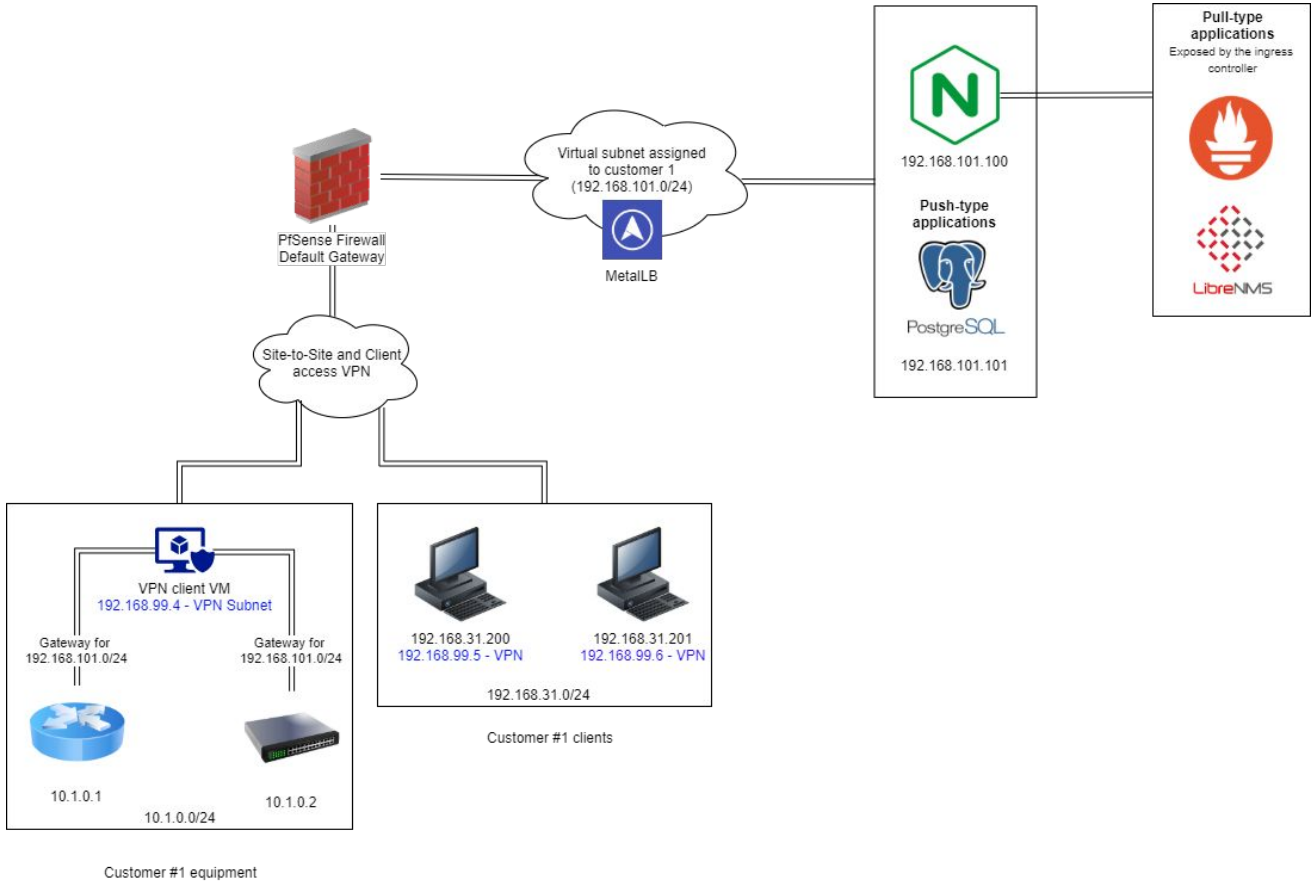
- Kubernetes container orchestrator
- Applications added to the NMaaS catalog are represented by Helm charts
- GitOps principle for configuring deployed applications



NMaaS Under the Hood (continued)

NMaaS VPN setup

- Client-to-Site VPN – secure user web-access to the UI of deployed NMaaS tools
  - OpenVPN
- Site-to-Site VPN – secure data exchange between the devices being monitored and NMaaS tools running in the cloud
  - OpenVPN and WireGuard
- Routing and firewall settings on a central PfSense Firewall VM
- Set up based on domain name and IP addresses of monitored devices provided by the user



Conclusion

NMaaS Key Benefits and Features

- PRIVATE
  - Each management instance is separated within the platform by design to maintain isolation
  - Allows institutions and projects to manage separate infrastructure
- SECURE
  - Uses VPN technology to incorporate management platform instance into the network instance
- PLUG AND PLAY
  - Cloud based platform reduces start-up costs and management overhead
- NOT LIMITED TO ONE DOMAIN
  - Network management use-case
  - Elearning virtual lab use-case
- OPEN SOURCE
  - Apache 2.0

NMaaS contact and further information

Contact us at nmaas@lists.geant.org if you'd like to:

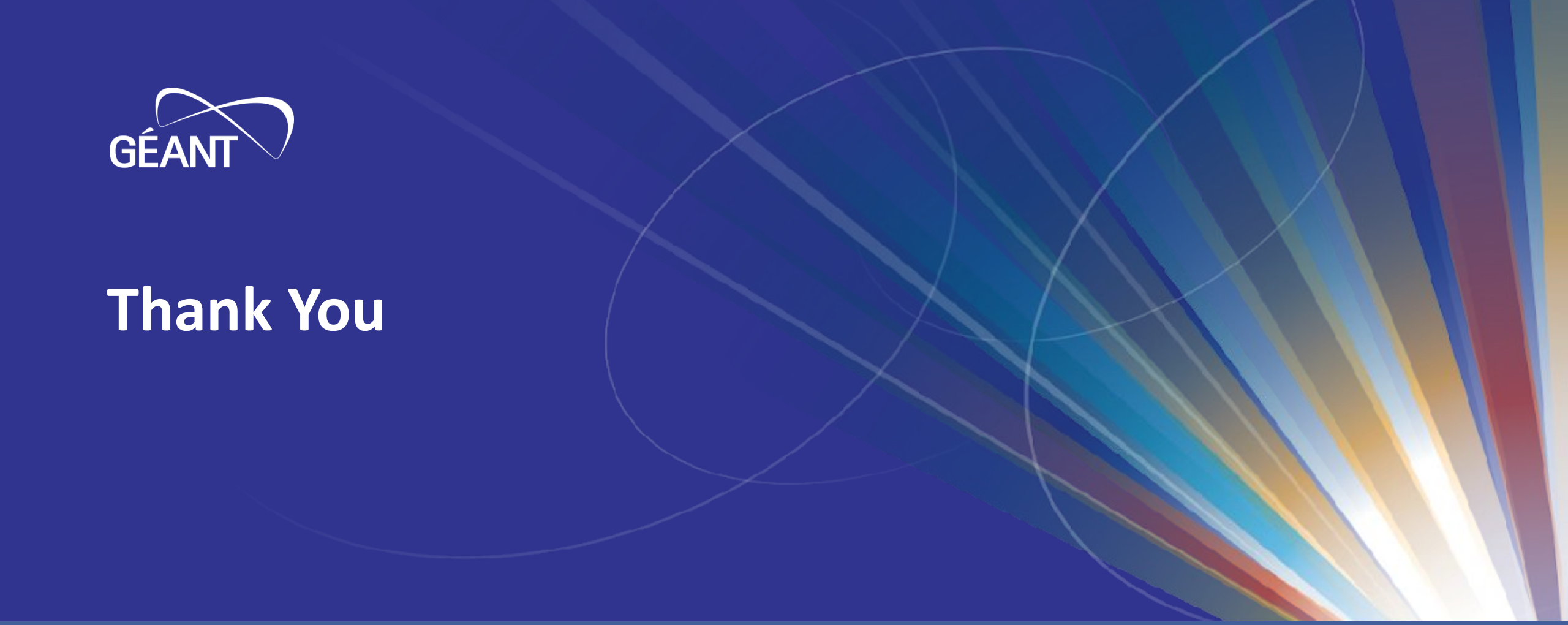
- monitor your equipment with tools offered by NMaaS
- try out elearning virtual lab use-case
- share your own custom tools with the community via the NMaaS marketplace
- test NMaaS capabilities

Check out the latest NMaaS posts: https://docs.nmaas.eu/

NMaaS github repository: https://github.com/nmaas-platform

NMaaS production instance: https://nmaas.eu

NMaaS playground instance: https://nmaas.geant.org



Thank You

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