



nmaas

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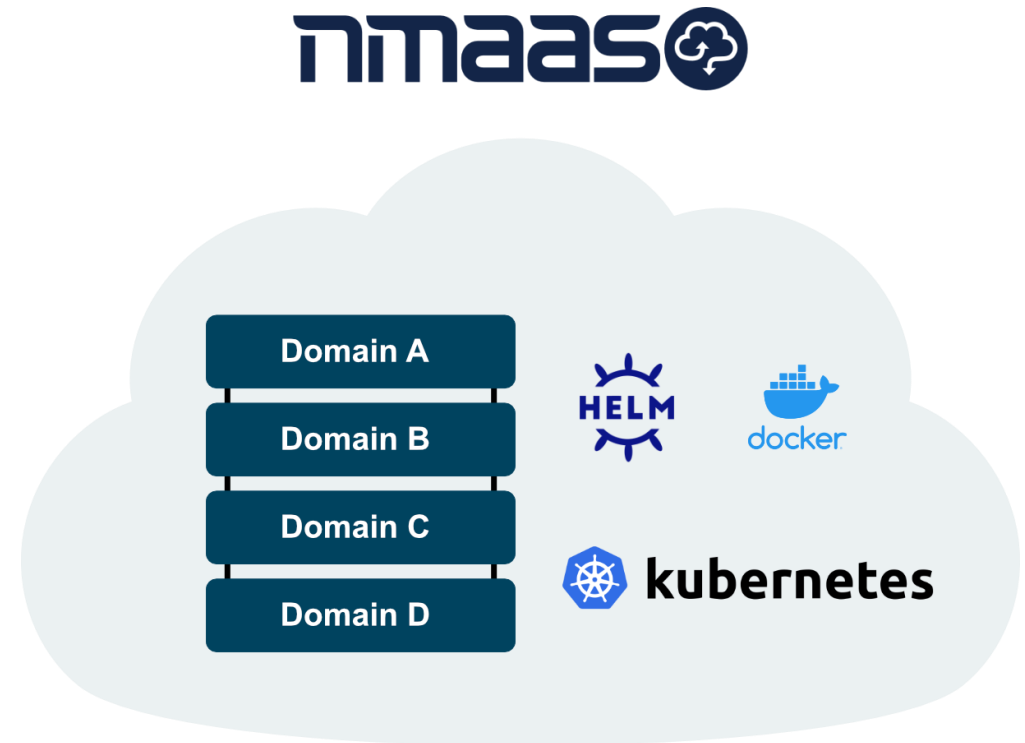
Agenda

- nmaas as a general-purpose orchestration platform
- vNOC use-case
- vLAB use-case
- Federations use-case
- Ongoing activities and plans for the future

Introduction to nmaas

nmaas is an open-source platform for orchestrated on-demand deployment of applications in a cloud environment

- Kubernetes-based infrastructure
- Multi-tenant architecture
- Simple application deployment and upgrade process
- Wide and easily extendable portfolio of applications
- GitOps approach for application instance configuration management
- Easy troubleshooting via integrated log viewing
- eduGAIN login support



Source code available at <https://gitlab.software.geant.org/nmaas>

nmaas Flavors and Existing Use-Cases

- Versatility of nmaas as an open-source orchestration platform
- Support for multiple use-cases by providing relevant software features and deployable applications
- Currently supported use-cases on top a common code base
 - **nmaas for Virtual NOC** (originally referred to as NMaaS - Network Management as a Service)
 - **nmaas for Virtual Lab** (use-case for online hands-on exercises in an education context)





<https://vnoc.nmaas.eu>

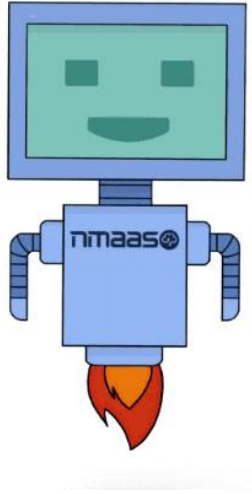


<https://vlab.dev.nmaas.eu>

Rebranding

- Completed in 2024

NMaaS  → nmaas 




VirtualNOC

Run your network monitoring application stack in the cloud with the nmaas Platform

Get started

What is Virtual NOC?

Today's network services are complex with heterogeneous infrastructures and increasing number of value added services and features. Services are becoming increasingly mission-critical for end users and the need to provide an integrated view of network and service management is becoming vital. The cost and complexity of developing and integrating in-house network management may be too high for many NREs and institutions.



VirtualLab

Organization of online hands-on exercises made easy with the nmaas Platform

Read the Docs

Alternatively, organize a pilot on the managed instance by issuing an

Access Request

What is Virtual Lab?





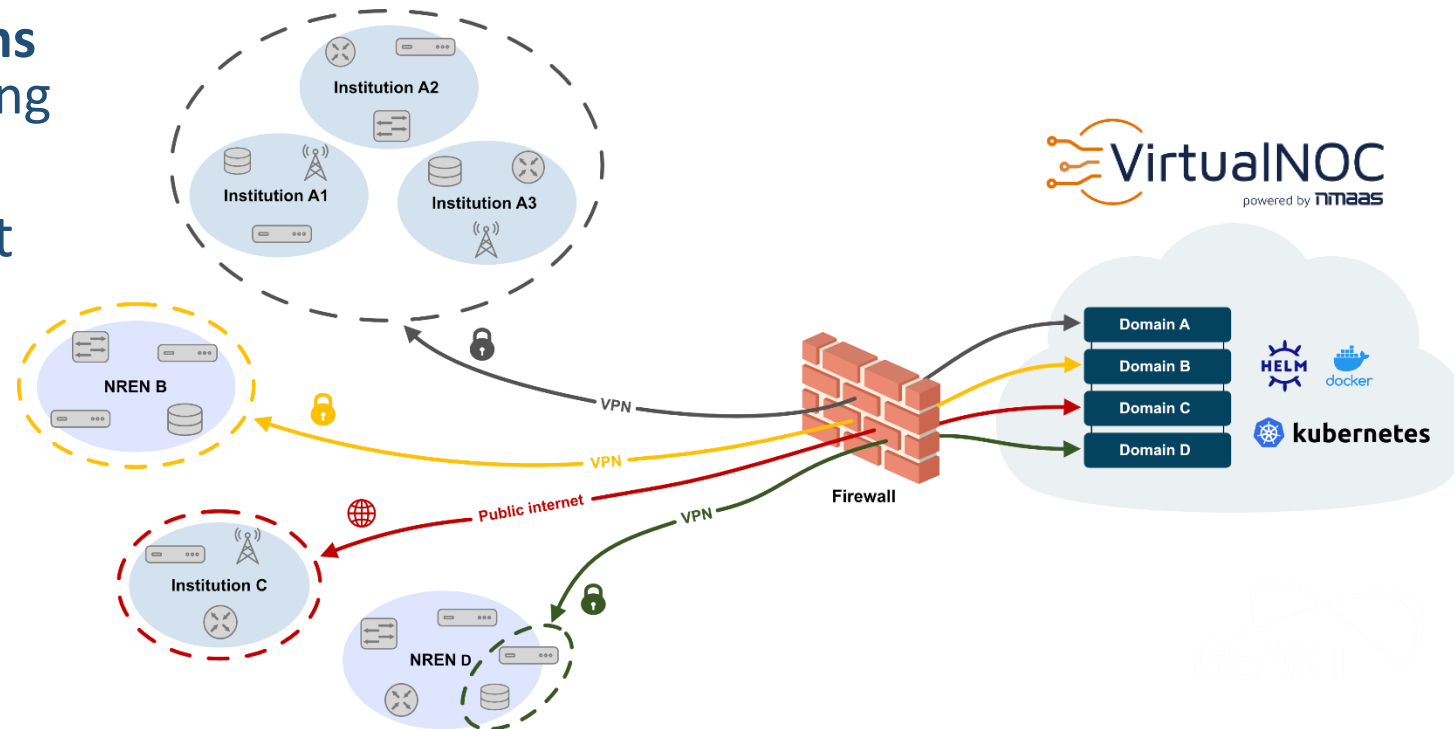
nmaas for Virtual NOC (vNOC)

Run your network monitoring application stack in the cloud

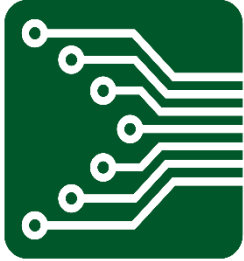

















nmaas for Virtual NOC



- Production service with dedicated team support
- Target groups
 - **NRENs or end institutions** with limited capacity for in-house network management
 - Universities, high schools, primary schools
 - International **research projects** with (distributed) hardware resources
 - **Development/infrastructure teams** requiring external health monitoring and alerting for their applications
- Application catalog containing most popular network management applications
- Continuous improvement



vNOC Success Stories

 <p>IrelandQCI</p>				
<p>IRELANDQCI</p> <ul style="list-style-type: none"> • National project • Distributed team  	<p>PSNC projects</p> <ul style="list-style-type: none"> • Distributed laboratory Infrastructure • Software services monitoring and database backups  	<p>GP4L</p> <ul style="list-style-type: none"> • Global testbed • Automation of user access   	<p>perfSONAR</p> <ul style="list-style-type: none"> • Public statistics dashboard • stats.perfsonar.net 	<p>Others</p> <ul style="list-style-type: none"> • 20+ domains     

New vNOC infrastructure

- Ongoing migration to a more performant infrastructure for the vNOC use-case
- nmaas.eu --> **vnoc.nmaas.eu**
- Benefits:
 - **Self-service client-access VPN** portal based on eduVPN and eduGAIN authentication
 - **Better** compute and storage **performance**
 - New network architecture for better isolation and **IPv6 support**
 - Revamped federated sign-in and sign-up experience using **OpenID Connect** instead of SAML





Virtual Labs Deployment with nmaas

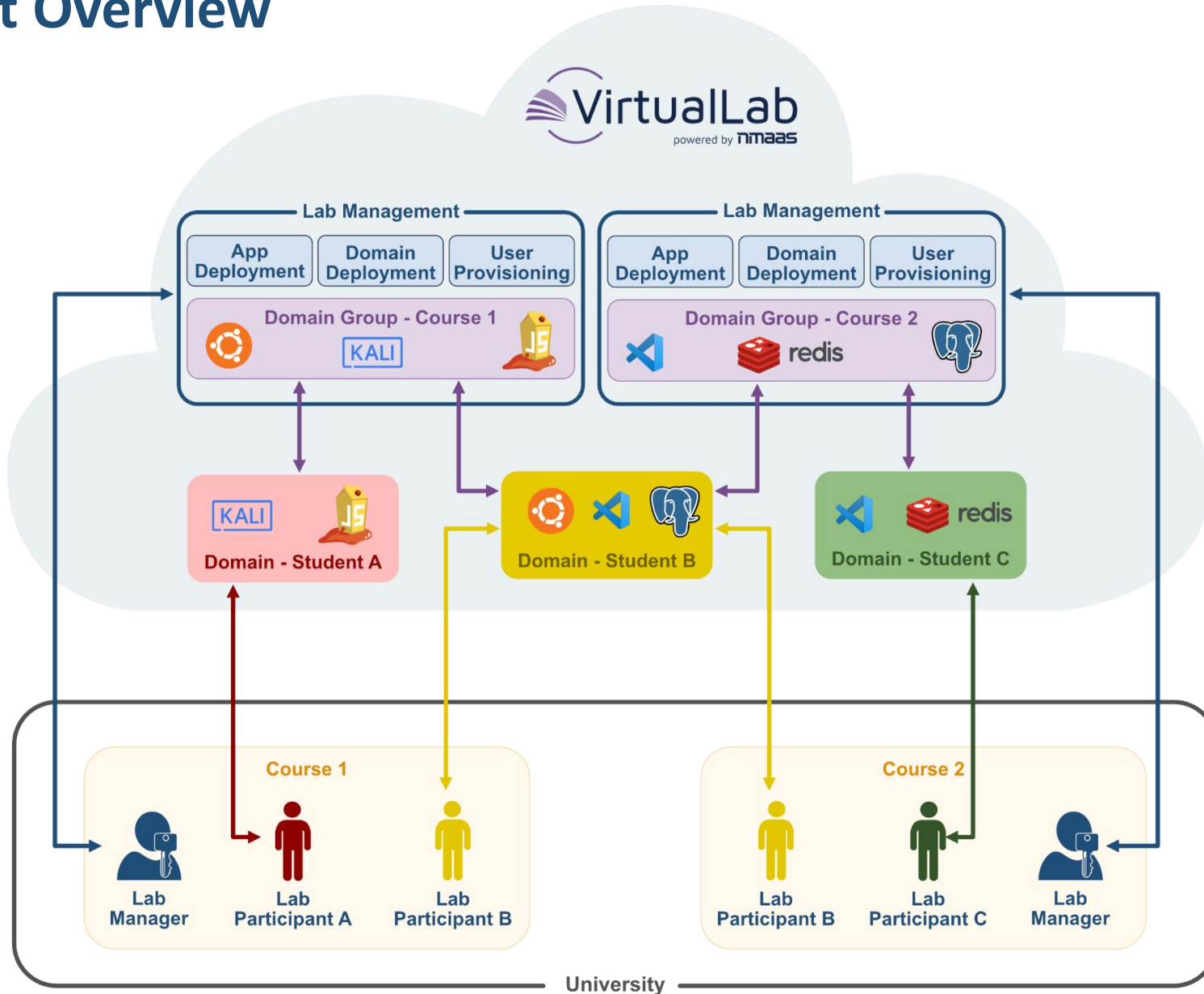
Organization of online hands-on exercises made easy

nmaas vLAB in a Nutshell

- The challenge of organizing hands-on educational exercises
 - Formal learning
 - Informal learning
- nmaas as a general-purpose orchestrator for various applications
- Core idea: Deployment of educational exercises not fundamentally different from network management applications
 - Same underlying concept and technologies
 - Containerization, orchestration, isolation, multi-tenancy



vLAB Concept Overview



Recent Improvements to vLAB



Improved bulk application deployment with introduction of advanced scheduling



More flexible bulk user on-boarding process supporting local and federated accounts



General improvements to vLAB specific features

Multiple domain group managers in a single domain group

Better user experience (progress bars, caching, dialogs)

vLAB Pilots and Presentations

- 3 pilots with around 80 students in total
 - 2 pilots at UKIM (Ss. Cyril and Methodius University, Skopje)
 - Ethical Hacking and IT Service Management courses
 - 1 pilot at NTUA (National Technical University of Athens)
 - Network Management course
- Full-fledged hands-on vLAB tutorial, part of the JRES 2024 conference - <https://docs.nmaas.eu/tutorials-workshops/jres2024/introduction/>
- Walkthrough videos: <https://docs.nmaas.eu/nmaas-presentations/#jres-2024>



OTRS





nmaas Federation Use-Case

Sneak Peak at a new Use-Case: nmaas Federations

- New use-case, under active development
- **Core idea:** a central nmaas instance manages distributed Kubernetes clusters
- Remote Kubernetes cluster(s) associated with existing nmaas domains
- Solves the problem of managing many diverse environments
- nmaas catalog applications deployable on any of the on-boarded clusters
- Can be used in tandem with vNOC or vLAB
- All features to be part of the base software, which is open-source



nmaas Federations: Added Value

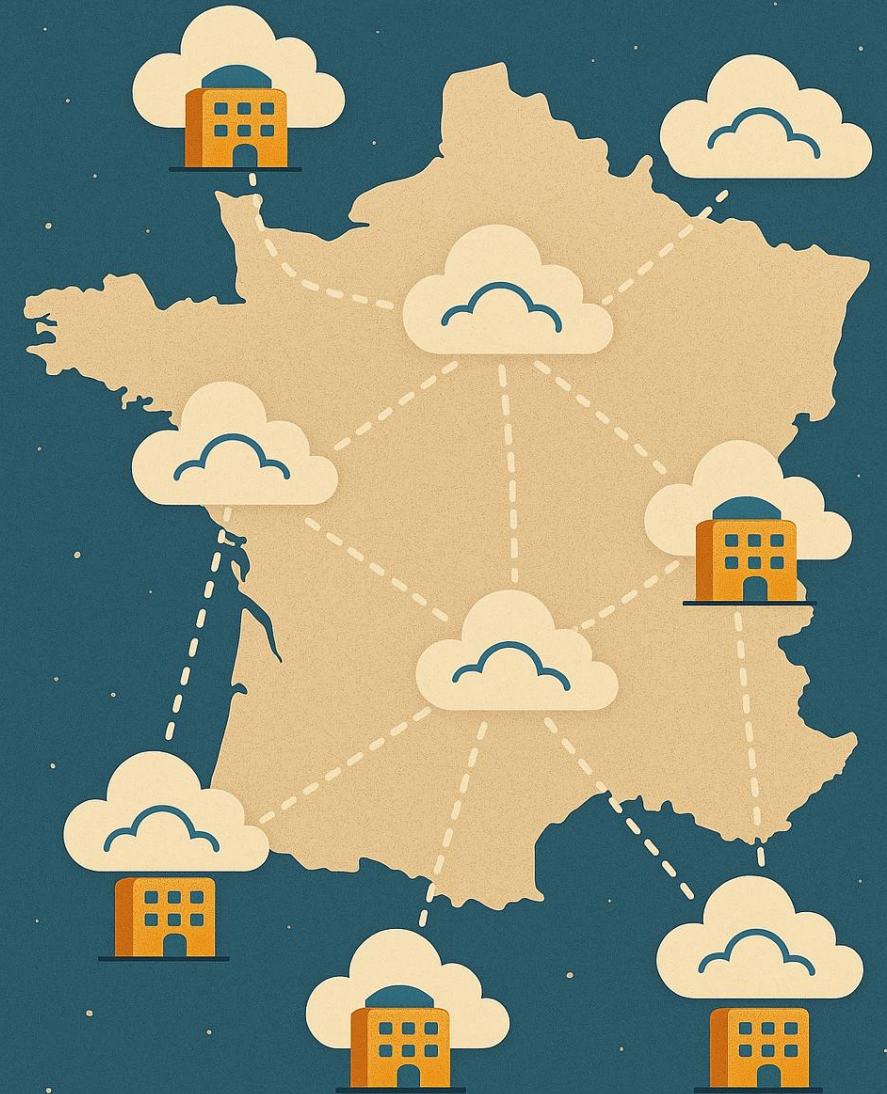


- All data is stored locally in the on-premise Kubernetes cluster(s) ensuring regulatory compliance and data privacy
- **Eliminates** the need for **complex site-to-site connectivity** and routing from the customer infrastructure to nmaas and vice versa
 - All applications run locally, within the customer's network
- Flexibility to **choose client-access strategy** for the deployed applications
- **Abstracts away Kubernetes** complexity while still reaping its benefits
 - Goal is to not require Kubernetes knowledge for adding a Kubernetes cluster node to nmaas
- On-board existing Kubernetes clusters to nmaas without impacting existing workloads
 - **BYOI – Bring your own Infrastructure** for vLAB or vNOC use-cases



nmaas Federations in Practice

- RENATER as a “use-case sponsor”
- Kubernetes clusters deployed in multiple Points of Presence (PoPs) within France
- Monitoring tools deployed from a single nmaas instance
- Reducing configuration drift and environment entropy, ensuring consistent configuration and easy lifecycle management
- Looking into ways for unattended Kubernetes deployment and on-boarding





On-going activities and plans for the future

On-going Activities and Plans for the Future (1)

- Finalisation of **release 1.7.0**
 - Full **OpenID Connect (OIDC) support**
 - Migration from SAML to OpenID Connect
 - Seamless transition with an in-place migration of existing accounts
 - Improvements to bulk domain creation and application deployment
 - Major Java and Spring Boot upgrade
- Implementation of features required by the **Federations use-case**
 - Multiple Kubernetes cluster management
 - User application deployment in federated environment
- **Webhooks support**
 - Integration with external systems
 - Allows for more complex workflows for user provisioning and environment setup



On-going Activities and Plans for the Future (2)

- Layout redesign
 - Visual refresh of the nmaas user interface
 - Introduction of user and admin dashboards
 - Dark mode

The image displays two versions of the nmaas user interface. On the left is the current interface, and on the right is the proposed redesign, with a blue arrow indicating the transition.

Current Interface (Left):

- Navigation: Applications, Subscriptions, Instances
- Domain: GLOBAL | Advanced | Send notification | admin
- Search bar, Tags: all, Sort: Name
- Grid of application cards:
 - Adminer: Web Database Management
 - Apache Airflow: Platform to author, schedule, and monitor workflows
 - Bastion: Bastion server based on Ubuntu OS
 - Booked: Web-based calendar and schedule
 - changedetectionio: Web Site Change Detection, Rostock monitoring and notifications
 - CodiMD: Collaborative Markdown Editor
 - GP4L Orchestrator: GP4L Camunda-based Orchestrator + Uptime Kuma
 - Grafana: Open source analytics & monitoring solution for every database
 - Healthchecks: A cron monitoring tool
 - Icinga2: Scalable and extensible monitoring system
 - InfluxDB: Time series database
 - Jenkins: Leading open-source automation server

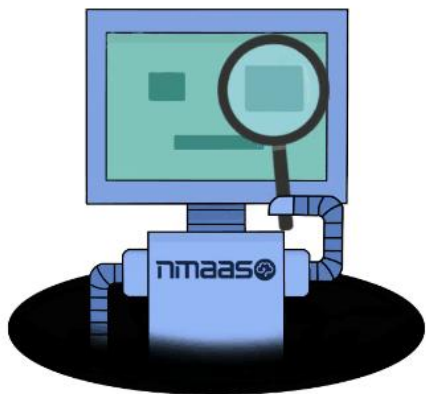
Proposed Redesign (Right):

- Navigation: Applications, Instances
- Domain: GLOBAL
- Search bar, Tags: all, Sort: Name, Show subscribed only
- Grid of application cards:
 - Grafana: Open source analytics & monitoring solution for every database
 - Healthchecks: A cron monitoring tool
 - PostgreSQL: PostgreSQL is a popular, open-source, database management system
 - Prometheus: Monitoring system & time series database
 - Uptime Kuma: Self-hosted monitoring tool like "Uptime Robot"
 - Zabbix: Enterprise-class monitoring solution for networks and applications
 - Netbox: Infrastructure resource modeling application
 - Oxidized: Network device configuration backup tool
 - Maat: A single source of truth for network resources/ services

Footer: GEANT logo, "Co-funded by the European Union", and links for Documentation, Privacy Notice, Contact, and Acceptable Use Policy.

Promotion

- Improved documentation and increased social media presence
 - Discord server
 - General discussion, announcements, troubleshooting, and help
 - LinkedIn nmaas user group
 - nmaas related news, events, blog posts
 - Blog posts - <https://docs.nmaas.eu/blog/>
 - Featuring new catalog applications and tutorials





Thank You

Documentation
Contact the nmaas team

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www.geant.org



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