



Global Network Advancement Group

Welcome to the **GNA-G Community Side Meeting**

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Tue, 6 June 2022: 8:30am - 10:30am CEST

TNC23 Side Meeting, Tirana, Albania



1. Opening & Welcome

Agenda



- | | | |
|---|-----------|-------------|
| 1. Opening & intro | | 8.30-8.35 |
| 2. Welcome from the GÉANT CEO, Erik Huizer | 8.35-8.50 | |
| 3. Since we last met: GNA-G strategy & objectives | | 8.50-9.20 |
| 4. Innovations corner: | | 9.20-9.50 |
| 1. P4 global testbed and RARE - Frederic Loui | | |
| 2. Virtual Routing @GXPs - Alexander Van Den Hil | | |
| 5. Operations corner: | | 9.50-10.20 |
| 1. Advancement of GREN Engineering - Pieter de Boer | | |
| 2. Securing the GREN - David Wilde | | |
| 6. Summary & close | | 10.20-10.30 |



3. Discussion: GNA-G strategy & objectives

Communicate, Contribute, Collaborate

Global Network Advancement Group

Motivation:

- Gathers experts worldwide around topics of their interest
- Provides a platform to:
 - **Communicate:** share information, experience, knowledge
 - **Contribute:** establish working groups around immediate opportunities
 - **Collaborate:** establish peer-liaison around common goals and initiatives
- Organising periodic community meetings
- Creates knowledge base of (document, code...) repositories

Communicate, Contribute, Collaborate

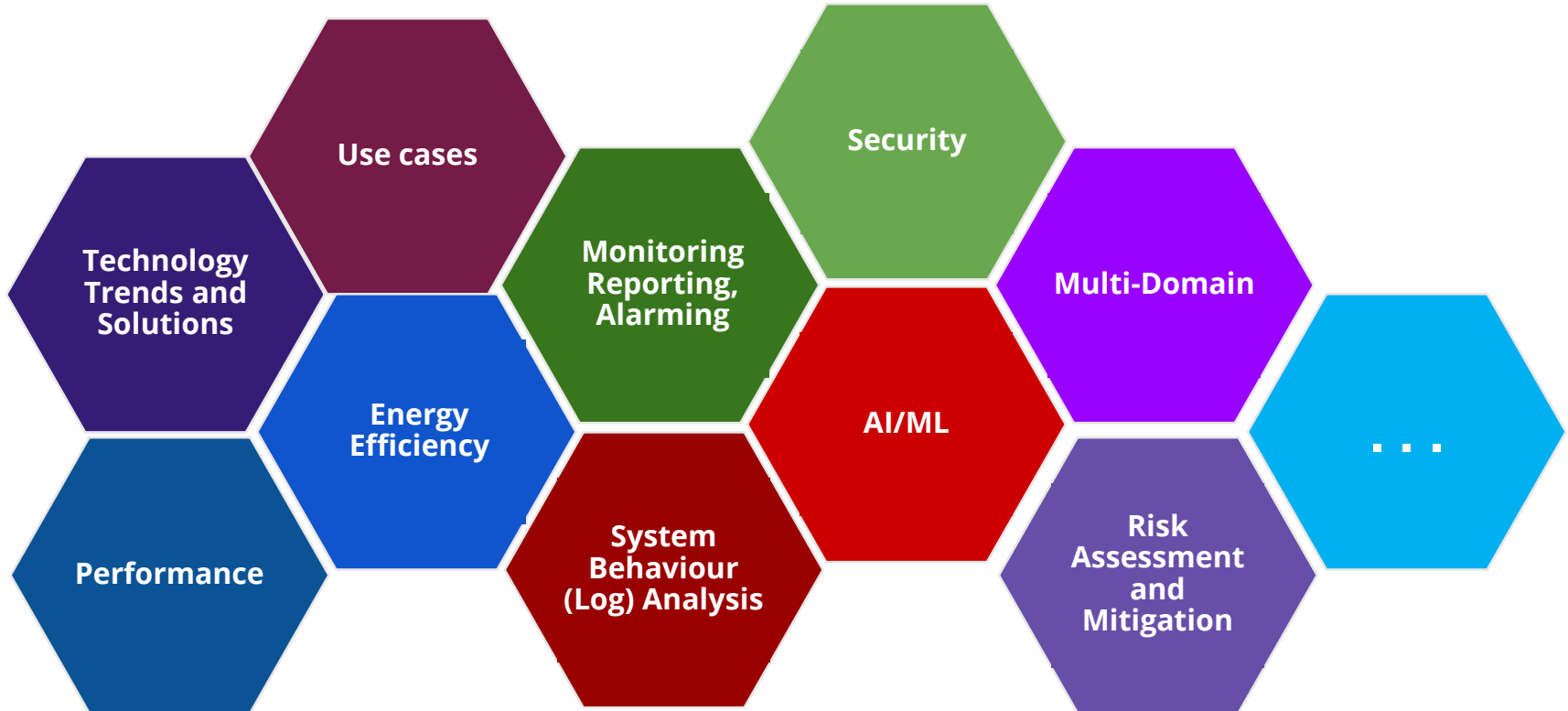


Communicate
Contribute
Collaborate

Knowledge sharing
Prototyping
Proof of concept
Testbeds
Deployment
Shared operations
Shared services
...

Technologies, Trends and Solutions
Use cases
Risk Assessment and Mitigation
Security
Performance
Monitoring Reporting, Alarming
System Behaviour (Log) Analysis
Multi-Domain
AI/ML
Energy Efficiency
...

GNA-G Topics



GNA-G strategy



Consists of:

1. Vision
2. Mission
3. Strategic objectives
4. Strategic initiatives & roadmap

We have 1-2 and elements of 3...

but need 4 to be more clearly articulated and delivered.

GNA-G: Vision



The Global Network Advancement Group (GNA-G) embodies a vision for the international collaboration of national research and education (R&E) networks. The set of networks that comprise the Global R&E infrastructure is large and diverse. There are differences in speed, accessibility and capacity. Building on the work of groups like the GNA and GLIF the GNA-G was started to continue the work of making the interconnection of these networks more effective for science and providing a model for the more effective use of resources in building these networks. By working together the NRENs of the world can both provide better services and agree to a blueprint which will enable R&E networks to align their spending for intercontinental bandwidth.

A shorter version...



Our vision: a unified global advanced network infrastructure to support the unique needs of research and education.

GNA-G: Mission



The primary mission of the Global Network Advancement Group (GNA-G) is to support global research and education using the technology, infrastructures and investments of its participants.

Research and Education within the academic community encompasses a wide range of disciplines and activities, from intellectual thought experiments to highly data driven projects. While all of these global activities use networks, these needs are the focus of the GNA-G.

In order for these data intensive collaborations to flourish, on a global scale, they require an effective means of moving, accessing and sharing, ever increasing amounts of data.

The GNA-G exists to bring together researchers, National Research and Education Networks (NRENs), Global eXchange Point (GXP) operators, regionals and other R&E providers, in developing a common global infrastructure for support of these needs.

This worldwide collaboration is built on Dependency, Democracy and Diversity. The global NREN community all depend upon one another, they all need to share in the decision processes related to network structure and use, and they all need to recognize the diverse nature of these organizations and not try to fit one model to everyone, while we ensure to always maximize results instead of looking for lowest common denominators.

To achieve these goals, the GNA-G:

- Works closely together with R&E groups to advance worldwide data movement capabilities;
- Has Working Groups to fulfil our mission;
- Develops architectures for highly advanced intelligent networks;
- Provides strategies and best current practices for NRENs to collaboratively work on procurements of capacity for global interconnections, helping to add to the Global Research and Education Network (GREN) infrastructure;
- Works with national and global groups dedicated to making the end-to-end experience better;
- Works to promote the general understanding of the reach and connectedness of the Global NREN community.

Again, a slightly shorter version...



The GNA-G:

- embodies a vision for international collaboration of the global research and education (R&E) networks

The Global R&E network:

- a large and diverse set of networks with differences in speed, accessibility, and capacity

GNA-G's purpose:

- to build on the work of GNA and GLIF to make interconnection of networks more effective for data-intensive research and education

Goals:

- Develop innovative architectures, services, and models for more effective use of GREN resources;
- Provide testbed resources for the demonstration of future capabilities;
- Agree on a blueprint for aligning equitable spending on intercontinental bandwidth for greatest value;
- Advance data movement capabilities and end-to-end experience;
- Provide a forum which brings together researchers, National Research and Education Networks (NRENs), Global eXchange Point (GXP) operators, regional and other R&E providers;
- Promote awareness of the capability, reach and connectedness of the Global R&E Network.

Some questions to reflect on



Can we clearly articulate the unique value of the GREN?

- How is it better than the commercial internet?
- How much is appropriate for each participating org to invest in it? What happens if we don't invest?
- How can we assist less well resourced regions?
- Conversely, how can we ensure we're supporting key "big science" projects?

Revisit GNA goals: group procurement of capacity; global operational coordination

Revisit GLIF goals: collaborative forum; testbed for future capabilities

Set new goals: ensure that the GNA-G is playing a key role in facilitating and delivering advances to the GREN.

GNA-G - what is it?

Action-oriented
Working-Groups to
develop the GREN

A global network
testbed for innovation

A forum for discussion
between operators,
researchers and users
of the GREN

GNA-G - strategic pillars

GREN innovations

- Global test facility
- *eg SC demos; P4 testbed*
- Innovative network services
- Data movement

GREN operations

- Global network services
- Coordinated operations
- Automation, orchestration
- Monitoring, reporting, GREN map
- Secure GREN; MANRS

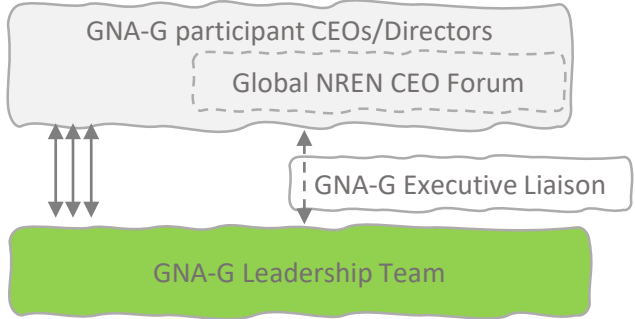
A forum for discussion.

Support for global big science & data intensive projects.

GNA-G structure



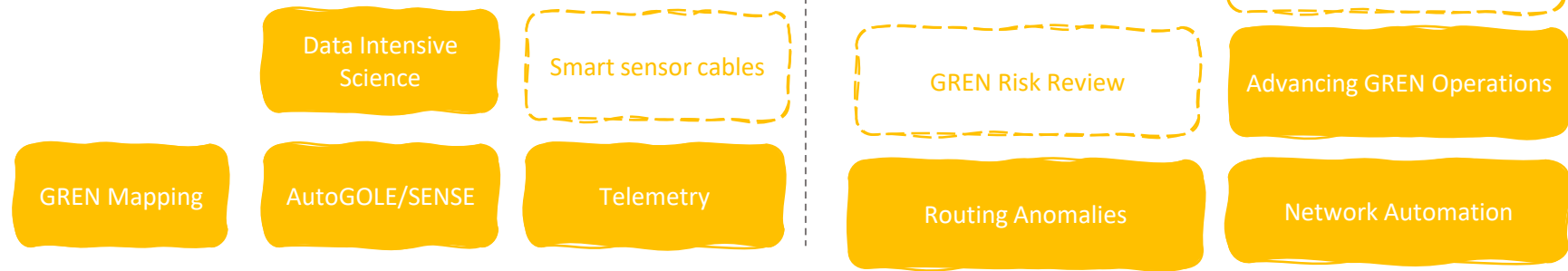
GNA Architecture v2.0



Research & Development



Operations



Proposed strategic objectives



“Advance the GREN”

1. Provide a forum to bring together researchers & network operators
2. Provide focused support for big science projects & data intensive research
3. Improve operational maturity of the GREN globally
4. Deliver innovative capabilities, services and testbeds
5. *Increase security maturity (planned)*
6. *Increase awareness of GNA-G (planned)*

Action: LT to work with WG chairs to ensure that

1. we have clearly identified outcomes, and
2. our WG initiatives and roadmaps are delivering these.

Question: GNA-G outreach



What other initiatives should we be coordinating with?

- FIRST, WISE, Trusted CI, REFEDS
- Geant groups: eg. Network Academy, SOC, NGN
- Internet2 & ESNet: eg. network automation; SENSE
- Network consortia: eg. APONet, ANA, AER/CAE-1
- Big science projects: eg. LHC, SKA
- eduroam
- MarComms
- Perfsonar
- ?

The past 12 months



- Review of previous meetings
- Summary of WGs – existing & new
- SC22
- LT changes, NomCom

The upcoming 12 months



- Proposed meetings
- WGs – proposed WGs, new ways of working
- SC23
- Security, Comms & engagement strategy

Questions?



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4. Innovation corner



4. Operations corner



8. Wrap-up

Discussions



- Trust as a basis for 3 infrastructures: community, network, identity federation, basis for services
- **Capacity planning for the overall GNA-G** - coordinating capacity planning
- GNA-G to set up and maintain a **knowledge base** for topics explored within GNA-G
- **Continuity planning, what ifs**
- **Vulnerability assessment**
- What can happen / what if something happens
- We are working as Friends - this is different from commercials, that differentiates us!
- **GREX Map helps** simulations and capacity **planning**
- Thanks to the collaboration and GNA-G, **inter-continental links** are jointly used for redundancy and resilience - **a system instead of collection of links**
- Space for advancement - procedures, tools, above “best-effort” network and operations

Discussions



- Advancement of GREN Engineering - not just operational but architectural work
- Useful to know how NRENs stand on implementing MANRS
- Useful to know - How secure we are as GRENS
- Community helping each others on implementing best practices like MANRS
- Two areas to work on - monitoring and actions
- Know your infrastructure well to protect it well
- Good practice from MANRS can be used

Next Meeting on Securing GREs



Mon 26/06 6-8am UTC

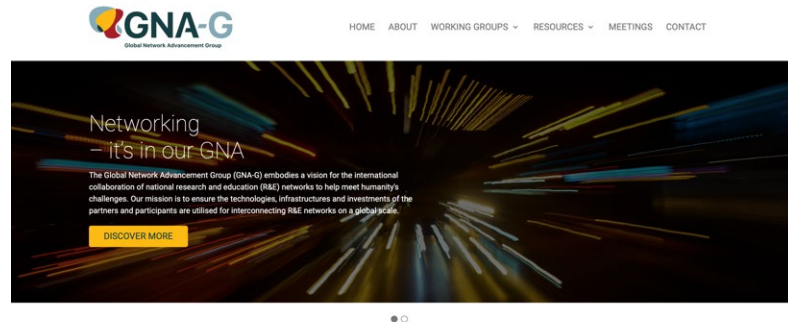
Tue 27/06 8-10pm UTC

Closure

Participate!

Visit our website:

<https://www.gna-g.net>



Chat on the GNA-G Community mailing-list: all@lists.gna-g.net

Join a working-group!



Thank you for participating!

Please mark your calendars

Our next Community VCs will be:

Wed, 18 January 2023: 6am - 8am UTC
Africa, and Europe

suits Asia, Australia, New Zealand,

Wed, 18 January 2023: 8pm - 10pm UTC
Africa, and Europe

suits North America, Latin America,



Additional slides

GNA-G Working Groups

- AutoGOLE/SENSE
- Data Intensive Science
- GREN Connecting Offshore Students - closed in Feb 2023
- GREN Map
- Network Automation
- GNA-G Routing WG
- GREN Engineering Advancement - NEW from Feb 2023
- NomCom

Proposed in Feb 2023:

- Subsea cable sensing and smart cables
- GREN vulnerability risk review

AutoGOLE/SENSE

- AutoGOLE = **A**utomated **G**lobal Lambda Integrated Facility (GLIF) **O**pen **L**ightpath **E**xchanges
- SENSE = Software-defined Network for End-to-end Networked Science
- Intelligent network services for Science Workflows
- Collaboration of open exchange points and R&E networks to deliver services end-to-end in a fully automated way using Network Service Interface Connection Service (NSI-CS)

Objectives :

- Delivering automated network (de)provisioning on the trans-Atlantic ANA fibre system
- Researching and Implementing of SENSE within the AutoGOLE networks, exchanges and end points
- Building a persistent infrastructure for science on top of dedicated connectivity, NSI and SENSE

WG Chairs: ESnet, KISTI, RNP, SURF

Data Intensive Science

- Collaboration between science and network communities on addressing the growing demand for network —integrated workflows, cross -institution data management, automation, resource management, etc.

Objectives :

- Share, deploy, develop tools and services, provide a forum to support science programs across network and science communities
- Looks for new tools and services, new modes of R&E network operations
- Moving towards (globally) federated infrastructures including networking, compute and storage

WG Chairs: Caltech, ESnet, AmLight/FIU

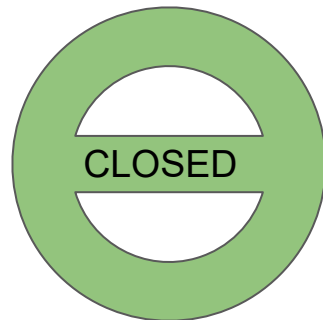
GREN Connecting Offshore Students

- GREN = Global Research and Education Network
- Investigate whether a collaborative international effort can deliver improvements in performance and/or lower costs for network connectivity to support teaching, learning and research for international users.

Objectives :

- Review delivery of services
- Investigate feasibility
- Identify performance improvements of capacity for connectivity and peering

WG Chairs: AARNet, Jisc, CANARIE



GREN Map

- Guiding the development of a unified system for visualizing the high-level connectivity of and participation in the community of R&E networks around the globe
- Achieving a dynamic visualization, without maintenance activities
- A joint development of a reference data model used also for other visualizations

Objectives :

- Provide dynamic visualization of the GREN that is perpetually up-to-date without requiring parallel data collection and maintenance activities

WG Chairs: CANARIE, GÉANT

Network Automation

- Develop a catalogue of tools to drive automation in network configuration, security auditing, change control activities and intra -domain automation activities
- Facilitate collaboration on common tools and practices

Objectives :

- Create a standardised glossary of network automation tools
- Create and maintain a catalogue of network automation tools
- Set up network automation training
- Identify a common set of network automation activities each NREN could re-use
- Identify common APIs that NRENs use
- Identify and agree on a common API set for communicating between NRENs

WG Chairs: AARNet, SURF

GNA-G Routing WG

- Optimal data routing, good performance, determined/expected data paths in single and multi domain networks -
- Engages network owners and NRENs to discuss and address ineffective routes and act proactively across community to systematically create policies to prevent ineffective routes

Objectives :

- **Engineering** – promoting and supporting advanced tools to identify and resolve routing issues
- **Collaboration** between network owners and operators to resolve network issues
- **Policy** – collaboration with higher-level networking operators to detail their routing policies and be able to check if the traffic follows the policy

WG Chairs: Indiana University, AARNet

GREN Engineering Advancement WG

- The aim of this workgroup pioneer, try, test, experiment with solutions to better/more efficiently/redundantly run services over links part of the GNA -G.

Objectives :

- **To enhance operation** on systems between production networks.
- Effective and efficient **multi-domain** service orchestration.
- Disseminate gather knowledge and work results.

WG Chairs: SURF

Nom Com

- NomCom = The Nominations Committee
- Differs from other working groups
- Gathers in November of every odd calendar year to nominate candidates to serve on the leadership team
- Consists of volunteers from the GNA -G community

Objectives :

- Elect members of the GNA-G Leadership team



Global Network Advancement Group

Thank you



Additional slides

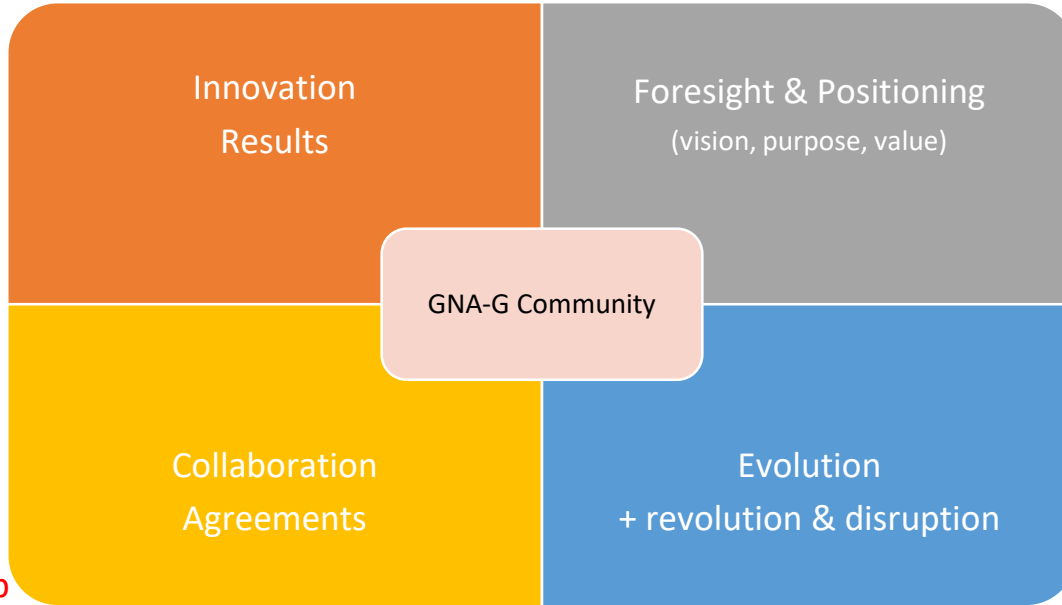
“The Learning Board”

How does GNA-G help the GREN?

How does GNA-G help the GREN?

External

Internal



How does GNA-G help my organization?

Short-term

Long-term

Proposal for structure

- Look at the four dimensions:
 - Where is GNA-G's strongest focus now?
 - Is this the right place for us?
- Try to do a SWOT for that quadrant