Quantum Internet Community Meetup

Ivana Golub, PSNC

Piotr Rydlichowski, PSNC

Vesna Manojlović, RIPE NCC

RIPE85

25 October 2022

Belgrade, Serbia

www.geant.org

DISCLAIMER

Quantum Training Material

- Quantum Flagship Training Material
- Quantum Technology Education
- Q-munity Tutorials
- Quantum Fundamentals
- …

Materials on Quantum Key Distribution, provided by the GÉANT Project:

- Quantum Technologies Status Overview White Paper
- Quantum Technologies - Principles, Challenges and Applications Infoshare
- QKD - Practical Implementations, Challenges, R&E Use Cases and Standardisation Outlook infoshare
- Quantum Key Distribution Simulation infoshare
- QKD, Physical Implementation and Testbed infoshare
- **Quantum Key Distribution Deployments infoshare - Nov 25, 2022**

Quantum Internet Community Meetup Agenda

- Quantum Technologies - Background
- Quantum Internet Activities in Europe
  - EU / EC
  - GÉANT
  - PSNC
- Quantum Internet Hackathon
- Discussion: Share Your Story

Quantum Technologies - background

Quantum Technologies

Allow for the manipulation and exploitation of effects described by quantum mechanics.

Currently in the process of **2nd quantum revolution**

Quantum mechanics effects are used to enhance the capabilities of current measurement, simulation, computation and communication technologies.

Nobel prize winner in physics in 2022

Alain Aspect, John F. Clauser and Anton Zeilinger

“for experiments with entangled photons, establishing the violation of Bell inequalities and pioneering quantum information science”

Winners of the 2023 Breakthrough Prize in Fundamental Physics

Charles H. Bennett, Gilles Brassard, David Deutsch and Peter Shor in the field of quantum information

Quantum Internet Activities in Europe

Quantum Manifesto EU document released in 2016

- Recognizes importance of quantum area for Europe
- Drafts schedule for the research and real life applications
- Foundation for future programs

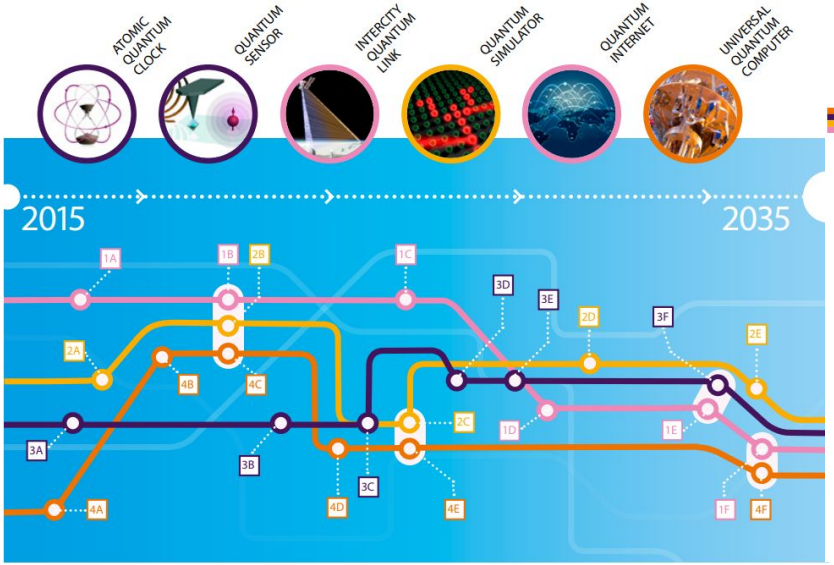
EU Quantum Projects started under The Digital Europe Programme (2021 – 2027):

- Quantum Flagship
- Quantum Key Distribution testbed (SU-ICT-04-2019)
- Quantum Internet Alliance
- Activities in ESA
- Quantum Communication Infrastructure (QCI)
- FPA consortia for quantum networks and quantum Internet

"The Digital Europe Programme (DIGITAL) is a new EU funding programme focused on bringing digital technology to businesses, citizens and public administrations."

Quantum Manifesto: Quantum Technologies Timeline

Quantum Technologies Timeline



1. Communication	2. Simulators	3. Sensors	4. Computers
0 – 5 years			
A Core technology of quantum repeaters	A Simulator of motion of electrons in materials	A Quantum sensors for niche applications (incl. gravity and magnetic sensors for health care, geosurvey and security)	A Operation of a logical qubit protected by error correction or topologically
B Secure point-to-point quantum links	B New algorithms for quantum simulators and networks	B More precise atomic clocks for synchronisation of future smart networks, incl. energy grids	B New algorithms for quantum computers
			C Small quantum processor executing technologically relevant algorithms
5 – 10 years			
C Quantum networks between distant cities	C Development and design of new complex materials	C Quantum sensors for larger volume applications including automotive, construction	D Solving chemistry and materials science problems with special purpose quantum computer > 100 physical qubit
D Quantum credit cards	D Versatile simulator of quantum magnetism and electricity	D Handheld quantum navigation devices	
> 10 years			
E Quantum repeaters with cryptography and eavesdropping detection	E Simulators of quantum dynamics and chemical reaction mechanisms to support drug design	E Gravity imaging devices based on gravity sensors	E Integration of quantum circuit and cryogenic classical control hardware
F Secure Europe-wide internet merging quantum and classical communication		F Integrate quantum sensors with consumer applications including mobile devices	F General purpose quantum computers exceed computational power of classical computers

https://qt.eu/app/uploads/2018/04/93056_Quantum-Manifesto_WEB.pdf

The Quantum Flagship

- Large-scale research and innovation initiative funded by the EC
- Started in October 2018 and will run for 10 years.
- Goals:
  - Consolidate and expand European scientific leadership and excellence
  - Kick-start a competitive European industry in Quantum Technologies
  - Make Europe a dynamic and attractive region for innovative research, business and investments in this field.
  - 25 projects on Quantum sensing, computers, communication, security, clock, processors, simulation, use cases…
- European funding opportunities for quantum technologies

The Quantum Internet Alliance (QIA)

> The Quantum Internet Alliance has started a seven-year program to build an innovative Quantum Internet ecosystem in Europe. The first phase has a budget of 24 million euros.

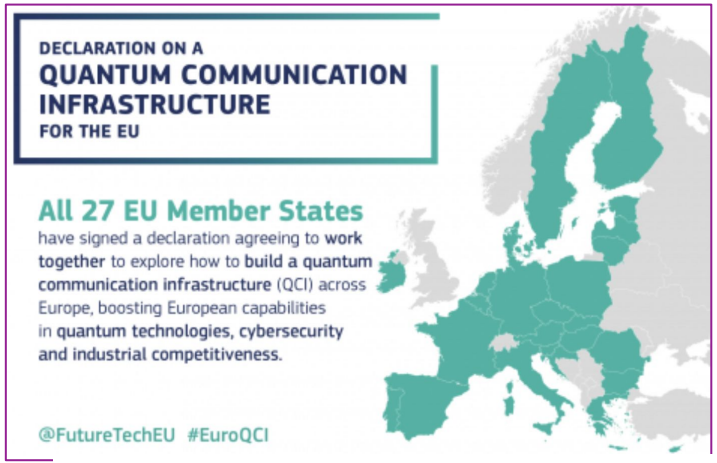
Source: https://qt.eu/about-quantum-flagship/newsroom/quantum-internet-alliance/

- Led by QuTech—a collaboration between the TU Delft and TNO
- Goal:
  - Develop a full-stack prototype network connecting distant cities
  - Connect users in two metropolitan areas, 100+ km apart.
- Project start: October 2022
- Duration: 3,5 years
- Budget of 24 million euros.

QUANTUM INTERNET ALLIANCE

The European Quantum Communication Infrastructure (EuroQCI) Initiative

The EuroQCI initiative **aims to build a secure quantum communication infrastructure** that will span the whole EU, including its overseas territories.
Since June 2019, **all 27 EU Member States have signed the European Quantum Communication Infrastructure (EuroQCI) Declaration**, signalling their commitment to the EuroQCI initiative.
The participating countries are working with the European Commission and the European Space Agency (ESA) to design, develop and deploy the EuroQCI. The aim is for it to be fully operational by 2027.



EuroQCI: Second call for proposals [open] >

General information

Programme
Connecting Europe Facility (CEF)

Call
European Quantum Communication Infrastructure - The EuroQCI initiative (CEF-DIG-2022-EUROQCI)

See budget overview

Type of action
CEF-INFRA CEF Infrastructure Projects

Type of MGA
CEF Action Grant Budget-Based [CEF-AG]

Open for submission

Deadline model	Opening date	Deadline date
single-stage	**12 October 2022**	**23 February 2023 17:00:00 Brussels time**

https://digital-strategy.ec.europa.eu/en/policies/european-quantum-communication-infrastructure-euroqci

Quantum Activities in the GÉANT Project

- GÉANT Environment
- GÉANT Project QKD Activities

More information:
https://geant.org/
https://wiki.geant.org/display/netdev/QKD

The GÉANT Project

GÉANT's vision is to ensure **equal** network **access for all scientists across Europe to** the research **infrastructures and** the **e-infrastructure resources** available to them.

A part of the European Union's Horizon 2020 research and innovation programme - GÉANT 2020 Framework Partnership Agreement (FPA)

500 contributors from 40 partners - European R&E Institutions

50 M users

GN4-3 duration: 1 Jan 2019 – 31 December 2022

The GÉANT Project Structure

WP2 Communications	WP3 Stakeholder engagement	WP4 Online services dev & delivery	WP5 T&I services evolution & dev	WP6 Network technologies & services dev	WP7 Net Core Infr & Core Service Evolution & Ops	WP8 Security	WP9 Operations Support
Task1 Communications Graphic Design	Task1 Partner Relations	Task1 Service delivery: platform	**Task1 T&I Services**	Task1 Net technology evolution	**Task1 Network Engineering & Implementation**	Task1 Business Continuity	**Task1 Operations Centre including CERT**
Task2 Services Marketing	Task2 Research Engagement	Task2 Service delivery: business desk	Task2 T&I Incubator	Task2 Net services evolution & dev	**Task2 Network Evolution & Future Planning**	Task2 Security Baselining	Task2 Software Governance and Support
Task3 Event Management	Task3 Intelligence Gathering	Task3 Service dev: video conferencing	**Task3 T&I Operational Support**	Task3 Monitoring & Management	**Task3 Implementation of the Fibre IRU Project**	Task3 Products and Services	**Task3 Service Management**
	Task4 Community Programme	Task4 Service dev: cloud offerings	Task4 T&I Enabling Communities				**Task4 GEANT Software Development and Operations**
		Task5 Service adoption support					

The GÉANT Project Structure

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		Task5 Service adoption support					

WP Leaders: **Tim Chown (Jisc), Ivana Golub (PSNC)**
WP6 budget: > 6,2 mil EUR
33 R&E organisations from 23 countries
88 team members

Quantum Key Distribution (QKD) Subtask

Network Technology Evolution (WP6 T1) Subtask

Objectives:

- Identify the R&E network community interest and needs
- Involve GÉANT and NREN community in the QKD technology.
- Establish a cooperation with commercial QKD vendors
- Make the NRENs ‘quantum aware’ and increase the ‘knowledge capital’
- Investigate QKD technology, solutions and use cases for the community

Participating organisations:

- CESNET, DFN, GÉANT, KIFU, PSNC, RENATER

Quantum Key Distribution Technologies and NRENs

Projects of interest to NRENs:

- Quantum Communication
- Quantum Metrology for the T&F signals transmission and activities
- Quantum Communication and Networks and its coexistence with existing networks
- Quantum Computing and its integration with quantum communication and classical HPC services

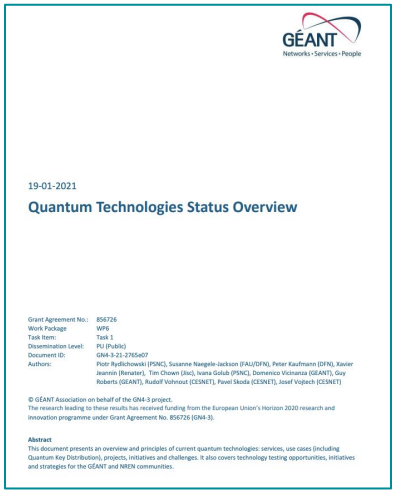
- Quantum communication is a base for the Quantum Internet Concept. Quantum Internet Proposed Research Group (QIRG) and Quantum Internet Alliance (QIA) have been launched and discuss about standardisation.

- Quantum Key Distribution (QKD) can be regarded as example of quantum communication and step toward more advanced quantum transmission schemes. QKD can be used for more than only encryption keys.

Quantum Activities in the QKD Subtask

Survey among EU NRENs on awareness and involvement in Quantum-related projects

- filled in by 70% NRENs
- 68% aware of QKD
- 21% participate in some Quantum-related project
- 61% welcome future training on QT


GÉANT
Networks · Services · People

19-01-2021

Quantum Technologies Status Overview

Grant Agreement No.: 856726
Work Package: WP6
Task Item: Task 1
Dissemination Level: PU (Public)
Document ID: GN4-3-21-2765e07
Authors: Piotr Rydlichowski (PSNC), Susanne Naegele-Jackson (FAU/DFN), Peter Kaufmann (DFN), Xavier Jeannin (Renater), Tim Chown (Jisc), Ivana Golub (PSNC), Domenico Vicinanza (GÉANT), Guy Roberts (GÉANT), Rudolf Vohnout (CESNET), Pavel Skoda (CESNET), Josef Vojtech (CESNET)

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The research leading to these results has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 856726 (GN4-3).

Abstract
This document presents an overview and principles of current quantum technologies: services, use cases (including Quantum Key Distribution), projects, initiatives and challenges. It also covers technology testing opportunities, initiatives and strategies for the GÉANT and NREN communities.

Activities:

- Quantum Technologies Status Overview White Paper
- Knowledge sharing - infoshares
- Quantum Simulators
- Long-haul PoC project
- Open Quantum Group Meeting
- Quantum Internet Hackathon 2022 co-organisation with RIPE NCC
- QKD Wiki

Quantum Technologies Status Overview White Paper

GÉANT
Networks • Services • People

19-01-2021

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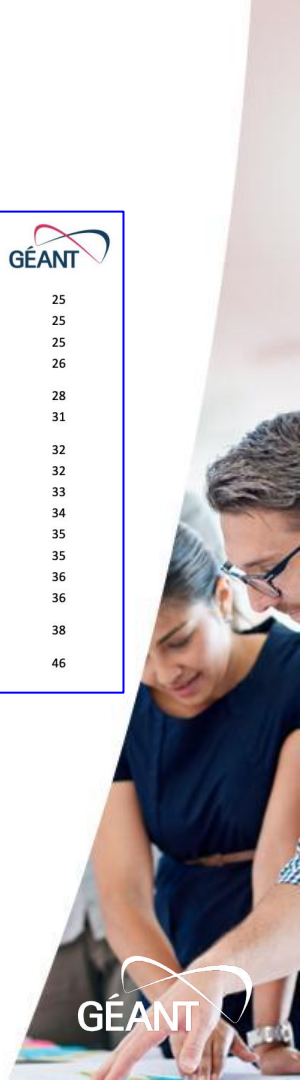
GÉANT



Dissemination Activities - GÉANT Infoshares

Previous infoshares (links with presentations and video recordings):

- Quantum Technologies - Principles, Challenges and Applications
- Quantum Key Distribution - Practical Implementations, Challenges, R&E Use Cases and Standardisation outlook
- Quantum Key Distribution (QKD) Simulation
- Quantum Key Distribution (QKD) Physical implementation and testbed

Forthcoming Infoshare: 25 November 13:30 - 16:00 CET

Quantum Key Distribution deployments

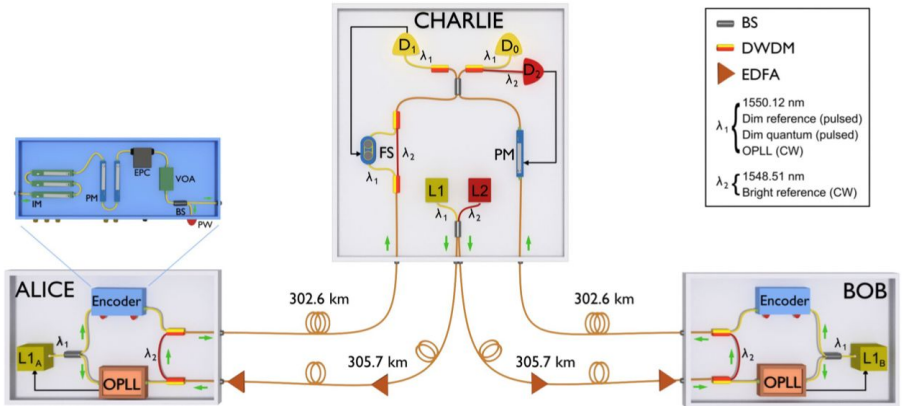
Registrations: https://events.geant.org/event/1304/

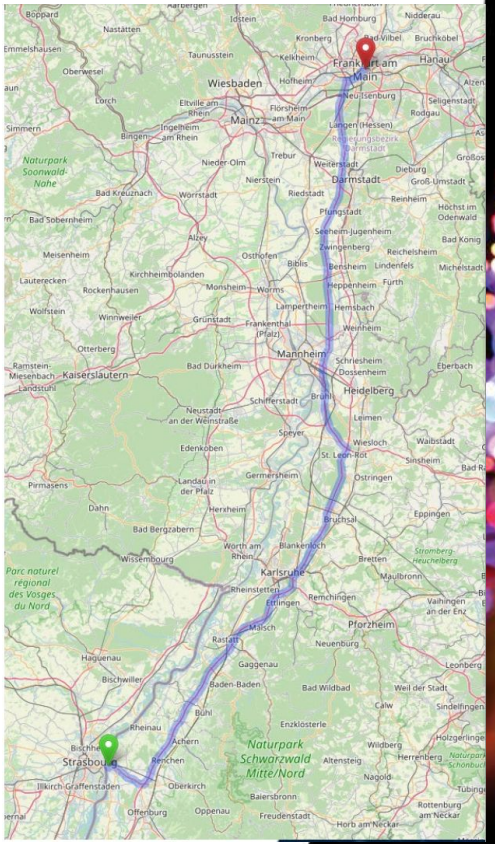
Quantum Simulators

- An overview provided in the Quantum Technologies Status Overview White Paper
- Two simulators tested
  - **QuISP** (Quantum Internet Simulation Package) - An open-source quantum network simulation package optimised for repeater/router software development focussing on optical layer.
  - **QKDNETSIM** (Quantum Key Distribution Network Simulation Module for NS-3) is targeting more the Quantum key distribution service by itself.
- Results presented at the infoshare:
  - Quantum Key Distribution (QKD) Simulation

Long-haul QKD proof-of-concept project

- A collaboration between the GÉANT GN4-3 project (WP6, WP7), OpenQKD and Toshiba
- Coordinator: GÉANT
- Between 2 GÉANT PoPs (254 Km)
  - Frankfurt - Strasbourg
- Based on a Twin Field Solution





Open Quantum Group Meeting

Open Quantum Group Meeting

join us

every 1st Friday at 14:00 CEST/CET

https://geant.zoom.us/j/4503592607?pwd=UkdRYWZkWlN6bE9SVGVjbktNYVY3dz09

Information- and knowledge sharing about Quantum Technology related work

Subscribe to:
quantum-discuss@lists.geant.org

Present your projects and their progress

Inform about important articles, upcoming events and project calls, etc …

Quantum Internet Hackathon 2022

1-2 December 2022

Amsterdam, Dublin, Padua, Poznan, Tashkent, Sarajevo - and online!

Initiated by RIPE NCC as a follow-up of QIH2019

10 participating organisations, including **PSNC and GÉANT**

6 places + online, including **PSNC in Poznan**

Goals:

- Sharing existing software and protocols, receiving feedback
- Developing new / improving existing software and tools
- Producing documentation and other materials
- Forging connections between participants and nodes
- Learning about Quantum Networking, monitoring and management

Participating Organisations

- GÉANT
- INHA University of Uzbekistan
- Poznan Supercomputing and Networking Center (PSNC)
- QuTech
- RIPE NCC
- SURF
- The Quantum Internet Alliance
- Trinity College Dublin
- University of Padova
- University of Sarajevo

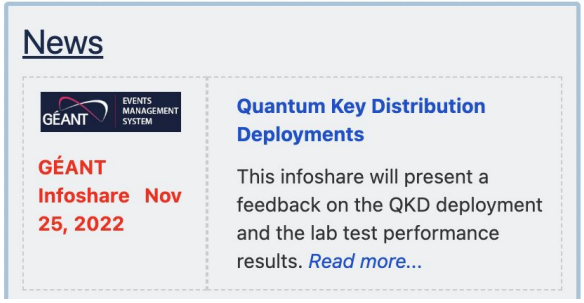
https://labs.ripe.net/author/karla-white/take-part-in-the-quantum-internet-hackathon-2022/

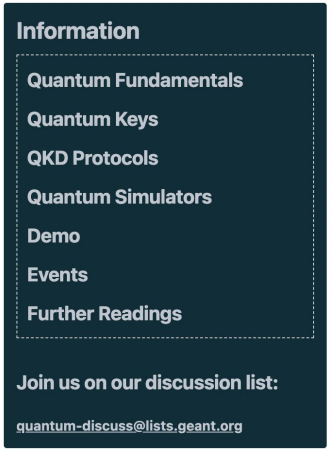
Collaborate

Quantum Key Distribution (QKD) Wiki

Gathering and presenting information about

- Quantum Technologies
- The results of the GÉANT project's QKD NETDEV subtask
- Upcoming events





More information:

https://wiki.geant.org/display/NETDEV/QKD

More about our work @ upcoming events

2022

- 10 November — NOG.HR Meetup
- 16-17 November — 17th SIG-NOC
- 23 November — GNA-G Community VC (6-8 am UTC & 8-10 pm UTC)
- 24 November — In-band Network Telemetry infoshare
- 25 November — Quantum Key Distribution deployments infoshare
- 28 November — Argus infoshare
- 1-2 December — Quantum Internet Hackathon
- 8 December — I2 TechEx:
  * Time and Frequency Services in NREN Networks
  * Monitoring the Hidden: TimeMap
  * Network Automation eAcademy

2023

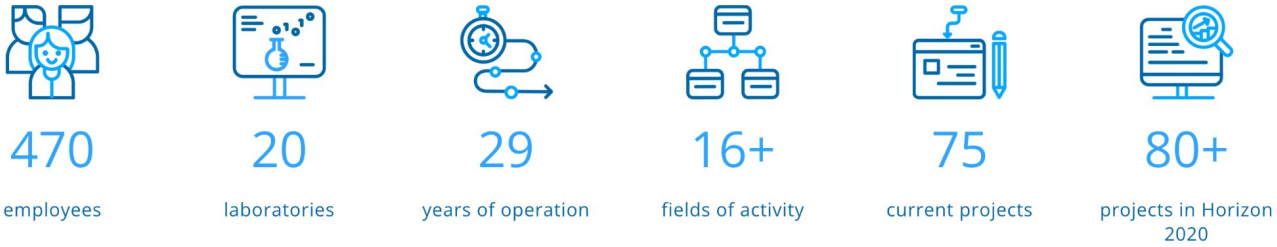
- 14 April — Celebrating The World Quantum Day

https://events.geant.org/

PSNC - Poznań Supercomputing and Networking Center

- PSNC Intro: psnc.pl
- Quantum Activities

PSNC in numbers



PSNC - Poznań Supercomputing and Networking Center

Center of e-Infrastructure

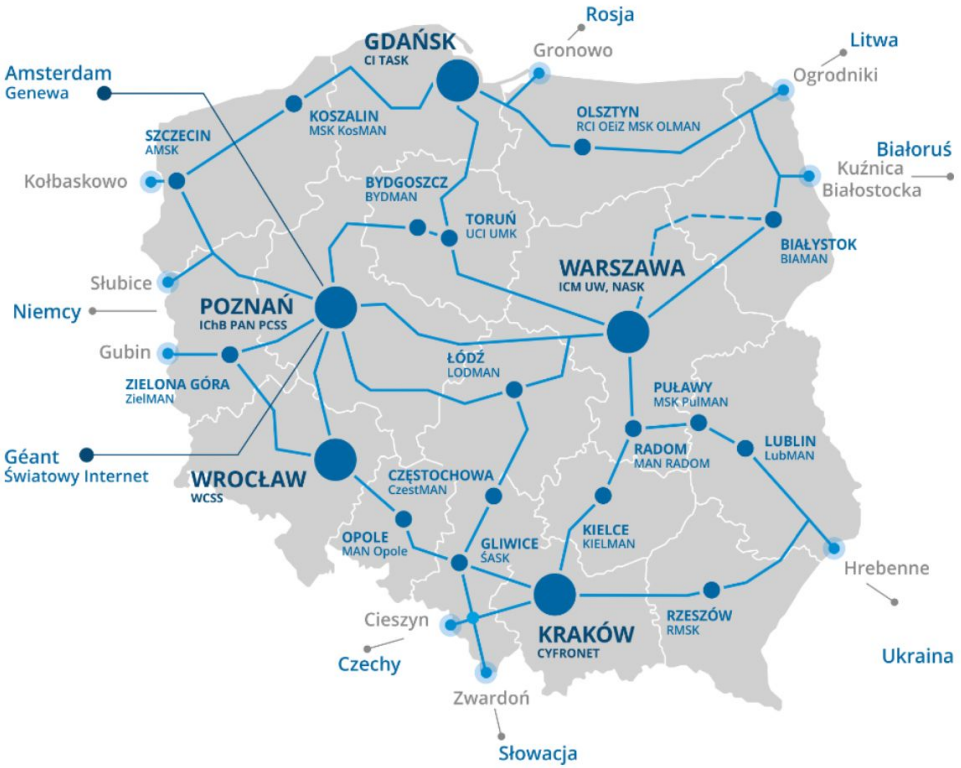
- National Research and Education Network PIONIER
- Research Metropolitan Area Network - POZMAN
- HPC Center
- Data repositories and Digital Libraries Federation

Center of Research & Development

- New Generation Networks
- HPC, Grids & Clouds
- Grand challenge applications
- New media and visualization technologies
- Knowledge Platforms
- Future Internet - Technology, Applications and Services for IS
- Cyber Security
- Quantum Communication and Computing – use cases and practical scenarios

Slides by P. Rydlichowski

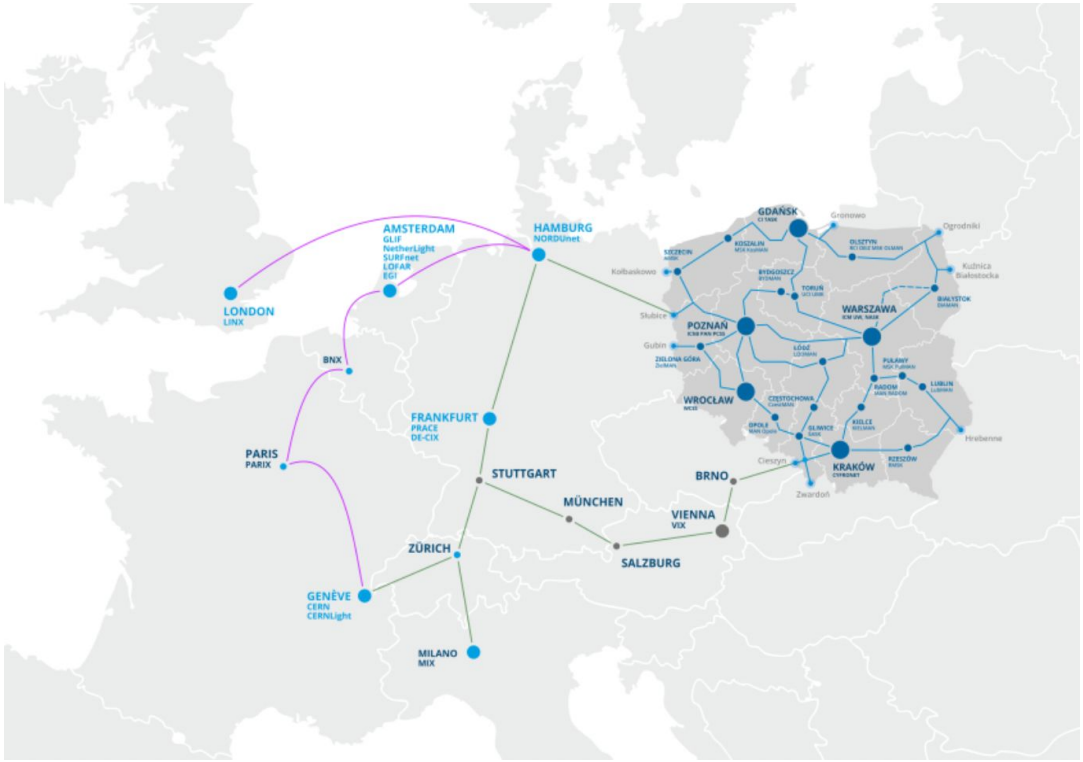
PSNC Network - PIONIER in Poland



Type of connected unit	Number of units
Research institutions	221
Universities	196
Post-secondary schools	21
High schools, secondary schools, primary schools and vocational schools	234
Healthcare	59
Public safety	27
Goverment administration	27
Provincial administration	59
District, municipality and city administration	73
Other administration	9
Court and public prosecutor's office	26
Cultural institutions	104
Other educational	27

~10 000 km of fiber in total

PIONIER Connectivity in Europe



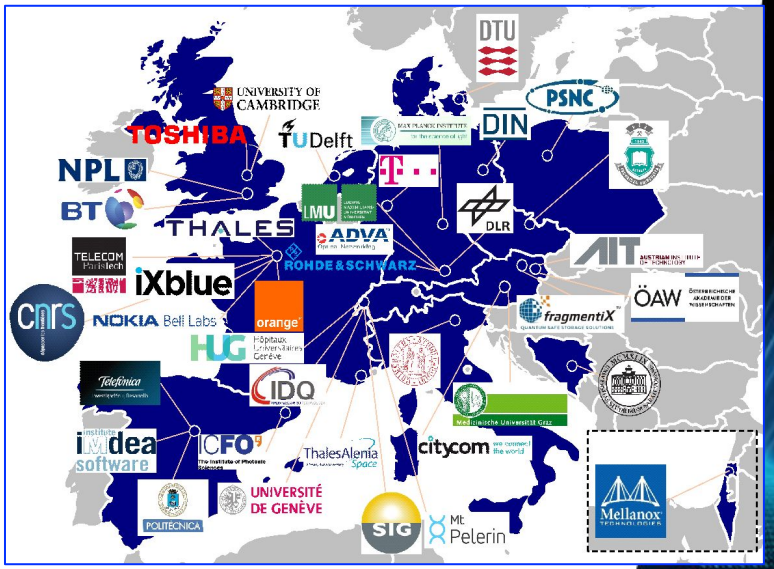
PSNC Quantum-Related Activities

- Quantum Computing
  - Focused on algorithms, uses cases and hardware evaluation
  - Participation in the EuroQCS project

- Quantum Communication Projects
  - OPENQKD (HORIZON2020)
  - NLPQT (NCBiR)
  - QUAPITAL
  - Quantum Internet Research Group QIRG (IETF)
  - GÉANT
  - EuroHPC Quantum Machine
  - QCI proposal for Poland

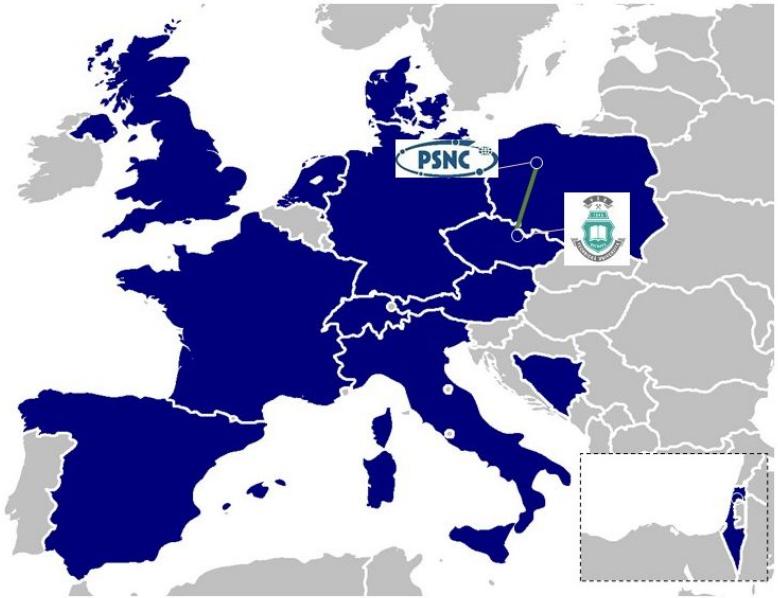
PSNC in the OpenQKD Project

- Construction of **QKD testbeds in Europe** and implementation of 40 different scenarios for services using QKD technology
- Project start: October 2019, 3 years
- **Poznań is one of the main testbeds**.
- Implementation and i**ntegration of QKD technology in the existing infrastructure** and services of the POZMAN and PIONIER networks.
- PSNC participates in works related to **standardisation** activities and IPR
- PSNC will develop **data management and analysis software**



OpenQKD Project Consortium

International QKD Link with CESNET



International link using Quantum Key Distribution technology on the Ostrava-Cieszyn route – a successful test of the new technology as part of the OPENQKD project

2021-08-17

QKD TESTBED – QKD equipment (OPENQKD)

TOSHIBA QKD system capable of quantum and classical signals co-propagation

NLPQT (NCBiR)

NLPQT - National Laboratory for Photonics and Quantum Technologies

NCBiR - The National Centre for Research and Development

Construction of metro QKD research and operational infrastructure, integration of QKD solutions

- QKD infrastructure (operational and R&D QKD devices, encoders and quantum random number generators)

Construction of the QKD Poznań - Warsaw link

- experiments related to quantum communication between University of Warsaw nodes and PSNC in Warsaw.
- Experiments related to sources and detectors of single photons
- Integration of the infrastructure with the optical carrier infrastructure
- Next generation QKD prototypes testing (based on entanglement)

NLPQT QKD TESTBED – QKD and QRNG equipment

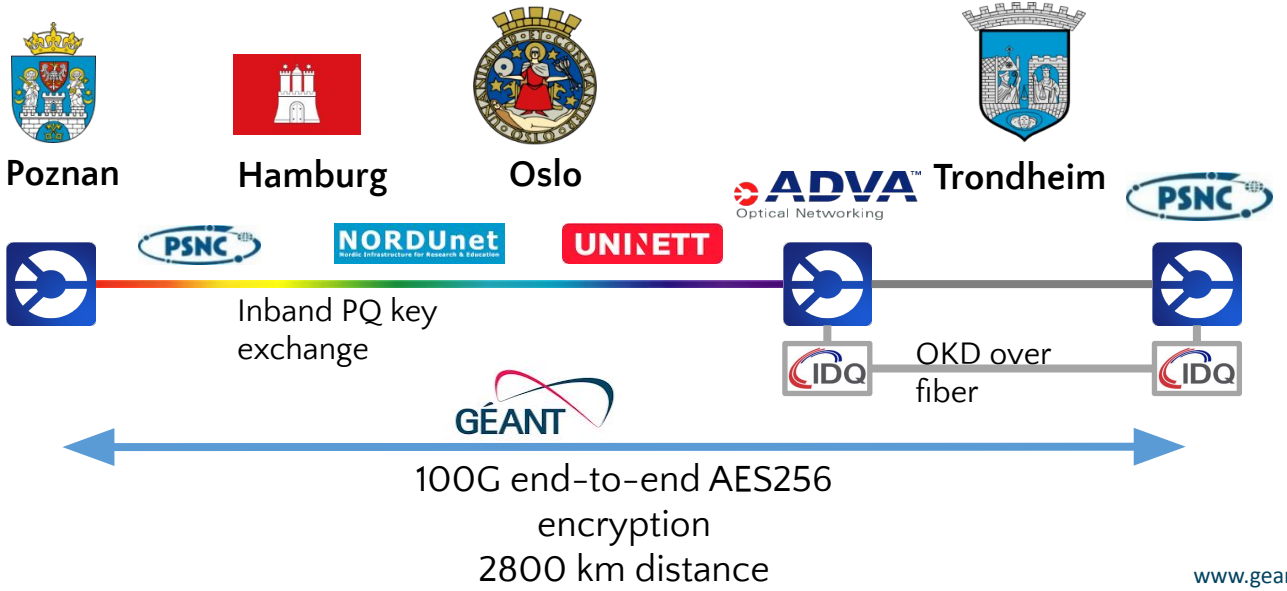
Quantum Key Distribution (QKD)

Quantum Random Number Generation (QRNG)

NREN Collaboration in a Quantum Communication Demo

TNC18, TNC21 presentation and demos, QIA, OPENQKD, QUAPITAL and EuroQCI

Post Quantum and QKD algorithms demo - TNC18 conference https://tnc18.geant.org/core/event/96.html

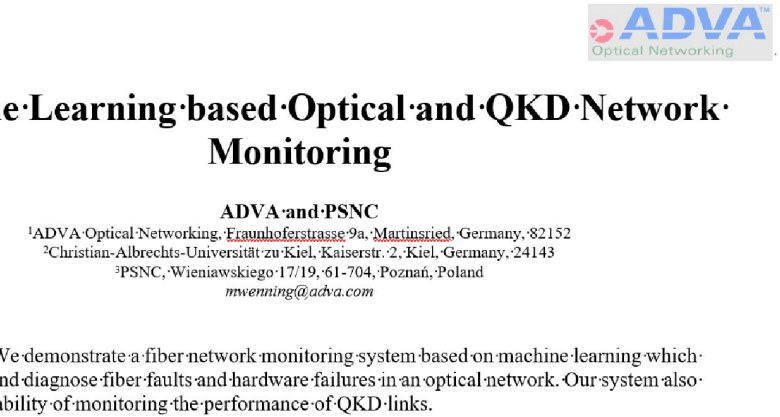


Live Demo at TNC21 and TNC22 conference – PSNC booth

KMS for Multi-vendor Interoperable QKDN

TNC 2021 Demo

ADVA, PSNC and IDQ



Machine·Learning·based·Optical·and·QKD·Network·Monitoring

ADVA·and·PSNC

[1]ADVA·Optical·Networking,·Fraunhoferstrasse·9a,·Martinsried,·Germany,·82152
[2]Christian-Albrechts-Universität·zu·Kiel,·Kaiserstr.·2,·Kiel,·Germany,·24143
[3]PSNC,·Wieniawskiego·17/19,·61-704,·Poznań,·Poland
mwenning@adva.com

Abstract: We demonstrate a fiber network monitoring system based on machine learning which can detect and diagnose fiber faults and hardware failures in an optical network. Our system also has the capability of monitoring the performance of QKD links.

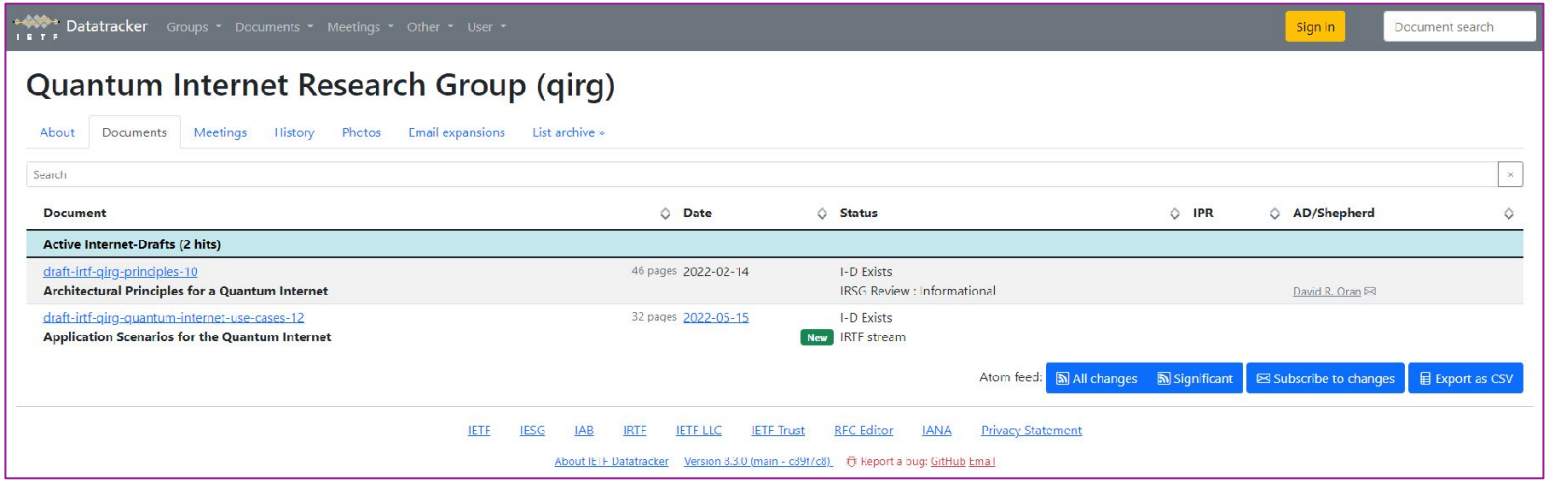
https://tnc21.geant.org/demonstrations/#c562

QUAPITAL

Building the first reliable Quantum Internet on top of Europe's glass fiber network

- **QUA**ntum **P**hotonic **I**ntercity **TrA**nsmission **L**attice (QUAPITAL)
- https://quapital.eu/
- Using the existing fibre infrastructure
- Led by Institut für Quantenoptik und Quanteninformation (IQOQI - Vienna)

Input for QIRG activities

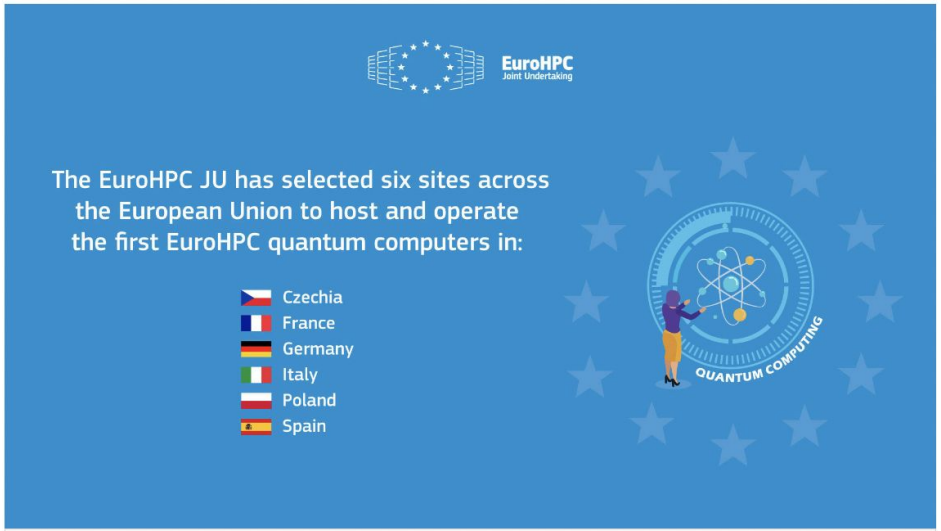


https://datatracker.ietf.org/rg/qirg/documents/

PSNC is Hosting a Quantum Machine as a part of EuroHPC

Selection of six sites to host the first European quantum computers

The European High Performance Computing Joint Undertaking (EuroHPC JU) has selected six sites across the European Union (EU) to host and operate the first EuroHPC quantum computers: Czechia, Germany, Spain, France, Italy, and Poland.



- R&D Purpose
- Available to EU users in scientific communities, industry and the public sector
- To help develop Q applications

https://eurohpc-ju.europa.eu/selection-six-sites-host-first-european-quantum-computers-2022-10-04_en

Quantum Internet Hackathon 2022

Vesna Manojlović, RIPE NCC

Quantum Internet Hackathon 2022

1-2 December 2022

Amsterdam, Dublin, Padua, Poznan, Tashkent, Sarajevo - and online!

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Goals:

- Sharing existing software and protocols, receiving feedback
- Developing new / improving existing software and tools
- Producing documentation and other materials
- Forging connections between participants and nodes
- Learning about Quantum Networking, monitoring and management

Participating Organisations

- GÉANT
- INHA University of Uzbekistan
- Poznan Supercomputing and Networking Center (PSNC)
- QuTech
- RIPE NCC
- SURF
- The Quantum Internet Alliance
- Trinity College Dublin
- University of Padova
- University of Sarajevo

https://labs.ripe.net/author/karla-white/take-part-in-the-quantum-internet-hackathon-2022/

QIH 2022 - Guidelines

All our hackathons are:

- Non-commercial; we are a not-for-profit organisation and have no monetary prizes
- All resulting software and tools are released under non-commercial licences
- Non-competitive; we prefer cooperation and teamwork

QIH 2022 - Challenge

The Hackathon Challenge

The goal of this hackathon is to develop some of the first applications that use quantum mechanics as a tool for communications, to catch a glimpse of the quantum Internet. An example of this kind of application is a browser that can load a web page over an encrypted HTTPS connection using a secret key generated by a quantum key distribution (QKD) protocol. Similarly, many other applications that need to encrypt their online traffic, such as e-mail or online messaging, can be integrated with QKD. Different protocols involving nodes of the network can be implemented, from quantum game theory to multi-party quantum measurements.

Existing projects and challenges:

- Using SimulaQron to simulate quantum network
- Integrating QKD into OpenSSL to enable running quantum encrypted TLS connections
- Design and implement applications that use Quantum Protocol Zoo
- Use the QNE Application Development Kit
- Designing protocols for resource sharing among multiple nodes for routing information within a quantum network

QIH 2022 - Practical information

Important Dates and Deadlines

- 1 October 2022: Applications open
- 1 November 2022: First deadline for applications
- 10 November 2022: Preliminary list of participants published
- 1-2 December 2022: Quantum Internet Hackathon takes place simultaneously at all nodes

Before the event

Applicants can use the collaborative tools (such as discussion mailing list, EtherPad and IRC) to help plan shared work. We will also organise a webinar to introduce the available tools and proposed projects for participants a week or two before the event. You are encouraged to check out the code and projects submitted during previous hackathons, available on GitHub.

During the event

Standard work/play times for the event are 9am - 5pm (UTC+1), depending on the location. The "marathon" side of the event might mean that cooperation can extend deep into the night! There will be scheduled "touch-base" video links between all the nodes and online participants twice every day, but due to the different time zones, and due to the virtual team participants, we will announce the exact times later on.

In addition to already proposed challenges, participants are encouraged to propose projects they wish to work on, either completely new ideas, or existing projects.

Participants will work in small teams, with each team focusing on a chosen project. All source code developed during the hackathon will be publicly licensed and available on GitHub, and accessible for the entire community to use. A variety of goodies will be provided for participating.

Venues and Travel

The event is free of charge - there is no fee to pay and food and drinks will be provided throughout the event on both days. The organisers will not be making any travel or accommodation arrangements for participants. The hackathon takes place simultaneously in six nodes. Make sure you select the node of your choice when filling in the application form. The precise locations for each node will be published closer to the actual event date.

After the Hackathon

Since this event is very short, we are conscious that most of the work will have to be done either in advance or in the future. For the sake of continuity, all projects will be documented on GitHub, and the teams will be encouraged to stay in touch with each other, and to join our follow-up events in 2023. Since we want to focus on collaboration and not on competition, there will be no single prize winner. We will showcase all achievements during the closing session. Several projects will be awarded symbolic prizes, in the categories of 'Most Innovative Solution', Best Team Work' and Most Complete Presentation'.

Quantum Communications in Ireland

Eoin Kenny, HEANet

Mick O'Donovan, HEAnet

Quantum Communications in Ireland

IrelandQCI Consortium

- HEAnet (Ireland National Education and Research Network) is a member of IrelandQCI
- IrelandQCI is participating in EuroQCI calls (National and Cross Border)
- Planning on building a national staging network for quantum communications
- Initially focused on QKD but Quantum Communications is the main goal
- Starting in early 2023

National Initiative called Equity (Éire Strategy for quantum information and technology)

- Consists of Universities and Industry partners
- Organises workshops and events on all things quantum

HEAnet - Questions?

- How to build Quantum Communications networks - what are the building blocks?
- Coexistence of Classical and Quantum Networks - how to?
- Monitoring and alerting of Quantum Communications networks - how to?
- How do you know if your quantum communication network is working?
- What type of SLA can you provide your customers with?

Discussion - Share Your Story!

- Name
- Organisation
- Your organisation main line of business?
- Your organisation current main focus?
- Your role in your organisation?

- Your experience with Quantum Technologies?
- Next steps?
- Needs on your path towards QT deployment?
- What do you want to know about QT?

Thank you

Any questions?

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