Quantum Key Distribution - Practical Implementations, Challenges, R&E Use Cases and Standardisation outlook

https://events.geant.org/event/453/

Piotr Rydlichowski, *QKD technical leader*
Xavier Jeannin, *GN4-3 WP6 T1 task leader*
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GÉANT Infoshare, 17 March 2021

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GÉANT Infoshares are intended to create a space to engage, improve knowledge sharing and discussion about services and strategic topics, and to build a human network across the Research and Education community.

Co-organised by Network Technologies and Services Development Work package (WP6), together with GÉANT Partner Relations Team, within the Community Programme

Public Infoshares are on Wednesdays and are recorded

Other Infoshares will be ‘invitation only’ events on other weekdays

Go to the main Infoshares Wiki page to suggest future topics

Recordings are available in the e-Academy, GLAD website and on Wiki pages after the event

Questions: partner-relations@GÉANT.org

Network Technologies and Services Development approach

- **Make European NRENs “quantum aware”**
  - dissemination activities: Infoshares, workshops
  - White paper**: Quantum Technologies Status Overview for the GÉANT NREN community** (https://www.geant.org/Resources)
  - Quantum WIKI: https://wiki.geant.org/display/NETDEV/QKD
  - Training, if NRENs are interested
- **Technology testing:**
  - Collaboration with NRENs, Research projects and industry
- **Exploring QT solutions for GÉANT**
- **Standardisation**

WP6 - Quantum Key Distribution Team

- Contact us at **qkd-discuss@lists.GÉANT.org**

- **Piotr Rydlichowski**, PSNC - **QKD technical leader**
- Rudolf Vohnout , Josef Vojtech, Pavel Skoda, CESNET
- Peter Kaufmann, Susanne Naegele-Jackson, DFN
- Guy Roberts, Domenico Vicinanza, GÉANT
- Andor Jeszenszky, KIFU

- Xavier Jeannin , task leader
- Ivana Golub, Work Package Leader
- Tim Chown, Work Package Leader

Your feedback is crucial

- An interactive infoshare
  - Please **use the Zoom chat** to submit your questions
  - Open discussion at the end of each session

- Catch your feedback to lead our work

QKD - Practical Implementations and R&E Use Cases

Second quantum revolution

- The second revolution is about controlling individual quantum systems and using the quantum principles: **Superposition, Entanglement**, …
- Maybe a new **technological and industrial revolution**

Quantum wave

- A lot of countries prepared strategic quantum technology development plans
  - EC: Strategic Research Agenda on Quantum technologies
- Create an ecosystem in Europe that allows this quantum revolution emerging in European industry
- Research and Education community, **a key role in this phase**

1ts GÉANT Infoshare: Quantum Principles

- Available at GEANTtv YouTube channel: https://youtu.be/eZN41xyfUr4

Quantum Key Distribution - Practical Implementations, Challenges, R&E Use Cases and Standardisation outlook

- 12:30 – 13:00 Zoom room test
- 13:00 – 14:10 Session 1 quantum Security context
  - 13:00 Introduction and welcome
  - 13:10 QKD principles and networks (Andreas Poppe, AIT)
  - 13:50 Open discussion
- 14:10 – 14:25 Coffee Break
- 14:25 – 16:00 Session 2: Quantum Key Distribution Session
  - 14:25 ACONET, QKD implementation (Christian Panigl, ACOONET)
  - 14:45 ID Quantique (Pejman, Panahi)
  - 15:10 Toshiba (Robert Woodward, Mirko Pittaluga)
  - 15:25 PSNC Demo
  - 15:30 Open Discussion

Introduction Speaker Session 1

Andreas Poppe

Austrian Institute of Technology, OPENQKD project leader

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Coffee Break

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Next Network Technologies and Services Development Infoshares

- 24 March, Workshop on Network Management and Monitoring Tools
- 14 - 15 April, European perfSONAR User Workshop (Online)
- 28 April, Tools for Campus Network Management as A Service (Online)

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Session2

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Introduction Speaker Session 2

Christian Panigl

- *Head of ACOnet & Vienna Internet eXchange at the University of Vienna since 2008*

  Christian is in charge of the Vienna Internet eXchange (www.VIX.at) since its creation in 1996

  Christian has been involved in the development and operation of the Austrian research network ACOnet (www.ACO.net) since 1986,
- *Under Christian supervision in 2017/2018 the ACOnet backbone topology has been redesigned to better support national collaborations between the regions.*
- *Continuing this vision ACONet is supporting latest technological advances like emerging Quantum technolgoies.*

Introduction Speaker Session 2

Robert Woodward

Robert Woodward is a Research Scientist in the Quantum Information Group of the Toshiba Cambridge Research Laboratory, investigating the development of new QKD technologies and their integration into existing network infrastructure. Prior to this, he worked in academia in both the UK and Australia, researching nonlinear fiber optics and ultrafast laser physics.

Mirko Pittaluga

Mirko Pittaluga is a researcher at Toshiba Europe. He began his research career at Toshiba as a Marie Curie PhD student within the European Union's ITN project QCALL, a project that aimed to promote the diffusion of quantum technologies across Europe. During his PhD, he supported Toshiba's effort to enhance QKD performances at high loss regimes, by contributing to the first implementation of the new Twin-Field QKD protocol. His current research is focused on increasing the reach and practicality of long-distance QKD.

Introduction Speaker Session 2

Pejman Panahi

- *Graduated in computer engineering from Chalmers Technical University in Sweden.*
- *Experienced in working for different companies in different companies including Ericsson in Sweden, Versatel in Holland, H1 Telecom in Croatia, Swisscom and IDQ in Switzerland.*
- *Joined IDQ in 2016, leading the QRNG product development and sales team.*
- *Currently in charge of Global Market and Business Development with main focus on Academia, Government, Defence, Healthcare, gaming, etc.*

Introduction Speaker Session 2

Piotr Rydlichowski

- Head of Optical Networking Laboratory, Institute of Bioorganic Chemistry of the Polish Academy of Sciences Poznan Supercomputing and Networking Center Researcher. Focused on optical data transmission technologies and electromagnetic wave theory and propagation simulation.
- Involved in European QKD projects and Quantum Flagship (https://openqkd.eu/)
- Involved in Polish National Quantum Technologies Laboratory (http://nlpqt.fuw.edu.pl/)
- QKD subtask leader in GN4-3 project, WP6 T1

Open Discussion (session 2)

- Topics:
  - Questions to the speakers
  - Involvement in European and national initiatives
  - Practical implementations and testbeds in NRENs

Thank you

Any questions?

Share with us your feedback at

qkd-discuss@lists.GEANT.org

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