howest hogeschool
2025-12-05

Bunny Rose against quantum attacks on cryptography!

Karolin Varner
https://rosenpass.eu

The Plan

1. **What is cryptography?**
2. **The end is nigh (quantum attacks)**
3. **Migrating to post-quantum cryptography**
4. **Advertisement (Migrating your own setup)**

Slides

Karolin Varner

- Initiator & Lead Scientist of Rosenpass e. V.
- Software developer & Cryptographer
- Worked for about 12 years in industry with start ups and large corps
- Working at Max-Planck-Institute for Security and Privacy since 2024
- Worked on Rosenpass & other cryptographic projects, such as the X-Wing cipher

Rosenpass e. V.

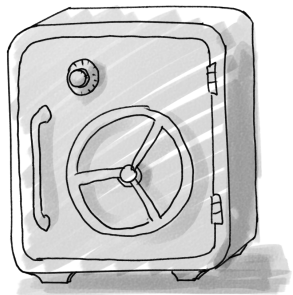
- Founded in 2023 as a host for the eponymous project
- Security WireGuard VPN against quantum attacks via protocol level hybridization
- Institution for translational research in cryptography
- Communication hub between science, industry, and civil society

rosenpass.eu

What is Cryptography?

Creating trustful communication spaces

Protecting privacy



Protecting belongings & capital

Digital spaces, as trustful as the analog ones

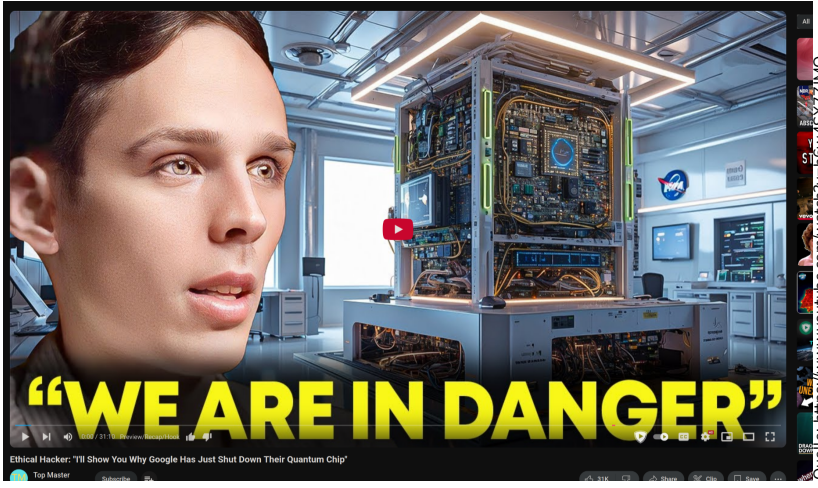
Data communication is usually public

Data streams become gibberish

- Patient and doctor exchange a secret number
- Both computers use this number to encrypt & decrypt
- Patient and doctor can understand each other
- For everyone else, the data stream looks like gibberish (random)
- Well-made cryptography even protects info about who is communicating

The end is neigh (quantum attacks)

Doom sayers: “Please Like and Subscribe”



Quelle: https://www.youtube.com/watch?v=h6w4SX7ZMQ

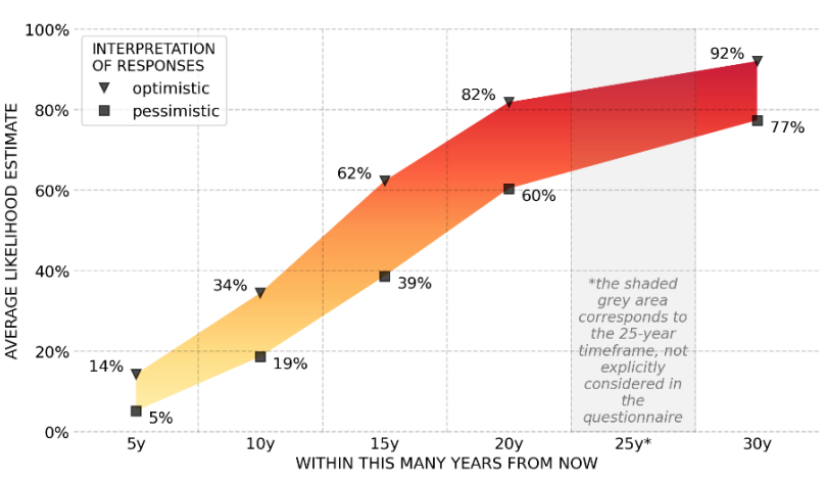
Doom sayers: “Please Like and Subscribe”

Quelle: https://www.youtube.com/watch?v=ONspVc9blRo

Doom sayers: “Please Like and Subscribe”

Quelle: https://www.youtube.com/watch?v=-UrdLxQW0cs

Quantum computing – As soon as we have fusion power



Quelle: https://globalriskinstitute.org/publication/2024-quantum-threat-timeline-report/

When networked world stops turning

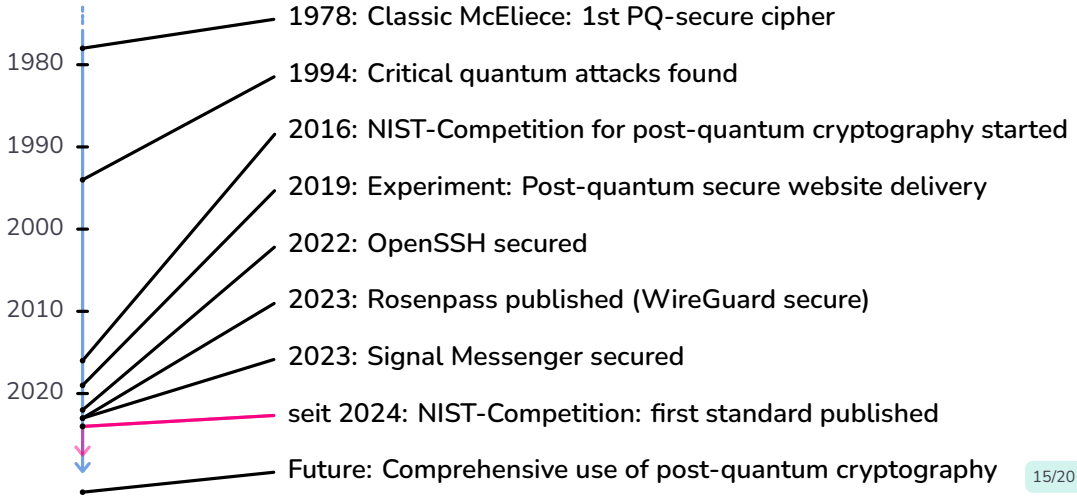
- We work on the internet
- We manage critical infrastructure
- Our supply chains depend on it

Hoarding hamster attacker

- Angreifer hoard encrypted communication
- This enables attacking past communication
- “Store now, decrypt later Attack”

Migrating to post-quantum security

Migrating to post-quantum security



System complexity is a major challenge

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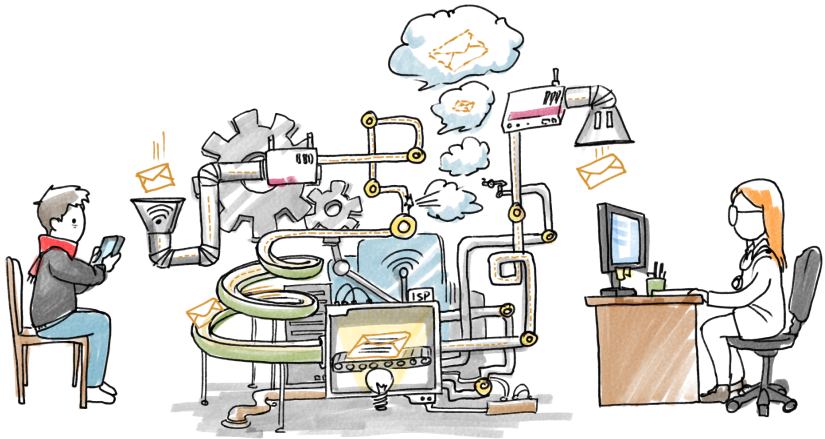
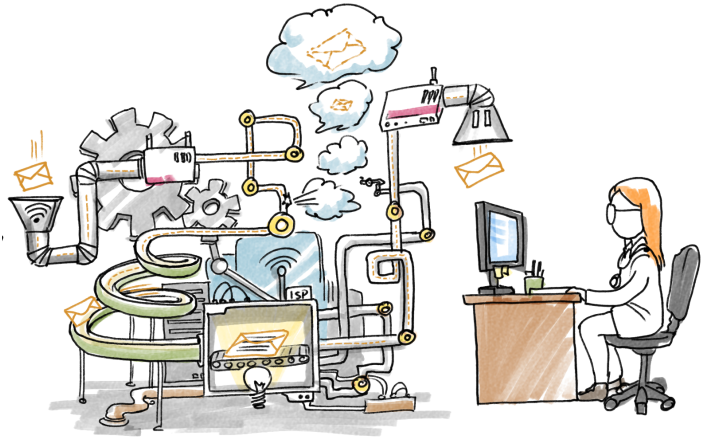


System complexity is a major challenge

- Our cryptographic infrastructure is a massive mess of components
- We don’t even precisely know which components are used
- Almost all must be migrated

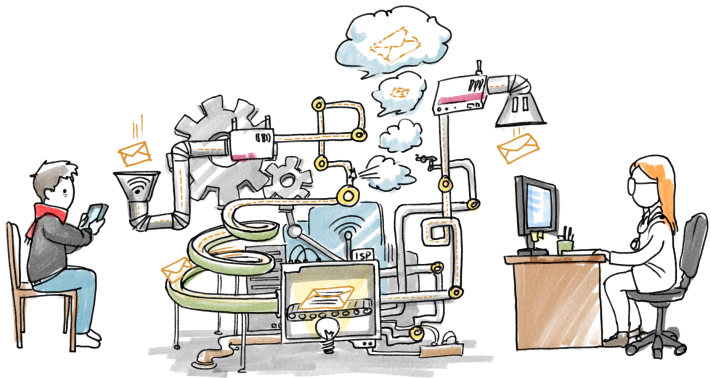


Kryptoagilität

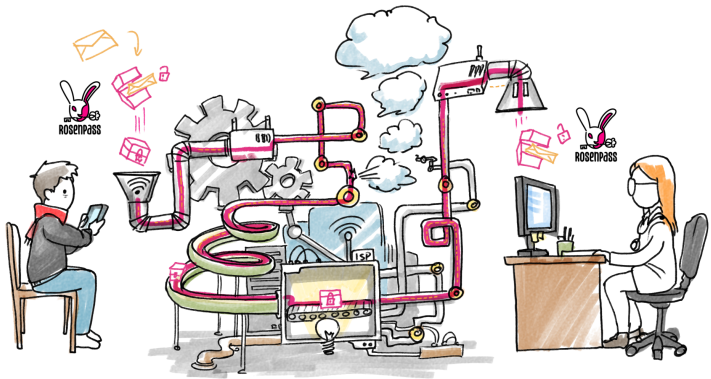
- Document existing cryptographic infrastructure
- Introduce procedures for rapid upgrades
- Sustainable & enduring

Advertisement!

PQ-Security without replacing infrastructure



PQ-Security without replacing infrastructure



The VPN-advantage: Adding post-quantum-security on top

OpenSSH
Linux Server
Administration

Signal
Messaging

mullvad.net
Internet Gateway
(VPN Provider)

VPN

SSL/TLS, Web
(Not standardized)