

Architectural Principles of a Quantum Internet

<https://datatracker.ietf.org/doc/draft-irtf-qirg-principles/>

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Recap

- First version of draft prepared and presented at IETF 104 in Prague on 26 March 2019
- Motivation is to address charter point:
 - *An architectural framework delineating network node roles and definitions, to build a common vocabulary and serve as the first step toward a quantum network architecture.*
- Also want to create a good starting point for people with no quantum background

GitHub

- A GitHub repo is maintained at <https://github.com/Wojtek242/draft-irtf-qirg-principles>
- A more convenient way to share updates at a finer granularity than datatracker allows
- However, all discussions are still done on the mailing list so no fancy CI/CD

Seen in the wild

- Cited in academic articles by authors who are not affiliated (to my knowledge) with the draft's authors.
- Need to expedite path to RFC for a permanent record

[SeQUeNCe: A Customizable Discrete-Event Simulator of Quantum Networks](#)

[X Wu](#), [A Kolar](#), [J Chung](#), [D Jin](#), [T Zhong](#)... - arXiv preprint arXiv ..., 2020 - arxiv.org

Recent advances in quantum information science enabled the development of quantum communication network prototypes and created an opportunity to study full-stack quantum network architectures. This work develops SeQUeNCe, a comprehensive, customizable ...

☆ 🔖 Cited by 2 All 4 versions ⇨

[Topological Photonics for Optical Communications and Quantum Computing](#)

[A Manzalini](#) - Quantum Reports, 2020 - mdpi.com

The ongoing digital transformation is bringing a pervasive diffusion of ultra-broadband, fixed-mobile connectivity, the deployment of cloud-native Fifth Generation (5G) infrastructures, edge and fog computing and a wide adoption of artificial intelligence. This transformation ...

☆ 🔖 ⇨

Overheard (by me)

- I have received feedback from a networking expert (outside of QIRG) that the draft is a good introduction to the subject
- Obviously small and biased sample, but hopefully it does serve the purpose of being a good introduction to the subject

Overview of changes (since 108)

- Added “Control plane and two data planes” subsection
 - Needs to be made consistent with use-case draft
- Added note that passive optical elements, such as optical switches can be used without destroying quantum state
 - This clarification was introduced to emphasize the fact that one can also switch entanglement over short distances using optical switches rather than entanglement swapping (c.f. MDI-QKD talk)
- Some additional clarifications
- Added references to academic literature

Next steps

- Is the draft ready for RG last call?