Architectural Principles of a Quantum Internet

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

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Quantum networks are imminent

There is no quantum network stack

Different groups are working on different architectures for quantum networks

Classical Internet

The top level goal for the DARPA Internet Architecture was to develop an effective technique for multiplexed utilization of existing interconnected networks

Clark, David. "The design philosophy of the DARPA Internet protocols." ACM SIGCOMM Computer Communication Review 18.4 (1988): 106-114.

Classical Internet

1) Internet communication must continue despite loss of networks or gateways

2) The Internet must support multiple types of communications service

3) The Internet architecture must accommodate a variety of networks

4) The Internet architecture must permit distributed management of its resources

5) The Internet architecture must be cost effective

6) The Internet architecture must permit host attachment with a low level of effort

7) The resources used in the iutemet architecture must be accountable.

Clark, David. "The design philosophy of the DARPA Internet protocols." ACM SIGCOMM Computer Communication Review 18.4 (1988): 106-114.

Classical Internet

Architectural Principles of the Internet

Status of This Memo

   This memo provides information for the Internet community. This memo
   does not specify an Internet standard of any kind. Distribution of
   this memo is unlimited.

Abstract

   The Internet and its architecture have grown in evolutionary fashion
   from modest beginnings, rather than from a Grand Plan. While this
   process of evolution is one of the main reasons for the technology's
   success, it nevertheless seems useful to record a snapshot of the
   current principles of the Internet architecture. This is intended for
   general guidance and general interest, and is in no way intended to
   be a formal or invariant reference model.

Table of Contents

What are our goals?

Quantum Internet

The draft

Quantum Internet

1) Support distributed quantum applications

2) Support tomorrow's distributed quantum applications

3) Hardware heterogeneity

4) Be flexible with regards to hardware capabilities and limitations

5) Security, availability, and resilience

6) Easy to manage and monitor

7) ???

Why?

There will be trade-offs

What should be prioritised?

Serve as a guide for designers

QIRG Community

Would it be useful for us to define such goals?

Would it be useful to work together to define some guiding principles?

Is the QIRG a right place for it?