

A.1 justification for proposed draft new ITU-T Y.QKDNI-qos-fa, “QKDNI - Functional architecture for quality of service assurance”

Question:	Q6/13	Proposed new ITU-T Recommendation	Geneva, 23 Oct - 3 Nov 2023
Reference and title:	ITU-T Y.QKDNI-qos-fa, “Quantum key distribution networks interworking - Functional architecture for quality of service assurance”		
Base text:		Timing:	3Q2024
Editor(s):	Jeongyun Kim; ETRI; Taesang Choi, ETRI; Hyeongsoo Kim, KT;	Approval process:	AAP
<p>Scope (defines the intent or object of the Recommendation and the aspects covered, thereby indicating the limits of its applicability):</p> <p>This draft Recommendation specifies the functional architecture of quality of service (QoS) assurance for the quantum key distribution network interworking (QKDNI), the scope of this Recommendation is as follows:</p> <ul style="list-style-type: none"> - Overview of QoS assurance for QKDNI. - Functional architecture of QoS assurance for QKDNI. - Reference points of functional architecture. - Basic operational procedure of QoS assurance for QKDNI. 			
<p>Summary (provides a brief overview of the purpose and contents of the Recommendation, thus permitting readers to judge its usefulness for their work):</p> <p>This draft Recommendation specifies the functional architecture of quality of service (QoS) assurance for the quantum key distribution network interworking (QKDNI).</p>			
<p>Relations to ITU-T Recommendations or to other standards (approved or under development):</p> <p>ITU-T Y.3806 “Quantum key distribution networks – Requirements for quality of service assurance” ITU-T Y.3810 “Quantum key distribution network interworking – Framework” ITU-T Y.3811 “Quantum key distribution networks – Functional architecture for quality of service assurance” ITU-T Y.3817 “Quantum key distribution networks interworking – Requirements for quality of service assurance” ITU-T Y.3818 “Quantum key distribution networks interworking – architecture”</p>			
<p>Liaisons with other study groups or with other standards bodies:</p> <p>ITU-T SG11, SG17, ETSI ISG-QKD, IRTF</p>			
<p>Supporting members that are committing to contributing actively to the work item:</p> <p>Korea (Rep. of), ETRI, KT corp., KAIST, and Korea Univ.</p>			

Attachment 2

Draft new Recommendation ITU-T Y.QKDNI-qos-fa

**Quantum key distribution networks interworking – Functional architecture
for quality of service assurance**

Summary

This draft Recommendation specifies the functional architecture of quality of service (QoS) assurance for the quantum key distribution network interworking (QKDNI).

Keywords

Functional architecture, QKDN, QKDNI, QoS assurance.

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Draft new Recommendation ITU-T Y.QKDNI-qos-fa

Quantum key distribution networks interworking – Functional architecture for quality of service assurance

1 Scope

This draft Recommendation specifies the functional architecture of quality of service (QoS) assurance for the quantum key distribution network interworking (QKDNI), the scope of this Recommendation is as follows:

- Overview of QoS assurance for QKDNI.
- Functional architecture of QoS assurance for QKDNI.
- Reference points of functional architecture.
- Basic operational procedure of QoS assurance for QKDNI.

[Editor's note] Whether new functional component for QoS assurance in QKDNI is added or not will be decided during developing Y.QKDNI-qos-fa by examining [ITU-T Y.3810], [ITU-T Y.3811], [ITU-T Y.3817] and [ITU-T Y.3818].

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[ITU -T E.860] Recommendation ITU-T E.860 (2002), *Framework of a service level agreement.*

[ITU-T Y.3806] Recommendation ITU-T Y.3806 (2021), *Quantum key distribution networks – Requirements for quality of service assurance.*

[ITU-T Y.3811] Recommendation ITU-T Y.3811 (2022), *Quantum key distribution networks – Functional architecture for quality of service assurance.*

[ITU-T Y.3817] Recommendation ITU-T Y.3817 (2023), *Quantum key distribution networks interworking – Requirements for quality of service assurance.*

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 assurance [b-ITU-T X.1500]: The degree of confidence that the process or deliverable meets defined characteristics or objectives.

3.1.2 network performance [b-ITU-T E.417]: The performance of a portion of a telecommunications network that is measured between a pair of network-user or network-network interfaces using objectively defined and observed performance parameters.

3.1.3 quality of experience (QoE) [b-ITU-T P.10]: The degree of delight or annoyance of the user of an application or service. [b-Qualinet 2013]

NOTE – Recognizing on-going research on this topic, this is a working definition which is expected to evolve for some time. (This note is not part of the definition.)

3.1.4 quality of service [b-ITU-T Q.1741.9]: The collective effect of service performances, which determine the degree of satisfaction of a user of a service. It is characterized by the combined aspects of performance factors applicable to all services, such as: service operability performance, service accessibility performance, service retainability performance, service integrity performance and other factors specific to service.

3.2 Terms defined in this Recommendation

None.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

TBD

5 Conventions

None.

6 Overview

Quantum key distribution network (QKDN) is a cryptographic infrastructure to provide secure symmetric keys to cryptographic applications in user networks. QKDN is able to cover a wide area by interworking multiple QKDNs, which is called to QKDN interworking (QKDNi).

[ITU-T Y.3810] introduces an overview of interworking QKDNs, the reference models, and the functional models of gateway functions (GWFs) and interworking functions (IWFs). Moreover, QKDNi functional requirements are identified in [ITU-T Y.3813].

One of the challenges of the QKDNi is to assure the network performance and that different quality of service (QoS)/quality of experience (QoE) requirements of different application scenarios are met.

The requirements of QoS assurance for QKDNi specified in [ITU-T Y.3817] address these challenges. Based on the requirements, this draft Recommendation specifies the functional architecture, associated functional entities and reference points and an example of operational procedure.

7 Functional architecture of QoS assurance for QKDNi

This clause defines the QKDNi layered functional architecture and associated functional entities in accordance with [ITU-T Y.QKDN-iwac]. Two functional architectures for QKDNi with gateway nodes (GWNs) and interworking node (IWN) are illustrated in Figure 1 and Figure 2 in [ITU-T Y.QKDN-iwac], respectively.

This draft Recommendation extends the functional entities required for QoS assurance as shown in Figure 1 and Figure 2, where the QoS assurance functional entities are added in each layer management function. Each entity interacts with each layer's control and management function to fulfil the QoS KPIs. This includes planning, monitoring, analysing, optimizing and provisioning, which are addressed in [ITU-T Y.3811]. Also new functional entities are added in Figure 1 and Figure 2, which are based on [ITU-T Y.3817].

Contributor's Note – The figures will be modified if having original files.

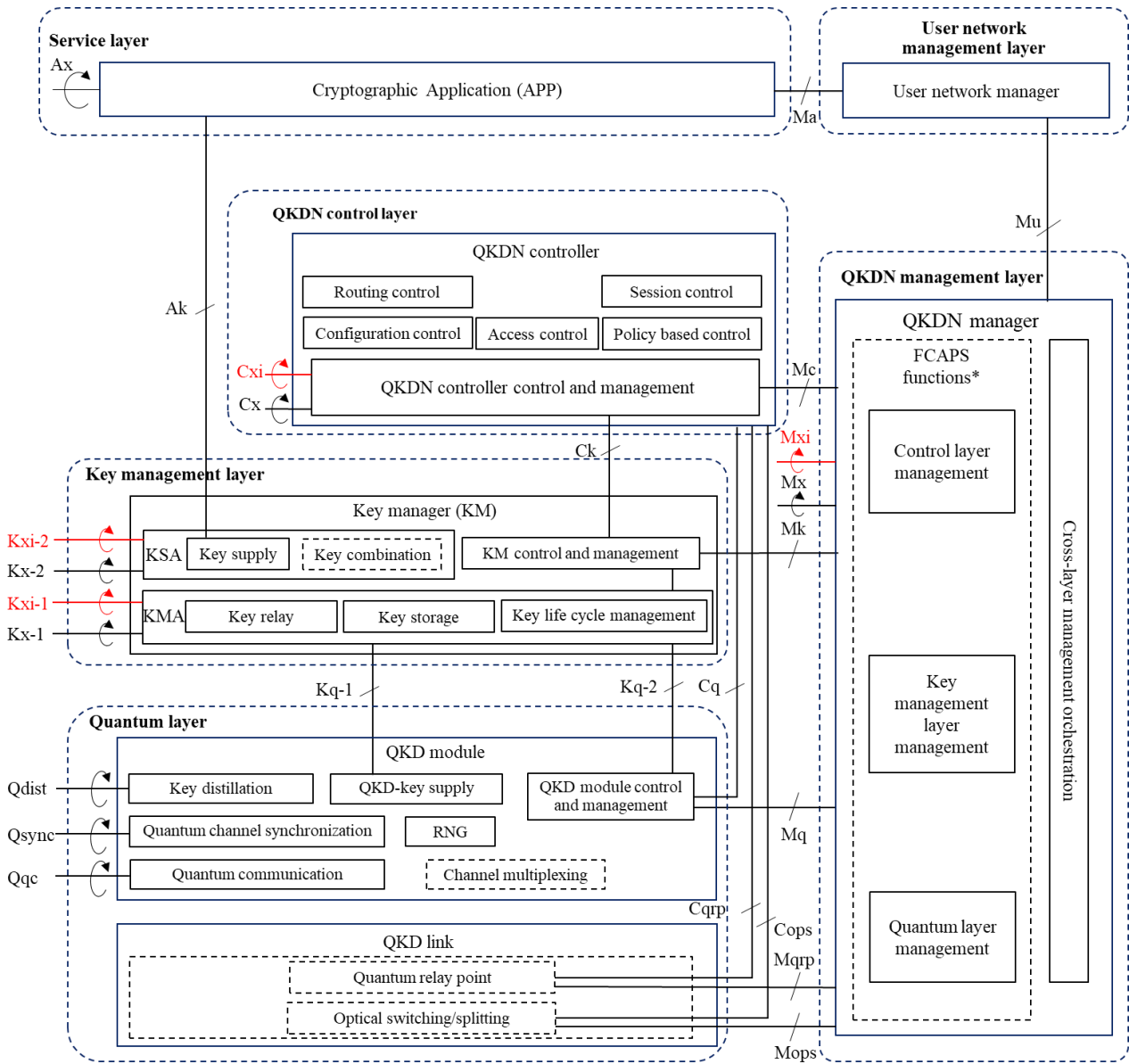


Figure 1 – Functional architecture of QoS assurance for QKDNI with GWN

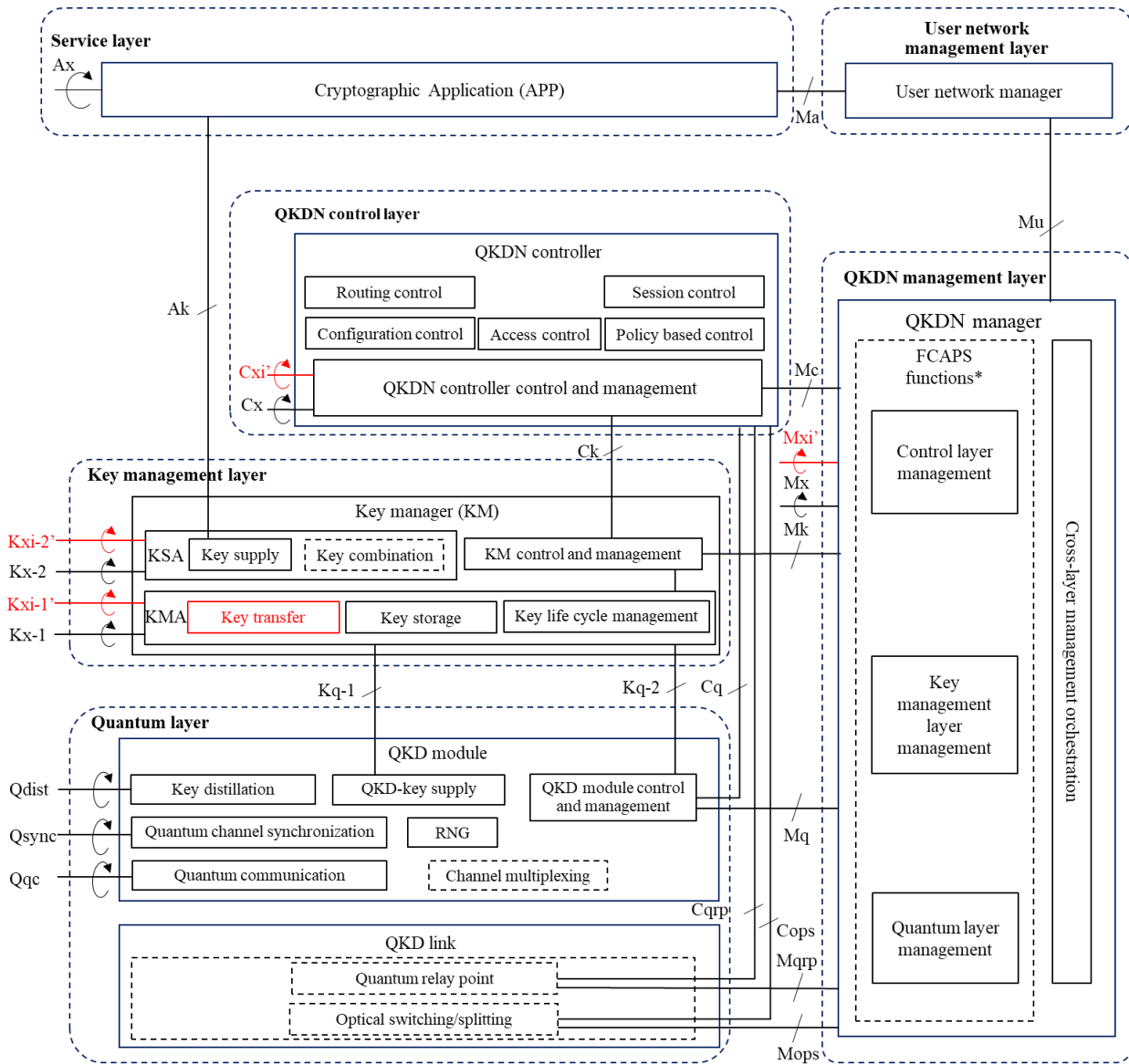


Figure 2 – Functional architecture of QoS assurance for QKDNI with IWN

8 Reference points of the functional architecture

TBD

9 Basic operational procedure of QoS assurance for QKDNI

TBD

10 Security considerations

TBD

Bibliography

TBD
