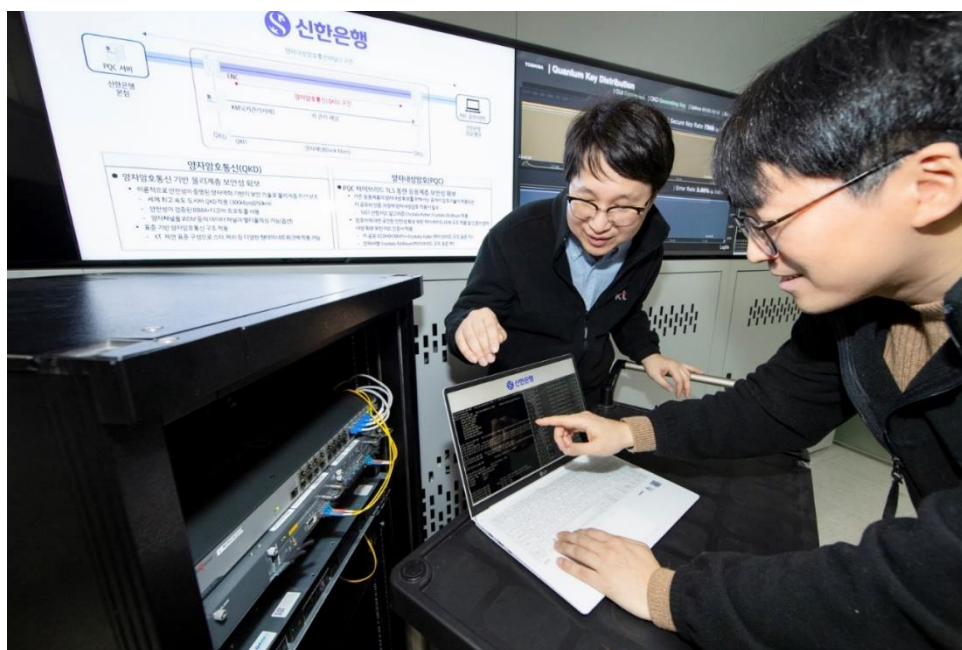


April 19, 2024

Toshiba Digital Solutions Corporation

**Toshiba Digital Solutions and KT Demonstrate  
Hybrid Quantum Secure Communications with South Korea's Shinhan Bank**  
*Collaboration demonstrates technologies that will  
strengthened the cybersecurity of financial networks*

Toshiba Digital Solutions Corporation (Toshiba Digital Solutions), the Toshiba Group company driving forward industry-leading solutions in digital and quantum technology, in partnership with KT Corporation (KT), a leading telecommunications service provider and its collaborator in quantum secure communication in South Korea, has demonstrated how banks and financial networks can be protected from cyberattacks by quantum computers by bringing hybrid quantum secure communications, comprising quantum key distribution (QKD)<sup>\*1</sup> and post-quantum cryptography (PQC)<sup>\*2</sup>, to secure communications at Shinhan Bank, one of South Korea's leading banks.



KT engineers monitoring quantum key delivery speed (key rate) and quantum bit errors using Toshiba Digital Solutions' quantum key management system (Photo provided by KT)

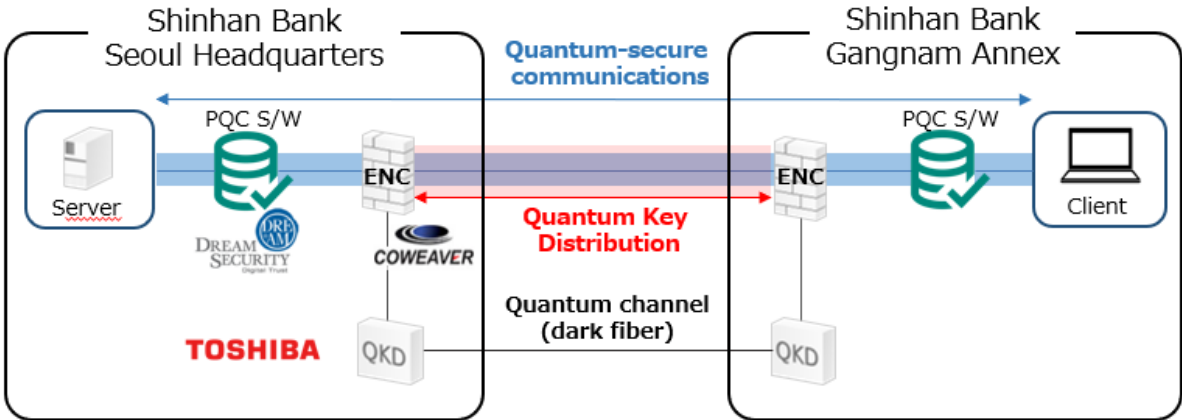
Financial data on the assets and transactions of individuals, organizations and companies requires robust security that is provided by cryptographic communications on information and communications networks. However, when quantum computers are made commercially

available in the near future, it will become very easy to decrypt the encryption keys now used to encrypt communications. South Korea’s financial sector is responding to this threat by introducing quantum secure technology.

KT, Shinhan Bank and Toshiba Digital Solutions have shown the capabilities of quantum secure communications technology by collaborating in a demonstration network connecting Shinhan Bank's Seoul headquarters with its Gangnam Annex, a distance of about 22 kilometers. Secure communications technology was applied in the network layer in a hybrid manner, realizing end-to-end security. QKD eliminates eavesdropping and protects the physical layer of optical lines, while applying PQC public key algorithm to the internet security protocol provides security against cryptanalytic attacks. This provides complete protection for application services such as homepage login, while allowing evaluation of hybrid quantum secure communications.

The design of the demonstration network is compliant with the Korean Quantum Cryptography Communication Secure System. Toshiba Digital Solutions provided its high performance QKD system and quantum key management system (Q-KMS), and the PQC is a FIPS\*<sup>3</sup> compliant quantum-resistant computer cryptographic algorithm, which is in line with South Korea's national roadmap to promote the migration to quantum-resistant computer cryptography.

The demonstration was supported by technical cooperation from South Korean companies. Coweaver provided the QKD interoperable high speed network encryptor (ENC)\*<sup>4</sup>, technology transferred to it from KT, that receives the secure key generated by the QKD system, encrypts data, and protects the physical layer during data transmission. Dream Security collaborated with KT to provide the PQC services used to protect the application layer.



- kt** • Quantum-Safe network design and construction
- Quantum-Safe performance/stability test and verification

Commenting on the demonstration project, Hiroshi Tsukino, Corporate Officer and Corporate Vice President of Toshiba Corporation, and Vice President of ICT Solutions Division at Toshiba Digital Solutions, said, “This is a significant step forward in our partnership with KT, which started in 2022\*<sup>5</sup>. It provides strong support for the development of a quantum secure communications ecosystem in South Korea, and will build momentum toward expanding the quantum secure communications market. We are excited for what lies ahead in our collaboration with KT.”

Going forward, Toshiba Group will continue to strengthen collaborative relationships with partners and accelerate the global expansion of its quantum secure communication business, and to provide the market with innovative technologies that advance quantum secure communications.

\*1: A secure communications technology that transmits encryption keys using photons, the smallest unit of light.

<https://www.global.toshiba/ww/company/digitalsolution/articles/tsoul/38/004.html>

\*2: Cryptographic algorithms that make it difficult for quantum computers to crack encrypted data.

[https://www.nttdata.com/global/en/-/media/nttdataglobal/1\\_files/media/press-release/2023/me\\_pr\\_oct\\_02\\_01.pdf](https://www.nttdata.com/global/en/-/media/nttdataglobal/1_files/media/press-release/2023/me_pr_oct_02_01.pdf)

\*3: The Federal Information Processing Standards

\*4: Dedicated equipment installed at both ends of a communications line section to encrypt data flowing through the line.

\*5: News release in March 2022

<https://www.global.toshiba/ww/company/digitalsolution/news/2022/0328.html>

\*Company names, product names, and service names may be trademarks of their respective companies.

\*Information in this news release, including product prices and specifications, content of services and contact information, is current on the date of the announcement but is subject to change without prior notice.

■ Toshiba Quantum Key Distribution

<https://www.global.toshiba/ww/products-solutions/security-ict/qkd.html>