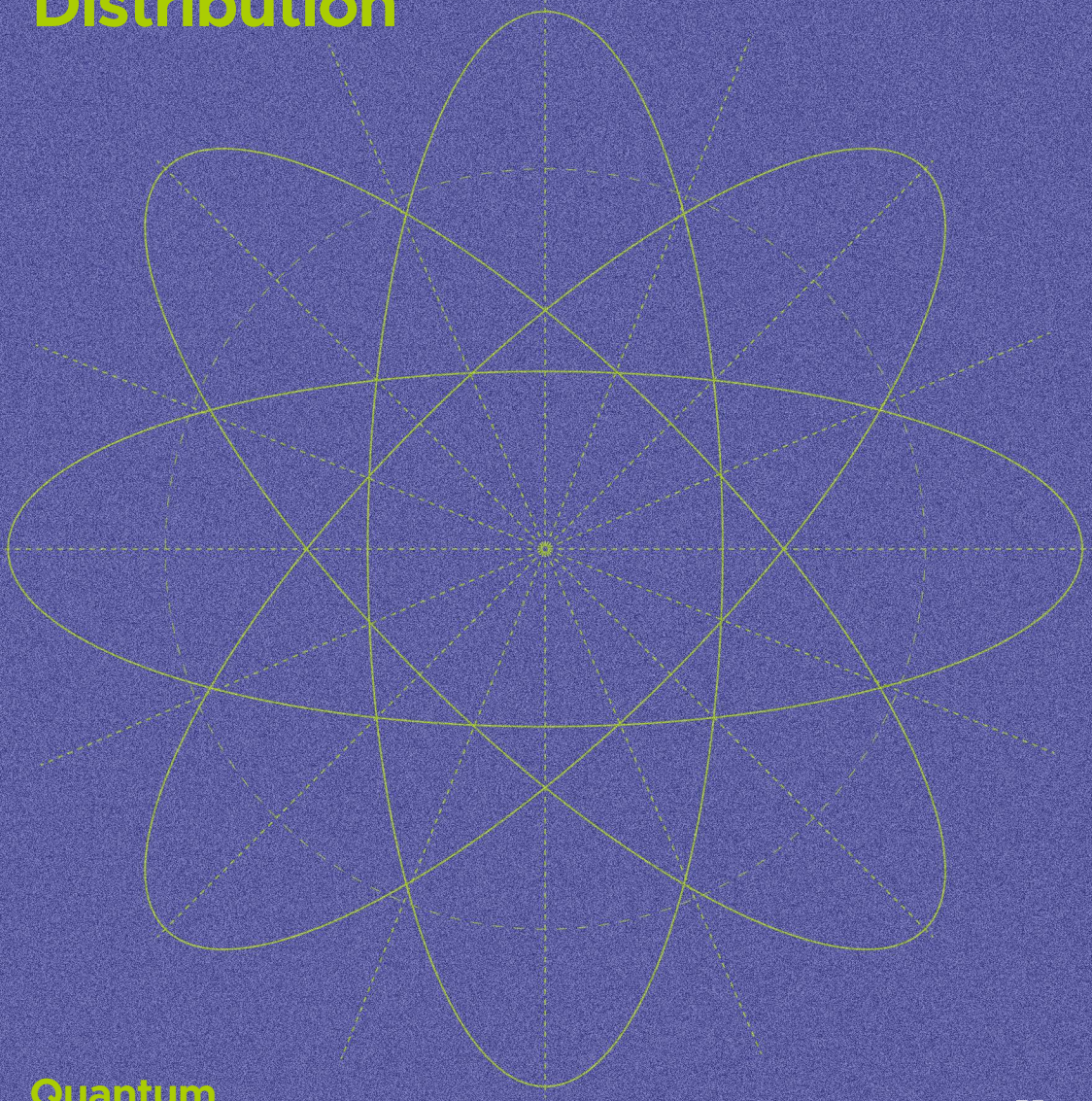
1:N QKD

Quantum Key Distribution



Quantum Products

sdt

1:N QKD

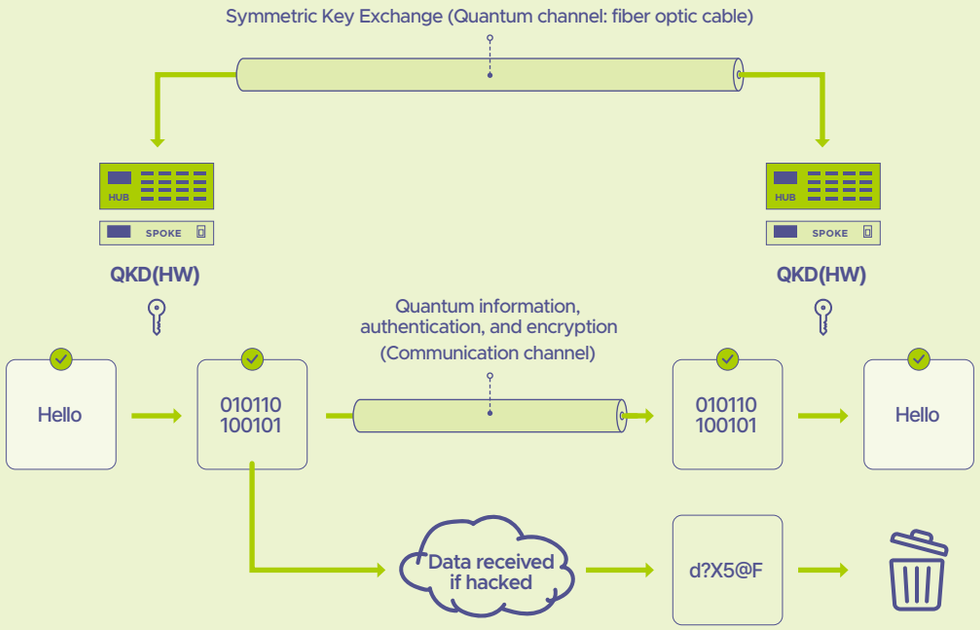
SDT's 1:N QKD revolutionizes data transmission by leverging the no-cloning theorem of quantum mechanics to connect one receiver with up to 64 senders, creating a secure and robust network for advanced encryption.

What Makes SDT's 1:N QKD Special?

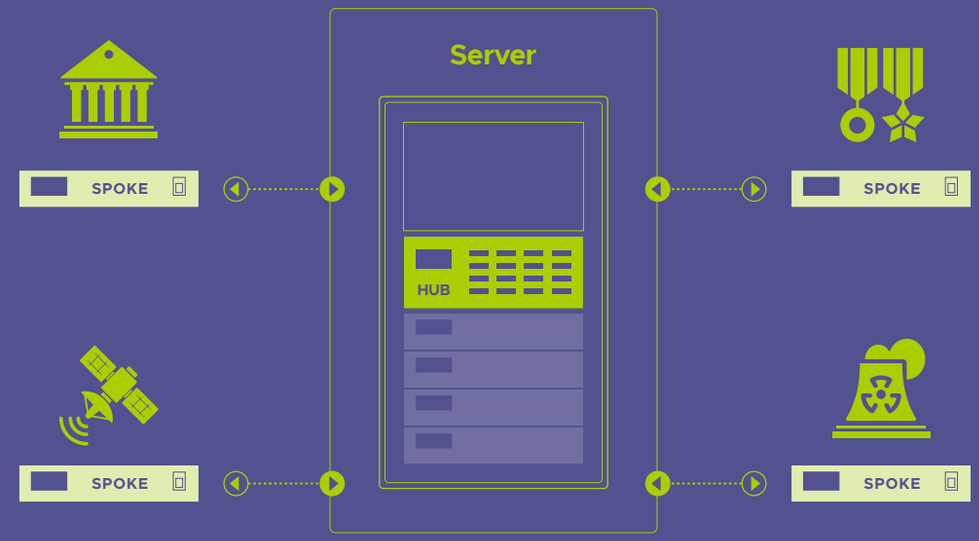
Unlike conventional 1:1 QKD systems that require installing both a sender and receiver for each new connection, SDT's QKD solution only needs an additional sender. This streamlined approach dramatically reduces deployment costs, enabling the construction of quantum cryptography infrastructure at up to 20 times less than competing solutions.

QKD Encryption Method

QKD (Quantum Key Distribution) is a technology that securely generates and distributes encryption keys for communication by utilizing the quantum phenomenon of state collapse upon measurement, which ensures the integrity and security of the key distribution process. These keys are designed for single-use only, remaining valid for only a brief period before being discarded and replaced with new quantum keys. Thanks to the unique quantum properties of superposition and the impossibility of cloning, any interception of the key causes the quantum state to collapse, rendering the key obsolete and effectively blocking any eavesdropping attempts.



1:64 Star Topology



Supporting a 1:64 star topology, SDT's QKD system delivers a robust quantum cryptographic network that allows a central control hub to securely connect with and manage multiple distributed facilities.

Key Applications

- Data center interconnections
- HQ to branch communications
- Major urban communication network connections
- End user to cloud communications
- Power grid communication
- Crypto keys as-a-service

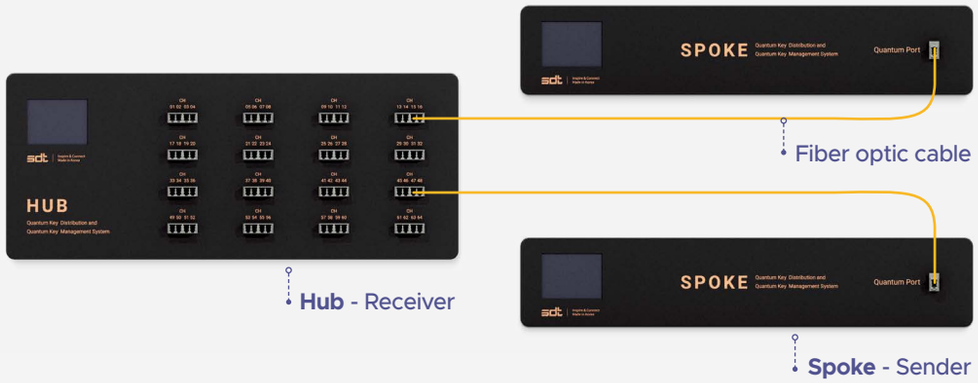
Key Markets

- Data Centers
- Banking & Finance
- Defense & Security
- Healthcare Organizations
- Critical Infrastructure
- IP-focused Enterprises

Specifications

SDT QKD

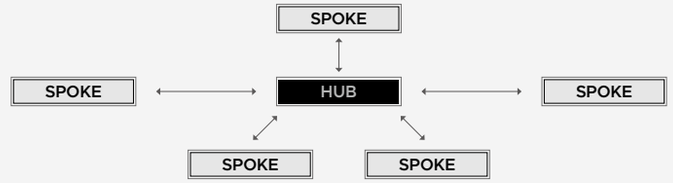
Engineered for unparalleled security and cost efficiency, **SDT's 1:N QKD** establishes a secure network between **one receiver** and **up to 64 senders**.



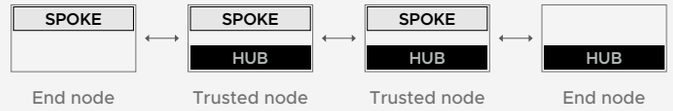
Item	Specifications
Maximum length of quantum channel	80km
Key Rate	1kb/s @25km
Maximum number of channels for user	64
Protocol	Decoy-state BB84 protocol
Quantum channel	1 x 64 WDM: O-Band in a single core
Optical engine	Plug&Play system (two-way)
Core technologies	Double phase modulation, self stabilizing algorithm
Power supply	1+1 Redundant hot-swappable power supply Each 300 W, 100-240 VAC, 47-63 Hz, 5-2.5 A or 36-72 VDC (optional)
Temperature range	(Operating) +10 ~ +35°C (Non-operating) -10 ~ +60°C
Relative humidity range	(Operating) 5% ~ 85% (Non-operating) 5% ~ 90%

System Description

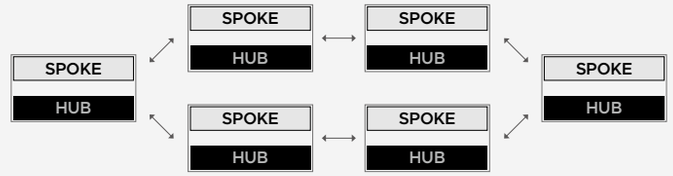
01 Star



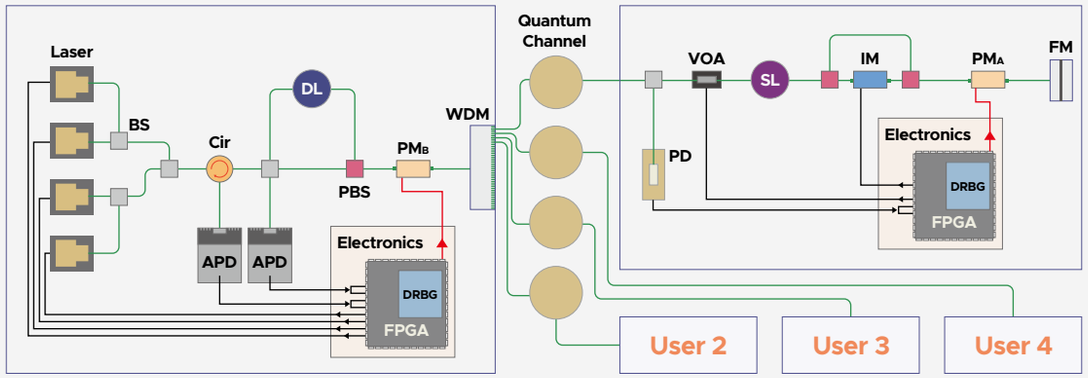
02 Point-to-Point



03 Ring Network



Network Architecture



SDT's 1:N QKD system offers a Plug & Play solution with an optical design suited for stability in fluctuating environments. It employs a single interferometer and a Faraday mirror on the sender side to ensure reliable two-way birefringence compensation, making it resilient to changes in pressure and temperature. With multiple lasers and wavelength division multiplexing (WDM) integrated into the sender, the system supports scalable 1:N QKD networks. The receiver's advanced setup, featuring multiple lasers and a pair of avalanche photodetectors (APDs), provides cost-effective quantum key distribution, ensuring high performance and affordability.

Main Advantages

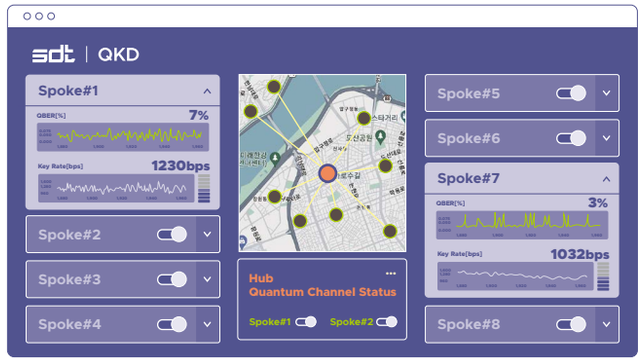
01 Double Phase Modulation

SDT's patented double phase modulation technology provides exceptional stability and reliability by compensating for birefringence even amid environmental changes.

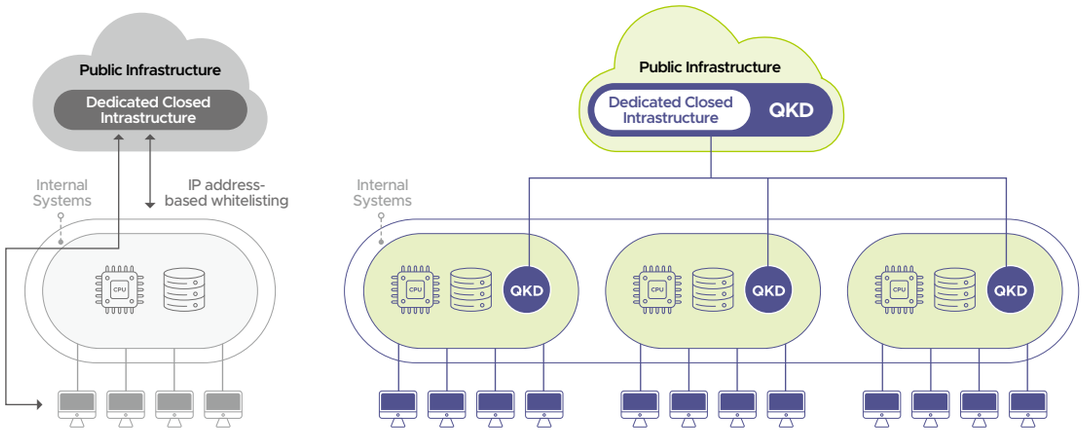
02 Self Stabilizing Algorithm

SDT's patented self-stabilizing algorithm continuously monitors the efficiency of encryption keys generated by QKD, minimizing noise in the quantum channel and significantly boosting accuracy over time.

03 QKD Dashboard



Benefits



Current Issue

While security-critical environments employ a closed system with IP address-based whitelisting to limit access to authorized users, this approach still leaves vulnerabilities exposed. Despite these precautions, the threat of hacking persists.

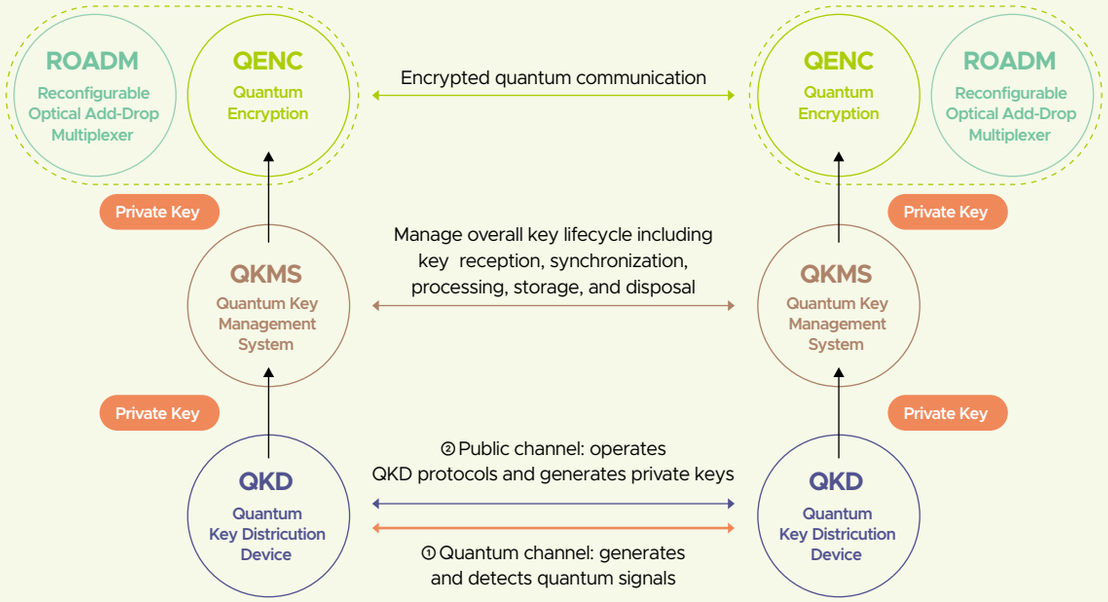
Benefits of QKD

Access to the infrastructure is securely restricted to those within the QKD network, ensuring that unauthorized users are fundamentally excluded. As a result, public infrastructure can be seamlessly leveraged with the same security and functionality as internal systems.

Why QKD?

The RSA algorithm, the cornerstone of today's digital security, is becoming vulnerable to quantum computing, whose rapid prime factorization capabilities could eventually break the algorithm .
In response, Post-Quantum Cryptography (PQC) and Quantum Key Distribution (QKD) are emerging as critical solutions. PQC, while compatible with current infrastructure at a lower cost, may still face future risks from advancing quantum algorithms. On the other hand, QKD is based on the principles of quantum mechanics and offers a key distribution method that remains unbreakable, even with current computing methods and future advancements in quantum computers. However, practical limitations such as distance constraints and challenges with quantum relays currently exist. QKD and PQC are complementary technologies that will not only ensure security in the coming era of quantum computing but also lay the foundation for secure quantum internet.

QKD Ecosystem



QKD

QKD serves as the foundational layer of quantum encryption. The keys generated and distributed by QKD are used to encrypt and decrypt data through existing cryptographic methods.

QKMS

QKMS handles the storage, rotation, disposal, and protection of the secret keys created by QKD, and manages access permissions.

QENC

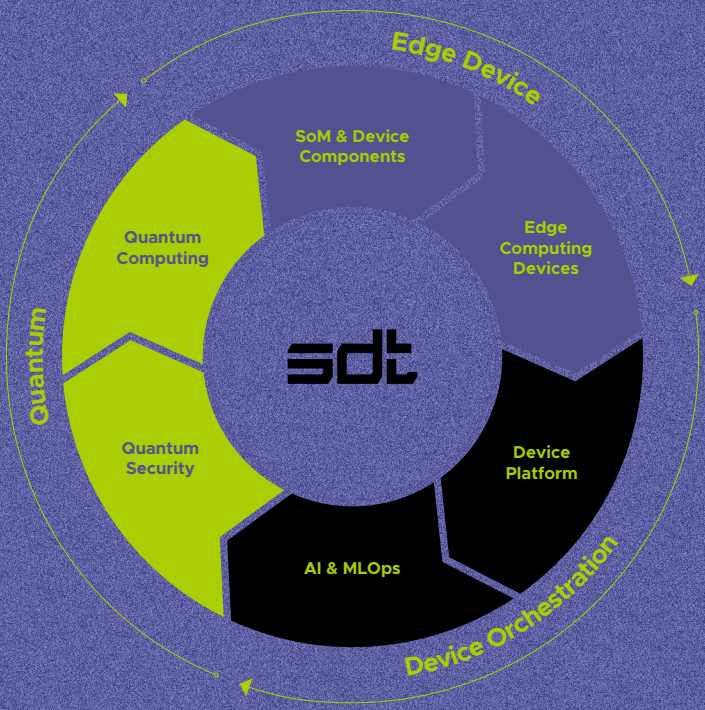
QENC uses these secret keys to encrypt data and subsequently decrypt it with the same keys, ensuring data security, integrity, and confidentiality.

ROADM

ROADM significantly enhances the flexibility and efficiency of communication networks, enabling users to access a wide range of services.

Bringing Quantum Cryptography to Your Sites

SDT delivers cutting-edge protection and secure transmission of all information using advanced quantum encryption keys, setting the standard in quantum cryptography technology



QRNG IP Camera
Quantum Communication

Quantum Control Devices
Quantum Computing

Quantum Dot Sensor Camera
Quantum Sensing

SDT Inc. | **QKD Brochure**

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