

Cyber-resilient networks for the quantum age

Secure connections. Secure operations.



Corporate presentation

Agenda

- Threat landscape and regulation
- Company profile
- Our offer
- Use cases with enterprises and governmental agencies



Security challenges for mission-critical operations



Threat landscape

- Nation-state actors
- Cyber criminals
- Artificial Intelligence
- Quantum computing



Damages (Germany)

- €266bn in 2024
- Annual growth: 22%
- 65%: existential threat

Source: BITKOM Research 2024; Wirtschaftsschutz 08.2024



New EU Regulation

- More sectors are covered with emerging regulation
- More measures including risk management, technical means, supply chain



Urgent need for action

We should do more in Europe



Information security spending per employee by region

Region	IS spending as % of IT spending	IS FTEs as % of IT FTEs	IS spending per employee
North America (NA)	6,4%	6,5%	1308€
European Union*	5,1%	4,5%	673€
Asia Pacific (APAC)	6,3%	6,3%	1050€

*The peer group does not include Cyprus

Source: Network information security investments; ENISA (European Union Agency for Cybersecurity) report, Nov 2023



Regulatory requirements

Minimizing risk, assuring operations

- **NIS-2 (Network and Information Security)** wide range of security controls including means to encrypt sensible data
- **CER (Critical Entities Resilience)** for better protection against physical impact



EU regulation enforces stricter security controls

Company profile



Hermann-Dorner-Allee 91, 12489 Berlin, Germany

Key facts

- Outsourced from ADVA Optical Networking in 2022
- Development and production of encrypted optical transport and Ethernet access solutions in Germany
- >15 years of experience in high-security networks
- Service portfolio for secure operations
- BSI approved and NIST certified products
- ISO 27001, 14001 and 9001 certified
- Sites in Berlin (HQ), Meiningen and Munich

Combining security expertise with network competence

Track record with protective network controls



2025: More to come...

2024: 400G crypto-agile encryption

2021: First crypto-agile end-to-end Ethernet encryption

2021: First commercial post-quantum optical transport

2018: Introducing standard compliant key exchange interface

2017: BSI-approved VS-NfD 100G encryption

2016: First QKD demo in live network

2014: Market-first 100G optical encryption

2010: First 10G optical encryption using AES-256



Helping our customers to protect their mission-critical networks

Our mission: making networks quantum safe

Research

- Post Quantum Cryptography
- QKD system, QKD components
- KMS, Network integration



SEQUIN

QuNET⁺



QuNEST

OPEN QKD



TRUE-SEC



Demos/Trials

- 2014: QKD co-prop (oe)
- 2018: McEliece KEM (tnc18)
- 2019: multihop-QKD (QComsHub)
- Many more ...



colt

Telecom Italia

citycom we connect the world



NORDUnet Nordic Gateway for Research & Education

UNINETT

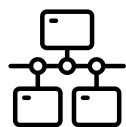
Products

- Hybrid QKD & DH (key interface, 2020)
- Hybrid McEliece & DH (2021), FrodoKEM & DH (2023) with DWDM transport
- 2024+: ML-KEM, Frodo-KEM, McElice in hybrid configuration with DWDM and Ethernet access

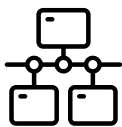


Commercialization of security technologies

Secure data transport – proven measures



IP/Internet



Layer 3 encryption: IPsec

Interconnecting **users, applications and resources**; any-to-any; short duration



Ethernet

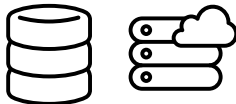


Layer 2 encryption: MACsec

Long-term **inter-office** connectivity, medium capacity, low latency, obscuring IP addresses



Optical



Layer 1 encryption: OTNsec

Long-term connectivity, **large sites**, lowest latency, obscuring IP and Ethernet addresses

Hardening of market-leading network products

Adtran

Technology, products

Optical transport (**FSP 3000**)
Ethernet and IP transmission (**FSP 150**)



Adva

NETWORK SECURITY

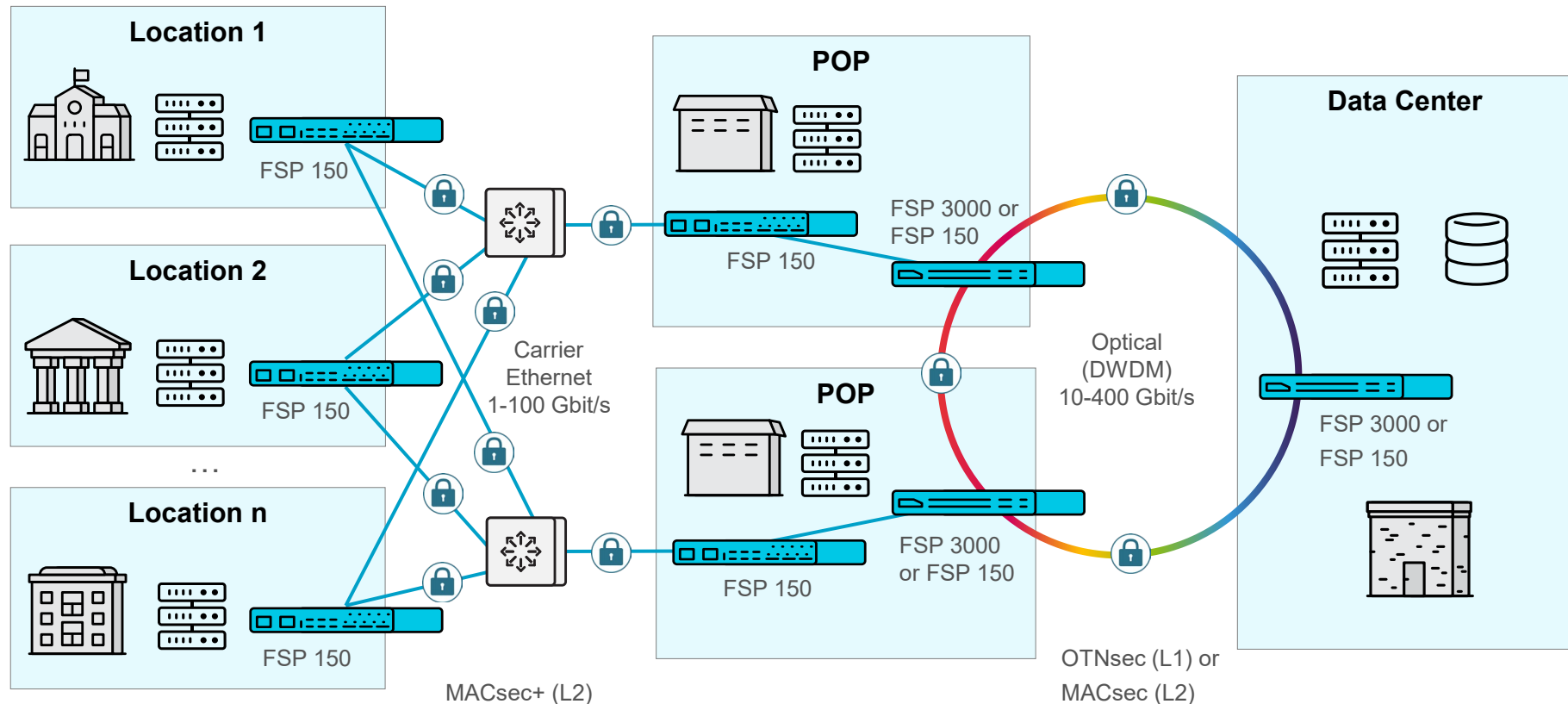
Security competence



- Security features
- Certifications, approvals
- Services for secure operations

THE BIG PICTURE

Secure connectivity across multiple network layers



Secure solutions for cyber-resilient networks

Features

- **Network Access:** Ethernet access & Optical Transport
- **Speed:** 100 Mbps to multi-terabit/s
- **Security:** Quantum-safe end-to-end encryption
- **Approval:** BSI VS-NfD and VS-V as well as EU/NATO RESTRICTED
- **Redundancy:** Highest availability



FSP 150

Ethernet network access with
Layer 2 encryption
and NFV servers



FSP 3000

Optical transport solution with
Layer 1 Encryption

Comprehensive Services



Consulting & Training

- System consulting, planning, design, conception (network, DCN and sync)
- Enabling technical staff on products and solutions



Construction

- Site analysis, fiber characterization
- Staging, delivery, installation and commissioning



Operation

- 24/7 maintenance services, Gold, Silver, Bronze service packages incl. customer portal
- SOC and NOC-as-a-Service
- Penetration Testing

End-to-end solutions

Packet edge and virtualization

Secure IP/Ethernet access and aggregation networks with VNF hosting on an integrated server

Synchronization

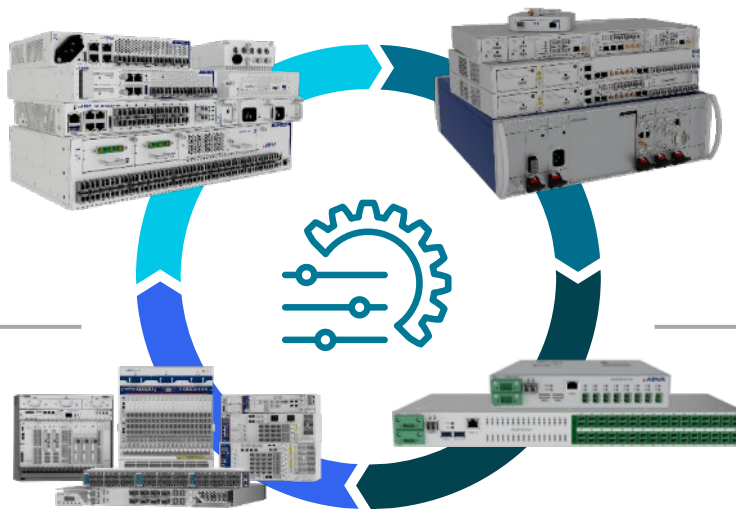
Delivering price and robust timing from GNSS and ultra-stable Cesium clocks

Optical transport

Open, disaggregated terminals and line systems for DCI and communication networks

Fiber monitoring

Real-time detection of breaks and anomalies on point-to-point links and PON



Common management
system featuring SDN
control

Use Cases



Quantum computers and cyber threats

- Quantum computers can compromise classical encryption
- Vulnerable asymmetric key protocols are widely applied
- Migration to quantum-safe controls is complex and time-consuming
- “Store-now-decrypt-later”-attacks create a significant security risk



The quantum threat demands immediate attention

USE CASE I

Quantum-migration of installed DWDM system

Requirements

- Upgrade installed FSP 3000 DWDM system at governmental data center
- Smooth path to quantum-safety
- Certified and approved encryption

Solution

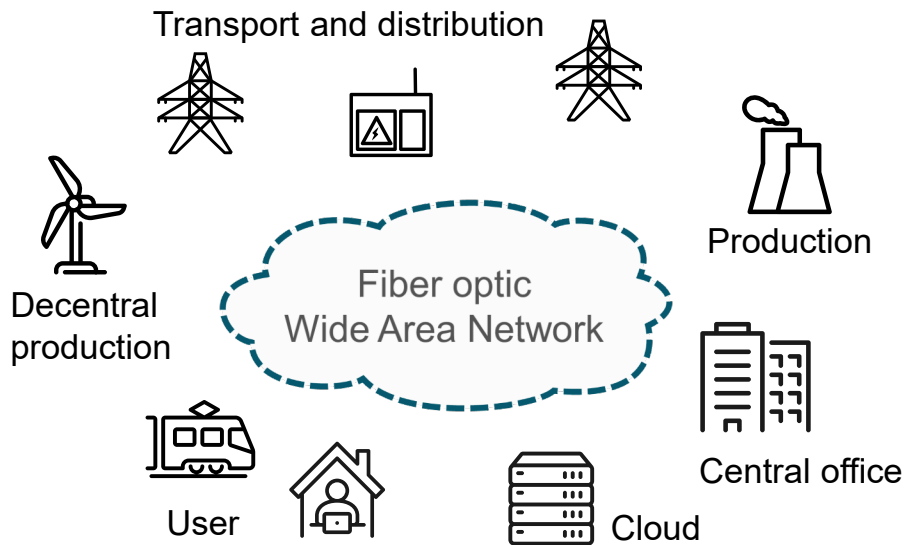
- Evaluating post-quantum cryptography and quantum key distribution
- Cooperation with QKD expert company: Quantum Optics Jena
- Successful upgrade and field-trialing



IT team of Thuringian Data Center,
Quantum Optics Jena and Adva Network Security

USE CASE 2: BACKGROUND

Cyber-resilient networks for critical infrastructure



Key requirements



Certified, quantum-safe optical transport



Protected Ethernet access and edge hosting



Robust synchronization, precise timing



Realtime monitoring

Comprehensive connectivity solution for digitized IT/OT infrastructure

Resilient connectivity for power utility

Requirements

- Secure connectivity among sites, offices and cloud sites
- Future-proof technology (features, regulation)
- Support from planning to operations

Solution

- Secure Ethernet and DWDM transport from 2 Mbit/s to 100 Gbit/s capability
- Precise synchronization
- Certified, approved products
- Comprehensive service offering



“When it comes to safeguarding our communication network, we can’t afford to compromise”; Michael Schick, TransnetBW.

USE CASE 3

Future-proof connectivity with federal agency

Requirements

- More bandwidth for federal agencies
- Secure Ethernet connections over untrusted public network
- Future proof: flexibility, quantum-safe

Solution

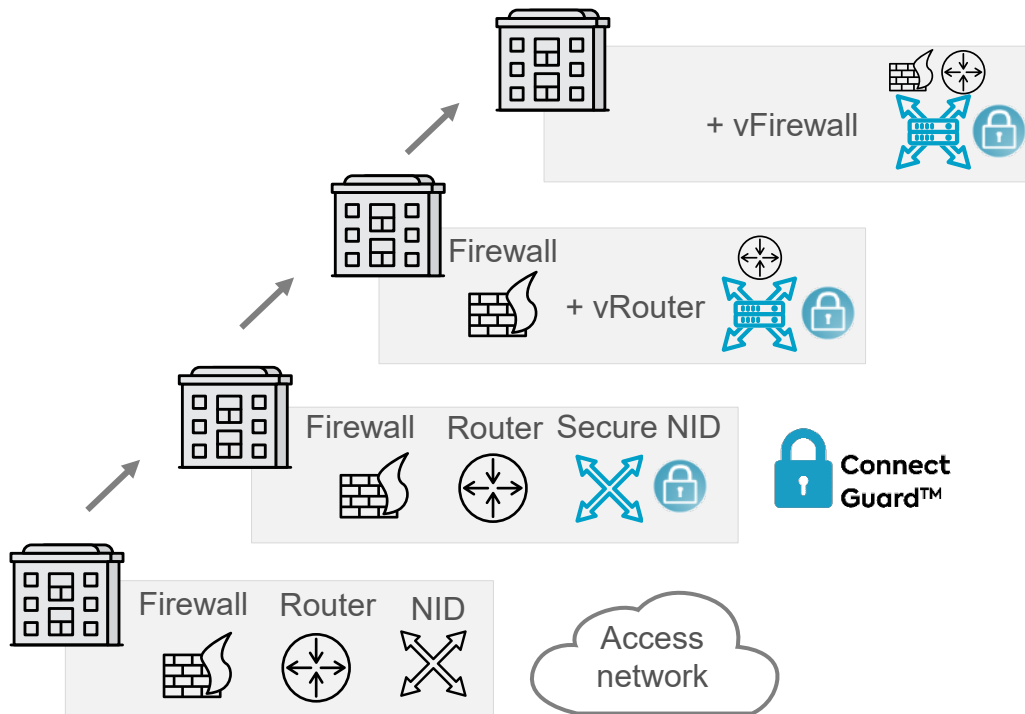
- FSP 150 Ethernet access device
- BSI-approved encryption and crypto-agility for PQC
- Upgrade with modular server for virtualized network functions



Collaboration: IT team of federal agency, Adva Network Security, other technology partners to come

USE CASE 3: BACKGROUND

Scale, security and flexibility at the network edge



Step 3: Improving security with feature-rich virtual firewall

Step 2: New routing features with virtualized router on plug-in server

Step 1: More bandwidth and quantum-safe end-to-end encryption

Starting point: Insufficient capacity and unencrypted connectivity

One product for improving scale, security and flexibility: FSP 150-XG118Pro

SUMMARY

Cyber-resilient networks for the quantum age



With ConnectGuard™, we make Adtran's market-leading transport solutions quantum-safe

Recognized expertise in post-quantum cryptography (PQC) and quantum key distribution (QKD)

Proven high-security solutions for government, defense, and critical infrastructure

Thank you

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