

# Deutsche Telekom Utilizes Open Source VOLTHA to Modernize Fixed-Access Network



## SUMMARY

Deutsche Telekom (DT) launched the Access 4.0 program to introduce a disaggregated, automated platform for access and service edge in the next generation German fixed network - while preserving already installed equipment and services. Progress in the Access 4.0 platform development is ongoing, with first pilot deployments running stable and robust over time. By inserting VOLTHA between its existing Optical Line Terminals (OLTs) and upper-layer OSS/BSS, DT created a vendor-neutral environment that supports both in-service hardware and new, white-box platforms. This case study explains why DT chose VOLTHA, how the solution was integrated, the benefits so far, and the operator's forward path.

## CHALLENGES

Prior to Access 4.0, DT's broadband network consisted of multiple proprietary PON domains. Each vendor supplied OLTs tightly coupled to its own management system, leading to high costs, operational complexity, and per-supplier OSS/BSS integration efforts. Manual configuration procedures lengthened service-activation cycles, while the need to expand gigabit coverage increased cost pressure. Crucially, DT had no appetite for a rip-and-replace strategy; the company required a migration path that would let it reuse existing OLTs and introduce new hardware without disrupting customer service.

## SOLUTION

VOLTHA was selected because it offers a hardware-agnostic abstraction layer for PON equipment. On its southbound side, VOLTHA communicates with OLTs through adapters - open source where available and proprietary where necessary - so legacy devices can participate in the new architecture. Northbound, it presents the PON network to SDN applications as a programmable Ethernet switch, simplifying integration with DT's OSS/BSS. DT deploys VOLTHA as micro-services inside small "Point-of-Delivery" x86 Kubernetes clusters hosted at central-office sites, alongside a leaf/spine fabric and standard compute nodes.

The implementation followed two proof-of-concept stages: an initial functional PoC with sample hardware and a second PoC using target equipment. Throughout both phases, DT engineers worked "upstream first," ensuring that all adaptations were merged into the mainline VOLTHA project. Key technical issues - such as the need to support thousands of Optical Network Units (ONUs) and to manage in-service OLTs - were addressed by enhancing the open source OpenOMCI component and by developing the VOLTHA Go Controller (VGC) for higher scale.

A carefully designed process now allows DT to migrate an installed OLT during a maintenance window: the device receives updated firmware and configuration, reboots, and immediately registers under VOLTHA, eliminating truck rolls and preserving subscriber settings.

## RESULTS

Since integration, DT has reported several tangible benefits:

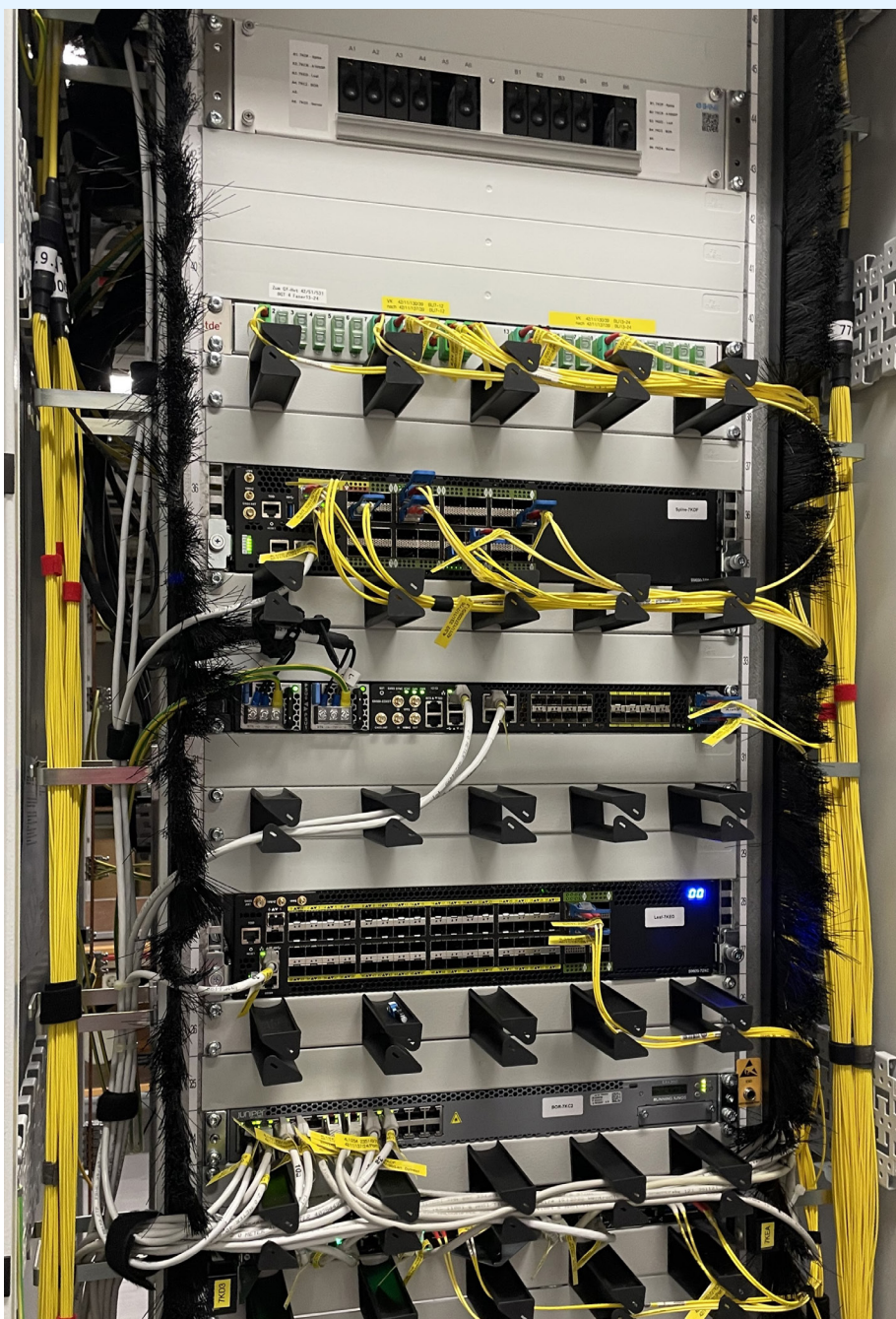
- **Cost Efficiency** – By supporting a mix of existing "black-box" equipment (now functioning like whiteboxes through VOLTHA) and new OLTs in a common SDN-enabled control and management plane, DT has reduced dependence on single-vendor solutions, lowering both capital and licensing costs.
- **Operational Simplification** – Zero-touch provisioning via the POD Access Orchestrator (PAO) and automated onboarding workflows have replaced manual configuration steps.
- **Vendor Diversity & Innovation** – The open interfaces and community-driven roadmap have encouraged multiple hardware suppliers to align their feature plans with VOLTHA releases, accelerating the introduction of new capabilities without locking DT into bespoke integrations.

## RESULTS

While DT emphasises that Access 4.0 is a brownfield project with inherently higher complexity than a greenfield rollout, the operator reports that community collaboration and continuous integration testing have brought the solution to what it calls “Carrier-grade quality and stability” suitable for large-scale production.

## NEXT STEPS

Looking ahead, Deutsche Telekom plans to extend the Access 4.0 architecture as new PON technologies mature. The company also continues to participate in the joint LF Broadband-Broadband Forum collaboration, ensuring that VOLTHA remains tightly aligned with standards such as BBF TR-383, TR-385, and TR-413. DT's stated goal is to leverage the same open source reference implementation and community test infrastructure for any future enhancements, thereby sustaining multi-vendor interoperability and shortening time to market.



*“Access 4.0 turns our PON network into software. With carrier grade VOLTHA solutions being deployed in production, network disaggregation has become a reality. VOLTHA lets us add capacity or features as easily as deploying a new container. LF Broadband enables efficiency through collaboration, not just in code development, but also through pre-qualification.”*

**– FABIAN SCHNEIDER, SUPERSQUAD  
LEAD ACCESS 4.0 DEVELOPMENT &  
ENGINEERING, DEUTSCHE TELEKOM**