LF BROADBAND

Türk Telekom Transforms Access Network with Open Source VOLTHA

Türk Telekom
Değerli Hissettirir

SUMMARY

Türk Telekom launched a comprehensive network transformation initiative to modernize its access infrastructure while addressing new features which cannot be applied to traditional vendor-specific architectures. Central to this effort is SEBA-VOLTHA - the open source, cloud-native broadband access management hosted by Linux Foundation Broadband (LF Broadband) - implemented under the SEBA (SDN-Enabled Broadband Access) framework. By deploying SEBA-VOLTHA across its access network, Türk Telekom achieved vendor neutrality, significant cost reductions, and enhanced service agility through a microservice-based architecture. This case study presents Türk Telekom's strategic approach, developed in collaboration with Netsia, highlighting the implementation aspects, the solutions created, and the significant results achieved. It demonstrates how Türk Telekom became the first operator in Türkiye to lead a large-scale, open source-based access transformation.

CHALLENGES

Prior to adopting SEBA-VOLTHA, Türk Telekom operated on traditional access architectures, like most of the other tier-1 operators around the World, that reflected common industry practices of the time. While effective for earlier service delivery needs, this model offered limited flexibility for adapting to evolving technology environments and scaling service innovation. There was also room for improvement in operational agility and multi-vendor interoperability.

To strengthen its leadership in digital transformation, Türk Telekom identified the need to enhance service agility, accelerate new service deployment, and create a more flexible, vendor-agnostic access architecture that could support future innovation and growth.

SOLUTION

SEBA-VOLTHA was selected as the optimal solution for creating an open, flexible, and vendor-agnostic access architecture. As an open source software platform, SEBA-VOLTHA enables whitebox OLT architectures through hardware abstraction. The solution provides a microservice-based architecture that separates control plane and data plane functions, allowing for centralized and more flexible network management.

Türk Telekom implemented VOLTHA under the SEBA framework, which provides a reference design for SDN-enabled broadband access.

Implementation Process

The implementation followed a systematic approach beginning with comprehensive pilot trials conducted in collaboration with Netsia, Türk Telekom's subsidiary:

Testing and Validation

- Establishment of dedicated test environments
- Comprehensive testing of various operational modes and functions and scale testing Friendly User field installations to validate real-world performance
- Integration trials with Türk Telekom's existing OSS/BSS systems
- Deployment in live field environments for production validation
- Scaling in live network

SOLUTION *(continuted)*

Industry Leadership Through Innovation

Rather than waiting for a mature ecosystem, Türk Telekom chose to lead the market transformation:

- **Platform Enhancement**: Through active collaboration with LF BB, Türk Telekom contributed code and requirements that shaped SEBA-VOLTHA to meet carrier-grade needs, ensuring the platform would serve global operator requirements.
- **Vendor Ecosystem Expansion**: As an early adopter when whitebox OLT and ONT manufacturer options were limited, Türk Telekom aimed catalyzed industry investment, significantly expanding the vendor ecosystem and creating a competitive marketplace.
- **Technical Innovation**: Türk Telekom drove development on both platform and device sides, working with manufacturers to resolve compatibility challenges and establish production-grade stability standards.

Operational Excellence Initiatives:

CI/CD Implementation: Collaborated with Netsia to establish automated software update workflows, setting new standards for network operations efficiency.

Real-World Validation: Created comprehensive test environments that accurately simulated live network conditions, establishing benchmarks for industry testing standards.

End-User Focus: Implemented extensive Friendly User Testing programs to ensure technology advancement translated to superior customer experience.

Strategic Market Impact: Türk Telekom's deployment success directly contributed to the global expansion of disaggregated OLT solutions, with their network serving as the reference implementation that enabled widespread industry adoption.

RESULTS

Since implementation completion, Türk Telekom has achieved significant operational and financial benefits:

- **Scale Achievement**: The system was successfully deployed across about 200K HP demonstrating the solution's production-scale viability.
- **Cost Efficiency**: Vendor neutrality enabled separate development of hardware and software components, resulting in significant CAPEX and OPEX savings.
- **Operational Transformation**: The deployment established an agile, updatable, and sustainable microservice-based access network architecture that supports rapid service innovation.
- **Future-Ready Infrastructure**: Implementation of SEBA prepared the network for advanced capabilities including dissagregation, comprehensive telemetry, and potential AI/ML-supported systems. An open source approach ensures the technology will remain flexible into the future.
- **Vendor Neutrality**: Unlike legacy PON solutions, SEBA-VOLTHA enables devices from different vendors to operate seamlessly on the same platform, eliminating vendor lock-in constraints and recurring OSS/BSS integrations.

Strategic Differentiation

Türk Telekom's SEBA-VOLTHA implementation differs significantly from traditional PON solutions in several key areas:

- **Vendor Neutrality**: The solution enables both OLT and ONT devices from multiple vendors to operate seamlessly on a unified platform, allowing them to be mixed and matched while eliminating traditional limitations. Vendor neutrality provides a significant cost reduction in investment.
- **Cloud-Native Architecture**: Separation of control plane and data plane enables centralized, flexible network management with improved scalability and operational efficiency This speeds up the time to market for new services by enabling network changes to be made in a much shorter time frame
- **Community-Driven Innovation**: Built on standards developed collaboratively with organizations including LF BB and the Broadband Forum (BBF), the solution ensures continuous platform evolution and industry alignment. It also benefits from a global development community of developers and organizations, versus relying on a single vendor's R&D resources.
- **CI/CD Integration**: Advanced automation support enables faster, lower-risk version upgrades and system integrations.

NEXT STEPS

Türk Telekom's implementation provides a proven blueprint that other operators can follow, reducing deployment risk and accelerating time-to-value.

Türk Telekom continues to expand its SEBA-VOLTHA deployment as part of its ongoing fixed access investment strategy. As an active contributor to the SEBA-VOLTHA ecosystem, the company maintains its vision of leading Türkiye's telecommunications industry in open source-based access transformation.

The operator continues to participate in joint LF Broadband initiatives, ensuring alignment with evolving standards and contributing to the global advancement of open source broadband technologies.

*"**SEBA**-VOLTHA has fundamentally transformed our network economics and operational capabilities. We've achieved significant CAPEX savings while serving about 200K HP with minimal service disruptions during our Green Field Investment. The transformation goes beyond cost savings – we've eliminated vendor lock-in, accelerated our service deployment cycles, and created an agile network infrastructure that scales like a cloud platform. Most importantly, we've proven that open source broadband technology delivers carrier-grade reliability at production scale.*

We continued our contributions as a board member under ONF (Open Networking Foundation). Today, we are advancing these efforts even more strongly under the LF framework. Seeing our efforts turn into real, practical benefits in the field once again proves that we made the right choices. We will keep expanding SEBA with confidence, growing the ecosystem and increasing our investments by keeping Türk Telekom 2030 network vision."

– ZAFER ORHAN, CNO OF TÜRK TELEKOM