Empowering Italy's Digital Future with EOLO's 5G mmWave FWA Network

At a Glance:

- EOLO
- Location: Italy
- Industry: Telecommunications

Challenge:

- EOLO needed to deliver ultra-high-speed broadband to underserved and rural areas of Italy, overcoming the economic and geographic barriers of fiber deployment, while handling massive peaks in network traffic driven by streaming and live events.

Solution:

- 6WIND VSR

Results:

- 1 Gbps down link achieved over 6.6 km at 26 GHz
- Fully automated, self-healing network with zero-touch provisioning
- 4,000+ distributed UPF sites delivering ultra-low latency
- Significant reduction in power consumption and operational costs
- Enhanced scalability and sustainability with software-defined, hardware-agnostic design
- Improved user experience in rural and remote areas

EOLO is an Italian telecommunications service provider dedicated to connecting underserved and rural areas across the country. Founded over 15 years ago, EOLO pioneered Fixed Wireless Access (FWA) services to bridge Italy's digital divide. As a certified B Corporation, EOLO's mission extends beyond profit—to create social and economic impact by enabling people and businesses to thrive locally without relocating to large cities. Today, EOLO operates one of Europe's largest millimeter-wave networks, delivering high-speed broadband through innovative radio and network technologies.

Challenge

Connecting underserved areas of Italy with high-speed internet despite deployment challenges.

Italy's complex geography makes fiber deployment to remote areas economically unsustainable. EOLO's mission to connect the "digitally divided" population required a high-performance, scalable, and cost-efficient solution capable of delivering gigabit speeds wirelessly. However, as network traffic surged—particularly during evening hours and live football broadcasts—the company faced the challenge of unpredictable bandwidth peaks, congested backhaul links, and growing energy demands. Traditional centralized network models and manual interventions were no longer sufficient to guarantee service continuity or efficiency.

EOLO needed a flexible, automated, and sustainable approach to manage thousands of network nodes and ensure a consistent, fiber-like experience for customers, even in the most remote regions.

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EOLO chose 6WIND for its long-standing partnership, technical innovation, and shared vision of open, software-based networking. The collaboration dates back more than a decade, beginning with EOLO's first generation of Blue Routers. 6WIND's proven virtualization expertise, high-performance UPF, and flexibility across architectures (including ARM) made it the ideal choice for EOLO's distributed 5G rollout.

> "6WIND has been a partner of EOLO since the very beginning. Their software allowed us to virtualize the UPF and BNG functions on our routers, giving us performance, automation, and flexibility to evolve without disruption."
>
> *Francesco Alberti, Head of Networking at EOLO*

Requirements

EOLO required a 5G mmWave network that could provide 1 Gbps fixed broadband services with low latency and high reliability. The company needed to automate network operations, including provisioning, scaling, and fault management, to handle thousands of distributed sites efficiently. Energy efficiency and sustainability were key design goals, alongside the need for compatibility with wholesale partners through Layer 2 and Layer 3 services. To remain agile and avoid vendor lock-in, EOLO sought an open, software-defined solution that could evolve with future technologies.

Solution

EOLO partnered with 6WIND and Mavenir to design a fully virtualized, distributed 5G SA FWA network.

At the edge, EOLO deployed its custom-designed **"Blue Routers"**, white box platforms optimized for low power consumption (≈75W).

6WIND's Virtual Service Router (VSR) provided the BNG and UPF functions, leveraging DPDK acceleration for high throughput.

By virtualizing the UPF on each tower, EOLO ensured customer sessions terminate locally—reducing latency and minimizing backhaul congestion.

The network is fully automated with zero-touch provisioning, API-driven orchestration, and real-time traffic optimization, dynamically rerouting data based on load conditions.
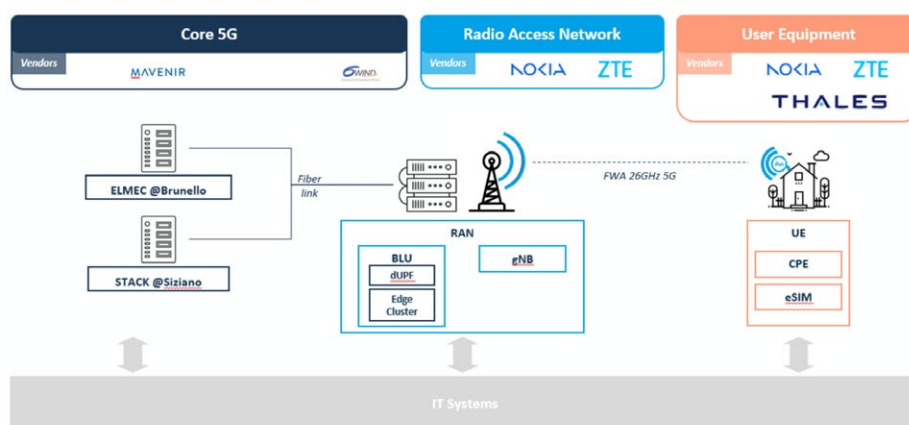
This modular, software-defined approach allowed EOLO to integrate 5G technologies without disrupting existing infrastructure, achieving both innovation and sustainability.

Results

EOLO's collaboration with 6WIND and its partners delivered tangible operational and technical success. The new network achieved 1 Gbps throughput over 6.6 kilometers using 26 GHz spectrum, proving the viability of long-range, high-speed FWA. The automation framework now performs zero-touch provisioning and continuous optimization, dynamically rebalancing traffic to maintain stability during sudden demand peaks such as major sporting events. The distributed UPF architecture reduced latency and improved resilience, while energy-efficient ARM-based routers minimized environmental impact. Overall, EOLO achieved a faster deployment timeline, lower costs, and a sustainable, future-proof network architecture that sets a benchmark for European broadband innovation.

Conclusion

EOLO's partnership with 6WIND represents a landmark in European telecom innovation. By combining open standards, distributed cloud-native architecture, and sustainable engineering, EOLO has built a scalable, energy-efficient, and socially impactful 5G FWA network. This initiative not only bridges Italy's digital divide but also sets a benchmark for operators worldwide seeking to modernize networks through software-defined, virtualized, and environmentally conscious solutions.

5G - 1Gbps, Service Architecture – EOLO

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