



Transforming Large-Scale Apartments into Connected Smart Communities

Overview

The Tivoli Garden project aimed to transform 445 apartments into a smart living community by building a futureproof KNX-based automation system to manage over 10,000 devices across KNX lines.

Zyxel Networks, in partnership with maneth stiefel and Studerus, deployed fifteen XGS4600-52F L3 fiber switches and a USG FLEX 700 firewall to build a reliable, secure, and scalable network. The infrastructure supports real-time smart home communication while remaining flexible for future expansion, creating a secure, connected, and future-ready living environment.

Challenges

The Tivoli Garden project aimed to provide residents with a seamless smart living experience, enabling centralized control of lighting, shading, ventilation, and heating in every apartment. The project's complexity quickly became apparent, as it required connecting and managing a vast number of smart devices within a single unified system. Integrating 483 KNX lines to link over 10,000 devices created a highly intricate network. Additionally, planners had to manage 445 databases and configure more than 80,000 group addresses, each demanding precision and synchronization. Ensuring smooth communication among all smart home components relied on careful IP router configuration, while the network also had to remain stable under heavy traffic, supporting more than 1,000 devices simultaneously.

Solutions

To overcome the challenges of managing a large-scale smart residential environment, the Tivoli Garden project partnered with Zyxel Networks to build a robust and scalable network foundation. Selected for its strong balance of performance, security, and cost efficiency, Zyxel Networks' solution provided the reliability needed to support a complex smart home ecosystem, designed and implemented by partners maneth stiefel and Studerus.

Customer

Tivoli Garden

Industry

Real estate

Location

Spreitenbach, Switzerland

Organization Size

445 apartments

Partner

maneth stiefel and Studerus

Customer Background

Tivoli Garden redefines urban living by combining advanced building technology with comfort. Each apartment includes smart home systems controlling lighting, shading, ventilation, and heating. Direct access to Shoppi Tivoli, a nearby Limmattalbahnhof rail stop, and a green courtyard enhance connectivity, convenience, and quality of life.



A key success factor was the project's strategic use of existing infrastructure. By reserving a fourth FTTH connection exclusively to smart home communication, the network gained additional bandwidth and remained flexible enough to support future technologies and expansion.

At the heart of the deployment, fifteen XGS4600-52F fiber switches form a high-capacity backbone that ensures smooth, stable data transmission across the entire site. Combined with more than 500 SFP modules and fiber converters, the solution delivers consistent performance for over 1,000 connected devices, even during peak usage.

To support reliable and efficient smart home connectivity, the network design implements eleven VLANs, enabling clear segmentation and organized traffic management. The optimized VLAN structure efficiently supports multicast data streams essential for KNX IP communication. With IGMP protocols and multicast routing configured on the core switch, data streams are distributed via VLANs efficiently, ensuring seamless operation of smart home services.

To complete the solution, a centrally deployed USG FLEX 700 firewall safeguards the entire network, delivering secure connectivity with integrated VPN and SD-WAN capabilities.

Results

The Tivoli Garden project represents a milestone in smart building automation, demonstrating how Zyxel Network technology forms the backbone of modern, connected living. By combining high-performance switches, advanced security firewalls, thoughtful design, and optimized network infrastructure, the project delivers a reliable, scalable foundation for smart homes of the future.

- Segmented network with VLANs and IGMP-enabled multicast routing ensures smooth KNX IP communication
- Centralized USG FLEX 700 firewall delivers integrated VPN and SD-WAN security across the network
- Scalable, stable, and secure smart home infrastructure enables residents of 445 apartments to seamlessly control all connected systems



- XGS4600-52F L3 Aggregation Fiber Switch



- USG FLEX 700 Firewall

