Zakliczyn Public Wi-Fi Network Improvement Project

Project Overview

During our visit to Zakliczyn, we observed that internet coverage was weak in many public areas. To address this, we designed a network improvement plan to provide stable, high-quality public internet access through an outdoor Wi-Fi infrastructure.

This project aims to enhance internet accessibility and digital inclusion by deploying a robust fiber-connected Wi-Fi network across 8.1 kilometers of key urban and rural routes. First was built the architeture map and the network was built according to that map

Objetives

Provide free and stable internet access in public areas

Enhance digital inclusion and public safety

Support local tourism, education, and businesses

Lay the groundwork for smart city infrastructure

Network Architecture & Design

We first designed the network architecture using simulation software (Cisco Packet Tracer), guided by distance measurements from Google Earth. The infrastructure was mapped and built accordingly.

Central Node (OLT Location): Town Center (Zakliczyn Town Hall or Local Administrative Building)

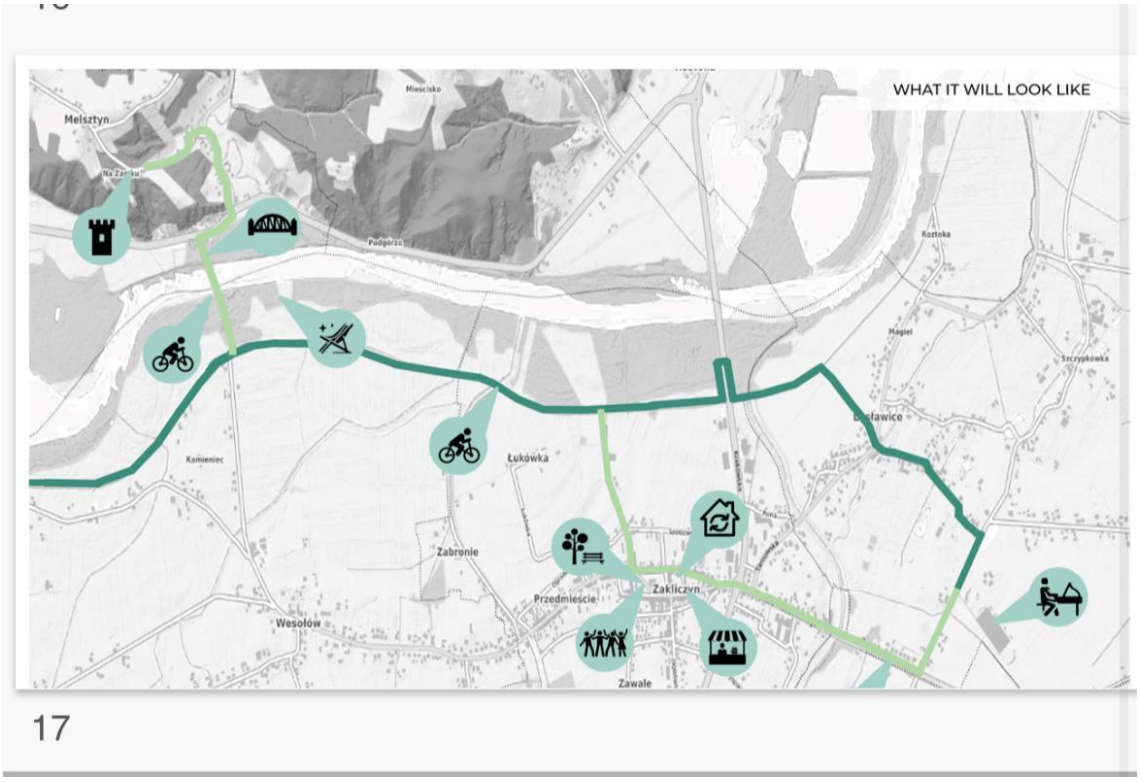
OLT (Optical Line Terminal): Centralized fiber internet distribution point

Fiber Optic Backbone: Spanning 8.1 km, connecting all major network nodes

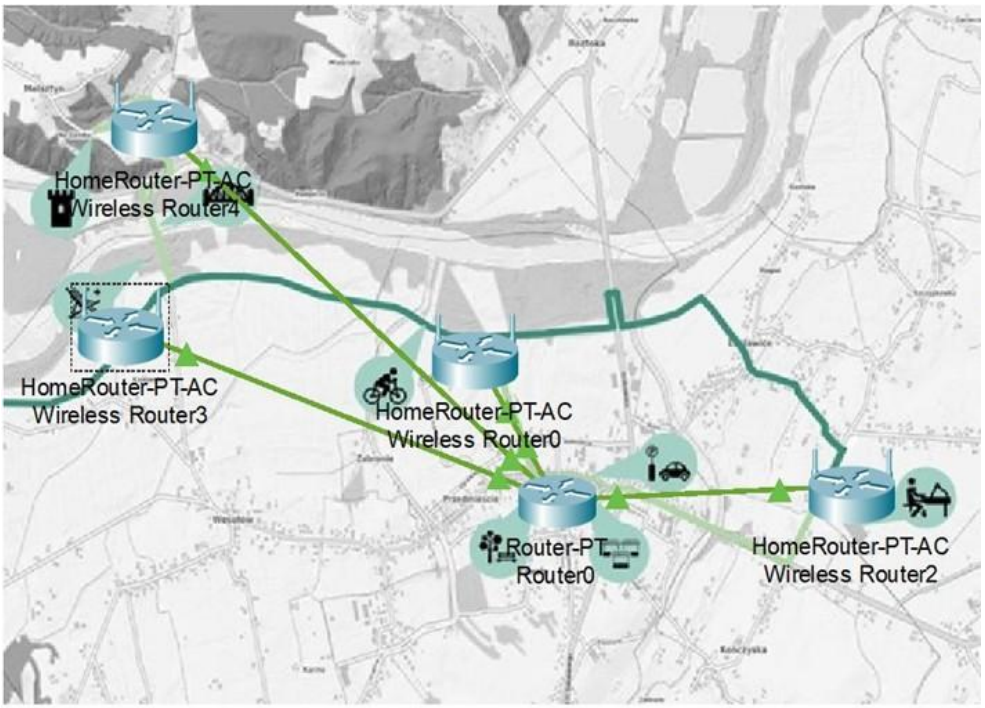
Primary Router/AP Nodes: Castle, Melsztyn, River, Bike, Center, Penderick

Wi-Fi Access Points: Installed every 150–250 meters

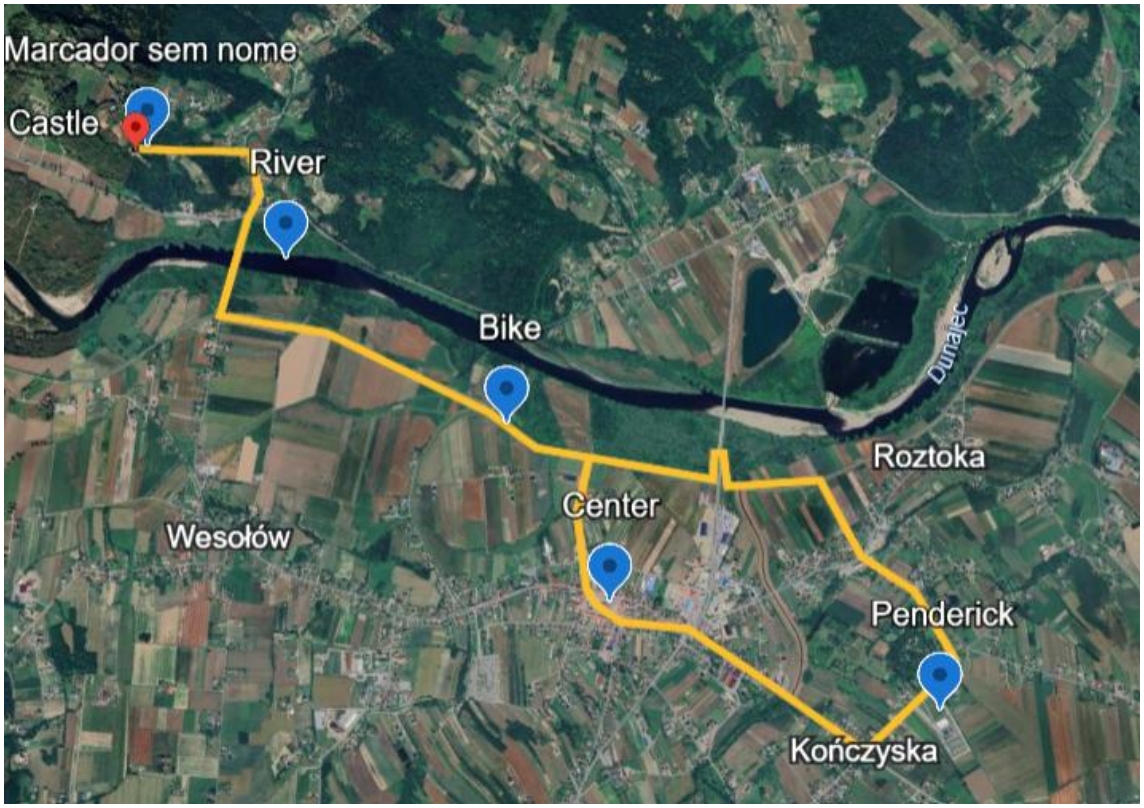
Architeture map



Network built on Cisco Packet Tracer



Google Earth



Technical Topology

Central Node (OLT Location): Center (Zakliczyn Town Hall / Local Office)

- **OLT (Optical Line Terminal):** Central internet distribution point.
- **Fiber Optic Backbone:** Runs from the OLT through each main node.
- **Primary Router/AP Nodes:** Castle, Melsztyn, River, Bike, Center, Penderick.
- **Repeaters:** Deployed every 150–250 meters for signal continuity.

Equipment Summary

Item	Quantity	Unit Price (€)	Total (€)
Fiber optic cable (12F)	8200	0,35	2870
Splice boxes (every 1 km)	10	50	500
Managed Switches	6	250	1500
OLT (Ubiquiti UFiber OLT)	1	1200	1200
Outdoor Wi-Fi Access Points	42	130	5460
Poles (if needed)	20	200	4000
PoE power supplies + electrical cabling	42	30	1260
Fiber installation labor (per meter)	8200	12	98400
Access Point installation labor	42	150	6300
Network design and configuration	1	5000	5000
TOTAL			126490

The table below presents a detailed breakdown of the projected costs for deploying the public Wi-Fi infrastructure in Zakliczyn. It includes all essential components such as fiber optic cable, managed switches, outdoor access points, installation labor, and core network equipment.

All prices are based on current market rates in Portugal (2024–2025). Actual costs in Poland may differ depending on local suppliers, labor costs, taxes, and logistical factors.

This cost estimate serves as a reliable reference for budgeting and feasibility analysis. Adjustments should be made during the procurement phase to reflect local pricing and infrastructure conditions in Poland

Deployment Phases

Phase 1 – Core Infrastructure Setup

- Install OLT and main switches at the Center
- Lay fiber backbone along the planned route

Phase 2 – Device Deployment

- Install access points and repeaters every 150–250 meters
- Set up managed switches at main nodes

Phase 3 – Testing & Optimization

- Network configuration and quality testing
- Adjust coverage gaps and optimize bandwidth

Tools & Methodology

Cisco Packet Tracer: for network simulation and planning

Google Earth: for precise distance measurements