LokalFi:

Empowering Communities in the Philippines with Wi-Fi to Close the Digital Gap in the Age of Industry 4.0

REIINN

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Industry 4.0

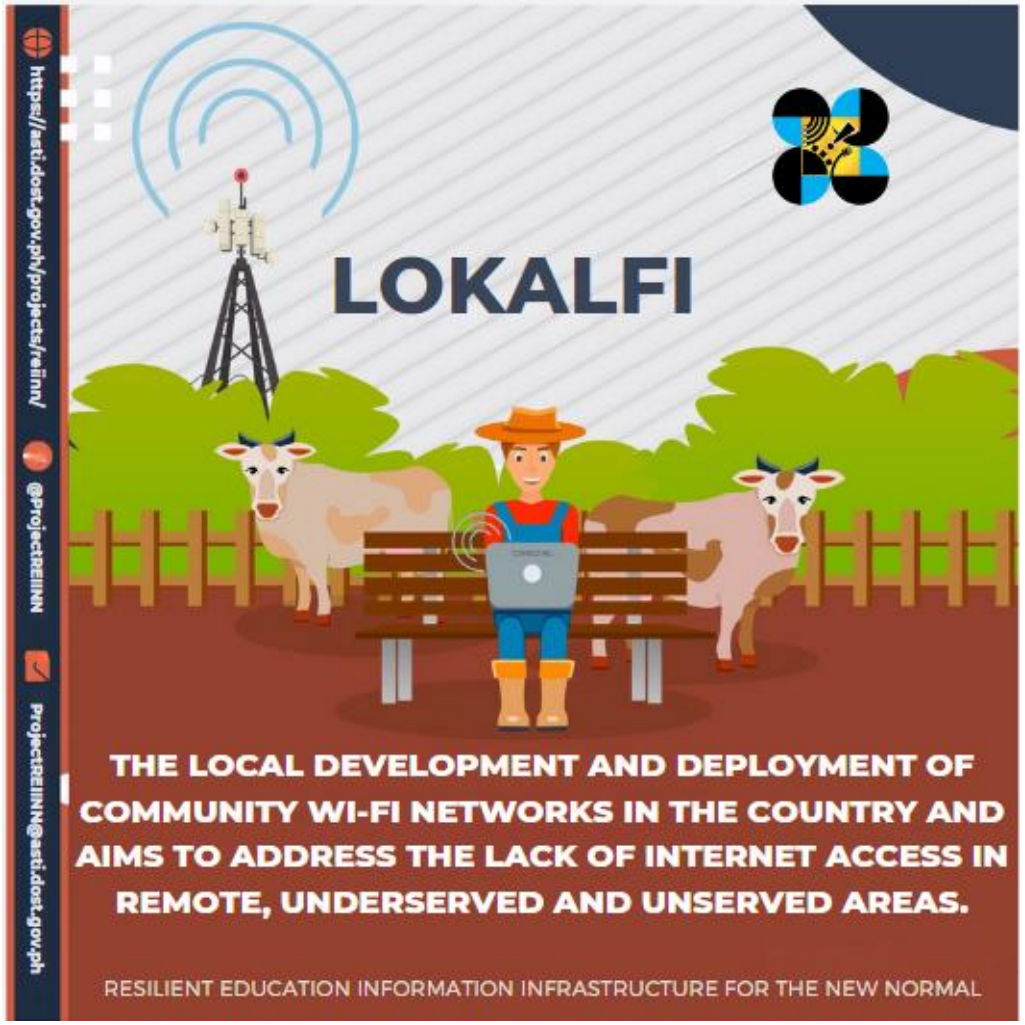
Characterized by the integration of technologies like **IoT**, **AI**, **cloud computing**, **big data**, and **edge computing** to create “smart” factories and environments.

[Problem] Roadblocks to Industry 4.0 Adoption

1. **Digital Divide/Gap:** Last-mile communities without internet access, modern software, and devices are left behind in the adoption of these technologies.
2. **Insufficient (or lack of) Infrastructure:** Communities with outdated or insufficient infrastructure will struggle to adopt Industry 4.0
3. **Skills Gap:** Educational and training systems may not be keeping pace with these technological advancements.

LokalFi as an Enabler of Industry 4.0

1. **Bridge the digital gap:** Provide connectivity to last-mile communities
2. **Build Infrastructure:** Affordable and community-operated Wi-Fi Network
3. **On-premises Apps**: Free access to online learning resources and platforms that offer courses in relevant technologies



*LokalFi empowers last-mile communities by bridging the digital gap with affordable, community-operated Wi-Fi and free access to online learning resources, **fostering innovation and growth in Industry 4.0**.*

PROPOSED METHOD

Part I: Site Identification and Selection

Main criteria: Absence of internet service provider and telecommunication network provider in the area

Part II: System Design

A. Hardware

Commercial-off-the-shelf components

B. Software

Mikrotik Platform: Mikhmon

– voucher and log-in credentials generation, monitoring, and user management

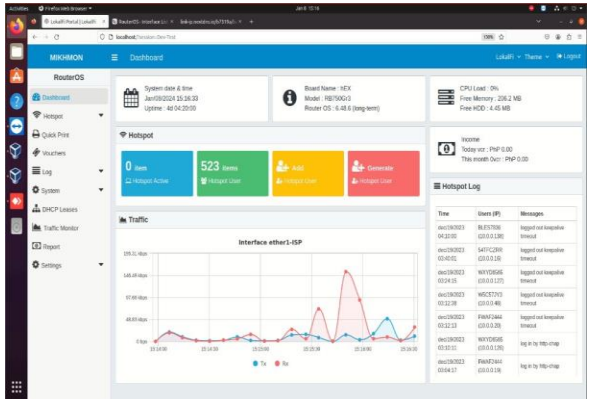
LokalFi Captive Portal

- built using web technologies such as HTML, CSS, JavaScript for the user interface, and PHP for backend operations
- integrates with RouterOS API to automate the generation, monitoring, and management of vouchers

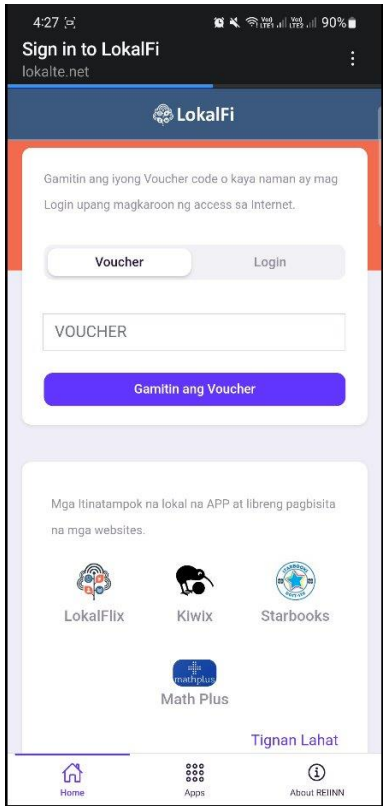
C. On-Premises Apps (Locally cached content)

- accessed locally even without an internet connection
- the edge server stores and distributes content within the LAN

Site Selection

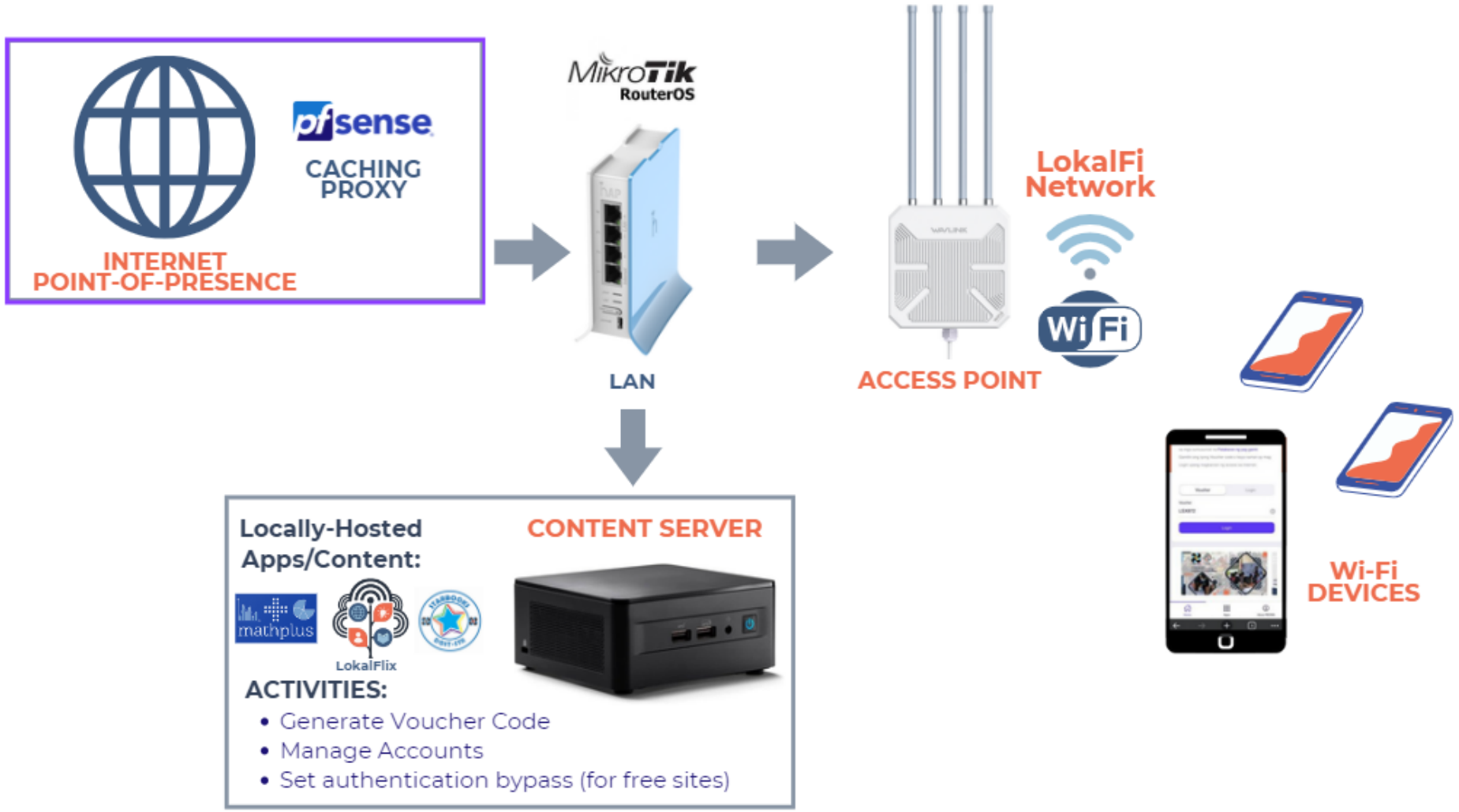


Mikrotik Mikhmon



LokalFi Captive Portal

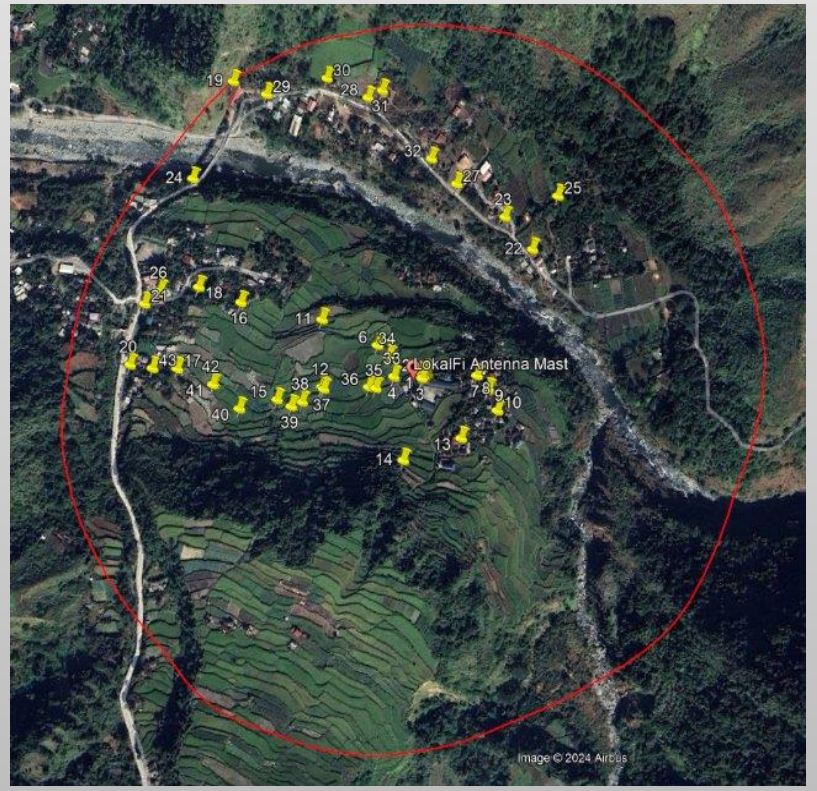
LokalFi System Overview

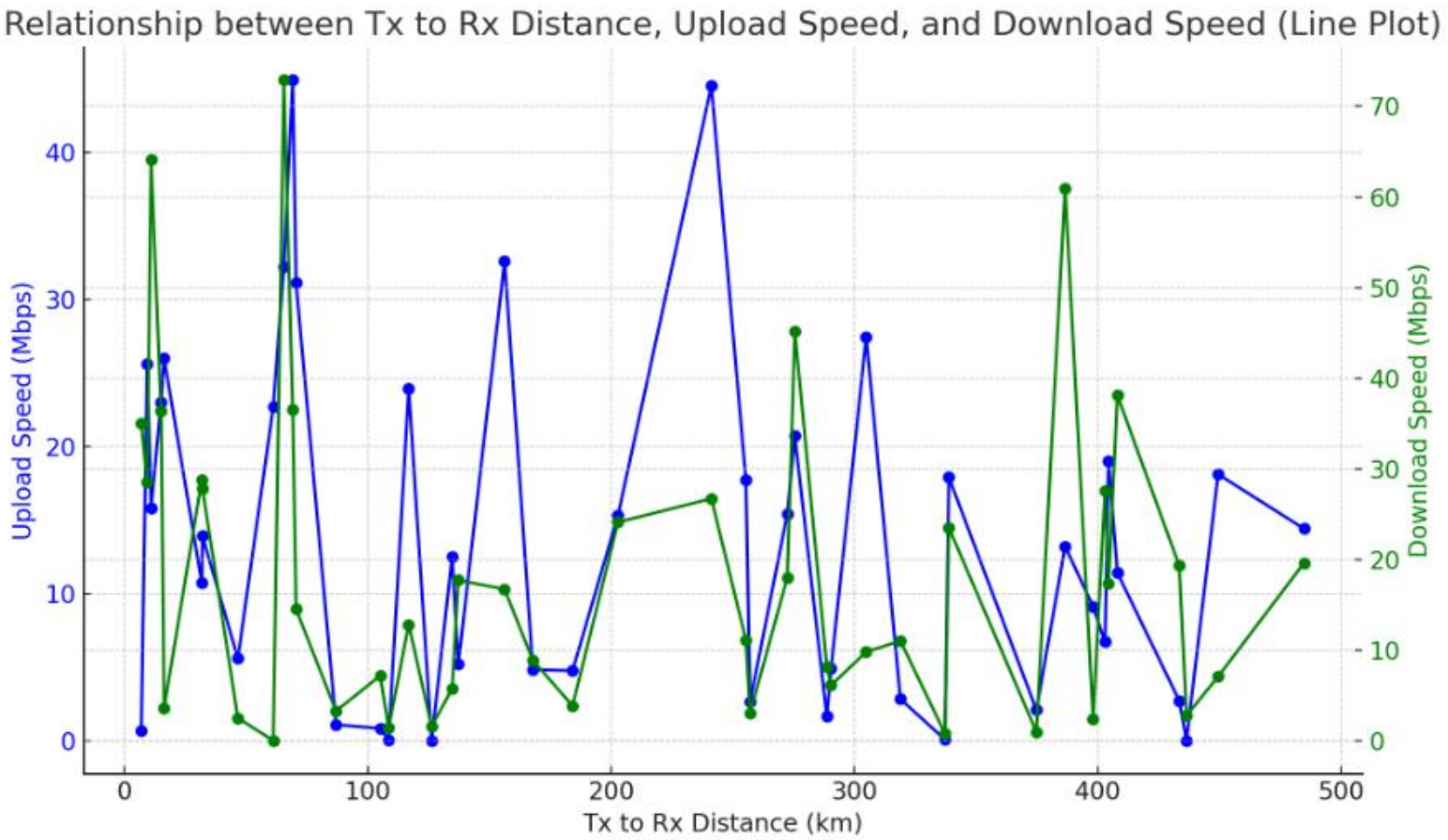


EXPERIMENTS AND FIELD TESTING

Walk Test Objective:

Determine the network coverage (i.e., range) while utilizing the Wavlink Access Point (height: 12 meters)





- The maximum range covered by LokalFi network is 450 meters.
- There is no correlation between distance and upload/download speed.
  This is due to several factors such terrain (the location is mountainous), thick foliage, and other obstructions.

IMPACT

Scientific and Technological

✓ **Boost to IoT Infrastructure:**
- Foster widespread deployment of IoT systems

✓ **Digital Inclusion and Research Opportunities:**
- Bridge the digital gap
- Contribute to data-sharing initiatives

Societal

✓ **Improved Connectivity and Social Inclusion**
-Enabling communities to connect to the outside world

✓**Economic Development**
-Remote work opportunities

✓ **Education Opportunities**
- Online Courses and Training Certification

✓ **Health Services**
- Telemedicine

✓ **Sustainability**
- Community-operated network

Collaborative

✓ **Partner Agencies**
for digital content
- Department of Education
- Schools and Universities
- Technical Education and Skills Development Authority

✓ **Local Government Units**
for Pilot Sites

✓ **Department of Science and Technology (DOST)**
Regional Offices

IMPACT

LokalFi Pilot Sites

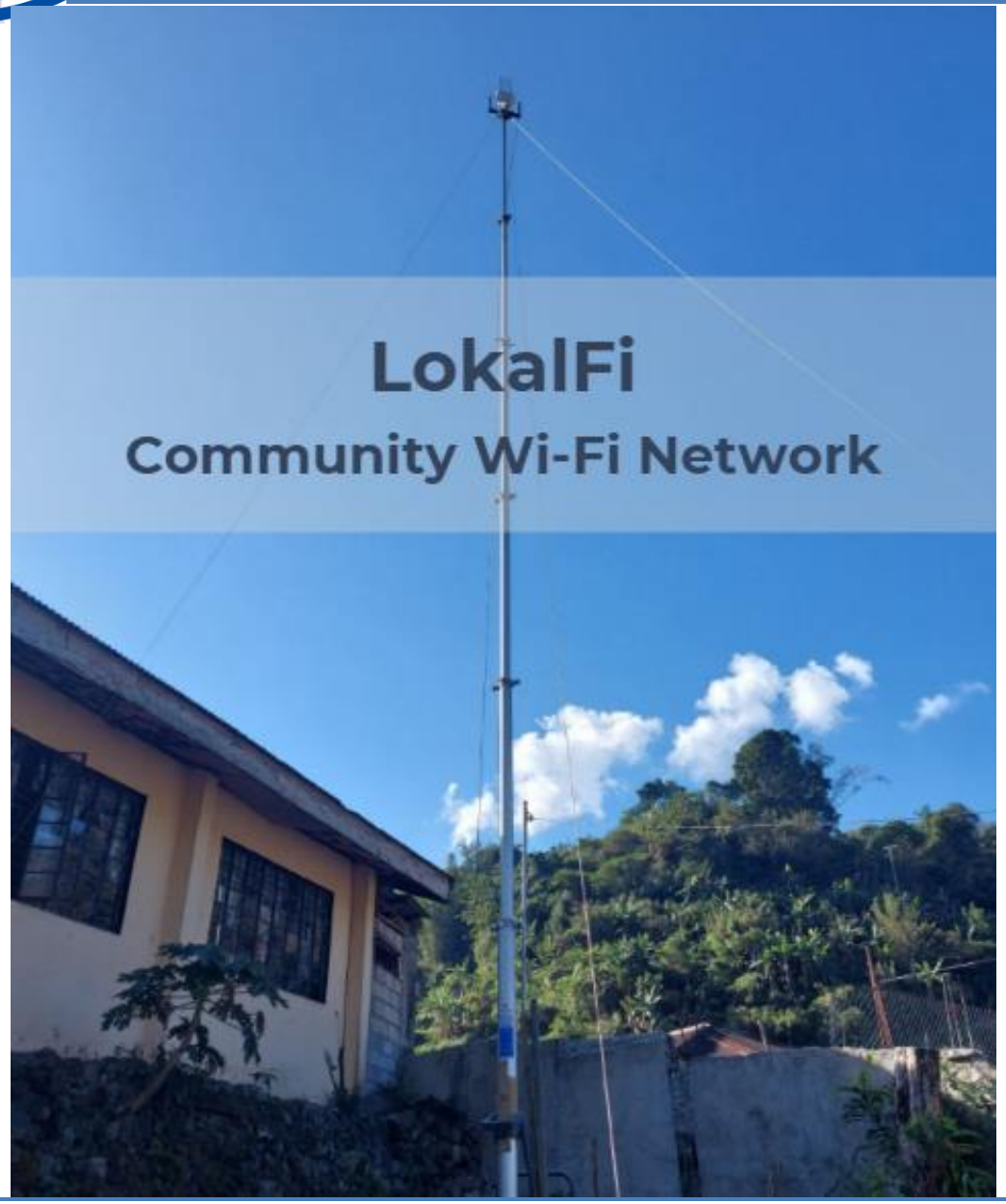
Cordillera Administrative Region

Region II

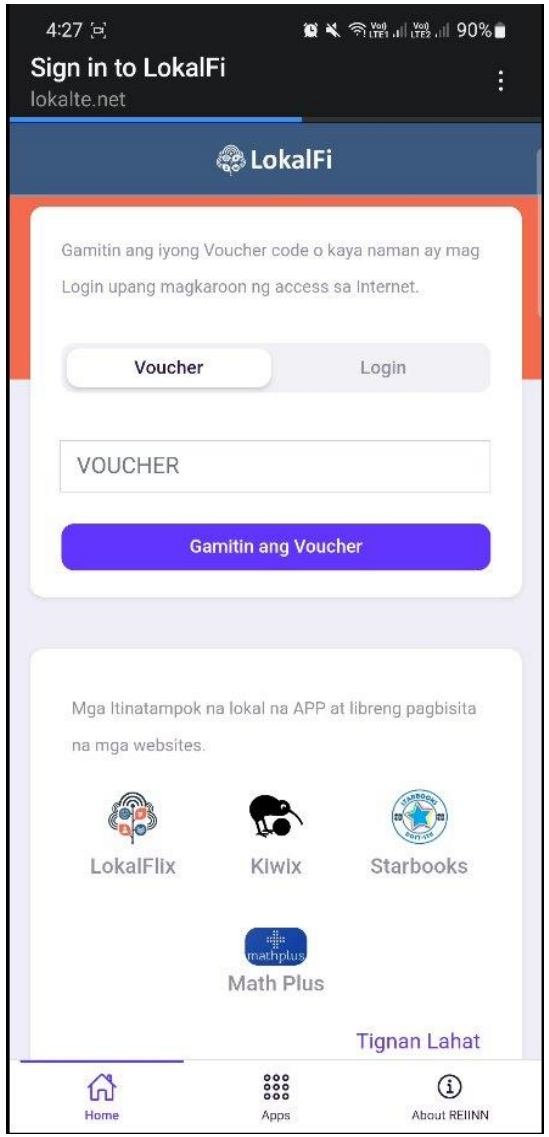
Region III

Region IV-A

OUTPUT



LokalFi Captive Portal



LokalFi

- A community-owned, community-operated Wi-Fi network
- Sustainable through the voucher system
- Offers free-access on-premises apps
- Customizable locally-cached content (can host content about AI, IoT, Machine Learning, etc)

Long-term Output

1. **Improved Access to Digital Infrastructure:** affordable or even free internet access in last-mile communities

2. **Economic Growth and Opportunities:** access to e-commerce platforms

3. **Community Engagement and Empowerment:** LokalFi as an income-generating platform

4. **Better appreciation** among Filipinos of the essential role of **technology** and **science-based interventions** in nation-building in general.

CONCLUSION

❖ LokalFi is an enabler of Industry 4.0

Develop and deploy community Wi-Fi networks to empower last-mile communities, ensuring they stay connected and are not left behind by the advancements of Industry 4.0

❖ LokalFi Network Design and Implementation

1. Identify sites
2. Acquire necessary hardware components (COTS)
3. Install and configure Mikhmon
4. Build and integrate the LokalFi Captive Portal
5. Customize on-premises apps to meet the specific needs of the communities

Future Plans:

- ❖ Develop a business model to ensure the ongoing operation and maintenance of the LokalFi Network
- ❖ Expand LokalFi network coverage by implementing mesh technology and adding more nodes.

Thank you.

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