

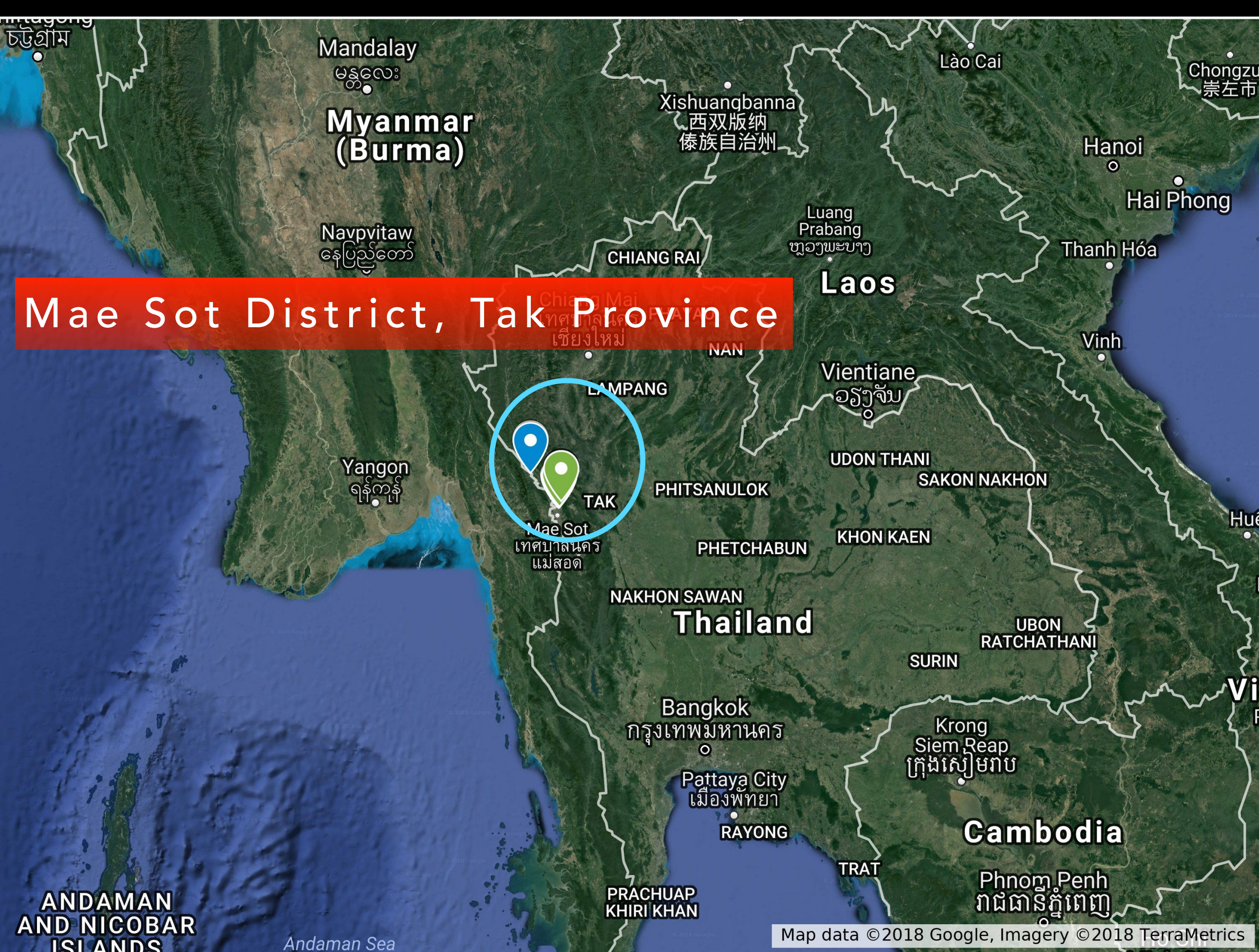
TakNet Community Network

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WESHSUWANNARUGS, PREECHAI MEKBUNGWAN AND KANCHANA KANCHANASUT

intERLab, Asian Institute of Technology (AIT)

IRTF GAIA, Montreal Canada

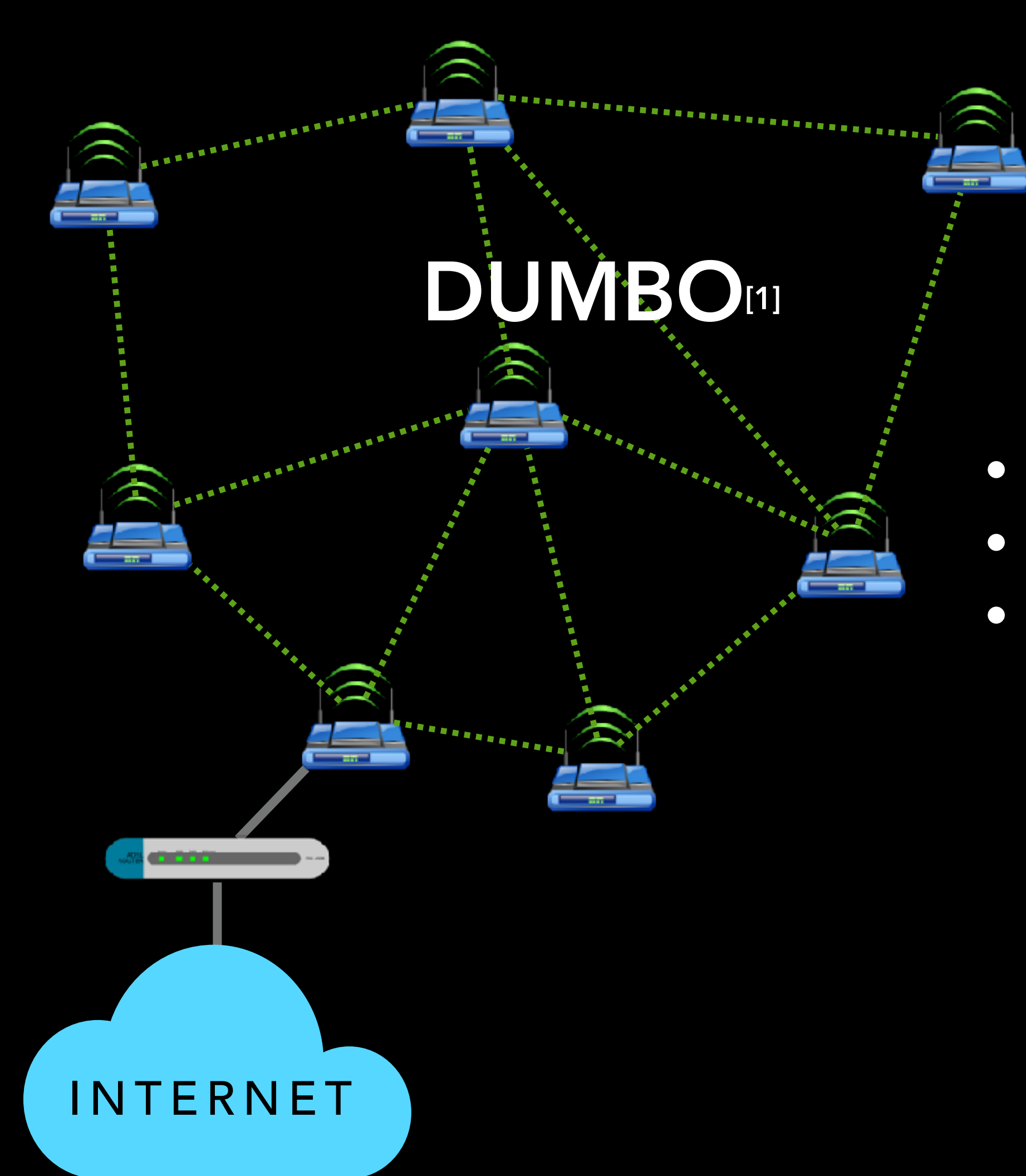
17 July 2018



TakNet: Last meters access solution
Started in late **2013**
15 remote communities
190 + deployed nodes
1000+ residents using our network



Our Technologies



TPlink MR3040

- Coverage: 50-60 m
- WiFi 2.4 GHz
- Usage: Portable, Apply to emergency situation



TPlink AC1750

- Coverage: 100 m
- WiFi 2.4/5 GHz
- Usage: Static and Indoor



Unifi Outdoor AP

- Coverage: upto 200 m
- WiFi 2.4/5 GHz
- Usage: Outdoor, Link to GW



Raspberry Pi

- Micro Server
- Running local services (e.g., chat, VoD)

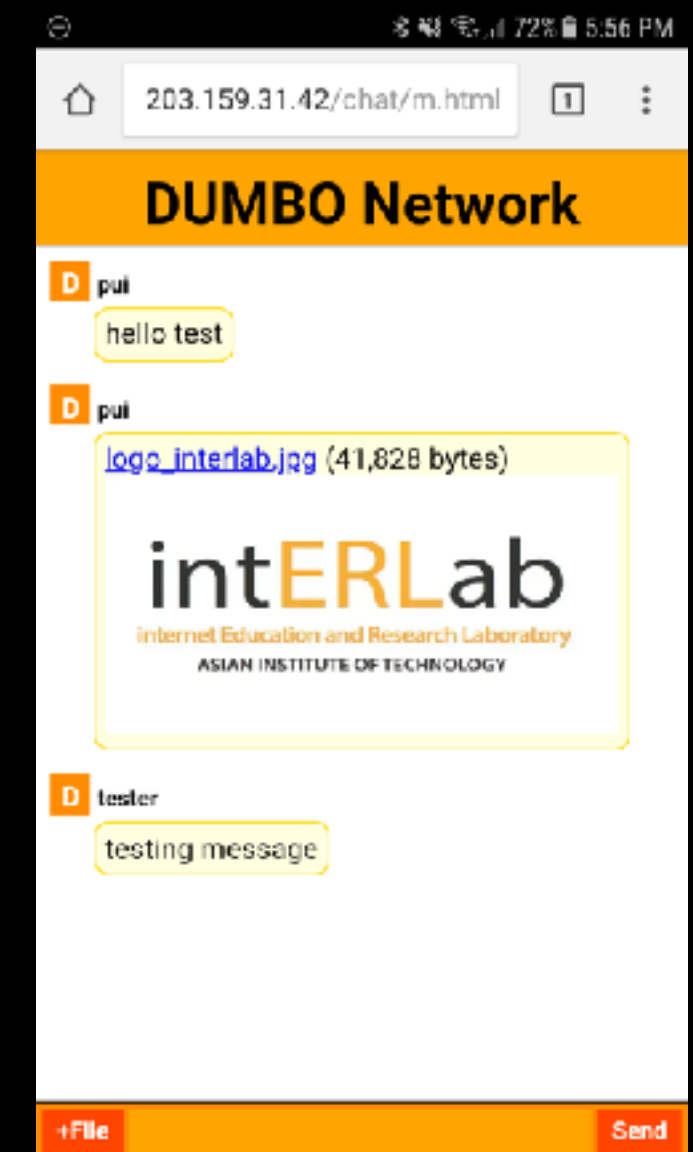
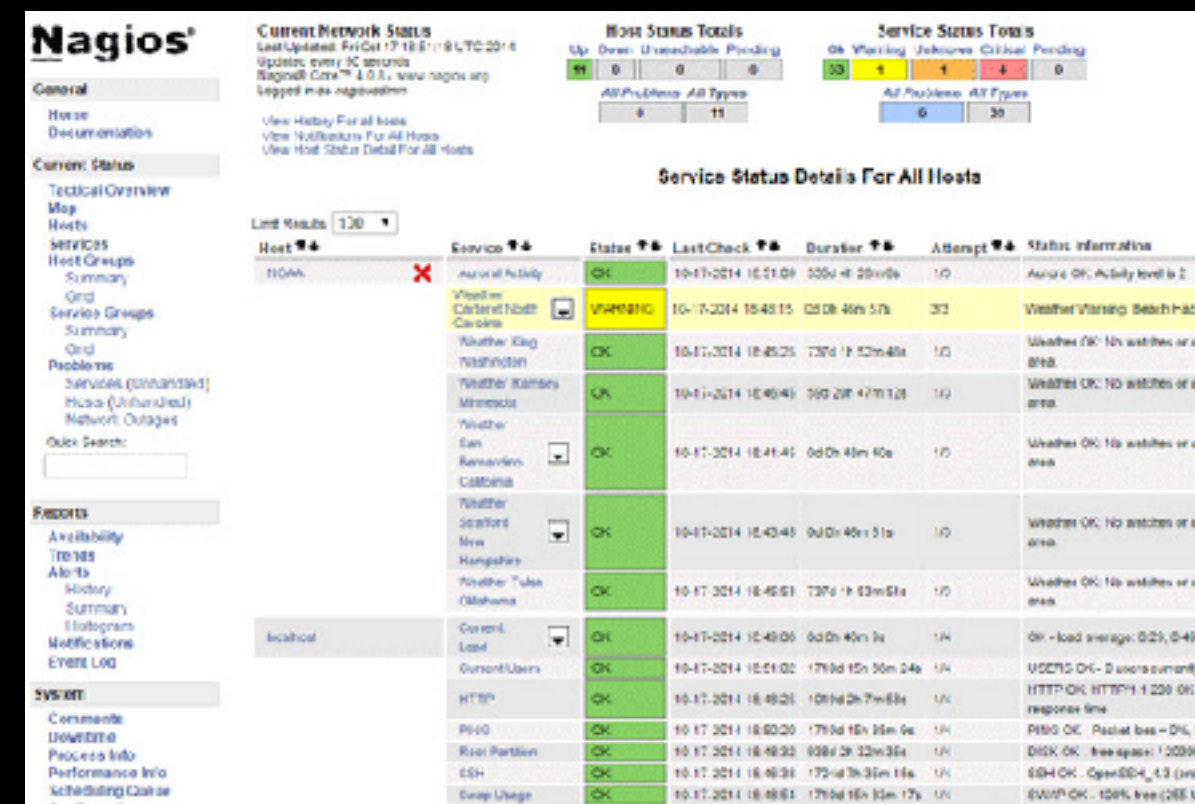


Wok

- DIY p2p antenna
- Extend the connectivity

[1] Kanchanasut, K., Tunpan, A., Awal M.A., Das, D.K., Wongsardsakul, T. and Tsuchimoto, Y., "DUMBONET: A Multimedia Communication System for Collaborative Emergency Response Operation in Disaster-affected Areas, International Journal of Emergency Management, Inderscience, Vol. 4, No. 4, pp. 670 – 681, 2007.

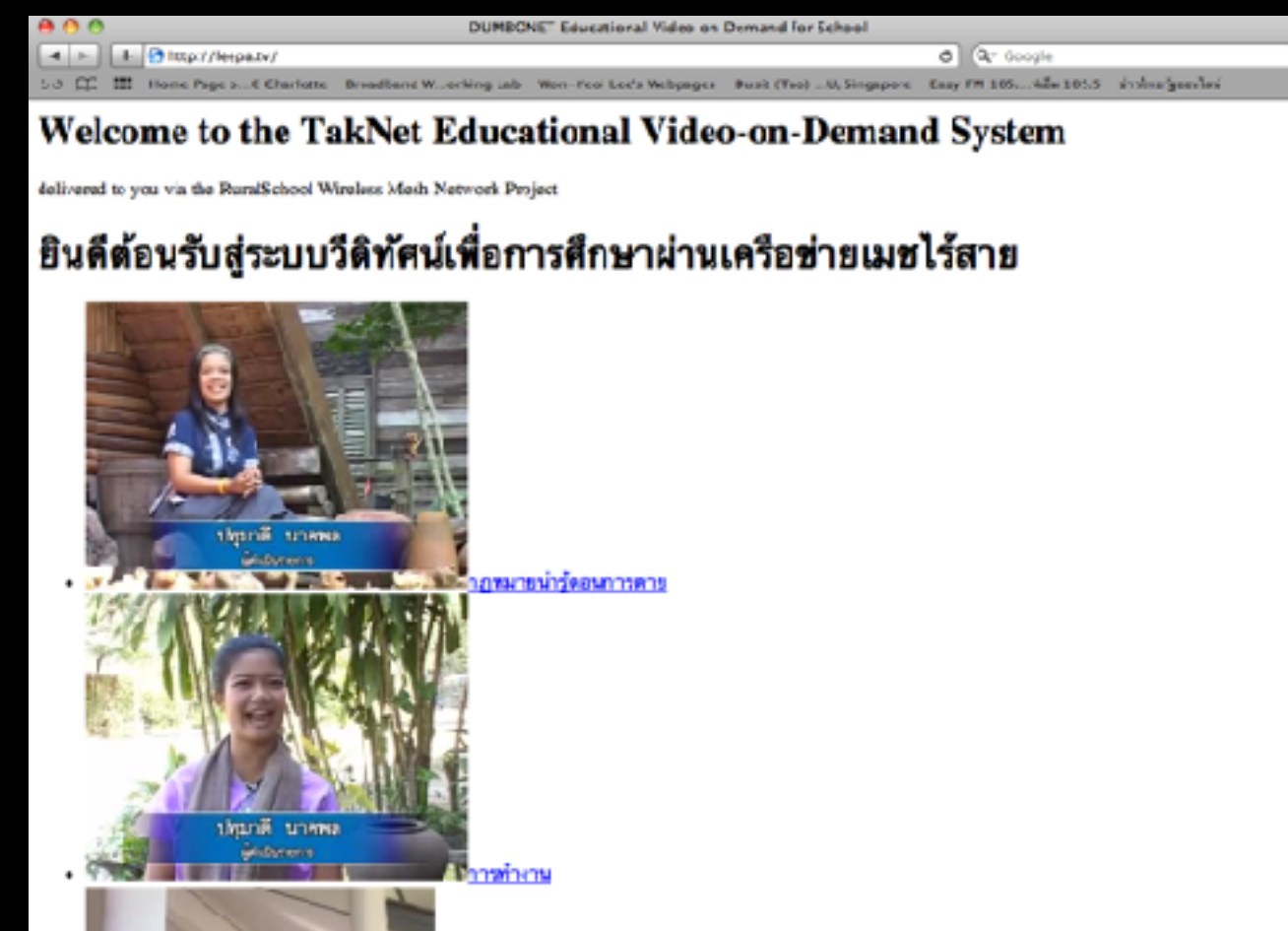
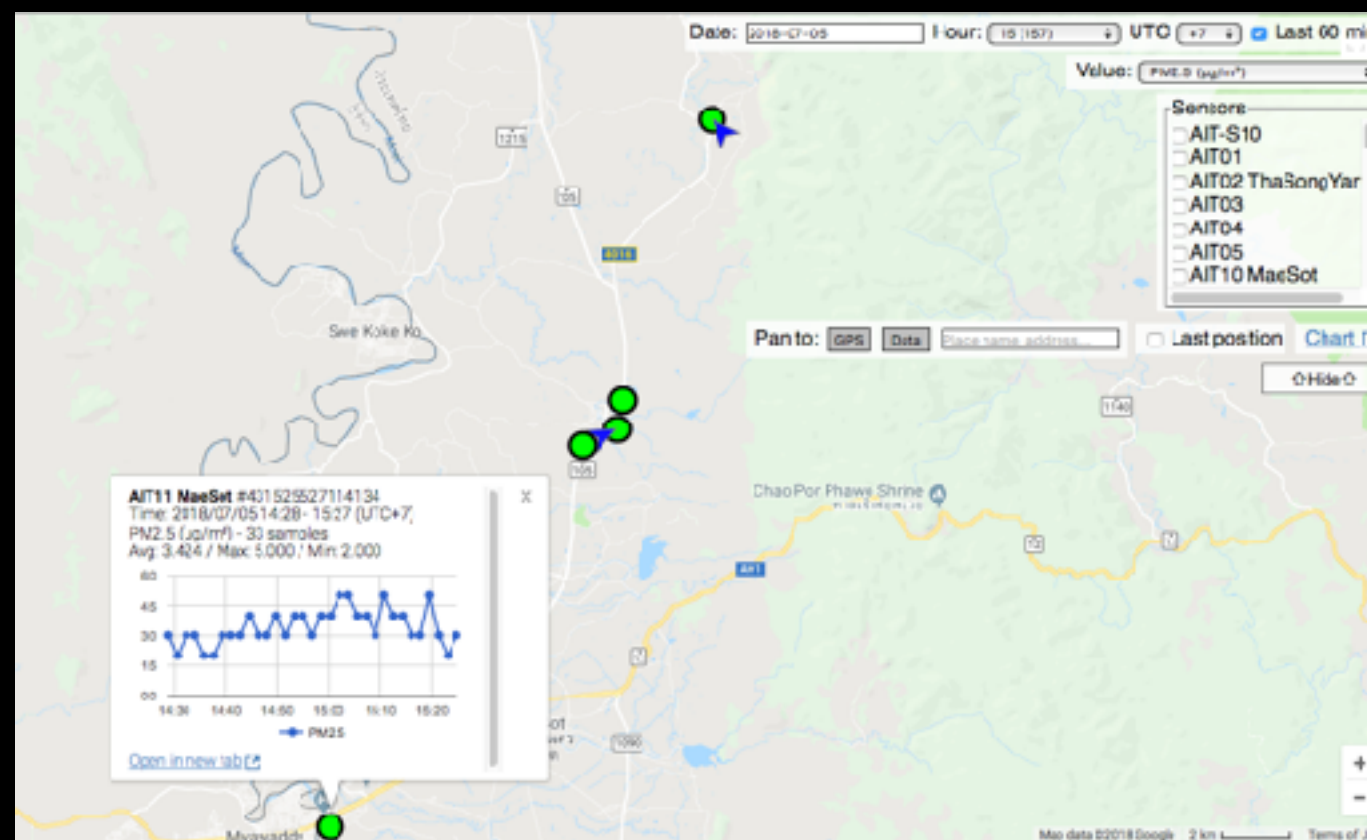
Our Services



Authentication

Network Monitoring

DUMBO chat



Haze monitoring (www.canarin.net)

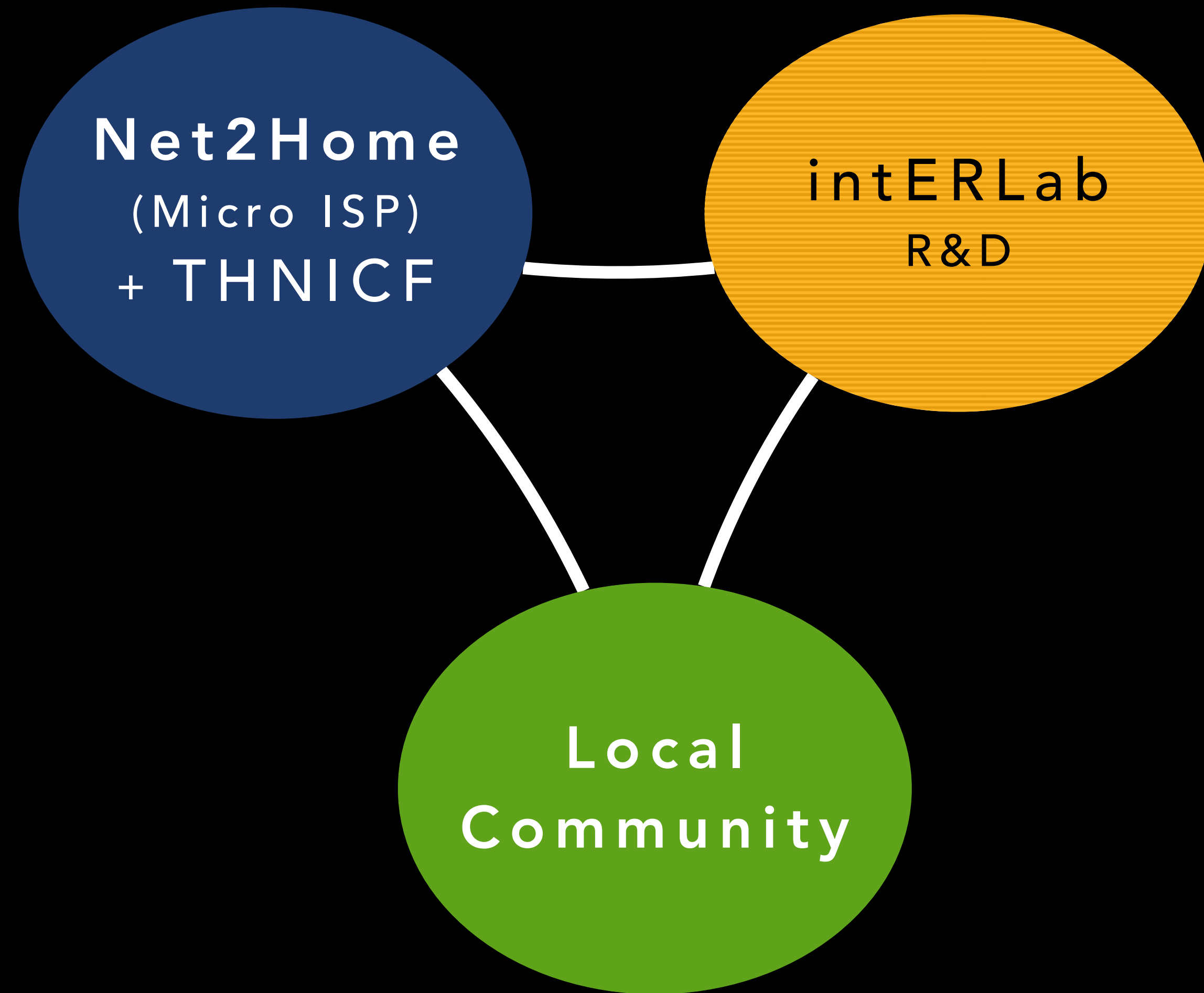
HD Video Streaming

Communicate with
line accounts (No1
chat application in
Thailand)

“What we do to make TakNet sustain?”

TakNet II

TakNetII Model



Deployment by
local ppl

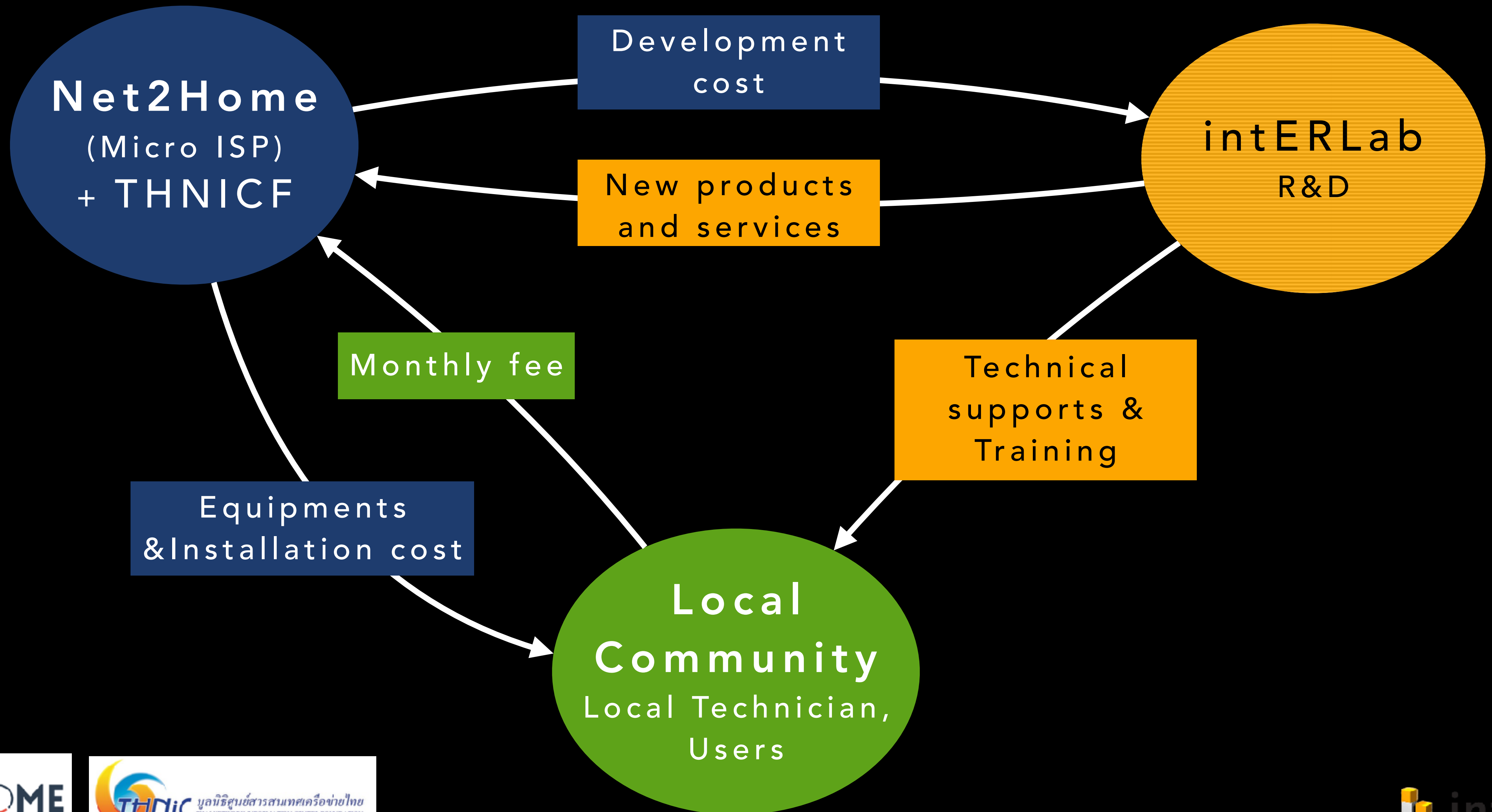


Our first prototype



Training the local

TakNetII Model



Traffic Locality in TakNet?

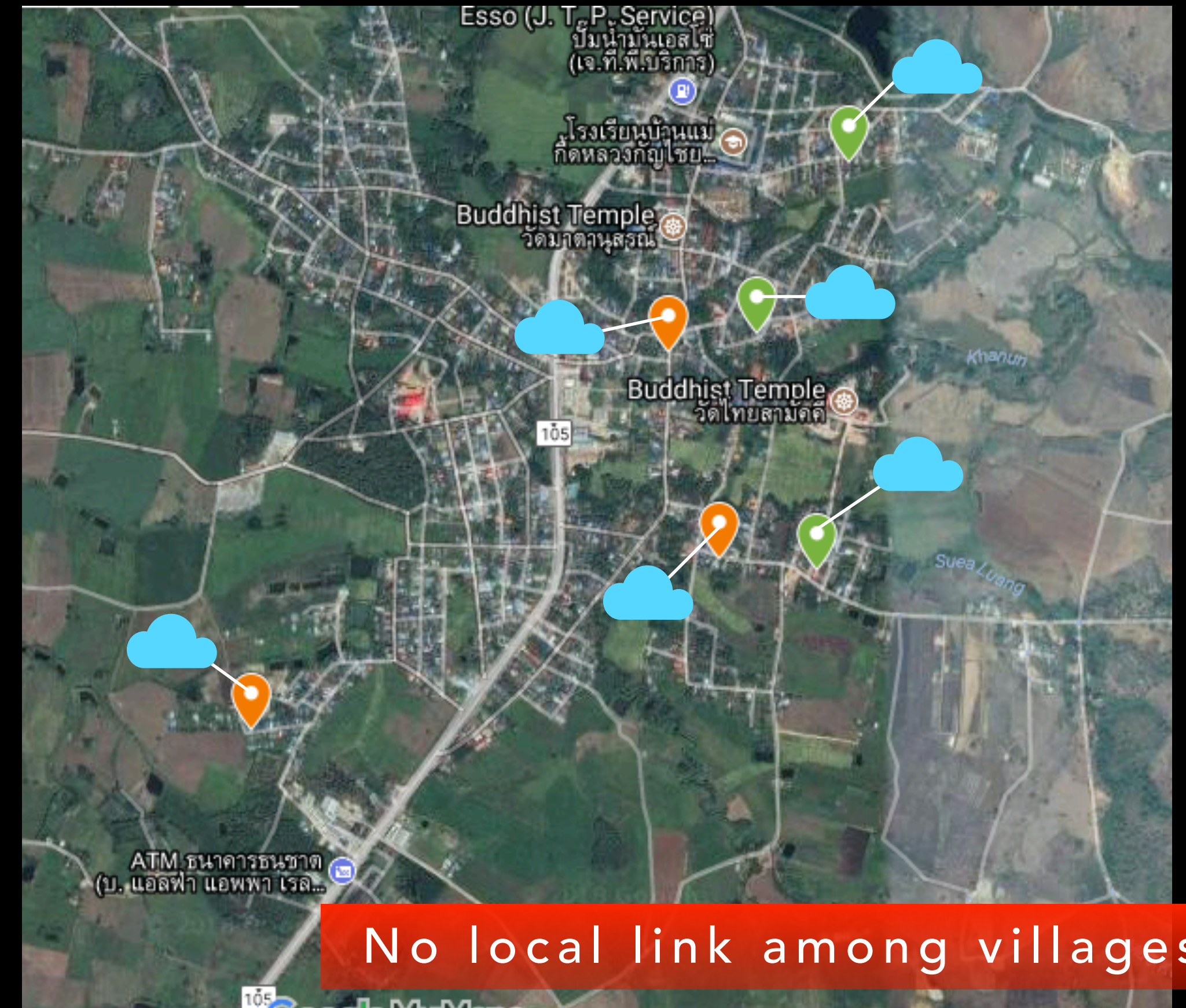


BUT !

Local traffic is not yet optimised

TakNet environment: Hill tribe, Foliage, NLOS

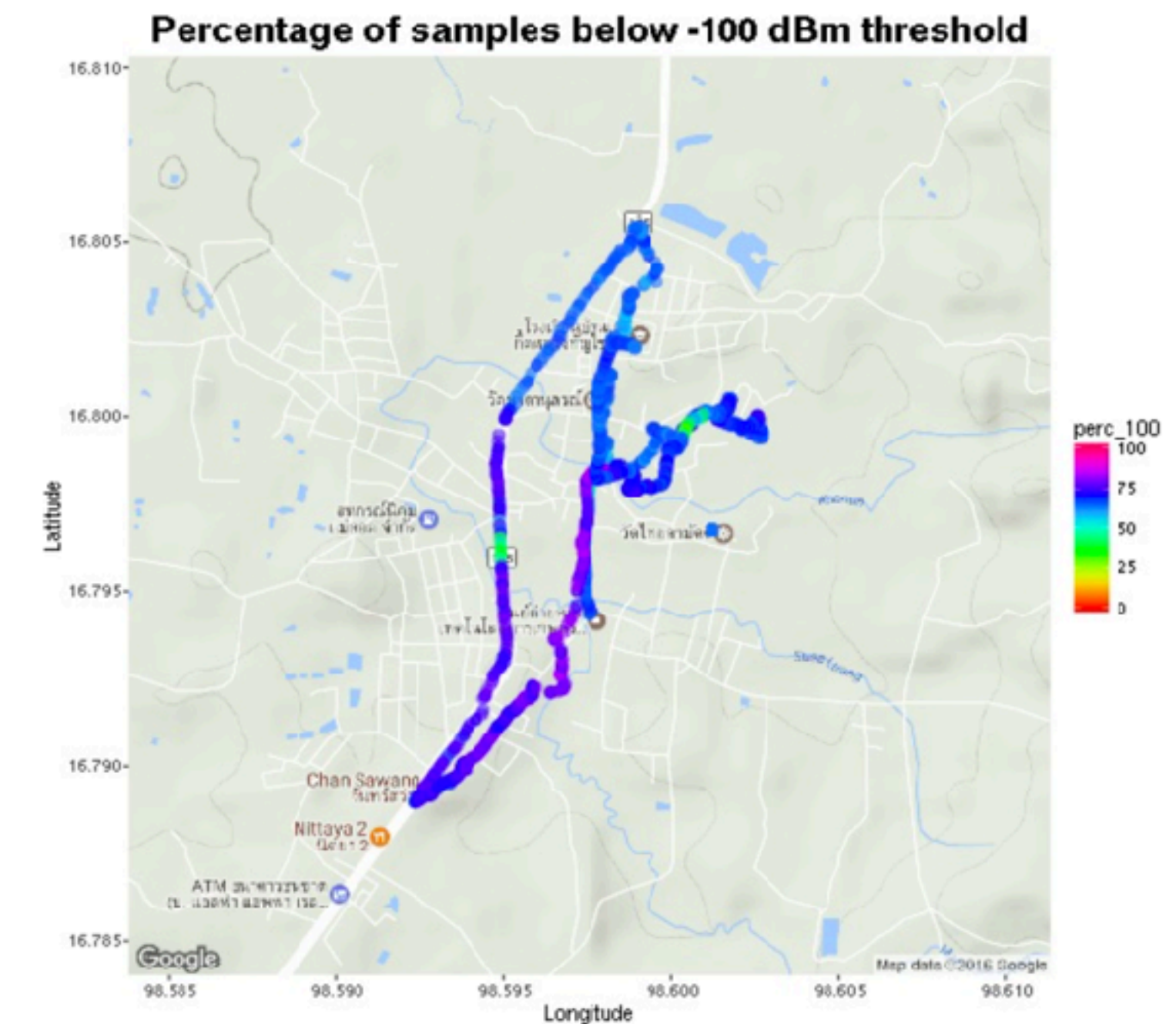
Not applicable with WiFi



[1] A. Lertsinsruttavee, L. Wang, A. Sathaseelan, N. Weshsuwannarugs, A. Tunpan, K. Kanchanasut, J. Crowcroft, "Understanding Internet Usage and Network Locality in a Rural Community Wireless Mesh Network", In Proceedings of ACM AINTEC, 2015

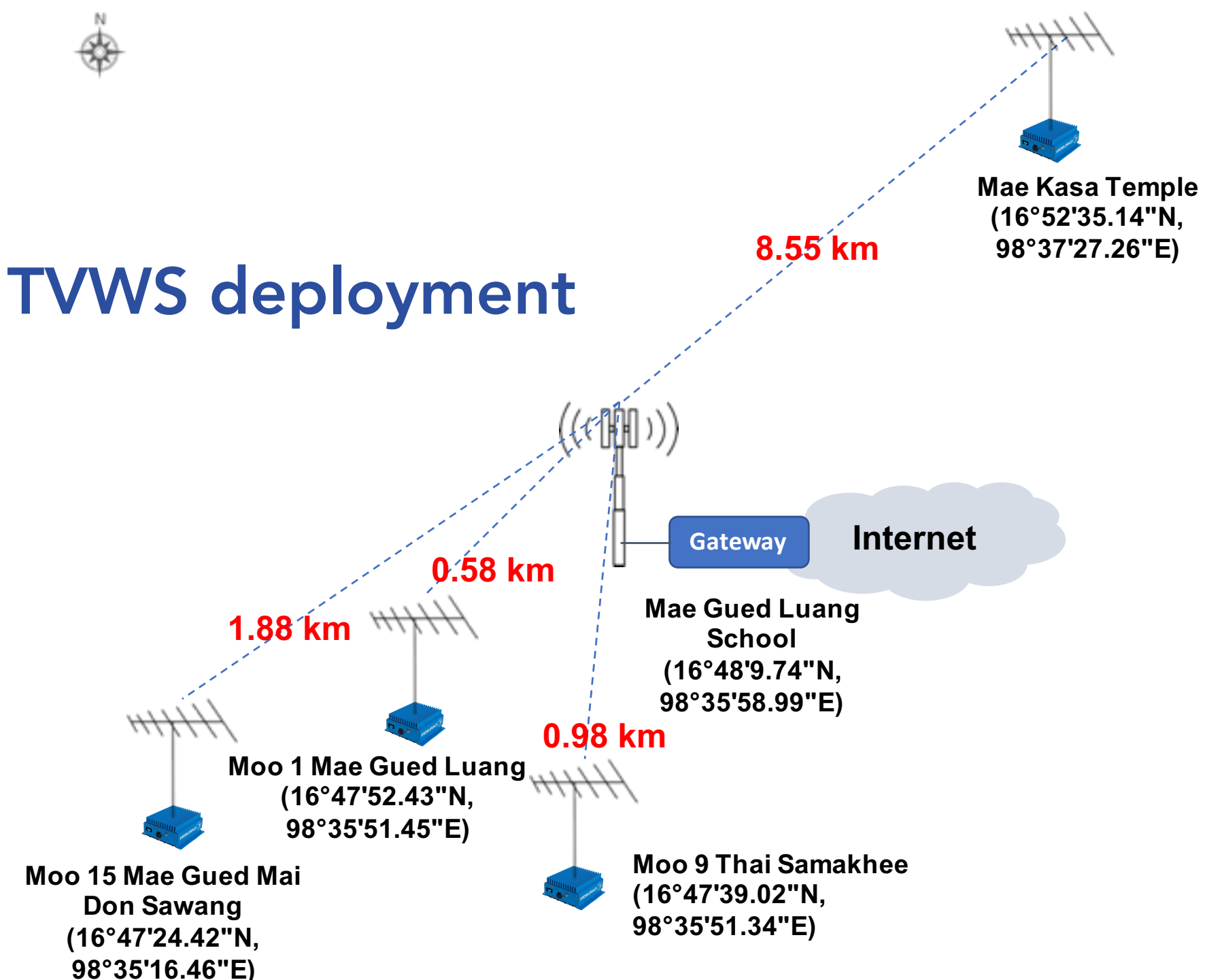
TakNet with TVWS

- Research grant funded by Thai regulator
- License: 470 - 790 MHz
- Trial experiments on TV white space
- Carry out TVWS spectrum measurements to build WSDB



Spectrum usage in TakNet 1

TVWS deployment



Extending the network coverage?



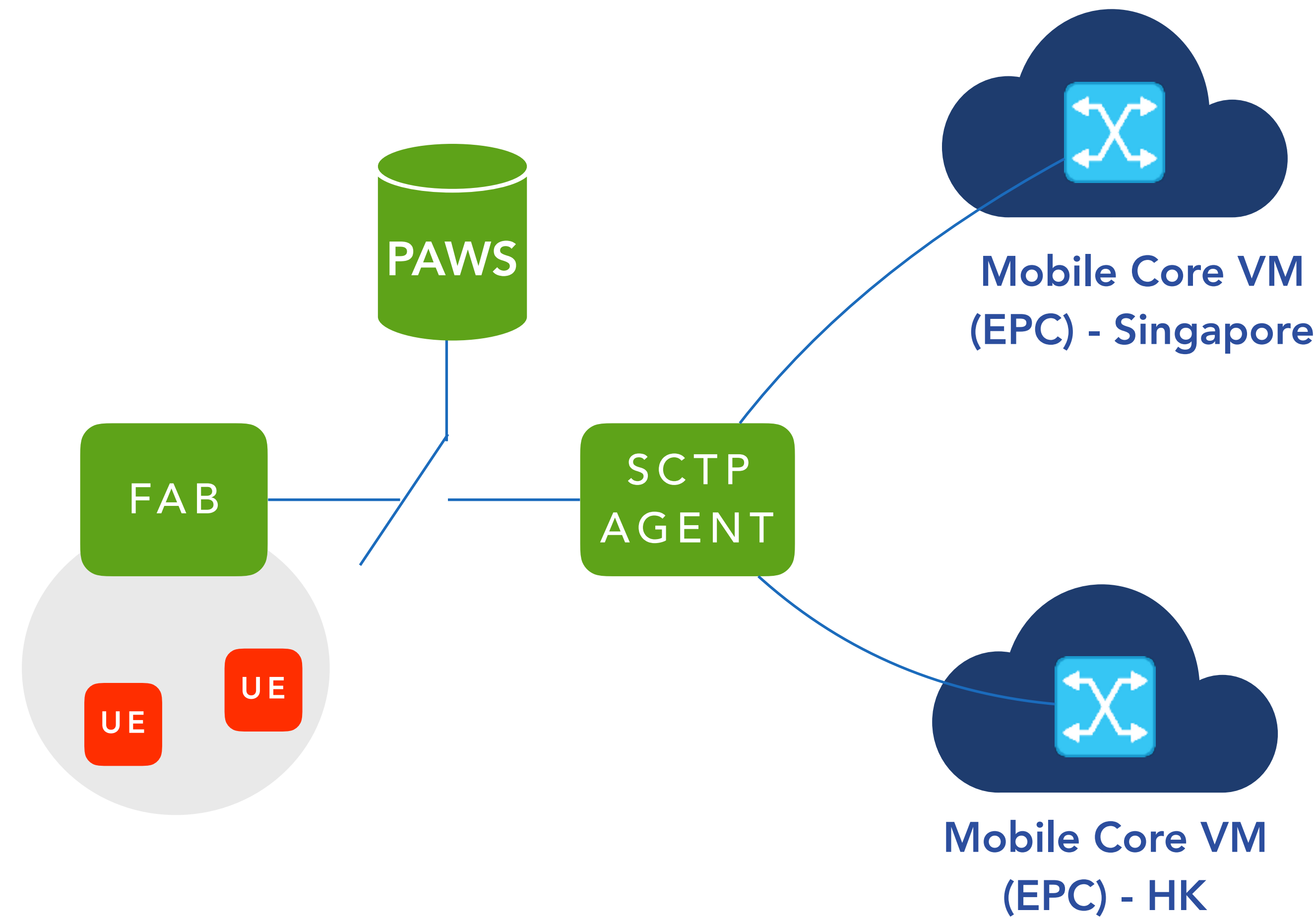
Some houses were abandon

- WiFi signal (Mesh) is not sufficient
- Too much multi hop (3 hops max)
- NLOS



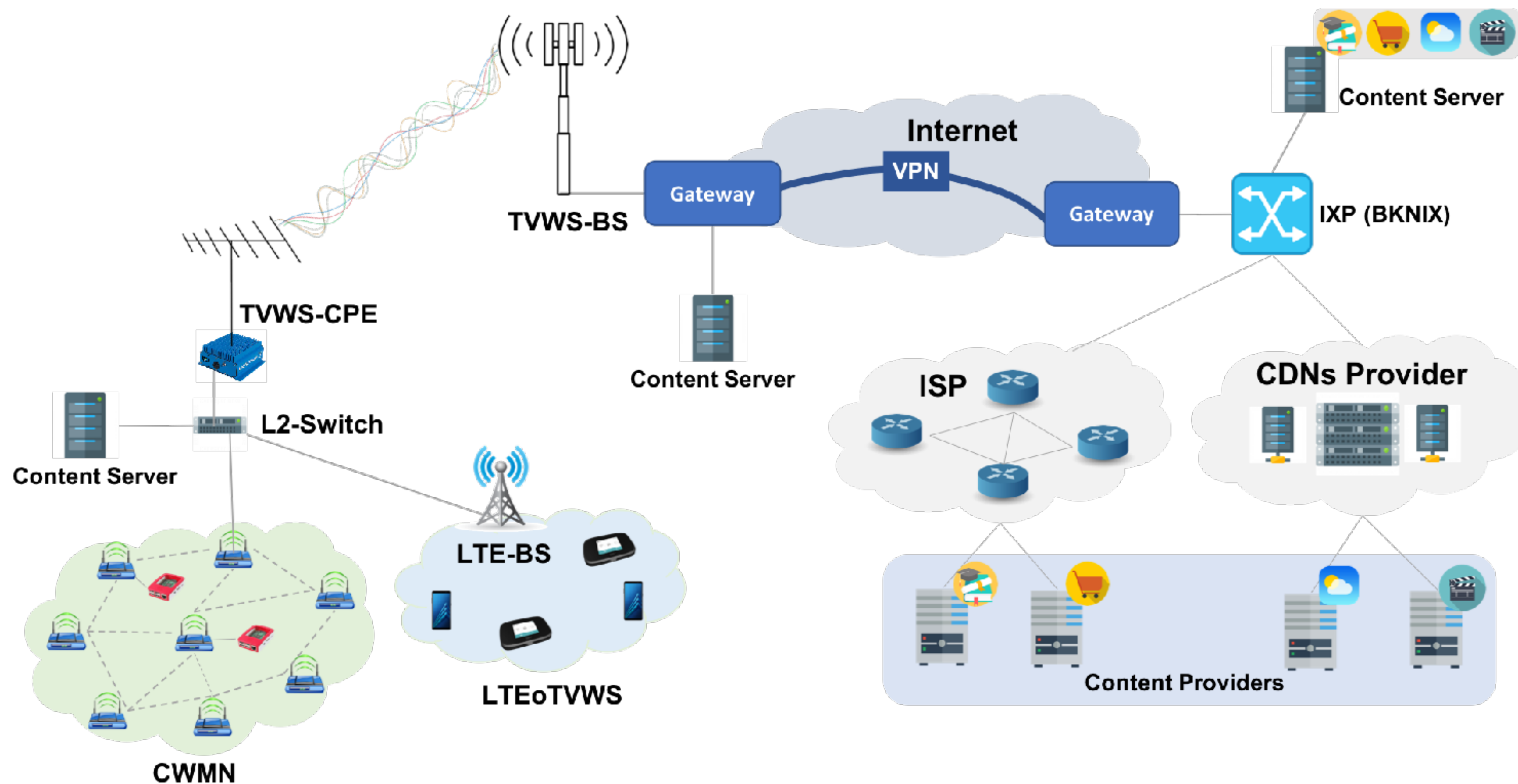
LTE Small Cell Solution

- Collaborating with Microsoft research, UK
- Utilises the excellent radio characteristics of TVWS to cover the gap that CWMN could not support.



- LTE small cell on the UHF 700 band
- 75/25 Mbps bandwidth
- maximum 16 active users
- Coverage area 4 km.

TakNetII architecture



Value added services

(Local apps:
Barter trading,
chat, IoT, etc.)

Content Distribution
(CDN + Local IX)

Middle mile access
(TVWS)

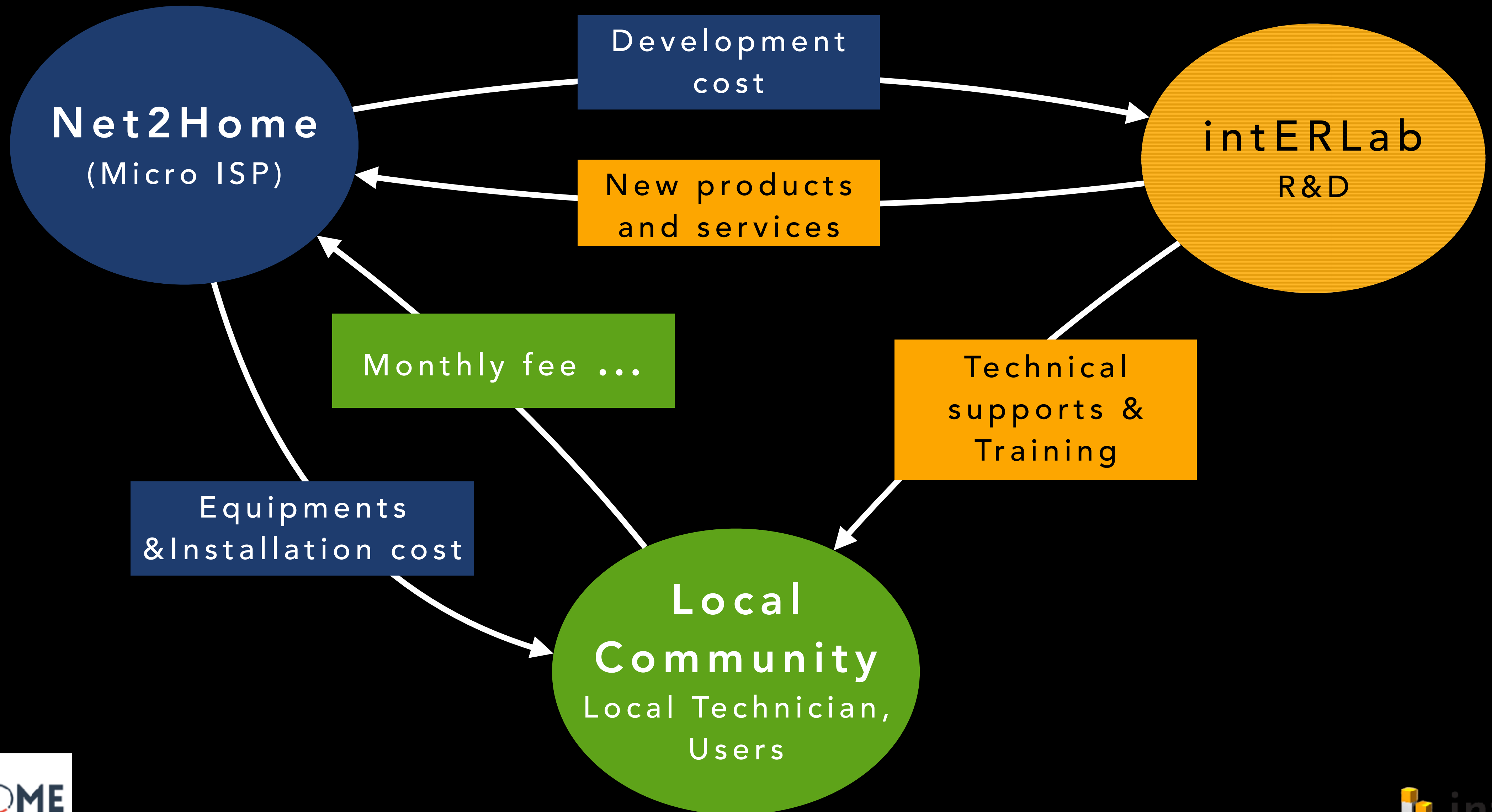
Last meter access
(CWMN + LTE)

Takeaways

- **Strong collaboration** of three main players
 - R&D team (intERLab), Micro ISP (Net2Home) and local community's participation
- **Simple technology:** Technical maintenance and installation are handled by local technicians with support from the Net2Home and intERLab teams
- **Engage with local community:** Technology transfer, Create revenue for local tech, HW ownership
- **TakNet is growing:** 1 village/year (2013-2016), 11 villages: 2017&2018 (new model)



Next ...



Our Team



Kanchana



Mongkol



Apinun



Atthaphongse



Nunthaphat



Preechai



Nisarat



Adisorn

Internet Education
and
Research Laboratory

Thank you !



Thank you

Fellowship to the Internet Engineering Task Force (IETF) Programme

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Planning to come to  103 in Bangkok?

wait **there's MORE...**



AINTEC 2018

ASIAN INTERNET ENGINEERING CONFERENCE



November 12-14, 2018
Bangkok, Thailand
<https://interlab.ait.ac.th/aintec2018/>



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70% Opacity

