

UiO : **Universitetet i Oslo**

TEK5110

L12 Basic Internet Infrastructure



Josef Noll

Secretary General and Co-Founder at BasicInternet.org, Professor at UiO, Head of Research at Movation

Oslo Area, Norway | Telecommunications

| | |
|-----------|--|
| Current | Basic Internet Foundation, University Graduate Studies (UNIK), University of Oslo (UiO), Movation AS |
| Previous | MobileMonday, Telenor R&I, Telenor R&D |
| Education | Ruhr University Bochum |



Maghsoud Morshedi

PhD Fellow at Eye Networks AS

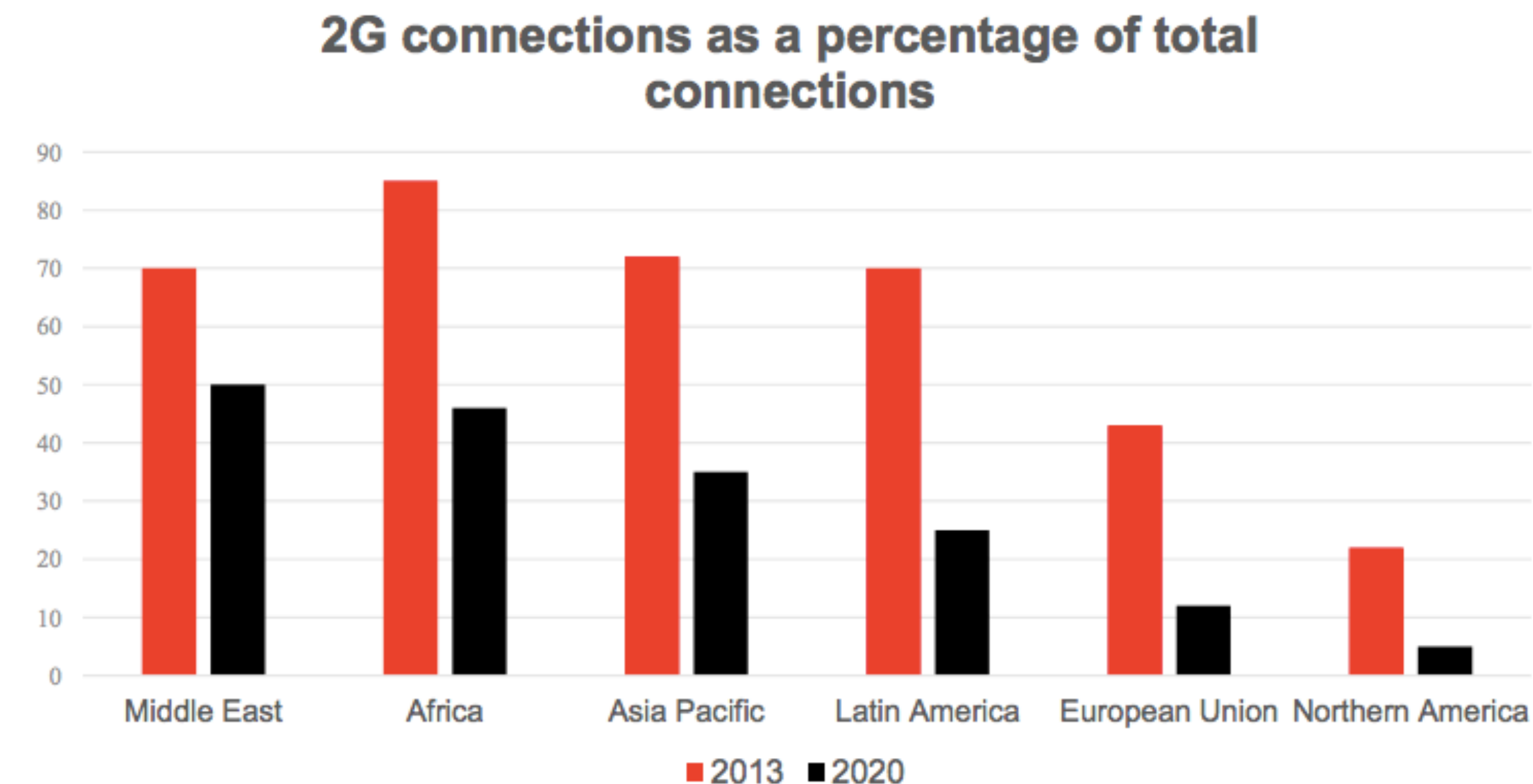
Oslo, Oslo, Norway

| Information Technology and Services

| | |
|-----------|---|
| Current | Eye Networks AS |
| Previous | Høgskolen i Oslo og Akershus, State Organization for Registry of Deed & Property, Karaj Islamic Azad University |
| Education | University of Oslo (UiO) |

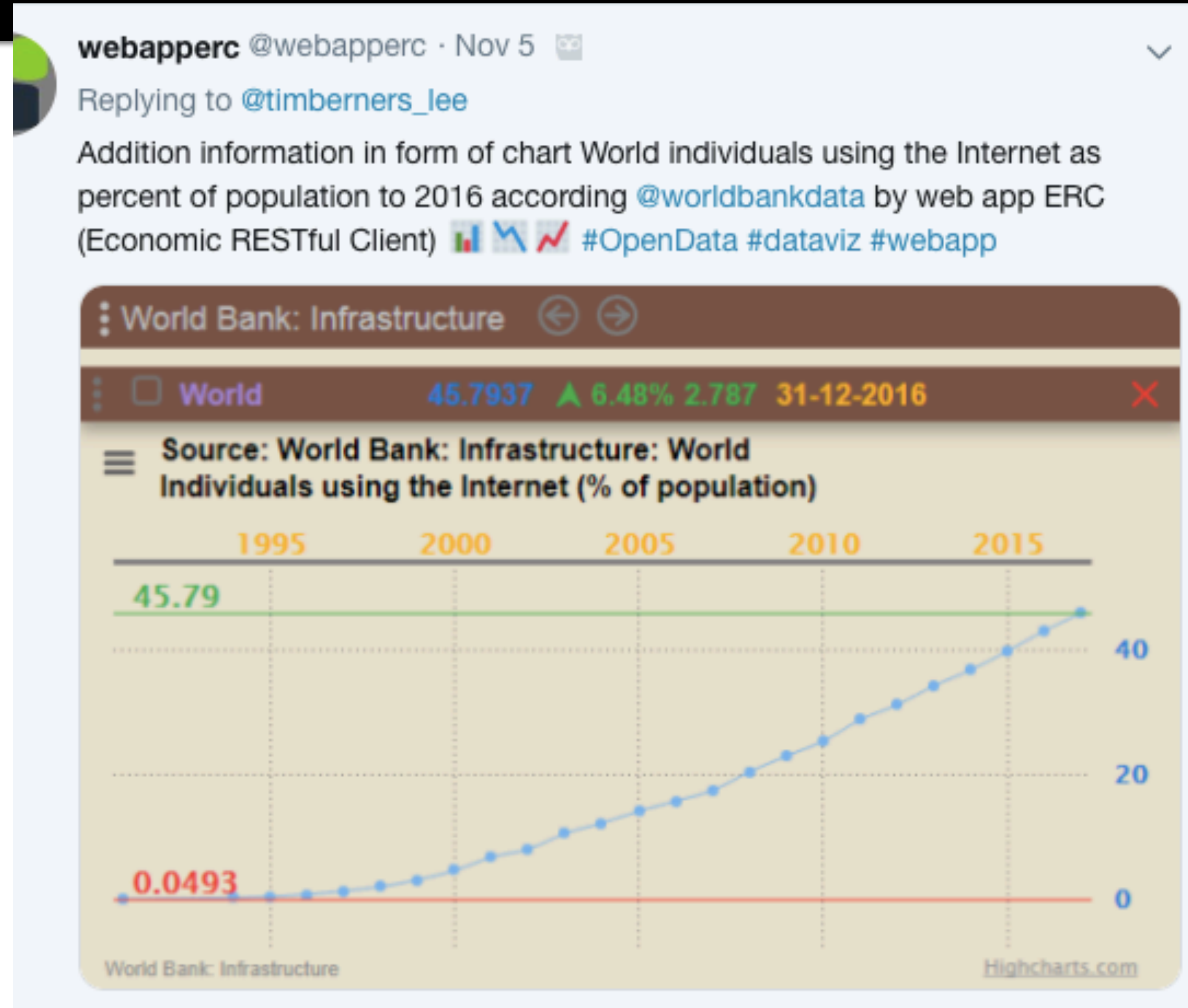
The challenge of area coverage

- Land area Norway, 385.178 km² - 7500 basestasjons
 - ➔ <http://www.mynewsdesk.com/no/telenor/pressreleases/sjekk-naar-du-faar-4g-der-du-bor-1399662>
- Tanzania 947,303 km² = 3 x Norway,
- Mali 1.240.000 km² = 4 x Norway
- DR Congo 2.345.000 km² = 8 x Norway
- Economy in building Wireless Broadband
 - ➔ #5Gforall - *Discuss*



Digital Divide

“Internet had the ability to dismantle the divide. Internet failed miserably, the divide is bigger than ever.”
Kate Gilmore, Human Rights, UNO



United Nations Sustainable Development Goals

| | | | | | |
|---|--|---|--|---|---|
| 1 NO POVERTY  | 2 ZERO HUNGER  | 3 GOOD HEALTH AND WELL-BEING  | 4 QUALITY EDUCATION  | 5 GENDER EQUALITY  | 6 CLEAN WATER AND SANITATION  |
| 7 AFFORDABLE AND CLEAN ENERGY  | 8 DECENT WORK AND ECONOMIC GROWTH  | 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE  | 10 REDUCED INEQUALITIES  | 11 SUSTAINABLE CITIES AND COMMUNITIES  | 12 RESPONSIBLE CONSUMPTION AND PRODUCTION  |
| 13 CLIMATE ACTION  | 14 LIFE BELOW WATER  | 15 LIFE ON LAND  | 16 PEACE AND JUSTICE STRONG INSTITUTIONS  | 17 PARTNERSHIPS FOR THE GOALS  |  THE GLOBAL GOALS For Sustainable Development |

Public Opinion on SDGs (afrobarometer.org)

→ Priorities by people in Africa

- decent work
- zero hunger
- good health
- ...

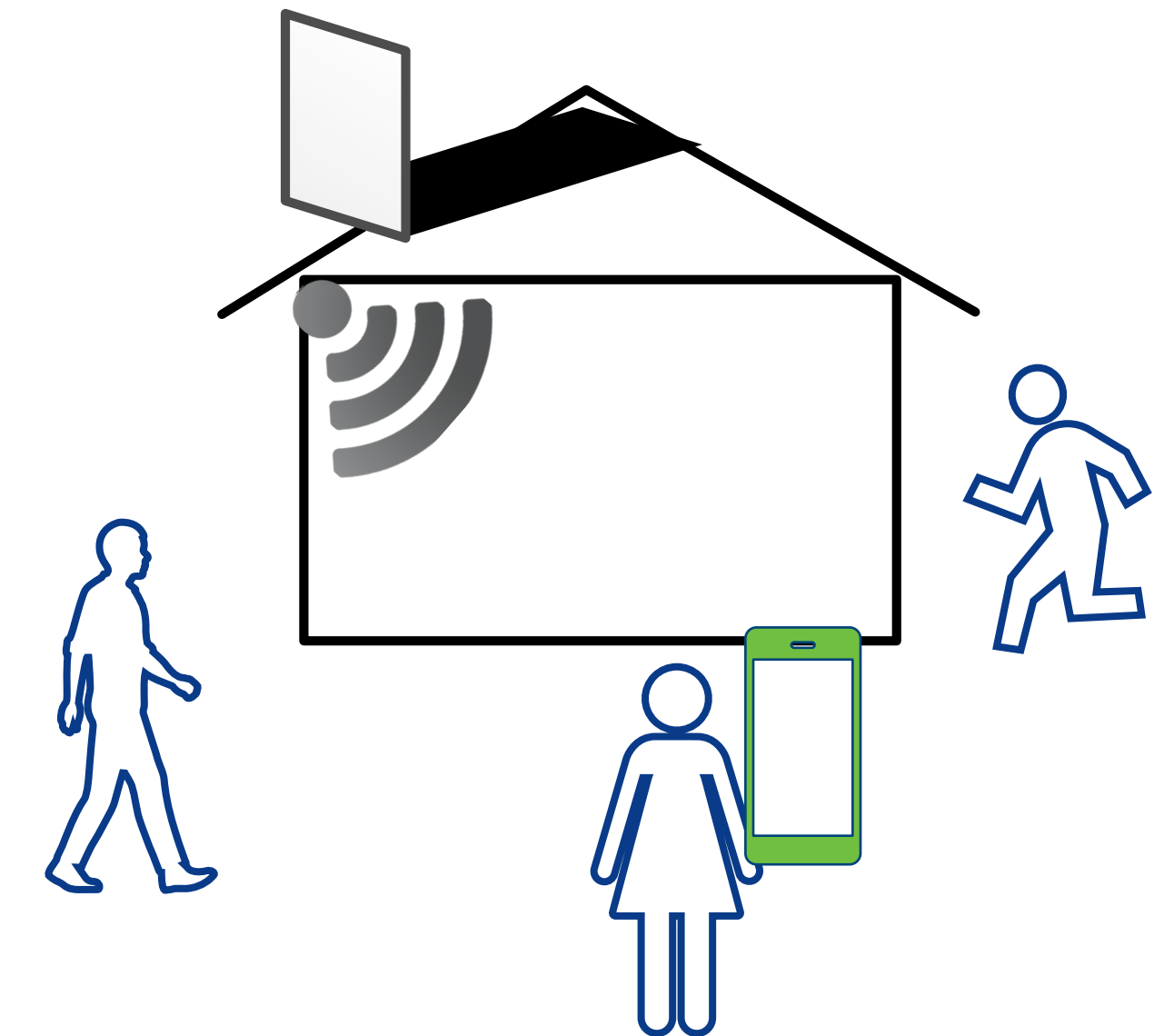


<https://blogs.worldbank.org/africacan/how-do-africans-priorities-align-with-the-sdgs-and-government-performance-new-results-from>

Digital Inclusion of everyone

“Providing Internet to the basic of the pyramid isn't a question of affordability, but rather a question of sustainability”
Internet Governance Forum, Panel,

- **Business aspects**
 - OPEX, CAPEX
 - Income models?
- **Traditional business** models are too slow
 - Mobile broadband roll-out dominated by return on investment
 - Premier league, Bollywood **outranges non-profit content**
- Providing at least **one Information Spot** in each village
 - **Internet lite for all** - free access to information
 - **Paid** access to profitable content - **sustainable** solution



Providing Internet for All

- ➔ **Free access to Information** (Internet Lite)
 - 1) Access - one **Information Spot** per village
 - 2) Skills - Health, Education, Agriculture
 - 3) Regulations - Freemium model
 - 4) Inclusion -
Free access for all #LeaveNoOneBehind
- ➔ Internet Lite & **Freemium** model for access
 - **free access to National Knowledge Portal** for all
 - **premium** access to **broadband**
 - sustainable solution

+18 dB
>20 km

“Providing Internet to the basic of the pyramid isn't a question of affordability, but rather a question of sustainability”
Internet Governance Forum, Panel, WIN

At least
one Information Spot
per village

Operator model - tower

- Example: Digital Tanzania
 - ➔ Unconnected: 13 Million people in 4.000 villages



1 USD/month for Telecom

the village that got Internet:

<http://www.bistandsaktuelt.no/nyheter/2018/landsbyen--som-fikk-facebook/>



GSM + Wifi
➔ 200W
➔ MicroBTS

Cost: 70 kUS\$/village

Governmental / Community model

→ SchoolNet distribution (Ethiopia)

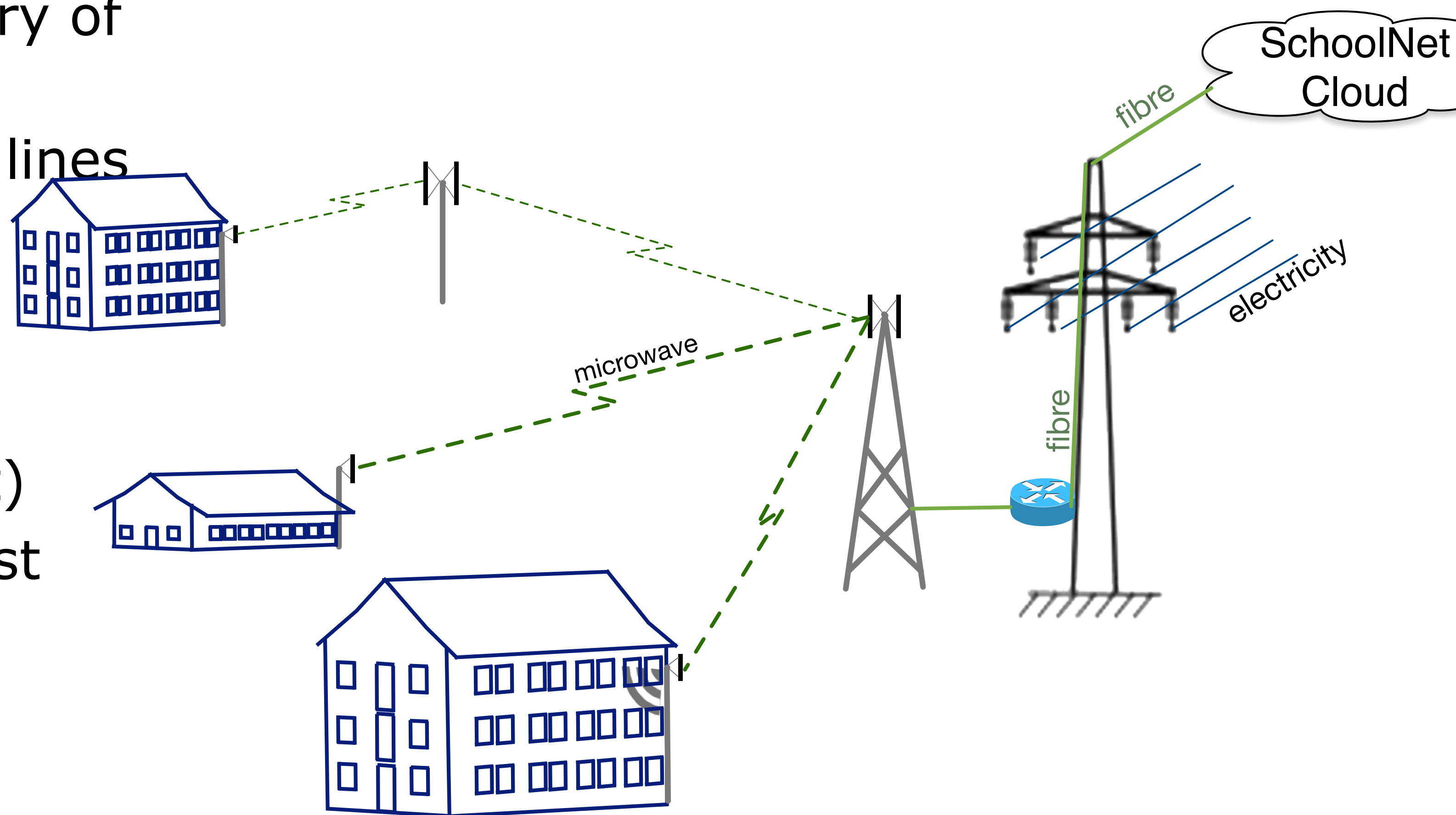
- educational network by Ministry of Education (MoE)
- national fibre on high-voltage lines
- fibre to microwave

→ Microwave distribution

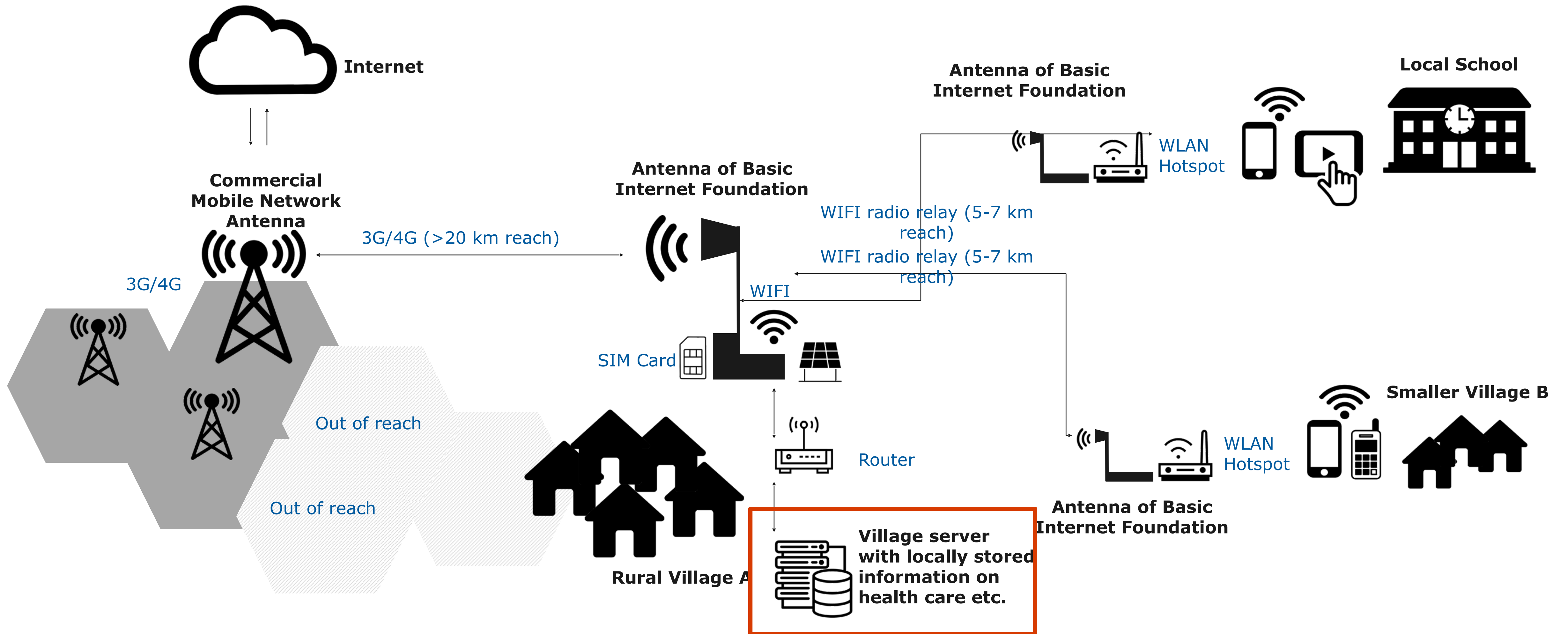
- 0-5 km: point to multipoint
- 5-15 km: point to point (mast)
- >15 km: microwave relay mast

→ Local school

- receive microwave antenna
- local Wifi distribution: local network controller & school server

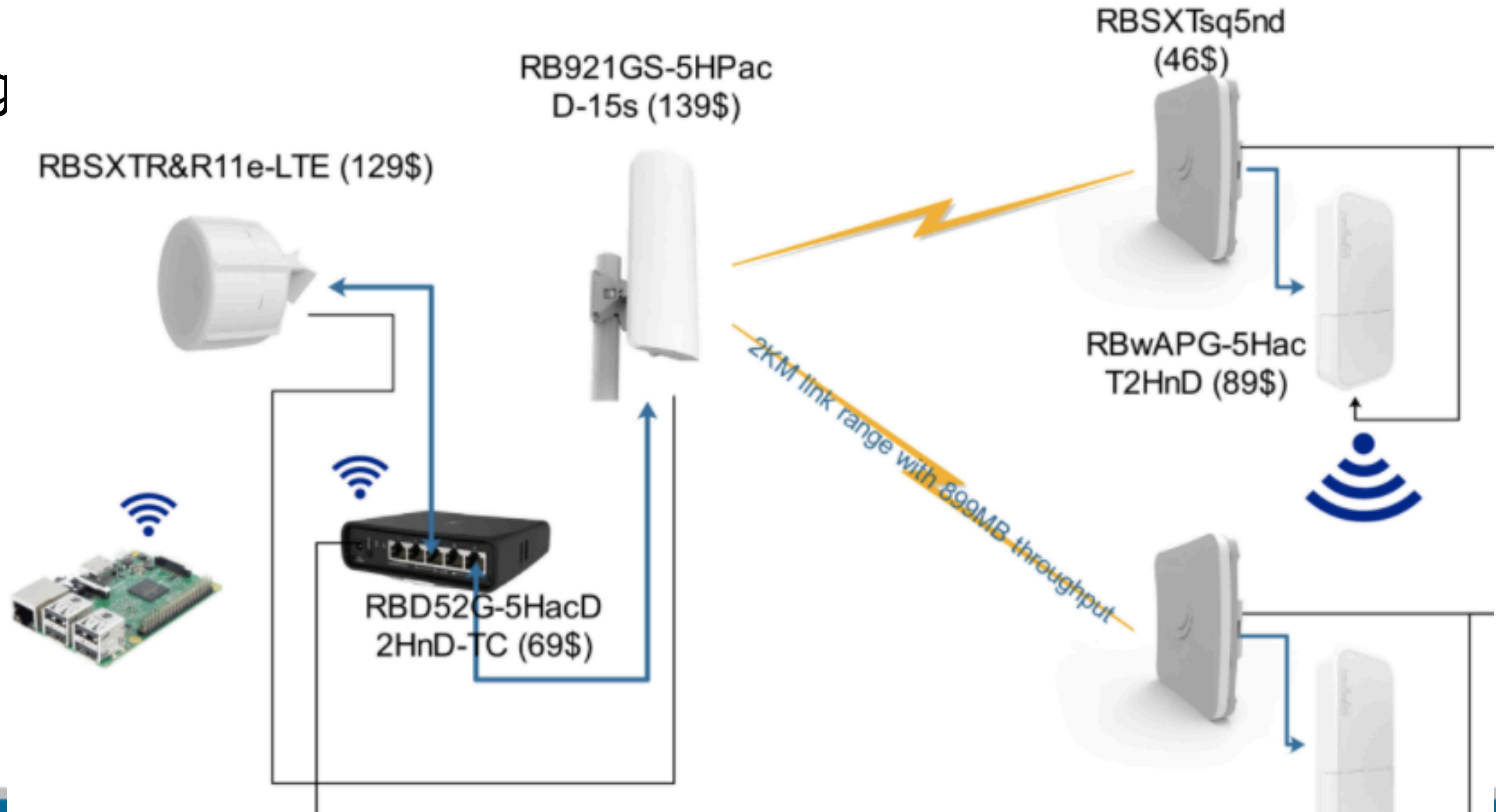


Set-up and Design – Connecting Rural Villages



Wireless infrastructure

→ Creating



“Connect the Unconnected” Selela Market Place



- Antenna in 6 m height
- Reaches Tigo tower > 20 km away

Digital Health Spot for 300 €

Creating digital access for the unconnected



Digital inclusion
The catalyst for sustainable development

300 € digital health hotspot

60.000 € connecting a village in TZ

250.000.000 € connecting all villages in TZ

89.000.000.000 € EU border control per year



Digital society



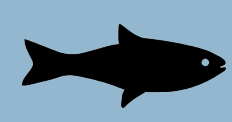
Agricultural and rural development



Education



Health



Food, water and shelter



80 € Solar panel



50 € Hotspot



50 € Tablet



20 € Battery



30 € Regulator



20 € USB-charger



15 € LED light



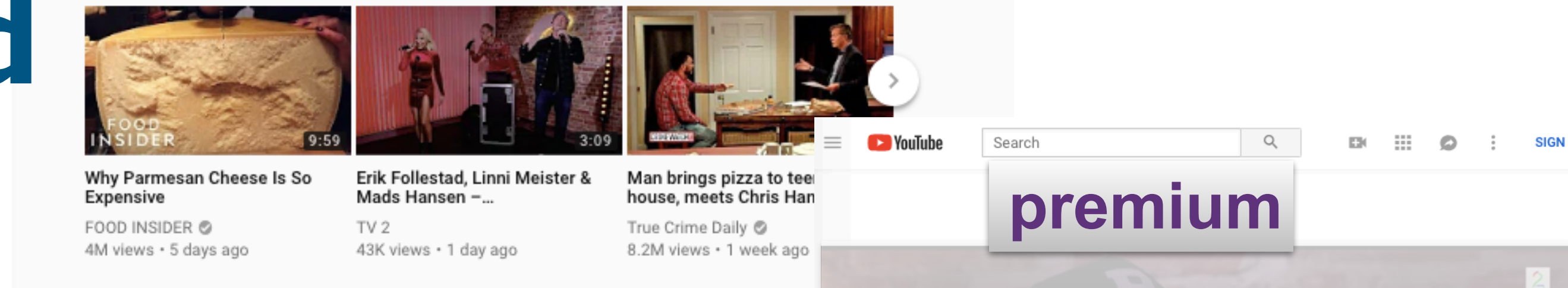
20 € Materials

InfoInternet Standard

Konzept:

free

premium



→ Network responsiveness

→ InfoInternet Standard development

- **Konzept:** www-filtering

- ▶ free: text & picture, premium: video

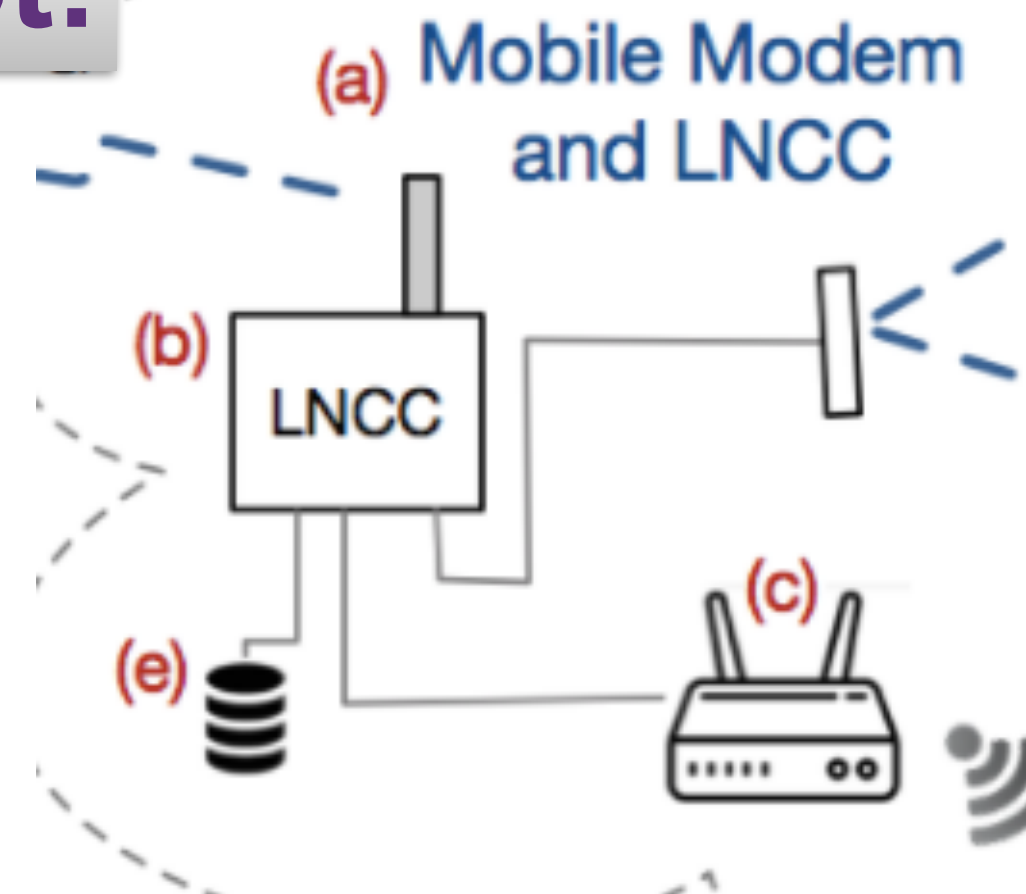
- **Pilot:** www metadata & inspection

- ▶ address, port & deep packet analysis

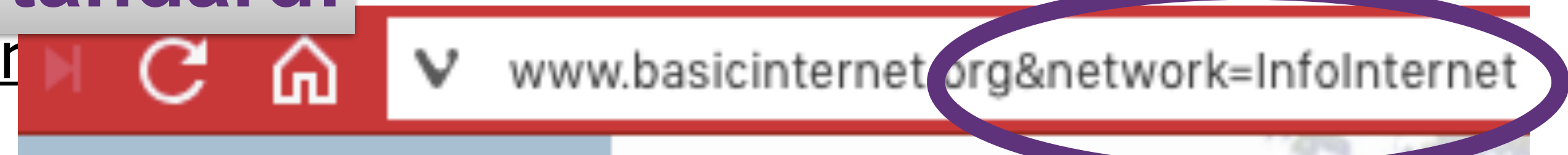
- **Standard:** proxy & html5 standard,

- ▶ <http://BasicInternet.org&standard=InfoInter>

Pilot:



Standard:



No magic, exist today.... Lightweight Protocols, e.g. AMP

<https://basicinternet.org/internet-lite-to-the-migoli-high-school/>

<https://basicinternet.org/internet-lite-to-the-migoli-high-school/?amp>



Basic Internet Foundation

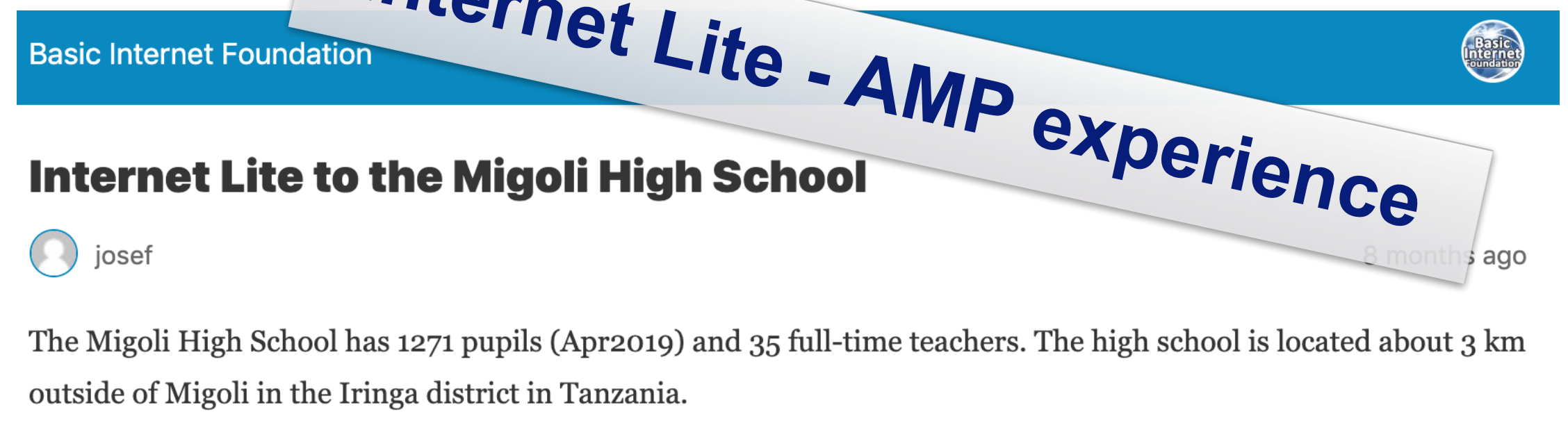
MISSION PROJECTS ABOUT PARTNERS MEDIA

Full Web experience

INTERNET LITE TO THE MIGOLI HIGH SCHOOL

By josef | 4 May 2019 | Uncategorized

The Migoli High School has 1271 pupils (Apr2019) and 35 full-time teachers. The high school is located about 3 km outside of Migoli in the Iringa district in Tanzania.



Basic Internet Foundation

Internet Lite - AMP experience

8 months ago

josef

The Migoli High School has 1271 pupils (Apr2019) and 35 full-time teachers. The high school is located about 3 km outside of Migoli in the Iringa district in Tanzania.



School Connectivity (ET)

- Koye Secondary and Preparatory School
 - connected as part of African Innovation Week 2019
 - using mobile network
- Local knowledge portal
 - yeboo.com health



Addressing the Priorities of Norway

- Report to Stortinget 11 (2019-2020), **Priorities**
 - Access, skills, regulations, inclusion
- “Boys have the toys”
 - digital divide in both **devices**
 - and **mobile broadband** access
- **Integrated model for digital inclusion**
 - School connectivity (SDG indicator 4.A.1)
 - SchoolNet as Knowledge Portal
 - Knowledge transfer
 - Community involvement



Norwegian Ministry
of Foreign Affairs

Summary

Meld. St. 11 (2019–2020) Report to the Storting (white paper)

Digital transformation and development policy

Access

Skills

Regulations

Inclusion



Challenges

3 groups:
- 20 min work
- 5 min presentation/discussion

- Radio coverage
 - how can we reach Izazi?
 - what is the expected capacity?
- Business model - (A) fixed line vs (B) mobile hot-spot
 - What needs to be the price for a voucher?
 - ▶ Time, Amount, Validity
 - Expense model based on OPEX
 - Goal: Break-even

Cost example

→ Target price Oct2019

| Description | fixed costs TZS | fixed costs Euro | monthly costs TZS | monthly costs Euro |
|-----------------------|-----------------|------------------|-------------------|--------------------|
| | 376,48 | 1 000 000 | 376,48 | 1 Mio TZS = 376 € |
| Halotel 3G bundle | | | | |
| HALO-KIT | | | 118 000 | € 44,42 |
| | | | | |
| Leased 4Mb/s line | | | 1 689 854 | € 636,20 |
| Co-location (2sets) | | | 706 820 | € 266,10 |
| <i>Installation</i> | | | | |
| 4 Mbps line equipment | 1 689 854 | € 636,20 | | |
| Deployment P2P | 10 384 000 | € 3 909,37 | | |
| | | | | |

Upcoming Topics / To do for next week

Upcoming Topics

- L12 Hands-on Monitoring

To Do:

- Group work: Present specific plans
 - ➔ what do you want to achieve?
 - ➔ what is the outcome?

*Goal oriented
approach*

