

**UiO : Universitetet i Oslo**

**Hot-Spot trial**

## **Providing Internet Access to Students in DRC and Burundi**



Josef Noll  
University of Oslo

[jnoll@uio.no](mailto:jnoll@uio.no)

Guy Kamanda  
Monka

[guy.kamanda@gmail.com](mailto:guy.kamanda@gmail.com)



# Objectives and Goals “Digital Inclusion”

- Enable students to be part of the digital society
- Provide students with access to Internet
  - Free access to Cedesurk and educational content
  - Payed access to other content
- Let students use their own devices (Smartphone, Tablet, PC)
- Ensure security of Cedesurk infrastructure
- Establish a cost-neutral infrastructure for Internet access
- Motivate students for (digital) entrepreneurship

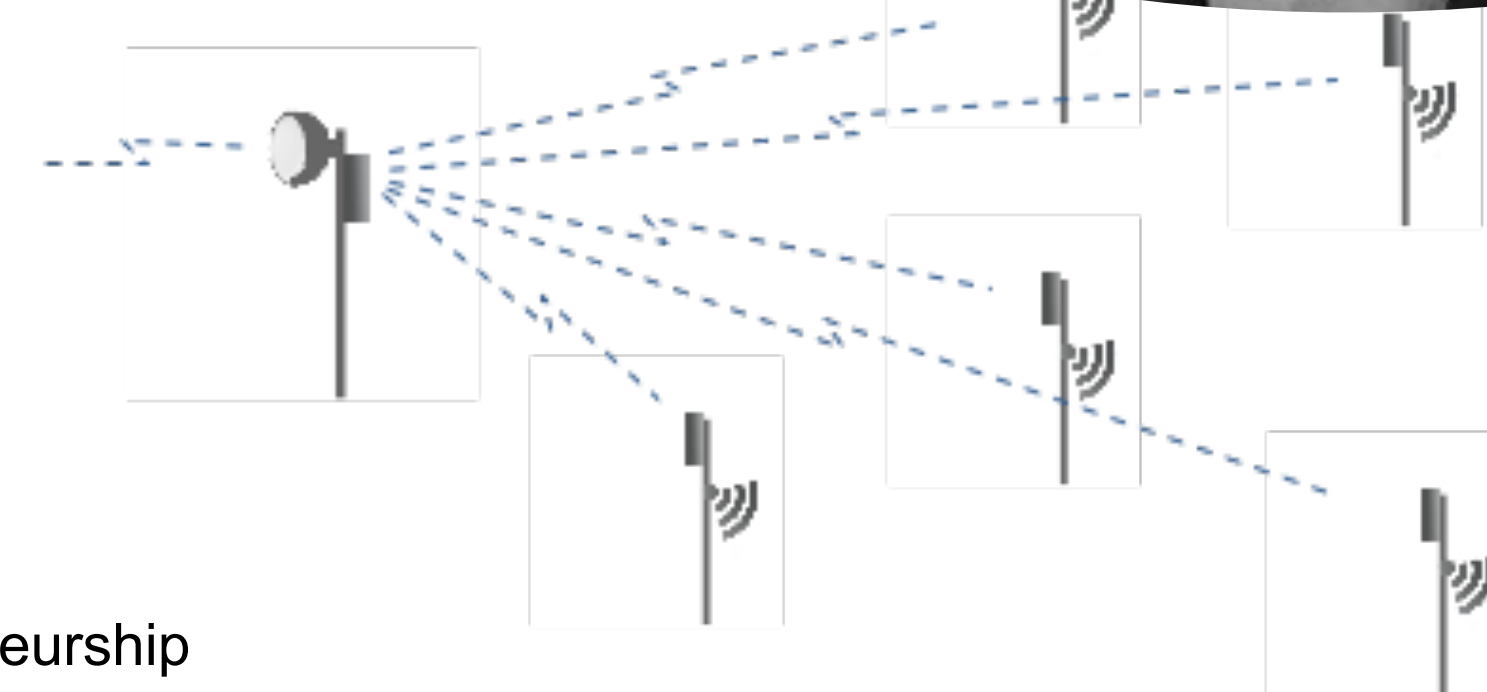
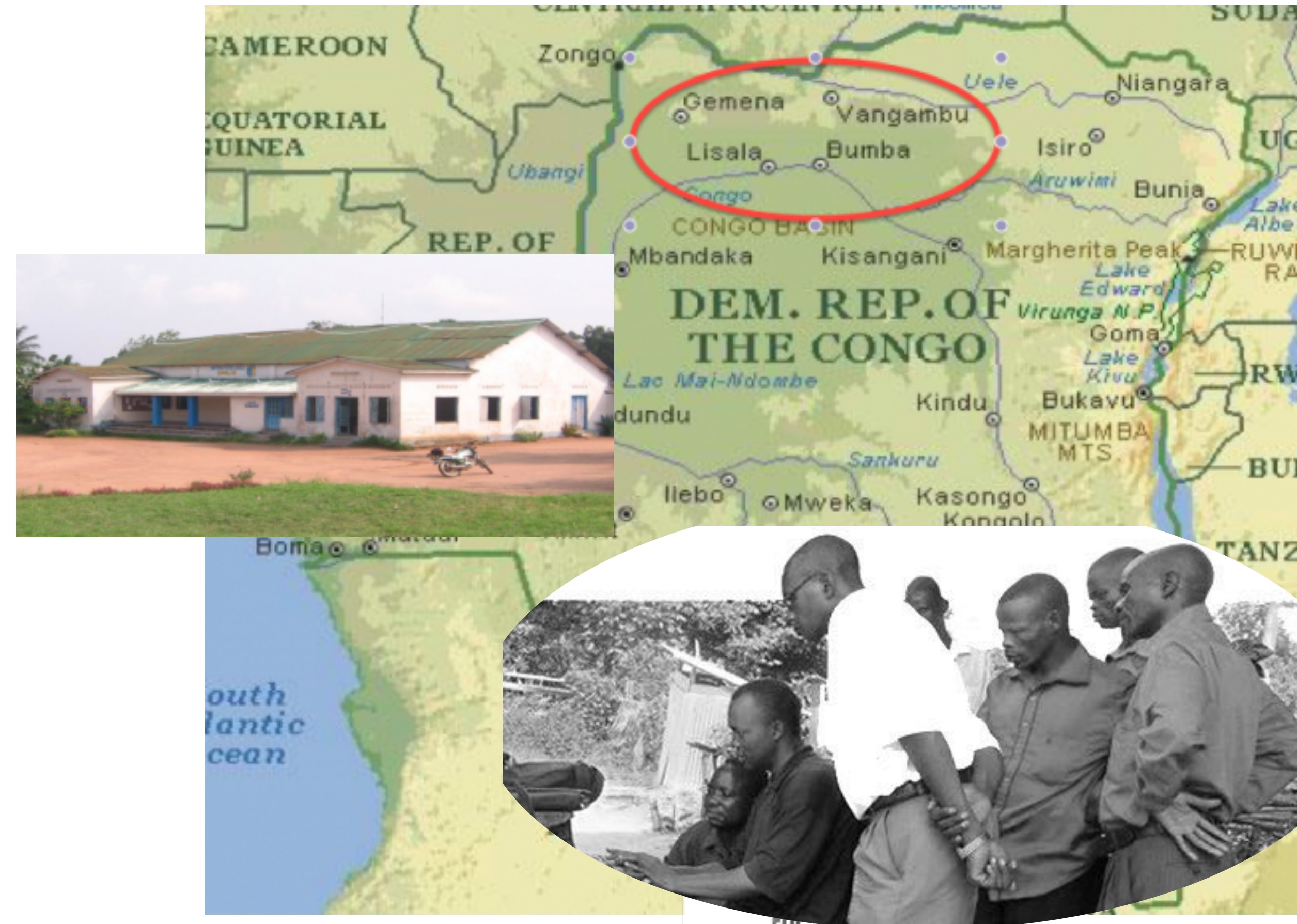
Project proposal  
“Digital Inclusion”  
- 6 months,  
- V-Phases





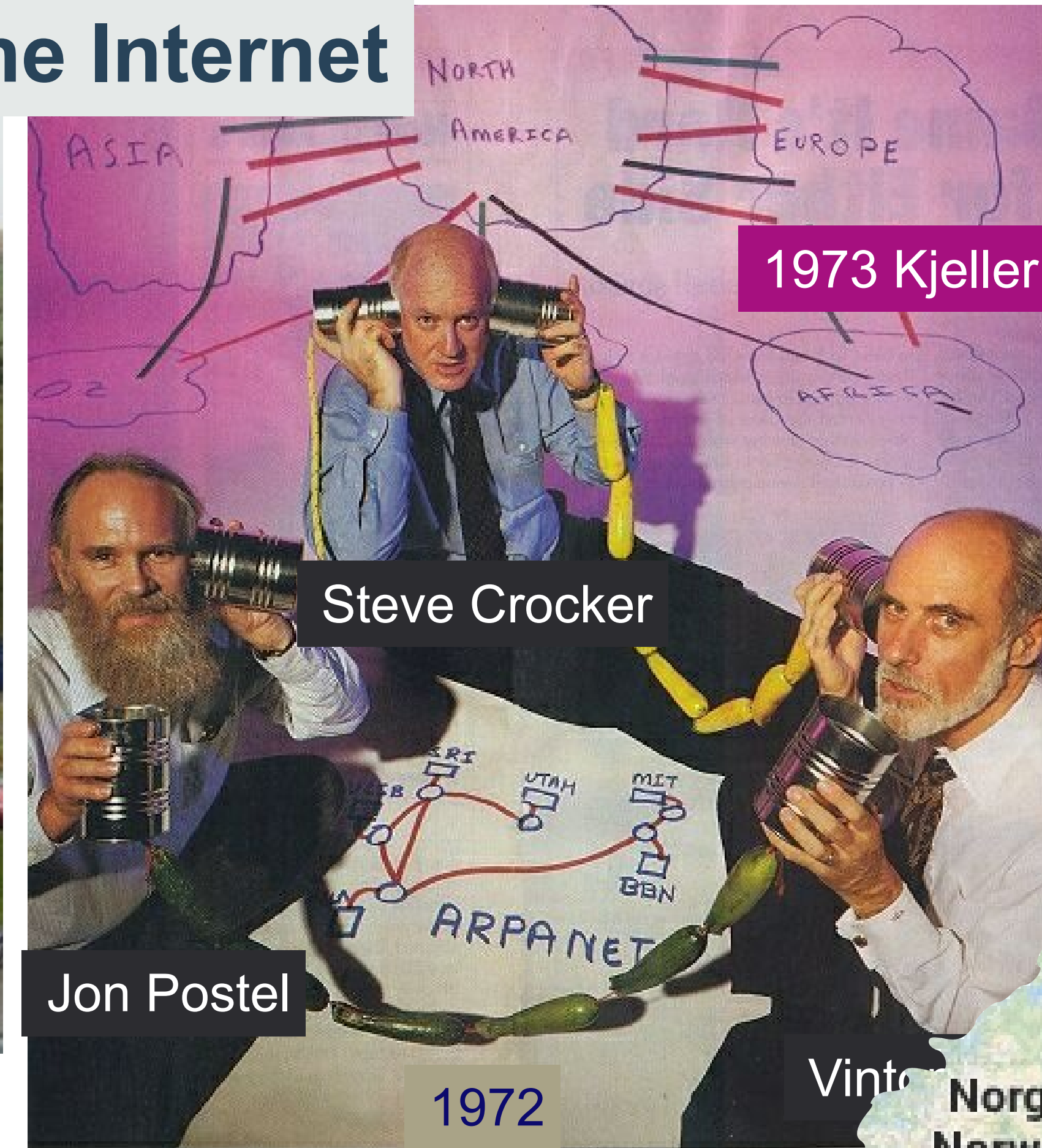
# Background

- Internet provision to various parts of DRC
  - ➔ operations since 2011
- Connection to a.o. University of Lisala
- Experiences from Internet provision
  - ➔ Expensive access
  - ➔ Requirement for self-sustainable infrastructure
- Developed network infrastructure
  - ➔ low-cost establishment of local hot-spots
  - ➔ remote core infrastructure (in Norway)
  - ➔ based on experiences from Internet history at UiO/UNIK





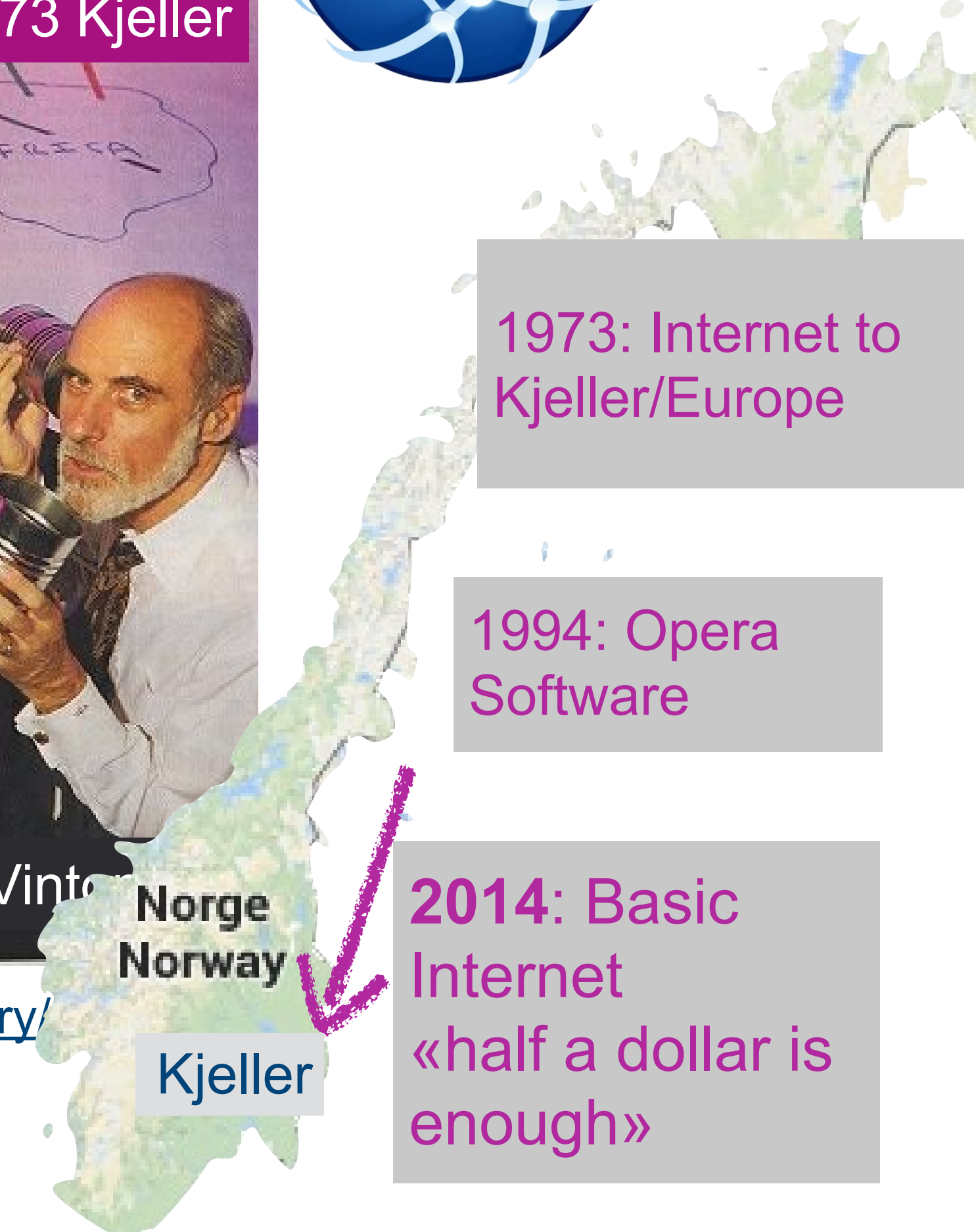
# UNIK .... and the Internet



1973: Internet to Kjeller/Europe

1994: Opera Software

2014: Basic Internet «half a dollar is enough»



- The building where the **Internet** (Arpanet) came **to Europe** in June **1973**

Source: <http://www.michaelkaul.de/History/>

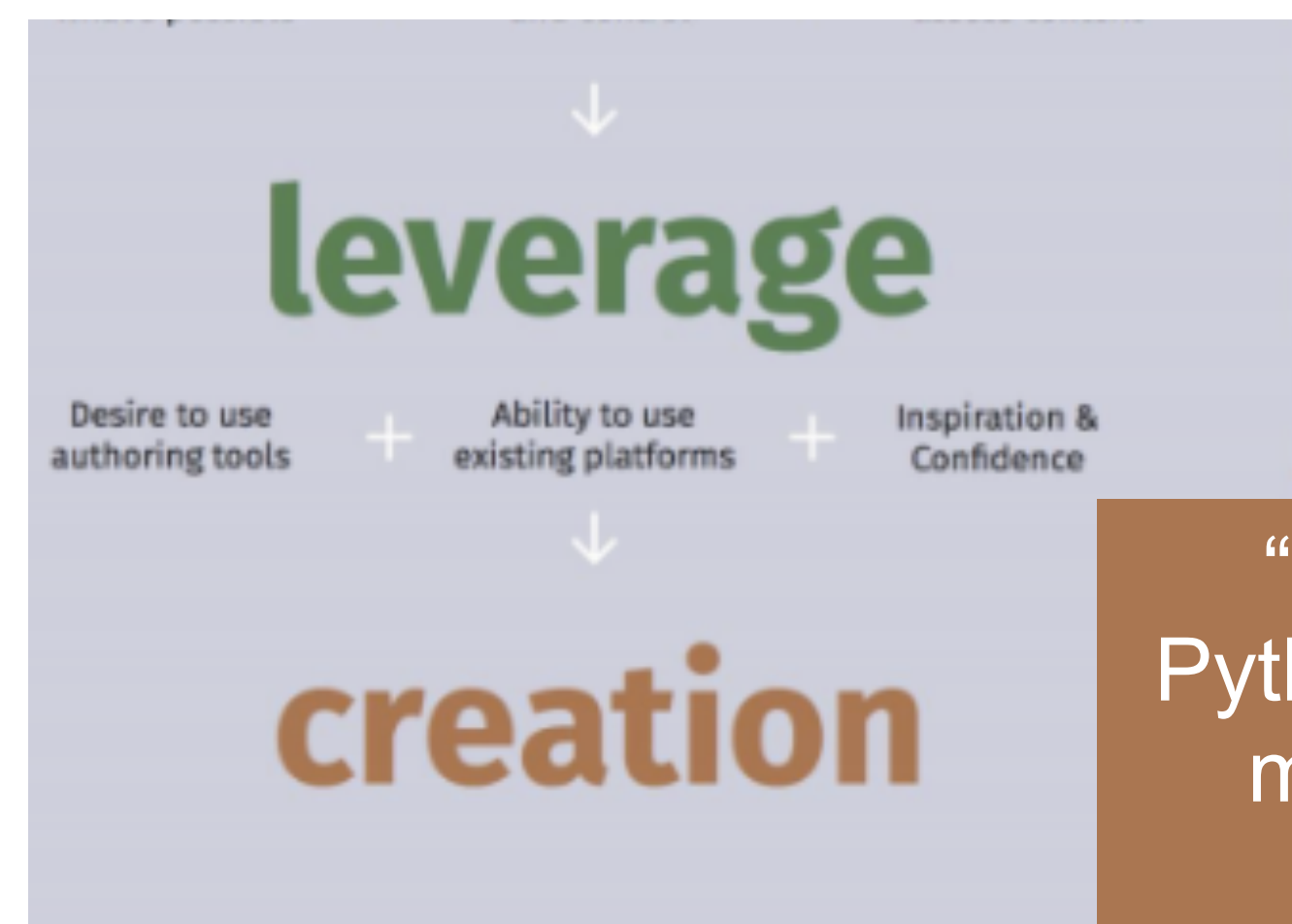
1971 (at which point 23 hosts, at universities and government research centers, were connected to the ARPANET); 29 by August, 1972, and 40 by September, 1973.

At that point, two satellite links, across the Pacific and Atlantic Oceans to **Hawaii** and **Norway** (NORSAR) had been added to the network. From Norway, a terrestrial circuit added an IMP in London to the growing network.



# Motivation: “Need to close the digital gap”

- The Global Goals:  
Norway is the secretariat for Quality Education
- Internet history
  - ➔ 1973 Europe through Kjeller
  - ➔ 1994 Opera Software
- Digital Industries
  - ➔ Health Care
  - ➔ Automation



“Internet is my teacher”

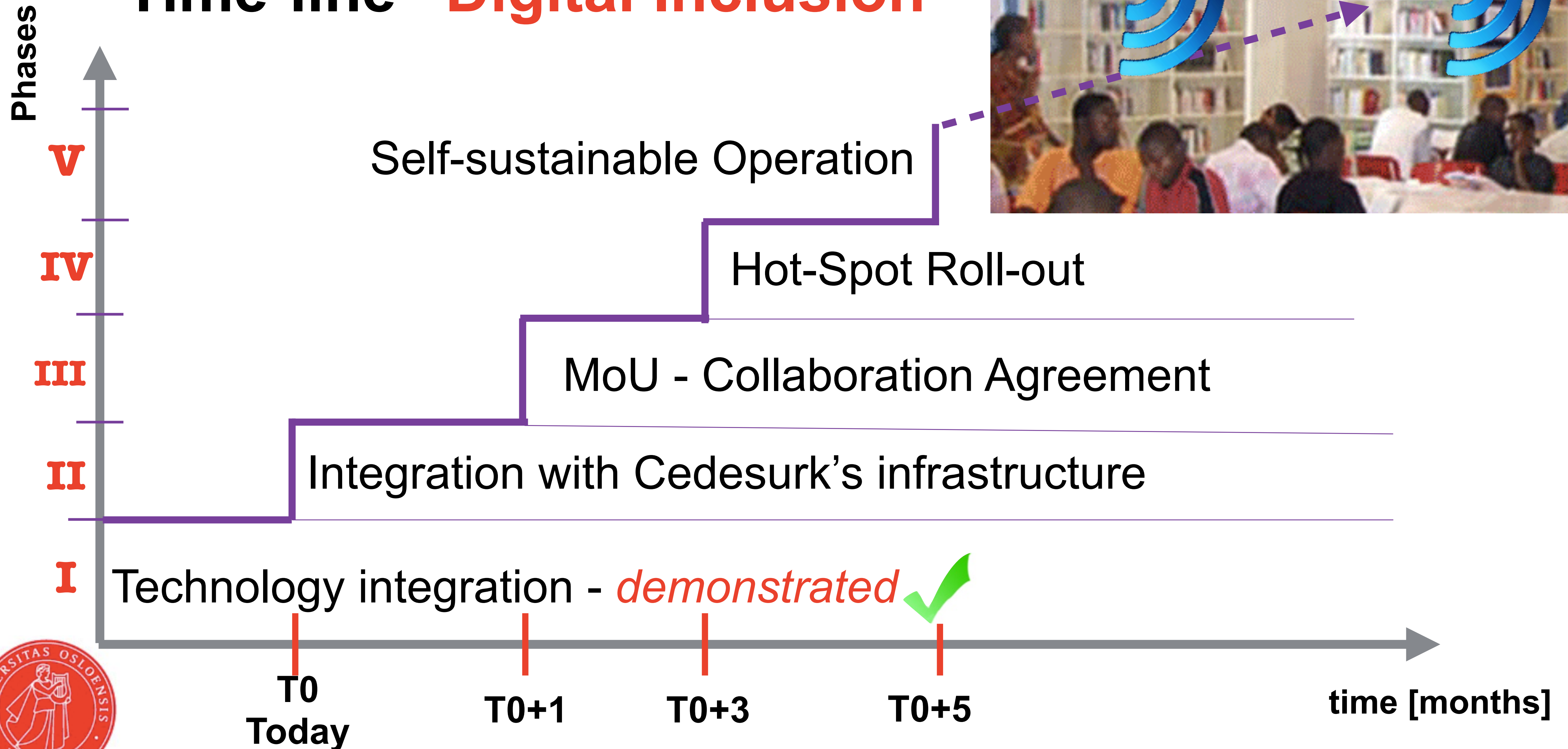
“I’m currently learning Python and HTML, so I can make a website for my parents’ business”



[Source: GSMA, Nov2015]



# Time-line “Digital Inclusion”



# Phases and Goals “Digital Inclusion”

- Phase **I**: Technology integration demonstrated
  - Successful pilot with Inet and Monka
  - Demonstrated technology
- Phase **II**: Integration with Cedesurk’s infrastructure
  - Free access for students to Cedesurk and educational content
  - Basis for scalability to multiple Universities
- Phase **III**: Memorandum of Understanding for Regional Perspective
  - Collaboration between UiO, IPN(?), ... Cedesurk,
- Phase **IV**: Hot-spot roll-out for self-sustainability
  - Voucher sales for Internet content to students
  - Extension of the network
- Phase **V**: Self-sustainable operation
  - Innovation: Novel business
  - Scaling to other areas

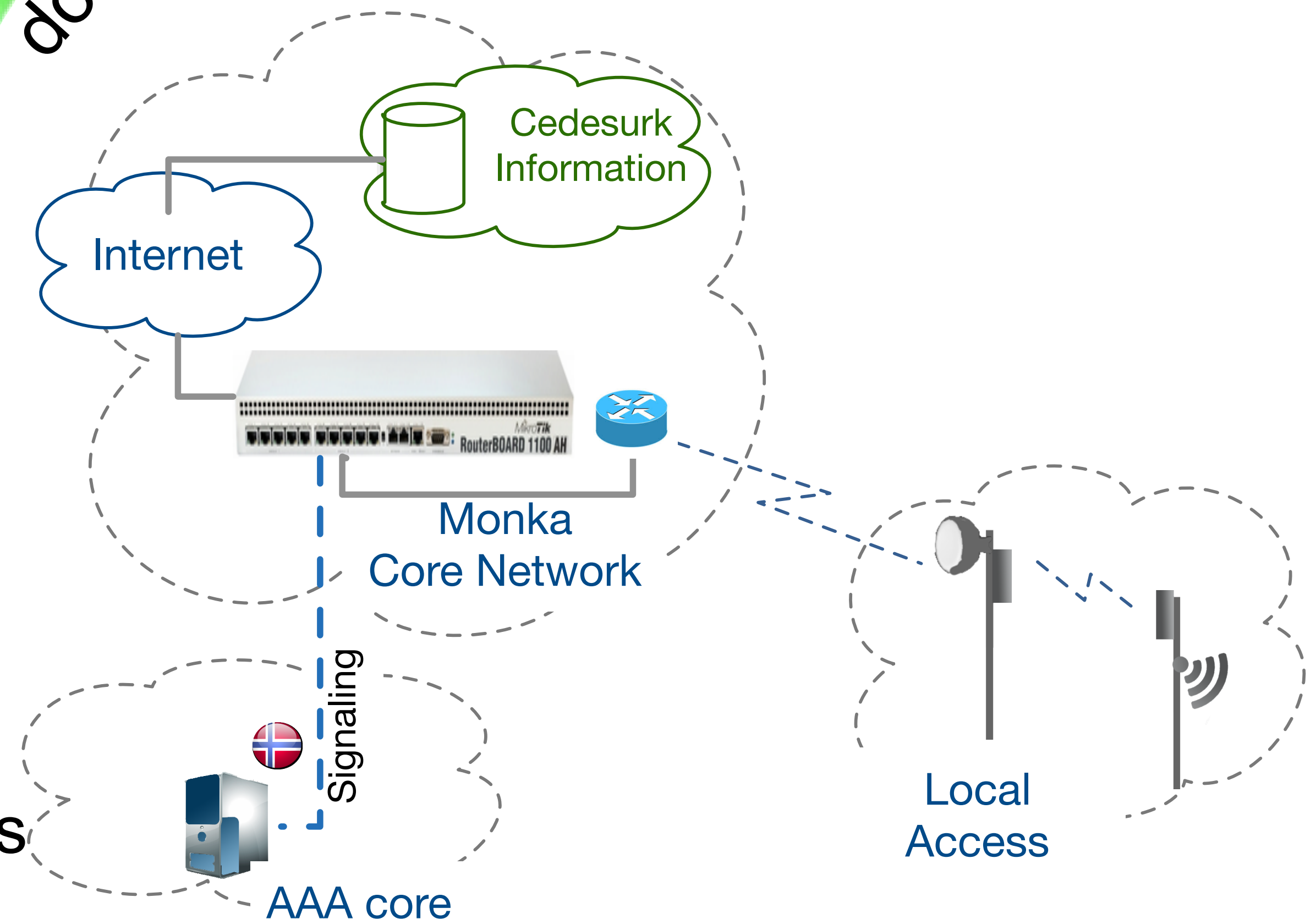




# Phase I: Technology integration demonstrated

- Successful pilot with Inet and Monka
- Demonstrated technology
  - ➔ Free access to Cedesurk Content
  - ➔ Hot-spot provision
  - ➔ Smartphone, Tablet, PC-access
- Lessons learned
  - ➔ Content from Cedesurk integrated
  - ➔ need priority for signalling
  - ➔ vouchers for e.g. 10, 50, 100 MB, 1 GB
  - e.g. 1 h, 24 h, 1 month, and combinations

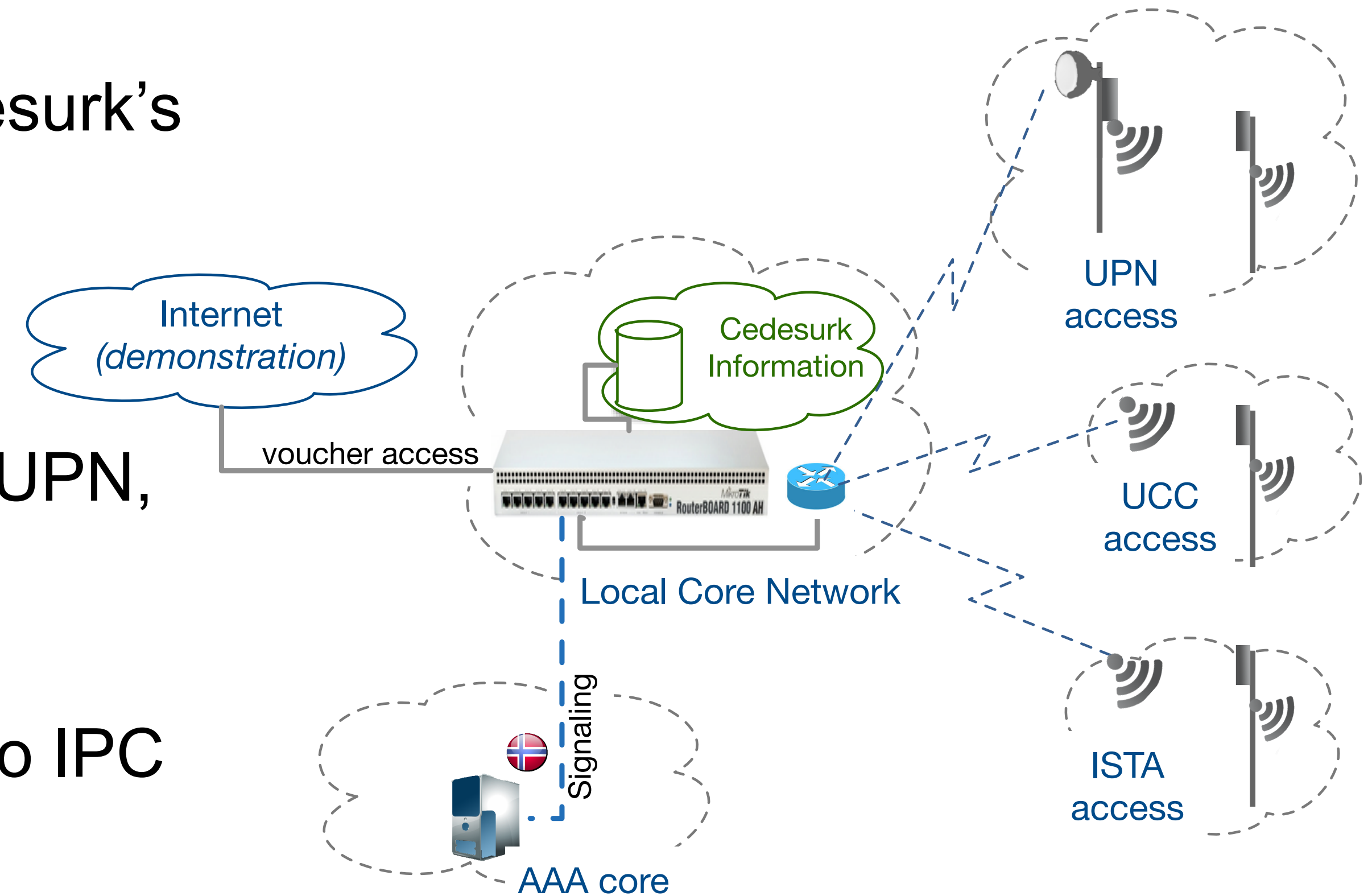
*see Annex for details*





# Phase II: Integration with Cedesurk's infrastructure

- Goals
  - ➔ Provide free access for students to Cedesurk's and educational content
- Activities
  - ➔ Integrate servers at Cedesurk
  - ➔ set-up 2 hot spots at 3 Universities, e.g. UPN, UCC, ISTA
- Costs
  - ➔ ... hours to transport Monka equipment to IPC
  - ➔ ... hours to update signalling
  - ➔ ... hours to integrate local content



450 US\$ for 4 additional hot-spots

- Time schedule: 1 month

*see Annex for details*





# Phase **III**: Memorandum of Understanding Goals

- Goals
  - ➔ Collaboration between UiO, IPN(?), ... Cedesurk, Basic Internet Foundation
  - ➔ Business agreement towards self-sustainable operation
- Activity
  - ➔ Prepare basic MoU
  - ➔ Travel of Prof. Josef Noll to Kinshasa
    - Discussion and signature of MoU
- Costs
  - ➔ Travel costs to Kinshasa
  - Time schedule: 2 months

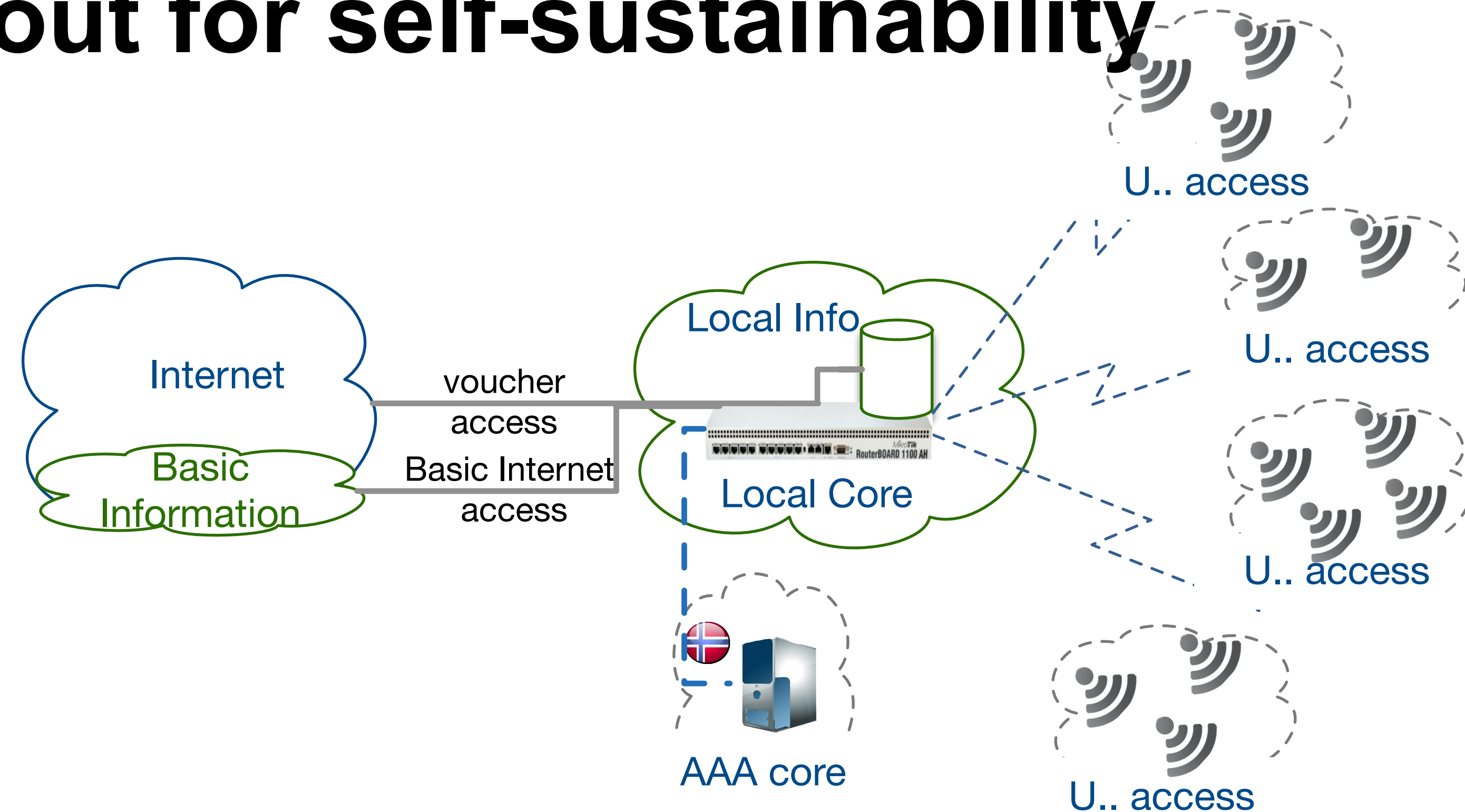


see Annex for details



# Phase IV: Hot-spot roll-out for self-sustainability

- Goals
  - ➔ Provide full Internet access
- Activities
  - ➔ Voucher sales for Internet content to students
  - ➔ Purchase of add. bandwidth
  - ➔ Extension of the network
- Costs
  - ➔ Extension of the network
  - Time schedule: 2 month



see Annex for details



# Steps **V**: Self-sustainable operation

- Goals
  - **leverage & creation**
    - Students as innovators
  - **Scaling to other areas**
    - student homes, ...
- **Activities**
  - expand network
- **Costs - self-sustainable**
  - Voucher sales (income) => bandwidth purchase & extension of network
  - Basic Internet through License fees

**Digital Competency**

**90% leverage**

Desire to use authoring tools + Ability to use existing platforms + Inspiration & Confidence

**30% creation**



“Internet is my teacher”

“I’m currently learning Python and HTML, so I can make a website for my parents’ business”



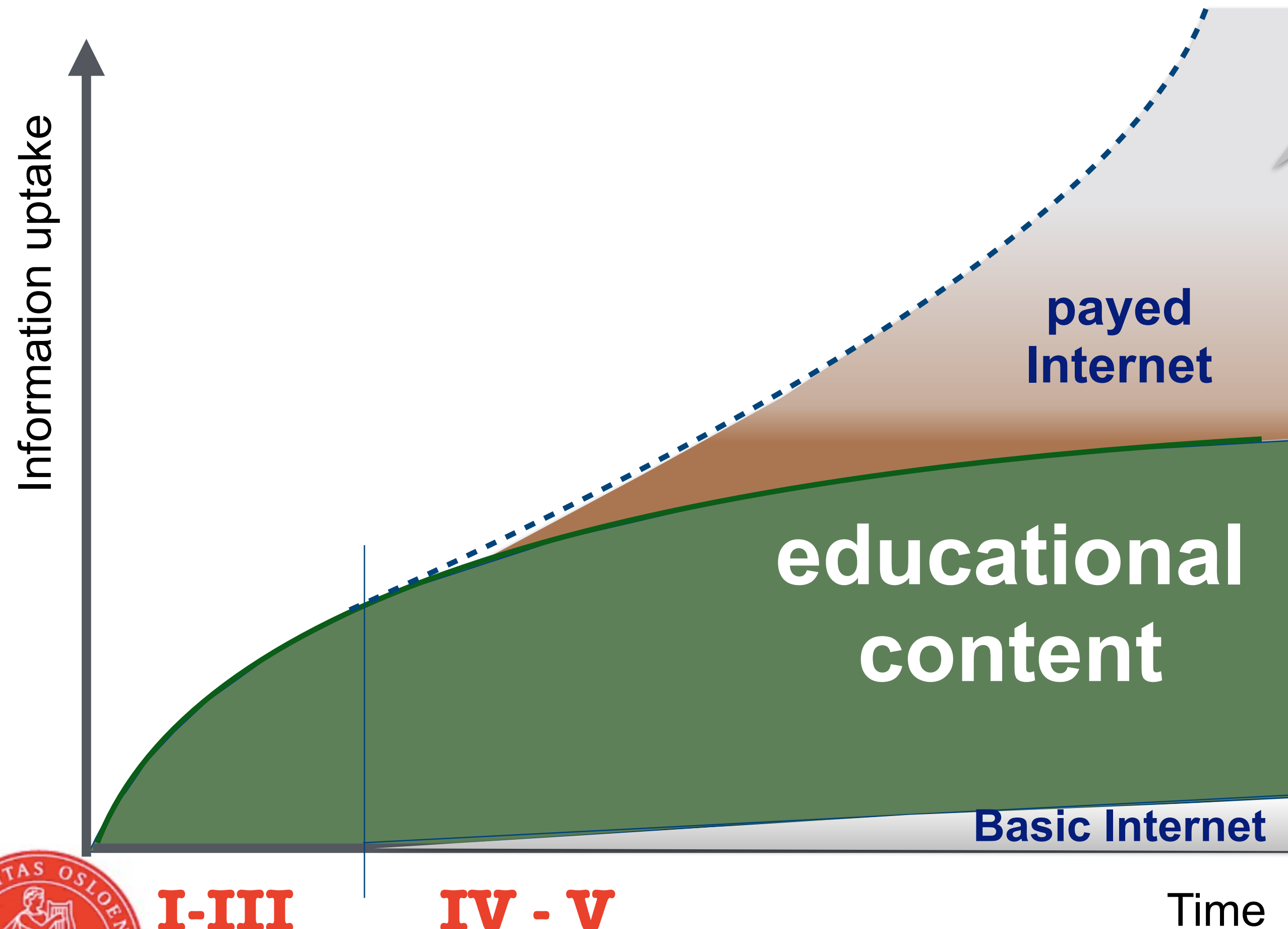
Time frame: T0+5 months onwards

*see Annex for details*





# Steps **V**: Expected uptake



- Innovation from students and staff
- novel business ideas
- voucher-based access

**30% creation**

**90% leverage**

- local content
- Cedesurk: Wikipedia, Education

- Basic Information (low capacity)
- by Basic Internet Foundation
- open access



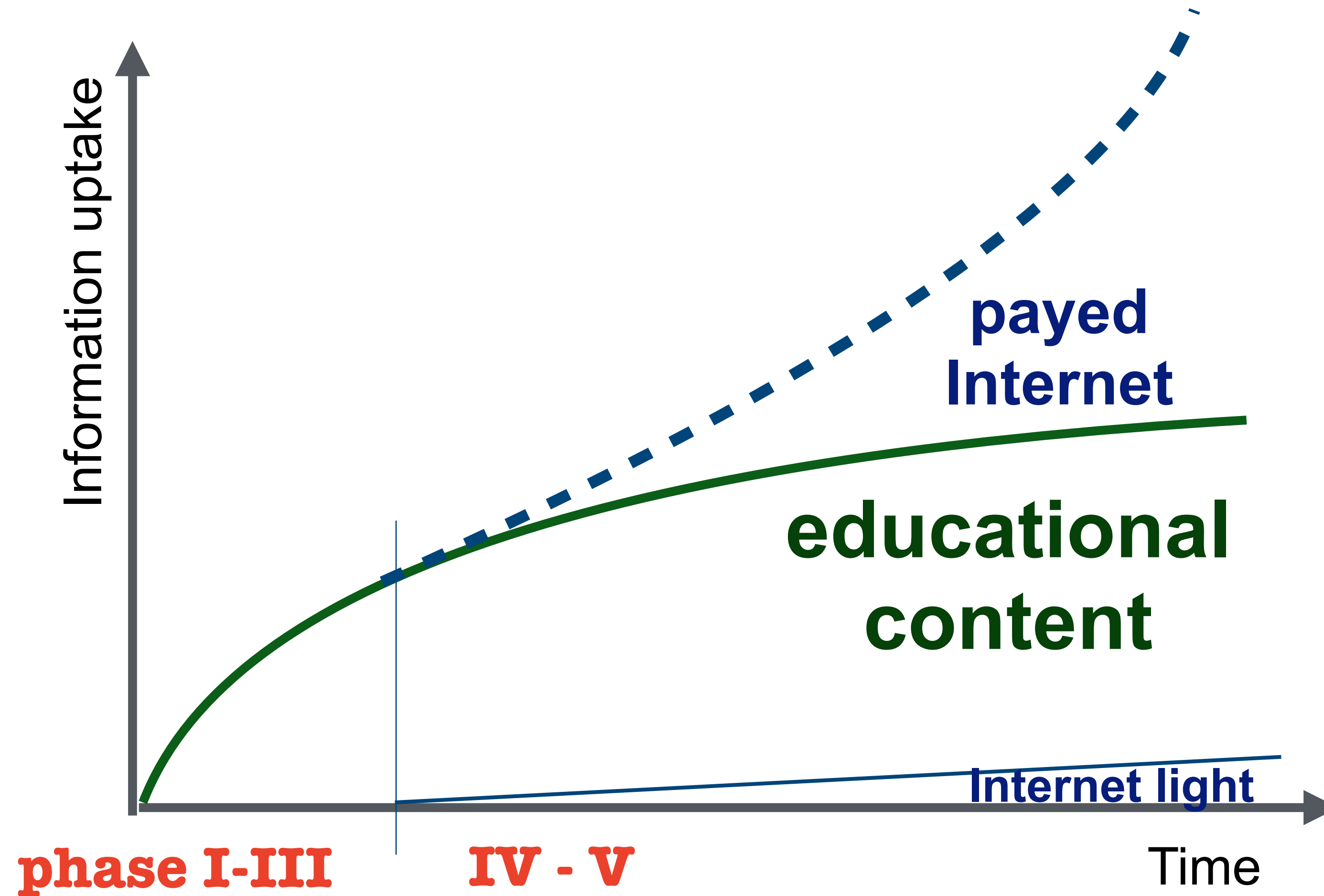
**I-III**

**IV - V**

see Annex for details



# Steps **V**: Expected uptake



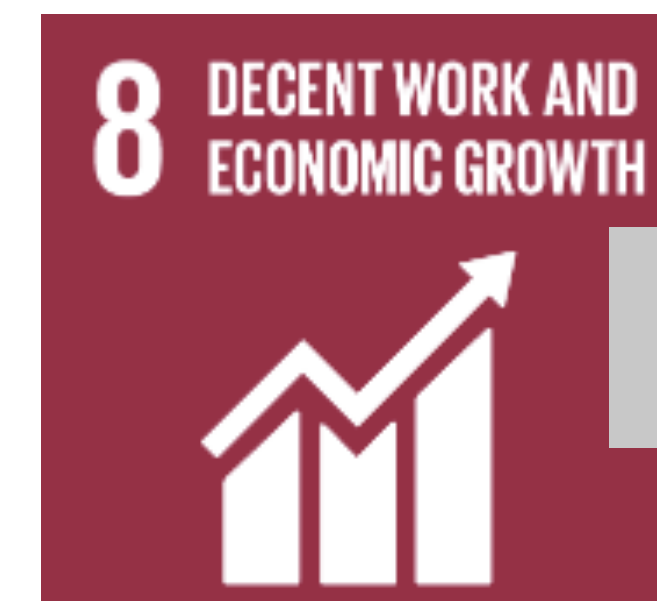
see Annex for details





# Way ahead: African Perspective

- Model for Digital Inclusion and Entrepreneurship
  - Self-sustainable developments
  - Supporting United Nations “Global Goals for Sustainable Development”
    - ➔ Digital Inclusion is key for development
    - ➔ Norway has secretariat on G4: education
- address other Goals





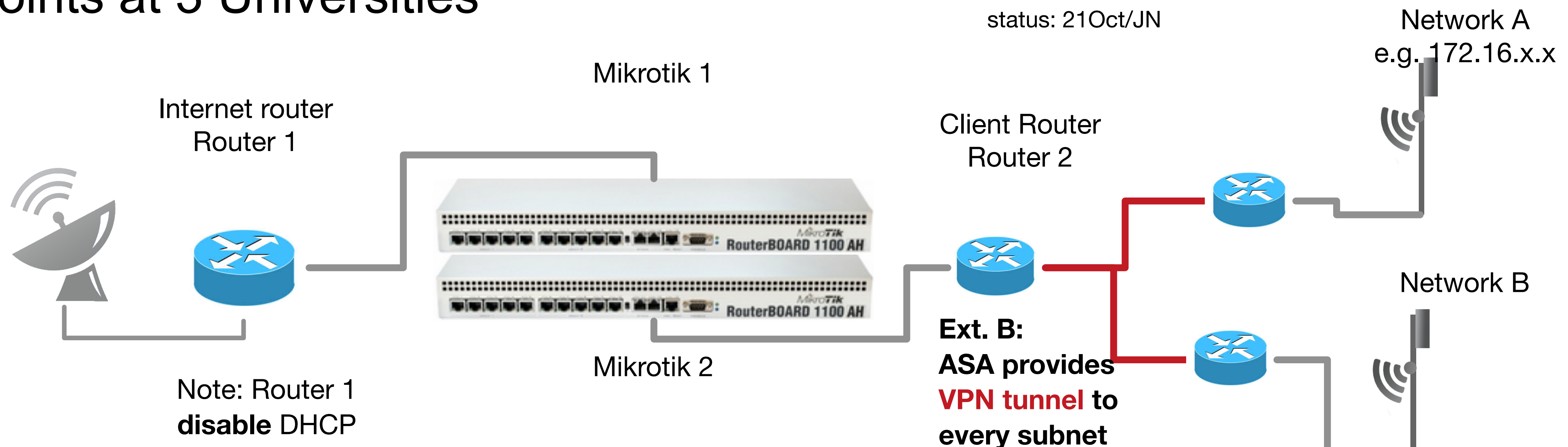
# **Attachment**

## **- detailed technology, budget, time plan phase 2**



# Integrated Infrastructure

- Goal: Integrate the existing “local core” infrastructure into Cedesurk
- Local core
  - ➔ 1 x Mikrotik X2, 1100 AH (local core)
  - ➔ 2 x Mikrotik RG
- Access Points at 3 Universities
  - ➔ 6 APs
  - ➔ Cable++





# Lessons learned from Phase I

- Content from Cedesurk integrated
  - free access to Cedsurk's local content
  - usage of own devices (BYOD) at no cost
- Lessons learned
  - Technology works, need priority for signalling link to Norway
  - Cost-efficient deployment, local core for <500 US\$
  - Easy expandable, through cheap (and open) access points
  - Vouchers for payed Internet access for amount, time, or combinations, e.g. 10, 50, 100 MB, 1 GB, time: 1h, 24h, 1 month, and e.g. 100 MB/24h

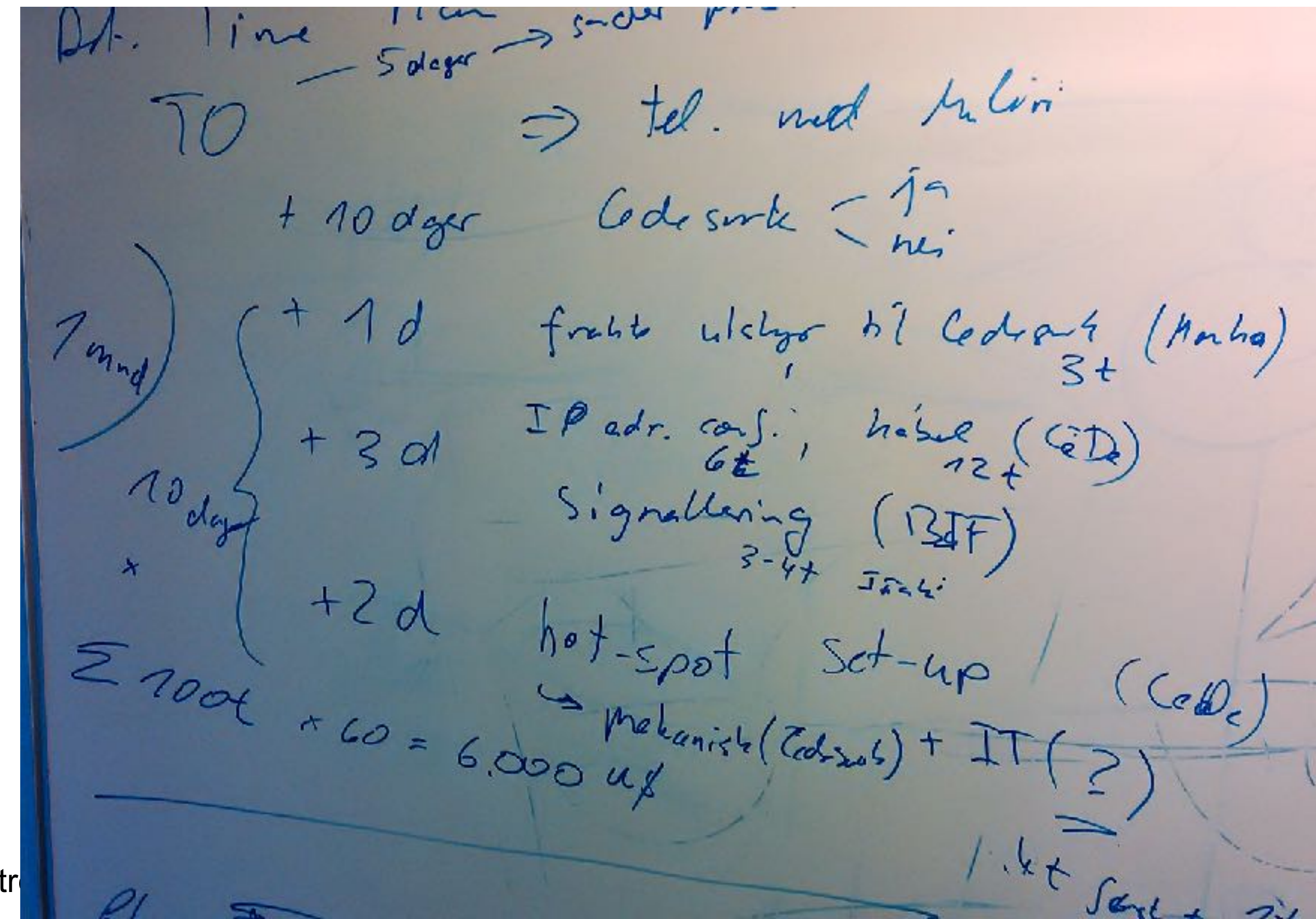




# To Do -

- integrate servers at Cedesurk
  - ➔ 2 router and core board
  - ➔ local (or Monka) server
  - ➔ signalling link to global AAA server
- Set-up hot-spots at 3 Universities
  - ➔ 6 APs
  - ➔ Cable++
- Costs
  - ➔ ca 1000 US\$ (estimate Josef) vs 6000 US\$ (Guy)

- Time schedule
  - ➔ decision and detailed plans - 10 days
  - ➔ purchase additional equipment (if needed)
  - ➔ Integration 10 days





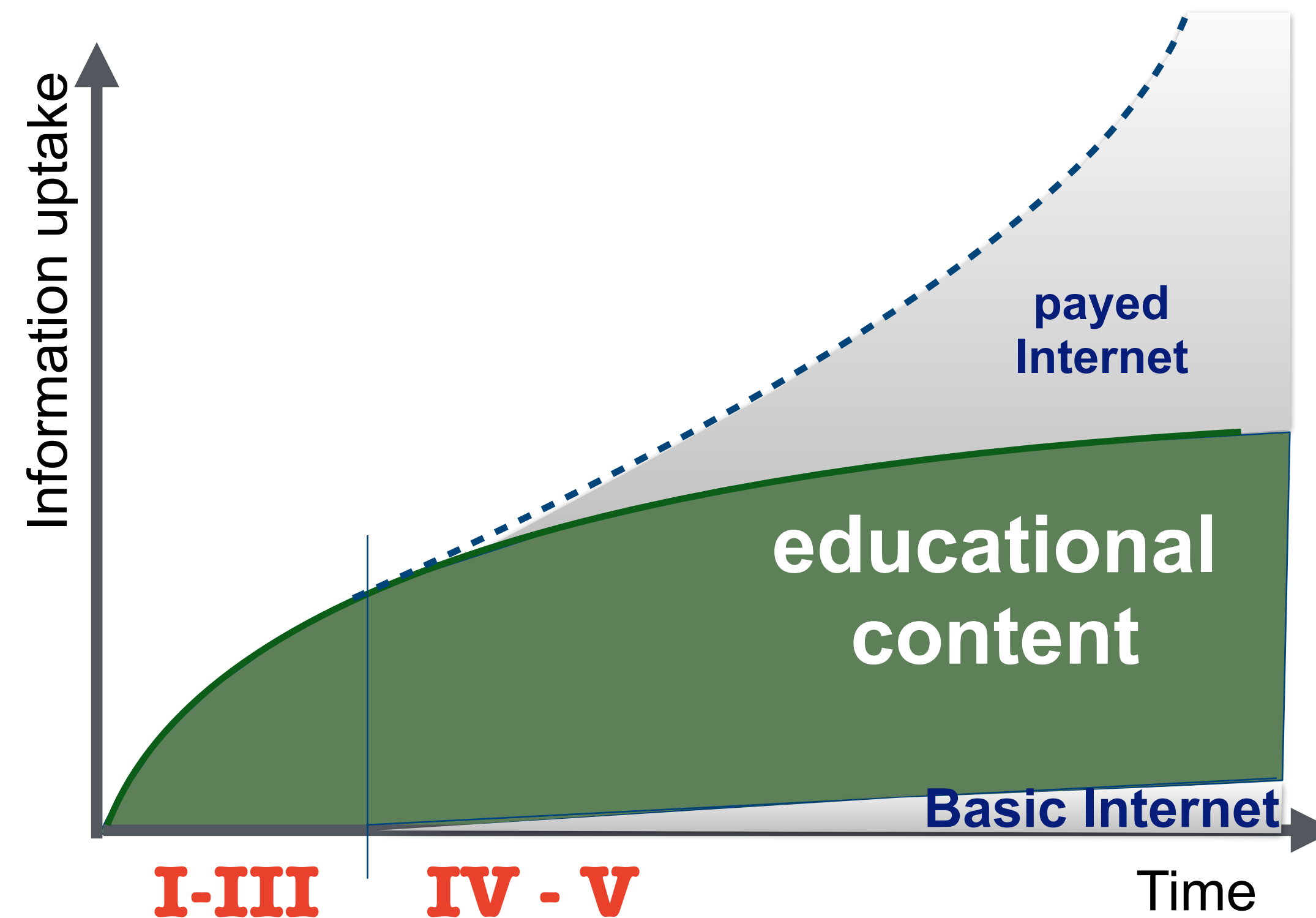
# Memorandum of Understanding - “self-sustaining”

- Collaboration between UiO & Cedesurk (UPN, UNIP, ...)
- Business agreement towards self-sustainable operation
  - plans for conversion into commercial operation
- Way ahead, plans for extension
  - extended coverage of existing buildings
  - extension to new areas, e.g. student buildings
- Timeline
  - T0+3 weeks core bullets agreement
  - T0+7 weeks agreement ready for discussion
  - T0+2 month - Visit Kinshasa
    - signature of agreement
- Costs
  - travel costs to Kinshasa (BI)



# Hot-spot roll-out for self-sustainability

- Collaboration between UiO & Cedesurk (UPN, UNIP, ...)
- Business agreement towards self-sustainable operation
  - **plans** for conversion into commercial operation
- Way ahead, **plans** for extension
  - extended coverage of existing buildings
  - extension to new areas, e.g. student buildings





# Self-sustainable operation

- Monka, Cedesurk and others
  - expanding according to market needs
- Basic Internet provision
  - as x% of payed Internet usage

