NETWORKING FOR DEVELOPMENT (N4D) LAB

Arjuna Sathiaseelan

www.cl.cam.ac.uk/~as2330/n4d
Digital Divide is Universal

North America
Internet penetration: 82%
Population: 350 million
GDP: $19 trillion

Europe
Internet penetration: 68%
Population: 700 million
GDP: $21 trillion

China
Internet penetration: 45%
Population: 1.4 billion
GDP: $9 trillion

South and East Asia
Internet penetration: 21%
Population: 800 million
GDP: $2.3 trillion

Latin America
Internet penetration: 45%
Population: 600 million
GDP: $5.8 trillion

Africa
Internet penetration: 20%
Population: 1.1 billion
GDP: $2.1 trillion

India
Internet penetration: 13%
Population: 1.2 billion
GDP: $1.8 trillion
THE CENTRALISED INTERNET ECOSYSTEM IS A FUNDAMENTAL BARRIER
It's not just access but also services

65% of Google caches that serve Africa are outside the continent

N4D at a Glance

R&D
- Measurement Studies
- Decentralised Cloud + Lightweight Virtualisation
- NFV / SDN
- ICN (Pursuit, NDN)
- Low Cost Backhaul Solutions
- Fog/Edge Computing
- Real Deployments
- Socio-economics

Community Networks
- Guifi.net, TakNet, PAWS

Tools

Projects
- PAWS
- RIFE
- UMOBILE
- CONFINE
TakNet: Community Network (CN)

The 1st CN in Thailand: a small rural village with 300 populations

Internet subscription (per household) reduces from 28$ to 5$ per month

Number of Internet users increases from 10 (2012) to 200 (2015)

Catalyst for change: ISPs expand more backhaul to cover the villages
The Real Cloud

Building a lightweight micro-datacenter in the air

Cloud Drone (MANET-OLSR)

Lightweight and self contain service: Unikernel, Docker, IncludeOS

Build: Ship: Run on small devices

Not only connectivity, but people also need services

EMERGENCY SITUATIONS

MIGRANT CRISIS

Wireless Link

Satellite Link connects to the Internet
Efficient Service Dissemination

Service Centric Network

SUBSCRIBER → Subscribe → Service → PUBLISHER

Cloud Drone (MANET-OLSR)

Pub-Sub Communications
Name-Based Routing
In-network caching
Inherent Multicast Support
Data Trust Model
Working with the wider community