ITU Annual HCB Regional Workshop on Strengthening Capacities in International Internet Governance
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Session 3: Telecommunications infrastructure: traditional and emerging challenges

Marcelino Tayob

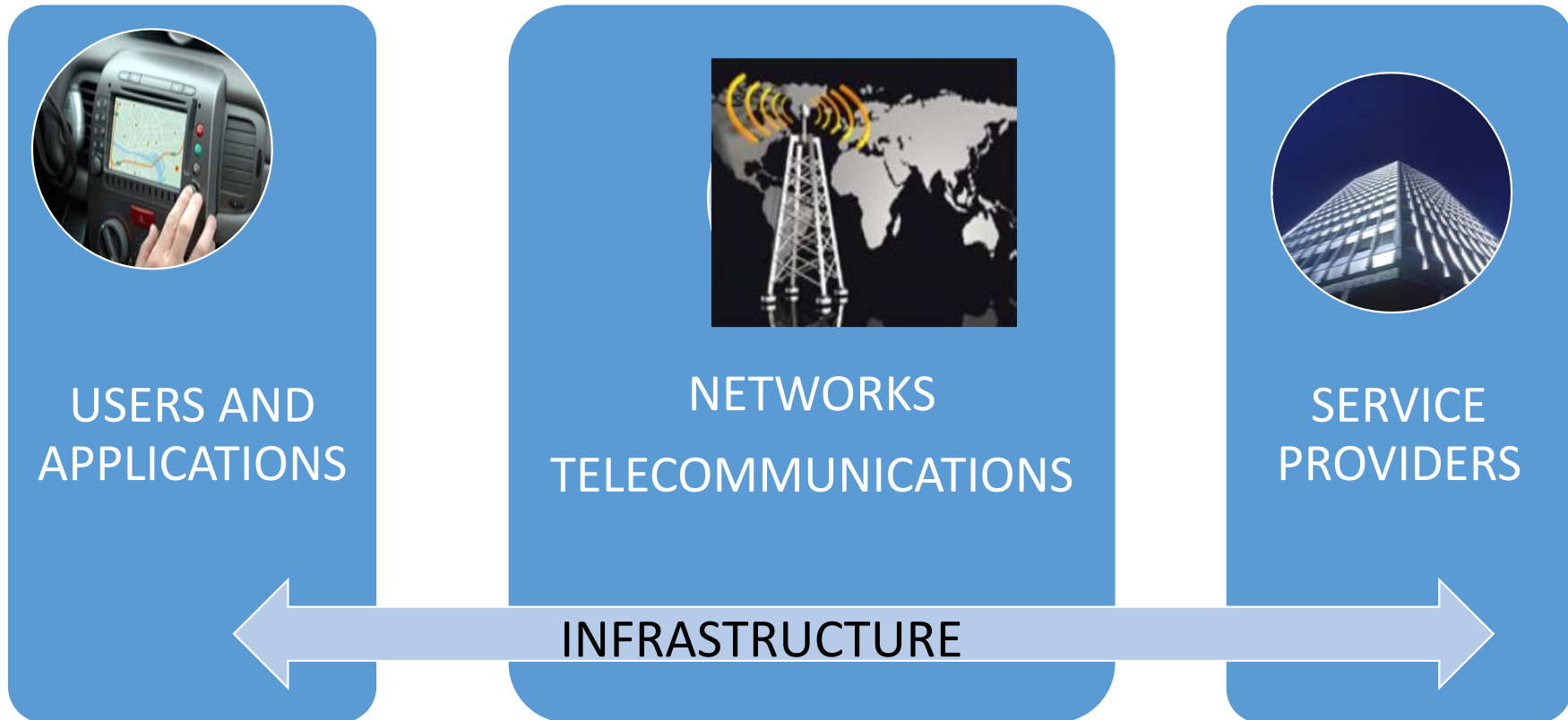**Senior Adviser – ITU Regional Office for Africa**

Outline

❑ INTRODUCTION

❑ ICT/TELECOMMUNICATIONS INFRASTRUCTURE ECOSYSTEM
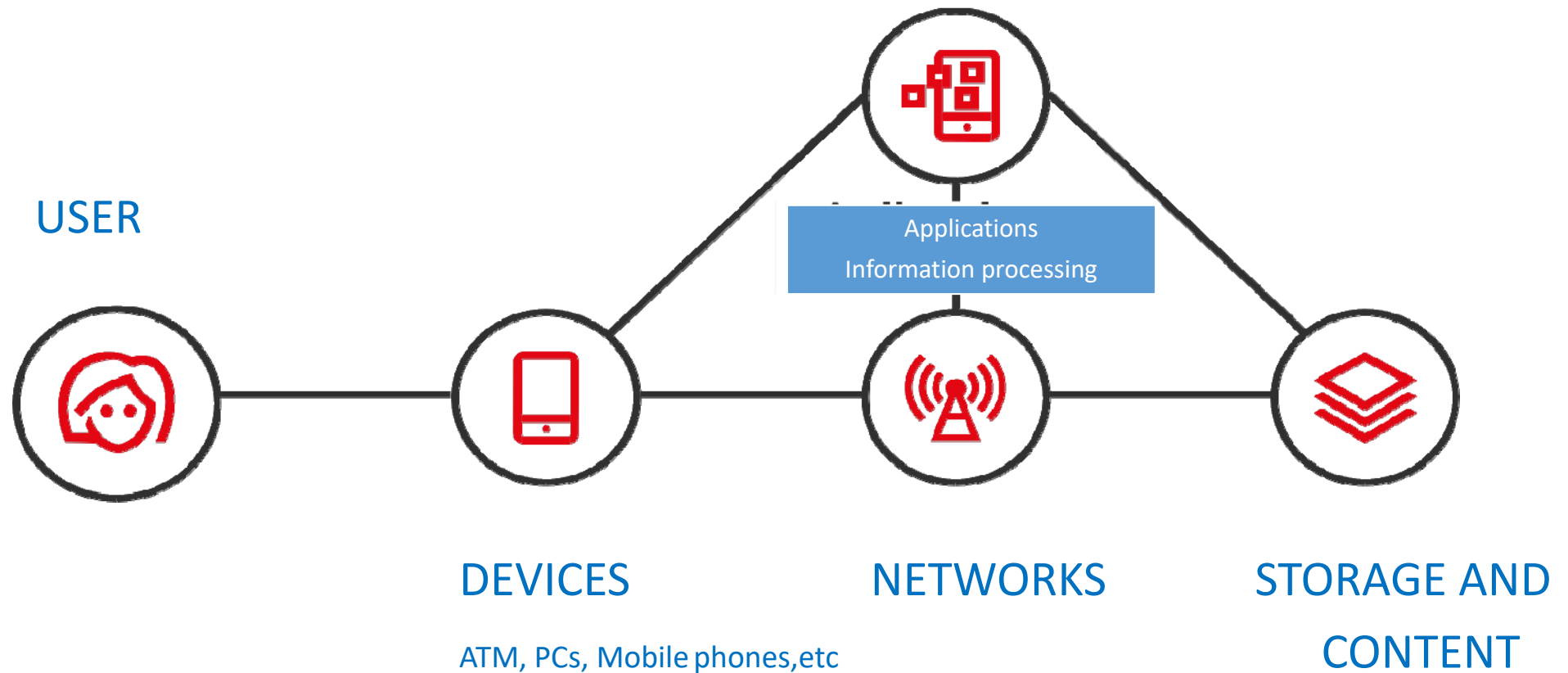
❑ SITUATION IN AFRICA

❑ CONCLUSION

ICTs/Telecommunications

USERS AND APPLICATIONS

NETWORKS

TELECOMMUNICATIONS

SERVICE PROVIDERS

INFRASTRUCTURE

THE INTERNET VALUE CHAIN – VARIOUS PLAYERS

USER

DEVICES

ATM, PCs, Mobile phones,etc

NETWORKS

STORAGE AND CONTENT

Applications

Information processing

USING OSI 7 LAYER MODEL

The 7 Layers of OSI

Transmit Data

Receive Data

User

- Application (Layer 7)
- Presentation (Layer 6)
- Session (Layer 5)
- Transport (Layer 4)
- Network (Layer 3)
- Data Link (Layer 2)
- Physical (Layer 1)

FOCUS

xDSL, FTTH, WiFI, 3G/4G,PLC

FO, Satellite, Radio Relay,etc

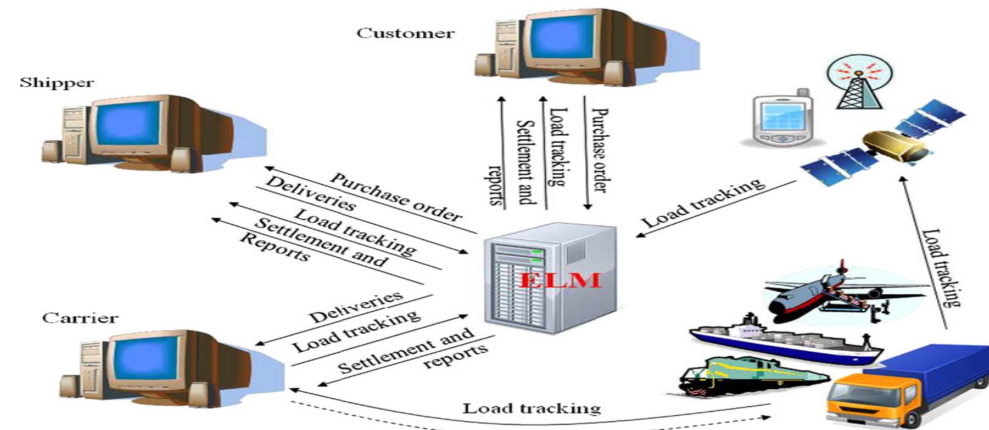Physical Link
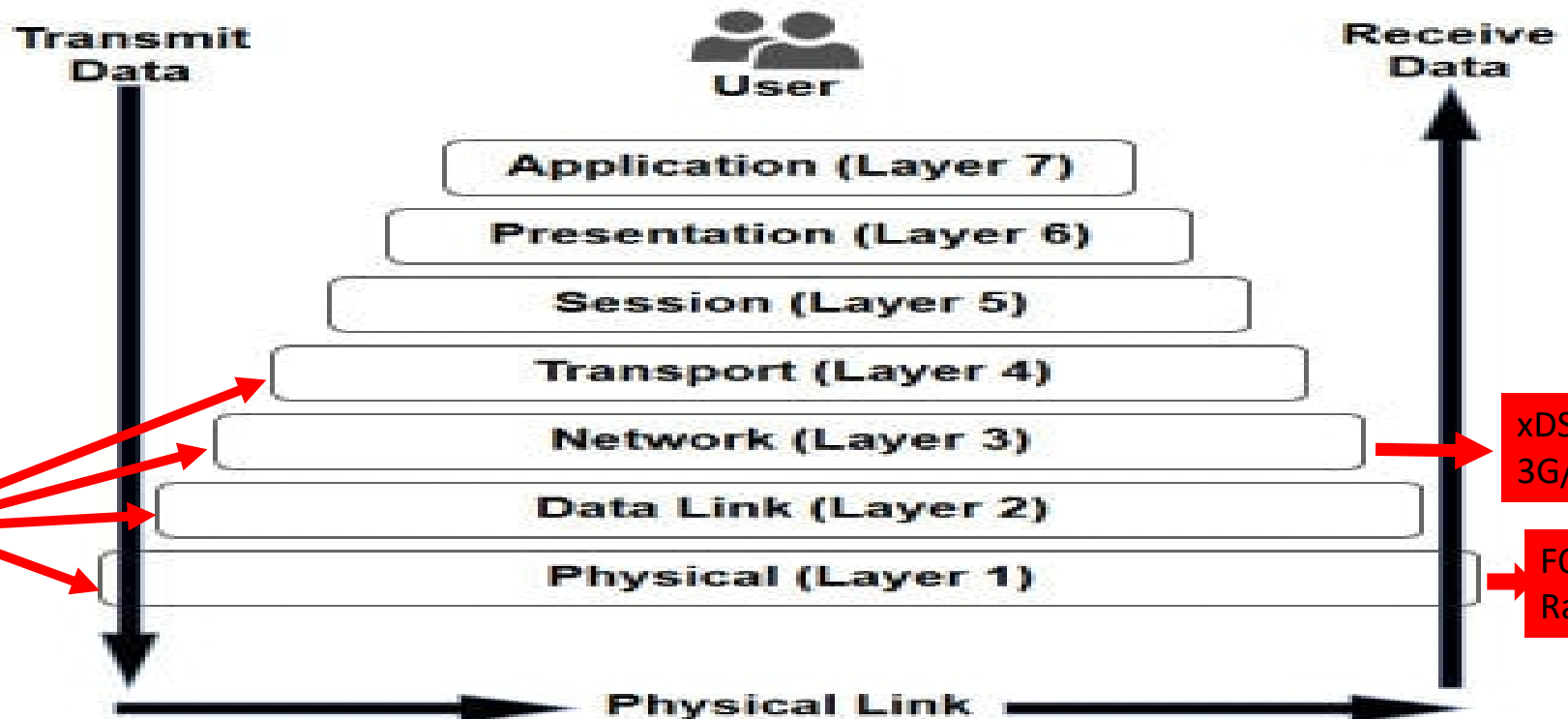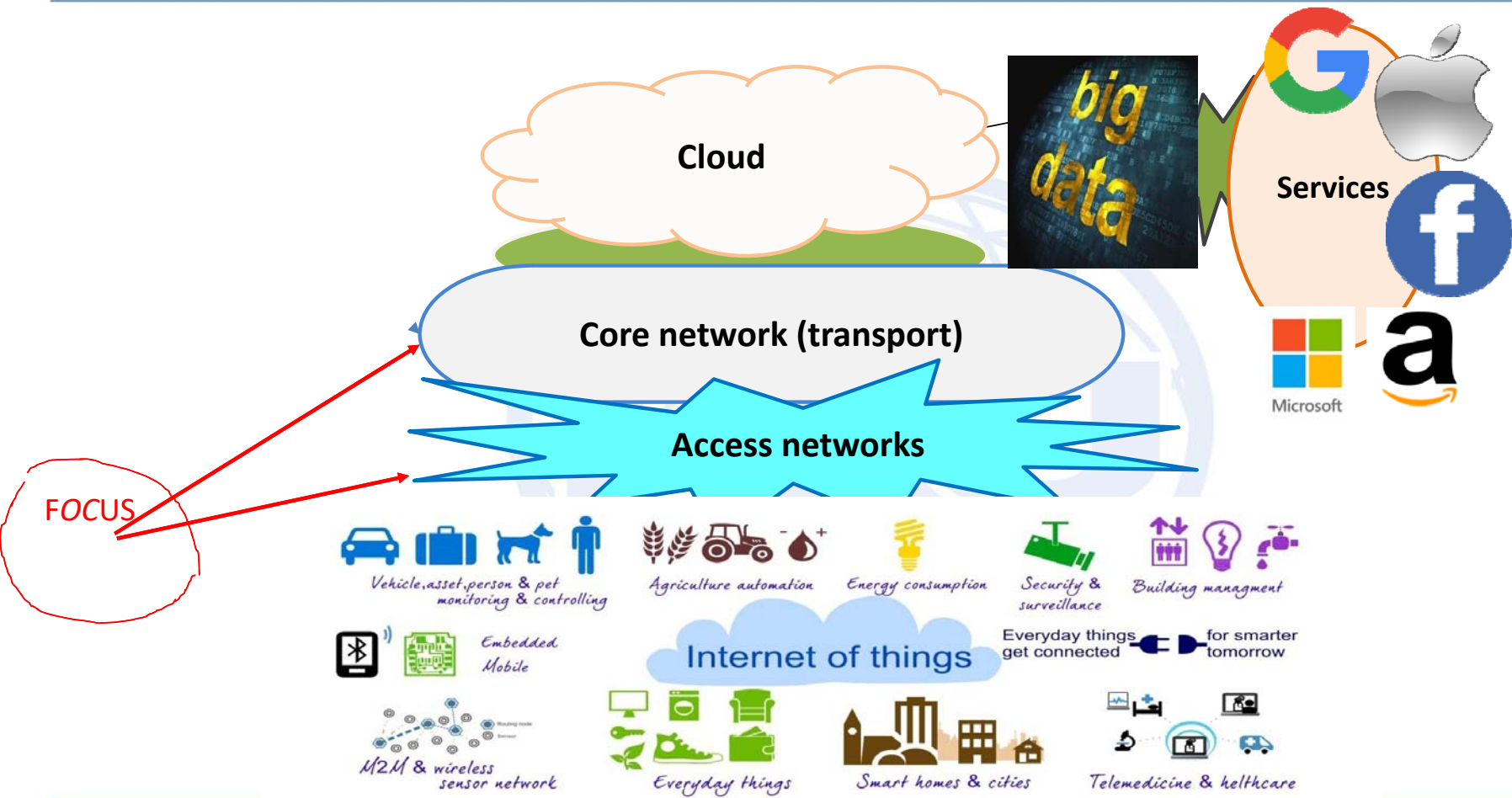
TELECOMMUNICATIONS NETWORKS

CORE/ BACKBONE/INTERNATIONAL

- Networks base in FIBER OPTICS CABLES linking continents, countries, cities .
- Satellite Networks
- Microwave radio relays and other WIRELESS Systems

ACCESS

- FTTH (Fiber to the Home), Cable TV, etc. – mostly in urban areas
- Copper cables and various wireless systems (WiFi, WiMax, Doongle, etc).

PROGRESS ON TRANSPORT NETWORK

- SUBMARINE FIBER OPTICS CABLES.
  - ➢ Extensive progress over the last decade
  - ➢ Almost all costal countries have landing points
  - ➢ Extension to the interior of the country (National Backbones)
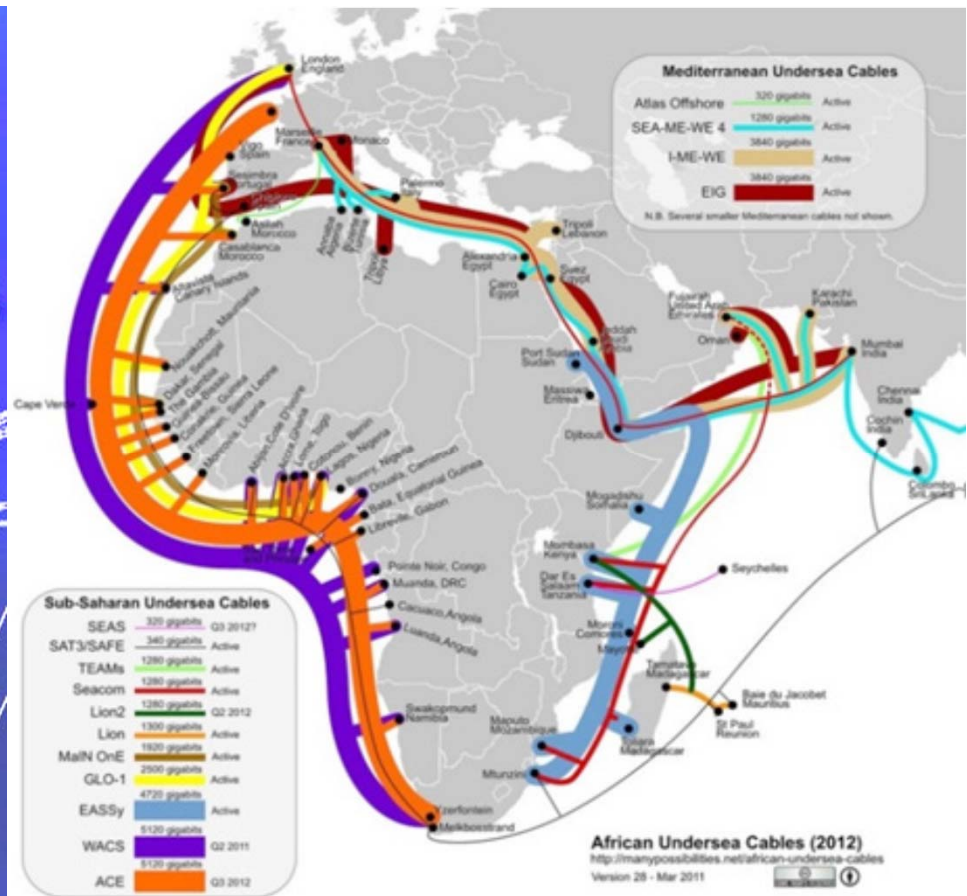
- TERRESTRIAL FIBER FOR LANDLOCKED COUNTRIES
  - ➢ There are still some gaps but most countries have access.
  - ➢ The access cost depends on the negotiations

TELECOMMUNNNNICATIONS TRANSPORT NETWORK – SUBMARINE CABLES

## 2007   2017

TELECOMMUNICATIONS NETWORKS

➢ Extensive terrestrial network though still some gaps exist in the connectivity of the land locked countries.

➢ **ITU Interactive Map**
https://www.itu.int/itu-d/tnd-map/

➢ The cost of providing the services. Cost Structure both CAPEX and OPEX.

➢ Affordability

➢ Remote Areas and/or Rural Communities.

TANZANIA NATIONAL ICT BROADBAND BACKBONE NETWORK MAP
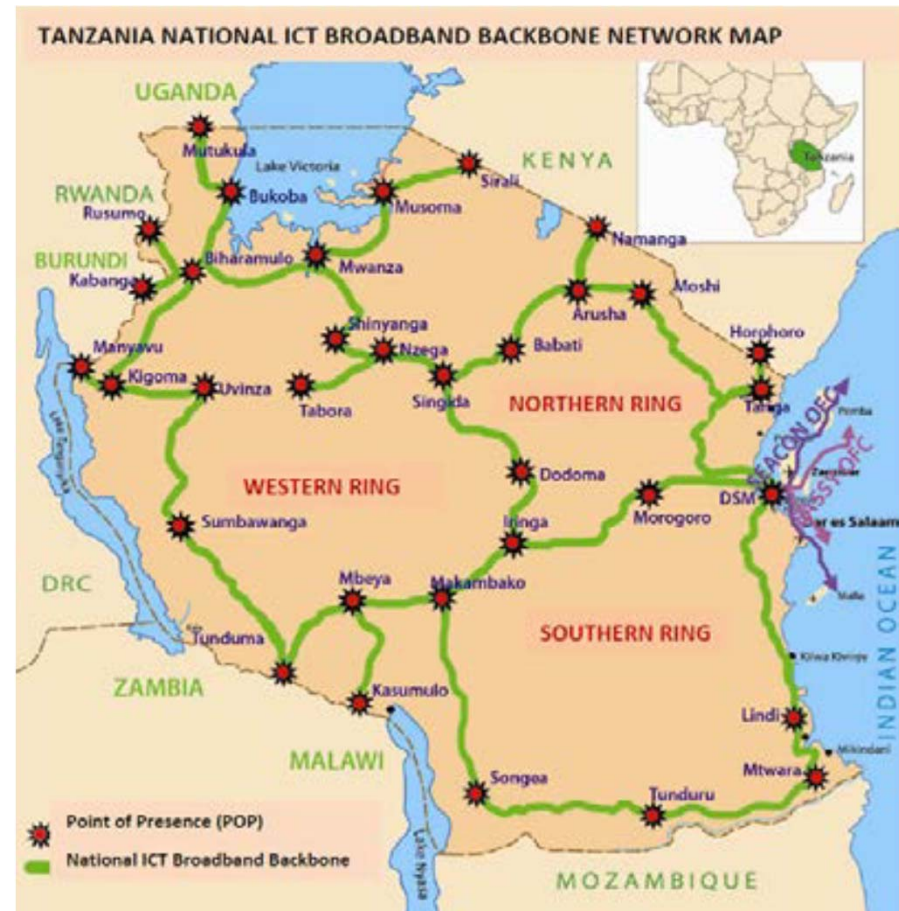
ACCESS

Access to services predominantly done through mobile networks
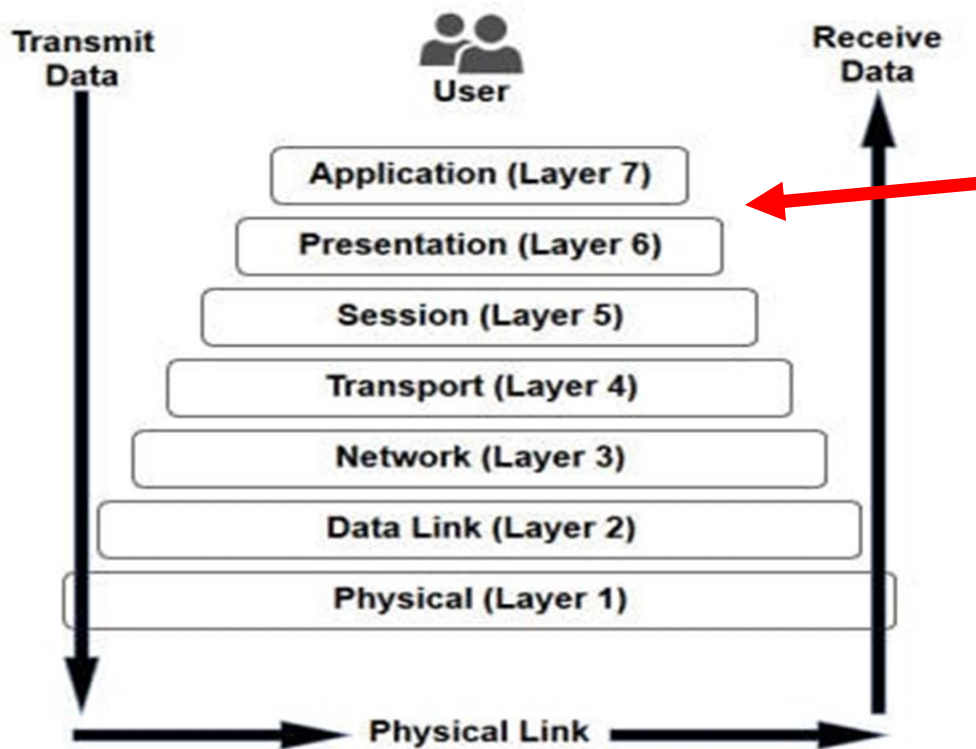Geographical coverage and population coverage still have large gaps.

	Millions	Per 100 Inhabitants
Fixed Telephone subscriptions	10	1
Mobile Subscriptions	759	77.8
Active Mobile Broadband Subscriptions	253	22.9
Fixed broadband subscriptions	4	0.4

The 7 Layers of OSI

Transmit Data

Receive Data

User

Application (Layer 7)

Presentation (Layer 6)

Session (Layer 5)

Transport (Layer 4)

Network (Layer 3)

Data Link (Layer 2)

Physical (Layer 1)

Physical Link

- WORKING AT UPPER LAYERS
- APPLICATIONS AND SERVICES IS WHERE THE IMPACT IN THE PEOPLES LIVES AND COUNTRIES ECONOMY
- OTT (Over the Top)
- IoT (Internet of Things)
- ETC

- LOWER LAYER = CONNECTIVITY TO THE UNCONNECT WITHOUT WHICH THE UPPER LAYER CAN NOT BE PROVIDED.

DIGITAL ACCESS

- Digital Access goes beyond just voice and internet connectivity it includes access to services and things using the CONNECTIVITY.

- Digital Inclusivity touches the everyday lives of all people by meeting their basic needs in more intelligent ways though a proliferation of DIGITAL SERVICES such as
  - E-AGRICULTURE
  - E-EDUCATION
  - E-GOVERNMENT
  - E-HEALH or M-HEALTH
  - Mobile Money/Finance
  - IoT Services : Smart Security, Smart metering, Smart Energy, etc.
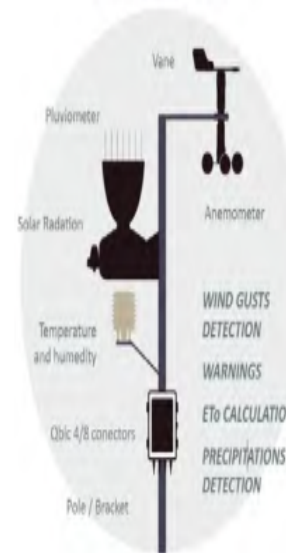
E-SERVICES – Not everything is BB

IoT network general architecture
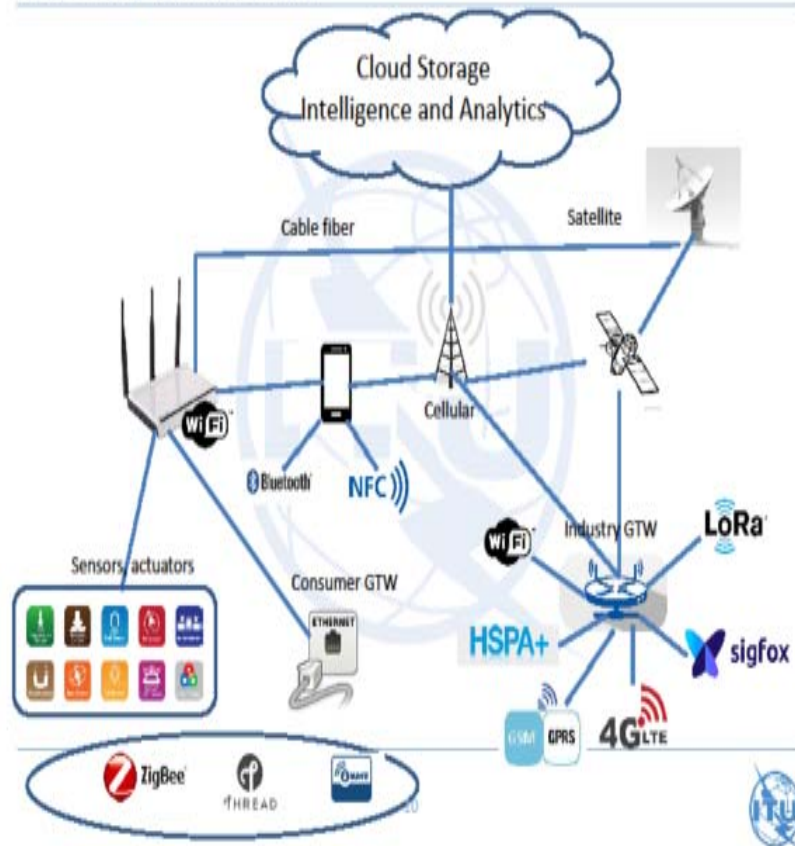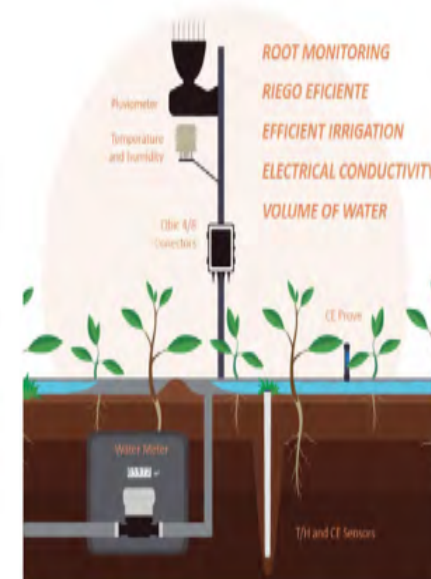

EXAMPLES -IoT Stations – Components E-AGRICULTURE

CHALLENGES- DIGITAL INCLUSIVITY

❑   UNCONNECTED POPULATION . AFRICA RURAL COMMUNITY REPRESENT → =+/-60% OF THE POPULATION = 683 MILLION PEOPLE

❑   DIGITAL INCLUSIVITY FUNDAMENTAL FOR POSITIVE IMPACT THAT ICT CAN HAVE IN THE DIGITAL TRANSFORMATION OF AFRICA SOCIETY AND ECONOMY.

❑   ALMOST ALL COUNTRIES HAVE OR ARE IN THE PROCESS OF HAVING DIGITAL ECONOMY POLICIES/NATIONAL BROADBAND PLANS IN FORM OF VISION 2020/2030/ETC.
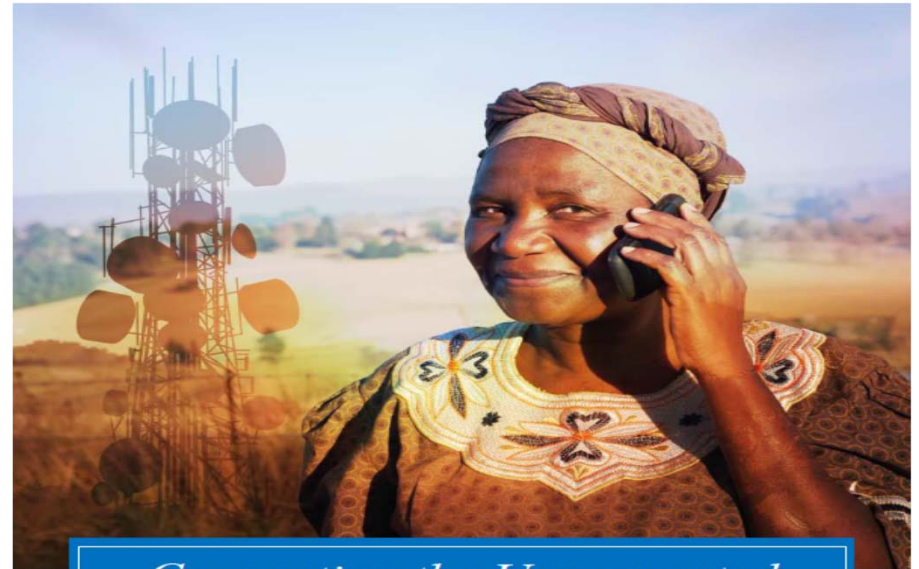
Connecting the Unconnected

WHITE PAPER ON RURAL COVERAGE IN AFRICA

Contributed by Huawei
eb 2018

CHALLENGES- DIGITAL INCLUSIVITY

- There are a number of unique challenges that   Africa faces that results in the rural areas lagging behind urban areas when it cones to the provision of and access to telecommunications services.

  - Political and Legal (Regulatory Regimes, lack of strategies, inadequate use of USF, etc)

  - Economic (substantial disparities between urban and rural, affordability, taxation, ROI, etc)

  - Environmental and Technological (new technologies for cost saving, low power , spectrum affiances, etc)

  - Socio Cultural (language barrier, low literacy rate, ICT Skills,etc)

POLICIES and NATIONAL PLANS

- UNITED NATIONS AGENDA 2013 – SDG.

- NATIONAL BROADBAND PLANS e.g.
  - South Africa National Development Plan 2030 (2012) "… seamless information infrastructure … universally available and accessible to meet the citizens needs…"
  - Malawi Vison 2020 "…… robust national ICT infrastructure that feeds into international networks……… developing public online services"
  - Nigeria Vision 20: 2020 "…….. ICT Sector encourages research …..driven mainly by private sector….innovation and local capacity development …."

- GSR 17 : Best practices Guidelines on Policy and Regulatory Incentives for Affordable access for Digital Services.

POLICIES and NATIONAL PLANS

AFRICAN UNION 2063 Agenda : acknowledges the importance of Digital Inclusivity a calls to all African countries to increase broadband penetration by 10% by 2018 and BB connectivity by 20%.

- UNITED NATIONS AGENDA 2013 – SDG. (ICT an enabler to practically all)

- NATIONAL BROADBAND PLANS e.g.
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  - Malawi Vison 2020 "...... robust national ICT infrastructure that feeds into international networks......... developing public online services"
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Wireless Technology for Rural Areas

- People with Low income living remote areas in Africa this is the situation for more the 60% of population

- No infrastructure (Roads, Electricity, etc). Provision of services: HIGH cost LOW return/revenue ➔ some sort of Gov. Policy intervention
  - Universal Access/Infrastructure Sharing ➔ use of common premises/U. Service Fund ➔ individual or household

- WIRELESS TECHNOLOGIES with adequate Spectrum (propagation caracteristics).

- GSMA estimates a spectrum shortfall of 900MHz by 2025.
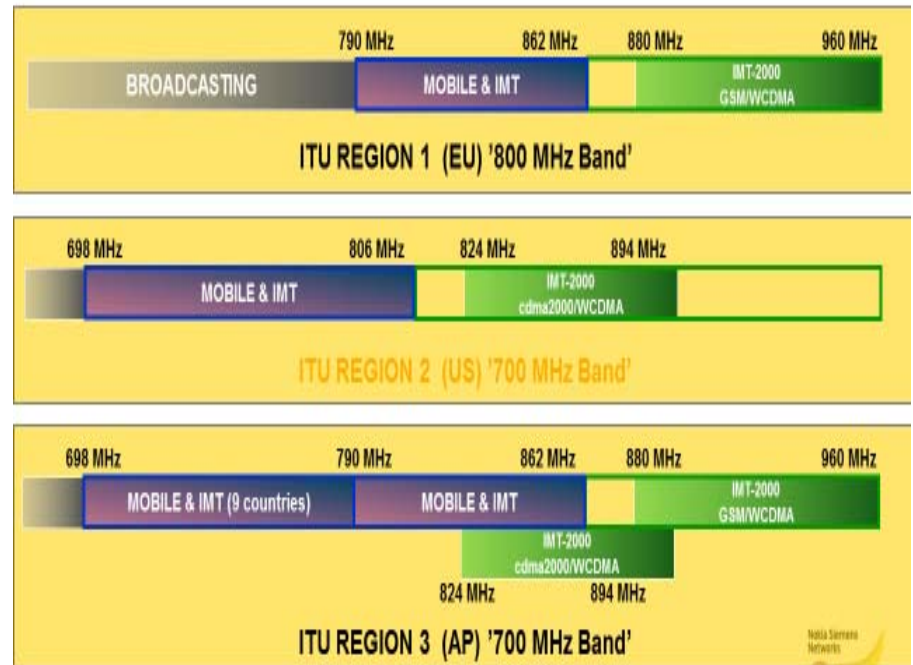
Wireless Technology for Rural Areas

- Digital Dividend
  - Frequencies released from DTTB Migration
  - Few African Countries met the deadline.

Digital Dividend in 800 MHz & 700 MHz bands

MOBILE BROADBAND

CONCLUSION

❑	THE IMPACT OF THE ICTs IN PEOPLE LIFES AND CONTRIES ECONOMIES ARE THROUGH THE APPLICATIOS I.E. HOW IS IT USED.

❑	WITHOUT ADEQUATE INFRASTRUCTURE NO SERVICE PROVISION IS POSSIBLE → FROM DEVICES TO TELECOMMUNICATIONS NETWORKS.

❑	THE BOTTLENECK IN AFRICA IS STILL THE LAST MILE AND/OR AVAILABILITY OF SERVICE TO RURAL COMMUNITIES (MAJORITY)

THANK YOU

marcelino.tayob@itu.int