AfricaConnect2 – Setting the Scene

Researchers and students need tailor-made internet networks

- To exchange big amounts of data in a secure, cost-effective and reliable way

- To participate in international collaborations

- To increase knowledge and opportunities even in remote areas
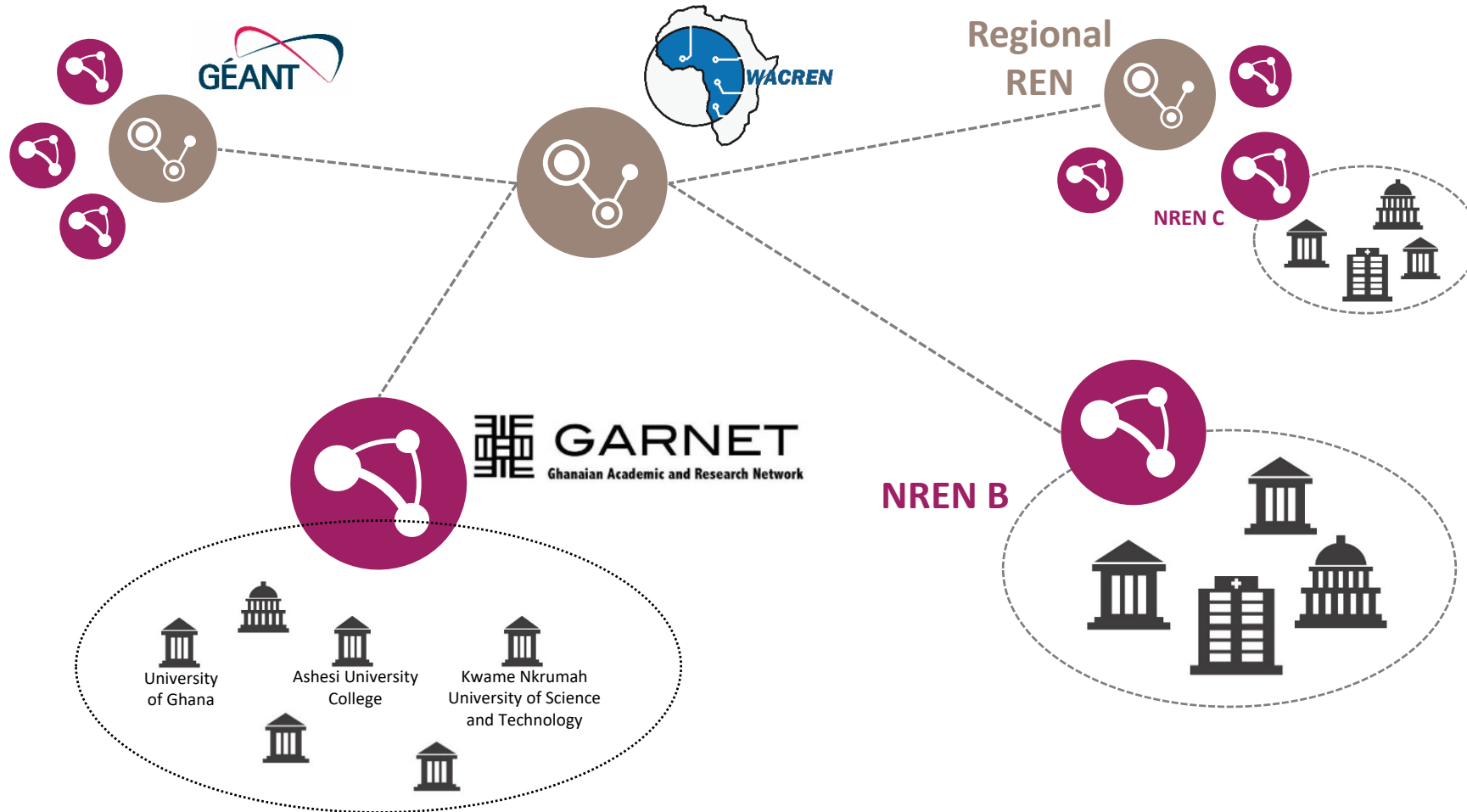
⇒ This is what NRENs offer

What is an NREN?

- National Research and Education Networks typically provide internet connectivity and services to universities and research institutes in a country

- Vital to progress education and research by providing e-learning and e-science applications

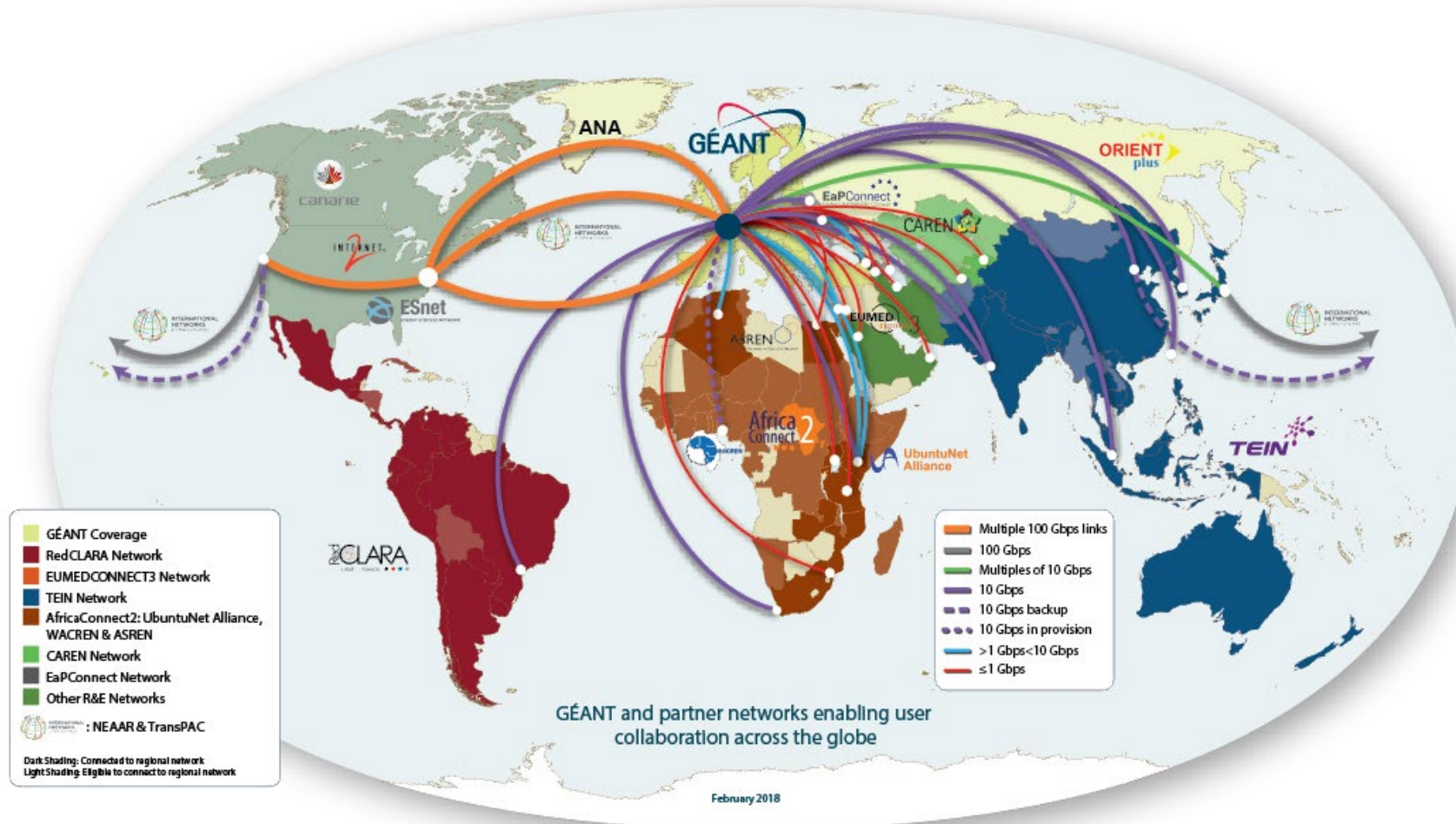- Over 100 NRENs worldwide, 38 in Africa

How do NRENs connect students and researchers?

GÉANT

WACREN

Regional REN

NREN C

GARNET
Ghanaian Academic and Research Network

NREN B

University of Ghana

Ashesi University College

Kwame Nkrumah University of Science and Technology

GÉANT · UbuntuNet Alliance · WACREN · ASREN · AfricaConnect2

The Global Research and Education Networking Fabric

GÉANT and partner networks enabling user collaboration across the globe

February 2018

- AfricaConnect allowed to build a sustainable regional research and education network in Southern and Eastern Africa, interconnecting 7 NRENs and connecting the region to the rest of the world via Europe.

Southern and Eastern Africa
2011-2015

- AfricaConnect2 aims to support the development of African regional networks to create a pan-African network fully and sustainably connected to the rest of the world.
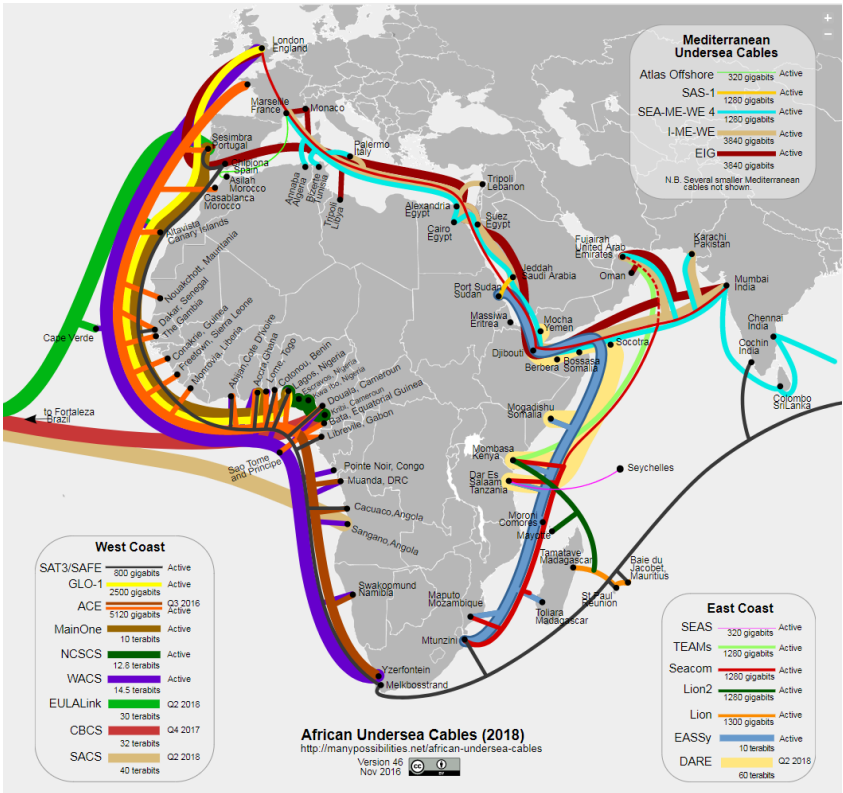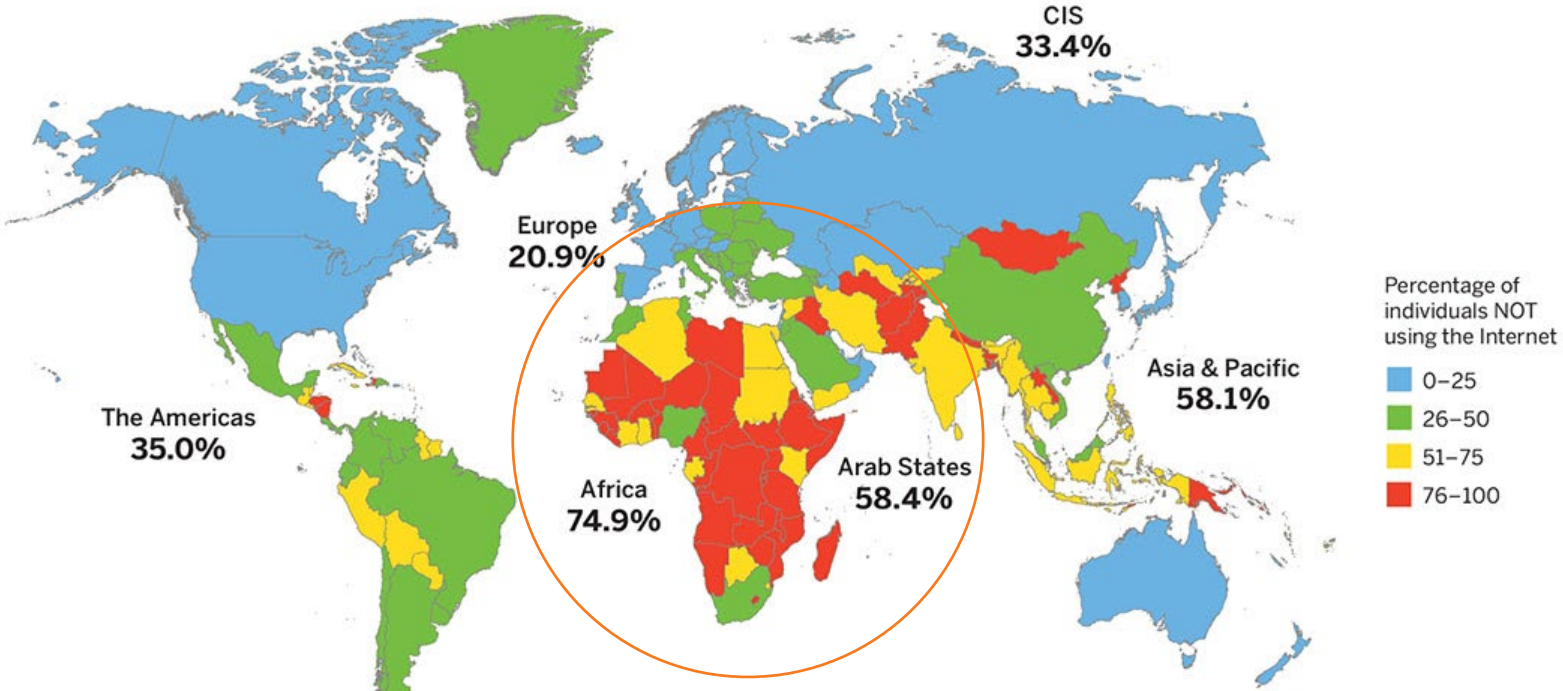
Pan-African
Started in 2015

Africa is the best connected continent but with the lowest internet penetration

African Undersea Cables

World's Offline Population, 2016
MORE THAN HALF THE WORLD'S POPULATION IS NOT USING THE INTERNET

CIS **33.4%**

Europe **20.9%**

The Americas **35.0%**

Africa **74.9%**

Arab States **58.4%**

Asia & Pacific **58.1%**

Percentage of individuals NOT using the Internet

- 0–25
- 26–50
- 51–75
- 76–100

SOURCE: International Telecommunication Union, *ICT Fact and Figures 2016* [21]

African countries have the lowest internet penetration

INTERNET PENETRATION RANKINGS

JAN 2017

BASED ON INTERNET PENETRATION IN COUNTRIES WITH A NATIONAL POPULATION OF 50,000 PEOPLE OR MORE

HIGHEST INTERNET PENETRATION

#	HIGHEST PENETRATION	%	USERS
01	UNITED ARAB EMIRATES	99%	9,200,000
02	ICELAND	98%	327,046
03	NORWAY	97%	5,167,573
04	LUXEMBOURG	97%	564,706
05	DENMARK	96%	5,492,085
06	BERMUDA	96%	59,231
07	ANDORRA	96%	65,913
08	NETHERLANDS	95%	16,200,000
09	BAHRAIN	93%	1,316,045
10	JAPAN	93%	117,767,216

LOWEST INTERNET PENETRATION

#	LOWEST PENETRATION	%	USERS
213	NORTH KOREA	0.1%	16,000
212	ERITREA	1%	67,000
211	NIGER	2%	469,331
210	CHAD	3%	397,740
209	DEM. REP. OF THE CONGO	4%	3,101,210
208	CENTRAL AFRICAN REPUBLIC	5%	230,384
207	GUINEA-BISSAU	5%	90,000
206	BURUNDI	5%	571,515
205	WESTERN SAHARA	5%	29,000
204	SIERRA LEONE	6%	370,000

SOURCES: INTERNETWORLDSTATS; INTERNATIONAL TELECOMMUNICATION UNION (ITU); INTERNETLIVESTATS; CIA WORLD FACTBOOK; FACEBOOK; NATIONAL REGULATORY AUTHORITIES.

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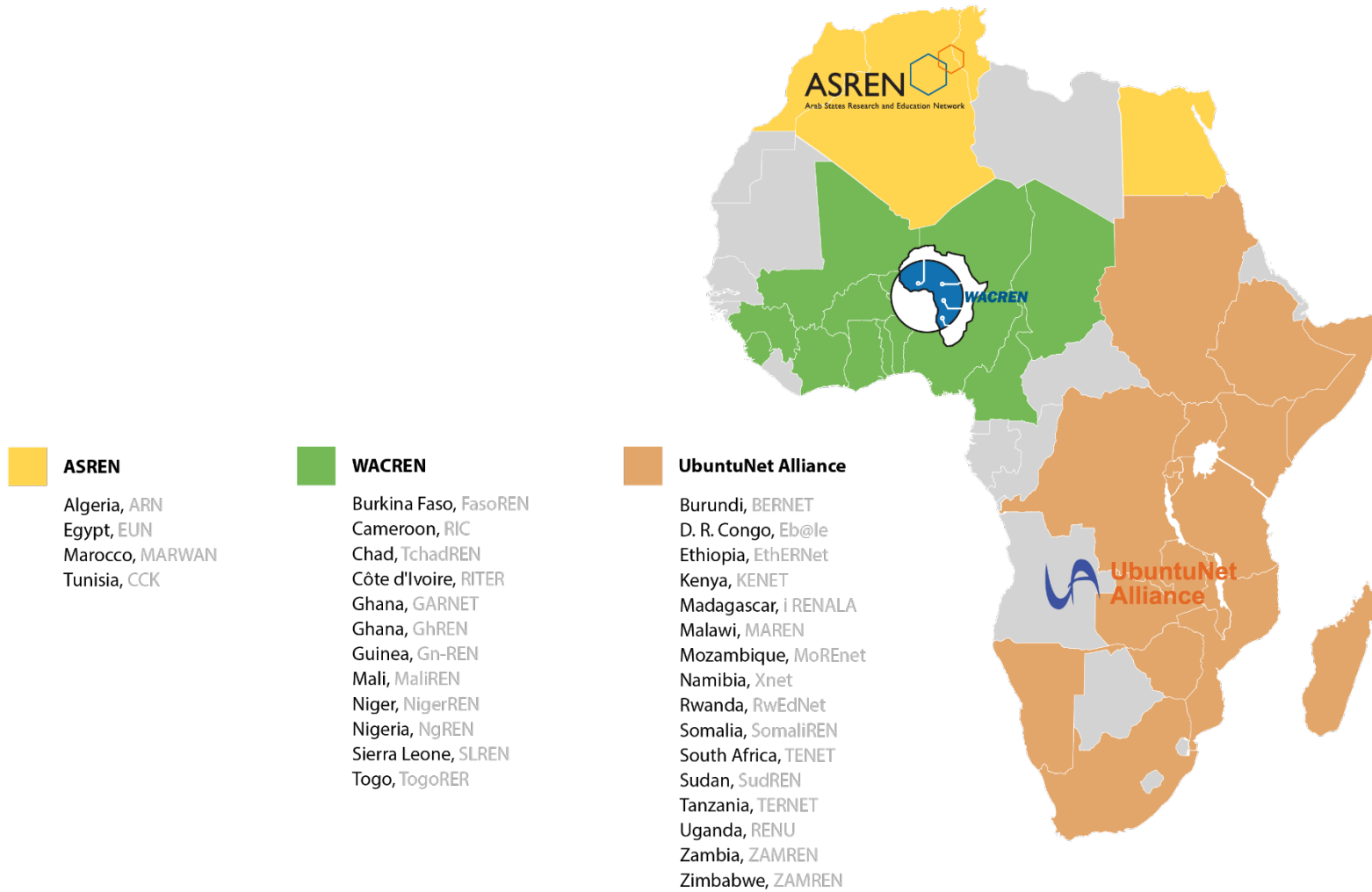Hootsuite™   we are social

Internet penetration in Africa has more than tripled since 2011 – but still lagging behind

Internet penetration (% of population)

Year	Africa	World total
2011	11%	31.5%
2016	28.7%	53.5%
2018	35.2%	54.4%

■ Africa ■ World total
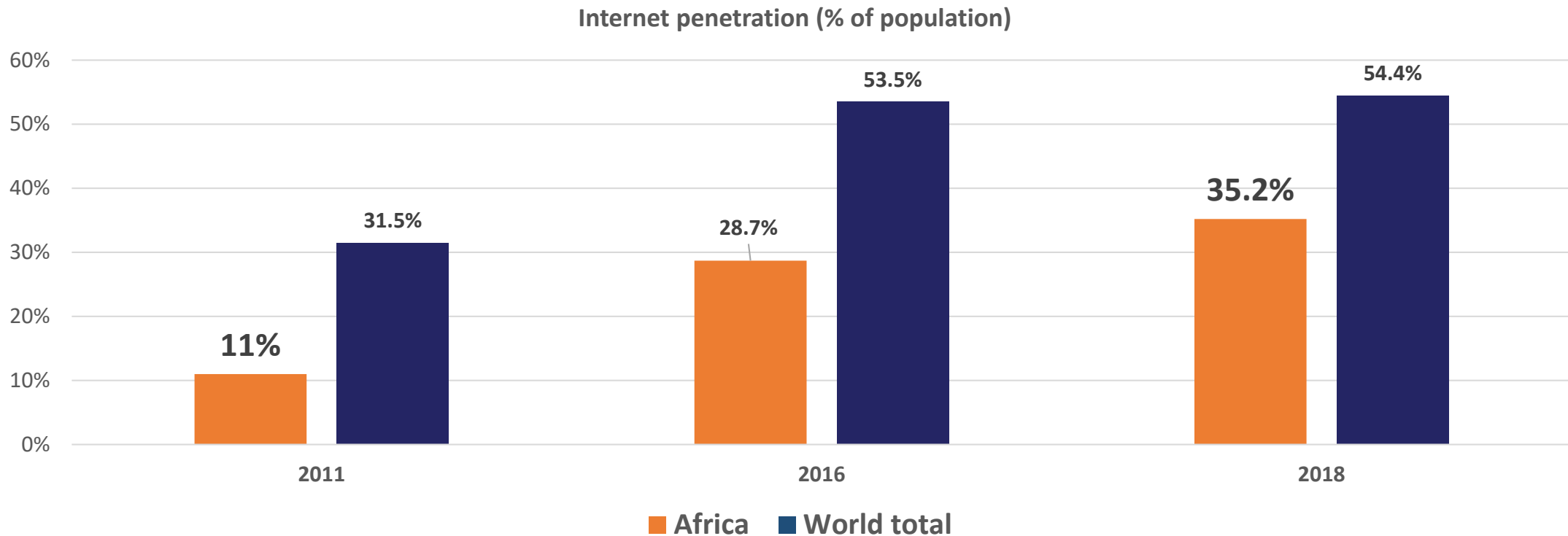
Source: Internet World Stats
Data: June 30 June 2011; 30 June 2016; 31 Dec 2017

What are the African regional networks?

ASREN

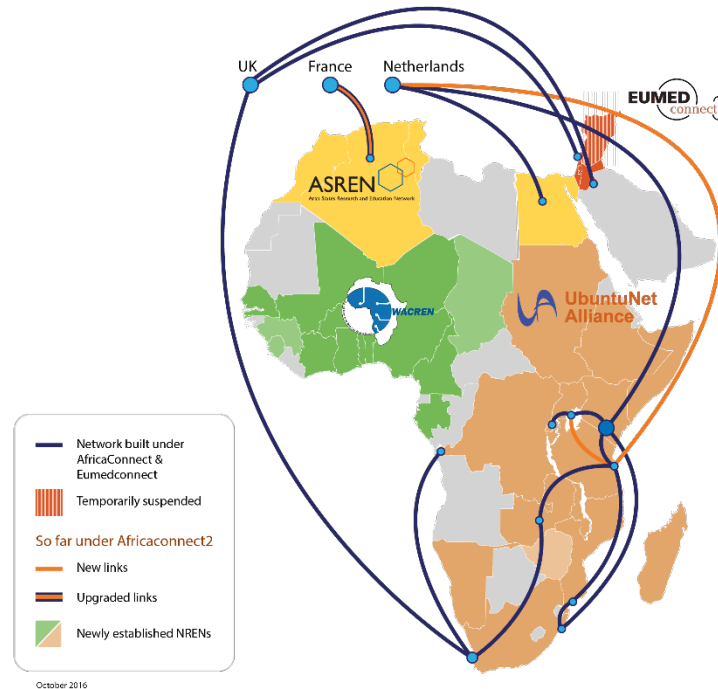Algeria, ARN
Egypt, EUN
Marocco, MARWAN
Tunisia, CCK

WACREN

Burkina Faso, FasoREN
Cameroon, RIC
Chad, TchadREN
Côte d'Ivoire, RITER
Ghana, GARNET
Ghana, GhREN
Guinea, Gn-REN
Mali, MaliREN
Niger, NigerREN
Nigeria, NgREN
Sierra Leone, SLREN
Togo, TogoRER

UbuntuNet Alliance

Burundi, BERNET
D. R. Congo, Eb@le
Ethiopia, EthERNet
Kenya, KENET
Madagascar, i RENALA
Malawi, MAREN
Mozambique, MoREnet
Namibia, Xnet
Rwanda, RwEdNet
Somalia, SomaliREN
South Africa, TENET
Sudan, SudREN
Tanzania, TERNET
Uganda, RENU
Zambia, ZAMREN
Zimbabwe, ZAMREN

Before and After AfricaConnect & EumedConnect

October 2010

October 2016

February 2018

Connected countries share high economies of scale

Before and After connecting to the EU-funded network

NRENs	Capacity growth	Cost drop (per Mb)
ZAMREN, Zambia 2011 / 2015	X60!	-94%!
RENU, Uganda 2013 / 2017	X19!	-89%!
ARN, Algeria 2003 / 2015	X55!	-97%!
TERNET, Tanzania 2011 / 2017 – 2012 / 2017	X7!	-75%!

Source: NRENs

A pan-African network in the making

| Connected Countries (NRENs)	Institutions (Higher Ed & Research) 2016	Institutions (Higher Ed & Research) 2018
ASREN	**154**	**154**
Algeria (ARN)	124	124
Egypt (EUN)	30	30
UbuntuNet Alliance	**493**	**596**
Kenya (KENET)	180	230
South Africa (TENET)	86	86
Mozambique (MoRENet)	83	83
Uganda (RENU)	42	80
Zambia (ZAMREN)	75	75
Tanzania (TERNET)	27	27
Rwanda (RwEdNet)	0	15
WACREN	**0**	**52**
Nigeria (NgREN)	0	36
Ghana (GARNET)	0	16
TOTAL	**647**	**802**

- Out of 38 African NRENs, 11 are connected to a regional network.
- All three regional networks are still under construction

- Hundreds of institutions can collaborate with peers across the world,
  - helping to connect remote users
  - retain local talents and fight brain drain

Source: NRENs

Female participation in the R&E community

- Women in WACREN #1 – Physical Computing with Python workshop 20-24 November 2017 @ Université Cheikh Anta Diop de Dakar (UCAD), Senegal

- Women in WACREN #2 – Physical Computing with Python workshop 22-26 January 2018 @ University of Lagos (UNILAG), Nigeria

- Female leaders: Margreth Mushi (TERNET), Sylvie Mboyo (RwEdNet), Harinaina RAVELOMANANTSOA (i RENALA)

- Dr. Iman Abuel Maaly Abdelrahman, ex-CEO SUDREN (Sudan), received the 2015 Sudanese "Distinguished Arab Women Engineer" Award.
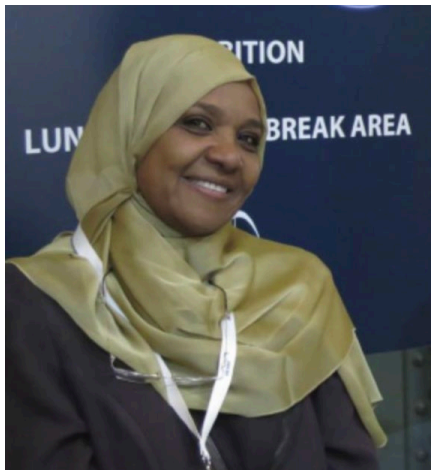
Creating jobs for the community

Students at Kyambogo University created a suite of management software that resulted in a start-up company **Zeenode Limited** which led to:

- Job creation in ICT and engineering for the community

- Students created own jobs and secured their future

- Digitalization of the university administration

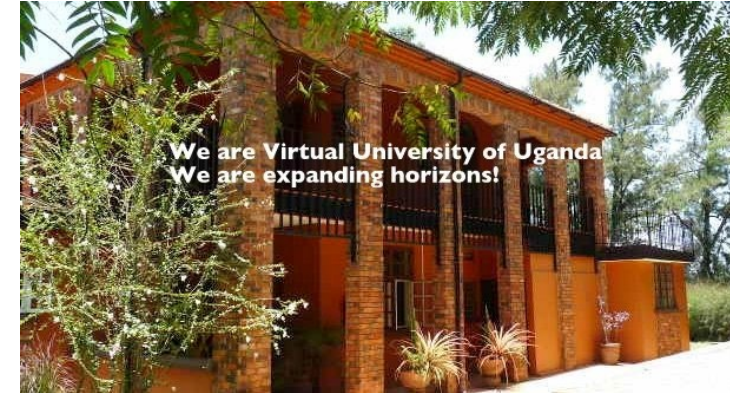- RENU (Ugandan NREN) as an enabler of collaborations and innovations in the R&E community

Watch the video about this case study: https://www.youtube.com/watch?v=Vzp7IUQO_nw&t=89s

JOSH MUZAAYA
Developer and CTO of Zeenode

When I was still at the university we saw a lot of frustration. Registration process would take long for a student.

that they used to have for teaching. The technology, which has come along with the connectivity, has opened up their spectrum.

Bringing education to the students

- 1st online-only university in Sub-Saharan Africa

- Created in 2011

- 4 diploma and master programmes (Public Health, ICT for Development, International Development, and Business Administration)

- Students from Uganda, Tanzania, South Africa, Burundi, and other African & European countries.

- **Enabled and supported by Research and Education Network for Uganda, RENU**

VUU allows students who live in rural areas and who cannot travel to pursue higher education studies

Soil Observation for Agriculture in Zambia

Dr Lydia Chabala
How ZAMREN helped me advance my research
Click here to watch the interview

- Challenge: identify soils that are suitable for agriculture in Sub-Saharan Africa to sustain economy and feed the world.

- Solution: Use the AfricaConnect network to access, process and modelize satellite maps to identify soil properties and classify lands.

- Benefit: Provide input to sustainable land management in Zambia.
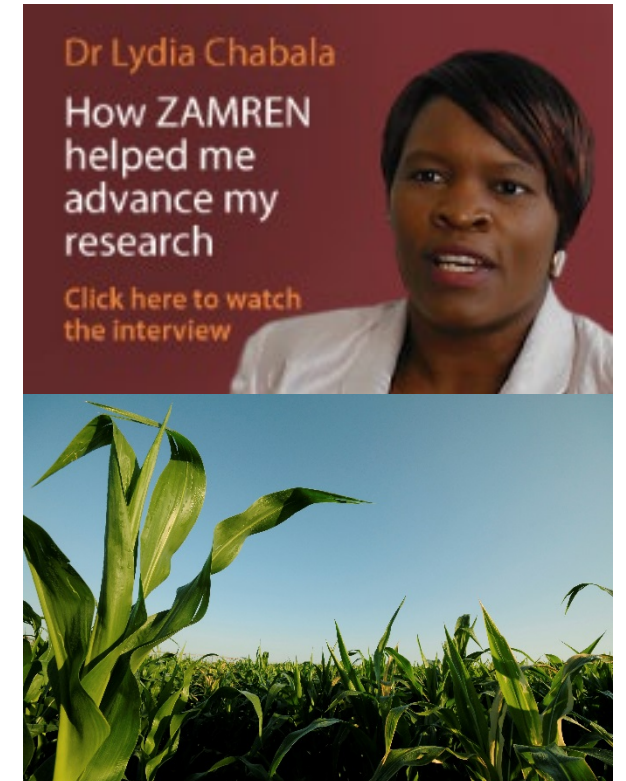
Capacity Building In Southern and Eastern Africa

- <u>Challenge</u>: make sure engineers know how to connect campuses to NRENs, and NRENs to RENs and build the appropriate networks to address the end users needs.

- <u>Solution</u>: ''Train the Trainers Programme'' **NSRC** Network Startup Resource Center

- <u>Benefits</u>:

  - Over 1000 engineers and technical staff trained during AfricaConnect

  - % women doubled in 3 years

Thank You For Your Attention
Merci Pour Votre Ecoute

Africa Connect 2

For more information please visit: **www.africaconnect2.net**

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