



RENs, Campus networks, and the Africa Training Initiative (ATI)

Eko-Konnect Wireless Bootcamp – ATI-4

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About RENs

- REN: Research and Education Network
- Closed user groups with specific needs
 - e.g. huge bandwidth requirements during specific periods
- Platform for collaboration and local, regional and global level
- A layered model dedicated to research and education
 - Global connectivity
 - Regional RENs
 - National RENs (sometimes with clusters)
 - Users connected at campus network level

About RENS

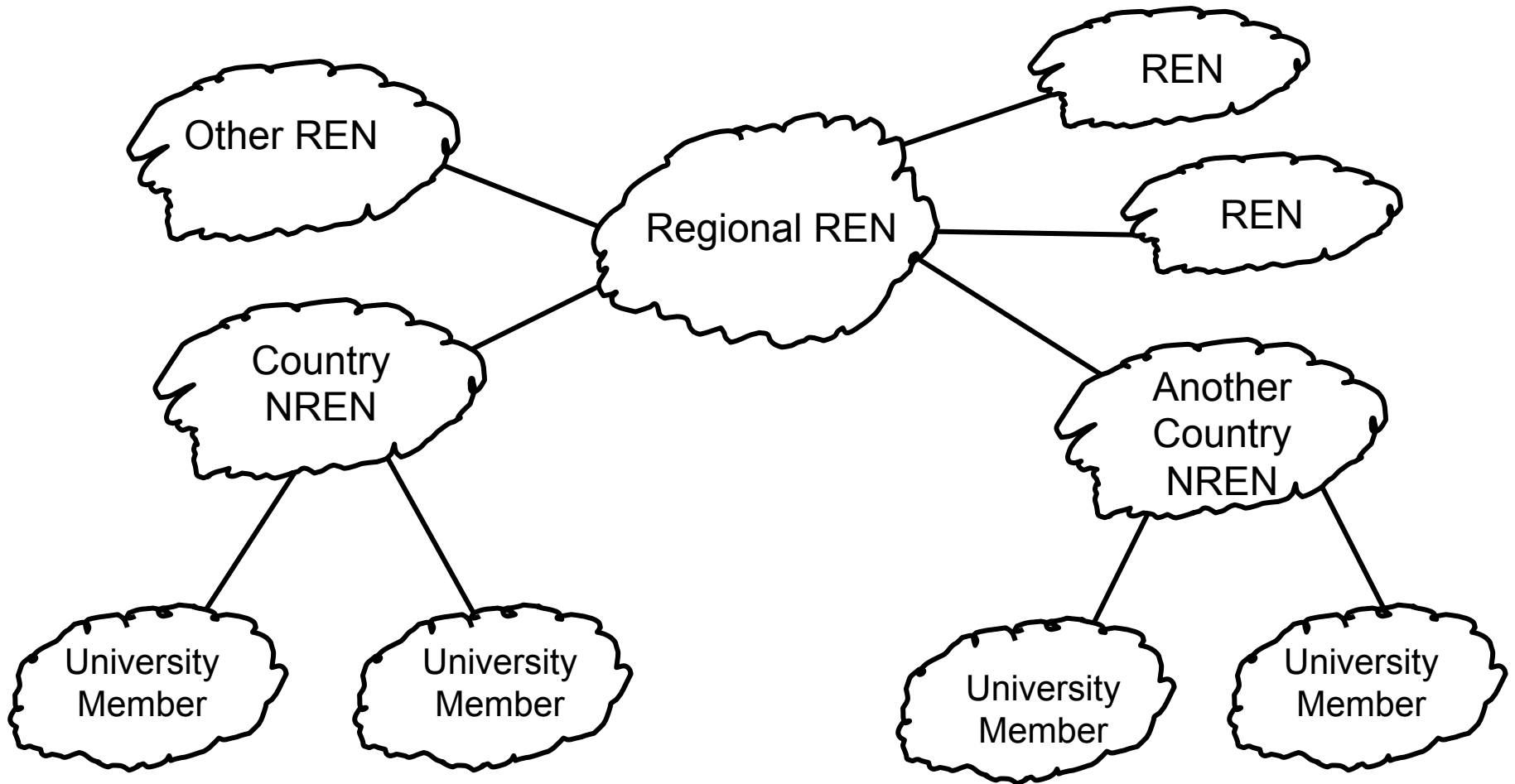
- Infrastructure either owned or leased from telecom and cable operators
- Provides services to higher education, research organisations, hospitals, and others in an entire country
- Different from commodity (commercial) Internet, but use same network technologies
- Generally provide IP transit to members as well as value added services
 - Video conferencing, Identity and Trust platforms, VoIP, e-learning, Cloud services, Threat Intelligence and CSIRT, data center space for disaster recovery, etc

About RENs

Two basic models:

- REN is Peering network
 - Exchange traffic between members
 - Provide international connections (WACREN, ASREN, Ubutunet Alliance, GEANT etc)
 - Can peer with a local commercial exchange (Google, Facebook, local ISPs, etc)
- REN is the ISP and also provides peering network
 - Simplest for campus members
 - Treats REN as Internet Service Provider
 - Only one connection to manage

Typical NREN



The African REN ecosystem – UA (1)

- UbuntuNet Alliance incorporated in 2005
- Regional REN for Eastern and Southern Africa
- 16 Members
 - Eba@le – DRC; BERNET – Burundi; EthERNET – Ethiopia
 - KENET – Kenya; iRENALA – Madagascar; MAREN – Malawi
 - MoRENet – Mozambique; Xnet – Namibia; RwEdNet – Rwanda
 - SomaliREN – Somalia; TENET – South Africa; SudREN – Sudan
 - TERNET – Tanzania; RENU – Uganda; ZAMREN – Zambia; ZARNet – Zimbabwe
- Operational Network
- Connected to the global R&E network via links to GEANT
- Implementing AfricaConnect2 project (cluster 1)

The African REN ecosystem – UA (2)



2015



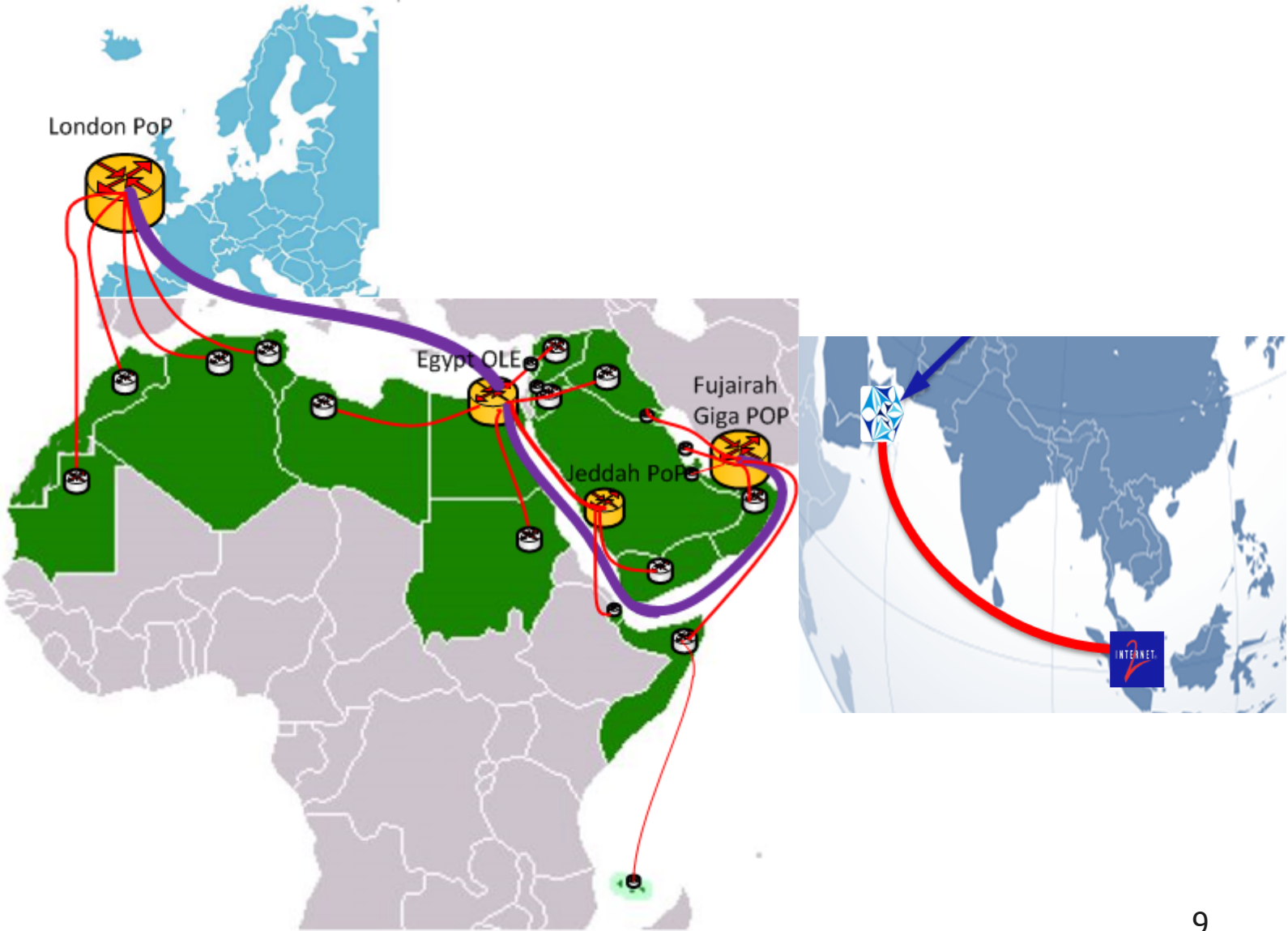
Planned



The African REN ecosystem – ASREN (1)

- Established in 2012
- Non profit organization registered in Germany; operates under League of Arab States in Northern Africa and the Middle East
- 6 Shareholders:
 - Abu-Ghazaleh GmbH
 - JUNET (Jordan)
 - EUN (Egypt)
 - CNRST (Morocco)
 - SudREN (Sudan)
 - CCK (Tunis)
- Operational Network
- Connected to the global R&E network via links to GEANT and Internet2
- Implementing AfricaConnect2 (cluster 3)

The African REN ecosystem – ASREN (2)



The African REN ecosystem – WACREN (1)

- Incorporated in 2010 as a not for profit organisation
- Currently 12 NREN members

<ul style="list-style-type: none">■ FasoREN – Burkina Faso■ RIC -- Cameroon■ RITER – Côte d’Ivoire■ GARNET – Ghana■ GhREN – Ghana■ Gn-REN – Guinée■ MaliREN – Mali	<ul style="list-style-type: none">■ Niger-REN – Niger■ NgREN – Nigeria■ SLREN – Sierra Leone■ TchadREN – Tchad■ TogoRER – Togo
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- Initiatives: RerBenin (Benin), GabonREN (Gabon), snRER (Senegal)
- Associate members: RENATER (FR), Eko-Konnnect (NG)

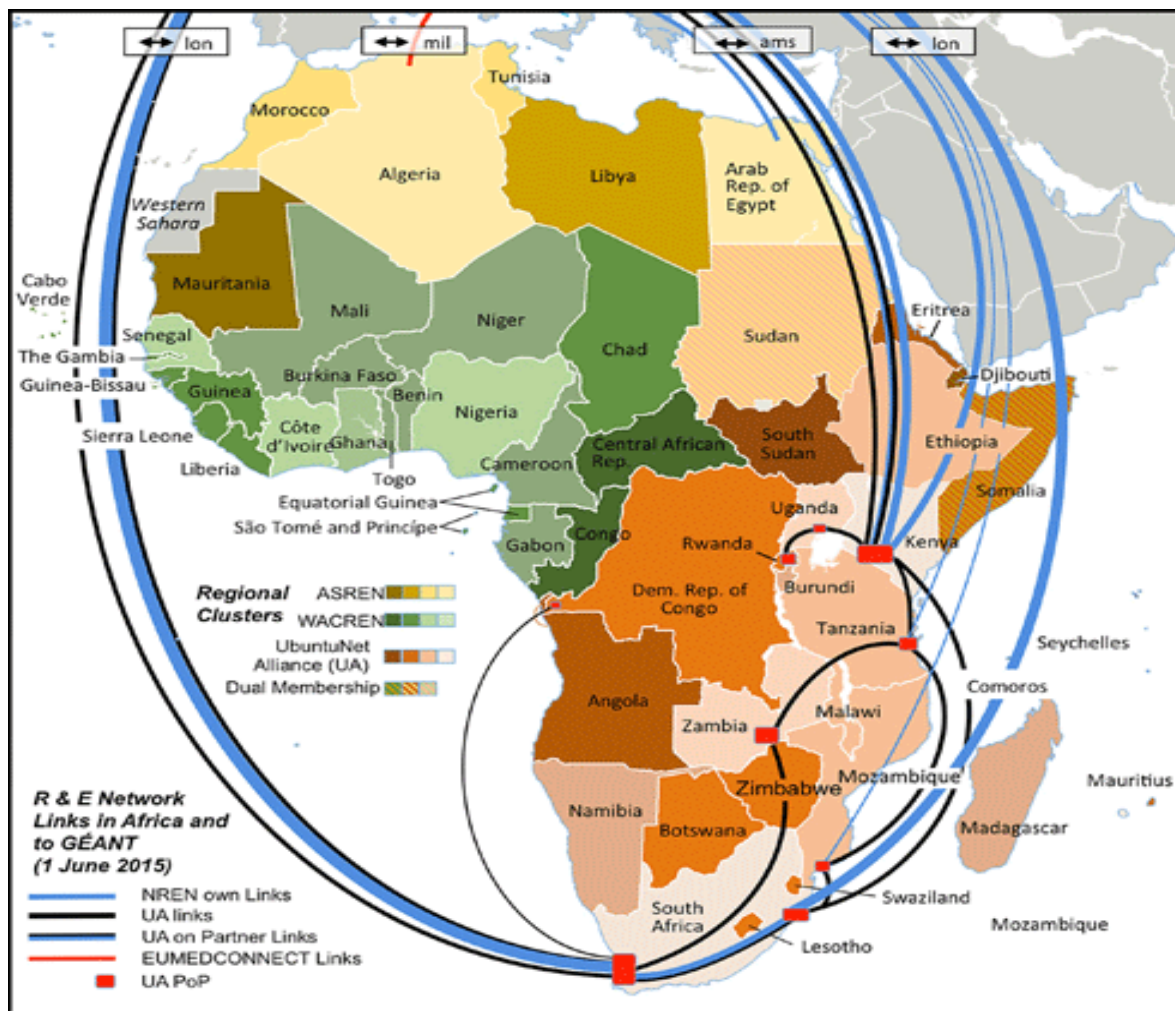
The African REN ecosystem – WACREN (2)



AfricaConnect 2

- Second phase of the AfricaConnect Project
- EC Funding (26.6 M€)
- Project duration: 2015 - 2018
- Objective: Support RENS in Africa and interconnect with GEANT
- Three clusters
 - Cluster 1: UbuntuNet Alliance
 - Cluster 2: WACREN
 - Cluster 3: ASREN
- 80:20% funding scheme
- Budget for Cluster 2: 12.25 M€ (2.5 M€ counter-funding by WACREN)
- Implementation of Cluster 2 component: GEANT and WACREN

Status before AC2



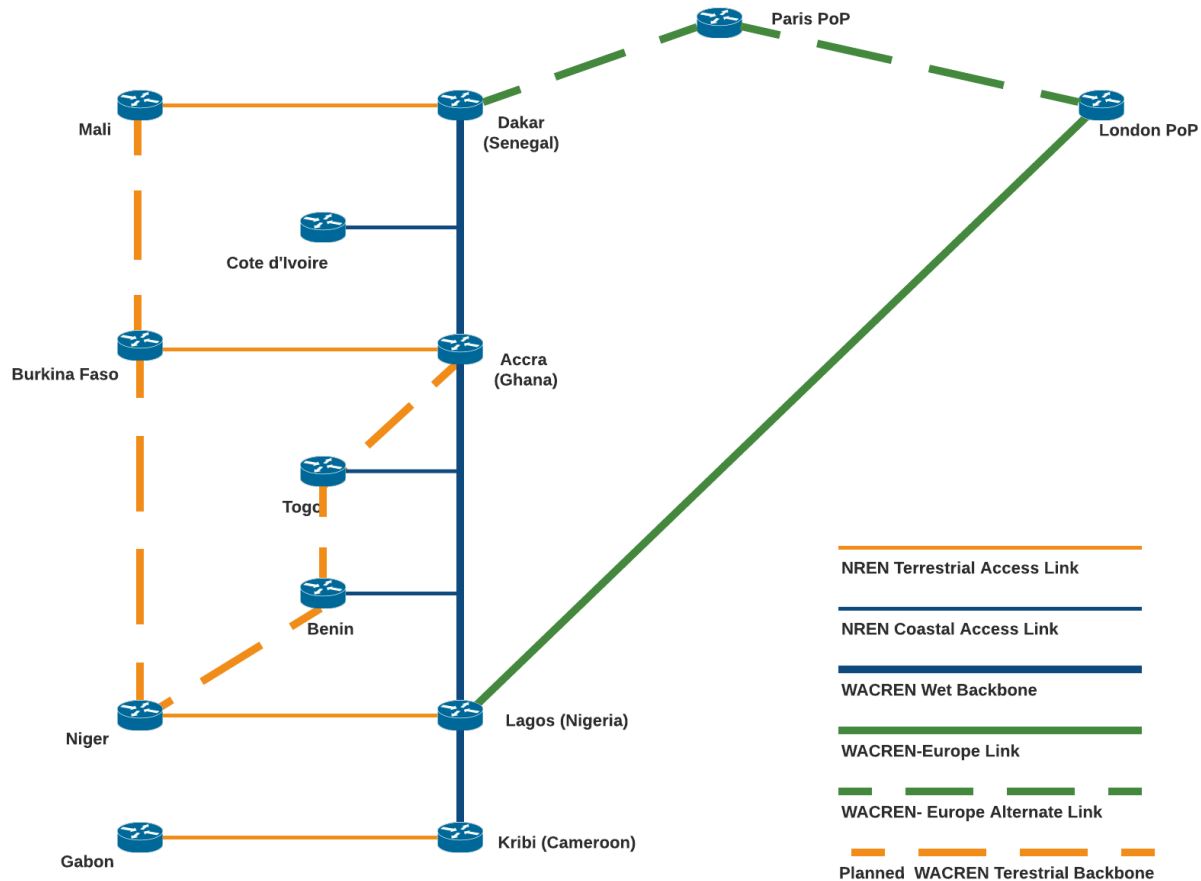
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Proposed WACREN network topology (1)

- Core + Access
 - 10G+ Core
 - 1G+ Access
- 3-4 main hubs: Cameroon, Côte d'Ivoire, Ghana, Nigeria, Senegal
 - Final decision on hubs dependent of variety of connection options, readiness of NREN and cost
- Redundant links from hubs to NRENs
- At least 2 intl. links: to London and Paris
- Multiple Submarine Cable Access
- Peering at Open Internet Exchange Points

Proposed WACREN network topology (2)



Current status



Opportunities for WACREN RENs

- Transforming higher education and research in the region through access to the following services:
 - High speed connectivity (at least 1 Gbps link)
 - Collaboration platform and participation in global cutting edge research projects
 - Access to computational grids and simulation platforms
 - Identity federations and science gateways
 - eduroam (academic roaming)
 - e-learning
 - Videoconferencing (incl. involvement of diaspora)
 - etc.

Collaboration and Services

- eduroam
 - African Confederation – Roaming Proxy Service
 - On-going pilot has quadrupled number of roaming operators in 6 months
- WACREN Cloud pilot – Shared services model based on presence in datacenters in the region
 - IaaS
 - Enabling and Improving Research Output - Science Gateways and OARs
- WACREN EduID
 - Bootstrap establishment of Identity Federations and connection to edugain
 - SAML Identity Providers and metadata registry as a Service
 - Leverage hosted IdPs and radius servers for eduroam

LIBSENSE- Library Support for embedding NREN services and e-Infrastructure

- Formal program and research agenda to develop sustainable institutional support for librarians to play a central role in NRENs
 - Build capacity to support Open Science and embed e-Infrastructure
 - Tracking research outputs and improving researcher visibility
 - Promoting National, Regional and Global Collaborations – working with COAR and OpenAIRE to develop repository network in WACREN
 - Act as institutional focal points in a network of communication and collaboration

- On-going study initiated in collaboration with University of Sheffield and AULNU (Nigeria)
 - to understand challenges and enablers in establishing efficient and sustainable information resource management capabilities within HEIs
 - Survey validation in #WACREN2017; to be extended to other members of the AfricaConnect2 consortium

...but there are some challenges at campus level

- Many campus networks are not structured properly and can't effectively utilize high bandwidth connections
- Many make heavy use of NAT and firewalls that limit performance
- Many are built with unmanaged network equipment that provide no ability for monitoring or tuning the network
- Many HEI administrations seem to be unaware of REN and benefits

Africa Training Initiative (ATI)

- AfREN collaboration – ASREN, Ubuntunet Alliance and WACREN initiative.
- Framework for capacity building and skills growth in all areas of network operation and even other technical areas
- Iterative social program that engages NRENs to both deliver and benefit from capacity building
- RENS at the core as committed local partners for facilitation and ownership + knowledge partners who provide global expertise, knowledge transfer and professional support on the other.

Africa Training Initiative (ATI)

- Includes working with or establishing support structures such as Computer Security Incident Response Teams (CSIRTs), Performance Enhancement and Response Teams (PERTs) and Network Operators Groups (NOGs).
- Partnership with FIRST and AfricaCERT for training of security teams and ecosystem development
- Relationship with AFNOG and country NOGs (NgNOG) to leverage experienced instructors
- Portal is being developed with support from AfricaConnect2

Contacting WACREN ...

- Website - www.wacren.net
- Email - info@wacren.net
- Twitter - @wacren
- Facebook Page - <https://www.facebook.com/WACRENinfo/>

THANK YOU