

Partnerships for African Research & Education Networking Transformation [PARENT]

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Overview of presentation

1. Introduction to Uganda: [4 Slides]
2. Overview of R&E Environment in Uganda in 2015
3. Project Link Target Area & Related RENU Sites
4. Summary of challenges & how they have been addressed
5. The NREN partnerships & processes that emerged
6. Project Link & other PIPs' part in the partnership
7. Sample last-mile delivery plan (from project-Link)
8. Project-Link planned coverage area & RENU sites covered so far.
9. Highlights of the RENU/Project Link Collaboration
10. Review of the RENU/Project Link Collaboration
11. Challenges Encountered
12. Lessons Learnt
13. Recommendations
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Introduction: (Uganda's

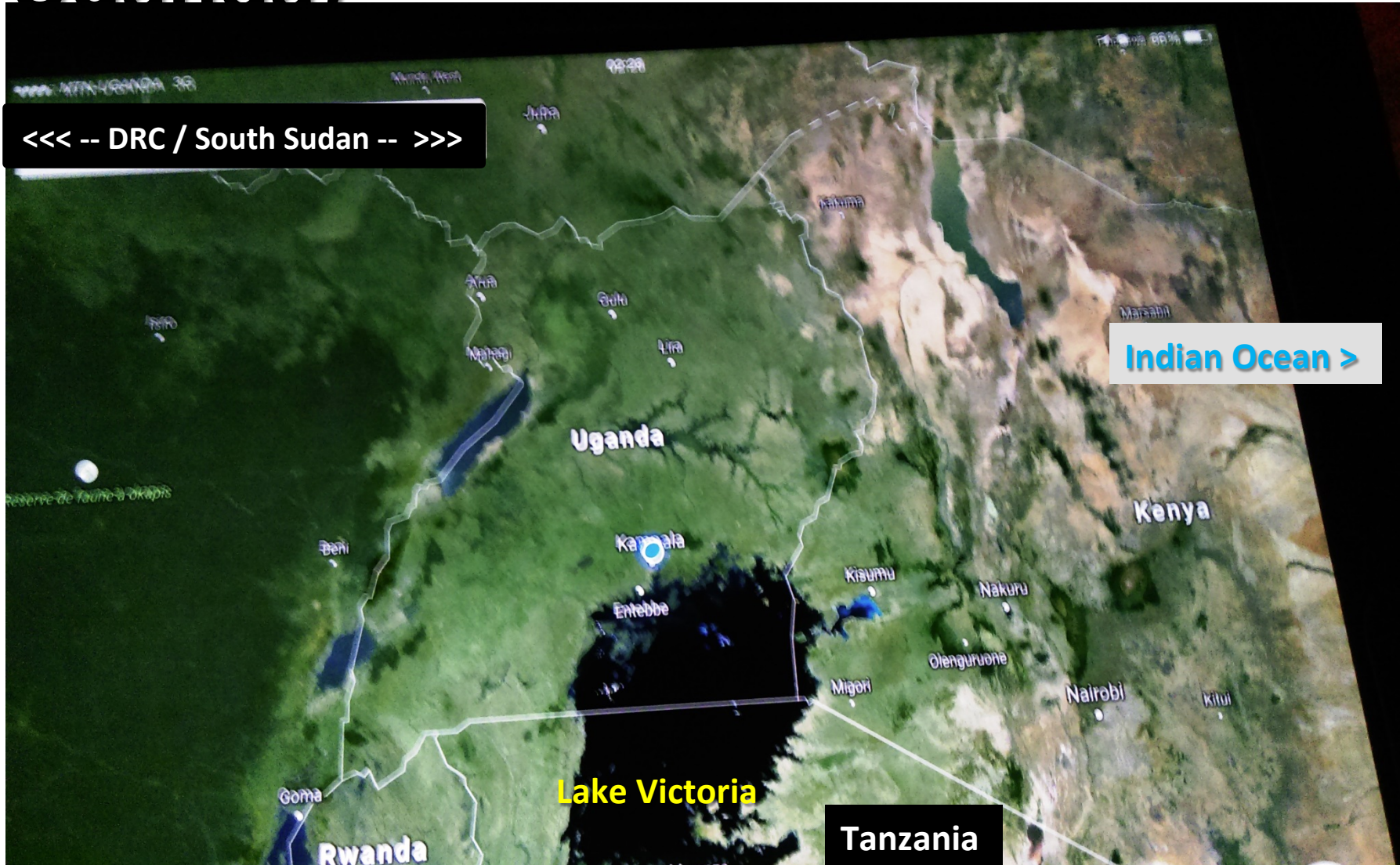
Quick Geography)

- **Location in Africa:** A Land-connected country of Eastern Africa
- **Longitude range:** 29°45'E - 35°
- **Latitude range:** 01°19'S - 4 ° 08'N
- **Altitude:** Avg. = 1,085 m; & Peak of 5109 m @ Mt. Rwenzori
- **Area:** 236,040 Sq. km of which 199810 Sq. km is land
- **Eastern border:** Kenya
- **Western border:** DR Congo
- **Northern border:** South Sudan
- **Southern border:** Tanzania & Rwanda
- **Key Physical features:** River Nile Lakes Vic &



Introduction: (Map of

Uganda)





Introduction: (Economic Snapshot of Uganda)

- Total population: 34.9 million
- Population of Capital City: 1.5 million*
- GDP: US\$ 27 Billion growing @ 6.3%;
- GDP per capita: \$ 686

Sources: UBOS Census Report Dec 2014 & IMF WEO – Oct 2014

- ICT Regulation environment: Very Liberalised
- Industry performance: Low competitiveness



Introduction: (Sample Sites of Uganda)





Overview of R&E

Environment in Uganda in 2015

- No of Public Universities & degree-awarding institutions: 7
- No of Private Universities: 32
- No of private degree-awarding institutions: 11
- No of Research organisations: 12
- Public Tertiary institutions: 49
- Private Tertiary institutions: 84

[Source: National Council for Higher Education]

- Year of NREN formation: 2006
- Year of actualisation of R&E network: 2014
- Current RENU Membership: 27

[Source: RENU]

- Estimated 2015 tertiary enrolment : 420,000 of which about 40% are in universities.¹
- Of these, about 60% are in the areas where shared-ring has been used.



Summary of challenges & how they have been addressed

Challenge

- International connectivity still very costly
- Very Fragile Financial State
- NBI initially not fully operational.
- Prevailing gaps in inter-town fibre
- Frequent Infrastructure Failure
- Costly Last-mile Options
- Unreliable Power in upcountry locations
- Changing regulatory environment
- Low National competitiveness
- Inadequate Network Engineering skills
- Waning Cooperative/Collaboration Spirit
- Poor bills-payment Compliance

Remedy

- AfricaConnect Intervention
- Frugal Operation
- Be willing to be a trail blazer
- Do interim bridging using other PIP
- Compound leaf-like Network topology
- Shared ring last mile & best fit upcountry
- Supply augmented with Solar
- Caution & Consult widely & frequently
- Patience & slower unit price reduction
- Intensive Capacity building Support
- Support by National & International partners.
- Case by case nurturing.

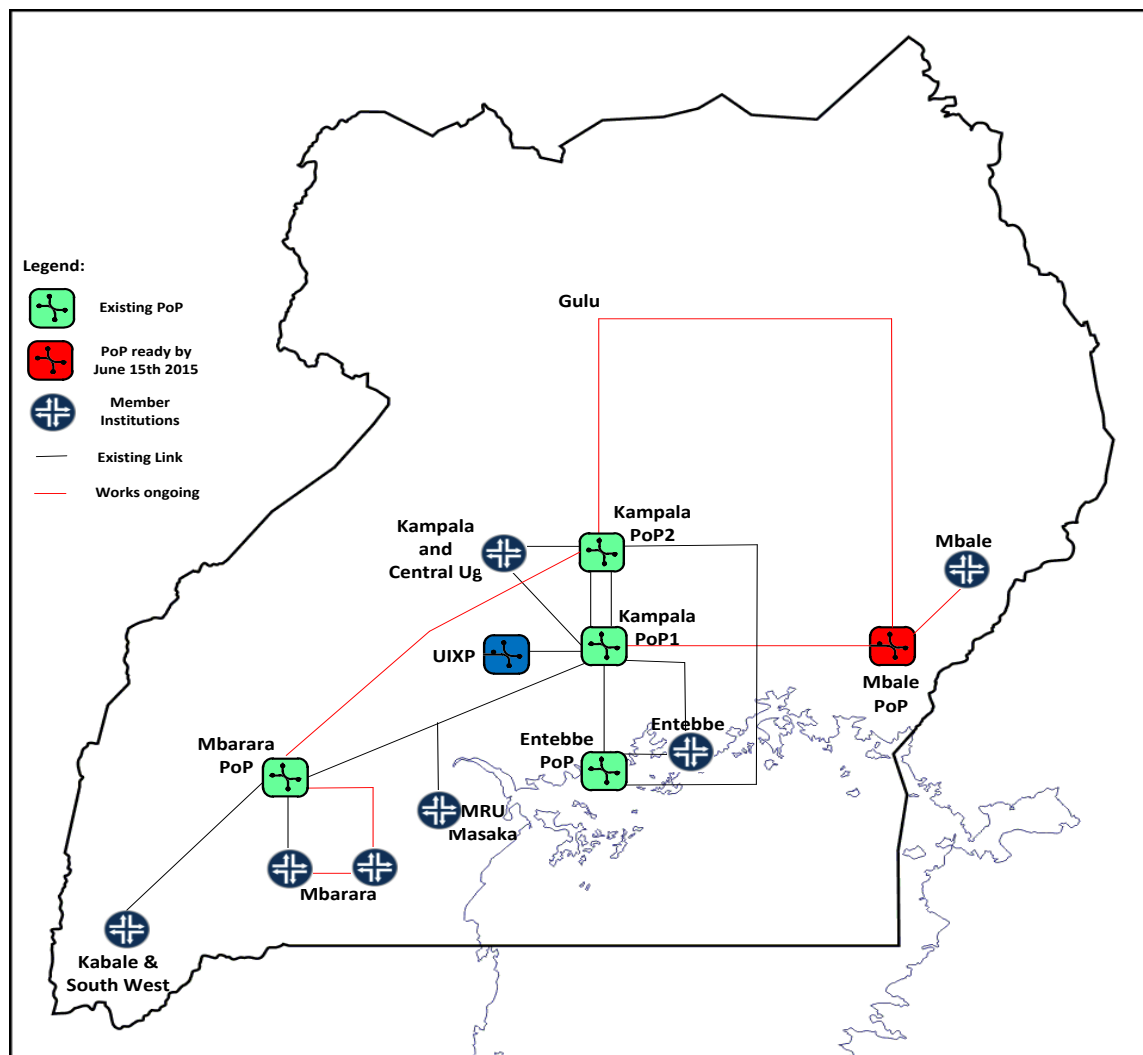


The NREN Partnerships & Processes that Emerged

| Processes & Partnerships that Birthed & Nurtured (parented) RENU | | | | |
|--|--|--|----------------|--|
| Cont | Strategic Challenge | Intervention(s) | When? | Key Actors |
| 1 | Isolation of Ugandan R&E Communities | Resolution to Start NREN for Uganda | Jan 2006 | VCs of Univs & CEOs of REIs |
| 2 | Absence of Costly International Connectivity | Africa Connect Project | From 2011 | Development partners (EU), GEANT, UA, AFREN, 6 Univs & UCC |
| 3 | Absence of Costly National Connectivity | Building the Physical R&E Network for Uganda | From Feb 2014 | USAID, UCC, SURFnet, NIIA-U, RENU & some PPs |
| 4 | Very Expensive Last mile Links | Shared Dark Fiber Rings | From July 2014 | Project Link & Liquid |
| 5 | Inadequate Technical Capacity of REIs | Tot and CNE Workshops | From Nov 2012 | INASP, Ubuntu Net Alliance & NSRC |
| 6 | Inadequate Campus Network Readiness | Direct Engineering Assistance (DEA) | From May 2014 | |

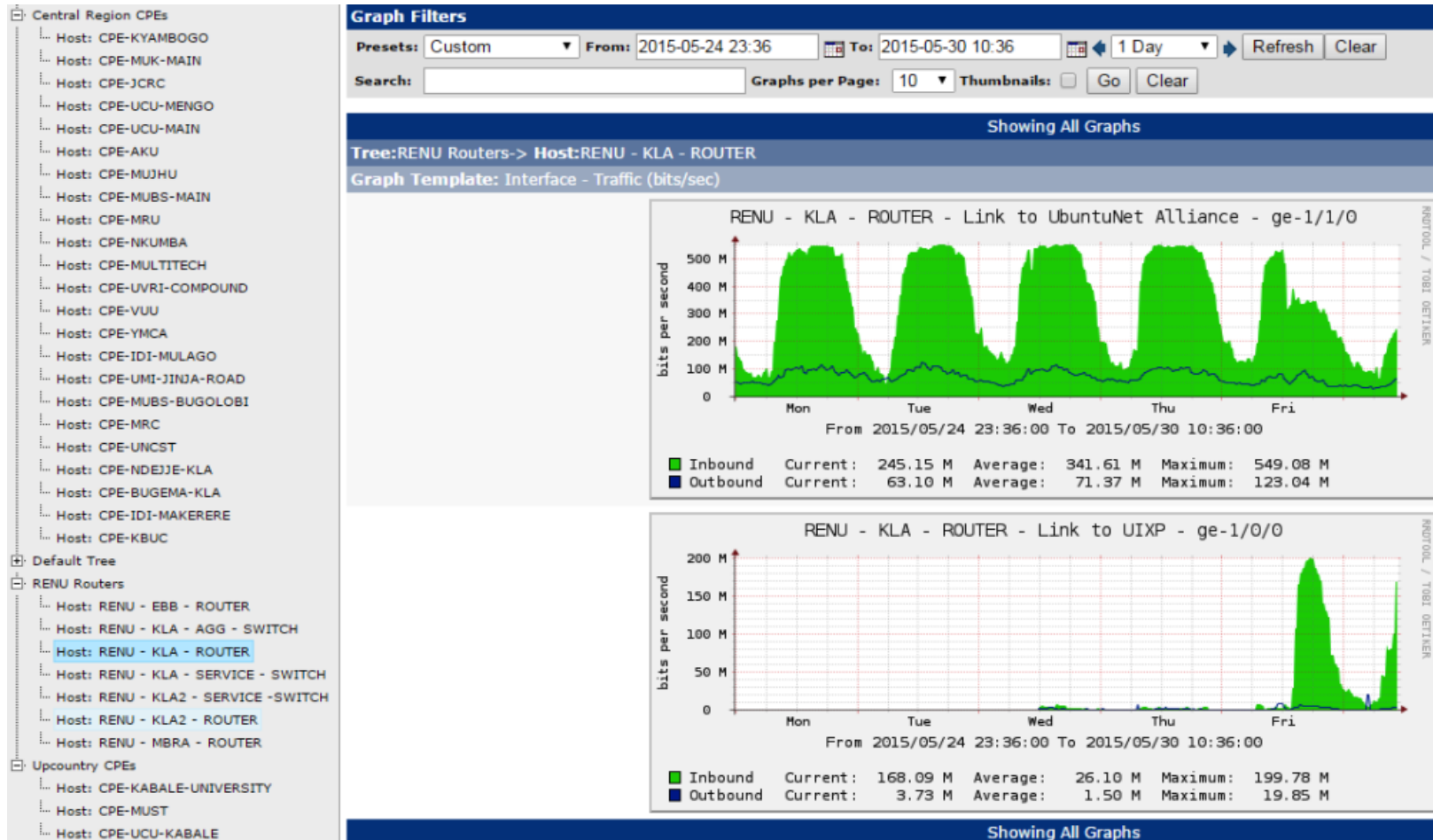
Overview of Impact

May 2015



Impact Overview - 2

Connected campuses and traffic





PIP Actors' part in the

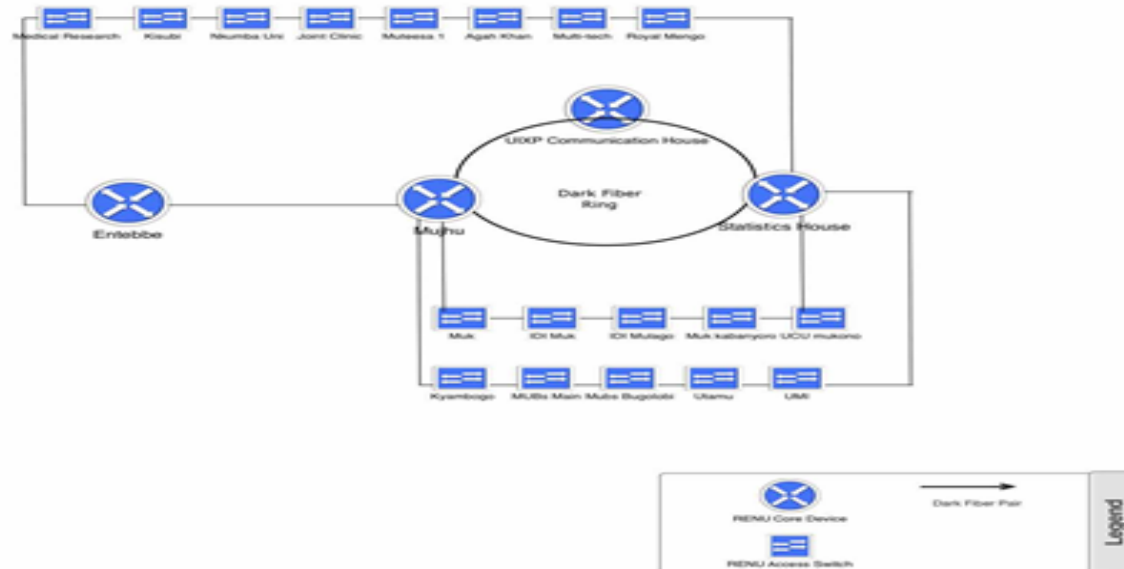
Information process

- The technical model for last-mile links offered to many NRENs hitherto was based on the deployment of long dedicated fibre by ISPs which resulted in prohibitively expensive NRC for R&E institutions.
- The new technical model adopted (illustrated in next slide) is based on sharing² key network resources including fibre and this is combined with a service-costing model based on the number of total sites covered and not on individual link capacity or distances from PoPs.
- This technical model simplifies the architecture and deployment, resulting in cost reduction, better resilience and allows the NREN to focus on other RED issues.
- More PIP players started to adopt the model in other viable upcountry locations.

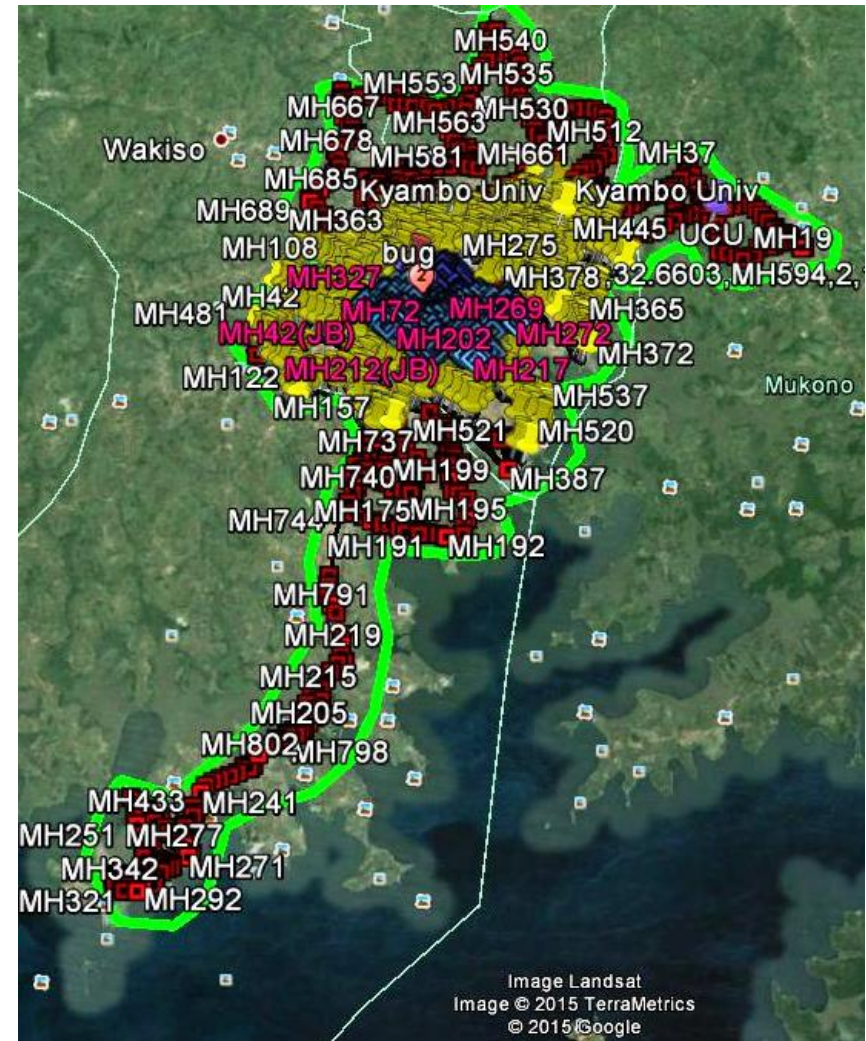


Case study: P -Link Last-mile delivery plan

RENU DARK FIBER DESIGN SCHEMATIC



< Project Link Target Coverage Area : : Spread of Related NREN Sites so far >





Highlights of REN Collaboration

- **PIP Emphasis:** Enhance access by lowering cost of local connectivity, Sustainability, Ease of Support, Resilient network design
- **RENU Emphasis:** Deepen resource-sharing, Lower Unit Cost, Grow usage coverage & local content, Ensure optimal traffic routing and enhance Network resilience, Optimize **RED** Impact.
- **Impact:** Unit Price drop: From \$630 to \$180 per Mbps per month in Year 1.

R&E connectivity growth: 230Mbps to 520 Mbps in Year 1.

Enhanced R&E collaboration*



Benefits of the

Collaboration

- Links offered as dark fibre hence not charged per Mbps leading to price competitiveness & high inherent scalability of the NREN.
- NRC made on a per-site basis independent of distance from PoP, making it easier for RENU to effect its' location-independent pricing.
- The sub-ring / double-entry methodology improved RENU's resilience in areas using this topology.
- The 10-year IRU arrangement helped to reduce the pre-financing gap since RENU is assured last-mile links to member institutions while paying manageable periodic amounts (both Capex & Opex)



Challenges Encountered

- Process of negotiating first PIP contract was over stretched followed by frequent unexplained stops and the resulting long order-to-market time strained the nascent relationship between RENU & its returning member institutions.
- The uncertainty of what was clearly a Learn as you go adventure
- The extreme slow pace of some public sector partners was very costly.



Lessons Learnt

- The value of multilateral partnerships for NREN growth is clear but can coordination among key players be more refined?
- The need to identify best practices & insist on features crucial to NRENs while negotiating last-mile agreements.
- Include NREN's imperatives like site-delivery timelines in a PIP SLA.
- The need to integrate upcountry last-mile in the initial planning.



Recommendations

- NREN supporting partnerships would benefit from standardisation and actors assigned specific areas of intervention where they already have a relative advantage & commit to pre-agreed performance targets for that area.
- A shared approach to resource utilization invariably yields cost reduction.
- Negotiation with last-mile providers should be bilateral but aim for certain minimum concessions.
- For example:
 - The operator of the NBI could focus on Inter-town connectivity.
 - Private PIP operators could focus on shared Metro last-mile deliveries in densely populated areas.
 - NRENs would then focus on coordination of cooperation



Conclusion

- It should be noted that RENUNet's growth was a result of the evolution of a multi-stakeholder partnership process as summarised in slide No. 9 and that when each partner focuses on a segment they have relative advantage, the impact on NREN growth and the telecom sector as a whole will be significant.
- Greater coordination between NRENs and RREN during planning & implementation is a potential strength and could transform REN competitiveness in Africa.
- Judging by the RENU experience, long-term NREN sustainability, would benefit from more involvement of private sector players who have a clear win-win agenda they are committed to.