



Performance Monitoring and Verification in the WACREN network

WACREN 2018 — Lomé, TG

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INDIANA UNIVERSITY



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Outline

- Performance Monitoring and Verification on the New Network
- perfSONAR
 - Some measurements
- RIPE Atlas
- ARK
- Looking forward

Performance Monitoring and Verification

- A new network:
 - new links
 - new upstreams
 - new peerings
- Better latency?
- More bandwidth?
- Need to measure!
- Does the new network delivers?

perfSONAR

- Network performance monitoring toolkit
- Help set network performance expectations
- Find network problems (“soft failures”)
 - Help troubleshoot
 - Help fix
- In Multi-domains environments
 - Multiple networks
 - Multiple owners and NOC
- Over 2000 public hosts
- From and for the REN community

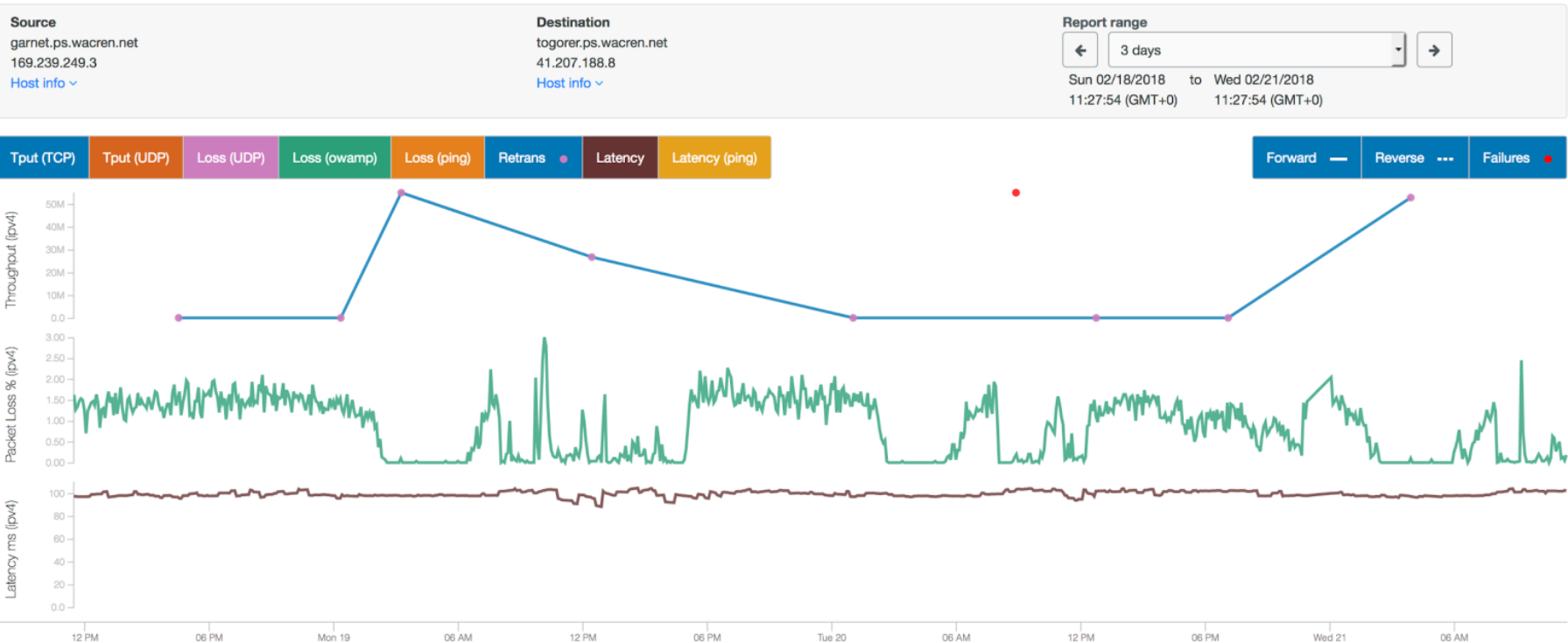
perfSONAR and WACREN

- 2 past Workshops and 1 planned
 - 2015: Network Monitoring & Measurements — Abuja, NG
 - 2017: perfSONAR Training Workshop — Accra, GH
 - 2018: perfSONAR Training Workshop — Dakar, SN (with AIS)
- NEAAR sponsored pS deployment
 - 10 small nodes for NREN
 - 1 Gbps ethernet
 - 5 in production, 5 waiting for network
 - 1 central MP in Lagos
 - 10 Gbps ethernet, connected to the core of WACREN's network
 - More small nodes at 2018 training

perfSONAR measurement mesh

- Setting up a Measurement mesh
- Internal measurements
 - Full mesh, between NREN edges and with WACREN core (Lagos)
 - 7 NREN now (2 on VM)
 - Provision for 5 more
 - Latency
 - Throughput, but without loading links too much
- External destinations
 - To some interesting destinations: GÉANT, KENET, RENU, ZAMREN
- End-Users
 - To some Universities connected through NREN networks

Between GARNET and TogoRER



Throughput between TogoRER and GARNET

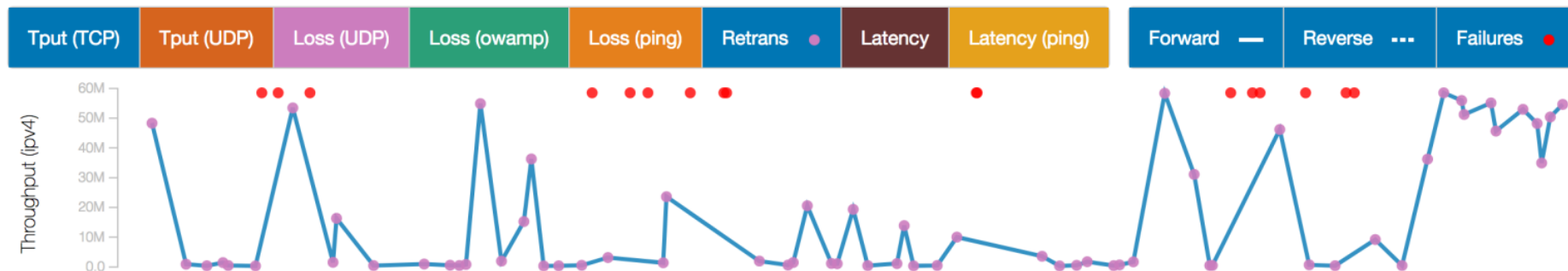
Source
togorer.ps.wacren.net
41.207.188.8
[Host info](#)

Destination
garnet.ps.wacren.net
169.239.249.3
[Host info](#)

Report range

←
1 month
→

Sat 02/10/2018 to Tue 03/13/2018
10:59:33 (GMT+0) to 10:59:33 (GMT+0)



Between RERBenin and WACREN (Lagos)

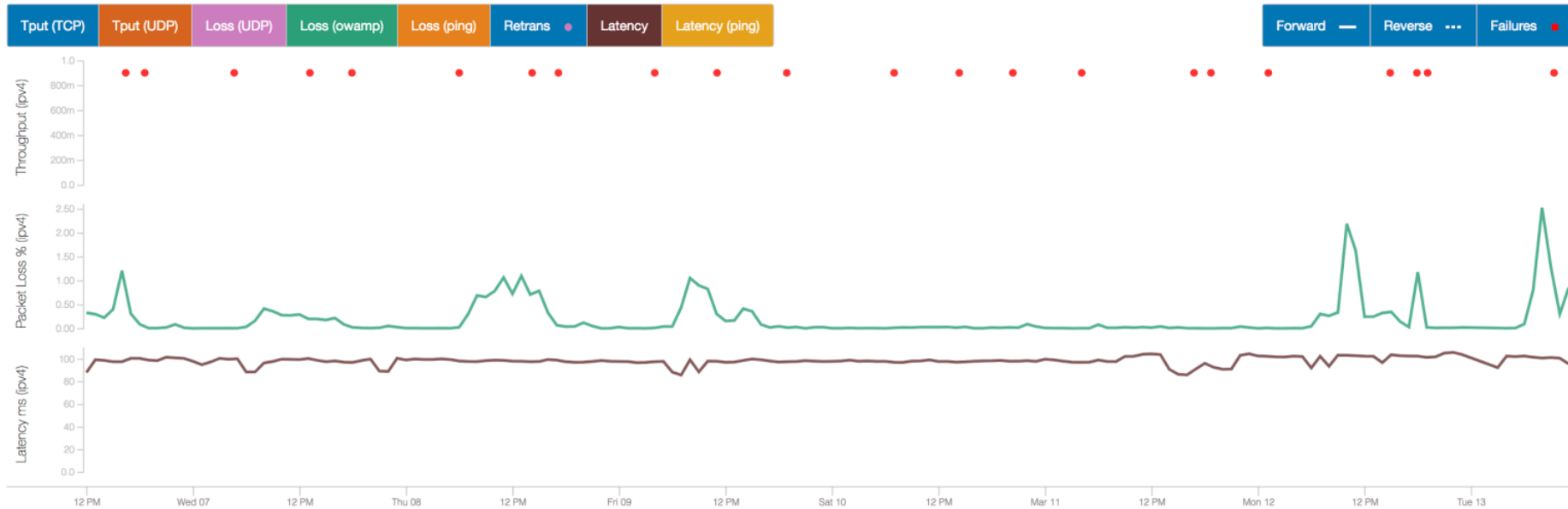
Source
rerbenin.ps.wacren.net
196.192.16.26
[Host info](#) ▾

Destination
lagos.ps.wacren.net
196.216.208.5
[Host info](#) ▾

Report range

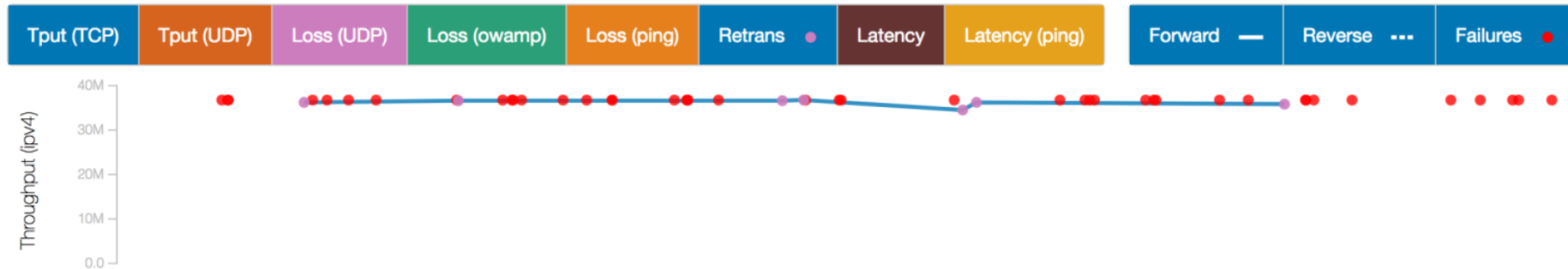
← 1 week →

Tue 03/06/2018 to Tue 03/13/2018
11:36:13 (GMT+0) 11:36:13 (GMT+0)



Throughput between Univ Lomé and WACREN (Lagos)

Source perf.univ-lome.tg 41.207.188.19 Host info	Destination lagos.ps.wacren.net 196.216.208.5 Host info	Report range <div> <div>←</div> <div>3 days</div> <div>→</div> </div> <div> <div>Tue 02/13/2018 11:43:26 (GMT+0)</div> <div>to</div> <div>Fri 02/16/2018 11:43:26 (GMT+0)</div> </div>
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RIPE Atlas

- Many probes (10,000 + around the world)
 - But are there some in West-African NREN or Universities?
- 1 AFRINIC sponsored Anchor
 - Donated to WACREN
 - To be deployed soon in Lagos PoP
- Anchor is more stable than probes
 - beefier hardware, better connectivity
 - more measurements possibilities
 - often used as measurement target

Make your RIPE Atlas probe known!

- Give it a meaningful name/description
- Make it public
- Keep it online
 - Make you earn credits
 - Credits allow you to run custom measurements
- Try to make it well-connected
 - At the core of your network
 - Or at the upstream edge

Do some measurements

- Built in measurements
 - First and second hop latency
 - DNS root servers latency
- If you have available credits, make your own measurements
 - Between probes
 - To some anchors
 - Application level measurements (DNS, HTTP)

ARK

CAIDA Archipelago Measurement Infrastructure

- About 100+ probes around the world
 - 1 in Ghana, 1 in Nigeria
- Mainly used for network research
 - Internet Topology Discovery
 - Congestion
 - Spoofing
 - IPv4 and IPv6 stability
 - DNS Health
 - Middleboxes detection and localisation
 - TCP behavior
- CAIDA grants access to researchers

How to leverage that infrastructure?

- Make your own perfSONAR measurements
 - Deploy a perfSONAR node
 - Use Lagos MP as target
- Add your own RIPE Atlas measurements
 - If you host a probe, you can run measurements
- Tell your network staff about it
- Discuss it on the WACREN PERT list: perts@lists.wacren.net
- NEAAR happy to help where it can
 - Join us at the next perfSONAR workshop in Dakar alongside AIS
 - Ask for new perfSONAR trainings!

Conclusions and Looking forward

- Many tools are available
- perfSONAR mesh is keeping a history of latency and throughput
 - ready to testify the improvement brought by the WACREN network
 - Add more perfSONAR nodes
 - Build your own national or campus mesh
- Deploy and publicise your RIPE Atlas probes
 - Use WACREN anchor as target (soon...)
- Monitor performance and let's verify at WACREN 2019!