

# Using Google-based metrics to measure the impact of the bandwidth open up at RENU

By

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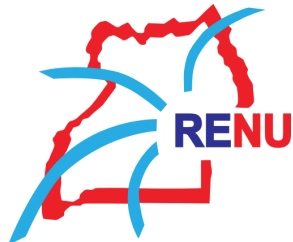
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Google ISP Portal



# Overview

11<sup>th</sup> November 2021

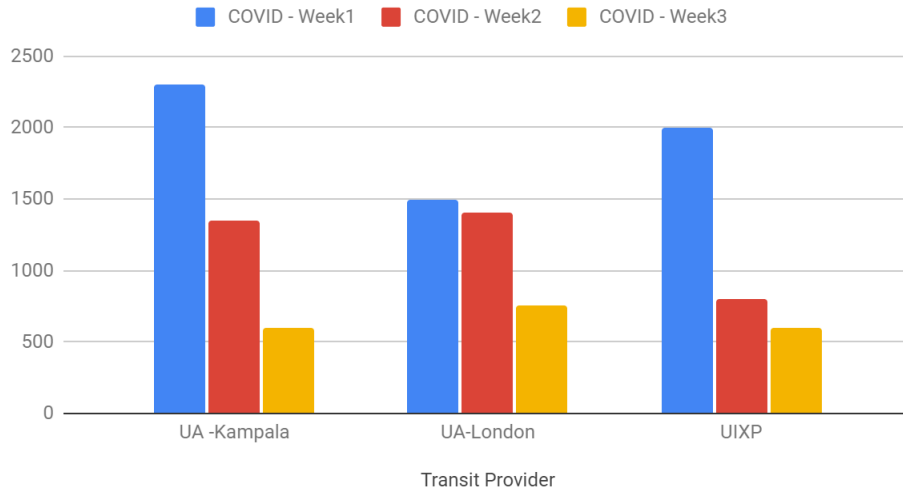
## Outline

- No Bandwidth Caps
- RENU Network Structure
- Traffic Breakdown
- Analysis
- Conclusion

# No Bandwidth Caps

- **Week 1** [15<sup>th</sup> to 21<sup>st</sup> of March 2020] – Educational Institutions Lockdown.
- **Week 2** [ 22<sup>nd</sup> to 28<sup>th</sup> of March 2020] – Public Transport Lockdown + **No Caps**.
- **Week 3** [ 29<sup>th</sup> March to 4<sup>th</sup> April of 2020] – Private Transport Lockdown & Curfew.

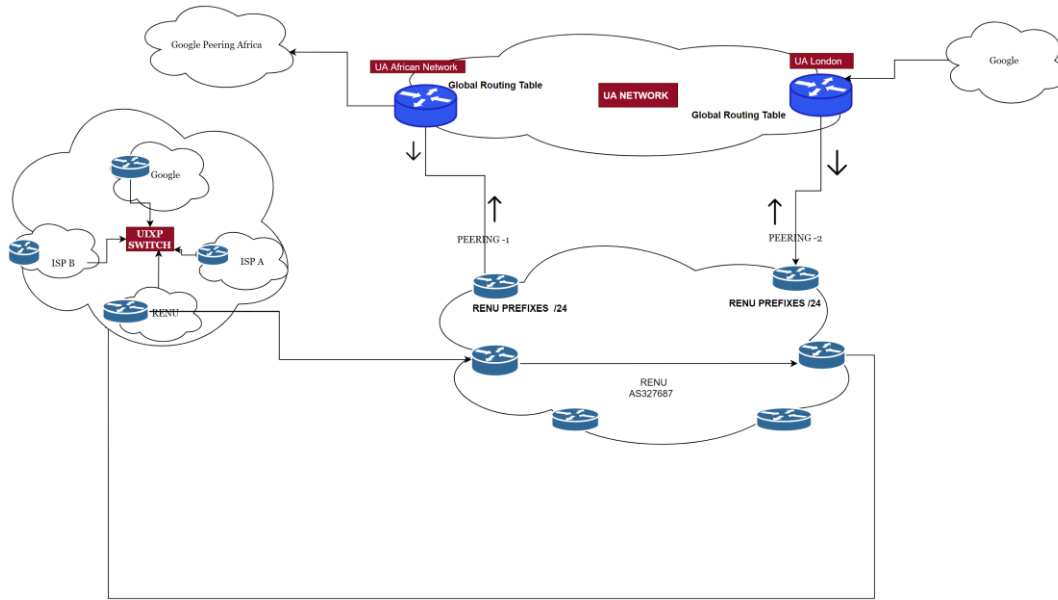
## PANDEMIC TIMELINES



Week 2 – **37%** decline.

Week 3 – **26%** decline.

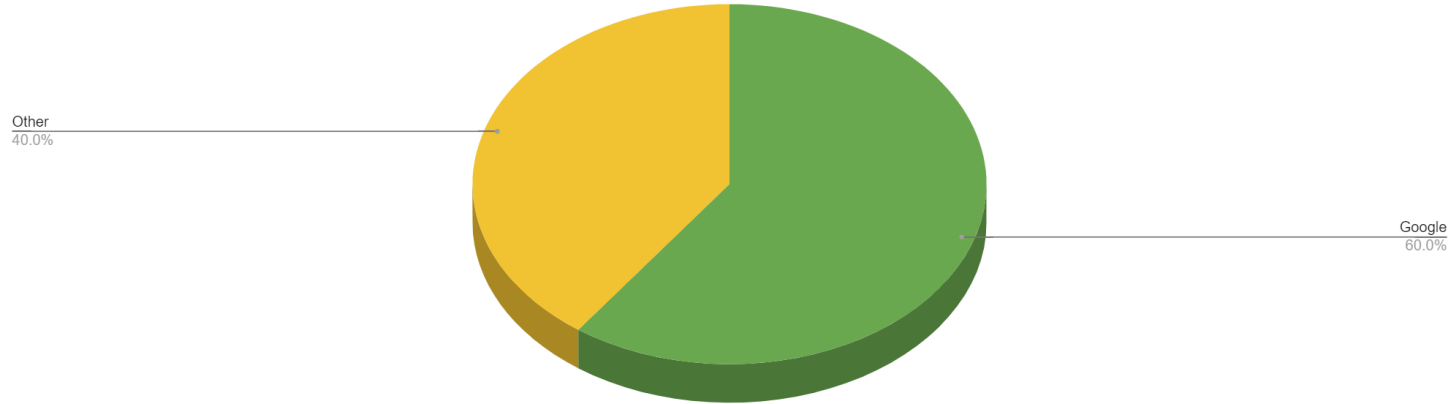
# RENU Network Structure



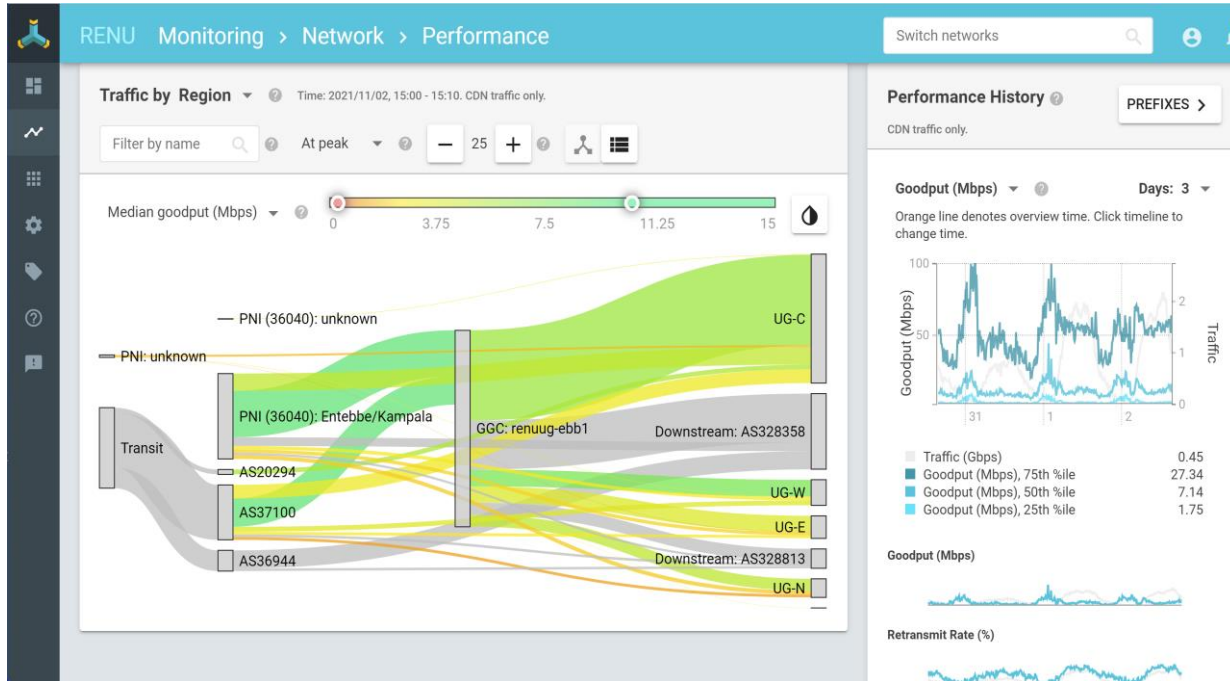
- ✓ Multi-homing(London and Kampala)
- ✓ /24 for each institution(identity)
- ✓ Google (UA Transit & UIXP)

# RENU TRAFFIC BREAKDOWN

RENU Traffic BreakDown

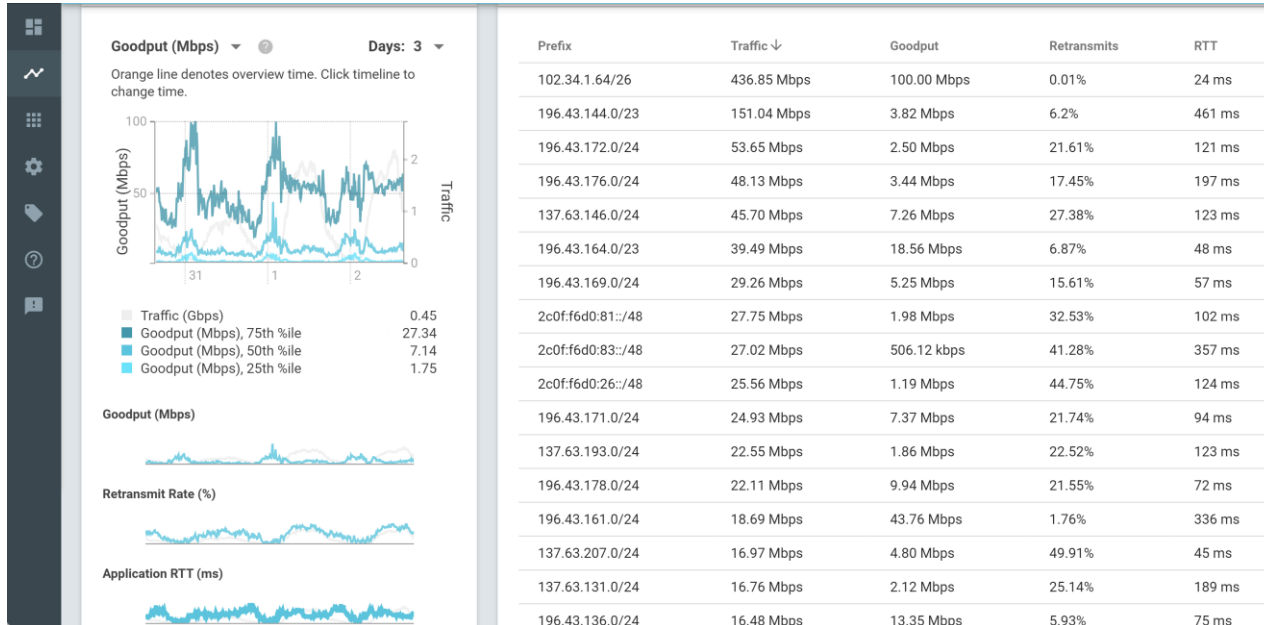


# ISP Google Portal



- ✓ Monitoring platform.
- ✓ Stats on Google bound traffic.
- ✓ Prefix based performance.
- ✓ Color based indicators-easy.
- ✓ Annual performance graphs.
- ✓ Measures from Google servers to end user device.

# ISP Google Portal



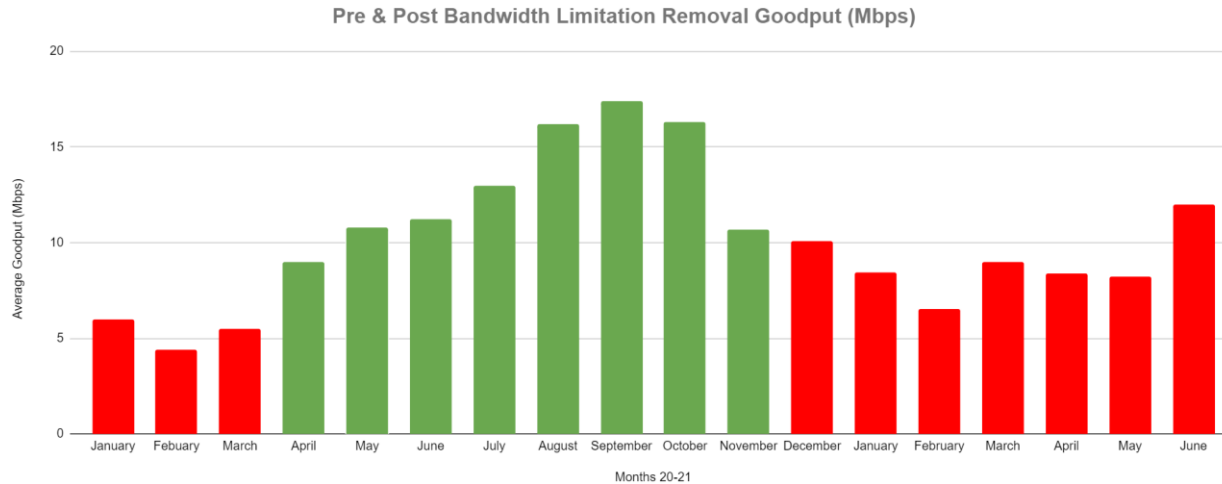
Prefix performance based on the following metrics:

- ✓ Goodput
- ✓ Retransmit rate
- ✓ RTT

# Performance Metrics

- **Goodput:** is the number of successful bits delivered by the network to a destination per second.
- **Retransmit Rate:** is the rate of resending of packets which have been either damaged or lost usually on unreliable networks.
- **Application Round Trip Time:** is the time required for a packet to travel from source to destination and back.

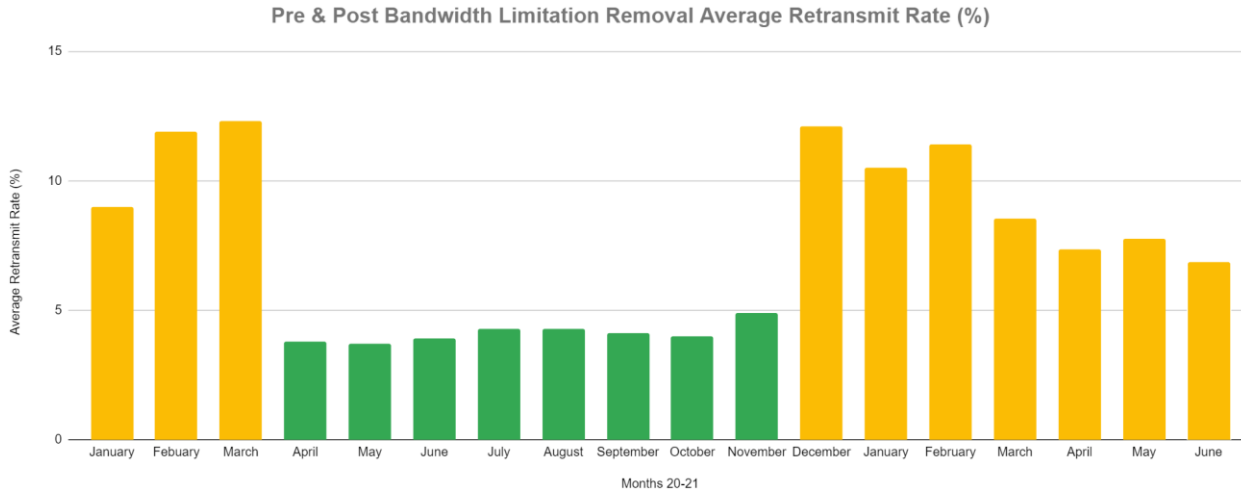
# Analysis



## Observation

- ✓ April to October 2020.
- ✓ **Steady performance improvement**

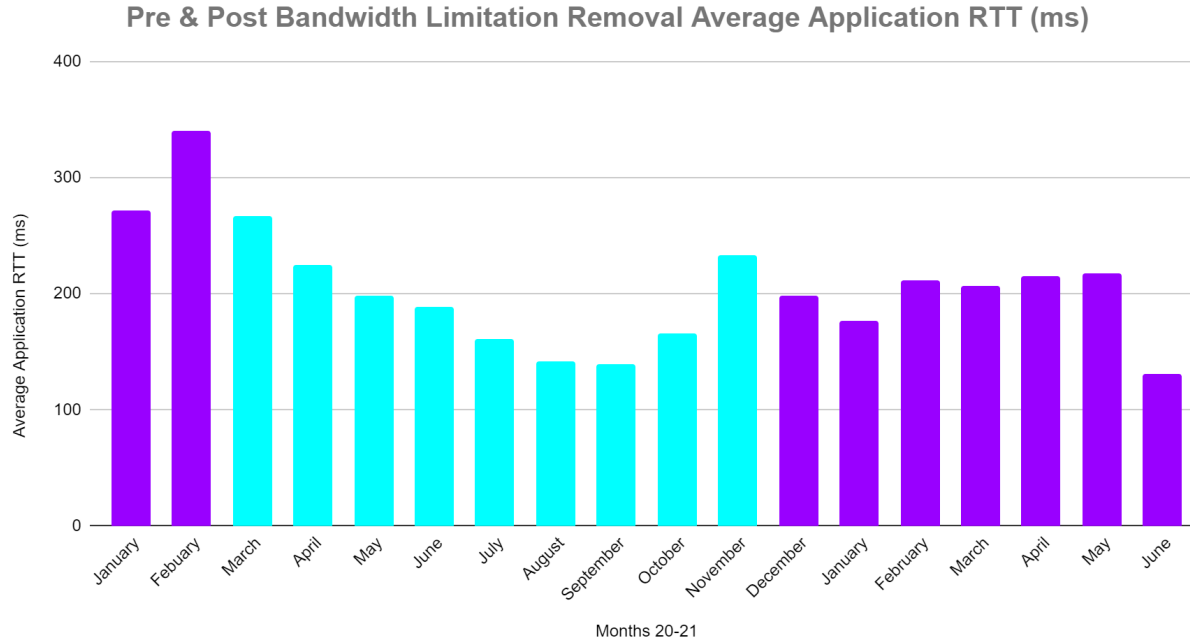
# Analysis



## Observation

- ✓ No bandwidth limiters.
- ✓ Post & Pre Bandwidth Limitation
- ✓ Huge reduction in retransmit rates.

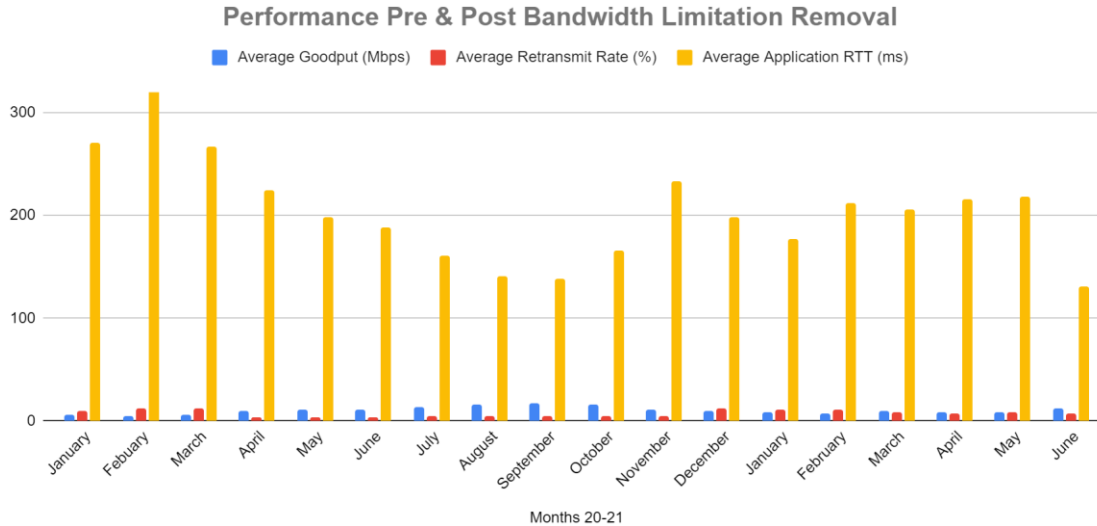
# Analysis



## Observation

- ✓ No bandwidth limiters.
- ✓ Post & Pre Bandwidth Limitation removal
- ✓ Huge reduction in RTT

# Analysis



## Observation

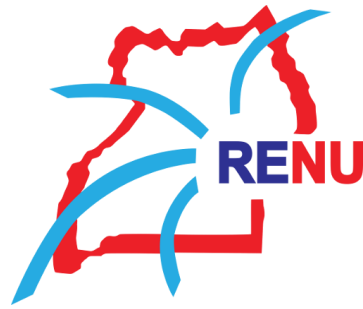
- ✓ April to October 2020
- ✓ Correlation between the different parameters.
- ✓ **High Good Put, Low Retransmit Rate & low RTT**

## Need for more Institutional Capacity

- Notable service performance improvement between **April 2020** to **October 2020**.
- Interventions to acquire more bandwidth and cheaply.
- **Bandwidth Chocking:** Available capacity vs Required Capacity

## Need for more Institutional Capacity

- Many dynamic factors affect performance: Google servers to end user device.
- Intervention: Clean up of Institution's LAN to prevent bottlenecks (DEAs)
- Performance hiccups due to local limitations weak equipment.
- ISP Google gives 3D analysis in a network.



# THE END

Thank you for your time