



User experience on mobile networks

# Botswana

February 2021





## About the data

**Total number of samples:** 31,550

**Total number of unique devices:** 10,473

**Data collection period:** 2 February - 26 February 2021

## About the report

Because SpeedChecker aims to benchmark operators on the user experience the metrics in this report are designed with this in mind. Users accessing the services on the Internet are affected not only by the quality of the radio access network but also by other factors such as the mobile device performance, network backhaul capacity and interconnections to other networks.

Our [methodology](#) is designed to take into account all of those factors. Our metrics do not show the highest possible speeds or the lowest latencies that a particular operator can provide locally. The majority of the content accessed on the Internet is on CDNs and that is why SpeedChecker uses CDNs to perform the tests. Operators who have great radio access network as well as great connections to CDNs offer superior user experience and score better in our reports.

# MNO speed benchmark

The following table shows average download and upload speeds per MNO. The measurements were done across the whole country and across the whole spectrum of available Radio Access Technologies (3G, 4G, 5G if available).


<b>BTC</b>	<div><div></div>95% Confidence interval</div>
Download speed (Mb/s)	<div><div>10.69</div><div>+/- 0.43</div></div>
Upload speed (Mb/s)	<div><div>6.68</div><div>+/- 0.32</div></div>
<b>Mascom</b>	
Download speed (Mb/s)	<div><div>7.04</div><div>+/- 0.20</div></div>
Upload speed (Mb/s)	<div><div>3.31</div><div>+/- 0.13</div></div>
<b>Orange</b>	
Download speed (Mb/s)	<div><div>18.68</div><div>+/- 0.41</div></div>
Upload speed (Mb/s)	<div><div>6.04</div><div>+/- 0.21</div></div>

BTC 5,846 samples, Mascom 11,410 samples, Orange 14,239 samples



# MNO 4G and 3G download speed benchmark

The following table shows average download speed per MNO and particular RAT.

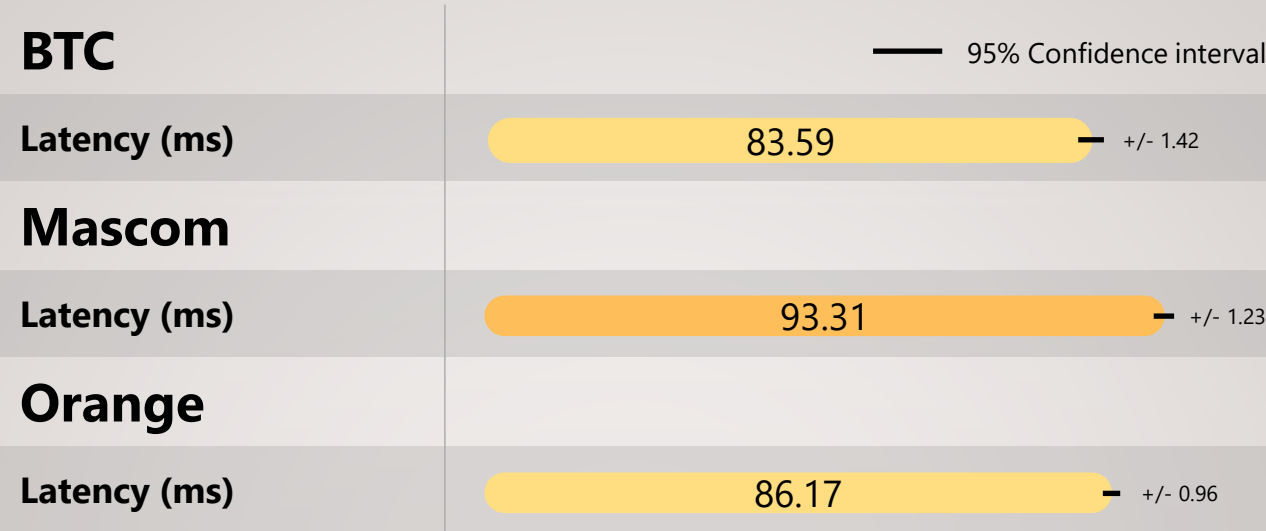
<b>BTC</b>		 95% Confidence interval
4G Download speed (Mb/s)	<div><div>11.09</div><div>+/- 0.65</div></div>	
3G Download speed (Mb/s)	<div><div>4.53</div><div>+/- 0.86</div></div>	
<b>Mascom</b>		
4G Download speed (Mb/s)	<div><div>7.19</div><div>+/- 0.31</div></div>	
3G Download speed (Mb/s)	<div><div>4.68</div><div>+/- 0.61</div></div>	
<b>Orange</b>		
4G Download speed (Mb/s)	<div><div>18.91</div><div>+/- 0.60</div></div>	
3G Download speed (Mb/s)	<div><div>7.19</div><div>+/- 0.94</div></div>	

BTC 2,126 samples, Mascom 4,254 samples, Orange 5,310 samples



# MNO latency benchmark

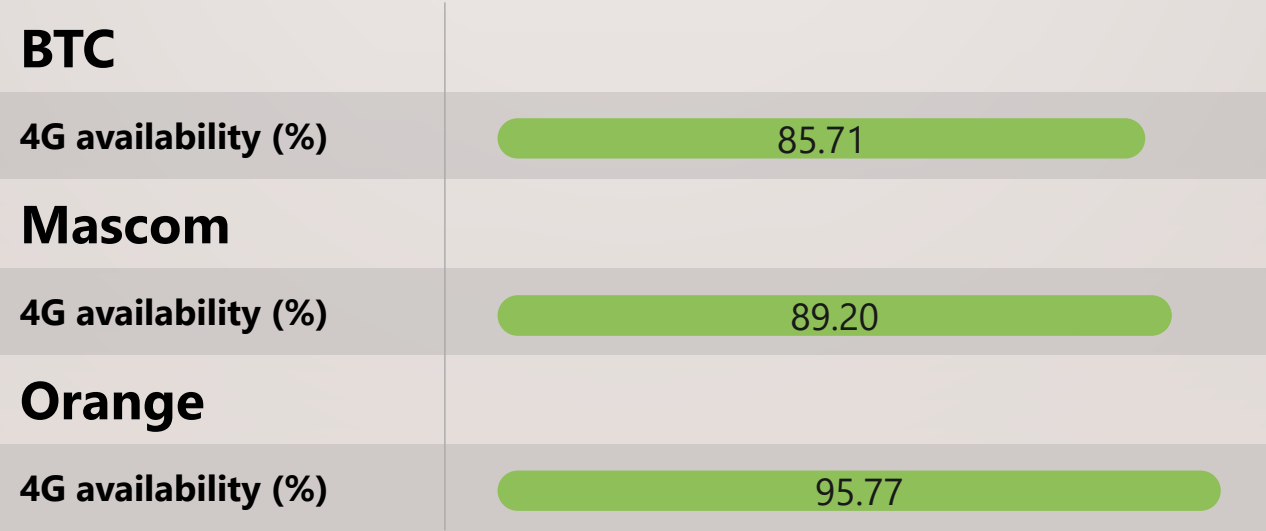
As described in our [data collection methodology](#), latency is measured to the CDN endpoints. Operators who interconnect with CDNs well - tend to offer better user experience in latency-sensitive applications as well as score well in our latency comparison.



BTC 5,846 samples, Mascom 11,410 samples, Orange 14,239 samples

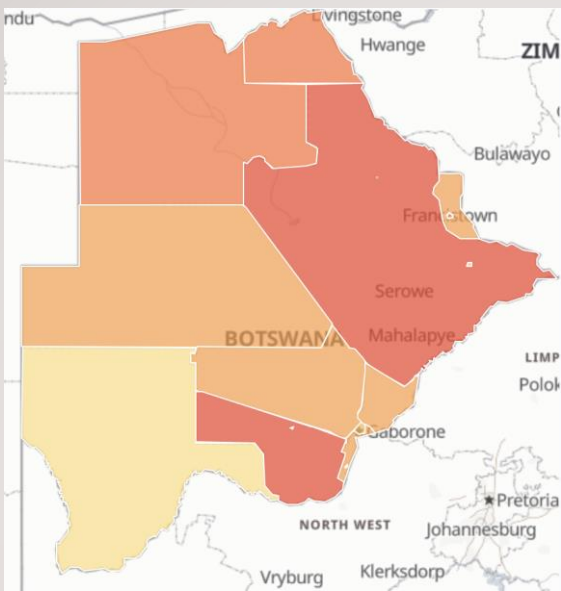
# MNO 4G Availability benchmark

Our 4G availability metrics correspond to the % of the tests done on 4G vs 3G. This metric does not represent 4G coverage.



# Regional comparison of MNO download speed performance

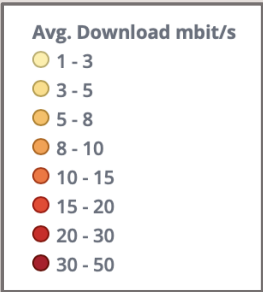
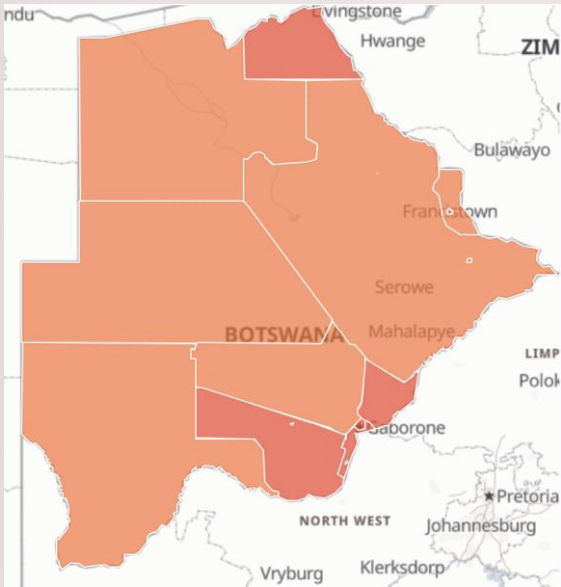
## BTC



## Mascom



## Orange



The following table shows the average download speeds in different regions of Botswana. The 2<sup>nd</sup> column is an average of all MNOs in a particular region.

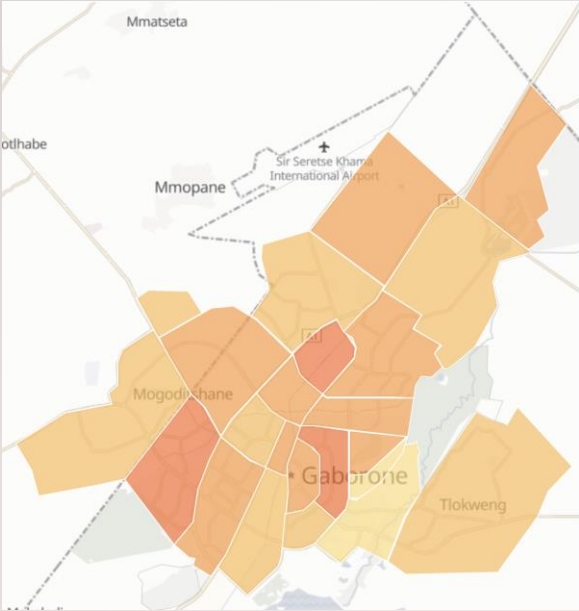
The fastest regions are at the top of the table.

District	All operators	BTC	Mascom	Orange	Test Count
Francistown	16.21	14.879	8.511	23.876	2057
Southern	15.697	24.529	6.398	18.556	1574
Kgatleng	14.207	11.66	5.984	21.424	1470
Chobe	13.473	17.394	5.849	18.82	354
Selibe Phikwe	13.427	8.743	3.496	19.881	413
Gaborone	13.179	8.417	8.289	21.355	12243
Sowa	13.162		13.162		19
South-East	13.103	10.146	5.28	19.219	1186
Lobatse	12.702	10.081	4.547	17.504	426
Jwaneng	12.417	4.443	5.886	19.366	433
Kweneng	12.01	12.289	4.858	15.661	2975
Central	11.925	17.707	6.185	16.341	4785
Ghanzi	11.863	9.717	5.492	14.46	525
Kgalagadi	11.597	5.347	6.553	15.722	462
North-East	11.339	10.527	7.396	14.876	795
North-West	10.427	15.091	6.598	12.634	1777

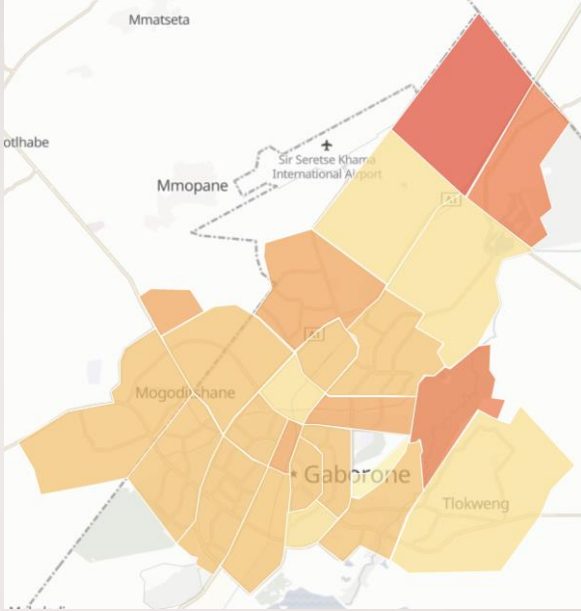


# MNO download speed performance in Gaborone

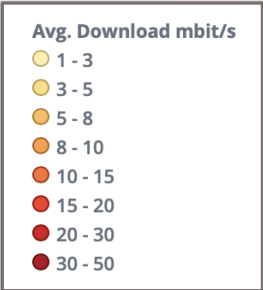
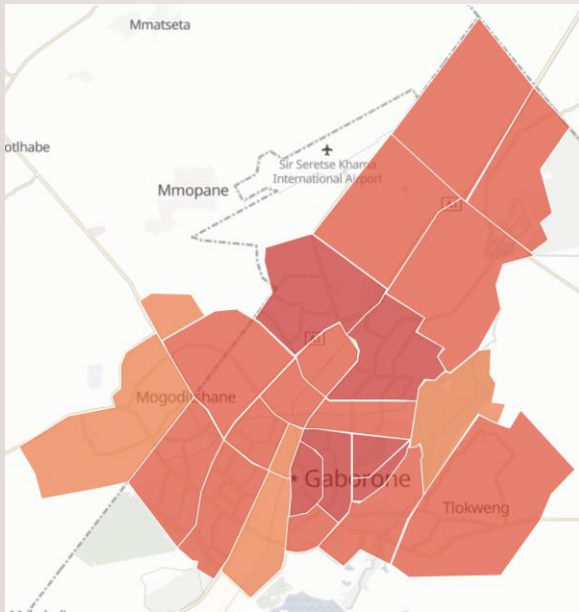
## BTC



## Mascom



## Orange

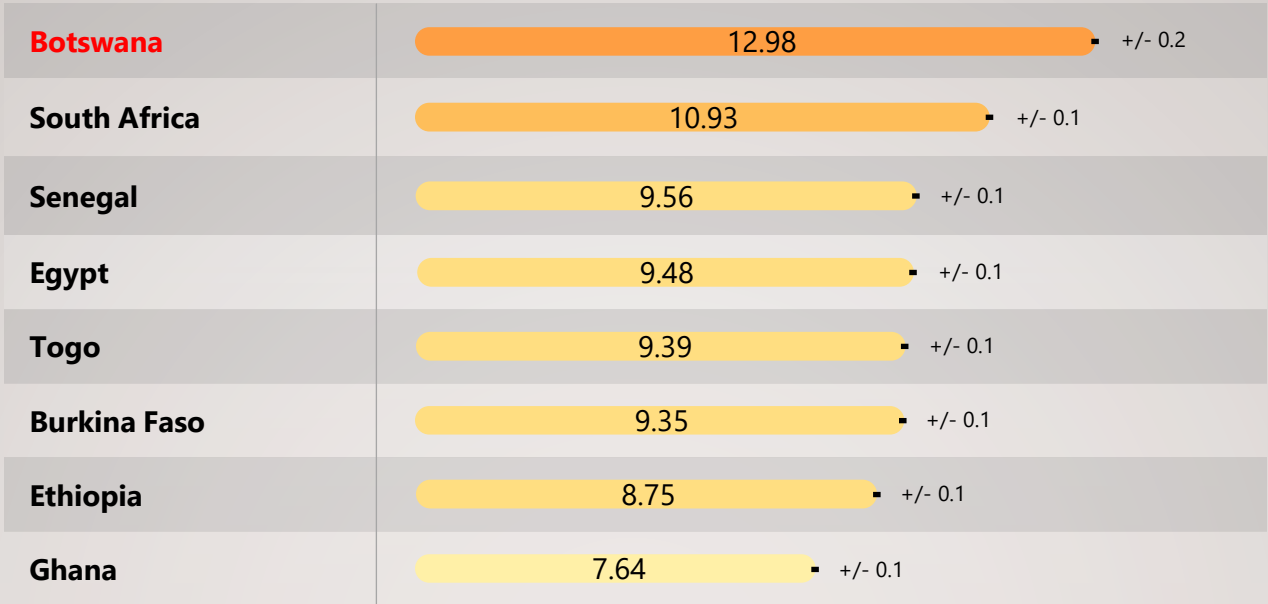




# Download speed African benchmark

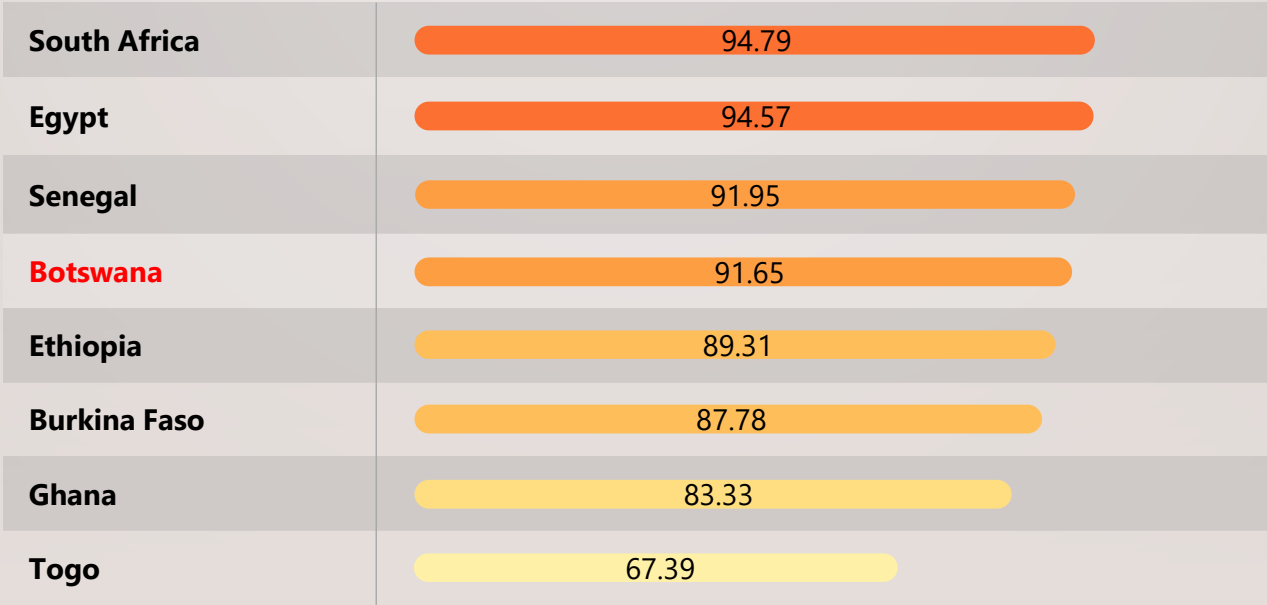
## Download speed (Mb/s)

— 95% Confidence Interval



# 4G availability African benchmark

## 4G availability (%)



## ARE YOU LOOKING FOR MORE DETAILED CROWDSOURCED DATA IN BOTSWANA?

What you see in this free report is a high-level snapshot of the crowdsourced data we offer to our clients. Our crowdsourcing system contains billions of data points collected from mobile devices worldwide. Unlike our competitors, we can sell access to the data with different granularity: Our clients can pick data they need with significant cost savings associated with a reduced scope.



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# Flexibility is in our DNA

Our customers value our flexible and modular approach in delivering our solutions. There is no one size fits all in providing crowdsourcing projects. Customers increasingly require tailored solutions which will satisfy all technical, operational and legal requirements.



With reduced scope comes reduced price. Our Basic KPI set is a more cost effective way to get speed test data. Our Advanced KPI set is more comprehensive with 100+ active and passive KPIs.



Crowdsourcing is about trade-offs. Do you want more tests or do you want tests to run longer ? Do you want to collect data passively without impacting the network and user bandwidth or run active tests which will stress and assess the capacity better?



Do you want us to host the solution for fast & easy deployment or require data to be within your data center for compliance reasons?



You not only want the data but you also want your own app or web-based tester? We can do it all. Our team can produce iOS, Android, HTML, Windows and MAC clients tailored to your specific needs.

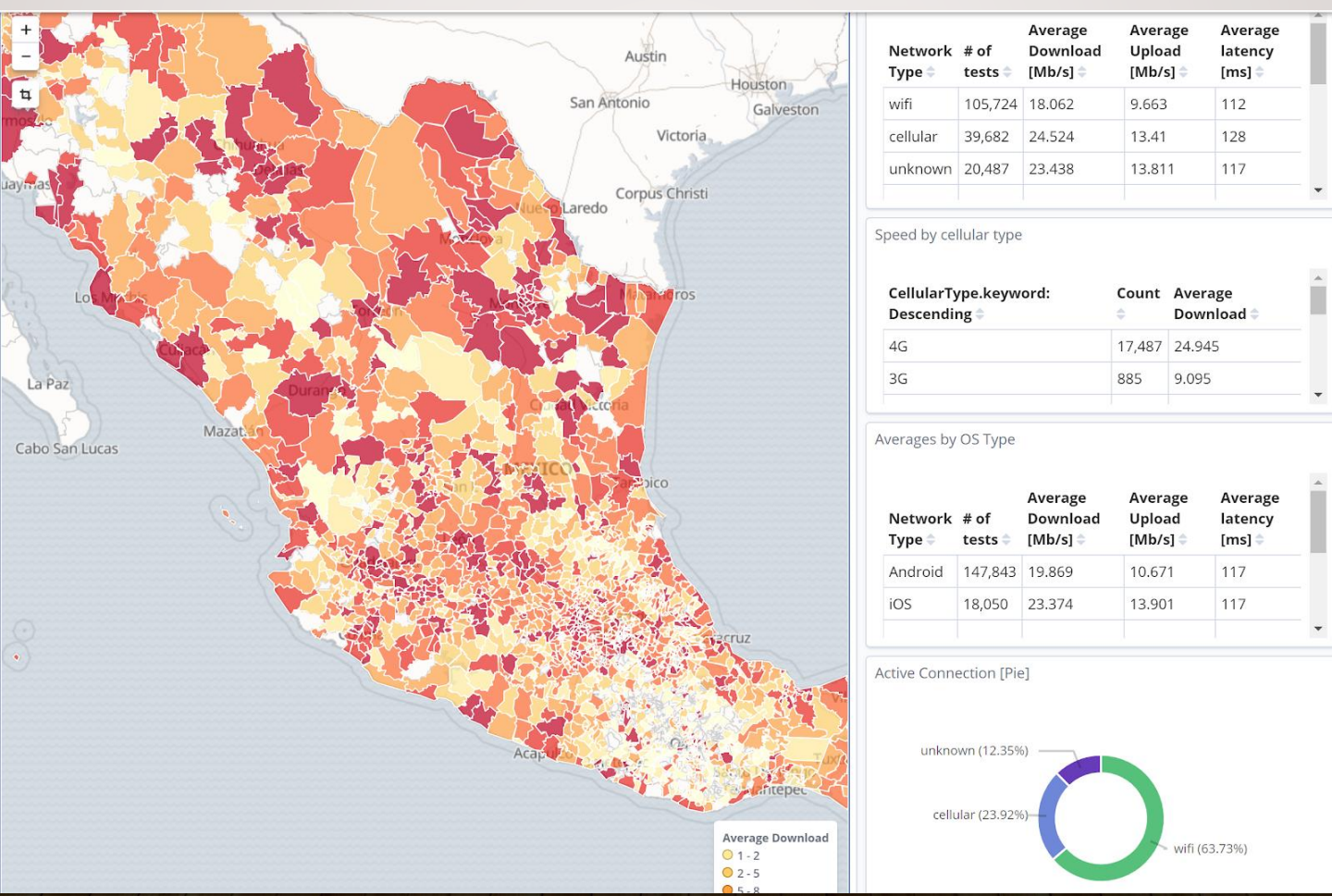


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# Basic Crowdsourcing System

Our Basic CrowdSourcing System offers full analytical options like our Advanced system but with the limitation of a smaller Basic KPI set. Basic KPIs include speed test data along with device and network information but do not contain detailed Radio KPIs nor passive measurements.



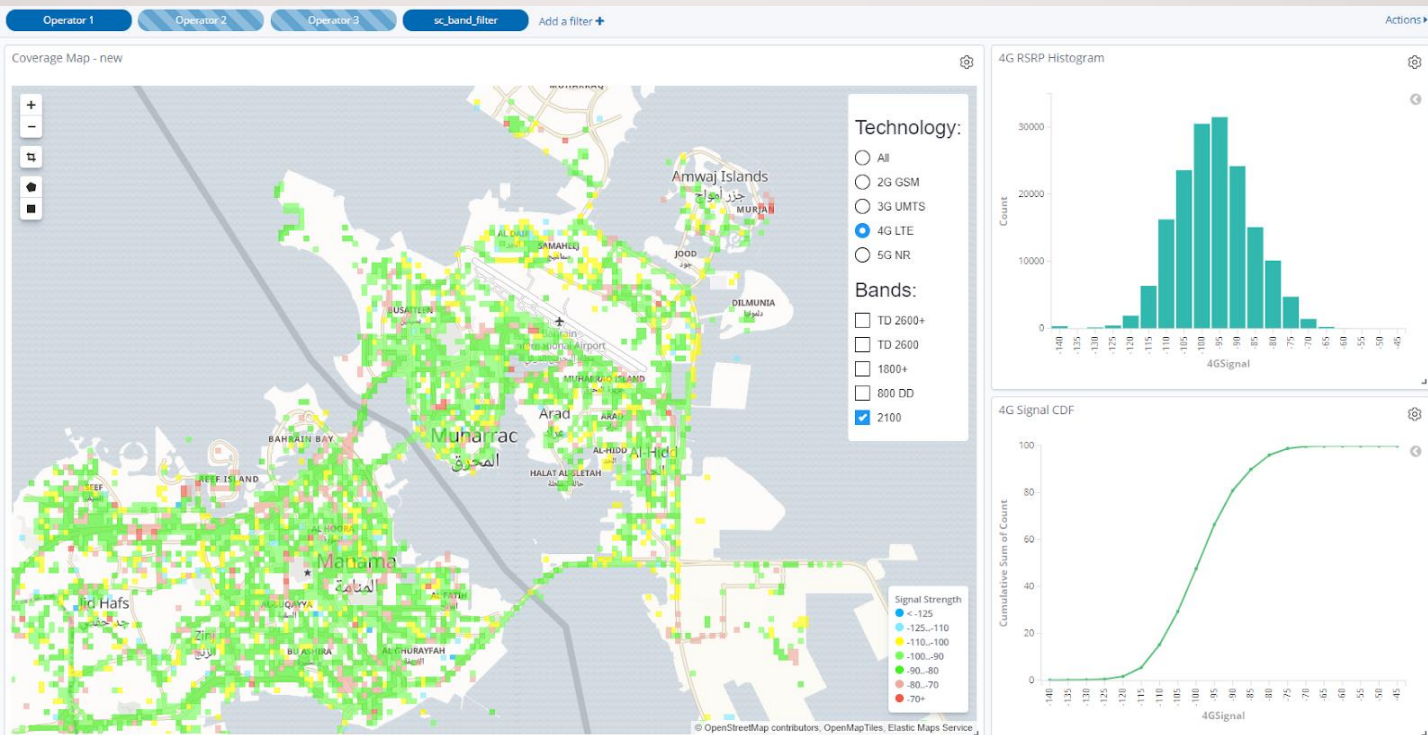


# Advanced Crowdsourcing System

Step up from our Basic system to our Advanced Crowdsourcing system with more than 100+ KPIs to analyse

## Coverage Analysis Dashboard

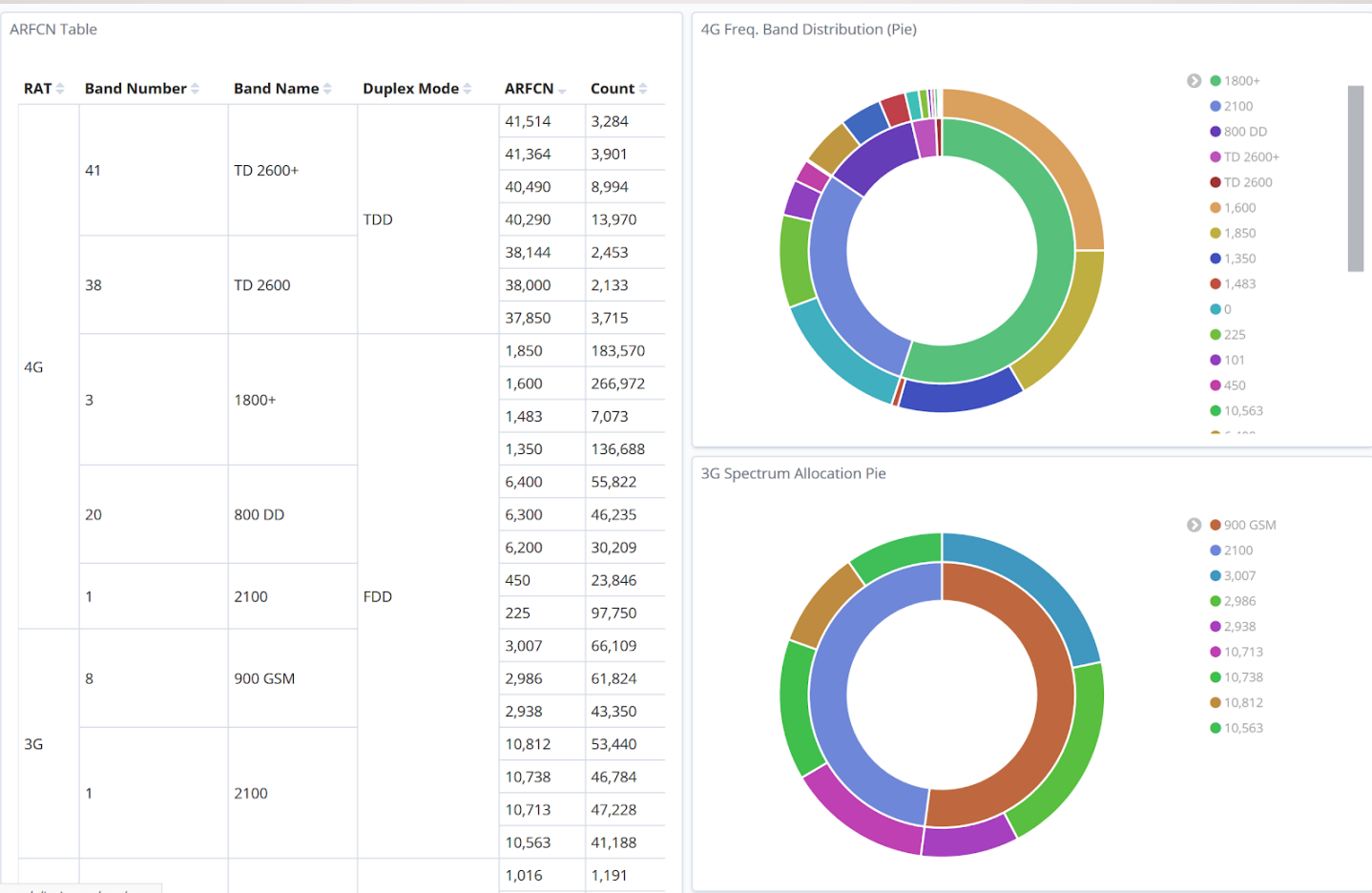
- ✓ Statistical research on basis of millions of crowdsourced samples
- ✓ Multiple signal metrics RSRP, RSRQ, SNR, RSSI, CQI
- ✓ Split by MNO, Radio Access Type, Band (down to individual ARFCN)
- ✓ Possibility to filter by: speed (e.g. High-Speed Train Scenarios)
- ✓ Possibility to separate samples between Indoor/Outdoor



# Advanced Crowdsourcing System

## Frequency Bands Dashboard

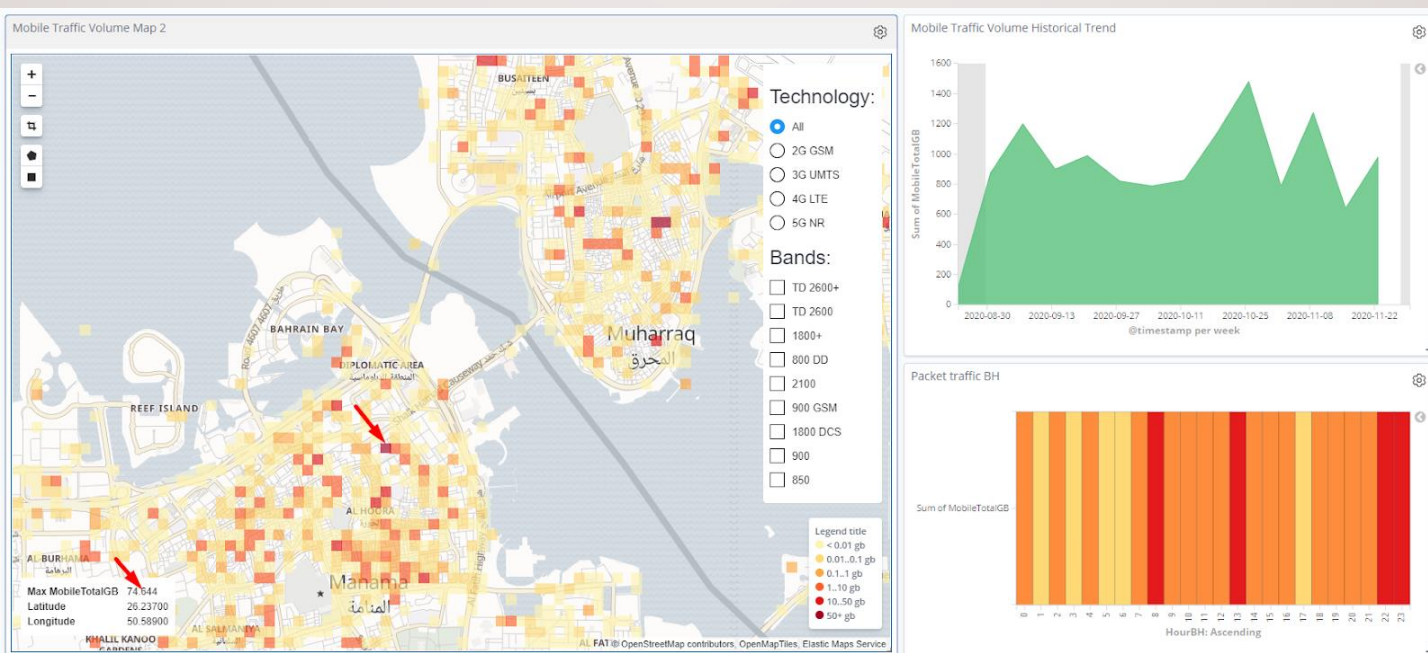
The Frequency Bands Dashboard reveals frequency usage for different areas and comparison between operators. It is grouped by RAT, band number and ARFCN.



# Advanced Crowdsourcing System

## Cellular Data Usage Dashboard

The Cellular Data Usage dashboard shows the locations with the highest traffic demands to suggest to the operators which areas would benefit from additional investment or where network expansion might be required.

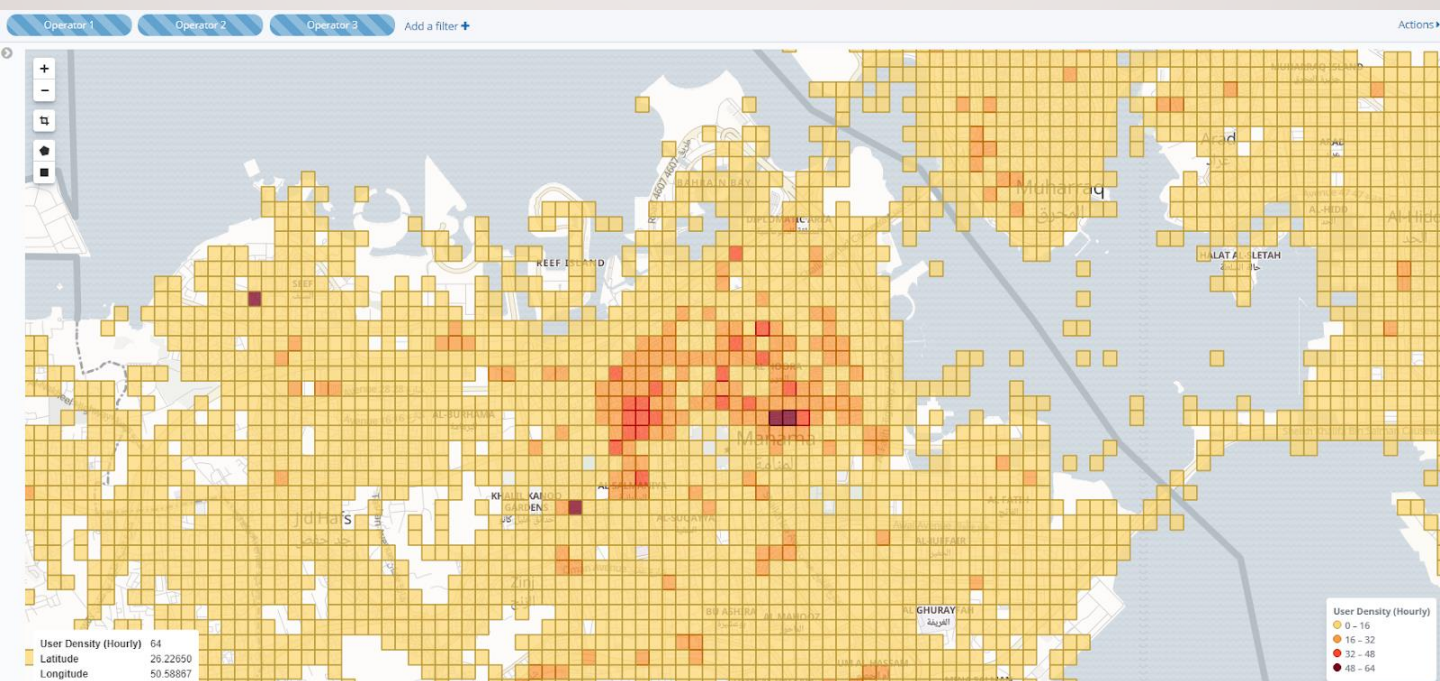




# Advanced Crowdsourcing System

## User Density Map

The User Density Map shows the locations with the highest subscriber density to suggest to the operators the areas where additional investments into network expansion might be required.

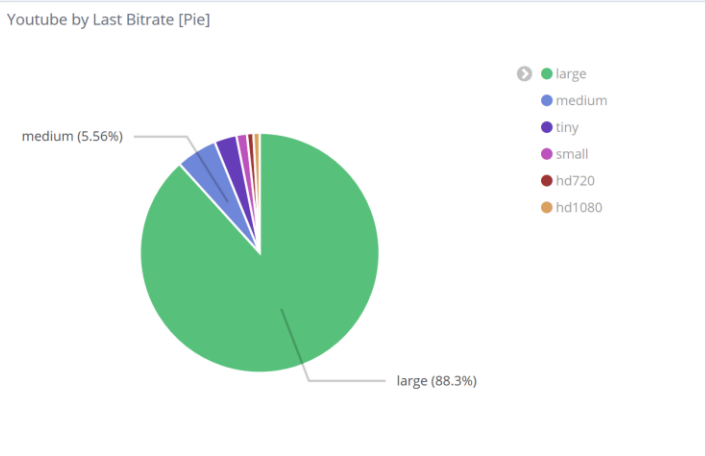
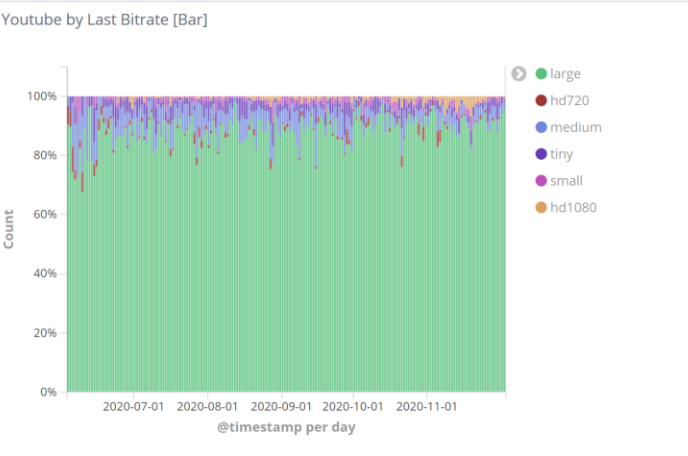
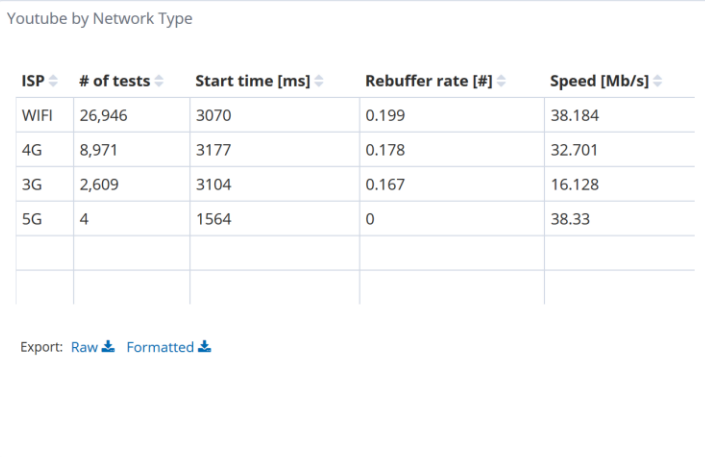
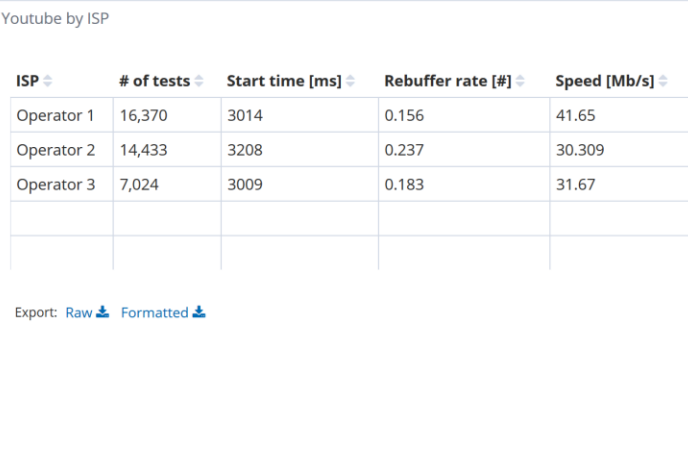




# Advanced Crowdsourcing System

## Video Experience dashboard

Streaming video apps such as YouTube or Netflix are being increasingly used by consumers who expect the best video quality with low start-up time and no rebufferings. Our data can contain metrics such as video download speed, streaming bit rate, start-up time and more.

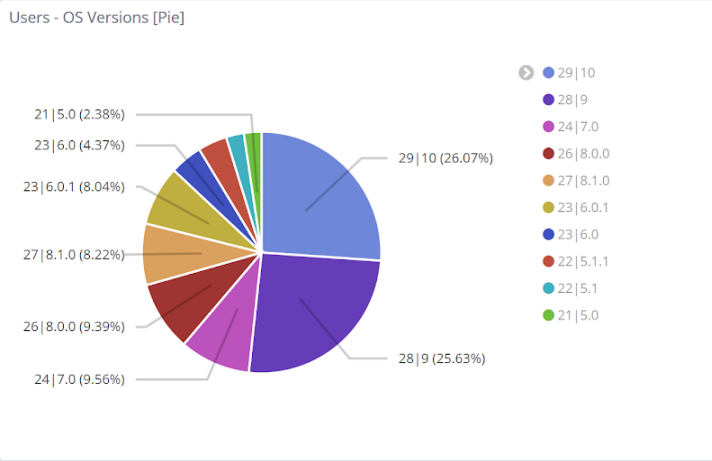
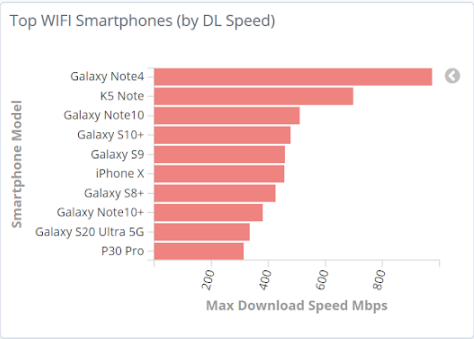
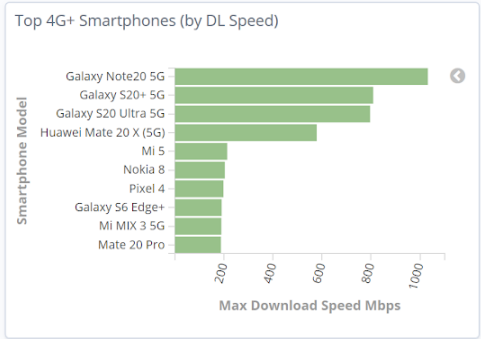
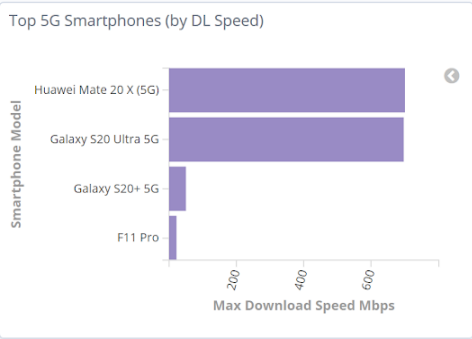


# Advanced Crowdsourcing System

## Device Information Dashboard

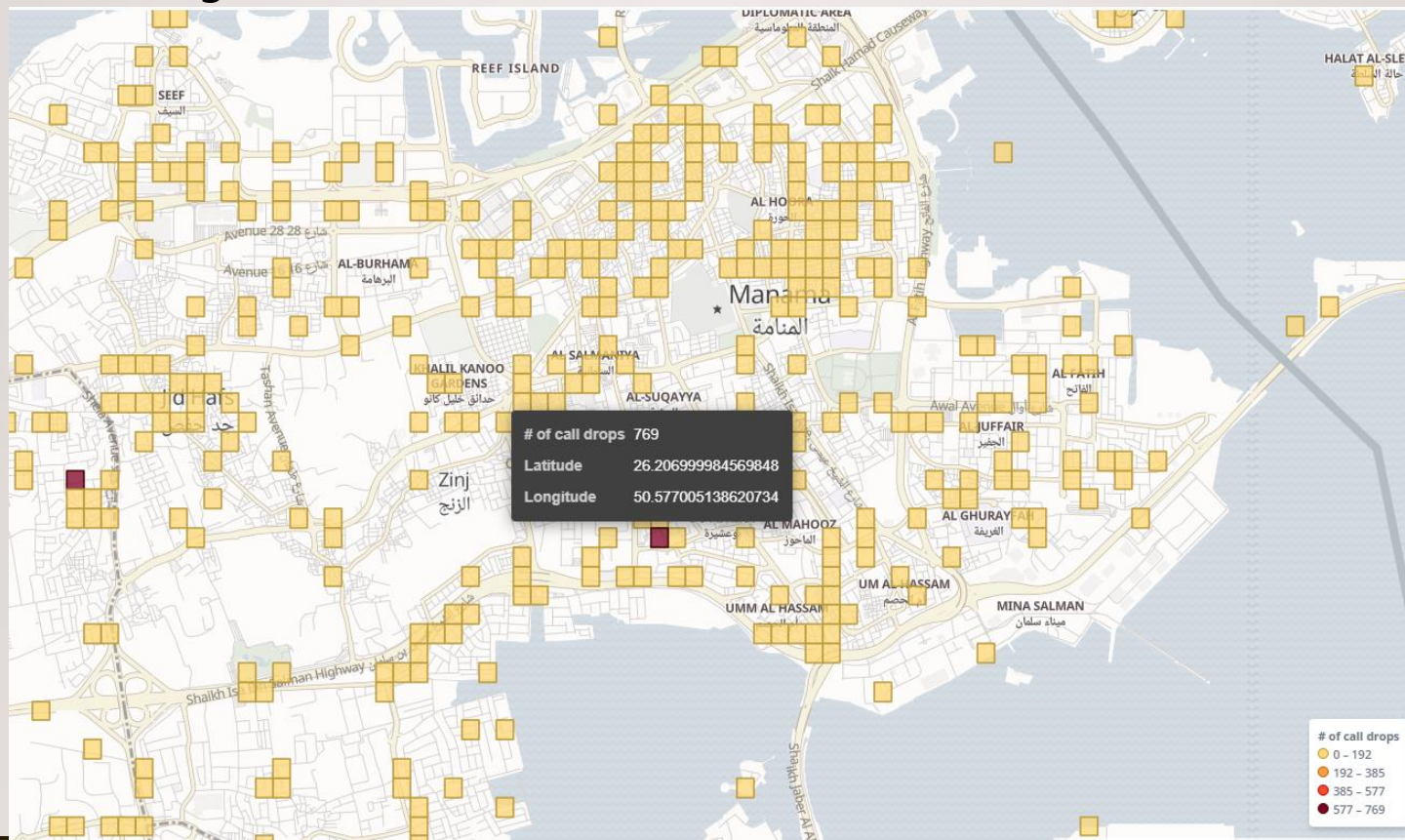
The Device Information dashboard contains information about devices that are in use for each operator as well as all the performance KPIs. Specific relevant device KPIs are:

- ✓ Model name
- ✓ Manufacturer
- ✓ OS version
- ✓ Platform (iOS/Android)
- ✓ Top 5G / 4G / Wi-fi smartphones



Users - OS Versions [Table]

OS Version	Users
29 10	1427
28 9	1403
24 7.0	523
26 8.0.0	514
27 8.1.0	450
23 6.0.1	440
23 6.0	239
22 5.1.1	215
22 5.1	132
21 5.0	130





## Data collection methodology

Our data is collected from end user devices running Android and iOS systems. All measurements are executed towards a CDN which has a large geographical footprint and hosts a significant part of the content that is being accessed by the users. This ensures our results are a good approximation of the user's actual quality of experience.

All measurements must contain accurate location information using GPS or wi-fi geolocation method. Measurements are considered only from the apps that have been approved by SpeedChecker. Submitted measurements are checked if they are within expected ranges and additional security precautions are implemented to ensure measurement data is not being manipulated.

The data collection process aims to deliver a single measurement sample from every device in our crowdsourcing system device pool and we strive to remove all duplicates. Due to privacy settings on some users phones we cannot reliably detect unique devices therefore some devices have contributed to more than 1 measurement into this dataset.



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# Measurement methodology

The methodology is based on the concept of the [ITU-T Q.3960 \(2016\)](#), "Framework of Internet related performance measurements" and "Supplement 71 to ITU-T Q-series Recommendations".

This test methodology aims at delivering an accurate measurement of the maximum bandwidth available over a given internet connection. This is achieved by transferring multiple parallel data streams over separate TCP connections within a predefined amount of time. The transferred data consists of randomly generated data with high entropy.

#	Parameter	Unit	ITU Range	Current Setting
1	Number of parallel threads	#	$1 \leq n \leq 10$	Dynamic addition from 1 to 10
2	Duration of pre-test	s	$0 \leq T_p \leq 5$	1s
3	Duration of the downlink test	s	$5 \leq T_d \leq 15$	5s
4	Duration of the uplink subtest	s	$5 \leq T_u \leq 15$	5s
5	Number of 'pings' during delay subtest	s	$5 \leq p \leq 20$	$p = 10$



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