SPEEDCHECKER

Turkey

July 2021

ABOUT THE DATA

Total number of samples: 98,275

Total number of unique devices: 66,626

Data collection period: 1 July - 8 July 2021

ABOUT THE REPORT

SpeedChecker aims to benchmark operators on the user experience and, therefore, 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 made across the whole country and across the whole spectrum of available Radio Access Technologies (3G, 4G, 5G if available).

—— **95% Confidence interval**

(±X %) change from Jan 2021

Turkcell
30,337 samples

Download speed (Mb/s)	40.22	+/- 0.56 **(+49%)**
Upload speed (Mb/s)	13.91	+/- 0.38 **(+562%)**

Türk Telekom
28,676 samples

Download speed (Mb/s)	30.76	+/- 0.41 **(+22%)**
Upload speed (Mb/s)	11.61	+/- 0.27 **(+23%)**

Vodafone
34,135 samples

Download speed (Mb/s)	20.78	+/- 0.27 **(+40%)**
Upload speed (Mb/s)	8.60	+/- 0.14 **(-11%)**

MNO 4G AND 3G DOWNLOAD SPEED BENCHMARK

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

Turkcell
13,000 samples

4G Download speed (Mb/s)	46.69 +/- 1.02	**(+71%)**
3G Download speed (Mb/s)	12.20 +/- 0.37	**(+34%)**

Türk Telekom
9,301 samples

4G Download speed (Mb/s)	35.44 +/- 0.78	**(+31%)**
3G Download speed (Mb/s)	11.97 +/- 0.34	**(+11%)**

Vodafone
10,259 samples

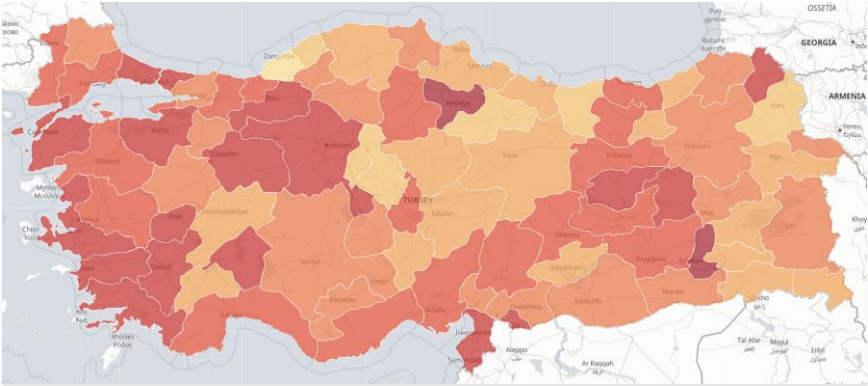|		
4G Download speed (Mb/s)	24.16 +/- 0.50	**(+69%)**
3G Download speed (Mb/s)	8.03 +/- 0.46	**(+47%)**

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MNO LATENCY BENCHMARK

As described in our <u>data collection methodology</u>, 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.

—— **95% Confidence interval**

(±X %) change from Jan 2021

Turkcell
30,035 samples

| Latency (ms) | 93 | +/- 0.26 | **(-8%)** |

Türk Telekom
28,462 samples

| Latency (ms) | 48 | +/- 0.29 | **(-54%)** |

Vodafone
33,750 samples

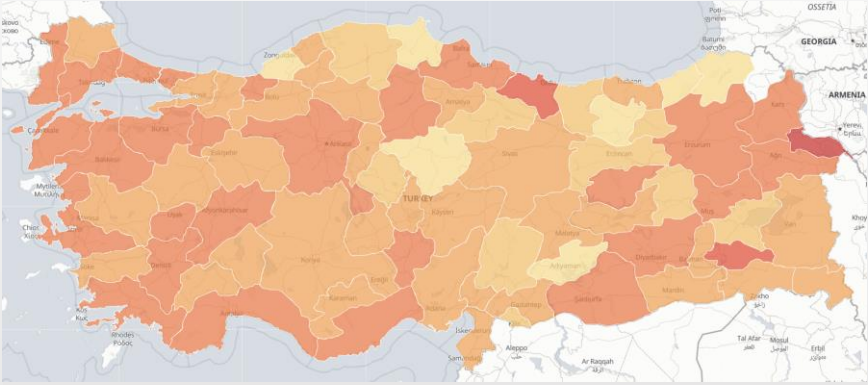| Latency (ms) | 79 | +/- 0.34 | **(-25%)** |

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REGIONAL COMPARISON OF MNO DOWNLOAD SPEED PERFORMANCE

Avg. Download mbit/s
- 0 - 10
- 10 - 20
- 20 - 25
- 25 - 30
- 30 - 35
- 35 - 40
- 40 - 50
- 50 - 75

Turkcell
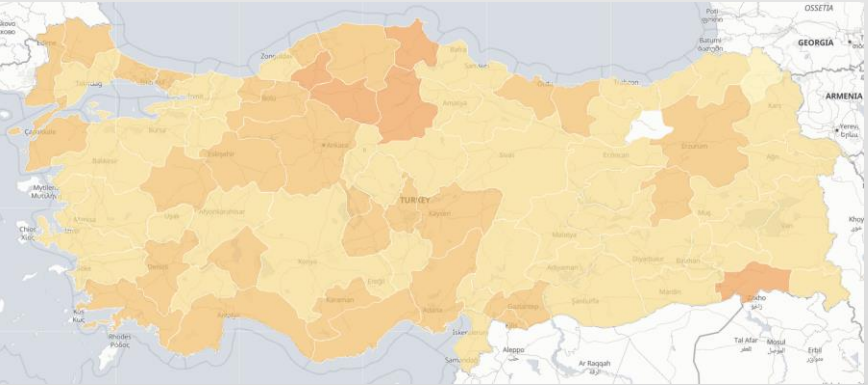

Avg. Download mbit/s
- 0 - 10
- 10 - 20
- 20 - 25
- 25 - 30
- 30 - 35
- 35 - 40
- 40 - 50
- 50 - 75

Türk Telekom

Avg. Download mbit/s
- 0 - 10
- 10 - 20
- 20 - 25
- 25 - 30
- 30 - 35
- 35 - 40
- 40 - 50
- 50 - 75

Vodafone

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AVERAGE DOWNLOAD SPEEDS IN DIFFERENT REGIONS OF TURKEY

The following table shows the average download speeds in different regions of Turkey. The 2nd column is an average of all MNOs in a particular region.

The fastest regions are at the top of the table measured in Mb/s.

REGION	ALL OPERATORS	TURKCELL	TÜRK TELEKOM	VODAFONE	TEST COUNT #
Istanbul	35.16	45.84	32.80	24.01	27,144
Kilis	34.46	49.43	22.94	23.59	49
Ankara	33.51	42.52	33.38	21.35	6,371
Hatay	33.18	41.56	29.30	19.40	1,398
Diyarbakir	32.68	37.96	34.22	19.39	965
Bolu	32.61	44.66	27.21	21.81	339
Düzce	31.72	37.94	33.68	21.72	359
Nevsehir	30.86	37.67	28.22	24.80	256
Mugla	30.77	42.81	31.05	20.54	2,684
Izmir	30.64	44.14	30.47	19.59	6,759
Mersin	30.52	37.32	30.72	21.33	1,769
Antalya	30.52	39.97	30.83	21.09	4,741
Usak	30.45	43.37	30.51	15.62	307
Denizli	30.41	40.57	32.54	20.48	871
Bursa	30.33	42.49	31.00	19.20	3,523
Tunceli	30.18	41.18	33.56	15.32	72
Çorum	30.08	36.46	30.85	25.19	397
Trabzon	30.05	37.82	29.22	19.31	666
Batman	29.97	51.83	25.99	16.53	308
Elazığ	29.72	37.16	26.77	19.24	508
Çanakkale	29.70	40.39	32.32	21.65	817
Ordu	29.37	28.84	35.02	20.66	482
Isparta	28.93	47.69	29.33	20.39	512
Sakarya	28.88	35.30	28.24	19.95	1,021
Adana	28.77	36.08	29.93	20.64	1,621
Kayseri	28.58	29.21	28.97	23.06	915

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REGION	ALL OPERATORS	TURKCELL	TÜRK TELEKOM	VODAFONE	TEST COUNT #
Gaziantep	28.45	34.55	28.24	20.38	1,576
Eskisehir	28.41	41.31	25.31	20.25	924
Kocaeli	28.40	32.64	29.78	17.22	3,008
Bingöl	28.39	41.08	21.83	24.42	162
Manisa	28.26	35.62	29.75	17.82	1,072
Edirne	28.05	37.14	31.68	20.64	438
Çankiri	28.04	30.93	26.84	25.88	157
Iğdır	27.94	32.51	42.70	15.48	96
Erzurum	27.83	31.45	31.01	20.39	515
Tekirdag	27.80	36.45	34.26	17.66	1,305
Malatya	27.71	36.79	27.12	18.41	483
Artvin	27.70	33.04	14.44	17.39	134
Kütahya	27.51	30.48	29.85	22.30	281
Bayburt	27.47	27.23	22.93	38.03	44
Yalova	27.41	36.34	28.65	15.14	236
Balikesir	27.41	37.93	30.39	18.96	1,534
Aksaray	27.24	33.79	28.46	20.11	240
Karabük	27.19	31.14	25.12	25.45	150
Kirklareli	27.16	34.73	27.71	22.50	366
Sirnak	27.05	29.42	27.43	25.11	196
Sinop	26.75	30.70	18.07	25.51	136
Konya	26.74	34.90	27.58	18.81	1,565
Nigde	26.74	26.84	30.17	15.23	226
Aydin	26.72	40.05	27.95	16.57	1,245
Sivas	26.46	29.37	29.93	16.70	417
Mus	26.24	33.68	30.62	17.56	120
Gümüshane	25.89	38.82	17.38	16.32	75
Bilecik	25.60	32.20	30.88	17.41	188
Kastamonu	25.17	26.28	24.84	21.86	311
K. Maras	24.99	37.11	24.10	16.42	611
Van	24.90	34.82	26.25	15.58	570
Mardin	24.87	33.68	25.11	12.62	386
Sanliurfa	24.86	31.36	33.35	17.22	1,186
Erzincan	24.83	35.16	20.82	17.45	184

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REGION	ALL OPERATORS	TURKCELL	TÜRK TELEKOM	VODAFONE	TEST COUNT #
Burdur	24.80	29.27	29.59	18.14	156
Amasya	24.71	50.23	25.02	15.62	176
Siirt	24.70	29.75	38.79	15.20	113
Rize	24.60	26.59	19.74	18.55	262
Agri	24.29	27.91	34.22	16.95	266
Giresun	24.19	23.12	24.49	21.33	274
Karaman	24.07	31.02	26.89	20.30	141
Bartın	23.93	22.22	27.27	22.22	185
Kinkkale	23.64	24.71	29.30	18.17	73
Samsun	23.18	28.91	31.82	16.45	1,177
Afyon	22.72	27.40	32.51	12.80	541
Bitlis	22.65	28.11	22.31	18.21	190
Hakkari	22.54	25.92	26.80	17.20	147
Ardahan	22.41	42.32	23.98	9.63	45
Tokat	22.25	23.90	22.27	19.54	303
Osmaniye	22.12	30.73	26.64	15.99	282
Kars	21.98	22.08	30.69	16.89	168
Adiyaman	21.75	27.51	18.94	16.83	252
Kirsehir	18.84	20.07	20.91	14.19	185
Yozgat	18.76	26.80	19.03	13.11	142
Zinguldak	17.16	18.04	15.42	13.99	383

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MNO DOWNLOAD SPEED PERFORMANCE IN ISTANBUL
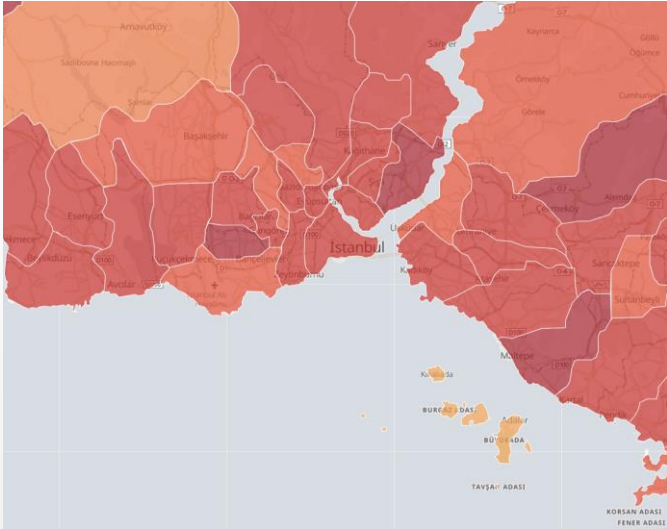
Turkcell
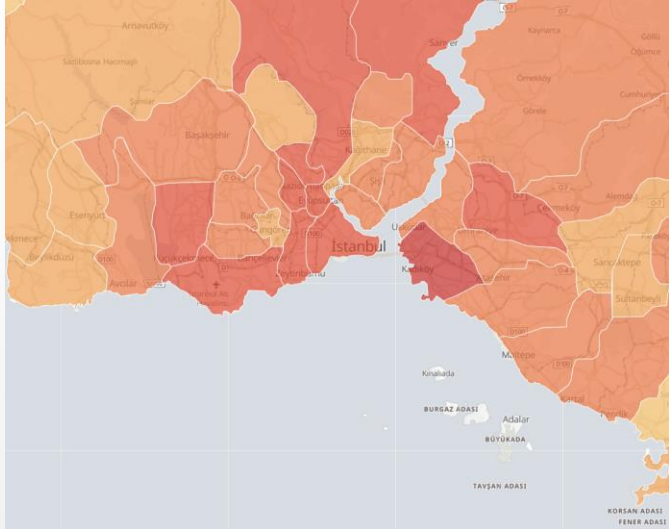
Türk Telekom

Vodafone

Avg. Download mbit/s
- 0 - 10
- 10 - 20
- 20 - 25
- 25 - 30
- 30 - 35
- 35 - 40
- 40 - 50
- 50 - 75

ARE YOU LOOKING FOR MORE DETAILED CROWDSOURCED DATA IN TURKEY?

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.

CONTACT US FOR MORE INFORMATION ✉

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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 do you require data to be within your data center for compliance purposes?

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.
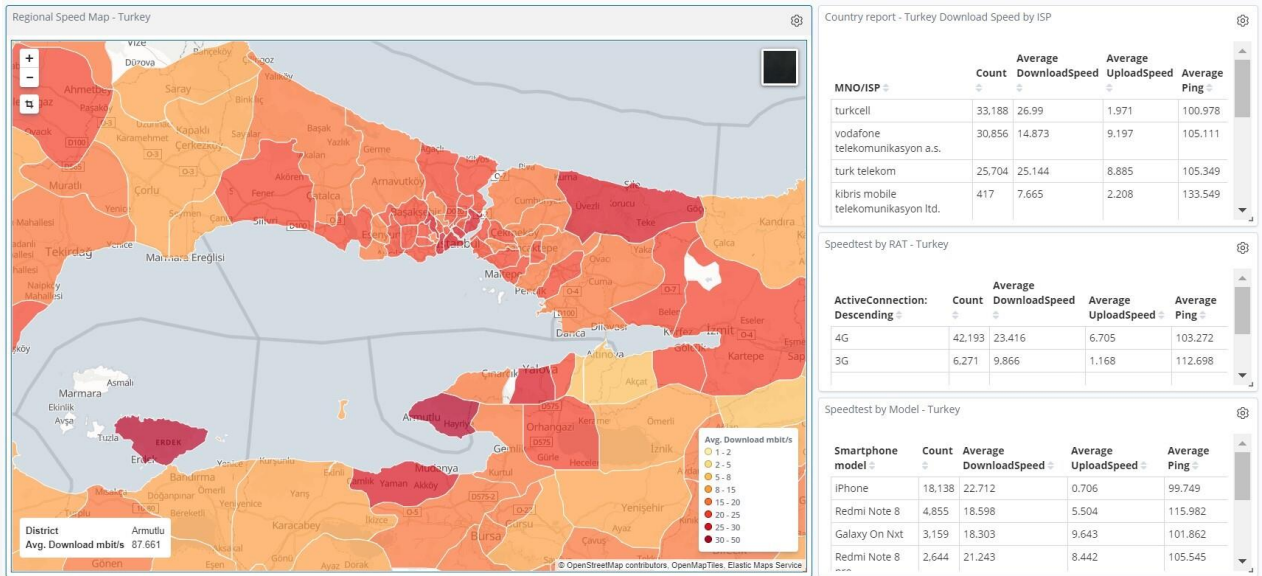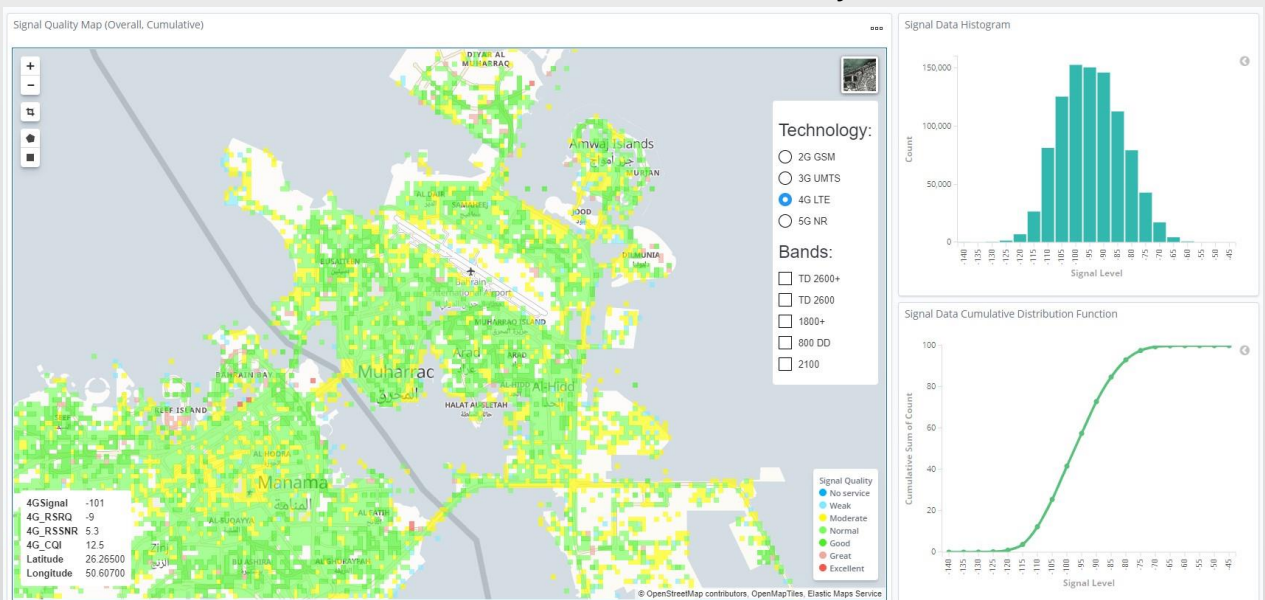

Internet Speeds

🔍 **See Full Screen image**

Basic KPIs include speed test data along with device and network information but do not contain Streaming Video, detailed Radio KPI's 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

🔍 **See Full Screen image**

- Statistical research on the 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)
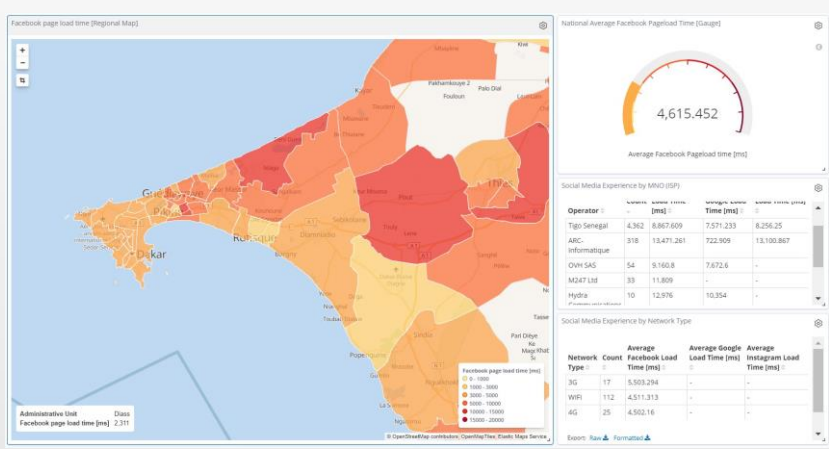- Possibility to filter by: Speed (e.g. High Speed Scenario) and Indoor

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ADVANCED *CROWDSOURCING SYSTEM*
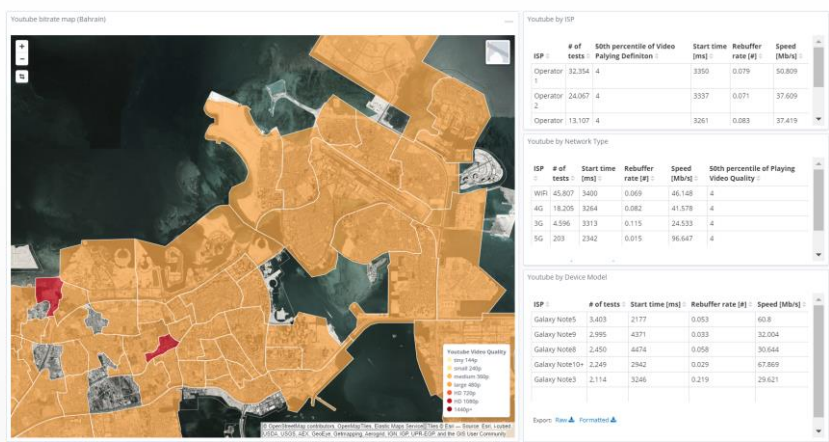
YouTube Quality

YouTube quality dashboard provides information about YouTube regional performance. It features metrics such as YouTube playing definition, buffering time, start delay.

🔍 See Full Screen image

Social Media Experience

Social media experience dashboard shows regional performance of major social media platforms such as Facebook, Google and Twitter.
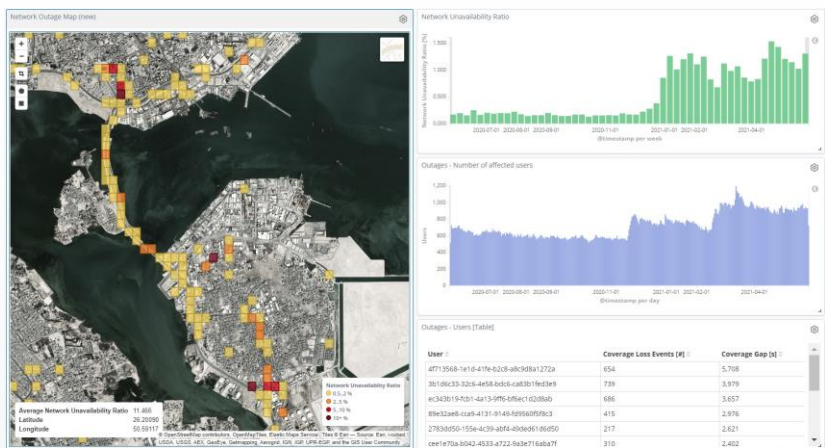
🔍 See Full Screen image

Point of Interest Performance

Reveals Internet performance in specific important locations such as Airports, Malls, Stadiums and other places located outside of drive test routes.
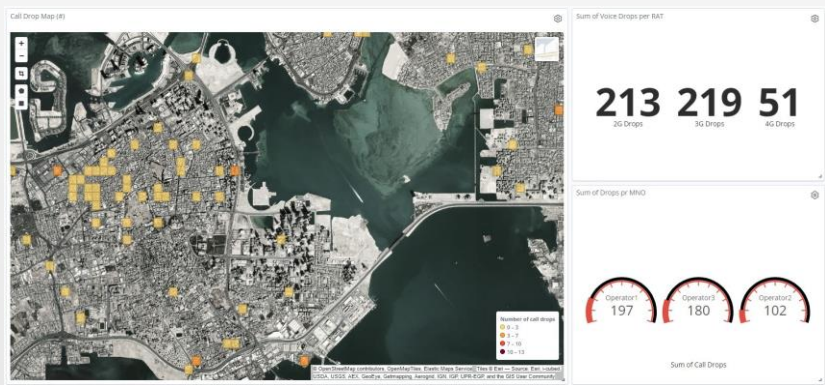
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ADVANCED CROWDSOURCING SYSTEM

Outages

Network Availability is the number one metric for any network. While OSS data provides overall information, crowdsourcing is able to spot exact locations where subscribers are not able to attach to the network.
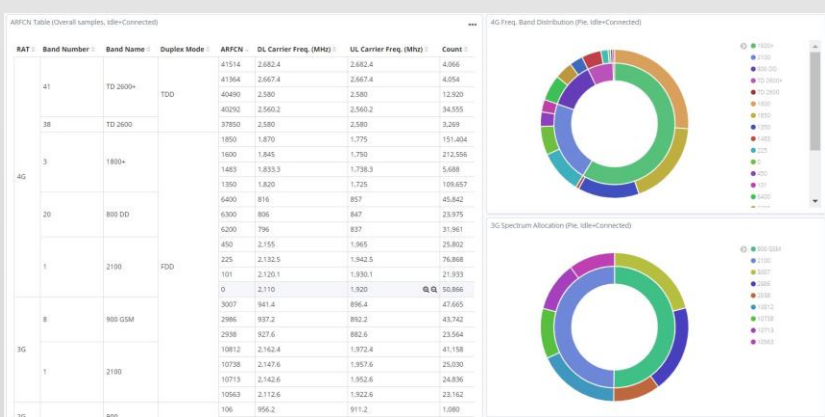
🔍 See Full Screen image

Voice Quality

The Voice Quality dashboard shows the user issues visualized on a map to spot any areas where users are making calls and their quality is not satisfactory or where calls are being dropped.

🔍 See Full Screen image

Spectrum Usage

Spectrum utilization dashboard allows the monitoring of how the available spectrum is used in various locations. It may reveal the load balancing situation or the fact that individual band are overloaded or unloaded.

🔍 See Full Screen image

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DATA COLLECTION METHODOLOGY

Our data is collected from end user devices running Android and iOS systems. All measurements are executed towards a CDN that 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 methods. Measurements are considered only from the apps that have been approved by SpeedChecker. Submitted measurements are checked to see 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.

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	#	$5 \leq p \leq 20$	$p = 10$

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