

NAVIGATE YOUR NEXT



DIAL-Malawi Use Case
Data Quality Report Ver 1 0

November 21, 2018

Data Description - Overall



MNO Data

Raw MNO Data	All 26 months of data
# records	12,900,001,208
# columns	8
% null records	0
# unique-originating numbers	23,400,290
# unique-receiving numbers	78,600,039
# unique-LAC_ID	66
# unique-Cell_ID	6,743
# voice calls	7,042,083,467
# SMS	5,851,418,367
# call forwarding	3,705,148
# roaming call forwarding	2,794,226

- ~ 58% of overall raw MNO data belong to Voice data
- ~ 41.7 % of overall raw MNO data belong to SMS data

Data Description Year-wise



MNO Data contd..

Raw MNO Data	2016	2017	2018
# records	5,004,750,666	5,960,543,159	1,934,707,383
# columns	8	8	8
% null records	0	0	0
# unique-originating numbers	12,261,549	16,762,626	8,821,575
# unique-receiving numbers	50,092,409	31,288,109	18,993,028
# unique-LAC_ID	39	54	54
# unique-Cell_ID	3,926	5,562	6,648
# voice calls	3,073,839,525	3,375,532,407	592,711,535
# SMS	1,927,785,317	2,582,155,890	1,341,477,160
# call forwarding	1,278,911	1,996,888	429,349
# roaming call forwarding	1,846,913	857,974	89,339

Data Description Month-wise



MNO Data contd..

Raw MNO Data	# records	# columns	% null records	# unique-originating numbers	# unique-receiving numbers	# unique-LAC_ID	# unique-Cell_ID	# voice calls	# SMS	# call forwarding	# roaming call forwarding
Jan, 2016	323,936,875	8	0	4,785,121	15,793,879	35	3583	185,752,766	137,916,689	75,606	191,814
Feb, 2016	385,730,387	8	0	4,817,467	17,177,527	34	3679	222,974,594	162,436,033	94,707	225,053
Mar, 2016	412,266,350	8	0	4,980,372	17,942,171	35	3703	236,905,016	175,089,224	102,225	169,885
June, 2016	652,909,493	8	0	5,864,791	22,793,445	34	3768	370,872,514	281,701,983	147,753	187,243
Jul, 2016	672,373,390	8	0	5,999,233	23,855,244	34	3,768	390,282,150	281,738,882	154,495	197,863
Aug, 2016	586,732,734	8	0	6,079,874	23,048,063	35	3,875	375,837,992	210,544,325	149,126	201,291
Sept, 2016	550,249,841	8	0	6,039,289	22,226,444	35	3,892	360,218,279	189,700,761	140,524	190,277
Oct, 2016	513,554,348	8	0	5,934,834	6,442,668	35	3,893	333,165,097	180,081,290	136,087	171,874
Nov, 2016	443,419,578	8	0	5,685,994	6,210,905	36	3,885	292,814,110	150,318,904	129,086	157,478
Dec, 2016	463,577,670	8	0	5,725,911	6,422,861	35	3,881	305,017,007	158,257,226	149,302	154,135

MNO Data contd..

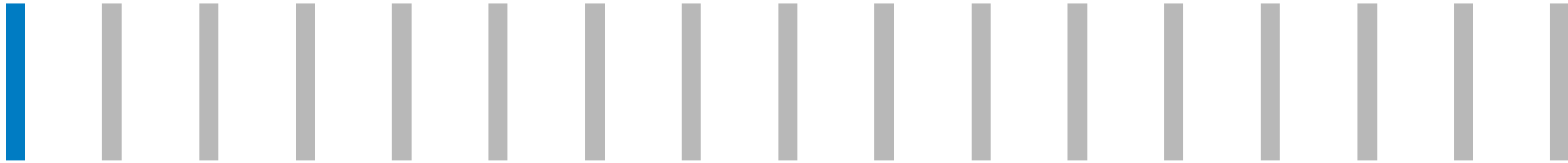
Raw MNO Data	# records	# columns	% null records	# unique-originating numbers	# unique-receiving numbers	# unique-LAC_ID	# unique-Cell_ID	# voice calls	# SMS	# call forwarding	# roaming call forwarding
Jan, 2017	439,716,325	8	0	5,566,932	6,156,940	36	3,924	264,519,630	174,944,970	129,829	121,896
Feb, 2017	384,909,720	8	0	5,292,131	5,885,408	36	3,927	232,569,143	152,115,811	118,394	106,372
Mar, 2017	268,064,328	8	0	4,714,263	5,211,958	36	3,919	157,844,474	110,056,791	85,329	77,734
Apr, 2017	427,588,149	8	0	8,206,102	9,283,430	37	3,928	259,144,651	168,179,548	146,096	117,854
May, 2017	504,766,582	8	0	5,544,577	7,242,160	39	3,949	294,852,487	209,661,122	174,662	78,311
June, 2017	541,341,013	8	0	5,763,144	7,895,264	43	3,976	324,627,904	216,479,882	180,092	53,135
Jul, 2017	564,081,466	8	0	6,059,911	8,338,467	44	4,055	346,730,386	217,091,123	202,173	57,784
Aug, 2017	606,182,211	8	0	6,231,181	9,017,117	49	4,712	353,058,947	252,847,465	216,425	59,374
Sept, 2017	573,481,661	8	0	6,256,191	11,316,490	47	4,919	340,107,435	233,114,318	204,694	55,214
Oct, 2017	467,926,913	8	0	5,971,543	12,400,009	46	4,949	261,704,163	206,022,161	159,010	41,579
Nov, 2017	537,942,215	8	0	5,897,482	12,745,235	46	5,093	254,078,030	283,653,440	173,145	37,600
Dec, 2017	644,542,576	8	0	6,140,839	13,373,683	46	5,471	286,295,157	357,989,259	207,039	51,121

MNO Data contd..

Raw MNO Data	# records	# columns	% null records	# unique-originating numbers	# unique-receiving numbers	# unique-LAC_ID	# unique-Cell_ID	# voice calls	# SMS	# call forwarding	# roaming call forwarding
Jan, 2018	419,895,923	8	0	4,613,336	4,679,862	47	5,660	0	419,895,923	0	0
Feb, 2018	391,321,583	8	0	4,394,259	4,456,690	44	5,861	0	391,321,583	0	0
Apr, 2018	528,330,627	8	0	5,883,703	13,344,583	45	6,372	280473231	247,617,877	193,533	45,986
May, 2018	595,159,250	8	0	6,124,474	14,061,577	45	6,581	312238304	282,641,777	235,816	43,353

- In data description month-wise the distinct cell_id count is increasing each month. More towers are getting added each month.

Other findings



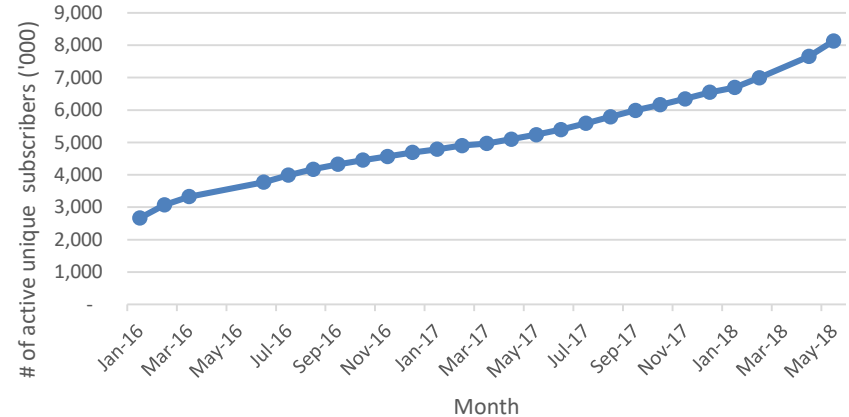
of Active Subscribers

Mobile cellular subscriptions

Mobile cellular telephone subscriptions are subscriptions to a public mobile telephone service that provide access to the PSTN using cellular technology. The indicator includes (and is split into) the number of postpaid subscriptions, and the number of active prepaid accounts (i.e. that have been used during the last three months). The indicator applies to all mobile cellular subscriptions that offer voice communications. It excludes subscriptions via data cards or USB modems, subscriptions to public mobile data services, private trunked mobile radio, telepoint, radio paging and telemetry services.

- Ref-<https://data.worldbank.org/indicator/IT.CEL.SETS>
- According to world bank, if a mobile service is used for last three months, then that will be considered as active sim_id.
- For this we have considered last three months from CDR data (Feb, April and May 2018)
- We will consider only active sim_id records for our analysis.

Total # of active unique subscribers month-wise



Description	# of data points
Total records of active sim_id	11,079,312,165
Number of active unique sim_id	8,130,377
Number of inactive unique sim_id	15,269,913
Total number unique sim_id	23,400,290

Distribution of SMS and Voice records

Description	# of days	% of days
Data available for Voice only	0	0
Data available for SMS only	60	8%
Data available for Voice and SMS	686	92%

- There are 60 days (~8%) where only SMS data are present
- There are 683 days (~92%) Voice and SMS data are present

Observations

- Data is not available for the months-
 - April 2016, May 2016 and March 2018
- Cell Towers Not present in Tower Master list-
 - There are total 7,025 cell towers given in Tower master including (2G,3G and 4G)
 - There are 6,743 distinct cell_ids present in CDR / MNO data
 - Only 6,049 cell_ids of CDR / MNO are present in our tower master file. For the remaining cell id (694) not present in Tower master can be found in the attached excel file.
 - Considering these cell_ids, area covered and population covered considering 10KM boundary is ~ 85%.



**Microsoft Excel
Worksheet**

THANK YOU