

Elmayet, Reham; Serag El-din, Eman

Conference Paper

Implementing Tool 4G SON Handover Algorithm

2nd Europe - Middle East - North African Regional Conference of the International Telecommunications Society (ITS): "Leveraging Technologies For Growth", Aswan, Egypt, 18th-21st February, 2019

Provided in Cooperation with:

International Telecommunications Society (ITS)

Suggested Citation: Elmayet, Reham; Serag El-din, Eman (2019) : Implementing Tool 4G SON Handover Algorithm, 2nd Europe - Middle East - North African Regional Conference of the International Telecommunications Society (ITS): "Leveraging Technologies For Growth", Aswan, Egypt, 18th-21st February, 2019, International Telecommunications Society (ITS), Calgary

This Version is available at:

<https://hdl.handle.net/10419/201756>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

Implementing Tool 4G SON Handover Algorithm

Reham Elmayet¹ and Eman Serag El-din²

^{1,2}Network Planning Department, National Telecommunication Institute, Cairo, Egypt

Emails: reh_elmayet@yahoo.com and eman.serag@nti.sci.eg

Abstract:

The objective of Mobility robustness optimization (MRO) is to dynamically improve the network performance of handover (HO) in order to provide improved end-user experience as well as increased network capacity. This is done by automatically adapting cell parameters to adjust handover boundaries based on feedback of performance indicators. The automating of this minimizes human intervention in the network management and optimization tasks. This paper targets the automation and optimization process of the 4G network by developing a tool that analyzes the data and statistics of the network cells.

Keywords: SON, Network Optimization, Handover Algorithms.

I. INTRODUCTION

Introduction

For developing to 4G mobile communication, the requirement to evolve the systems towards providing support to a broader range of telecommunication applications, including multimedia service, is increasingly achieving significance. Consequently, International Telecommunication Union (ITU) continues 4G technique as International Mobile Telecommunication-Advanced (IMT-Advanced), and defines high network convergence, data rate, ubiquitous and continuous connection as features. In turn, mobile operators now face the issue of maintaining these increasingly complicated networks composed of several Radio Access Technologies (RATs), various cell types and subscribers with a variety of Quality of Service (QoS) needs. The income of the mobile operators is,

generally, degrading simultaneously. Hence, it is significant that combining and operating novel and available network nodes need minimal manual attempts to control operating expenses (OPEX) of business expenses. Accordingly, considerable industry momentum has made currently to establish Self-Organizing Network (SON) characteristics that can control mobile network deployment, operation and management. Within the 3rd Generation Partnership Project (3GPP) Long Term Evolution (LTE) standardization, SON was among the early system needs; SON characteristics were involved in the first 3GPP LTE Release, Release 8 [1, 2]. SON operate in 3GPP has been inspired by available SON studies and the set of needs described by the operators' bond, Next Generation Mobile Network (NGN) [3]. As a technique which fulfils above specified situations, LTE –Advanced.

In order to achieve higher network performance and flexibility, while reducing capital expenditures and operational expenditures, Third Generation Partnership Project (3GPP) introduces the concept of SON. In the context of SON, LTE systems have self-organizing capabilities of automating the configuration and optimization of the wireless network by introducing functionalities of self-configuring, self-optimizing, and self-healing [2].

The concept of *SON* has picked up only after the transition from 3G to 4G started. This was because of the exponential increase in the data traffic which required a change in the way the network coverage and capacity were planned. Huge volumes of data traffic clogged up the network while not leading to proportional increase in the revenue. This required a rethink on how the network was managed so that a reduction in OPEX could be achieved. Also, the data traffic pattern is very different from the voice traffic pattern and it requires a different approach

towards network planning. A data centric network requires a large number of small base stations with small coverage area which provide high capacity that may fit inside homes/offices or are present at airports / cafes / public places etc. So, the problem arises in the backhaul connectivity and in the management of the large number of small base stations so that optimum capacity and coverage can be provided while minimizing interference from nearby cells (eNodeBs).

Because of the large number of parameters involved, the process of automating the network planning is gaining support. SON is a concept where automated processes enable a constant monitoring of service and network performance and analyses data collected from different parts of the network providing useful feedback that can be used for making decisions. SON capabilities aim to support mobile broadband business priorities and manage network complexity in a smart way. It leaves operators free to focus on providing an excellent user experience as the management of multi technology; multi-vendor network is simplified and streamlined. Figure1 shows the continuous process which is SON. Figure 2 shows how SON replaces human effort through automation.

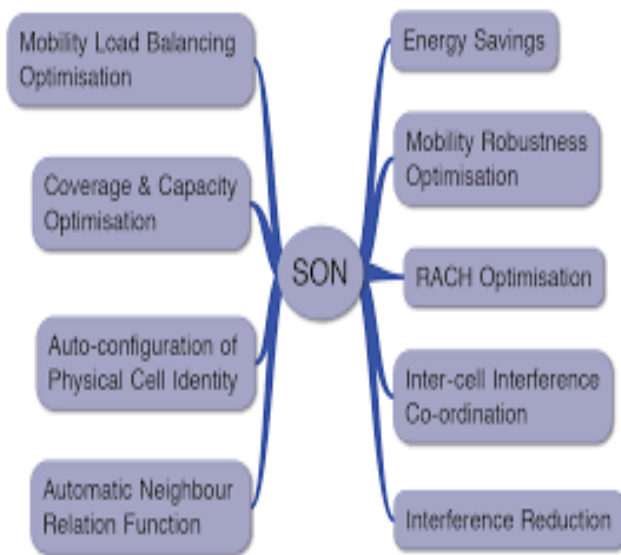


Figure 1: Self-Organization Networks (SON) Concepts

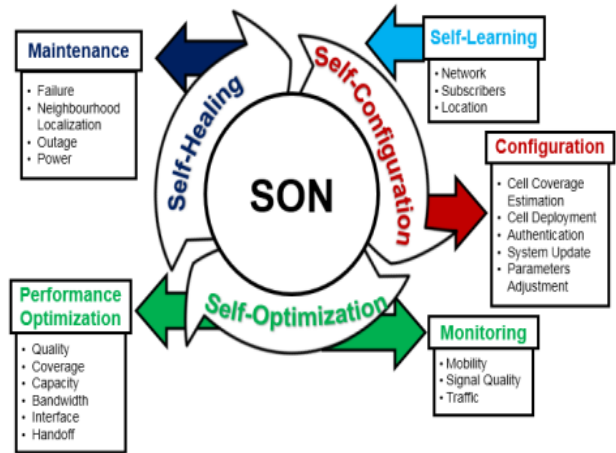


Figure 2: How SON replaces human effort through automation

II. Assessment Criteria for SONs

To assess the benefits of implementing self-organization methods in the network, a set of well-defined metrics and appropriate reference cases (benchmarks) are required. The most important metrics assess network capacity, coverage, service quality and Capital expenditures (CAPEX) and operating expenses (OPEX) represent two categories of business expenses. A set of well-defined metrics helps in the comparison of different SON algorithms with respect to each other while the presence of a reference case allows the evaluation of gains from self-organization with respect to contemporary and manually operated networks. In this section[4-5], the key performance metrics that are relevant in the assessment of self-organization methods are organized in different categories: performance metrics, coverage metrics, capacity metrics and OPEX/CAPEX.

a) Performance metrics: These include quality of service metrics, e.g., packet delay statistics, packet loss ratio, transfer time statistics, fairness, throughput statistics, mean opinion score, grade of service, e.g., call blocking ratio, call dropping ratio, which express the service level experience from the user perspective[6-7].

b) Coverage metrics: Different types of coverage metrics exist, e.g., the service coverage, i.e., the fraction of area where a given service can be supported with adequate service quality and the data rate coverage, i.e., the fraction of area where a user can experience some specified data rate[8].

c) Capacity metrics: Cell (or network) capacity is can be defined in several ways which are enumerated below: Maximum number of concurrent calls, Maximum supportable traffic load, Spectrum efficiency, the spectrum efficiency.

d) CAPEX: In general, CAPEX encompasses the investments made to create future benefits, including e.g., radio and core network elements [9].

e) OPEX: The costs associated with the network operations and, in particular, the reduction of these costs due to the introduction of self-organization functionalities, are rather difficult to access [10].

III. SON ARCHITECTURE

There are three main alternatives regarding the architecture of SON functions in cellular networks as illustrated in Figure 3. These are denoted centralized, distributed, and hybrid architectures [14]. Different SON functions can be implemented by different architectures in the same network.

We briefly describe the three different architecture options and discuss pros and cons of the different types:

a) Centralized SON Architecture: In a centralized SON architecture, the algorithms are executed at the network management level.

b) Distributed SON Architecture: In a distributed SON architecture, the SON algorithms are run in the network nodes and the nodes exchange SON related messages directly with each other.

c) Hybrid SON Architecture. Hybrid SON solution means that part of the SON algorithm is

run on the network management level and part is run in the network elements [15-18].

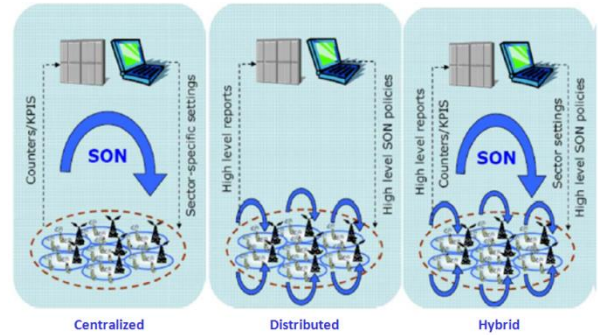


Figure 3: SON Functions in Cellular Networks

The rest of the paper is organized as follow: section IV describes the system model and the problem formulation. Section III presents SON Architecture. Then we evaluate the performance of our algorithm in section V, and the conclusion is presented in section VI.

IV. SYSTEM MODEL AND PROBLEM FORMULATION

The SON HO Optimization function is an algorithm or set of algorithms designed to improve performance of HOs from one cell to another. Performance data collected from each cell is analyzed in order to correlate HO failures that may be due to improperly configured or optimized parameters.

Adjustments can then be made to the configuration in an attempt to improve the overall HO performance of the network. Care must be taken to provide a methodical adjustment to network configuration. Assuming certain cell pair neighbors exhibit poor performance exceeding an operator-defined threshold (target key performance indices KPIs are not met), the expected flow of operation comprises the following steps:

1. Monitor the network for a sufficient period of time in order to accurately baseline the performance of all cells with respect to traffic loading, traffic type, time-of-day, etc. This may take days or weeks depending on the amount of user traffic in the cells.
2. Output from algorithms suggests changes to the network that should provide overall increase in successful HO across the network. These changes or subset of changes are then made to the network
3. The network is monitored for a sufficient period of time in order to accurately compare the performance of the network with respect to the baseline in Step 1
4. Keep track of attempted changes and repeat this iterative process as necessary until the target KPI thresholds are met
5. Update centralized data base with “final” outputs.

This research targets the automation and optimization process of the 4G network by *developing a tool by using C and Java languages that analyzes the data and statistics of the network cells.*

V. PERFORMANCE EVALUATION

Our SON tool targets two major issues regarding Mobile Communication problems

MOBILITY ROBUSTNESS:

- 1) Early Handover
- 2) Delayed Handover
- 3) Ping Pong Handover

Different areas have different problems regarding Mobility Robustness, We've set three main areas in order to target each problem, Dense (Down Town Cairo), Sub Urban (Suez Road) and Ruler (Desert Road)

Monitor the counters and make decisions accordingly through Increasing/Decreasing certain parameters such as A3 Offset and Hysteresis Dense areas are known to have high Early Handover percentage as well as Ping Pong Handover percentage.

$$\text{Early Handover \%} = \frac{\text{LLHONCellHoTooearly}}{\text{LHHNOCeIlExectAttOut}}$$

$$\text{Ping Pong Handover \%} = \frac{\text{LLHONCellPingPongHO}}{\text{LHHNOCeIlExectAttOut}}$$

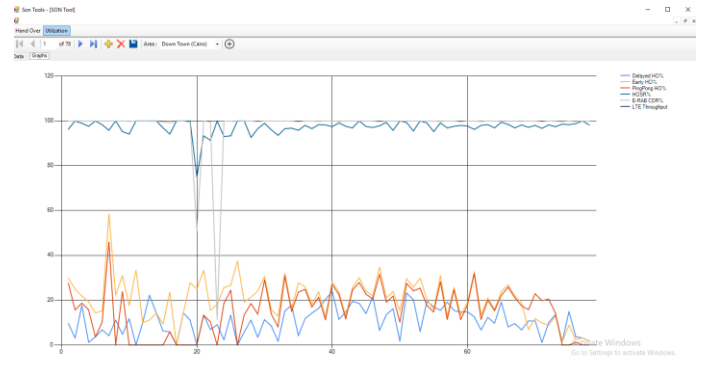


Figure 4: Early Handover and Ping Pong handover

As shown in the figure both Early Handover and Ping Pong handover are about 35% which causes major issues regarding the quality of the voice and/or data sessions.

Our target is to reduce Early Handover and Ping Pong handover to 20% through increasing A3 Offset and Hysteresis which was successfully accomplished.

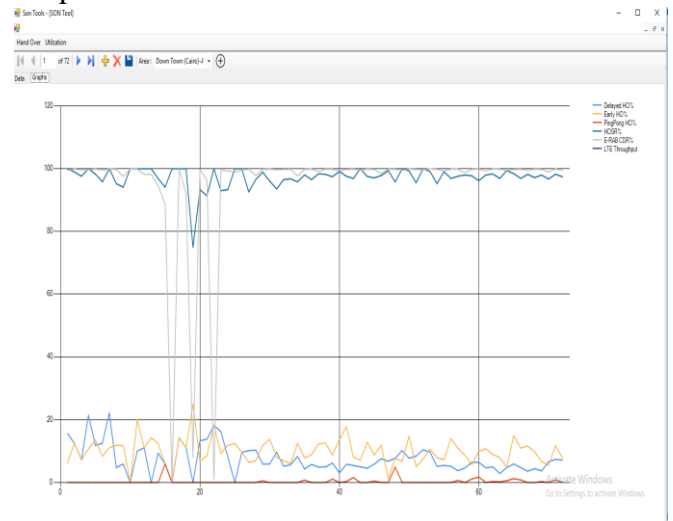


Figure 5: High Delayed Handover percentage

Ruler areas are known to have high Delayed Handover percentage.

$$\text{Delayed Handover \%} = \frac{\text{LLHONCellHoToolate}}{\text{LHHNOCellexectAttOut}}$$

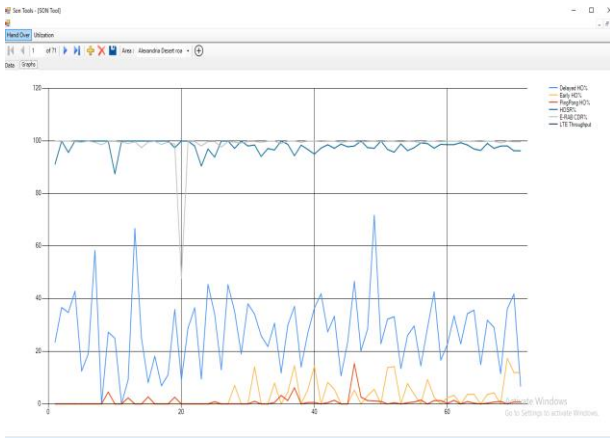


Figure 6: Delayed Handover Major

As shown in the figure Delayed Handover is about 40% which causes major issues regarding the quality of the voice and/or data sessions

Our target is to reduce Delayed Handover 20% through Decreasing A3 Offset. Which was successfully accomplished

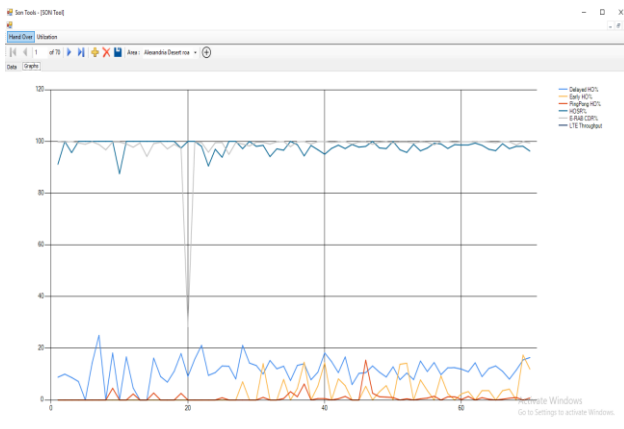


Figure 8: Sub Urban areas Delayed Handover percentage

Sub Urban areas are known to have mid-high Delayed Handover percentage

$$\text{Delayed Handover \%} = \frac{\text{LLHONCellHoToolate}}{\text{LHHNOCellexectAttOut}}$$

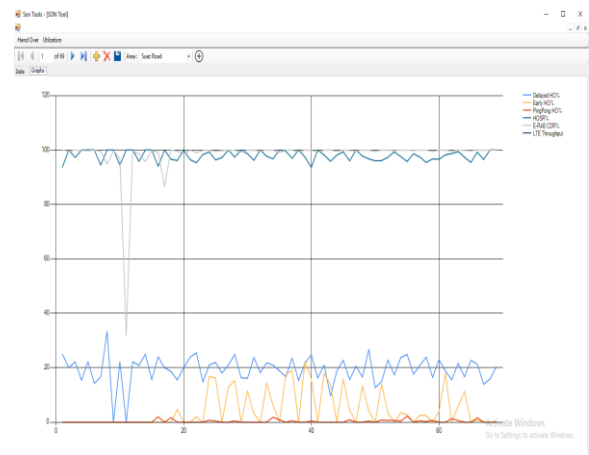


Figure 7: SON Sub Urban areas Delay Handover

As shown in the figure Delayed Handover is about 25% which causes major issues regarding the quality of the voice and/or data sessions

Our target is to reduce Delayed Handover 15% through Decreasing A3 Offset which was successfully accomplished.

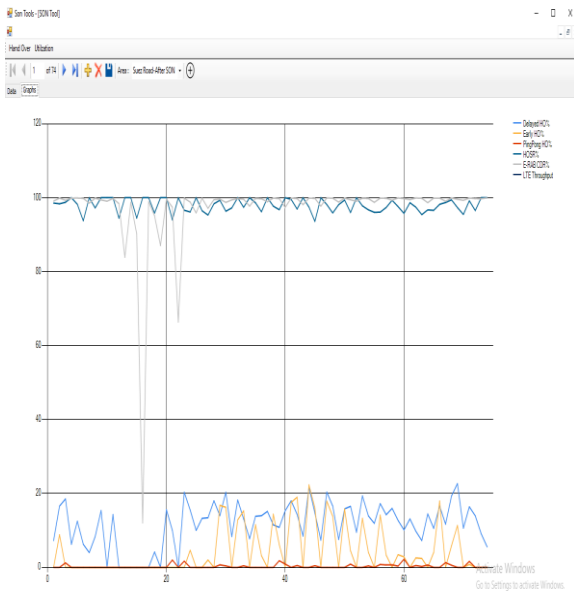


Figure 9: SON reduce Delayed Handover 15%.

VI. CONCLUSION

In this paper, Our goal is to monitor the counters and make decisions accordingly through Increasing/Decreasing certain parameters such as A3 Offset and Hysteresis Dense areas are known to have high Early Handover percentage as well as high Ping Pong Handover percentage

REFERENCES

- [1] T. Cisco, "Global mobile data traffic forecast update, 2014–2019 white paper," *Cisco Public Information*, Feb. 2015.
- [2] 3GPP, Overview of 3GPP Release 8 V0.3.3, September 2008.
- [3] Self-Optimisation and self-ConfiguRATion in wirelEssnetworkS. [Online]. Available: <http://www.fp7-socrates.org/>
- [4] SEMAFOUR. Self-Management for Unified Heterogeneous Radio Access Networks.[Online]. Available: <http://fp7-semafour.eu/>
- [5] SESAME. Small Cells Coordination for Multi-tenancy and Edge services. [Online]. Available: <https://5g-ppp.eu/sesame/>

- [6] SELFNET. Framework for Self-Organised Network Management in Virtualised and Software Defined Networks. [Online]. Available: <http://www.cognet.5g-ppp.eu/cognet-in-5gpp/>
- [7] COGNET. Cognitive Networks.[Online]. Available: <https://5g-ppp.eu/>
- [8] O. Aliu, A. Imran, M. Imran, B. Evans, "A Survey of Self Organization in Future Cellular Networks," *IEEE Communications Surveys & Tutorials*, no. 99, pp. 1–26, 2012.
- [9] Sistelbanda. SN4G SON.[Online]. Available: <http://sistelbanda.es/>
- [10] Qualcomm. Self managing and enabling seamless roaming.[Online]. Available: <https://www.qualcomm.com/videos/qualcomm-wi-fi-son>
- [11] Huawei. Huawei's Innovative Single SON Solution.[Online]. Available: <http://www1.huawei.com/en/solutions/broader-smarter/>
- [12] A. communications. Powering 4G networks.[Online]. Available: <http://www.airhopcomm.com>
- [13] Cellwize. Driving value through SON.[Online]. Available: <http://www.cellwize.com>
- [14] AVIAT. Wireless products for small cell applications.[Online]. Available: <https://startupgenome.co/aviat-networks>
- [15] S. C. Forum. Small cell industry award.[Online]. Available: <http://www.smallcellforum.org/events/awards>
- [16] 3GPP, "Technical Specification Group Services and System Aspects; Telecommunication Management; Self-Organizing Networks (SON); Concepts and requirements (Release 13)," 3GPP, TS 32.500, v13.0.0, 2016.
- [17] A. Imran, A. Zoha, A. Abu-Dayya, "Challenges in 5G: How to Empower SON with Big Data for Enabling 5G," *IEEE Network*, vol. 28, no. 6, pp. 27–33, 2014.
- [18] NOKIA, "Intelligent Self-Organizing Networks: Increased automation for higher network performance with lower costs," White paper, 2013.

- [19] N. Baldo, L. Giupponi, J. Manges-Bafalluy, “Big Data Empowered Self Organized Networks,” 20th IEEE European Wireless, 2014.
- [20] B. Romanous, N. Bitar, A. Imran, H. Refai, “Network Densification: Challenges and Opportunities in enabling 5G,” 20th IEEE International Workshop on Computer Aided Modelling and Design of Communication Links and Networks (CAMAD, Special Session: Dense and Elastic Big Data Empowered SON, pp. 129–134, 2015.

ANNEX

Our SON tool targets two major issues regarding Mobile Communication problem is Most problems associated with HO failures or sub-optimal behavior can ultimately be categorized as either too-early or too-late triggering of the handover, provided the required fundamental network RF coverage exists. Thus, poor HO-related performance can generally be categorized by the following events:

- Late HO triggering
- Early HO triggering
- Ping Pong Handover

Different areas have different problems regarding Mobility Robustness, We've set three main areas in order to target each problem, Dense (Down Town Cairo), Sub Urban (Suez Road) and Ruler (Desert Road)

Date	Hour	NCell	NE_Name	LHONCellExecAttOut_(Nor	LHONCellExecSuccOut_(	LHONCellHoTooearly_(	LHONCellHoToolate_(No	LHONCellPingPongHo	LThrbitsDL_(bit)	LThrbitsDLLastTTI	LE-RABAbnormRel_	LThrpTimeDLRmvLz	ID
27/03/2018	12:00 ص	LUPP5005_5005...	LUPP5005	134	129	40	13	37	1674146680	243323080	4	75734	1
27/03/2018	12:00 ص	LUPP5005_5005...	LUPP5005	32	32	8	1	5	1186810192	248215336	4	46006	2
27/03/2018	12:00 ص	LUPP5005_5005...	LUPP5005	96	95	21	17	18	5331356120	969718328	5	197578	3
27/03/2018	01:00 ص	LUPP5005_5005...	LUPP5005	83	81	16	1	13	1791821224	498347856	4	59947	4
27/03/2018	01:00 ص	LUPP5005_5005...	LUPP5005	28	28	4	1	1	1547797104	243715168	4	68053	5
27/03/2018	01:00 ص	LUPP5005_5005...	LUPP5005	59	58	9	4	6	2631659312	400152784	5	186259	6
27/03/2018	02:00 ص	LUPP5005_5005...	LUPP5005	24	23	14	1	11	1659638032	535040360	4	59013	7
27/03/2018	02:00 ص	LUPP5005_5005...	LUPP5005	9	9	2	1	0	5193049584	591498824	4	218147	8
27/03/2018	02:00 ص	LUPP5005_5005...	LUPP5005	42	40	13	2	10	2710491464	310456664	4	143467	9
27/03/2018	03:00 ص	LUPP5005_5005...	LUPP5005	17	16	3	2	0	272888896	132621096	4	8951	10
27/03/2018	03:00 ص	LUPP5005_5005...	LUPP5005	3	3	1	0	0	5199866912	142063584	4	229813	11
27/03/2018	03:00 ص	LUPP5005_5005...	LUPP5005	10	10	1	1	0	4432174016	239729512	4	241417	12
27/03/2018	04:00 ص	LUPP5005_5005...	LUPP5005	9	9	1	2	0	277616536	38485880	4	12662	13
27/03/2018	04:00 ص	LUPP5005_5005...	LUPP5005	7	7	1	1	0	249044776	15402000	4	12669	14
27/03/2018	04:00 ص	LUPP5005_5005...	LUPP5005	32	31	3	2	0	319013048	209555664	4	4046	15
27/03/2018	05:00 ص	LUPP5005_5005...	LUPP5005	17	16	4	1	1	50161192	6874640	4	1824	16
27/03/2018	05:00 ص	LUPP5005_5005...	LUPP5005	1	1	0	0	0	249044776	45645637	4	12662	17
27/03/2018	05:00 ص	LUPP5005_5005...	LUPP5005	7	7	1	1	0	3149697920	313439888	4	154172	18
27/03/2018	06:00 ص	LUPP5005_5005...	LUPP5005	18	18	5	2	0	26745752	2896672	4	2814	19
27/03/2018	06:00 ص	LUPP5005_5005...	LUPP5005	4	3	1	0	0	2994552	2305040	4	21	20
27/03/2018	06:00 ص	LUPP5005_5005...	LUPP5005	15	14	5	2	2	1743129592	240650696	4	99044	21
27/03/2018	07:00 ص	LUPP5005_5005...	LUPP5005	58	53	9	4	6	161709376	41682640	4	6221	22
27/03/2018	07:00 ص	LUPP5005_5005...	LUPP5005	11	11	2	1	0	583496	543688	4	3	23

Ruler areas are known to have high Delayed Handover percentage.

Date	Hour	NCell	NE_Name	LHONCellExecAttOut_Nor	LHONCellExecSuccOut_U	LHONCellHoTooearly_(	LHONCellHoToolate_(No	LHONCellPingPongHo_	LThrpbitsDL_(bit)	LThrpbitsDLLastTTI	LE-RABAbnormRel_	LThrpTimeDLRmVLe	ID	
29/03/2018	01:00	ص	LUPP5005_5005...	LUPP5005	68	62	0	16	0	4658962048	885205640	4	209908	148
29/03/2018	01:00	ص	LUPP5005_5005...	LUPP5005	30	30	0	11	0	5219872104	707828368	4	167745	149
29/03/2018	01:00	ص	LUPP5005_5005...	LUPP5005	46	44	0	16	0	15860683920	2733208288	5	815919	150
29/03/2018	02:00	ص	LUPP5005_5005...	LUPP5005	28	28	0	12	0	1419238912	534631632	4	62719	151
29/03/2018	02:00	ص	LUPP5005_5005...	LUPP5005	8	8	0	1	0	966358608	169233752	4	33415	152
29/03/2018	02:00	ص	LUPP5005_5005...	LUPP5005	21	21	0	4	0	9745915520	1384966728	4	306924	153
29/03/2018	03:00	ص	LUPP5005_5005...	LUPP5005	12	12	0	7	0	721767904	446653368	4	30693	154
29/03/2018	03:00	ص	LUPP5005_5005...	LUPP5005	1	1	0	0	0	165028320	33927816	4	11041	155
29/03/2018	03:00	ص	LUPP5005_5005...	LUPP5005	22	22	0	6	1	5764907584	1436635256	4	171556	156
29/03/2018	04:00	ص	LUPP5005_5005...	LUPP5005	8	7	0	2	0	2266845872	919090520	4	164754	157
29/03/2018	04:00	ص	LUPP5005_5005...	LUPP5005	12	12	0	0	0	1000426544	99108224	4	38621	158
29/03/2018	04:00	ص	LUPP5005_5005...	LUPP5005	43	43	0	4	1	794433944	340944408	4	16403	159
29/03/2018	05:00	ص	LUPP5005_5005...	LUPP5005	3	3	0	2	0	517472872	47664944	4	63232	160
29/03/2018	05:00	ص	LUPP5005_5005...	LUPP5005	4	4	0	1	0	101570248	17756896	4	6112	161
29/03/2018	05:00	ص	LUPP5005_5005...	LUPP5005	37	37	0	3	1	1362708440	254967920	4	43754	162
29/03/2018	06:00	ص	LUPP5005_5005...	LUPP5005	11	11	0	2	0	996643720	83408176	4	115965	163
29/03/2018	06:00	ص	LUPP5005_5005...	LUPP5005	29	29	0	2	0	108587264	5834376	4	12737	164
29/03/2018	06:00	ص	LUPP5005_5005...	LUPP5005	36	36	0	4	0	1036597088	361258128	4	34474	165
29/03/2018	07:00	ص	LUPP5005_5005...	LUPP5005	39	38	0	14	1	180284584	28983160	4	13836	166
29/03/2018	07:00	ص	LUPP5005_5005...	LUPP5005	11	11	0	1	0	4246376	2545704	4	153	167
29/03/2018	07:00	ص	LUPP5005_5005...	LUPP5005	38	38	0	11	0	3096526632	1041306248	4	97206	168
29/03/2018	08:00	ص	LUPP5005_5005...	LUPP5005	52	51	0	19	0	1928974352	147162184	4	91431	169
29/03/2018	08:00	ص	LUPP5005_5005...	LUPP5005	21	19	0	2	0	64682952	6488896	4	8870	170

Ruler areas are known to have high Delayed Handover percentage up to 15%

Date	Hour	NCell	NE_Name	LHONCellExecAttOut_Nor	LHONCellExecSuccOut_U	LHONCellHoTooearly_(	LHONCellHoToolate_(No	LHONCellPingPongHo_	LThrpbitsDL_(bit)	LThrpbitsDLLastTTI	LE-RABAbnormRel_	LThrpTimeDLRmVLe	ID	
28/03/2018	02:00	ص	LUPP5005_5005...	LUPP5005	32	30	0	8	0	2371449760	488204928	4	169267	79
28/03/2018	02:00	ص	LUPP5005_5005...	LUPP5005	25	25	0	5	0	599089640	171402840	4	20017	80
28/03/2018	02:00	ص	LUPP5005_5005...	LUPP5005	36	35	0	8	0	4773975616	1070336336	4	218812	81
28/03/2018	03:00	ص	LUPP5005_5005...	LUPP5005	13	13	0	2	0	1716371416	765448536	4	49852	82
28/03/2018	03:00	ص	LUPP5005_5005...	LUPP5005	9	9	0	2	0	873131576	202694576	4	31196	83
28/03/2018	03:00	ص	LUPP5005_5005...	LUPP5005	21	21	0	3	0	3787746656	878647528	4	149232	84
28/03/2018	04:00	ص	LUPP5005_5005...	LUPP5005	18	17	0	3	0	523651544	91524640	4	18462	85
28/03/2018	04:00	ص	LUPP5005_5005...	LUPP5005	3	3	0	1	0	67322128	25534152	4	1578	86
28/03/2018	04:00	ص	LUPP5005_5005...	LUPP5005	5	5	0	0	0	1079130640	515191120	4	24254	87
28/03/2018	05:00	ص	LUPP5005_5005...	LUPP5005	18	17	0	4	0	63291448	18529368	4	2794	88
28/03/2018	05:00	ص	LUPP5005_5005...	LUPP5005	2	2	0	0	0	4365464	3143576	4	42	89
28/03/2018	05:00	ص	LUPP5005_5005...	LUPP5005	9	9	0	2	0	1227959184	401608992	4	28646	90
28/03/2018	06:00	ص	LUPP5005_5005...	LUPP5005	24	23	0	5	0	93002768	17215128	4	5988	91
28/03/2018	06:00	ص	LUPP5005_5005...	LUPP5005	4	4	0	1	0	61513752	3740592	4	2077	92
28/03/2018	06:00	ص	LUPP5005_5005...	LUPP5005	32	32	0	5	0	3315862352	1031133400	4	89951	93
28/03/2018	07:00	ص	LUPP5005_5005...	LUPP5005	50	47	0	12	1	145553576	14227160	4	11718	94
28/03/2018	07:00	ص	LUPP5005_5005...	LUPP5005	5	5	0	1	0	29463720	17549544	4	616	95
28/03/2018	07:00	ص	LUPP5005_5005...	LUPP5005	59	57	0	11	1	6219225232	1402592240	4	233284	96
28/03/2018	08:00	ص	LUPP5005_5005...	LUPP5005	129	124	6	20	0	875459976	521459208	4	26174	97
28/03/2018	08:00	ص	LUPP5005_5005...	LUPP5005	10	10	0	2	0	325300400	149151080	4	7286	98
28/03/2018	08:00	ص	LUPP5005_5005...	LUPP5005	113	109	0	27	0	7088437896	1518564424	4	216495	99
28/03/2018	09:00	ص	LUPP5005_5005...	LUPP5005	149	142	3	38	0	351773296	129626376	4	10680	100
28/03/2018	09:00	ص	LUPP5005_5005...	LUPP5005	61	60	0	9	0	1653050874	107079360	4	60738	101