2G and 3G Consistency Check Tool (SPOT)

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Abstract. SPOT is a network optimization tool that performs Consistency Check for both 2G and 3G Communication systems in mobile operators providing the ability to expand and work on new technologies such as the LTE based 4G system. The network optimization tool, SPOT, is done in cooperation with Vodafone Egypt[1]. It aims at providing an automated tool that keeps hundreds of thousands of parameters under control all the time saving tons of precious working hours, saving manpower and helps engineers to automatically keep track of the network at any time. It can also operate offline which makes it easy to be used anywhere. Having this tool in hands, engineers will no longer have to go through the long process of checks to conclude the network status in any area to get the defects, "SPOT" does this whole job in a few seconds and provides a simple way to store the results on the personal computer or even share them via e-mail. The tool doesn't just spot the defect and show it to the optimizer, but rather a future update of the tool will send a detailed report to the specialized team after generating the correct script needed to fix the errors in the network providing the ability to send the script through email easily. Apart from keeping track of such a massive amount of parameters, SPOT also performs many of the network optimizers' everyday job by providing 4 different relations checks for the 2G system with just a single click, and other 8 different relations mismatches for the 3G system, and other fixed and customizable rule to prevent the errors caused by missing cell definitions and eventually improve the handover success rate and reduce the call drop rate, thus improving the GSM and CDMA network quality and the user experience. The tool is to be used by network optimizers in mobile operators on a daily basis, as it helps minimize the everyday repetitive work and keeps the system under control 24/7 spotting the errors anywhere on the system before experiencing a network failure, without the need for the dive testing process that takes time and consumes money. All results can be exported as Excel files to be sent to the proper sub-technology department responsible for taking action. The user-friendly frontend has been coded in java which makes it accessible for all kinds of computers. The tool is totally customizable giving the optimizer the space to check whichever rule he believes could better serve the network beside the built-in default settings. To conclude, simplicity and speed

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are what defining "SPOT".

1 Acknowledgements

2   Conclusion

SPOT is fully designed and maintained by 6 undergraduate students in faculty of Engineering at Cairo University, it is sponsored by Vodafone-EG, under the direct supervision of Dr. Yasmine A. Fahmy.

Huawei and Ericsson are the vendors that provide the technology for Vodafone-EG, SPOT deals with the portion of the network provided by Huawei vendor, which covers a total of 7100 GSM cells and 6700 CDMA cells, distributed over 25 BSCs and 9 RNCs, covering Ismailia government and Upper-Egypt as well as portion of Alexandria.

SPOT is a network optimization tool that mainly performs Consistency Check through multiple functionalities for both GSM 2G system and CDMA 3G system in mobile operators. SPOT is by far the only available tool that does this whole job automatically keeping hundreds of thousands of parameters under control all the time saving tons of precious working hours, saving manpower and helping engineers to automatically keep track of the network at any time. Once launched SPOT will be used on a daily basis by dozens of Engineers and optimization analysts in mobile operators.

SPOT can detect the 2G relations mismatches including Zero, Minimum, Co-sited and Bidirectional mismatches, as well as 3G relations including all the different relations of the Intra-rat (3G on 2G relations), Intra-frequency Relations (3G same Carrier) and Inter-frequency Relations (3G different Carriers).

Through SPOT, user can perform 1-to-l check for as much parameters as he wishes, to check the whole network cells for violations in the value of some parameters than the default value. It also provides some fixed rules such as External Definitions for the 2G GSM and 3G CDMA that are being used frequently by many optimizers, the matter that implied a dedicated button for such a check.

SPOT doesn't only support fixed rules, but rather users can build combined rules from their own and the tool generates the query for them and executes it showing network cells violating such rules. Thus, the tool is totally customizable giving the optimizer the space to check whichever rule he believes could better serve the network beside the built-in default settings. To make it even more flexible, the optimizer is given the space to edit the default value of the parameter in the template database table, to manage all the coming checks.

The database is updated through a simple import button that takes text or Excel files and import them directly into the database. All results can be exported as Excel files to be sent to the proper sub-technology department responsible for taking action.

To conclude, simplicity, accuracy and speed are what define "SPOT".

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