

Mobile Communication System Planning in Brazil

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Brazil's mobile communication system currently holds a unique position in the world regarding size (260 million subscribers and 58,000 radio bases). There are already more mobile terminals than people in Brazil, but there is still a projected growth boosted by sport events to be held in the very near future (The 2014 Soccer World Cup and the 2016 Summer Olympics) and also due to recent increases in the middle class purchasing power. This continuous growth is happening in a scenario full of problems for mobile carriers, who have been suffering recent interventions from the Brazilian regulatory agency (Anatel), regarding lack of capacity to serve the entire subscriber base. Present efforts are focused on implementing 4G systems. Considering this scenario, it is important to have system data and engineering tools that enable the analysis of the network as a whole, and the forecast of new service areas and their respective coverage. This paper describes data collection and the development of information systems that can help on these analyses.

The Brazilian regulatory agency on telecommunications, Anatel, holds a database that contains the country network system parameters and the subscriber count per area code. This information is available through Anatel's website (www.anatel.gov.br), but only through specific queries. Initially we developed a persistent query that downloads and organizes the whole database, with more than 1 million transmitters. Then, using a terrain clutter database for the whole country, we correlated the subscriber information to arrive at a detailed subscriber count per clutter class, on districts all over Brazil. Parallel to that, using GIS tools, we also applied census data to generate maps of purchasing power per district.

In order to process this information employing current planning tools, we have developed a plug-in that imports Anatel's system data into Mentum Planet (www.mentum.com), while plug-ins for other tools are also being planned. We have also developed an Android app that allows network data to be seen on a compatible terminal. The results from these developments can now be used by mobile carriers to: 1) make system plans considering their own data, as well as their competitors'; 2) make business and market analyses; 3) calculate mobile traffic potential; and 4) analyze network data using mobile terminals. These developments, together with several results, will be shown at the Conference.

We consider that the procedures described in this paper show a new knowledge, through a new data format, that contributes to a broader analysis extent, which is demanded in Brazil. To our knowledge, regarding the volume of data involved, there is no similar previous work to date.