Calculation of population and migration statistics based on Call Detail Records

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The processes in society have become more and more rapid. The 11-year long cycle of censuses does not suffice anymore for understanding different population processes as these might occur during the period between two censuses. Hence these phenomena are not reflected in the official statistics. Furthermore, the registries (e.g. population register) that could be used for describing the ongoing or short cycled processes (e.g. financial crisis), are suffering from inaccuracy and contain multiple errors.

In the recent past new big data sources, which are often side products of certain Information & Communication Technology (ICT) based services, have been increasingly used for studying different societal processes. Among other ICT based datasets, the CDR (Call Detail Record) data, consisting of log-files collected by mobile network operators to monitor and keep track of billable calling services used by their clients, have been successfully applied in the population mobility analysis. Such dataset that contains information about the phone call initiator (the unique and anonymous ID), time of calling activities as well as the location of the mobile antenna where the call activity was made, is an excellent source for analysing spatio-temporal behaviour of phone users.

The aim of the current study is to demonstrate how the CDR data can be used for producing population statistics on a national scale. As a result, a cost-effective methodology is developed for calculating the population size and migration statistics on the municipality level: the size of population, internal migration statistics [net migration rate, immigration rate, emigration rate.