# Simulation-based design and analysis of on-demand mobility services

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On-demand mobility services promise to transform transportation and urban living. Moving more people with fewer vehicles and fewer kilometers driven can reduce congestion and pollution, enable new levels of productivity otherwise lost in long commutes, and allow us to re-imagine cities around people instead of cars. Yet, designing such services involves an array of challenges: from demand data acquisition and analysis, to developing efficient matching and routing algorithms, to finally evaluating a variety of service configurations. This report illustrates the process of designing and analyzing various types of on-demand mobility services in the City of Chicago, Illinois. We study how different service designs respond to real travel demand patterns in terms of key performance indicators of several service and fleet efficiency metrics. Rather than giving a recipe, this type of analysis helps service providers and public transit authorities gain insights into the interplay of the different passenger- and fleet-related key performance indicators and the fundamental trade-offs between passenger service level and fleet efficiency. Furthermore, the effects on externalities associated with passenger transportation such as traffic volume, parking space, and CO2 emissions can be estimated, which is of interest to city planners and transportation authorities.