In this presentation we will give an overview of the work done at the Delft Center for Systems and Control in the field of traffic management and control. The main focus is on how model-based predictive control (MPC) can be used to obtain a balanced trade-off between reduction of total time spent, emissions, and fuel consumption in large-scale road traffic networks. We address several methods to deal with the computational complexity issues arising in model-based control of large-scale road traffic networks, such as choosing appropriate traffic flow models, using parametized control, distributed or multi-level control, and the right optimization approach. We consider in particular on multi-level, multi-agent traffic control with coordination within and across all control levels. We explain how model predictive control can be used at several levels of the control hierarchy. The proposed multi-level architecture provides a scalable approach for control of large-scale traffic networks where at different levels of the hierarchy different temporal and spatial scales are taken into account.

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