

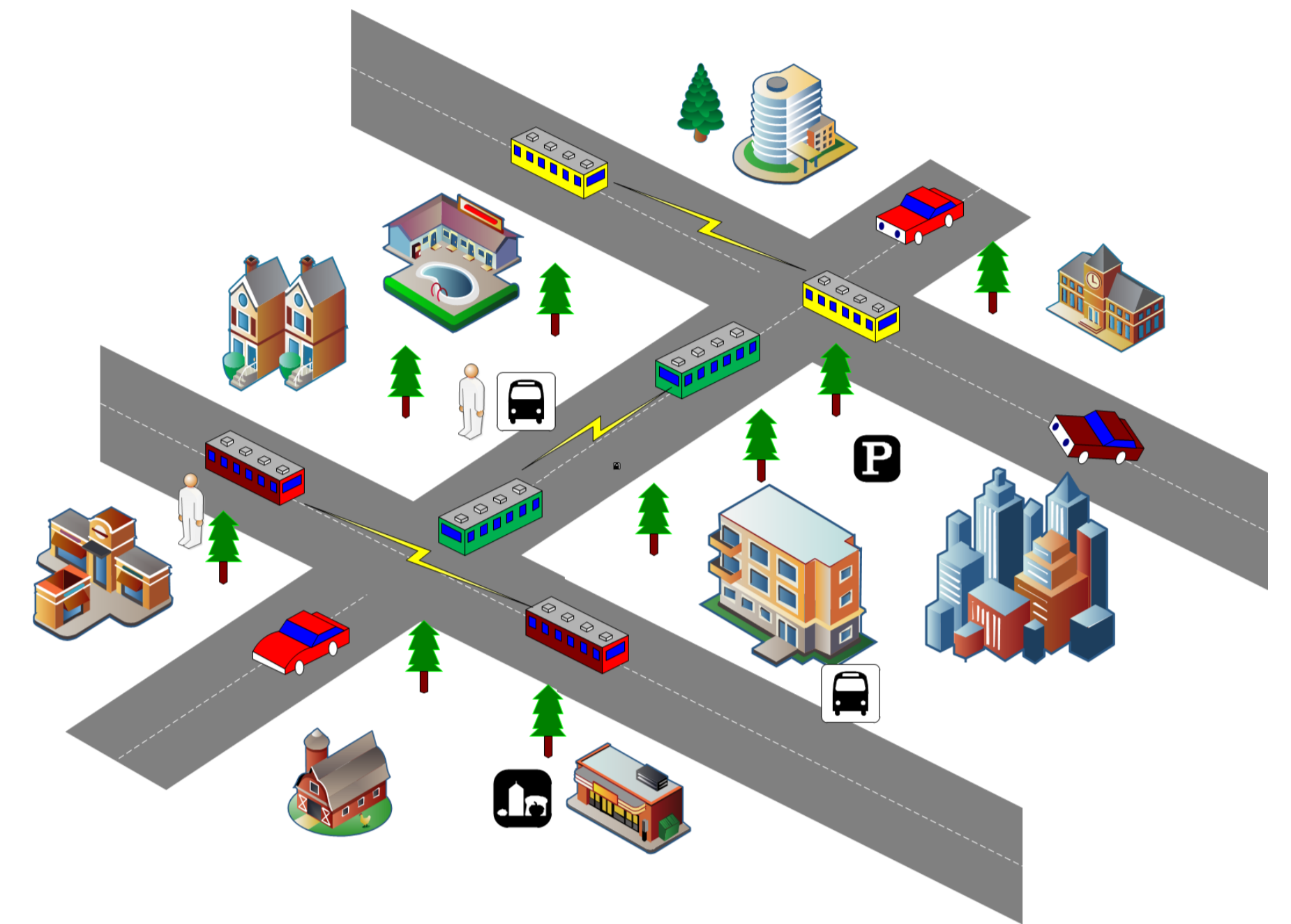
基于公交车自组织网络的数据路由机制

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CBS: Community-based Bus System as Routing Backbone for Vehicular Ad Hoc Networks, **IEEE Transactions on Mobile Computing**, 2017, Accepted
On Geocasting over Urban Bus based Networks by Mining Trajectories, **IEEE Transactions on Intelligent Transportation Systems**, 17(6), Pages: 1734-1747, 2016

Motivation

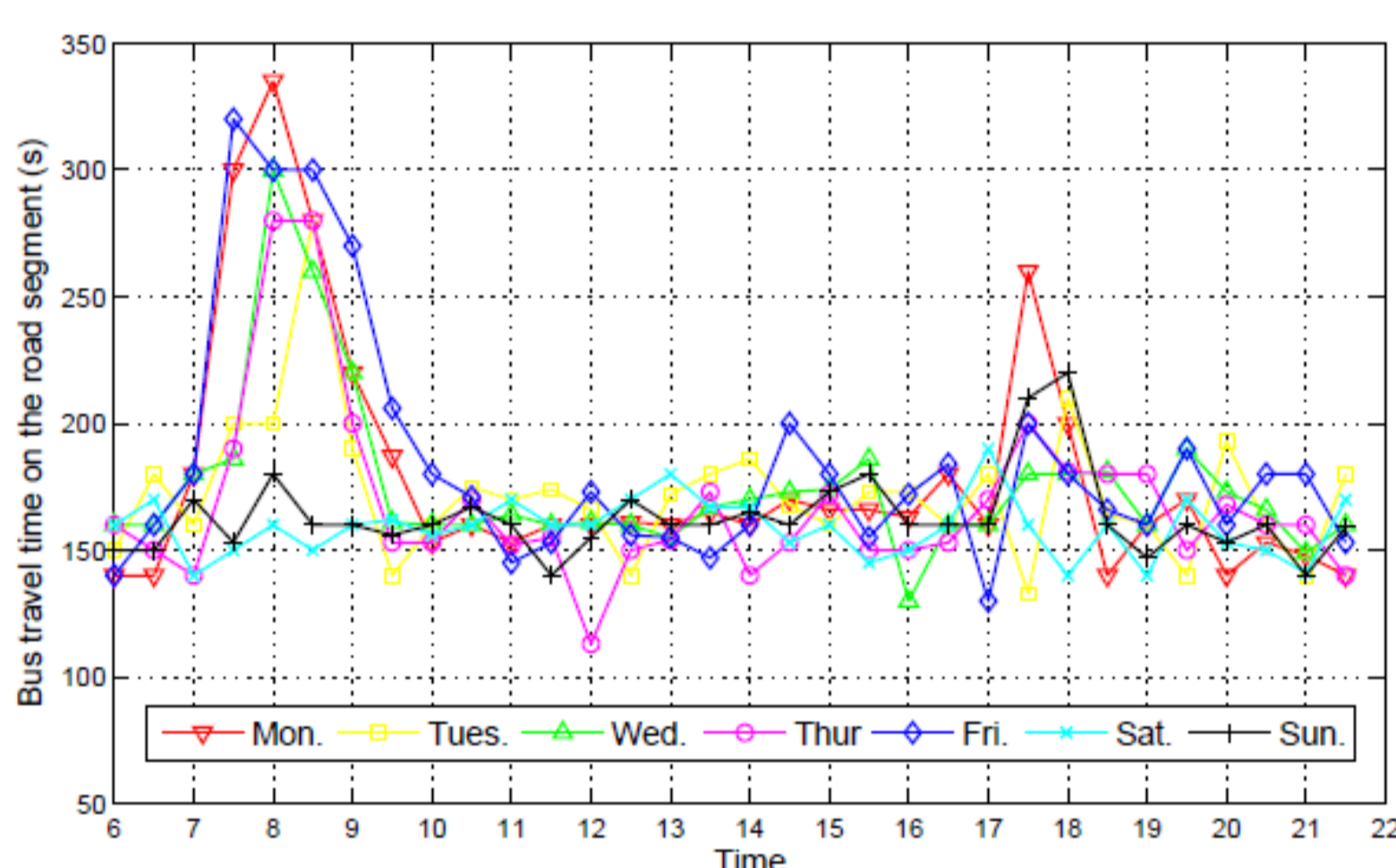
- ❑ A Vehicular Ad hoc NETWORK (VANET) consists of a set of mobile vehicles equipped with dedicated short-range communication (DSRC) devices
- ❑ A VANET can support various applications, such as emergency message delivery, geographic advertising and location-based services
- ❑ Compared with general vehicular systems, bus systems have advantages including wide coverage, fixed routes and regular services. Inspired by these unique features of the bus systems, we propose to use the bus systems as routing backbones of VANETs



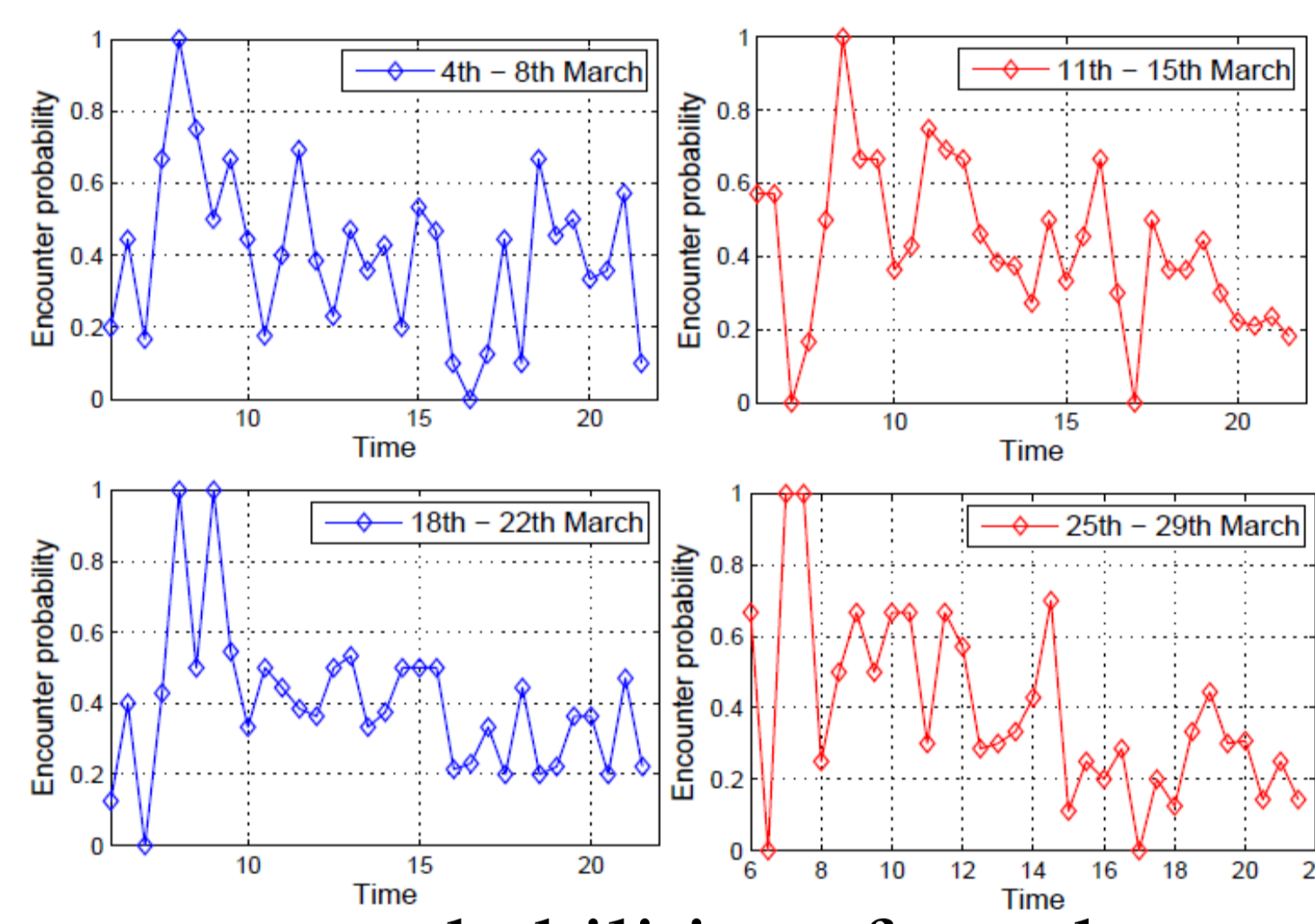
The Proposed Routing Algorithms

A geocast routing mechanism (Vela)

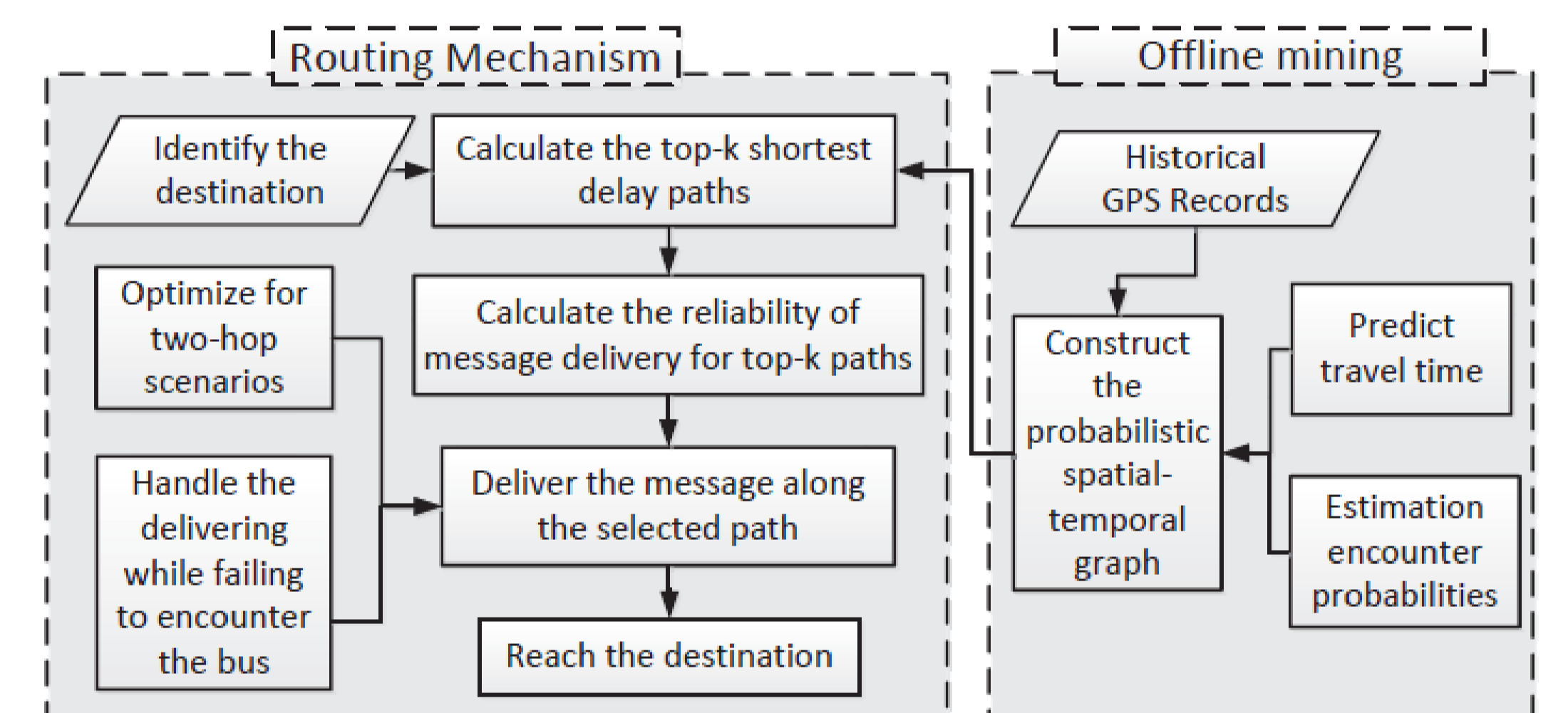
- ❑ Characterize spatial-temporal patterns (i.e., the bus travel time patterns and the bus spatial encounter patterns)
- ❑ Build a probabilistic spatial-temporal graph model and provide the available routing paths with best possible QoS levels



Travel time on the sampling road segment



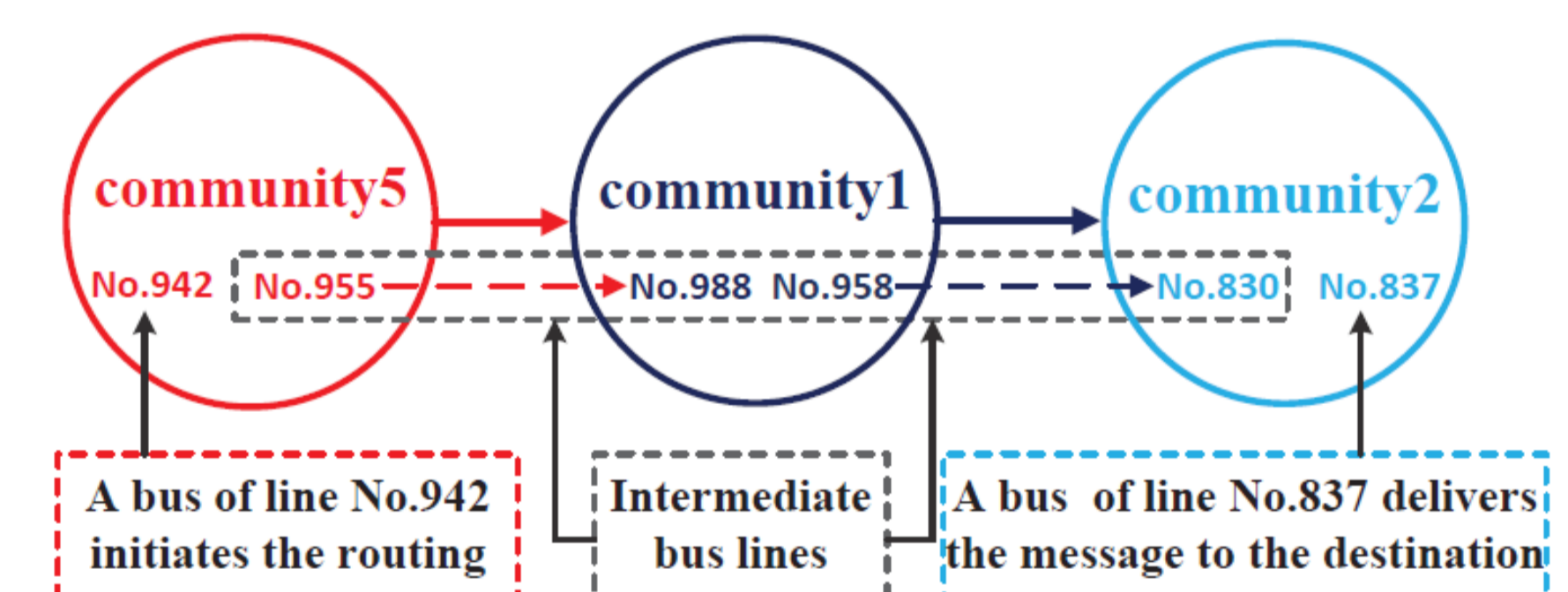
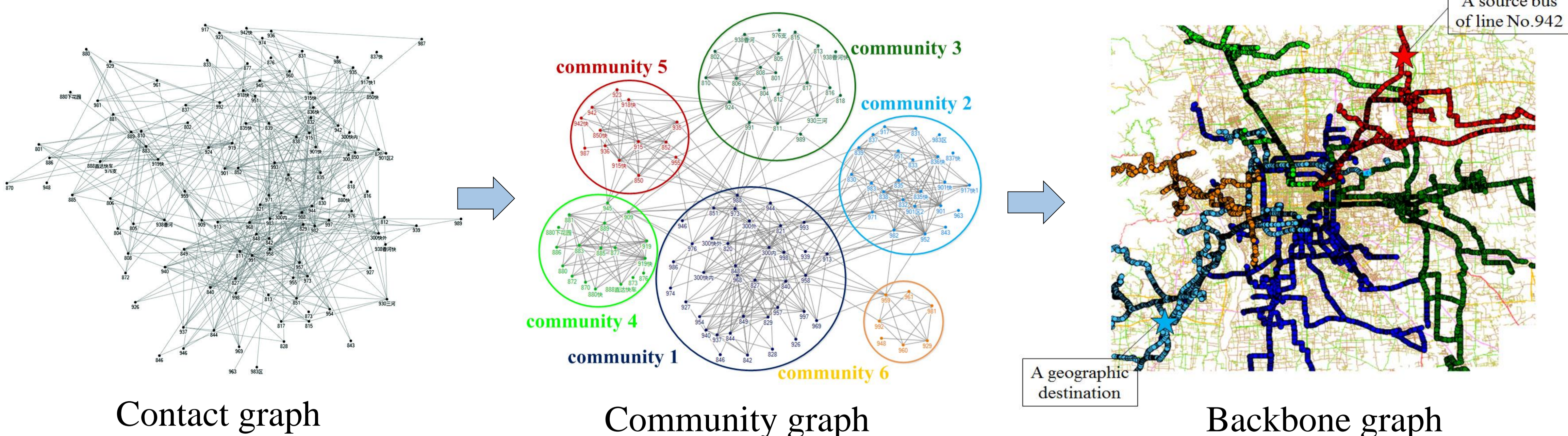
Encounter probabilities of two bus routes



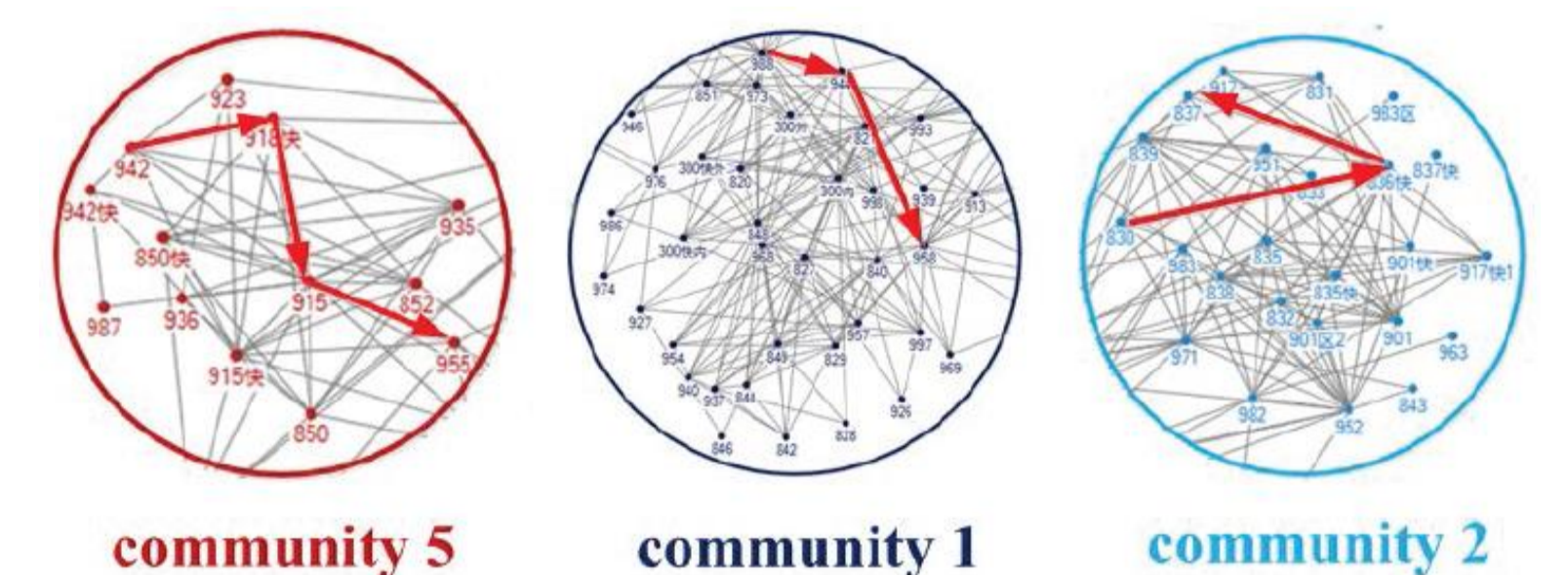
Framework of Vela

Community-based Bus System (CBS)

- ❑ Construct a community-based backbone
- ❑ Provide two level routing scheme over the backbone: inter-and intra-community levels



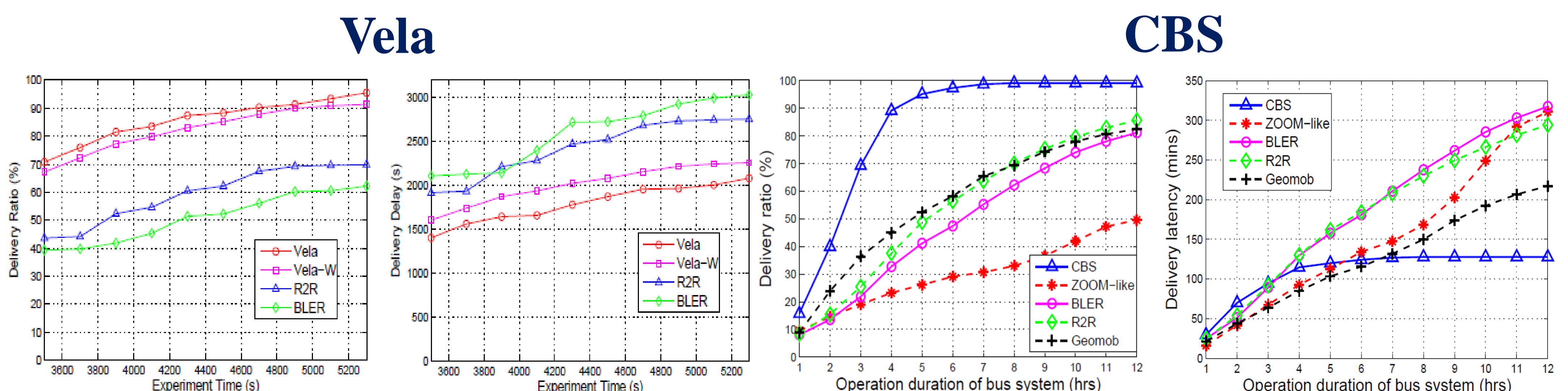
Inter-community routing



Intra-community routing

Evaluation & Results

- ❑ Vela: we use an open-source simulator NS-3 for simulation. Based on the real map of Beijing, two groups of experiments on the real-world bus trajectories and the synthetic trajectories are conducted, respectively
- ❑ CBS: we conduct extensive real trace driven simulations. CBS is compared with two routing schemes in bus-based VANETs and two routing schemes in general VANETs



Delivery ratio & delivery latency vs. operation duration of the bus system