

Towards an Effective but Socially-Conscious Congestion Pricing Strategy in the GTHA

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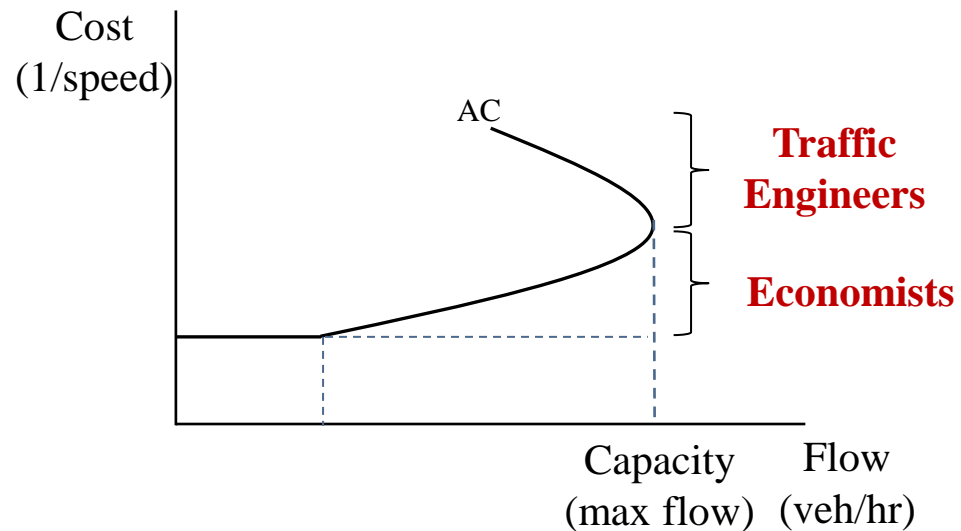
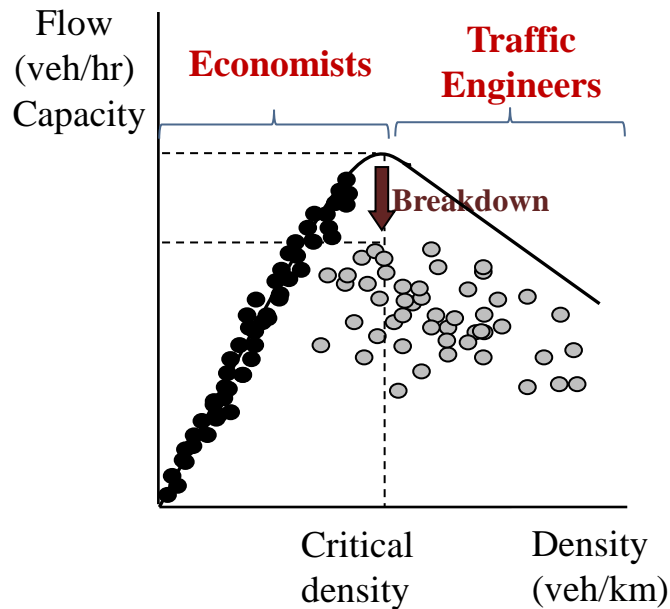
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Established Facts

- VKT is quite responsive to **price** (as opposed to transit or capacity expansions)
- Increasing ***drive alone costs*** brings greater reductions in SOV demand than increasing *SOV travel time* or *improving* times and costs of alternatives
- Policy makers should place as much emphasis on ***financial disincentives*** for auto use as they do on improving the supply of alternative modes.

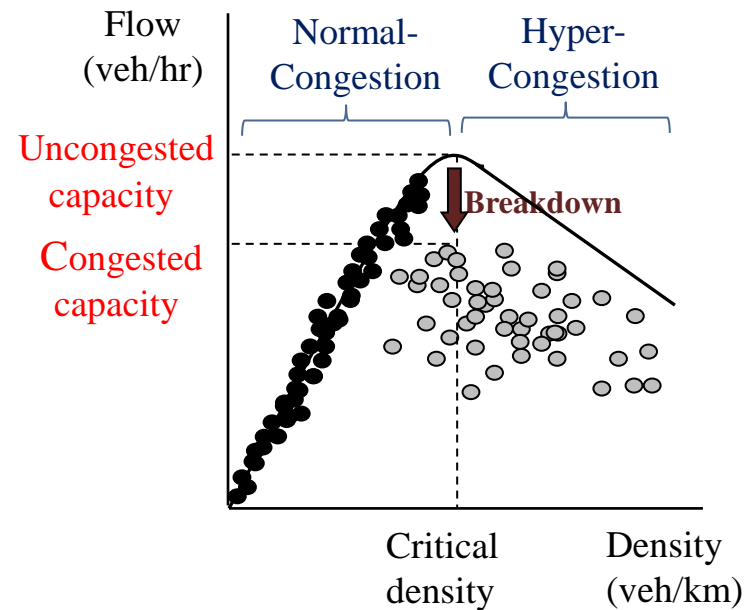
Congestion? Microeconomic and Traffic Engineering Perspectives

- Economists: performance of the system (e.g. travel time) **rises** with the intensity of use (e.g. flow levels)
- Traffic engineers: traffic density exceeds the **critical density**, resulting in traffic **breakdown**

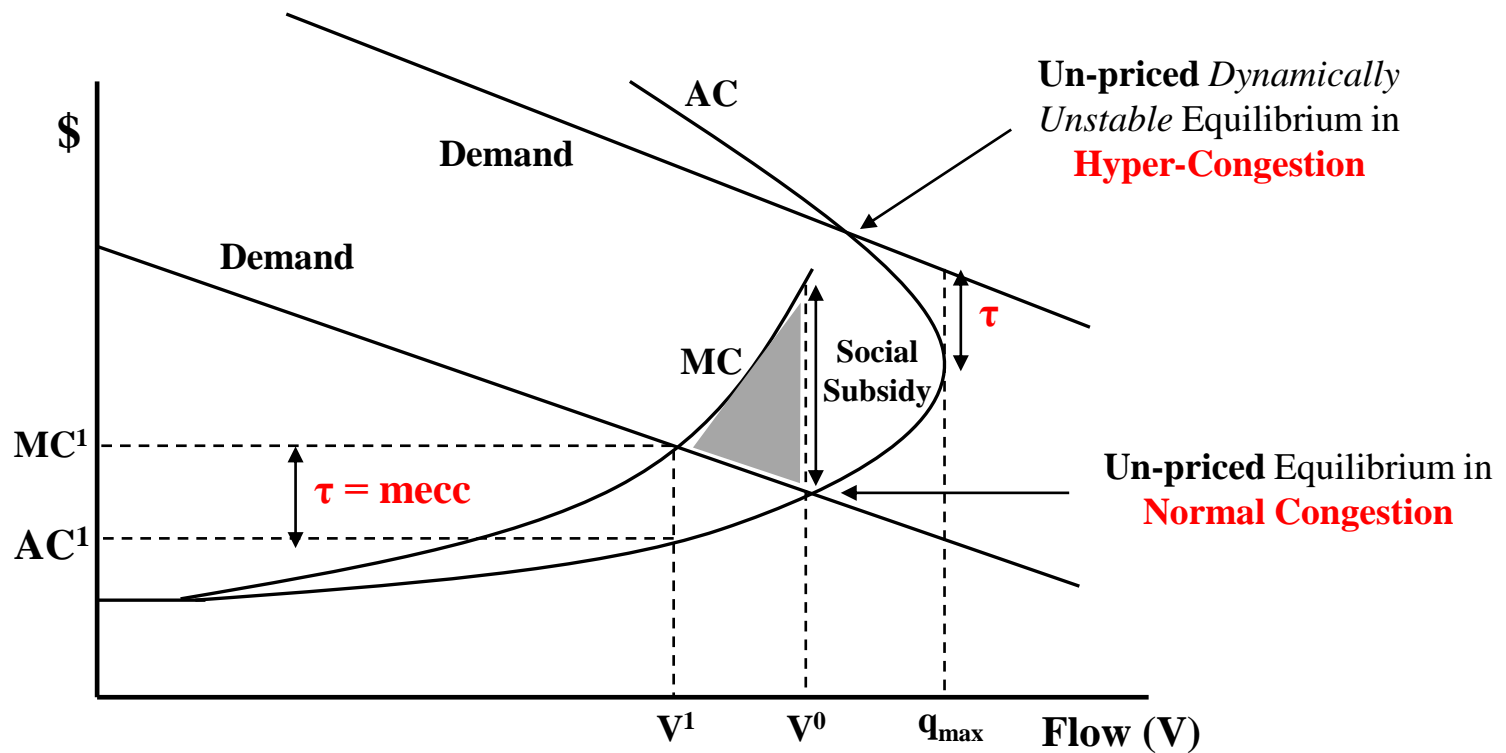


Normal-Congestion Vs. Hyper-Congestion

- What is “congestion” for traffic engineers is termed “**hyper-congestion**” for economists.
- Hyper-congestion causes a significant **drop** in capacity (notable at the critical density in the figure). Thus, eliminating hyper-congestion allows the sustenance of the original capacity.

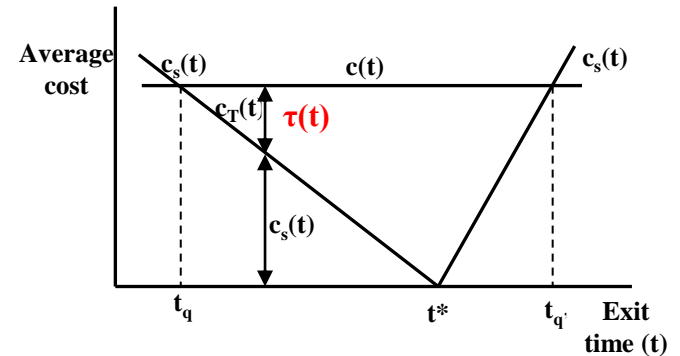
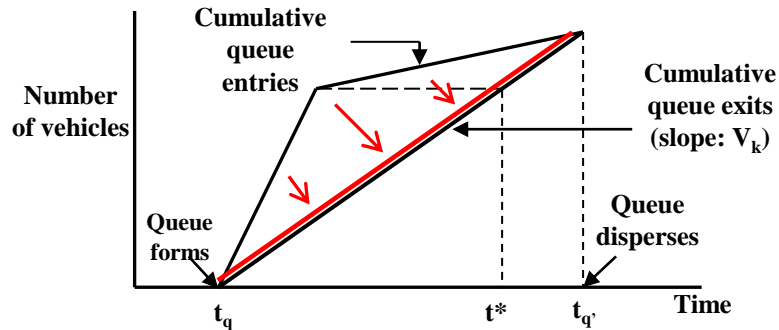


First-best Pricing with **Static** Congestion



Dynamic Hyper-Congestion Pricing

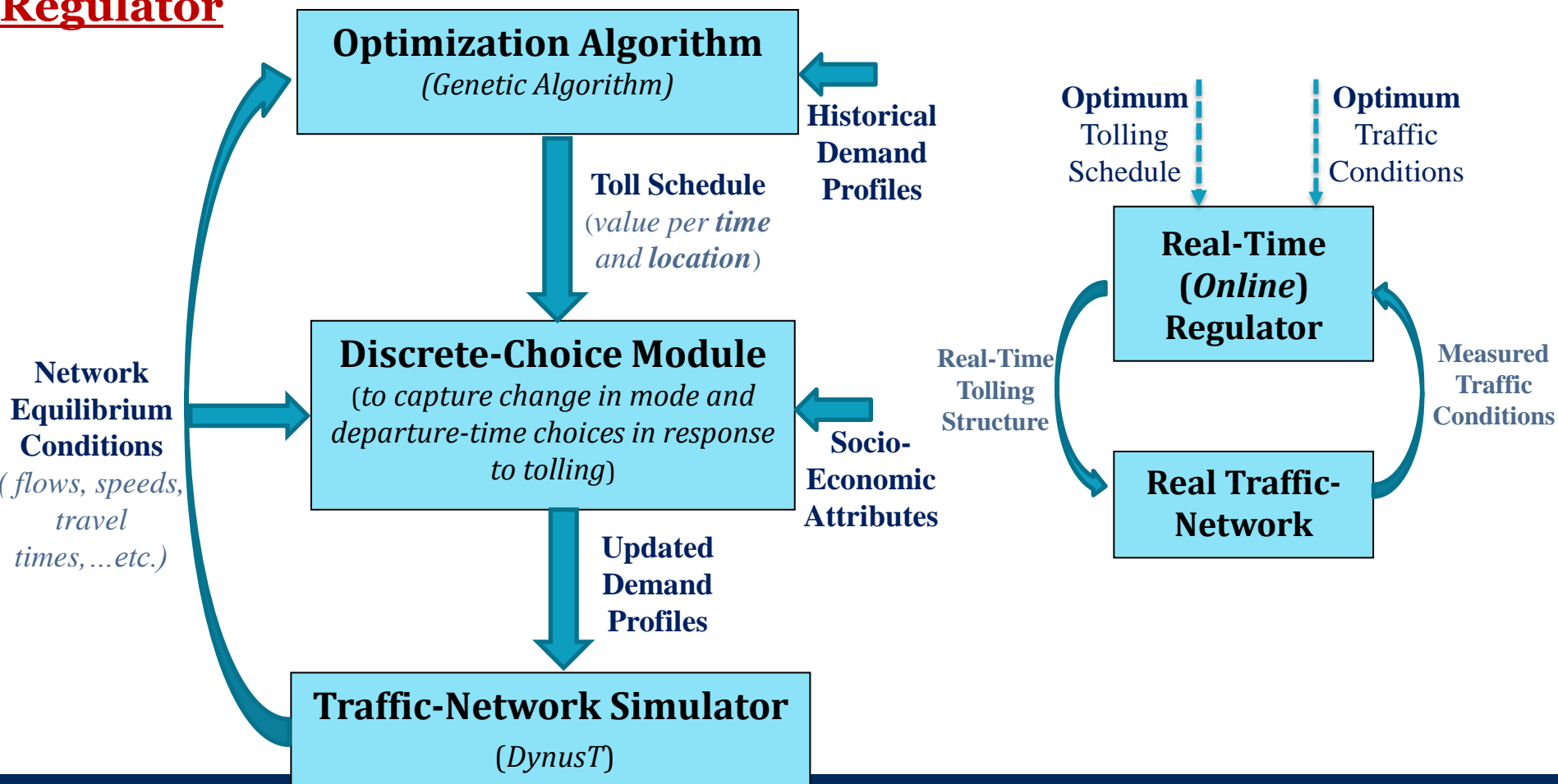
The Basic Bottleneck Model



Dynamic Pricing System (Aboudina and Abdulhai)

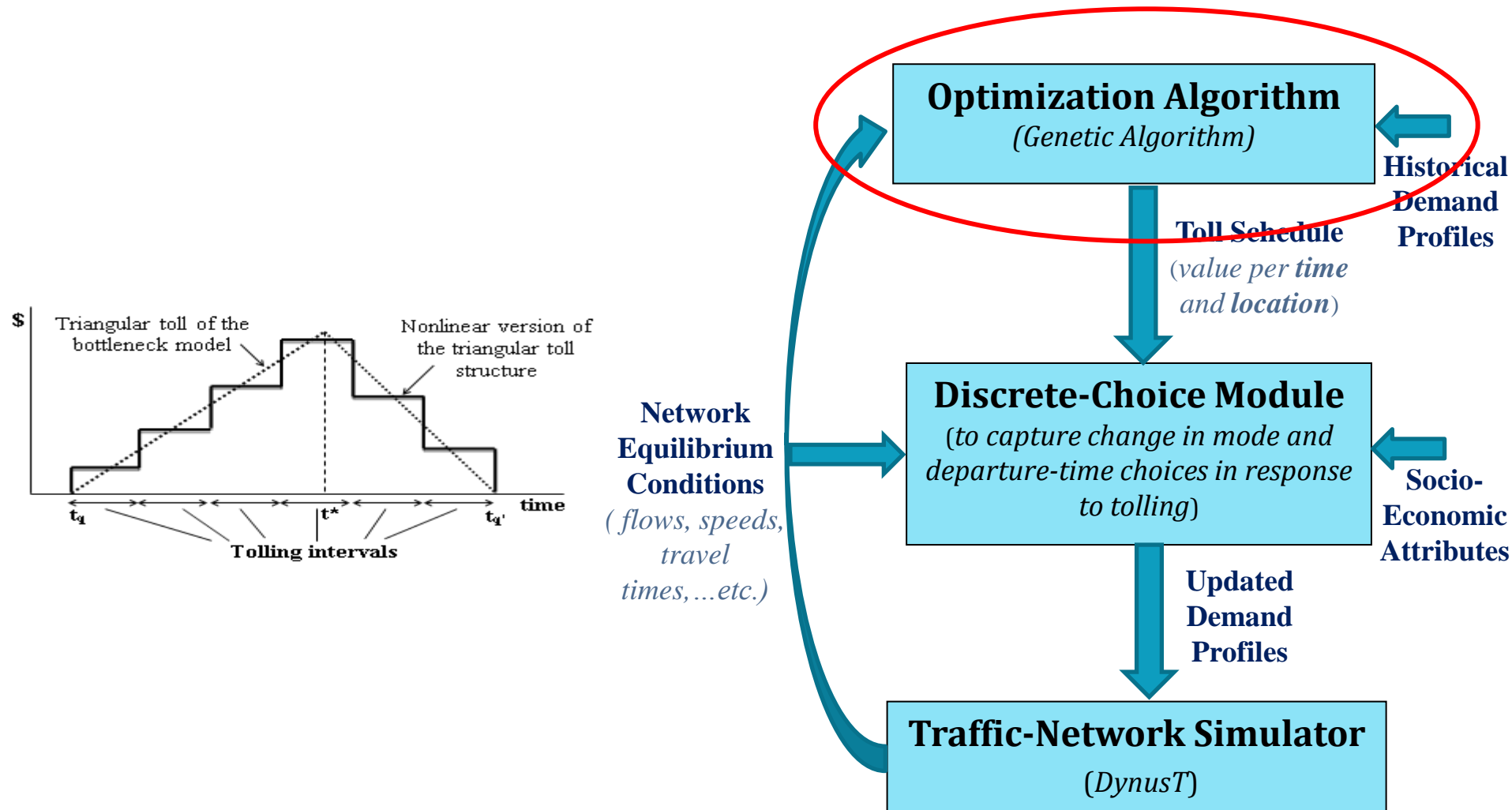
Offline (Open-Loop) Toll Optimizer Regulator

Online (Closed-Loop) Toll



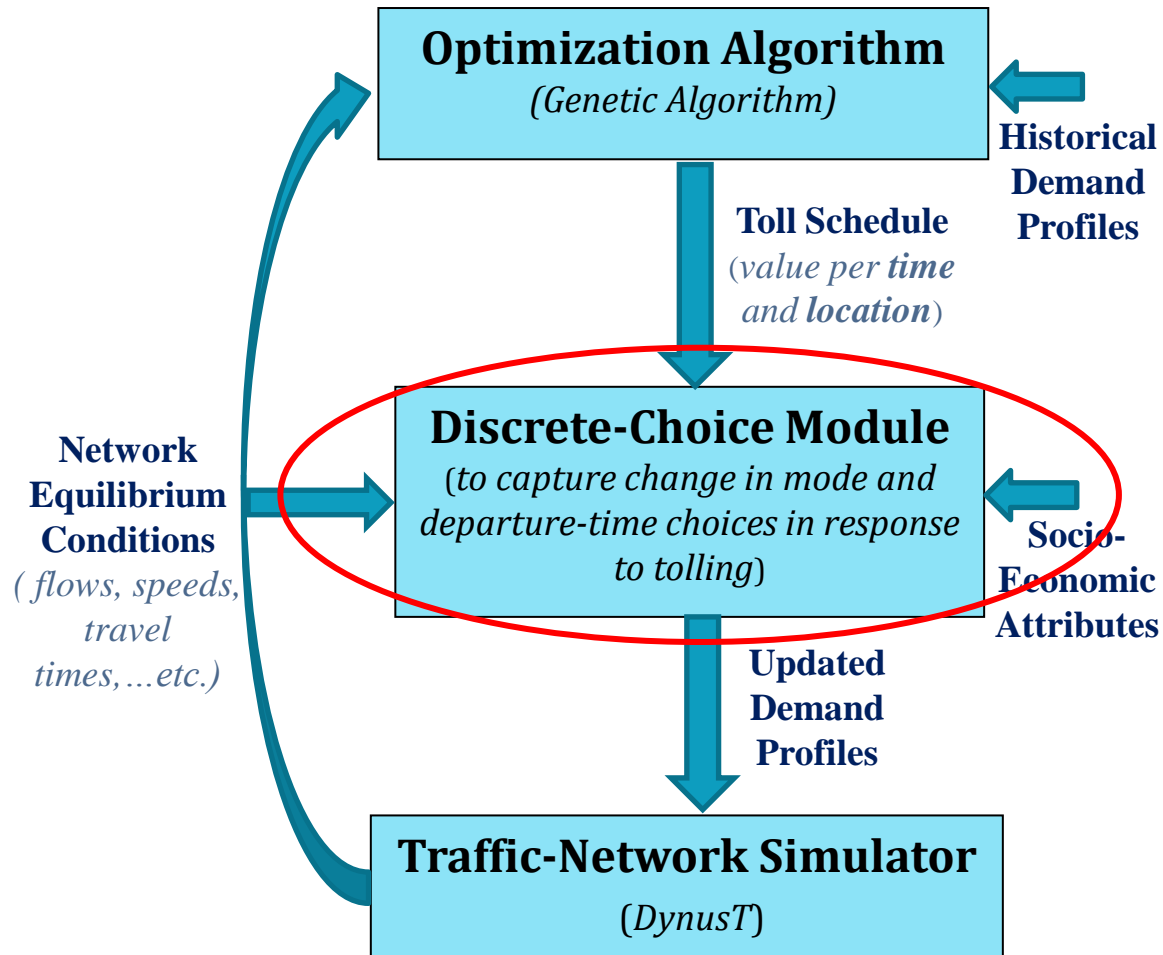
Dynamic Pricing System

Offline Toll Optimizer



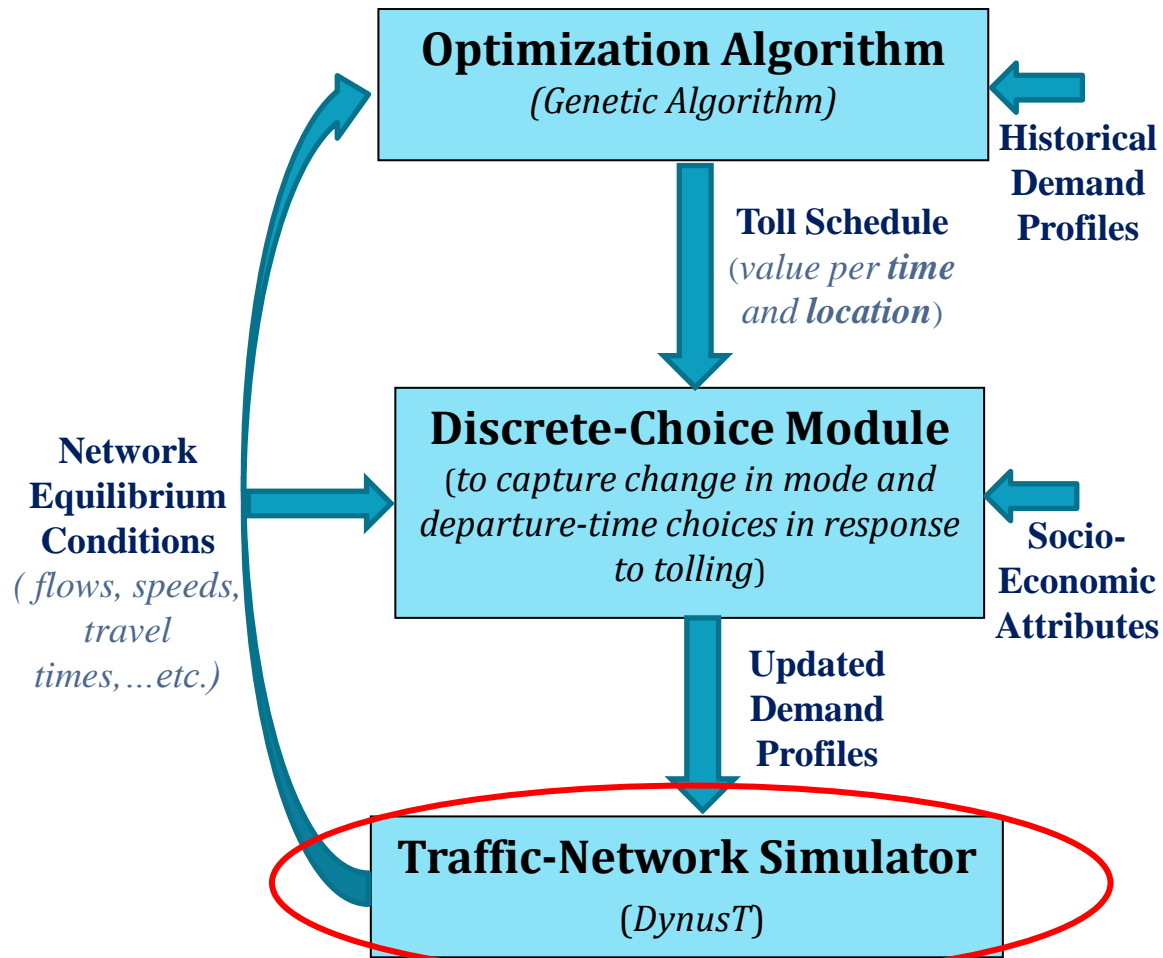
Dynamic Pricing System

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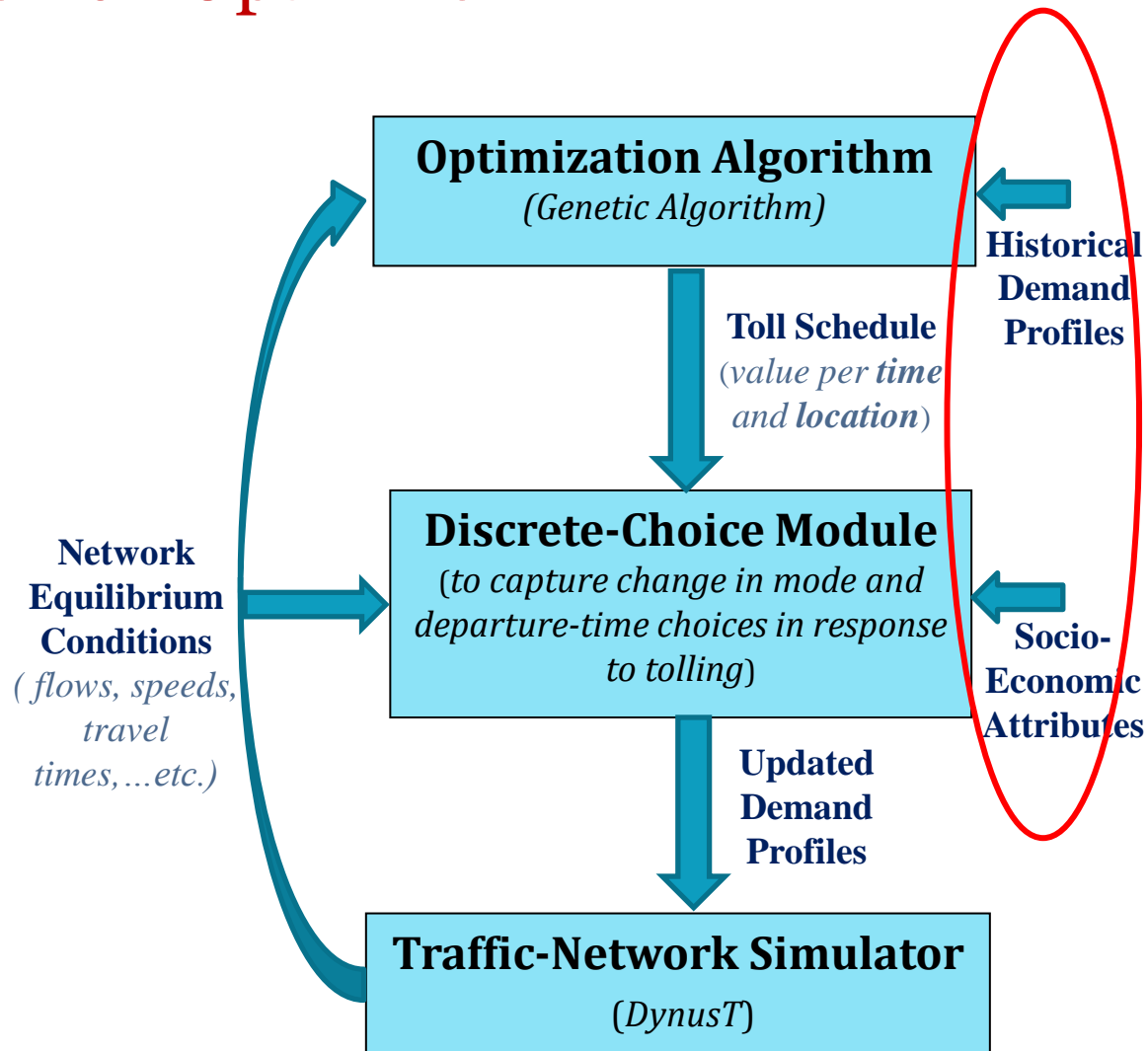
Dynamic Pricing System

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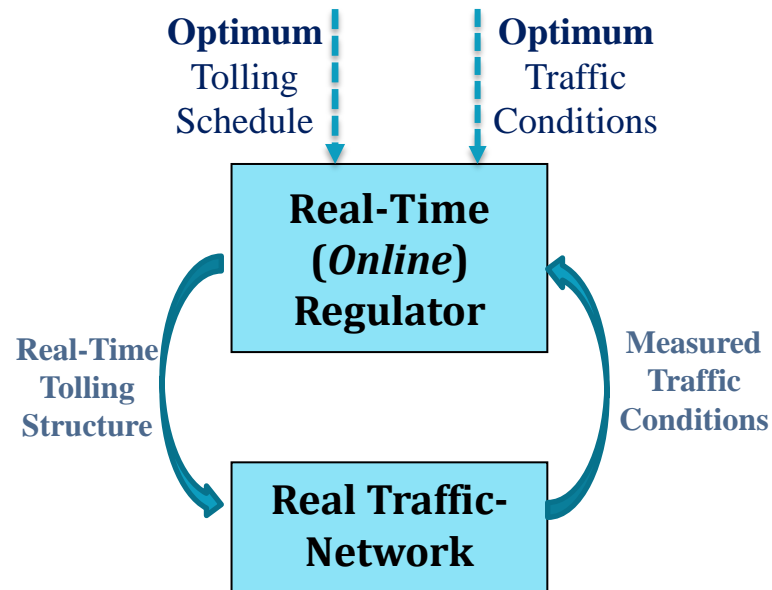
Dynamic Pricing System

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Dynamic Pricing System

Online Toll Regulator

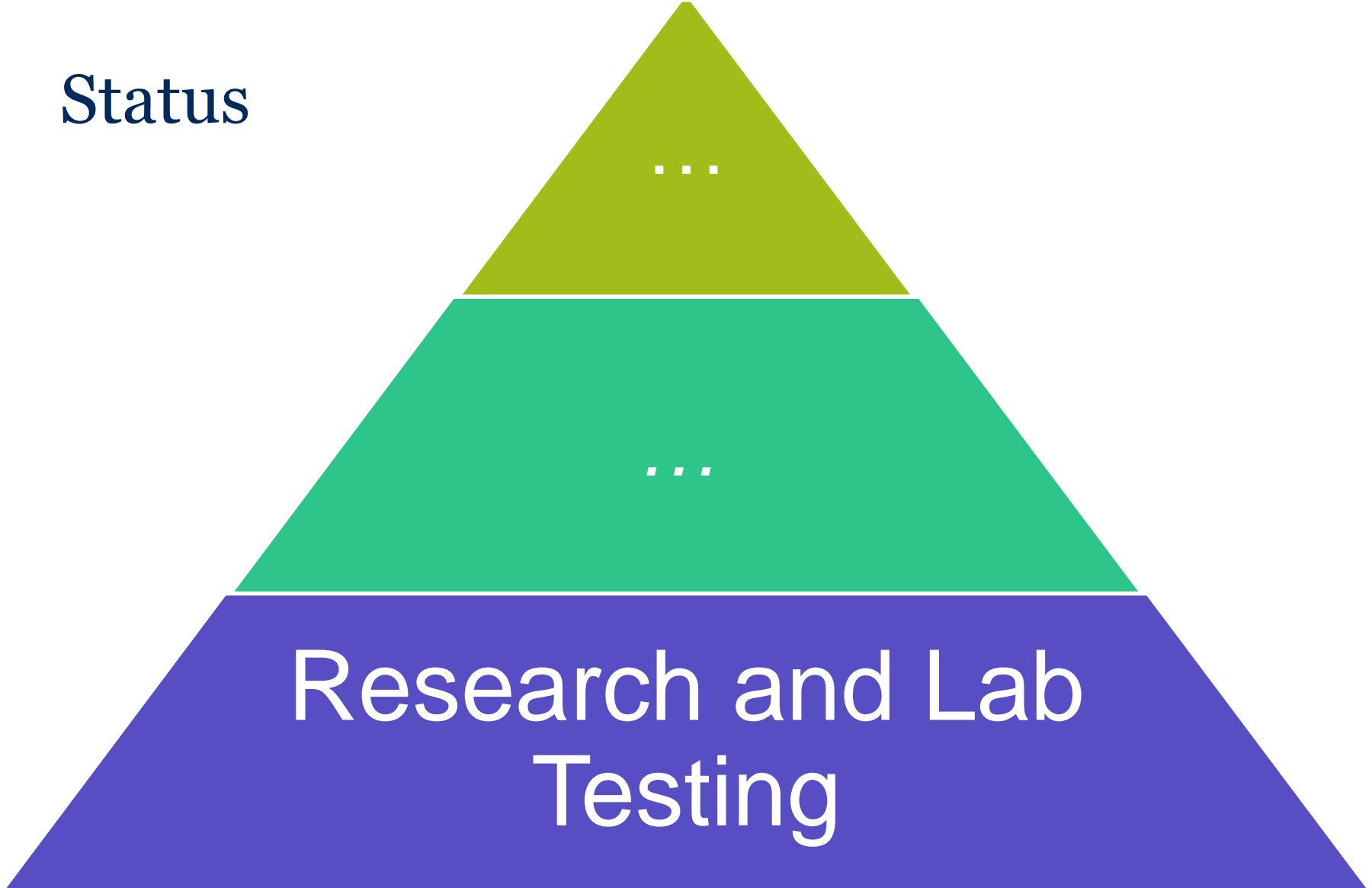


Current Test Scenarios

- Freeway only with **HOT lanes**, e.g. the Gardiner Expressway or the 401 Express lanes
- **Freeway corridor**, e.g. “Gardiner-LakeShore” where Gardiner would be tolled
- **Cordoned network**, e.g. downtown Toronto



Status



** First prototype expected in summer of 2015 with test results on selected freeway pricing scenarios*



Thank you

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