



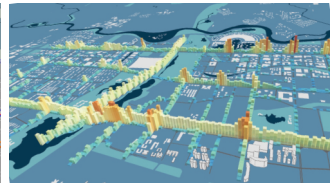
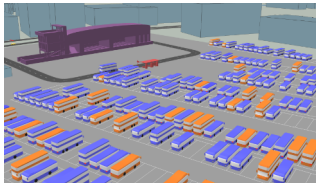
City Mobility Simulator Use Cases



What is CityMoS?

CityMoS, the City Mobility Simulator, is software designed to create and study virtual copies, or digital twins, of both existing and planned transport systems. This includes everything from roads and vehicles to public transport and traffic lights.

A Singapore government official called it "SimCity for Professionals"



With CityMoS, planners and operators can see how changes in the transport system might impact traffic flow, emissions, or overall efficiency. For instance, they can analyse the effects of switching to electric buses or redesigning intersections on reducing carbon emissions.

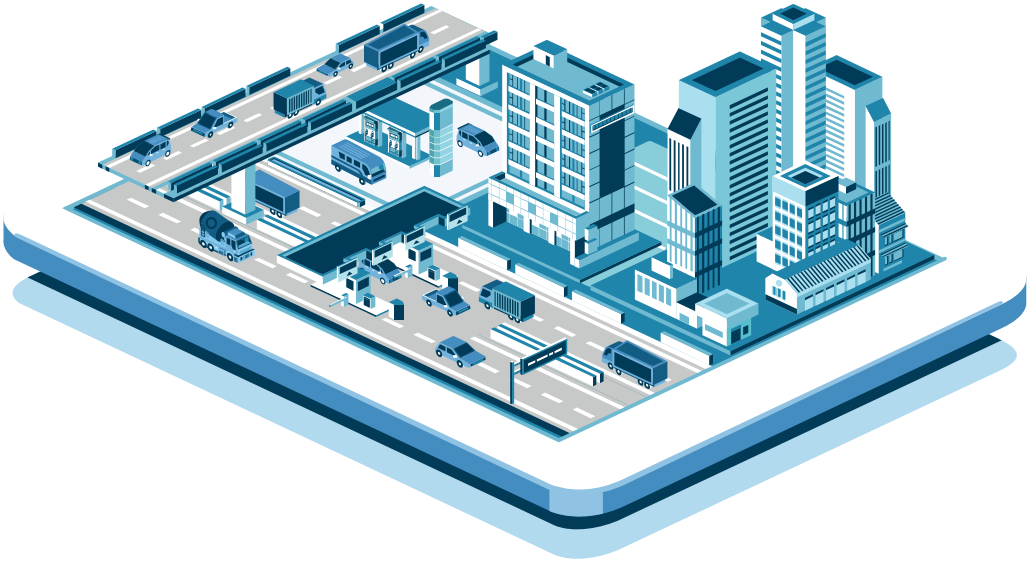
CityMoS allows for the re-creation and analysis of areas ranging from individual roads and neighborhoods to entire cities, providing valuable insights for urban planning and development. CityMoS is best suited for analysis and planning, not for live monitoring.



A faster, cheaper and safer way to plan, optimize and control transportation systems

CityMoS is an agent-based, microscopic simulator, meaning vehicles are simulated as individual entities. What sets CityMoS apart from other solutions is its high performance, unlocking applications and use cases previously not suited for high-detail simulation.

CityMoS can simulate millions of vehicles and drivers over multiple days, enabling the analysis of entire cities or highway networks, running on consumer hardware without the need for an expensive computing infrastructure.



About Intobyte

Intobyte Pte Ltd is a company incorporated in Singapore, focusing on digital twin technology for transportation systems. Their customer base includes European and Asian government entities as well as companies, traffic planning consultancies, and fleet operators.

Intobyte's offerings encompass the entire spectrum, from providing stand-alone CityMoS licenses to carrying out full projects, identifying and evaluating solutions for today's and tomorrow's transportation challenges.

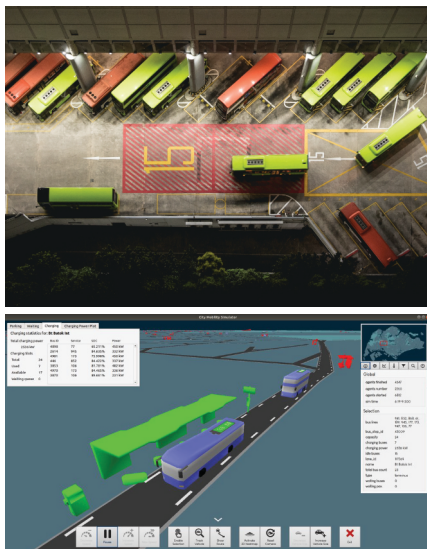
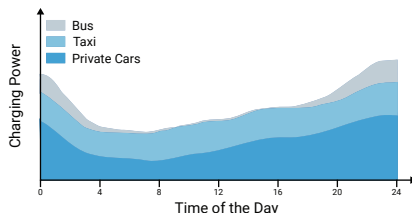
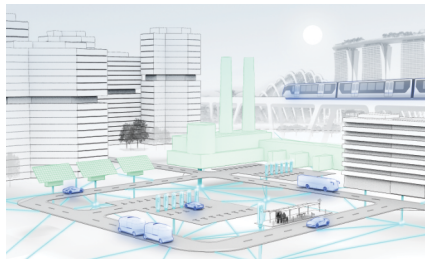
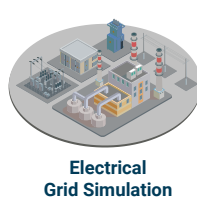
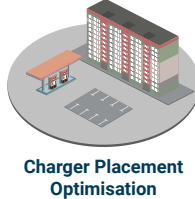
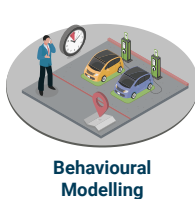
Intobyte partners up with system integrators and ITS businesses around the world to offer customers one-stop solutions for their digitalisation challenges on their pathway to a more intelligent transport system.

The following pages show a range of example applications for Intobyte's services and the City Mobility Simulator.

CityMoS supports the transition to electric vehicles towards a more sustainable transport system. This includes the evaluation of charging station placements, the charging station mix and understanding the impact on mobility and environment.

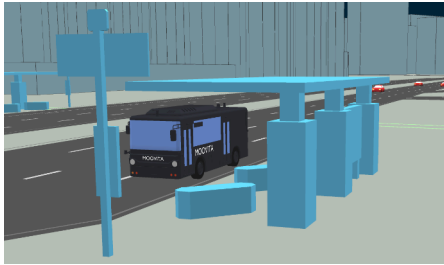


Mobility and Charging Simulation



CityMoS is a powerful tool to plan and optimize public transport systems. It can be used to create all-encompassing digital twins of bus systems, including bus stops, depots, termini, lines and passenger demand as well as off-service trips. Each vehicle is individually simulated including air conditioning and passenger weights, allowing for detailed analysis of energy or fuel consumption.

Such a digital twin can be used to optimize the bus service, mitigate bus bunching, plan new lines or even Bus Rapid Transit (BRT) corridors. It serves as a virtual laboratory to support the transition to electric buses. CityMoS further supports rail-based transport to model passenger shift and mode choice.



Autonomous Shuttle Buses

Autonomous shuttle buses represent the future of public transit, offering sustainable, efficient, and accessible mobility. Their seamless integration, however, requires meticulous planning.

CityMoS enables city planners, transportation authorities, and operators to simulate various scenarios, assessing factors like shuttle and terminal configuration, route optimization, traffic flow, passenger demand, as well as safety and comfort considerations.

From vehicle-centric metrics such as energy consumption or drive cycles to system-level information such as utilization or commute times, CityMoS is an all-in-one solution.

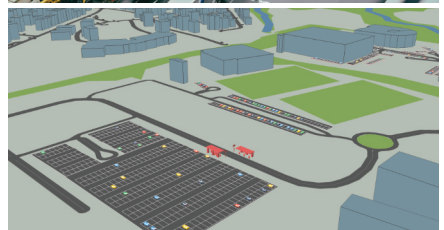
Traffic Impact Analysis

The introduction of new policies, the construction of new buildings, or changes to existing infrastructure can have significant impact on traffic flows.

CityMoS enables informed decision-making so that planners can see the effect of various proposals in detailed what-if-analyses.

Example questions include but are not limited to:

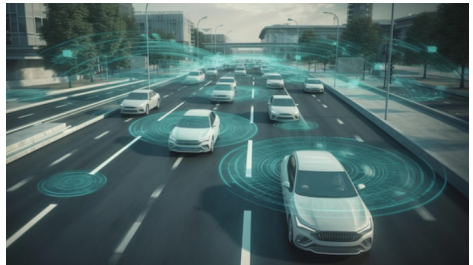
- What upgrades to the road network are required to support certain developments?
- Will existing parking facilities suffice if new companies are added to a business complex?
- Would replacing a certain traffic-light with a roundabout alleviate traffic problems?
- How should traffic be routed under extreme conditions such as severe weather or mass events?



Cooperative Intelligent Transport Systems

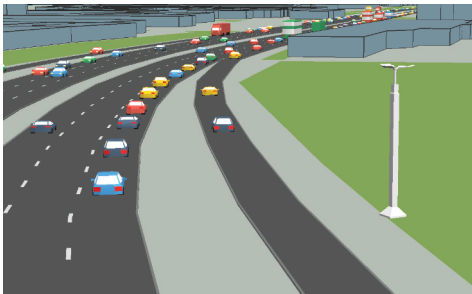
The introduction of Car-2-X technology is expected to improve traffic efficiency, safety, and environmental impacts.

Cooperative Intelligent Transport Systems includes the integration of communication technology not just into vehicles but also into infrastructure such as traffic lights or even roads.



CityMoS supports the evaluation of Wifi-based systems (e.g. C-ROADS) to understand the impact on metrics such as traffic flow, traffic safety as well as fuel consumption and CO₂ emissions.

For advanced analysis, CityMoS can be coupled to a network simulator to include network aspects such as signal interference and channel congestion.



Emission Modelling and Reduction

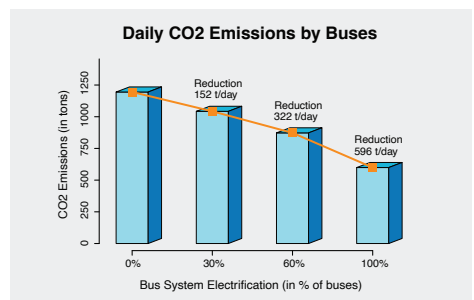


In CityMoS, each individual vehicle is simulated with high detail, painting a holistic picture of spatiotemporal emissions in a city or on a highway.

This baseline enables the identification and measurement of emissions reduction potentials, such as the introduction of electric vehicles, a change of speed limits, or other traffic flow-improving methods.

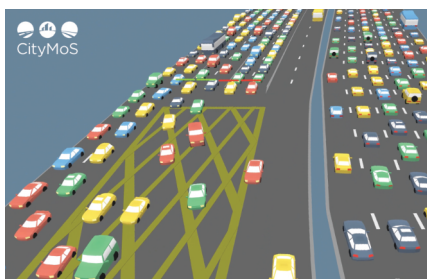
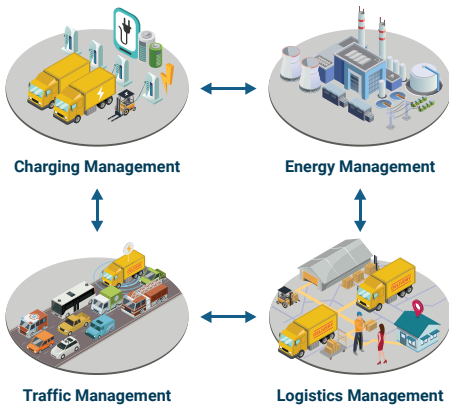
Transport accounts for around one-fifth of global CO₂ emissions. Vehicles furthermore emit heat, noise, and micropollutants.

Understanding the quantity of emissions in a region is the first step to introduce mitigation strategies to achieve a more sustainable transportation system and more liveable cities.



Commercial Vehicle Fleets

CityMoS provides a virtual testbed to cost-efficiently evaluate new concepts of operations and generate recommendations for strategic planning. It is also the perfect platform to plan the electrification of vehicle fleets, including charging infrastructure planning and energy management.



Congestion Mitigation

Identifying causes and effective counter-measures in complex traffic networks of large cities is challenging.

Oversaturated traffic systems are sensitive and events such as spillbacks from one intersection to the next can even cause grid locks.

With CityMoS, it is possible to simulate challenging and country-specific road layouts and traffic rules and calibrate the simulations to real-world data with high accuracy.

CityMoS' high-performance simulation capabilities allow users to quickly identify small and cost-efficient changes to the traffic system that can significantly improve traffic flow.

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