

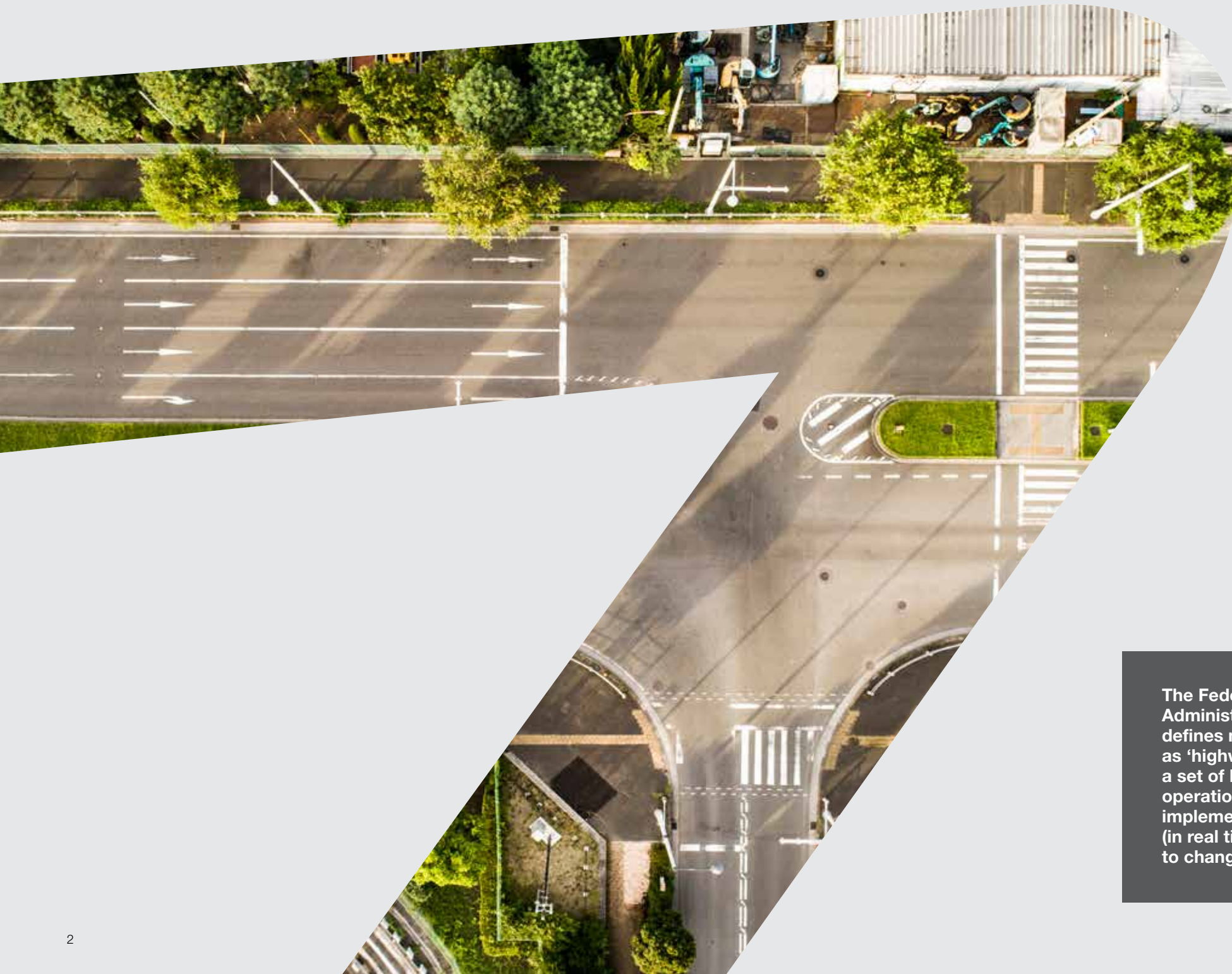


Kapsch TrafficCom

Boosting the effectiveness of managed lanes with dynamic pricing

Freeway congestion is a huge and growing problem for transportation agencies worldwide. Over the past decade, traffic volumes and vehicle miles travelled have increased steadily, with peak travel periods expanding accordingly. At the same time, agencies are often unable to build new freeway capacity on their networks due to constrained rights-of-way, prohibitive construction costs, or environmental and sustainability concerns.

In the face of these challenges, managed lanes operations can help by proactively managing traffic demand. They do this, for example, by setting minimum vehicle occupancy requirements, or by implementing tolls or charges for certain types of vehicles throughout the day, or at peak traffic times.



What are managed lanes operations?

Managed lanes implement measures to reduce congestion on specific roadways or sections. In doing so, they give road users the opportunity to reduce their journey times – but only in exchange for a change in their behaviour, such as paying a toll, car-pooling, taking a bus, or purchasing an electric vehicle.

For operating agencies, managed lanes are about proactively managing traffic demand. This is achieved by applying one or more operational strategies to meet a set of performance objectives, such as maintaining a minimum speed threshold, maximizing vehicle throughput, or optimizing revenues to fund additional infrastructure or traffic management initiatives.

Traditionally, managed lanes operate as a “freeway within a freeway”, alongside general purpose lanes. Managed lanes operations often include:

- Vehicle specific lanes, such as bus only or truck only lanes
- High Occupancy Vehicle (HOV) lanes, which can only be used by vehicles with 2+ or 3+ people traveling in them
- Express Toll Lanes (ETL), which require drivers of vehicles to pay a toll, irrespective of vehicle type or occupancy
- High Occupancy Toll (HOT) Lanes, where only low-occupancy vehicles have to pay a toll (and high-occupancy vehicles can use the lane with no charge)
- Reversible lanes, where the flow of traffic can change direction depending on real-time traffic conditions

The Federal Highway Administration (FHWA) defines managed lanes as ‘highway facilities or a set of lanes in which operational strategies are implemented and managed (in real time) in response to changing conditions.’

How are managed lanes evolving to meet today's traffic management needs?

Until recently, most managed lanes operations focused on providing lanes for specific types of vehicles, such as buses or trucks. But as traffic demand continues to increase exponentially, an increasing number of agencies are implementing priced managed lanes that involve some kind of charge or toll. As well as providing more incentive for drivers to change their road-use behaviour, priced lanes can help to finance roadway infrastructure, to fund alternative greener transport options, or to offset freeway maintenance costs.

The next step: from fixed-variable to dynamic pricing

While priced lanes are not new, many initially relied on fixed charges to manage traffic demand on specific roadways or segments, and during specified peak times. This is known as 'fixed variable pricing', or 'time of day pricing', with charges predetermined based on a daily or weekly schedule. While fixed-variable pricing schemes can have an impact in terms of shaping overall traffic demand, they often lack the flexibility to adapt to real-time traffic conditions – for example, by increasing charges to reduce demand during peak times. To address this challenge, agencies are now looking to deploy next-generation managed lanes solutions that support dynamic pricing. This means that toll rates are established in real time based on real-time analysis of traffic conditions. Combined with other smart traffic management solutions, dynamic pricing could be applied strategically – with higher charges for more polluting vehicles.

Key technology requirements for dynamic pricing

Dynamic pricing managed lanes can be deployed as long as traffic monitoring systems and tolling systems are in place. However, some network operators choose to deploy 'umbrella systems' that integrate and analyse traffic data from a larger number of sources to support a more ample range of smart traffic management capabilities. Critically, effective dynamic pricing also requires technologies that allow toll transactions to be completed at highway speeds using transponders or video tolling. This ensures that traffic continues to flow freely across multiple lanes, minimizing congestion and emissions and reducing the cost of manual toll processing. The benefits of this approach are also significant for road users, with improved safety and no need to queue at toll booths. Finally, but equally importantly, agencies need technology tools to advise drivers about tolls and rates before they enter a managed lane. This kind of solution ensures that drivers can make an informed decision about whether to use managed lanes or free lanes for their journey.

Technology requirements for dynamic lane charging at a glance:

- Open and modular architecture
- Performance driven solutions that align pricing to specific revenue KPIs
- Automated intelligence for price setting, monitoring, and violation enforcement
- High reliability and accuracy
- Effective tools for communicating toll and pricing information to road users



Why Kapsch TrafficCom for next-generation managed lanes

Kapsch provides the industry’s most comprehensive, end-to-end managed lanes solution. This gives agencies a single, trusted point of contact for All Electronic Tolling capabilities, Highway Traffic Management (HTM) capabilities, Remote Operations and Management System (ROMS) requirements, and all the hardware and software components needed to support and manage a single managed lane, or network of managed lanes.

Critically, our solutions also offers advanced business logic to support dynamic pricing across your managed lanes network. This allows to adjust pricing based on vehicle type, traffic speed, time-of-day traffic peaks, and rush hours – ensuring you can meet your KPIs for traffic speed, network throughput, and revenue generation.

Key features of the Kapsch TrafficCom managed lanes solution

To support dynamic pricing for managed lanes, the Kapsch TrafficCom solution offers the following key features:

- 1 Traffic metrics for each segment/trip, which are calculated using volume, occupancy, and speed measurements from roadside sensors
- 2 Toll calculation based on traffic metrics and schedule requirements that are fed into a “controller” for processing
- 3 Application of required business rules to the calculated toll
- 4 Delivery of toll ranges back to the database, which allows toll rates to be posted to roadside signs
- 5 Simple configuration, monitoring and adjustment of managed lanes parameters via an intuitive user portal

The Kapsch solution also provides a range of ‘Trip Building’ features to support dynamic pricing on sections of toll roads, as well as for full journeys. These include:

- 1 Transaction workflows that apply business rules to collect, correlate and assemble individual toll point vehicle transactions, and complete trip transactions
- 2 Features that ensure tolls are from the same toll roads (or sections of toll road), with no backtracking or errors
- 3 A Trip aggregator module that provides a workflow for transforming individual vehicle transactions from different toll points into full-trip transactions



The Kapsch TrafficCom Managed Lanes solution in action

Priced Managed Lanes in Austin, Texas, USA

The challenge:

Loop 1 (MoPac) is the oldest and most congested roadway in the Austin area. It runs through the center of the city and is route to downtown, as well as several key locations beyond. Traffic on MoPac is projected to reach 220,000 vehicles a year by 2035 . Due to the urban location of the roadway – and its close proximity to private property and businesses – there was limited space to construct new lanes. As a result, the local authority determined that a high-occupancy (HOT) lane in each direction would be a viable solution to the congestion challenge.

The solution:

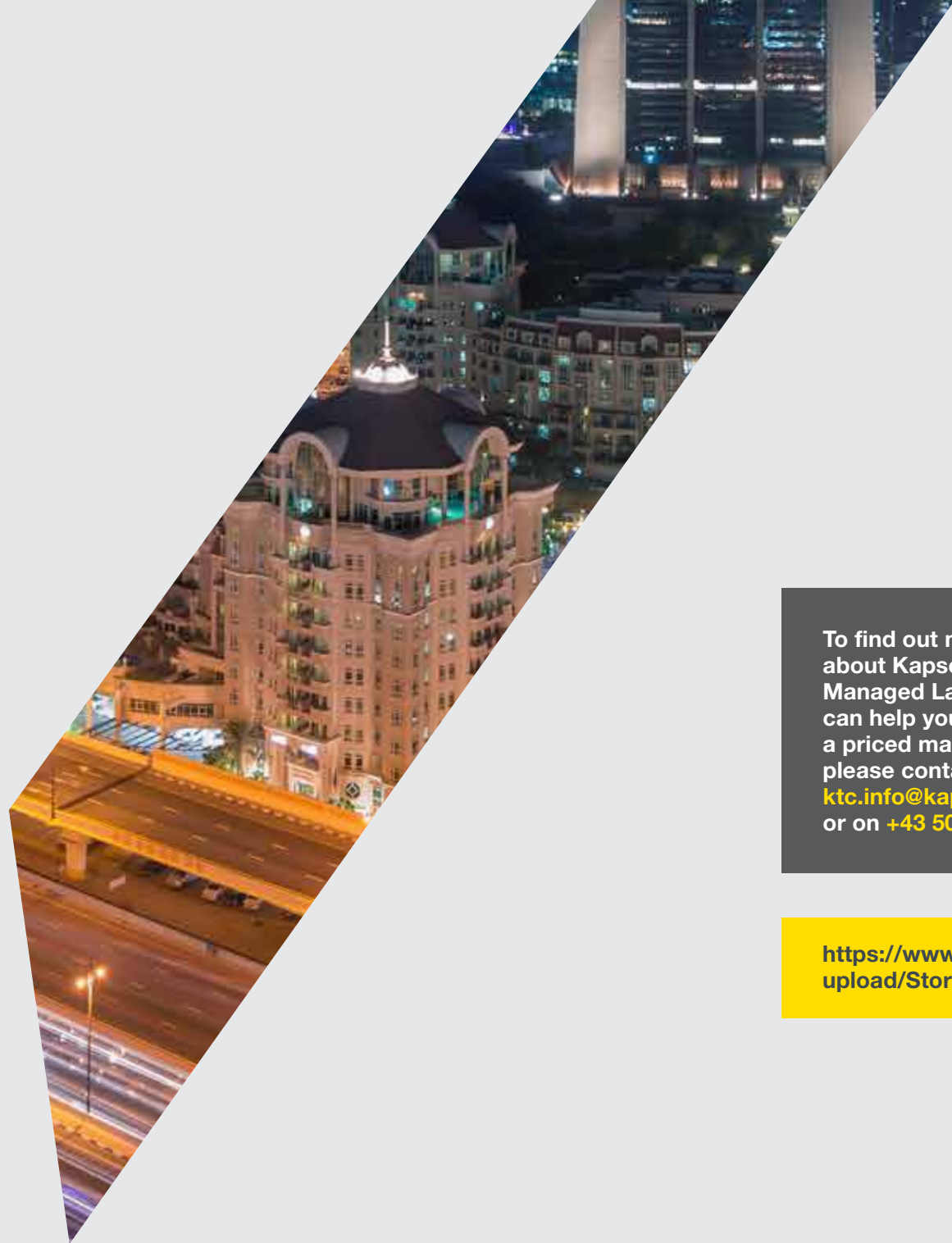
Working with Kapsch TrafficCom, the local authority created the MoPac Express Lane (MEL). This uses a dynamically priced tolling scheme based on supply and demand. The toll is higher when the roadway is congested, and less expensive when traffic is flowing freely. In addition, Capital Metro buses and registered van pools are allowed to use the lane free of charge. Kapsch designed, implemented, installed and integrated the managed lanes system that supports MEL. This includes the dynamic pricing system, AVI, and image-based trip building capabilities needed to support the scheme. Additionally, Kapsch provided the intelligent transportation system components for MEL, including Microwave Vehicle Detectors (MVD) and Dynamic Message Signs (DMS). We also support the local authority with ongoing operations and maintenance activities, and ensure that the systems that support MEL are constantly available.

The benefits:

- **Improved traffic management and reduced congestion**
with real-time traffic insights and data as well as dynamic pricing capabilities to manage demand during busy times and to improve throughput and road-user experience
- **Enhanced mobility and trip reliability**
based on a more stable travel corridor and reduced travel times for motorists who are prepared to pay for the HOT lanes or HOV options
- **Increased revenue generation**
The Kapsch solution generates revenues for infrastructure financing, while also providing a high level of service to road users
- **Always-on reliability**
based on an architecture with no single point of failure and redundancy built into the system
- **Scalability**
to support future growth in the managed lanes network

Key features of the Kapsch solution include:

- **Vehicle eligibility:** with certain types of vehicles exempt from charges, such as HOV, LEV, and motorcycles, for example. These exemptions be managed during peak hours or on a 24-hour basis to provide flexibility
- **Pricing:** dynamic pricing is used to optimize toll pricing for Single Occupancy Vehicles (SOVs), and to maintain specified level of service
- **Access:** the authority can configure specific access points for the lanes and choose between 'line' or 'barrier' lane separation (i.e. physical or virtual divisions between lanes)
- **Carpool registration:** carpool users register for access to the lanes and use tags on their vehicles to gain toll-free access.



To find out more about Kapsch TrafficCom's Managed Lanes solution and how we can help you implement and sustain a priced managed lanes strategy, please contact us today at ktc.info@kapsch.net or on +43 50 811 0.

https://www.mobilityauthority.com/upload/StoryOfMopac-05_09_19.pdf

Kapsch TrafficCom

Kapsch TrafficCom is a globally renowned provider of transportation solutions for sustainable mobility. Our innovative solutions in the application fields of Tolling, Traffic Management, Demand Management and Mobility Services contribute to a healthy world without traffic congestion.

We have brought projects to fruition in more than 50 countries around the globe. With our one-stop solutions, we cover the entire value chain of our customers, from components to design and implementation to operation of systems.

As part of the Kapsch Group and headquartered in Vienna, Kapsch TrafficCom has subsidiaries and branches in more than 30 countries. It has been listed in the Prime Market segment of the Vienna Stock Exchange since 2007 (ticker symbol: KTCG).

Kapsch TrafficCom's about 5,100 employees generated revenues of EUR 731.2 million in financial year 2019/20.

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