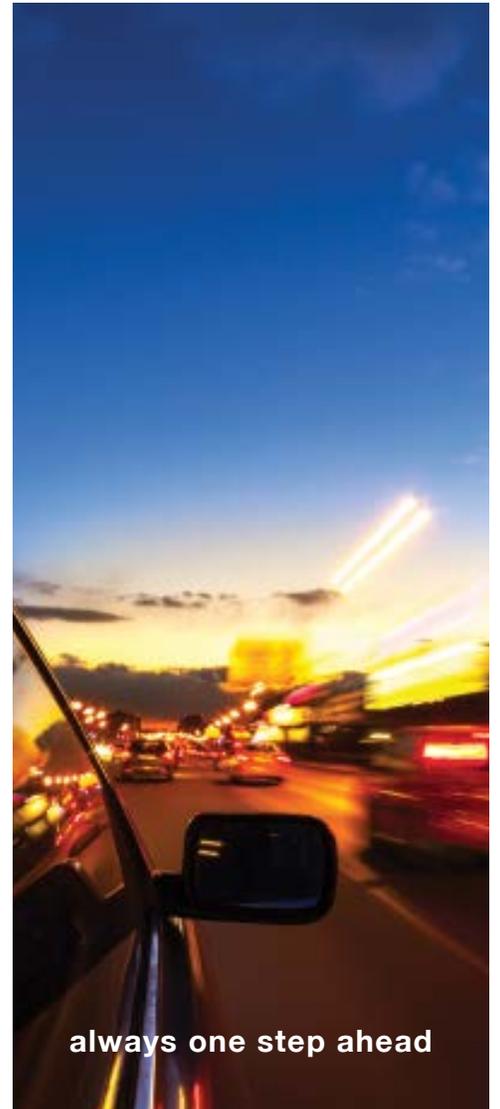US

Kapsch Managed Lanes
E2E Solution.

always one step ahead

The Kapsch Managed Lanes E2E Solution provides the tools needed to **manage traffic for priced lanes roadway.**

A hybrid of our AET solution which combines our highway traffic management system, the Managed Lanes (ML) Solution is designed to assist Customers in optimizing traffic flow on their HOT/HOV and priced lanes.

The Kapsch ML incorporates highly specialized features such as Video Image Processing, Automatic License Plate Reading (ALPR), Trip Building and Dynamic Pricing, Audit and Reconciliation, Maintenance and many more built-in features. In addition, the roadside Electronic Toll Collection (ETC) system has a fully integrated Express Lane Command Center (ELCC) which gives the road operator a complete real-time view and control over the management of traffic flow. In addition, for customers who desire a robust ITS solution, our ML Solution has an interface to our DYNAC® and EcoTrafiX® solutions that can be quickly and efficiently plugged together for providing full visibility and control over an entire Managed Lanes network.

The Core Functionality.

Kapsch provides numerous options for a complete end-to-end solution that allows optimal management and insight into a single or a network of Managed Lanes (HOT/HOV) roads. We take into account every aspect of the Managed Lane/HOT/HOV roadway from the tolling, traffic management, network, and all infrastructure components.

Entry Point → HTM → ETC → NCS → Exit Point

Highway Traffic Management (HTM)

- Sensors measure traffic volumes and vehicle speeds.
- Toll Setting Module (TSM) determines ideal price.
- Price and travel times are sent to dynamic message signs on highway.

Electronic Toll Collection (ETC)

- Antenna scans vehicle's toll tag, toll fee is deducted from driver's account And / or
- ALPR camera photographs vehicle license plate and driver is invoiced

Network Communication System (NCS)

- Connects to roadside systems to create transaction and manage entire operation.
- Consists of all field components including fiber optic cables, monitoring software, security appliances, servers, and IP networks.

System Components.

At the Core of the ML Solution are the following highlighted components and subsystems:

Device Handler	▪ Responsible for all external hardware plugged into the system, designed to fault tolerant, robust, and scalable.
Lane/Zone Controller(LC/ZC)	▪ The heart of the lane/zone. The controller is a multitasking, real time common application execution framework. Provides messaging and workflow management as well as monitoring of all tasks and hardware execution in the toll lane/zone.
Host	▪ Remote Operations and Maintenance System. ROMS monitors all events and tasks being executed in the lane/zone, host, and all other components. Provides dashboards and reports for management, manages maintenance teams workflow, ensures 24/7 operation of all subsystems and component parts.
Remote Operations and Maintenance System (ROMS)	▪ Remote Operations and Maintenance System. ROMS monitors all events and tasks being executed in the lane/zone, host, and all other components. Provides dashboards and reports for management, manages maintenance teams workflow, ensures 24/7 operation of all subsystems and component parts.
Transaction Processing (TP)	▪ Collects tolling data on a specific vehicle along with traffic data to determine the appropriate dynamic toll rate. Assembles this information into a Trip that can be used for billing the user of the road.
Dynamic Pricing Engine (DPE)	▪ The Dynamic Pricing Engine provides several different algorithms that are used to vary pricing in order to encourage or discourage ML usage, which controls traffic and maintain the desired level of service.
Trip Building Engine (TBE)	▪ Data collected in the toll lane/zone are made into transactions and later used by the Trip Building Engine to assemble Trips. Based on business rules, Trips are compared to a predefined set of allowable trips on the road or road network to create Trip Transactions (TT) that are used in billing the user.
Express Lane Command Center (ELCC)	▪ An application used to monitor and manage Level of Service (LoS) and day-to-day operations on the Managed Lanes. With the ELCC, operators can perform real-time traffic monitoring, adjust toll rates, and manage traffic and congestion. The interface includes analytic dashboards, controls, and historic traffic data for Managed Lanes and General Purpose lanes if they are part of the system.

Video Image Processing (VIP)	▪ Video Image Processing is used to audit Transaction Trips that need additional processing and can be used to make adjustments, ensure complete trips have been identified and accounted.
Sign Manager (SM)	▪ The Sign Manager software application that receives fare and alert messages from a centralized point of control, interacts with third-party sign controllers over the network to ensure that messages are displayed correctly, and then reports status and operating conditions to ROMS/ELCC.
Image Capture Station (ICS)	▪ A real-time system that responds to lane/zone controller by correlating camera images with specific transactions. These image/transaction relationships, including actual image and transaction data, are staged by the ICS and forwarded to the image long term storage (I-LTS) for permanent storage as part of the transaction record.
Digital Video Recorder (DVR)	▪ A real-time continuous video recording system designed to provide insight and audit capabilities to the system by recording all in-lane activity. This activity is stored and correlated in relationship to time and location by the DVR, and is available for retrieval via the ROMS application.

Key Features.

Lane Management.
- Vehicle Eligibility: Restriction to a particular type of vehicle: HOV, LEV, Motorcycles. This can be managed during peak hours or on a 24-hour basis to provide flexibility
- Pricing: Utilization of congestion or dynamic pricing to price access to the lanes for SOV and maintain specified level of service
- Access: Can utilize open access or designate specific access points for the lanes. Line or barrier separation.
- Carpool Registration: Require carpool users to utilize tags and register for access to the lanes regardless of any fee waived for occupancy levels.

User Benefits
- **Improved Traffic Management & Control over Congestion Relief:** Kapsch fully integrates all aspects of operating a ML and provide full insight and control over the components and data to optimize traffic flow in the lanes
- **Improved Throughput:** Increased control leads to better management and an improved experience for the road user
- **Enhanced Mobility & Trip Reliability:** Our tools give you a stabilized travel corridor through instantaneous, real time access to the traffic data and continuous monitoring of every subsystem and component ensuring high reliability, resulting in travel time saved for drivers willing to pay to use the HOT lanes or HOV options
- **Revenue Generation:** Kapsch ML solution provides the tools necessary to operate and maintain a high level of service for the road user so they will buy excess capacity which maximizes revenue generation

Other Benefits

- Scalable to meet future needs
- Integrates key functionality with proven systems and equipment
- Applies industry standard best practice
- Facilitates informed business decisions through intelligent dashboards and reporting
- Design focused on:
  - Accuracy and performance
  - Reliability designed around critical requirements and challenges
  - Open source architecture
  - Maintenance control and reporting
- Architected redundancy for no single point of failure
  - Dual redundant Hosts
  - Dual redundant Lane Controllers
- Dual data streams independent of one another for complete failover & reconciliation
- Redundancy ensures that systems can operate in degraded mode & quality transactions can still be assembled
- Reduces system downtime and service interruptions
  - Degraded components can be repaired or replaced during off-peak times to ensure safety to patrons and maintenance personnel as well as minimizing traffic interruptions

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About Kapsch Group.

Kapsch is one of Austria's most successful technology corporations to specialize in the future-oriented market segments of intelligent transport systems (ITS) and information and communications technology (ICT). Headquartered in Vienna, Kapsch is organized as a group of companies with the key entities Kapsch TrafficCom, Kapsch CarrierCom, and Kapsch BusinessCom. The companies of the Kapsch Group employ more than 5,000 people around the world. Kapsch. Always one step ahead.

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