



kapsch >>>
challenging limits

Kapsch TrafficCom

2nd Institutional Investors' Day.

Alfredo Escriba: Urban Traffic & Mobility Management.

September 18, 2018

Cities today.

Struggle with congestion and pollution.



More than **50% of the population** living in cities where the air is unhealthy.



As number of **trips is expected to grow by 30% until 2040** efficiency and optimization of the Transportation Network is needed



73% of people in metropolitan areas spend more than **90 minutes per day on commuting.**

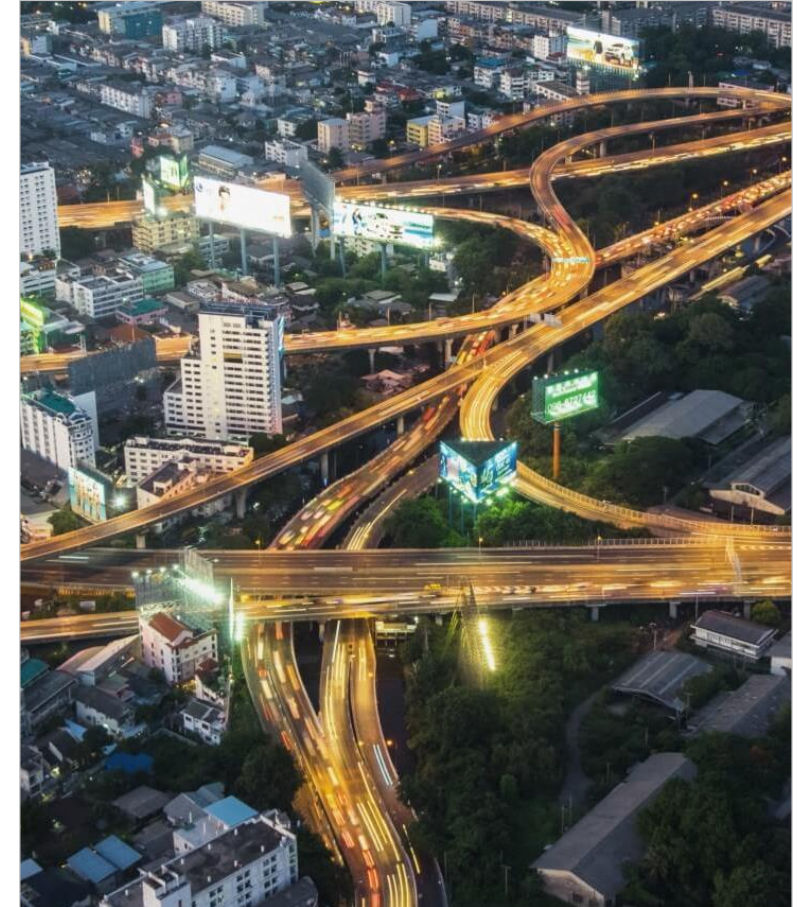


Investments in new road infrastructure is **limited** and costly and **maintaining** existing road networks is **costly and deficient**



Motor vehicles are major energy consumers and origin of air, noise and water pollution.

Transportation represents about **27% energy consumption** of U.S. and **70% of total petroleum** consumption.



Cities today.

Traffic management has barely evolved for the last 20 years and heterogeneity has grown.



Sensors limitations:

Big investment, maintenance needs, fixed locations, not enough information



Fighting against multiple “silos”:

- > Authorities & agencies
- > Technologies & protocols
- > Maturity and life-cycles



Traffic Management still **not adaptive**:

Signals: Fixed timing plans & vehicle/ pedestrian actuated strategies.

Signal plans update cycle: 3-5 yrs.



Technology **not fully impacted** traffic:

- > RT adaptive control barely evolved.
- > Simulation is still expensive.
- > AI not applied and DSS not used.



Traffic systems are not connected to drivers and to vehicles (bi-directionally and on real-time) and ...

... **demand is not managed**

- > Routing people in the way that is best for them, doesn't mean that traffic overall is moving more efficiently.”
- > And when throngs of drivers use the same apps, traffic can build up in ways that the roadway system wasn't built to accommodate.

Cities today.

Diversity worsens (traffic → mobility) in metropolitan areas and cities continue operating with poor or inexistent proper data and without decision making tools.



Huge volume of raw **data** is collected but **not efficiently used nor shared**



Mobility services options growing faster than agencies can manage.



Challenging future on automated vehicles and curbs management



Transportation systems are not connected to commuters and to vehicles (bi-directionally and on real time) and demand is not managed



Users seamlessly move on their daily trips but **fragmentation** is the norm among metropolitan area authorities



Cities don't have complete **situational awareness** and they lack of **data** and of **decision support tools**



Expectations of citizen are evolving...

Citizens' priorities have evolved; they ask for better commutes and more livable cities.



Cleaner, safer and livable cities



Information to make better decisions



Less wasted time in traveling and commuting.



Easiness and convenience
(unique points of contact, end-to-end services)



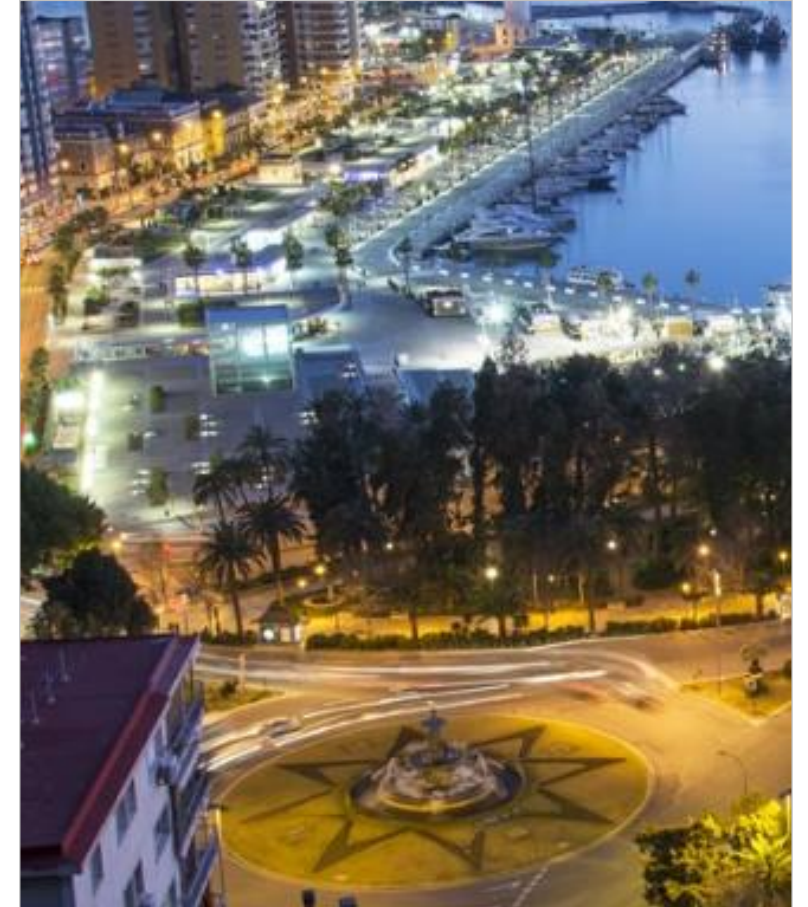
Access to transportation and newer mobility services



Multiple options to commute or travel



Easy and simple tools to manage efficiently their mobility



Trends, enablers and transformers.

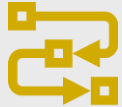
Technology, data, OEM, collective acknowledgement.



Data collected through IoT, mobile phones, CV



The **OEM industry involvement** and active role



Technology such as edge computing, AI, mobile phones, payments, etc.



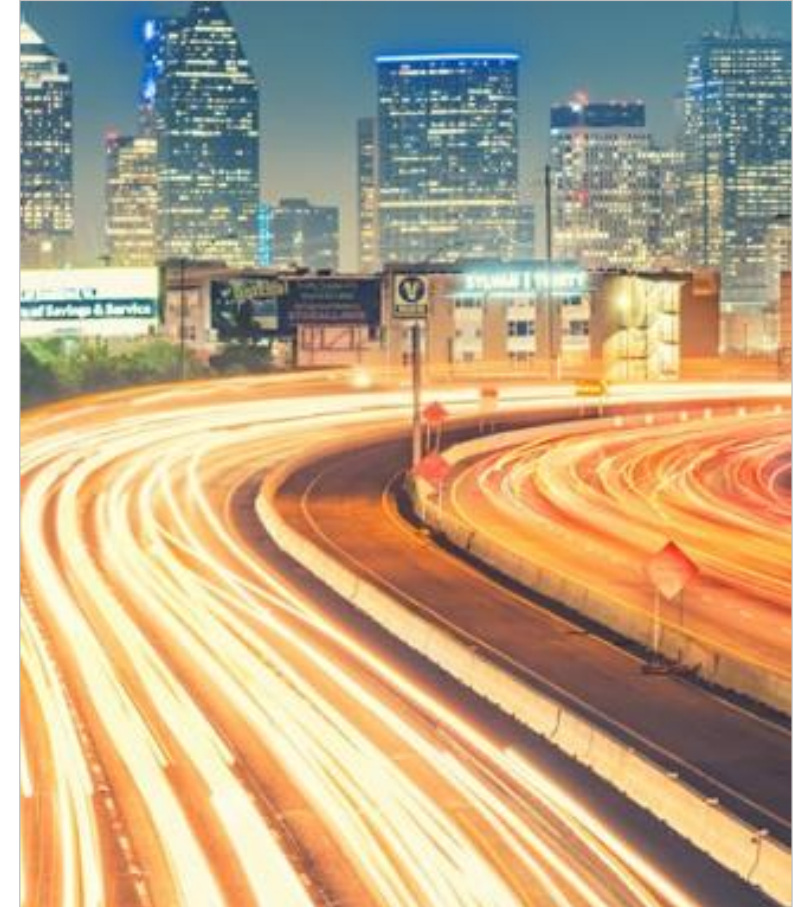
Emerging city **consciousness**



Connected vehicle: bidirectional coms including in-car telematics



Public pressure for **transparency and services**



How cities will look like in 10 years.

The new mobility landscape will demand new ways of managing and understanding mobility.

- > **Connected and autonomous** vehicles will be in operation
- > **Ride sharing, ride hailing** will **coexist** with own vehicle
- > Infrastructure **space will be assigned based on travel demand**
- > **MaaS providers** will be active part of public transit
- > On-demand **small shuttles with flexible routes** replace big rigid backbones
- > **Data** will be **available and accessible**, sometimes for free others will be traded



- > ATMS will evolve to **traffic tower control** assigning road usage and priority
- > **Curb management** solutions will assign space and usage for parking, drop-on / drop-off
- > **Dynamic pay-per-use** schemes will be implemented to manage city space assignment
- > **Data hub and ecosystems** for use of data will connect mobility actors and foster app development
- > **AI** will be key topic for management and optimization

Kapsch TrafficCom: Urban traffic strategy.

Focus on traffic, integration platforms and data.

Traffic



Urban traffic management

Multiprotocol end-to-end urban traffic management solution



Demand management

Stand alone advanced demand management system that adapts and optimizes traffic demand by routing vehicles based on city priorities



City access and air quality management:

Integrated set of solutions from traffic management to congestion charging for access control and air quality monitoring and management

Integration platform



Regional signals integration:

Multisystem, multiagency signals system coordination platform for awareness, data sharing and common strategies implementation



Integrated regional management

Multimodal multiagency platform for awareness, coordination, incident management through the use of DSS

Data management



Data hub

Data Warehouse for diverse data gathering, filtering and standardizing, with a BI layer



Data mart

Publishing services for internal/shared use and 3rd party APIs, may also include open data compliance



Data analytics

Processing data with analytics and AI towards added-value information as prediction, correlations, ...



***Advanced Traffic and
Demand Management.***

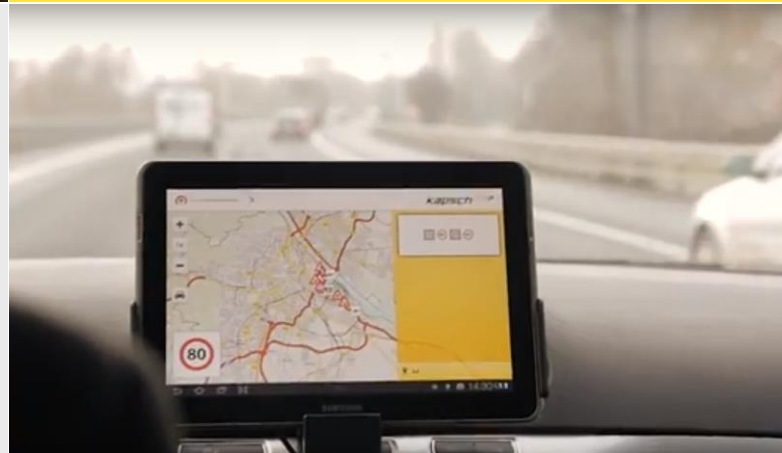
A new way of understanding traffic.



Maximizing the network capacity and usage

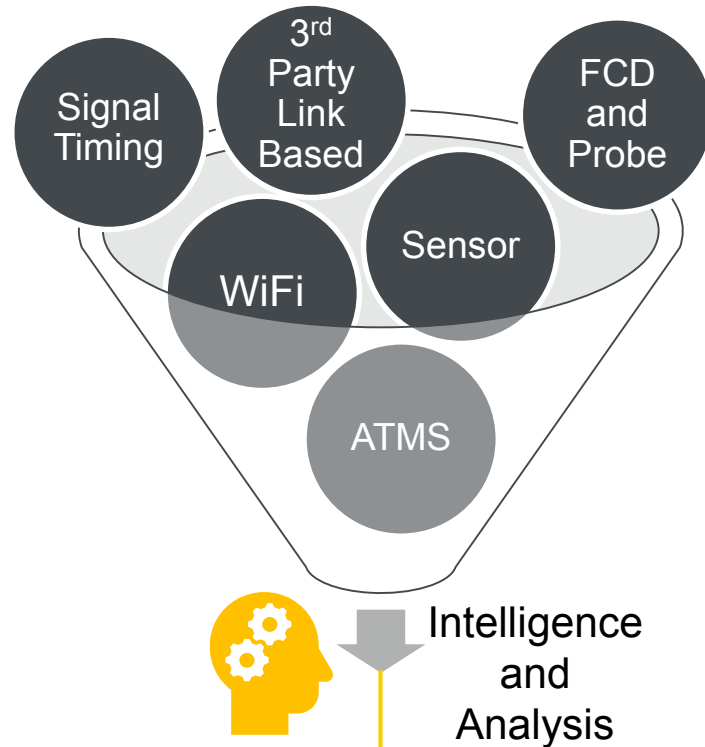


Data and Intelligence for better decisions



Connecting and directing travelers

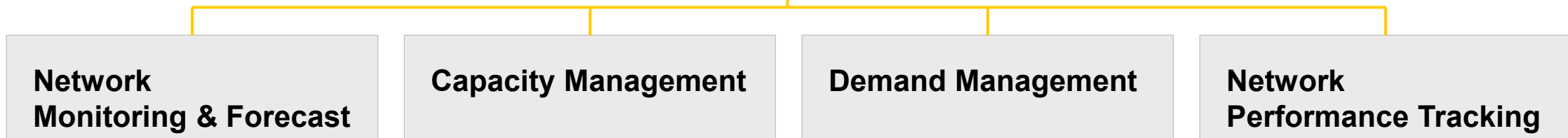
Developing our mission.



Leverage on our expertise in traffic engineering and operations to deploy solutions that combine

- > data processing,
- > analytics,
- > machine-learning and
- > advanced decision support

for reducing congestion, emissions and achieving overall traffic management proactivity.



Network monitoring and forecast.

Traffic network predictive analytics.



Multiple predictors to improve forecasting accuracy (e.g. sensor's own data, surrounding sensors data etc.).

Near zero calibration to support different environments and data source.

Automatic quality metrics generation.

Machine learning.
Multiple time ahead horizons.

(i.e. +5, +30, +60 min)

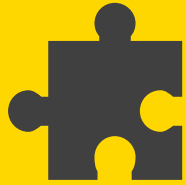
Automatic model generation and tuning (using historical data and optimization algorithms).

Identify under-performing intersections and routes in order to predict congestion in advance by analyzing the real-time traffic data and generated forecasting data.



Capacity management.

Maximize the usage of the infrastructure



Arterials optimizer

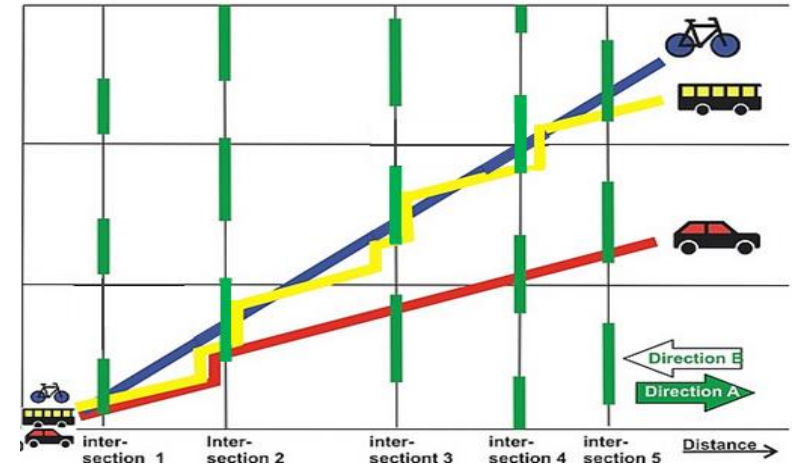
Dynamically calculate arterials timing parameters according to short-term past or future traffic flow.

Arterials timing selection

Adjust arterial timing plan to changing in a simple way with few sensors.

Realtime adaptive

Real-time changes in timing parameters according to traffic flows and queues.



Traffic flow demand split

Avoid main arterial blockage by timely evaluate and alternative route(s), so splitting traffic flow on 2 or more corridors.

Demand management.

Load balancing & collaborative routing.



Collaborative routing

Distribute and optimize traffic over the network assigning individual routes to individual vehicles.

Real-time model, evaluate, predict and assign.

Load balancing

Redistribute vehicles in pre-engineered alternative routes.

Identify optimum routes between established origins and destinations.

Monitor, anticipate and assign.

Managing demand through diverting and routing drivers based on transportation authority's priorities and policies.



Demand management.

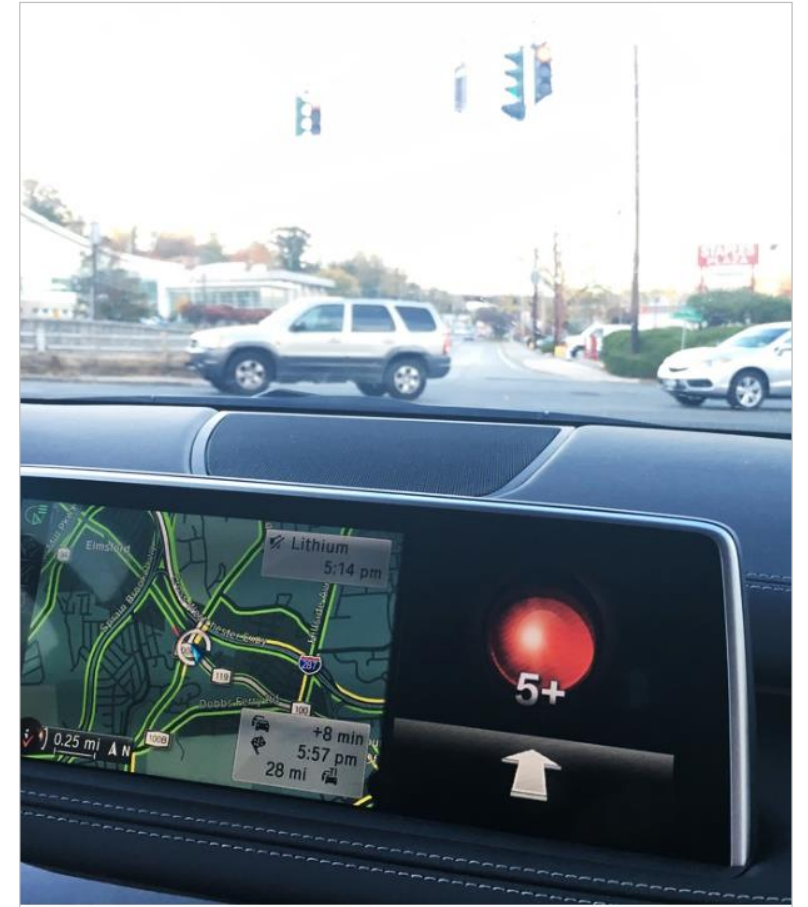
Connected travelers.



- Influence behavior
- Manage demand
- Improve traffic flow
- Reduce emissions
- Avoid risks
- Better citizen experience

Connect infrastructure – vehicle & travelers
Using precise data to dynamically manage traffic
Based on city priorities and policies
From recommended speed to prioritized routes

- Applications:
- > Green wave speed
 - > Recommended route
 - > Collaborative routing
 - > Incentives



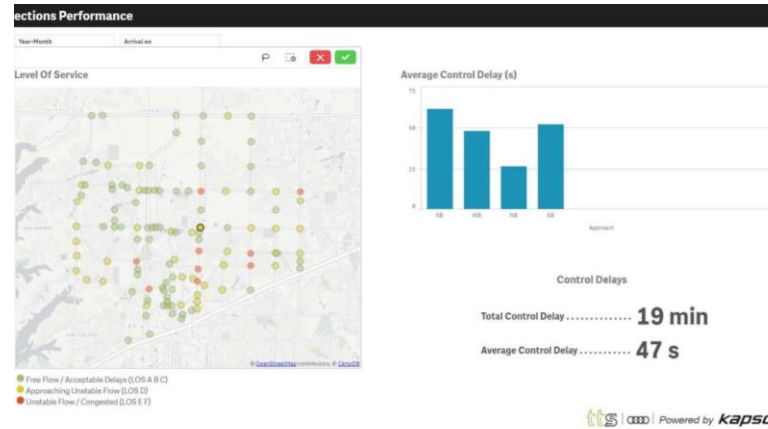
Network performance tracking.

Business intelligence.

System performance tracking

Provide system based Performance Dashboards to provide visibility of all levels of performance:

- Traffic, safety and maintenance



Traffic network evaluations

Post and live analysis of network performance dashboards displaying the impacts of the improved strategies:

- Travel times and speeds;
- Capacities;
- Corridor travel time reliability

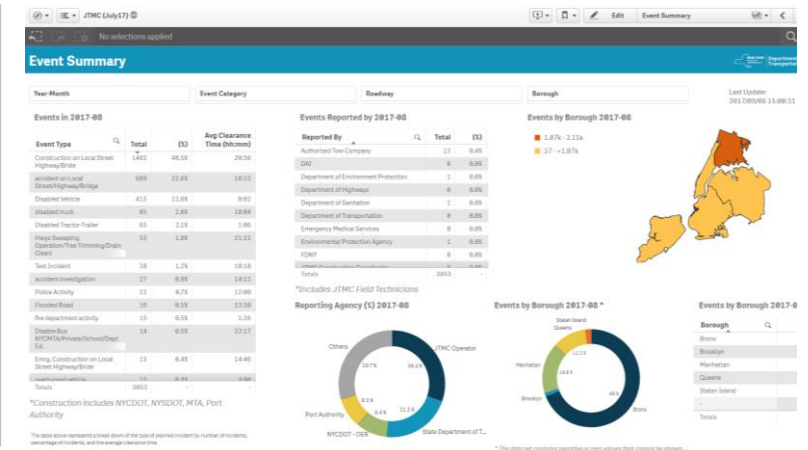
Safety tracking

Mapping of incidents and events across the network

Incident correlations to weather, time of data and geographic location. Help identify deficiencies in the network

ITS maintenance support

Providing the tools to help monitor the health of devices, identify preventative maintenance cycles, and track repair times.



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for your attention.***

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