

## Webinar: Digitalization & Automation Meet the Tolling Industry September 27, 2017

*Below are questions that were submitted during the webinar but unanswered during the live event.*

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**Q:** In a future "Mobility as Service" environment, will the cost of tolls be charged directly to the user (like on an airport limo ride) or will it be bundled into the total cost of the service (like the cost of wiper fluid or brake pads)?

**A:** Christian Kittl:

Both options are feasible and have pros and cons. I personally think that variable costs, that make up a significant portion of a service, should be charged individually. I expect mileage packages similar to data plans for mobile phones: people will buy contingents of road kilometers they plan to travel in advance as part of their mobility service, and will be able to top up anytime (but at a higher cost than of course).

**A:** Zlatan Ajanovic

I believe that Mobility as a Service will constitute a big part of transportation but private mobility will still be present in large scale. Private mobility tolling could be solved by mileage packages similar to data plans for mobile phone as Christian suggested. Mobility as a Service will probably have bundled the cost of tolls as a particular advantage of Mobility as a Service is that users don't want to think about particularities, similar to using public transport such as busses today.

Next >>

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Q: There was mention that in the future, toll equipment can be replaced with sensors. Can you elaborate a little on an example of current toll hardware that would be a good candidate to be replaced by a sensor and what the benefit would be?

A: Christian Kittl:

Ad Toll equipment can be replaced with sensors: In the future, advanced driver-assistance systems and autonomous cars will come along with more and more on-board sensors built into the vehicles used to enable for example CACC (Cooperative Adaptive Cruise Control). These sensors can not only communicate from vehicle to vehicle (V2V), but also vehicle-to-environment (V2E) so that also ETC systems can make use of them for automatic vehicle identification. And as sensors in the road surface or close to the road will be installed in a dense grid (due to the drastically lower price of the sensors and the necessary connectivity to gather data from them; e.g. these sensors will be used to gather local weather and road conditions, detect traffic jams,..) it will no longer be necessary to establish automated gates for electronic-toll lanes or cameras and video recognition technology to get the plate numbers. Rather, reliable information about the route of a vehicle will be gathered all along the way (this of course entails privacy issues, but the same holds true for example with Google Maps, which tracks the movement of a driver's mobile phone for navigation purposes).

A: Zlatan Ajanovic

In my opinion, the biggest physical change will be on gates. I believe automated vehicles will not be obligated to slow down as identification will be fast and reliable, so barriers will be obsolete. This would help to solve congestion and increase driving comfort. But, not only hardware will change but also the software, as technologies like Blockchain are demonstrating reliability and being accepted worldwide as a basis for cryptocurrencies, mean of authorization, handling transparent contracts, etc.