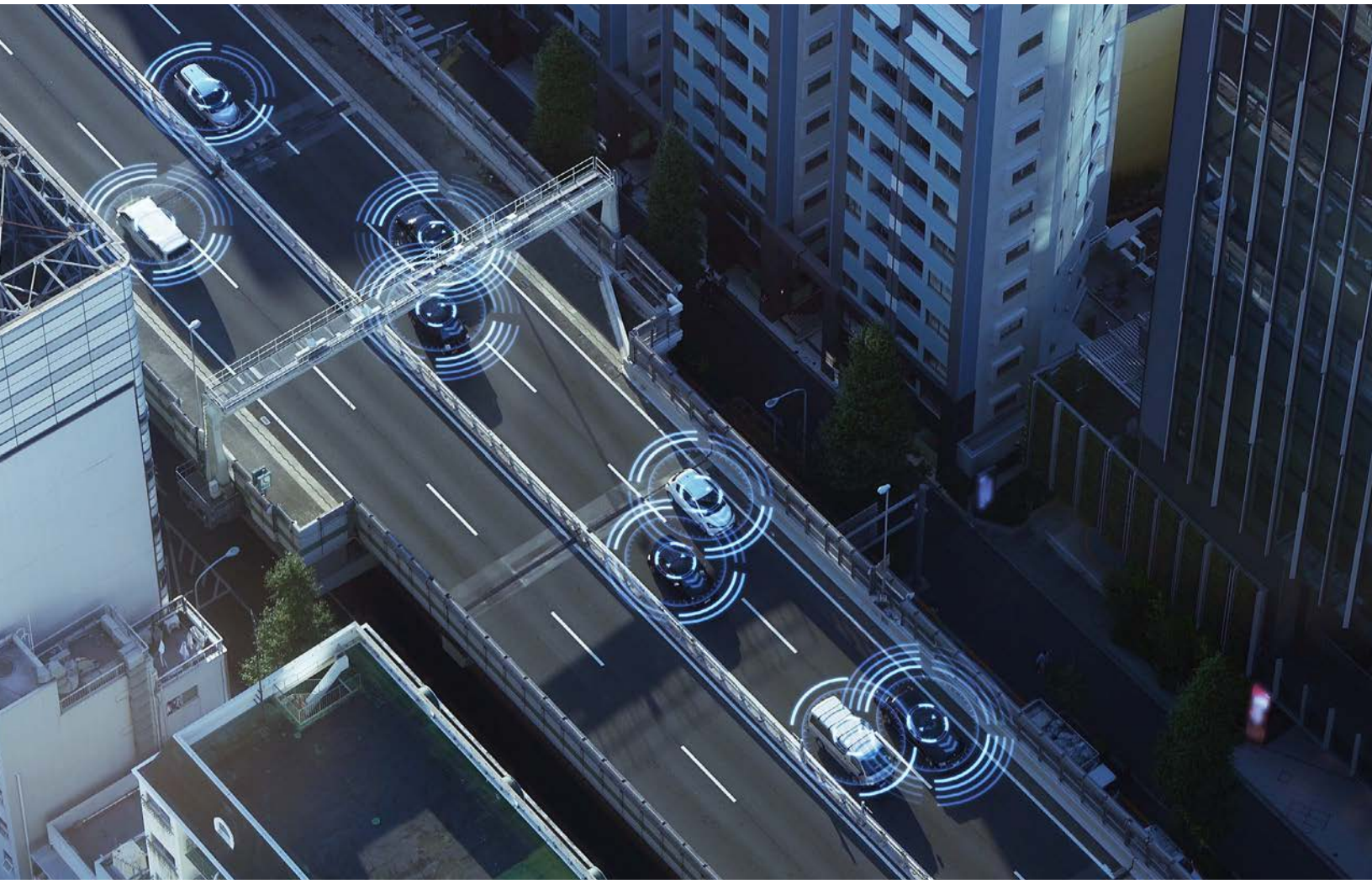

A Frost & Sullivan Virtual Think Tank

Breaking the Speed Limit: Overcoming Obstacles to Drive Connectivity

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For years, vehicles have been evolving from a simple means of transportation toward an extension of our connected lives. Today's cars and vehicle fleets are integrated with smart devices and have more computational power than most consumer computers. From these devices, automakers and tech companies are amassing deep, interwoven data lakes filled with petabytes of vehicle and consumer information that will power connected cars and services. As connectivity becomes increasingly imperative for the automotive industry, stakeholders are faced with great opportunities and significant challenges associated with managing mass volumes of data to develop the necessary technology, use cases and best practices demanded by the next generation of connected vehicle services. Before realizing the value of this data and launching profitable business cases, ecosystem participants must address the crucial data challenges of bandwidth and latency, data prioritization and computing distance.

Managing Bandwidth and Latency

Original equipment manufacturers (OEMs) must manage vehicles as mobile data platforms that will produce and send massive amounts of data. In fact, by 2025, networks will need to handle the bandwidth of multiple connected OEM fleets—connected vehicles that will likely send up to 10 exabytes of data to the cloud every month. Current computing systems and cloud networks are not optimized or able to handle the latency requirements of massive data loads in real time, forcing OEMs to address the limitations of their connected infrastructure, widespread broadband connectivity and the ongoing rollout of 5G. Moreover, automakers and industry participants must identify the best way to prioritize, collect and process mass volumes of data from connected

vehicles. “Over the years, we’re going to end up with a larger problem in front of us, more than just a big data problem,” stated Said Tabet, Automotive Edge Computing Consortium (AECC) board member and chief architect, Intelligent Connected Vehicles and AI and IoT technology lead, Dell Technologies. “We need to figure out the best way to enable businesses to innovate and be able to participate.” Each OEM, mobile network operator (MNO) and cloud provider individually create a unique connected vehicle ecosystem to address and overcome these data challenges. Yet, each different solution yields a fragmented global network functioning on a patchwork of technology.

Reducing Computational Distance

To bridge the gap between disparate technologies and networks, transportation technology leaders came together to form the AECC. The AECC is working to meet the future needs of more than 400 million connected vehicles that will eventually depend on optimized infrastructure, including cellular communication networks, Wi-Fi and satellites, for data transmission. Even the latest 5G and cloud computing methods are not optimized for effectively transmitting real-time data to and from millions of connected vehicles on a global scale. This dependency complicates seamless connectivity, as not every highway or city street will have the same level of broadband coverage. Additionally, decentralized computing methods are necessary to meet the latency and data processing speed requirements of the AECC use cases. As such, the AECC seeks to effectively augment computational speed for connected vehicles through distributed edge computing. Edge computing moves data processing closer to the source, in this case, a moving connected vehicle, to significantly reduce network latency. Rather than sending data to a centralized database or the cloud, data transmission speeds are improved by reducing the distance between processing nodes and effectively improving the quality of services. Although technology will continue to evolve, edge computing serves as a means for industry participants to set a global standard and future-proof business models through a sustainable and scalable connected vehicle ecosystem.

Prioritizing Data Streams

Beyond managing the sheer volume of data within network constraints, OEMs, MNOs, cloud providers and service providers must collaborate on how to optimize and prioritize data transmission. As vehicles become increasingly dependent on software and real-time data streams to interact with the road and each other, it is abundantly clear that automotive industry participants can no longer develop technology and use cases in silos. With that in mind, the AECC seeks to identify the best way to collect, process and prioritize big data generated by connected vehicles on an industry level. Ken-ichi Murata, President and Chairperson of the AECC and Fellow at Toyota Motor Corporation, explained, “Our interest was

to understand how such a huge amount of data from a moving vehicle can be computed and analyzed in the location nearest to the roadside to enable new services like intelligent driving, mobility-as-a-service, HD mapping and more." The consortium's goal is to comprehensively understand how mass volumes of data currently move from a vehicle to the cloud or computing centers, then codifying and implementing best practices to empower connected services depending on real-time data streams to function.

Collectively Setting Standards

AECC members take an active role in writing the script for connected services and planting the seeds for substantial future return on investment (ROI). By mobilizing mass amounts of vehicle data from major industry stakeholders, the AECC unlocks new insights and enables better practices, new business models and revenue streams. Given the automotive and telecommunication industry's long product life cycles, these entities must take a proactive approach to cross-industry collaboration. Consortia offer the means to maintain long-term success by sharing insights, technology and best practices with all industry participants. That's why the AECC collaborates with major industry associations and standards development organizations (SDOs) such as 3GPP and IIC to help foster sustainable business models and outcomes. Taking a leadership role within the AECC also allows members to mobilize resources more effectively and reduce redundancies in research and development (R&D) investment. The AECC guides initiatives regarding on-road technology. More important than developing connected vehicle business cases is setting standards across the entire industry.

Realizing the Potential of Data

The immediate benefits of connectivity are clear: safer roads, more convenient features and better driving experiences. However, the explosive proliferation of global connectivity presents dire problems for industry participants that do not collaboratively address the issues of bandwidth, computational distance and data prioritization. Murata-san states, “Without optimizing how the infrastructure handles high-volume data, the acceleration of innovative new services and applications will not be happening.” Building that infrastructure and realizing the value of uniting separate efforts between disparate technologies requires a fundamental change in approach toward data management, edge computing, data prioritization and industry collaboration. The AECC is spearheading that approach, which has the potential to shift the industry toward a collective leveraging of data to identify future-proof concepts, use cases and revenues that are not only congruent with the way that next-generation communications networks, Wi-Fi and satellite all come into play, but scaled to meet the comprehensive needs of each generation beyond.

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