

F R O S T & S U L L I V A N

2024 ENABLING TECHNOLOGY LEADER

*IN THE GLOBAL OTA
SOLUTIONS INDUSTRY*

F R O S T & S U L L I V A N

BEST
2024 PRACTICES
AWARD

 **vexcelfore**

Best Practices Criteria for World-Class Performance

Frost & Sullivan applies a rigorous analytical process to evaluate multiple nominees for each award category before determining the final award recipient. The process involves a detailed evaluation of best practices criteria across two dimensions for each nominated company. Excelfore excels in many of the criteria in the OTA solutions space.

AWARD CRITERIA	
<i>Technology Leverage</i>	<i>Customer Impact</i>
Commitment to Innovation	Price/Performance Value
Commitment to Creativity	Customer Purchase Experience
Stage Gate Efficiency	Customer Ownership Experience
Commercialization Success	Customer Service Experience
Application Diversity	Brand Equity

A Market Snapshot

The automotive sector’s growing adoption of electrification, automation, and connectivity continues to reshape customer expectations, increasingly driving the transition towards a software-centric landscape. As a result, vehicle original equipment manufacturers (OEMs) increasingly focus on software-defined

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- Gautham Hegde
Senior Research Analyst, Mobility

capabilities, such as advanced driver assistance features, infotainment innovations, intelligent connectivity solutions, and over-the-air (OTA) updates, to distinguish themselves from competitors by delivering smarter, safer, and future-proof vehicles. Specifically, OTA solutions allow automakers to remotely fix software bugs, enhance vehicle performance, introduce new features, and address security vulnerabilities without requiring vehicle owners to physically bring their vehicles to service centers. As a result, this technology significantly reduces recall expenses, improves operational efficiency, and enhances overall customer satisfaction, thereby propelling the demand for

automotive OTA solutions.

However, several factors restrain the OTA solution space's overall growth. The industry's prevalent interoperability challenges, exacerbated by the absence of a common industry standard, lead to a fragmented market with restricted communication between vehicle infrastructure from different suppliers. Moreover, the outdated vehicle architecture of older model-year vehicles consisting of electronic control units (ECUs) that do not support OTA software updates limits their usage to newer models. Similarly, weak network bandwidth, limited consumer knowledge, high solution development and integration costs, and data privacy and cybersecurity concerns restrict the widespread implementation of OTA solutions.

Within this context, standards that allow different auto manufacturers, solution developers, and suppliers to establish and maintain interoperability across systems will bring down OTA solutions' overall costs and delivery timeframes. Consequently, companies contributing to and building standardization into their offerings will outperform their competition. As a founding member of the eSync Alliance, Excelfore is a torchbearer in this regard.

eSync Alliance: Leading OTA Standard Development

Founded in 2008 and headquartered in Fremont, California, Excelfore provides an end-to-end platform for the digital lifecycle management of edge devices in the automotive sector. The company's founders leveraged their deep understanding of automotive connectivity from their prior success with an automotive technology startup to capitalize on the industry's transition to a software-centric landscape.

"As part of the eSync alliance, the company is privy to new developments in the automotive sector, enabling it to direct its software development roadmap accordingly. Equipped with this knowledge, Excelfore's dedicated team of engineers and experts tirelessly refine and expand its product offerings, addressing the dynamic automotive industry's emerging needs."

- Sama Suwal
Best Practices Research Analyst

Early on, the company realized that delivering exceptional customer experiences would require a seamless integration with the cloud, leading it to develop innovative solutions that effortlessly support the connection between in-vehicle edge devices and the cloud. Initially focused only on OTA updates, Excelfore eventually adopted a bi-directional approach that pushes OTA updates to and pulls diagnostics data from any in-vehicle edge device.

However, Excelfore recognized the evident lack of applicable industry standards to guide the development of such a capability, prompting it to join other industry leaders (such as AlpsAlpine, Hella (now

Forvia), ZF, and Molex) in creating the eSync Alliance™. Now Aptiv, CityQ, JoyNext, GuardKnox, Luxoft, Magna, Tata Communications, and other industry leaders have joined the ecosystem. The alliance works towards building a standardized bi-directional data pipeline between the cloud and in-vehicle ECUs and sensors to enable all companies in the automotive value chain to participate in the OTA space. Ultimately, the eSync Alliance strives to create a unified standard that spans cloud-to-car-to-device connectivity, vehicle gateways, data management, and middleware with end-to-end cybersecurity. Excelfore champions this common standard for the OTA industry as a founding member of the alliance.

Today, Excelfore offers secure standards-based in-vehicle and cloud-to-vehicle connectivity solutions and comprehensive cloud-based device management applications for software-defined vehicles (SDVs). These solutions enable automotive companies to confidently navigate the complexities of the digital era and unlock new opportunities to excel in an increasingly connected and software-driven world. Excelfore leverages a qualified team of 100+ people to power over 17 million vehicles with more than 100 million edge devices globally as a part of its **SDVconnect** suite of products.

Most importantly, Excelfore continues to drive connectivity and innovation in the SDV space. As a part of the eSync Alliance, the company is privy to new developments in the automotive sector, enabling it to direct its software development roadmap accordingly. Equipped with this knowledge, Excelfore's dedicated team of engineers and experts tirelessly refine and expand its product offerings, addressing the dynamic automotive industry's emerging needs. With over 10 patents, the company's strong intellectual property portfolio upholds its technological leadership, placing a high entry barrier for competitors. As a result, Excelfore has earned global recognition for its innovative technology and cutting-edge solutions, positioning it as a trusted partner to leaders across the automotive industry.

Excelfore: Powering Software-defined Vehicle Connectivity

Fully implementing the eSync Alliance standard, Excelfore offers its **eSync OTA** product as a secure bi-directional server-client-agent architecture to push updates from the cloud to in-vehicle devices and pull data from those devices to the cloud. This product empowers customers with a consistent approach to updating all the programmable devices in their vehicles, regardless of complexity. Similarly, the eSync pipeline is highly fault-tolerant, allowing interrupted streams to continue from the latest checkpoint. Moreover, the product leverages the company's adaptive data compression technology to reduce payload size by up to 95%¹, significantly decreasing operating costs and preventing excessive vehicle downtimes.

Excelfore's proven eSync OTA solution helps customers maximize their products' potential by offering several unique benefits²:

- **Best-in-class security:** The eSync OTA data pipeline incorporates the industry best practice "zero trust" model to ensure secure delivery and verification of software updates and parameter files. To this end, the company employs mutual authentication, layered defenses, and payload encryption at rest and in transit to safeguard data security.
- **Flexibility and scalability:** The product employs distributed agents to carry out update tasks specific to each edge device, encapsulating a device's unique requirements into its designated agent. Proven to update all popular automotive operating systems, the eSync OTA product scales to serve as many devices as desired (With eSync there is no technical limit, but the largest commercial deployment so far is 65.).
- **Future-proofing and innovation:** Excelfore's eSync OTA allows automotive customers to utilize connectivity to ensure all in-vehicle devices adapt to evolving market needs throughout the

¹ <https://excelfore.com/esync-ota#features>, accessed November 2023.

² <https://excelfore.com/esync-ota#benefits>, accessed November 2023.

product lifecycle. Furthermore, the solution future-proofs customer products by preparing them for new features, technical capabilities, and requirements.

- **Time and cost savings:** The full-vehicle OTA solution expedites solution development (with OEM integration projects completed in as little as four months) and optimizes costs by reducing manual updates and product recalls.

In addition to the eSync OTA solution, Excelfore's other key **SDVconnect** products include:

- **eDatx** helps automotive OEMs harness the power of deep data aggregation by allowing them to capture data efficiently from connected vehicles' edge devices, enhance system efficiencies, and enable robust artificial intelligence analytics and data monetization.
- **TSN/AVB** empowers SDVs with Excelfore's Ethernet time-sensitive networking (TSN), ensuring high-performance networking and guaranteed latencies and bandwidth essential for safety-critical automotive applications.
- Excelfore's most recent launch, **Features-on-Demand**, optimizes vehicle ownership, enabling OEMs to manage payment integrations and execute targeted OTA campaigns while facilitating customer access to new features.

Frost & Sullivan commends Excelfore for empowering automotive OEMs to excel in a progressively more connected software-driven landscape with its evolving product portfolio, unmatched engineering excellence, and continual market-driven innovation. The company continues to shape the future of automotive technology, differentiating itself in the highly competitive OTA space.

Roadmap to Success: Customer-centric, Continuous, Proactive

Since its inception, Excelfore's sterling reputation and customer-centric framework have led to its coveted status as a preferred partner to companies across the automotive ecosystem. The company's strategic partners include market leaders such as Amazon Web Services (AWS), Google Cloud, Azure Microsoft Solutions, NXP, Siemens, and Green Hills Software. Besides offering industry-leading OTA solutions, Excelfore collaborates closely with these partners, customers, and other industry stakeholders to drive innovation and collective progress.

Excelfore extends its solutions to meet diverse customer segments' specific needs:

- **Passenger Vehicles:** Automotive OEMs can implement Excelfore's full-vehicle OTA, a technology already deployed in millions of cars, to reduce recalls by delivering software updates over the air, thus saving costs and improving the customer experience.
- **Commercial Vehicles:** Automakers can strategically leverage connectivity to optimize fleet performance and ensure regulatory compliance through on-demand OTA updates.
- **Autonomous Vehicles:** Customers can harness extensive fleet data using Excelfore's interactive learning loop to enhance autonomous algorithms continuously.
- **Agriculture & Construction:** OEMs can upgrade agricultural and construction equipment with robust data connectivity, enabling predictive analytics and efficient asset management.
- **Smart Batteries:** Battery manufacturers for electric vehicles can now rethink energy storage and management by plugging in to data connectivity to manage their deployment across automakers.

- **Charging Stations:** With Excelfore's innovative solutions, customers can standardize the cloud connectivity for their Internet of Things-enabled charging stations, ensuring seamless OTA interactions between telecommunications and infotainment units.

Excelfore builds on these value propositions by offering optimal price/performance value to deliver exceptional customer experiences. To this end, the company provides multiple pricing models (one-time, usage-based, and subscription models), aligning its prices based on its OEM customers' perspective and market competition. Moreover, Excelfore's lean organizational structure enables it to offer highly competitive pricing to win customers and strategic partners, especially those the company views as desirable.

As a result, Excelfore has added a range of new customers to its established base over the years. The company boasts of an impressive customer portfolio with 20+ OEMs, including some of the most notable names in the automotive industry, such as Audi, Volkswagen, BMW, Maruti Suzuki, FAW, VinFast, GAC Motors, and Stellantis. Excelfore's success with bagging these prominent customers is a testament to its engineering expertise and its solutions' differentiated capabilities, as the company primarily relies on word-of-mouth accolades and client referrals to drive its customer acquisition efforts.

Use Case Example: Ficosa for Maruti Suzuki

Ficosa, the telematic control unit (TCU) supplier to various Maruti Suzuki India Ltd. (MSIL) vehicles, needed a future-proof, affordable, and low-bandwidth network-compatible solution to update MSIL cars' TCUs while avoiding software-related recalls' high costs and inconvenience. The company chose Excelfore's eSync on the AWS cloud as the optimal solution to address these specific requirements. The scalable and secure platform facilitates efficient OTA updates for TCUs and other connected devices in MSIL vehicles, improving connectivity, reducing overall costs, and supporting the solution's future growth.³

"We chose the eSync OTA platform because it provides a robust, secure vehicle-to-cloud data pipeline that is compatible with multiple operating systems and in-vehicle networks. This gives us the flexibility and scalability to adapt and grow the solution over future years, and to add OTA updating for more components."

- Joan Palacin, Advanced Communications Business Unit Director at Ficosa⁴

Excelfore's dedication to advancing connectivity and the automotive industry's future drives its growth trajectory. The company's lean organizational structure with minimal overheads enables it to stay cash-positive. Moreover, Excelfore continues to enjoy robust uptake from the automotive sector, with growing interest from other industries, such as the medical and battery management sectors. Frost & Sullivan believes the company is well-positioned to drive the OTA solutions space into its next growth phase, capturing market share and sustaining its leadership in the coming years.

³ <https://excelfore.com/blog/combining-experience-and-excellence-for-the-global-automotive-industry-2>, accessed November 2023.

⁴ Ibid.

Conclusion

Technology integration is a critical success factor for the over-the-air (OTA) solutions industry. Yet, with many options available, market stakeholders need to leverage the most appropriate and best technology-based solutions to optimize their market impact.

Excelfore offers secure standards-based in-vehicle and cloud-to-vehicle connectivity solutions and comprehensive cloud-based device management applications for software-defined vehicles. These solutions enable automotive companies to confidently navigate the complexities of the digital era and unlock new opportunities to excel in an increasingly connected and software-driven world. Specifically, Excelfore's eSync OTA product fully implements the eSync Alliance standard to offer a bi-directional server-client-agent architecture to push updates from the cloud to in-vehicle devices and pull data from those devices to the cloud. The proven product empowers customers to maximize their products' potential by offering best-in-class security, unmatched flexibility and scalability, future-proofing capabilities, and market-leading time and cost savings.

Excelfore stands out from competitors based on its commitment to innovation, creativity, and engineering excellence with far-reaching impact and application. The company pairs its technology focus with customer-centric values, thus earning a solid reputation in the OTA solutions market.

With its strong overall performance, Excelfore earns Frost & Sullivan's 2023 Global Enabling Technology Leadership Award in the OTA solutions industry.

What You Need to Know about the Enabling Technology Leadership Recognition

Frost & Sullivan's Enabling Technology Leadership Award recognizes the company that applies its technology in new ways to improve existing products and services and elevate the customer experience.

Best Practices Award Analysis

For the Enabling Technology Leadership Award, Frost & Sullivan analysts independently evaluated the criteria listed below.

Technology Leverage

Commitment to Innovation: Continuous emerging technology adoption and creation enables new product development and enhances product performance

Commitment to Creativity: Company leverages technology advancements to push the limits of form and function in the pursuit of white space innovation

Stage Gate Efficiency: Technology adoption enhances the stage gate process for launching new products and solutions

Commercialization Success: Company displays a proven track record of taking new technologies to market with a high success rate

Application Diversity: Company develops and/or integrates technology that serves multiple applications and multiple environments

Customer Impact

Price/Performance Value: Products or services provide the best value for the price compared to similar market offerings

Customer Purchase Experience: Quality of the purchase experience assures customers that they are buying the optimal solution for addressing their unique needs and constraints

Customer Ownership Experience: Customers proudly own the company's product or service and have a positive experience throughout the life of the product or service

Customer Service Experience: Customer service is accessible, fast, stress-free, and high quality

Brand Equity: Customers perceive the brand positively and exhibit high brand loyalty

