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FROST & SULLIVAN BEST PRACTICES AWARD

EDGE INTELLIGENCE PLATFORM FOR ENTERPRISES - NORTH AMERICA

Technology Innovation Award 2019

SMART EDGE

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2019 BEST PRACTICES AWARD

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Background and Company Performance

Industry Challenges

Many cloud-based applications employ a data center as a central server to process data from devices, such as smartphones, tablets, wearables, and sensors. The Internet of Things (IoT) is generating an unprecedented volume and variety of data, which is then transferred to servers to store and process. Frost & Sullivan notes that this entire activity involves high data storage and maintenance costs for enterprises and is unable to generate real-time insights, on which the opportunity to act could be missed.

In industries such as manufacturing, retail, healthcare, oil and gas, utilities, transportation, mining, and the public sector, accessing the data and generating insights in real time can help businesses reduce the time taken to respond to equipment failure, with improved safety. Frost & Sullivan notes that today's cloud models are not designed to handle the volume, velocity, and variety of data that IoT generates, clearly depicting the need for a new computing model that can minimize the latency in transferring and processing data generated from sensors in real time.

In edge computing, data processing occurs close to the source of activity. Processing data at the edge reduces the latency of transferring data from the source to processing units, which is ideal for use cases that require real-time, rapid responses. Organizations report to Frost & Sullivan how they are looking to differentiate themselves from their competitors and stay ahead by generating real-time insights from data, thereby helping enterprises to improve response times.

Frost & Sullivan's ongoing research shows that current solutions that depend on high-cost data centers and outdated cloud models are not minimizing the latency in transferring the data from endpoints to servers - and often fail to reduce response times.

Technology Attributes and Future Business Value

Industry Impact

US-based Smart Edge developed an edge application platform that enables reliable and deterministic access to enterprise applications at the edge. This innovative multi-access edge computing (MEC) platform brings the data center's computation or processing power, storage, and networking capabilities on-premise across the enterprise.

Smart Edge's MEC platform enables faster response times with the data, and computation capabilities are distributed and made local. In addition, edge computing helps manufacturers stop critical machine operations from breaking down when hazardous incidents occur. The MEC computing model decentralizes the network and allows any enterprise or mobile operator to place a cloud at the network edge adjacent to the user.

Frost & Sullivan appreciates Smart Edge's leadership initiative in reducing the time taken to transfer, process, and act on the data generated through sensors. Smart Edge's MEC approach enables applications to be deployed across the network (instead of run in the data center), thereby reducing or avoiding the cost to maintain and run energy-consuming data centers.

Product Impact

Smart Edge's MEC platform moves the computation of traffic and services from a centralized cloud to the edge of the network that is closer to the customer. For example, the platform is built on low-latency edge cloud services architecture, thus delivering applications to and from the cloud quickly.

Furthermore, Smart Edge developed its all-in one hardware and software solution (MEC Controller and MEC Appliance) to decentralize the network and the cloud, enabling data computation at the edge of the network. Smart Edge's MEC Controller and MEC Appliance are built on high-performing Intel scalable processors with a small footprint and a depth of less than 18 inches, which is configurable for a classic rack mount or as a standalone unit to fit any use across vertical markets and working environments. Moreover, Smart Edge's MEC devices provide security with fast encryption powered by Intel QuickAssist Technology, accelerating security and data compression tasks by offloading data to hardware that can optimize the functions.

Smart Edge's MEC solution comprises its Smart Edge appliance and controller, with the appliance software running on a virtualized server based on Intel architecture CPUs at the mobile network. The Smart Edge appliance hosts virtualized network functions for customer enterprise services and boasts built-in content delivery network (CDN) intelligence for caching and distributing content. In addition, the solution can collect and display service-quality analytics.

Smart Edge MEC Controller is a software-defined networking system integrated with 3GPP and gateway functionality and includes the custom-developed core services platform that allows the controller to interact with Smart Edge nodes and applications. The core services of the controller platform include lifecycle and configuration management of appliance firmware and software, capacity planning, and centralized reporting.

Frost & Sullivan firmly believes that Smart Edge's MEC Controller and MEC Appliance offer breakthrough performance in bringing computing power to the edge by minimizing the latency and controlling network bandwidth.

Visionary Innovation and Application Diversity

Smart Edge's approach in reducing the lag time in data processing and transmission using MEC, combined with Intel processors, provides scalable and cost-effective solutions for

enterprises. MEC is a new services architecture that delivers overlay IT and cloud computing capabilities from servers deployed near mobile base stations, small cells, and eNodeB on-premise throughout the enterprise. Smart Edge can host any cloud-based application using MEC servers, including retail marketing and operations, heavy enterprise applications involving machine-to-machine learning, IoT, connected vehicles, and augmented reality (AR) games.

Furthermore, Smart Edge's MEC platform can analyze network and application performance data and act on the insights, without sending data to a remote cloud data center for processing. The platform is embedded with capabilities including performing real-time analytics. By deploying Smart Edge's MEC platform, Frost & Sullivan points out that customers can improve application performance, accelerate responsiveness, decrease data transmission costs, lower risks, and leverage context-aware content.

The company's MEC platform can be inserted into LTE networks and supports unlicensed wireless access technologies. Because the application environment is adjacent to users, virtual applications can be managed and modified at the edge for over-the-air data transmission and enable an as-a-service ecosystem. MEC Appliance is ideal for retail stores, mobile network operators (MNOs), warehouses, airport terminals, hospitals, campuses, casinos, concert arenas, and sports venues.

Frost & Sullivan's own market benchmarking research shows that this MEC platform's close proximity to end users reduces latency, resulting in both improved application performance and response times. Smart Edge's MEC platform, powered by Intel processers and QuickAssist Technology, provides the necessary performance for data crunching applications, such as AR/virtual reality (VR), video streaming, and voice-based services.

Customer Acquisition and Technology Licensing

Smart Edge's MEC solution uses Intel technologies - Intel Xeon and Atom® Processors, Intel storage, and networking technologies - that distinguish customers in various sectors, including retail, telecom, manufacturing, and enterprises in the marketplace, in the way that they use Smart Edge-based services to improve their customer engagement. For example, Smart Edge enables retailers to deliver new services and a positive customer experience through location-based, personalized ads and offers signage and next-generation immersive technologies. Moreover, the benefits help mobile network operators cut costs and improve security, while unlocking new revenue opportunities.

The pricing of Smart Edge's software platform is based on the size of the customer and the number of services and processors that are required to optimize their performance. The Smart Edge solution can scale down for smaller retailers or even pop-ups and scale up to meet the needs of the largest retailers.

Frost & Sullivan expects that proper utilization of MEC networking, combined with Intel technologies, will enable Smart Edge to move from a startup to a high-growth edge computing company that delivers highly secure, low-latency applications at the network's edge.

Conclusion

Smart Edge's MEC platform empowers enterprises to provide differentiated services, such as optimized, high-priority content and applications at the edge. Smart Edge offers localized deployments of fast, agile customer-facing applications. In addition, the company provides analytics, caching computation, and traffic routing built on micro servers, and its solution is security focused, with high encryption and integrity.

Frost & Sullivan analysis concludes that Smart Edge's MEC software and hardware (MEC Controller and MEC Appliance) will have a significant impact on providing real-time insights to enterprises, while minimizing latency issues and controlling network bandwidth.

With its strong overall performance, Smart Edge has earned the 2019 Frost & Sullivan Technology Innovation Award.

Significance of Technology Innovation

Ultimately, growth in any organization depends upon finding new ways to excite the market and upon maintaining a long-term commitment to innovation. At its core, technology innovation, or any other type of innovation, can only be sustained with leadership in three key areas: understanding demand, nurturing the brand, and differentiating from the competition.

Understanding Technology Innovation

Technology innovation begins with a spark of creativity that is systematically pursued, developed, and commercialized. This spark can result from a successful partnership, a productive in-house innovation group, or a bright-minded individual. Regardless of the source, the success of any new technology is ultimately determined by its innovativeness and its impact on the business as a whole.

Key Benchmarking Criteria

For the Technology Innovation Award, Frost & Sullivan analysts independently evaluated two key factors—Technology Attributes and Future Business Value—according to the criteria identified below.

Technology Attributes

Criterion 1: Industry Impact
Criterion 2: Product Impact
Criterion 3: Scalability
Criterion 4: Visionary Innovation
Criterion 5: Application Diversity

Future Business Value

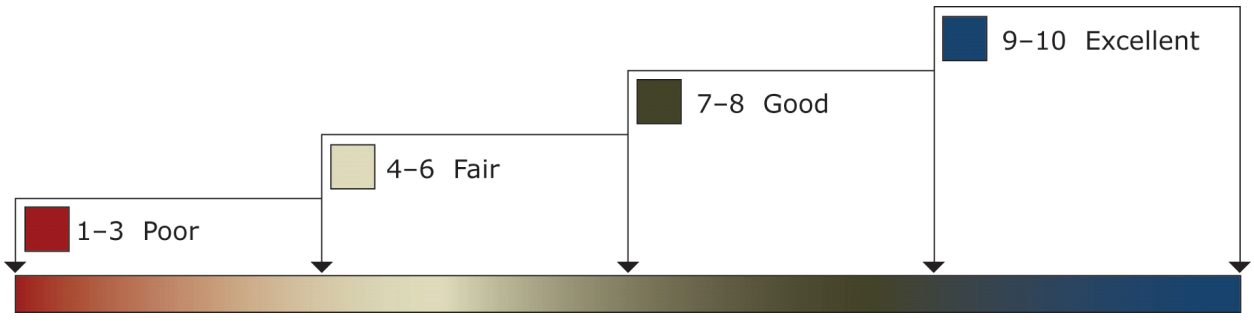
Criterion 1: Financial Performance
Criterion 2: Customer Acquisition
Criterion 3: Technology Licensing
Criterion 4: Brand Loyalty
Criterion 5: Human Capital

Best Practices Award Analysis for Smart Edge

Decision Support Scorecard

To support its evaluation of best practices across multiple business performance categories, Frost & Sullivan employs a customized Decision Support Scorecard. This tool allows our research and consulting teams to objectively analyze performance, according to the key benchmarking criteria listed in the previous section, and to assign ratings on that basis. The tool follows a 10-point scale that allows for nuances in performance evaluation. Ratings guidelines are illustrated below.

RATINGS GUIDELINES



The Decision Support Scorecard is organized by Technology Attributes and Future Business Value (i.e., These are the overarching categories for all 10 benchmarking criteria; the definitions for each criterion are provided beneath the scorecard.). The research team confirms the veracity of this weighted scorecard through sensitivity

analysis, which confirms that small changes to the ratings for a specific criterion do not lead to a significant change in the overall relative rankings of the companies.

The results of this analysis are shown below. To remain unbiased and to protect the interests of all organizations reviewed, we have chosen to refer to the other key participants as Competitor 2 and Competitor 3.

Measurement of 1–10 (1 = poor; 10 = excellent)			
Technology Innovation	Technology Attributes	Future Business Value	**Average Rating**
Smart Edge	**9.0**	**9.0**	**9.0**
Competitor 2	9.0	7.0	8.0
Competitor 3	8.0	7.0	7.5

Technology Attributes

Criterion 1: Industry Impact

Requirement: Technology enables the pursuit of groundbreaking ideas, contributing to the betterment of the entire industry.

Criterion 2: Product Impact

Requirement: Specific technology helps enhance features and functionalities of the entire product line for the company.

Criterion 3: Scalability

Requirement: Technology is scalable, enabling new generations of products over time, with increasing levels of quality and functionality.

Criterion 4: Visionary Innovation

Requirement: Specific new technology represents true innovation based on a deep understanding of future needs and applications.

Criterion 5: Application Diversity

Requirement: New technology serves multiple products, multiple applications, and multiple user environments.

Future Business Value

Criterion 1: Financial Performance

Requirement: Potential is high for strong financial performance in terms of revenues, operating margins, and other relevant financial metrics.

Criterion 2: Customer Acquisition

Requirement: Specific technology enables acquisition of new customers, even as it enhances value to current customers.

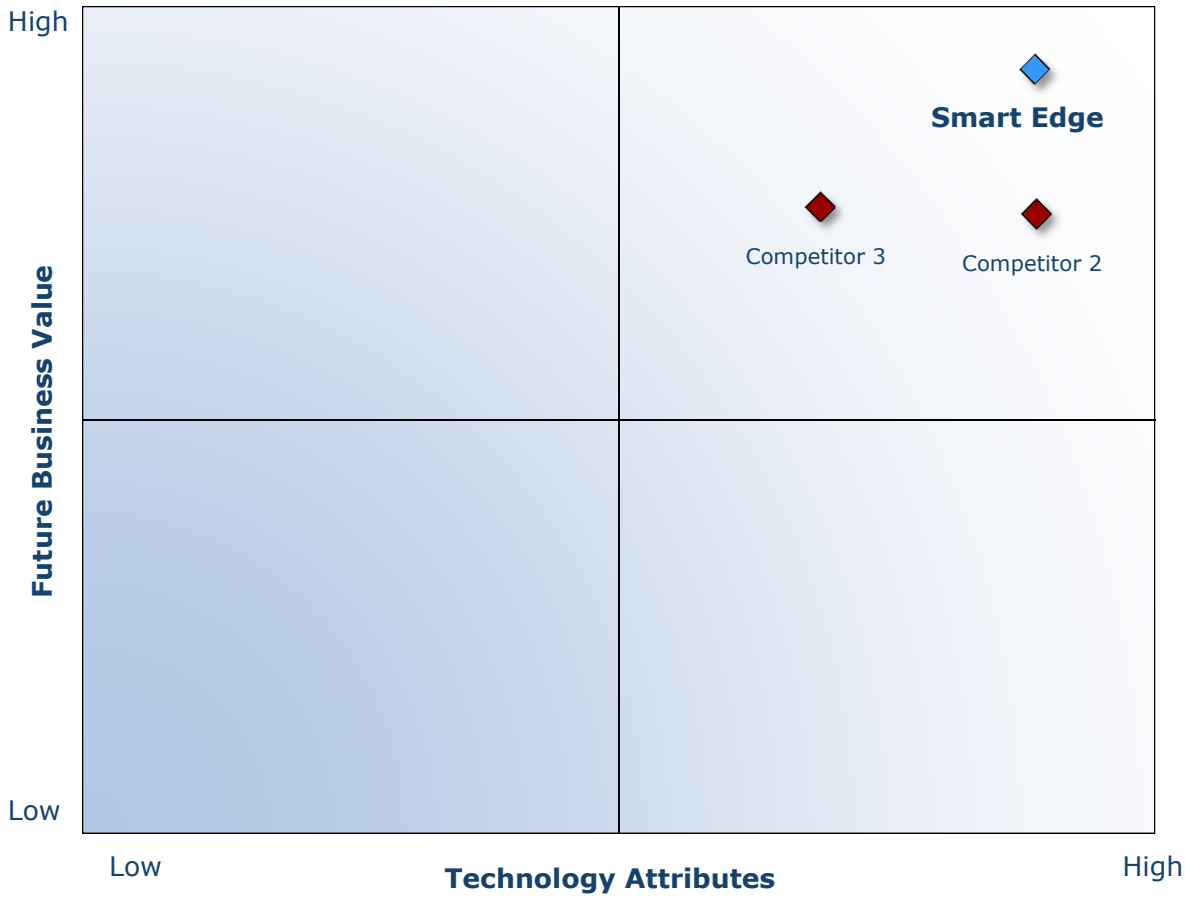
Criterion 3: Technology Licensing
Requirement: New technology displays great potential to be licensed across many sectors and applications, thereby driving incremental revenue streams.

Criterion 4: Brand Loyalty
Requirement: New technology enhances the company's brand, creating and/or nurturing brand loyalty.

Criterion 5: Human Capital
Requirement: Customer impact is enhanced through the leverage of specific technology, translating into positive impact on employee morale and retention.

Decision Support Matrix

Once all companies have been evaluated according to the Decision Support Scorecard, analysts then position the candidates on the matrix shown below, enabling them to visualize which companies are truly breakthrough and which ones are not yet operating at best-in-class levels.



Best Practices Recognition: 10 Steps to Researching, Identifying, and Recognizing Best Practices

Frost & Sullivan analyst follow a 10-step process to evaluate Award candidates and assess their fit with select best practice criteria. The reputation and integrity of the Awards are based on close adherence to this process.

STEP		OBJECTIVE	KEY ACTIVITIES	OUTPUT
1	**Monitor, target, and screen**	Identify Award recipient candidates from around the globe	• Conduct in-depth industry research • Identify emerging sectors • Scan multiple geographies	Pipeline of candidates who potentially meet all best-practice criteria
2	**Perform 360-degree research**	Perform comprehensive, 360-degree research on all candidates in the pipeline	• Interview thought leaders and industry practitioners • Assess candidates' fit with best-practice criteria • Rank all candidates	Matrix positioning of all candidates' performance relative to one another
3	**Invite thought leadership in best practices**	Perform in-depth examination of all candidates	• Confirm best-practice criteria • Examine eligibility of all candidates • Identify any information gaps	Detailed profiles of all ranked candidates
4	**Initiate research director review**	Conduct an unbiased evaluation of all candidate profiles	• Brainstorm ranking options • Invite multiple perspectives on candidates' performance • Update candidate profiles	Final prioritization of all eligible candidates and companion best-practice positioning paper
5	**Assemble panel of industry experts**	Present findings to an expert panel of industry thought leaders	• Share findings • Strengthen cases for candidate eligibility • Prioritize candidates	Refined list of prioritized Award candidates
6	**Conduct global industry review**	Build consensus on Award candidates' eligibility	• Hold global team meeting to review all candidates • Pressure-test fit with criteria • Confirm inclusion of all eligible candidates	Final list of eligible Award candidates, representing success stories worldwide
7	**Perform quality check**	Develop official Award consideration materials	• Perform final performance benchmarking activities • Write nominations • Perform quality review	High-quality, accurate, and creative presentation of nominees' successes
8	**Reconnect with panel of industry experts**	Finalize the selection of the best-practice Award recipient	• Review analysis with panel • Build consensus • Select recipient	Decision on which company performs best against all best-practice criteria
9	**Communicate recognition**	Inform Award recipient of Award recognition	• Present Award to the CEO • Inspire the organization for continued success • Celebrate the recipient's performance	Announcement of Award and plan for how recipient can use the Award to enhance the brand

STEP	OBJECTIVE	KEY ACTIVITIES	OUTPUT
10 **Take strategic action**	Upon licensing, company is able to share Award news with stakeholders and customers	• Coordinate media outreach • Design a marketing plan • Assess Award's role in future strategic planning	Widespread awareness of recipient's Award status among investors, media personnel, and employees

The Intersection between 360-Degree Research and Best Practices Awards

Research Methodology

Frost & Sullivan's 360-degree research methodology represents the analytical rigor of our research process. It offers a 360-degree-view of industry challenges, trends, and issues by integrating all 7 of Frost & Sullivan's research methodologies. Too often companies make important growth decisions based on a narrow understanding of their environment, leading to errors of both omission and commission. Successful growth strategies are founded on a thorough understanding of market, technical, economic, financial, customer, best practices, and demographic analyses. The integration of these research disciplines into the 360-degree research methodology provides an evaluation platform for benchmarking industry participants and for identifying those performing at best-in-class levels.

360-DEGREE RESEARCH: SEEING ORDER IN THE CHAOS

About Frost & Sullivan

Frost & Sullivan, the Growth Partnership Company, enables clients to accelerate growth and achieve best-in-class positions in growth, innovation and leadership. The company's Growth Partnership Service provides the CEO and the CEO's Growth Team with disciplined research and best practice models to drive the generation, evaluation and implementation of powerful growth strategies. Frost & Sullivan leverages more than 50 years of experience in partnering with Global 1000 companies, emerging businesses, and the investment community from 45 offices on six continents. To join our Growth Partnership, please visit http://www.frost.com.