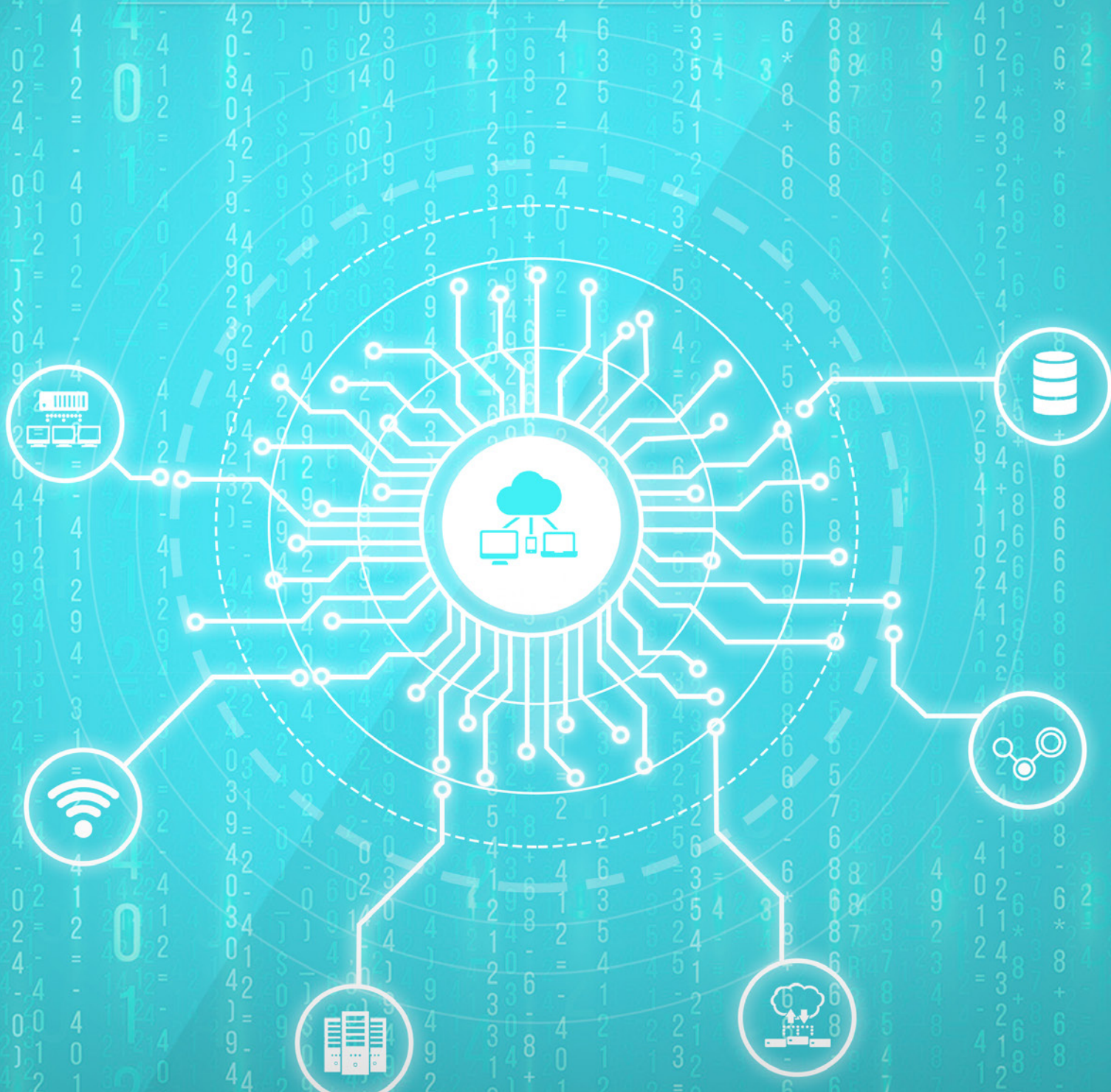


EDGE COMPUTING

REDEFINING AND POWERING CLOUD TECHNOLOGY

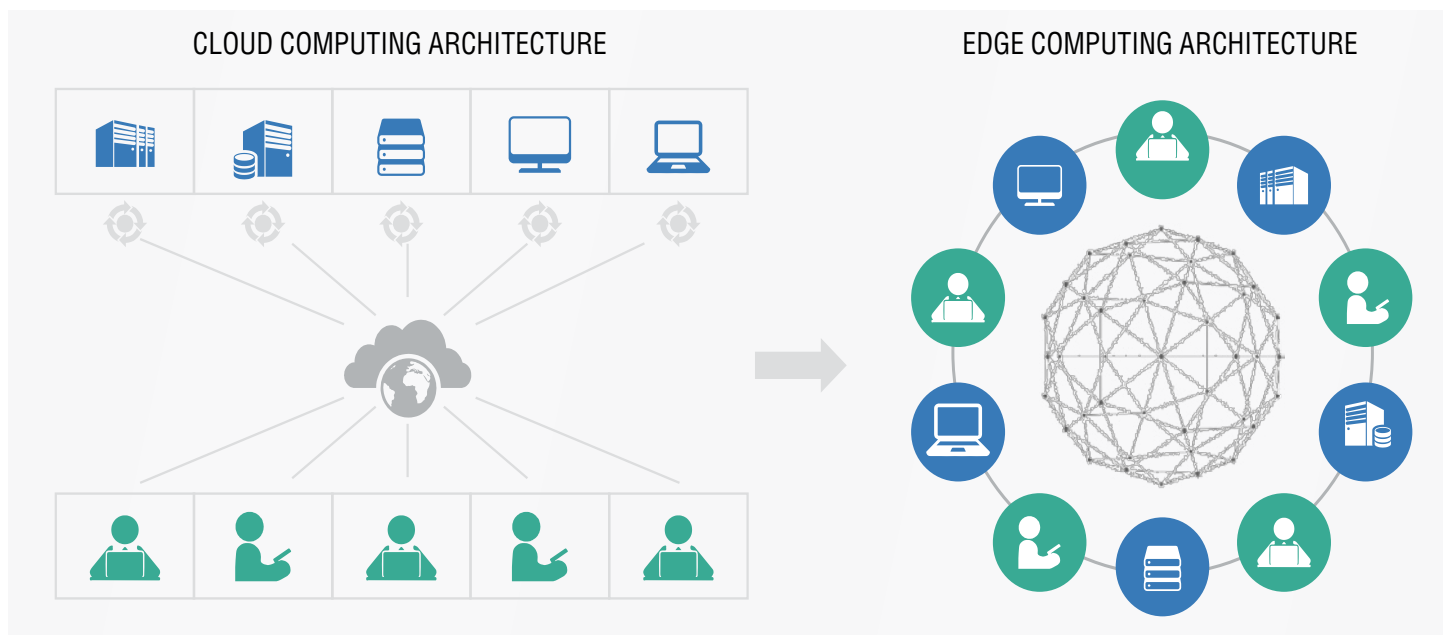




Edge computing is a revolutionary technology that moves processes and storage to the device at the edge of the network, to make the cloud more efficient. Edge computing assists real-time applications in processing and analyzing data collected from various sensors and connected devices at the edge of the network. The data transmitted from the sensors and devices is stored and processed on the edge of the network, close to the devices, instead of being transferred to the cloud or data centers located miles away from the connected devices. It reduces latency and, thereby, provides a faster response to critical applications.

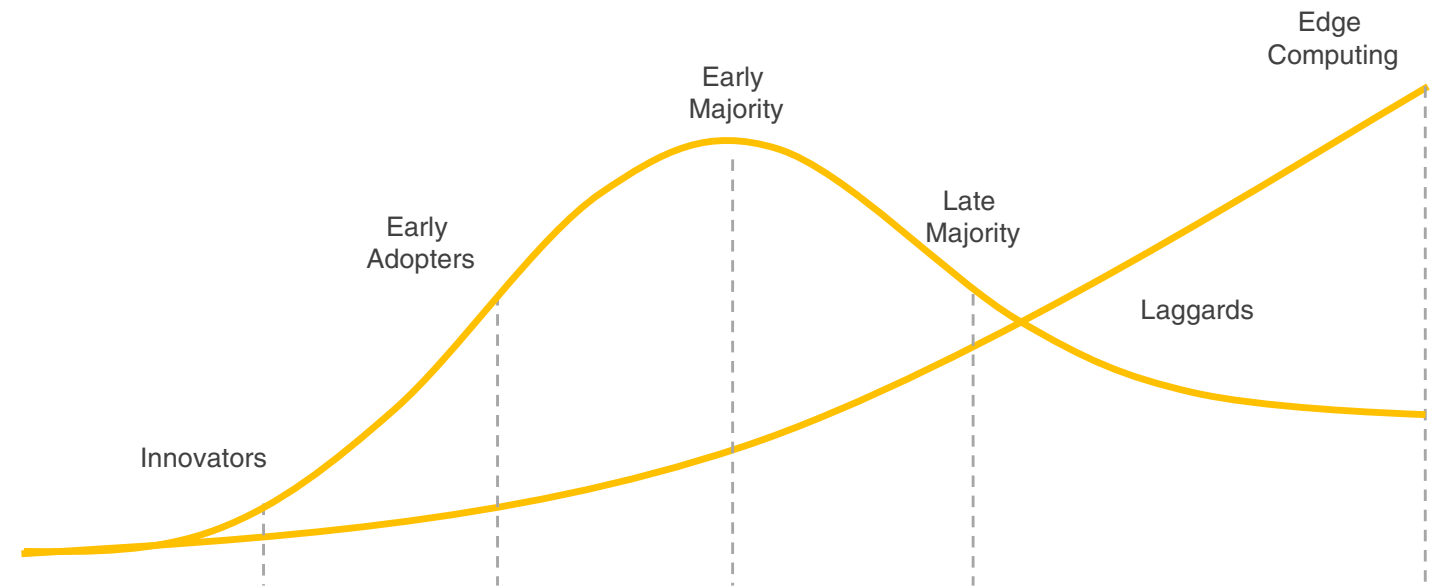
Use of Internet of Things (IoT) devices is significantly changing the digital journey of organizations, globally. An IoT device produces large volumes of data per second. With growth in adoption of 5G technology, the volume and velocity of data will also increase rapidly. At the same time, streaming all this information to the cloud or a data center for processing will also become inconvenient. In edge computing, critical data processing occurs at the data source rather than in a centralized cloud-based location. To conclude, the concept of edge computing has come into existence to enhance cloud computing efficiency, i.e., to reduce latency for faster decision making.

FIGURE: SHIFTING ARCHITECTURE FROM CENTRALIZED (CLOUD) TO HYPERCONNECTED (EDGE) COMPUTING



Edge computing is changing the way cloud computing works, while complementing cloud in numerous ways. Unlike traditional cloud computing architecture, which is based on centralized storage and processing concept i.e., hyper connected devices (as shown in the above figure). The large volumes of data generated by IoT devices are processed at the network edge (local network), instead of centralized cloud servers. The shift in the processing provides precise results and consumes far less network bandwidth. It results in quicker response and greater quality.

FIGURE: EDGE SOLUTIONS REPRESENT NEXT WAVE OF ADOPTION



According to MarketsandMarkets, approximately 70% of organizations now use cloud computing in some fashion and thus we believe that cloud adoption has reached the early majority of the bell curve. With cloud adoption at the early majority, new and better solutions like edge computing are now emerging.

REQUIREMENTS OF EDGE COMPUTING

Edge computing has evolved as an effective way to reduce latency, therefore facilitating critical applications and faster responses. According to MarketsandMarkets, the global edge computing market is expected to grow from USD 1,478.8 million in 2017 to USD 6,727.4 million by 2022, at a CAGR of 35.4% during the forecast period. Edge computing is expected to witness increasing demand across different industry verticals, due to the proliferation of cloud and IoT in the manufacturing, healthcare, telecom and IT, retail, and energy and utilities verticals. Also growing load on cloud computing and advent of 5G network is expected to encourage edge computing initiatives.

A range of factors, such as requirements for secure file sync and transfer, low latency in decision making, support to mobile users, infrastructure for complex systems, and distributed application in industries, and infrastructure to manage complex systems are driving the adoption of edge computing.

- **SECURE FILE SYNC AND TRANSFER:** Keeping data/files safe is a high priority for organizations. Organizations need to make sure that all their important and confidential data does not get duplicated, copied, or synced to third parties or secondary locations. Well-defined policies and other mechanisms for authentication and authorization running on the edge computing network are proposed to enable fast adaptability of the systems.
- **ULTRA LOW LATENCY IN DECISION-MAKING:** As mentioned earlier, IoT devices are generating massive amounts of data per millisecond. Reducing the time needed to move data from devices to the cloud and back within a millisecond is the key requirement. Applications such as facial recognition, language processing, and obstacle avoidance need a minimal latency.
- **SUPPORT TO MOBILE USERS:** A few sectors, such as transportation, automobile, and logistics, are more demanding in terms of mobility. Edge network components can provide intelligent resource distribution, which will help mobile users in these industries.



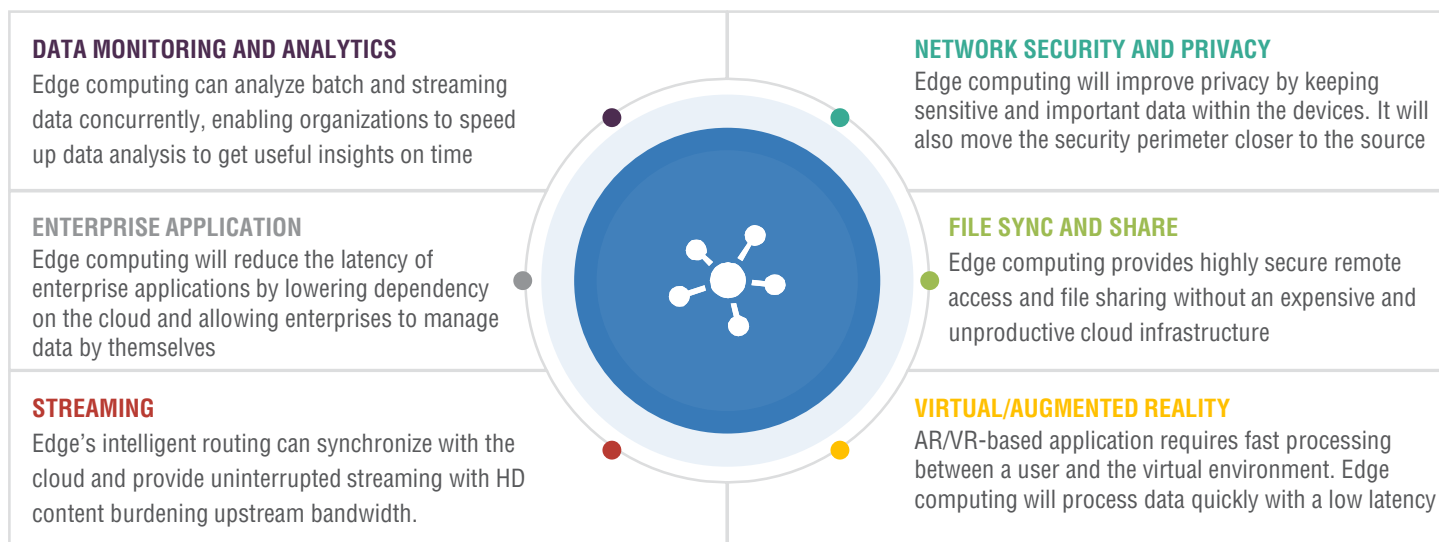
- **DISTRIBUTED APPLICATION IN DIFFERENT INDUSTRIES:** The growing acceptance of advanced technologies, such as Artificial Intelligence (AI), Machine Learning (ML), predictive maintenance in manufacturing, smart grid and drones in oil and gas operations, and Augmented Reality/Virtual Reality (AR/VR) in the retail vertical, has aided the adoption of edge computing solutions across the globe.
- **INFRASTRUCTURE TO MANAGE COMPLEX AND DYNAMIC SYSTEMS:** To successfully process a large amount of complex data, an additional infrastructure component must support the broader system, such as local bus and Wide Area Network (WAN) bandwidth, through intelligent routing.

EMERGING USE CASES OF EDGE COMPUTING

The concept of edge computing introduces a paradigm shift in terms of acquiring, storing, and processing data because in edge computing, data processing takes place on the edge of the network. With edge computing, organizations do not need to copy anything to a third-party provider, purchase an EFSS, or build a private cloud. Edge computing brings a new level of security to content collaboration and remote file sharing—without the risks associated with traditional cloud file transfer and duplication. It eliminates the security and privacy concerns related with the traditional cloud computing model and provides enhanced remote file sharing service that significantly improves the efficiency of information and provides the assurance that the files will be kept at the source location behind the organization’s firewall.

A few use cases of edge computing by application and industry are given below:

BY APPLICATION



BY INDUSTRY

Edge computing holds significant growth potential in the future. It will facilitate unique use cases for various industries, which will translate into significant benefits. It is particularly useful in a situation where time is critical. Below are the edge computing use cases by industries:

INDUSTRY	USE CASES DESCRIPTION
Manufacturing	Real-time monitoring and diagnostics, energy efficiency, safety, operations optimization, and device replacement alert
Automobile and Transportation	Autonomous vehicle, intelligent transportation, connected cars, traffic safety, and fleet tracking
Smart City	Utility usages, traffic analyzation, parking management, and public safety
Oil and Gas	Remote monitoring, disaster and operational strategies, smart metering, and workplace safety
Utilities	Predictive maintenance, real-time sensor data analysis, and accurate energy forecasting
Retail and eCommerce	Customer behavior analysis, supply chain optimization, traffic pattern and footfall analysis, and real-time delivery tracking
Agriculture	Precision farming, soil analysis, hazard warning, and cost optimization
Healthcare	Real-time health monitoring, rural medicine, patient generated health data, and enhancement of patient services
BFSI	Control or prevention of non-compliant transactions, and use of trading algorithm
Mining	Real-time onsite monitoring and diagnostics, alarm management, predictive maintenance, and operational efficiency
Media and Gaming	Live gaming, live broadcasting, and file transfer
Education	Live training and lecture broadcasting
Construction	Smart building, construction optimization, and secure and connected elevators



BENEFITS AND OBSTACLES ON THE ROAD FOR EDGE COMPUTING

As edge computing becomes mainstream, it presents many potential advantages for a wide range of industries. A few advantages of edge computing are given below:

- **QUICK RESPONSE:** Due to high computational power at the edge of sensors, edge computing takes very less time to process data and share the analysis with host. So, no roundtrip to the cloud reduces latency and empowers faster responses. Quick response time can stop the breakdown of critical machine operations or occurrence of unsafe incidents.
- **HIGHEST LEVEL OF SECURITY AND COMPLIANCE:** Computing at the edge provides more security than computing at the cloud because a lot of data transfer is avoided between the devices and the datacenter. Edge computing permits filtering sensitive data and transferring only essential information, which provides a suitable amount of security.
- **COST-EFFECTIVE SOLUTIONS:** Edge computing performs data analytics at the device location, which IT teams to save the cost of bandwidth, storage, and computational power.
- **IMPROVEMENT IN PERFORMANCE:** Edge computing can improve the performance of applications that do not work well in high network traffic
- **ON-PREMISES AND RELIABLE:** Edge computing can empower devices' ability to locally store and process data, which prevents data loss or operational failure in the event of limited internet connectivity or emergency.


The success of the edge computing is only possible when hardware vendors, system integrators, and network communicators work together. At present, there are a few obstacles for edge computing. Some of these obstacles are given below:

- **INADEQUATE INDUSTRY STANDARDS AND INTEROPERABILITY ISSUES:** One of the challenges in the edge computing market is the creation of an interoperable ecosystem. Providers of the edge computing technology need to focus on developing adequate standards, so that different applications can work and synchronize together across industries.
- **LACK OF EXPERTISE:** The market has a lack of expertise when it comes to deploying edge computing in an organization. Solution providers are still working on the edge computing use cases for a few industries. Organizations need to partner with cloud vendors and solution providers to work on the implementation of edge computing.
- **HIGH CAPITAL EXPENDITURE (CAPEX):** For an edge computing system to work properly, an organization needs to update infrastructure and security system, which will increase investment. Moreover, edge computing requires high processing power at the edge thereby increasing CAPEX.

At present, there are a few hurdles around the edge computing, but eventually, organizations will realize its potential. MarketsandMarkets expects that many technology partners will guide organizations to define and design their own edge architecture. But at first, organizations need to align their business strategy with edge computing.

HOW QNEXT IS INNOVATING EDGE COMPUTING?

Qnext Corp has developed FileFlex Enterprise has developed FileFlex Enterprise. FileFlex enterprise is an innovative hybrid point-to-point software-only services that addresses the inherent issues of cloud sync and share via edge technology. FileFlex Enterprise facilitates remote access to share, stream, and manage 100% of data from source location. FileFlex can provide optional Intel® vPro® hardened crypto-functionality using Intel® Software Guard Extensions (Intel® SGX) and secure enclaves to provide added protections within the silicon itself against shared data being snooped or tampered with at any stage of access or transmission. Major features that showcase the edge computing technology are listed below:

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- Ability to handle huge files and massive file libraries : AutoCAD, Illustrator, InDesign, After Effects, and video and photo libraries
 - No storage on third-party servers
 - Eliminates secret data exfiltration by third parties or law enforcement and protection from the CLOUD Act
 - Compliant with privacy regulations such as GDPR and HIPAA
 - More secure, with reduced threat surface and simplified storage structure
 - Files accessed from source locations to improve productivity

FileFlex Enterprise keeps files at the edge of the network in their source locations. It addresses various challenges, such as data residency, data sovereignty, privacy, security, and file duplication, faced by traditional cloud-based solutions.

Qnext has partnered with various Managed Service Providers (MSPs) for increasing awareness about edge computing as well as reselling. FileFlex is rapidly gaining global acceptance, as it provides a solution for the future and delivers a security benchmark for content collaboration for every organization.

THE PROMISING FUTURE OF EDGE COMPUTING

Edge computing will facilitate massive deployment of IoT devices on cloud across the globe. It will transform cloud computing the same way that cloud computing is changing enterprise IT. Although it has a few challenges, organizations will realize its potential eventually. For the success of edge computing, players need to work together. Technology companies such as Qnext Corp should work on new use cases and architecture. System integrators should offer new professional services around the cloud. Each ecosystem player should play their part carefully to bring the edge technology to the next level by developing new edge use cases. In the future, we can expect new services, such as interconnected Software-Defined Data Centers (SDDCs) and new security standards. The edge computing technology is here to bring improvement in the quality and richness of the services. In the end, we can expect an exciting time for edge computing ahead.

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Our revenue impact methodology provides quantified and actionable insights on converged, granular and connected market eco-systems that result from disruptive technologies and high-growth markets. We provide an extended lens on not only what will impact our client's revenue but also what will impact their clients' revenues, continually uncovering latent opportunities.

We work across all major B2B industries with C-level executives in functions such as Strategy, Marketing, Sales, R&D, Product, and M&A. MarketsandMarkets™ brings exclusive high-growth markets intelligence generated by over 850 SMEs and analysts along with its proprietary Revenue Impact platform (Knowledge Store).

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