The opportunity for MNOs to increase their share of the cloud data center services market is driving the MEC initiative to locate virtualized cloud servers in base stations, small-cell sites, and other areas at the edge of the mobile network. MEC technology promises a range of benefits, including:

- More flexible application deployments
- Improved application response
- The launch of new services
- Reduction in data traffic on the backhaul links

The MEC specification calls for an open compute-appliance platform based on network functions virtualization (NFV) that can be installed in base stations and small-cell locations. This NFV infrastructure (NFVI) uses a general-purpose server and leverages an open-source operating system combined with NFVI software.

MEC technology suppliers like Intel® Network Edge Ecosystem partner Smart-Edge.com build on this foundation with additional features such as content delivery network (CDN) nodes, enterprise applications, security-enabled connectivity, analytics probes, and others. A controller utilizing software-defined networking (SDN) technologies is centrally located for management and control of the MEC appliances.

Smart-Edge.com’s MEC appliance’s close proximity to end users reduces latency, resulting in improved application response times. This is especially beneficial for video streaming, augmented reality/virtual reality (AR/VR), and database and voice services.

The Smart Edge™ multi-access edge computing (MEC) solution utilizes virtualized servers powered by Intel® processors. The technology provides mobile network operators (MNOs) with a low-latency edge cloud services architecture that can deliver new enterprise services and reduce network operating costs.

Smart Edge™ Drives New Revenue for the MNO Enterprise Business

The Smart Edge™ appliance’s close proximity to end users reduces latency, resulting in improved application response times. This is especially beneficial for video streaming, augmented reality/virtual reality (AR/VR), and database and voice services. Meanwhile, low-latency cloud servers allow MNOs to offer more competitive service-level agreements.

Smart Edge is designed to improve MNO competitiveness in the following ways:

- **Increased customer satisfaction**
  The Smart Edge appliance’s close proximity to end users reduces latency, resulting in improved application response times. This is especially beneficial for video streaming, augmented reality/virtual reality (AR/VR), and database and voice services. Meanwhile, low-latency cloud servers allow MNOs to offer more competitive service-level agreements.

- **New cloud services**
  Low latency benefits existing cloud applications, but it also unlocks possibilities for emerging applications to be delivered from the cloud or to move applications into the cloud that had been deployed on-site.
Services that leverage radio network inputs
Smart Edge servers can integrate data from the network, including device location information, network congestion, and other information. This enables operators to manage radio conditions and make real-time changes to applications for improved performance.

Potential to reduce network operating expenses
Using Smart Edge can help MNOs lower network costs by reducing backhaul traffic and improving network reliability. These two advantages enable MNOs to better manage the skyrocketing mobile data consumption rates that challenge their networks.

Smart Edge Use Cases
The number and variety of uses cases for Smart Edge are equal to those for the cloud. The following applications are based on MNO deployments and proofs of concept for enterprise services conducted by Smart-Edge.com using its Smart Edge appliance and controller platform.

Real-time safety systems: A major transportation manufacturer wanted to leverage the low-latency benefits of Smart Edge for safety applications involving sensors that detect workers crossing into dangerous areas and alerts for safety personnel. This included tracking safety zones such as active equipment or painting booths. The goal is to shift these applications to the Smart Edge–based cloud servers that use low latency to shorten the time to action.

Wireless coverage and new services: A large port authority analyzed adoption of Smart Edge, along with a build-out of its wireless infrastructure, to facilitate network communications for ship captains and others who guide ships into port. The port is planning to use Smart Edge for the compute power and low latency required to enable new applications such as edge-deployed enterprise resource platform (ERP) systems. This allows tablet-computer-equipped crane and forklift operators to get the information they need to retrieve containers safely and efficiently and place them in the correct location. Additionally, real-time video will be processed in the Smart Edge servers for logistics, physical security, and container-inspection applications.

Smart-Edge.com Partners with Intel
Smart Edge appliances are powered by Intel® Xeon® processors, which are scalable, cost-effective, and provide the necessary performance for a variety of use cases. The processors are an intelligent platform for a fully virtualized, software-defined infrastructure that dynamically self-provisions resources based on workload needs. With Intel Xeon processors, Smart Edge appliances deliver a highly advanced compute core that enables communications networks to power through compute-hungry workloads. Those networks can also scale to meet the dynamic performance requirements increasingly seen in cloud services.

Smart Edge appliances take advantage of Intel® Trusted Execution Technology (Intel® TXT). Intel TXT verifies low-level software and firmware at launch time to help detect sophisticated attacks. It provides a verifiable chain of trust to allow critical applications to be hosted on “known good” systems. For fast encryption, the appliance leverages Intel® QuickAssist Technology (Intel® QAT), accelerating security and data compression tasks, including the IPsec used for encrypted communications with the controller. With crypto and compression workload acceleration now handled by the integrated Intel QAT, more compute cores are available for revenue-generating network services.
Retail application diagnostics: Retailers and other remote branch offices that host applications are finding it difficult to isolate performance issues without on-site technical personnel. With the processing power delivered by a Smart Edge server, the MNO was able to use specialized deep-packet inspection (DPI) tools to inspect packets in real time up to layer seven of the OSI model. This led to fast problem isolation and resolution and an excellent customer experience. The use of Smart Edge requires no specialized hardware in the store/branch office, and the MNO can provision DPI as an ongoing service or on demand.

AR/VR: AR/VR is emerging as a tool for employee training and for retailers to demonstrate product features as well as stand-alone gaming and entertainment services. Smart Edge can host these applications and deliver them to a location with low latency, enabling the full benefits of the technology without on-site AR/VR servers and apps.

Grow Service Offerings with Smart Edge

Smart-Edge.com offers its Smart Edge MEC Appliance and Controller solution for MNOs providing enterprise services. As seen in Figure 1, the Smart Edge appliance software runs on a virtualized server based on Intel® CPUs that sit in the last mile of the mobile network. The Smart Edge appliance hosts virtualized network functions (VNFs) for customer enterprise services. It also has built-in CDN intelligence for caching and distributing content, and can collect and display service-quality analytics.

In addition to a complete NFV environment that can support enhanced service-provisioning VNFs, the Smart Edge MEC integrates a built-in analytics probe to collect real-time statistics on data traffic, quality of service, and application analytics.

MEC controller platform

The Smart Edge appliance relies on an IPsec-encrypted connection to the Smart Edge MEC controller platform. This software-defined networking (SDN) system integrates industry-standard 3GPP* serving gateway functionality.

It also includes the developed Core Services Platform* (CSP*), a microservices-based management capability that leverages Representational State Transfer (REST) APIs to allow the controller to interact with Smart Edge nodes and applications.

With CSP, the controller can manage a wide range of functionality in the distributed MEC nodes from a centralized management console. The other core services of the controller platform include:

- Life cycle and configuration management of appliance firmware and software (including the operating environment), core appliance software features, and third-party software
- Centralized reporting and capacity planning
A Path to Low-Latency Enterprise Cloud Services

MEC gives MNOs an edge compute architecture that leverages their network assets to provide low-latency enterprise cloud services. MEC enables new, revenue-generating opportunities, outstanding cloud application performance, and the potential for reduced costs. Plus, it is an important infrastructure element needed to fully capitalize on 5G networks. The Smart Edge multi-access edge computing solution utilizes virtualized servers powered by Intel® processors to deliver cost-effective appliances with the performance needed for a wide range of advanced services.

About Smart-Edge.com

Smart Edge was developed by ACS (US), Inc., a wholly owned subsidiary of Pivot Technology Solutions. Smart-Edge.com was formed in 2018 to focus on commercializing the Smart Edge application platform. Smart Edge enables reliable and deterministic access to an enterprise’s existing applications at the edge. As an early pioneer in multi-access edge computing standards, Smart-Edge.com embraced the notion of delivering security-enabled, low latency applications at the edge of the network. Smart-Edge.com envisaged and developed a secure, trusted cloud environment at the network edge, allowing enterprises to deploy existing and new applications to accelerate new revenue. By leveraging Intel’s leading technology, the Smart Edge software platform enables a significantly improved user experience and well positions the enterprise to take advantage of 5G.

Find more information

To learn more about the Smart Edge solution, please contact us at info@smart-edge.com.

About Intel® Network Builders

Intel® Network Builders is an ecosystem of infrastructure, software, and technology vendors coming together with communications service providers and end users to accelerate the adoption of solutions based on network functions virtualization (NFV) and software defined networking (SDN) in telecommunications and data center networks. The Network Edge Ecosystem is a new initiative gathering ecosystem partners with a focus on accelerating network edge solutions. As an integral part of the broader Intel Network Builders program, this initiative aims to facilitate partners’ access to tested and optimized solutions for network edge and cloud environments.