Use Cases

Owned by David Cherney DISH •••
Last updated: Aug 02, 2023 • Add Workflow

Contents

Multi-access edge computing (MEC) has a long list of current and potential use cases. Below, we present three use case from each of 3 groups of stakeholders: customers (end consumers of applications), applications (or rather their developers), and network operators (like DISH).

Customer Use Cases

Augmented reality

One of the future use cases for 5G that will heavily rely on edge computing is augmented reality, wherein a person's vision of the natural environment is enhanced With additional visual elements. For example, a car driver may get additional visual cues about pedestrians and hazards.

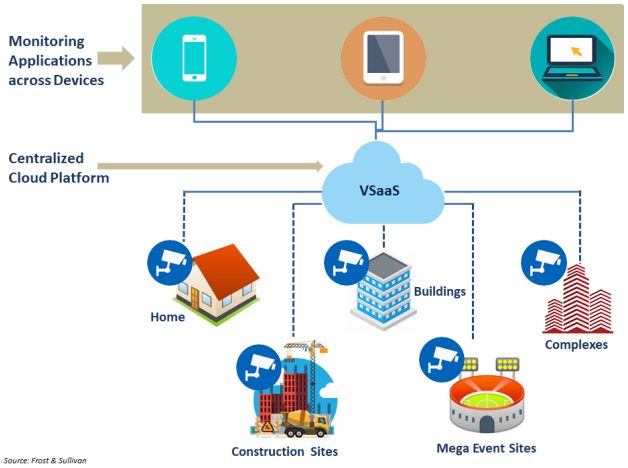
This application requires low latency so that artificial elements appear in synchrony with natural elements. The application also requires considerable computation power. Wireless mobility is also essential to the application. This kind of application is best run on the edge.

It is expected that 5G access networks and their infrastructure edge will need to be heavily built out to bring this technology to its potential.

Video Surveillance as a Service (VSaaS)

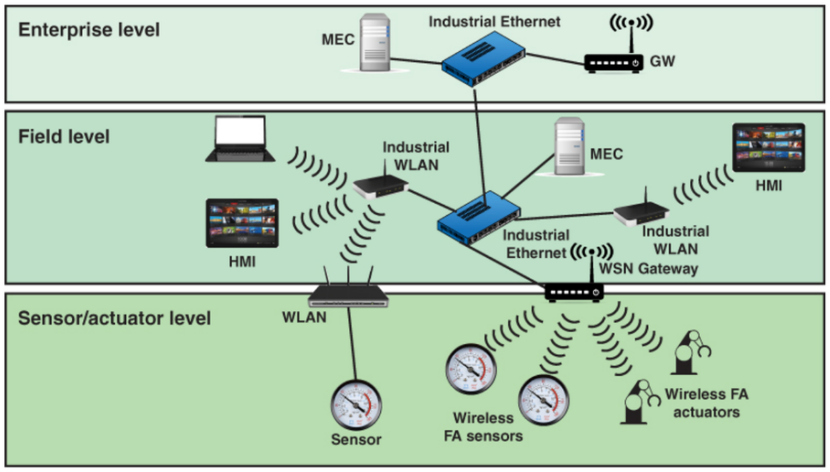
In situations where a large number of security cameras record in high definition, like sporting events, an enormous volume of data is saved.

- Placing the anchoring UPF(s) on the infrastructure edge reduces networking load on the 5G network as the data does not need to travel as far to get to a UPF
- Saving the video on the infrastructure edge (instead of sending the video to "the cloud" as in large but distant data centers) reduces load on the cloud network because the data does not need to travel farther than the MEC host



Factories of the Future

This use case brings together all three of the specializations of 5G; low latency, high data rates, and large number of devices. The data from factory devices often needs to be brought together and quickly acted upon. The infrastructure edge is the right place to do this since AI models running there can make fast decisions about factory operations.



FA = Factory Automation
GW = Gateway
HMI = Human-Machine Interface
WLAN = Wireless Local Area Network
WSN = Wireless Sensor Network

Use Cases for Applications

Besides the customers who use applications, the applications used can also benefit from edge computing.

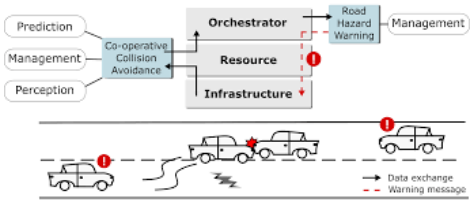
App Analytics

The creator of an app might want to know who uses the app and how. Data about UE served by an edge application server can be stored at the MEC host. This allows

- periodic calculation of summary quantities to be sent to a central location
  - each MEC hosts sends these summary values, and those summary values can be combined into a summary of app use across the edge data network
- deletion of the raw data without sending the raw data across a network
- saving of some of the data for occasional cross checks.

V2X communication

An envisioned future use case of 5G networks is to allow vehicles to avoid collisions by providing ultra low latency warnings in response to data from a network of sensors. Placing a MEC host close to a cluster of sensors facilitates fast analysis of sensor data and fast warning of the vehicles.



IPTV for Video on Demand

A provider of a video on demand application can store the most commonly accessed videos (e.g. a currently popular movie or show) at MEC hosts for faster retrieval by customers close to those MEC hosts.

Use Cases for Network Operators

Traffic De-Duplication

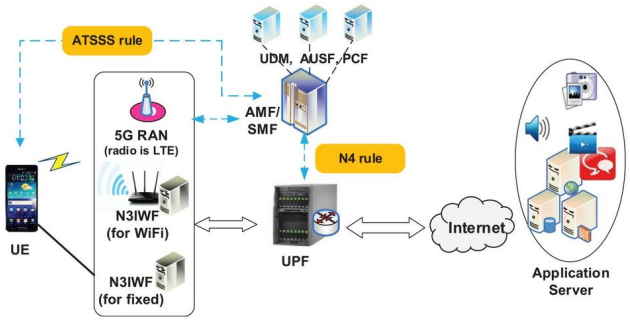
Redundant traffic (like frequently accessed video) can be identified and cached at a MEC host. This allows frequently accessed data to be accessed from the MEC host instead of from the source data network. Further, this frequently accessed data can be reference to an index value of cached content. This combination allows network operators to greatly reduce the traffic across the user plane of 5G core.

Optimization of Resource Utilization on Multi-Access Networks

Often UE have access to several access technologies to the 5G core. For example, a UE might have access to NR, LTE, satellite, WiFi, and ethernet (because it is plugged in). MEC hosts can be enabled with multi-access management services (MAMS) that allow the MEC host to make decisions about which access technology each UE uses. MEC enables this by providing data about

- location of the UE,
- location of the the MEC host,
- data about network use through the various access technologies.

This data is analyzed and acted upon by a MAMS.



This action can take a verity of forms:

- steering is separately selecting an access type for each SDF within a PDU
- switching is moving a SDF from one access type to another
- splitting is allowing some of the packets for an SDF to flow over one access type, and other packets from the same SFD to flow over a different access type.

Together these options comprise access traffic steering, switching, and splitting (ATSSS), specified in release 16.

There is also the possibility of connecting to two gNBs over NR to support a single SDF; this is called NR dual connectivity.

D2D Offload in Dense Urban Deployments

It is anticipated that dense urban deployments (like sports stadiums where 10,000 UE might be in simultaneous use) variations in congestion will be large. A MEC platform can have a dedicated application that identifies congestion and relieves it. The relief can come in the form of pushing UE to use each other as relays; device to device communication. More specifically, the dedicated app can tell apps on the UE to activate their D2D capabilities through their application specific means.