

Edge computing in universal CPE (uCPE)

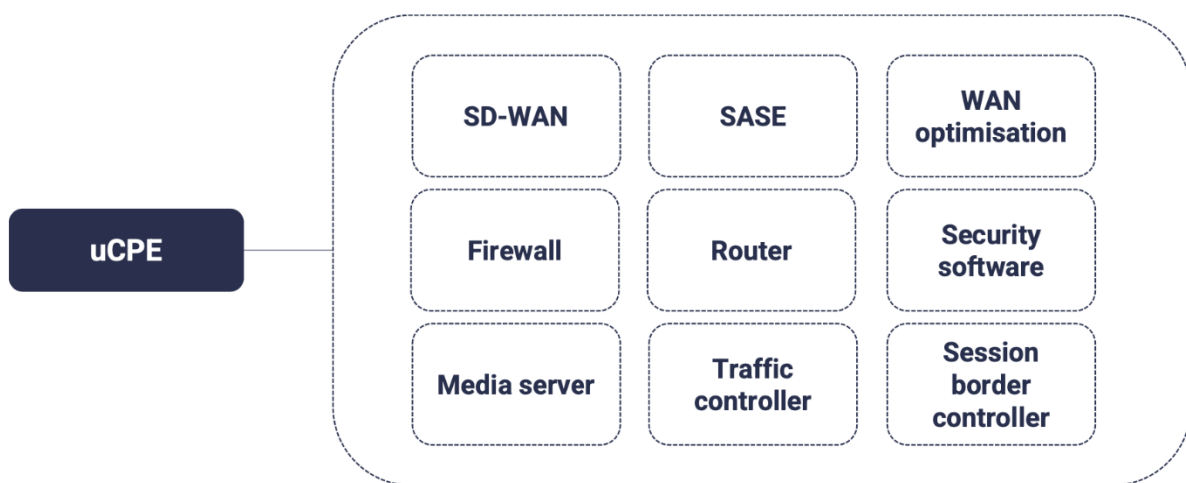
Enterprise networking has evolved the last decade, moving away from proprietary appliances, to universal platforms that allow for flexibility and choice for how to manage enterprise network services and functions. Question is – can these be extended to provide edge computing for non-network services? This article evaluates the opportunity and provides examples for companies innovating in the edge uCPE space.

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What is uCPE?

Universal CPE (uCPE) was a concept developed in the early years of network function virtualisation (NFV), as the telecoms industry began to explore the use of common-off-the-shelf (COTS) servers and IT infrastructure to support network workloads. Historically, enterprises would have appliance-based customer premises equipment (CPE) at their sites, each running a different network function/application/service. In other words, a box for network firewall, one for load balancer, etc. uCPE was designed to consolidate all these boxes into one (universal) platform, virtualised, and able to run multiple applications, which could each be from different vendors. There are “grey box” uCPE devices, which mean the applications and hardware are from a single vendor.

Types of network functions on uCPE

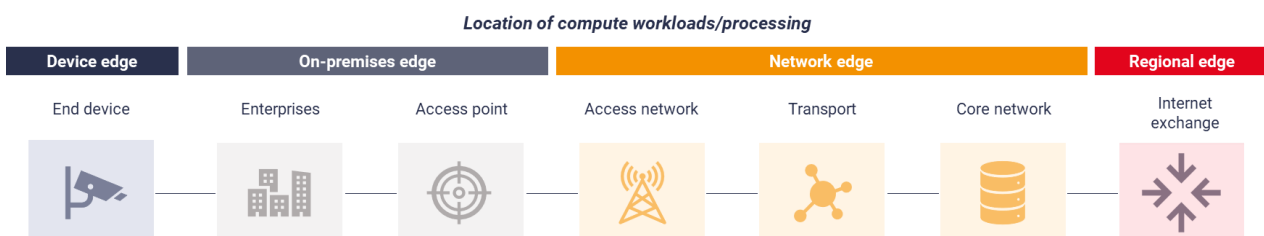


Source: STL Partners

What is edge computing at the uCPE?

STL Partners has always maintained a broad definition of edge computing locations. These can span from the end-device (e.g. a camera with virtualised infrastructure) to a regional edge data centre. Within the on-premises edge, the edge computing can either reside at the access point itself (the router or gateway) or on a computer (including server-type infrastructure). uCPE fits into the access point category.

Types of edges



Source: STL Partners

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For uCPE to become an edge computing device, it should have infrastructure that a non-network workload or software application can be ported to, for example computer vision or access control. This should ideally be virtualised or containerised infrastructure.

There are a number of reasons why an enterprise may choose to use edge compute on the uCPE:

- **Cost effective:** Able to use existing infrastructure, which reduces additional hardware investments required
- **Agile:** Using existing infrastructure can also make it quicker for an enterprise to be up and running
- **Space:** Using one box takes up less space than deploying multiple servers, which is particularly interesting in environments where there is limited real estate (e.g. in a small retail store, petrol station, fast food outlet, etc.)
- **Skills and resources:** Limits the need to have staff on-site to maintain a larger edge environment (e.g. IT closet, small data centre)
- **Application performance:** Keeping the application on-site reduces latency and ensures reliability (compared to hosting it in the cloud or remote data centre)

What are the challenges?

It is still early days when it comes to uCPE edge and some of the challenges we have encountered speaking to telecoms operators, solution providers and enterprises include:

- **Service providers' ability to sell customer applications:** The proposition of providing a solution that supports applications is very different to that of one for network services. Service providers will need to really understand customers' needs, which applications they want to use and how to sell into the organisation. The stakeholders involved for this could be different – for example an operational or site manager, vs. the network and IT team.
- **Competition with other edges:** There are many options for which edge could support applications that need to run locally. As seen above, it could be on-premises, but take the form of an on-prem data centre, existing infrastructure (e.g. manufacturing equipment in a factory), other gateways, existing servers, etc. Customers can also consider using the network edge or regional edge data centres, therefore the proposition for using uCPE needs to be clear.
- **Technical constraints:** uCPEs are relatively small and are constrained by capacity. Although advancements in processors are helping overcome this, there is always going to be limited compute capacity compared to other options. In addition, customers are considering using edge computing for graphics-heavy use cases such as video analytics, which puts forward a need for GPUs within the uCPE.
- **Finding the sweet-spot use case:** There are many edge use cases out there but the industry needs to support customers in understanding which are most suitable in these environments. Some of this will be customer-driven, e.g. whether there are alternative infrastructure options available at the site.

Examples of uCPE edge

Here are 5 examples of companies innovating in the uCPE edge space:

1. ADVA

ADVA has been a proponent of uCPE for a number of years. Its offering includes Ensemble Virtualization Director for managing NFV operations and Ensemble Orchestrator which helps instantiate applications and

manage the lifecycle. It is **working with Etisalat** in the UAE to offer services to government and enterprise customers in the country, supported by NEC as the systems integrator. ADVA has also partnered with a telecoms operator in APAC to provide machine learning service for smart factories, smart cities and smart sports stadiums.

2. Verizon

Verizon has been a pioneer of uCPE for a number of years, started by evolving its Virtualised Network Services (VNS) portfolio. Since 2020, it has partnered with Rafay to create VNS Application Edge, which allows customers to deploy and manage containerised applications in uCPEs. They have seen traction from a range of industries, from inventory management and store analytics in retail, to remote medical equipment monitoring and diagnostics in healthcare to virtual teller and video chat applications in banks. There is also adoption within industrial sectors such as energy, utilities and manufacturing, for example augmented reality applications to assist workers and for collecting and analysing telemetry data.

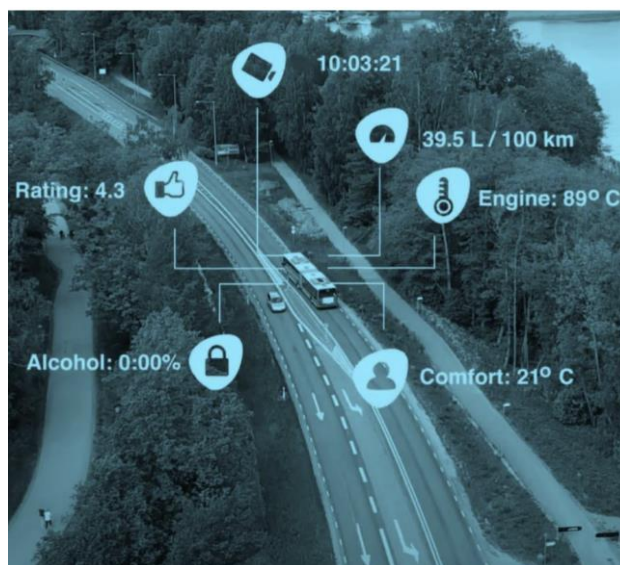
3. Ekinops & SixSq

Ekinops has been a long-time provider of network services and solutions for enterprise networks. In 2021, it acquired SixSq, which has an edge computing marketplace, Nuvla, provided in a SaaS model. They are growing their application partnerships to allow enterprises to easily deploy applications in a consumption-based, cloud model. These include companies such as ClearBlade, which specialises in edge IoT applications in sectors such as transportation, and AI EdgeLabs, which provides cyber security services.

4. Telco Systems

Telco Systems' Edgility OS enables any device to become a virtualised managed smart edge device. In other words, a universal CPE with built-in network functions. Edgility OS is complemented by Edgility Central, which manages edge devices through a central single pane of glass. One of its interesting case studies is within bus systems – deploying uCPE in the bus to run a combination of different application workloads, from video analytics, tracking information on the vehicle, customer satisfaction, etc.

Telco Systems' bus system deployment allows fleet operators to track multiple data points



Source: Telco Systems

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5. Intel, Dell, Red Hat, Juniper, Turnium & IBM

These five companies have come together to develop truly open, multi-vendor edge platforms, exemplifying why ecosystems are important for edge computing. The vendors are also leveraging their existing IoT ecosystems to augment this, plus combining Intel's Smart Edge Open initiative which has a toolkit for developers looking to use multi-access edge computing (MEC).

Dalia Adib is a Director at STL Partners, specialising in new growth opportunities for the telecoms and technology industries, edge computing and 5G.

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Or visit STL Partners' Edge Hub

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