

Tier 1 Service Provider Blueprint Implementing Practical, Cost-Effective uCPE

An integrated, open, multi-vendor architecture, leveraging the full power of virtualization and cloud technologies, while bringing attractive uCPE economics.

ADVANTECH

CloudOps

ENEAA

FONEX

New Generation Enterprise CPE and NFVI Solution

- ▶ “One stop” **integrated** solution with simplified supply chain
- ▶ Based on **open** technologies to avoid vendor lock-in
- ▶ Pre-validated **multi-vendor** architecture reduces risks
- ▶ Attractive uCPE **economics** and greater agility
- ▶ Edge-native characteristics

Service Provider Needs

Telecommunications service providers strive to provide unique or best in class experiences every day, and to offer new value-added services to B2B customers, all through enriched connectivity. Service providers enable small, medium and large enterprise customers with cloud-native technology for digital transformation.

The uCPE as an edge compute platform is a key to customer-centric business transformation enabled by cloud-native applications.

The Challenge

When creating an enterprise uCPE offering, service providers need to take into account several important issues:

- Autonomously and automatically manage the lifecycle of VNFs which are deployed on the uCPE located at end customer’s site.
- Avoid single-vendor offering, and rely on open, disaggregated and standardized technologies.
- Mitigate integration and deployment risks.
- Meet a variety of requirements on platform and networking characteristics.
- Find the right cost level for large-scale deployments.

The Solution

Together with well-known industry leaders Fonex, Advantech and CloudOps, Enea has created a turnkey multi-vendor solution, based on open interface standards (see Figure 1). The solution leverages the full

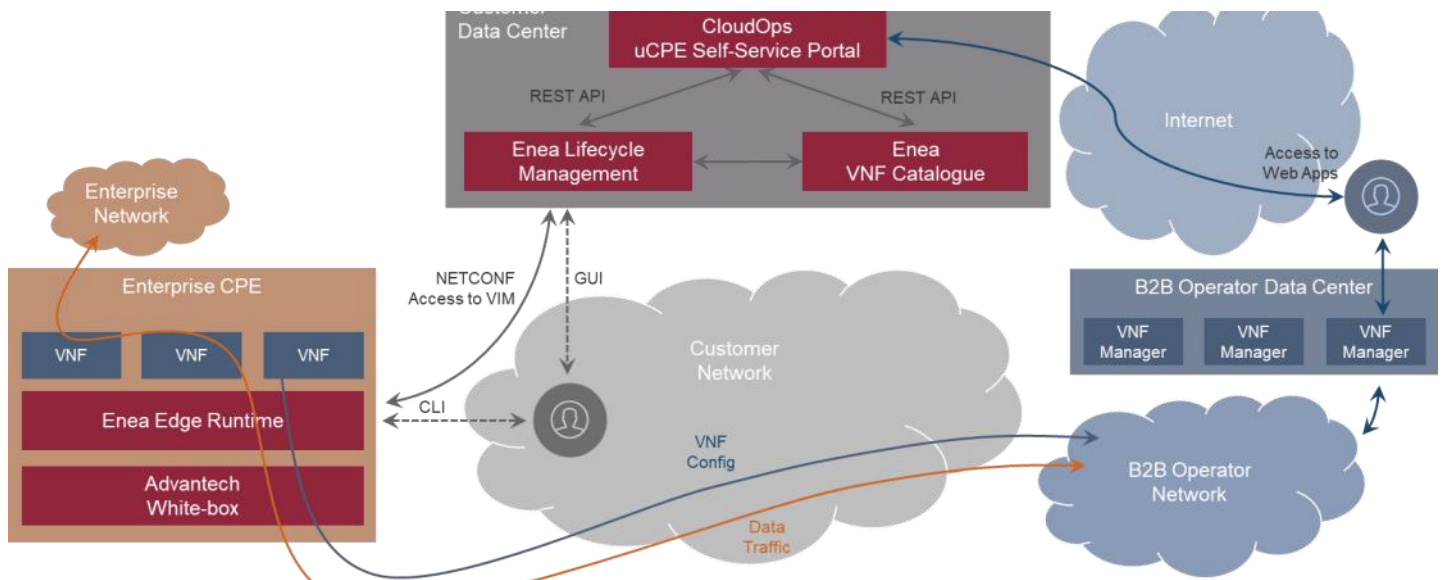


Figure 1. New Generation Wholesale CPE and NFVi Solution

power of virtualization and cloud technologies, and has the flexibility to allow each component to be picked individually, avoiding vendor lock-in.

Lightweight uCPE—HW, SW and VIM

Advantech's FWA-T011, FWA-1012VC and FWA-3050 bring scalable processing performance, outstanding network throughput and flexible connectivity options. Optimized for uCPE and SD-WAN, the whiteboxes are powered by processors based on Intel® architecture and are scalable from 2-18 cores with choice of hybrid LTE, WiFi, xDSL & SFP+ configurations depending on platform.

The uCPE software virtualization platform Enea Edge runs on as little as one core, with retained throughput and performance levels (10G line rate). Support for container virtualization increases the VNF density and minimizes total system footprint.

Enea Edge provides a variety of management interfaces, from CLI to NETCONF northbound interfaces fully modelled in YANG. It also provides all the standard VIM functions, modelled in YANG and executed with NETCONF. This relieves the solution from an OpenStack implementation, which has proven to be too resource consuming for the uCPE use case.

VNF Lifecycle Management & Catalog

The VNF Lifecycle Management and VNF Catalog components are delivered with the Enea Edge Management, a purpose-built suite of functions and REST APIs tailored for uCPE. It supports Zero Touch Provisioning (ZTP), configuration of Service Function Chains (SFC), and full FCAPS through YANG and secure NETCONF connections.

A bundle is created for each 3rd party VNF which then becomes available within the VNF catalog, accessible

locally or via remote storage. Once in the catalog, the VNF can be deployed to the uCPE along with the required configurations (network interfaces, cloud-init, etc...).

uCPE Self-Service Portal for Operators and End Users

CloudOps' CloudMC is an API-driven, multi-tenant self-service portal used by service providers to deliver, monetize and operationalize IaaS and SDN/NFV service offerings. It enables service providers to deliver their entire portfolio of multi-vendor (open or proprietary) products and services to market through a single pane of glass.

With Enea's management and automation, CloudOps' CloudMC streamlines and automates the VNF on-boarding and lifecycle management process at scale, empowering service providers with greater flexibility and control over how they provision and deliver virtual network services with a unified experience for operators, re-sellers and end users.

Integration, Support and Maintenance

Fonex offers a uCPE operational model that provides systems integration and "one-stop" support and maintenance. It provides operators with the flexibility to take advantage of a fully disaggregated hardware and software model in a manner that significantly reduces the burden and risk performing the overall systems integration function and greatly simplifies the overall support model.

Fonex' multi-vendor approach ensures flexibility to access the right technology solution at the right cost to satisfy our customers' business and operational objectives. Their expertise and integration capabilities enable them to select best-of-breed elements in their portfolio and combine them to achieve the best value solution for their customers stated requirements.

Find out more on the Enea website!



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Enea develops the software foundation for the connected society with a special emphasis on reducing cost and complexity at the network edge. We supply open-source based NFVi software platforms, embedded DPI software, Linux and Real-Time Operating Systems, and professional services. Solution vendors, Systems Integrators, and Service Providers use Enea to create new networking products and services faster, better and at a lower cost. More than 3 billion people around the globe already rely on Enea technologies in their daily lives. For more information: www.enea.com