

## Enea NFV Access: Virtualization Platform for White Box uCPE

Enea NFV Access is a virtualization and management platform for white box uCPEs. It provides minimal footprint and maximum networking performance for SD-WAN and edge applications.

### Key Benefits

- ▶ **Future Proven** - Replace or extend with new VNFs post deployment
- ▶ **Automated** - Automate deployment and management with Zero Touch Provisioning, automation framework and orchestration integration
- ▶ **Optimized for uCPE**- Low footprint and high networking performance with no OpenStack
- ▶ **Scales from ultra-low to high-end** - Scales from high-end Xeon servers down to 2 Core / 2GB RAM hardware configurations for cost-efficient deployments
- ▶ **Secure** - Secured using NETCONF for all management communications, secure boot and role based access control
- ▶ **Centralized uCPE management** - Centralized VNF onboarding, networking management and VNF lifecycle management
- ▶ **Ecosystem** - Large ecosystem of verified white boxes, VNFs, and orchestrators for best-of-breed solutions
- ▶ **Choice of hardware** - deploy on any white box or COTS server
- ▶ **Choice of software**—deploy with any VNFs and connect to any orchestration

### Ideal uCPE Networking Characteristics

The award-winning Enea NFV Access is purpose-built to host virtual network functions (VNFs) on white box universal customer premise equipment (uCPE). It is optimized to combine high networking performance with small platform footprint. Unlike solutions originating from the data center, the edge native Enea NFV Access provides virtualization and management without OpenStack, greatly reducing overheads and complexity.

### Any VNF, Any Orchestrator, Any White Box uCPE

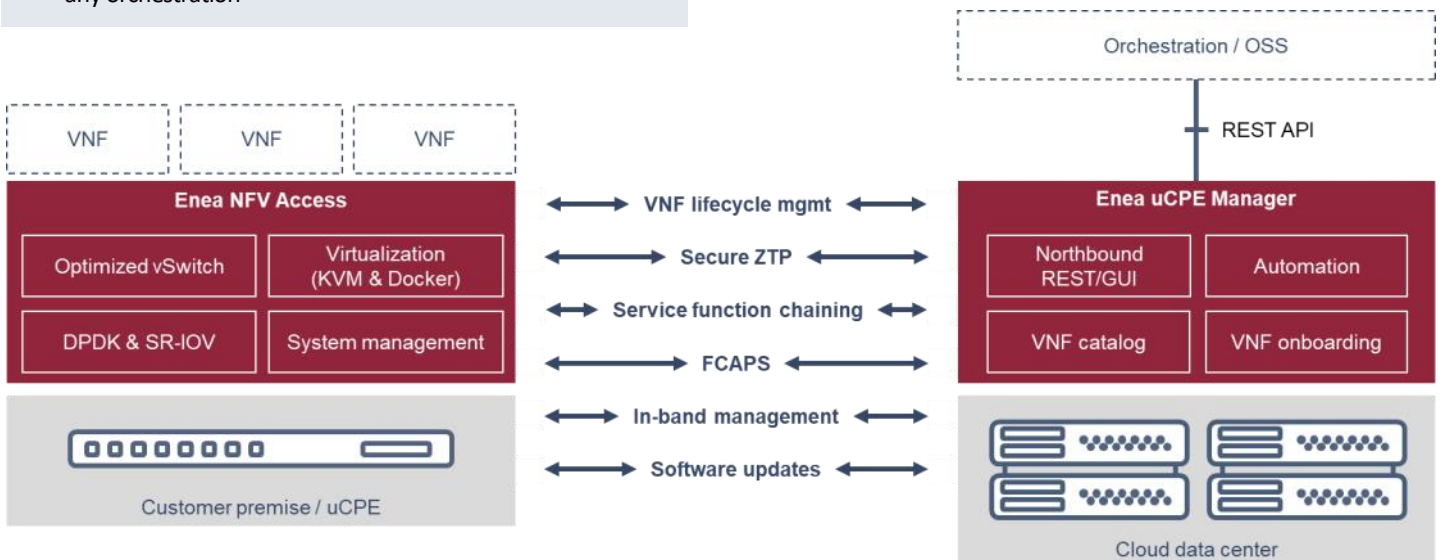
Enea NFV Access deploys on any white box based on Intel or ARM, on-boards any VNF using its built-in onboarding wizard, and connects to any orchestrator and service automation tool through open REST interfaces.

A large partner ecosystem provides pre-qualified solutions from hardware and software vendors, as well as system integrator services.

### Integrated End-to-End Management over NETCONF

Enea uCPE Manager is a management solution for large-scale deployments of VNFs and uCPEs, and an integral part of Enea NFV Access. It provides end-to-end management using NETCONF to connect customer premises with the data center for configuring, deploying and managing infrastructure and VNF lifecycles.

It connects to 3rd party orchestration solutions using standard REST APIs. It is extensible and adaptable to brownfield deployments, feature extensions and complex integrations and deployments.



## Virtualization

Virtual machines and containers can be set up in any combination. The VNFs communicate over an internal OVS bridge independently of virtualization implementation.

- ▶ Machine virtualization: KVM
- ▶ Container virtualization: Docker

## Networking

A highly optimized data plane provides high throughput and low latency.

- ▶ Built-in Linux routing
- ▶ Network acceleration with SR-IOV, PCI pass-through, and DPDK-accelerated OVS
- ▶ LTE access over PCI and USB
- ▶ WiFi support via PCI pass-through
- ▶ Supports uCPE deployment behind NAT

## Open interfaces

Open standards and APIs enable integration with any white box, any VNF, and any orchestrator, and avoids vendor lock-in.

- ▶ NETCONF connection between Enea NFV Access platform deployed on a device and Enea uCPE Manager deployed in data center
- ▶ REST API for northbound connection with orchestration

## Security Hardened

- ▶ Secure boot
- ▶ Secured Call Home (RFC 8071)
- ▶ Signed updates

## Zero Touch Provisioning

- ▶ ZTP over secure NETCONF
- ▶ Compliant with RFC 8071

## Infrastructure Provisioning

Infrastructure provisioning is based on simple and flexible procedures.

- ▶ Centralized installation: network Installation over PXE
- ▶ Local installation: installation from USB

## Automation

Built-in automation simplifies management and roll-outs for large scale deployments.

- ▶ Automation of deployment and management functions
- ▶ Ansible framework for platform and VNF automation
- ▶ Python/REST based automation

Characteristics	Enea NFV Access	Alternatives
Platform RAM footprint	< 1 GB	4-12 GB
Platform Disk footprint	< 1 GB	4-12 GB
Platform CPU footprint	1 core	2-4 cores
Platform boot speed	< 3 s	10-30 s
Throughput over vSwitch	10 Gb IMIX line rate	1 Gb IMIX line rate
Latency over vSwitch	Average 10-15 $\mu$ s	Average 25-75 $\mu$ s

Comparison of performance characteristics between Enea NFV Access and alternatives typically based on OpenStack.

## In-Band Management

In-band management simplifies deployment

- ▶ VNF management and NETCONF-based uCPE management on separate management plane over a shared network connection
- ▶ Single NIC for WAN data and VNF and platform management

## Virtualization Management

- ▶ Service function chaining using flow rules
- ▶ VNF lifecycle management
- ▶ VNF image update
- ▶ VNF monitoring with alarms

## Platform Management

- ▶ Software upgrade and patch management
- ▶ Network management
- ▶ FCAPS

## VNF Onboarding Wizard

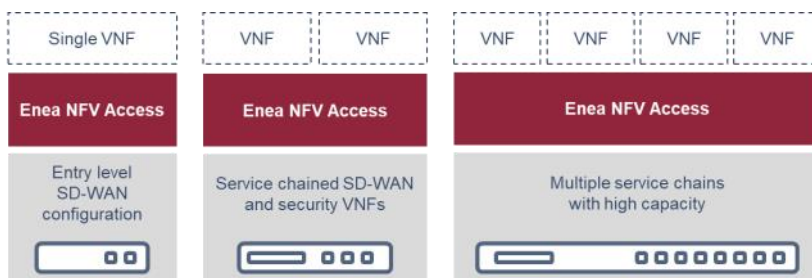
The onboarding wizard simplifies the onboarding of VNFs onto the NFVI platform.

- ▶ Quick and easy onboarding for 3rd party VNFs
- ▶ Completes Day 0 configuration

## White Box Support

Enea NFV Access is designed for deployment on any white box uCPE device based on Intel or ARM

- ▶ Intel Xeon
- ▶ Intel Atom
- ▶ Intel Celeron
- ▶ ARMv8



Deploys with single VNF on 2 core / 2GB uCPE devices and scales to high-end servers

Best fit for each deployment scenario is a major cost saver. Enea NFV Access scales from entry-level to high-end deployments.

Find out more!



Enea is a world-leading supplier of innovative software components for telecommunications and cybersecurity. Focus areas are cloud-native, 5G-ready products for mobile core, network virtualization, and traffic intelligence. More than 3 billion people around the globe already rely on Enea technologies in their daily lives. For more information: [www.enea.com](http://www.enea.com)

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