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Supermicro and ENEA High-Performance and Low-Power uCPE Solutions for SD-WAN

Introduction

Innovation and technology advances are accelerating the adoption of SD-WAN (Software Define Wide Area Network) and NFV (Network Functions Virtualization) with a variety of CPE (Customer Premises Equipment) devices. uCPE (Universal Customer Premises Equipment) provides network platform suppliers, systems integrators and software vendors the ability to quickly deliver managed services using software driven and virtual network functions.

Current generation network equipment is built with purpose built proprietary hardware. Propriety hardware based appliances offer single function boxes and complex to maintain, slow and expensive to upgrade, and inhibits network platform suppliers from dynamically offering new network services and functions.

Supermicro and ENEA uCPE solutions optimized for SD-WAN provide rapid deployment of real time network functions and eliminate the need for proprietary purpose built servers that are hard to manage and maintain. The solution provides software configurable commercial off-the-shelf (COTS) platform that is usually deployed at customer site. Service providers can run multiple Virtual Network Functions (VNF) such as routing, VPN and firewall on Supermicro's standard x86 architecture based servers depending on user requirements. uCPEs have the flexibility to rapidly roll out new functions and services without the need of deploying new hardware at customer site, resulting in significant CAPEX & OPEX reduction and time savings.
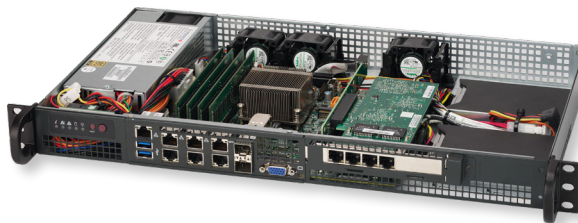
The uCPE solution takes advantage of innovations in SDN (Software-defined Networking) and NFV (Network Functions Virtualization). SDN and NFV are complementary but increasingly co-dependent in order for the benefits of software-defined networking to be fully realized.

Supermicro and ENEA uCPE Solutions

As a premier partner of Intel Select Solution uCPE program to lanuch the latest technologies for different market segments & applications, Supermicro offers telecom operators and service providers industry's broadest range of Building Block Solutions® to enabled customized software-defined solutions for different requirements.

Supermicro Performance Optimized Tier Featuring Intel® Xeon® D-1500 SoC

Supermicro® SuperServer® 5018D-FN8T with Intel® Xeon® D-1518 SoC offers 4-core/8 threads processing power along with 6x 1 GbE LAN ports and 2x 10GbE LAN ports for high speed communication (Total of 8 LAN ports).

Key Benefits of SD-WAN vs Traditional WAN

SD-WAN is one of the commonly deployed SDN application used in Wide Area Networks (WAN) connections. In traditional WAN, users are required to lease expensive MPLS circuit to secure their private network, and impractical to scale-out due to prohibitive cost structures and difficult to manage without trained staff. By adopting new SD-WAN technologies, TCO can be reduced significantly when network providers want to expand their network. The SD-WAN router is able to aggregate different links into one big trunk and allocate dynamically. Such the elasticity achieves the 'pay-as-you-use' model to provide better cost efficiency to end-users and on premises.

- Cost
- Flexibility
- Deployment Time
- Security
- Manageability
- Cloud Access
- Bandwidth

Figure 1.   *Supermicro® SuperServer® 5018D-FN8T*

Key Specifications

- Compact Design, < 10" depth
- 7 year life cycle
- Intel® Xeon® processor D-1518,
  - 4-Core, 8 Threads, 35W
- Up to 128GB ECC RDIMM DDR4
- Dual 10G SFP+ and Six 1GbE LAN
- 1 M.2 NVMe slot, SATA DOM support
- 200W Gold-level power supply

Detailed Specifications

In addition, it offers the capability to add a PCI-E 3.0 Card for other functions such as Crypto card or additional Bypass LAN Ports. The SoC Design with Intel Xeon D CPU which is rated at 35 Watts offers a very powerful and compelling solution, the industry's most compact and short-depth 1U network appliance solution. Ideally developers can take advantage of industry advances in NFV, SDN and vCPE to build their own edge devices.

Supermicro Power Efficiency Optimized Tier Featuring Intel® Atom® C3000 SoC
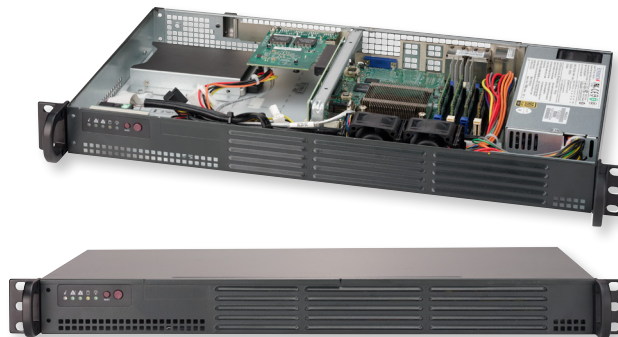
Figure 2.   *Supermicro® SuperServer® 5019A-12TN4*

Key Specifications

- Low Power, Low Cost Applications
- Intel® Atom® processor C3850, 25W TDP
- Up to 64GB Unbuffered ECC DDR4
- 4x 1GbE LAN, 1 dedicated IPMI LAN
- 1 M.2 NVMe slot, SATA DOM support
- 200W Low-noise AC-DC power supply

Detailed Specifications

Supermicro SuperServer® 5019A-12TN4 with Intel® Atom® C3850 SoC offers 12-core/12 threads processing power along with 4x 1 Gb Ethernet LAN ports. The SoC TDP is rated at 25W and system comes with a 200W supply. The new Intel® Atom® Denverton (C3000) SoC processors from 2- to 16- core options offers choice of low power and core count to balance price/performance in a compact and short-depth 1U network appliance solution.

|	Supermicro & Enea NFV Access	Traditional NFV Access
Platform RAM Footprint	Sub 1 GB	4-12 GB
Platform Disk Footprint	Sub 1 GB	4-12 GB
Minimal Platform CPU Utilization	Down to a single core	2-4 cores
Platform Boot Speed (excl. BIOS)	Sub 3 seconds	10-30 seconds
Virtualized Network Throughput over vSwitch	10 Gb IMIX Line Rate	1 Gb IMIX Line Rate
Virtualized Network Latency over vSwitch	Average 10-15 μs	Average 25-75 μs

Traditional NFV vs SD-WAN NFV

The table below summarized some key metrics of Supermicro and Enea NFV Access compared to traditional NFV access.

ENEA Software Stacks

Enea NFV Access features a lightweight virtualization software runtime platform designed for deployment on edge devices at the customer premise. It is streamlined for high networking performance with minimal RAM footprint for both platform and VNFs, resulting in very high compute density.

Enea NFV Access provides a foundation for uCPE agility and innovation, reducing cost and complexity for computing at the network edge.
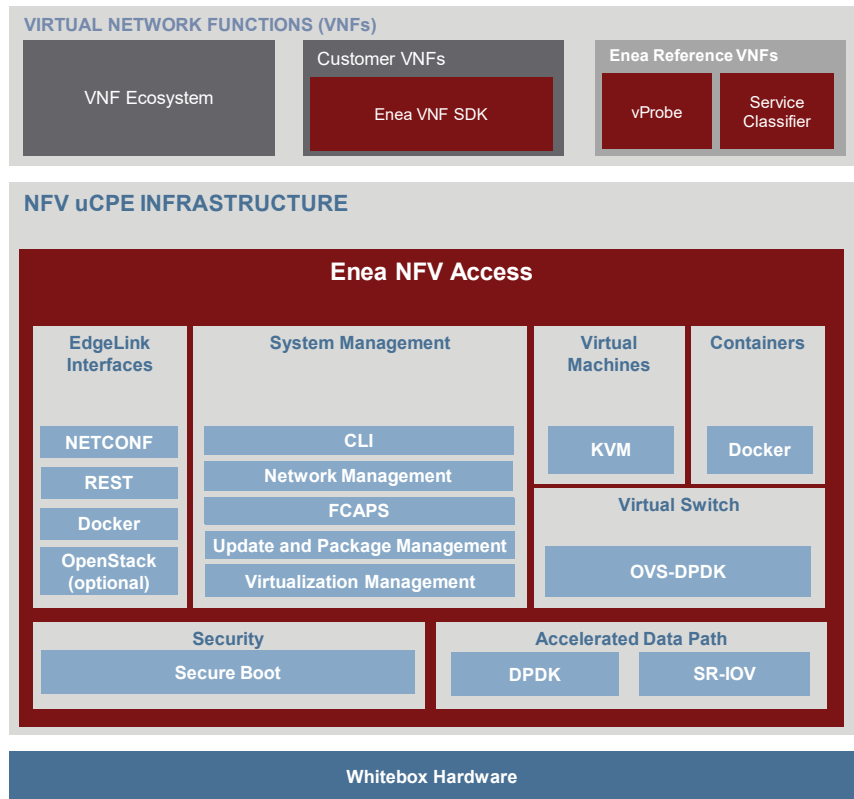
Figure 3. *Enea NFV Access Standard Profile*

The main features of Enea NFV Access include hardware accelerated virtualized networking, optimized data path, and mixed native virtual machine and native container VNFs. Enea NFV Access is customizable and extensible with SDKs for FCAPS, containers and bare metal applications, and offers multi-hardware architecture support, making it white-box vendor agnostic.

Enea NFV Access is based on open source technologies, and communicates over standardized interfaces – including management over NETCONF.Enea NFV Access also features the Enea uCPE Manager, a platform and VNF management platform which control and monitor the uCPE using NETCONF protocol.
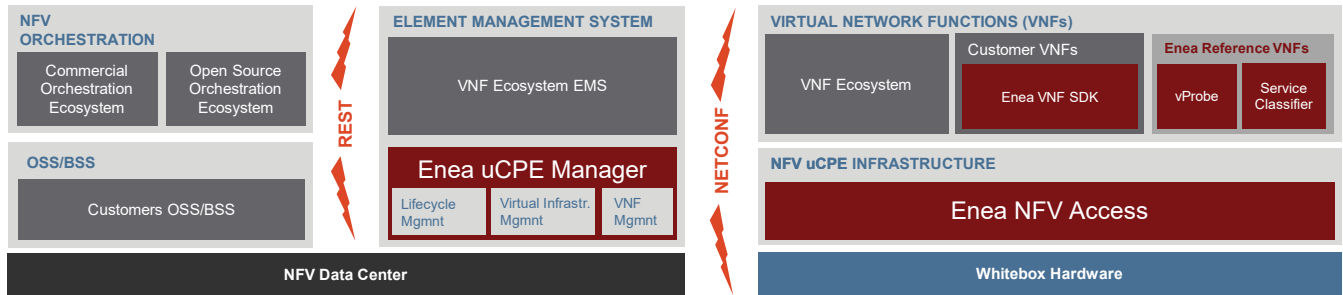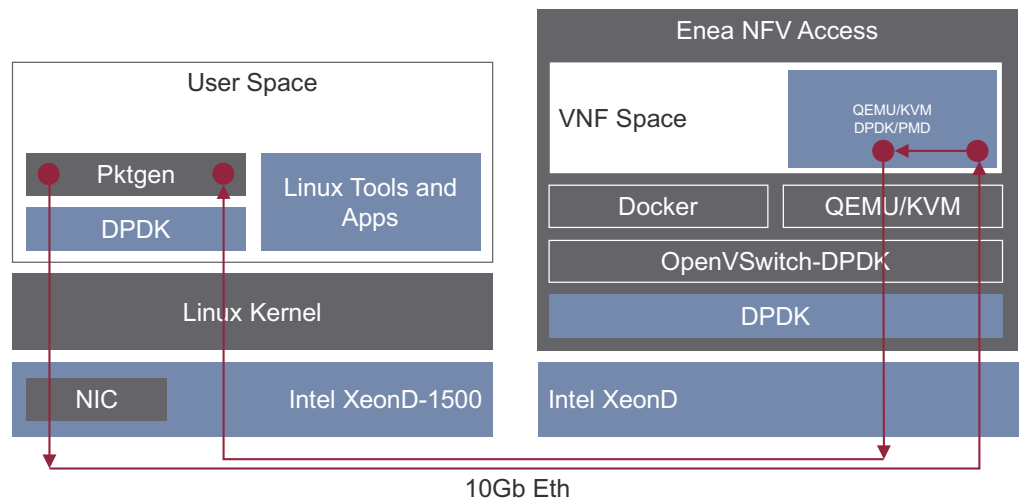

Figure 4.   *Enea NFV Access Deployment Overview*

[Enea NVF Access Datasheet](#)

Use Case (Single VNF Forwarding on Xeon-D)

The single VNF forwarding benchmark is used to test the throughput performance when loaded with traffic through the ovs-dpdk, for a single VNFs. Both VMs (KVM/QEMU) and

containers (Docker) are used to benchmark the specific scenario. The native forwarding benchmark result comparison is used to determine the impact of vSwitch and VNF usage.

Performance Results: Single VNF Forwarding (Xeon-D)
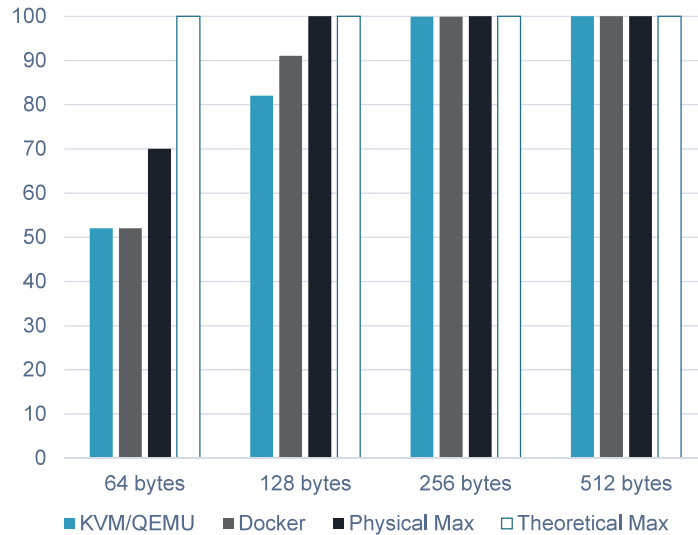
- The result show no significant performance difference between KVM/QEMU and Docker
- Line utilization at 64 byte packets utilize 74% of the physical max and 52% of theoretical max
- Line rate speed of 10Gb down to 256 bytes packets

Conclusions

- Both Xeon D and Atom processors are relevant for SD-WAN use cases, but delivery different level of networking performance.
- The choice of processor is to a large extent determined by the overall networking performance requirements of the solution.
- Entry-level SD-WAN solutions can utilize Atom based solutions, while more complex or high performant SD-WAN solutions use the more powerful Xeon D.

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About Super Micro Computer, Inc.

Supermicro® (NASDAQ: SMCI), the leading innovator in high-performance, high-efficiency server technology is a premier provider of advanced server Building Block Solutions® for Data Center, Cloud Computing, Enterprise IT, Hadoop/Big Data, HPC and Embedded Systems worldwide. Supermicro is committed to protecting the environment through its "We Keep IT Green®" initiative and provides customers with the most energy-efficient, environmentally-friendly solutions available on the market.

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About ENEA

Enea develops the software foundation for the connected society. We provide solutions for mobile network traffic management, network virtualization, network traffic classification, embedded operating systems, and professional services. Solution vendors, systems integrators, and service providers rely on Enea when creating new world leading networking products and services. More than 3 billion people around the globe already depend on Enea technologies in their daily lives. Enea is listed on Nasdaq Stockholm.

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