

Solution Brief

Intel® Select Solution for uCPE
Intel® Xeon® Processor D-2100 Family
Intel® Atom™ Processor C3000

Deploying & Orchestrating ECI's Mercury™ uCPE on Advantech White Boxes

Overview

Universal Customer Premise Equipment, or uCPE, is taking center stage as communication service providers consolidate physical network functions and evolve their Software Defined WAN (SD-WAN) offerings to run in more generic, off-the-shelf universal platforms. With uCPE, SD-WAN can just as easily be deployed as a virtual network function (VNF) complemented by a wide choice of other network functions such as a router, firewall or WAN optimization.

The transition of multiple physical functions into their virtual equivalents and serviced by hypervisors executing on standard Intel® processors is now well understood, with uCPE deployments in small to medium enterprise networks reaching significant volumes on Intel® Atom™ C2000 and C3000 based devices.

A strong market outlook and uCPE uptake by communication service providers has led to the introduction of a growing number of hardware and software solutions from a vibrant ecosystem of suppliers. Solutions are available that dramatically simplify complex networks, allow organizations to reduce their capital outlays on equipment, and deliver services to end-users in a more flexible, agile and cost-effective way from a centralized location.

The benefits of uCPE are transformational for all organizations - uCPE is clearly set to play a key role in every company's Software Defined Networking (SDN) strategy.

The ability to select the right solution from a growing choice of vendors may not seem such an easy task, and will depend on multiple factors both technical and operational as well as economical. Much hinges on in-house capabilities to integrate uCPE components and building blocks or conversely the willingness to adopt a one-stop solution from a single supplier. This Solution Brief focuses on the latter, with an open-source software and commercial-off-the-shelf hardware approach in mind. One that offers a fully validated and supported solution, while avoiding vendor lock-in by the ability to mix and match vendor products and white box hardware.

Traditional enterprise WAN architectures are becoming obsolete. SDN and uCPE herald in a new era, one that promises to be truly transformational.

A new network is in the making. One where communication service providers can offer unique managed or self-managed services to enterprise IT departments, enabling the remote deployment of VNFs and instantiation of new network service chains 'on the fly' using state-of-the-art management and orchestration tools.

This brief describes how ECI® is leveraging white box uCPEs from Advantech to deploy new services from branch office to regional HQ locations.



Hardware Highlights

- FWA-1012VC
 - Versatile platform for SMB
- FWA-3050
 - Fully configurable to fit any enterprise deployment
- Advanced packet processing technologies including DPDK and Intel® QuickAssist
- Compact designs, reduced size and power footprint

Software Highlights

- Comprehensive zero touch provisioning
- Highly secured platforms
- HW and network resource Management
- Access SW support capabilities (VDSL, GPON, LTE)
- High Availability
- Full lifecycle management
- High scale of uCPEs per VIM

- High performance per NFVi
- Small footprint of MANO SW microservices based
- Customer profile, SLA, configuration & inventory management
- "Any VNF catalogue" (Designer tool)
- Open standard NB/SB REST APIs
- Multi tenancy
- Cloud native orchestration

Mercury™ uCPE delivers major benefits to service providers and customers alike.



For
Service Providers
the ability to offer
leased services
for new revenue
streams



For
Enterprises
peace-of-mind
as upgrades
and security are
outsourced



Lower
equipment costs



Elimination of
truck rolls



The ability
to shop for
best-of-breed
solutions



Freedom to
customize
services to specific
customer needs

ENABLING MODERNIZED BUSINESS SERVICES

One peek into the communications closet of a typical business today brings you face-to-face with a clutter of single-purpose boxes for edge routing, cyber security, WAN optimization, SD-WAN and other networking functions. Each box is individually installed, managed, and upgraded.

Not anymore. ECI's Mercury™ uCPE streamlines multiple customer premises networking functions into a single software-configurable appliance – directly reducing entry costs. But Mercury uCPE is much more than that. It allows service providers to combine networking functions flexibly in innovative ways to create value-added service mixes.

These can be tailored to individual customer needs, expand the services portfolio, and generate new revenue streams. In parallel, uCPE lowers operational costs through self-installation capabilities and centralized management, delivering remote zero-touch provisioning and upgrades, and eliminating truck rolls. This can even be incorporated into self-service customer portals.

Mercury uCPE is future-proof and can easily incorporate new networking functions as they

become available. In short, Mercury uCPE is the ultimate vehicle to deliver modernized business services, while improving service providers' top and bottom lines.

Maintaining physical Customer Premises Equipment (CPE) is costly for both service providers and businesses. It involves hardware from many vendors, truck rolls, manpower, and specialized skill sets to install each one physically at the customer site, and to perform upgrades, patches, and fixes. Then, there is the entire issue of deploying new functions and services.

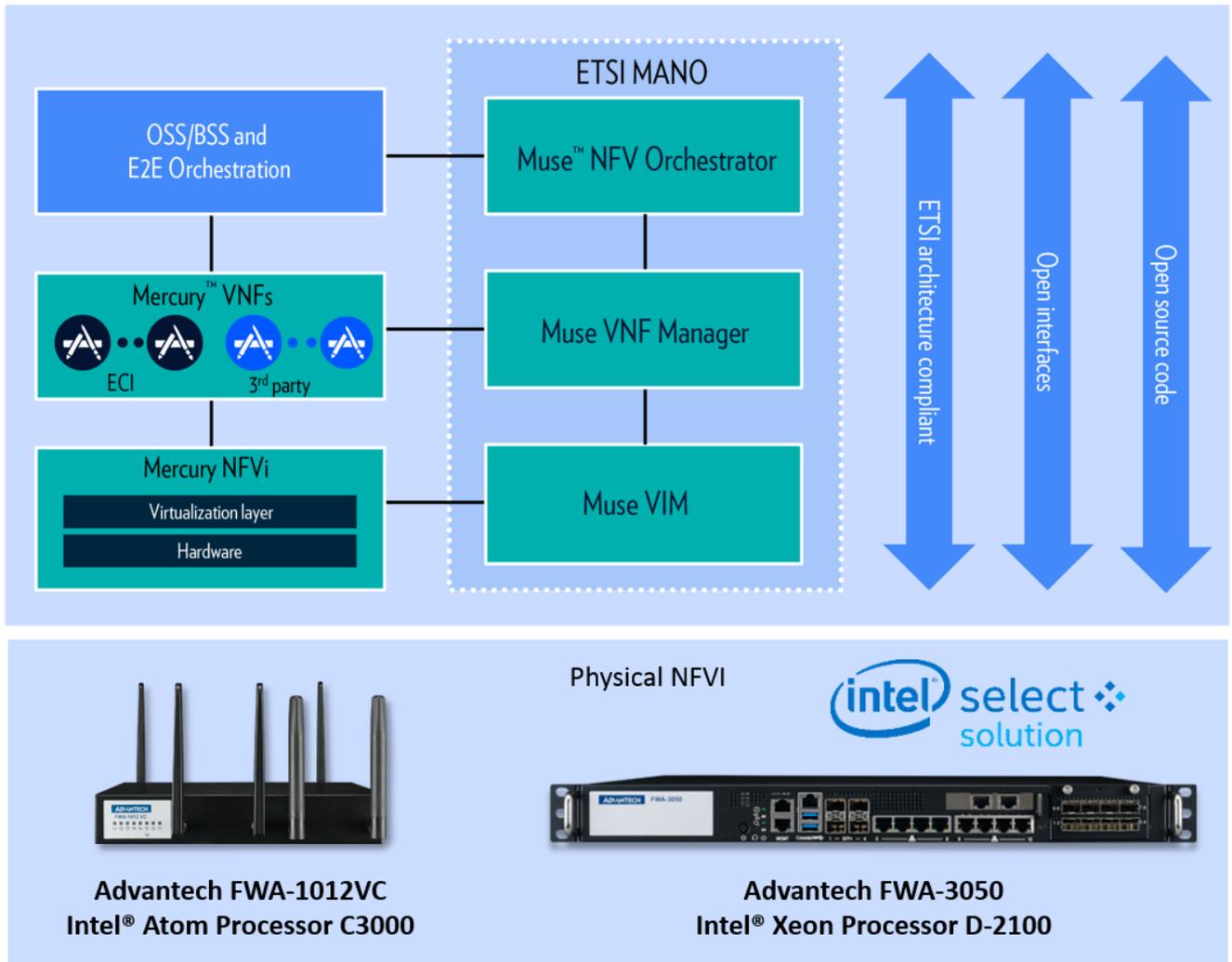
Mercury Universal CPE (uCPE) revolutionizes this environment using network function virtualization (NFV), delivering CPE functionality as software running on commodity hardware. Mercury is ECI's NFV platform, encompassing infrastructure (NFVi), VNF software, and management and orchestration (MANO). It is compatible with ETSI NFV specifications to ensure carrier-grade standards. Mercury lets customers select and combine best-of-breed VNFs from a library of certified ECI or third-party VNFs. For uCPE, these may include SD-WAN, edge routing, cyber security (such as universal threat management), session border control, WAN optimization, LAN monitoring, and enterprise storage, with more on the

way. Selected VNFs are easily provisioned, managed, and upgraded remotely onto the customers' Mercury uCPE appliances. They provide services such as internet access, voice services, L3VPN connectivity, or other value-added business services. As a managed service, Mercury uCPE is a source of new revenues for service providers, beyond connectivity. Mercury uCPE and associated VNFs supports diverse configurations. This gives the agility to deploy network functions based on individual customer needs and to optimize cost-performance.

BEST-OF-BREED VNFs

The starting point for Mercury's value is its library of certified, best-of-breed ECI and third-party VNFs. These include SD-WAN, edge routing (vRouter), session border control (vE-SBC), next generation firewalls (vFW), WAN Optimization, Enterprise Storage and more.

Mercury is highly versatile and can run multiple VNFs on the same platform simultaneously, and sequence the VNFs per service-chaining rules. This minimizes infrastructure costs and enables creation of custom-tailored service packages.



BRINGING SERVICE AGILITY CLOSER TO THE NETWORK EDGE

ECI's Mercury Network Function Virtualization (NFV) family empowers your network to respond quickly to new customer service opportunities.

Mercury lets you mix and match a rich library of certified ECI and third-party virtualized network functions (VNFs) to create differentiable service value. This drives new revenues for fixed and mobile networks and streamlines operations, reducing OPEX.

Providing end-users with the best low-latency service experience, Mercury excels at deploying VNFs

at the network edge, in the access, or at the customer premises. Mercury can also deploy VNFs more centrally in metro POPs, the network core, or in a data center.

Mercury is fully-compliant with ETSI Management and Orchestration (MANO) and is cloud native cutting edge technology based. NFV infrastructure platforms are available as thin or thick appliances.

OPEN INDUSTRY STANDARD ARCHITECTURE

Mercury optimizes for network edge deployments through a family of runtime NFVi devices based on hyper-converged computing. This approach combines processing, storage, and networking in a manner expressly designed to bring the

value of data center virtualization close to the end-user when high performance is demanded.

Best of all, the entire Mercury family, including MANO, VNFs, and NFVi, is totally ETSI-compliant, and has a strong commitment to openness, leveraging software like OpenStack. This enables easy operational integration, end-to-end orchestration, and incorporating third-party software.

THE WHITEBOX ADVANTAGE

Mercury has been ported to a range of Advantech White-box uCPE platforms to meet the needs of small, medium, and large enterprise branch offices. For a highly optimized uCPE processing solution, Advantech's FWA-1012VC brings outstanding performance processing and power efficiency, and is available as a 2 to 8 core scalable offering designed to handle small to medium locations. The system supports flexible RAM capacities with error correcting code(ECC), multiple solid state drives (SSD) via SATA and/or M.2 interfaces for reliability and high availability, and a wide range of integrated gigabit Ethernet and 10 GbE ports with both copper and optical SFP connections depending on the model.

The FWA-1012VC offers an optional integrated Wi-Fi access point and 4G/LTE connectivity. The 4G/LTE option can provide failover protection for the primary WAN connections and can also be used for higher bandwidth bonding with the wireline WAN ports. In addition, the FWA-1012VC offers optional dual-SIM capability for active/standby and an optional cost saving PoE module that can power two IEEE PoE+ (25.5W) ports without the need for a PoE+ switch.

All models include an optional trusted platform module (TPM) that acts as the root of trust for security certificates. Communication Service Providers can scale their Mercury uCPE deployments with Advantech's FWA-3050, **an Intel® Select Solution for uCPE based on the Intel® Xeon® D-2100 processor**, this further scales up whitebox uCPE choice and provides the extra throughput, VNF onboarding and processing headroom that CSPs and Enterprises need to efficiently address increasing on-premise workloads.



Advantech FWA-1012VC Rear Ports

This versatile 1U rackmount platform offers flexible WAN connectivity supporting multiple site-to-site communication protocols, broadband internet and 4G LTE through field-replaceable expansions.

The FWA-3050 can be configured to meet any enterprise needs thanks to Advantech Network Mezzanine Cards (NMC) that can be populated with a choice of 1, 10, 25 or 40GbE interfaces.

Integrated Intel® QuickAssist Technology accelerates execution of crypto algorithms including IPsec without burdening the CPU. As a result, secure branch connectivity including end-to-end encryption can be provided without compromising VNF performance or increasing cost.

Additional IPsec acceleration and offload can be added by leveraging the Advantech PCIE-3020 Intel® QuickAssist PCIe adapter.

Technical Highlights

Mercury NVE-100 thin Appliance FWA-1012VC

- uCPE application for SMB
- Up to 4 VNFs @ 250Mbs
- 6-2 LAN/WAN ports; WIFI/Wireless modem (optional)

Mercury NVE-1000 Thick Appliance FWA-3050

- uCPE application for enterprise
- Up to 8 VNFs @ 1Gbs
- 8 – 4 LAN/WAN ports; WIFI/Wireless modem (optional)
- Additional GE/10GE ports and acceleration HW expansions

NFVi

- KVM-based hypervisor
- DPDK
- OVS and Routed data path
- ECI "Board applications"
- OpenStack agents

Mercury WAN Connectivity Options

- VDSL/VDSL2/G.fast/GPON access

Management and Orchestration

- All ETSI defined components provided as bundle or separately
- Zero touch Provisioning
- Full lifecycle management
- Customer management and portal
- Container based platform running over ECI PaaS

Conclusion

Communication service providers are planning for the upcoming network transformation and starting to build the infrastructure that will run their next-generation virtual and software-centric services. With the broad choice of components that can be used to implement the new network infrastructure, validated solutions offering optimized performance and functionality will be key.

ECI's Mercury uCPE running on open architecture Intel-based white boxes from Advantech gives service providers and integrators a head-start on fully integrated uCPE deployment, reducing time-to-rollout and risk when building next-generation network services.

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