



vCPE

Virtual Customer Premises Equipment Router (vCPE)

Software-based, virtualized & platform-agnostic router.

Key features

- ▶ **Scalable performance**
- ▶ **Zero touch provisioning**
- ▶ **Supports VNF and CNF deployment**
- ▶ **Compatible with major SDN and SD-WAN controllers**
- ▶ **Reliable IPsec VPN security**
- ▶ **Multi-tenancy support**
- ▶ **Remote management & automation**

Benefits

- ▶ Seamless scaling
- ▶ Pay as you grow
- ▶ Integrated security
- ▶ Ease of deployment and provisioning
- ▶ Optimized resource usage (low CPU and memory footprint)
- ▶ Reliability

Traditional uCPE Challenges

Universal Customer Premises Equipment (uCPE) are general-purpose “universal” multirole networking platforms that combine and integrate essential enterprise networking functions and services, like L3 routing, VPN connectivity, DHCP, DNS, QoS and more. uCPEs are used to connect different customer sites into a private and secure, fast and dependable Wide Area Network (WAN), as per Figure 1.

Traditionally, each one of the enterprise networking functions is implemented as a single-purpose network element (NE). To implement the desired set of enterprise networking functions, multiple single-role NEs, have to be sourced, tested, installed, integrated, managed and of course maintained.

This approach results in a complex, lengthy and laborious procurement & deployment cycle, delaying time to service. Any substantial change in the required networking functions or just the simple scaling of the network can force a replacement of costly NEs, imparting avoidable yet substantial cost, implementation effort and delay.

With the uCPE approach, all essential enterprise networking functions and services are integrated into a single general-purpose device, addressing aforementioned time to service, scaling, cost and effort challenges.

“ With 6WIND VSR solutions we can increase the performance and scalability of our Smart Network solutions, with limited impact on existing applications and infrastructure, and continuing to maintain transparency towards Marlink customers. ”

*Alain Bertrand,
Chief Technology Officer,
Marlink*



6WIND's Groundbreaking vCPE Router

6WIND vCPE Router provides software-based and virtualized routing and security functions on a universal CPE. It is platform-agnostic, running on inexpensive and ubiquitous x86 or ARM processor-based hardware platforms. It can be deployed on a virtual machine (VM) or inside a container and provisioned through zero-touch provisioning.

6WIND's vCPE router is characterized by seamless scaling (pay as you grow), integrated security (IPsec), ease of deployment & provisioning (zero touch) and demonstrated dependability.

It is one of the most efficient routing and security implementation available on the market, providing the best possible performance on any given platform with a minimal hardware resource consumption, which is of particular importance for cost-sensitive CPE applications.

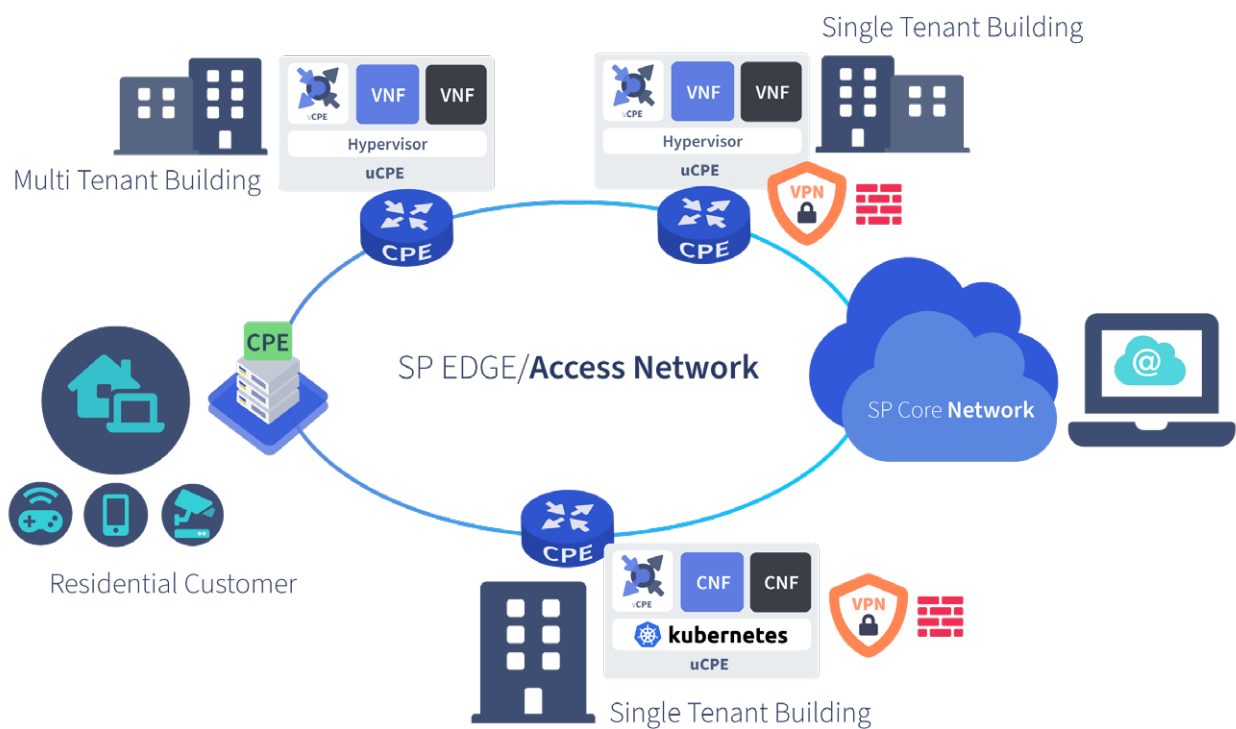


Figure 1: deployment scenarios for the vCPE virtual universal CPE.



Specification

IP Networking:

- ▶ IPv4 and IPv6
- ▶ IPv6 auto-configuration
- ▶ Multitenancy (VRF)
- ▶ IPv4/IPv6 tunneling
- ▶ IPv4/IPv6 filtering
- ▶ Network address translation
- ▶ multicast (PIM/IGMP)

Routing:

- ▶ BGP4, BGP4+, BGP RPKI
- ▶ IS-IS, OSPFv2, OSPFv3
- ▶ RIPv1, RIPv2, RIPv3
- ▶ Static routes & path monitoring
- ▶ BGP multi-path (ECMP)
- ▶ Policy base routing (PBR)
- ▶ BGP L3VPN, BGP-LU
- ▶ Bidirectional Forwarding Detection (BFD)
- ▶ NHRP

Quality of Service:

- ▶ Rate limiting per Interface
- ▶ Rate limiting per VRF
- ▶ Hierarchical QoS (H-QoS)
- ▶ Class-based QoS
- ▶ Classification:
 - ToS/IP/DSCP/CoS
- ▶ Shaping and policing
- ▶ Scheduling:
 - PQ, PB-DWRR

Management / Monitoring:

- ▶ SSHv2
- ▶ CLI, NETCONF/YANG
- ▶ SNMP
- ▶ KPIs/telemetry (YANG-based)
- ▶ RBAC with AAA
- ▶ Syslog
- ▶ 802.1ab LLDP
- ▶ sFlow
- ▶ IPFIX, Netflow v9

L2 and Encapsulations:

- ▶ GRE, mGRE
- ▶ VLAN (802.1Q, QinQ)
- ▶ VXLAN
- ▶ LAG (802.3ad, LACP)
- ▶ Ethernet bridge

IP Services:

- ▶ DHCP server / client / relay
- ▶ DNS client / proxy
- ▶ NTP
- ▶ TWAMP

Security:

- ▶ ACLs (stateless & stateful)
- ▶ uRPF
- ▶ CP protection
- ▶ BGP FlowSpec (IPv4, IPv6)

VPN IPsec

- ▶ IKE v1/v2 pre-shared keys or X509 certificates
- ▶ MOBIKE
- ▶ Encryptions: 3DES, AES-CBC / GCM (128, 192, 256)
- ▶ Hash: MD-5, SHA-1, SHA-2 (256, 384, 512) AES-XCBC (128)
- ▶ Key management: RSA, DH MODP groups 1 (768 bits), 2 (1024 bits), 5 (1536 bits) and 14 (2048 bits), DH PFS
- ▶ EAP/Radius, EAP-MSCHAPv2
- ▶ Extended sequence numbers (ESN), large anti-replay windows
- ▶ High performance (AES-NI, QAT)
- ▶ Tunnel, transport or BEET mode
- ▶ Static and dynamic VTI
- ▶ Dynamic multipoint VPN

System Requirements

Processor:

- ▶ Single or multi-sockets Intel® Xeon® and Atom® processor
- ▶ Arm based processors (Ampere Altra, Graviton2)

CPU/vCPU cores

- ▶ 2 minimum (one for control, one for data plane)

Memory:

- ▶ 2GB minimum

NICs:

- ▶ Intel: 1G, 10G, 40G, 100G (E810)
- ▶ Mellanox: 10G, 25G, 40G, 50G, 100G: CX4, CX5, CX6
- ▶ Broadcom NetExtreme E-Series

I/O virtualization:

- ▶ virtIO (Linux KVM)
- ▶ SR-IOV
- ▶ PCI passthrough
- ▶ VMXNET3 (VMware ESXi)
- ▶ ENA

Supported Hypervisors

- ▶ KVM (RH, Ubuntu, CentOS)
- ▶ VMware ESXi (6.5+)
- ▶ Microsoft Hyper-V

Public Clouds Support

- ▶ Amazon Web Services
- ▶ Microsoft Azure
- ▶ Google Cloud Platform

Deployments

- ▶ Bare metal, virtual machines, containers (Kubernetes/Docker)
- ▶ Installation: PXE, USB, ISO, QCOW2, OVA
- ▶ Update / rollback support
- ▶ Provisioning: cloud-init, Ansible, ZTP
- ▶ Licensing: Online licensing system for feature and capacity enablement