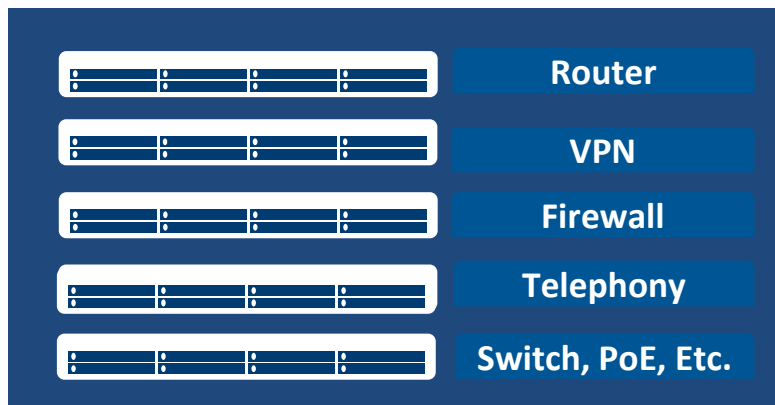


vE-CPE Open Modular White Box Architecture for uCPE

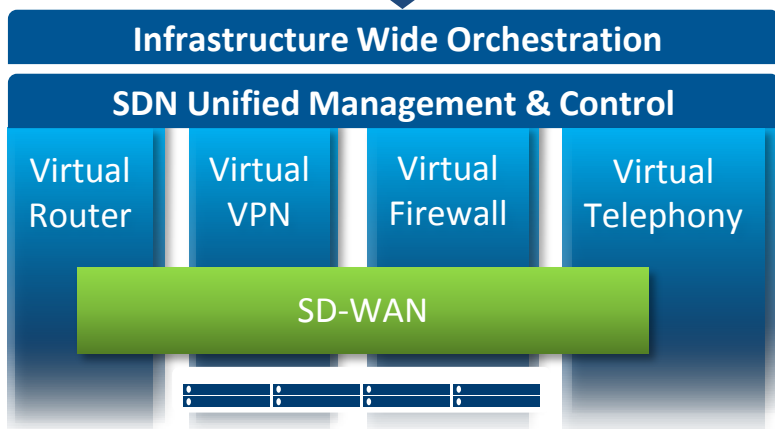
September 25, 2017

SD-WAN Drives New Requirements for uCPE Flexibility

Conventional



SD-WAN



Box Chaining

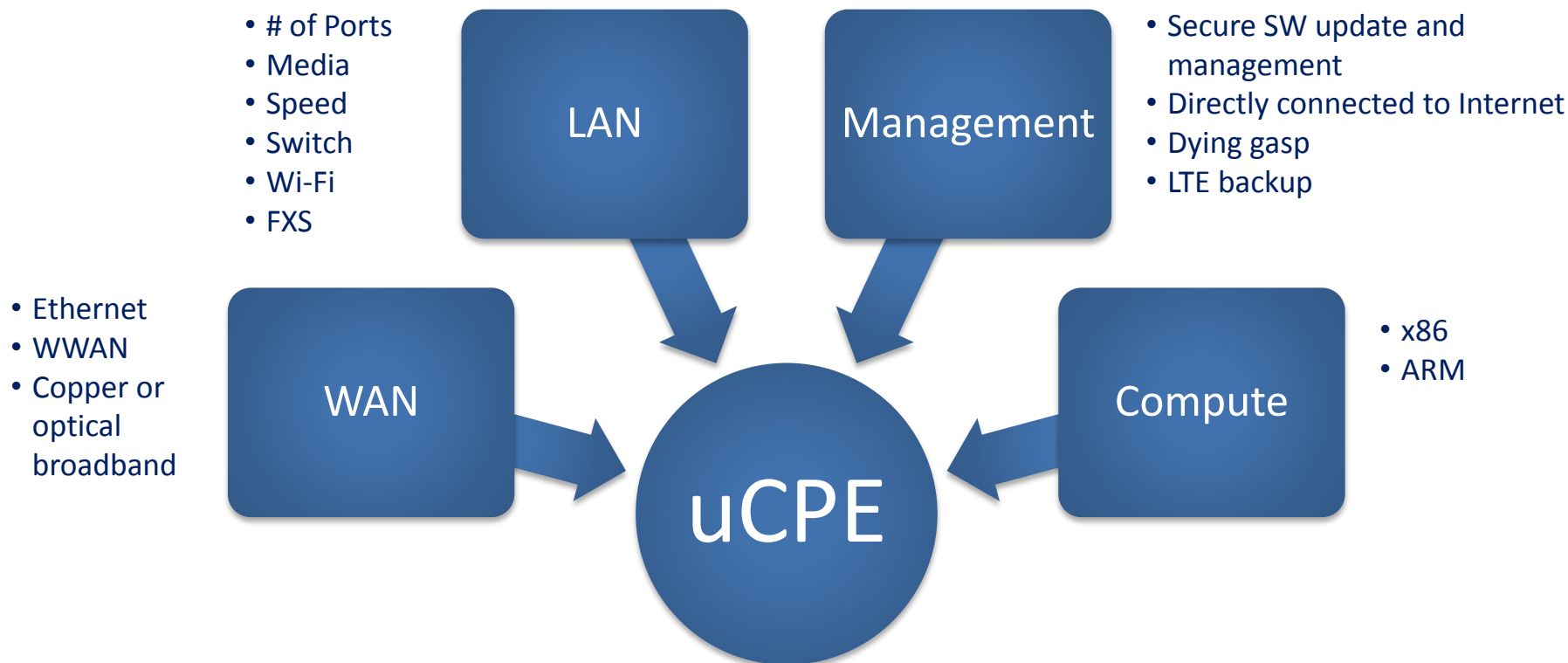
Purpose-built HW with fixed per-function features & I/O



Service Chaining

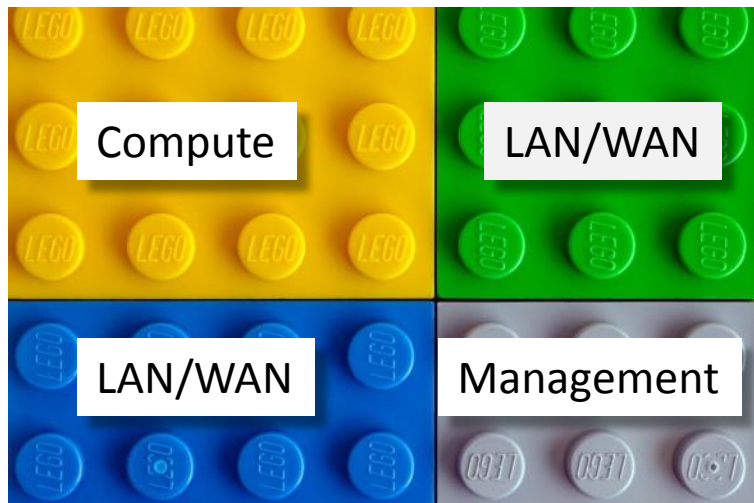
White Box with converged SW services, HW features, and I/O

Telcos Need Agile uCPEs

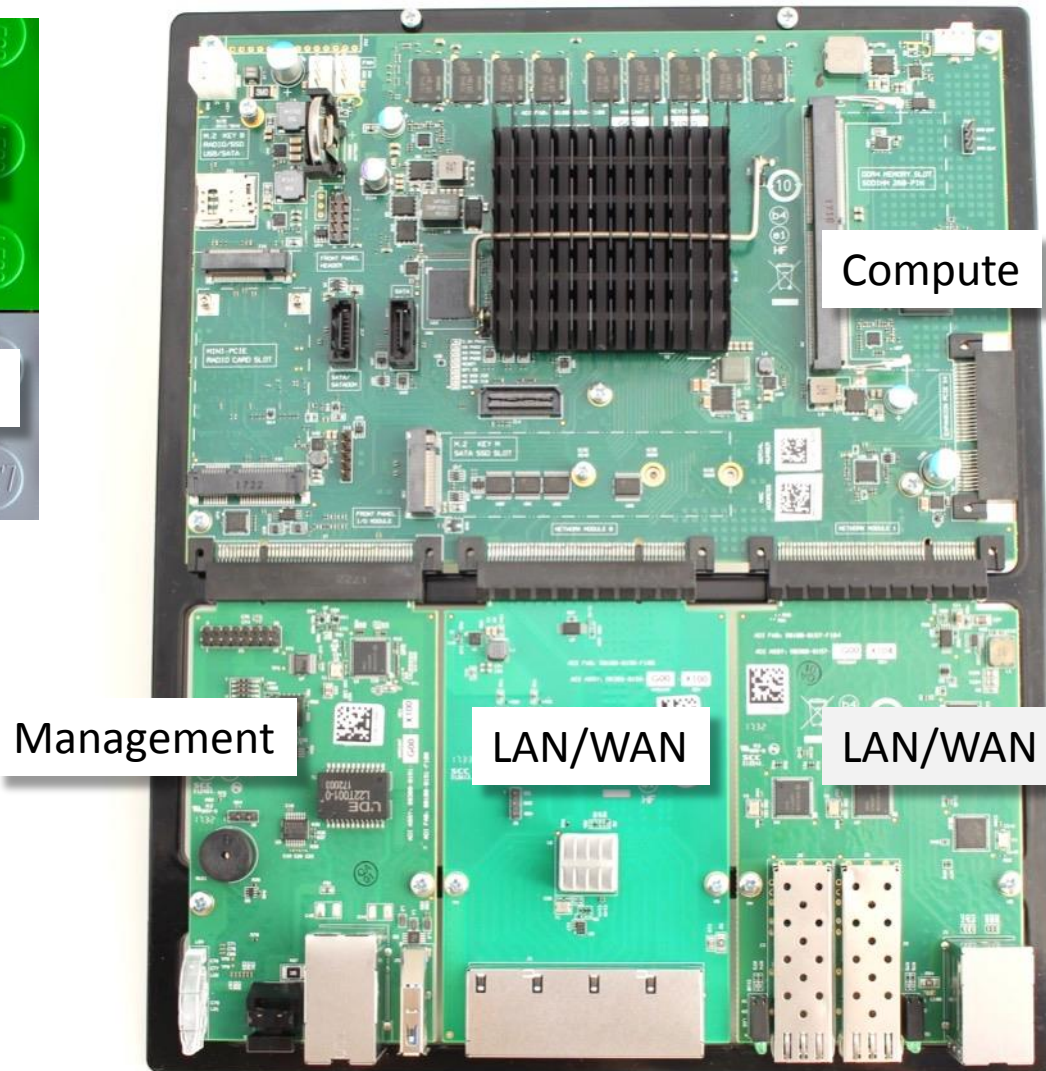


***SKU explosion limits applicability of monolithic boxes
...BUT conventional modular boxes too expensive***

Silicom and Intel Open White Box uCPE Architecture: vE-CPE



***vE-CPE Is A New, Open
Building Block Approach
to uCPE Agility, Based
on Telco Feedback***



Keys to Right-Sizing Modularity for uCPE



Low-Cost Internal Modularity

- Reconfigurable HSIO reduces signal count
- Allow module access to CPU MACs
- Allow PHY only and direct connect modules



LAN/WAN Freedom

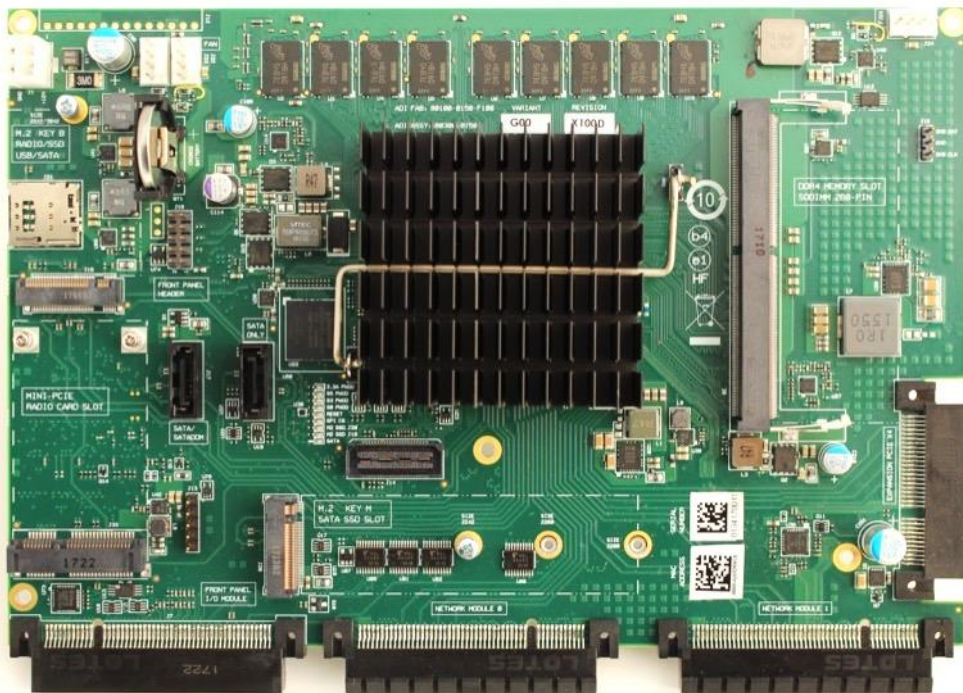
- Mix-and-match LAN/WAN
- LAN
 - Ethernet
 - 1G, 2.5G, 10G – Copper/optical
 - Switched or independent
 - 2-8 ports/module
 - Wi-Fi
- WAN
 - xDSL, DOCSIS, GPON
 - LTE
- Enable PHY only and direct connect modules



Secure, Flexible Management

- Enable flexibility in BMC, or even no BMC
- Secure management and SW updates even when connected directly to the Internet
- Dying gasp
- LTE backup

Intel Atom C3000 vE-CPE Compute Module



- Supports all C3000 SKUs 2C to 16C
- Up to 32GB DDR4
 - Dual channel – Mem down + DIMM
- Two LAN/WAN Module Slots
 - 2x LAN (Base-X, KR, SFI – 1, 2.5, 10G)
 - 4x HSIO (PCIe, SATA)
- Front Panel I/O and Management Slot
 - PCIe, UART, USB, SPI, I2C
 - Analog voltage monitor taps
 - Fan, temperature
 - ACPI
- 2x M.2 for LTE and SSD
- 1x mPCIe for Wi-Fi
- x4 PCIe Gen3 Expansion Slot
- 2x SATA host (1x SATADOM)
- Fanless for 2C and 4C

Availability

- Today: Intel Atom C3000 (Denverton)
- In Development: Next Generation Intel
- In Discussion: ARM64

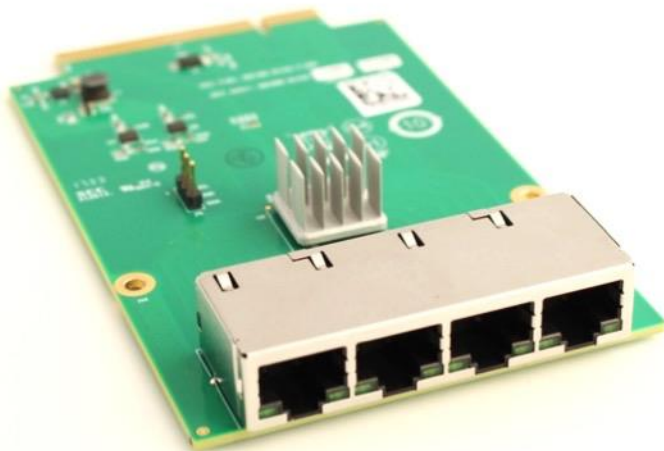
vE-CPE LAN/WAN Modules

Available at Production Launch:

- 4x1GbE (not Switched)
- 4x1GbE (Switched)
- 2x1GbE (Cu/SFP auto detect)
- 8x1GbE (Switched)
- 8x1GbE w/PoE+ (Switched)
- 4x1GbE (2xCu, 2xSFP)
- SSD
- VDSL2/ADSL

In Planning:

- 10GbE
- 2.5GbE
- DOCSIS
- GPON
- FXS



vE-CPE Management Modules

Pass-through Module

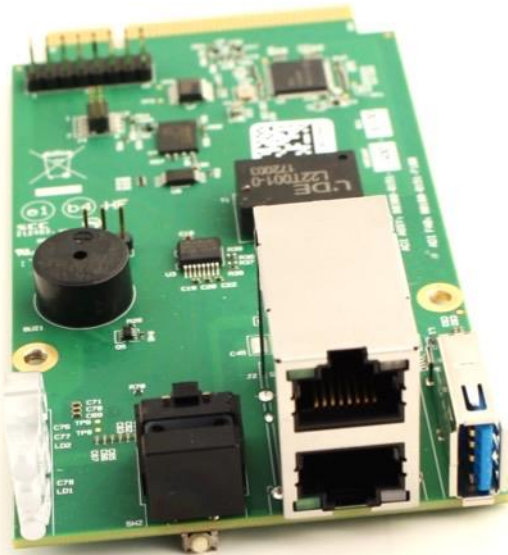
- Console
- Ethernet management port
- USB

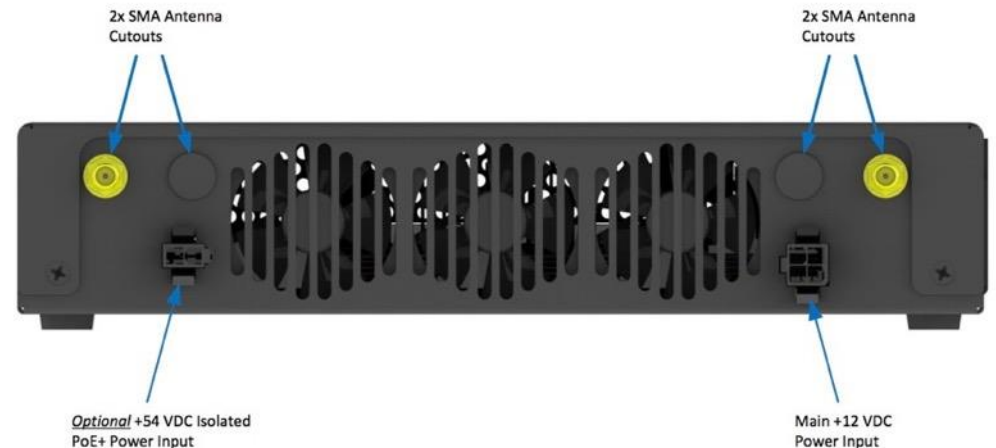
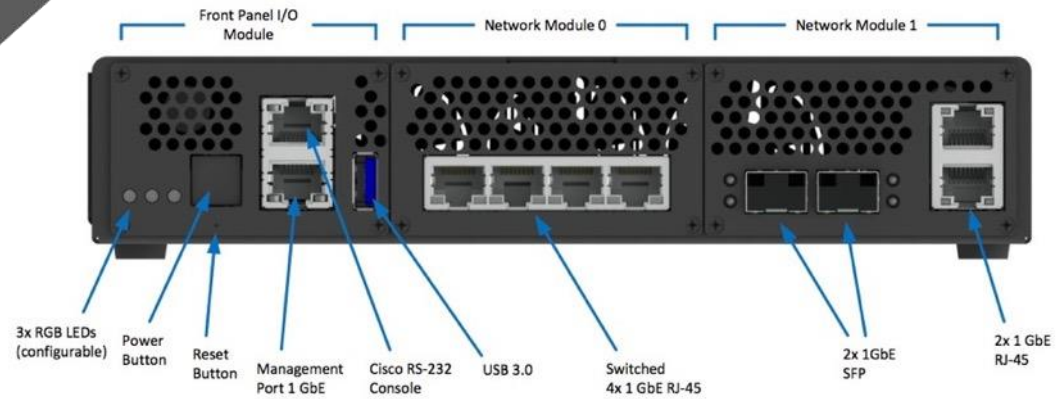
MicroBMC (pfSense based BMC)

- Right-sized BMC for uCPE
- Secure management and SW updates without private secure network
- Dying gasp
- LTE backup

In Discussion:

- IPMI
- OpenBMC





- vE-CPE developed under close Intel-Silicom collaboration
- vE-CPE is based on Telco feedback for openness and flexibility
- vE-CPE delivers uCPE agility without big modularity cost penalty
- vE-CPE enables LAN/WAN freedom without limits on innovation
- vE-CPE brings secure management targeted to uCPE

Contact Silicom for further information