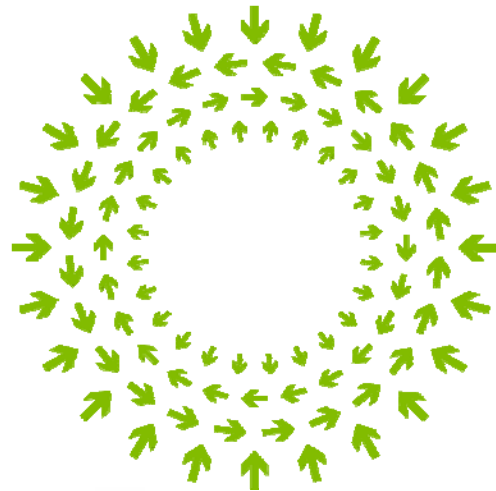


# Universal CPE

OCP Telco Engineering Workshop 05.15.2017



**OPEN**  
Compute Project

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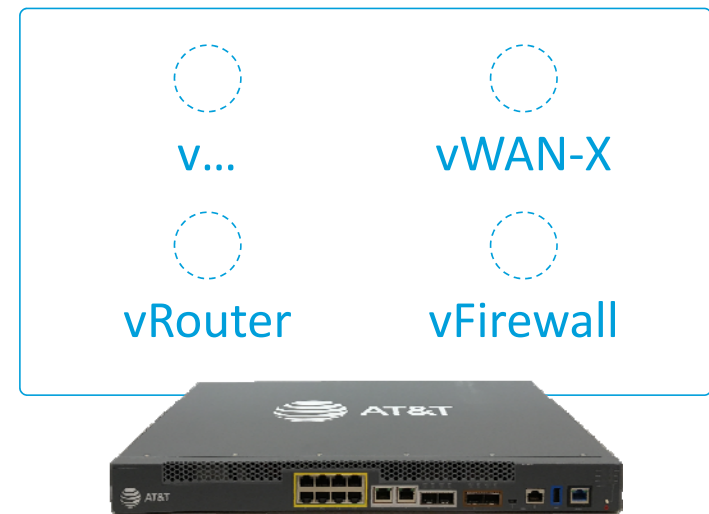
# Network Function Virtualization for Customer Premise Locations

## Traditional Network Appliance Approach



Specialized, proprietary hardware  
Physical install per appliance per site  
Complex network management

## Network Function Virtualization Approach (Functions run on x86 as VMs or Containers)



Standard x86 hardware platform  
Multiple functions on a single device  
Less complexity, improved TCO



# Background and Goals

## Background:

- AT&T been developing whitebox solutions in the customer premise space for 15+ year
- The AT&T VPN Gateway provides IPsec based VPNs to small/medium enterprise locations
- AT&T has the hardware built for us and AT&T owns and develops the software that runs the box
- Over 100K units currently in production
- In 2014, as part of our goal to virtualize and SDN control 75% of our network by 2020, AT&T started work on a larger x86 uCPE platform to support multiple Virtual Network Functions (VNFs) on a single box
- AT&T is currently shipping our GA uCPE marketed under AT&T Flexware

## Goals with OCP:

- To take advantage of the OCP community to define a reference architecture spec for uCPE
- Bring the innovation and requirements from across our industry to provide a high quality, cost effective solution for our end customers
- Make the hardware standard and allow the traditional network vendor community to focus their resources on software solutions (base OS and VNF based products)



# Architectural Guidelines

## **Create an architecture to meet the demands at the customer premise:**

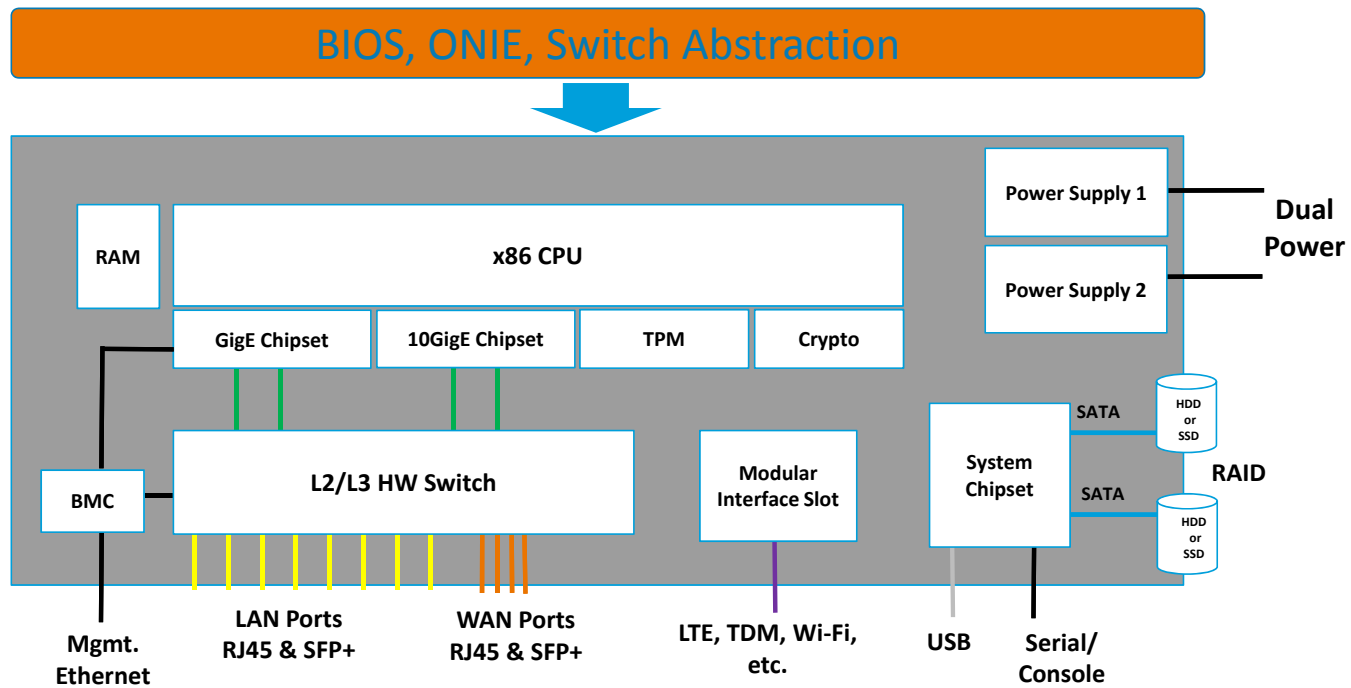
- x86 based CPU with crypto co-processor option
- Trusted Platform Module (TPM)
- Flexible RAM and storage options
- Ethernet network interfaces with Power over Ethernet (POE) option
- Merchant silicon chip for local LAN switching
- Baseboard Management Controller (BMC) for Out of Band Management
- Single and dual power options with last gasp support
- Modular interface slot to support optional items (LTE modem, extra storage, TDM interface, etc.)
- Firmware Items – ONIE bootloader, Switch Abstraction Interface, BIOS

## **Items to Consider:**

- May need multiple specs based in small, medium, large sizes
- Each size could be based on a different CPU chipset, physical size, port count, etc.
- Within each size range items will have to be variable (core count, memory, storage, etc.)



# Open uCPE Hardware – High Level Architecture



# Call to Action

## **AT&T is looking to form a team of interested parties to help define the detailed spec:**

- Define key hardware components (CPU, memory, BMC, etc.)
- Define what components are fixed and which are variable
- BIOS, ONIE types/versions to be used
- Work on different uCPE sizes
- Physical design for the box





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