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SUMMIT

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OCP uCPE Ecosystem Using Marvell CPU, PHY and Switch Devices

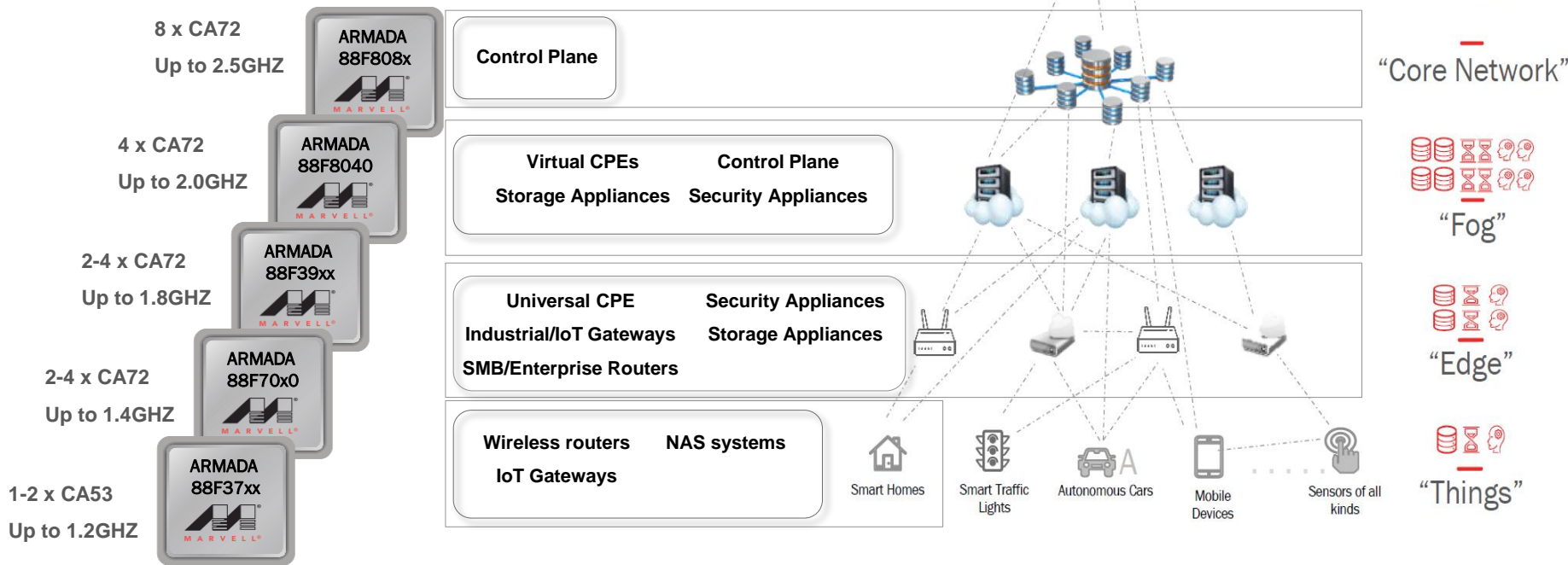
Jeffrey Ho and Maen Suleiman
Marvell

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CPUs for Edge Compute and Enterprise

ARMADA High Performance ARM64bit Processors

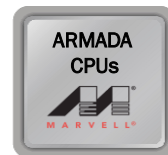


Marvell-based White Box Solutions



One Stop Shop for
Compute, Network & Storage

- Processors
- Switches
- PHYs
- Storage
- WiFi



AT&T OCP uCPE Specification

Hardware

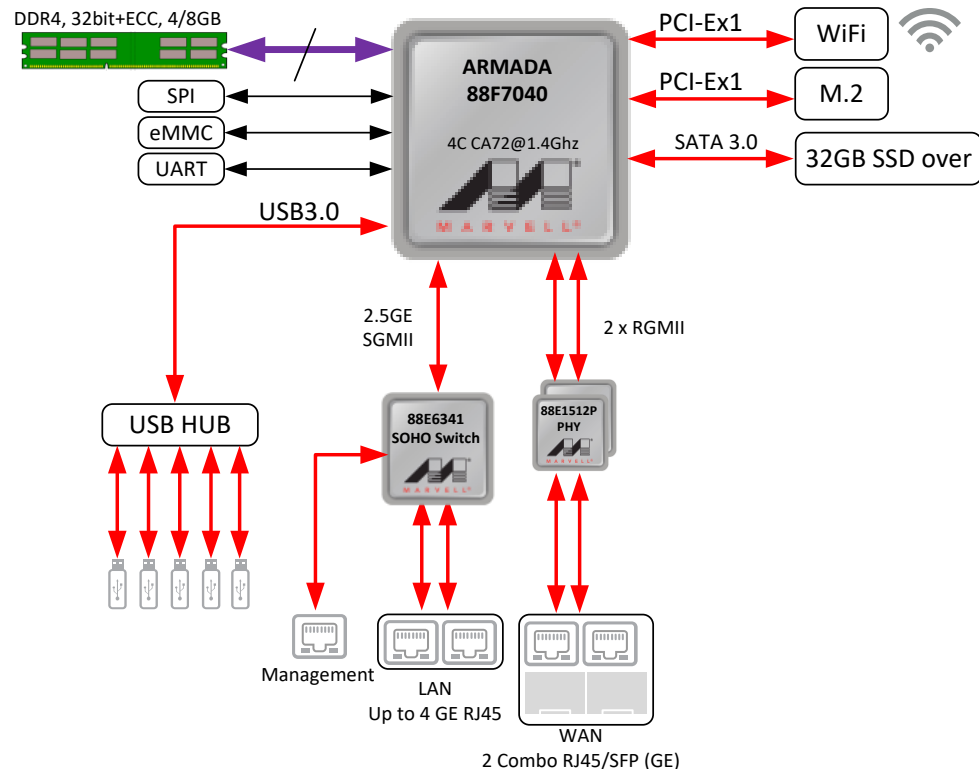
	Micro	Extra Small	Small	Medium	Large
CPU	2 small cores	4 small cores	4 big cores	8 big cores	16 big cores
Memory	4GB	8GB	16GB	32GB	64GB
Storage	32GB SSD	16GB SSD 64GB SSD	32GB SSD 200GB SSD	64GB SSD 400GB SSD	100GB SSD 2x 3TB HDD
Internal Switch Ports	None	1x 2.5GE	4x 1GE	2x 10GE 2x 1GE	2x 10GE 2x 1GE
External Switch Ports	None	6x 1GE RJ45 2x SFP	10x 1GE RJ45 4x SFP	10x 1GE RJ45, 2x SFP+ 2x SFP	18x 2.5GE RJ45 8x SFP+
PoE Ports	None	2x 802.1at	4x 802.1at	4x 802.1at	16x 802.1at
Host External NIC's	4x 1GE RJ45 2x SFP	None	None	None	None
Host Mgmt Port	1x 1GE RJ45	1x 1GE RJ45	1x 1GE RJ45	1x 1GE RJ45	1x 1GE RJ45
USB Ports	5x USB 3.0	5x USB 3.0	5x USB 3.0	5x USB 3.0	5x USB 3.0
Serial Console	Yes	Yes	Yes	Yes	Yes
LTE	Optional Module	Optional Module	Optional Module	Optional Module	Optional Module
Wifi	Optional Module	Optional Module	Optional Module	Optional Module	Optional Module
M2 Expansion	Yes	Yes	Yes	Yes	Yes
BMC	Optional	Yes	Yes	Yes	Yes
TPM	Yes	Yes	Yes	Yes	Yes
Power Supply	Single, w/Dying Gasp	Single, w/Dying Gasp	Dual, w/Dying Gasp	Dual, w/Dying Gasp	Dual, w/Dying Gasp

Software

- BMC – OpenBMC
- Switch Abstraction Interface (SAI)
- Open Network Operating System

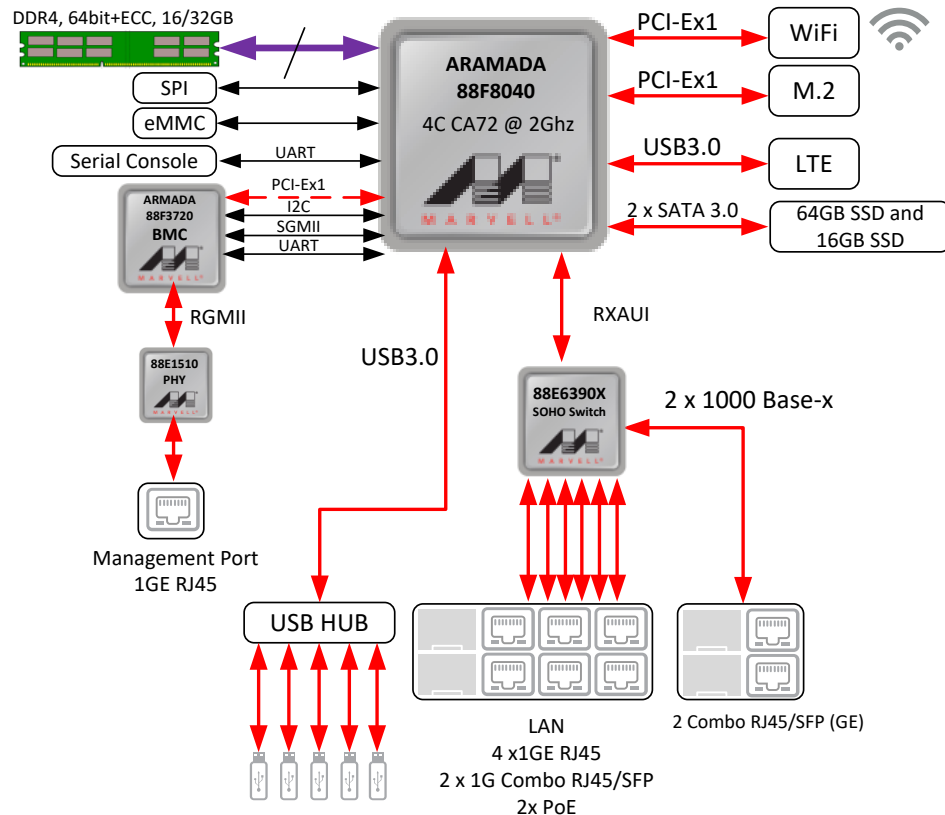
Micro uCPE

	Required	Solution
CPU	2C Atom	4C CA72 @ 1.2Ghz
Memory	4GB	4/8GB + ECC @ 32bit 1600bps
Storage	32GB SSD	1x M.2 SATA 3.0
Internal Switch Ports	None	
External Switch Ports	None	
PoE Ports	None	
Host External NIC's	4x 1GE RJ45 2x SFP	4 x 1GE RJ45 using Topaz 2 x SFP using E1510
Host Mgmt Port	1x 1GE RJ45	1 x 1GE
USB Ports	5x USB 3.0	5 USB port using USB Hub
Serial Console	Yes	Yes – UART
LTE	Optional Module	Yes – over USB
Wifi	Optional Module	Yes – over PCI-E x1
M2 Expansion	Yes	Yes – Over PCI-E x1
BMC	Optional	Optional – Using Armada 3700
TPM	Yes	Yes – using ARM Trust Zone
Power Supply	Single, w/Dying Gasp	Dying Gasp – done by the SoC



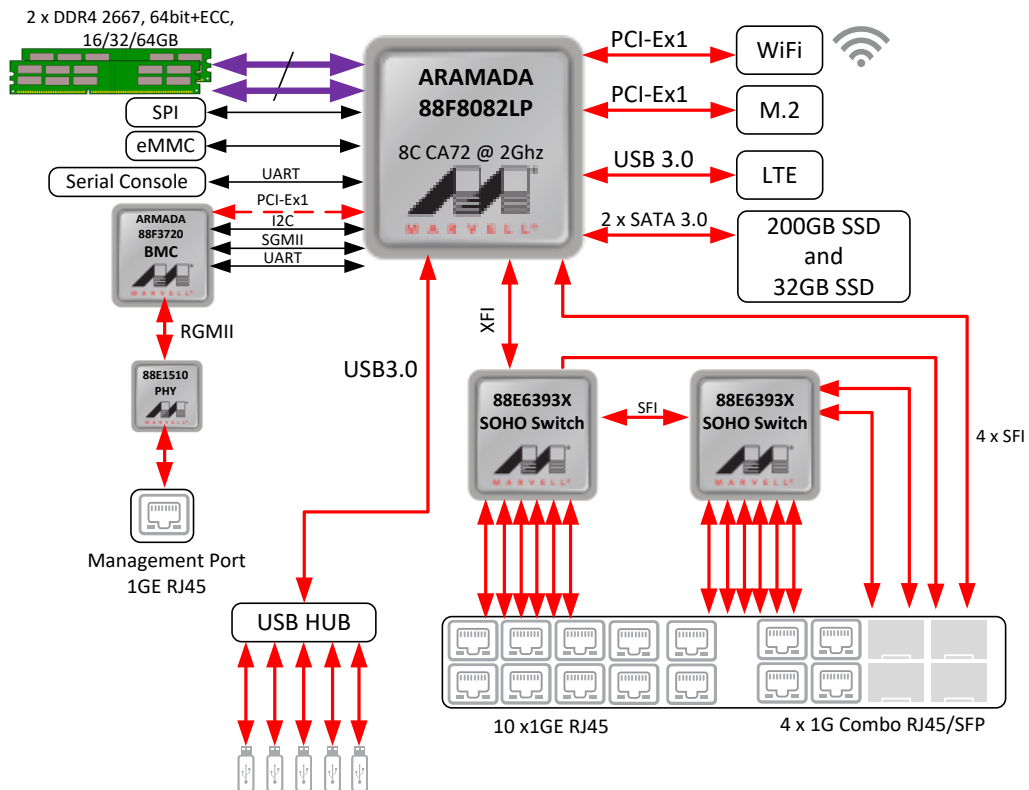
Extra Small uCPE

	Required	Solution
CPU	4C Atom	4C CA72 @ 2Ghz
Memory	8GB	8/16GB + ECC @ 64bit DDR4 2100bps
Storage	16GB SSD 64GB SSD	2x M.2 SATA 3.0
Internal Switch Ports	1x 2.5GE	1 x 10GE RXAUI
External Switch Ports	6x 1GE RJ45 2x SFP	6 x 1GE RJ45 Using Peridot. 2 x 1GE RJ45/SFP Using Peridot
PoE Ports	2x 802.1at	2 x 802.1at POE+ (optional)
Host External NIC's	None	
Host Mgmt Port	1x 1GE RJ45	1 x 1GE using E1510
USB Ports	5x USB 3.0	5 USB port using USB Hub
Serial Console	Yes	Yes – UART
LTE	Optional Module	Yes – over USB
Wifi	Optional Module	Yes – over PCI-E x1
M2 Expansion	Yes	Yes – Over PCI-E x1
BMC	Yes	Yes – Using Armada 3700
TPM	Yes	Yes – using ARM Trust Zone
Power Supply	Single, w/Dying Gasp	Dying Gasp – done by the SoC



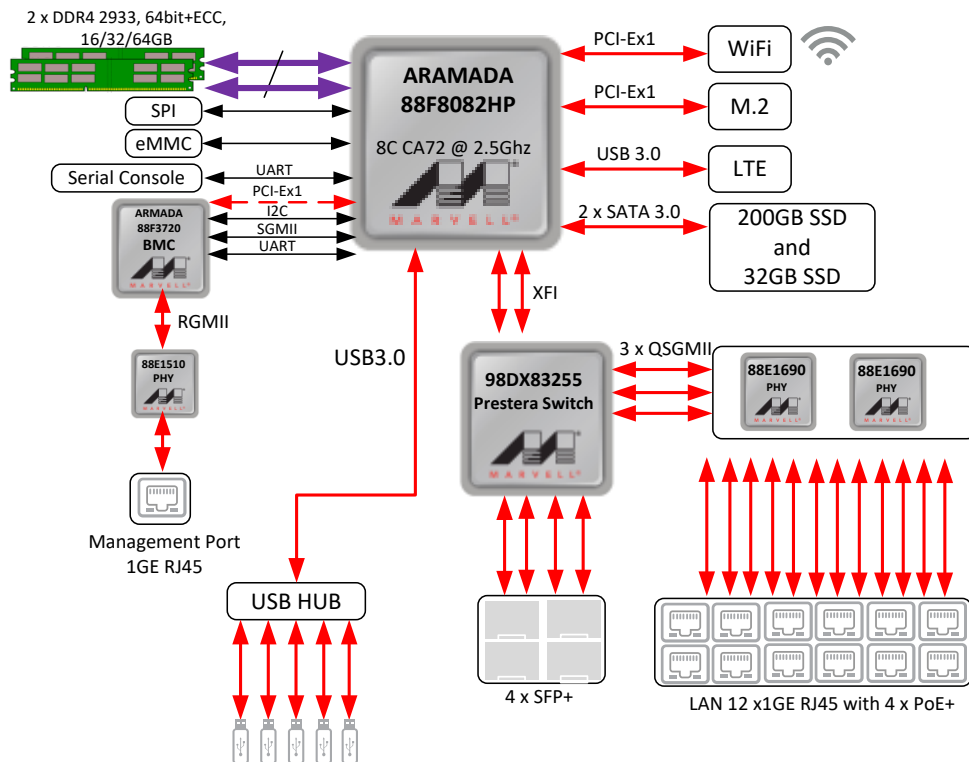
Small uCPE

	Required	Solution
CPU	4 big cores	8C CA72 @ 2Ghz/
Memory	16GB	16/32/64GB + ECC @ 2 x 64bit DDR4 2667bps
Storage	32GB SSD 200GB SSD	2x M.2 SATA 3.0
Internal Switch Ports	4x 1GE	1 x 10GE XFI
External Switch Ports	10x 1GE RJ45 4x SFP	14 x 1GE RJ45 Using 2 x Amethyst. 4 x 10GE SFP+ Using 2 x Amethyst
PoE Ports	4x 802.1at	4 x 802.1at POE+ (Optional)
Host External NIC's	None	
Host Mgmt Port	1x 1GE RJ45	1 x 1GE using E1510
USB Ports	5x USB 3.0	5 USB port using USB Hub
Serial Console	Yes	Yes – UART
LTE	Optional Module	Yes – over USB 3.0
Wifi	Optional Module	Yes – over PCI-E x1
M2 Expansion	Yes	Yes – Over PCI-E x1/ x4
BMC	Yes	Yes – Using Armada 3700
TPM	Yes	Yes – using ARM Trust Zone
Power Supply	Dual, w/Dying Gasp	Dual, Dying Gasp – done by the SoC



Medium uCPE

	Required	Solution
CPU	8C Xeon-D	8C CA72 @ 2.5 Ghz
Memory	32GB	8/16/32GB + ECC @ 64bit DDR4 2100bps
Storage	64GB SSD 400GB SSD	2x M.2 SATA 3.0
Internal Switch Ports	2x 10GE 2x 1GE	2 x 10GE XFI
External Switch Ports	10x 1GE RJ45, 2x SFP+ 2x SFP	12x 1GE RJ45, 4x SFP+
PoE Ports	4x 802.1at	4 x 802.1at POE+ (optional)
Host External NIC's	None	
Host Mgmt Port	1x 1GE RJ45	1 x 1GE using E1510
USB Ports	5x USB 3.0	4x USB 3.0
Serial Console	Yes	Yes – UART
LTE	Optional Module	Yes – over USB
Wifi	Optional Module	Yes – over PCI-E x1
M2 Expansion	Yes	Yes – Over PCI-E x1
BMC	Yes	Yes – Using Armada 3700
TPM	Yes	Yes – using ARM Trust Zone
Power Supply	Dual, w/Dying Gasp	Dying Gasp – done by the SoC



ARMADA uCPE Software Features

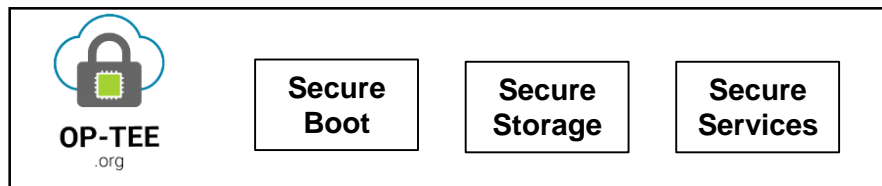
- ONIE Boot Loader - Ported to ARMADA CPU (ARM64bit)
- SAI – Switch Abstraction Interface – Support Presteria Switches
- SONiC – Ported to ARMADA CPU (ARM64bit)
 - Open Networking Operating System

OCF
approved
Software

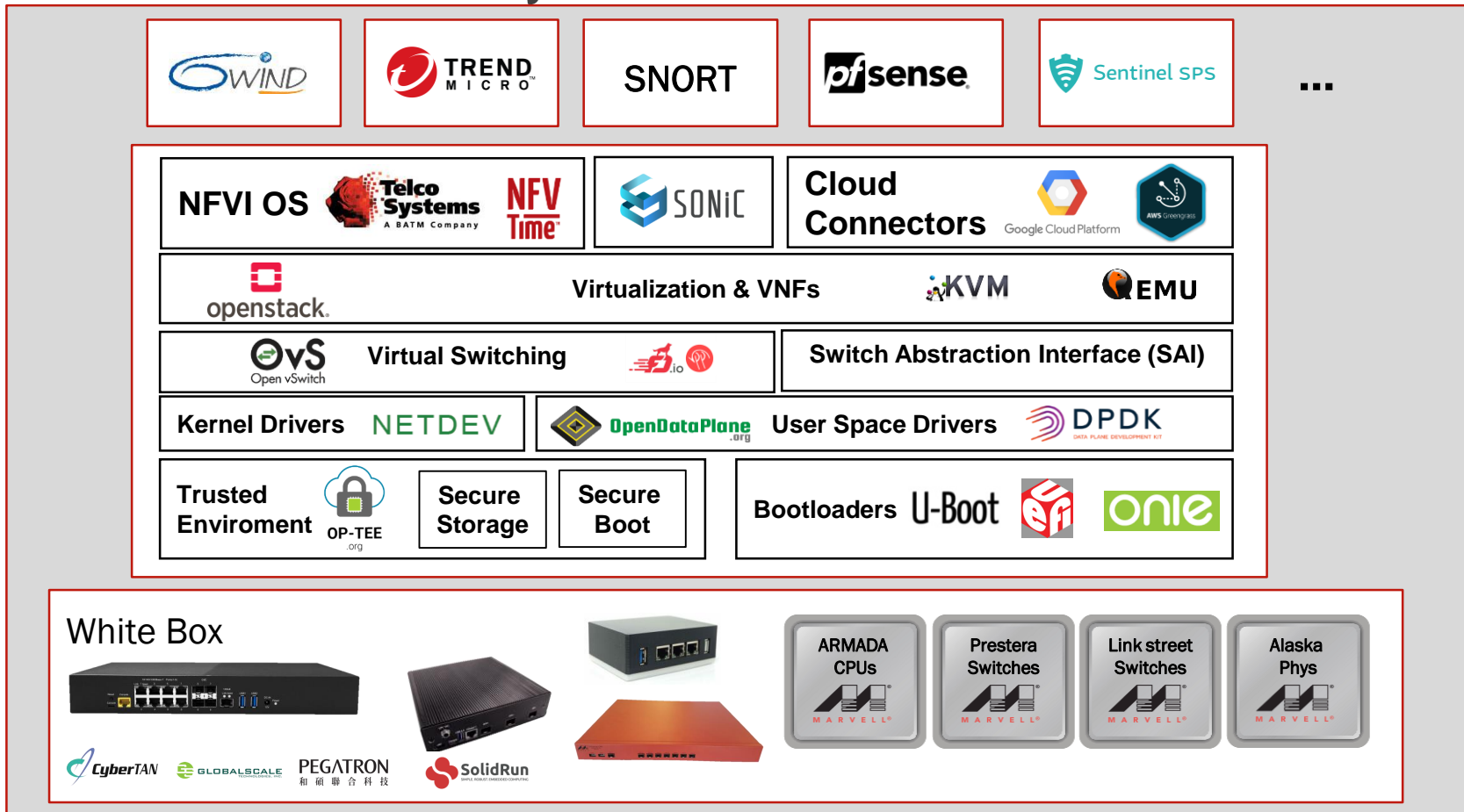


ARMADA uCPE TPM Solution

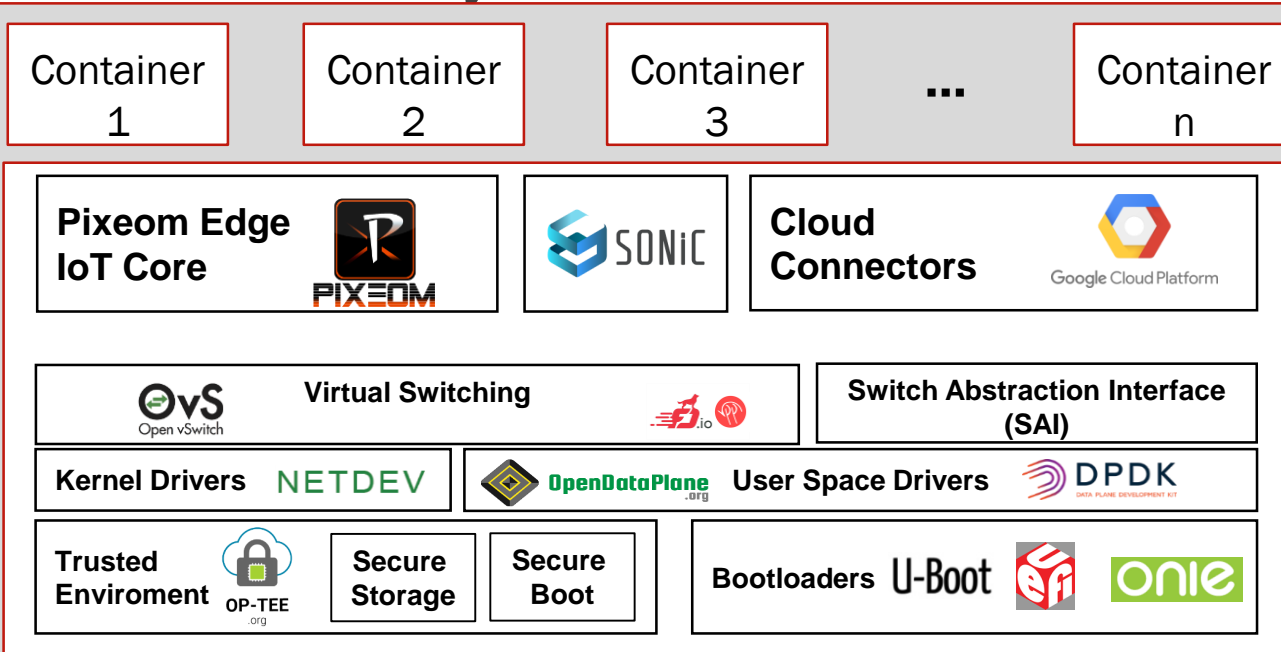
- ARMADA CPU support Secure boot & ARM TrustZone
- Support OPTEE (Open Portable Trusted Execution Environment) operating system
- Features
 - Chain of Trust
 - Secure services
 - Secure Storage



Marvell uCPE Ecosystem – Virtualized Model



Marvell uCPE Ecosystem – Containerized Model



White Box

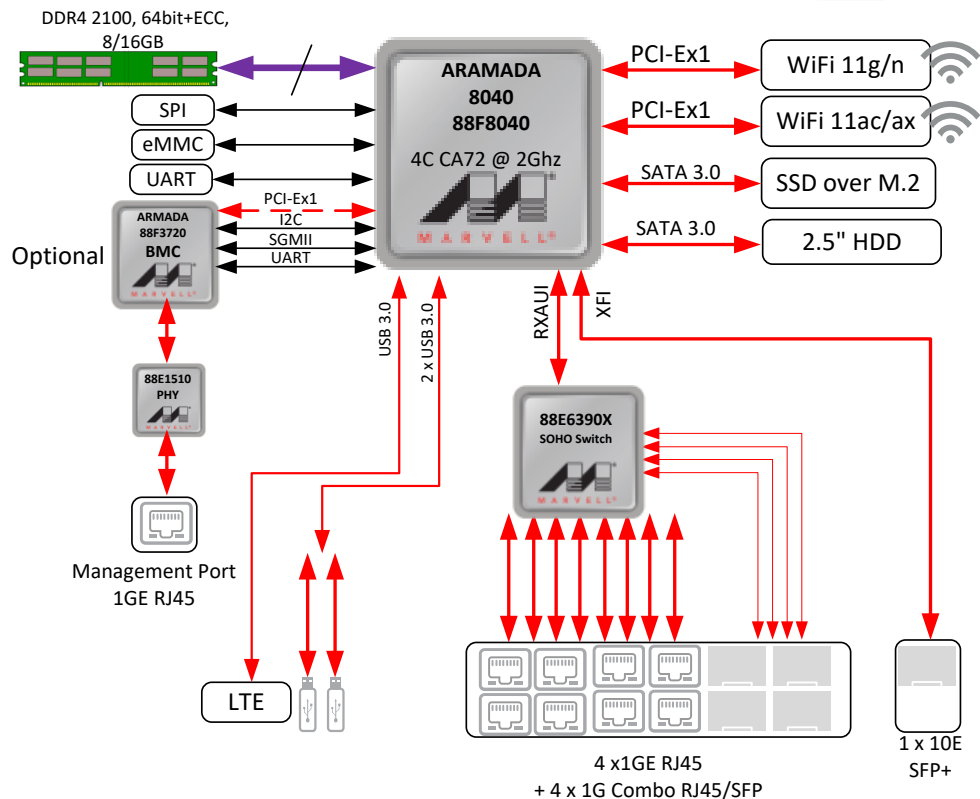
This section displays various white box hardware components and Marvell product logos:

- Hardware units: A network switch, a small form-factor device, a server rack unit, and a flat board device.
- Logos: CyberTAN, GLOBALSCALE, PEGATRON (和碩聯合科技), and SolidRun.
- Marvell Product Logos: ARMADA CPUs, Prestera Switches, Link street Switches, and Alaska Phys.

Cybertan Extra Small uCPE Solution



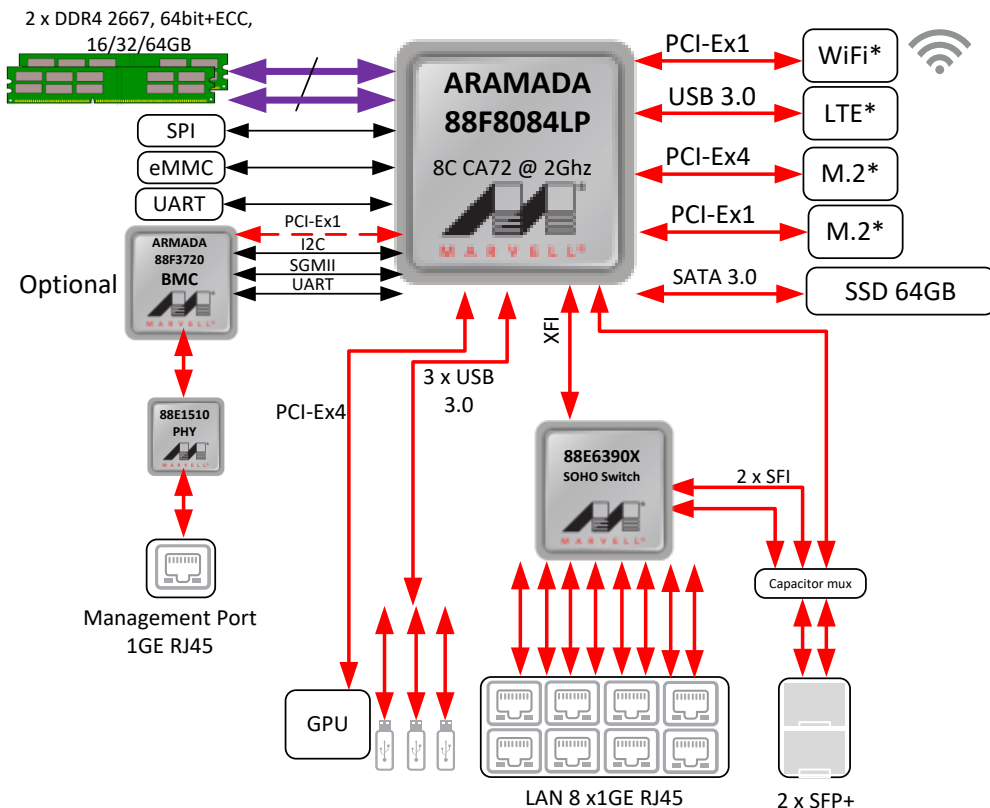
	Required	Solution
CPU	4 small cores	4C CA72 @ 2Ghz
Memory	8GB	8/16GB + ECC @ 64bit DDR4 2100bps
Storage	16GB SSD 64GB SSD	2x M.2 SATA 3.0
Internal Switch Ports	1x 2.5GE	1 x 10GE RXAUI
External Switch Ports	6x 1GE RJ45 2x SFP	8 x 1GE RJ45 / 4 x SPF Using Peridot. 1x SFP+ 10GE
PoE Ports	2x 802.1at	2 x 802.1at POE+ (optional)
Host External NIC's	None	
Host Mgmt Port	1x 1GE RJ45	1 x 1GE using E1510
USB Ports	5x USB 3.0	2 USB port
Serial Console	Yes	Yes – UART
LTE	Optional Module	Yes – over USB
Wifi	Optional Module	Yes – over PCI-E x1
M2 Expansion	Yes	Yes – Over PCI-E x1
BMC	Yes	Yes – Using Armada 3700
TPM	Yes	Yes – using ARM Trust Zone
Power Supply	Single, w/Dying Gasp	Dying Gasp – done by the SoC



Marvell Small uCPE

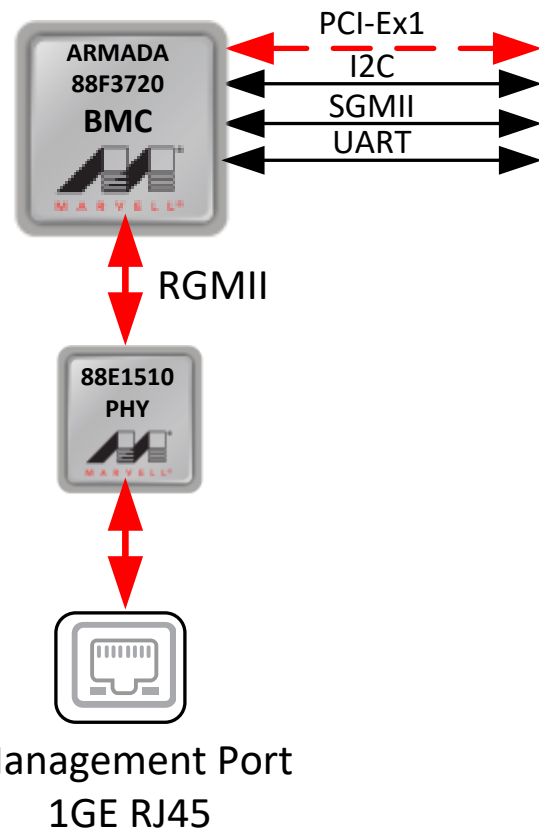


	Required	Solution
CPU	4 big cores	8C CA72 @ 2Ghz
Memory	16GB	8/16GB + ECC @ 64bit DDR4 2100bps
Storage	32GB SSD 200GB SSD	HDD Over SATA 3.0 SSD Over SATA 3.0
Internal Switch Ports	4x 1GE	1 x 10GE XFI
External Switch Ports	10x 1GE RJ45 4x SFP	8 x 1GE RJ45 2 x 10GE SFP+
PoE Ports	4x 802.1at	8 x 802.1at POE+
Host External NIC's	None	
Host Mgmt Port	1x 1GE RJ45	1 x 1GE using E1510
USB Ports	5x USB 3.0	4 USB port using USB Hub
Serial Console	Yes	Yes – UART
LTE	Optional Module	Yes – over USB 3.0
Wifi	Optional Module	Yes – over PCI-E x1
M2 Expansion	Yes	Yes – Over PCI-E x1/ x4
BMC	Yes	Yes – Using Armada 3700
TPM	Yes	Yes – using ARM Trust Zone
Power Supply	Dual, w/Dying Gasp	Dual, Dying Gasp – done by the SoC



uCPE BMC Solution

- BMC
 - Based on ARMADA 3720
 - Cortex A53 (ARMv8 64bit)
 - Security support
 - Chain of trust
 - OPTEE OS for Trusted Execution Environment (using ARM TrustZone)
 - TPM functionality
 - Open and upstreamed Software
 - Support Yocto
 - Ready for OpenBMC Development



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