



Solution Brief



Intel® Select Solution for uCPE
Intel® Xeon® Processor D-2100

Intel® Select Solution for uCPE

Overview

Thanks to their increasing adoption of software defined networking (SDN), software defined wide area networking (SD-WAN) and network functions virtualization (NFV), service providers have been able to make significant changes in their approach to connectivity at the network edge. They are adopting an approach that simplifies the way networks are designed, deployed, and managed. This translates to greater flexibility, enabling both the service provider and the customer to monetize on new business models faster, and to lower the total cost of ownership (TCO).

The result is a network where a new branch office or retail outlet can be brought online and securely connected to a corporate WAN via the internet in minutes. A network where managed service providers can remotely deploy virtual network functions and new network service chains in a matter of seconds using state-of-the-art management and orchestration tools. A network where network administrators deploy new services at the click of a button through self-service portals. And ultimately a network that is abstracted from the physical to provide unprecedented agility and cost efficiencies.

The first step to achieving greater network agility begins by disaggregating physical network elements such as routers, firewalls, application delivery controllers and SD-WAN appliances into virtual network functions (VNFs). These elements are then reunified on open universal customer premises equipment (uCPE) based on Intel® architecture that can be scaled to meet performance, throughput and connectivity needs and programmed to fulfill new functions on the fly.

This not only allows service providers to manage software and hardware lifecycles separately, but also avoids fixed function vendor lock in and provides the means to self-maintain the same software platform across multiple generations of hardware.

To support these platforms, Intel has developed the Intel® Select Solutions for uCPE reference design that combines Intel's expertise with NFV systems architecture requirements with the performance foundation of the Intel® Xeon® D processor. This brief describes the PREMIER products that are verified as Intel® Select Solutions for uCPE.

<i>Hardware Platform</i>	<i>Software Platform</i>
<ul style="list-style-type: none">• Compact 1U white box uCPE architected around Intel® Xeon® processor D-2100• Flexible GbE, 10GbE, 25GbE and 40GbE connectivity• 1+1 redundant PSU• Advanced management and security features	<ul style="list-style-type: none">• Fully tested with Ubuntu operating system• Wide support from PREMIER and Advantech uCPE Ecosystem partners



White Box uCPE

A white box uCPE can be defined as a commercial off-the-shelf (COTS) server-grade appliance operating on the customer premises where proximity to users provides lower latency services. It is used for hosting VNFs that run on an open operating system such as Ubuntu, CentOS or Red Hat Enterprise Linux and provides a virtualization layer for resource abstraction and control.

Both open-source and commercial software solutions can be hosted, and zero touch provisioning at power on can connect the uCPE to the internet using a secure and automated process over a choice of WAN connections. Encryption can be performed in software or accelerated by hardware based on Intel® QuickAssist Technology to ensure secure communications.

Introduction to Intel Select Solutions for uCPE Configurations

The Intel® Select Solutions for uCPE were defined based on the functional requirements of a wide range of uCPE use cases to arrive at a verified and workload-optimized configuration for VNFs and other NFVI applications. Intel has designed two product configurations as part of the Intel® Select Solutions for uCPE reference design.

Two configuration variants of the PREMIER Pi-CON AT-SKY white box uCPE passed Intel® Select Solution for uCPE base and plus configuration tests, integrating Intel® Xeon® processor D-2123IT and Intel® Xeon® processor D-2187NT.

Table 1 and Table 2 below show the exact hardware configurations of the Pi-CON AT-SKY verified as Intel® Select Solutions for uCPE and compare them to the reference specifications.

Table 1: Pi-CON AT-SKY Compatibility with Intel Select Solution for uCPE Base Configuration		
Platform	Intel Reference Platform	PREMIER Pi-CON AT-SKY - 4CA1S
Processor	Intel® Xeon® processor D-2123IT, 4 core, 2.2 GHz, 60 W, or higher SKU	Verified with Intel® Xeon® processor D-2123IT, 4 core, 2.2 GHz Turbo boost to 3.0 GHz, 60 W
Memory	16 GB DDR4 2133 MHz, 4 * 4 GB (16 GB Total) Minimum all 4 memory channels populated (1 DPC) to achieve 16 GB (i.e., 4 * 4 GB RDIMM)	Configured with 4 * 4 GB (16 GB Total) all 4 memory channels populated
NICs	2 x 10 GbE integrated Ethernet ports	4 x 10 GbE integrated Ethernet SFP+ ports 2 x RJ45 management ports 8 x 1GbE RJ45 Ethernet ports 1 Network Mezzanine Card slot (NMC) for expansion

Intel® QAT	Integrated Intel® QuickAssist Technology (recommended for the configuration but not required)	Without Intel® QuickAssist Technology
Storage	Intel® Solid State Drive Data Center S3110 256 GB 2.5" internal solid-state drive (SATA or M.2)	2 x Intel® Solid State Drive Data Center S4510 2 x 960 GB Family

Table 2: Pi-CON AT-SKY Compatibility with Intel Select Solution for uCPE Plus Configuration

Platform	Intel Reference Platform	PREMIER Pi-CON AT-SKY -16CAR1
Processor	Intel® Xeon® processor D-2177NT, 14 core, 1.9 GHz, 105 W, or higher SKU	Intel® Xeon® processor D-2187NT, 16 core, 2.0 GHz Turbo boost to 3.0 GHz, 110 W
Memory	64 GB DDR4 2667 MHz, 4 * 16 GB (64 GB Total) Minimum all 4 memory channels populated (1 DPC) to achieve 64 GB (i.e., 4 * 16 GB RDIMM)	64 GB DDR4 2667 MHz, 4 * 16 GB (64 GB Total) All 4 memory channels populated
NICs	4 x 10 GbE integrated Ethernet ports	4 x 10 GbE integrated Ethernet SFP+ ports 2 x RJ45 management ports 8 x 1GbE RJ45 Ethernet ports 1 Network Mezzanine Card slot (NMC) for expansion
Intel® QAT	Integrated Intel® QuickAssist Technology	Integrated Intel® QuickAssist Technology 100G
Storage	Intel® Solid State Drive Data Center S3110 512 GB 2.5" internal solid-state drive (SATA or M.2)	2 x Intel® Solid State Drive Data Center S4510 2 x 960 GB Family

PREMIER Pi-CON AT-SKY

The Pi-CON AT-SKY is a versatile white box with two different configurations that have been verified to meet the criteria for the Intel Select Solutions for uCPE. It has been optimized to run enterprise workloads in a compact 1U enclosure that provides advanced security and management features. The platform has been verified as a VNF-ready system integrating the Ubuntu operating system.

The Pi-CON AT-SKY -4CA1S configuration verified to meet Intel's base reference benchmark-performance threshold was equipped with a 4-core, 2.2 GHz Turbo boost to 3.0 GHz, 60W Intel® Xeon® processor D-2123IT, while the Pi-CON AT-SKY -16CAR1 configuration verified to meet Intel's plus reference benchmark-performance threshold was equipped with an Intel® Xeon® processor D-2187NT, 16 core, 2.0 GHz Turbo boost to 3.0 GHz, 110W. The Intel® Xeon® processor D-2100 product family has been designed for high density implementations, leveraging essential Data Plane Development Kit (DPDK) and

Intel QuickAssist Technology acceleration for high-performance packet processing, which makes it an ideal choice for lower TCO solutions at the customer edge.

Additional configurations of the Pi-CON AT-SKY allow from 4-to-18 core Intel® Xeon® processor D-2100 with or without Intel QuickAssist Technology acceleration. The platform supports 4 DDR4 DIMMs for up to 256 GB of ECC memory for highly virtualized environments. Support for one internal low-profile PCIe x8 add-on card enables further encryption offload or internet broadband connectivity extension.

The Pi-CON AT-SKY integrates up to four fixed 10GbE SFP+ ports and eight 1GbE RJ45 ports. Customers can match specific deployment needs within the same platform thanks to an additional PREMIER Network Mezzanine Card (NMC) slot that can be populated with a choice of 1GbE, 10GbE, 25GbE and 40GbE network interfaces. Please contact your PREMIER representative for additional information on LTE and Wi-Fi connectivity options.



Figure 1. PREMIER Pi-CON AT-SKY with one Network Mezzanine Card (NMC) and one PCIe adapter slot

PREMIER leverages Advanced Lights Out Management based on Advantech code base BMC and IPMI suite to improve system manageability and reliability, providing platform thermal management, H/W monitoring and supervision. Remote firmware upgrade capability and hardware-based BIOS redundancy make the Pi-CON AT-SKY an ideal platform for mission-critical and highly available networks. For enhanced platform security the Pi-CON AT-SKY provides Trusted Platform Module TPM 1.2/2.0 and Intel secure boot support.

The Pi-CON AT-SKY is CE, FCC, UL, CB, CCC, RoHS, WEE and UL60950/62368 compliant.

Enhanced Features

PREMIER networking platforms come with an enhanced feature set to improve availability, serviceability and usability:

- Remote Intelligent Platform Monitoring & Control
 - Integrated IPMI Based Management Controller
 - Development, Customization, Validation and Life Cycle Management
 - Remote Virtual Storage Media
 - Standard and Advanced IPMI Features
- Redundant BIOS
 - Physical Redundant Flashes for Current/Backup BIOS
 - Watchdog Mechanism to Detect Failing / Corrupted BIOS
 - Rollback Mechanism for System Recovery if BIOS Upgrade Fails
 - Dedicated Update Utility (ABU)
- Remote BMC/BIOS Upgrade
 - x86 BIOS Upgradable by BMC and ABU (PREMIER leverages Advantech's BIOS Utility)
 - Industry Standard HPM.1 Protocol

The safeguard and continuity of business-critical services is also ensured by eliminating single points of failure with LAN bypass. PREMIER leverages Advantech's advanced LAN Bypass feature, guaranteeing uptime by preserving network connectivity and maintaining communications in case of power outage or appliance malfunction. When Bypass Mode is active, multiple interface pairs can be bridged on power failure and will resume normal functionality when power is restored.

Intel® Network Builders community members who share similar philosophies about telecom and edge cloud architecture can openly collaborate on a range of platforms from two Intel Atom® processor cores to several hundred Intel® Xeon® processor cores.

For more information on the PREMIER Pi-CON AT-SKY verified Intel® Select Solution for uCPE, how to secure product for an evaluation, and how to order a platform, please visit: www.kgpc.com/ucpe.

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