IEI PUZZLE Series Products

Aiming to The Future with Next Generation Network Appliance

IEI PUZZLE series is the next generation product of network appliance which includes a broad portfolio of x86-based and ARM-based network platform built with the latest generation Intel, AMD, Marvell, NXP or Cavium processors, and Aquantia, Intel, Broadcom, Mellanox network interface controllers. These products are built for proprietary network appliance and uCPE (Universal Customer Premise Equipment).

Proprietary Network Appliance

A Proprietary network appliance is a specialized electronic device that plugs into a network that is optimized for one specialized network purpose like switching, routing, protecting in a network environment. Proprietary network appliances include as Router, Load Balance, Bandwidth Management, Gateway security, WAN Optimization, application delivery controller (ADC), Next Generation Firewall (NGFW), Unified Threat Management (UTM), Intrusion detection system (IDS).

uCPE (Universal Customer Premise Equipment)

uCPE consists of virtual network functions (VNFs) running on a standard operating system hosted on an open server with NFV technology.

Now with NFV technology, we can create several virtual machine and install these VNFs in a x86 or ARM based uCPE. VNFs could include popular software services such as a virtual firewall, virtual load-balancing, or other software-defined wide area network (SD-WAN)service. Besiads with NFV Orchestration, uCPU could be an Edge computing or an AI inference computing systems.

PUZZLE is Ready for Proprietary Network Appliance

Unified Threat Management (UTM)

Unified threat management or UTM is a single network appliance for all-inclusive security functions, such as network firewall, intrusion detection/prevention system (IDS/IPS), anti-virus gateway, anti-spam gateway, VPN, content filtering, load balancing, data loss prevention and appliance monitoring.

UTM appliances offer cost-effective, all-in-one security ideal for small/medium businesses, remote offices and retail networks.

Intrusion Detection System (IDS)

An intrusion detection system (IDS) is a device that monitors a network or systems for malicious activity or policy violations. Any malicious activity or violation is typically reported either to an administrator or collected centrally using a security information and event management (SIEM) system. A SIEM system combines outputs from multiple sources, and uses alarm filtering techniques to distinguish malicious activity from false alarms.

Application Delivery Controller

An application delivery controller (ADC) is a computer network device to improve the performance of web applications in a datacenter and it also could be a part of an application delivery network (ADN). In order to deal with the increasing of Internet traffic, application delivery controller (ADC) also provide load balancing, and support multi-tenancy for deployment at data centers and a large number of sessions with a fast transaction rate.

Wireless Gateway

A wireless gateway routes packets from a wireless LAN to another network, wired or wireless WAN. It may be implemented as software or hardware or combination of both. Wireless gateways combine the functions of a wireless access point, a router, and often provide firewall functions as well. They provide network address translation (NAT) functionality, so multiple user can use the internet with a single public IP. It also acts like a dynamic host configuration protocol (DHCP) to assign IPs automatically to devices connected to the network.

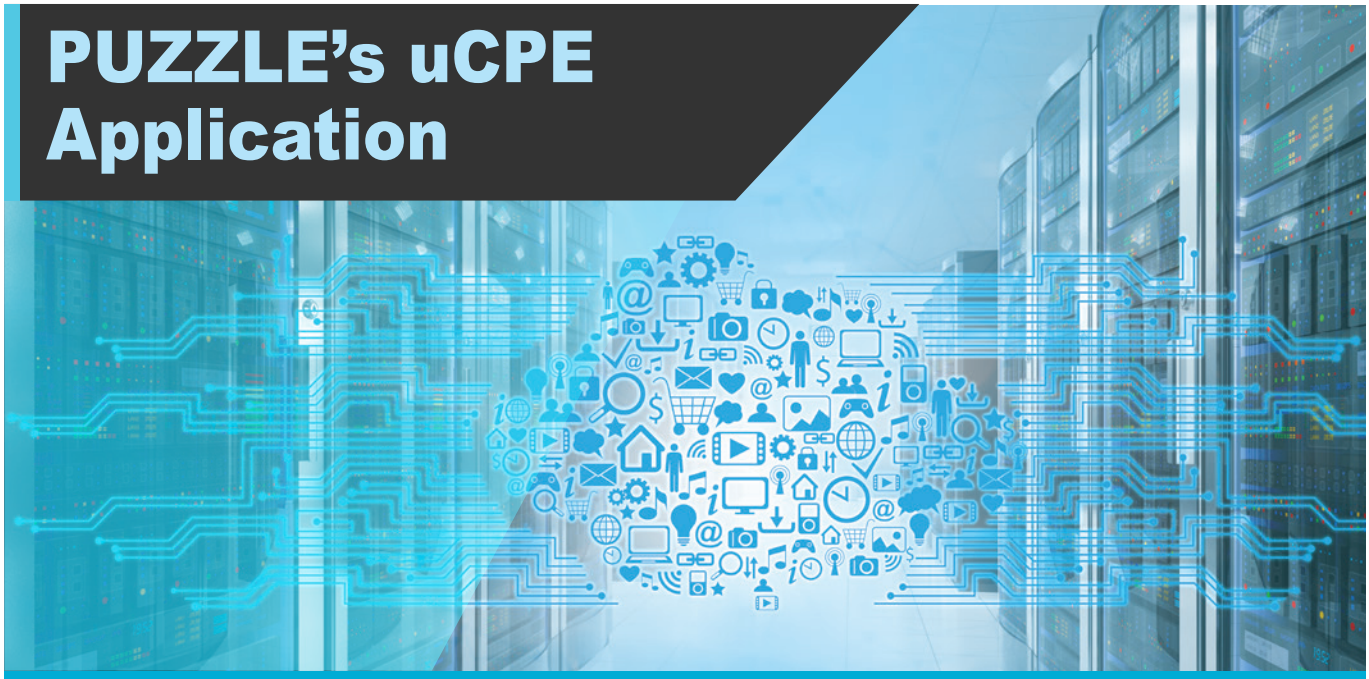
WAN Optimization

WAN optimization or WAN acceleration is a collection of techniques to enhance the efficiency of data flow across a wide area network (WAN). The goal of WAN optimization is to speed up the data transfer, to reduce latency and insure bandwidth of access to critical applications and information. The most common industrial WAN connection is from branch to headquarters.

Next Generation Firewall (NGFW)

Both NGFW and traditional firewalls aim to serve the same purpose of protecting an organization's network and data assets, but the most important differences between traditional and next-generation firewalls is that NGFW offer a deep-packet inspection function that goes beyond simple port and protocol inspection by inspecting the data carried in network packets.

PUZZLE's uCPE Application



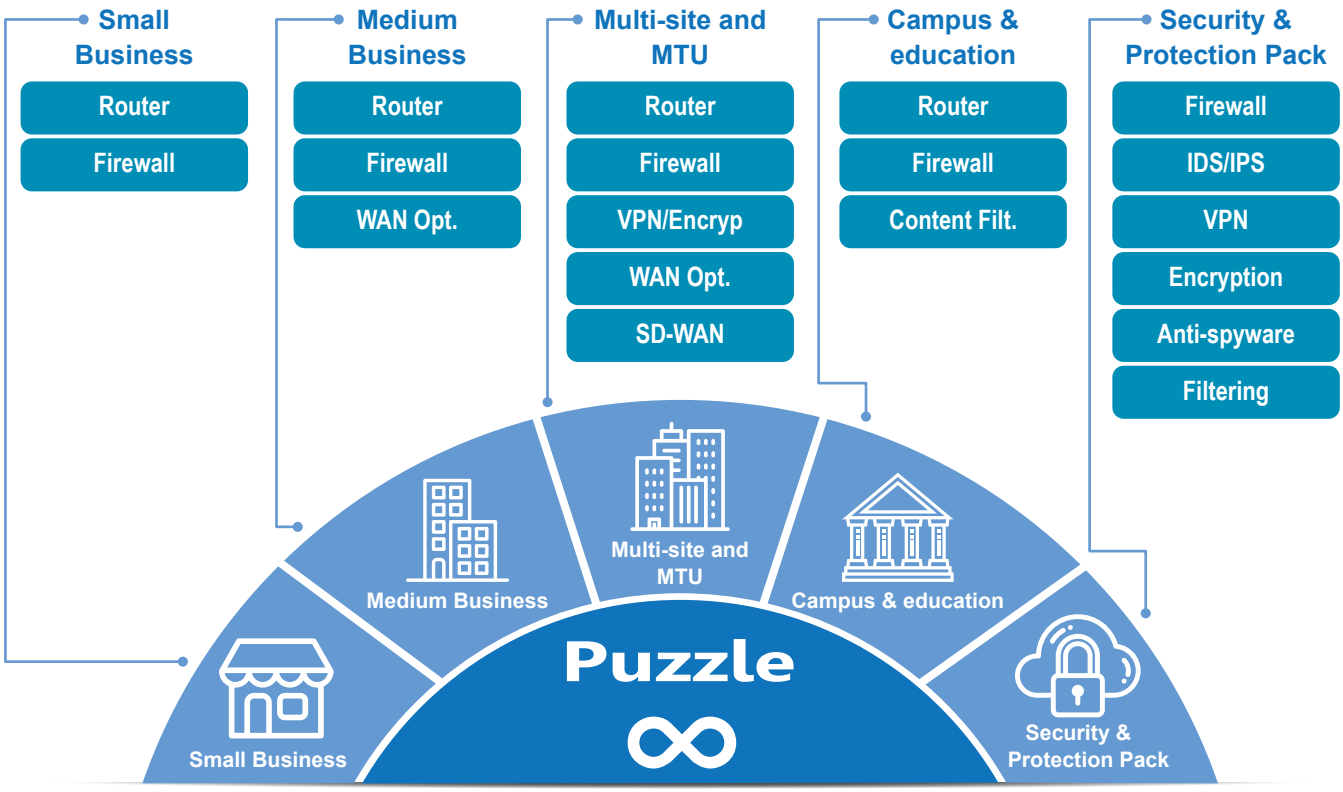
In a virtual CPE (vCPE) model, all the network functions can be consolidated using software-based virtual network functions (VNFs) running on top of a single universal CPE (uCPE) appliance. The VNFs may reside inside an on-site hardware device, in an enterprise data center, or in the cloud. Both businesses and service providers can easily operate IEI PUZZLE series.

PUZZLE Designed for Every Environment

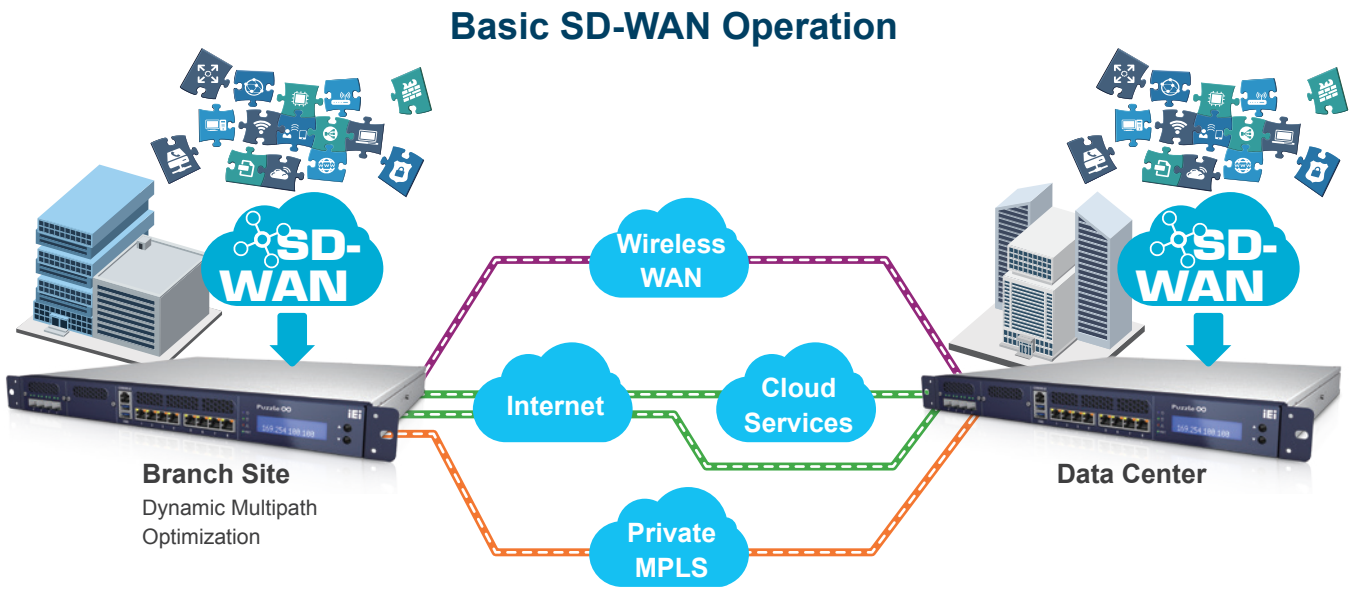
The PUZZLE series can be used in different environment, from small company to global corporations. Firewall and router are software that is basically used in uCPE, and are ones of the most important software with high usage. Each kind of software is built based on network security and communication system to avoid external attacks. By using SD-WAN (Software-Defined WAN), the problem of insufficient performance and security can be solved at the same time. With simple and easy-to-use programming functions, central device management can be achieved to provide enterprises a full line of protection.

PUZZLE designed for SMB or enterprise application environment

One of the commercially viable applications for NFV is the area of Universal Customer Premise Equipment (uCPE). The PUZZLE series uCPE allows customer service providers to offer their SMB or enterprise functions as VNFs more commonly on a purpose-built device running at the customer premises. Generally, the most applicable enterprise services managed in uCPE include router, firewall, WAN optimization, and SD-WAN.



SD-WAN Application



SD-WAN services revenues will see a compound annual growth rate (CAGR) of 69.6% and reach $8.00 billion in 2021

uCPE in Telecom & Network Operators

Now a day, Telecom & Network Operators can build network services by deploying VNFs on a uCPE. There are several Advantage of uCPE, that is why uCPEs become more and more popular.

This model allows Telecom & Network Operators to deploy services more quickly and with more flexibility and save a lot of money.

Service providers simplify customer site deployments by using a panoply of dedicated appliances with VNFs running on a single universal platform.

Lower CapEx & OpEx

Reduce the Consumption of CapEx and OpEx including for management time and effort, maintenance and contracts or software licensing etc.

Standard Hardware

Open Source Software

Open source software reduces time to market and the risk of vendor lock-in.

Lower Power Consumption

uCPE can run several VNFs to build up a network enviroment instead of running several phycial network appliances. Running an uCPE can save engergy.

Various Solutions

The true value of openness comes from being able to combine a mix of open source and proprietary software components to deliver an innovative service.

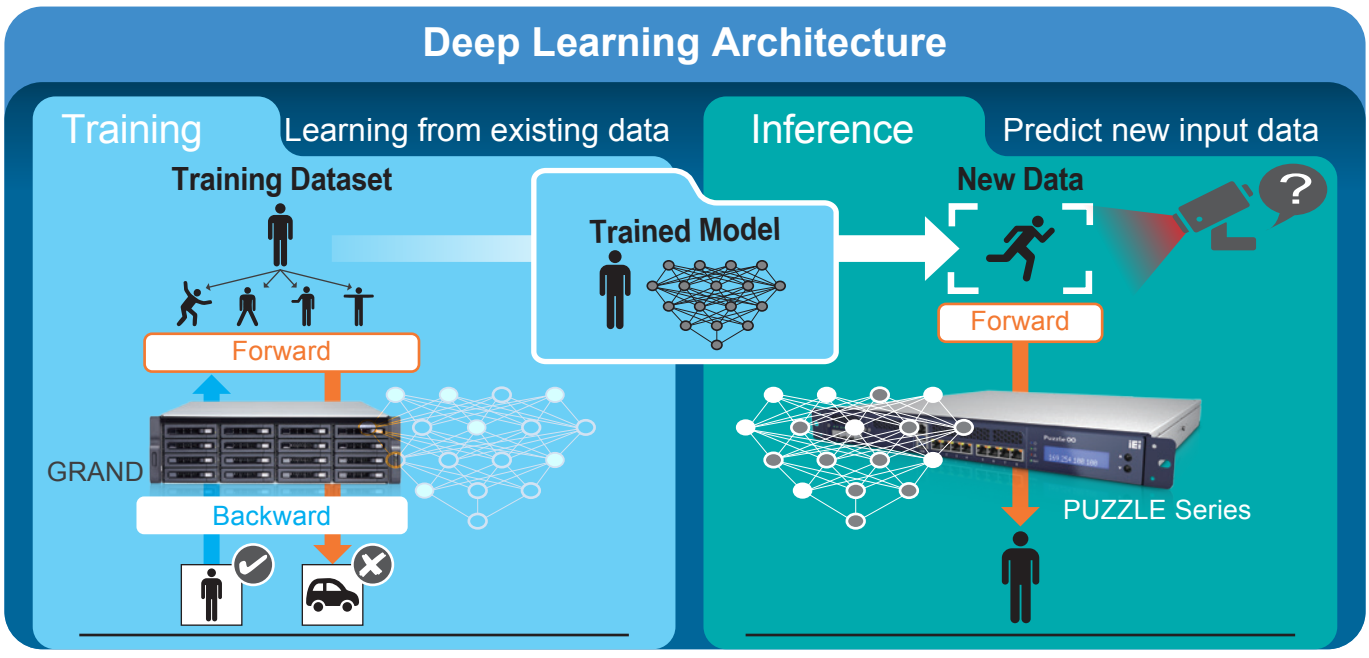
Flexible

The uCPE helps service providers and their customers not suffering from hardware vendor lock-in. It creates the flexibility of manageability through NFV.

Edge Computing & AI Inference Computing

How Does Deep Learning Work?

Deep learning is a machine learning technique that can learn useful representations of features directly from images, test and sound. There are two phases, training and inference. The training servers designed for AI creates patterns and algorithms from the dataset, and each layer of data is assigned some random weights and your classifier runs a forward pass through the data, predicting the class labels and scores using those weights, after the training model is built, that will be applied into systems that are able to predict the result, this is what inference systems do.



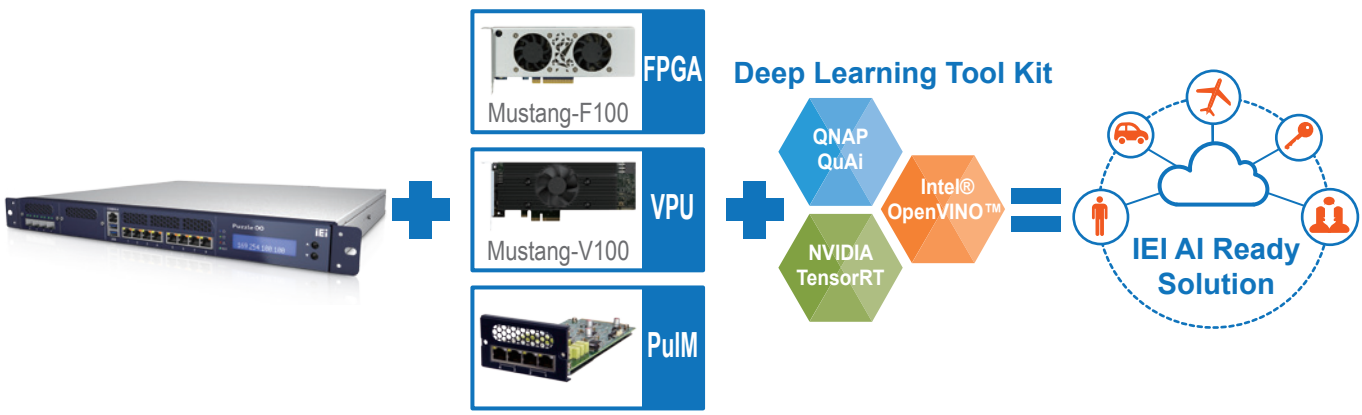
Achieving AI with IEI Deep Learning Solution

The most likely markets to adopt AI technologies, will be medicine, biology, media, security, defense and transportation. Each market faces a variety of challenges, for example, in transportation traffic flow prediction, heavily depends on historical and real-time traffic data collected from various sensor sources, including inductive loops, radars, cameras, etc. It is difficult to find a safe and reliable hardware for the kind of harsh and strict environment.

Therefore, IEI introduces the PUZZLE series which is specifically designed not only for network appliance but also for edge computing and AI inference system, and features modularized, rich interconnectivity, and powerful computing capability. For instance, the PUZZLE-IN001 is equipped with workstation-class Intel® C246 chipset, cutting edge technology, 8 GbE and two network module slots which support 25GbE, 10GbE interface for transport huge amount of data. In addition, various add-on card interfaces such as PCIe 3.0 slots, PCIe Mini card slot and M.2 slot are provided for customers to add acceleration cards like VPU, FPGA, GPU cards to increase the computing power. IEI PUZZLE series is perfect to be used as AI inference systems or edge computing systems.

IEI AI Ready Solution Accelerates your AI Initiative

PUZZLE series are AI hardware ready system ideal for deep learning inference computing to help you get faster, deeper insights into your customers and your business. IEI's PUZZLE series support graphics cards, Intel FPGA acceleration card, and Intel VPU acceleration card and provide additional computational power and end-to-end solution to help run your tasks more efficiently. With the NVIDIA TensorRT, QNAP QuAI,and Intel OpenVINO AI development toolkit, it help you deploy your solutions faster than ever.



What is an NFV Orchestration?

Network functions virtualization (NFV) Orchestration (or NFV Orchestration) is used to coordinate the resources and networks needed to set up cloud-based services and applications. This process uses a variety of virtualization software and industry standard hardware. Cloud service providers or global telecom operators use NFV orchestration to quickly deploy services, or virtual network functions (VNFs), using cloud software rather than specialized hardware networks.

With NFV Orchestration technology, we can remotely and quickly deploy VNFs, edge computing software and AI inference trained model into the uCPU-based IEI PUZZLE series products.

There are only two steps to create an edge computing or AI inference computing system with the PUZZLE series.

First

Deploy VNFs in the PUZZLE to create network connection ability and security protection.

Second

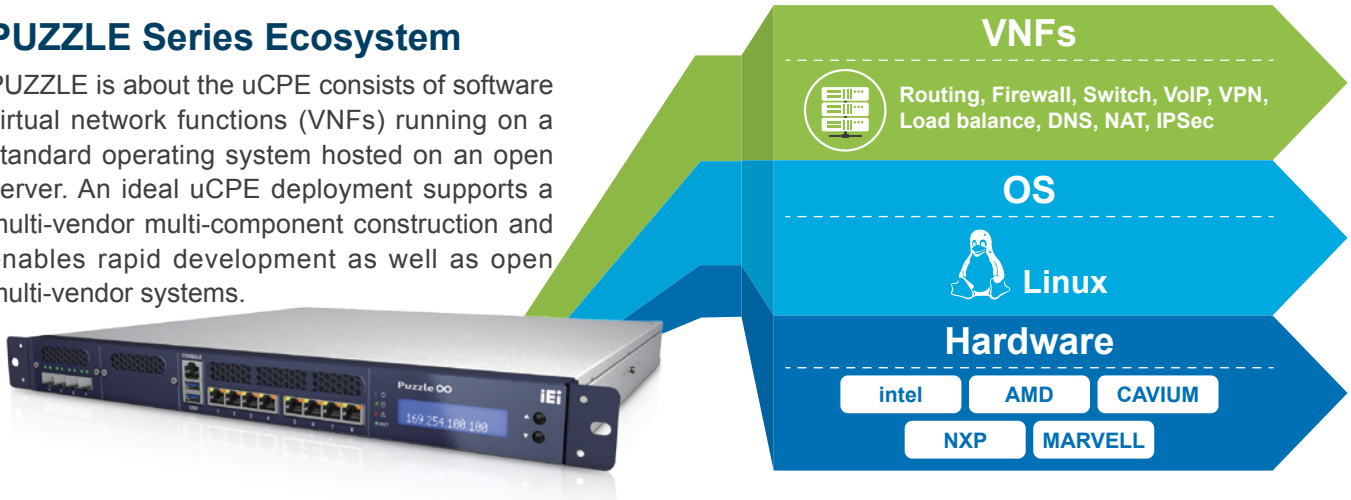
Deploy edge computing software & AI inference trained model to the PUZZLE.

PUZZLE Series Technology

Virtualization is the process of creating a software-based, or virtual, representation of something, such as virtual applications, servers, storage and networks. Network functions virtualization or NFV is a network architecture concept that uses the technologies of IT virtualization to virtualize entire classes of network node functions into building blocks that may connect, or chain together, to create communication services.

PUZZLE Series Ecosystem

PUZZLE is about the uCPE consists of software virtual network functions (VNFs) running on a standard operating system hosted on an open server. An ideal uCPE deployment supports a multi-vendor multi-component construction and enables rapid development as well as open multi-vendor systems.



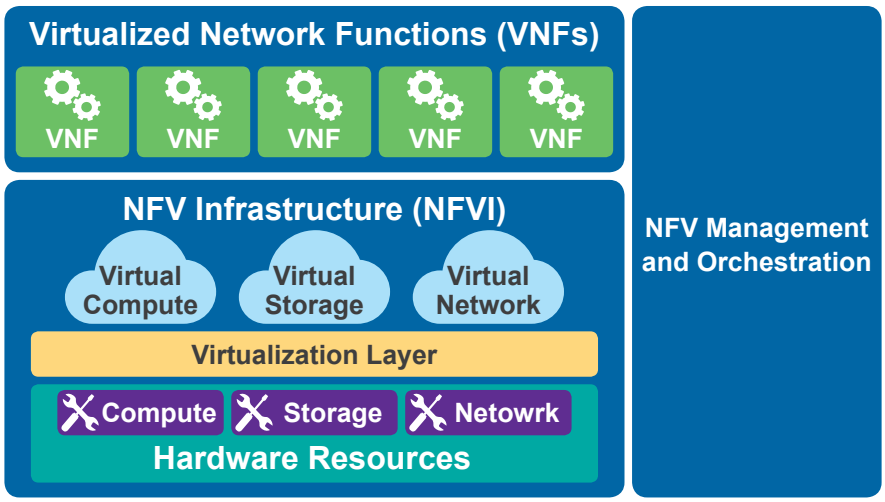
Universal CPE (uCPE) is one of the most compelling use cases of Network Function Virtualization (NFV) currently attracting the interest of hosted service providers. uCPE provides a remotely manageable platform on which hosted service providers can easily deploy, modify or delete VNFs over Wide Area Networks (WAN).

The PUZZLE system can provide an open universal customer premises equipment (uCPE) solution that offers real-time software-defined wide-area network (SD-WAN) services that support both Intel x86 and ARM architectures with any additional virtual network functions (VNF) services.

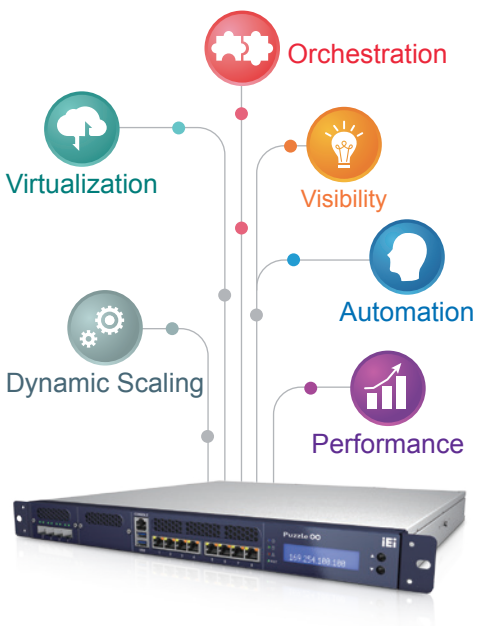
What is NFV?

Advantages of NFV on the PUZZLE's series

NFV (Network Functions Virtualization) is network architecture concepts that using IT virtualization related technologies, to virtualize entire classes of network node functions into building blocks that may be connected, or chained, together to create communication services. Is to take your traditional hardware network devices (routers, switches, firewalls, etc.) and deploy them virtually, like computer running as a virtual machine.

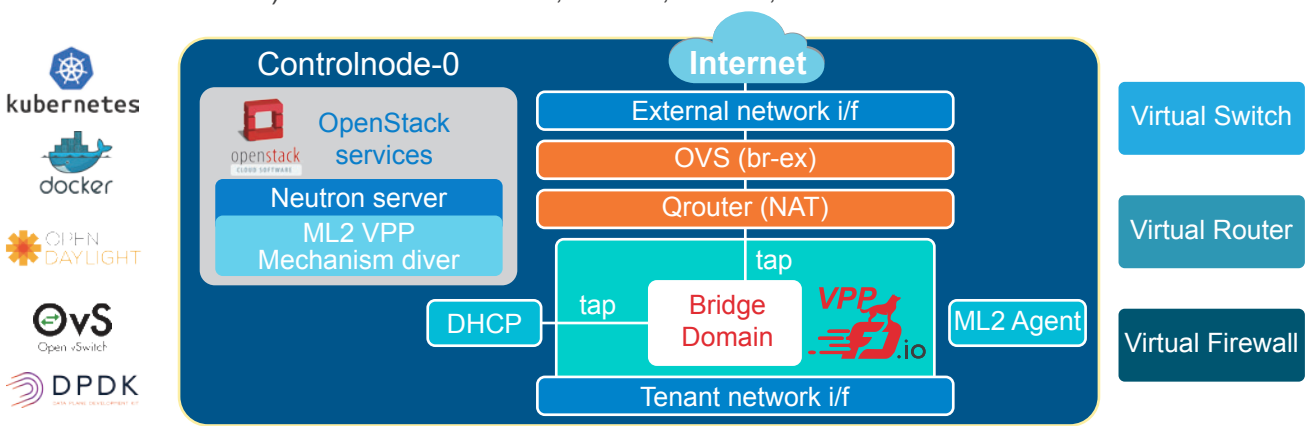


VNF (virtualized network functions) refers to the implementation of a network function using software that is decoupled from the underlying hardware. Software is implementation of NFV that can be deployed in a virtualized infrastructure.



Support NFV Technology

IEI uCPEs have been verified with NFV (Network Functions Virtualization) software testing tools based on open source. With the test and verification, IEI uCPEs are ready to implement DPDK (Data Plan Development Kit), OVS (Open vSwitch), or VPP (Vector Packet Processing), which can be installed on OpenStake to create virtual machines and containers. Once the virtual machines and containers are created, it can be easily to deploy VNFs (Virtual Network Functions) and to create vFirewall, vRouter, vSwitch, and SD-WAN as needed.



What is SD-WAN?

The software-defined wide-area network (SD-WAN) is specific application of software-defined networking (SDN) technology adds app-layer intelligence and service chaining in WAN connections within enterprise networks, including headquarter, branch offices and data centers. SD-WAN connectivity can be delivered as service using software orchestration.

SD-WAN is appealing because it is a replacement for traditional WAN routers and supports transport technologies like MPLS, Internet, and LTE. SD-WAN also allows load sharing of traffic across multiple WAN connections making it more efficient.

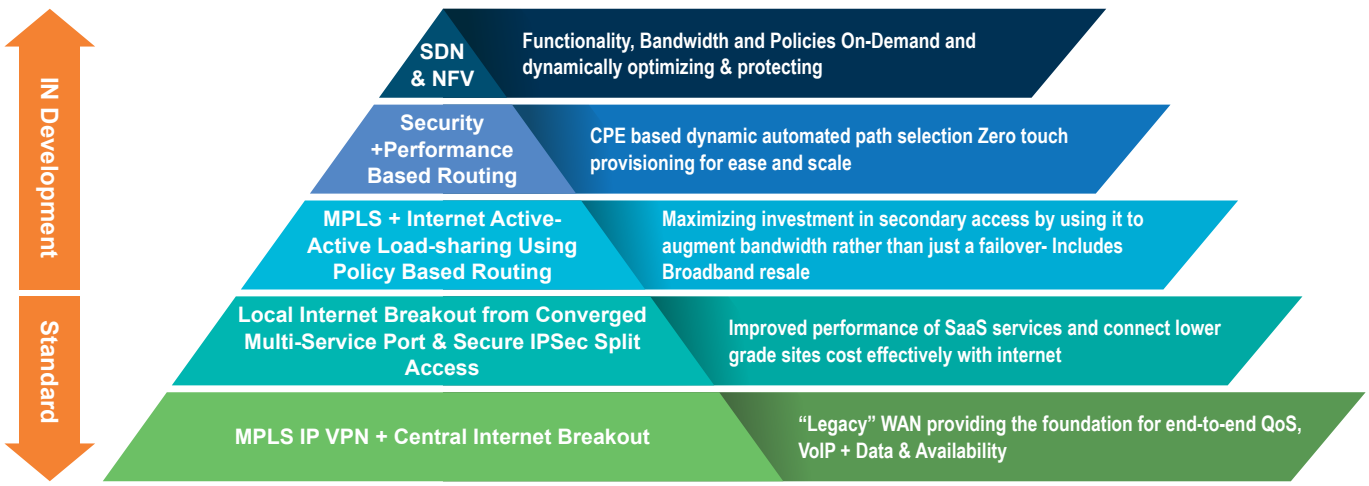
SD-WAN Benefits of PUZZLE's Series

One of the main benefits that most enterprises deploy SD-WAN is that it can reduce their WAN costs by up to 90 percent because it supplements or replaces dedicated private WAN networks, which usually are MPLS, with regular broadband connectivity.

That same cost-benefit can be applied to SD-WAN as a Service. By using this, enterprises can get the flexibility and cost savings of SD-WAN and at the same time minimize the headache of managing the infrastructure and connectivity.

SD-WAN Basic Architecture

The common point between SD-WAN and hybrid WAN is to combine multiple external connections. For example: Internet, Wireless network. But the difference between SD-WAN is that: Automated management network,Programmable. And traffic can be automatically and dynamically transferred based on network status, security, and application service quality requirements.

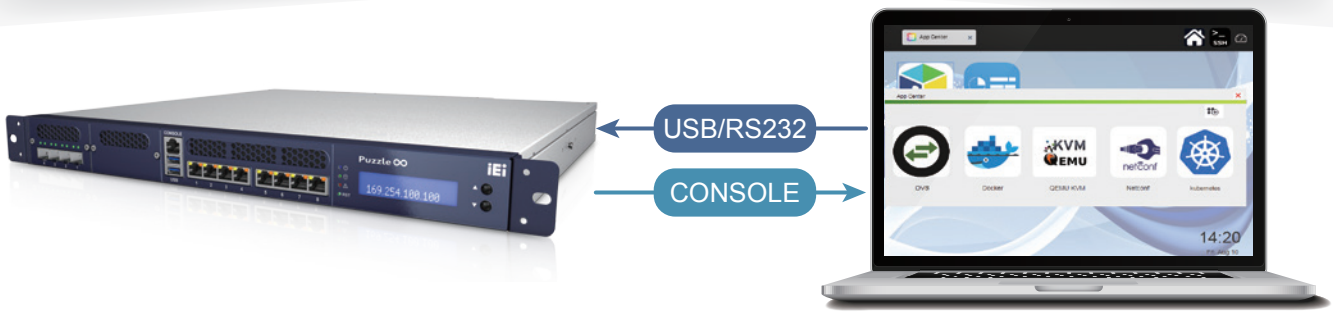


PUZZLE Software Introduction

PUZZLE Finder Software AP

Use your PC/Laptop as a development environment.

After installing Ubuntu 16.04 on your PUZZLE, you can install the PUZZLE Finder application on your PC/Laptop. PUZZLE Finder can help users quickly develop environment and network applications, and allow them to perform PUZZLE system management, resource monitoring, version maintenance, software installation, software update and gaining information of CPU, memory, Internet, etc.



Easy to Install

The APP center provides the most popular and configured applications.

Eliminate cumbersome installation steps; choose the APP you want to install. The APP can be downloaded and automatically installed. You can immediately enjoy the benefits of the software.

Utilize Virtual Technology, Create Unlimited Value

Docker containerization unlocks the potential for Dev and Ops. Freedom of choice, agile operations and integrated security for legacy and cloud-native applications. Implement Docker Lightweight Micro Services on the IEI PUZZLE.

Install the Open vSwitch (OVS) can implement domain cutting, QoS, data monitoring, and support openFlow.

Provide a more efficient Linux virtualization solution. Enhance the efficiency of virtualization by enhancing the operating mode of the CPU through QEMU-KVM.

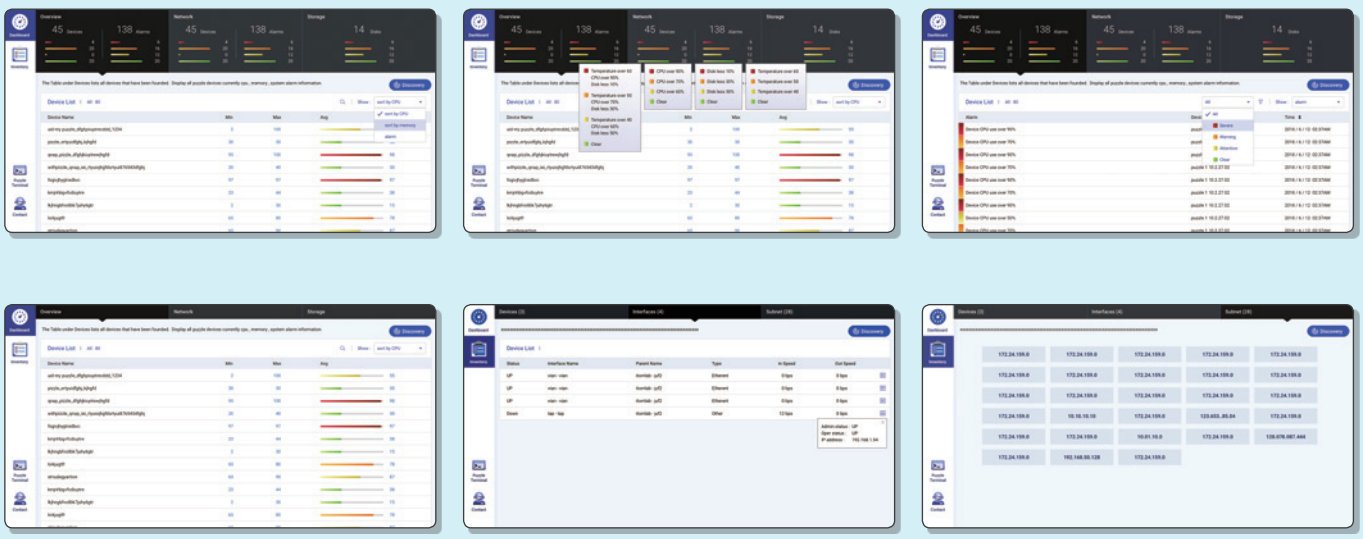
Automate network configuration with Netconf; accelerate network equipment and services in enterprise in order to lower the cost.

Kubernetes is a system that helps us automate the deployment, expansion, and management of containerized applications.

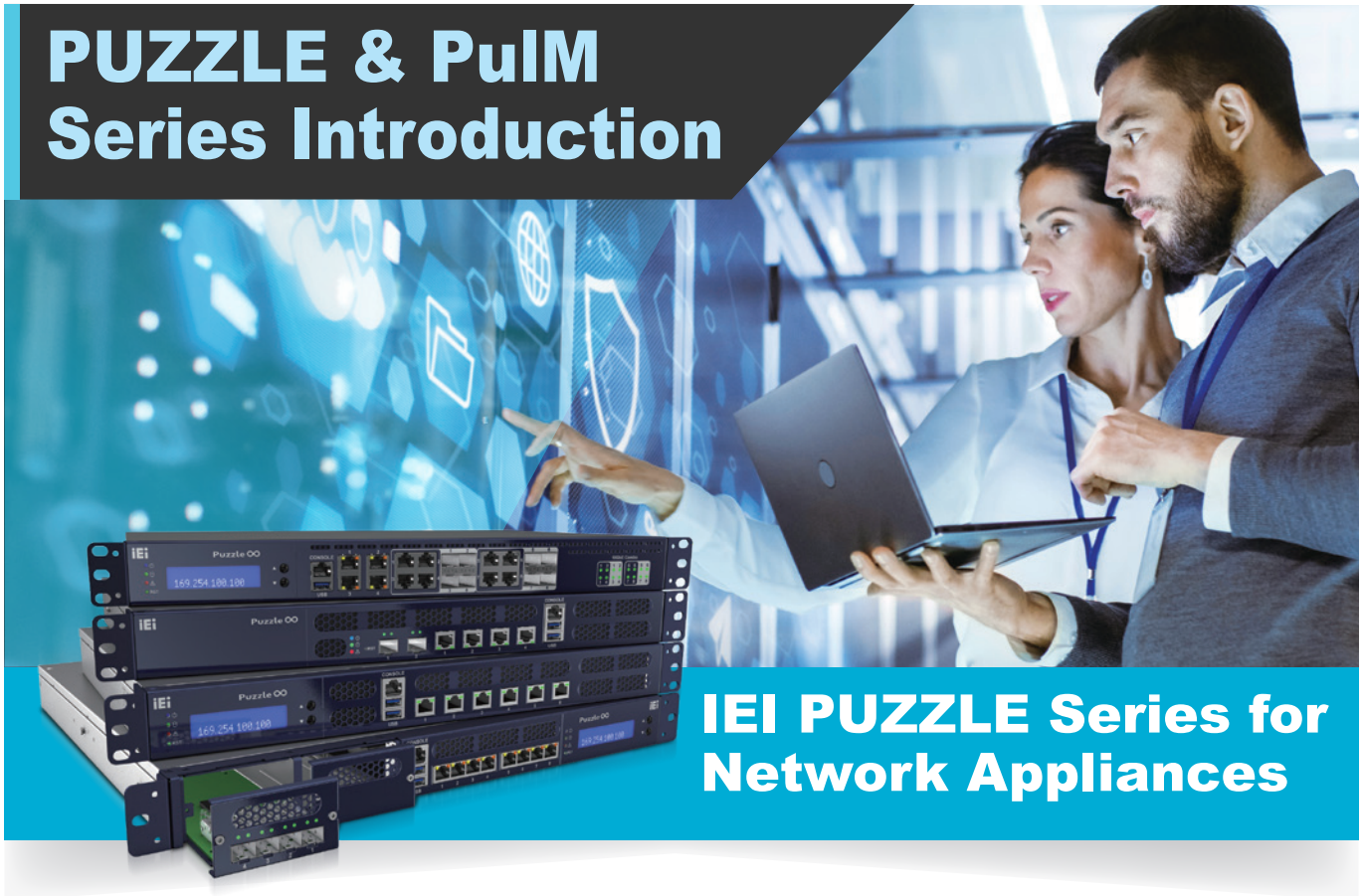
PUZZLE System Status Monitoring

Graphical user interface allows you to easily get an overview of the PUZZLE system and monitor resource status of each PUZZLE system you have.

User Interface



PUZZLE & PuIM Series Introduction



IEI PUZZLE series includes x86-based and ARM-based product solutions. x86 systems adapt Intel or AMD CPU; ARM-based systems adapt Marvell, NXP or Cavium SoC. Each CPU & SoC has its own advantage for network appliances. For example, Intel is the most popular chip maker and provides complete driver support; AMD provides high performance; ARM-based SoC provides special HW offload for networking function such as packet processor and datapath acceleration.

It is easy to choose the right network appliance or uCPE solution from IEI PUZZLE series.

IEI PUZZLE Series – Processer Options

	X86		ARM		
Brand	**Intel**	**AMD**	**MARVELL**	**NXP**	**CAVIUM**
Platform	Coffee Lake C246, H310	EPYC 3000 R-Series SoC	Armada 8040 Armada 7040	QorIQ® LS2088	OCTEON CN8300
Advantage	• Most popular • Stability • Complete driver support • Easy to develop	• High core count • High performance • Secure encrypted virtualization • Secure memory encryption	• Quad Cortex-A72 cores • Packet processor • 10GbE integrated • Low cost	• Eight to four Cortex-A72 cores • Packet processor • Datapath acceleration • 10GbE integrated	• Up to 24 Cortex-A72 cores • Packet processor • HW offload for networking • 10GbE integrated • Low cost

IEI PUZZLE Series – Smart NIC Option

Smart NIC is getting more and more important. It not only increases the performance of system but also provides special functions like virtualization technology and packet processing. It is ideal for users want to, for instance, build up a network server with virtual machine and provide storage function.

Mellanox would be a better choice for the solution.

Offload Function		Mellanox	Intel	BROADCOM	AQUANTIA
CPU Offload	LSO	Y	Y	Y	Y
	TSO	Y	Y	Y	
	RSS	Y	Y	Y	Y
	HDS	Y		Y	Y
	MSI-X	Y	Y		Y
Storage Offload	iWARP		Y		
	iSER	Y	Y		
	VEPA		Y	Y	
	NFS RDMA	Y	Y		
	uDAPL	Y			
Virtualization Support	VxLAN	Y	Y		
	NetQueue	Y		Y	
	GENEVE	Y			
	IEEE 802.1Qbg	Y	Y		
	SR-IOV	Y	Y	Y	

IEI PUZZLE Series is Ready for Next Generation Network

The following picture completely shows the components of the PUZZLE series.

Choose the right components from CPU, NIC, software, manufacturing side, and fit them together. You will create a perfect network appliance.

Software/ Application

On the left hand side, it shows the S/W support from IEI. IEI will help customers to get device driver, application, other NFV basic software, DPDK, OvS, VPP, OpenDaylight and OpenStack. IEI will also help customers to deploy and install all of the software and build up their own NFV solutions.

Device Driver

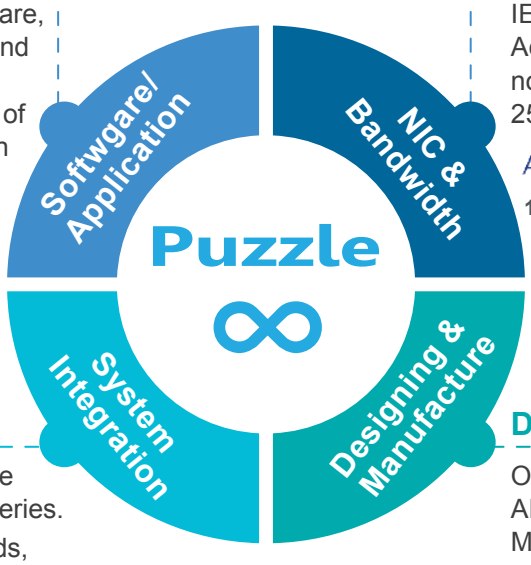
Application

NIC & Bandwidth

On the upper side, it shows the network connection ability of the PUZZLE series.

IEI provides four brands of NIC from Aquantia, Intel, Broadcom, Mellanox, and with 1G, 2.5G, 5G, 10G or 25G different kinds of speed.

10/100Mb, 1G, 2.5G, 5G, 10G 25G, 100G



System Integration

On the right hand side, it shows the computing ability of the PUZZLE series.

IEI implements 5 major CPU brands, including Intel, AMD, Marvell, NXP, Cavium, and 3 kinds of accelerator cards for edge computing or AI computing .

Designing & Manufacture

On the bottom side, it shows ARMOR Link cross IEI cross QNAP. Most of network appliances are about network security. Some of the customers care about where the network appliance is designed and made. Therefore, we provide you two choices, design and manufacture in Taiwan or in China. QNAP factory is in New Taipei City, Taiwan, and ARMOR Link factory is located in Shanghai, China.

PUZZLE Series Selection Guide



		PUZZLE-A001	PUZZLE-A002	PUZZLE-IN001
Platform	Form Factor	1U	1U	1U
	CPU	AMD EPYC™ Embedded 3201 processor, 8C/8T, up to 3.10 GHz AMD EPYC™ Embedded 3151 processor, 4C/8T, up to 2.90 GHz	AMD R-Series RX-421ND processor, 4C, up to 3.4 GHz	Intel® Xeon® E-2136 Processor, 6C/12T, up to 4.50 GHz 8th Generation Intel® Core™ i3-8100T Processor, 4C/4T, up to 3.10 GHz
	Chipset	Integrated in CPU	Integrated in CPU	Intel® C246
Memory	Memory Technology	4 x DDR4 2666 MHz ECC or non-ECC UDIMM Support RDIMM	2 x DDR4 2400MHz Non-ECC UDIMM	2 x DDR4 2400MHz ECC/Non-ECC UDIMM
	Memory Capacity	UDIMM Up to 64GB RDIMM Up to 128GB	Up to 32GB	Up to 32GB
	Memory Socket	4 x 288-pin DIMM	2 x 288-pin DIMM	2 x 288-pin DIMM
Network and Security	Network acceleration and Security function	• Secure Processor for Crypto Co-processing • Secure Memory Encryption (SME) • Secure Encrypted Virtualization (SEV) • Integrated crypto acceleration supporting the IPsec protocol	• AES-NI encryption acceleration • AMD Secure Processor • Secure boot with AMD Hardware Validated Boot (HVB)	• Intel® AES New Instructions • Intel® Software Guard Extensions (Intel® SGX) • Intel® Memory Protection Extensions (Intel® MPX) • Intel® Trusted Execution Technology
	TPM	1 x TPM 2.0 Pin header	1 x TPM 2.0 Pin header	1 x TPM 2.0 Pin header
Networking	Ethernat IC	1 GbE NIC: Broadcom® BCM5720	1 GbE NIC: Broadcom® BCM5720	1 GbE NIC: Intel® i211-AT
	Ethernat Port	8 x 1GbE RJ45 LAN ports 4 x 10GbE SPF+ ports	6 x 1GbE RJ45 LAN ports	8 x 1GbE RJ45 LAN ports
	Network Module Slot	1 x Networking Module Slot	N/A	2 x Networking Module Slot
Expension slot	PCIe slot	2 x PCIe x4 slot	2 x PCIe x4 slot	1 x PCIe x4 slot, 1 x PCIe x8 slot
	PCIe mini card slot	1 x PCIe mini card (PCIe, USB 2.0)	1 x PCIe mini card (PCIe, USB 2.0, Micro SIM slot)	1 x PCIe mini card (PCIe & SATA, USB 2.0)
	M.2	1 x M.2 B Key (3042/2260) (2 x PCIe or 1 x USB 3.1 Gen 1 or 1 x SATA Gen3)	1 x M.2 A key (PCIe & USB 2.0)	1 x M.2 B key 2260/2280 (SATA & USB 3.1 Gen 1)
Storage	Storage	2 x 2.5" SATA HDD/SSD bay	2 x 2.5" SATA HDD/SSD bay	2 x 2.5" SATA HDD/SSD bay
	eMMC	N/A	8GbE	N/A
	SD card	N/A	N/A	N/A
External I/O	USB 3.1	2 x USB 3.1 Gen 1	2 x USB 3.1 Gen 1	2 x USB 3.1 Gen 1
	Console	1 x RJ45	1 x RJ45	1 x RJ45
Internal I/O	M.2	1 x M.2 B key (SATA & USB 3.1 Gen 1)	1 x M.2 A key (PCIe & USB 2.0)	1 x M.2 B key 2260/2280 (SATA & USB 3.1 Gen 1)
	HDMI	N/A	N/A	1 x HDMI connecter (optional)
	USB	1 x USB USB 3.1 Gen 1 4 x USB 2.0	1 x USB USB 3.1 Gen 1 2 x USB 2.0	4 x USB 2.0 (pin header)
Power and Mechanical	Power Switch	1 x Power Switch	1 x Power Switch	1 x Power Switch
	Reset Button	1 x Reset Button	1 x Reset Button	1 x Reset Button
	Power Input	100 V ~ 240 V	100 V ~ 240 V	100 V ~ 240 V
	Type/Watt	Redundant Power 300W, 90V~264V AC	ATX Power 250W, 90V~264V AC	Redundant Power 300W, 90V~264V AC
	Processor Cooling	1 x Passive CPU Heatsink	1 x Passive CPU Heatsink	1 x Passive CPU Heatsink
	System Cooling	4x Cooling Fans with Smart Fan	4 x Cooling Fans with Smart Fan	4 x Cooling Fans with Smart Fan
	Antenna Port	1 x Antenna port	1 x Antenna port	1 x Antenna port
Physical and Environmental	Storage Temperature	-10°C ~ 50°C	-10°C ~ 50°C	-10°C ~ 50°C
	Operating Temperature	0 ~ 40 °C (32 ~ 104 °F)	0 ~ 40 °C (32 ~ 104 °F)	0 ~ 40 °C (32 ~ 104 °F)
	Operating Humidity	5%~90% non-condensing	5%~90% non-condensing	5%~90% non-condensing
	Dimensions (W x H x D) (mm)	430x426x44.2	430 x 320 x 44.2	430x426x44.2
	Weight	7kg	5kg	7kg
OS and Certifications	Certification	CE / FCC	CE / FCC	CE / FCC
	Operating System	Linux Ubuntu 16.04.04	Linux Ubuntu 16.04.04	Linux Ubuntu 16.04.04
Indicators	LCM	LCM, 2 buttons	LCM, 2 buttons	LCM, 2 buttons
	LED	1 x Power LED, 1 x Storage LED, 1 x Alert LED	1 x Power LED, 1 x Storage LED, 1 x Alert LED	1 x Power LED, 1 x Storage LED, 1 x Alert LED

PUZZLE Series Selection Guide




		PUZZLE-IN002	PUZZLE-M801	PUZZLE-N001	PUZZLE-C001
Platform	Form Factor	1U	1U	1U	1U
	CPU	8th Generation Intel® Core™ i3-8100T Processor, 4C/4T, up to 3.10 GHz Intel® Pentium® Gold G5400T Processor, 2C/4T, up to 3.10 GHz	Marvell® ARMADA® 88F8040 High-Performance CPU System on Chip, 4C, 1.8GHz	NXP QorIQ® Layerscape LS2084ASE7TTB Multicore Communications Processors, 8C, 1.8GHz NXP QorIQ® Layerscape LS2044ASE7TTB Multicore Communications Processor, 4C, 1.8GHz	Cavium ® CN8240 High-Performance System on Chip,8C, 1.5GHz/1.8GHz Cavium ® CN8360 High-Performance System on Chip,16C, 2.0GHz/2.2GHz
	Chipset	Intel® H310	Integrated in CPU	Integrated in CPU	Integrated in CPU
Memory	Memory Technology	2 x DDR4 2400MHz Non-ECC UDIMM	DDR4 2400MHz ECC/Non-ECC/ RDIMM	DDR4 1867MHz ECC/Non-ECC/RDIMM	DDR4 2133MHz ECC/Non-ECC/ RDIMM
	Memory Capacity	Up to 32GB	Up to 16GB	Up to 64GB	Up to 32GB
	Memory Socket	2 x 288-pin DIMM	1 x 288-pin DIMM	4 x 288-pin DIMM	2 x 288-Pin DIMM (CN8240) 4 x 288-Pin DIMM (CN8360)
Network and Security	Network acceleration and Security function	• Intel® AES New Instructions • Intel® Software Guard Extensions (Intel® SGX) • Intel® Memory Protection Extensions (Intel® MPX) • Intel® Trusted Execution Technology	• Configurable packet processor • HW offload for networking • Acceleration engines for storage, networking and security • Public Key Processor (RSA/DH/ ECC) • Secure Storage • Secure boot	• Packet Processor • Datapath acceleration Cryptography acceleration • DPAA2 (Datapath acceleration architecture • Pattern matching acceleration (PME 2.0) • Decompression/compression acceleration (DCE 1.0)	• Scalable custom multicores • Crypto offload / acceleration • Packet processor Virtualized network I/F controller (vNIC) • TrustZone
	TPM	1 x TPM 2.0 Pin header	N/A	TustZone (like a soft TPM)	TPM 2.0, SPI I/F
Networking	Ethernat IC	1 GbE NIC: Intel® i211-AT	10 GbE PHY: SoC Marvell 88F8040 1 GbE PHY: Marvell 88E1512P	10 GbE PHY: Marvell 88X3340P 1 GbE PHY: Marvell 88E1512P	Quad-10GbE PHY: 1 x Marvell® 88X3340P (CN8240) 2 x Marvell® 88X3340P (CN8360) Quad-1 GbE PHY: Marvell® 88E1545P
	Ethernat Port	6 x 1GbE RJ45 LAN ports	2 x 10 GbE SFP+ 4 x 1GbE RJ45 LAN ports	8 x 10 GbE (RJ-45/SFP+ combo) 4 x 1GbE RJ45 LAN ports	1 x Quad-10GbE fiber/copper combo, 1 x Quad-1GbE RJ45 ports (CN8240) 2 x Quad-10GbE fiber/copper combo, 1 x Quad-1GbE RJ45 ports (CN8360)
	Network Module Slot	N/A	N/A	N/A	2 x PCIe x4 slot
Expension slot	PCIe slot	1 x PCIe x16 slot	1 x PCIe x4 slot (PCIe x2 signal)	N/A	2 x PCIe x4 slot
	PCIe mini card slot	1 x PCIe mini card (SATA, USB 2.0) with SIM slot	N/A	N/A	1 x Mini PCIe slot
	M.2	1 x M.2 A key (PCIe & USB 2.0)	1 x M.2 B key (SATA & USB 3.1 Gen 1)	1 x M.2 A key (PCIe & USB 2.0) 1 x M.2 B key (PCIe & USB 3.1 Gen 1)	1 x M.2 A key (PCIe and USB 2.0 w/ SIM slot)
Storage	Storage	2 x 2.5" SATA HDD/SSD bay	2 x 2.5" SATA HDD/SSD bay	2 x 2.5" SATA HDD/SSD bay	2 x 2.5" SATA HHD/SSD bay 1 x M.2, M key, 2260/2280, PCIe x2 only
	eMMC	N/A	32GB	32GB	32 GB
	SD card	N/A	N/A	1 x SD card slot	N/A
External I/O	USB 3.1	2 x USB 3.1 Gen 1	2 x USB 3.1 Gen 1	2 x USB 3.1 Gen 1	2 x USB 3.1 Gen 1
	Console	1 x RJ45	1 x RJ45	1 x RJ45	1 x RJ45
Internal I/O	M.2	1 x M.2 A key (PCIe & USB 2.0)	1 x M.2 B key (SATA & USB 3.1 Gen 1)	1 x M.2 A key (PCIe & USB 2.0) 1 x M.2 B key (PCIe & USB 3.1 Gen 1)	1 x M.2 A key (PCIe and USB 2.0) 1 x M.2 M key, 2260/2280, PCIe x2 only
	HDMI	1 x HDMI connecter (optional)	N/A	N/A	N/A
	USB	2 x USB 2.0 (pin header)	2 x USB 2.0	N/A	N/A
Power and Mechanical	Power Switch	1 x Power Switch	1 x Power Switch	1 x Power Switch	1 x Power Switch
	Reset Button	1 x Reset Button	1 x Reset Button	1 x Reset Button	1 x Reset Button, programmable
	Power Input	100 V ~ 240 V	100 V ~ 240 V	100 V ~ 240 V	100 ~240V
	Type/Watt	ATX Power 250W, 90V~264V AC	ATX Power 250W, 90V~264V AC	ATX Power 250W, 90V~264V AC	ATX Power 300W, redundant, hot-swap
	Processor Cooling	1 x Passive CPU Heatsink	1 x Active CPU Heatsink with fan	1 x Passive CPU Heatsink	1 x Passive CPU Heatsink
	System Cooling	4 x Cooling Fans with Smart Fan	2 x Cooling Fans with Smart Fan	4 x Cooling Fans with Smart Fan	3 x Cooling Fans with Smart Fan
	Antenna Port	1 x Antenna port	1 x Antenna port	1 x Antenna port	1 x Antenna Port
Physical and Environmental	Storage Temperature	-10°C ~ 50°C	-10°C ~ 50°C	-10°C ~ 50°C	-20°C ~ 70°C
	Operating Temperature	0 ~ 40 °C (32 ~ 104 °F)	0 ~ 40 °C (32 ~ 104 °F)	0 ~ 40 °C (32 ~ 104 °F)	0 ~ 40°C (32 ~ 104°F)
	Operating Humidity	5%~90% non-condensing	5%~90% non-condensing	5%~90% non-condensing	5%~90% non-condensing
	Dimensions (W x H x D) (mm)	430 x 320 x 44.2	430 x 320 x 44.2	430 x 320 x 44.2	430 x 320 x 44.2
	Weight	5kg	5kg	5kg	6 Kg
OS and Certifications	Certification	CE / FCC	CE / FCC	CE / FCC	CE / FCC
	Operating System	Linux Ubuntu 16.04.04	Linux Ubuntu 16.04.04	Linux Ubuntu 16.04.04	Linux Ubuntu 16.04.04
Indicators	LCM	LCM, 2 buttons	N/A	LCM, 2 buttons	1 x LCM w/ 2 buttons
	LED	1 x Power LED, 1 x Storage LED, 1 x Alert LED	1 x Power LED, 1 x Storage LED, 1 x Alert LED	1 x Power LED, 1 x Storage LED, 1 x Alert LED, 8 x 1 GbE LED, 16 x 10 GbE LED	1 x Power LED(blue), 1 x HDD LED(Green) 1 x Status LED(Red), 10GbE/1GbE port LEDs (Green/Amber)

PUZZLE-A001

1U Rackmount Network Appliance with AMD EPYC™ Embedded 3000 series processor, 1 NMS & 2 PCIe x4 slots

Features

- AMD EPYC™ Embedded 3000 series processor High-Performance CPU System on Chip
- Support 8 x GbE RJ45 via BCM 5720, 4 x 10 GbE SFP+ and IEI Networking Module
- 2 x 288-pin DIMM, 2 x DDR4 2666 MHz, UDIMM Up to 64GB / RDIMM Up to 128GB
- 1 x RJ45 Console, 2 x USB 3.1 Gen 1 (5Gb/s), LCM
- 2 x 2.5" SATA drive bay, 1 x M.2 B-Key (SATA, USB 3.1 Gen 1 (5Gb/s)),1 x PCIe mini card (PCIe, USB 2.0)
- Support two PCIe x4 slots
- Redundant PSUs

Specifications

		PUZZLE-A001-SO2	PUZZLE-A001-SO3
Platform	Form Factor	1U	
	CPU	AMD EPYC™ Embedded 3201 processor, 8C/8T, up to 3.10 GHz	AMD EPYC™ Embedded 3151 processor, 4C/8T, up to 2.90 GHz
	Chipset	Integrated in CPU	
Memory	Memory Technology	4 x DDR4 2666 MHz ECC or non-ECC UDIMM Support RDIMM	
	Memory Capacity	UDIMM Up to 64GB / RDIMM Up to 128GB	
	Memory Socket	4 x 288-pin DIMM	
Network and Security	Network acceleration and Security function	• Secure Processor for Crypto Co-processing • Secure Memory Encryption (SME) • Secure Encrypted Virtualization (SEV) • Integrated crypto acceleration supporting the IPsec protocol	
	TPM	1 x TPM 2.0 Pin header	
Networking	Ethernat IC	1 GbE NIC: Broadcom® BCM5720	
	Ethernat Port	8 x 1GbE RJ45 LAN ports, 4 x 10 GbE SPF+	
	Network Module Slot	1 x Networking Module Slot	
Expension slot	PCIe slot	2 x PCIe x4 slot	
	PCIe mini card slot	1 x PCIe mini card (PCIe, USB2.0)	
	M.2	1 x M.2 B key (SATA & USB 3.1 Gen 1 (5Gb/s))	
Storage	Storage	2 x 2.5" SATA HDD/SSD bay	
	eMMC	N/A	
	SD card	N/A	
External I/O	USB 3.1	2 x USB 3.1 Gen 1 (5Gb/s)	
	Console	1 x RJ45	
Internal I/O	M.2	1 x M.2 B key (SATA & USB 3.1 Gen 1 (5Gb/s))	
	HDMI	N/A	
	USB 3.1	1 x USB 3.1 Gen 1 (5Gb/s)	
	USB 2.0	4 x USB 2.0	
Power and Mechanical	Power Switch	1 x Power Switch	
	Reset Button	1 x Reset Button	
	Power Input	100 V ~ 240 V	
	Type/Watt	Redundant Power 300W	
		90V ~ 264V AC	
	Processor Cooling	1 x Passive CPU Heatsink	
	System Cooling	4 x Cooling Fans with Smart Fan	
	Antenna Port	1 x Antenna port	
Physical and Environmental	Storage Temperature	-10°C ~ 50°C	
	Operating Temperature	0 ~ 40°C (32 ~ 104°F)	
	Operating Humidity	5% ~ 90% non-condensing	
	Dimensions (W x H x D) (mm)	430x426x44.2	
	Weight	7kg	
OS and Certifications	Certification	CE / FCC	
	Operating System	Linux Ubuntu 16.04.04	
Indicators	LCM	LCM, 2 buttons	
	LED	1 x Power LED, 1 x Storage LED, 1 x Alert LED	

Ordering Information

Part No.	Description
PUZZLE-A001-SO2/R-R10	1U Rackmount Network Appliance with AMD EPYC™ Embedded 3201 processor, four DDR4 slots, two 2.5" SATA bay, four 10 GbE SFP+, eight 1GbE, one PulM, two PCIe expansion, Redundant Power, RoHS
PUZZLE-A001-SO3/R-R10	1U Rackmount Network Appliance with AMD EPYC™ Embedded 3151 processor, four DDR4 slots, two 2.5" SATA bay, four 10 GbE SFP+, eight 1GbE, one PulM, two PCIe expansion, Redundant Power, RoHS
PUZZLE-A001-SO2/16G/R-R10	1U Rackmount Network Appliance with AMD EPYC™ Embedded 3201 processor, 16GB DDR4, two 256GB SSD, four 10 GbE SFP+, eight 1GbE, one PulM, two PCIe expansion, Redundant Power, RoHS
PUZZLE-A001-SO3/16G/R-R10	1U Rackmount Network Appliance with AMD EPYC™ Embedded 3151 processor, 16GB DDR4, two 256GB SSD, four 10 GbE SFP+, eight 1GbE, one PulM, two PCIe expansion, Redundant Power, RoHS

Packing List

	PUZZLE-A001-SO2/R	PUZZLE-A001-SO3/R	PUZZLE-A001-SO2/16G/R	PUZZLE-A001-SO3/16G/R
Power cord	1	1	1	1
Heatsink	1	1	1	1
Rack mounting ears	2	2	2	2
SCREW for Rack mounting ears	6	6	6	6
USB to console cable	Option	Option	1	1
RS232 to console cable	1	1	Option	Option
Slide rail	Option	Option	Option	Option

Options

Item	Part No.	Description
Slide rail	RAIL-B02	New rail kit for new 1U & 2U NAS: TVS-471U, 1253U, etc
USB to console cable	32013-004000-100-RS	ROUND CABLE; LAN CABLE; FTDI Console Cable; 2; 1800MM; (A)USB A TYPE 4P MALE+PCB:FTDI_FT232RL; (B)RJ45 8P8C; RoHS
RS232 to console cable	32005-005100-100-RS	ROUND CABLE; RS-232/422/485; PUZZLE RS-232 Cable; 2; 500MM; 24AWG; (A)D-SUB 9P MALE+#4-40 Screw; (B)RJ45 PLUG 8P8C; ONE PCS PKG; TC&C; RoHS

PUZZLE-A002

1U Rackmount Network Appliance with AMD R-Series RX-421ND processor, Support 6 x GbE RJ45

Features

- AMD R-Series RX-421ND quad-core 2.1 GHz processor
- 2 x DDR4 2400MHz Non-ECC UDIMM, up to 32 GB
- Support 6 x GbE RJ45 via BROADCOM BCM 5720
- 1 x RJ45 Console, 2 x USB 3.1 Gen 1 (5Gb/s), 2 x USB 2.0, LCM
- 1 x PCIe x8, 2 x 2.5” SATA drive bay, 1 x PCIe mini, 1 x SD slot
- Support two PCIe x4

Specifications

		PUZZLE-A002
Platform	Form Factor	1U
	CPU	AMD R-Series RX-421ND processor, 4C, up to 3.4 GHz
	Chipset	Integrated in CPU
Memory	Memory Technology	2 x DDR4 2400MHz ECC/Non-ECC/RDIMM
	Memory Capacity	Up to 32GB
	Memory Socket	2 x 288-pin DIMM
Network and Security	Network acceleration and Security function	• AES-NI encryption acceleration • AMD Secure Processor • Secure boot with AMD Hardware Validated Boot (HVB)
	TPM	1 x TPM 2.0 Pin header
Networking	Ethernat IC	1 GbE NIC: Broadcom® BCM5720
	Ethernat Port	6 x 1GbE RJ45 LAN ports
	Network Module Slot	N/A
Expension slot	PCIe slot	2 x PCIe x4 slot
	PCIe mini card slot	1 x PCIe mini card (PCIe, USB 2.0, Micro SIM slot)
	M.2	1 x M.2 A key (PCIe & USB 2.0)
Storage	Storage	2 x 2.5" SATA HDD/SSD bay
	eMMC	8GbE
	SD card	N/A
External I/O	USB 3.1	2 x USB 3.1 Gen 1 (5Gb/s)
	Console	1 x RJ45
Internal I/O	M.2	1 x M.2 A key (PCIe & USB 2.0)
	HDMI	N/A
	USB 3.1	1 x USB 3.1 Gen 1 (5Gb/s)
	USB 2.0	2 x USB 2.0
Power and Mechanical	Power Switch	1 x Power Switch
	Reset Button	1 x Reset Button
	Power Input	100 V ~ 240 V
	Type/Watt	ATX Power 250W 90V~264V AC
	Processor Cooling	1 x Passive CPU Heatsink
	System Cooling	4 x Cooling Fans with Smart Fan
	Antenna Port	1 x Antenna port
Physical and Environmental	Storage Temperature	-10°C ~ 50°C
	Operating Temperature	0 ~ 40°C (32 ~ 104°F)
	Operating Humidity	5% ~ 90% non-condensing
	Dimensions (W x H x D) (mm)	430 x 320 x 44.2
	Weight	5kg
OS and Certifications	Certification	CE / FCC
	Operating System	Linux Ubuntu 16.04.04
Indicators	LCM	LCM, 2 buttons
	LED	1 x Power LED 1 x Storage LED 1 x Alert LED

Ordering Information

Part No.	Description
PUZZLE-A002-MF1-R10	1U Rackmount Network Appliance with AMD® RX-421ND processor, two DDR4 slots, and six 1GbE, two PCIe x4 expansion, RoHS
PUZZLE-A002-MF1/8G-R10	1U Rackmount Network Appliance with AMD® RX-421ND processor, 8GB DDR4, one 256GB SSD, six 1GbE, two PCIe x4 expansion, RoHS

Packing List

	PUZZLE-A002-MF1	PUZZLE-A002-MF1/8G
Power cord	1	1
Heatsink	1	1
Rack mounting ears	2	2
SCREW for Rack mounting ears	6	6
USB to console cable	Option	1
RS232 to console cable	1	Option
Slide rail	Option	Option

Options

Item	Part No.	Description
Slide rail	RAIL-B02	New rail kit for new 1U & 2U NAS: TVS-471U, 1253U, etc
USB to console cable	32013-004000-100-RS	ROUND CABLE; LAN CABLE; FTDI Console Cable; 2; 1800MM; (A)USB A TYPE 4P MALE+PCB:FTDI_FT232RL; (B)RJ45 8P8C; RoHS
RS232 to console cable	32005-005100-100-RS	ROUND CABLE; RS-232/422/485; PUZZLE RS-232 Cable; 2; 500MM; 24AWG; (A) D-SUB 9P MALE+#4-40 Screw; (B)RJ45 PLUG 8P8C; ONE PCS PKG; TC&C; RoHS

PUZZLE-IN001

1U Rackmount Network Appliance with Intel® Xeon® E and 8th Generation Intel® Core™ i3/Pentium®/Celeron® Processor, up to 2 NMS and 2 PCIe slots

Features

- Intel® Xeon® E, 8th Generation Intel® Core™/Pentium®/ Celeron® Processor
- Support 8 x GbE RJ45 via Intel® I211, and two IEI Network Module
- 2 x 288-pin Long DIMM, DDR4 2100MHz ECC & non ECC, up to 32GB
- 1 x RJ45 Console, 2 x USB 3.1 Gen 1 (5Gb/s), LCM
- 2 x 2.5" SATA drive bay, 1 x M.2 B-Key (SATA, USB 3.1 Gen 1 (5Gb/s)), 1 x PCIe mini
- Support PCIe x4 and PCIe x8 slot
- Redundant PSUs

Specifications

		PUZZLE-IN001-XE	PUZZLE-IN001-i3T
Platform	**Form Factor**	1U	
	CPU	Intel® Xeon® E-2136 Processor, 6C/12T, up to 4.50 GHz	8th Generation Intel® Core™ i3-8100T Processor, 4C/4T, up to 3.10 GHz
	Chipset	Intel® C246	
Memory	**Memory Technology**	2 x DDR4 2400MHz ECC/Non-ECC/RDIMM	
	Memory Capacity	Up to 32GB	
	Memory Socket	2 x 288-pin DIMM	
Network and Security	**Network acceleration and Security function**	• Intel® AES New Instructions • Intel® Software Guard Extensions (Intel® SGX) • Intel® Memory Protection Extensions (Intel® MPX) • Intel® Trusted Execution Technology	
	TPM	1 x TPM 2.0 Pin header	
Networking	**Ethernat IC**	1 GbE NIC: Intel® i211-AT	
	Ethernat Port	8 x 1GbE RJ45 LAN ports	
	Network Module Slot	2 x Networking Module Slot	
Expension slot	**PCIe slot**	1 x PCIe x4 slot, 1 x PCIe x8 slot	
	PCIe mini card slot	1x PCIe mini card (PCIe & SATA, USB 2.0)	
	M.2	1 x M.2 B key 2260/2280 (SATA & USB 3.1 Gen 1 (5Gb/s))	
Storage	**Storage**	2 x 2.5" SATA HDD/SSD bay	
	eMMC	N/A	
	SD card	N/A	
External I/O	**USB 3.1**	2 x USB 3.1 Gen 1 (5Gb/s)	
	Console	1 x RJ45	
Internal I/O	**HDMI**	1 x HDMI connecter (optional)	
	USB 3.1	N/A	
	USB 2.0	4 x USB 2.0 (pin header)	
Power and Mechanical	**Power Switch**	1 x Power Switch	
	Reset Button	1 x Reset Button	
	Power Input	100 V ~ 240 V	
	Type/Watt	Redundant Power 300W	
		90V ~ 264V AC	
	Processor Cooling	1 x Passive CPU Heatsink	
	System Cooling	4 x Cooling Fans with Smart Fan	
	Antenna Port	1 x Antenna port	
Physical and Environmental	**Storage Temperature**	-10°C ~ 50°C	
	Operating Temperature	0 ~ 40°C (32 ~ 104°F)	
	Operating Humidity	5% ~ 90% non-condensing	
	Dimensions (W x H x D) (mm)	430 x 426 x 44.2	
	Weight	7kg	
OS and Certifications	**Certification**	CE / FCC	
	Operating System	Linux Ubuntu 16.04.04	
Indicators	**LCM**	LCM, 2 buttons	
	LED	1 x Power LED, 1 x Storage LED, 1 x Alert LED	

Ordering Information

Part No.	Description
PUZZLE-IN001-XE/R-R10	1U Rackmount Network Appliance with Intel® Gen8 Xeon® E-2136 processor, two DDR4 slots, and eight 1GbE, two PulM, two PCIe expansion, Redundant Power, RoHS
PUZZLE-IN001-i3T/R-R10	1U Rackmount Network Appliance with Intel® Gen8 Core™ i3-8100T processor, two DDR4 slots, and eight 1GbE, two PulM, two PCIe expansion, Redundant Power, RoHS
PUZZLE-IN001-XE/16G/ R-R10	1U Rackmount Network Appliance with Intel® Gen8 Xeon® E-2136 processor, 16GB DDR4, two 256GB SSD, and eight 1GbE, two PulM, two PCIe expansion, Redundant Power, RoHS
PUZZLE-IN001-i3T/16G/ R-R10	1U Rackmount Network Appliance with Intel® Gen8 Core™ i3-8100T processor, 16GB DDR4, two 256GB SSD, and eight 1GbE, two PulM & two PCIe expansion, Redundant Power, RoHS

Packing List

	PUZZLE-IN001-XE/R	PUZZLE-IN001-i3T/R	PUZZLE-IN001-XE/16G/R	PUZZLE-IN001-i3T/16G/R
Power cord	1	1	1	1
Heatsink	1	1	1	1
Rack mounting ears	2	2	2	2
SCREW for Rack mounting ears	6	6	6	6
USB to console cable	Option	Option	1	1
RS232 to console cable	1	1	Option	Option
Slide rail	Option	Option	Option	Option

Options

Item	Part No.	Description
Slide rail	RAIL-B02	New rail kit for new 1U & 2U NAS: TVS-471U, 1253U, etc
USB to console cable	32013-004000-100-RS	ROUND CABLE; LAN CABLE; FTDI Console Cable; 2; 1800MM; (A)USB A TYPE 4P MALE+PCB:FTDI_FT232RL; (B)RJ45 8P8C; RoHS
RS232 to console cable	32005-005100-100-RS	ROUND CABLE; RS-232/422/485; PUZZLE RS-232 Cable; 2; 500MM; 24AWG; (A) D-SUB 9P MALE+#4-40 Screw; (B)RJ45 PLUG 8P8C; ONE PCS PKG; TC&C; RoHS

PUZZLE-IN002

1U Rackmount Network Appliance with 8th Generation Intel® Core™ i7/i5/i3, Pentium® or Celeron® Processor, 1 PCIe slots

Features

- 8th Generation Intel® Core™ i7/i5/i3, Pentium® or Celeron® Processor
- Support 6 x GbE RJ45 via Intel® I211
- 2 x DDR4 2400MHz Non-ECC UDIMM, up to 32GB
- 1 x RJ45 Console, 2 x USB 3.1 Gen 1 (5Gb/s), LCM
- 2 x 2.5” SATA drive bay, 1 x M.2 A key (PCIe & USB 2.0), 1 x PCIe mini card (SATA, USB 2.0) with SIM slot
- Support PCIe x16

Specifications

		PUZZLE-IN002-i3T	PUZZLE-IN002-PGT
Platform	Form Factor	1U	
	CPU	8th Generation Intel® Core™ i3-8100T Processor, 4C/4T, up to 3.10 GHz	Intel® Pentium® Gold G5400T Processor, 2C/4T, up to 3.10 GHz
	Chipset	Intel® H310	
Memory	Memory Technology	2 x DDR4 2400MHz Non-ECC UDIMM	
	Memory Capacity	Up to 32GB	
	Memory Socket	2 x 288-pin DIMM	
Network and Security	Network acceleration and Security function	• Intel® AES New Instructions • Intel® Software Guard Extensions (Intel® SGX) • Intel® Memory Protection Extensions (Intel® MPX) • Intel® Trusted Execution Technology	
	TPM	1 x TPM 2.0 Pin header	
Networking	Ethernat IC	1 GbE NIC: Intel® i211-AT	
	Ethernat Port	6 x 1GbE RJ45 LAN ports	
	Network Module Slot	N/A	
Expension slot	PCIe slot	1 x PCIe x16 slot	
	PCIe mini card slot	1 x PCIe mini card (SATA, USB 2.0) with SIM slot	
	M.2	1 x M.2 A key (PCIe & USB 2.0)	
Storage	Storage	2 x 2.5" SATA HDD/SSD bay	
	eMMC	N/A	
	SD card	N/A	
External I/O	USB 3.1	2 x USB 3.1 Gen 1 (5Gb/s)	
	Console	1 x RJ45	
Internal I/O	M.2	1 x M.2 A key (PCIe & USB 2.0)	
	HDMI	1 x HDMI connecter (optional)	
	USB 3.1	N/A	
	USB 2.0	2 x USB 2.0 (pin header)	
Power and Mechanical	Power Switch	1 x Power Switch	
	Reset Button	1 x Reset Button	
	Power Input	100 V ~ 240 V	
	Type/Watt	ATX Power 250W	
		90V~264V AC	
	Processor Cooling	1 x Passive CPU Heatsink	
	System Cooling	4 x Cooling Fans with Smart Fan	
	Antenna Port	1 x Antenna port	
Physical and Environmental	Storage Temperature	-10°C ~ 50°C	
	Operating Temperature	0 ~ 40°C (32 ~ 104°F)	
	Operating Humidity	5% ~ 90% non-condensing	
	Dimensions (W x H x D) (mm)	430 x 320 x 44.2	
	Weight	5kg	
OS and Certifications	Certification	CE / FCC	
	Operating System	Linux Ubuntu 16.04.04	
Indicators	LCM	LCM, 2 buttons	
	LED	1 x Power LED, 1 x Storage LED, 1 x Alert LED	

Ordering Information

Part No.	Description
PUZZLE-IN002-i3T-R10	1U Rackmount Network Appliance with Intel® Gen8 Core™ i3-8100T processor, two DDR4 slots, and six 1GbE, one PCIe x16 expansion, RoHS
PUZZLE-IN002-PGT-R10	1U Rackmount Network Appliance with Intel® Gen8 Pentium® Gold G5400T processor, two DDR4 slots, and six 1GbE, one PCIe x16 expansion, RoHS
PUZZLE-IN002-i3T/8G-R10	1U Rackmount Network Appliance with Intel® Gen8 Core™ i3-8100T processor, 8GB DDR4, one 256GB SSD, six 1GbE, one PCIe x16 expansion, RoHS
PUZZLE-IN002-PGT/8G-R10	1U Rackmount Network Appliance with Intel® Gen8 Pentium® Gold G5400T processor, 8GB DDR4, one 256GB SSD, and six 1GbE, one PCIe x16 expansion, RoHS

Packing List

	PUZZLE-IN002-i3T	PUZZLE-IN002-PGT	PUZZLE-IN002-i3T/8G	PUZZLE-IN002-PGT/8G
Power cord	1	1	1	1
Heatsink	1	1	1	1
Rack mounting ears	2	2	2	2
SCREW for Rack mounting ears	6	6	6	6
USB to console cable	Option	Option	1	1
RS232 to console cable	1	1	Option	Option
Slide rail	Option	Option	Option	Option

Options

Item	Part No.	Description
Slide rail	RAIL-B02	New rail kit for new 1U & 2U NAS: TVS-471U, 1253U, etc
USB to console cable	32013-004000-100-RS	ROUND CABLE; LAN CABLE; FTDI Console Cable; 2; 1800MM; (A)USB A TYPE 4P MALE+PCB:FTDI_FT232RL; (B)RJ45 8P8C; RoHS
RS232 to console cable	32005-005100-100-RS	ROUND CABLE; RS-232/422/485; PUZZLE RS-232 Cable; 2; 500MM; 24AWG; (A) D-SUB 9P MALE+#4-40 Screw; (B)RJ45 PLUG 8P8C; ONE PCS PKG; TC&C; RoHS

PUZZLE-M801

1U Rackmount Network Appliance with Marvell® ARMADA® 88F8040 High-Performance Quad-Core CPU

Features

- Marvell® ARMADA® 88F8040 High-Performance Quad-Core CPU System on Chip
- Support 2 x 10GbE SFP+ via Marvell® ARMADA® 88F8040
- Support 4 x GbE RJ45 via Marvell 88E1512P
- 1 x 288-pin DIMM, DDR4 2400MHz, 16GB (ECC)
- 2 x USB 3.1 Gen 1 (5Gb/s), 1 x RJ45 console, 1 x M.2 B key (SATA & USB 3.1 Gen 1 (5Gb/s)) with SIM holder, 1 x PCIe x16 slot (PCIe x2 signal)

Specifications

		PUZZLE-M801
Platform	Form Factor	1U
	CPU	Marvell® ARMADA® 88F8040 High-Performance CPU System on Chip, 4C, 1.6GHz
	Chipset	Integrated in CPU
Memory	Memory Technology	DDR4 2400MHz ECC/Non-ECC/RDIMM
	Memory Capacity	Up to 16GB
	Memory Socket	1 x 288-pin DIMM
Network and Security	Network acceleration and Security function	• Configurable packet processor • HW offload for networking • Acceleration engines for storage, networking and security • Public Key Processor (RSA/DH/ECC) • Secure Storage • Secure boot
	TPM	N/A
Networking	Ethernat IC	1 GbE PHY: Marvell 88E1512P
	Ethernat Port	2 x 10 GbE SFP+, 4 x 1GbE RJ45 LAN ports
	Network Module Slot	N/A
Expension slot	PCIe slot	1 x PCIe x16 slot (PCIe x2 signal)
	PCIe mini card slot	N/A
	M.2	1 x M.2 B key (SATA & USB 3.1 Gen 1 (5Gb/s))
Storage	Storage	2 x 2.5" SATA HDD/SSD bay
	eMMC	32GB
	SD card	N/A
External I/O	USB 3.1	2 x USB 3.1 Gen 1 (5Gb/s)
	Console	1 x RJ45
Internal I/O	M.2	1 x M.2 B key (SATA & USB 3.1 Gen 1 (5Gb/s))
	HDMI	N/A
	USB 3.1	N/A
	USB 2.0	2 x USB 2.0
Power and Mechanical	Power Switch	1 x Power Switch
	Reset Button	1 x Reset Button
	Power Input	100 V ~ 240 V
	Type/Watt	ATX Power 250W 90V~264V AC
	Processor Cooling	1 x Active CPU Heatsink with fan
	System Cooling	2 x Cooling Fans with Smart Fan
	Antenna Port	1 x Antenna port
Physical and Environmental	Storage Temperature	-10°C ~ 50°C
	Operating Temperature	0 ~ 40°C (32 ~ 104°F)
	Operating Humidity	5% ~ 90% non-condensing
	Dimensions (W x H x D) (mm)	430 x 320 x 44.2
	Weight	5kg
OS and Certifications	Certification	CE / FCC
	Operating System	Linux Ubuntu 16.04.04
Indicators	LCM	LCM, 2 buttons
	LED	1 x Power LED, 1 x Storage LED, 1 x Alert LED

Ordering Information

Part No.	Description
PUZZLE-M801-A1-R10	1U Rackmount Network Appliance with Marvell Armada 8040 processor, one DDR4 slot, four 1GbE, two 10GbE via SFP+, one PCIe expansion, RoHS
PUZZLE-M801-A1/8G-R10	1U Rackmount Network Appliance with Marvell Armada 8040 processor, 8GB DDR4, one 256GB SSD, four 1GbE, two 10GbE via SFP+, one PCIe expansion, RoHS

Packing List

	PUZZLE-M801-A1	PUZZLE-M801-A1/8G
Power cord	1	1
Heatsink	1	1
Rack mounting ears	2	2
SCREW for Rack mounting ears	6	6
USB to console cable	Option	1
RS232 to console cable	1	Option
Slide rail	Option	Option

Options

Item	Part No.	Description
Slide rail	RAIL-B02	New rail kit for new 1U & 2U NAS: TVS-471U, 1253U, etc
USB to console cable	32013-004000-100-RS	ROUND CABLE; LAN CABLE; FTDI Console Cable; 2; 1800MM; (A)USB A TYPE 4P MALE+PCB:FTDI_FT232RL; (B)RJ45 8P8C; RoHS
RS232 to console cable	32005-005100-100-RS	ROUND CABLE; RS-232/422/485; PUZZLE RS-232 Cable; 2; 500MM; 24AWG; (A)D-SUB 9P MALE+#4-40 Screw; (B)RJ45 PLUG 8P8C; ONE PCS PKG; TC&C; RoHS

PUZZLE-N001

1U Rackmount Network Appliance with NXP QorIQ® Layerscape LS2044A/LS2084A Multicore Communications Processor, 8 x 10 GbE, 4 x 1GbE RJ45 LAN ports

Features

- NXP LS2044A/LS2084A High-Performance Four/Eight-Core CPU System on Chip
- 4 x GbE RJ45, Networking Module
- 8 x 10 GbE RJ-45/SFP+ combo
- 4 x 288-pin DIMM, DDR4 1867MHz, up to 64GB
- 1 x RJ45 Console, 2 x USB 3.1 Gen 1 (5Gb/s), LCM
- 2 x 2.5" SATA HDD/SSD bay, 1 x M.2 A key (PCIe & USB 2.0) 1 x M.2 B key (PCIe & USB 3.1 Gen 1 (5Gb/s)), 1 x SD card slot

Specifications

		PUZZLE-N001-LS1	PUZZLE-N001-LS2
Platform	Form Factor	1U	
	CPU	NXP QorIQ® Layerscape LS2044ASE7TTB Multicore Communications Processor, 4C, 1.8GHz	NXP QorIQ® Layerscape LS2084ASE7TTB Multicore Communications Processors, 8C, 1.8GHz
	Chipset	Integrated in CPU	
Memory	Memory Technology	DDR4 1867MHz ECC/Non-ECC/RDIMM	
	Memory Capacity	Up to 64GB	
	Memory Socket	4 x 288-pin DIMM	
Network and Security	Network acceleration and Security function	• Packet Processor • Datapath acceleration Cryptography acceleration • DPAA2 (Datapath acceleration architecture • Pattern matching acceleration (PME 2.0) • Decompression/compression acceleration (DCE 1.0)	
	TPM	TustZone (like a soft TPM)	
Networking	Ethernat IC	10 GbE PHY: Marvell 88X3340P, 1 GbE PHY: Marvell 88E1512P	
	Ethernat Port	8 x 10 GbE (RJ-45/SFP+ combo), 4 x 1GbE RJ45 LAN ports	
	Network Module Slot	N/A	
Expension slot	PCIe slot	N/A	
	PCIe mini card slot	N/A	
	M.2	1 x M.2 A key (PCIe & USB 2.0), 1 x M.2 B key (PCIe & USB 3.1 Gen 1 (5Gb/s))	
Storage	Storage	2 x 2.5" SATA HDD/SSD bay	
	eMMC	32GB	
	SD card	1 x SD card slot	
External I/O	USB 3.1	2 x USB 3.1 Gen 1 (5Gb/s)	
	Console	1 x RJ45	
Internal I/O	M.2	1 x M.2 A key (PCIe & USB 2.0), 1 x M.2 B key (PCIe & USB 3.1 Gen 1 (5Gb/s))	
	HDMI	N/A	
	USB 3.1	N/A	
	USB 2.0	N/A	
Power and Mechanical	Power Switch	1 x Power Switch	
	Reset Button	1 x Reset Button	
	Power Input	100 V ~ 240 V	
	Type/Watt	ATX Power 250W	
		90V~264V AC	
	Processor Cooling	1 x Passive CPU Heatsink	
	System Cooling	4 x Cooling Fans with Smart Fan	
	Antenna Port	1 x Antenna port	
Physical and Environmental	Storage Temperature	-10°C ~ 50°C	
	Operating Temperature	0 ~ 40°C (32 ~ 104°F)	
	Operating Humidity	5% ~ 90% non-condensing	
	Dimensions (W x H x D) (mm)	430 x 320 x 44.2	
	Weight	5kg	
OS and Certifications	Certification	CE / FCC	
	Operating System	Linux Ubuntu 16.04.04	
Indicators	LCM	LCM, 2 buttons	
	LED	1 x Power LED, 1 x Storage LED, 1 x Alert LED	

Ordering Information

Part No.	Description
PUZZLE-N001-LS1-R10	1U Rackmount Network Appliance with NXP QorIQ® Layerscape LS2044ASE7TTB processor, four DDR4 slots, four 1GbE, eight 10GbE SFP+ (fiber) and RJ-45 (copper) ports (combo), RoHS
PUZZLE-N001-LS2-R10	1U Rackmount Network Appliance with NXP QorIQ® Layerscape LS2088ASE7TTB processor, four DDR4 slots, four 1GbE, eight 10GbE SFP+ (fiber) and RJ-45 (copper) ports (combo), RoHS
PUZZLE-N001-LS1/16G-R10	1U Rackmount Network Appliance with NXP QorIQ® Layerscape LS2044ASE7TTB processor, 16GB DDR4, two 256GB SSD, four 1GbE, etght 10GbE SFP+ (fiber) and RJ-45 (copper) ports (combo), RoHS
PUZZLE-N001-LS2/16G-R10	1U Rackmount Network Appliance with NXP QorIQ® Layerscape LS2088ASE7TTB processor, 16GB DDR4, two 256GB SSD, four 1GbE, eight 10GbE SFP+ (fiber) and RJ-45 (copper) ports (combo), RoHS

Packing List

	PUZZLE-N001-LS1	PUZZLE-N001-LS2	PUZZLE-N001-LS1/16G	PUZZLE-N001-LS2/16G
Power cord	1	1	1	1
Heatsink	1	1	1	1
Rack mounting ears	2	2	2	2
SCREW for Rack mounting ears	6	6	6	6
USB to console cable	Option	Option	1	1
RS232 to console cable	1	1	Option	Option
Slide rail	Option	Option	Option	Option

Options

Item	Part No.	Description
Slide rail	RAIL-B02	New rail kit for new 1U & 2U NAS: TVS-471U, 1253U, etc
USB to console cable	32013-004000-100-RS	ROUND CABLE; LAN CABLE; FTDI Console Cable; 2; 1800MM; (A)USB A TYPE 4P MALE+PCB:FTDI_FT232RL; (B)RJ45 8P8C; RoHS
RS232 to console cable	32005-005100-100-RS	ROUND CABLE; RS-232/422/485; PUZZLE RS-232 Cable; 2; 500MM; 24AWG; (A)D-SUB 9P MALE+#4-40 Screw; (B)RJ45 PLUG 8P8C; ONE PCS PKG; TC&C; RoHS

PUZZLE-C001

Cavium® OCTEONCN® 8240, 8-core/Cavium® OCTEONCN® CN8360, 16-core with 1(CN8240)/2(CN8360) x quad-10GbE fiber/copper combo and 1 x quad-1GbE RJ45 ports

Features

- Cavium® OCTEONCN® 8240, 8-core/Cavium® OCTEONCN® CN8360, 16-core
- 2 x 288pin (CN8240) / 4 x 288pin (CN8360) DDR4, 2133MT, ECC/Non-ECC/RDIMM, up to 32GB
- 1(CN8240)/2(CN8360) x quad-10GbE fiber/copper combo ports
- 1 x quad-1GbE RJ45 ports
- 32GB eMMC, 2 x 2.5" SSD bay, M.2 M key 2260/2280 (PCIe x2 only) for storage expansion
- M.2 A key (PCIe and USB 2.0) for Wi-Fi/LTE
- 2 PCIe x4 slot for expansion

Specifications

		PUZZLE-C001-CN1/16G	PUZZLE-C001-CN2/16G
Platform	Foam factor	1U	
	CPU	Cavium® CN8240 High-Performance System on Chip, 8C, 1.5GHz/1.8GHz	Cavium® CN8360 High-Performance System on Chip, 16C, 2.0GHz/2.2GHz
	Chipset	Integrated in CPU	
Memory	Memory Technology	DDR4 2133MHz ECC/Non-ECC/RDIMM	
	Memory Capacity	Up to 32GB	
	Memory Socket	2 x 288-Pin DIMM	4 x 288-Pin DIMM
Network and Security	Network acceleration and Security function	• Scalable custom multicores • Crypto offload / acceleration • Packet processor • Virtualized network I/F controller (vNIC) • TrustZone	
	TPM	TPM 2.0, SPI I/F	
Networking	Ethernet IC	1 x Quad-10GbE PHY, Marvell® 88X3340P 1 x Quad-1 GbE PHY, Marvell® 88E1545P	2 x Quad-10GbE PHY, Marvell® 88X3340P 1 x Quad-1 GbE PHY, Marvell® 88E1545P
	Ethernet Port	1 x Quad-10GbE fiber/copper combo 1 x Quad-1GbE RJ45 ports	2 x Quad-10GbE fiber/copper combo 1 x Quad-1GbE RJ45 ports
	Network Module Slot	2 x PCIe x4 slot	
Expansion Slot	PCIe Slot	2 x PCIe x4 slot	
	Mini PCIe Slot	1 x Mini PCIe slot	
	M.2	1 x M.2 A key (PCIe and USB 2.0 w/ SIM slot)	
Storage	Storage (2.5" SSD)	2 x 2.5" SATA HHD/SSD bay	
	Storage (M.2, M key)	1 x M.2, M key, 2260/2280, PCIe x2 only	
	eMMC	32 GB	
External I/O	USB 3.1	2 x USB 3.1 Gen 1 (5Gb/s)	
	Console	1 x RJ45	
Internal I/O	M.2	1 x M.2 A key (PCIe and USB 2.0) 1 x M.2 M key, 2260/2280, PCIe x2 only	
	HDMI	N/A	
	USB 3.1	N/A	
	I²C	1 x PIN-header	
Power and Mechanical	Power Switch	1 x Power Switch	
	Reset Button	1 x Reset Button, programmable	
	Power Input	100 ~ 240V	
	Type/Watt	ATX Power 300W, redundant, hot-swap	
	Processor Cooling	1 x Passive CPU Heatsink	
	System Cooling	3 x Cooling Fans with Smart Fan	
	Antenna Port	1 x Antenna Port	
Physical and Environmental	Storage temperature	-20°C ~ 70°C	
	Operation temperature	0 ~ 40°C (32 - 104°F)	
	Dimensions (W x H x D) (mm)	430 x 320 x 44.2	
	Weight	6 Kg	
OS and Certifications	Certification	CE / FCC	
	Operation system	Linux Ubuntu 16.04.04	
Indicators	LCM	1 x LCM w/ 2 buttons	
	LED	1 x Power LED(blue), 1 x HDD LED (Green), 1 x Status LED(Red), 10GbE/1GbE port LEDs (Green/Amber)	

Ordering Information

Part No.	Description
PUZZLE-C001-CN1-R10	1U Rackmount Network Appliance with Cavium OCTEON CN8240 procrssor, two DDR4 slots, four 1GbE , four 10GbE SFP+ (fiber) and RJ-45 (copper) ports (combo), two PCIe x4 expansion, RoHS
PUZZLE-C001-CN2-R10	1U Rackmount Network Appliance with Cavium OCTEON CN8360 procrssor, four DDR4 slots, four 1GbE , eight 10GbE SFP+ (fiber) and RJ-45 (copper) ports (combo), two PCIe x4 expansion, RoHS
PUZZLE-C001-CN1/16G-R10	1U Rackmount Network Appliance with Cavium OCTEON CN8240 procrssor, 16GB DDR4, two 256GB SSD, four 1GbE, four 10GbE SFP+ (fiber) and RJ-45 (copper) ports (combo), two PCIe x4 expansion, RoHS
PUZZLE-C001-CN2/16G-R10	1U Rackmount Network Appliance with Cavium OCTEON CN8360 procrssor, 16GB DDR4, two 256GB SSD, four 1GbE, eight 10GbE SFP+ (fiber) and RJ-45 (copper) ports (combo), two PCIe x4 expansion, RoHS

Packing List

	PUZZLE-C001-CN1	PUZZLE-C001-CN1/16G	PUZZLE-C001-CN2	PUZZLE-C001-CN2/16G
Power cord	1	1	1	1
Heatsink	1	1	1	1
Rack mounting ears	2	2	2	2
SCREW for Rack mounting ears	6	6	6	6
USB to console cable	Option	Option	1	1
RS232 to console cable	1	1	Option	Option
Slide rail	Option	Option	Option	Option

Options

Item	Part No.	Description
Slide rail	RAIL-B02	New rail kit for new 1U & 2U NAS: TVS-471U, 1253U, etc
USB to console cable	32013-004000-100-RS	ROUND CABLE; LAN CABLE; FTDI Console Cable; 2; 1800MM; (A)USB A TYPE 4P MALE+PCB:FTDI_FT232RL; (B)RJ45 8P8C; RoHS
RS232 to console cable	32005-005100-100-RS	ROUND CABLE; RS-232/422/485; PUZZLE RS-232 Cable; 2; 500MM; 24AWG; (A)D-SUB 9P MALE+#4-40 Screw; (B)RJ45 PLUG 8P8C; ONE PCS PKG; TC&C; RoHS