DeviceEdge_AGX Orin Series

AIE-PX13-1-A2

AIE-PX23-1-A2

USER MANUAL

www.aetina.com

Document Change History

Version	Date	Description
V1.0	2023/07/24	Initial Release.
V1.1	2023/10/30	Update DS information
V1.2	2026/06/02	Update DS information

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Version 1.0

Acknowledgements

Customer Support Overview

Contact your distributor, sales representative, or Aetina's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:

- Product name and serial number
- Description of your peripheral attachments
- Description of your software (operating system, version, application software, etc.)
- A complete description of the problem
- The exact wording of any error messages

Visit the Aetina website at https://www.Aetina.com/support-warranty-policy.php where you can find the latest information about the product.

Contact Information

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Mail sales@Aetina.com

Worldwide Technical Support

Mail Tech_support@aetina.com

Product Warranty (2 years)

Aetina warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Aetina, or which have been subject to misuse, abuse, accident or improper installation. Aetina assumes no liability under the terms of this warranty as a consequence of such events.

Because of Aetina's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Aetina product is defective, it will be repaired or replaced at no charge during the warranty period. For out of warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Aetina products used other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandise authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy of the proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

ESD Warning

This product, like all electronic products, uses the product that can be damaged by electrostatic discharge (ESD). When handling, care must be taken so that the devices are not damaged. Damage due to inappropriate handling is not covered by the warranty. The following precautions must be taken:

- Do not open the protective conductive packaging until you have read the following and are at an approved anti-static workstation.
- If working on a prototyping board, use a soldering iron or station that is marked as ESD-safe.
- Always disconnect the product from the prototyping board when it is being worked on.
- Always discharge yourself by touching a grounded bare metal surface or approved anti-static mat before picking up an ESD - sensitive electronic component.
- Use an approved anti-static mat to cover your work surface.

Safety Precautions

Please read the following safety instructions carefully. It is advised that you keep this manual for future references:

1. All cautions and warnings on the equipment should be noted.
2. Make sure the power source matches the power rating of the device.
3. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
6. Always completely disconnect the power before working on the system's hardware.
7. Keep this equipment away from humidity.
8. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
9. The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS.
10. Be sure that the room in which you choose to operate your system has adequate air circulation. Ensure that the chassis cover is secure.
11. The chassis design allows cooling air to circulate effectively. An open chassis permits air leaks, which may interrupt and redirect the flow of cooling air from internal components.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
14. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
15. If any of the following situations arises, please the contact our service personnel:
    - Damaged power cord or plug
    - Liquid intrusion to the device
    - Exposure to moisture
    - Device is not working as expected or in a manner as described in this manual
    - The device is dropped or damaged
    - Any obvious signs of damage displayed on the device

Contents

1. Introduction

DeviceEdge AGX Orin series – AIE-PX13/AIE-PX23 is a standard system, supporting for NVIDIA Jetson AGX Orin. The system is with smart button for one-key recovery function to address critical system failure and real-time monitoring for status of device through the AIM (Aetina Intelligent Management).

1.1 Features

- Supports NVIDIA Jetson AGX Orin™ 32GB/64GB module
- 1 x GbE/1 x 10GbE LAN port
- 1 x B-Key/1 x E-Key/1 x M-Key slot
- Wide Power Voltage Range 9 to 36V DC
- Operating Temperature -25°C ~ +55°C
- Supports OOB (out-of-band) powered by Innodisk (optional)

1.2 Specifications

System configuration

Specification	**AIE-PX13**-1-A2	**AIE-PX23**-1-A2
Module Compatibility	NVIDIA Jetson AGX Orin 32GB	NVIDIA Jetson AGX Orin 64GB
AI Performance	200 TOPs	275 TOPs
GPU	1792-core NVIDIA Ampere GPU With 56 Tensor Cores	2048-core NVIDIA Ampere GPU with 64 Tensor Cores
CPU	8-core Arm® Cortex®-A78AE v8.2 64-bit CPU 2MB L2 + 4MB L3	12-core Arm® Cortex®-A78AE v8.2 64-bit CPU 3MB L2 + 6MB L3
Memory	32 GB 256-bit LPDDR5 204.8 GB/s	64GB 256-bit LPDDR5 204.8 GB/s
Storage	64GB eMMC 5.1	
Display	1 x HDMI 2.0 Type-A	
Audio	Line-out, Line-in, Mic (optional with daughter board)	
LAN	1 x RJ-45 1GbE port 1 x RJ-45 10GbE port	
USB	2 x USB 3.2 Gen 1 Type-A 1 x USB 3.2 Gen 2 Type-C 1 x USB 2.0 OTG Type-C 1 x USB 2.0 DB-15	
I/O Interfaces	2 x I²C 1 x SPI 2 x UART 5 x GPIO 1 x RS-232 1 x RS-422/485 2 x CAN 2.0b (Isolated, CAN FD supported)	
Expansion	1 x M.2 B-Key 3042/3052 (LTE/4G/5G) 1 x M.2 E-Key 2230 (Wi-Fi/BT) 1 x M.2 M-Key 2280 (supports NVMe; PCIe Gen4 x4) 1 x microSD card socket 1 x microSIM card socket	
MISC. Function	1 x Power button, 1 x Recovery button, 1 x Reset button	
Power Input/Connector	DC-in 9–36V DC, 4-pin DC Jack power connector	
Power Consumption	Idle: 5.5 W Full Loading: 51.08 W	Idle: 5.9 W Full Loading: 71 W
	Idle: Connect with Keyboard, Mouse and HDMI Display Full Loading: Connect with keyboard, mouse, HDMI display and LAN with CPU and GPU 100% loading	
Dimension (W x D x H)	270 x 195 x 80 mm (10.63 x 7.67 x 3.15 in)	

Mounting	Wall Mount / Din Rail (optional)
Net Weight	4.4 kg (9.7 lb)
Vibration	1 Grms, IEC 60068-2-64, random, 5 ~ 500 Hz, 1 hr/axis
Shock	10 G, IEC 60068-2-27, half sine, 11 ms duration
Temperature	Operating Temperature: -25°C ~ +55°C (-13° F ~ +131° F) with 0.5 m/s air flow Storage Temperature: -40°C ~ +85°C (-40° F ~ +185° F)
Humidity	95% @ 40°C (104°F) (non-condensing)
Software Support	Linux (supports NVIDIA® Jetpack™ 6.2 and above)

2. Hardware Information

2.1 I/O Interface

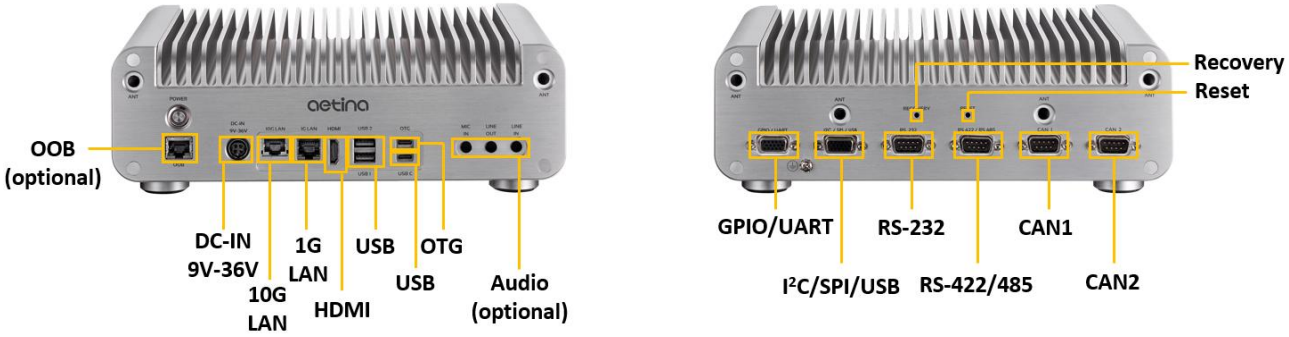


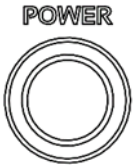
Figure 2.1 AIE-PX13/AIE-PX23 I/O Interface

2.2 External Connector Summary

Location	External Connector	Description
Front	Power	Power pushbutton
	DC IN	Power Connector 9V-36V
	10G LAN	10 GbE Port
	1G LAN	1 GbE Port
	HDMI	HDMI Type-A female connector
	USB 1	USB3.2 Gen1 Type-A connector
	USB 2	USB3.2 Gen1 Type-A connector
	USB C	USB3.2 Gen2 Type-C connector
	OTG	OTG Type-C port
Rear	DB 15	I^2C/SPI/USB
	DB 15	GPIO/UART
	DB 9	RS-422/RS-485
	DB 9	RS-232
	CAN1	DB9 male connector
	CAN2	DB9 male connector
	Recovery	Recovery pushbutton
	Reset	Reset pushbutton

2.2.1 Connector Interface

Power

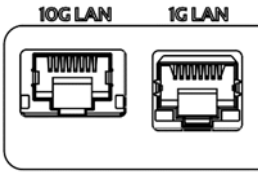


Item	Description
Location	Front
Type	Pushbutton

Power input connector

Item	Description
Location	Front
Type	9V to 36V 4-Pin DC Jack

10G LAN / 1G LAN



Item	Description
Location	Front
Type	RJ-45 Connector

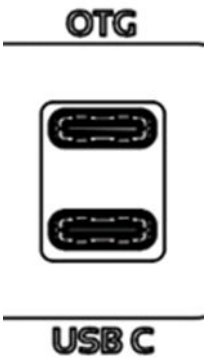
HDMI

Item	Description
Location	Front
Type	HDMI Type-A female connector

Dual USB3.2 Gen 1 Type-A connector

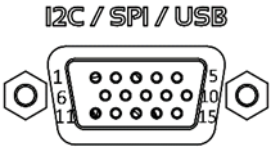
Item	Description
Location	Front
Type	Type-A USB connector
Pin	Refer to USB Standard

Dual Type-C connector



Item	Description
Location	Front
Type	Type-C USB connector
Pin	Refer to USB Standard
Notes	OTG: OTG Type-C port USB: USB 3.2 Type-C port

DB15 female connector (I²C / SPI / USB)



Item	Description
Location	Rear
Type	DB15 female connector

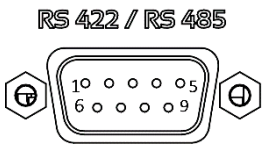
Pin #	Definition	Pin #	Definition	Pin #	Definition
1	SPI_MOSI	6	I2C_1_CLK	11	USB_DM
2	SPI_SCK	7	I2C_1_DAT	12	USB_DP
3	SPI_MISO	8	I2C_2_CLK	13	5V
4	SPI_CS1	9	I2C_2_DAT	14	GND
5	SPI_CS0	10	3.3V	15	GND

DB15 female connector (GPIO / UART)

Item	Description
Location	Rear
Type	DB15 female connector

Pin #	Definition	Notes	Pin #	Definition	Pin #	Definition
1	GPIO_1 (GPIO17 / PP.04 444)	IN/OUT	6	UART2_TX	11	UATR4_RT
2	GPIO_2 (GPIO11 / PAC.05 491)	IN/OUT	7	UART2_RX	12	UATR4_TX
3	GPIO_3 (PWM01 / PR.00 456)	IN/OUT	8	UATR2_CTS	13	5V
4	GPIO_4 (GPIO27 / PN.01 433)	IN/OUT	9	UATR2_RTS	14	GND
5	GPIO_5 (GPIO35 / PH.00 391)	IN/OUT	10	3.3V	15	GND

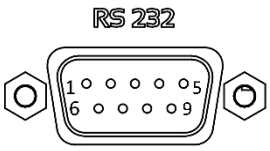
DB9 male connector (RS-422 / RS-485)



Item	Description
Location	Rear
Type	DB9 male connector
Notes	Default setting is RS-485 mode (Data-/+)

Pin #	Definition	Pin #	Definition
1	TxD+	6	NA
2	TxD-	7	NA
3	RxD-/Data-	8	NA
4	RxD+/Data+	9	NA
5	GND		

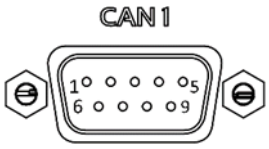
DB9 male connector (RS-232)



Item	Description
Location	Rear
Type	DB9 male connector

Pin #	Definition	Pin #	Definition
1	NA	6	NA
2	RX	7	RTS
3	TX	8	CTS
4	NA	9	NA
5	GND		

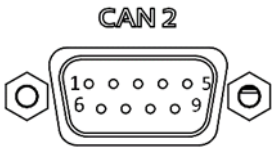
DB9 male connector (CAN1)



Item	Description
Location	Rear
Type	DB9 male connector

Pin #	Definition	Pin #	Definition
1	NA	6	NA
2	CAL_L	7	CAL_H
3	GND	8	NA
4	NA	9	NA
5	NA		

DB9 male connector (CAN2)



Item	Description
Location	Rear
Type	DB9 male connector

Pin #	Definition	Pin #	Definition
1	NA	6	NA
2	CAL_L	7	CAL_H
3	GND	8	NA
4	NA	9	NA
5	NA		

Reset & Recovery Button

Item	Description
Location	Rear
Type	Pushbutton

2.3 Power Consumption

The power consumption shown as below is the theoretical value with AGX Orin module installed on AIE-PX13.

Specification	Theoretical Maximum System power
Idle	5.5W (Connect with keyboard, mouse, and HDMI display)
Full loading	51.08W (Connect with keyboard, mouse, HDMI display and LAN with CPU and GPU 100% loading)

The power consumption shown as below is the theoretical value with AGX Orin module installed on AIE-PX23.

Specification	Theoretical Maximum System power
Idle	5.9W (Connect with keyboard, mouse, and HDMI display)
Full loading	71W (Connect with keyboard, mouse, HDMI display and LAN with CPU and GPU 100% loading)

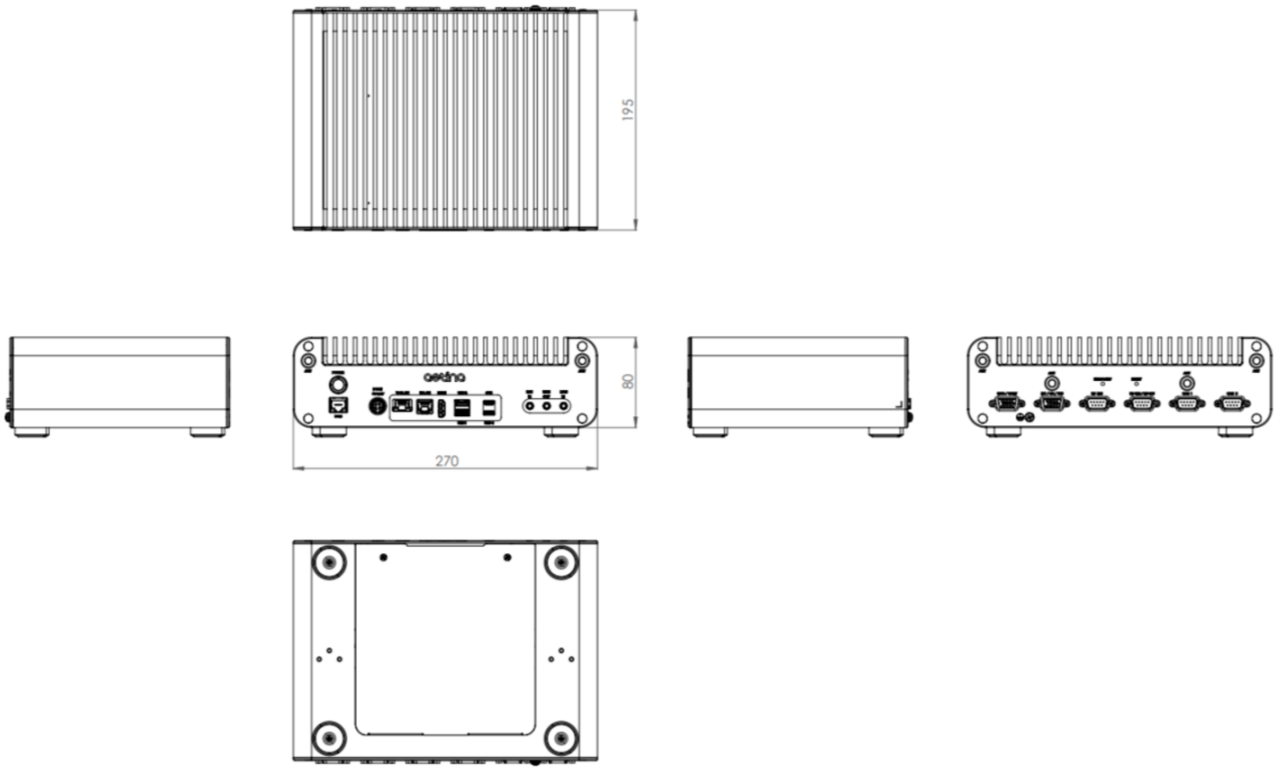
Please refer to the following power consumption of individual I/O interface according to your use case.

Type	Theoretical Maximum System power
USB 3.2 Gen1 Type A (1 port)	4.5 W
USB TypeC	4.5 W
HDMI	0.25 W
M.2 E KEY	2 W
M.2 M KEY	7 W
M.2 B KEY	3 W
CAN Bus	1 W
SD Card	0.72 W
RJ45(PHY)	0.83 W
RJ45(10G)	3.43 W

2.4 Mechanical Dimensions

System & Mounting Dimensions

Integration assembly drawing for AIE-PX13/AIE-PX23 system.



3. Software Installation

Aetina NVIDIA Jetson products have built-in BSP so the users don't have to install it after getting the products. Since we develop our own BSP, the users may need to follow the BSP installation SOP to re-install/upgrade/downgrade the BSP. Please visit the Aetina website or contact with Aetina FAE at **Tech_support@aetina.com** for installation guides, BSPs and technical tips.

4. Recovery Mode

The USB2.0 Type-C (support OTG) port of AIE-PX13/AIE-PX23 can be connected to another host device (Linux PC running NVIDIA Jetpack™) to run recovery process for re-flashing BSP.
Note: Please backup user personal files before flashing process

Step 1: Connect the OTG USB port to another host device which supplying updated BSP file.
Step 2: Press and hold the Reset button, then press and hold the Recovery button continually.
Step 3: After one second (1 sec.) release the Reset button first, then release the Recovery button.
Step 4: The Orin Nano or NX will show up as a new NVIDIA device on USB list (Terminal console) at the host device.
Step 5: Running re-flashing BSP process can be executed by the host device now.

5. Initial Setup

Before using AIE-PX13/AIE-PX23, please follow the steps below to have initial setup.

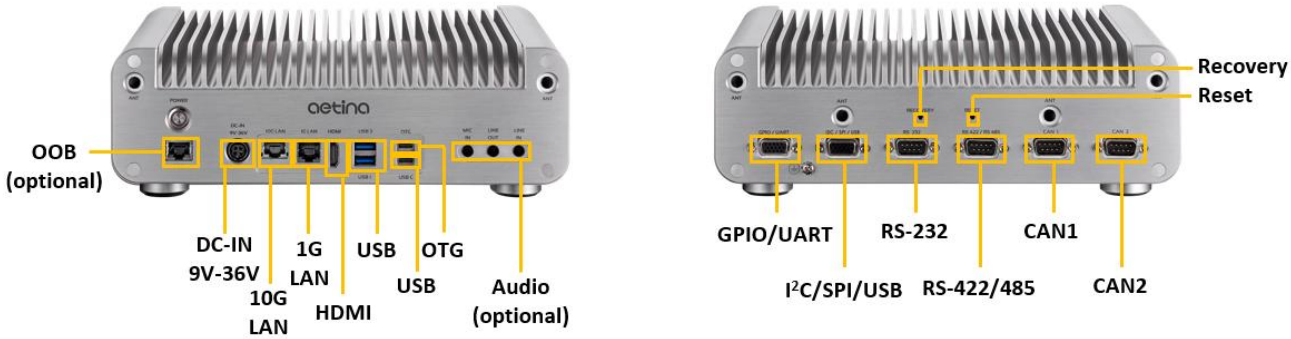
5.1 Prepare the Materials

Please prepare the materials list below.

- A monitor with HDMI and respective cables
- USB keyboard and mouse
- Ethernet cable

5.2 Hardware Connection

Here is the AIE-PX13/AIE-PX23 below and for the initial setup, users will need to connect LAN port, keyboard and mouse via USB interface, HDMI interface, and power connector.



5.3 Setup Details

1. Connect to the monitor while powering off
2. Power on and automatically enter the OS
3. Log in to the Ubuntu OS via credentials below
   Username: nvidia
   Password: nvidia

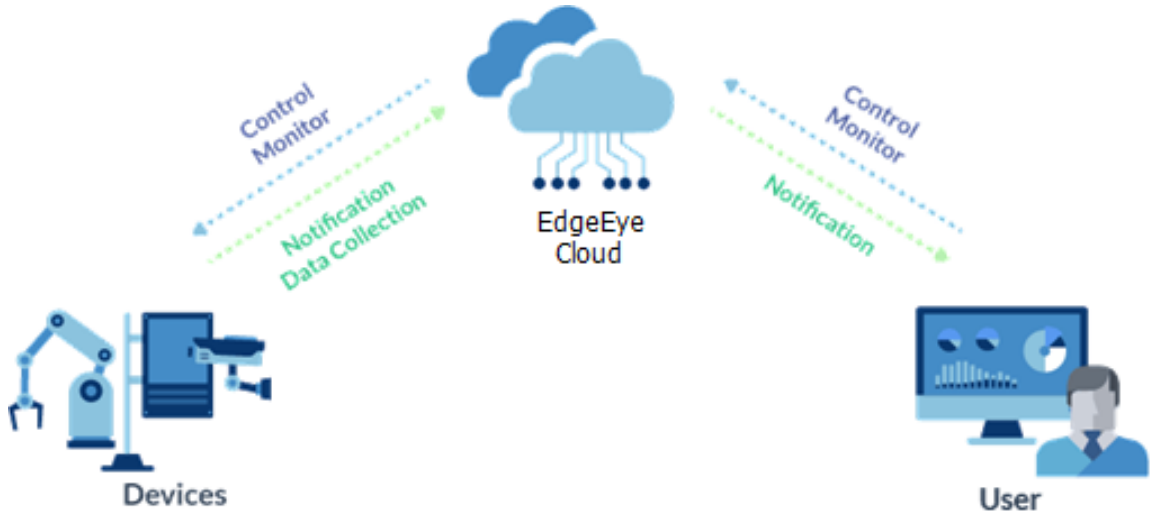
For more information on how to use Ubuntu and NVIDIA Jetson modules, please visit Ubuntu and NVIDIA website.

6. EdgeEye

6.1 Aetina 360 Edge Administration Platform

Introduction

To help clients efficiently and systematically manage edge devices deployed in different locations, Aetina offers several cloud management platforms. For example, EdgeEye, an Aetina browser-accessed management platform, allows clients to conveniently manage edge devices via intranet-connected cell phones, tablets, or laptops, no matter where the devices are deployed. It shows diversified status of devices with user-friendly interfaces to help clients check if user-defined values are in the normal range, including CPU/GPU loading and temperature, memory loading, storage status, deployment sites, and unsolved events setting. In addition, EdgeEye supports functions of reboot, shutdown, backup, and recovery via out-of-band management modules, especially when clients are intuitively aware of abnormal charts on the dashboard.



6.2 Feature

Edge Device Management

Monitor edge devices' hardware status, such as CPU, GPU, Memory' s utilization and capacity.

Alert Notification

Customized alert threshold and when getting abnormal data from edge devices, send warning notification immediately.

Remote Controlling

Reboot and shut down edge device through the operating system's command from server when needs.

User-Friendly Operation Interface

User can set and arrange monitoring data format by their needs.
Group devices control and Scheduler

6.3 System Requirements

Web Service

Web browsers support HTML5, CSS3, JavaScript:
Microsoft Edge 103.0+
Google Chrome:9.0+
Firefox:15.0+
Safari:5.1+

Server

Hardware Minimum Requirements:
Intel Core™ i5 2.3 Ghz CPU or above
32 GB RAM
200 GB root partition for the system
Operating System:
Linux Ubuntu 18.04+
Browser
Google Chrome 9.0+

Client

Support all Aetina products

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