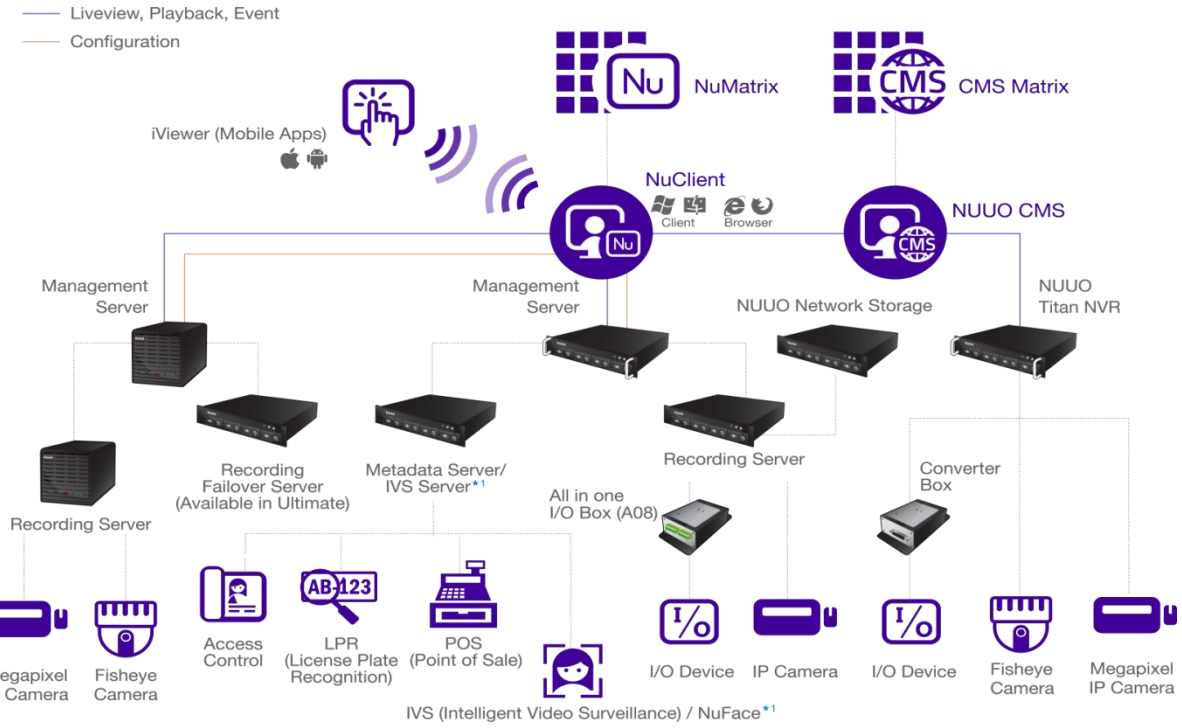
Specification

NUUO Crystal™ R1-0400CT-V2 & R2-0800CT

NUUO Crystal™



System Diagram



Product Overview

NUUO Crystal™ is the product that represents the next stage in VMS evolution. Rock solid, easily manageable, with powerful recording and viewing options available. Featuring revolutionary modular system structure that is made to handle middle to large project size, NUUO Crystal™ is the ideal choice for your enterprise. Featuring technology that focuses on delivering stable video recording performance, recording failover, and 3rd party integration choice, you will be impressed with the stability and flexible options with NUUO Crystal™.

Main Features

Server Highlight

- Linux based system
- Linux based intelligent video analysis
- Supports over 4,000 camera models from more than 130 brands, and RTSP video stream (Supported List)
- Records up to 256-megapixel cameras per Recording Server
- Supports throughput up to 860 Mbps (Depends on the type of storage, RAID level and quantity of Volume Group)
- Recording failover (available in Ultimate)

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- Edge recording (available in Ultimate)
- Login Management Server via Active Directory user accounts (available in Ultimate)
- Metadata Server for 3rd Party Integration such as Point of Sale, Access Control, License Plate Recognition and Facial Recognition
- Diagnostic Service for retrieving important logs from both server and client for troubleshooting
- Web-based Hardware Health Check Tool for OS Storage Device and Hard Drive Disks
- Web-based Network Quality Evaluation Tool for checking the connection quality between server and cameras
- **Enterprise Management**
  - Built-in Management Server, Recording Server, Recording Failover Server and Metadata Server in one Crystal
  - Centralized I/O and event respond systems
  - Support NTP (Management Server can be a time server to make all system time consistent)
  - Volume group to distribute cameras to assigned volumes
  - Individual Retention Condition (IRC) per device
  - Video Device Utility: auto setup & bulk import
  - PTZ control priority
  - Powerful authorization for device permission and function privilege
  - System Navigator for connecting multiple management servers.
- **Stability**
  - Support RAID 0,1, 5, 6 and 10 (by software RAID)
  - Support redundant power (by model)
  - Support hardware watchdog and software watchdog
- **Open Platform**
  - ONVIF Profile compatible
  - Camera multiple stream support
  - Multiple format support: H.265, H.264, MJPEG, MPEG4 and MxPEG
- **Value-added Benefits**
  - Stream up to 1,024ch live viewing connections per server to multiple clients simultaneously
  - Camera edge motion detection
  - Linux based video analytic
  - Support continuous, scheduled, event based and I/O based recording
  - Schedule-based and input-triggered boosting record
  - Schedule-based user management
  - Scheduled Backup video to FTP location
  - Watermark for video verification
  - Dual gigabit Ethernet ports

Client Highlight

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- Cross platform for Windows, Mac and Linux (Linux System is binding with NuStation)
- All in one NuClient for remote configuring and viewing
- Unlimited channels of live view and playback
- Unlimited channels of NuMatrix Video Wall (available in Enterprise)
- System Navigator for centralized management for multi-sites and managing unlimited devices and events from multiple management servers on NuClient
- **Enterprise Management**
  - Centralized server upgrade for firmware and device pack
  - Bulk camera configuration
  - Centralized E-map
  - Centralized I/O Panel and Event Panel
  - Public and Private View/View profile for each user
  - View Tour to loop through selected Views
- **Open Platform**
  - Export video with 3rd party data overlay
  - Generic Fisheye Dewarp technology for all fisheye cameras
  - Panorama 360° PTZ - Immervision and fisheye camera
  - Support multiple stream profile
  - Auto-switch stream profile
- **Value-added Benefits**
  - Support mobile client for iPhone / iPad / Android
  - NUUO Image Fusion Technology - stitch up to 10 cameras together
  - Layout Wizard - customized layout for viewing
  - Instant Playback on live view, e-map and event list
  - Thumbnail in Playback Timeline
  - Twin Clients to support identical, full featured software client and web client
  - Support digital and optical PTZ
  - Support preset and patrol
  - Save video clips into AVI, ASF
  - Multi-Metadata source on video display
  - Intelligent Search in playback
  - Language switch capacity
  - Hardware GPU Acceleration for NUUO Fisheye Dewarp

External Support

- External storage through iSCSI and NFS

  * Support list
- Support third party Point of Sale, Access Control, License Plate Recognition and Facial Recognition

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- Support up to 256 NUUO I/O boxes per server (A08)

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Server			
Hardware Specifications			
Model	**R1-0400CT-V2**	**R2-0800CT**	**R2-0800CT-EX**
Product Image			
Type	Rack-mount 1U	Rack-mount 2U	
CPU	Intel® Celeron	Intel® Core i5	Intel® Core i7
RAM	4 GB (8 GB optional)	8 GB (16 GB optional)	
Number of Drives (Hot Swapping Supported)	4 X SATA III	8 X SATA III	
Max Storage Per Drive	20TB		
Max Internal Total Storage	80TB	160TB	
RAID Level	RAID 0, 1, 5, 10 (Hot Spare and Hot Swapping)	RAID 0, 1, 5, 6, 10 (Hot Spare and Hot Swapping)	
I/O Interface	2 x USB 3.2 2 x USB 2.0 (for mouse、UPS) 1xVGA & 1xHDMI	2 x USB3.0 2 x USB2.0 (for mouse、UPS) VGA / DVI / HDMI / DP	
LAN	2 x Gigabit Port, RJ45		
LAN Transmission Speed	10/100/1,000 Mbps		
Voltage	100-240V		
Power Consumption	Typical: 50W Max: 200W	Typical: 160W Max: 550W	
Device Dimension (H X W X D)	43.5 x 438.0 x 560.1 mm (1.71” x 17.24” x 22.05”)	88 x 447 x 583 mm (3.46” x 16.93” x 22.05”)	
Device Weight	6.0 kg (13.2 lbs)	11.4 kg (25.1 lbs)	

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(Without HDD)		
Temperature	Operating: 0 ~ 40 °C (32 ~ 122 °F) Non-Operating: -40 ~ 70 °C (-40 ~ 156 °F)	
Humidity	Operating: 5%-95%	
Certification	CE, FCC, BIS, RoHS	
Software Specification		
Server Operating System	Linux	
License Type	Professional / Enterprise / Ultimate / Metadata channel licenses*	
Number of Cameras per Recording Server	128 CH	256 CH
Number of Camera per NuClient	400 CH	
ONVIF Device Support	V	
Video Format	H.265, H.264, MPEG4, MJPEG, MxPEG	
Multiple Stream Profile	V	
Recording Throughput	Optimal 150 Mbps, Maximum 250 Mbps	Maximum 550 Mbps
3rd Party Support	Point of Sale, Access Control, License Plate Recognition, Facial Recognition (Depends on plugin installed)	
Metadata Function	1. Live View and playback line by line with video 2. Metadata Search and Result Export 3. Multiple Metadata source on video	
Export	AVI, Original AVI, ASF	
Recording Type	Continuous record, trigger record by digital input, motion-triggered record, event-triggered record, boosting record, record by schedule, and manual trigger record on NuClient	
Event Pre-record and Post-Record	V	
Network Time Protocol (NTP)	V	
Joystick Support	V	
Supported IP Camera Brands	3M 3SVision ACTi Ademco Adler ADT ARKS Airlive Alarm.com Alphatech American Dynamics ARM ATV Amtk	

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	Arecont Vision Aver Asoni Axis Basler Bolide Bosch BrainChild Bullwark Brickcom Canon Capture Centrix Champ Cisco CNB COP CORUM D-Link Dahua Digital Watchdog Dyna Color Eneo Ernitec Etrovision EverFocus FalconTech Fine Flir Fornix GE GNS Grandstream Grundig Guardeon Guardliner Hanwha Vision HDPRO HikVision Histream Honeywell Hunt iMega InnoTech InscapeData IP Power IPCam IQeye Jetstor JVC KedaCom LevelOne LG LiLin Linksys Lumenera MegaIP Messoa Milesight MIWI Urmet Mobotix Monacor Neovista Netgear NetworkCamera Norden NTIC NUUO OnCam OnElectronics Onvif Optec Panasonic Pelco Pixord Planet Prisma Bytes Probe ProVision ISR QAlumia QVS RedVision RIVA Rover Saerim Samsung SANTEC Burg Wächter Sanyo Secubest Shany Sony Spark StarDot Sunell Techson TelView Tiandy Toshiba TrendNet TriCorps Truen TVT UDP UniView Viakom Videosec Vision Hi-Tech Vista Vitek Vivotek ViZOiD WatchNet Wavekrom Yudor Zavio
Supported Languages	Czech, Chinese(Simplified), Chinese(Traditional), English, Finnish, French, Germany, Italian, Japanese, Korean, Polish, Portuguese (Brazil), Russian, Spanish, Swedish, Thai, Turkish

* NUUO Crystal™ Ultimate, Enterprise, and Professional licenses are not compatible with each other. Only 1 type of license may be installed onto a single management server.

** Refer NUUO web site for hard drive compatibility list

Client

Open Platform System suggest Requirement

CPU	Intel Core 2 Duo, 2.6GHz	
Display Card	NVIDIA or ATI with 1GB memory (OpenGL 2.0 and later)	
OS Supported	Microsoft Windows	Mac OS
	Windows XP (32-bit) Windows 7 (32/64-bit) Windows 8.1 (32/64-bit) Windows 10 Windows 11	Mac OS X 10.14 macOS 14
RAM	2GB	
LAN Transmission Speed	10/100/1,000 Mbps (RJ45)	
User Interface	■ Application • NuClient • NuMatrix (Available with Enterprise/ Ultimate License) ■ Web browser • Internet Explorer 8, 9, 10, 11 (Web Client) • Firefox 23 to 42 (Windows version) • Google Chrome (Windows version)	

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	■ iViewer for NUUO iPhone, iPad, and Android mobile
Notice	It is suggested to execute the remote client system on the 64-bit OS and 4G (2GB X 2) RAM for better performance.

License Level Specification

Feature	Ultimate	Enterprise	Professional
Edge Recording	V		
LDAP	V		
Recording Failover	V		
Video Wall	V	V	
System Navigator	V	V	V
Diagnostic Service	V	V	V
NUUO Fisheye Dewarp	V	V	V
Central Management	V	V	V
Individual Retention Condition	V	V	V
Boosting Record	V	V	V
Multi-stream Setting	V	V	V
SDK Support	V	V	V
3rd Party Support (Point of Sales / Access control / License Plate Recognition/ Facial Recognition)	V	V	V

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Technical Details

System, Setting, Management and Integration

- **Centralized Management:** Unlimited cameras, access control, POS and I/O devices for centrally configuring, user authority management, integrated video and 3rd party monitoring, system status overview, event handling, and cluster recording failover management.
- **System Navigator:** Use one NuClient to login multiple management servers. Watch videos from different recording servers under different management servers. Configuration on different management servers can also be accomplished.
- **Linux Based**: Stable, reliable and virus free.
- **Camera Integration:** Open platform supports multiple camera brands, models and RTSP stream, UPnP search and ONVIF Profile S. Centrally configure camera parameters including video format, resolution, frame rate, and lens setting.
- **Multiple and High Channel Streaming:** Stream up to 256 connections per server to multiple clients simultaneously for live view. Support multiple stream profile from cameras, displaying lower bit rate but still record with good quality.
- **All Services in One NUUO Crystal™:** Built in Management Server, Recording Server, Recording Failover Server, and Metadata Server in one NUUO Crystal™. Enable necessary services to meet different system scope and demand.
- **Authorization Management:** Manage function privilege, device access permission and priority with unlimited roles, users and user groups.
  - LDAP/ MSAD accounts login support
  - Customized login period by users
  - Privilege by function
  - Access permission by device
  - PTZ control priority
  - Priority for Video Wall control
- **Recording Failover Server Group (available in Ultimate):** Flexible N+M server cluster structure to maximize system reliability, uptime, and efficiency.

- **Linux Intelligent Video Analytic (optional license):** support 4 different license type: presence, counting, surveillance and advanced.
  - Counting
  - Tamper
  - Camera calibration
  - Object classification
  - Camera shake elimination
  - Presence(tripwire)
  - Enter and Exit
  - Appear and disappear
  - Dwell
  - Tailgating
  - Stop

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- Direction
- Abandoned/Removed object

- **Third Party Integration:** Integrate third party data and video on unified management platform. The plugin structure allows user extend the system by plugin installing.
- **Schedule-Based Architecture:** Unified Schedule Profile for event, user's login duration, recording schedule, recording parameter and 3rd party streaming for complicate environment and requirement.
- **Multiple Video Format Support:** NUUO Crystal™ supports H.265, H.264, MJPEG, MPEG4 and MxPEG for best quality and storage usage.
- **Video Device Utility:** Utility offers camera auto setup function and bulk import camera list.
- **Event/ Action Management:** Centrally manages events from system, cameras, 3rd party metadata devices, and I/O devices with instant alert responses. Event and boost record reduce storage usage but ensure important period recording.
  - **Event**
    - System event
      - Server disconnect
      - Fail to write to drive
      - Volume operation error
      - Volume Group no functional volume
      - Recording Module error
      - Power Failed (Redundant power)
      - Auto Backup Failed
      - No available Failover Server for disconnected Recording Server (available in Ultimate)
    - Camera event
      - Camera Motion Detection
      - Connection lost
      - No enough space for retention days
    - IVS event
      - Counting event
      - Presence
      - Enter/Exit
      - Appear/disappear
      - Dwell
      - Tailgating
      - Stop
      - Direction
      - Abandoned/Removed object
      - Tamper
    - Digital input event
      - Input signal on
    - 3rd party metadata event
      - Transaction Start
      - Transaction Stop
      - Up to 10 user-definable events
  - **Action**
    - Auto Video Popup to NuClient and NuMatrix when event happens
    - Video edge display on client
    - NuClient play alert sound
    - Send E-mail
    - Camera go to preset point

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- Trigger Digital Output

- **Centralized System Status Overview:** Real-time monitoring the status of all servers, cameras, IO devices, and metadata channels.
- **Automatic NUUO Crystal™ Search:** Automatically search for all NUUO Crystal™ in the network.
- **Automatic Camera Model Detection:** Automatically search for IP cameras in the network (camera should support UPnP protocol) or manually insert it. Auto detection help users to find the brand and model of the camera after specifying its IP address.
- **Dual Gigabit Ethernet Ports:** NUUO Crystal™ is equipped with 2x gigabit ports. User can separate the recording stream from viewing stream to ensure the cleanest recording pipeline.
- **I/O Event Control:** With the integration of camera I/O and NUUO I/O Box, system can start recording or trigger instant alert when input triggered, or trigger output as an event happened.
- **License Management:** Extendable license activation for up to 64CH per Recording Server, and unlimited channel per system. Supports online/ offline activation and transfer. It is scalable to upgrade system from Enterprise to Ultimate by simply activate upgrade license.
- **NTP Date/ Time Synchronization:** The system can interface to Internet Time Server (NTP server) for time and date synchronization at each location. Management Server can play the role as NTP server on LAN environment.
- **Watchdog:** Support software watchdog and hardware watchdog to system stability.
- **Diagnostic Service:** A simple tool to retrieving important logs both from servers and clients for troubleshooting.

Recording, Recycle and Storage:

- **High Recording Throughput:** Process large amount of data throughput boost Crystal's recording performance to 550 Mbps for single volume, about 256CH 3-Megapixel cameras (H.265, 30 fps, moderate traffic). Volume group mechanism can further increase the throughput.
- **Volume Group:** Volume Group mechanism distributes camera throughput loading to multiple volume groups so that further enlarges recording throughput. It can also maximize recording spec or have different levels of data protection
- **Individual Recycle Condition (IRC) Per Device:** NUUO Crystal™ supports individual recycle condition (IRC) for each video or metadata device. Videos within specified retention time periods will be protected from recycling deletion. Videos outside the retention time periods will be automatically deleted.
  When system reaches storage capacity limit, even video data within IRC retention periods will still be deleted to free up additional storage space for Recording. Users will be notified when this occurs.
- **RAID:** Support RAID 0, 1, 5, 6 and 10 for maximum capacity or data protection at the HDD level.
- **Multiple Recording Modes:** NUUO Crystal™ supports multiple event-based and schedule-based recording modes. It also supports pre-event and post-event record to make sure seamless protection.

  *Supported recording mode:
  - Continuous record
  - Digital-Input-triggered record
  - Motion-triggered record
  - Event-triggered record
  - Boosting record

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- Record by schedule
- Manually triggering record on NuClient
- Edge Recording

- **External Storage:** Support SAN (iSCSI), NFS.
- **Edge Motion:** Support camera edge motion detection, reduce server loading and ensure stability. With event-action management and recording mode in NUUO Crystal™, user can monitor system easily.
- **Audio:** Support camera audio and audio recording.
- **Watermark:** Protect original recording from alternation with our watermark verification tool.

Remote Operation:

- **Unified NuClient:** Simply login Management Server on NuClient to configure, live view or query video from all servers on the system. Support identical, full featured software client application and web client by browser.
- **Cross Platform:** NuClient and Video Wall support both Windows and Mac OS. The web client support both IE browser and Windows Firefox.
- **Video Wall (NuMatrix):** Support unlimited number of Video Walls and video displays, with up to 100CH display per monitor. Easily drag and drop view and cameras to Video Wall (available in Enterprise).
- **Unlimited Channels monitoring:** The system support unlimited client connection and unlimited live viewing/ playback display. It manages up to 400 channels live view and 100 channels playback simultaneously per view.
- **NUUO Image Fusion Technology:** Manipulating camera views by changing its viewing angle and image size, making viewing easier in both live view and playback. Moreover, users can stitch multiple cameras together to form a unified single view.
- **Layout Wizard:** Intuitive layout customization to meet needs for panorama cameras and camera corridor mode.
- **Centralized I/O Management:** Manage all I/O devices on one I/O panel. Control I/O for event detection, instant action and digital output.
- **Centralized Event Management:** View and search all event on one event panel. Video will pop up by double clicking the event.
- **View Management:** Including View group, View tour, device group and Matrix profile, NUUO Crystal™ supports public view for all users and private view for each user. It also supports View Tour to loop through different selected Views.
- **PTZ Control:**
  - Support physical Pan/Tilt/Zoom, camera preset point and Patrol
  - PTZ/Preset/Patrol control privilege and priority by device
  - Support digital PTZ. Easily monitor one camera on multiple grid with different zone to enlarge the usability of megapixel cameras
  - Event trigger camera goes to specific preset point
  - NUUO Dewarp 2.0-- Generic fisheye dewarp for all fisheye camera integrated
  - Support Immervision and fisheye cameras
- **Instant Playback:** User can view instantly play the last few minutes of video via double click event, E-Map notification, or video tool bar. The intuitive GUI enable users easily export instant playback video or sync to Playback.

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- **Multi-View:** NUUO Crystal™ can duplicate the same live view video onto multiple channels and digitally zoom in to see the details of different spots on cloned channels without losing the original live view video.

- **NUUO Dewarp 3.0 Module**
  - Generic dewarp technology to process all types of fisheye-warp video.
  - Manual calibration for precise dewarp video
  - Client display supports 4 modes: Original mode, PTZ mode, Quad mode and Perimeter mode.
  - GPU acceleration to increase dewarp performance
  - Camera pre-calibration for dewarp accuracy

- **Joystick:** Utilize joystick and keyboard to control cameras physical PTZ and software enabled digital PTZ function.

- **Snapshot:** Easily take snapshot in BMP/JPEG during live viewing or playback. User can also take snapshot for whole View.

- **Centralized E-Map:** Tree structured E-Map with unlimited map layers. Supports intuitive GUI indicators of cameras, I/O devices, POS, Access Control and all server locations to have real-time system monitor. Supports notification on indicator when event happened, double click popup live video and instant playback, drag and drop cameras from map into live view, and one click exam device property.

- **Auto-switch Stream Profile:** Automatically switch stream profile base on the grid layout to fulfill both need of best quality of viewing and the loading of client computer.

Playback, Search, Export and Secure Data

- **Intuitive Interface:** Browse video with GUI timeline and intuitive interface of playback, reverse playback, skip forward/backward, speed up/down, and play by speed shuttle.

- **Intelligent Search:** Intuitive post-event motion search for suspicious areas on video and post-event 3rd party data keyword search then query related camera recording. The system can also search events and double clicking query associated recording to quickly figure out flagged events.

- **Thumbnail:** Support thumbnail in playback timeline for easier evidence finding.

- **Event Search/Filter:** Support events filter function to enhance the speed of event search.

- **Evidence Export:** Export video or third party device data in AVI Snapshot and print video image in BMP/ JPEG with password and watermark.

- **Backup:** Support automatically backup videos to FTP and manually backup video from any recording servers.

- **Post-Recording Processing:** Support Intelligent search, Image fusion, digital PTZ, and Panorama 360° PTZ.

External Device

- **Remote I/O Modules:** Analog devices that are connected to NUUO I/O Modules are converted to Ethernet through a media converter which enables NUUO Crystal™ to starting recording when inputs are triggered, or trigger outputs when an event occurred.

- **Redundant Power Supply:** Support internal redundant power supplies. This ensures seamless operation even when the primary power supply has failed. Failed power supplies can be replaced while system is still operating.

- **APC UPS:** NUUO Crystal™ support external UPS (Uninterrupted Power Supply) power supplies which provide clean uninterruptable power.

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