IronYun VAIDIO
A&E SPECIFICATIONS

Vaidio 7.0.0

Table of Contents

1. Hardware

Recommended minimum hardware for enterprise-grade Vaidio solution version 5.4.0 and further.

Form Factor	2U Rack Mountable
Processors	Dual Intel Xeon Silver 4216 or higher
Chipset	Intel C610 series chipset or better
I/O Slots	Slot 1: Half Length, Half Height, PCIe Gen3 x8 (x16 connector) low profile bracket Slot 2: Half Length, Half Height, PCIe Gen3 x8 (x16 connector) low profile bracket Slot 3: Half Length, Half Height, PCIe Gen3 x8 (x16 connector) low profile bracket Slot 4: Full Length, Full Height, PCIe Gen3 x16 (x16 connector) Slot 5: Full Length, Full Height, PCIe Gen3 x8 (x16 connector) Slot 6: Full Length, Full Height, PCIe Gen3 x16 (x16 connector) Dedicated RAID card
Memory	64GB DDR4 or better
System Drive	960GB SSD or larger (depends on max current channels)
RAID Controller	PERC H730 or better
Maximum Storage	At least 8 hot swap SAS/SATA disk trays
GPU	Dual Nvidia RTX A4000 or better
Network Controller	2 x 1Gb, 2 x 10Gb
Power Supply	Dual 1100W AC, or larger (depends on GPU)
Operating System	Ubuntu Linux
Certificate	CE/FCC/RoHS/VCCI/KC

Recommended hardware for edge-based Vaidio solution version 6.0.0 and further.

Form Factor	AIoT Device

Processors	ARM
Memory	8GB
System Drive	16GB SSD
Maximum Storage	M.2 256GB SSD
GPU	NVidia Jetson Xavier NX
Network Controller	1 GbE
Power Supply	12V/5A
Operating System	Ubuntu 18.04.5 LTS
Certificate	CE/FCC

2. Software Overview

The Vaidio Core Platform Software version 5.4.0 and further (hereafter referred to as Vaidio) shall support web server application and mobile applications.
The Web Server Application shall support https and http access.
Vaidio shall be accessible and managed via standard web browsers: Chrome.
Vaidio shall be able to receive alert signals from 3rd-party devices (IoT devices, sensors, alert systems, etc.) via Vaidio API.
Vaidio shall be integrated with Video Management System (VMS) and Network Video Recorder (NVR) to allow the retrieval of recorded video from VMS and NVR/DVR: see the 3rd-Party Integration Datasheet in IronYun Partner Resources Portal (or contact IronYun for more information).
Vaidio shall be able to push Alert notifications into specific VMS: see the 3rd-Party Integration Datasheet in IronYun Partner Resources Portal (or contact IronYun for more information).
Vaidio shall have an API for 3rd-party integration.
Vaidio shall allow the user to delete recorded video via API.
Vaidio shall support cameras with standard RTSP (real time streaming protocol).
An AI training tool (Vaidio DIY) shall be available to train new AI model(s) to detect customized object types.
Vaidio shall support multiple AI models per stream. After one AI model has been activated, each additional AI model activated per device shall consume a certain amount of computing resource per server.
Vaidio shall support multiple analytics per stream. Each analytic shall consume a certain amount of computing resource per stream.
Vaidio shall support live view to create a wall of existing cameras in the Vaidio Platform.
Vaidio shall tag the objects in the video in real-time based on the Library of Objects, which is pretrained in the system.
The minimum object tagging speed shall be 1 frame per second (fps).
The following Analytics engines shall be able to run independently for each stream when activated and shall contain object detection (with the object-based Video Search analytic) based on the AI model(s) activated for that stream:

1. Vaidio Core Platform:

Shall support any combinations of the following analytic engines in each device:

- Video Search
- Intrusion Detection (Including weapon detection, smoke & fire detection)
- Face Recognition/Face Search (including age & gender, emotion, and facemask detection)
- Age & Gender Detection
- Identity Verification
- People Counting (including People Counting with Occupancy, Person Wrong Direction, and Loitering)
- Vehicle Counting (including Vehicle Counting with Occupancy, Vehicle Wrong Direction, Illegal Parking, and Abnormal Speed)
- Object Counting
- Person Fall/ Crouch
- Scene Change Detection
- Crowd Detection
- License Plate Recognition in the Parking Lot, City Road and Highway modes

- Vehicle Make & Model Recognition
- Personal Protective Equipment (PPE)
- Object Left Behind

2. Vaidio Edge Platform:

Shall support one of the following analytic engines in each device:

- Intrusion Detection
- License Plate Recognition in the Parking Lot, City Road, Highway modes (including Vehicle Make & Model Recognition)
- Object Counting

The Analytics listed above shall be based on deep learning AI models.

Vaidio shall support the following features for all connected streams with activated analytics:

- Object-based search
- Alert
- Heatmap
- Camera management: camera health management, AI model, analytics, object types to detect, ROI (regions of interest), NVR connection, location (GPS map, indoor map)
- NVR management: connection to NVR(s)
- File management: upload video, retrieve video (from NVR)
- User management: user group, camera control, video source control, AI engine control, configuration control
- System: Web service port configuration, Time, Storage, Mail, LDAP, Log, Audit Trail, License, Setting, AI Model, Utility
- Result export

Analytic engines	Maximum number of channels (1080p) supported in Vaidio device[1]			
	VSB-110 (tower PC)	VSB-550 (2U rackmount server)	VSB-55 (edge[2])	VSB-70 (edge)
Object-based Video Search	16	52	N/A	N/A
Intrusion Detection	8	52	4	N/A
Face Recognition/ Face Search	4	32	N/A	N/A
Age & Gender Detection	4	32	N/A	N/A
Identity Verification	2	21	N/A	N/A
People Counting (including People Counting, Person Fall Detection, Person Wrong Direction, and Loitering)	2	16	N/A	N/A
Vehicle Counting (including Vehicle Counting, Vehicle Wrong Direction and Illegal	2	16	N/A	N/A

Parking)				
Object Counting	2	16	N/A	2
License Plate Recognition (LPR/ ANPR): Parking Lot, City Road and Highway modes	8, 4, 2	64, 32, 16	4, 2, 1	N/A
Make and Model Recognition	2	16	N/A	N/A
Personal Protective Equipment	8	52	N/A	N/A
Object Left Behind	4	32	N/A	N/A
Scene Change	8	52	N/A	N/A
Crowd Detection	4	32	N/A	N/A
Cross Camera Tracking	4	32	N/A	N/A

Notes:

1. To find the exact server required to support a combination of analytics channels, visit IronYun.com > Partner Resources > Calculators.
2. Edge devices: only one type of analytic engine per device. Cannot support multiple analytics.

3. Vaidio Data

Vaidio data shall be installed on the same server as the Vaidio Core Platform.
Vaidio Data shall allow User to view a statistic dashboard displaying the metadata that it gathers from the Vaidio analytic appliances.
Vaidio Data Dashboard is categorized into 4 sections:

- Person
- Vehicle
- Alert Event
- Object Detection

Vaidio Data shall display components of the dashboard known as widgets.
Each Vaidio Data widget will appear as a chart in the dashboard and display information pulled from each camera.
Vaidio Data shall display widgets based on:

- Time Range
- Time Grain
- Camera

Vaidio Data 7.0.0 shall only display data from the server with which it is installed.
Vaidio Data 7.0.0 shall display data from cameras in Remote servers in each dashboard.

4. Details of Analytic Functions

A. Object-Based Video Search

The Object-Based Video Search analytic function shall allow Users to search based on the following filters:

- Cameras

- Start Date and End Date
- Start Time and End time
- Object of Interest
- Quantities and/or types of objects in the scene
    - Colors (Red, Blue, White, Black, Green, Yellow, Grey and Pink) of the object in the scene

Video Search shall present the results in Thumbnails or List view.
Video Search shall provide an NL (Natural Language) command line query function to search for objects.
Video Search shall allow Users to click on the Thumbnails or List to see the Expanded View.
The Expanded View shall have a Digital Magnifier to provide a digital zoom of the image.
In the Expanded View, Users can toggle to Playback Mode to playback a video clip of the scene, if the Platform is linked to a VMS and/or NVR.
In the Expanded View, Users can select Masked Video Export, which will mask the faces and license plate number found in the playback video clip.
Video Search shall allow Users to sort the search results based on Time, Camera Name, and Location Name.
Video Search shall allow Users to export the search results in Excel format.
Video Search shall present the results of non-moving objects during forensic video search (e.g., parked vehicles)
Video Search shall allow Users to search based on the following Library of Objects:

- Vehicle related: Bicycle, Bus, Cars, Forklift, Jeepney, Motorcycle, Tricycle, Truck, Tuktuk
- Human related: Person, Face, Head
- Animals related: Bear, Bird, Cat, Cow, Dog, Horse
- Object related: Backpack, Bag, Cell phone, Luggage, Stroller, Umbrella, Wheelchair
- Danger related: Smoke, Fire, Handgun, Rifle

B. Intrusion Detection (ID)

ID shall allow Users to define up to 4 ID Regions of Interest (ID ROIs) per camera FoV.
Users shall be able to define the object types from the Library of Objects and color that will trigger an alert when the object(s) appear in the ID ROIs.
The ID ROIs shall be created using multiple points to form a region.
The ID ROIs shall allow Users to create an Exclusion Region.
Users shall be able to define the schedule to turn on/off the detection for individual ID ROIs.
The triggered ID ROIs shall appear in the ID Live View Dashboard with a beeping sound.
All triggered ID ROI alerts shall be pushable to VMS via http/https.
The http message shall be configured with keywords that are searchable in the VMS.
The user shall be able to select to use the "AND" or "OR" rule in ROI configuration for object detection.
With the "OR" rule, ID shall trigger an event when any of the specified objects in the ROI configured are detected.

C. Face Recognition (FR)

FR shall allow Users to upload photos with faces to do a search in the Video stream or Target List database.
FR shall allow up to 10,000 Face Targets.
Faces in the video or image shall have at least 64 pixel height and above for recognition and

search. For better performance, the faces should be at least 100 pixels high.
FR shall have a Live View Dashboard of the recognized face.
FR Live View shall allow Users to see the Matched Target Faces Name, Similarity Score and the List to which the Target Face belongs.
FR Live View shall have a Similarity Score filter to allow filtering of results based on the Similarity Score.
Users shall be allowed to view the Top 3 matches of a detected face.
FR shall allow Users to create an unlimited number of List of faces.
FR shall allow up to 5 Target Face Template images (of the same person) per Target ID.
FR Target Face Template can be added by uploading the photo of the Subject's face or adding the face images found in Object Video Search.
FR shall allow Users to add the following information to the Target ID in List: Name, Birth Year, Gender, List, Description.
All recognized Face Target Name, List to which the Face Target belongs and Camera Source information shall be pushed to VMS via http/https.
The http/https message shall be configured with keywords that are searchable in VMS.
FR shall have a History Dashboard to search for Matched Faces based on the Date, Time and Camera Source, Age, Gender, Emotion and whether the person wears a facemask.
There shall be a Face Search (FS) Dashboard that allows Users to upload Faces of interest into the Platform.
The FS Dashboard allow Users to search based on the Camera Source, Date, Time and Similarity score filter.
The FS Dashboard allow the Users to search for matches in the Target Lists in the system.

D. Age & Gender Detection

Age & Gender Detection shall depend on Face Detection (Face Recognition is not required) and have accuracy above 90% for the detected faces that are at least 120 pixels.
Age & Gender Detection results shall be displayed in Statistics in the Demographic dashboard.
Age & Gender Detection results shall be displayed in three forms of chart: Bar chart, Pyramid chart, Pie chart, and exportable as .PDF or .JPG files.
Users shall be able to search for a person based on the estimated Age group and Gender in Video Search.
Users shall be able to set alerts for a person with Age and/or Gender criteria in combination with Color (of clothing) and other Object Type(s) as Video-Search-type Alerts.

E. Identity Verification (IDV)

IDV shall simultaneously detect and match the Face Image on a driver license with the Live Face and the Driver License Number (DLN) on the driver license with the DLN saved in a list on Vaidio in real time.
IDV shall count a detection as a match only if the Face Image on the driver license matches the Live Face AND the DLN on the driver license exactly matches the DLN in the list in Vaidio. If one or both conditions fail to match, the detection shall be counted as a non-match to deny access.
IDV shall allow users to draw the Region of Interest to detect the Live Face and move (but not adjust the size or shape of) the Region of Interest to detect the Driver License.
Users shall be able to register up to 10,000 Target IDs with the Face Image and DLN in lists in Vaidio. There shall be no restriction on the number of lists.
IDV shall have a History Dashboard to search for Matched Faces/DLNs based on the Date,

Time and Camera Source Filter.
Users shall be able to set Alerts for IDV events based on match/non-match criteria.
IDV shall only support US driver license and shall require Users to specify the US state (one state only per Vaidio server) to install the correct Driver License profile.

F. People Counting (PC) and Vehicle Counting (VC)

PC and VC shall count only People and Vehicles, respectively.
PC and VC shall allow Users to define multiple counting lines per stream.
The supported types of vehicles are: Cars, Bus, Trucks, Motorcycle, and Bicycle.
The Counting accuracy shall be at least 90% when the objects are more than 90 pixels.
PC and VC shall have a dashboard to present the counting results in a bar chart (exportable as .PDF or .JPG format) and a table (exportable as an Excel file).
PC and VC shall have a History tab to allow Users to search for counting results based on date, time and camera.
PC and VC shall allow generation of Hourly, Daily, Weekly and Monthly counting results.
PC shall include People Abnormal Detection, which shall allow Users to detect Loitering and Wrong Direction (of a person)Users shall be able to choose between Head/Person object for PC in camera configuration.
VC shall include Vehicle Abnormal Detection, which shall allow Users to detect Illegal Parking, Wrong Direction (of a vehicle), and Abnormal Speed.
Person Fall shall not require any ROI to be set.
Person Wrong Direction and Vehicle Wrong Direction shall allow Users to define multiple sets of tripwires in each video stream.
Person Loitering and Vehicle Illegal Parking shall allow Users to define multiple ROIs in each stream.
VC shall include Illegal Parking and Loitering with a time check period threshold of 10-1,200 seconds.
VC shall include Illegal Parking and Loitering with a cooldown interval time. User shall adjust the cooldown interval time when the event occurs and receive a notification trigger based on the defined period.
Each ROI shall allow the Users to define the allowance duration before the alarm is triggered.
User shall be able to set alerts for People/Vehicle counts (Occupancy, In, Out) that exceed a certain threshold.

G. Object Counting (OC)

OC shall track and count all object types in the applied AI Model.
OC shall allow Users to define up to four sets of counting lines per channel.
The counting accuracy shall be at least 90% when the objects are more than 90 pixels.
OC shall have a dashboard to present the counting results in a bar chart (exportable as .PDF or .JPG format) and a table (exportable as an Excel file).
OC shall have a History tab to allow Users to view the counting results based on the date, time and camera.
OC shall display Hourly, Daily, Weekly and Monthly counting results.
OC shall allow comparison from one period of time to another in the history data.

H. Person Fall/ Crouch Detection (PFCD)

PFCD shall detect when a person falls or crouches. The following positions shall trigger a Person Fall/Crouch detection event): Lying down, Crouching, Squatting, Kneeling, Sitting on the floor, and any similar position on the floor.

PFCD shall allow Users to define up to four ROIs per channel.
PFCD shall have a Dashboard to present the person fall/crouch results.
PFCD shall have a History tab to allow Users to search for person fall/crouch results based on the date, time and camera.

I. License Plate Recognition (LPR)

LPR shall output the vehicle Type, Color, Make and Model information, e.g., {Type=car, Color=red, Make=BMW, Model=X5, License=ABC-1234}.
Vaidio Cam App shall be provided to work with the Vaidio platform to treat the mobile phone as a video-capturing tool and show the LPR result right on the mobile phone screen.
Vaidio Cam App shall treat a mobile phone as a video capturing tool to show license plate results on the mobile phone screen.
LPR shall function with 98% accuracy under the following conditions:

- The height of the captured plate characters would approximately fall between 30 and 35 pixels.
- The distance between the vehicle and the camera should be within 5-50 meters / 15-164 feet.
- The camera's height should be within 3-9 m / 3-29 ft.
- The camera setup vertical angle should be within 30 degrees.
- If the camera is setup at the side of the road, the horizontal angle between the license plate and the camera shall be within 15 degrees.

LPR shall allow Users to create a multiple point ROI for License Plate Detection per video stream.
LPR shall detect and recognize license plates on moving or stationary vehicles.
LPR shall support processing of single frames, recorded videos and live video streams.
LPR shall allow Users to create infinitely many lists of license plate numbers, automatically compare the detected plates against the list database and provide real-time alerts on plate matches.
LPR shall provide detailed reports, which include date, time, camera ID and GPS coordinates of the LPR plate captured.
The LPR results can be displayed on the indoor/outdoor maps.
Users shall be able to perform real-time search for a vehicle across multiple cameras based on vehicle properties including Type, Color, Make, Model, Speed, and partial license plate number.
When searching across multiple cameras, the vehicle moving route can be displayed on the map with timestamps and images.
LPR shall support three modes of operations: Parking mode, City mode and Highway mode.
All metadata about the recognized License Plate, List to which the License Plate belongs and Camera Source shall be pushed to VMS via http/https.
LPR shall allow users to set the desired width/height of the license plate.
Users shall be able to unselect uncommon vehicle types or those without a license plate to declutter results in Video Search (in System > Setting > LPR).

J. Make & Model Recognition (MMR)

MMR shall detect and distinguish vehicles of the top 109 most widely known Makes and over 2000 corresponding Models.
MMR shall have accuracy above 90% for the detected faces that are at least 120 pixels.

MMR results shall be displayed in the Detail Page in Video Search and Dashboard and History in LPR if the LPR analytics engine is activated for that camera.
Users shall be able to search for a vehicle based on the Make and/or Model in Video Search.
Users shall be able to set alerts for a vehicle with Make and/or Model criteria in combination with Color and other Object Type(s) as Video-Search-type alerts.

K. Personal Protective Equipment (PPE)

PPE shall detect and distinguish whether a person is wearing a construction Hardhat/Helmet and/or a Safety Vest.
PPE shall allow User to select the Head type in Video Search for enhanced helmet classification.
PPE results shall be displayed in the Detail Page in Video Search.
Users shall be able to search for a person based on whether he/she is wearing a construction Hardhat/Helmet and/or a Safety Vest in Video Search.
Users shall be able to set alerts for a person based on the construction Hardhat/Helmet and/or a Safety Vest criteria in combination with Color (of clothing) and other Object Type(s) as Video-Search-type alerts.

L. Object Left Behind (OLB)

OLB shall allow Users to define up to 4 OLB Regions of Interest (OLB ROIs) per camera FoV.
Users shall be able to define the object types from the Library of Objects that will trigger an alert when the object(s) has remained in the OLB ROI(s) for longer than a user-defined time threshold without human appearance.
The OLB ROIs shall be created using multiple points to form a region.
The OLB ROI time countdown shall restart immediately when a Person is detected in the ROI (but not when other Object Types are detected).
The OLB ROI shall be specified for the User to receive the real-time notification for when the event occurs.
Users shall be able to define the schedule to turn on/off the detection for individual OLB ROIs.
The triggered OLB ROIs shall appear in the Abnormal Live View Dashboard with a beeping sound.
All triggered OLB ROI alerts shall be pushable to VMS via http/https.
The http message shall be configured with keywords that are searchable in the VMS.

M. Cross Camera Tracking (CCT)

Vaidio shall support tracking a person based on their appearance across multiple cameras using a specific scene image.
Vaidio shall support mapping the exact path of a person using GPS or indoor floor plan.
Vaidio shall only allow tracking for persons based on the shape and pattern of their clothing or other wearable objects on the person (e.g., backpack). Vaidio will not support the tracking of objects other than people.
Vaidio shall show only pinned scenes in the result display.
Vaidio shall support Cross Camera Tracking across cameras connected to multiple Vaidio servers in a cluster.

N. Scene Change Detection

Vaidio shall identify and alert on changes to a continuously monitored location (e.g., fallen tree, fence break, corroding pipe, undefined object left behind, or object removed).

User shall be able to configure the parameters to detect either a gradual change over time or a sudden change.

O. Crowd Detection

Vaidio shall be able to detect the number of people in a crowded area.
User shall be able to define the crowd numbers for alert notification.
User shall be able to use Plus and Ultra detail extraction for very crowded areas where each person is very small compared to the entire field of view, e.g., the audience in a stadium.

5. Details of Vaidio Core Platform Software (CPS)

A. File Management

Vaidio CPS shall allow Users to Upload and Retrieve recorded videos/images.
CPS shall support applying analytics engines to recorded files.
CPS shall support the brands of recording devices listed in the 3rd-Party Integration Datasheet in IronYun Partner Resources Portal.
Users shall be able to apply the following Analytic Engines in this mode of operations: Object-Based Video Search, Face Recognition, LPR Recognition, MMR, PPE.
The uploaded video formats supported shall be: .avi, .mpeg, .mp4, .ogm, .ogv, .webm, .wmv, .m4v, .mov, .asx.
The uploaded image formats supported shall be: .pjp, .jpeg, .pjpeg and .jfif.

B. Camera Management

CPS shall be able to connect to ONVIF Compliant Cameras through RTSP Stream.
CPS shall be able to detect the RTSP stream URL of the ONVIF Compliant Cameras when the IP address, Port number, Username and Password of the IP cameras are provided.
CPS Camera Settings shall allow Users to define a Single Region Of Interest (ROI), where the object tagging will occur, on the Camera Image.
The ROI can be resized or moved around the Camera Image.
The Camera Setting shall allow Users to select the Object Type(s) to tag, minimum and maximum pixel Sizes of the Object(s) and Confidence score of the Object(s).
The Camera Setting shall allow Users to select the Analytic Engines to be activated for the camera.
The Camera Setting shall allow the Users to define the ROIs of each activated Analytic Engine (ID, FR, OLB, etc.) in the Camera Image.
The Camera Setting shall allow the Users to add GPS coordinates and positions in Indoor Map for each Camera.
User shall be able to select one of three levels of Detail Extraction for each camera (Standard, Plus, and Ultra), depending on the size of the object to be detected relative to the size of the field of view. Ultra shall be appropriate for when the object is very small, e.g., a spectator in a stadium in a 4k camera view.

C. Alert Management

Alert Management shall allow Users to create multiple Alerts to be triggered.
The alerts shall be pushable via email, http/https messages, mobile App notifications and alerts displayed in 3rd-party VMSs.
Alert Management shall have an Alert Dashboard to display all alerts triggered by the

activated Analytic Engines (FR, LPR, ID, etc.) in real time.
Alert Management shall have a History Dashboard to allow Users to search for past Alert notifications based on Date, Time, Camera and Alert Type.
Alert Management shall have an Alert Rule Dashboard to allow Users to define the Alert Rules.
Alert Dashboard shall have an Online Map showing the location(s) of the Cameras that trigger the alert events, if the Cameras have been configured with GPS coordinates and/or an Indoor Map.
The Online Map shall also display a thumbnail image of the detected Alert event at the configured camera location to indicate the most recent event triggered.
Alert Management shall have a Schedule to automatically turn on/off an alert based on user-defined timing.
The Alert Dashboard shall have a Filter Button to allow Users to select the alerts they would like to view.
Alert Management shall include Line & Telegram Messaging App Integration for user to receive alerts from the Vaidio Core device.

D. User Management

User Management shall allow an Admin User to create User Groups, add New User Accounts to each User Group, and assign Privileges to each User Group.
User Permissions shall allow one main Admin user and multiple Co-Admin users to manage the system, activity, and user groups.
User Management shall allow Co-Admin users to have the same system permission as the main Admin and be able to edit each user and group. The only difference shall be that the Co-Admin cannot remove or edit the Admin account.
User Management shall include Configuration Control for the Admin User to enable permissions, add cameras and alerts, and enable/disable privacy protection.
User Management shall allow the following types of Privileges to be assigned:

- Camera Control: select camera(s); View/Manage
- Video Source Control: select video source(s); View/Manage
- AI Engine Control: None/View/Manage
- Configuration Control:
    - Add Camera: Enable/Disable
    - Alert: View/Manage
    - Privacy Protection – Unblur: Enable/Disable

E. Privacy Protection

Privacy Protection, if activated, shall automatically blur all detected persons and faces in search and alert results throughout the UI, regardless of which AI engines are activated.
Privacy Protection shall allow authorized Users to unblur one certain detected face/person on demand for investigative purposes.
User shall be able to download a blurred image or an image with one person unblurred
User shall be able to set the desired data retention time (number of days to save data in Vaidio) to enhance data security.

F. Internal Video Recording

Internal Video Recording shall allow Users to record video in the Vaidio server.
Internal Video Recording shall allow Users to select indvidual camera streams to record video.
The recorded video shall be available for event playback.

The recorded video using Internal Video Recording shall be recorded in a separate drive from the metadata.
The User shall be able to set the desired data retention time (number of days to save the recorded video in Vaidio) to enhance data security.

G. False Detection Report

Video Search shall allow False Detection Reporting in Vaidio. User shall be able to send falsely detected objects to IronYun with stable internet connection.

H. Vaidio Mobile Apps

Vaidio shall support two mobile apps on Android and iOS: Vaidio App and Vaidio Cam App.
Vaidio App shall allow users to conduct video search and receive alert notifications from Vaidio Core Platform in real time.
Vaidio Cam App shall allow a mobile phone as a video capturing tool to send the video to Vaidio Core Platform in real time for analytic processing.
Vaidio Cam App shall support Face Recognition and LPR.
Vaidio Cam App shall receive and display the Face Recognition and/or LPR results from Vaidio on the mobile phone screen in real time.

I. Vaidio Command Center

Vaidio Command Center is a central management platform for user to manage information from multiple sources.
Vaidio Command Center shall provide central management via a federation architecture for large deployment across multiple locations.
Vaidio Command Center 7.0.0 shall provide:

- Central Alert Monitoring
- Central Event Search
- Central Object Search
- Central Node Management (with license information of each node)
- Central Camera Management
- Central Storage Management

Vaidio remote Nodes will not be connected to Command Center through the main node. Vaidio nodes must be added separately.
Command Center 7.0.0 shall support up to 32 nodes; each node can be a Vaidio Core or Vaidio Edge device.
Vaidio Node Status Types:

- Accepted
- Rejected
- Canceled
- Waiting

6. Data Security

A. Network Architecture

For on-premise deployment: Vaidio shall connect to the cameras and NVRs in the LAN and operate within the network security of the LAN.
For cloud deployment: Vaidio shall operate within the network security of the cloud instance

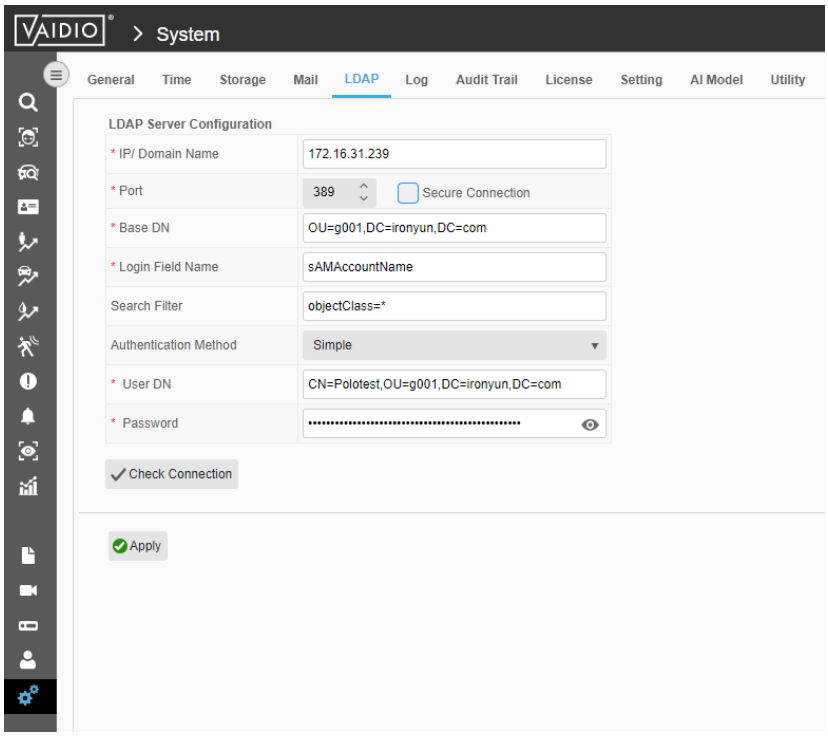
(AWS)
To transmit sensitive information over a TCP/IP network from user workstations to the server, Vaidio shall utilize the HTTPS protocol, which uses Secure Socket Layer (SSL) to encrypt data that is transferred between client and server. SSL uses the RSA algorithm https://en.wikipedia.org/wiki/RSA_(cryptosystem), which is an asymmetric encryption technology. Vaidio shall use 256-bit AES encryption over networks and from servers to browsers.
For installable packages, Vaidio shall be tested with basic tests and additional test scenarios defined by regression test cases. The test procedure shall include validation of each software build to ensure that there are no major issues and the build is stable.
Vaidio user interface (UI) is a browser-based interface, where the user logs into the Vaidio server(s) via Google Chrome using the IP address of the Vaidio server(s). The UI shall allow the user to access all analytics and management (user, camera, NVRs, files, other Vaidio servers in the system, system) functions.
Vaidio Mobile APP is an APP on Android and iOS to access Vaidio servers in the same network using their IP address and user account(s). Using the APP, the user can receive alert notifications and perform searches for detected objects and events in the connected Vaidio servers.
Communication protocols used by the system: Vaidio shall utilize all standard TCP/IP networking protocols in Linux.

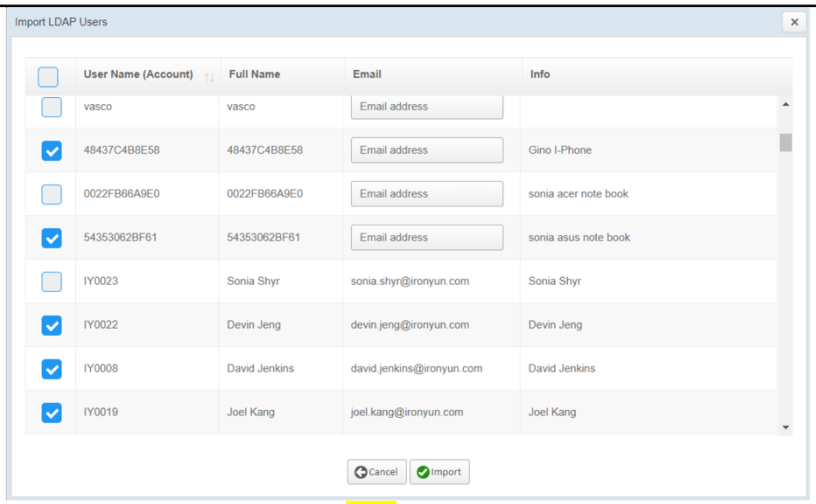
B. Database Security

Vaidio shall utilize the following data encryption types: per column encryption for sensitive data; disk encryption to prevent unencrypted data from being read from the drives if the drives or the entire computer is stolen.
Password shall be encrypted before saving to database.
Data exchange: Vaidio shall support many methods for data exchange, including email, HTTP/HTTPS, and RESTful API.
Vaidio shall support any browser with HTTP/HTTPS.
The administrator of Vaidio shall be able to set up the metadata archive and removal interval (e.g., 30 days) in System Settings.
Disk encryption at-rest to protect sensitive data in storage shall rely on hardware disk encryption protocols instead of being executed in the software.

C. System Security

User authentication: Vaidio admin user shall be encouraged to change the admin user password from the default after the first login.
Admin user shall be able create as many user accounts with unique passwords and access permissions to the Vaidio features as necessary.
User IDs shall be manually created in Vaidio by the admin user or imported via LDAP.





Import LDAP Users Window

Item	Description
User Name (Account)	Username or account name imported from the LDAP server
Full Name	Full name imported from the LDAP server
Email	Email address imported from the LDAP server. Some LDAP servers may have a different contact bridge, which is not in an email format; then, Email is left empty. The administrator can manually enter the email address for this LDAP user.
Info	Information or description imported from the LDAP server

Vaidio shall provide data input validation and error messages in the UI.
User access shall be customized to allow read-only access, update access, or no-access to specific types of records, record attributes, components, or functions.
Security roles shall be fully customizable
The following log types shall be available in Vaidio:
System log: analyze specific trends or record the data-based events/actions of the Vaidio system environment network. Three log types: INFO, WARN, ERROR.
Diagnostic log: encrypted log of hardware errors, processing consumption, analytic/alert/connection errors, failed login attempt from the IP address of the computer trying to access Vaidio.
Audit trail: successful user login/logout, time and user actions in the entire Vaidio system (such as camera activation/modification).

D. Disaster Recovery

User shall be able to archive the Vaidio file system setup and configuration files offline. Vaidio software system shall be docker-container-enabled, which shall permit the rapid reinstallation of the system software for recovery.
IronYun shall recommend good IT data retention and metadata backup policies, including weekly incremental backup policies and monthly full backup of all administrative, system, setup, configuration and metadata.